Huxley Envelope Industrial Site

KINGS COUNTY, NEW YORK

Site Management Plan

NYSDEC Site Number: C224147

Prepared for:

MP 145 WS Lessee LLC, 10 Huron FS Condo LLC,
19 India Fee Owner LLC, MP 145 WS Lessee LLC,
MP 145 WS Owner LLC
$^{c}/_{o}$ Mack Real Estate Group,
& 145 West Street, LLC
60 Columbus Circle, 20th Floor
New York, NY 10023

Prepared by:

AKRF Engineering, P.C.
440 Park Avenue South, 7th Floor
New York, NY 10016
(646) 388-9500

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CERTIFICATION

I, Michelle Lapin, certify that I am currently a NYS registered professional engineer as defined in 6 NYCRR Part 375 and that this Site Management Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



NYS Professional Engineer # 073934-1

12-16-16
Date

Signature

SITE MANAGEMENT PLAN

1.0 INTRODUCTION AND DESCRIPTION OF REMEDIAL PROGRAM

1.1 Introduction

This document is required as an element of the remedial program at the Huxley Envelope Industrial Site (hereinafter referred to as the "Site") under the New York State (NYS) Brownfield Cleanup Program (BCP) administered by New York State Department of Environmental Conservation (NYSDEC). The Site was remediated in accordance with Brownfield Cleanup Agreement (BCA) Index No. C224147-05-11, Site No. C224147, which was executed on June 6, 2011.

1.1.1 General

145 West Street, LLC, the original Volunteer, entered into a BCA with the NYSDEC in June 2011 to investigate and remediate the 2.65-acre Site. The BCA was amended on October 21, 2014 to add an additional Volunteer, MP 145 WS Owner LLC. The BCA was amended a second time on March 24, 2016 to add two additional Volunteers, 10 Huron FS Condo LLC and 19 India Fee Owner LLC. The BCA was amended a third time on May 17, 2016 to change the tax block and lot numbers to Block 2530, Lots 1, 7, and 8, and to slightly reduce the size of the Site to 2.65 acres due to the new bulkhead, which was constructed east of the previous bulkhead line. The BCA was amended a fourth time on October 14, 2016 to add MP 145 WS Lessee LLC, the entity that will be the ground lessee of the affordable housing building, as an additional Volunteer. A fifth BCA amendment was issued to NYSDEC on November 3, 2016 to record the Site addresses as 23 India Street (Lot 1), 21 India Street (Lot 7), and 143 India Street (Lot 8). The Site is located in the Borough of Brooklyn in New York and is now identified as Block 2530, Lots 1, 7, and Lot 8 on the New York City Tax Map.

The BCA required the Remedial Parties to investigate and remediate contaminated media at the Site. The Site location, boundaries, and a Site plan with an alphanumeric grid are provided as Figures 1 and 2. The boundaries of the Site are more fully described in the metes and bounds Site description that is part of the Environmental Easements, provided as Appendix A.

After completion of the remedial work described in the NYSDEC-approved Remedial Action Work Plan (RAWP), the March 2014 Decision Document, March 2015 NYSDEC-approved Minor Change to the Decision Document, and September 2016 Final Engineering Report (FER), some contamination was left in the subsurface at this Site, which is hereafter referred to as "remaining contamination." Following completion of remedial work and subsequent approval of the FER, NYSDEC issued a Certificate of Completion (COC), which confirmed completion of remediation and requires specific compliance measures to maintain the COC.

This Site Management Plan (SMP) was prepared by AKRF Engineering, P.C. (AKRF) to manage remaining contamination at the Site until the Environmental Easements are extinguished in accordance with Environmental Conservation Law (ECL) Article 71, Title 36 and to address the means for implementing the Engineering Controls (ECs) and Institutional Controls (ICs) that are required by

the Environmental Easements for the Site. This SMP was prepared in accordance with the requirements in NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May, 2010, and the guidelines provided by NYSDEC. All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State.

1.1.2 Purpose

The Site contains remaining contamination on certain identified portions of the Site after completion of the remedial action. ECs have been incorporated into portions of the Site remedy to control exposure to remaining contamination during the use of the Site to ensure protection of public health and the environment. Environmental Easements granted to the NYSDEC, and recorded with the Kings County Clerk, will require compliance with this SMP and all ECs and ICs placed on the Site. The ICs place restrictions on Site use and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easements for remaining contamination at the Site. This SMP has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easements and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

This SMP provides a detailed description of all procedures required to manage remaining contamination at the Site after completion of the Remedial Action, including: (1) implementation and management of all Engineering and Institutional Controls; (2) media monitoring; (3) operation and maintenance of all treatment, collection, containment, or recovery systems; (4) performance of periodic inspections, certification of results, and submittal of Periodic Review Reports (PRRs); and (5) defining criteria for termination of treatment system operations.

To address these needs, this SMP includes three plans: (1) an Engineering and Institutional Control Plan for implementation and management of ECs/ICs; (2) a Monitoring Plan for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the Site; and (3) an Operation and Maintenance Plan for implementation of the remedial system.

This plan also includes a description of PRRs for the periodic submittal of data, information, recommendations, and certifications to NYSDEC.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easements. Failure to properly implement the SMP is a violation of the Environmental Easements, which is grounds for revocation of the COC; and
- Failure to comply with this SMP is also a violation of ECL, Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (6NYCRR) Part 375 and the BCA for the Site, (Index No. C224147-05-11, Site No. C224147), including the October 21, 2014, March 24, 2016, May 17, 2016, October 14, 2016, and a forthcoming BCA amendment to record

the Site addresses as 23 India Street (Lot 1), 21 India Street (Lot 7), and 143 India Street (Lot 8).

1.1.3 Revisions

Revisions to this SMP will be proposed in writing to the NYSDEC's project manager. In accordance with the Environmental Easements for the Site, the NYSDEC will provide a notice of any approved changes to the SMP, and append these notices to the SMP that is retained in its files.

1.2 Site Background

1.2.1 Site Location and Description

The Site is located in the Borough of Brooklyn, County of Kings, New York and is identified as Block 2530, Lots 1, 7, and Lot 8 on the New York City Tax assessor's maps. The Site is an approximately 2.65-acre area bounded by Huron Street to the north, West Street to the east, India Street to the south, and the East River to the west, as shown on Figure 1. A Site plan with the alphanumeric grid used throughout the remedial activities and the locations of the buildings constructed after the completion of remediation is shown on Figure 2. The boundaries of the Site are described in their entirety in Appendix A – Metes and Bounds and Environmental Easements.

1.2.2 Site History

A full Site history, including historical Sanborn maps and a summary of previous investigations, was provided in the BCP application, and prior Phase I ESAs prepared by Langan Engineering & Environmental Services, P.C. (Langan) in July 2011, and by AKRF in April 2016.

The Site formerly comprised Tax Block 2530, Lots 1, 55, and 56; however, the New York City Department of Finance issued a tax lot apportionment in March 2016 which redefined the lot boundaries and numbers as Lots 1, 7, and 8. The size of the Site was also slightly reduced from 2.8 acres as described in the BCA to 2.65 acres following the construction of the new bulkhead, which was constructed east of the prior bulkhead line. Historic documents indicate that former Lot 1, which occupied a majority of the Site, was initially developed as a lumber yard and shipyard, with various carpenter and woodworking facilities as early as 1887 through approximately 1965. In approximately 1970, this portion of the Site consisted of a warehouse building for Huxley Envelope Corporation and later as an ornament factory until approximately 2006.

Former Lots 55 and 56, located in the northeastern corner of the Site, were developed historically with residential stores, and partial lumber storage between approximately 1905 and 1942. Lot 55 was most recently utilized by a seafood distribution facility until approximately 2011. Lot 56 was utilized as an office, apartment, and garage. By 2015, all former Site buildings and associated features were demolished in preparation for the remediation and redevelopment of the Site.

1.2.3 Geologic Conditions

The surface topography slopes slightly west toward the East River. Based on the U.S. Geological Survey Brooklyn Quadrangle map, the Site is approximately 10 feet above the National Geodetic Vertical Datum of 1929, an approximation of

mean sea level. U.S. Geological survey studies show bedrock at an elevation of approximately -100 feet (approximately 110 feet below grade). A previous geotechnical study conducted by Langan in 2005 reported that bedrock at the Site is located between 70 and 100 feet below grade.

Based on previous subsurface investigations, the Site is underlain by fill material, consisting of concrete, brick, asphalt, coarse sand, and gravel to depths of approximately 5 to 8 feet below grade. The overburden material beneath the fill was documented as generally grey-brown fine sand with varying amounts of clay, silt, and gravel. A geologic section is shown on Figure 3.

Groundwater was encountered during previous studies at approximately 3 to 5 feet beneath the western portion of the Site, and between approximately 10 to 12 feet beneath the central and eastern portions of the Site. It is anticipated that groundwater generally flows in a westerly direction toward the East River, west-adjacent to the Site. Actual groundwater levels and/or flow direction may vary due to tidal and seasonal fluctuations in groundwater levels, precipitation, and geology. Due to the relatively shallow groundwater table in relation to the new foundation, all Site building foundations are either permanently under the water table (i.e., the Track 2 remediation area developed as Building B, and the Track 1 remediation area developed as Building C), or within a maximum of 6 feet vertically of the water table depending on tidal influence (i.e., the Track 4 remediation area developed as the Park/Building A).

1.3 Summary of Remedial Investigations and Findings

Remedial Investigations (RIs) were performed to characterize the nature and extent of contamination at the Site. The results of the RIs are described in detail in the following reports:

Remedial Investigation Report – Huxley Envelope Site, 145 West Street, Greenpoint, New York, Galli Engineering, P.C., dated June 2013

The initial RI conducted by Galli Engineering, P.C. (Galli) was performed in June 2012 in accordance with the NYSDEC-approved Remedial Investigation Work Plan (RIWP) dated January 2012. Work conducted under this RI consisted of:

- A geophysical survey;
- Advancement of 47 soil borings on 55-foot grid centers, and collection of 47 composite soil samples and one grab sample per boring;
- Collection of 16 endpoint grab samples collected from the clay layer beneath historic fill, between depths of 20 and 30 feet below grade;
- Installation and sampling of 4 on-site 20-foot deep groundwater monitoring wells; and
- Installation of 2 test pits to approximately 11 feet to obtain a greater understanding of subsurface conditions.

In total, 47 soil borings were advanced between depths of 10 and 30 feet below grade inside and outside of the former Site building. Soil samples were analyzed for volatile organic compounds (VOCs) by Environmental Protection Agency (EPA) Method 8260C, semivolatile organic compounds (SVOCs) by EPA Method 8270D, and Target Analyte List (TAL) metals by EPA Method 6010C. Select samples were also analyzed for

pesticides by EPA Test Method 8081, polychlorinated biphenyls (PCBs) by EPA Test Method 8082, and herbicides by EPA Method 8151A.

The 2012 RI identified the following soil contamination based on concentrations exceeding their respective Standards, Criteria, and Guidance (SCGs):

Soil

- The VOCs 1,1-dichloroethane, 1,1-dichloroethene, 1,2-dichloroethane, acetone, benzene, cis-1,2-dichloroethene, methyl ethyl ketone, methylene chloride, trans-1,2-Dichloroethene, and vinyl chloride, were detected above their respective UUSCOs in 25 of the 47 soil samples. No VOC concentrations exceeded their respective RRSCOs.
- The SVOCs 2-methylphenol, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and phenol were detected above their respective UUSCOs in 15 of the 47 soil samples. Of the 15 samples with UUSCO exceedances, SVOC concentrations in 14 samples exceeded their respective RRSCOs.
- The metals arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc were detected above their respective UUSCOs in 37 soil samples. Of the 37 samples with UUSCO exceedances, metals concentrations in 19 samples exceeded their respective RRSCOs.
- The metals arsenic, copper, lead, mercury, nickel, and zinc were detected above their respective UUSCOs in two endpoint soil samples collected at 20 and 25 feet below grade in the northwestern portion of the Site. One of the two samples with UUSCO exceedances also contained arsenic and mercury concentrations exceeding their respective RRSCOs.

Groundwater

- The VOC MTBE was detected in one groundwater sample at a concentration of 1.6 micrograms per liter (µg/L), below the AWQS of 10 µg/L. No other VOC detections were identified.
- No SVOCs were detected in the groundwater samples.
- The metals aluminum, iron, lead, magnesium, manganese, and sodium were detected in the groundwater samples at concentrations above their respective AWQS. A lead detection of 0.278 milligrams per liter (mg/L) was identified in monitoring well MW-103.

Progress Report – March and April 2015–145 West Street, Brooklyn, New York, AKRF Engineering, P.C., dated May 2015

AKRF performed a supplemental RI and waste characterization in September 2014 and February 2015 at the Site to supplement the previous subsurface investigation. Work under this RI consisted of:

- A geophysical survey;
- Advancement of 32 soil borings at approximate 50-foot centers in the proposed Building A and Park footprint, for the collection of 54 grab samples at 2, 4, 5, 10, and 15 feet below grade. Additional samples were collected from 8 borings at 20 and 25 feet below grade, to assess deeper soil conditions;

- Advancement of 20 soil borings on 50- and 100-foot centers in the proposed Buildings B and C footprints, for the collection of 47 grab samples at 2, 4, 10, and 15 feet below grade. Additional samples were collected from 3 borings between 25 and 30 feet below grade to assess deeper soil conditions;
- Advancement of 6 additional soil borings within the proposed Buildings A, B, and C footprints based on field observations for petroleum delineation sampling, which consisted of six grab endpoint samples from depth intervals beneath the observed soil contamination;
- Advancement of 5 soil borings around a known 20,000-gallon No. 2 fuel oil underground storage tank (UST) to delineate the extent of petroleum contamination in the vicinity of the tank, and the collection of 13 grab samples at 10 and 15 feet below grade, and below the contaminated interval (if it was observed); and
- Advancement and sampling of groundwater from one permanent groundwater monitoring well.

In total, 52 Site delineation soil borings were advanced between depths of 15 and 30 feet below grade inside and outside of the former Site building. Site delineation samples were analyzed for semivolatile organic compounds base neutral extractables (SVOC – BN) by EPA Method 8270D and TAL metals by EPA Method 6010C.

In addition, 11 petroleum delineation soil borings were advanced to assess the extent of petroleum "hotspots" inside the former buildings and in all cardinal directions relative to the known 20,000-gallon UST in the southeastern portion of the Site to determine the extent of petroleum contamination. Petroleum delineation samples were advanced to depths ranging from 18 to 25 feet below grade. Petroleum delineation soil samples were analyzed for VOCs by EPA Method 8260C and SVOC - BN by EPA Method 8270D.

One two-inch diameter groundwater monitoring well was installed south-adjacent to the known 20,000-gallon No. 2 fuel oil UST to a total depth of approximately 17 feet below grade. One groundwater sample was collected and analyzed for VOCs by EPA Method 8260C and SVOC - BN by EPA Method 8270D.

Soil analytical data were compared to 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (UUSCOs) and 6 NYCRR Part 375 Restricted Residential SCOs (RRSCOs). Groundwater analytical data were compared to the NYSDEC Class GA (Drinking Water) Ambient Water Quality Standards (AWQS).

The 2014-2015 supplemental RIs identified the following soil contamination based on concentrations exceeding their respective Standards, Criteria, and Guidance (SCGs):

Soil

- The SVOCs acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, indeno(1,2,3-cd)pyrene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene were detected above the respective UUSCOs in 66 Site delineation soil samples. Of the 66 samples with UUSCO exceedances, 63 sample concentrations exceeded their respective RRSCOs.
- The metals arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, and zinc were detected above the UUSCOs in 123 Site delineation soil samples. Of the 123 samples with UUSCO exceedances, 60 samples exhibited exceedances above the RRSCOs.

- The VOC ethylbenzene was detected in 3 of the petroleum delineation samples above the UUSCO of 1,000 micrograms per kilogram (µg/kg) or parts per billion (ppb). Elevated concentrations ranged from 1,700 to 4,500 ppb.
- The VOC benzene was detected in 2 of the petroleum delineation samples at concentrations of 91 and 250 ppb, above the UUSCO of 60 ppb.

Groundwater

- The VOCs benzene, ethylbenzene, and isopropylbenzene were detected above the Class GA AWQS in the groundwater sample collected from monitoring well MW-P4D.
- The SVOCs naphthalene and phenanthrene were detected in monitoring well MW-P4D above the Class GA AWQS.

The following pre-remediation soil and groundwater conditions were established following the completion of the 2014-2015 RIs.

1.3.1 Soil Contamination Summary

Exceedances of UUSCOs and RRSCOs in soil samples collected during the 2014 through 2015 RIs are included on Figures 2a through 2h and Tables 1a through 1c in the FER.

Soil samples with concentrations exceeding UUSCOs were detected across the Site up to depths of 30 feet below grade. Primary contaminants identified in the subsurface soil and fill included the metals arsenic, copper, lead, zinc, mercury and barium, and polycyclic aromatic hydrocarbons (PAHs), which were detected generally at concentrations typically found in urban fill.

VOC exceedances of the UUSCOs were primarily petroleum-related and were detected within the vicinity of the 20,000-gallon UST, and in grid cells R2 and W3, up to depths of 25 feet below grade. VOC contamination identified in petroleum delineation samples resulted in the designation of these petroleum-contaminated "hotspots".

Elevated lead and mercury concentrations were identified at a maximum depth of approximately 5 feet below grade in four samples resulting in the identification of four lead and mercury hotspots in grid cells X2, X3, X4, and Y2.

1.3.2 Site-Related Groundwater Summary

During the 2012 RI, four groundwater samples were collected from monitoring wells installed under the supervision of Galli. The RI report indicated that no VOCs or SVOCs were detected at concentrations above their respective AWQS. The metals aluminum, iron, lead, magnesium, manganese, and sodium were detected in the groundwater samples at concentrations above their respective AWQS. Elevated concentrations ranged from 0.278 to 7,740 milligrams per liter (mg/L).

Exceedances of NYSDEC Class GA AWQS in the groundwater sample collected during the 2014 through 2015 RIs are included on Figure 2i and Tables 1d and 1e in the FER.

Exceedances of VOCs and SVOCs were detected in monitoring well MW-P4D, located south-adjacent to the known 20,000-gallon No. 2 fuel oil UST. The petroleum-related VOCs benzene, ethylbenzene and isopropylbenzene were

detected at concentrations of 13 micrograms per liter (µg/L), 33 µg/L, and 18 µg/L, respectively, above the respective applicable AWQS.

The predominant contaminants identified in these groundwater sampling events are metals and petroleum hydrocarbons (PHCs). Though PHC-related vapor intrusion is not discussed in the NYSDOH Guidance document, it is considered in the Interstate Technology and Regulatory Council (ITRC) Vapor Intrusion Guidance and the EPA "Technical Guide For Addressing Petroleum Vapor Intrusion At Leaking Underground Storage Tank Sites", dated June 2015.

The EPA document provides the vertical zone of influence for a building overlying a plume of PHC. For a dissolved PHC plume, the vertical zone of influence is specified as 6 feet from the seasonal high water table to the bottom of the building slab (first floor for slab-on-grade construction or a basement slab). This 6-foot vertical zone of influence, as referred to in the EPA document, takes into consideration the natural biodegradation of PHCs.

As the Site groundwater depth varies from 5 to 12 feet below grade and Site building foundations range from 0 to 17.5 feet below grade, all Site building slabs are either under the groundwater table (i.e., the Track 2 remediation area developed as Building B, and the Track 1 remediation area developed as Building C), or well within the 6 feet vertically of the water table zone of influence depending on tidal influence (i.e., the Track 4 remediation area developed as the Park/Building A). Therefore, mitigation in the form of a vapor barriers and ventilation systems was warranted.

1.3.3 Underground and Aboveground Storage Tanks

The Site was registered with one closed-in-place, 20,000-gallon No. 2 fuel oil UST and one unregulated 10,000-gallon No. 2 fuel oil aboveground storage tank (AST). Both tanks were identified under PBS No. 2-054739 with Huxley Envelope Corporation listed as the facility name. The 20,000-gallon closed-in-place UST, located within the West Street sidewalk in the southeastern portion of the Site, was cleaned and filled with sand circa November 1994, according to previous Phase I ESAs. A Phase I ESA prepared by Langan in 2011 reported that interviews with the property manager at that time indicated that the 10,000-gallon AST had been removed. No further documentation of a tank removal or abandonment was provided to AKRF.

During RAWP implementation, the 20,000-gallon UST, three approximately 550-gallon USTs, and one approximately 50-gallon UST were encountered.

Details regarding removal of tanks encountered on-site during the Site remediation activities are provided in Section 1.4.2 of this SMP and in Section 4.3.1 of the FER.

1.4 Summary of Remedial Actions

The Site was remediated in accordance with the NYSDEC-approved July 2013 RAWP prepared by Galli, the March 2014 Decision Document, and the Minor Change to the Decision Document dated March 2015.

The following is a summary of the Remedial Actions performed at the Site, as specified in the RAWP and extrapolated upon in the Minor Change to the Decision Document:

1. Permanent sheeting, shoring, and underpinning required to stabilize the Site for the large scale remediation effort requiring excavation;

2. Excavation of soil/fill in Building C to a depth of 17 feet below grade (and to 20 feet below grade for two petroleum hotspots in grids R2 and P4) and comparison of endpoint samples to the Part 375 UUSCOs listed in Table 1a to achieve a Track 1 remedy;
3. Excavation of soil/fill in Building B to a depth of approximately 16 feet below grade and comparison of documentation endpoint samples to the Part 375 RRSCOs listed in Table 1b to achieve a Track 2 remedy;
4. Excavation of soil/fill in Building A and the Park to a minimum depth of two feet below grade (and to 5 feet below grade for three lead and mercury hotspots in grids X2, X3, X4, and Y2, and between 10 and 12 feet below grade for one petroleum hotspot in grid W3) and comparison of endpoint samples to RRSCOs and Site-specific action levels (SSALs) listed in Table 1c, to achieve a Track 4 remedy;
5. Dewatering during excavation below the water table in Buildings B and C, and treatment prior to discharging;
6. Removal of the former 20,000-gallon UST and all associated piping in the southeastern portion of the Site;
7. Removal of four additional fuel oil storage tanks encountered during soil excavation;
8. Installation of a vapor barrier/waterproofing (also acting as a demarcation layer) in the Site buildings in accordance with the RAWP and to address potential vapor intrusion concerns as caused by potential future groundwater contamination within the zone of influence;
9. Installation of a demarcation layer and sub-slab venting system in portions of the Site that do not meet Track 2 cleanup standards (Building A) in accordance with the RAWP;
10. Installation of a dedicated demarcation layer and a minimum of two feet of approved cap material (including on-site reuse material, concrete, and/or approved virgin stone) in the Park;
11. Construction and maintenance of a Site-wide remedial cover system to prevent human exposure to remaining contaminated soil/fill remaining at the Site consisting of the demarcation layer and a minimum of two feet of approved cap material (including on-site reuse material, or virgin stone) in the Park, the demarcation layer, sub-slab venting system, vapor barrier, and concrete building foundations in Building A, and concrete building foundations and vapor barrier/waterproofing in Buildings B and C to address potential vapor intrusion concerns related to potential future groundwater contamination in the zone of influence;
12. Execution and recording of an Environmental Easements to restrict land use in the Track 2 and Track 4 areas to prevent future exposure to any contamination remaining at the Site or potential future contamination;
13. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easements, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting; and
14. Periodic certification of the institutional and engineering controls listed above.

Remedial activities were completed at the Site in August 2016.

1.4.1 Removal of Contaminated Materials from the Site

Between May 6, 2015 and March 24, 2016, approximately 63,000 tons of soil and fill material characterized for disposal were excavated and disposed of off-site at 7 dedicated disposal facilities. Excavation consisted of removal of soil and fill material, and other subsurface debris consisting of wood, asphalt, concrete, and brick, to depths ranging from approximately 2 feet to 20 feet below grade. A list of the SCOs for comparison of soil removed during remedial excavation and applicable land use for this Site is provided in Tables 1a through 1c. Water generated from dewatering operations was treated and discharged to the New York City sewer system. A summary of waste streams, final disposal facilities, quantities and disposal dates is provided in Table T1:

Table T1 – Remedial Excavation Waste Disposal Summary

Waste Stream	Disposal Facility(ies)	Quantity Disposed	Disposal Dates*
Non-Hazardous Soil	Clean Earth of Carteret Clean Earth of Philadelphia Pure Soil-Perth Amboy, NJ P. Park NJ, LLC River Terminal Development	56,924 tons	5/6/15 – 3/24/16
Hazardous Soil	Clean Earth of North Jersey Clean Earth of Canada	6,928.67 tons	5/15/15 – 12/8/15
Non-Soil Fill Material and Demolition Debris (wood, asphalt, concrete, brick)	Pebble Lane, NJ Evergreen Recycling, NJ Queens County Carting, NY	15,680 tons	5/5/15 – 3/11/16
Scrap Metal	Cousins Metal Industries, NY DBA Standard Scrap Iron & Metal, NY	3 tons	6/3/15 – 2/26/16
Oily water from USTs	Clean Water, NY	800 gallons	5/28/15

Note: *Disposal dates are the dates the material left the Site.

In the Building A and Park Track 4 footprint, approximately 9,000 tons of soil were excavated to a depth of approximately 2 feet below grade, with the exception of the mercury and lead hotspot grid cells X2, X3, X4, and Y2, which were excavated to 5 feet below grade, and the petroleum hotspot grid cell W3, which was excavated between 10 and 12 feet below grade. Soil was transported off-site to Clean Earth of Philadelphia, P. Park NJ LLC, and Clean Earth of Carteret.

In the Building B Track 2 footprint, approximately 18,000 tons of soil were excavated to a depth of 16 feet below grade. Soil was transported off-site to Clean Earth of Carteret, Pure Soil at Perth Amboy, P. Park NJ LLC, and Clean Earth of Philadelphia. Two shallow soil hotspots with lead levels greater than the toxicity characteristic leaching procedure (TCLP) threshold of 5 mg/L were excavated to approximately 11 feet below grade and transported to Clean Earth of New Jersey. Two deep soil hotspots, with hazardous TCLP lead levels and underlying hazardous constituents (UHCs) for polycyclic aromatic hydrocarbons (PAHs), were excavated from approximately 9 to 16 feet below grade and transported to Clean Earth of Canada. A total of 6,829.95 tons of soil classified as hazardous waste (for lead) were excavated and disposed of off-site at Clean Earth of North Jersey, and a total of 98.72 tons of soil classified as hazardous waste (for lead with PAH UHCs) were excavated and disposed of off-site at Clean Earth of Canada.

In the Building C Track 1 footprint, approximately 29,000 tons of soil were excavated to a depth of 17 feet below grade, with the exception of petroleum hotspot grid cells R2 and P4, which were excavated to 20 feet below grade. Soil was transported off-site to Clean Earth of Carteret, Pure Soil at Perth Amboy, P. Park NJ LLC, Clean Earth of Philadelphia, and River Terminal Development at South Kearney, New Jersey. Additionally, approximately 8,000 tons of soil from Buildings B and C approved for on-site reuse, were either used as on-site backfill in Building A and the Park or stockpiled and covered with plastic sheeting in Building A and the Park. Erosion is being well maintained by hay bales around the perimeter of the stockpile. Inspections of the stockpile will be conducted in accordance with the SMP during the annual site-wide inspection. Analytical results of on-site reuse soil are summarized in Tables 2a through 2d.

A figure indicating areas of remedial excavation is provided as Figure 4.

1.4.2 Tank Closure

The on-site tanks encountered during the construction activities in 2015 included one registered 20,000-gallon No. 2 fuel oil UST, two approximately 550-gallon USTs, one approximately 1,080-gallon UST, and one approximately 50-gallon UST. Details regarding the removal and closure of the tanks are summarized below. Approximate tank locations are indicated on Figure 4.

20,000-Gallon UST

A 20,000-gallon No. 2 fuel oil UST located in the southeastern corner of the Site was previously identified in historic Site reports, including the November 1994 Tank Closure Report, prepared by *State Environmental Services* (SES). The tank was described as closed-in-place (cleaned and filled with sand) by SES and no evidence of contamination was noted during the 1994 closure activities. The 20,000-gallon tank was encountered in July 2015 during the installation of the support of excavation (SOE) for soil removal in grid P4 by Urban, the remediation contractor. During excavation, the top surface of the tank was revealed to be cut open and the tank filled with sand, confirming the information in historic reports. No signs of contamination were observed from the soil surrounding the tank during the tank excavation or later during remedial excavation to 20 feet below grade in the vicinity of the tank.

The tank contents were excavated, stockpiled on plastic sheeting, and field-

screened for visual and olfactory signs of contamination. Trace PID readings ranging from 2 to 3 parts per million (ppm) were detected from the sand excavated from the UST; however, no further visual or olfactory signs of contamination were noted. The sand excavated from the tank was deemed to be consistent with soil within the grid cell where the tank was located and was, therefore, used to backfill the excavation following tank removal. The tank was transported off-site for disposal as scrap metal by Cousins Metal Industries, Inc. on July 17, 2015. Soil from grid cell P4, adjacent to the UST, and tank contents were excavated and disposed of off-site between July 2015 and March 2016 as part of remedial/foundation excavation activities. Following completion of remedial excavation and collection of soil endpoint samples within the vicinity of the former 20,000-gallon UST, NYSDEC issued a spill closure letter, dated June 8, 2016, closing Spill Case # 1202875, following the removal of the closed-in-place UST and confirmation that no on-site impacts to soil or groundwater were identified during remedial activities.

UST and spill closure documentation, including waste disposal manifests, is provided in the FER as Appendix J.

550- and 1,080-Gallon USTs

Two approximately 550-gallon USTs (one empty and one containing liquid) and one approximately 1,080-gallon UST containing liquid were encountered during the excavation of soil/fill material from the eastern portion of the Site (grid cells R2 and R3), between May 22 and 27, 2015. In each instance, the tanks were identified at approximately 6 feet below grade and were observed with no exterior breaches, no stained soil during the initial excavation, and no other visual or olfactory signs of releases. Liquid tank contents were identified in two of the tanks and fingerprint samples were collected and submitted under chain-of-custody protocol to TestAmerica Laboratories, Inc. (TestAmerica) of Edison, New Jersey. The fingerprint analysis indicated that the 1,080-gallon tank contained a petroleum product that closely resembled degraded gasoline and that one 550-gallon tank contained a petroleum product that closely resembled degraded diesel fuel or No. 2 fuel oil. The analytical data for the fingerprint analyses is provided in the FER as Appendix J.

On May 28, 2015, ABC Tank Repair & Lining, Inc./Metropolitan Heat & Power Company Inc. (ABC Tank/Metropolitan) of Brooklyn, New York conducted on-site pumping, cleaning, and removal of the tanks and transported all tank contents and scrap metal off-site for disposal. Tank contents were transported to Clean Water of New York, Staten Island, New York and scrap metal was transported to S&A Scrap Iron & Metal. Following the removal of the USTs, no visual or olfactory signs of contamination were noted on soil adjacent to the tanks. Soil in grid cells R2 and R3 in the vicinity of the USTs was excavated and disposed of between May 2015 and February 2016 as part of remedial/excavation activities. No post-excavation/tank soil endpoint samples were collected, as there were no field observations of contamination and the soil in this portion of the Site was already characterized and designated for disposal. Remedial excavation soil endpoint samples were collected in grid cells R2 and R3 in December 2015. Endpoint sample results are included in the FER in Tables 4a through 4c.

50-Gallon UST

An approximately 50-gallon UST was encountered during SOE construction

outside of the northern boundary of grid cell P1 on July 17, 2015. The tank was, however, observed to be cut open and empty. The area around the tank was excavated, and the tank was then placed on plastic sheeting for further inspection. Field screening identified PID readings up to 4 ppm, but no further evidence of petroleum contents within the tank (such as visible product or odors). The tank was transported off-site for disposal as scrap metal on July 21, 2015 by ABC Tank/Metropolitan. Soil surrounding the tank, which was excavated as part of the tank removal, did not exhibit any elevated PID readings or visual or olfactory signs of contamination. As such, the soil was used to temporarily backfill the excavation following tank removal. Soil from grid cell P1 in the vicinity of the UST was excavated and disposed of between July 2015 and March 2016, as part of remedial/excavation activities.

As part of the BCP remediation work, NYSDEC was notified of tank removal activities as they occurred. NYSDEC confirmed that the tank removal work did not result in substantive findings and has not requested any immediate action, given the nature of the Site remediation efforts. Based on a review of the online NYSDEC Petroleum Bulk Storage (PBS) database, the two closed tanks are listed for the Site as the 20,000-gallon closed-in-place UST and an unregulated 10,000-gallon AST.

1.4.3 Remaining Contamination

Following the completion of the contaminated soil/fill material removal activities, endpoint soil samples were collected at the bottom of the excavation between May 2015 and March 2016 and soil vapor samples were collected within the Building A footprint in May 2016.

All soil endpoint sampling locations were surveyed to confirm final depths of excavation. Following surveying, a demarcation layer consisting of either orange construction fence, non-woven geotextile fabric, concrete, or virgin stone (in the Park), non-woven geotextile fabric followed by virgin stone, and Grace Florprufe® in Building A, or Grace Preprufe® below Buildings B and C were installed to identify the extent of the soil removal and any remaining contamination. Final excavation depths varied from 2 to 12 feet below grade in Building A and the Park, to 16 feet below grade in Building B, and 17 to 20 feet below grade in Building C.

These Engineering Controls are managed long-term in accordance with this SMP and the Environmental Easements described in Section 2.3.

The results of the post-remediation sampling are summarized below.

1.4.3.1 *Post-Remediation Soil Endpoint Sampling*

During the course of soil/fill material removal activities, 69 endpoint samples were collected at the extent of the soil removal areas. Endpoint samples were collected approximately every 50 linear feet, with the exception of hotspot grid cells, in which endpoint samples were collected from the four corners and the center of the hotspot. All endpoint sampling locations are shown on Figures 5 and 6.

Endpoint samples from the Park, Building A, and Building C were collected as confirmatory samples to assess soil conditions at the extents of the remedial excavations. As confirmed in the Minor Change to the Decision Document, the Track 2 Remedial Action within the Building B footprint was satisfied by the 16-

foot deep excavation, which extended beyond the groundwater table. As such, soil endpoint samples from within the Building B footprint were not used to consider additional remedial excavation within the Track 2 Remediation area. Notwithstanding, the Track 2 area endpoint samples were used to document the remaining contamination in the Track 2 cleanup area that exceed the RRSCOs.

AKRF field-screened the endpoint samples with a PID for VOCs prior to collection. No PID readings above background levels were detected on any of the endpoint samples submitted for laboratory analysis. Soil endpoint samples, with the exception of the samples collected from the petroleum hotspots, were submitted to TestAmerica Laboratories, Inc. (TestAmerica) of Edison, New Jersey, a New York State Department of Health (NYSDOH) - Environmental Laboratory Approval Protocol (ELAP) certified laboratory, for analysis of SVOCs/Base Neutrals by EPA Method 8270D and Resource Conservation Recovery Act (RCRA) Metals by EPA Method 6010C, including mercury by EPA Method 7471B. Petroleum hotspot endpoint samples collected from grid cells W3, R2, and P4 in Buildings A and C, were submitted to TestAmerica and Alpha Analytical Laboratories, Inc. (Alpha) of Westborough, Massachusetts, for laboratory analysis of CP-51 VOCs by EPA Method 8260, SVOCs/Base Neutrals by EPA Method 8270D, and RCRA Metals by EPA Method 6010C, including mercury by EPA Method 7471B.

Analytical results of endpoint samples collected from Building C in comparison to the UUSCOs are summarized in Tables 3a through 3c of the FER. Exceedances of RRSCOs in soil samples collected from Building B are included in Tables 3a and 3b, and Figure 5 of this SMP. Exceedances of RRSCOs and SSALs in soil samples collected from Building A and the Park are included in Tables 4a and 4b, and Figure 6 of this SMP.

Eleven of 15 Building B soil endpoint samples exceeded the Track 2 RRSCOs but excavation depths exceeded 15 feet; therefore, the Track 2 cleanup was achieved according to NYSDEC Final Commissioner Policy, CP-51. Seven of 31 Building A and Park area soil endpoint samples exceeded the RRSCOs and SSALS to achieve a Track 4 remedy. The third-party data usability summary report (DUSR) did not identify significant issues and endpoint sample results are generally of acceptable quality.

Based on the results documented following remediation excavation and collection of soil endpoint samples, the following remediation tracks contemplated in the RAWP, Decision Document, and Minor Change to the Decision Document were achieved: Track 4 Remediation in Building A and the Park; Track 2 Remediation in Building B; and Track 1 Remediation in Building C. As the Building C area satisfied the Track 1 Remediation requirements, it is excluded from the boundary of the Controlled Property, which comprises the portions of the Site that are governed by the ECs/ICs set forth in the Environmental Easements and this SMP. Notwithstanding, the Track 1 area (Building C) required additional remedial measures described below, as it is within the zone of influence of potential future groundwater contamination.

1.4.3.2 *Post-Remediation Sub-slab Vapor Sampling*

Soil vapor samples were collected from the three vacuum monitoring points (MP-1, MP-2, and MP-3) to assess sub-slab vapor conditions and to support the sub-slab venting system design and installation efforts. Prior to sampling, the

sub-slab vapor monitoring points were tested to confirm that a reliable seal had been created in the monitoring point annular space. The seal test was conducted by isolating the monitoring point above grade using an inverted bucket and introducing helium gas through a small hole in the bucket to saturate the atmosphere around the sample point with helium gas. The vapor from the monitoring points was then purged using a SKC PCXR8 sample pump, programmed with a flow rate of 100 milliliters per minute (mL/min). The purged vapors were monitored using a Dielectric Technologies Model MGD-2002 portable helium detector to check for short-circuiting of helium-enriched air into the sub-slab monitoring point screened interval. Helium concentrations of less than the NYSDOH threshold value of 10 percent are considered sufficient to verify a tight seal. Purged vapors were also field-screened for VOCs using a PID calibrated with 100 ppm isobutylene. PID readings of 0.7 and 0.3 ppm were detected in the purged vapor from monitoring points MP-2 and MP-3, respectively. Helium levels detected in the Tedlar bag ranged from 50 ppm (0.005%) to 400 ppm (0.04%), within the approved range specified in the NYSDOH guidance, and verifying an adequate surface seal.

After purging, the sampling points were connected via silicone tubing to laboratory supplied, individually cleaned-certified 6-liter SUMMA® canisters equipped with 2-hour flow regulators. Immediately after opening the SUMMA® canister, the initial vacuum (inches of mercury) was noted. After approximately 2 hours or when the canister vacuum decreased between 5 and 10 inches of mercury, the final canister vacuum reading was noted and the SUMMA® canister was closed. Upon completion, the sampling tubing was removed and the monitoring point was closed. Additionally, one ambient (outdoor) air sample was collected using an individually clean-certified 6-liter SUMMA® canister equipped with a 2-hour flow regulator, to obtain background air readings. For QA/QC purposes, one unopened SUMMA® canister was submitted as a trip blank with the collected samples. The soil vapor, ambient air, and trip blank samples were analyzed by TestAmerica of Burlington, Vermont for VOCs by EPA Method TO-15 with Category B deliverables.

1.4.3.3 *Soil Vapor Sample Results*

Soil vapor samples were compared to the NYSDOH Air Guideline Values (AGVs), the 2013 and 2015 Fact Sheets for tetrachloroethene (PCE) and trichloroethene (TCE), and Table 3.3 Matrix 1 and 2 values presented in the 2006 Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. The established AGVs and matrices provide the basis for mitigation or monitoring of detected compounds for the VOCs 1,1,1-trichloroethane (1,1,1-TCA), carbon tetrachloride, methylene chloride, PCE and TCE.

Low levels of solvent- and petroleum-related VOCs, including cyclohexane, ethylbenzene, methyl ethyl ketone (MEK), n-butane, and tetrahydrofuran were detected in the soil vapor samples. Acetone, a common laboratory contaminant, was detected in each of the soil vapor samples, but was not detected in the trip blank. The VOCs chloromethane, methylene chloride, n-butane, toluene, and trichlorofluoromethane were detected in the ambient air sample. Detections in the ambient air sample may be attributed to construction activities at the Site or adjacent off-site sources at the time of sampling; however, the SUMMA® canister was positioned on-site away from any activities or chemical storage that may impact the sample.

Analytical results from the air samples are presented in Table 5.

1.4.4 Contamination Summary

Though there are no NYSDOH AGVs or matrix values for the specific contaminants identified in the soil endpoint and soil vapor samples, pursuant to the EPA June 2015 Soil Vapor guidance document, the appropriate ECs are typically recommended when there is a potential for unacceptable human health risk resulting from vapor intrusion. In addition, while the NYSDOH October 2006 Soil Vapor guidance document includes a decision-making matrix for 12 contaminants to address soil vapor intrusion concerns, the guidance at page I (third page of 241 page document) recognizes that vapor intrusion can also occur through direct volatilization of contaminants from groundwater into indoor air. This can occur when, for example, a slab is in contact with contaminated groundwater (as is the case here), contaminated groundwater enters (floods) a space, or contaminated groundwater enters a sump pit drainage system. In such cases, volatile chemicals can be transferred directly from groundwater to indoor air without the intervening contamination of soil vapor.

Although exposures of this nature are not addressed in the NYSDOH guidance, the USEPA document provides the vertical distance of influence for a building overlying a plume of PHC. For a dissolved PHC plume, the distance of influence is specified as 6 feet from the seasonal high of the water table to the bottom of the building slab (first floor slab for slab-on-grade construction or a basement slab). The distance of influence as referred to in the EPA document takes into consideration the natural biodegradation of PHCs.

The RAWP and the remedial actions performed to satisfy the RAWP addressed the potential for such exposures by requiring a vapor barrier for all Site buildings based on the fact that all of the buildings are either permanently under the water table (i.e., the Track 2 remediation area developed as Building B, and the Track 1 remediation area developed as Building C), or within a maximum of 6 feet vertically of the water table depending on tidal influence (i.e., the Track 4 remediation area developed as the Park/Building A). Therefore, all Site buildings, including the Track 1 remediation area (Building C), required a vapor barrier, the concrete foundation system to securely install the vapor barrier, and ventilation systems to address potential future vapor intrusion concerns.

As a result, the contamination identified in the historic remediation investigations, residual contamination identified in the post-remediation soil and soil vapor analytical results, and the zone of influence of potential future groundwater contamination discussed in the EPA and ITRC guidance documents warranted vapor controls in the form of vapor barriers and ventilation systems for all Site buildings to reduce the potential for future vapor intrusion concerns.

In addition, Building A is a slab-on-grade construction, waterfront development with known residual soil contamination present within the building footprint and with an increased potential for tidal-influenced contaminant migration from off-site sources. Building A is also downgradient of known on-site residual contamination in the Track 2 cleanup area and also downgradient of off-site contamination sources from historic industrial uses identified in previous investigations. As such, the sub-slab venting system installed in Building A may be converted into an active sub-slab depressurization system (SSDS) based upon

periodic monitoring and assessments of on-site conditions in Building A, which will be conducted in accordance with this SMP.

The vapor barrier and sub-slab venting system components are shown on Figures 7a through 7c and Figure 8. Details regarding the vapor barriers and venting systems are described in Sections 2.2.1.1 and 2.2.1.2. Operation and maintenance of the vapor barrier and sub-slab venting system are described in Section 4.1.

2.0 ENGINEEERING AND INSTITUTIONAL CONTROL PLAN

2.1 Introduction

2.1.1 General

Since remaining contaminated soil exists beneath the Site, Engineering Controls and Institutional Controls (ECs/ICs) are required to protect human health and the environment. This EC/IC Plan describes the procedures for the implementation and management of all ECs/ICs at the Site. The EC/IC Plan is one component of the SMP and is subject to revision by NYSDEC.

2.1.2 Purpose

This plan provides:

- A description of all ECs/ICs on the Site;
- The basic implementation and intended role of each EC/IC;
- A description of the key components of the ICs set forth in the Environmental Easements;
- A description of the features to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of ECs/ICs, such as the implementation of the Excavation Work Plan for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Any other provisions necessary to identify or establish methods for implementing the ECs/ICs required by the site remedy, as determined by the NYSDEC.

2.2 Engineering Controls

2.2.1 Engineering Control Systems

2.2.1.1 *Remedial Cover System*

Exposure to remaining contamination in at the Site is prevented by an engineered composite cover system placed over the Site, as shown on Figure 8. In the Park, the cover system comprises a demarcation layer, comprising orange construction fence, non-woven geotextile fabric, virgin stone or concrete, indicating the extent of remedial soil excavation and remaining contamination, overlain by a minimum of 24 inches of approved on-site reuse material, concrete and/or approved virgin stone. A summary of on-site reuse soil sample results is presented in Tables 2a through 2d. In Building A, the cover system comprises a demarcation layer consisting of non-woven geotextile fabric, overlain by a minimum 6-inch thick layer of permeable aggregate, slotted PVC pipe (for the sub-slab venting system), Grace Florprufe® (vapor barrier), and the concrete building slab. The cover system in Building B comprises Grace Preprufe 300R® and 160R® (vapor barrier/waterproofing), and the concrete building slab and sidewalls to prevent exposure to remaining contamination beneath the Track 2 cleanup area. Though excluded from the Controlled Property and related Site management requirements, the Track 1 cleanup area was also constructed with Grace Preprufe

300R® and 160R® (vapor barrier/waterproofing), and concrete building slab and sidewalls to prevent exposure to potential subsurface contamination as the Building C basement construction is within the zone of influence of potential future groundwater contamination. As-built drawings for the cover system are provided as Appendix B.

The Excavation Work Plan, provided as Appendix C, outlines the procedures required to be implemented in the event the engineered cover system is breached, penetrated, or temporarily removed, and any underlying remaining contamination is disturbed. Procedures for the inspection and maintenance of this cover are outlined in the Monitoring Plan included in Section 3 of this SMP.

2.2.1.2 *Sub-slab Venting System*

A sub-slab venting system was installed underneath the Building A floor slab to minimize the potential for soil vapor intrusion into the Site building by sealing potential vapor entry points through the slab and providing a preferred pathway for any sub-slab vapor to vent to the roof. The layout and design details for the Building A vapor barrier and sub-slab venting system are provided on Figures 7a through 7c.

The major components of the sub-slab venting system include:

- A vapor barrier underneath the Building A first floor slab-on-grade;
- Four slotted 4-inch PVC horizontal pipes embedded in a gas-permeable aggregate layer (¾-inch stone) above the compacted subgrade;
- One 6-inch galvanized steel riser pipe located within a first floor commercial property;
- An exhaust stack consisting of a 6-inch cast iron riser pipe extending from the first floor to the northwestern corner of the fourth floor mechanical room and through the roof, terminating a minimum of 10 feet from the top of the building's roof (and 25 feet from any adjoining or adjacent buildings, operable windows, heating, ventilating and air conditioning (HVAC) intakes, or any other air inlets); and
- Three sub-slab vacuum monitoring points located throughout Building A.

Basement garage ventilation systems are also included in Buildings B and C to address potential future vapor intrusion concerns, as contemplated in the RAWP.

Procedures for inspecting the vapor barrier and sub-slab venting system are documented in Section 3.2 of this SMP. The monitoring plan also addresses severe condition inspections in the event that a severe condition, which may affect controls at the Site, occurs.

2.2.2 Criteria for Completion of Remediation/Termination of Engineering Controls

Generally, remedial processes are considered completed when effectiveness monitoring indicates that the remedy has achieved the remedial action objectives identified by the Decision Document and Minor Change to the Decision Document. The framework for determining when remedial processes are complete is provided in Section 6.6 of NYSDEC DER-10.

2.2.2.1 *Remedial Cover System*

The Site remedial cover system, including vapor barriers in all Site buildings is a permanent control and the quality and integrity of this system will be inspected at predefined, regular intervals in perpetuity until the criteria for completion of the remediation are met for the Controlled Property.

2.2.2.2 *Sub-slab Venting System*

The venting systems, inclusive of the abovegrade components of the Building A venting system, are considered permanent controls. These controls will be inspected in perpetuity or until the criteria for completion of the remediation are met.

2.3 Institutional Controls

A series of Institutional Controls is required by the Decision Document and Minor Change to the Decision Document to: (1) implement, maintain and monitor Engineering Control systems; (2) prevent future exposure to remaining contamination by controlling disturbances of the subsurface contamination; and, (3) limit the use and development of the Site to restricted residential, commercial, or industrial uses only, as defined by Part 375-1.8(g) for those portions of the Site where Track 1 was not achieved (i.e. "Controlled Property"). Adherence to these Institutional Controls on the Site is required by the Environmental Easements and will be implemented under this Site Management Plan. These Institutional Controls are as follows:

- Compliance with the Environmental Easements and this SMP by the Grantor and the Grantor's successors and assigns for the Controlled Property subject to the Easements and SMP;
- All Engineering Controls must be operated and maintained as specified in this SMP;
- All Engineering Controls on the Controlled Property must be inspected at a frequency and in a manner defined in the SMP; and
- Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in this SMP.

The Site has a series of Institutional Controls in the form of Site restrictions. Adherence to these Institutional Controls is required by the Environmental Easements. Site restrictions that apply to the Controlled Property are:

- The Controlled Property may only be used for restricted residential or commercial/industrial uses, provided that the long-term Engineering and Institutional Controls included in this SMP are employed;
- The Controlled Property may not be used for a higher level of use, such as Unrestricted Use without additional remediation and amendment of the Environmental Easements, as approved by the NYSDEC;
- All future activities on the Controlled Property that will disturb remaining contaminated material must be conducted in accordance with this SMP, as discussed further in Section 2.3.1;
- The use of the groundwater underlying the Controlled Property is prohibited without treatment rendering it safe for intended use;

- The potential for vapor intrusion must be evaluated for any buildings within the Controlled Property and any potential impacts that are identified must be monitored or mitigated, as discussed further in Section 2.3.2;
- Vegetable gardens and farming on the property are prohibited within the Controlled Property; and
- The Site Volunteer or remedial party will submit to NYSDEC a written statement that certifies, under penalty of perjury, that: (1) controls employed at the Controlled Property are unchanged from the previous certification or that any changes to the controls were approved by the NYSDEC; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. NYSDEC retains the right to access such Controlled Property at any time in order to evaluate the continued maintenance of any and all controls. This certification shall be submitted annually, or an alternate period of time that NYSDEC may allow and will be made by an expert that the NYSDEC finds acceptable.

Institutional Controls identified in the Environmental Easements may not be discontinued without an amendment to or extinguishment of the Environmental Easements.

2.3.1 Excavation Work Plan

The Site has been remediated for Track 1 Unrestricted Use in the Building C portion of the Site, Track 2 Restricted Residential Use in the Building B portion of the Site, and Track 4, Restricted Residential Use in Building A and the Park. Any future intrusive work that will penetrate the soil cover or hardscape cap, or encounter or disturb the remaining contamination on the Controlled Property, including any modifications or repairs to the Site remedial cover system will be performed in compliance with the Excavation Work Plan (EWP) that is attached as Appendix C to this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) prepared for the Site. The HASP and CAMP are attached as Appendix D to this SMP, and are in current compliance with DER-10, and 29 CFR 1910, 29 CFR 1926, and all other applicable Federal, State and local regulations. Based on future changes to State and federal health and safety requirements, and specific methods employed by future contractors, the HASP and CAMP will be updated and re-submitted with the notification provided in Section C-1 of the EWP. Any intrusive construction work will be performed in compliance with the EWP, HASP and CAMP, and will be included in the periodic inspection and certification reports submitted under the Site Management Reporting Plan (See Section 6).

The Site Volunteer and associated parties preparing the remedial documents submitted to the State, and parties performing this work, are completely responsible for the safe performance of all intrusive work, the structural integrity of excavations, proper disposal of excavation dewatering liquids, control of runoff from open excavations into remaining contamination, and for structures that may be affected by excavations (such as building foundations and bridge footings). The Site Volunteer will ensure that Site development activities will not interfere with, or otherwise impair or compromise, the engineering controls described in this SMP.

2.3.2 Soil Vapor Intrusion Evaluation

Prior to any proposed demolition and/or redevelopment of the Controlled Property, a soil vapor intrusion (SVI) evaluation will be performed to determine whether any mitigation measures are necessary to eliminate potential exposure to vapors in the proposed structure. The existing components of the vapor barrier and sub-slab venting system under Building A may be included as an element of any newly proposed vapor mitigation systems.

Prior to conducting an SVI investigation or installing a mitigation system, a work plan will be developed and submitted to the NYSDEC and NYSDOH for approval. This work plan will be developed in accordance with the most recent NYSDOH "Guidance for Evaluating Vapor Intrusion in the State of New York". Measures to be employed to mitigate potential vapor intrusion will be evaluated, selected, designed, installed pursuant to the RAWP, and shall be maintained based on this SMP, the SVI evaluation, the NYSDOH guidance, and construction details of the proposed structure.

In the event that an SVI evaluation is performed, preliminary (unvalidated) SVI sampling data will be forwarded to the NYSDEC and NYSDOH for initial review and interpretation. Upon validation, the final data will be transmitted to the agencies, along with a recommendation for follow-up action, such as continued mitigation or termination of the need to monitor the controls. Validated SVI data will be transmitted to the Volunteer within 30 days of validation. If any indoor air test results exceed NYSDOH guidelines, relevant NYSDOH fact sheets will be provided to all tenants and occupants of the property within 15 days of receipt of validated data.

SVI sampling results, evaluations, and follow-up actions will also be summarized in the subsequent Periodic Review Report.

2.4 Inspections and Notifications

2.4.1 Inspections

Inspections of all remedial components installed at the Site will be conducted at the frequency specified in the SMP Monitoring Plan schedule. A comprehensive Site-wide inspection will be conducted annually, regardless of the frequency of the Periodic Review Report. The inspections will determine and document the following:

- Whether Engineering Controls continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easements;
- Achievement of remedial performance criteria;
- Sampling and analysis of appropriate media during monitoring events;
- If Site records are complete and up to date; and
- Changes, or needed changes, to the remedial or monitoring system.

Inspections will be conducted in accordance with the procedures set forth in the Site Monitoring Plan of this SMP (Section 3). The reporting requirements are outlined in the Periodic Review Reporting section of this plan (Section 6).

If an emergency, such as a natural disaster or an unforeseen failure of any of the ECs occurs, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the ECs/ICs implemented at the Site by a Qualified Environmental Professional as determined by NYSDEC.

2.4.2 Notifications

Notifications will be submitted by the Volunteer to the NYSDEC as needed for the following reasons:

- 60-day advance notice of any proposed changes in site use that are required under the terms of the Brownfield Cleanup Agreement, 6NYCRR Part 375, and/or Environmental Conservation Law.
- 7-day advance notice of any proposed ground-intrusive activities pursuant to the Excavation Work Plan.
- Notice within 48-hours of any damage or defect to the any of the foundations incorporating the vapor barriers, structures, or the venting systems which reduce or has the potential to reduce the effectiveness of an Engineering Control and likewise any action to be taken to mitigate the damage or defect.
- Verbal notice by noon of the following day of any emergency, such as a fire, flood, or earthquake that reduces or has the potential to reduce the effectiveness of Engineering Controls in place at the Site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
- Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action shall be submitted to the NYSDEC within 45 days and shall describe and document actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

- At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser has been provided with a copy of the Brownfield Cleanup Agreement, and all approved work plans and reports, including this SMP.
- Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing.

2.5 Contingency Plan

Emergencies may include injury to personnel, fire or explosion, environmental release, or serious weather conditions.

Action for on-Site emergencies would be subject to the protocol in the attached HASP and CAMP, provided as Appendix D.

2.5.1 Emergency Telephone Numbers

In the event of any environmentally related situation or unplanned occurrence

requiring assistance, the Volunteer or Volunteer's representative(s) should contact the appropriate party from Tables T2 and T3. For emergencies, appropriate emergency response personnel should be contacted. Prompt contact should also be made to the current owner's environmental consultant's Project Principal or Project Manager or the current property manager/Volunteer's representative for the Site. These emergency contact lists must be maintained in an easily accessible location at the Site.

Table T2: Emergency Contact Numbers

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

Table T3: Other Contact Numbers*

Company/Regulator	Contact Name	Contact Title	Contact Number
AKRF Engineering, P.C.	Marc Godick	Project Principal/QEP	914-922-2356 (office)
	Eric Park	Project Manager	646-388-9532 (office)
	Adrianna Bosco	Asst. Project Manager	646-388-9576 (office)
NYSDEC	John Grathwol	Project Manager	518-402-9767 (office)
NYSDOH	Stephanie Selmer	Public Health Engineer	518-402-7860 (office)
Urban Development Partners New York, LLC	Darryl Herring	Volunteer's Representative	212-767-0960 (office)

* Note: Contact numbers subject to change and should be updated as necessary.

2.5.2 Map and Directions to Nearest Health Facility

Site Location: 145 West Street, Brooklyn, New York
(West Street between India Street and Huron Street)
Nearest Hospital Name: Woodhull Medical Center
Hospital Location: 760 Broadway, Brooklyn, NY 11206
Hospital Telephone: (718) 963-8000

Directions to the Hospital:

1. Exit Site and turn RIGHT onto WEST STREET
2. Turn LEFT onto GREENPOINT AVENUE
3. Turn RIGHT onto LEONARD STREET
4. Turn LEFT onto BROADWAY
5. Turn RIGHT onto FLUSHING AVENUE

Emergency room is on your LEFT on FLUSHING AVENUE between BROADWAY and THROOP AVENUE.

Total Distance: 2.8 miles

Total Estimated Time: 14 minutes

Map Showing Route from the Site to the Hospital:



2.5.3 Response Procedures

As appropriate, the fire department and other emergency response groups will be notified immediately by telephone of the emergency. The emergency telephone number list is found at the beginning of this Contingency Plan (Table T2). The list will also be posted prominently at the Site and made readily available to all personnel at all times.

2.5.3.1 *Procedure for Disturbance of Site Remedial Cover System*

Prior to any planned disturbance of the Site remedial cover system, the location of ECs located within or beneath the concrete floor slab including the vapor barriers or venting systems and aboveground venting system piping in Building A will be identified using Figures 7a through 7c, and Figure 8. The following procedures will be required if the Site cover system, including the vapor barriers, or venting systems, are accidentally disturbed, as part of a planned future building improvement/repair, or is discovered to be disturbed during a monitoring/inspection event:

- Notification of NYSDEC in accordance with applicable guidance outlined in Section 2.4.2 of this SMP and the Excavation Work Plan;
- Submittal of a written plan detailing the disturbance location and proposed repair or replacement activities to return the cover system or associated underlying components to the appropriate operating condition;
- Performance of the work set forth in such written plan;
- Scheduling of a follow-up inspection to be performed under the direct oversight of a Professional Engineer; and
- A Site Remedial Cover System Inspection and Sub-Slab Venting System Inspection, in accordance with Section 3.2 of this SMP, must be conducted to document that disturbances were rectified in a manner that complies with the requirements of the Monitoring Plan.

The appropriate actions for other on-site emergencies are detailed in the attached HASP, provided in Appendix D. The HASP may require revisions as necessitated by changes to Site conditions and project personnel. The plan will be updated as necessary or at a minimum of once every five years to ensure accuracy. Procedures associated with monitoring and operating of the sub-slab venting system are described in Section 4.1 of this SMP.

3.0 SITE MONITORING PLAN

3.1 Introduction

3.1.1 General

The Monitoring Plan describes the measures for evaluating the performance and effectiveness of the remedy to reduce or mitigate contamination at the Site, the Site cover system, and all affected Site media identified below. Monitoring of other Engineering Controls (including the venting system) is described in Chapter 4, Operation, Monitoring and Maintenance Plan. This Monitoring Plan may only be revised with the approval of NYSDEC.

3.1.2 Purpose and Schedule

This Monitoring Plan describes the methods to be used for:

- Assessing achievement of the remedial performance criteria;
- Evaluating Site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment; and
- Preparing the necessary reports for the various monitoring activities.

To adequately address these issues, this Monitoring Plan provides information on:

- Reporting requirements and frequency; and
- Annual inspection and periodic certification.

Annual monitoring of the performance of the remedy for the Controlled Property will be conducted for the first five years. The frequency thereafter will be determined by NYSDEC. Trends in contaminant levels will be evaluated to determine if the remedy continues to be effective in achieving remedial goals. Monitoring programs are summarized in Table T4 and outlined in detail in Sections 3.2 and 3.3.

Table T4: Monitoring Inspection Schedule

Monitoring Program	Frequency*	Matrix	Analysis
Remedial Cover System and Sub-slab Venting System Inspection	Annually	Remedial Cover system and sub-slab venting system integrity	Visual inspection of conditions
Site-Wide Inspection	Annually	All ECs and ICs	Complete Site Inspection

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC and NYSDOH

3.2 Remedial Cover System Monitoring

Exposure to remaining contamination at the Site or in the vicinity of the Site and from any potential future groundwater contamination and vapors which may impact the Site by way of the groundwater table zone of influence is prevented by an engineered composite remedial cover system placed over the Site. The locations, types, and configurations of

the Site cover system are shown on Figure 8 and as-built drawings for Site foundation elements are included in Appendix B.

In the Track 4 Park area, the cover system comprises a demarcation layer, comprising orange construction fence, non-woven geotextile fabric, virgin stone, or concrete, indicating the extent of remedial soil excavation and remaining contamination, overlain by a minimum of 24 inches of approved on-site reuse material, followed by concrete and/or approved virgin stone. A summary of on-site reuse soil sample results is presented in Tables 2a through 2d.

In the Track 4 Building A area, the cover system comprises a demarcation layer, consisting of non-woven geotextile fabric, overlain by a minimum 6-inch thick layer of permeable aggregate, slotted PVC pipe (for the sub-slab venting system), Grace Florprufe® (vapor barrier), and the concrete building slab, which the vapor barrier is adhered to.

The cover system in Building B comprises Grace Preprufe 300R® and 160R® (vapor barrier/waterproofing), which serves as a demarcation layer, and the concrete building slab and sidewalls to prevent exposure to remaining contamination and potential future contamination beneath the Track 2 remediation area, as the Building B basement is constructed beneath the water table and is within the zone of influence of potential future groundwater contamination.

Though excluded from the Environmental Easements Controlled Property and related Site management requirements, the Track 1 remediation area was also constructed with Grace Preprufe 300R® and 160R® (vapor barrier/waterproofing), and concrete building slab and sidewalls to prevent exposure to potential future subsurface contamination in the Track 1 area, as the Building C basement is constructed beneath the water table and, therefore, within the zone of influence of potential future groundwater contamination. As-built drawings for the remedial cover system are provided as Appendix B. The location and details of the remedial cover system are shown on Figure 8.

The Site cover system is designed to remain intact 24 hours a day, 7 days a week, for 365 days a year. Disturbance of any of the cover system components, including the concrete floor slabs, vapor barriers, paved areas and clean fill, without prior NYSDEC approval is prohibited by the Environmental Easements for the Controlled Property. In the unlikely event of an unanticipated accidental or required disturbance of the Site cover system, the response procedure is outlined in Section 2.5.3.1.

Monitoring of the Site cover system will be conducted on an annual basis to assess the system's integrity as long as the Environmental Easements are in effect. Monitoring will consist of a visual inspection, to identify any evidence of invasive activities that may have penetrated the cover system, and evaluate the condition of the surficial cover system elements, such as the approved on-site reuse soil layer in the Park, visible concrete floor slabs in Buildings A, and concrete basement slabs and wall joints in Building B. If any cracks or openings are identified, they shall be screened for organic vapors with a PID and any readings shall be documented. PID readings and pressure (vacuum) measurements will also be collected from the venting system sub-slab monitoring points, MP-1, MP-2, and MP-3, to assess sub-slab vapor conditions and the potential for upgrading the sub-slab venting system to an active system.

A smoke test will be performed to identify air movement around any observed cracks, openings, or other newly observed penetrations in the floor and any observed cracks or openings shall then be properly sealed. In addition, the Site cover system must be inspected and certified any time a disturbance to the system occurs. The inspection

frequency is subject to change with the approval of the NYSDEC. Unscheduled inspections may take place when a suspected failure of the Site cover system has been reported or an emergency occurs that is deemed likely to affect the operation of the system.

The results of the inspection will be documented on the Cover System Inspection Log presented in Appendix E. The Cover System Inspection Log Sheet will be subject to the reporting requirements discussed in Sections 3.2 and 5.0 and included in the Periodic Review Report.

3.3 Site-Wide Inspection

Site-wide inspections will be performed on a regular schedule at a minimum of once a year. Site-wide inspections will also be performed after all severe weather conditions that may affect Engineering Controls or monitoring devices. During these inspections, an inspection form will be completed (Appendix F). The form will compile sufficient information to assess the following:

- Compliance with all ICs, including Site usage;
- An evaluation of the condition and continued effectiveness of ECs, including the condition of the Site wide cover system and the abovegrade components of the sub-slab venting systems;
- General Site conditions at the time of the inspection;
- The Site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection;
- Compliance with permits and schedules included in the Operation and Maintenance Plan; and
- Confirm that Site records are up to date.

3.4 Monitoring Reporting Requirements

Forms and any other information generated during regular monitoring events and inspections will be kept on file on-site. All forms, and other relevant reporting formats used during the monitoring/inspection events, will be (1) subject to approval by NYSDEC and (2) submitted at the time of the Periodic Review Report, as specified in the Reporting Plan of this SMP.

All monitoring results will be reported to NYSDEC on a periodic basis in the Periodic Review Report. The Document submittal will include, at a minimum:

- Date of event;
- Personnel conducting inspection;
- Description of the activities performed;
- Copies of all field forms completed (e.g., inspection logs);
- Any observations, conclusions, or recommendations; and
- A determination as to whether conditions have changed since the last reporting event.

Data will be reported in hard copy or digital format as determined by NYSDEC. A summary of the monitoring program deliverables are summarized in Table T5.

Table T5: Schedule of Monitoring/Inspection Reports

Task	Reporting Frequency*
Periodic Review Report	Annually for five years and frequency thereafter to be determined in consultation with NYSDEC

* The frequency of events will be conducted as specified until otherwise approved by NYSDEC.

4.0 EC OPERATION AND MAINTENANCE PLAN

4.1 Introduction

Vapor barriers and venting systems were installed in each Site building as part of Site remediation. The venting systems, with the exception of the basement mechanical ventilation systems in Buildings B and C, which are to be maintained as part of typical building HVAC maintenance, do not include any mechanical equipment at this time that would require routine maintenance. As such, no operations and maintenance criteria are set forth within this SMP. The Site-wide cover system prevents human exposure to remaining contamination. All venting systems and cover system inspection requirements are included in the Cover System inspection description in Section 3.2 and in the associated log sheet included as Appendix E. Since no operations and maintenance criteria are established for the venting systems, the venting systems will be inspected as part of the annual Cover System and Site-Wide inspections, and the status of the abovegrade components of the venting systems will be certified as part of the routine IC/EC certification process.

Notwithstanding, the annual Cover system and Site-wide inspection findings reported in the PRR will be used to determine whether or not future site findings warrant the conversion of the Building A sub-slab venting system to an active SSDS.

In the event that the Building A sub-slab venting system is converted to an active system or additional ECs requiring an Operation and Maintenance Plan are installed at the Site, this SMP will be revised to update the operation and maintenance requirements as necessary.

5.0 PERIODIC ASSESSMENT/EVALUATIONS

5.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessments provide information so that the Site and associated remedial systems are prepared for the impacts of the increasing frequency and intensity of severe storms/weather events and associated flooding.

This section provides a summary of vulnerability assessments that will be conducted for the Site during periodic assessments, and briefly summarizes the vulnerability of the Site and/or engineering controls to severe storms/weather events and associated flooding.

- Flood Plain: The Site lies within the 100-year flood plain, which is defined as an area with a one percent chance of an annual flood hazard and is covered by the Site remedial cover system discussed in Section 2.1.1, and including a vapor barrier in Building A and waterproofing in Building B and Building C. Additionally, slab-on-grade portions of the Site (Building A) were constructed approximately 3 feet above sidewalk grade, reducing the likelihood of significant flooding impacts. Subgrade portions of the Site (portions of Buildings B and C) comprise basement parking areas with flood barriers, designed to limit significant flooding impacts.
  However, due to the proximity of the Site to the East River, increases in storm severity and frequency, increases in sea level, and accompanying flooding impacts may result in the migration of off-site contaminants to the Site. The vapor barrier and waterproofing provide protection against the impacts of potential future subsurface contamination.
- Site Drainage and Storm Water Management: Stormwater at the Site and the surrounding area flows to the New York City combined sewer system. Additionally, a stormwater detention system was installed beneath the Site building to manage excess stormwater during periods of heavy precipitation and/or snowmelt.
- Erosion: A portion of the Site comprises the waterfront Park area, which is currently covered by a minimum of 24 inches of approved on-site reuse material or concrete, and approved virgin stone. The virgin stone portion of the remedial cover system is expected to protect against erosion caused by significant flooding.
- High Wind: All permanent building components are secured against high winds. In the event that high winds are forecast for the Site, proper precautions will be taken to secure or shelter any Site components that are not protected against high winds.
- Electricity: Electricity to the building is supplied via newly installed underground vaults and conduits and is not expected to be affected by severe weather events.
- Spill/Contaminant Release: Storage of large amounts of fuel oil, or other chemicals at the Site is not expected. Nominal amounts of cleaning chemicals are likely to be stored throughout the Site, but are not expected to be affected by severe weather conditions.

6.0 INSPECTIONS, REPORTING AND CERTIFICATIONS

6.1 Site Inspections

A comprehensive summary of the inspections and reporting is provided in the following Table T6:

Table T6: SMP Inspections Summary

Operations Monitoring Tasks	Frequency *	Matrix	Analysis	Reporting **
Cover System Inspection	Annually (first inspection no more than 12 months after SMP approval)	Integrity of cover system to protect vapor barriers and prohibit exposure to remaining contamination, and aboveground piping for sub-slab venting system and monitoring point PID and pressure (vacuum) readings in Building A	Visual assessment, repair components as necessary	Periodic Review Report
Site-Wide Inspection	Annually (first inspection no more than 12 months after SMP)	EC/IC Assessment	Visual assessment, repair components as necessary	Periodic Review Report

* Inspection frequency may be adjusted as necessary, to be determined in consultation with NYSDEC and NYSDOH.

**Any unexpected or critical issues identified during the monitoring tasks will be reported via email or phone notification to the NYSDEC Project Manager and will be reported and followed up in the pertinent monitoring report, in accordance with the requirements established in this SMP.

6.1.1 Inspection Frequency

All inspections will be conducted at the frequency specified in the schedules provided in Section 3 - Site Monitoring Plan and Section 4 - Operation and Maintenance Plan of this SMP. At a minimum, a Site-wide inspection will be conducted annually. Inspections of remedial components will also be conducted whenever a severe condition has taken place, such as an erosion or flooding event that may affect the ECs.

6.1.2 Inspection Forms, Sampling Data, and Maintenance Reports

All inspections and monitoring events will be recorded on the appropriate forms for their respective system which are contained in Appendices F (Site-Wide Inspection), and E (Cover System Inspection). These forms are subject to NYSDEC revision.

All applicable inspection forms and other records, including all media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format in the Periodic Review Report. All media sampling will be conducted in accordance with the Quality Assurance Project Plan, provided as Appendix G.

6.1.3 Evaluation of Records and Reporting

The results of the inspection and Site monitoring data will be evaluated as part of the EC/IC certification to confirm that the:

- ECs/ICs are in place, are performing properly, and remain effective;
- The Monitoring Plan is being implemented;
- Operation and maintenance activities are being conducted properly; based on the above items; and
- The Site remedy continues to be protective of public health and the environment and is performing as designed in the NYSDEC-approved RAWP and FER.

6.2 Certification of Engineering and Institutional Controls

After the last inspection of the reporting period, a Professional Engineer licensed to practice in New York State will prepare the following certification:

For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- *The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction.*
- *The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the NYSDEC.*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment.*
- *Nothing has occurred that would constitute a violation or failure to comply with any Site management plan for this control.*
- *Access to the Site will continue to be provided to the NYSDEC to evaluate the remedy, including access to evaluate the continued maintenance of this control.*
- *If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document.*
- *Use of the Site is compliant with the environmental easements.*
- *The engineering control systems are performing as designed and are effective.*

- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices.*
- *The information presented in this report is accurate and complete.*

  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, [name], of [business address], am certifying as [Owner or Owner's Designated Site Representative] I have been authorized and designated by all Site owners to sign this certification for the Site.
- *No new information has come to my attention, to indicate that the assumptions made in the qualitative exposure assessment of off-site contamination are no longer valid.*

Every five years the following certification will be added:

- *The assumptions made in the qualitative exposure assessment remain valid.*

The signed certification will be included in the Periodic Review Report described below.

6.3 Periodic Review Report

A Periodic Review Report will be submitted to the NYSDEC every year, beginning 16 months after the Certificate of Completion is issued. In the event that the Site is subdivided into separate parcels with different ownership, a single Periodic Review Report will be prepared that addresses the Site described in Appendix A (Environmental Easements and Metes and Bounds). The report will be prepared in accordance with NYSDEC DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also incorporated into the Periodic Review Report. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site.
- Results of the required annual Site inspections and severe condition inspections, if applicable.
- All applicable inspection forms and other records generated for the Site during the reporting period in electronic format.
- A summary of any discharge monitoring data and/or information generated during the reporting period with comments and conclusions.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted electronically in a NYSDEC-approved format.
- A Site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the Site-specific RAWP, Decision Document, and Minor Change to the Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring Plan for the media being monitored;

- Recommendations regarding any necessary changes to the remedy and/or Monitoring Plan, including an assessment of the sub-slab venting system and statement regarding the need to convert to an active SSDS; and
- The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the Site during the calendar year, including information such as:
  - The number of days the system was run for the reporting period;
  - The average, high, and low flows per month;
  - A description of breakdowns and/or repairs along with an explanation for any significant downtime;
  - A description of the resolution of performance problems;
  - A summary of the performance, effluent and/or effectiveness monitoring; and
  - Comments, conclusions, and recommendations based on data evaluation.

The Periodic Review Report will be submitted, in hard-copy format, to the NYSDEC Central Office and Regional Office in which the Site is located, and in electronic format to NYSDEC Central Office, Regional Office and the NYSDOH Bureau of Environmental Exposure Investigation.

6.4 Corrective Measures Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an institutional or engineering control, a corrective measures plan will be submitted to the NYSDEC for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the corrective measures plan until it is approved by the NYSDEC.

TABLES

Tables 1-5
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Notes

GENERAL

NS : No cleanup objective listed.

U : The analyte was not detected at the indicated concentration.

J : The concentration given is an estimated value.

UJ : The analyted was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Exceedances are highlighted in bold font.

SOIL

Exceedances of Part 375 Restricted Residential Soil Cleanup Objectives are highlighted in bold font.

Exceedances of Site-Specific Action Levels are highlighted in gray.

Exceedances of Part 375 Protection of Groundwater are highlighted in gray.

Part 375 Soil Cleanup Objectives : Soil Clean-up Objectives listed in NYSDEC (New York State Department of Environmental Conservation) "Part 375" Regulations (6 NYCRR Part 375).

µg/kg : micrograms per kilogram = parts per billion (ppb)

mg/kg : milligrams per kilogram = parts per million (ppm)

SOIL VAPOR

NYSDOH Soil Vapor Intrusion Air Guidance Value : NYSDOH Air Guideline Values (AGVs) and Table 3.3 Matrix 1 and 2 Chemicals presented in the Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006 (“NYSDOH Vapor Intrusion Guidance Document”), updated September 2013 for change of AGV for PCE and August 2015 for TCE.

$\mu g/m^3$: micrograms per cubic meter of air

Exceedances of NYSDOH Soil Vapor Intrusion Air Guidance Values are highlighted in bold font.
Exceedances of NYSDOH Soil Vapor Intrusion Air Guidance Matrix Values are highlighted with gray shading.

Table 1a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives

Parameter	NYSDEC Part 375 Unrestricted Use
VOCs	**mg/kg**
1,1,1-Trichloroethane	0.68
1,1-Dichloroethane	0.27
1,1-Dichloroethene	0.33
1,2,4-Trimethylbenzene	3.6
1,2-Dichlorobenzene	1.1
1,2-Dichloroethane	0.02
1,3,5-Trimethylbenzene	8.4
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,4-Dioxane	0.1
2-Butanone (MEK)	0.12
Acetone	0.05
Benzene	0.06
Carbon tetrachloride	0.76
Chlorobenzene	1.1
Chloroform	0.37
cis-1,2-Dichloroethene	0.25
Ethylbenzene	1
Methyl tert-butyl ether	0.93
Methylene Chloride	0.05
n-Butylbenzene	12
N-Propylbenzene	3.9
sec-Butylbenzene	11
tert-Butylbenzene	5.9
Tetrachloroethene	1.3
Toluene	0.7
trans-1,2-Dichloroethene	0.19
Trichloroethene	0.47
Vinyl chloride	0.02
Xylenes, Total	0.26
Total Conc	NS
SVOCs	**mg/kg**
1,2-Dichlorobenzene	1.1
1,3-Dichlorobenzene	2.4
1,4-Dichlorobenzene	1.8
1,2,4-Trichlorobenzene	NS
2-Chloronaphthalene	NS
2,4-Dinitrotoluene	NS
2,6-Dinitrotoluene	NS
2-Methylnaphthalene	NS
2-Nitroaniline	NS
3-Nitroaniline	NS
4-Nitroaniline	NS
2,2'-oxybis[1-chloropropane]	NS
4-Chlorophenyl phenyl ether	NS
Acenaphthene	20
Acenaphthylene	100
Anthracene	100
Benzo[a]anthracene	1
Benzo[b]fluoranthene	1
Benzo[k]fluoranthene	0.8
Benzo[g,h,i]perylene	100
Benzo[a]pyrene	1
Bis(2-chloroethoxy)methane	NS

Table 1a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives

Parameter	NYSDEC Part 375 Unrestricted Use
SVOCs	**mg/kg**
Bis(2-chloroethyl)ether	NS
Bis(2-ethylhexyl) phthalate	NS
4-Bromophenyl phenyl ether	NS
Butyl benzyl phthalate	NS
Carbazole	NS
4-Chloroaniline	NS
Chrysene	1
Dibenz(a,h)anthracene	0.33
Dibenzofuran	7
Di-n-butyl phthalate	NS
Di-n-octyl phthalate	NS
Diethyl phthalate	NS
Dimethyl phthalate	NS
Fluoranthene	100
Fluorene	30
Hexachlorobenzene	0.33
Hexachlorobutadiene	NS
Hexachlorocyclopentadiene	NS
Hexachloroethane	NS
Indeno[1,2,3-cd]pyrene	0.5
Isophorone	NS
Naphthalene	12
Nitrobenzene	NS
N-Nitrosodiphenylamine	NS
N-Nitrosodi-n-propylamine	NS
Phenanthrene	100
Pyrene	100
3,3'-Dichlorobenzidine	NS
Total SVOCs	NS
RCRA Metals	**mg/kg**
Silver	2
Arsenic	13
Barium	350
Cadmium	2.5
Chromium	1
Lead	63
Selenium	3.9
Mercury	0.18
Polychlorinated Biphenyls	**mg/kg**
Aroclor 1016	NS
Aroclor 1221	NS
Aroclor 1232	NS
Aroclor 1242	NS
Aroclor 1248	NS
Aroclor 1254	NS
Aroclor 1260	NS
Aroclor 1262	NS
Aroclor 1268	NS
Polychlorinated biphenyls, Total	0.1

Table 1a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
NYSDEC Part 375 Unrestricted Use Soil Cleanup Objectives

Parameter	NYSDEC Part 375 Unrestricted Use
Pesticides	**mg/kg**
4,4'-DDD	0.0033
4,4'-DDE	0.0033
4,4'-DDT	0.0033
Aldrin	0.005
alpha-BHC	0.02
alpha-Chlordane	0.094
beta-BHC	0.036
Chlordane (technical)	NS
delta-BHC	0.04
Dieldrin	0.005
Endosulfan I	2.4
Endosulfan II	2.4
Endosulfan sulfate	2.4
Endrin	0.014
Endrin aldehyde	NS
Endrin ketone	NS
gamma-BHC (Lindane)	0.1
Heptachlor	0.042
Heptachlor epoxide	NS
Methoxychlor	NS
Toxaphene	NS

Table 1b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
NYSDEC Part 375 Restricted Residential Use Soil Cleanup Objectives

Parameter	NYSDEC Part 375 Restricted Residential Use
VOCs	**mg/kg**
1,1,1-Trichloroethane	100
1,1-Dichloroethane	26
1,1-Dichloroethene	100
1,2,4-Trimethylbenzene	52
1,2-Dichlorobenzene	100
1,2-Dichloroethane	3.1
1,3,5-Trimethylbenzene	52
1,3-Dichlorobenzene	49
1,4-Dichlorobenzene	13
1,4-Dioxane	13
2-Butanone (MEK)	100
Acetone	100
Benzene	4.8
Carbon tetrachloride	2.4
Chlorobenzene	100
Chloroform	49
cis-1,2-Dichloroethene	100
Ethylbenzene	41
Methyl tert-butyl ether	100
Methylene Chloride	100
n-Butylbenzene	100
N-Propylbenzene	100
sec-Butylbenzene	100
tert-Butylbenzene	100
Tetrachloroethene	19
Toluene	100
trans-1,2-Dichloroethene	100
Trichloroethene	21
Vinyl chloride	0.9
Xylenes, Total	100
Total Conc	NS
SVOCs	**mg/kg**
1,2-Dichlorobenzene	100
1,3-Dichlorobenzene	49
1,4-Dichlorobenzene	13
1,2,4-Trichlorobenzene	NS
2-Chloronaphthalene	NS
2,4-Dinitrotoluene	NS
2,6-Dinitrotoluene	NS
2-Methylnaphthalene	NS
2-Nitroaniline	NS
3-Nitroaniline	NS
4-Nitroaniline	NS
2,2'-oxybis[1-chloropropane]	NS
4-Chlorophenyl phenyl ether	NS
Acenaphthene	100
Acenaphthylene	100
Anthracene	100
Benzo[a]anthracene	1
Benzo[b]fluoranthene	1
Benzo[k]fluoranthene	3.9
Benzo[g,h,i]perylene	100
Benzo[a]pyrene	1
Bis(2-chloroethoxy)methane	NS

Table 1b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
NYSDEC Part 375 Restricted Residential Use Soil Cleanup Objectives

Parameter	NYSDEC Part 375 Restricted Residential Use
SVOCs	**mg/kg**
Bis(2-chloroethyl)ether	NS
Bis(2-ethylhexyl) phthalate	NS
4-Bromophenyl phenyl ether	NS
Butyl benzyl phthalate	NS
Carbazole	NS
4-Chloroaniline	NS
Chrysene	3.9
Dibenz(a,h)anthracene	0.33
Dibenzofuran	59
Di-n-butyl phthalate	NS
Di-n-octyl phthalate	NS
Diethyl phthalate	NS
Dimethyl phthalate	NS
Fluoranthene	100
Fluorene	100
Hexachlorobenzene	1.2
Hexachlorobutadiene	NS
Hexachlorocyclopentadiene	NS
Hexachloroethane	NS
Indeno[1,2,3-cd]pyrene	0.5
Isophorone	NS
Naphthalene	100
Nitrobenzene	NS
N-Nitrosodiphenylamine	NS
N-Nitrosodi-n-propylamine	NS
Phenanthrene	100
Pyrene	100
3,3'-Dichlorobenzidine	NS
Total SVOCs	NS
RCRA Metals	**mg/kg**
Silver	180
Arsenic	16
Barium	400
Cadmium	4.3
Chromium	110
Lead	400
Selenium	180
Mercury	0.81
Polychlorinated Biphenyls	**mg/kg**
Aroclor 1016	NS
Aroclor 1221	NS
Aroclor 1232	NS
Aroclor 1242	NS
Aroclor 1248	NS
Aroclor 1254	NS
Aroclor 1260	NS
Aroclor 1262	NS
Aroclor 1268	NS
Polychlorinated biphenyls, Total	1

Table 1b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
NYSDEC Part 375 Restricted Residential Use Soil Cleanup Objectives

Parameter	NYSDEC Part 375 Restricted Residential Use
Pesticides	**mg/kg**
4,4'-DDD	13
4,4'-DDE	8.9
4,4'-DDT	7.9
Aldrin	0.097
alpha-BHC	0.48
alpha-Chlordane	4.2
beta-BHC	0.36
Chlordane (technical)	NS
delta-BHC	100
Dieldrin	0.20
Endosulfan I	24
Endosulfan II	24
Endosulfan sulfate	24
Endrin	11
Endrin aldehyde	NS
Endrin ketone	NS
gamma-BHC (Lindane)	1.3
Heptachlor	2.1
Heptachlor epoxide	NS
Methoxychlor	NS
Toxaphene	NS

Table 1c
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Track 4 Building A and Park Site- Specific Action Levels

Parameter	Site-Specific Action Levels
SVOCs	**mg/kg**
Total SVOCs	**250**
Metals	**mg/kg**
Arsenic	**24**
Barium	**700**
Lead	**1,200**
Mercury	**2.5**

Table 2a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	RU-P1D-11102015 460-104361-9 11/10/2015	RU-P1D-A-11102015 460-104361-10 11/10/2015	RU-P2D-11102015 460-104361-1 11/10/2015	RU-P2D-A-11102015 460-104361-2 11/10/2015	RU-P2S-11102015 460-104361-7 11/10/2015	RU-P2S-A-11102015 460-104361-8 11/10/2015	RU-P3D-11112015 460-104421-3 11/11/2015
1,1,1-Trichloroethane	100,000	680	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,1-Dichloroethane	26,000	270	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,1-Dichloroethene	100,000	330	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,2,4-Trimethylbenzene	52,000	3,600	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,2-Dichlorobenzene	100,000	1,100	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,2-Dichloroethane	3,100	20	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,3,5-Trimethylbenzene	52,000	8,400	1.1 U	1.1 U	0.15 J	1.3 U	1.1 U	1.3 U	1.2 U
1,3-Dichlorobenzene	49,000	2,400	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,4-Dichlorobenzene	13,000	1,800	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
1,4-Dioxane	13,000	100	21 U	23 U	23 U	26 U	21 U	25 U	24 U
2-Butanone (MEK)	100,000	120	5.4 U	5.6 U	5.9 U	6.5 U	5.3 U	6.3 U	7.6
Acetone	100,000	50	5.4 U	5.6 U	5.9 U	6.5 U	5.3 U	6.3 U	29
Benzene	4,800	60	1.1 U	1.1 U	2.6	1.3 U	1.1 U	1.3 U	1.2 U
Carbon tetrachloride	2,400	760	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Chlorobenzene	100,000	1,100	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Chloroform	49,000	370	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
cis-1,2-Dichloroethene	100,000	250	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Ethylbenzene	41,000	1,000	1.1 U	1.1 U	0.8 J	1.3 U	1.1 U	1.3 U	1.2 U
Methyl tert-butyl ether	100,000	930	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Methylene Chloride	100,000	50	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
n-Butylbenzene	100,000	12,000	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
N-Propylbenzene	100,000	3,900	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
sec-Butylbenzene	100,000	11,000	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
tert-Butylbenzene	100,000	5,900	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Tetrachloroethene	19,000	1,300	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Toluene	100,000	700	1.1 U	1.1 U	0.69 J	1.3 U	1.1 U	1.3 U	1.2 U
trans-1,2-Dichloroethene	100,000	190	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Trichloroethene	21,000	470	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Vinyl chloride	900	20	1.1 U	1.1 U	1.2 U	1.3 U	1.1 U	1.3 U	1.2 U
Xylenes, Total	100,000	1,600	2.1 U	2.3 U	1.3 J	2.6 U	2.1 U	2.5 U	2.4 U
Total Conc	NS	NS	0	0	5.54	0	0	0	36.6

Table 2a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	RU-P3D-A-11112015 460-104421-4 11/11/2015	RU-Q1D-11092015 460-104290-3 11/9/2015	RU-Q1D-A-11092015 460-104290-4 11/9/2015	RU-Q1S-11092015 460-104290-1 11/9/2015	RU-Q1S-A-11092015 460-104290-2 11/9/2015	RU-Q2D-11102015 460-104361-3 11/10/2015	RU-Q2D-A-11102015 460-104361-4 11/10/2015
1,1,1-Trichloroethane	100,000	680	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,1-Dichloroethane	26,000	270	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,1-Dichloroethene	100,000	330	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,2,4-Trimethylbenzene	52,000	3,600	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,2-Dichlorobenzene	100,000	1,100	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,2-Dichloroethane	3,100	20	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,3,5-Trimethylbenzene	52,000	8,400	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,3-Dichlorobenzene	49,000	2,400	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,4-Dichlorobenzene	13,000	1,800	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
1,4-Dioxane	13,000	100	21 U	19 U	22 U	21 U	21 U	19 U	20 U
2-Butanone (MEK)	100,000	120	4.2 J	4.8 U	5.5 U	5.1 U	5.3 U	4.9 U	5 U
Acetone	100,000	50	15	4.8 U	5.5 U	5.1 U	5.3 U	4.9 U	5 U
Benzene	4,800	60	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Carbon tetrachloride	2,400	760	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Chlorobenzene	100,000	1,100	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Chloroform	49,000	370	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
cis-1,2-Dichloroethene	100,000	250	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Ethylbenzene	41,000	1,000	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Methyl tert-butyl ether	100,000	930	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Methylene Chloride	100,000	50	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
n-Butylbenzene	100,000	12,000	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
N-Propylbenzene	100,000	3,900	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
sec-Butylbenzene	100,000	11,000	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
tert-Butylbenzene	100,000	5,900	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Tetrachloroethene	19,000	1,300	1.1 U	0.52 J	0.55 J	1 U	1.1 U	0.97 U	1 U
Toluene	100,000	700	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
trans-1,2-Dichloroethene	100,000	190	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Trichloroethene	21,000	470	1.1 U	0.9 J	0.83 J	1 U	1.1 U	0.97 U	1 U
Vinyl chloride	900	20	1.1 U	0.95 U	1.1 U	1 U	1.1 U	0.97 U	1 U
Xylenes, Total	100,000	1,600	2.1 U	1.9 U	2.2 U	2.1 U	2.1 U	1.9 U	2 U
Total Conc	NS	NS	19.2	1.42	1.38	0	0	0	0

Table 2a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	RU-Q2S-11102015 460-104361-5 11/10/2015	RU-Q2S-A-11102015 460-104361-6 11/10/2015	RU-Q3D-11112015 460-104421-1 11/11/2015	RU-Q3D-A-11112015 460-104421-2 11/11/2015	RU-Q4D-11122015 460-104548-1 11/12/2015	RU-Q4D-A-11122015 460-104548-2 11/12/2015	RU-R4D-11112015 460-104421-5 11/11/2015
1,1,1-Trichloroethane	100,000	680	1.1 U	1.1 U	1.2 U	1.2 U	1.1 UJ	1 UJ	0.52 J
1,1-Dichloroethane	26,000	270	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
1,1-Dichloroethene	100,000	330	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	0.7 J
1,2,4-Trimethylbenzene	52,000	3,600	1.1 U	1.1 U	3	1.8	1.1 U	1 U	1.1 U
1,2-Dichlorobenzene	100,000	1,100	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
1,2-Dichloroethane	3,100	20	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
1,3,5-Trimethylbenzene	52,000	8,400	1.1 U	1.1 U	0.52 J	0.41 J	1.1 U	1 U	1.1 U
1,3-Dichlorobenzene	49,000	2,400	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
1,4-Dichlorobenzene	13,000	1,800	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
1,4-Dioxane	13,000	100	22 U	22 U	23 U	23 U	22 U	20 U	23 U
2-Butanone (MEK)	100,000	120	5.4 U	5.5 U	4.5 J	3.3 J	5.5 U	5.1 U	3.9 J
Acetone	100,000	50	5.4 U	5.5 U	21	11	5.5 U	5.1 U	22
Benzene	4,800	60	1.1 U	1.1 U	2	2.7	1.1 U	1 U	1.1 U
Carbon tetrachloride	2,400	760	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Chlorobenzene	100,000	1,100	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Chloroform	49,000	370	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
cis-1,2-Dichloroethene	100,000	250	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Ethylbenzene	41,000	1,000	1.1 U	1.1 U	3.1	3.3	1.1 U	1 U	1.1 U
Methyl tert-butyl ether	100,000	930	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Methylene Chloride	100,000	50	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
n-Butylbenzene	100,000	12,000	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
N-Propylbenzene	100,000	3,900	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
sec-Butylbenzene	100,000	11,000	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
tert-Butylbenzene	100,000	5,900	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Tetrachloroethene	19,000	1,300	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Toluene	100,000	700	1.1 U	1.1 U	1.4	1.4	1.1 U	1 U	1.1 U
trans-1,2-Dichloroethene	100,000	190	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Trichloroethene	21,000	470	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	0.34 J
Vinyl chloride	900	20	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1 U	1.1 U
Xylenes, Total	100,000	1,600	2.2 U	2.2 U	5.8	6.1	2.2 U	2 U	2.3 U
Total Conc	NS	NS	0	0	41.32	30.01	0	0	27.46

Table 2a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	RU-R4D-A-11112015 460-104421-6 11/11/2015	RU-S2D-11122015 460-104618-1 11/12/2015	RU-S2D-A-11122015 460-104618-2 11/12/2015	RU-S3D-11112015 460-104421-7 11/11/2015	RU-S3D-A-11112015 460-104421-8 11/11/2015	RU-S4D-11122015 460-104548-3 11/12/2015	RU-S4D-A-11122015 460-104548-4 11/12/2015
1,1,1-Trichloroethane	100,000	680	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 UJ	1.1 U
1,1-Dichloroethane	26,000	270	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,1-Dichloroethene	100,000	330	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,2,4-Trimethylbenzene	52,000	3,600	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,2-Dichlorobenzene	100,000	1,100	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,2-Dichloroethane	3,100	20	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,3,5-Trimethylbenzene	52,000	8,400	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,3-Dichlorobenzene	49,000	2,400	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,4-Dichlorobenzene	13,000	1,800	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
1,4-Dioxane	13,000	100	33 U	21 U	18 U	18 U	19 U	22 U	22 U
2-Butanone (MEK)	100,000	120	4.5 J	5.4 U	4.6 U	1.9 J	2 J	5.6 U	5.4 U
Acetone	100,000	50	16	14	4.6 U	7.2	8.2	5.6 U	6.6
Benzene	4,800	60	1.6 U	1.1 U	0.92 U	4.2	2.9	1.1 U	1.1 U
Carbon tetrachloride	2,400	760	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Chlorobenzene	100,000	1,100	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Chloroform	49,000	370	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
cis-1,2-Dichloroethene	100,000	250	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Ethylbenzene	41,000	1,000	1.6 U	1.1 U	0.92 U	0.25 J	0.93 U	1.1 U	1.1 U
Methyl tert-butyl ether	100,000	930	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Methylene Chloride	100,000	50	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	4	4
n-Butylbenzene	100,000	12,000	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
N-Propylbenzene	100,000	3,900	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
sec-Butylbenzene	100,000	11,000	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
tert-Butylbenzene	100,000	5,900	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Tetrachloroethene	19,000	1,300	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Toluene	100,000	700	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
trans-1,2-Dichloroethene	100,000	190	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Trichloroethene	21,000	470	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 U	1.1 U
Vinyl chloride	900	20	1.6 U	1.1 U	0.92 U	0.91 U	0.93 U	1.1 UJ	1.1 U
Xylenes, Total	100,000	1,600	3.3 U	2.1 U	1.8 U	0.16 J	1.9 U	2.2 U	2.2 U
Total Conc	NS	NS	20.5	14	0	13.71	13.1	4	10.6

Table 2b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	Site-Specific Action Levels µg/kg	RU-P1D-11102015 460-104361-9 11/10/2015	RU-P2D-11102015 460-104361-1 11/10/2015	RU-P2S-11102015 460-104361-7 11/10/2015	RU-P3D-11112015 460-104421-3 11/11/2015	RU-Q1D-11092015 460-104290-3 11/9/2015
2-Methylphenol	**100,000**	**330**	**NS**	400 U	420 U	380 U	430 U	380 U
3 & 4 Methylphenol	**100,000**	**330**	**NS**	400 U	420 U	380 U	430 U	380 U
Acenaphthene	**100,000**	**98,000**	**NS**	400 U	130 J	130 J	430 U	380 U
Acenaphthylene	**100,000**	**107,000**	**NS**	400 U	420 U	32 J	430 U	380 U
Anthracene	**100,000**	**1,000,000**	**NS**	400 U	260 J	360 J	430 U	380 U
Benzo[a]anthracene	**1,000**	**1,000**	**NS**	40 U	310	**1,100**	43 U	38 U
Benzo[a]pyrene	**1,000**	**22,000**	**NS**	16 J	260	**1,100**	43 U	38 U
Benzo[b]fluoranthene	**1,000**	**1,700**	**NS**	16 J	230	**1,300**	43 U	38 U
Benzo[g,h,i]perylene	**100,000**	**1,000,000**	**NS**	400 U	180 J	1,100	430 U	380 U
Benzo[k]fluoranthene	**3,900**	**1,700**	**NS**	40 U	92	480	43 U	38 U
Chrysene	**3,900**	**1,000**	**NS**	21 J	310 J	1,300	430 U	380 U
Dibenz(a,h)anthracene	**330**	**1,000,000**	**NS**	40 U	54	270	43 U	38 U
Dibenzofuran	**59,000**	**210,000**	**NS**	400 U	72 J	88 J	430 U	380 U
Fluoranthene	**100,000**	**1,000,000**	**NS**	31 J	570	2,100	430 U	380 U
Fluorene	**100,000**	**386,000**	**NS**	400 U	130 J	120 J	430 U	380 U
Hexachlorobenzene	**1,200**	**3,200**	**NS**	40 U	42 U	38 U	43 U	38 U
Indeno[1,2,3-cd]pyrene	**500**	**8,200**	**NS**	40 U	160	**1,100**	43 UJ	38 U
Naphthalene	**100,000**	**12,000**	**NS**	400 U	140 J	97 J	430 U	380 U
Pentachlorophenol	**6,700**	**800**	**NS**	320 UJ	340 UJ	300 UJ	340 U	310 U
Phenanthrene	**100,000**	**1,000,000**	**NS**	28 J	1,000	1,700	430 U	380 U
Phenol	**100,000**	**330**	**NS**	400 U	420 U	380 U	430 U	380 U
Pyrene	**100,000**	**1,000,000**	**NS**	27 J	670	1,900	430 U	380 U
Total Conc	**NS**	**NS**	**250,000**	139	4,568	14,277	0	0

Table 2b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	Site-Specific Action Levels µg/kg	RU-Q1S-11092015 460-104290-1 11/9/2015	RU-Q2D-11102015 460-104361-3 11/10/2015	RU-Q2S-11102015 460-104361-5 11/10/2015	RU-Q3D-11112015 460-104421-1 11/11/2015	RU-Q4D-11122015 460-104548-1 11/12/2015
2-Methylphenol	**100,000**	**330**	**NS**	380 U	380 U	390 U	430 U	400 U
3 & 4 Methylphenol	**100,000**	**330**	**NS**	380 U	380 U	390 U	430 U	400 U
Acenaphthene	**100,000**	**98,000**	**NS**	71 J	380 U	65 J	48 J	400 U
Acenaphthylene	**100,000**	**107,000**	**NS**	380 U	380 U	16 J	430 U	400 U
Anthracene	**100,000**	**1,000,000**	**NS**	230 J	380 U	200 J	100 J	400 U
Benzo[a]anthracene	**1,000**	**1,000**	**NS**	610	38 U	740	270	40 U
Benzo[a]pyrene	**1,000**	**22,000**	**NS**	450	38 U	700	250	20 J
Benzo[b]fluoranthene	**1,000**	**1,700**	**NS**	590	38 U	820	300	28 J
Benzo[g,h,i]perylene	**100,000**	**1,000,000**	**NS**	280 J	380 U	620	200 J	400 U
Benzo[k]fluoranthene	**3,900**	**1,700**	**NS**	280	38 U	270	130	40 U
Chrysene	**3,900**	**1,000**	**NS**	640	380 U	810	300 J	29 J
Dibenz(a,h)anthracene	**330**	**1,000,000**	**NS**	85	38 U	160	48	40 U
Dibenzofuran	**59,000**	**210,000**	**NS**	54 J	380 U	43 J	44 J	400 U
Fluoranthene	**100,000**	**1,000,000**	**NS**	1,100	380 U	1,300	580	66 J
Fluorene	**100,000**	**386,000**	**NS**	89 J	380 U	65 J	57 J	400 U
Hexachlorobenzene	**1,200**	**3,200**	**NS**	38 U	38 U	39 U	43 U	40 U
Indeno[1,2,3-cd]pyrene	**500**	**8,200**	**NS**	320	38 U	**650**	190 J	40 U
Naphthalene	**100,000**	**12,000**	**NS**	37 J	380 U	40 J	150 J	400 U
Pentachlorophenol	**6,700**	**800**	**NS**	310 U	310 UJ	320 UJ	340 U	320 U
Phenanthrene	**100,000**	**1,000,000**	**NS**	1,000	380 U	1,100	490	47 J
Phenol	**100,000**	**330**	**NS**	380 U	380 U	390 U	430 U	400 U
Pyrene	**100,000**	**1,000,000**	**NS**	1,300	380 U	1,300	540	68 J
Total Conc	**NS**	**NS**	**250,000**	7,136	0	8,899	3,697	258

Table 2b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Semivolatile Organic Compounds

Client ID Lab Sample ID Date Sampled µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	NYSDEC Part 375 Protection of Groundwater SCO µg/kg	Site-Specific Action Levels µg/kg	RU-R4D-11112015 460-104421-5 11/11/2015	RU-S2D-11122015 460-104618-1 11/12/2015	RU-S3D-11112015 460-104421-7 11/11/2015	RU-S4D-11122015 460-104548-3 11/12/2015
2-Methylphenol	**100,000**	**330**	**NS**	420 U	390 U	370 U	420 U
3 & 4 Methylphenol	**100,000**	**330**	**NS**	420 U	390 U	18 J	420 U
Acenaphthene	**100,000**	**98,000**	**NS**	360 J	390 U	240 J	12 J
Acenaphthylene	**100,000**	**107,000**	**NS**	420 U	390 U	17 J	420 U
Anthracene	**100,000**	**1,000,000**	**NS**	65 J	390 U	180 J	420 U
Benzo[a]anthracene	**1,000**	**1,000**	**NS**	99	39 U	140	71
Benzo[a]pyrene	**1,000**	**22,000**	**NS**	64	39 U	98	54
Benzo[b]fluoranthene	**1,000**	**1,700**	**NS**	79	39 U	110	61
Benzo[g,h,i]perylene	**100,000**	**1,000,000**	**NS**	46 J	390 U	53 J	39 J
Benzo[k]fluoranthene	**3,900**	**1,700**	**NS**	31 J	39 U	42	21 J
Chrysene	**3,900**	**1,000**	**NS**	97 J	390 U	150 J	64 J
Dibenz(a,h)anthracene	**330**	**1,000,000**	**NS**	42 U	39 U	37 U	42 U
Dibenzofuran	**59,000**	**210,000**	**NS**	82 J	390 U	69 J	420 U
Fluoranthene	**100,000**	**1,000,000**	**NS**	310 J	17 J	360 J	100 J
Fluorene	**100,000**	**386,000**	**NS**	89 J	390 U	200 J	420 U
Hexachlorobenzene	**1,200**	**3,200**	**NS**	42 U	39 U	37 U	42 U
Indeno[1,2,3-cd]pyrene	**500**	**8,200**	**NS**	48	39 U	62 J	40 J
Naphthalene	**100,000**	**12,000**	**NS**	89 J	390 U	71 J	420 U
Pentachlorophenol	**6,700**	**800**	**NS**	340 U	320 U	300 U	340 U
Phenanthrene	**100,000**	**1,000,000**	**NS**	490	14 J	670	80 J
Phenol	**100,000**	**330**	**NS**	420 U	390 U	370 U	420 U
Pyrene	**100,000**	**1,000,000**	**NS**	190 J	390 U	400	110 J
Total Conc	**NS**	**NS**	**250,000**	2,139	31	2,880	652

Table 2c
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Metals

Client ID Lab Sample ID Date Sampled Dilution mg/kg	NYSDEC Part 375 Restricted Residential SCO mg/kg	NYSDEC Part 375 Protection of Groundwater SCO mg/kg	Site-Specific Action Levels mg/kg	RU-P1D-11102015 460-104361-9 11/10/2015 1/4 †	RU-P2D-11102015 460-104361-1 11/10/2015 1/4 †	RU-P2S-11102015 460-104361-7 11/10/2015 1/4 †	RU-P3D-11112015 460-104421-3 11/11/2015 1/4 †	RU-Q1D-11092015 460-104290-3 11/9/2015 1/4 †
Arsenic	**16**	**16**	**24**	2.8 J	1.9 J	8.4	3.1	1.6 J
Barium	**400**	**820**	**700**	15.2 J	15.7 J	124	44.8	25.9 J
Beryllium	**72**	**47**	**NS**	0.47 U	0.49 U	0.4 J	0.45	0.42 U
Cadmium	**4.3**	**7.5**	**NS**	0.94 U	0.99 U	0.9 U	0.79 U	0.83 U
Chromium	**NS**	**NS**	**NS**	8.3	7.6	18.3	15	11.1
Cr (III)	**180**	**NS**	**NS**	8.3	7.6	18.3	15	11.1
Cr (VI)	**110**	**19**	**NS**	2.4 U	2.5 U	2.4 U	2.6 U	2.3 U
Copper	**270**	**1,720**	**NS**	6.5	4.2 J	58.9	9.8	7.5
Cyanide, Total	**27**	**40**	**NS**	0.036 J	0.021 U	0.28	0.03 J	0.11 U
Lead	**400**	**450**	**1,200**	5.4	4.1	217	5.4	5.1
Manganese	**2,000**	**2,000**	**NS**	78.7	54.5	338	113	118
Mercury	**0.81**	**0.73**	**2.5**	0.019 U	0.02 U	**0.85**	0.022 U	0.019 U
Nickel	**310**	**130**	**NS**	10.4	9.1 J	22.2	13.8	11.2
Selenium	**180**	**4**	**NS**	4.7 U	4.9 U	4.5 U	4 U	4.2 U
Silver	**180**	**8.3**	**NS**	2.3 U	2.5 U	2.3 U	2 U	2.1 U
Zinc	**10,000**	**2,480**	**NS**	26	22.8	202	31.9	26.8

† ***Dilution factor varies***

Table 2c
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Metals

Client ID Lab Sample ID Date Sampled Dilution mg/kg	NYSDEC Part 375 Restricted Residential SCO mg/kg	NYSDEC Part 375 Protection of Groundwater SCO mg/kg	Site-Specific Action Levels mg/kg	RU-Q1S-11092015 460-104290-1 11/9/2015 1/4 †	RU-Q2D-11102015 460-104361-3 11/10/2015 1/4 †	RU-Q2S-11102015 460-104361-5 11/10/2015 1/4 †	RU-Q3D-11112015 460-104421-1 11/11/2015 1/4 †	RU-Q4D-11122015 460-104548-1 11/12/2015 1/4 †
Arsenic	**16**	**16**	**24**	3.8	1.9 J	3.1 J	3	1.9 J
Barium	**400**	**820**	**700**	49.8	29.8 J	37.3 J	53.8	29.4 J
Beryllium	**72**	**47**	**NS**	0.4	0.44 U	0.46 U	0.39 J	0.43 U
Cadmium	**4.3**	**7.5**	**NS**	0.79 U	0.88 U	0.93 U	0.81 U	0.86 U
Chromium	**NS**	**NS**	**NS**	18.4	12.1	16.6	17.5	11
Cr (III)	**180**	**NS**	**NS**	18.4	12.1	16.6	17.5	11
Cr (VI)	**110**	**19**	**NS**	2.4 U	2.2 U	2.4 U	2.6 U	2.4 U
Copper	**270**	**1,720**	**NS**	16.6	6.5	11.5	17.9	10.3
Cyanide, Total	**27**	**40**	**NS**	0.059 J	0.027 U	0.056 J	0.05 J	0.056 J
Lead	**400**	**450**	**1,200**	32.5	6.3	67.6	19.7	9.3
Manganese	**2,000**	**2,000**	**NS**	339	64.9	102	151	71.3
Mercury	**0.81**	**0.73**	**2.5**	0.079	0.019 U	0.039	0.067	0.019 U
Nickel	**310**	**130**	**NS**	16.5	6.7 J	11.4	14.5	10.8
Selenium	**180**	**4**	**NS**	3.9 U	4.4 U	4.6 U	4.1 U	4.3 U
Silver	**180**	**8.3**	**NS**	2 U	2.2 U	2.3 U	2 U	2.2 U
Zinc	**10,000**	**2,480**	**NS**	52.7	22.3	34.2	80.5	33.9

† ***Dilution factor varies***

Table 2c
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Metals

Client ID Lab Sample ID Date Sampled Dilution mg/kg	NYSDEC Part 375 Restricted Residential SCO mg/kg	NYSDEC Part 375 Protection of Groundwater SCO mg/kg	Site-Specific Action Levels mg/kg	RU-R4D-11112015 460-104421-5 11/11/2015 1/4 †	RU-S2D-11122015 460-104618-1 11/12/2015 1/4 †	RU-S3D-11112015 460-104421-7 11/11/2015 1/4 †	RU-S4D-11122015 460-104548-3 11/12/2015 1/4 †
Arsenic	**16**	**16**	**24**	3.9	2.4 J	4	2.7 J
Barium	**400**	**820**	**700**	74.2	35.1 J	62.2	30.1 J
Beryllium	**72**	**47**	**NS**	0.53	0.56	0.34	0.41
Cadmium	**4.3**	**7.5**	**NS**	0.81 U	0.72 U	0.65 U	0.8 U
Chromium	**NS**	**NS**	**NS**	14.9	18.1	16.8	13.5
Cr (III)	**180**	**NS**	**NS**	14.9	18.1	16.8	13.5
Cr (VI)	**110**	**19**	**NS**	2.5 U	2.4 U	2.2 U	2.6 U
Copper	**270**	**1,720**	**NS**	19.7	11.4	18.2	17.1
Cyanide, Total	**27**	**40**	**NS**	0.073 J	0.03 J B	0.03 J	0.045 J
Lead	**400**	**450**	**1,200**	9.8	8	148	20.8
Manganese	**2,000**	**2,000**	**NS**	92.3	144	212	104
Mercury	**0.81**	**0.73**	**2.5**	0.02 U	0.019 U	0.014 J	0.025
Nickel	**310**	**130**	**NS**	16.7	9.7	12.4	11.9
Selenium	**180**	**4**	**NS**	4.1 U	3.6 U	3.3 U	4 U
Silver	**180**	**8.3**	**NS**	2 U	1.8 U	1.6 U	2 U
Zinc	**10,000**	**2,480**	**NS**	48.7	29	37.7	31.7

† ***Dilution factor varies***

Table 2d
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Polychlorinated Biphenyls, Pesticides, and Herbicides

Client ID Lab Sample ID Date Sampled	NYSDEC Part 375 Restricted Residential SCO	NYSDEC Part 375 Protection of Groundwater SCO	RU-P1D-11102015 460-104361-9 11/10/2015	RU-P2D-11102015 460-104361-1 11/10/2015	RU-P2S-11102015 460-104361-7 11/10/2015	RU-P3D-11112015 460-104421-3 11/11/2015	RU-Q1D-11092015 460-104290-3 11/9/2015	RU-Q1S-11092015 460-104290-1 11/9/2015
Polychlorinated Biphenyls - µg/kg	**µg/kg**	**µg/kg**						
Aroclor 1016	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1221	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1232	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1242	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1248	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1254	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1260	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1262	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Aroclor 1268	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Polychlorinated biphenyls, Total	**1,000**	**3,200**	81 U	86 U	76 U	87 U	78 U	78 U
Total Conc	**NS**	**NS**	0	0	0	0	0	0
Pesticides - µg/kg	**µg/kg**	**µg/kg**						
4,4'-DDD	**13,000**	**14,000**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
4,4'-DDE	**8,900**	**17,000**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
4,4'-DDT	**7,900**	**136,000**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Aldrin	**97**	**190**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
alpha-BHC	**480**	**20**	2.4 U	2.6 U	2.3 U	2.6 U	2.3 U	2.3 U
alpha-Chlordane	**4,200**	**2,900**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
beta-BHC	**360**	**90**	2.4 U	2.6 U	2.3 U	2.6 U	2.3 U	2.3 U
Chlordane (technical)	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
delta-BHC	**100,000**	**250**	2.4 U	2.6 U	2.3 U	2.6 U	2.3 U	2.3 U
Dieldrin	**200**	**100**	2.4 U	2.6 U	2.3 U	2.6 U	2.3 U	2.3 U
Endosulfan I	**24,000 TS**	**102,000 TS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Endosulfan II	**24,000 TS**	**102,000 TS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Endosulfan sulfate	**24,000 TS**	**1,000,000 TS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Endrin	**11,000**	**60**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Endrin aldehyde	**NS**	**NS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Endrin ketone	**NS**	**NS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
gamma-BHC (Lindane)	**1,300**	**100**	2.4 U	2.6 U	2.3 U	2.6 U	2.3 U	2.3 U
Heptachlor	**2,100**	**380**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Heptachlor epoxide	**NS**	**NS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Methoxychlor	**NS**	**NS**	8.1 U	8.6 U	7.6 U	8.7 U	7.8 U	7.8 U
Toxaphene	**NS**	**NS**	81 U	86 U	76 U	87 U	78 U	78 U
Herbicides - µg/kg	**µg/kg**	**µg/kg**						
Silvex (2,4,5-TP)	**100,000**	**3,800**	20 U	22 U	19 U	22 U	20 U	20 U

Table 2d
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Polychlorinated Biphenyls, Pesticides, and Herbicides

Client ID Lab Sample ID Date Sampled	NYSDEC Part 375 Restricted Residential SCO	NYSDEC Part 375 Protection of Groundwater SCO	RU-Q2D-11102015 460-104361-3 11/10/2015	RU-Q2S-11102015 460-104361-5 11/10/2015	RU-Q3D-11112015 460-104421-1 11/11/2015	RU-Q4D-11122015 460-104548-1 11/12/2015	RU-R4D-11112015 460-104421-5 11/11/2015	RU-S2D-11122015 460-104618-1 11/12/2015
Polychlorinated Biphenyls - µg/kg	**µg/kg**	**µg/kg**						
Aroclor 1016	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1221	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1232	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1242	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1248	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1254	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1260	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1262	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Aroclor 1268	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Polychlorinated biphenyls, Total	**1,000**	**3,200**	78 U	80 U	86 U	81 U	86 U	80 U
Total Conc	**NS**	**NS**	0	0	0	0	0	0
Pesticides - µg/kg	**µg/kg**	**µg/kg**						
4,4'-DDD	**13,000**	**14,000**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
4,4'-DDE	**8,900**	**17,000**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
4,4'-DDT	**7,900**	**136,000**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Aldrin	**97**	**190**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
alpha-BHC	**480**	**20**	2.3 U	2.4 U	2.6 U	2.4 U	2.6 U	2.4 U
alpha-Chlordane	**4,200**	**2,900**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
beta-BHC	**360**	**90**	2.3 U	2.4 U	2.6 U	2.4 U	2.6 U	2.4 U
Chlordane (technical)	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
delta-BHC	**100,000**	**250**	2.3 U	2.4 U	2.6 U	2.4 U	2.6 U	2.4 U
Dieldrin	**200**	**100**	2.3 U	2.4 U	2.6 U	2.4 U	2.6 U	2.4 U
Endosulfan I	**24,000 TS**	**102,000 TS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Endosulfan II	**24,000 TS**	**102,000 TS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Endosulfan sulfate	**24,000 TS**	**1,000,000 TS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Endrin	**11,000**	**60**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Endrin aldehyde	**NS**	**NS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Endrin ketone	**NS**	**NS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
gamma-BHC (Lindane)	**1,300**	**100**	2.3 U	2.4 U	2.6 U	2.4 U	2.6 U	2.4 U
Heptachlor	**2,100**	**380**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Heptachlor epoxide	**NS**	**NS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Methoxychlor	**NS**	**NS**	7.8 U	8 U	8.6 U	8.1 U	8.6 U	8 U
Toxaphene	**NS**	**NS**	78 U	80 U	86 U	81 U	86 U	80 U
Herbicides - µg/kg	**µg/kg**	**µg/kg**						
Silvex (2,4,5-TP)	**100,000**	**3,800**	20 U	20 U	22 U	21 U	22 U	20 U

Table 2d
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
On-Site Reuse Soil Results
Polychlorinated Biphenyls, Pesticides, and Herbicides

Client ID Lab Sample ID Date Sampled	NYSDEC Part 375 Restricted Residential SCO	NYSDEC Part 375 Protection of Groundwater SCO	RU-S3D-11112015 460-104421-7 11/11/2015	RU-S4D-11122015 460-104548-3 11/12/2015
Polychlorinated Biphenyls - µg/kg	**µg/kg**	**µg/kg**		
Aroclor 1016	**NS**	**NS**	74 U	85 U
Aroclor 1221	**NS**	**NS**	74 U	85 U
Aroclor 1232	**NS**	**NS**	74 U	85 U
Aroclor 1242	**NS**	**NS**	74 U	85 U
Aroclor 1248	**NS**	**NS**	74 U	85 U
Aroclor 1254	**NS**	**NS**	74 U	85 U
Aroclor 1260	**NS**	**NS**	74 U	85 U
Aroclor 1262	**NS**	**NS**	74 U	85 U
Aroclor 1268	**NS**	**NS**	74 U	85 U
Polychlorinated biphenyls, Total	**1,000**	**3,200**	74 U	85 U
Total Conc	**NS**	**NS**	0	0
Pesticides - µg/kg	**µg/kg**	**µg/kg**		
4,4'-DDD	**13,000**	**14,000**	7.4 U	8.5 U
4,4'-DDE	**8,900**	**17,000**	7.4 U	8.5 U
4,4'-DDT	**7,900**	**136,000**	7.4 U	8.5 U
Aldrin	**97**	**190**	7.4 U	8.5 U
alpha-BHC	**480**	**20**	2.2 U	2.5 U
alpha-Chlordane	**4,200**	**2,900**	7.4 U	8.5 U
beta-BHC	**360**	**90**	2.2 U	2.5 U
Chlordane (technical)	**NS**	**NS**	74 U	85 U
delta-BHC	**100,000**	**250**	2.2 U	2.5 U
Dieldrin	**200**	**100**	2.2 U	2.5 U
Endosulfan I	**24,000 TS**	**102,000 TS**	7.4 U	8.5 U
Endosulfan II	**24,000 TS**	**102,000 TS**	7.4 U	8.5 U
Endosulfan sulfate	**24,000 TS**	**1,000,000 TS**	7.4 U	8.5 U
Endrin	**11,000**	**60**	7.4 U	8.5 U
Endrin aldehyde	**NS**	**NS**	7.4 U	8.5 U
Endrin ketone	**NS**	**NS**	7.4 U	8.5 U
gamma-BHC (Lindane)	**1,300**	**100**	2.2 U	2.5 U
Heptachlor	**2,100**	**380**	7.4 U	8.5 U
Heptachlor epoxide	**NS**	**NS**	7.4 U	8.5 U
Methoxychlor	**NS**	**NS**	7.4 U	8.5 U
Toxaphene	**NS**	**NS**	74 U	85 U
Herbicides - µg/kg	**µg/kg**	**µg/kg**		
Silvex (2,4,5-TP)	**100,000**	**3,800**	19 U	22 U

Table 3a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building B Post-Remediation Soil Endpoint Sample Exceedance Summary
Semivolatile Organic Compounds - BNs and RCRA Metals

Client ID Lab Sample ID Date Sampled Dilution SVOCs - µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	EP-28-10292015 460-103652-1 10/29/2015 2	EP-29-10292015 460-103652-2 10/29/2015 5/10 †	EP-30-10302015 460-103751-1 10/30/2015 2	EP-32-11042015 460-104076-2 11/04/2015 2	EP-33-11042015 460-104076-3 11/04/2015 10
1,2,4-Trichlorobenzene	NS	99 U	280 U	100 U	83 U	450 U
1,2-Dichlorobenzene	100,000	990 U	2,800 U	1,000 U	830 U	4,500 U
1,3-Dichlorobenzene	49,000	990 U	2,800 U	1,000 U	830 U	4,500 U
1,4-Dichlorobenzene	13,000	990 U	2,800 U	1,000 U	830 U	4,500 U
2,2'-oxybis[1-chloropropane	NS	990 U	2,800 U	1,000 UJ	830 U	4,500 U
2,4-Dinitrotoluene	NS	200 U	560 U	210 U	170 U	910 U
2,6-Dinitrotoluene	NS	200 U	560 U	210 U	170 U	910 U
2-Chloronaphthalene	NS	34 J	2,800 U	1,000 U	830 U	4,500 U
2-Methylnaphthalene	NS	1,200	13,000	1,300	530 J	3,100 J
2-Nitroaniline	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
3,3'-Dichlorobenzidine	NS	400 U	450 J	420 U	340 U	1,800 U
3-Nitroaniline	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
4-Bromophenyl phenyl ethe	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
4-Chloroaniline	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
4-Chlorophenyl phenyl ethe	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
4-Nitroaniline	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Acenaphthene	100,000	2,900	18,000	2,500	1,900	15,000
Acenaphthylene	100,000	290 J	1,700 J	200 J	830 U	610 J
Anthracene	100,000	5,000	21,000	3,100	2,800	22,000
Benzo[a]anthracene	1,000	**6,300**	**21,000**	**5,400**	**2,600**	**26,000**
Benzo[a]pyrene	1,000	**5,000**	**17,000**	**4,700**	**1,900**	**21,000**
Benzo[b]fluoranthene	1,000	**5,300**	**19,000**	**5,000**	**1,900**	**22,000**
Benzo[g,h,i]perylene	100,000	4,000	16,000	4,100	1,300	17,000
Benzo[k]fluoranthene	3,900	2,500	**6,600**	2,100	650	**8,600**
Bis(2-chloroethoxy)methan	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Bis(2-chloroethyl)ether	NS	99 U	280 U	100 U	83 U	450 U
Bis(2-ethylhexyl) phthalate	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Butyl benzyl phthalate	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Carbazole	NS	1,000	8,100	1,100	220 J	4,200 J
Chrysene	3,900	**6,100**	**21,000**	**5,700**	2,700	**28,000**
Dibenz(a,h)anthracene	330	**1,000**	**4,100**	**980** J	**450**	**4,200**
Dibenzofuran	59,000	1,900	13,000	1,500	330 J	8,300
Diethyl phthalate	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Dimethyl phthalate	NS	990 U	2,800 U	1000 U	830 U	4,500 U
Di-n-butyl phthalate	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Di-n-octyl phthalate	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Fluoranthene	100,000	14,000	50,000	13,000	4,600	56,000
Fluorene	100,000	3,100	16,000	2,100	1,100	13,000
Hexachlorobenzene	1,200	99 U	280 U	100 U	83 U	450 U
Hexachlorobutadiene	NS	200 U	560 U	210 U	170 U	910 U
Hexachlorocyclopentadiene	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Hexachloroethane	NS	99 U	280 U	100 U	83 U	450 U
Indeno[1,2,3-cd]pyrene	500	**4,300**	**17,000**	**4,400** J	**1,400**	**17,000**
Isophorone	NS	400 U	1100 U	420 U	340 U	1,800 U
Naphthalene	100,000	3,300	35,000	4,600	810 J	6,600
Nitrobenzene	NS	99 U	280 U	100 U	83 U	450 U
N-Nitrosodi-n-propylamine	NS	99 U	280 U	100 U	83 U	450 U
N-Nitrosodiphenylamine	NS	990 U	2,800 U	1,000 U	830 U	4,500 U
Phenanthrene	100,000	16,000	78,000 D	15,000	13,000	70,000
Pyrene	100,000	10,000	37,000	9,700	4,600	48,000
Total Conc	NS	93,224	334,950	86,480	42,790	390,610

Table 3a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building B Post-Remediation Soil Endpoint Sample Exceedance Summary
Semivolatile Organic Compounds - BNs and RCRA Metals

Client ID Lab Sample ID Date Sampled Dilution SVOCs - µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	EP-34-11092015 460-104291-1 11/09/2015 1	EP-35-11092015 460-104291-2 11/09/2015 5	EP-36-11302015 460-105374-1 11/30/2015 1	EP-37-11302015 460-105374-2 11/30/2015 2	EP-38-11272015 460-105373-1 11/27/2015 1
1,2,4-Trichlorobenzene	NS	430 U	2,200 U	43 U	81 U	40 U
1,2-Dichlorobenzene	100,000	43 U	220 U	430 U	810 U	400 U
1,3-Dichlorobenzene	49,000	430 U	2,200 U	430 U	810 U	400 U
1,4-Dichlorobenzene	13,000	430 U	2,200 U	430 U	810 U	400 U
2,2'-oxybis[1-chloropropane	NS	430 U	2,200 U	430 UJ	810 UJ	400 UJ
2,4-Dinitrotoluene	NS	88 U	450 U	87 U	170 U	81 U
2,6-Dinitrotoluene	NS	88 U	450 U	87 U	170 U	81 U
2-Chloronaphthalene	NS	430 U	2,200 U	430 U	810 U	400 U
2-Methylnaphthalene	NS	53 J	810 J	860	410 J	360 J
2-Nitroaniline	NS	430 U	2,200 U	430 U	810 U	400 U
3,3'-Dichlorobenzidine	NS	180 U	900 U	170 U	330 U	160 U
3-Nitroaniline	NS	430 U	2,200 U	430 U	810 U	400 U
4-Bromophenyl phenyl ethe	NS	430 U	2,200 U	430 U	810 U	400 U
4-Chloroaniline	NS	430 U	2,200 U	430 U	810 U	400 U
4-Chlorophenyl phenyl ethe	NS	430 U	2,200 U	430 U	810 U	400 U
4-Nitroaniline	NS	430 U	2,200 U	430 U	810 U	400 U
Acenaphthene	100,000	1,100	4,100	1,900	1,700	1,500
Acenaphthylene	100,000	28 J	250 J	430 U	73 J	120 J
Anthracene	100,000	620	8,400	1,900	2,100	2,300
Benzo[a]anthracene	1,000	820	**13,000**	**1,900**	**3,700**	**4,400**
Benzo[a]pyrene	1,000	720	**12,000**	**1,300**	**2,900**	**3,600**
Benzo[b]fluoranthene	1,000	940	**13,000**	**1,500**	**3,300**	**4,000**
Benzo[g,h,i]perylene	100,000	710	9,100	800	2,700	2,700
Benzo[k]fluoranthene	3,900	400	**5,200**	710	1,400	1,500
Bis(2-chloroethoxy)methan	NS	430 U	2,200 U	430 U	810 U	400 U
Bis(2-chloroethyl)ether	NS	43 U	220 U	43 U	81 U	40 U
Bis(2-ethylhexyl) phthalate	NS	430 U	2,200 U	430 U	810 U	400 U
Butyl benzyl phthalate	NS	430 U	2,200 U	430 U	810 U	400 U
Carbazole	NS	56 J	1,600 J	620	920	420
Chrysene	3,900	840	**14,000**	2,000	3,800	**4,600**
Dibenz(a,h)anthracene	330	110	**2,400**	250 J	**820** J	**680** J
Dibenzofuran	59,000	210 J	2,000 J	1,300	1,000	800
Diethyl phthalate	NS	430 U	2,200 U	430 U	810 U	400 U
Dimethyl phthalate	NS	430 U	2,200 U	430 U	810 U	400 U
Di-n-butyl phthalate	NS	430 U	2,200 U	430 U	810 U	400 U
Di-n-octyl phthalate	NS	430 U	2,200 U	430 U	810 U	400 U
Fluoranthene	100,000	2,100	29,000	4,900	9,100	9,300
Fluorene	100,000	460	4,600	1,800	1,500	1,400
Hexachlorobenzene	1,200	43 U	220 U	43 U	81 U	40 U
Hexachlorobutadiene	NS	88 U	450 U	87 U	170 U	81 U
Hexachlorocyclopentadiene	NS	430 U	2,200 U	430 U	810 U	400 U
Hexachloroethane	NS	43 U	220 U	43 U	81 U	40 U
Indeno[1,2,3-cd]pyrene	500	**710**	**9,400**	**850** J	**2,900** J	**2,600** J
Isophorone	NS	180 U	900 U	460	48 J	160 U
Naphthalene	100,000	150 J	2,300	2,700	890	1,100
Nitrobenzene	NS	43 U	220 U	43 U	81 U	40 U
N-Nitrosodi-n-propylamine	NS	43 U	220 U	43 U	81 U	40 U
N-Nitrosodiphenylamine	NS	430 UJ	2,200 UJ	430 U	810 U	400 U
Phenanthrene	100,000	2,400	26,000	8,000	10,000	7,500
Pyrene	100,000	2,300	23,000	3,800	6,600	7,200
Total Conc	NS	14,727	180,160	37,550	55,861	56,080

Table 3b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building B Post-Remediation Soil Endpoint Sample Exceedance Summary
RCRA Metals

Client ID Lab Sample ID Date Sampled Dilution RCRA Metals - mg/kg	NYSDEC Part 375 Restricted Residential SCO mg/kg	EP-27-10272015 460-103494-2 10/27/2015 2	EP-28-10292015 460-103652-1 10/29/2015 2	EP-29-10292015 460-103652-2 10/29/2015 5/10 †	EP-30-10302015 460-103751-1 10/30/2015 2	EP-32-11042015 460-104076-2 11/04/2015 2
Arsenic	**16**	6.5	**20.3**	**25.9**	10.9	8.1
Barium	**400**	188	374	**483**	148	180
Cadmium	**4.3**	1 U	1 U	1.1 U	1 U	1 U
Chromium	**NS**	31.8	20.6	27.8	92.5	17.5
Lead	**400**	171	**559**	**1,200**	**618**	**636**
Mercury	**0.81**	**0.93**	**1.1**	**3.2**	**5.2**	0.81
Selenium	**180**	5.2 U	5 U	5.3 U	5.2 U	5 U
Silver	**180**	2.6 U	2.5 U	2.7 U	2.6 U	2.5 U

† ***Dilution factor varies***

Table 3b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building B Post-Remediation Soil Endpoint Sample Exceedance Summary
RCRA Metals

Client ID	NYSDEC	EP-33-11042015	EP-35-11092015
Lab Sample ID	Part 375	460-104076-3	460-104291-2
Date Sampled	Restricted	11/04/2015	11/09/2015
Dilution	Residential	10	5
RCRA Metals - mg/kg	SCO mg/kg		
Arsenic	16	47.4	18.8
Barium	400	891	325
Cadmium	4.3	0.98 U	0.97 U
Chromium	NS	21	16.2
Lead	400	1,710	515
Mercury	0.81	3.3	6.7
Selenium	180	4.9 U	4.8 U
Silver	180	0.46 J	2.4 U

† ***Dilution factor varies***

Table 4a
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building A and Park Post-Remediation Soil Enpoint Sample Exceedance Summary
Semivolatile Organic Compounds - BNs

Client ID Lab Sample ID Date Sampled Dilution µg/kg	NYSDEC Part 375 Restricted Residential SCO µg/kg	Site-Specific Action Levels µg/kg	EP-7-02042016 460-108491-5-DL 2/4/2016 20	EP-20-0202016 460-108326-2-DL 2/2/2016 20
1,2,4-Trichlorobenzene	NS	NS	810 U	760 U
1,2-Dichlorobenzene	100,000	NS	8,100 U	7,600 U
1,3-Dichlorobenzene	49,000	NS	8,100 U	7,600 U
1,4-Dichlorobenzene	13,000	NS	8,100 U	7,600 U
2,2'-oxybis[1-chloropropane]	NS	NS	8,100 U	7,600 UJ
2,4-Dinitrotoluene	NS	NS	1,600 U	1,500 U
2,6-Dinitrotoluene	NS	NS	1,600 U	1,500 U
2-Chloronaphthalene	NS	NS	8,100 U	7,600 U
2-Methylnaphthalene	NS	NS	15,000	3,400 J
2-Nitroaniline	NS	NS	8,100 U	7,600 UJ
3,3'-Dichlorobenzidine	NS	NS	3,300 U	3,100 U
3-Nitroaniline	NS	NS	8,100 U	7,600 UJ
4-Bromophenyl phenyl ether	NS	NS	8,100 U	7,600 U
4-Chloroaniline	NS	NS	8,100 U	7,600 U
4-Chlorophenyl phenyl ether	NS	NS	8,100 U	7,600 U
4-Nitroaniline	NS	NS	8,100 U	7,600 U
Acenaphthene	100,000	NS	28,000	17,000
Acenaphthylene	100,000	NS	1,100 J	7,600 U
Anthracene	100,000	NS	50,000	46,000
Benzo[a]anthracene	1,000	NS	6,900	61,000
Benzo[a]pyrene	1,000	NS	3,300	54,000
Benzo[b]fluoranthene	1,000	NS	4,600	68,000
Benzo[g,h,i]perylene	100,000	NS	1,600 J	29,000
Benzo[k]fluoranthene	3,900	NS	1,800	24,000
Bis(2-chloroethoxy)methane	NS	NS	8,100 U	7,600 U
Bis(2-chloroethyl)ether	NS	NS	810 U	760 UJ
Bis(2-ethylhexyl) phthalate	NS	NS	8,100 U	7,600 U
Butyl benzyl phthalate	NS	NS	8,100 U	7,600 U
Carbazole	NS	NS	20,000	18,000
Chrysene	3,900	NS	8,000 J	63,000
Dibenz(a,h)anthracene	330	NS	610 J	10,000 J
Dibenzofuran	59,000	NS	23,000	11,000
Diethyl phthalate	NS	NS	8,100 U	7,600 U
Dimethyl phthalate	NS	NS	8,100 U	7,600 U
Di-n-butyl phthalate	NS	NS	8,100 U	7,600 U
Di-n-octyl phthalate	NS	NS	8,100 U	7,600 U
Fluoranthene	100,000	NS	39,000	170,000
Fluorene	100,000	NS	35,000	20,000
Hexachlorobenzene	1,200	NS	810 U	760 U
Hexachlorobutadiene	NS	NS	1,600 U	1,500 U
Hexachlorocyclopentadiene	NS	NS	8,100 UJ	7,600 U
Hexachloroethane	NS	NS	810 U	760 U
Indeno[1,2,3-cd]pyrene	500	NS	1,700	37,000 J
Isophorone	NS	NS	3,300 U	620 J
Naphthalene	100,000	NS	19,000	7,800
Nitrobenzene	NS	NS	810 U	760 U
N-Nitrosodi-n-propylamine	NS	NS	810 U	760 U
N-Nitrosodiphenylamine	NS	NS	8,100 U	7,600 U
Phenanthrene	100,000	NS	100,000	160,000
Pyrene	100,000	NS	28,000	76,000
Total Conc	NS	250,000	386,610	875,820

Table 4b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building A and Park Post-Remediation Soil Endpoint Sample Exceedance Summary
RCRA Metals

Client ID Lab Sample ID Date Sampled Dilution mg/kg	NYSDEC Part 375 Restricted Residential SCO mg/kg	Site-Specific Action Levels mg/kg	EP-7A-02042016 460-108491-6 2/4/2016 4/5†	EP-11-05262015 460-95423-5 5/26/2015 1/4†	EP-14-01212016 460-107947-1 1/21/2016 1/4†	EP-20-0202016 460-108326-2 2/2/2016 1/4†
Arsenic	**16**	**24**	70	26.9	13.3	13.2
Barium	**400**	**700**	2,490	356	339	579 J
Cadmium	**4.3**	**NS**	1.7	1.1	2.7	**9.2 J**
Chromium	**NS**	**NS**	34.4	31.8	59.2	30.9
Lead	**400**	**1,200**	740	421	1,480	2,340 J
Mercury	**0.81**	**2.5**	2.2	1.3	0.81	0.63 J
Selenium	**180**	**NS**	3.9 U	3.4 U	3.5 U	4.3 U
Silver	**180**	**NS**	2 U	1.7 U	0.37 J	0.69 J

† ***Dilution factor varies***

Table 4b
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Building A and Park Post-Remediation Soil Endpoint Sample Exceedance Summary
RCRA Metals

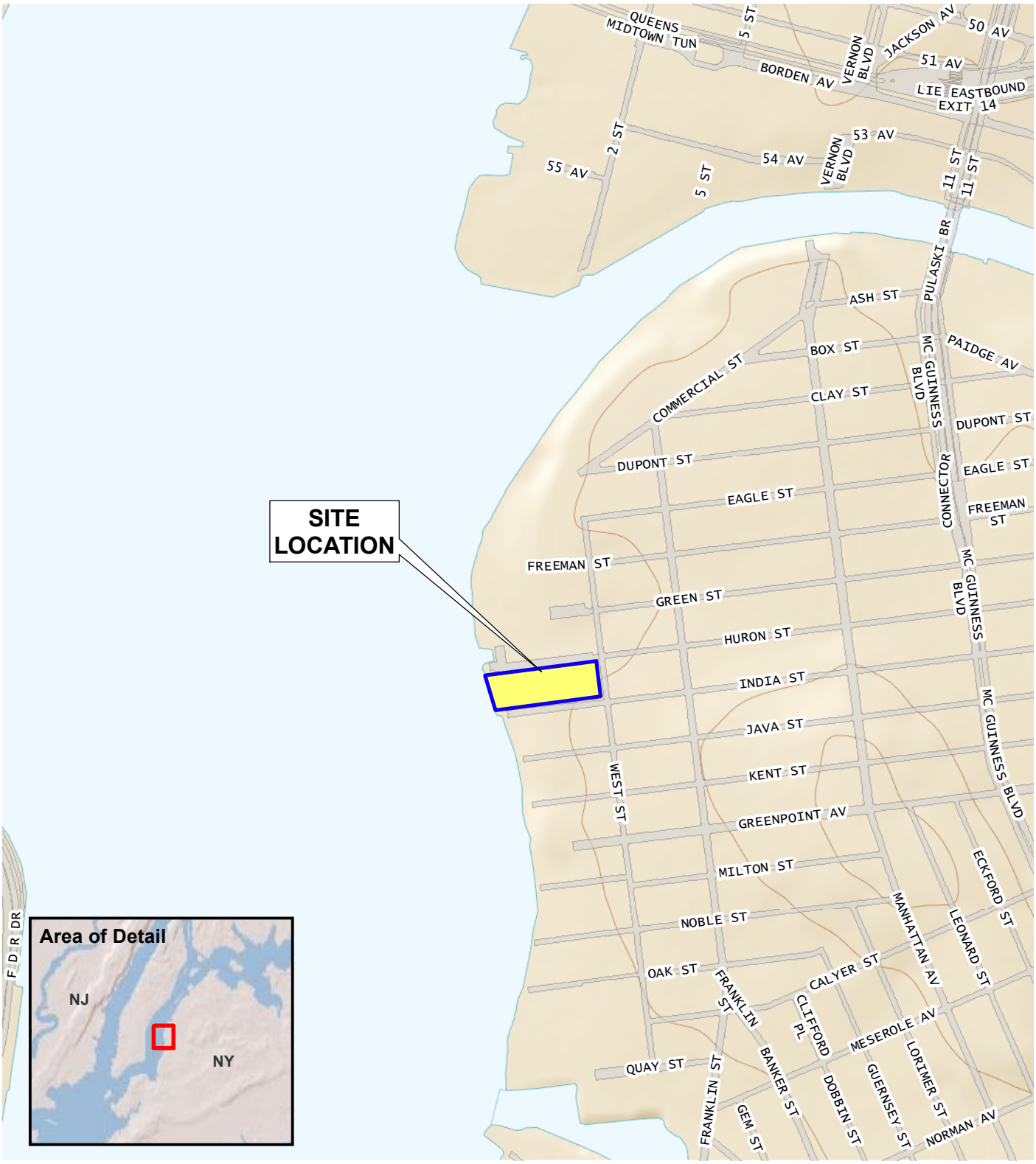
Client ID Lab Sample ID Date Sampled Dilution mg/kg	NYSDEC Part 375 Restricted Residential SCO mg/kg	Site-Specific Action Levels mg/kg	EP-20-0202016 460-108326-2 (2) 2/2/2016 2/4†	EP-24-11242015 460-105200-1 11/24/2015 4/10/20†	EP-24A-11242015 460-105200-2 11/24/2015 4/10†
Arsenic	**16**	**24**	8.7	39.3	29.7
Barium	**400**	**700**	561	269	259
Cadmium	**4.3**	**NS**	**9.2**	0.86 J	0.84 U
Chromium	**NS**	**NS**	22.8	17.2	18.3
Lead	**400**	**1,200**	1,820	4,460	1,650
Mercury	**0.81**	**2.5**	1.3	6.4	8.7
Selenium	**180**	**NS**	2.1 J	2.1 J	4.6
Silver	**180**	**NS**	0.47 J	1.2 J	0.52 J

† ***Dilution factor varies***

Table 5
Huxley Envelope Industrial Site
145 West Street
Brooklyn, NY
Soil Vapor and Ambient Air Sample Results
Volatile Organic Compounds

Client ID Lab Sample ID Date Sampled Dilution µg/m3	NYSDOH 2006 Soil Vapor Intrusion Air Guideline Value (Matrix Value) µg/m3	MP-1 200-33478-1 5/9/2016 10	MP-2 200-33478-2 5/9/2016 23	MP-3 200-33478-3 5/9/2016 6.9	AA-1 200-33478-4 5/9/2016 1	TRIP BLANK 200-33478-5 5/9/2016 1
1,1,1-Trichloroethane	NS (100)	11 U	25 U	7.5 U	1.1 U	1.1 U
1,1,2,2-Tetrachloroethane	NS	14 U	32 U	9.5 U	1.4 U	1.4 U
1,1,2-Trichloroethane	NS	11 U	25 U	7.5 U	1.1 U	1.1 U
1,1-Dichloroethane	NS	8.1 U	19 U	5.6 U	0.81 U	0.81 U
1,1-Dichloroethene	NS	7.9 U	18 U	5.5 U	0.79 U	0.79 U
1,2,4-Trichlorobenzene	NS	37 U	85 U	26 U	3.7 U	3.7 U
1,2,4-Trimethylbenzene	NS	9.8 U	23 U	6.8 U	0.98 U	0.98 U
1,2-Dibromoethane	NS	15 U	35 U	11 U	1.5 U	1.5 U
1,2-Dichlorobenzene	NS	12 U	28 U	8.3 U	1.2 U	1.2 U
1,2-Dichloroethane	NS	8.1 U	19 U	5.6 U	0.81 U	0.81 U
1,2-Dichloroethene, Total	NS	16 U	36 U	11 U	1.6 U	1.6 U
1,2-Dichloropropane	NS	9.2 U	21 U	6.4 U	0.92 U	0.92 U
1,2-Dichlorotetrafluoroethane	NS	14 U	32 U	9.6 U	1.4 U	1.4 U
1,3,5-Trimethylbenzene	NS	9.8 U	23 U	6.8 U	0.98 U	0.98 U
1,3-Butadiene	NS	4.4 U	10 U	3.1 U	0.44 U	0.44 U
1,3-Dichlorobenzene	NS	12 U	28 U	8.3 U	1.2 U	1.2 U
1,4-Dichlorobenzene	NS	12 U	28 U	8.3 U	1.2 U	1.2 U
1,4-Dioxane	NS	180 U	410 U	120 U	18 U	18 U
2,2,4-Trimethylpentane	NS	9.3 U	21 U	6.4 U	0.93 U	0.93 U
2-Chlorotoluene	NS	10 U	24 U	7.1 U	1 U	1 U
3-Chloropropene	NS	16 U	36 U	11 U	1.6 U	1.6 U
4-Ethyltoluene	NS	9.8 U	23 U	6.8 U	0.98 U	0.98 U
4-Isopropyltoluene	NS	11 U	25 U	7.6 U	1.1 U	1.1 U
Acetone	NS	490	700	650	12 U	12 U
Benzene	NS	6.4 U	15 U	4.4 U	0.64 U	0.64 U
Benzyl chloride	NS	10 U	24 U	7.1 U	1 U	1 U
Bromodichloromethane	NS	13 U	31 U	9.2 U	1.3 U	1.3 U
Bromoethene(Vinyl Bromide)	NS	8.7 U	20 U	6 U	0.87 U	0.87 U
Bromoform	NS	21 U	48 U	14 U	2.1 U	2.1 U
Bromomethane	NS	7.8 U	18 U	5.4 U	0.78 U	0.78 U
Carbon disulfide	NS	16 U	36 U	11 U	1.6 U	1.6 U
Carbon tetrachloride	NS (5)	13 U	29 U	8.7 U	1.3 U	1.3 U
Chlorobenzene	NS	9.2 U	21 U	6.4 U	0.92 U	0.92 U
Chloroethane	NS	13 U	30 U	9.1 U	1.3 U	1.3 U
Chloroform	NS	9.8 U	22 U	6.7 U	0.98 U	0.98 U
Chloromethane	NS	10 U	24 U	7.1 U	1.2	1 U
cis-1,2-Dichloroethene	NS	7.9 U	18 U	5.5 U	0.79 U	0.79 U
cis-1,3-Dichloropropene	NS	9.1 U	21 U	6.3 U	0.91 U	0.91 U
Cumene	NS	9.8 U	23 U	6.8 U	0.98 U	0.98 U
Cyclohexane	NS	6.9 U	47	4.8 U	0.69 U	0.69 U
Dibromochloromethane	NS	17 U	39 U	12 U	1.7 U	1.7 U
Dichlorodifluoromethane	NS	25 U	57 U	17 U	2.5 U	2.5 U
Ethylbenzene	NS	8.7 U	20 U	8.7	0.87 U	0.87 U
Freon 22	NS	18 U	41 U	12 U	1.8 U	1.8 U
Freon TF	NS	15 U	35 U	11 U	1.5 U	1.5 U
Hexachlorobutadiene	NS	21 U	49 U	15 U	2.1 U	2.1 U
Isopropyl alcohol	NS	120 U	280 U	85 U	12 U	12 U
m,p-Xylene	NS	22 U	50 U	15 U	2.2 U	2.2 U
Methyl Butyl Ketone (2-Hexanone)	NS	20 U	47 U	14 U	2 U	2 U
Methyl Ethyl Ketone	NS	450	640	510	1.5 U	1.5 U
methyl isobutyl ketone	NS	20 U	47 U	14 U	2 U	2 U
Methyl methacrylate	NS	20 U	47 U	14 U	2 U	2 U
Methyl tert-butyl ether	NS	7.2 U	17 U	5 U	0.72 U	0.72 U
Methylene Chloride	60	17 U	40 U	12 U	2.2	1.7 U
Naphthalene	NS	26 U	60 U	18 UJ	2.6 UJ	2.6 UJ
n-Butane	NS	32	72	36	1.5	1.2 U
n-Butylbenzene	NS	11 U	25 U	7.6 U	1.1 U	1.1 U
n-Heptane	NS	8.2 U	19 U	5.7 U	0.82 U	0.82 U
n-Hexane	NS	7 U	16 U	4.9 U	0.7 U	0.7 U
n-Propylbenzene	NS	9.8 U	23 U	6.8 U	0.98 U	0.98 U
o-Xylene	NS	8.7 U	20 U	6 U	0.87 U	0.87 U
sec-Butylbenzene	NS	11 U	25 U	7.6 U	1.1 U	1.1 U
Styrene	NS	8.5 U	20 U	5.9 U	0.85 U	0.85 U
tert-Butyl alcohol	NS	150 U	350 U	100 U	15 U	15 U
tert-Butylbenzene	NS	11 U	25 U	7.6 U	1.1 U	1.1 U
Tetrachloroethene	30 (100)	14 U	31 U	9.4 U	1.4 U	1.4 U
Tetrahydrofuran	NS	420	1,500	620	15 U	15 U
Toluene	NS	7.5 U	17 U	5.2 U	1.5	0.75 U
trans-1,2-Dichloroethene	NS	7.9 U	18 U	5.5 U	0.79 U	0.79 U
trans-1,3-Dichloropropene	NS	9.1 U	21 U	6.3 U	0.91 U	0.91 U
Trichloroethene	2 (5)	11 U	25 U	7.4 U	1.1 U	1.1 U
Trichlorofluoromethane	NS	11 U	26 U	7.8 U	1.3	1.1 U
Vinyl chloride	NS	5.1 U	12 U	3.5 U	0.51 U	0.51 U
Xylene (total)	NS	30 U	70 U	21 U	3 U	3 U

FIGURES



SOURCE
USGS 7.5 Minute Topographic Map
Brooklyn Quad 2011

0 800 1,600 Feet

Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

SITE LOCATION MAP

AKRF Engineering, P.C.
440 Park Avenue South, New York, N.Y. 10016

DATE
6/22/2016

PROJECT No.
11884

FIGURE
1

O:\Projects\11884 - 145 WEST STREET-BROOKLYN\11884 Fig 1 site loc map.mxd

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Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

SITE PLAN WITH ALPHANUMERIC GRID

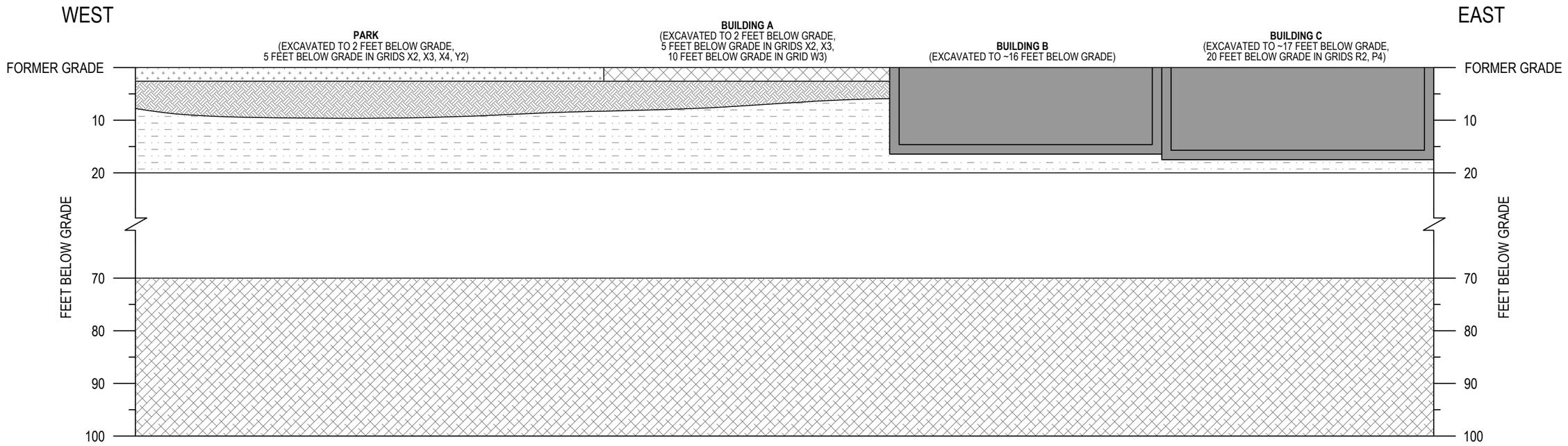
DATE
12/15/2016

PROJECT NO.
11884

SCALE
as shown

FIGURE
2

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M:\AKRF Project Files\11884 - 145 West St (Urban-MREG)\Figures\2016 DWGs\11884 Fig 3 (FER) Fig 2 (SMP) Site Plan.dwg



LEGEND:

- FILL 0 TO <10 FEET
- MINIMUM 2 FEET CLEAN FILL
- CONCRETE FOUNDATION, VAPOR BARRIER, MINIMUM 6-INCH AGGREGATE LAYER, SUB-SLAB VENTING SYSTEM
- CONCRETE FOUNDATION, WATERPROOFING
- SILTY SAND WITH TRACE CLAY
- BEDROCK > 70-FEET

NOTES:

1. DEPTH TO GROUNDWATER RANGES FROM 3 TO 5 FEET IN THE WEST AND 10 TO 12 FEET IN THE EAST.
2. NOT TO SCALE.

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440 Park Avenue South, New York, NY 10016

Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

CROSS-SECTION OF CUT AND FILL THICKNESSES

DATE
6/22/2016

PROJECT NO.
11884

SCALE
NTS

FIGURE
3

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M:\AKRF Project Files\11884 - 145 West St (Urban-MREG)\Figures\2016 DWGs\11884 Fig 5 (FEER) Fig 3 (SMP).dwg

- Building A - excavated to 2 feet for remediation

- Building B - excavated to 16 feet for remediation & basement

- Building C - excavated to 17 feet for remediation & basement

Former 50-gal Fuel Oil UST (Approx Location)

Former 1,080-gal Fuel Oil UST (Approx Location)

Former 550-gal USTs (Approx Location)

Former 20,000-gal Fuel Oil UST (Approx Location)

Building A

Building B

Building C

Park

Bulkhead Line

East River

HURON STREET

WEST STREET

INDIA STREET

1 2 3 4

P Q R S T U V W X Y Z

Park - excavated to 2 feet for remediation

Removed isolated fill hotspots for metals (5 feet)

- Removed petroleum hot spot (10 feet)

- Removed petroleum hot spot (20 feet)

- Removed UST and petroleum hot spot (20 feet)

LEGEND:

P 4 GRID

APPROXIMATE LEAD HOT SPOT REMOVAL AREA (MAXIMUM DEPTH OF 5 FEET)

PROJECT SITE BOUNDARY

FORMER BUILDING

NEW BUILDING

UST UNDERGROUND STORAGE TANK

S SEWER LINE

APPROXIMATE PETROLEUM HOT SPOT REMOVAL AREA

APPROXIMATE MERCURY HOT SPOT REMOVAL AREA (MAXIMUM DEPTH OF 5 FEET)

0' 40' 80' 160'

SCALE IN FEET

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Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

EXTENT AND DEPTHS OF REMEDIAL EXCAVATIONS AND UST LOCATIONS

DATE 12/15/2016

PROJECT NO. 11884

SCALE as shown

FIGURE 4

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M:\AKRF Project Files\11884 - 145 West St (Urban-MREG)\Figures\2016 DWGs\11884 Fig 4 (FER) Fig 4 (SMP).dwg

Sample ID Date Sampled	NYSDEC RRSCOS	EP-28 10/29/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	6,300
Benzo[a]pyrene	1,000	5,000
Benzo[b]fluoranthene	1,000	5,300
Chrysene	3,900	6,100
Dibenz(a,h)anthracene	330	1,000
Indeno(1,2,3-cd)pyrene	500	4,300
Metals	mg/kg	mg/kg
Arsenic	16	20.3
Lead	400	559
Mercury	0.81	1.1

Sample ID Date Sampled	NYSDEC RRSCOS	EP-32 11/4/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	2,600
Benzo[a]pyrene	1,000	1,900
Benzo[b]fluoranthene	1,000	1,900
Dibenz(a,h)anthracene	330	450
Indeno(1,2,3-cd)pyrene	500	1,400
Metals	mg/kg	mg/kg
Lead	400	636

Sample ID Date Sampled	NYSDEC RRSCOS	EP-36 11/30/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	1,900
Benzo[a]pyrene	1,000	1,300
Benzo[b]fluoranthene	1,000	1,500
Indeno(1,2,3-cd)pyrene	500	850 J

Sample ID Date Sampled	NYSDEC RRSCOS	EP-33 11/4/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	26,000
Benzo[a]pyrene	1,000	21,000
Benzo[b]fluoranthene	1,000	22,000
Benzo[k]fluoranthene	3,900	8,600
Chrysene	3,900	28,000
Dibenz(a,h)anthracene	330	4,200
Indeno(1,2,3-cd)pyrene	500	17,000
Metals	mg/kg	mg/kg
Arsenic	16	47.4
Barium	400	891
Lead	400	1,710
Mercury	0.81	3.3

Sample ID Date Sampled	NYSDEC RRSCOS	EP-27 10/27/2015
Metals	mg/kg	mg/kg
Mercury	0.81	0.93

Sample ID Date Sampled	NYSDEC RRSCOS	EP-29 10/29/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	21,000
Benzo[a]pyrene	1,000	17,000
Benzo[b]fluoranthene	1,000	19,000
Benzo[k]fluoranthene	3,900	6,600
Chrysene	3,900	21,000
Dibenz(a,h)anthracene	330	4,100
Indeno(1,2,3-cd)pyrene	500	17,000
Metals	mg/kg	mg/kg
Arsenic	16	25.9
Barium	400	483
Lead	400	1,200
Mercury	0.81	3.2

Sample ID Date Sampled	NYSDEC RRSCOS	EP-37 11/30/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	3,700
Benzo[a]pyrene	1,000	2,900
Benzo[b]fluoranthene	1,000	3,300
Dibenz(a,h)anthracene	330	820 J
Indeno(1,2,3-cd)pyrene	500	2,900 J

Sample ID Date Sampled	NYSDEC RRSCOS	EP-35 11/9/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	13,000
Benzo[a]pyrene	1,000	12,000
Benzo[b]fluoranthene	1,000	13,000
Benzo[k]fluoranthene	3,900	5,200
Chrysene	3,900	14,000
Dibenz(a,h)anthracene	330	2,400
Indeno(1,2,3-cd)pyrene	500	9,400
Metals	mg/kg	mg/kg
Arsenic	16	18.8
Lead	400	515
Mercury	0.81	6.7

Sample ID Date Sampled	NYSDEC RRSCOS	EP-30 10/30/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	5,400
Benzo[a]pyrene	1,000	4,700
Benzo[b]fluoranthene	1,000	5,000
Chrysene	3,900	5,700
Dibenz(a,h)anthracene	330	980
Indeno(1,2,3-cd)pyrene	500	4,400
Metals	mg/kg	mg/kg
Lead	400	618
Mercury	0.81	5.2

Sample ID Date Sampled	NYSDEC RRSCOS	EP-34 11/9/2015
SVOCs	µg/kg	µg/kg
Indeno(1,2,3-cd)pyrene	500	710

Sample ID Date Sampled	NYSDEC RRSCOS	EP-38 11/27/2015
SVOCs	µg/kg	µg/kg
Benzo[a]anthracene	1,000	4,400
Benzo[a]pyrene	1,000	3,600
Benzo[b]fluoranthene	1,000	4,000
Chrysene	3,900	4,600
Dibenz(a,h)anthracene	330	680 J
Indeno(1,2,3-cd)pyrene	500	2,600 J

HURON STREET

INDIA STREET

WEST STREET

Building A

Building B

Building C

Park

Bulkhead Line

East River

EP-1 EP-2 EP-3 EP-4 EP-5 EP-6 EP-7 EP-8 EP-9 EP-10 EP-11 EP-12 EP-12A EP-13 EP-13A EP-14 EP-15 EP-16 EP-17 EP-18 EP-18A EP-19 EP-19A EP-20 EP-21 EP-22 EP-23 EP-23A EP-24 EP-25 EP-26 EP-27 EP-28 EP-29 EP-30 EP-31 EP-32 EP-33 EP-34 EP-35 EP-36 EP-37 EP-38 EP-39 EP-40 EP-41 EP-42 EP-42A EP-43 EP-44 EP-45 EP-46 EP-47 EP-48 EP-49 EP-50 EP-51 EP-52 EP-53 EP-54 EP-54A EP-55 EP-56 EP-57 EP-58 EP-59 EP-60 X1A X2A X3A

1 2 3 4

Z Y X W V U T S R Q P

1. Subpart 375-6 Soil Cleanup Objectives: listed in New York State Department of Environmental Conservation (NYSDEC) Part 375 Regulations (6NYCRR Part 375).
2. This plan depicts exceedances of NYSDEC subpart 375-6 Restricted Residential Use Soil Cleanup Objectives (RRSCOs).

mg/kg = milligrams per kilogram = parts per million (ppm)
µg/kg = micrograms per kilogram = parts per billion (ppb)

J: The concentration given is an estimated value.

0' 40' 80' 160'
SCALE IN FEET

LEGEND:

- PROJECT SITE BOUNDARY
- FORMER BUILDING
- NEW BUILDING
- EP-27 ENDPOINT SAMPLE ANALYZED FOR SVOC-BN, AND RCRA METALS
- EP-18A ENDPOINT SAMPLE ANALYZED FOR CP-51 VOC, SVOC-BN, RCRA METALS
- P / 4 GRID
- APPROXIMATE LEAD HOT SPOT REMOVAL AREA (MAXIMUM DEPTH OF 5 FEET)
- APPROXIMATE PETROLEUM HOT SPOT REMOVAL AREA (MAXIMUM DEPTH VARIES)
- APPROXIMATE MERCURY HOT SPOT REMOVAL AREA (MAXIMUM DEPTH OF 5 FEET)

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M:\AKRF Project Files\11884 - 145 West St (Urban-MRE)\Figures\2016 DWGs\11884 Fig 6 (FER) Fig 5 (SMP).dwg

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Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

LOCATIONS OF REMAINING CONTAMINATION ABOVE RRSCOs (BUILDING B)

DATE
12/15/2016

PROJECT NO.
11884

SCALE
as shown

FIGURE
5

Sample ID Date Sampled	NYSDEC RRSCOS	SSALS	EP-11 5/26/2015
Metals	mg/kg	mg/kg	mg/kg
Arsenic	16	24	26.9

Sample ID Date Sampled	NYSDEC RRSCOS	SSALS	EP-24 11/24/2015	EP-24A 11/24/2015
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Arsenic	16	24	39.3	29.7
Lead	400	1,200	4,460	1,650
Mercury	0.81	2.5	6.4	8.7

Sample ID Date Sampled	NYSDEC RRSCOS	SSALS	EP-7 2/4/2016
SVOCs	µg/kg	µg/kg	µg/kg
Total SVOCs	NS	250,000	386,610

Sample ID Date Sampled	NYSDEC RRSCOS	SSALS	EP-7A 2/4/2016
Metals	mg/kg	mg/kg	mg/kg
Arsenic	16	24	70
Barium	400	700	2,490

Sample ID Date Sampled	NYSDEC RRSCOS	SSALS	EP-20 2/2/2016	EP-20 2/2/2016 Re-analysis
SVOCs	µg/kg	µg/kg	µg/kg	µg/kg
Total SVOCs	NS	250,000	875,820	14,228
Metals	mg/kg	mg/kg	mg/kg	mg/kg
Cadmium	4.3	NS	9.2 J	9.2
Lead	400	1,200	2,340 J	1,820

Sample ID Date Sampled	NYSDEC RRSCOS	SSALS	EP-14 1/21/2016
Metals	mg/kg	mg/kg	mg/kg
Lead	400	1,200	1,480

HURON STREET

INDIA STREET

WEST STREET

Building A

Building B

Building C

Park

Bulkhead Line

East River

EP-1 EP-2 EP-3 EP-4 EP-5 EP-6 EP-7 EP-8 EP-9 EP-10 EP-11 EP-12 EP-13 EP-14 EP-15 EP-16 EP-17 EP-18 EP-19 EP-20 EP-21 EP-22 EP-23 EP-24 EP-25 EP-26 EP-27 EP-28 EP-29 EP-30 EP-31 EP-32 EP-33 EP-34 EP-35 EP-36 EP-37 EP-38 EP-39 EP-40 EP-41 EP-42 EP-43 EP-44 EP-45 EP-46 EP-47 EP-48 EP-49 EP-50 EP-51 EP-52 EP-53 EP-54 EP-55 EP-56 EP-57 EP-58 EP-59 EP-60

EP-7A EP-12A EP-13A EP-14A EP-18A EP-19A EP-23A EP-42A EP-54A X2A X3A

1 2 3 4

P Q R S T U V W X Y Z

1 Subpart 375-6 Soil Cleanup Objectives: listed in New York State Department of Environmental Conservation (NYSDEC) Part 375 Regulations (6NYCRR Part 375).
2 This plan depicts exceedances of NYSDEC subpart 375-6 Restricted Residential Use Soil Cleanup Objectives (RRSCOs) as amended by NYSDEC-approved Site-Specific Action Levels (SSALs).

mg/kg = milligrams per kilogram = parts per million (ppm)
µg/kg = micrograms per kilogram = parts per billion (ppb)

J: The concentration given is an estimated value.

0' 40' 80' 160'
SCALE IN FEET

LEGEND:

- PROJECT SITE BOUNDARY
- FORMER BUILDING
- NEW BUILDING
- EP-11 — ENDPOINT SAMPLE ANALYZED FOR SVOC-BN, AND RCRA METALS
- EP-18A — ENDPOINT SAMPLE ANALYZED FOR CP-51 VOC, SVOC-BN, RCRA METALS
- P / 4 — GRID
- APPROXIMATE PETROLEUM HOT SPOT REMOVAL AREA (MAXIMUM DEPTH VARIES)
- APPROXIMATE LEAD HOT SPOT REMOVAL AREA (MAXIMUM DEPTH OF 5 FEET)
- APPROXIMATE MERCURY HOT SPOT REMOVAL AREA (MAXIMUM DEPTH OF 5 FEET)

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Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

LOCATIONS OF REMAINING CONTAMINATION ABOVE RRSCOs AND/OR SSALS (BUILDING A AND PARK)

DATE
12/15/2016

PROJECT NO.
11884

SCALE
as shown

FIGURE
6

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M:\AKRF Project Files\11884 - 145 West St (Urban-MREG)\Figures\2016 DWGs\11884 Fig 7 (FER) Fig 6 (SMP).dwg

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Huxley Envelope Industrial Site
145 West Street
BROOKLYN, NEW YORK

BUILDING A - VAPOR BARRIER AND SUBSLAB VENTING SYSTEM LAYOUT AND DESIGN DETAILS

DATE
12/15/2016

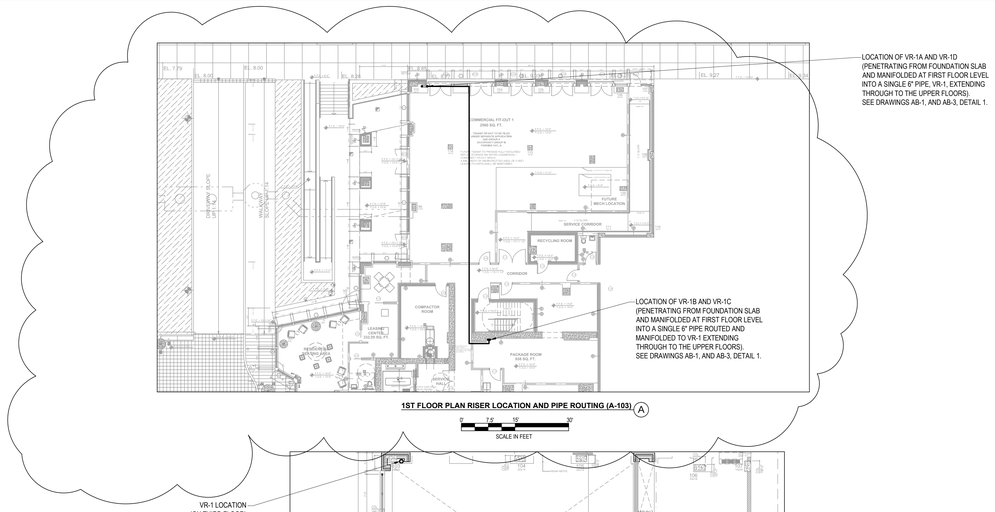
SCALE
as shown

PROJECT No.
11884

FIGURE
7a

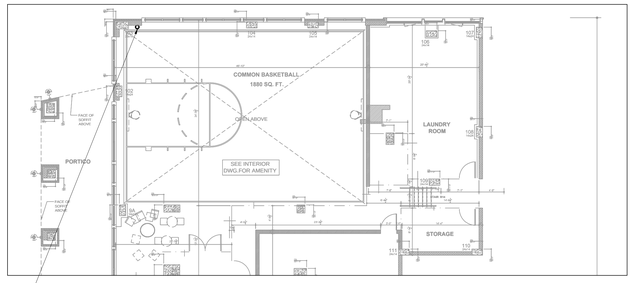
©2016 AKRF Engineering, P.C.

M:\AKRF Project Files\11884 - 145 West St (Urban\ARES\Figures\2016\DWGs\11884 Fig 8a-8b (PER) Fig 7a-7b (SMP) AB-1 AB-2.dwg



1ST FLOOR PLAN RISER LOCATION AND PIPE ROUTING (A-103) (A)

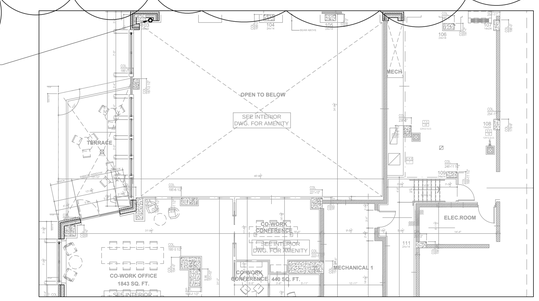
SCALE IN FEET



VR-1 LOCATION ON SECOND FLOOR

2ND FLOOR PLAN RISER LOCATION (A-104) (B)

SCALE IN FEET

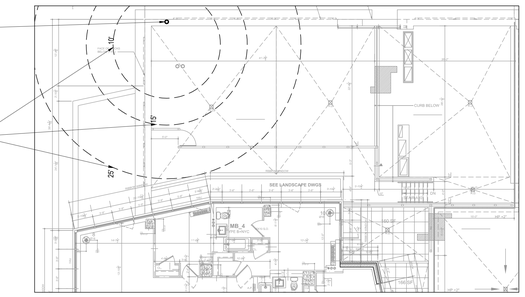


3RD FLOOR PLAN RISER LOCATION (A-105) (C)

SCALE IN FEET

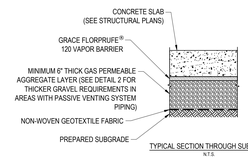
VR-1 PENETRATION THROUGH ROOF SLAB. ROOF-MOUNTED PIPING AND EXHAUST STACK INSTALLED ON ROOF, PER DRAWING AB-3, DETAIL 1.

25-, 15-, AND 10-FOOT RADII FROM EFFLUENT STACK. EXHAUST STACK LOCATED SUCH THAT NO AIR INTAKES ARE LOCATED WITHIN A 25-FOOT RADIUS, PER NYSDOH VAPOR INTRUSION GUIDANCE.

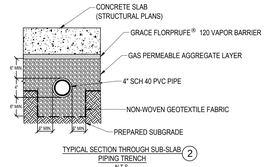


4TH FLOOR PLAN RISER LOCATION (A-106) (D)

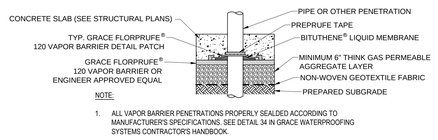
SCALE IN FEET



TYPICAL SECTION THROUGH SUB-SLAB (1)
N.T.S.



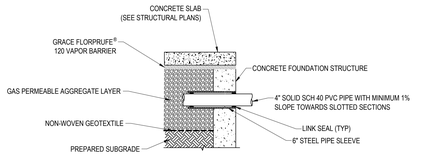
TYPICAL SECTION THROUGH SUB-SLAB PIPING TRENCH (2)
N.T.S.



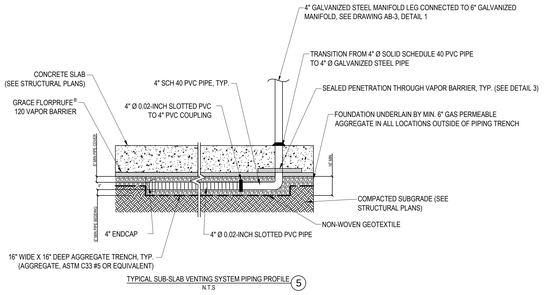
NOTE:

1. ALL VAPOR BARRIER PENETRATIONS PROPERLY SEALDED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. SEE DETAIL 34 IN GRACE WATERPROOFING SYSTEMS CONTRACTOR'S HANDBOOK.

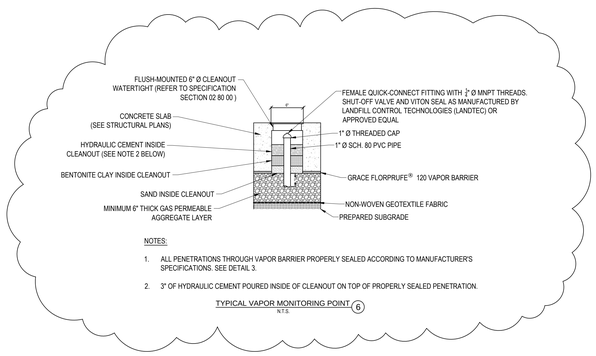
TYP. VAPOR BARRIER PENETRATION (3)
N.T.S.



TYPICAL PIPE SLEEVE THROUGH FOUNDATION ELEMENT (4)
N.T.S.



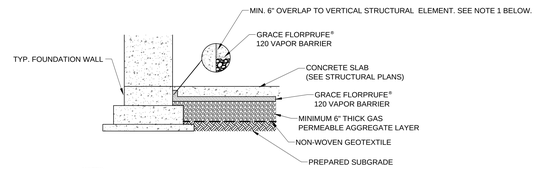
TYPICAL SUB-SLAB VENTING SYSTEM PIPING PROFILE (5)
N.T.S



NOTES:

1. ALL PENETRATIONS THROUGH VAPOR BARRIER PROPERLY SEALED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. SEE DETAIL 3.
2. 3" OF HYDRAULIC CEMENT POURED INSIDE OF CLEANOUT ON TOP OF PROPERLY SEALED PENETRATION.

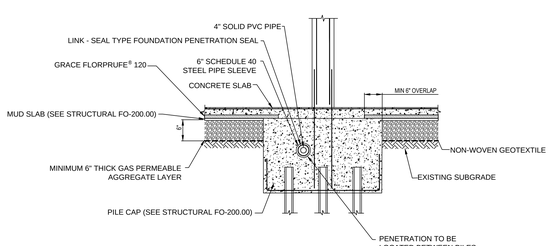
TYPICAL VAPOR MONITORING POINT (6)
N.T.S.



NOTES:

1. VAPOR BARRIER INSTALLED AT FOUNDATION WALL PER MANUFACTURER'S SPECIFICATIONS. REFER TO DETAIL 6 IN GRACE WATERPROOFING SYSTEMS CONTRACTOR'S HANDBOOK FOR SEAL DETAIL.
2. REFER TO STRUCTURAL DRAWINGS FOR EXTERIOR FOUNDATION WALL DETAILS.

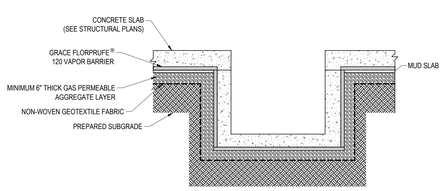
VAPOR BARRIER DETAIL AT TYPICAL EXTERIOR FOUNDATION WALL (7)
N.T.S.



NOTES:

1. REFER TO FO-200.00 FOR STRUCTURAL DETAIL

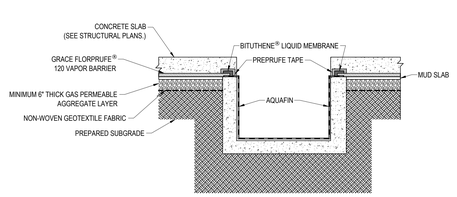
SUB-SLAB VENTING SYSTEM AND VAPOR BARRIER DETAIL AT TYPICAL INTERIOR PILE CAP
N.T.S.



NOTES:

1. PIPE PENETRATIONS IN PIT WALL SEALED IN ACCORDANCE WITH DETAIL 3 OF THIS DRAWING.

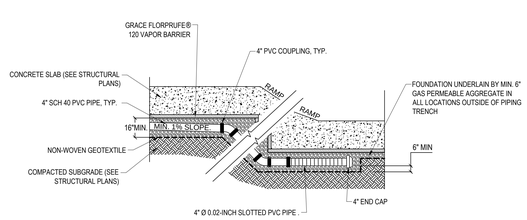
VAPOR BARRIER DETAIL AT TYPICAL ELEVATOR / SUMP PIT / UTILITY PIT, ETC.
N.T.S.



NOTES:

1. ALL PIPE PENETRATIONS IN PIT SEALED IN ACCORDANCE WITH DETAIL 3 OF THIS DRAWING.
2. PIT WATERPROOFED IN ACCORDANCE WITH SPECIFICATION SECTION 07 13 26.

VAPOR BARRIER DETAIL WITH AQUAFIN AT TYPICAL ELEVATOR / SUMP PIT / UTILITY PIT WHERE FLORPRUFE OR PREPRUFE APPLICATION IS INFEASIBLE (10)
N.T.S.



TYPICAL PROFILE AT FLOOR ELEVATION CHANGE (11)
N.T.S.

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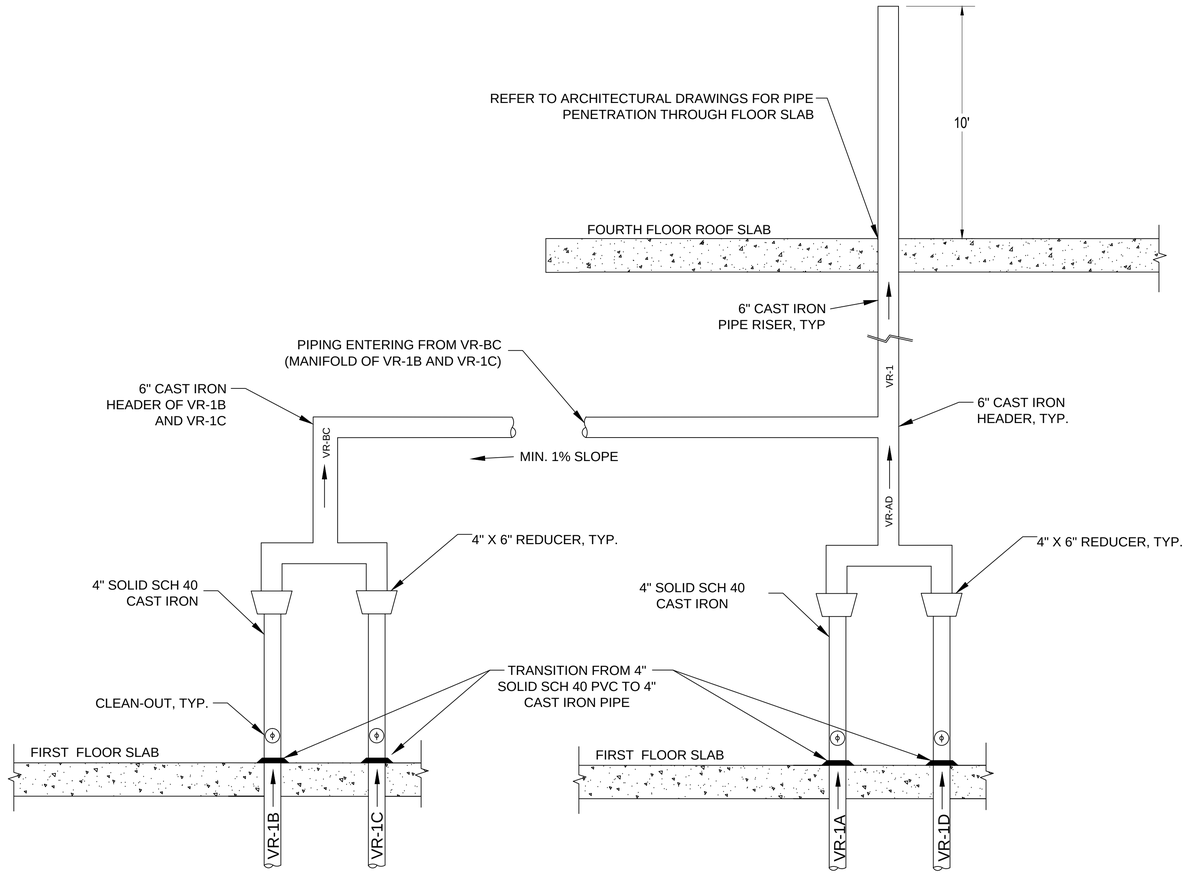
SUBSLAB VENTING SYSTEM LAYOUT AND DESIGN DETAILS

DATE
12/15/2016

SCALE
as shown

PROJECT No.
11884

FIGURE
7b



PIPING MANIFOLD DIAGRAM 1
N.T.S.

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Huxley Envelope Industrial Site
145 West Street
BROOKLYN, NEW YORK

SUB-SLAB VENTING SYSTEM LAYOUT AND DESIGN DETAILS

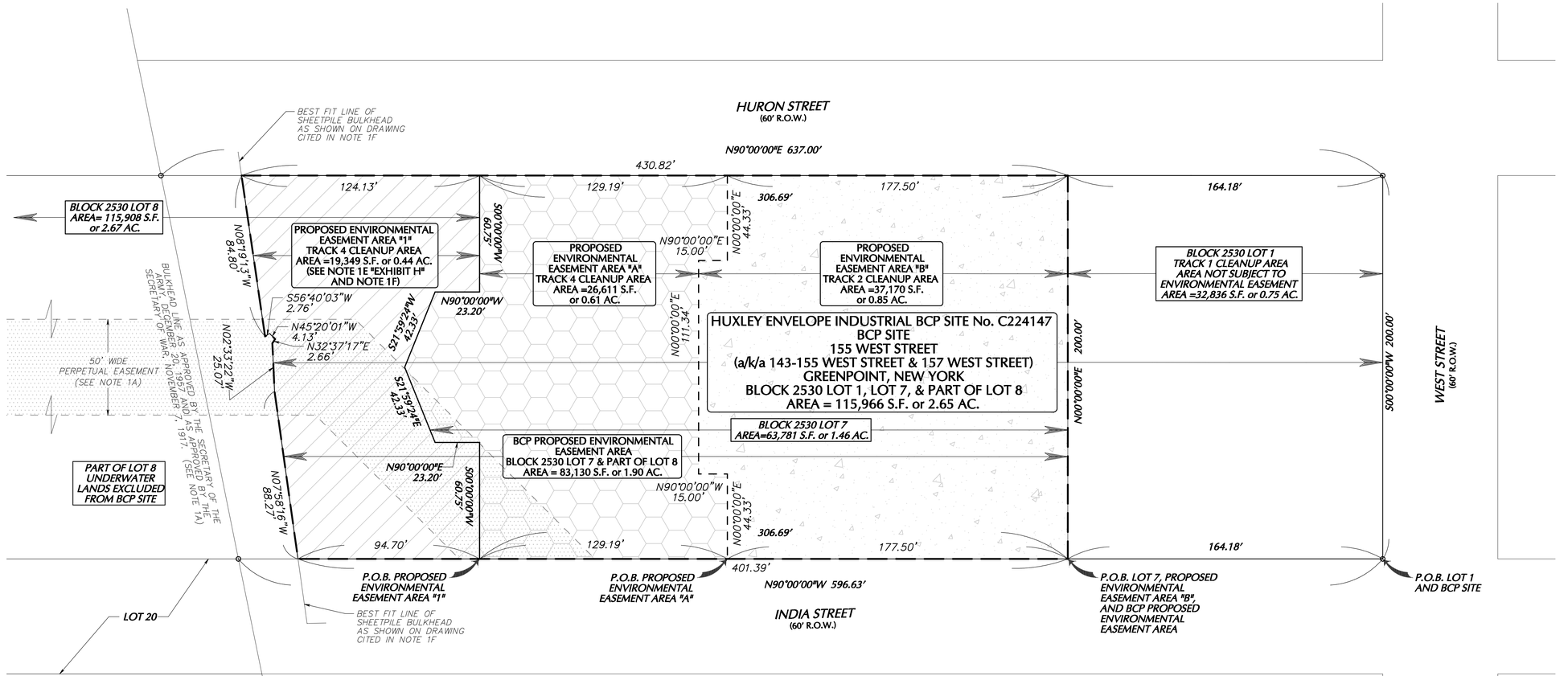
DATE
12/15/2016

SCALE
as shown

PROJECT No.
11884

FIGURE
7c

APPENDIX A
METES AND BOUNDS AND ENVIRONMENTAL EASEMENTS



PROPOSED ENVIRONMENTAL EASEMENT AREA "1" TRACK 4 CLEANUP AREA

PROPOSED ENVIRONMENTAL EASEMENT AREA "A" TRACK 4 CLEANUP AREA

PROPOSED ENVIRONMENTAL EASEMENT AREA "B" TRACK 2 CLEANUP AREA

50' WIDE PERPETUAL EASEMENT

HATCH LEGEND

NOTES

1. THIS SURVEY IS BASED UPON EXISTING PHYSICAL CONDITIONS FOUND AT THE SUBJECT SITE, AND THE FOLLOWING REFERENCES:
   - A. PLAN ENTITLED: "BOUNDARY AND TOPOGRAPHIC SURVEY, 155 WEST STREET", BY LANGAN, PROJECT NO. 5700203, DRAWING NO. 07.01, DATED APRIL 15, 2009 AND LAST REVISED DECEMBER 23, 2014.
   - B. CRFN: 2006000335525 RECORDED/FILED: 06-14-2006 15:45.
   - C. CRFN: 2014000013960 RECORDED/FILED: 01-13-2014 10:01.
   - D. CRFN: 2007000472978 RECORDED/FILED: 09-13-2007 16:06.
   - E. CRFN: 2009000136665 RECORDED/FILED: 05-07-2009 16:04.
   - F. "AS BUILT H-PILE PLAN, MARKET RATE BUILDING, 10 HURON ST. (AKA 155 WEST ST.), BROOKLYN, NY" BY ISMAEL LEYVA ARCHITECTS, P.C., PROJECT NO. 05.196, DRAWING NO. AS-1, DATED 01/21/15, LAST ISSUED 10/27/14 (NYC SBS PERMIT SET), LABELED AS RECEIVED BY NOBLE CONSTRUCTION 01/21/15.
   - G. CURRENT TAX MAP.
2. THE SURVEYED PROPERTY IS SUBJECT BUT NOT LIMITED TO THE FOLLOWING FACTS AS REVEALED BY THE HEREON REFERENCED INFORMATION. THE INFORMATION SHOWN HEREON DOES NOT CONSTITUTE A TITLE SEARCH BY THE SURVEYOR. ALL INFORMATION THAT MAY AFFECT THE QUALITY OF TITLE TO BOTH THE SUBJECT AND ADJOINING PARCELS SHOULD BE VERIFIED BY AN ACCURATE AND CURRENT TITLE REPORT.
3. THE MERIDIAN OF THIS SURVEY IS REFERENCED TO AN ARBITRARY SYSTEM (SEE NOTE 1A).
4. STREET NAMES AND R.O.W. WIDTHS, BLOCK AND LOT NUMBERS AS PER MAP REFERENCED IN NOTE 1A.
5. PROPERTY ADDRESSES SHOWN HEREON AS PER DOCUMENTS CITED IN NOTES 1B THROUGH 1D.
6. OFFSETS (IF SHOWN) ARE FOR SURVEY REFERENCES ONLY AND ARE NOT TO BE USED IN CONSTRUCTION OF ANY TYPE.
7. WETLANDS, ENVIRONMENTAL AND/OR HAZARDOUS MATERIALS LOCATION, IF ANY, NOT COVERED UNDER THIS CONTRACT.
8. UNLESS SPECIFICALLY NOTED HEREON, STORM AND SANITARY SEWER INFORMATION (INCLUDING PIPE INVERT, PIPE MATERIAL, AND PIPE SIZE) WAS OBSERVED AND MEASURED AT FIELD LOCATED STRUCTURES (MANHOLES/CATCH BASINS, ETC.). CONDITIONS CAN VARY FROM THOSE ENCOUNTERED AT THE TIMES WHEN AND THE LOCATIONS WHERE DATA WAS OBTAINED. DESPITE MEETING THE REQUIRED STANDARD OF CARE THE SURVEYOR CANNOT AND DOES NOT WARRANT THAT PIPE MATERIAL AND/OR PIPE SIZE THROUGHOUT THE PIPE RUN ARE THE SAME AS THOSE OBSERVED AT EACH STRUCTURE, OR THAT THE PIPE RUN IS STRAIGHT BETWEEN THE LOCATED STRUCTURES.

   ADDITIONAL UTILITY (WATER, GAS, ELECTRIC ETC.) DATA MAY BE SHOWN FROM FIELD LOCATED SURFACE MARKINGS (BY OTHERS), EXISTING STRUCTURES, AND/OR FROM EXISTING DRAWINGS.

   UNLESS SPECIFICALLY NOTED HEREON THE SURVEYOR HAS NOT EXCAVATED TO PHYSICALLY LOCATE THE UNDERGROUND UTILITIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE SHOWN UNDERGROUND UTILITIES ARE EITHER IN SERVICE, ABANDONED OR SUITABLE FOR USE, NOR ARE IN THE EXACT LOCATION OR CONFIGURATION INDICATED HEREON.

   PRIOR TO ANY DESIGN OR CONSTRUCTION THE PROPER UTILITY AGENCIES MUST BE CONTACTED FOR VERIFICATION OF UTILITY TYPE AND FOR FIELD LOCATIONS

   UNLESS NOTED BELOW SUPPLEMENTAL DOCUMENTS WERE NOT USED TO COMPILE THE SUBSURFACE UTILITY INFORMATION SHOWN HEREON
9. UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB-DIVISION 2, OF THE NEW YORK STATE EDUCATION LAW.
10. THIS PLAN NOT VALID UNLESS EMBOSSED OR BLUE INK STAMPED WITH THE SEAL OF THE PROFESSIONAL.

GRAPHIC SCALE 1"=9.144 meters

0m 9.144m 18.288m 27.432m

GRAPHIC SCALE 1"=30'

0 30 60 90

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW. THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@DEC.NY.GOV.

Date	Description	No.
04/01/16	Apportioned Lots and Revised Written Descriptions	1

REVISIONS

"I hereby state that this plan is based on a field survey made by me or under my immediate supervision in accordance with NYSPLS Code of Practice for Land Surveys, and to the best of my professional knowledge, information and belief, and in my professional opinion, correctly represents the conditions found on the date of the field survey at the subject property".

DRAFT
Apr 11,2016

SIGNATURE DATE SIGNED

PAUL D. FISHER
PROFESSIONAL LAND SURVEYOR
NY LIC. No. 050784-1

LANGAN
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com
NEW JERSEY NEW YORK VIRGINIA CALIFORNIA PENNSYLVANIA CONNECTICUT FLORIDA
ABU DHABI ATHENS DOHA DUBAI ISTANBUL
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan Engineering and Environmental Services, Inc.
Langan International, LLC
Collectively known as Langan

Project
155 WEST STREET
BLOCK No. 2530, LOT Nos. 1, 7, & PART OF LOT No. 8
BOROUGH OF BROOKLYN
CITY OF NEW YORK
KINGS COUNTY NEW YORK

Drawing Title
BROWNFIELD CLEANUP PROGRAM SITE PROPOSED ENVIRONMENTAL EASEMENT AREAS
BCA SITE No. C224147

Project No.	170320701
Date	08/10/15
Scale	1"=30'
Drawn By	LB
Checked By	PDF

Drawing No. **VE102**

Sheet 001 of 002

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\\langan.com\data\PAR\data2\5700203\Survey Data - 5700203\Terramodel\Existing\5700203 Proposed DEC Easement.pro Apr 11,2016

LANGAN
PROJECT No. 170320701

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

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2016112901265001002EBCA4

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 12**

Document ID: 2016112901265001 Document Date: 11-10-2016 Preparation Date: 12-15-2016
Document Type: EASEMENT
Document Page Count: 11

PRESENTER:
FREEDOM LAND TITLE AGENCY
999 WALT WHITMAN ROAD
FLT-34122
MELVILLE, NY 11747
631-423-1300
MSNEDECOR@FREEDOMLTA.COM

RETURN TO:
FREEDOM LAND TITLE AGENCY
999 WALT WHITMAN ROAD
FLT-34122
MELVILLE, NY 11747
631-423-1300
MSNEDECOR@FREEDOMLTA.COM

PROPERTY DATA

Borough	Block	Lot	Unit	Address
BROOKLYN	2530	7	Entire Lot	10 HURON

Property Type: OTHER

CROSS REFERENCE DATA

CRFN_____ *or* DocumentID_____ *or* _____ Year_____ Reel____ Page_____ *or* File Number_____

PARTIES

GRANTOR/SELLER:
10 HURON FS CONDO LLC
60 COLUMBUS CIRCLE , 20TH CIRCLE
NEW YORK, NY 10023

GRANTEE/BUYER:
PEOPLE OF STATE OF NY THRU COMMISS OF NY DEC
625 BROADWAY , 14TH FLOOR
ALABNY, NY 12233

FEES AND TAXES

Mortgage :

Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	92.00
Affidavit Fee:	$	0.00

Filing Fee: $ 100.00

NYC Real Property Transfer Tax: $ 0.00

NYS Real Estate Transfer Tax: $ 0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 12-16-2016 10:37
City Register File No.(CRFN): **2016000445435**

City Register Official Signature

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 10th day of November, 2016, between Owner(s) 10 Huron FS Condo LLC, having an office at 60 Columbus Circle, 20th Floor, New York, New York 10023, County of New York, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 21 India Street (f/k/a N/A West Street) in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 2530 Lot 7, being the same as that property conveyed to Grantor by deed dated May 24, 2016 and recorded in the City Register of the City of New York as CRFN #2016000196641. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 1.46 +/- acres, and is hereinafter more fully described in the Land Title Survey dated August 10, 2015 and last revised November 2, 2016 prepared by Paul D. Fisher, P.L.S., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation

established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224147-05-11 as last amended October 14, 2016, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled

Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held

by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved b the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C224147
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

10 Huron FS Condo LLC:

By: _____

Print Name: Richard Mack

Title: Authorized Signatory Date: 11/2/16

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF New York)

On the 2nd day of November, in the year 2016, before me, the undersigned, personally appeared Richard Mack, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Angela F Saandra
Notary Public - State of New York

ANGELA F. SAANDRA
Notary Public, State of New York
Registration #01SC6294897
Qualified In Kings County
Commission Expires December 23, 2017

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner.

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 10th day of November, in the year 2016 before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

SCHEDULE "A" PROPERTY DESCRIPTION

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 164.18 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 306.69 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 60.75 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 23.20 FEET TO A POINT; THENCE

NORTHERLY, N21°59'24"W A DISTANCE OF 42.33 FEET TO A POINT; THENCE

NORTHERLY, N21°59'24"E A DISTANCE OF 42.33 FEET TO A POINT; THENCE

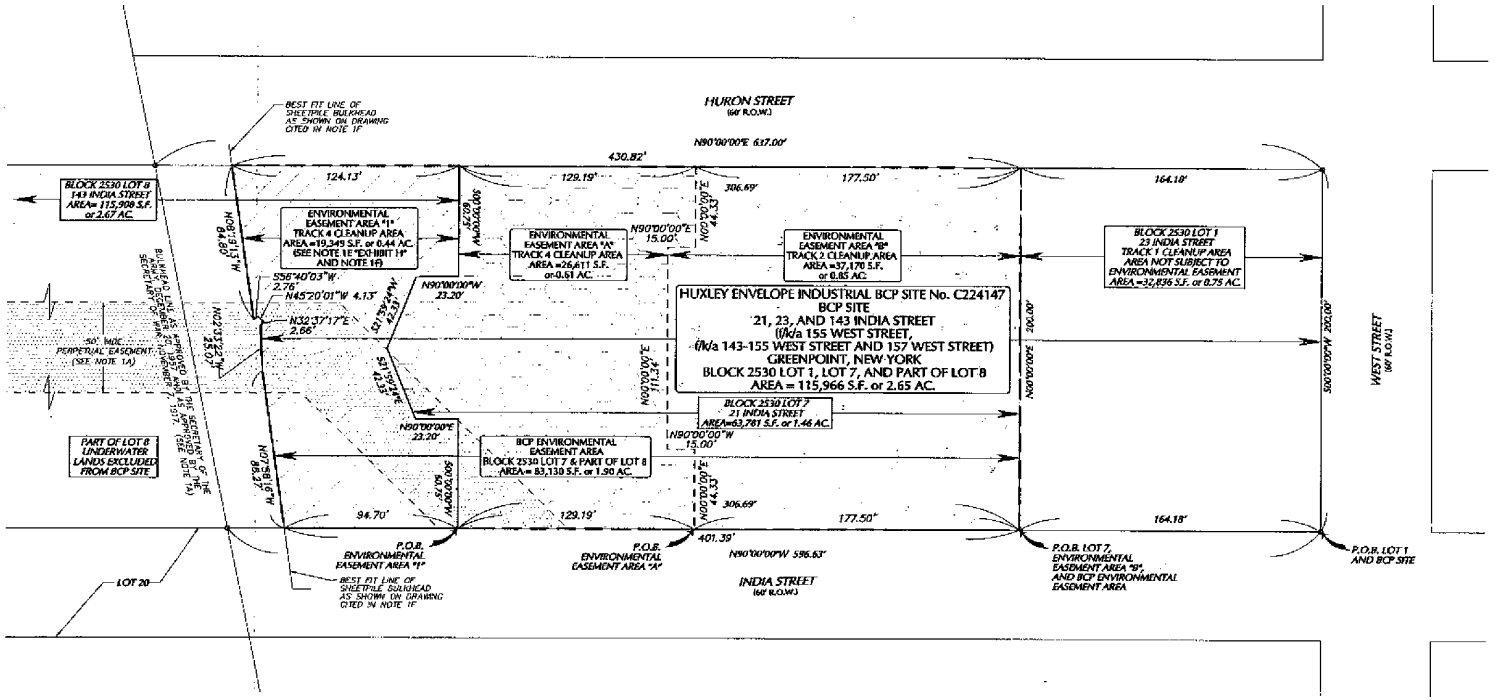
EASTERLY, N90°00'00"E A DISTANCE OF 23.20 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 60.75 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 306.69 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 200.00 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 63,781 SQUARE FEET OR 1.46 ACRES, MORE OR LESS.



ENVIRONMENTAL EASEMENT AREA "1"
TRACK 4 CLEANUP AREA

ENVIRONMENTAL EASEMENT AREA "A"
TRACK 4 CLEANUP AREA

ENVIRONMENTAL EASEMENT AREA "B"
TRACK 2 CLEANUP AREA

50' WIDE PERPETUAL EASEMENT

HATCH LEGEND

NOTES

1. THIS SURVEY IS BASED UPON EXISTING PHYSICAL CONDITIONS FOUND AT THE SUBJECT SITE, AND FOLLOWING REFERENCES:
   A. PLAN ENTITLED "PRELIMINARY AND TOPOGRAPHIC SURVEY, 155 WEST STREET, BY LANGAN, PROPERTY NO. 170326801, DRAWING NO. 01.01, DATED APRIL 16, 2008 AND LAST REVISED DECEMBER 23, 2015.
   B. DEED: BOROUGH OF BROOKLYN, LIBER 1264, PAGE 145.
   C. DEED: BOROUGH OF BROOKLYN, LIBER 1264, PAGE 147.
   D. DEED: BOROUGH OF BROOKLYN, LIBER 1264, PAGE 149.
   E. DEED: BOROUGH OF BROOKLYN, LIBER 1264, PAGE 151.
   F. DEED: BOROUGH OF BROOKLYN, LIBER 1264, PAGE 153.
   G. CURRENT TAX MAP.
2. THE SURVEYED PROPERTY IS SUBJECT BUT NOT LIMITED TO THE FOLLOWING FACTS AS SHOWN ON THE CONSULTANTS TITLE REPORT PREPARED BY: FIDELITY NATIONAL TITLE INSURANCE COMPANY, ORDER NO. 27-1-2007-0006, DATED APRIL 16, 2008 AND LAST REVISED DECEMBER 23, 2015. THERE MAY BE ADDITIONAL RESTRICTIONS OR ENCUMBRANCES THAT MAY AFFECT THE QUALITY OF TITLE TO BOTH THE SUBJECT AND ADJOINING PARCELS WHICH SHOULD BE REVIEWED BY AN ASSOCIATE AND SUBMIT TITLE REPORT.
3. THE MERIDIAN OF THIS SURVEY IS REFERENCED TO AN ARBITRARY SYSTEM (SEE NOTE 1A).
4. STREET WIDTHS AND BLOCK WIDTHS, BLOCK AND LOT NUMBERS AS PER MAP REFERENCED IN NOTE 1A.
5. PROPERTY ADDRESSES SHOWN HEREON AS PER KHAKH BRAIN LLP.
6. OFFSETS OF BUILDING ARE FOR SURVEY REFERENCES ONLY AND ARE NOT TO BE USED IN CONSTRUCTION OF ANY TYPE.
7. NO PLANTS, ENVIRONMENTAL AND/OR HAZARDOUS MATERIALS LOCATION, IF ANY, NOT COVERED UNDER THIS CONTRACT.
8. UNLESS SPECIFICALLY NOTED HEREON, THE SURVEYOR HAS NOT EXAMINED OR CONSIDERED ANY WETLAND, ENVIRONMENTAL, ZONING OR SANITARY SEWER INFORMATION INCLUDING ANY WETLAND, ENVIRONMENTAL, AND PIPE SIZES WAS OBSERVED AND RECORDED AT VISIBLE STRUCTURES (MANHOLES, CATCH BASINS, ETC.). CONDITIONS MAY EXIST FROM WHERE ENCROACHMENTS MAY OCCUR WHERE NONE ARE SHOWN, OR WHERE THERE ARE NO VISIBLE INDICATIONS OF ENCROACHMENTS. THERE MAY BE AREAS OF CONCERN WHICH WERE NOT OBSERVED AS THEY WERE BURIED OR OVERGROWN AND NOT VISIBLE AT THE TIME OF THE SURVEY. NO EXCAVATIONS WERE MADE AS PART OF THIS SURVEY. THE SURVEYOR DOES NOT CERTIFY AS TO THE EXACT LOCATION OF UNDERGROUND STRUCTURES.

   ADDITIONAL UTILITY OWNERS, MAY EXIST BUT DATA MAY BE SHOWN FROM FIELD LOCATED SURFACE EVIDENCE OF OTHERS, LISTED STRUCTURES, AND/OR FROM EXISTING DRAWINGS.

   UNLESS SPECIFICALLY NOTED HEREON THE SURVEYOR HAS NOT ENDEAVORED TO PHYSICALLY LOCATE OR ENCROACHMENTS THEREON. THE SURVEYOR MAKES NO GUARANTEES THAT THE SHOWN UNDERGROUND UTILITIES, AND OTHER IN SERVICE, MAINTAINED OR SUITABLE FOR USE. NOR ARE IN THE EXACT LOCATION OR CONFIGURATION INDICATED HEREON.

   PRIOR TO ANY DESIGN OR CONSTRUCTION THE PROPER UTILITY AGENCIES MUST BE CONTACTED FOR VERIFICATION OF UTILITY TYPE AND THEIR FIELD LOCATIONS.

   KNOWN NOTED BELOW SUPPLEMENTAL DOCUMENTS WERE NOT USED TO COMPILE THE SUBSURFACE UTILITY INFORMATION SHOWN HEREON:
9. UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUB-DIVISION 2, OF THE NEW YORK STATE EDUCATION LAW.
10. THIS PLAN NOT VALID UNLESS ENDORSED ON BLUE INK STAMPED WITH THE SEAL OF THE PROFESSIONAL.

GRAPHIC SCALE 1"=9.144 meters
0m 9.144m 18.288m 27.432m

GRAPHIC SCALE 1"=30'
0 30 60 90

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION, PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW. THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@DEC.NY.GOV.

Date	Description	No.
11/02/16	Added Property Addresses and Removed Proposed Notation Only	2
04/01/16	Apportioned Lots and Revised Written Descriptions	1

REVISIONS

"I hereby state that this survey is based on a field survey made by me or under my supervision in accordance with 19 NYCRR Codes of Rules and Regulations, and to the best of my professional knowledge and belief, meets the minimum standard requirements for boundary surveys. The certification is limited to the facts observed by me on the date of the survey as the subject property."

SIGNATURE — DATE SIGNED 11-2-2016

PAUL B. FISHER
PROFESSIONAL LAND SURVEYOR
NY LIC. No. 050784-1

LANGAN
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, NY 10001
T 212.479.5400 F 212.479.5444 www.langan.com
NEW JERSEY · NEW YORK · PENNSYLVANIA · CONNECTICUT · WASHINGTON, DC · FLORIDA · TEXAS · ABU DHABI · BUSAN · ISTANBUL
Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan Engineering and Environmental Services, Inc.
Langan Holdings, LLC
Member of the Langan Group

Project
21, 23, AND 143 INDIA STREET
BLOCK No. 2530, LOT Nos. 1, 7, & PART OF LOT No. 8
BOROUGH OF BROOKLYN
CITY OF NEW YORK
KINGS COUNTY NEW YORK

Drawing Title
BROWNFIELD CLEANUP PROGRAM SITE ENVIRONMENTAL EASEMENT AREAS
BCA SITE No. C224147

Project No.	170326801
Date	08/10/15
Scale	1"=30'
Drawn By	LB
Checked By	PDF

Drawing No. VE102
Sheet 001 of 002

\\langan.com\data\PAR\data2\170326801\Survey Data - 170326801\Terramodel\Exhibits\170326801 Proposed OEC Easements.tex Nov 2,2016

PROJECT No. 170326801

WRITTEN DESCRIPTION-
BLOCK 2530 LOT 1
TRACK 1 CLEANUP AREA

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT AT THE INTERSECTION OF THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE) WITH THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE:

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 164.18 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 200.00 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 164.18 FEET TO A POINT, SAID POINT BEING THE INTERSECTION OF SAID SOUTHERLY SIDE OF HURON STREET WITH SAID WESTERLY SIDE OF WEST STREET; THENCE

SOUTHERLY ALONG SAID WESTERLY SIDE OF WEST STREET, S00°00'00"W A DISTANCE OF 200.00 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 32,836 SQUARE FEET OR 0.75 ACRES, MORE OR LESS.

WRITTEN DESCRIPTION-
BLOCK 2530 LOT 7

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 164.18 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 308.69 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 60.75 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 23.20 FEET TO A POINT; THENCE

NORTHERLY, N21°59'24"W A DISTANCE OF 42.33 FEET TO A POINT; THENCE

NORTHERLY, N21°59'24"E A DISTANCE OF 42.33 FEET TO A POINT; THENCE

EASTERLY, N90°00'00"E A DISTANCE OF 23.20 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 60.75 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 306.69 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 208.00 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 63,781 SQUARE FEET OR 1.46 ACRES, MORE OR LESS.

WRITTEN DESCRIPTION-
BCP SITE

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT AT THE INTERSECTION OF THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE) WITH THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 563.57 FEET TO A POINT; THENCE

RUNNING THE FOLLOWING SIX COURSES, GENERALLY ALONG THE SHEETPILE BULKHEAD:

NORTHERLY, N07°58'16"W A DISTANCE OF 88.27 FEET TO A POINT; THENCE

NORTHERLY, N02°33'22"W A DISTANCE OF 25.07 FEET TO A POINT; THENCE

NORTHERLY, N32°37'17"E A DISTANCE OF 2.66 FEET TO A POINT; THENCE

NORTHERLY, N45°20'01"W A DISTANCE OF 4.13 FEET TO A POINT; THENCE

SOUTHERLY, S56°40'03"W A DISTANCE OF 2.76 FEET TO A POINT; THENCE

NORTHERLY, N08°19'13"W A DISTANCE OF 84.80 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 595.00 FEET TO A POINT, SAID POINT BEING THE INTERSECTION OF SAID SOUTHERLY SIDE OF HURON STREET WITH SAID WESTERLY SIDE OF WEST STREET; THENCE

SOUTHERLY ALONG SAID WESTERLY SIDE OF WEST STREET, S00°00'00"W A DISTANCE OF 200.00 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 115,986 SQUARE FEET OR 2.65 ACRES, MORE OR LESS.

WRITTEN DESCRIPTION-
BCP ENVIRONMENTAL EASEMENT AREA

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 164.18 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 401.38 FEET TO A POINT; THENCE

RUNNING THE FOLLOWING SIX COURSES, GENERALLY ALONG THE SHEETPILE BULKHEAD:

NORTHERLY, N07°58'16"W A DISTANCE OF 88.27 FEET TO A POINT; THENCE

NORTHERLY, N02°33'22"W A DISTANCE OF 25.07 FEET TO A POINT; THENCE

NORTHERLY, N32°37'17"E A DISTANCE OF 2.66 FEET TO A POINT; THENCE

NORTHERLY, N45°20'01"W A DISTANCE OF 4.13 FEET TO A POINT; THENCE

SOUTHERLY, S56°40'03"W A DISTANCE OF 2.76 FEET TO A POINT; THENCE

NORTHERLY, N08°19'13"W A DISTANCE OF 84.80 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 430.82 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 200.00 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 83,130 SQUARE FEET OR 1.90 ACRES, MORE OR LESS.

WRITTEN DESCRIPTION-
ENVIRONMENTAL EASEMENT AREA "1"
TRACK 4 CLEANUP AREA

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 470.87 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 94.70 FEET TO A POINT; THENCE

RUNNING THE FOLLOWING SIX COURSES, GENERALLY ALONG THE SHEETPILE BULKHEAD:

NORTHERLY, N07°58'16"W A DISTANCE OF 88.27 FEET TO A POINT; THENCE

NORTHERLY, N02°33'22"W A DISTANCE OF 25.07 FEET TO A POINT; THENCE

NORTHERLY, N32°37'17"E A DISTANCE OF 2.66 FEET TO A POINT; THENCE

NORTHERLY, N45°20'01"W A DISTANCE OF 4.13 FEET TO A POINT; THENCE

SOUTHERLY, S56°40'03"W A DISTANCE OF 2.76 FEET TO A POINT; THENCE

NORTHERLY, N08°19'13"W A DISTANCE OF 84.80 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 124.13 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 60.75 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 23.20 FEET TO A POINT; THENCE

SOUTHERLY, S21°59'24"W A DISTANCE OF 42.33 FEET TO A POINT; THENCE

SOUTHERLY, S21°59'24"E A DISTANCE OF 42.33 FEET TO A POINT; THENCE

EASTERLY, N90°00'00"E A DISTANCE OF 23.20 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 60.75 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 19,349 SQUARE FEET OR 0.44 ACRES, MORE OR LESS.

WRITTEN DESCRIPTION-
ENVIRONMENTAL EASEMENT AREA "A"
TRACK 4 CLEANUP AREA

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 341.68 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 129.19 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 60.75 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 23.20 FEET TO A POINT; THENCE

NORTHERLY, N21°59'24"W A DISTANCE OF 42.33 FEET TO A POINT; THENCE

NORTHERLY, N21°59'24"E A DISTANCE OF 42.33 FEET TO A POINT; THENCE

EASTERLY, N90°00'00"E A DISTANCE OF 23.20 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 60.75 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 129.19 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 44.33 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 15.00 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 111.34 FEET TO A POINT; THENCE

EASTERLY, N90°00'00"E A DISTANCE OF 15.00 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 44.33 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 26,611 SQUARE FEET OR 0.61 ACRES, MORE OR LESS.

WRITTEN DESCRIPTION-
ENVIRONMENTAL EASEMENT AREA "B"
TRACK 2 CLEANUP AREA

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 164.18 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 177.50 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 44.33 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 15.00 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 111.34 FEET TO A POINT; THENCE

EASTERLY, N90°00'00"E A DISTANCE OF 15.00 FEET TO A POINT; THENCE

NORTHERLY, N00°00'00"E A DISTANCE OF 44.33 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 177.50 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 200.00 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 37,170 SQUARE FEET OR 0.85 ACRES, MORE OR LESS.

SEE DRAWING NO. VE102 SHEET NO. 001 OF 002 FOR NOTES

THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL EASEMENT HELD BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION PURSUANT TO TITLE 36 OF ARTICLE 71 OF THE NEW YORK ENVIRONMENTAL CONSERVATION LAW. THE ENGINEERING AND INSTITUTIONAL CONTROLS FOR THIS EASEMENT ARE SET FORTH IN THE SITE MANAGEMENT PLAN (SMP). A COPY OF THE SMP MUST BE OBTAINED FROM NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION, DIVISION OF ENVIRONMENTAL REMEDIATION, SITE CONTROL SECTION, 625 BROADWAY, ALBANY, NY 12233 OR AT DERWEB@DEC.NY.GOV.

Date	Description	No.
31/02/15	Added Property Addresses and Removed Proposed Notation Only	2
04/01/16	Apportioned Lots and Revised Written Descriptions	1

REVISIONS

I hereby state that this survey was prepared in accordance with the Code of Practice for Land Surveys, and to the best of my professional knowledge, information and belief, that it conforms to the standards and requirements adopted by the New York State Association of Professional Land Surveyors, except as noted hereon. This survey is not valid unless it bears the original signature and seal of the surveyor. Any alterations to the subject property, other than those authorized by the surveyor, voids this survey.

SIGNATURE — PAUL D. FISHER, PROFESSIONAL LAND SURVEYOR, NY LIC. No. 050784 — DATE SIGNED 11.2.2016

LANGAN

21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, NY 10001 T.212.479.5400 F.212.479.5444 www.langan.com

offices in: Albany, Boston, Chicago, Dallas, Denver, Edison, Exton, Houston, Irvine, Los Angeles, Newark, New York, Orange County, Pasadena, Pittsburgh, Princeton, Sacramento, San Diego, San Francisco, Stamford, Tampa, Toronto, Washington, West Palm Beach

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
Langan International, LLC
Langan Canada Inc.

Project: 21, 23, AND 143 INDIA STREET
BLOCK No. 2530, LOT Nos. 1, 7, & PART OF LOT No. 8
BOROUGH OF BROOKLYN
CITY OF NEW YORK
KINGS COUNTY NEW YORK

Drawing Title: BROWNFIELD CLEANUP PROGRAM SITE ENVIRONMENTAL EASEMENT AREAS
BCA SITE No. C224147

Project No.	170220701
Date	08/10/15
Scale	1"=20'
Drawn By	LB
Checked By	PDF

Drawing No. VE102

Sheet 002 of 002

\\langan.com\data\HAN\data2\170220701\Survey Data - 170220701\Terramodel\Easement\170220701 Proposed BCP Easements.dwg Nov 2,2015

LANGAN

PROJECT No. 170220701

NYC DEPARTMENT OF FINANCE
OFFICE OF THE CITY REGISTER

This page is part of the instrument. The City Register will rely on the information provided by you on this page for purposes of indexing this instrument.The information on this page will control for indexing purposes in the event of any conflict with the rest of the document.

2016112901032001001E307B

RECORDING AND ENDORSEMENT COVER PAGE **PAGE 1 OF 11**

Document ID: 2016112901032001 Document Date: 11-10-2016 Preparation Date: 11-29-2016
Document Type: EASEMENT
Document Page Count: 10

PRESENTER:
FREEDOM LAND TITLE AGENCY
999 WALT WHITMAN ROAD
SUITE 201
MELVILLE, NY 11747
631-423-1300
MSNEDECOR@FREEDOMLTA.COM

RETURN TO:
FREEDOM LAND TITLE AGENCY
999 WALT WHITMAN ROAD
SUITE 201
MELVILLE, NY 11747
631-423-1300
MSNEDECOR@FREEDOMLTA.COM

PROPERTY DATA

Borough	Block	Lot	Unit	Address
BROOKLYN	2530	8	Entire Lot	143 INDIA STREET

Property Type: OTHER

CROSS REFERENCE DATA

CRFN_____ *or* DocumentID_____ *or* _____ Year_____ Reel____ Page_____ *or* File Number_____

PARTIES

GRANTOR/SELLER:
19 INDIA FEE OWNER LLC
60 COLUMBUS CIRCLE 20TH FLOOR
NEW YORK, NY 10023

GRANTEE/BUYER:
PEOPLE OF THE STATE OF NY THROUGH
COMM.NYSDEC
625 BROADWAY 14TH FLOOR
ALBANY, NY 12233

FEES AND TAXES

Mortgage :		
Mortgage Amount:	$	0.00
Taxable Mortgage Amount:	$	0.00
Exemption:		
TAXES: County (Basic):	$	0.00
City (Additional):	$	0.00
Spec (Additional):	$	0.00
TASF:	$	0.00
MTA:	$	0.00
NYCTA:	$	0.00
Additional MRT:	$	0.00
TOTAL:	$	0.00
Recording Fee:	$	87.00
Affidavit Fee:	$	0.00

Filing Fee:	
$	0.00
NYC Real Property Transfer Tax:	
$	0.00
NYS Real Estate Transfer Tax:	
$	0.00

RECORDED OR FILED IN THE OFFICE OF THE CITY REGISTER OF THE CITY OF NEW YORK
Recorded/Filed 11-29-2016 16:53
City Register File No.(CRFN):
2016000421410

City Register Official Signature

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 10th day of November, 2016, between Owner(s) 19 India Fee Owner LLC, having an office at 60 Columbus Circle, 20th Floor, New York, New York 10023, County of New York, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee."), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 143 India Street in the City of New York, County of Kings and State of New York, known and designated on the tax map of the New York City Department of Finance as tax map parcel number: Block 2530 Lot 8, being a portion of the property conveyed to Grantor by deed dated May 24, 2016 and recorded in the City Register of the City of New York as CRFN #2016000187458. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 0.44 +/- acres, and is hereinafter more fully described in the Land Title Survey dated August 10, 2015 and last revised November 2, 2016 prepared by Paul D. Fisher, P.L.S., which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation

established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Brownfield Cleanup Agreement Index Number: C224147-05-11 as last amended October 14, 2016, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement")

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Restricted Residential as described in 6 NYCRR Part 375-1.8(g)(2)(ii), Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the New York City Department of Health and Mental Hygiene to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled

Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held

by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved b the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: C224147
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

19 India Fee Owner LLC:

By: _____

Print Name: Richard Mack

Title: Authorized Signatory Date: 11/2/16

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF New York)

On the 2nd day of November in the year 2016 before me, the undersigned, personally appeared Richard Mack, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

ANGELA F. SCIANDRA
Notary Public, State of New York
Registration #01SC6294897
Qualified In Kings County
Commission Expires December 23, 2017

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Robert W. Schick, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 10th day of November, in the year 2016, before me, the undersigned, personally appeared Robert W. Schick, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

David J. Chiusano
Notary Public, State of New York
No. 01CH5032146
Qualified in Schenectady County
Commission Expires August 22, 2018

SCHEDULE "A" PROPERTY DESCRIPTION

ALL THAT CERTAIN PLOT, PIECE OR PARCEL OF LAND SITUATE, LYING AND BEING IN THE BOROUGH OF BROOKLYN, COUNTY OF KINGS, CITY AND STATE OF NEW YORK, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT IN THE NORTHERLY SIDE OF INDIA STREET (60 FEET WIDE), DISTANT 470.87 FEET WESTERLY FROM THE INTERSECTION OF SAID NORTHERLY SIDE OF INDIA STREET WITH THE WESTERLY SIDE OF WEST STREET (60 FEET WIDE), SAID POINT BEING THE POINT OR PLACE OF BEGINNING; THENCE

WESTERLY ALONG SAID NORTHERLY SIDE OF INDIA STREET, N90°00'00"W A DISTANCE OF 94.70 FEET TO A POINT; THENCE

RUNNING THE FOLLOWING SIX COURSES, GENERALLY ALONG THE SHEETPILE BULKHEAD:

NORTHERLY, N07°58'16"W A DISTANCE OF 88.27 FEET TO A POINT; THENCE

NORTHERLY, N02°33'22"W A DISTANCE OF 25.07 FEET TO A POINT; THENCE

NORTHERLY, N32°37'17"E A DISTANCE OF 2.66 FEET TO A POINT; THENCE

NORTHERLY, N45°20'01"W A DISTANCE OF 4.13 FEET TO A POINT; THENCE

SOUTHERLY, S56°40'03"W A DISTANCE OF 2.76 FEET TO A POINT; THENCE

NORTHERLY, N08°19'13"W A DISTANCE OF 84.80 FEET TO A POINT ON THE SOUTHERLY SIDE OF HURON STREET (60 FEET WIDE); THENCE

EASTERLY, ALONG SAID SOUTHERLY SIDE OF HURON STREET, N90°00'00"E A DISTANCE OF 124.13 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 60.75 FEET TO A POINT; THENCE

WESTERLY, N90°00'00"W A DISTANCE OF 23.20 FEET TO A POINT; THENCE

SOUTHERLY, S21°59'24"W A DISTANCE OF 42.33 FEET TO A POINT; THENCE

SOUTHERLY, S21°59'24"E A DISTANCE OF 42.33 FEET TO A POINT; THENCE

EASTERLY, N90°00'00"E A DISTANCE OF 23.20 FEET TO A POINT; THENCE

SOUTHERLY, S00°00'00"W A DISTANCE OF 60.75 FEET TO A POINT, SAID POINT BEING THE POINT OR PLACE OF BEGINNING.

ENCOMPASSING AN AREA OF 19,349 SQUARE FEET OR 0.44 ACRES, MORE OR LESS.

RESPONSIBILITIES OF OWNER AND REMEDIAL PARTY

The responsibilities for implementing the Site Management Plan ("SMP") for the Huxley Envelope Industrial site (the "Site"), number C224147, are divided between the Site owner and a Remedial Party, as defined below. The owner is currently listed as:

MP 145 WS Owner LLC
c/o Mack Real Estate Group (the "Owner")
60 Columbus Circle, 20th Floor
New York, NY 10023

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation (NYSDEC) is carrying out remediation or Site management, the NYSDEC and/or an agent acting on its behalf. The RPs are:

145 West Street, LLC
c/o Palin Enterprises
235 Park Avenue South, 8th Floor
New York, NY 10003

MP 145 WS Owner LLC
60 Columbus Circle, 20th Floor
New York, NY 10023

MP 145 WS Lessee LLC
60 Columbus Circle, 20th Floor
New York, NY 10023

19 India Fee Owner LLC
c/o Mack Real Estate Group
60 Columbus Circle, 20th Floor
New York, NY 10023

10 Huron FS Condo LLC
c/o Mack Real Estate Group
60 Columbus Circle, 20th Floor
New York, NY 10023

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the Site.

Site Owner's Responsibilities:

1) The Owner shall follow the provisions of the SMP as they relate to future construction and excavation at the Site.

2) In accordance with a periodic time frame determined by the NYSDEC, the Owner shall periodically certify, in writing, that all Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The Owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.

3) In the event the Site is delisted, the Owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.

4) The Owner shall grant access to the Site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The Owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. In the event that damage to the remedial components or vandalism is evident, the Owner shall notify the Site's RP and NYSDEC in accordance with the timeframes indicated in Section 2.4.2-Notifications.

6) In the event some action or inaction by the Owner adversely impacts the Site, the Owner must notify the Site's RP and the NYSDEC in accordance with the time frame indicated in Section 2.4.2-Notifications and coordinate the performance of necessary corrective actions with the RP.

7) The Owner must notify the RP and the NYSDEC of any change in ownership of the Site property (identifying the tax map numbers in any correspondence) and provide contact information for the new Owner of the Site property. 6 NYCRR Part 375 contains notification requirements applicable to any construction or activity changes and changes in ownership. Among the notification requirements is the following: Sixty days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section. Notification requirements for a change in use are detailed in Section 2.4 of the SMP. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) If an Owner has a written agreement to perform work for the RP, a description of the activities may be inserted here and said agreement shall also be included in the SMP. The Owner will conduct all such activities on behalf of the RP. The RP remains ultimately responsible for maintaining the engineering controls.

9) Until such time as the NYSDEC deems the sub-slab depressurization system (SSDS) unnecessary, the Owner shall operate the system, pay for the utilities for the system's operation, and report any maintenance issues to the RP and the NYSDEC.

10) In accordance with the tenant notification law, within 15 days of receipt, the Owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the Site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

Remedial Party Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the Site.

2) The RP shall report to the NYSDEC all activities required for remediation, operation, maintenance,

monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the Site property to undertake a specific activity, the RP shall provide the Owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the Owner, upon the owner's request, (ii) the NYSDEC, and (iii) other entities, if required by the SMP, a copy of any data generated during the Site visit and/or any final report produced.
4) If the NYSDEC determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC. Within 5 business days after NYSDEC approval, the RP shall submit a copy of the approved SMP to the owner(s).
5) The RP shall notify the NYSDEC and the Owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.
6) The RP shall notify the NYSDEC of any damage to or modification of the systems as required under Section 2.4.2- Notifications of the SMP.
7) The RP is responsible for the proper maintenance of any installed vapor intrusion mitigation systems associated with the Site, as required in Section 4.0 of the SMP.
8) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC for approval an amended SMP.
9) Any change in use, change in ownership, change in Site classification (*e.g.*, delisting), reduction or expansion of remediation, and other significant changes related to the Site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the Department to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the Site unless a legally binding document executed by the NYSDEC releases the RP of its obligations.

Future Site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

APPENDIX B
REMEDIAL COVER SYSTE, WESTERN BULKHEAD,
AND SUB-SLAB VENTING SYSTEM AS-BUILT DRAWINGS

LEGEND

- SLOTTED 4" PVC PIPE BENEATH SLAB WITH ENDCAP
- SOLID 4" PIPE BENEATH SLAB
- VERTICAL RISER (SEE DRAWING AB-3 FOR RISER DETAILS)
- VAPOR BARRIER INSTALLATION LOCATIONS. MINIMUM 6" OVERLAP OVER FOUNDATION MATS AND PILE CAPS
- MINIMUM 6" GRAVEL LAYER BENEATH VAPOR BARRIER
- EXTENT OF BUILDING A FIRST FLOOR
- PIPE SLEEVE THROUGH FOUNDATION ELEMENT (SEE DRAWING AB-2, DETAILS 4 & 8)
- MONITORING POINT LOCATION (SEE DRAWING AB-2, DETAIL 6)

SEAL:

STATE OF NEW YORK
MICHELLE LAPIN
LIC. NO. 073934
LICENSED PROFESSIONAL ENGINEER

SIGNATURE DATE 12/15/16

AKRF Engineering, P.C.
440 Park Avenue South, New York, N.Y. 10016

Huxley Envelope Industrial Site
145 West Street
BROOKLYN, NEW YORK

BUILDING A - VAPOR BARRIER AND SUBSLAB VENTING SYSTEM LAYOUT AND DESIGN DETAILS

DATE
12/15/2016

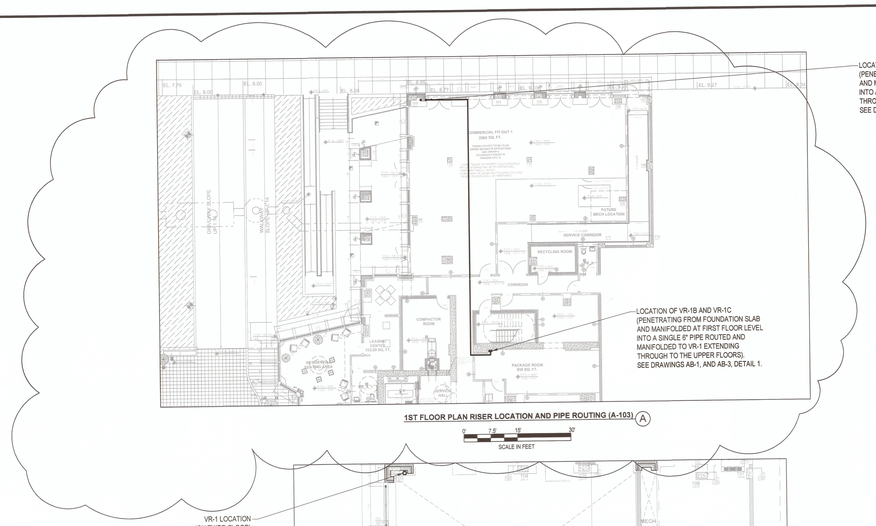
SCALE
as shown

PROJECT No.
11884

FIGURE
AB-1

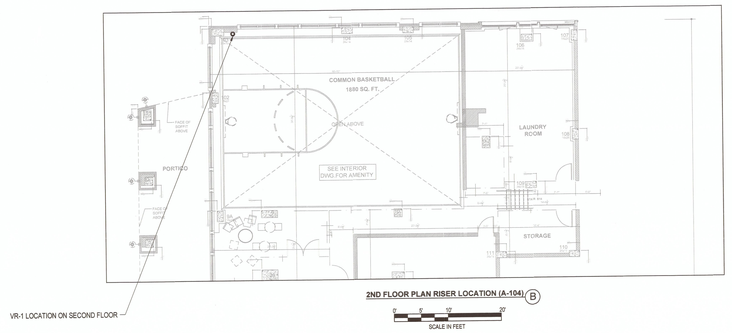
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M:\AKRF Project Files\11884 - 145 West St (Urban ARES)\Figures\2016\12\VD\s\11884 Fig Ba Bb (FEIN Figs 7a-7h (SMP) AB-1.dwg

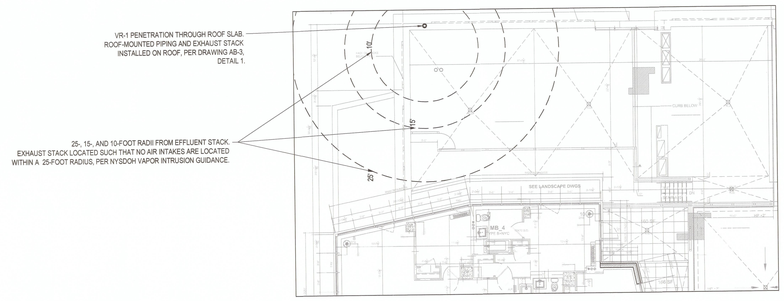


1ST FLOOR PLAN RISER LOCATION AND PIPE ROUTING (A-103) (A)

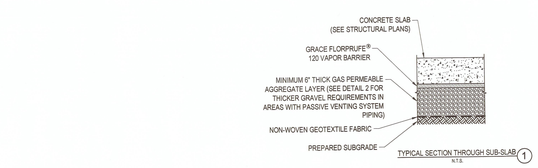
3RD FLOOR PLAN RISER LOCATION (A-105) (C)



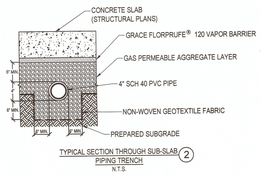
2ND FLOOR PLAN RISER LOCATION (A-104) (B)



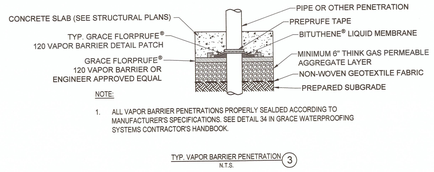
4TH FLOOR PLAN RISER LOCATION (A-106) (D)



TYPICAL SECTION THROUGH SUB-SLAB (1)
N.T.S.

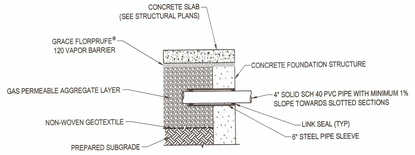


TYPICAL SECTION THROUGH SUB-SLAB PIPING TRENCH (2)
N.T.S.

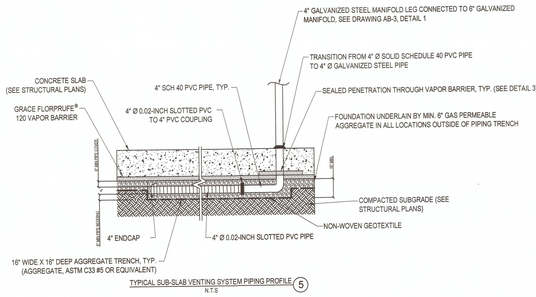


NOTE:
1. ALL VAPOR BARRIER PENETRATIONS PROPERLY SEALDED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. SEE DETAIL 34 IN GRACE WATERPROOFING SYSTEMS CONTRACTOR'S HANDBOOK.

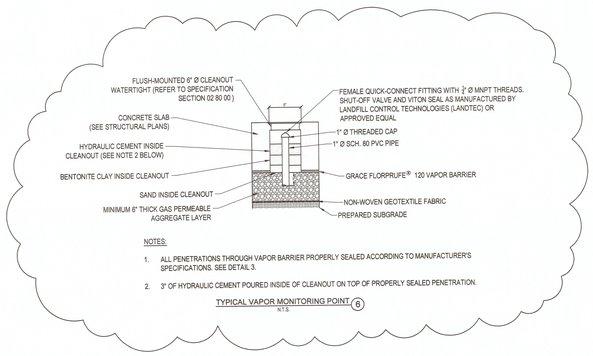
TYP. VAPOR BARRIER PENETRATION (3)
N.T.S.



TYPICAL PIPE SLEEVE THROUGH FOUNDATION ELEMENT (4)
N.T.S.

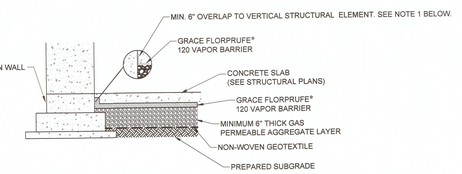


TYPICAL SUB-SLAB VENTING SYSTEM PIPING PROFILE (5)
N.T.S.



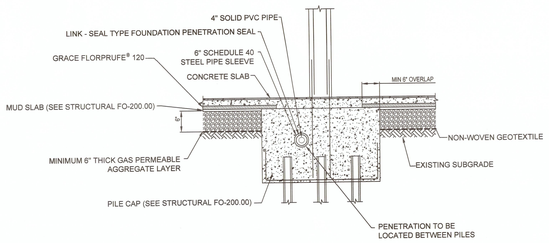
NOTES:
1. ALL PENETRATIONS THROUGH VAPOR BARRIER PROPERLY SEALED ACCORDING TO MANUFACTURER'S SPECIFICATIONS. SEE DETAIL 3.
2. 3" OF HYDRAULIC CEMENT POURED INSIDE OF CLEANOUT ON TOP OF PROPERLY SEALED PENETRATION.

TYPICAL VAPOR MONITORING POINT (6)
N.T.S.



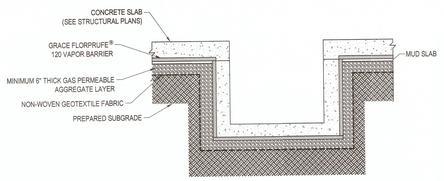
NOTES:
1. VAPOR BARRIER INSTALLED AT FOUNDATION WALL PER MANUFACTURER'S SPECIFICATIONS. REFER TO DETAIL 6 IN GRACE WATERPROOFING SYSTEMS CONTRACTOR'S HANDBOOK FOR SEAL DETAIL.
2. REFER TO STRUCTURAL DRAWINGS FOR EXTERIOR FOUNDATION WALL DETAILS.

VAPOR BARRIER DETAIL AT TYPICAL EXTERIOR FOUNDATION WALL (7)
N.T.S.



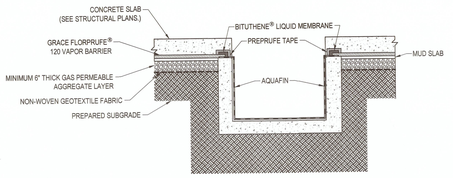
NOTES:
1. REFER TO FO-200.00 FOR STRUCTURAL DETAIL

SUB-SLAB VENTING SYSTEM AND VAPOR BARRIER DETAIL AT TYPICAL INTERIOR PILE CAP (8)
N.T.S.



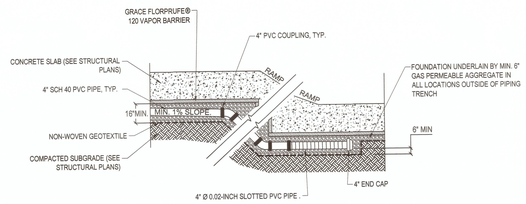
NOTES:
1. PIPE PENETRATIONS IN PIT WALL SEALED IN ACCORDANCE WITH DETAIL 3 OF THIS DRAWING.

VAPOR BARRIER DETAIL AT TYPICAL ELEVATOR / SUMP PIT / UTILITY PIT, ETC. (9)
N.T.S.



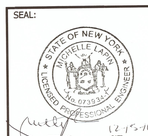
NOTES:
1. ALL PIPE PENETRATIONS IN PIT SEALED IN ACCORDANCE WITH DETAIL 3 OF THIS DRAWING.
2. PIT WATERPROOFED IN ACCORDANCE WITH SPECIFICATION SECTION 07 13 26.

VAPOR BARRIER DETAIL WITH AQUAFIN AT TYPICAL ELEVATOR / SUMP PIT / UTILITY PIT WHERE FLORPRUFE OR PREPRUFE APPLICATION IS INFEASIBLE (10)
N.T.S.



TYPICAL PROFILE AT FLOOR ELEVATION CHANGE (11)
N.T.S.

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440 Park Avenue South, New York, N.Y. 10016

Huxley Envelope Industrial Site
145 West Street
BROOKLYN, NEW YORK

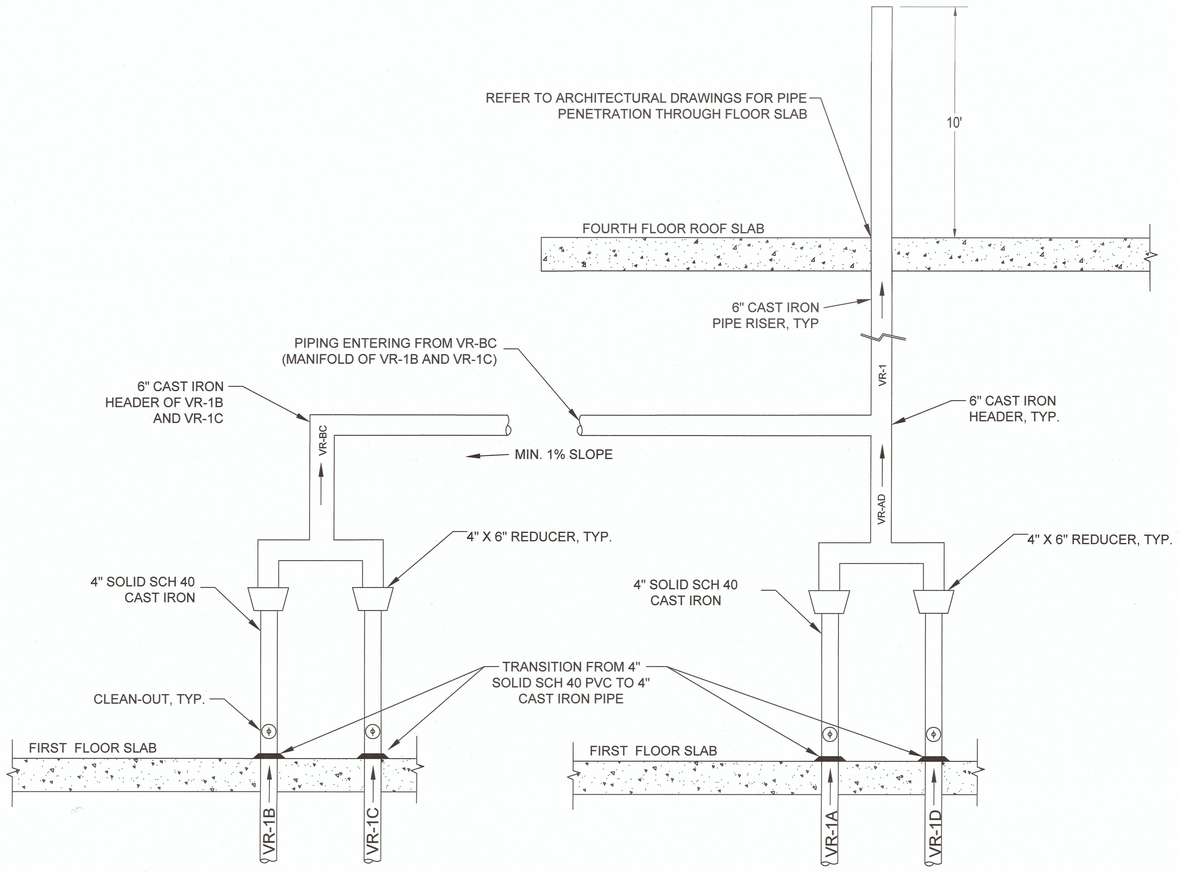
SUBSLAB VENTING SYSTEM LAYOUT AND DESIGN DETAILS

DATE
12/15/2016

SCALE
as shown

PROJECT No.
11884

FIGURE
AB-2



PIPING MANIFOLD DIAGRAM (1)
N.T.S.

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SUB-SLAB VENTING SYSTEM
LAYOUT AND DESIGN DETAILS

DATE
12/15/2016

SCALE
as shown

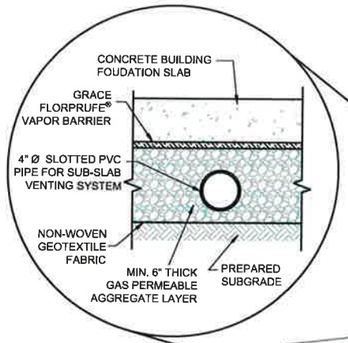
PROJECT No.
11884

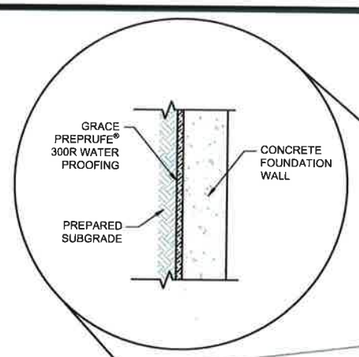
FIGURE
AB-3

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No. 073934
LICENSED PROFESSIONAL ENGINEER

SIGNATURE 12-15-16 DATE

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M:\AKRF Project Files\11884 - 145 West St (Huxley)\MXD\[Figure-AB3.03]Figure-AB3.03.DWG\11884 Fig 8a, 8b,FIG Fig 7a, DSM7 (AB-3.dwg





LEGEND:

PROJECT SITE BOUNDARY

NEW BUILDING

0' 30' 60' 120'

SCALE IN FEET

HURON STREET

WEST STREET

INDIA STREET

1 2 3 4

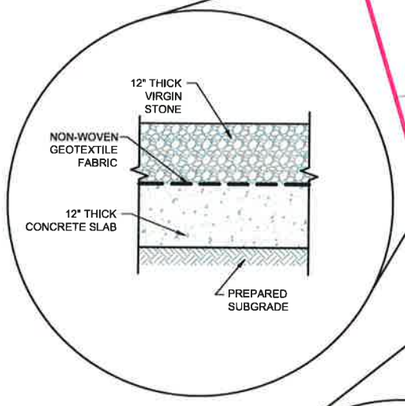
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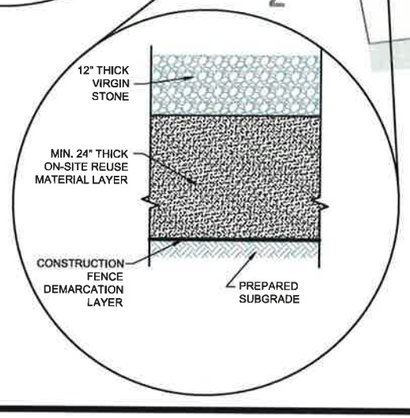
Building A

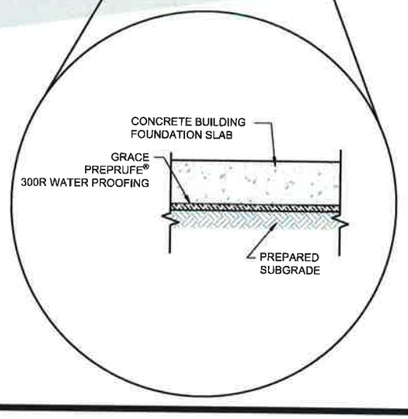
Building B

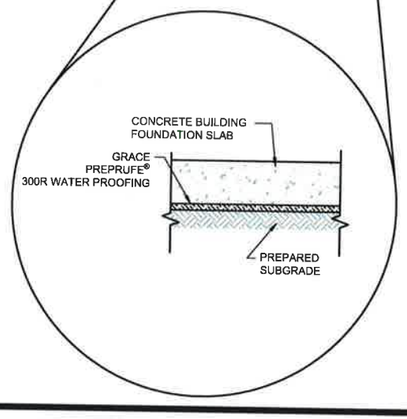
Building C

Park









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MICHELLE LAPIN
No. 073934
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12-15-16
DATE

AKRF

AKRF Engineering, P.C.
440 Park Avenue South, New York, NY 10016

Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

LOCATION AND CROSS-SECTIONS OF REMEDIAL COVER SYSTEM TYPES

DATE
12/15/2016

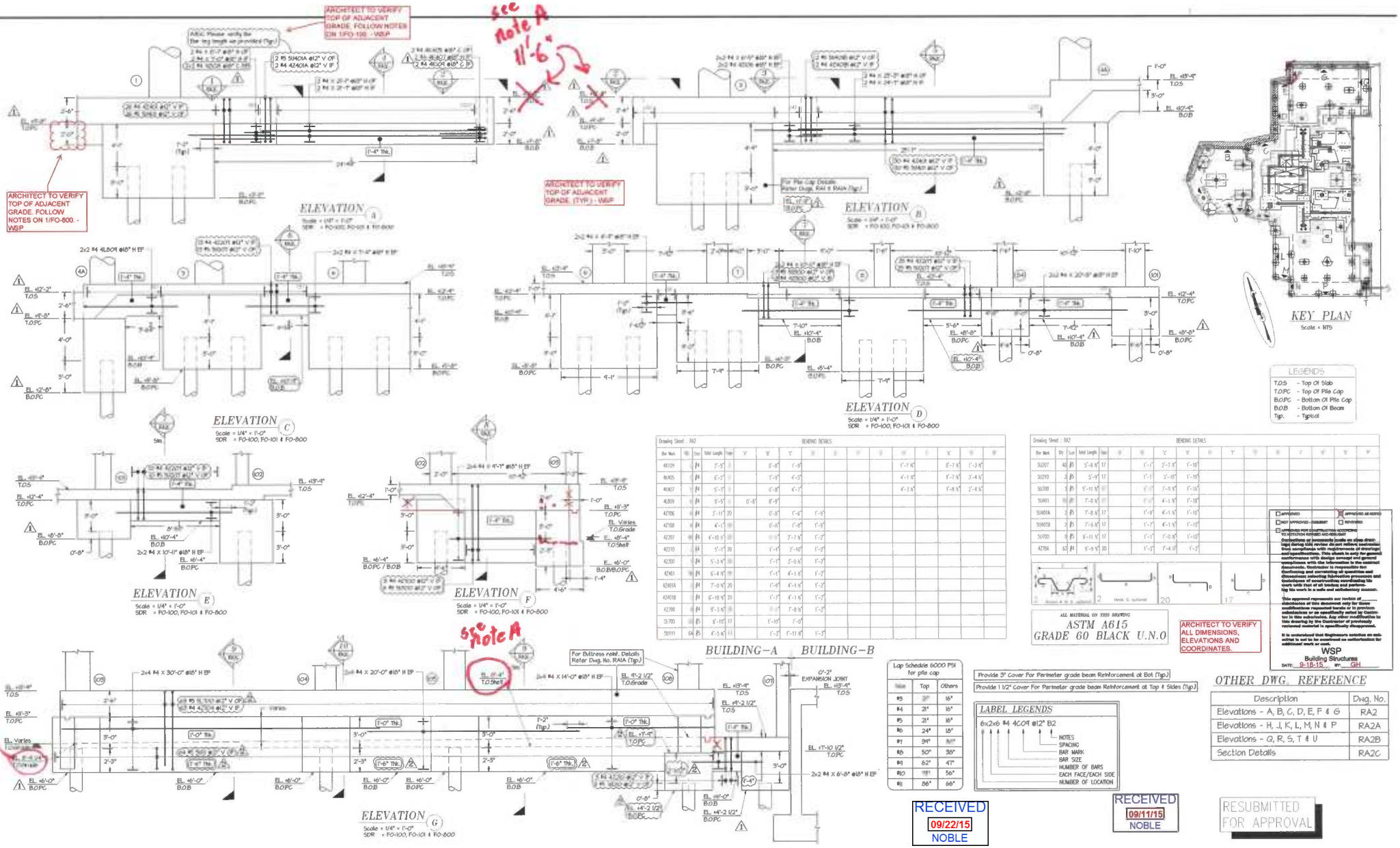
PROJECT NO.
11884

SCALE
as shown

FIGURE
AB-4

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M:\AKRF Project Files\11884 - 145 West St (Urban-MREG)\Figures\2016 DWGs\11884 Fig 9 (FER) Fig 8 (SMP) AB-4.dwg



OTHER DWG. REFERENCE

Description	Dwg. No.
Elevations - A, B, C, D, E, F & G	RA2
Elevations - H, J, K, L, M, N & P	RA2A
Elevations - Q, R, S, T & U	RA2B
Section Details	RA2C

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL	SOFT METRIC
#2 / #6	#6 / #19
#3 / #10	#7 / #22
#4 / #13	#8 / #25
#5 / #16	#9 / #29
	#10 / #32
	#11 / #36
	#14 / #43
	#18 / #57

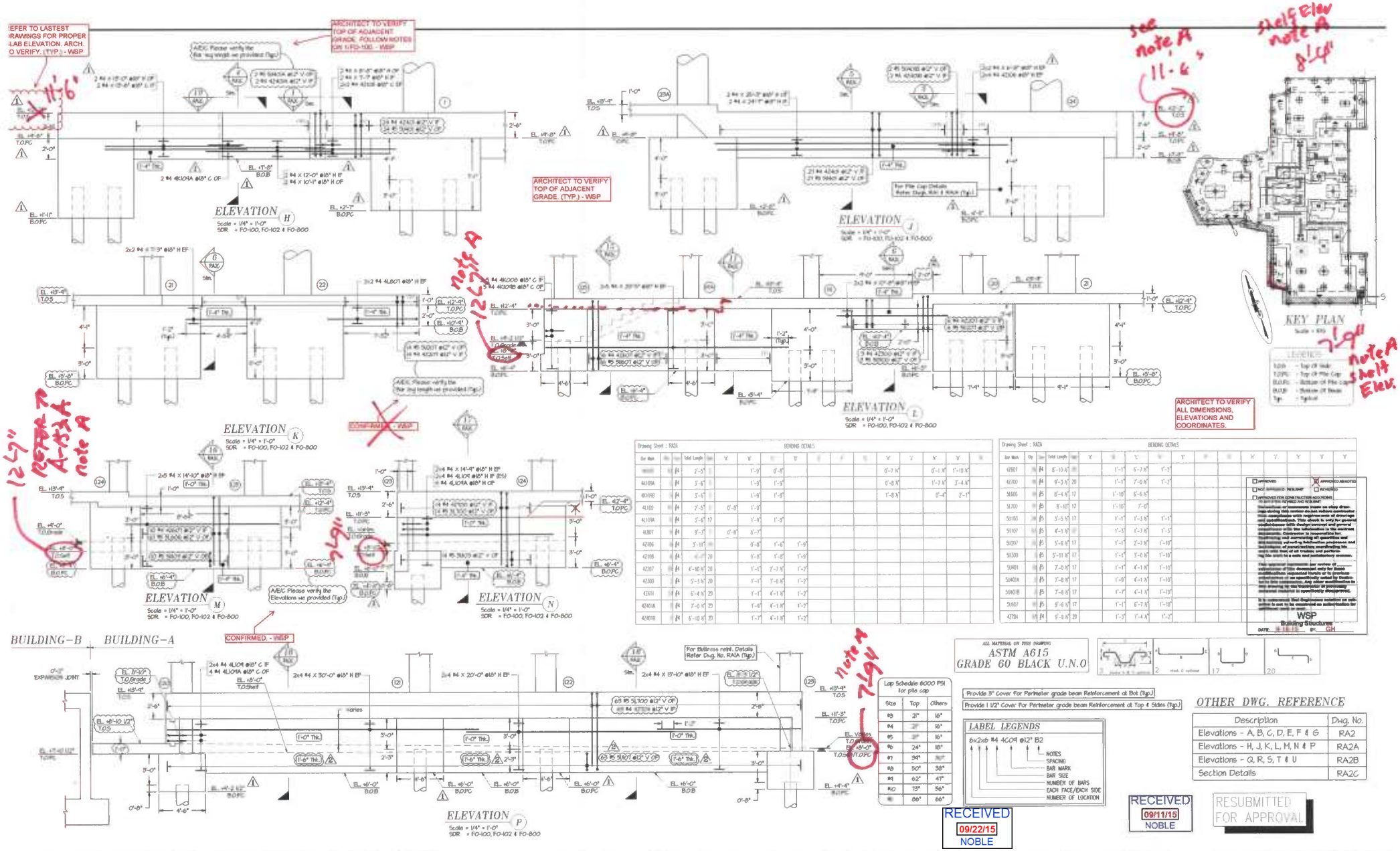
LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
609 E. 132 Street - Bronx, NY 10454
Phone 718-585-6888 | Fax 718-841-8110
www.cfssteel.com

NO	REVISIONS	DATE	BY
1	REVISED AS PER GC COMMENTS	09.10.15	RDD
0	REVISED AS PER GC COMMENTS	08.27.15	RDD
0	FOR APPROVAL	07.02.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PERIMETER GRADE BEAMS (PART-1)-BUILDING A (SHEET 01 OF 04)
DRAWING NO.: RA2

* Note A - see subsequent page for Note A



OTHER DWG. REFERENCE

Description	Dwg. No.
Elevations - A, B, C, D, E, F & G	RA2
Elevations - H, J, K, L, M, N & P	RA2A
Elevations - Q, R, S, T & U	RA2B
Section Details	RA2C

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION

IMPERIAL	METRIC		
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL REINFORCING STEEL WIRE MESH

CFS Steel Company
888 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
P	REVISED AS PER GC COMMENTS	09.10.15	RDD
I	REVISED AS PER GC COMMENTS	08.27.15	RDD
H	FOR APPROVAL	07.02.15	RDD

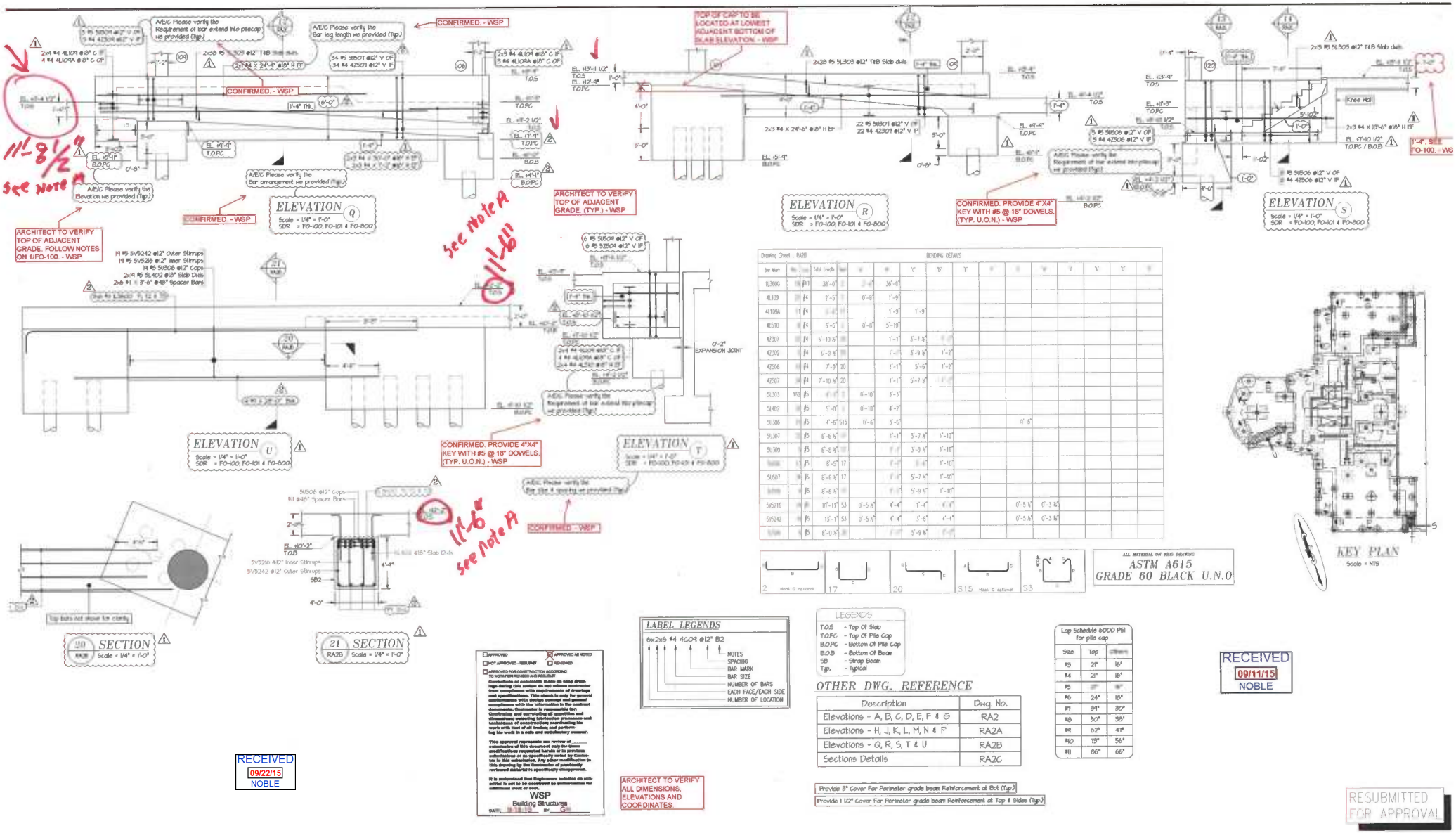
PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PERIMETER GRADE BEAMS (PART-2)-BUILDING A (SHEET 02 OF 04)

DRAWING NO.: RA2A

*Note A - confirm & revise all grade beam shelf elevation w/ current A153.A Building A 1st Floor Slab edge drawing. Confirm & revise elevations per A153.A likewise.



BENDING DETAILS

Bar Mark	No.	Size	Total Length	Wast	A	B	C	D	E	F	G	H	J	K	L	M
3L3006	19	#3	38'-0"	2	2'-4"	36'-0"										
4L109	2	#4	2'-5"	2	0'-8"	1'-9"										
4L109A	1	#4	3'-6"	2		1'-9"	1'-9"									
4L510	2	#4	5'-6"	2	0'-8"	5'-10"										
4L307	38	#4	5'-10 3/8"	20		1'-1"	5'-7 3/8"	1'-5"								
4L309	38	#4	6'-0 3/8"	19		1'-1"	5'-9 3/8"	1'-5"								
4L506	38	#4	7'-9"	20		1'-1"	5'-6"	1'-2"								
4L507	38	#4	7'-10 3/8"	20		1'-1"	5'-7 3/8"	1'-5"								
5L303	112	#5	41'-1"	3	0'-10"	5'-3"										
5L402	19	#5	5'-0"	3	0'-10"	4'-2"										
5L506	19	#5	4'-6"	515	0'-6"	5'-6"						0'-6"				
5L307	38	#5	8'-6 3/8"	20		1'-1"	5'-7 3/8"	1'-10"								
5L309	38	#5	8'-8 3/8"	19		1'-1"	5'-9 3/8"	1'-10"								
5L506	19	#5	8'-5"	17		1'-1"	5'-6"	1'-10"								
5L507	38	#5	8'-6 3/8"	17		1'-1"	5'-7 3/8"	1'-10"								
5L509	38	#5	8'-8 3/8"	19		1'-1"	5'-9 3/8"	1'-10"								
5L5216	38	#5	11'-11"	53	0'-5 3/8"	4'-4"	1'-4"	4'-4"				0'-5 3/8"	0'-3 3/8"			
5L5242	38	#5	13'-1"	53	0'-5 3/8"	4'-4"	5'-6"	4'-4"				0'-5 3/8"	0'-3 3/8"			
5L506	19	#5	8'-10 3/8"	20			5'-9 3/8"									

2 Hook G optional | 17 | 20 | 515 Hook G optional | 53

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

LABEL LEGENDS

6x2x6 #4 4G09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

LEGENDS

T.O.S	- Top Of Slab
T.O.P.C	- Top Of Pile Cap
B.O.P.C	- Bottom Of Pile Cap
B.O.B	- Bottom Of Beam
SB	- Strap Beam
Typ.	- Typical

OTHER DWG. REFERENCE

Description	Dwg. No.
Elevations - A, B, C, D, E, F & G	RA2
Elevations - H, J, K, L, M, N & P	RA2A
Elevations - Q, R, S, T & U	RA2B
Sections Details	RA2C

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	27"	19"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	78"	56"
#11	86"	66"

Provide 3" Cover For Perimeter grade beam Reinforcement at Bot (Typ.)
Provide 1 1/2" Cover For Perimeter grade beam Reinforcement at Top & Sides (Typ.)

RECEIVED
09/11/15
NOBLE

RECEIVED
09/22/15
NOBLE

APPROVED | APPROVED AS NOTED | NOT APPROVED - RESUBMIT | REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all trades; and performing his work in a safe and satisfactory manner.

This approval represents our review of ____ submission of this document only for those modifications requested hereon or in previous correspondence on the subject. Compliance with this and any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers review on submitted is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 9/18/15 BY: GH

ARCHITECT TO VERIFY ALL DIMENSIONS, ELEVATIONS AND COORDINATES.

RESUBMITTED FOR APPROVAL

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32		
#3 / #10	#7 / #22	#11 / #36		
#4 / #13	#8 / #25	#14 / #43		
#5 / #16	#9 / #29	#18 / #57		

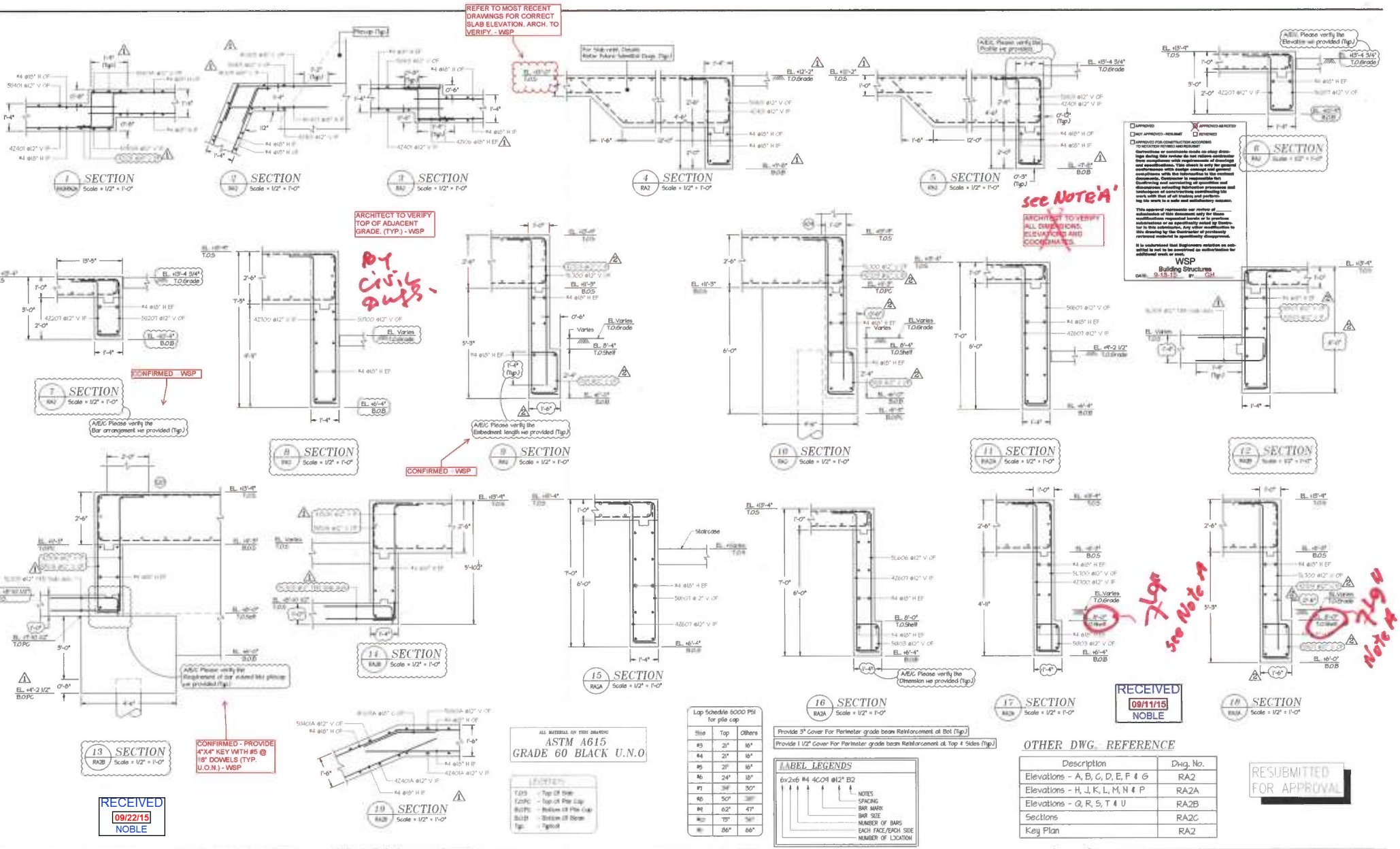
LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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CFS Steel Company
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Phone 718-589-0500 | Fax 718-841-8110
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REV	REVISIONS	BY	
1	-	-	-
0	-	-	-
E	REVISED AS PER GC COMMENTS	09.10.15	RDD
D	REVISED AS PER GC COMMENTS	08.27.15	RDD
0	FOR APPROVAL	07.02.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PERIMETER GRADE BEAMS (PART-3)--BUILDING A (SHEET 03 OF 04)
DRAWING NO.: RA2B

* Note A - see subsequent page for Note A



RECEIVED 09/22/15 NOBLE

RECEIVED 09/11/15 NOBLE

Lap Schedule 6000 PSI for pile cap		
Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	36"	30"
#8	50"	38"
#9	62"	47"
#10	75"	56"
#11	86"	66"

Provide 3" Cover For Perimeter grade beam Reinforcement at Bot (Typ.)

Provide 1 1/2" Cover For Perimeter grade beam Reinforcement at Top & Sides (Typ.)

ALL MATERIAL ON THIS DRAWING ASTM A615 GRADE 60 BLACK U.N.O

LABEL LEGENDS

6x2x6 #4 4C04 @12" B2

NOTES: SPACING; BAR MARK; BAR SIZE; NUMBER OF BARS EACH FACE/EACH SIDE; NUMBER OF LOCATION

OTHER DWG. REFERENCE

Description	Dwg. No.
Elevations - A, B, C, D, E, F & G	RA2
Elevations - H, J, K, L, M, N & P	RA2A
Elevations - Q, R, S, T & U	RA2B
Sections	RA2C
Key Plan	RA2

RESUBMITTED FOR APPROVAL

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL REINFORCING STEEL FABRICATORS

CFS Steel Company
888 E. 132 Street - Bronx, NY 10454
Phone 718-585-8000 | Fax 718-841-0110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER GC COMMENTS	09.10.15	RDD
1	REVISED AS PER GC COMMENTS	08.27.15	RDD
0	FOR APPROVAL	07.02.15	RDD

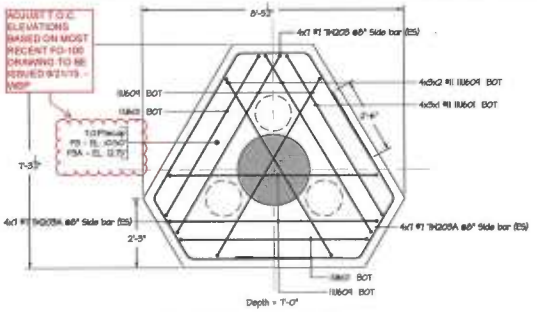
PROJECT: 145 WEST STREET

PROJECT NO: 35-083

TITLE OF DRAWING: PERIMETER GRADE BEAM SECTIONS-BUILDING A (SHEET 04 OF 04)

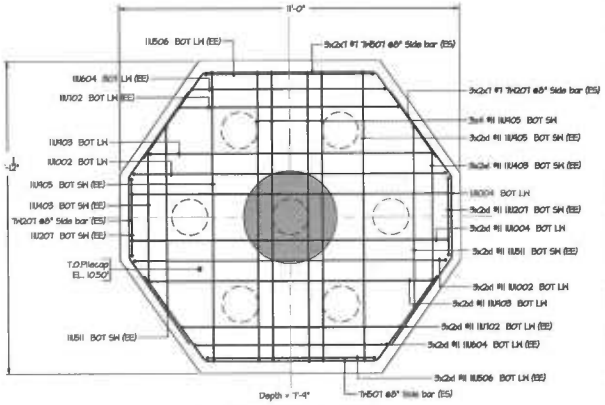
DRAWING NO.: RA2C

* Note A - confirm & revise all grade beam shelf elevations w/ current A153.A Building A 1st Floor slab edge drawing. Confirm & revise elevations per A153.A likewise.



P3&P3A–PILECAP DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-100FO-100
4 Req'd



P7–PILECAP DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-100FO-100
3 Req'd

PILE CAP SCHEDULE

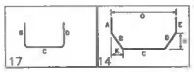
Mark	Size (H X L)	Pilecap Depth	Qty.	Top of Pilecap	Reinforcements	Remarks
P1	4'-6" X 4'-6"	3'-0" Minimum	24	EL. Varies	29x2x6 #4 4U510 BOT EW	
P2	7'-9" X 4'-6"	1'-0"	6	EL. Varies	6x6 #5 5U510 BOT SH 6x6 #10 10U101 BOT LH 6x2x5 #7 7M400A @6" Side bar (ES)	-
P4	7'-9" X 7'-9"	6'-6"	2	EL. 12.75'	2x2x6 #11 11U101 BOT EW 2x2x5 #7 7M203 @6" Side bar (ES) 4x2x10 #11 11U605 BOT EW	
P5	9'-1" X 9'-1"	7'-1"	1	EL. Varies	4x2x6 #7 7U801 @6" Side bar (ES)	
P6	11'-0" X 7'-9"	1'-5"	5	EL. Varies	5x1 #11 11U101 BOT SH 5x12 #8 11U004 BOT LH 3x2x5 #7 11U06 @6" Side bar (ES) 3x2x5 #7 11U05 @6" Side bar (ES)	
P11	14'-2 3/4" X 7'-8 1/8"	8'-6"	2	EL. 11.17'	2x28 #11 11U307 BOT LH 2x20 #11 11U101 BOT SH 4x2x5 #7 11U308 @6" Side bar (ES) 4x2x5 #7 11U08 @6" Side bar (ES)	Rebar arrangement Refer Dwg no : RA1B
P13	16'-6" X 10'-6"	9'-6"	1	EL. 11.17'	21 #11 11U510 BOT LH 23 #11 11U910 BOT SH 2x5 #7 7L1000 @6" Side bar (ES) 2x5 #7 7L1600 @6" Side bar (ES)	Rebar arrangement Refer Dwg no : RA1B

ADJUST PILE CAP ELEVATIONS BASED ON MOST RECENT FO-100 TO BE SUBMITTED ON 9/21. - WSP

BENDING DETAILS

Drawing Sheet : RA1

Bar Mark	Qty	Size	Total Length	Type	V	A	C	D	E	F	G	H	J	K	B	X
10U701	36	#10	14'-7"	17		3'-9"	7'-1"	3'-9"								
11U207	6	#11	10'-1"	17		3'-9"	2'-7"	3'-9"								
11U403	6	#11	11'-9"	17		3'-9"	4'-3"	3'-9"								
11U506	6	#11	13'-0"	17		3'-9"	5'-6"	3'-9"								
11U511	16	#11	13'-5"	17		3'-9"	5'-11"	3'-9"								
11U601	12	#11	13'-7 X"	17		3'-9"	6'-1 X"	3'-9"								
11U604	6	#11	13'-10"	17		3'-9"	6'-4"	3'-9"								
11U809	24	#11	14'-3 X"	17		3'-9"	6'-9 X"	3'-9"								
11U701	127	#11	14'-7"	17		3'-9"	7'-1"	3'-9"								
11U702	6	#11	14'-8"	17		3'-9"	7'-2"	3'-9"								
11U805	180	#11	15'-11"	17		3'-9"	8'-5"	3'-9"								
11U903	6	#11	16'-9"	17		3'-9"	9'-3"	3'-9"								
11U905	16	#11	16'-11 X"	17		3'-9"	9'-5 X"	3'-9"								
11U910	23	#11	17'-4"	17		3'-9"	9'-10"	3'-9"								
1U1002	6	#11	17'-8"	17		3'-9"	10'-2"	3'-9"								
1U1004	6	#11	17'-10"	17		3'-9"	10'-4"	3'-9"								
1U1307	56	#11	21'-1"	17		3'-9"	13'-7"	3'-9"								
1U1510	21	#11	23'-4"	17		3'-9"	15'-10"	3'-9"								
5U310	16	#5	11'-4"	17		3'-9"	3'-10"	3'-9"								
7L1006	50	#7	13'-0"	17		2'-6"	10'-6"									
7L1008	10	#7	12'-6"	17		2'-6"	10'-0"									
7L1308	20	#7	16'-2 X"	17		2'-6"	13'-8 X"									
7L1600	10	#7	18'-6"	17		2'-6"	16'-0"									
7L703	70	#7	9'-9"	17		2'-6"	7'-3"									
[illegible]	80	#7	14'-0"	17		5'-0"	4'-0"	5'-0"								
7U703	28	#7	17'-3"	17		5'-0"	7'-3"	5'-0"								
7U807	90	#7	19'-9"	17		5'-7"	8'-7"	5'-7"								
7W203	28	#7	10'-4"	14		4'-0 X"	2'-3 X"	4'-0 X"				3'-5 X"		2'-0 X"	6'-4"	
7W203A	56	#7	10'-4 X"	14		4'-0 X"	2'-3 X"	4'-0 X"				3'-5 X"		1'-11 X"	6'-3 X"	
7W207	42	#7	9'-5 X"	14		3'-4 X"	2'-7 X"	3'-4 X"				1'-11 X"		2'-9 X"	8'-2 X"	
7W507	6	#7	12'-4 X"	14		3'-4 X"	5'-7"	3'-4 X"				2'-9 X"		1'-11 X"	9'-6"	
9U310	348	#9	8'-10"	17		2'-6"	3'-10"	2'-6"								



ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Footing Reinforcement at Bot. & Sides -Typical

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	28"	16"
#5	28"	16"
#6	34"	18"
#7	39"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RA1
COLUMN & WALL DOWELS	RA1A
PILE CAP ARRANGEMENT & SECTIONS	RA1B

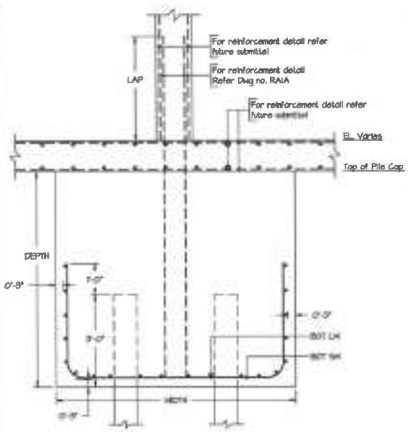
LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS
- EACH FACE/EACH SIDE
- NUMBER OF LOCATION

LEGENDS

Bot.	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LH	- Long Way
SH	- Short Way
Typ.	- Typical



TYPICAL PILECAP DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-100

APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

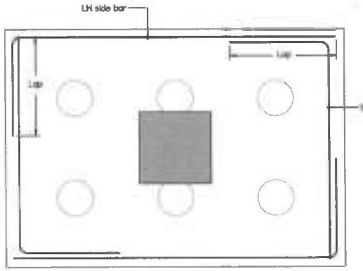
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This approval represents our review of ____ submission of this document only for items modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

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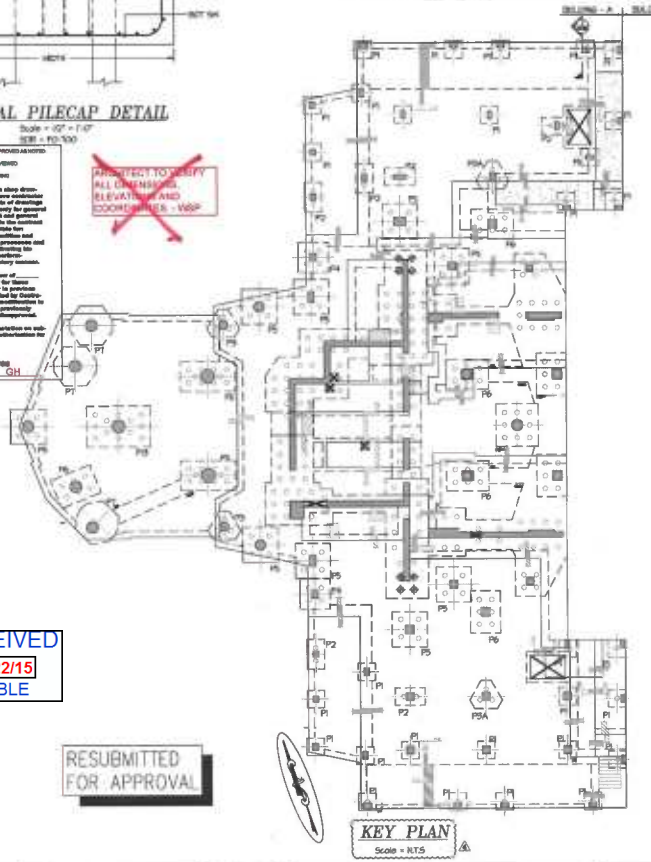
WSP
Building Structures
DATE: 9-18-15 BY: GH

RESUBMIT TO VERIFY ALL DIMENSIONS, ELEVATIONS AND COORDINATES - WSP



TYPICAL SIDE BAR ARRANGEMENT DETAIL FOR PILE CAPS P6, P11 & P13

Scale = 1/2" = 1'-0"



KEY PLAN

Scale = N.T.S

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09/11/15
NOBLE

RECEIVED
09/22/15
NOBLE

RESUBMITTED FOR APPROVAL

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC					
#2 / #5	#6 / #19	#10 / #32			
#3 / #10	#7 / #22	#11 / #36			
#4 / #13	#8 / #25	#14 / #43			
#5 / #16	#9 / #29	#18 / #57			

LOCATION	BROOKLYN NY
ARCHITECT	ISMAIL LEYVA
ENGINEER	WSP CANLOR SIDNUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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Phone 718-585-0000 | Fax 718-841-4110
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NO.	REVISIONS	DATE	BY
4	REVISED AS PER A/E/C COMMENTS	09.10.15	RDD
3	REVISED AS PER A/E/C COMMENTS	08.27.15	RDD
2	PILE CAP P6 ADDED	08.12.15	RDD
1	REVISED AS PER A/E/C COMMENTS	06.30.15	RDD
0	FOR APPROVAL	06.06.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAP - BUILDING A (SHEET 01 OF 03)

DRAWING NO.: RA1

ADJUST PILE CAP ELEVATION BASED ON MOST RECENT FO-100 TO BE SUBMITTED ON 9/21. - WSP

COLUMN DOWELS SCHEDULE

Column Mark	Size	Top of slab	Top of Pilecap	Bottom of Pilecap	Pilecap depth	Column Dowels
1	36#	EL. 12.17'	EL. 9.67'	EL. 2.92'	T'-1"	7 #6 X 13'-0" Dwls
2	36#	EL. 13.17'	EL. 9.67'	EL. 1.42'	T'-4"	12 #8 X 13'-8" Dwls
3	36#	EL. 12.17'	EL. 9.67'	EL. 1.42'	T'-4"	10 #11 X 13'-8" Dwls
4A	28#	EL. 13.15'	EL. 9.67'	EL. 2.81'	T'-0"	6 #6 X 14'-6" Dwls
5	32#	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	8 #8 X 10'-8" Dwls
6	18" X 36"	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	10 #8 X 10'-4" Dwls
7	20" X 24"	EL. 13.75'	EL. 12.75'	EL. 6.25'	6'-6"	8 #7 X 9'-6" Dwls
8	18" X 18"	EL. 13.33'	EL. 12.33'	EL. 5.33'	T'-0"	5 #6 X 9'-8" Dwls
8A	18" X 18"	EL. 13.33'	EL. 12.33'	EL. 8.66'	3'-8"	4 #6 X 6'-6" Dwls
9	36" X 16"	EL. 13.75'	EL. 12.75'	EL. 5.75'	6'-0"	6 #7 X 10'-0" Dwls
10	18" X 18"	EL. 13.75'	EL. 12.75'	EL. 5.75'	T'-0"	6 #6 X 10'-0" Dwls
11	28" X 28"	EL. 14.00'	EL. 12.75'	EL. 5.34'	T'-5"	10 #8 X 11'-0" Dwls
16	28" X 28"	EL. 13.75'	EL. 12.75'	EL. 5.34'	T'-5"	10 #8 X 10'-8" Dwls
17	24" X 24"	EL. 13.75'	EL. 12.75'	EL. 5.76'	T'-0"	8 #7 X 10'-0" Dwls
18	24" X 24"	EL. 13.75'	EL. 12.75'	EL. 5.76'	T'-0"	6 #7 X 10'-0" Dwls
18	18" X 18"	EL. 13.33'	EL. 12.33'	EL. 5.33'	T'-0"	6 #5 X 9'-4" Dwls
18A	18" X 18"	EL. 13.33'	EL. 12.33'	EL. 8.33'	6'-0"	4 #6 X 8'-8" Dwls
20	20" X 24"	EL. 13.75'	EL. 12.75'	EL. 6.26'	6'-6"	12 #4 X 10'-4" Dwls
21	18" X 32"	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	8 #8 X 10'-4" Dwls
22	32#	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	8 #8 X 10'-4" Dwls
23A	28#	EL. 13.75'	EL. 9.67'	EL. 2.81'	T'-0"	8 #7 X 14'-0" Dwls
24	36#	EL. 12.17'	EL. 9.67'	EL. 1.42'	T'-4"	10 #11 X 13'-7" Dwls
25	36#	EL. 13.17'	EL. 9.67'	EL. 1.92'	T'-3"	12 #11 X 13'-7" Dwls
26	40#	EL. 13.17'	EL. 9.67'	EL. 2.29'	4'-6"	35 #11 X 14'-0" Dwls
27	44#	EL. 13.17'	EL. 9.17'	EL. 1.92'	6'-6"	12 #11 X 14'-0" Dwls
28	44#	EL. 13.17'	EL. 9.17'	EL. 2.81'	6'-6"	12 #10 X 12'-5" Dwls
29	28" X 28"	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	8 #8 X 10'-4" Dwls
32	28" X 28"	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	10 #10 X 11'-0" Dwls
33	24" X 24"	EL. 13.66'	EL. 12.66'	EL. 5.88'	T'-1"	16 #7 X 10'-4" Dwls
34	24" X 24"	EL. 13.75'	EL. 12.75'	EL. 5.67'	T'-1"	16 #7 X 10'-4" Dwls

COLUMN DOWELS SCHEDULE

Column Mark	Size	Top of Slab	Top of Pilecap	Bottom of Pilecap	Pilecap depth	Column Dowels
101	18" X 22"	EL. 13.33'	EL. 12.33'	EL. 8.66'	3'-8"	6 #6 X 6'-6" Dwls
102	14" X 24"	EL. 13.75'	EL. 12.33'	EL. 6.33'	6'-0"	4 #6 X 9'-1" Dwls
103	24" X 16"	EL. 13.75'	EL. 11.25'	EL. 6.00'	5'-4"	8 #6 X 10'-0" Dwls
104	24" X 14"	EL. 13.75'	EL. 11.25'	EL. 6.00'	5'-4"	4 #6 X 10'-0" Dwls
105	24" X 14"	EL. 13.75'	EL. 11.25'	EL. 6.00'	5'-4"	4 #6 X 10'-0" Dwls
106	24" X 14"	EL. 9.20'	EL. 7.87'	EL. 4.21'	5'-8"	2 #6 X 7'-8" Dwls 2 #6 X 8'-6" Dwls 2 #6 X 8'-6" Dwls 6 #3 3126H 65° Ties 6 #3 3126H 65° Lines Refer section - 1 for refer dwg no. RAIB
107	14" X 24"	EL. 9.20'	EL. 7.87'	EL. 4.21'	5'-8"	4 #6 X 6'-6" Dwls
108	14" X 24"	EL. 10.00'	EL. 8.88'	EL. 5.16'	6'-0"	4 #6 X 8'-10" Dwls
109	24" X 14"	EL. 13.75'	EL. 9.75'	EL. 6.08'	5'-8"	2 #6 X 9'-8" Dwls 2 #6 X 4'-10" Dwls 2 #6 X 6'-8" Vert. 6 #3 3126H 65° Ties Refer section - 2 for refer dwg no. RAIB
110	24" X 14"	EL. 11.375'	EL. 10.045'	EL. 6.375'	3'-8"	4 #6 X 6'-8" Dwls
111	24" X 14"	EL. 12.00'	EL. 10.83'	EL. 7.16'	3'-8"	4 #6 X 6'-8" Dwls
112	14" X 24"	EL. 13.75'	EL. 12.75'	EL. 5.75'	T'-0"	4 #6 X 9'-8" Dwls
113	14" X 24"	EL. 13.75'	EL. 12.75'	EL. 9.08'	3'-8"	4 #6 X 6'-8" Dwls
115	14" X 24"	EL. 13.75'	EL. 12.33'	EL. 5.33'	T'-0"	4 #6 X 10'-1" Dwls
116	14" X 24"	EL. 13.75'	EL. 12.417'	EL. 8.747'	3'-8"	4 #6 X 6'-8" Dwls
117 & 118	14" X 24"	EL. 14.00'	EL. 12.87'	EL. 9.00'	3'-8"	2x4 #6 X 6'-8" Dwls
119	14" X 24"	EL. 13.96'	EL. 12.75'	EL. 6.75'	6'-0"	4 #6 X 9'-0" Dwls
120	24" X 14"	EL. 13.75'	EL. 7.86'	EL. 4.21'	3'-8"	2 #6 X 11'-5" Dwls 2 #6 X 6'-10" Dwls 2 #6 X 6'-8" Vert. 6 #3 3126H 65° Ties 6 #3 3126H 65° Lines Refer section - 3 for refer dwg no. RAIB
121 & 122	24" X 16"	EL. 13.75'	EL. 11.25'	EL. 6.00'	5'-3"	2x6 #6 X 9'-6" Dwls
123	24" X 16"	EL. 13.75'	EL. 8.00'	EL. 4.33'	3'-8"	6 #6 X 11'-5" Dwls 6 #6 X 6'-4" Dwls 6 #6 X 6'-6" Vert. 6 #3 3126H 65° Ties Refer section - 4 for refer dwg no. RAIB
124	16" X 24"	EL. 13.75'	EL. 12.358'	EL. 6.33'	6'-0"	8 #6 X 9'-1" Dwls
125	18" X 22"	EL. 13.33'	EL. 12.33'	EL. 6.33'	6'-0"	6 #6 X 7'-0" Dwls
126	18" X 24"	EL. 13.75'	EL. 12.33'	EL. 8.67'	3'-8"	8 #6 X 7'-0" Dwls
127 & 128	24" X 24"	EL. 13.75'	EL. 12.75'	EL. 9.09'	3'-8"	2x8 #6 X 6'-6" Dwls
129 & 130	24" X 24"	EL. 13.75'	EL. 12.75'	EL. 9.09'	3'-8"	2x8 #7 X 6'-10" Dwls
30	36"X30"	EL. 14'-0"	EL. 12'-4"	EL. 5'-4"	T'-5"	8 #8 X 12'-2" Dwls
31	36"X30"	EL.13'-11 1/2"	EL. 12'-4"	EL. 5'-4"	T'-5"	10 #8 X 11'-3" Dwls

ADJUST PILE CAP ELEVATIONS BASED ON MOST RECENT FO-100 TO BE SUBMITTED ON 9/21. - WSP

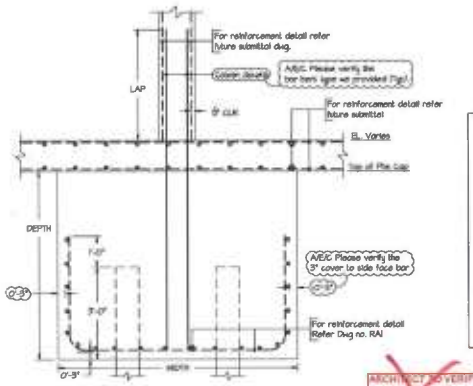
A/E/C Please verify the T.O.p/le cap as provided (typ).

7'-0". REFER TO FO-100. - WSP

Drawing Sheet : RAIA				BENDING DETAILS												
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'L'	'M'
381109	12	#3	2'-5"	T9	0'-4"	1'-5"					0'-4"					
371323	6	#3	6'-8"	T2	0'-4"	1'-1"	1'-11"	1'-1"	1'-11"		0'-4"					
372129	8	#3	9'-0"	T2	0'-4"	1'-9"	2'-5"	1'-9"	2'-5"		0'-4"					
372131	6	#3	9'-4"	T2	0'-4"	1'-9"	2'-7"	1'-9"	2'-7"		0'-4"					
372711	6	#3	7'-1"	T2	0'-4"	2'-3 N"	0'-11"	2'-3 N"	0'-11"		0'-4"					

T9

T2 Hooks A & B optional



TYPICAL PILECAP DETAIL

Scale = 1/2" = 1'-0"

SDR = FO-100

ARCHITECT TO VERIFY ALL DIMENSIONS, ELEVATIONS AND COORDINATES. - WSP

RECEIVED 09/11/15 NOBLE

RECEIVED 09/22/15 NOBLE

Lap Schedule for column (60 KSI)	
Size	Splice
#3	12"
#4	15"
#5	19"
#6	23"
#7	27"
#8	30"
#9	34"
#10	38"
#11	43"

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 1 1/2" Cover For Pier/Column Reinforcement to Ties -Typical

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RAI
COLUMN & WALL DOWELS	RAIA
PILE CAP ARRANGEMENT & SECTIONS	RAIB

LABEL LEGENDS

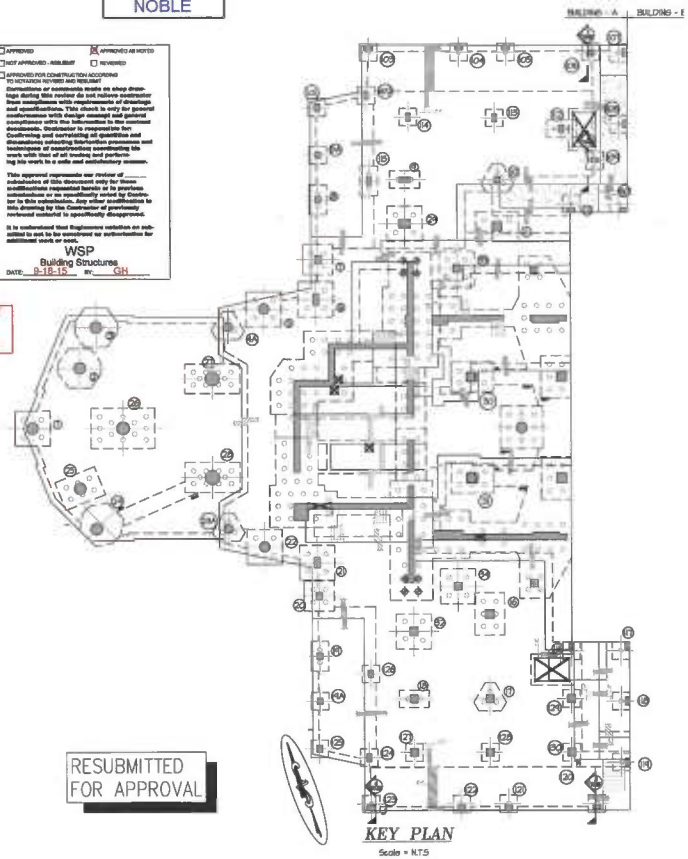
6x2x6 #4 4C04 @12" B2

NOTES
SPACING
BAR MARK
BAR SIZE
NUMBER OF BARS EACH FACE/EACH SIDE
NUMBER OF LOCATION

LEGENDS

Bot.	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
LH	- Long Hay
SH	- Short Hay
Typ.	- Typical

RESUBMITTED FOR APPROVAL



KEY PLAN

Scale = N.T.S

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC				
#2 / #6	#5 / #19	#10 / #32		
#3 / #10	#7 / #22	#11 / #36		
#4 / #13	#8 / #25	#14 / #43		
#5 / #16	#9 / #29	#18 / #57		

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEENUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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CFS Steel Company
693 E. 132 Street - Bronx, NY 10454
Phone 718-585-0888 | Fax 718-541-6110
www.cfssteel.com

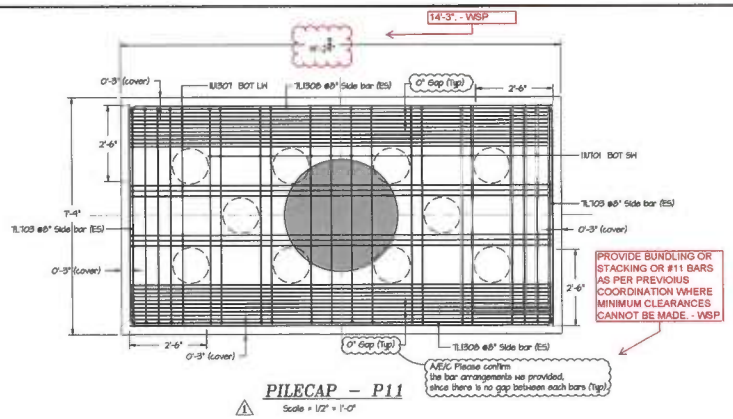
REV	REVISIONS	DATE	BY
4	REVISED AS PER A/E/C COMMENTS	09.10.15	RDD
3	REVISED AS PER A/E/C COMMENTS	08.27.15	RDD
2	COLUMNS 30 & 31 ADDED	08.12.15	RDD
1	REVISED AS PER A/E/C COMMENTS	08.03.15	RDD
0	FOR APPROVAL	06.05.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

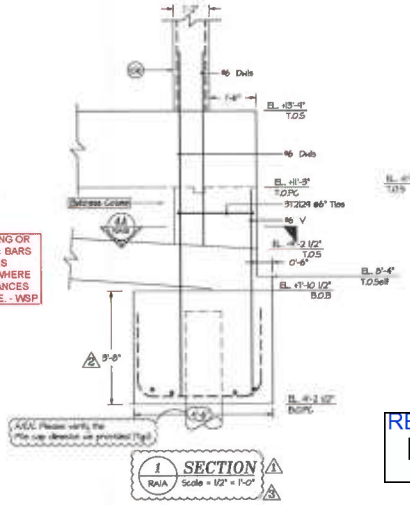
TITLE OF DRAWING: COLUMN DOWELS - BUILDING A (SHEET 02 OF 03)

DRAWING NO.: RAIA

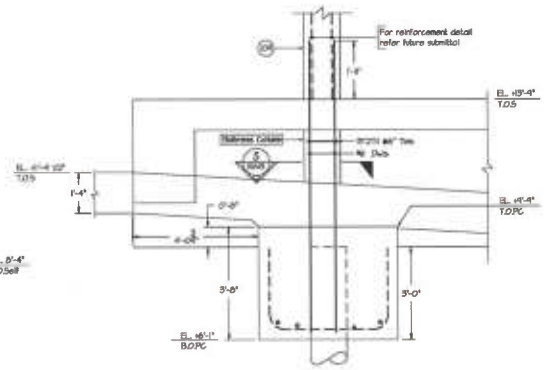


PILECAP – P11

Scale = 1/2" = 1'-0"

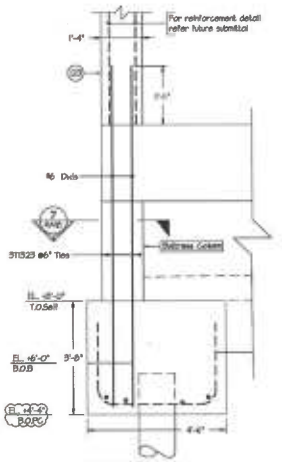


1 SECTION RA1A Scale = 1/2" = 1'-0"

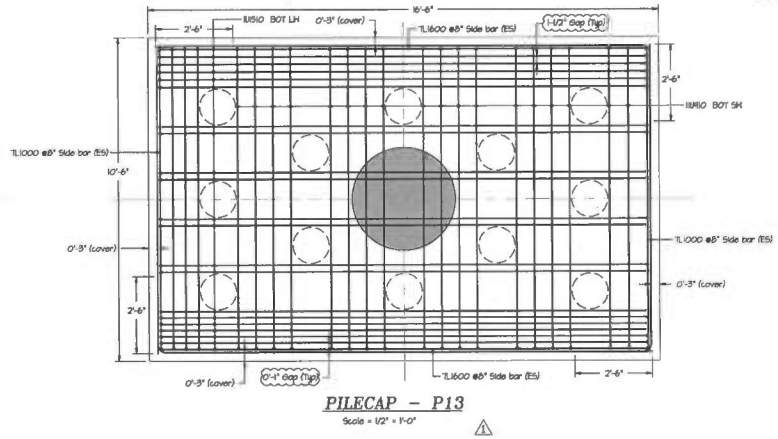


2 SECTION RA1A Scale = 1/2" = 1'-0"

RECEIVED
09/22/15
NOBLE



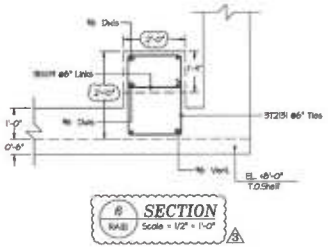
4 SECTION RA1A Scale = 1/2" = 1'-0"



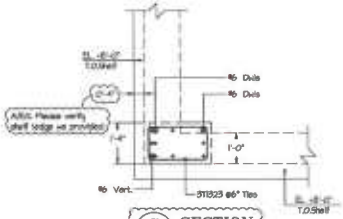
PILECAP – P13

Scale = 1/2" = 1'-0"

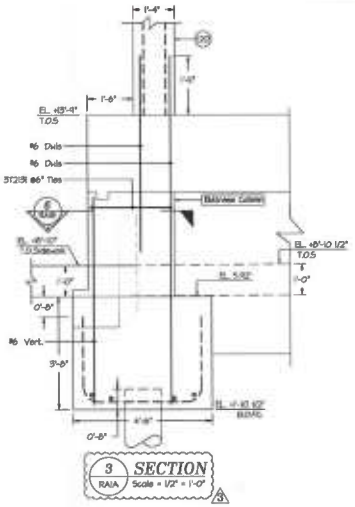
RECEIVED
09/11/15
NOBLE



6 SECTION RA1B Scale = 1/2" = 1'-0"



7 SECTION RA1B Scale = 1/2" = 1'-0"



3 SECTION RA1A Scale = 1/2" = 1'-0"

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Footing Reinforcement at Bot & Sides -Typical

Provide 1 1/2" Cover For Pier/Column Reinforcement to Ties -Typical

A/E/C Please verify the cover details we provided (Typ).

Lap Schedule 6000 PSI for pile cap		
Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	21"	18"
#7	34"	30"
#8	50"	36"
#9	62"	47"
#10	73"	56"
#11	86"	66"

Lap Schedule for column (60 KSI)	
Size	Splice
#3	12"
#4	15"
#5	19"
#6	23"
#7	27"
#8	30"
#9	34"
#10	38"
#11	43"

ARCHITECT TO VERIFY ALL DIMENSIONS, ELEVATIONS AND COORDINATES. - WSP

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RAI
COLUMN & WALL DOWELS	RAIA
PILE CAP ARRANGEMENT & SECTIONS	RAIB

LABEL LEGENDS

6x2x6 #4 4C01 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LW	- Long Way
SW	- Short Way
Typ.	- Typical

APPROVED / APPROVED AS NOTED / NOT APPROVED - RESUBMIT / REVIEWED / APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all trades; and performing his work in a safe and satisfactory manner.

This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modifications to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers's notation on submitted is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE 9-16-15 BY GH

RESUBMITTED FOR APPROVAL

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC					
#2 / #6	#6 / #19	#10 / #32			
#3 / #10	#7 / #22	#11 / #36			
#4 / #13	#8 / #25	#14 / #43			
#5 / #16	#9 / #29	#18 / #57			

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SHINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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CFS Steel Company
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Phone 718-665-6699 | Fax 718-541-0118
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	-	-	-
3	REVISED AS PER A/E/C COMMENTS	09.10.15	RDD
2	REVISED AS PER A/E/C COMMENTS	08.27.15	RDD
1	REVISED AS PER A/E/C COMMENTS	08.20.15	RDD
0	FOR APPROVAL	08.06.15	RDD

PROJECT: 145 WEST STREET

TITLE OF DRAWING: COLUMN DOWELS - BUILDING A (SHEET 03 OF 03)

PROJECT NO.: 35-083

DRAWING NO.: RA1B

APPROVED | APPROVED AS NOTED
NOT APPROVED - RESUBMIT | REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 BY: GH

RECEIVED 10/19/15 NOBLE

INCLUDE #6 BARS THAT WERE SHOWN ON PREVIOUS SUBMISSION. - WSP

RECEIVED 11/05/15 NOBLE

NOBLE CONSTRUCTION
PROJECT NAME 145 West Street
PROJECT NUMBER 14-007
CONTRACTOR NAME Urban Foundation
CONTRACTOR TRADE Concrete
SPEC SECTION # 033000
DRAWING 1 OF 10
SUBMITTAL # 0005-033000.2
DATE RECEIVED 10/19/2015
RECEIVED BY Sean Hachac

Arch/GC Please verify the all dimensions & elevations we provided (Typ).

PLACE BARS AT EACH PIT ELEVATION. 8 BARS TOTAL. SEE 6/FO-800. - WSP

Arch/GC Please verify The pit locations we provided (Typ).

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical
Provide 3" Cover For Slab Reinforcements At Bot & sides -Typical
Provide 3/4" Cover For Slab Reinforcements At Top -Typical 5
Provide 2" Cover For Wall Reinforcements At Outer Face -Typical
Provide 3/4" Cover For Wall Reinforcements At Inner Face -Typical

Lap Schedule 5000 PSI for Foundation Wall

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	23"	17"
#6	26"	20"
#7	43"	33"
#8	54"	41"
#9	67"	51"
#10	80"	61"
#11	94"	72"

OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

DETAIL-A
LAYOUT OF LOWER LEVEL PILE CAPS BOTTOM BAR ARRANGEMENTS 4
Scale = 3/8" = 1'-0"
SDR = FO-001.00, FO-100.00, FO-101.00, FO-102.00, FO-103.00, FO-800.00,

DETAIL-B
LAYOUT OF LOWER LEVEL PILE CAPS BOTTOM BAR ARRANGEMENTS
Scale = 3/8" = 1'-0"
SDR = FO-001.00, FO-100.00, FO-101.00, FO-102.00, FO-103.00, FO-800.00,

DETAIL-A

DETAIL-B

BUILDING-A KEYPLAN
Scale = 3/8" = 1'-0"

BENDING DETAILS

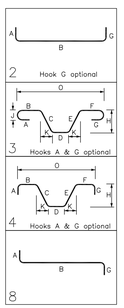
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'L'	'M'
101410	6	#11	18'-10"	2	2'-0"	16'-10"						2'-0"				
101602	7	#11	20'-2 K	2	2'-0"	18'-2 K						2'-0"				
102704	2	#11	31'-4"	2	2'-0"	27'-4"						2'-0"				
102700	8	#11	31'-0"	2	2'-0"	27'-0"						2'-0"				
101909	12	#11	23'-9"	2	2'-0"	19'-9"						2'-0"				
50703	10	#5	8'-11 K	2	0'-10"	7'-3 K						0'-10"				
50310	4	#5	5'-6 K	2	0'-10"	5'-10 K						0'-10"				
50602	4	#5	7'-10"	2	0'-10"	6'-2"						0'-10"				
50203	2	#5	3'-11"	2	0'-10"	2'-3"						0'-10"				
101006	12	#11	16'-6"	2	2'-0"	10'-6"						2'-0"				
50303	8	#5	4'-11"	2	0'-10"	3'-3"						0'-10"				
101400	8	#11	18'-0 K	2	2'-0"	14'-0 K						2'-0"				
101300	7	#11	15'-5"	2	2'-0"	13'-0"						2'-0"				
101803	2	#11	22'-3"	2	2'-0"	18'-3"						2'-0"				
101811	2	#11	22'-11 K	2	2'-0"	18'-11 K						2'-0"				
101907	2	#11	23'-7 K	2	2'-0"	19'-7 K						2'-0"				
102004	2	#11	24'-4"	2	2'-0"	20'-4"						2'-0"				
102010	12	#11	24'-10 K	2	2'-0"	20'-10 K						2'-0"				
70902	36	#7	11'-6 K	2	1'-3"	9'-2 K						1'-3"				
101701	2	#11	21'-1"	2	2'-0"	17'-1"						2'-0"				
101806	2	#11	22'-8 K	2	2'-0"	18'-8 K						2'-0"				
101902	2	#11	15'-3 K	2	2'-0"	9'-2 K						2'-0"				
101907	2	#11	15'-3 K	2	2'-0"	9'-2 K						2'-0"				
102100	4	#11	25'-0 K	2	2'-0"	21'-0 K						2'-0"				
101707	16	#11	21'-7 K	2	2'-0"	17'-7 K						2'-0"				
1L1206	10	#11	14'-6"	2	2'-0"	12'-6"										
5L302	43	#5	4'-0"	2	0'-10"	3'-2"										
401803	14	#4	19'-1 K	2	0'-8"	18'-3 K						0'-8"				
40510	8	#4	7'-2 K	2	0'-8"	5'-10 K						0'-8"				

BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'L'	'M'
90510	2	#3	8'-0 K	2	1'-7"	5'-10 K						1'-7"				
91803	2	#3	19'-10 K	2	1'-7"	18'-3 K										
702410	2	#7	27'-2"	2	1'-7"	24'-10"						1'-7"				
60708	4	#6	9'-8"	2	1'-0"	7'-8"						1'-0"				
601508	4	#6	17'-8 K	2	1'-0"	15'-8 K						1'-0"				
60508	2	#6	7'-8 K	2	1'-0"	5'-8 K						1'-0"				
70509	4	#7	8'-1 K	2	1'-7"	5'-9 K						1'-7"				
401001	8	#4	11'-5"	2	0'-8"	10'-1"						0'-8"				
91300	2	#9	14'-7"	2	1'-7"	13'-0"										
61300	4	#6	14'-0"	2	1'-0"	13'-0"										
50507	6	#5	7'-5"	2	0'-10"	5'-7"						0'-10"				
50508	4	#5	7'-4"	2	0'-10"	5'-8"						0'-10"				
901001	2	#9	13'-3"	2	1'-7"	10'-1"						1'-7"				
1L1006	10	#11	12'-6"	2	2'-0"	10'-6"										
1L1506	14	#11	17'-6"	2	2'-0"	15'-6"										
40500	10	#4	5'-8"	2	0'-8"	5'-0"										
1L1304	6	#11	27'-4 K	2	2'-0"	23'-4 K						2'-0"				
1L1703	37	#11	11'-3"	2	2'-0"	7'-3"						2'-0"				
1L1810	6	#11	12'-10 K	2	2'-0"	8'-10 K						2'-0"				
402410	14	#4	26'-2 K	2	0'-8"	24'-10 K						0'-8"				
40708	4	#4	9'-0"	2	0'-8"	7'-8"						0'-8"				
401410	8	#4	16'-2 K	2	0'-8"	14'-10 K						0'-8"				
61800	16	#6	10'-0"	2	1'-0"	8'-0"						1'-0"				
61808	20	#6	10'-8"	2	1'-0"	8'-8"						1'-0"				
61900	14	#6	11'-0"	2	1'-0"	9'-0"						2'-0"				
61600	4	#6	8'-0"	2	1'-0"	6'-0"						1'-0"				
1L2111	2	#11	25'-11 K	2	2'-0"	21'-11 K						2'-0"				
1L1506	2	#11	9'-6"	2	2'-0"	5'-6"						2'-0"				
1L2106	9	#11	23'-6"	2	2'-0"	21'-6"						2'-0"				

BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'L'	'M'
4L306A	8	#4	4'-7"	2	0'-8"	3'-6"										
92308	2	#9	13'-6 K	5		1'-0"	3'-8 K	4'-0 K	3'-8 K	1'-0"		2'-8"		2'-7 K	11'-3 K	
42308	6	#4	13'-6 K	5		1'-0"	3'-8 K	4'-0 K	3'-8 K	1'-0"		2'-8"		2'-7 K	11'-3 K	
54111	9	#5	9'-6"	3		7'-7"	1'-11"					1'-4 K		1'-3 K	8'-10 K	
52307	3	#5	9'-3"	4	0'-10"	4'-1 K	3'-7 K	0'-8"				2'-7"		2'-6 K	7'-3 K	
54109	2	#5	6'-8 K	4	0'-10"	4'-1 K	1'-9"					1'-3 K		1'-2 K	5'-4 K	
54208	5	#5	7'-2"	4	0'-10"	5'-7 K	2'-8 K					1'-7"		2'-2 K	5'-10"	
72309	5	#7	11'-6 K	4	1'-2"	4'-3 K	3'-9 K	2'-3"				2'-9"		2'-7 K	9'-2 K	
92602	3	#9	9'-4 K	8	1'-7"	6'-2 K						1'-7"				
92402	6	#9	7'-4 K	8	1'-7"	4'-2 K						1'-7"				
92901	5	#9	12'-3"	8	1'-7"	9'-1"						1'-7"				
481503	6	#4	7'-3 K	14	1'-0"	5'-3 K	1'-0"					5'-8 K		5'-8 K	4'-8 K	
41705	1	#4	12'-5"	17		2'-6"	7'-5"	2'-6"								
41505	1	#4	10'-5"	17		2'-6"	5'-5"	2'-6"								
51507	1	#5	10'-10"	17		5'-5"	5'-5"									
51410	1	#5	9'-4 K	17		4'-6"	4'-10 K									
41306	4	#4	7'-0"	17		3'-6"	3'-6"									
42204	5	#4	4'-3 K	20		0'-8"	2'-4 K	1'-9"								
42205	5	#4	4'-10 K	20		0'-8"	2'-5 K	1'-9"								
121400	27	#11	26'-8"	20		5'-6"	14'-0"	7'-2"								
42207	15	#4	5'-0 K	20		0'-8"	2'-7 K	1'-9"								
121203	7	#11	24'-11"	20		5'-6"	12'-3"	7'-2"								
74100	5	#7	7'-3 K	27			1'-0"	5'-1 K				1'-2"	0'-9"		0'-7 K	5'-9"	
54100A	5	#5	6'-7 K	27			1'-0"	4'-9 K				0'-10"	0'-9"		0'-8"	5'-5 K	
54100	5	#5	6'-3"	27			1'-0"	4'-5"				0'-10"	0'-7 K		0'-9 K	5'-2 K	



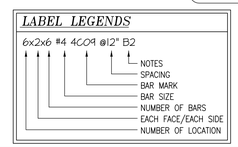
Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
T1	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.P.C	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

LABEL LEGENDS



FOR FILE & FIELD USE

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BAR SIZE CONVERSION
IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
5	REVISED AS PER AE COMMENTS	10.13.15	RDD
4	REVISED AS PER AE COMMENTS	09.30.15	RDD
3	REVISED AS PER GC COMMENTS	08.12.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A LOWER LEVEL - BOTTOM BAR DETAILS (SHEET 01 OF 10)
DRAWING NO.: RA3

APPROVED | APPROVED AS NOTED | NOT APPROVED - RESUBMIT | REVIEWED | APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all trades; and performing his work in a safe and satisfactory manner.

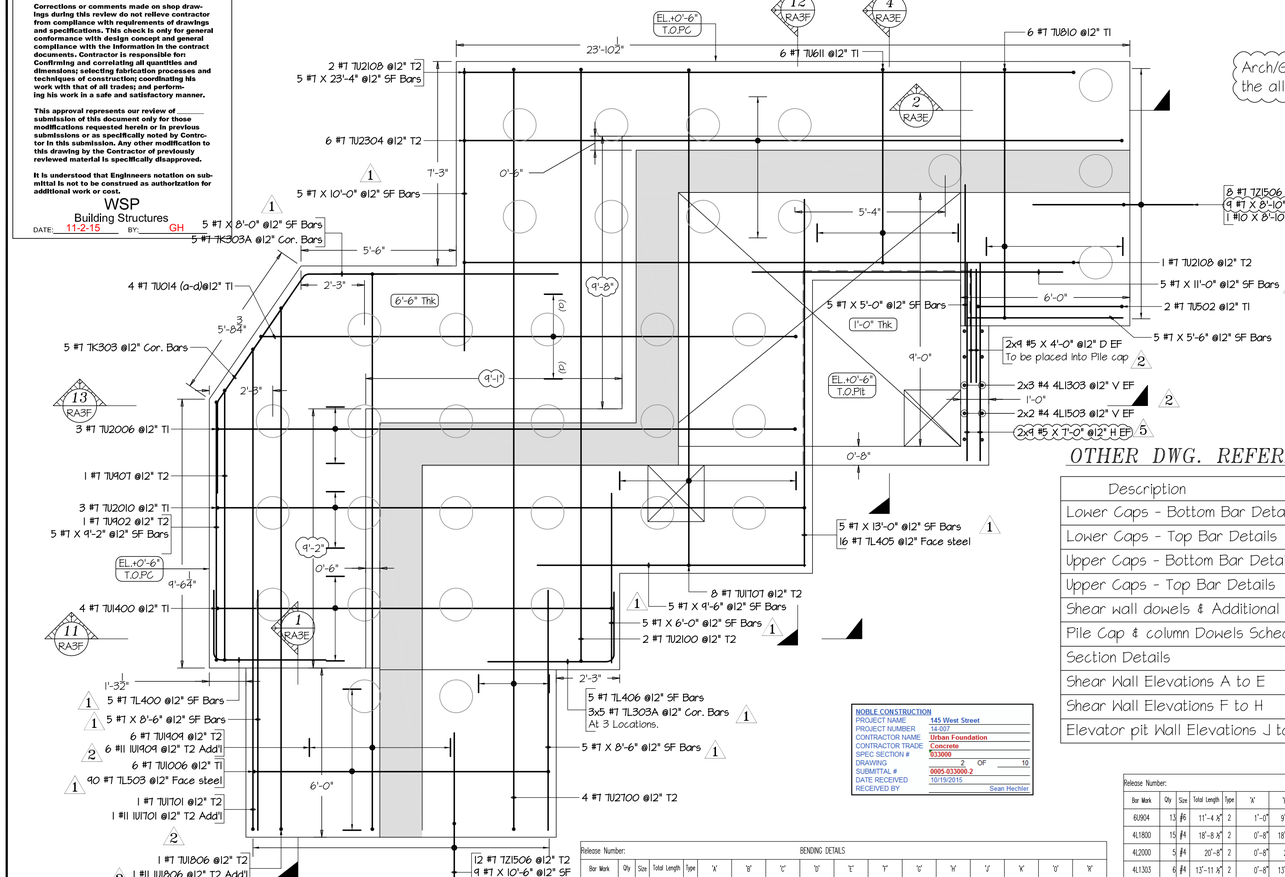
This approval represents our review of _____ submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

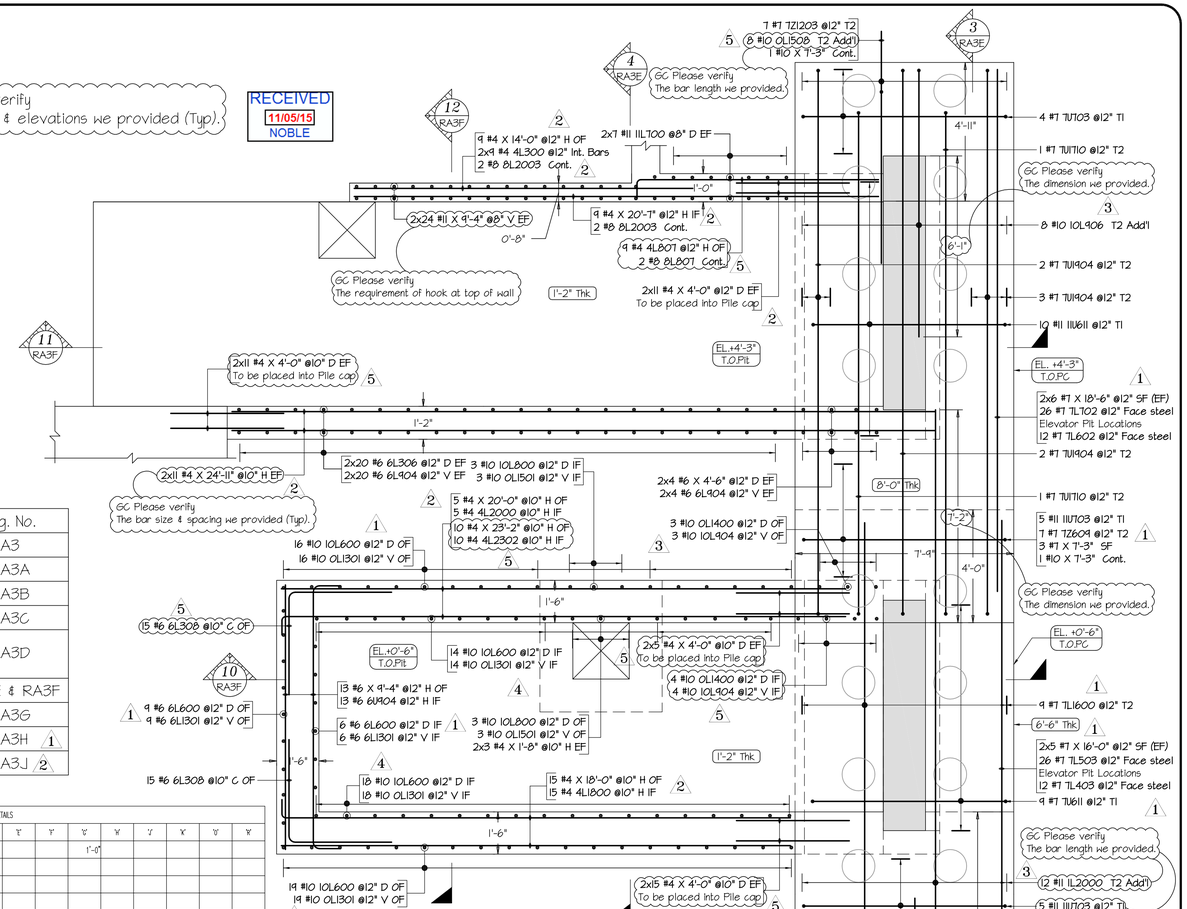
It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 BY: GH

Arch/GC Please verify the all dimensions & elevations we provided (Typ).

RECEIVED 11/05/15 NOBLE





OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H
Elevator pit Wall Elevations J to N	RA3J

NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14-027
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	03300
DRAWING SUBMITTAL #	2 OF 10
	0005-033000-2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

Release Number:

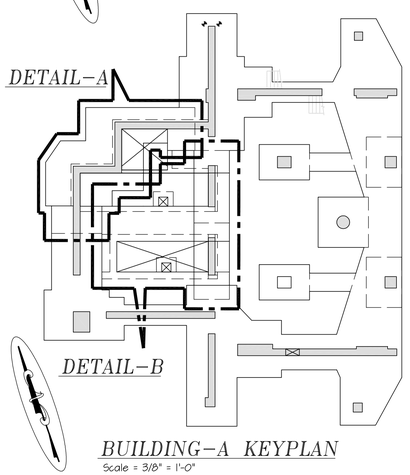
BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'X'
11U703	10	#11	11'-3"	2	2'-0"	7'-3"					2'-0"					
7U611	15	#7	9'-3"	2	1'-2"	6'-11"					1'-2"					
11U611	10	#11	10'-11"	2	2'-0"	6'-11"					2'-0"					
7U703	4	#7	9'-7"	2	1'-2"	7'-3"					1'-2"					
7L1600	9	#7	17'-2"	2	1'-2"	16'-0"										
7U1904	7	#7	21'-8"	2	1'-2"	19'-4"					1'-2"					
7U1710	2	#7	20'-2"	2	1'-2"	17'-10"					1'-2"					
7U1006	6	#7	12'-10"	2	1'-2"	10'-8"					1'-2"					
7U1400	4	#7	16'-4 X"	2	1'-2"	14'-0 X"					1'-2"					
7U2010	5	#7	23'-2 X"	2	1'-2"	20'-10 X"					1'-2"					
7U2006	3	#7	22'-10 X"	2	1'-2"	20'-6 X"					1'-2"					
7U014a	1	#7	20'-3 X"	2	1'-2"	17'-11 X"					1'-2"					
7U014b	1	#7	20'-11 X"	2	1'-2"	18'-7 X"					1'-2"					
7U014c	1	#7	21'-7 X"	2	1'-2"	19'-3 X"					1'-2"					
7U014d	1	#7	22'-4"	2	1'-2"	20'-0"					1'-2"					
7U2304	6	#7	25'-8 X"	2	1'-2"	23'-4 X"					1'-2"					
7U1909	6	#7	22'-1"	2	1'-2"	19'-9"					1'-2"					
7U902	1	#7	11'-6 X"	2	1'-2"	9'-2 X"					1'-2"					
7U907	1	#7	11'-11 X"	2	1'-2"	9'-7 X"					1'-2"					
7U2700	4	#7	28'-4"	2	1'-2"	27'-0"					1'-2"					
7U1707	8	#7	19'-11 X"	2	1'-2"	17'-7 X"					1'-2"					
7U810	6	#7	11'-2 X"	2	1'-2"	8'-10 X"					1'-2"					
7U2100	2	#7	23'-4 X"	2	1'-2"	21'-0 X"					1'-2"					
7U1806	1	#7	20'-10 X"	2	1'-2"	18'-6 X"					1'-2"					
7U1701	1	#7	19'-5"	2	1'-2"	17'-1"					1'-2"					
7U2108	3	#7	24'-0"	2	1'-2"	21'-8"					1'-2"					
10L600	67	#10	7'-10"	2	1'-10"	6'-0"										
10L800	6	#10	9'-10"	2	1'-10"	8'-0"										
OL1301	67	#10	14'-11"	2	1'-10"	13'-1"										
OL1501	6	#10	16'-11"	2	1'-10"	15'-1"										
6L600	15	#6	7'-0"	2	1'-0"	6'-0"										
6L1301	15	#6	14'-1"	2	1'-0"	13'-1"										

Release Number:

BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'X'
6U904	13	#6	11'-4 X"	2	1'-0"	9'-4 X"					1'-0"					
4L1800	15	#4	18'-8 X"	2	0'-8"	18'-0 X"										
4L2000	5	#4	20'-8"	2	0'-8"	20'-0"										
4L1303	6	#4	13'-11 X"	2	0'-8"	13'-3 X"										
4L807	9	#4	9'-3"	2	0'-8"	8'-7"										
6L306	40	#6	4'-6"	2	1'-0"	3'-6"										
6L904	48	#6	10'-4"	2	1'-0"	9'-4"										
7L503	116	#7	6'-5"	2	1'-2"	5'-3"										
7L405	16	#7	5'-7"	2	1'-2"	4'-5"										
7L602	12	#7	7'-4"	2	1'-2"	6'-2"										
7L403	12	#7	5'-5"	2	1'-2"	4'-3"										
7L702	26	#7	8'-4"	2	1'-2"	7'-2"										
8L2003	4	#8	21'-7"	2	1'-4"	20'-3"										
8L807	2	#8	9'-11"	2	1'-4"	8'-7"										
11L700	14	#11	9'-0"	2	2'-0"	7'-0"										
4L300	18	#4	3'-8"	2	0'-8"	3'-0"										
7L502	2	#7	7'-6"	2	1'-2"	5'-2"					1'-2"					
11U909	6	#11	23'-9"	2	2'-0"	19'-9"					2'-0"					
11U701	1	#11	21'-1"	2	2'-0"	17'-1"					2'-0"					
11U806	1	#11	22'-6 X"	2	2'-0"	18'-6 X"					2'-0"					
10L2000	12	#11	22'-0"	2	2'-0"	20'-0"										
10L906	8	#10	11'-4"	2	1'-10"	9'-6"										
4L2302	10	#4	23'-10"	2	0'-8"	23'-2"										
OL1400	7	#10	15'-10"	2	1'-10"	14'-0"										
10L904	7	#10	11'-2"	2	1'-10"	9'-4"										
4L1503	4	#4	15'-11 X"	2	0'-8"	15'-3 X"										
7K303	5	#7	7'-7 X"	3		4'-4 X"	3'-5"					1'-10 X"		2'-7 X"	7'-0 X"	
7K303A	5	#7	7'-7 X"	3		4'-4 X"	3'-5"					2'-8 X"		1'-9 X"	6'-2 X"	
6L308	30	#6	7'-4"	17		3'-8"	3'-8"									
7L406	5	#7	7'-0"	17		2'-6"	4'-6"									
7L400	5	#7	6'-6"	17		2'-6"	4'-0"									
7L303A	15	#7	6'-6"	17		3'-3"	3'-3"									
OL1508	8	#10	21'-2"	17		5'-6"	15'-8"									
7Z1506	27	#7	21'-5"	20		2'-6"	15'-6"	3'-3"								
7Z609	7	#7	12'-6"	20		2'-6"	6'-9"	3'-3"								
7Z1203	7	#7	18'-0"	20		2'-6"	12'-3"	3'-3"								
12U1706	12	#11	26'-8 X"	20		2'-0"	17'-6 X"	7'-2"								



DETAIL-A
LAYOUT OF LOWER LEVEL PILE CAPS TOP BAR ARRANGEMENTS

Scale = 3/8" = 1'-0"
SDR = F0-001.00, F0-100.00, F0-101.00, F0-102.00, F0-103.00, F0-800.00,

BUILDING-A KEYPLAN

Scale = 3/8" = 1'-0"

DETAIL-B
LAYOUT OF LOWER LEVEL PILE CAPS TOP BAR ARRANGEMENTS

Scale = 3/8" = 1'-0"
SDR = F0-001.00, F0-100.00, F0-101.00, F0-102.00, F0-103.00, F0-800.00,

SHEARWALLS TO BE 10,000PSI. - WSP

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

- Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
- Provide 2" Cover For Pile Cap Reinforcements at Top -Typical
- Provide 3" Cover For Slab Reinforcements At Bot & sides -Typical
- Provide 3/4" Cover For Slab Reinforcements At Top -Typical
- Provide 2" Cover For Wall Reinforcements At Outer Face -Typical
- Provide 3/4" Cover For Wall Reinforcements At Inner Face -Typical

RECEIVED 10/19/15 NOBLE

FOR FILE & FIELD USE

Lap Schedule 5000 PSI for Foundation Wall

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	23"	17"
#6	26"	20"
#7	43"	33"
#8	54"	41"
#9	67"	51"
#10	80"	61"
#11	44"	72"

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
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LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EA	- Each Side
B1	- Bottom 1st Layer
B2	- Bottom 2nd Layer
T1	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS STEEL REINFORCING STEEL WIRE MESH

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
5	REVISED AS PER AE COMMENTS	10.13.15	RDD
4	REVISED AS PER AE COMMENTS	09.30.15	RDD
3	REVISED AS PER GC COMMENTS	08.12.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A LOWER LEVEL - TOP BAR DETAILS (SHEET 02 OF 10)

DRAWING NO.: RA3A

RECEIVED
10/19/15
NOBLE

NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14-007
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	033000
DRAWING	3 OF 10
SUBMITTAL #	0005.033000.2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

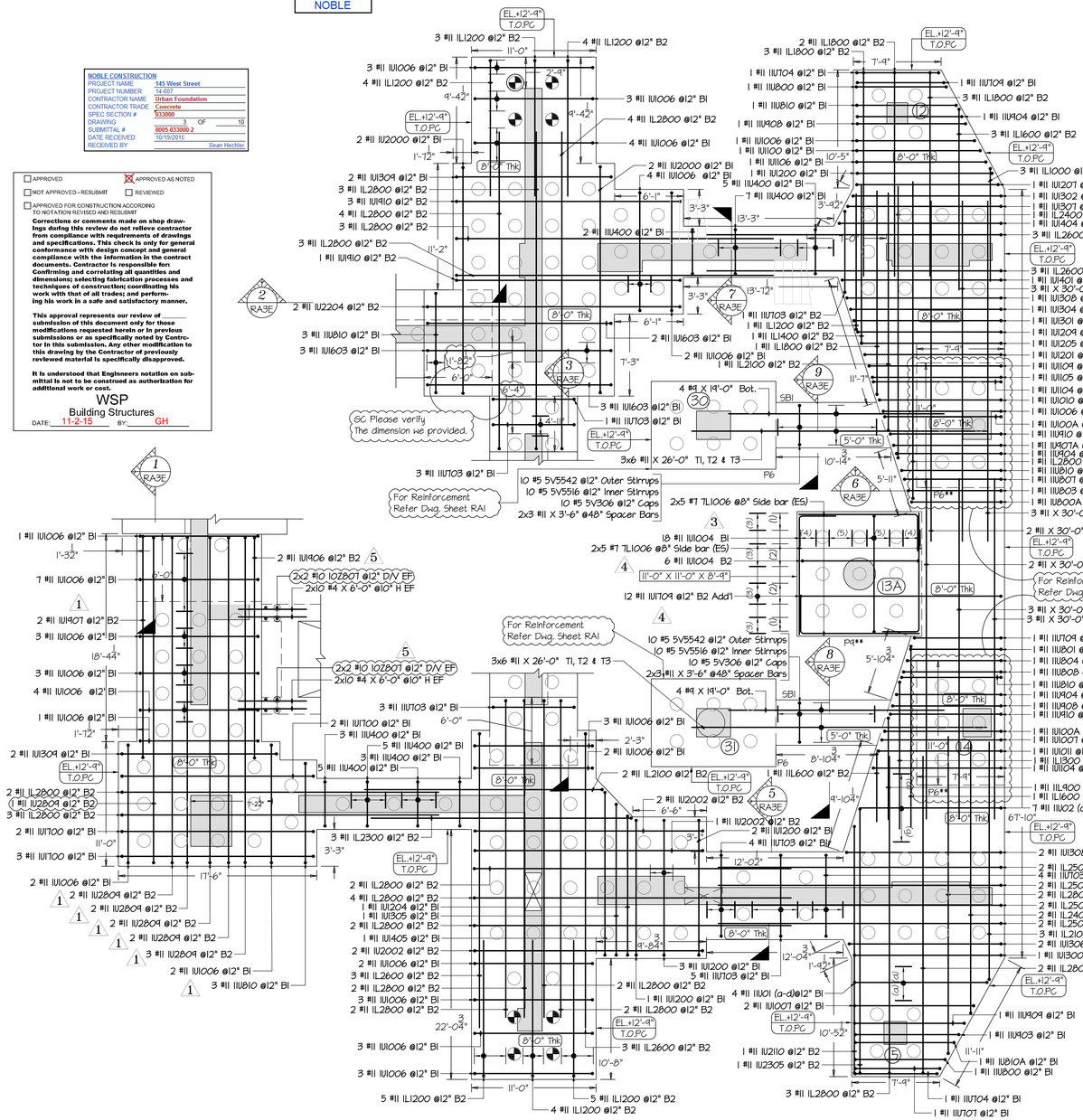
☐ APPROVED ☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT ☐ REVIEWED
☐ APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 BY: GH



LAYOUT OF PILE CAPS AT CORE – BUILDING A
UPPER LEVEL – BOTTOM BAR ARRANGEMENTS

Scale = 1/16" = 1'-0"
SDR = F0-001.00, F0-100.00, F0-101.00, F0-102.00, F0-103.00, F0-800.00,

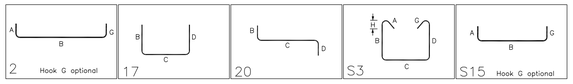
RECEIVED
11/05/15
NOBLE

BENDING DETAILS

Release Number:																	
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
1U1006	57	#11	14'-6"	2	2'-0"	10'-6"					2'-0"					
1U1309	4	#11	17'-9"	2	2'-0"	13'-9"					2'-0"					
1U1700	7	#11	21'-0"	2	2'-0"	17'-0"					2'-0"					
1L2800	46	#11	30'-0"	2	2'-0"	28'-0"										
1L2300	3	#11	25'-0"	2	2'-0"	23'-0"										
1L2100	6	#11	23'-0"	2	2'-0"	21'-0"										
1U2002	5	#11	24'-2 ½"	2	2'-0"	20'-2 ½"					2'-0"					
1U2809	12	#11	32'-9 ½"	2	2'-0"	28'-9 ½"					2'-0"					
11U810	9	#11	12'-10 ½"	2	2'-0"	8'-10 ½"					2'-0"					
1U1907	2	#11	23'-7 ½"	2	2'-0"	19'-7 ½"					2'-0"					
1U1906	2	#11	23'-6 ½"	2	2'-0"	19'-6 ½"					2'-0"					
11U400	30	#11	8'-0"	2	2'-0"	4'-0"					2'-0"					
1L2500	8	#11	27'-0"	2	2'-0"	25'-0"										
1U1306	2	#11	17'-6"	2	2'-0"	13'-6"					2'-0"					
1U1300	1	#11	17'-0 ½"	2	2'-0"	13'-0 ½"					2'-0"					
11U01a	1	#11	14'-10 ½"	2	2'-0"	10'-10 ½"					2'-0"					
11U01b	1	#11	15'-5"	2	2'-0"	11'-5"					2'-0"					
11U01c	1	#11	15'-11 ½"	2	2'-0"	11'-11 ½"					2'-0"					
11U01d	1	#11	16'-6"	2	2'-0"	12'-6"					2'-0"					
1U1007	3	#11	14'-7 ½"	2	2'-0"	10'-7 ½"					2'-0"					
1U1909	1	#11	13'-9 ½"	2	2'-0"	9'-9 ½"					2'-0"					
1U1903	1	#11	13'-3"	2	2'-0"	9'-3"					2'-0"					
1U810A	1	#11	12'-10"	2	2'-0"	8'-10"					2'-0"					
11U800	2	#11	12'-0 ½"	2	2'-0"	8'-0 ½"					2'-0"					
1U1707	1	#11	11'-7"	2	2'-0"	7'-7"					2'-0"					
1U1704	2	#11	11'-4"	2	2'-0"	7'-4"					2'-0"					
1U130B	3	#11	17'-8 ½"	2	2'-0"	13'-8 ½"					2'-0"					
11U02a	1	#11	15'-6 ½"	2	2'-0"	11'-6 ½"					2'-0"					
11U02b	1	#11	15'-10 ½"	2	2'-0"	11'-10 ½"					2'-0"					
11U02c	1	#11	16'-2 ½"	2	2'-0"	12'-2 ½"					2'-0"					
11U02d	1	#11	16'-6"	2	2'-0"	12'-6"					2'-0"					
11U02e	1	#11	16'-9 ½"	2	2'-0"	12'-9 ½"					2'-0"					
11U02f	1	#11	17'-1 ½"	2	2'-0"	13'-1 ½"					2'-0"					
11U02g	1	#11	17'-5 ½"	2	2'-0"	13'-5 ½"					2'-0"					
1U1011	1	#11	14'-11"	2	2'-0"	10'-11"					2'-0"					
1U1104	2	#11	15'-4 ½"	2	2'-0"	11'-4 ½"					2'-0"					
1U100A	2	#11	14'-4 ½"	2	2'-0"	10'-4 ½"					2'-0"					
11U910	2	#11	13'-10 ½"	2	2'-0"	9'-10 ½"					2'-0"					
11U90B	2	#11	13'-8"	2	2'-0"	9'-8"					2'-0"					
11U904	3	#11	13'-4"	2	2'-0"	9'-4"					2'-0"					
11U80B	1	#11	12'-8 ½"	2	2'-0"	8'-8 ½"					2'-0"					
11U804	1	#11	12'-4 ½"	2	2'-0"	8'-4 ½"					2'-0"					
11U801	1	#11	12'-1"	2	2'-0"	8'-1"					2'-0"					
1U1709	2	#11	11'-9"	2	2'-0"	7'-9"					2'-0"					
1U1100	1	#11	15'-0"	2	2'-0"	11'-0"					2'-0"					
1U1106	1	#11	15'-6"	2	2'-0"	11'-6"					2'-0"					
1U1200	7	#11	16'-0"	2	2'-0"	12'-0"					2'-0"					
1U1207	1	#11	16'-7"	2	2'-0"	12'-7"					2'-0"					
1U1302	1	#11	17'-2"	2	2'-0"	13'-2"					2'-0"					
1U1307	1	#11	17'-7 ½"	2	2'-0"	13'-7 ½"					2'-0"					
1U1404	1	#11	18'-4 ½"	2	2'-0"	14'-4 ½"					2'-0"					
1U1304	1	#11	17'-4 ½"	2	2'-0"	13'-4 ½"					2'-0"					
1U1301	1	#11	17'-1"	2	2'-0"	13'-1"					2'-0"					
1U1209	1	#11	16'-9"	2	2'-0"	12'-9"					2'-0"					
1U1205	1	#11	16'-5"	2	2'-0"	12'-5"					2'-0"					
1U1201	1	#11	16'-1 ½"	2	2'-0"	12'-1 ½"					2'-0"					
1U800A	1	#11	12'-0"	2	2'-0"	8'-0"					2'-0"					
11U803	1	#11	12'-3 ½"	2	2'-0"	8'-3 ½"					2'-0"					
1U1401	1	#11	18'-1 ½"	2	2'-0"	14'-1 ½"					2'-0"					
1U1109	1	#11	15'-9"	2	2'-0"	11'-9"					2'-0"					
1U1105	1	#11	15'-5 ½"	2	2'-0"	11'-5 ½"					2'-0"					
1U1010	1	#11	14'-10"	2	2'-0"	10'-10"					2'-0"					
11U807	1	#11	12'-7 ½"	2	2'-0"	8'-7 ½"					2'-0"					

BENDING DETAILS

Release Number:																	
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
1U907A	1	#11	13'-7"	2	2'-0"	9'-7"					2'-0"					
1U1910	4	#11	23'-10"	2	2'-0"	19'-10"					2'-0"					
1L2600	12	#11	28'-0"	2	2'-0"	26'-0"										
1U2204	2	#11	26'-4 ½"	2	2'-0"	22'-4 ½"					2'-0"					
1U1603	8	#11	20'-3 ½"	2	2'-0"	16'-3 ½"					2'-0"					
11U703	21	#11	11'-3"	2	2'-0"	7'-3"					2'-0"					
1U1204	1	#11	16'-4 ½"	2	2'-0"	12'-4 ½"					2'-0"					
1U1305	1	#11	17'-5"	2	2'-0"	13'-5"					2'-0"					
1U1405	1	#11	18'-5 ½"	2	2'-0"	14'-5 ½"					2'-0"					
1L1200	26	#11	14'-0"	2	2'-0"	12'-0"										
1U2110	1	#11	25'-10 ½"	2	2'-0"	21'-10 ½"					2'-0"					
1U2305	1	#11	27'-5"	2	2'-0"	23'-5"					2'-0"					
1L2400	3	#11	26'-0"	2	2'-0"	24'-0"										
1L1600	4	#11	18'-0"	2	2'-0"	16'-0"										
1L1300	1	#11	15'-0"	2	2'-0"	13'-0"										
11L900	1	#11	11'-0"	2	2'-0"	9'-0"										
11L600	1	#11	8'-0"	2	2'-0"	6'-0"										
1L1800	9	#11	20'-0"	2	2'-0"	18'-0"										
1L1400	1	#11	16'-0"	2	2'-0"	14'-0"										
1L1000	3	#11	12'-0"	2	2'-0"	10'-0"										
1U2000	4	#11	24'-0 ½"	2	2'-0"	20'-0 ½"					2'-0"					
1U1709	12	#11	21'-9 ½"	2	2'-0"	17'-9 ½"					2'-0"					
7L1006	20	#7	13'-9"	17		3'-3"	10'-6"									
1U1004	24	#11	17'-10"	17		3'-9"	10'-4"	3'-9"								
102807	8	#10	14'-11"	20		1'-3"	8'-7"	5'-1"								
5V5542	20	#5	13'-7"	S3	0'-5 ½"	4'-7"	3'-6"	4'-7"			0'-5 ½"	0'-3 ½"				
5V5516	20	#5	11'-5"	S3	0'-5 ½"	4'-7"	1'-4"	4'-7"			0'-5 ½"	0'-3 ½"				
5V306	20	#5	4'-6"	S15	0'-6"	3'-6"					0'-6"					



Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical
GC Please verify
the cover value we provided.

Lap Schedule 6000 PSI for pile cap

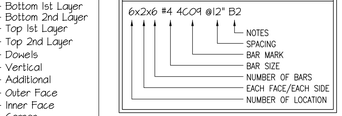
Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

LABEL LEGENDS



OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC		
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
5	REVISED AS PER AE COMMENTS	10.13.15	RDD
4	REVISED AS PER AE COMMENTS	09.30.15	RDD
3	REVISED AS PER GC COMMENTS	08.12.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A UPPER LEVEL - BOTTOM BAR DETAILS (SHEET 03 OF 10)
DRAWING NO.: RA3B

RECEIVED
10/19/15
NOBLE

NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14-007
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	033000
DRAWING	OF 10
SUBMITTAL #	0005 033000 2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

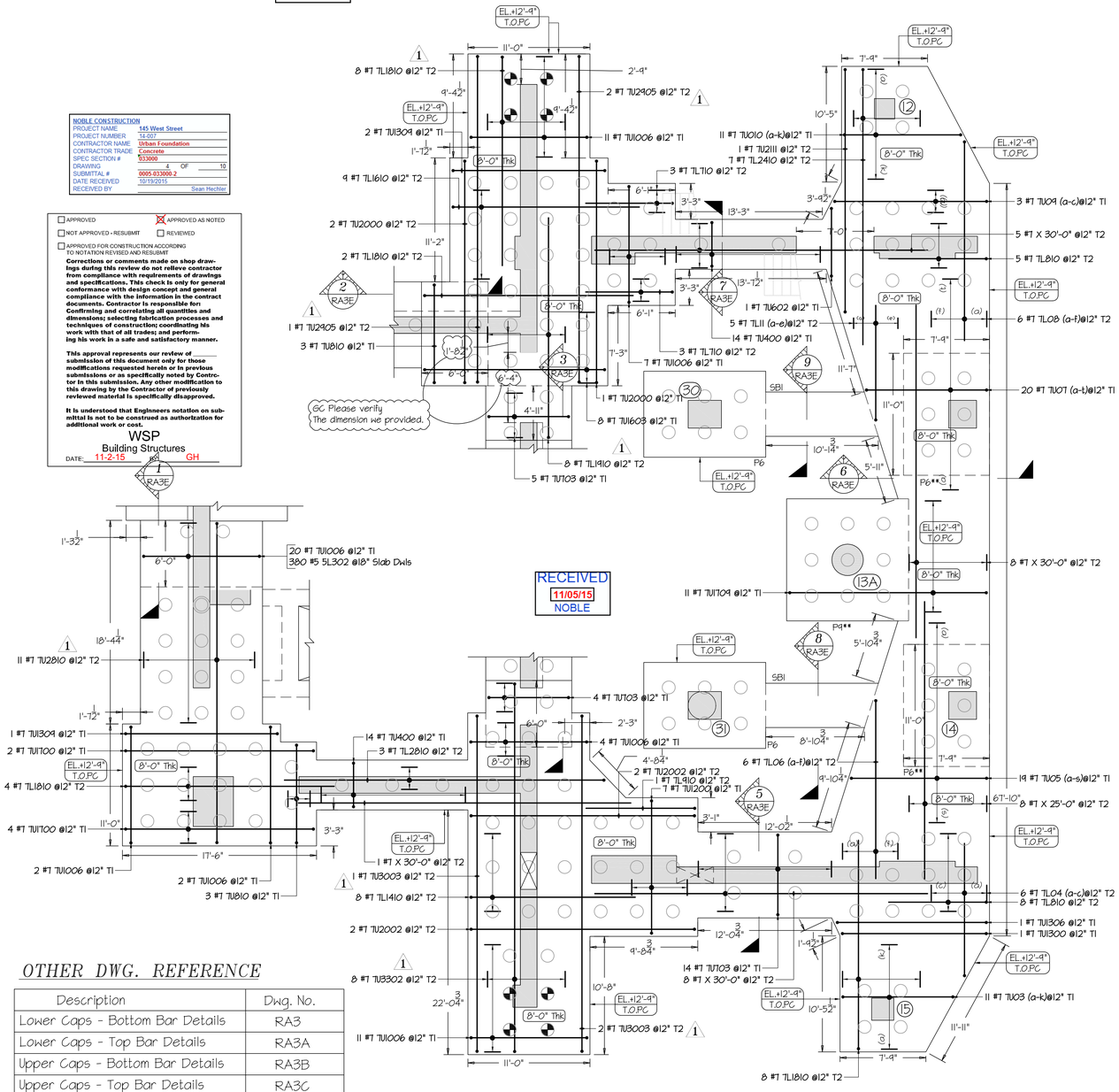
☐ APPROVED ☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT ☐ REVIEWED
☐ APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 GH



RECEIVED
11/05/15
NOBLE

OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

LAYOUT OF PILE CAPS AT CORE – BUILDING A
UPPER LEVEL – TOP BAR ARRANGEMENTS

Scale = 1/16" = 1'-0"
SDR = F0-001.00, F0-100.00, F0-101.00, F0-102.00, F0-103.00, F0-800.00,

Arch/GC Please verify
the all dimensions & elevations we provided (Typ).

Release Number: BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
7U1006	57	#7	12'-10"	2	1'-2"	10'-6"					1'-2"					
7U1309	3	#7	16'-1"	2	1'-2"	13'-9"					1'-2"					
7U1700	6	#7	19'-4"	2	1'-2"	17'-0"					1'-2"					
7L1810	22	#7	20'-0"	2	1'-2"	18'-10"										
7U703	23	#7	9'-7"	2	1'-2"	7'-3"					1'-2"					
7L2810	3	#7	30'-0"	2	1'-2"	28'-10"										
7U2002	4	#7	22'-6 X"	2	1'-2"	20'-2 X"					1'-2"					
7L1410	8	#7	16'-0"	2	1'-2"	14'-10"										
7L910	1	#7	11'-0"	2	1'-2"	9'-10"										
7L810	13	#7	10'-0"	2	1'-2"	8'-10"										
7U03a	1	#7	9'-8 X"	2	1'-2"	7'-4 X"					1'-2"					
7U03b	1	#7	10'-2 X"	2	1'-2"	7'-10 X"					1'-2"					
7U03c	1	#7	10'-8 X"	2	1'-2"	8'-4 X"					1'-2"					
7U03d	1	#7	11'-2 X"	2	1'-2"	8'-10 X"					1'-2"					
7U03e	1	#7	11'-9"	2	1'-2"	9'-5"					1'-2"					
7U03f	1	#7	12'-3"	2	1'-2"	9'-11"					1'-2"					
7U03g	1	#7	12'-9 X"	2	1'-2"	10'-5 X"					1'-2"					
7U03h	1	#7	13'-3 X"	2	1'-2"	10'-11 X"					1'-2"					
7U03i	1	#7	13'-9 X"	2	1'-2"	11'-5 X"					1'-2"					
7U03j	1	#7	14'-4"	2	1'-2"	12'-0"					1'-2"					
7U03k	1	#7	14'-10"	2	1'-2"	12'-6"					1'-2"					
7U1300	1	#7	15'-4 X"	2	1'-2"	13'-0 X"					1'-2"					
7U1306	1	#7	15'-10"	2	1'-2"	13'-6"					1'-2"					
7U05a	1	#7	10'-1 X"	2	1'-2"	7'-9 X"					1'-2"					
7U05b	1	#7	10'-5 X"	2	1'-2"	8'-1 X"					1'-2"					
7U05c	1	#7	10'-9"	2	1'-2"	8'-5"					1'-2"					
7U05d	1	#7	11'-0 X"	2	1'-2"	8'-8 X"					1'-2"					
7U05e	1	#7	11'-4 X"	2	1'-2"	9'-0 X"					1'-2"					
7U05f	1	#7	11'-8 X"	2	1'-2"	9'-4 X"					1'-2"					
7U05g	1	#7	12'-0"	2	1'-2"	9'-8"					1'-2"					
7U05h	1	#7	12'-4"	2	1'-2"	10'-0"					1'-2"					
7U05i	1	#7	12'-7 X"	2	1'-2"	10'-3 X"					1'-2"					
7U05j	1	#7	12'-11 X"	2	1'-2"	10'-7 X"					1'-2"					
7U05k	1	#7	13'-3 X"	2	1'-2"	10'-11 X"					1'-2"					
7U05l	1	#7	13'-7"	2	1'-2"	11'-3"					1'-2"					
7U05m	1	#7	13'-10 X"	2	1'-2"	11'-6 X"					1'-2"					
7U05n	1	#7	14'-2 X"	2	1'-2"	11'-10 X"					1'-2"					
7U05o	1	#7	14'-6 X"	2	1'-2"	12'-2 X"					1'-2"					
7U05p	1	#7	14'-10 X"	2	1'-2"	12'-6 X"					1'-2"					
7U05q	1	#7	15'-2"	2	1'-2"	12'-10"					1'-2"					
7U05r	1	#7	15'-5 X"	2	1'-2"	13'-1 X"					1'-2"					
7U05s	1	#7	15'-9 X"	2	1'-2"	13'-5 X"					1'-2"					
7U1709	11	#7	20'-1 X"	2	1'-2"	17'-9 X"					1'-2"					
7U07a	1	#7	10'-3 X"	2	1'-2"	7'-11 X"					1'-2"					
7U07b	1	#7	10'-7 X"	2	1'-2"	8'-3 X"					1'-2"					
7U07c	1	#7	10'-11 X"	2	1'-2"	8'-7 X"					1'-2"					
7U07d	1	#7	11'-3 X"	2	1'-2"	8'-11 X"					1'-2"					
7U07e	1	#7	11'-7"	2	1'-2"	9'-3"					1'-2"					
7U07f	1	#7	11'-10 X"	2	1'-2"	9'-6 X"					1'-2"					
7U07g	1	#7	12'-2 X"	2	1'-2"	9'-10 X"					1'-2"					
7U07h	1	#7	12'-6 X"	2	1'-2"	10'-2 X"					1'-2"					
7U07i	1	#7	12'-10 X"	2	1'-2"	10'-6 X"					1'-2"					
7U07j	1	#7	13'-2"	2	1'-2"	10'-10"					1'-2"					
7U07k	1	#7	13'-6"	2	1'-2"	11'-2"					1'-2"					
7U07l	1	#7	13'-9 X"	2	1'-2"	11'-5 X"					1'-2"					
7U07m	1	#7	14'-1 X"	2	1'-2"	11'-9 X"					1'-2"					
7U07n	1	#7	14'-5 X"	2	1'-2"	12'-1 X"					1'-2"					
7U07o	1	#7	14'-9 X"	2	1'-2"	12'-5 X"					1'-2"					
7U07p	1	#7	15'-1"	2	1'-2"	12'-9"					1'-2"					
7U07q	1	#7	15'-4 X"	2	1'-2"	13'-0 X"					1'-2"					
7U07r	1	#7	15'-8 X"	2	1'-2"	13'-4 X"					1'-2"					
7U07s	1	#7	16'-0 X"	2	1'-2"	13'-8 X"					1'-2"					
7U07t	1	#7	16'-4 X"	2	1'-2"	14'-0 X"					1'-2"					
7U09a	1	#7	15'-6 X"	2	1'-2"	13'-2 X"					1'-2"					
7U09b	1	#7	16'-0 X"	2	1'-2"	13'-8 X"					1'-2"					
7U09c	1	#7	16'-6 X"	2	1'-2"	14'-2 X"					1'-2"					
7U010a	1	#7	9'-8 X"	2	1'-2"	7'-4 X"					1'-2"					
7U010b	1	#7	10'-2 X"	2	1'-2"	7'-10 X"					1'-2"					
7U010c	1	#7	10'-8 X"	2	1'-2"	8'-4 X"					1'-2"					
7U010d	1	#7	11'-3"	2	1'-2"	8'-11"					1'-2"					
7U010e	1	#7	11'-9 X"	2	1'-2"	9'-5 X"					1'-2"					

Release Number: BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
7U010f	1	#7	12'-3 X"	2	1'-2"	9'-11 X"					1'-2"					
7U010g	1	#7	12'-10"	2	1'-2"	10'-6"					1'-2"					
7U010h	1	#7	13'-4 X"	2	1'-2"	11'-0 X"					1'-2"					
7U010i	1	#7	13'-10 X"	2	1'-2"	11'-6 X"					1'-2"					
7U010j	1	#7	14'-5"	2	1'-2"	12'-1"					1'-2"					
7U010k	1	#7	14'-11 X"	2	1'-2"	12'-7 X"					1'-2"					
7L1610	9	#7	18'-0"	2	1'-2"	16'-10"										
7L710	6	#7	9'-0"	2	1'-2"	7'-10"										
7U1603	8	#7	18'-7 X"	2	1'-2"	16'-3 X"					1'-2"					
7U2810	11	#7	31'-2"	2	1'-2"	28'-10"					1'-2"					
7U810	6	#7	11'-2 X"	2	1'-2"	8'-10 X"					1'-2"					
7U400	28	#7	6'-4"	2	1'-2"	4'-0"					1'-2"					
7U3302	8	#7	35'-6 X"	2	1'-2"	33'-2 X"					1'-2"					
7U3003	3	#7	32'-7 X"	2	1'-2"	30'-3 X"					1'-2"					
7U1200	7	#7	14'-4"	2	1'-2"	12'-0"					1'-2"					
7L04a	2	#7	11'-9 X"	2	1'-2"	10'-7 X"										
7L04b	2	#7	15'-4 X"	2	1'-2"	14'-2 X"										
7L04c	2	#7	19'-0"	2	1'-2"	17'-10"										
7L06a	1	#7	8'-0"	2	1'-2"	6'-10"										
7L06b	1	#7	11'-2 X"	2	1'-2"	10'-0 X"										
7L06c	1	#7	14'-4 X"	2	1'-2"	13'-2 X"										
7L06d	1	#7	17'-7 X"	2	1'-2"	16'-5 X"										
7L06e	1	#7	20'-9 X"	2	1'-2"	19'-7 X"										
7L08f	1	#7	24'-0"	2	1'-2"	22'-10"										
7L11a	1	#7	6'-0"	2	1'-2"	4'-10"										
7L11b	1	#7	9'-0"	2	1'-2"	7'-10"										
7L11c	1	#7	12'-0"	2	1'-2"	10'-10"										
7L11d	1	#7	15'-0"	2	1'-2"	13'-10"										
7L11e	1	#7	18'-0"	2	1'-2"	16'-10"										
7L08a	1	#7	16'-0"	2	1'-2"	14'-10"										
7L08b	1	#7	17'-9 X"	2	1'-2"	16'-7 X"										
7L08c	1	#7	19'-7 X"	2	1'-2"	18'-5 X"										
7L08d	1	#7	21'-4 X"	2	1'-2"	20'-2 X"										
7L08e	1	#7	23'-2 X"	2	1'-2"	22'-0 X"										
7L08f	1	#7	25'-0"	2	1'-2"	23'-10"										
7L2410	7	#7	26'-0"	2	1'-2"	24'-10"										
7U2111	1	#7	24'-3"	2	1'-2"	21'-11"					1'-2"					
7U602	1	#7	8'-6"	2	1'-2"	6'-2"					1'-2"					
7U2000	3	#7	22'-4 X"	2	1'-2"	20'-0 X"					1'-2"					
7L1910	8	#7	21'-0"	2	1'-2"	19'-10"										
7U2905	3	#7	31'-9"	2	1'-2"	29'-5"					1'-2"					
5L302	380	#5	4'-0"	2	0'-10"	3'-2"										

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical
GC Please verify the cover value we provided.

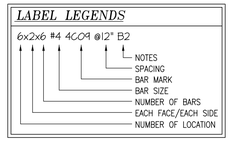
Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

LABEL LEGENDS



FOR FILE & FIELD USE

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Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC		
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

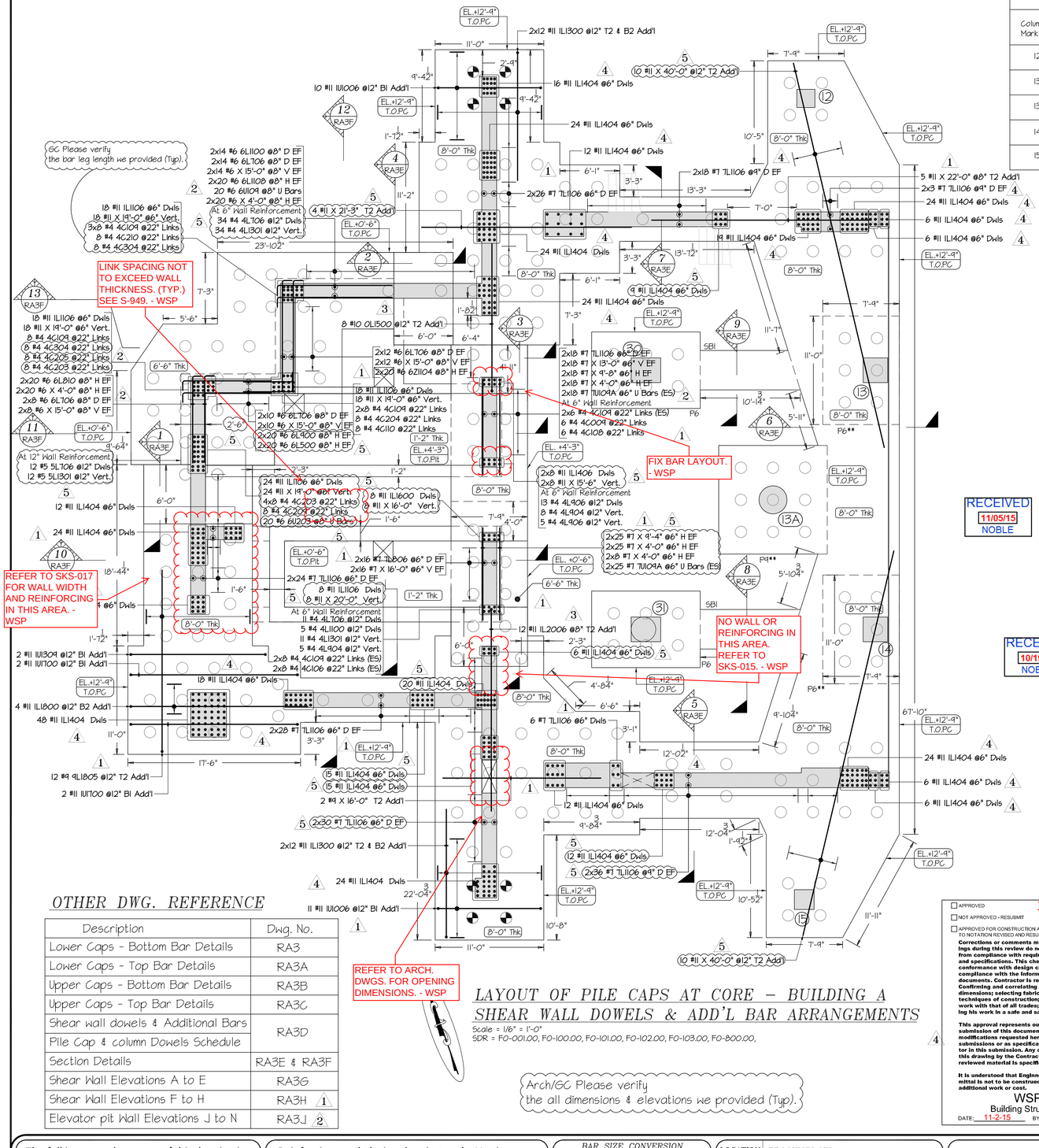
LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL
REINFORCING STEEL WIRE MESH

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	REVISED AS PER AE COMMENTS	10.13.15	RDD
3	REVISED AS PER AE COMMENTS	09.30.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PILE CAPS AT CORE WALLS – BUILDING A UPPER LEVEL – TOP BAR DETAILS (SHEET 04 OF 10)
DRAWING NO.: RA3C



OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H
Elevator pit Wall Elevations J to N	RA3J

LAYOUT OF PILE CAPS AT CORE - BUILDING A SHEAR WALL DOWELS & ADD'L BAR ARRANGEMENTS

Scale = 1/16" = 1'-0"
SDR = F0-001.00, F0-100.00, F0-101.00, F0-102.00, F0-103.00, F0-800.00,

COLUMN DOWELS SCHEDULE

Column Mark	Size	Top of slab	Top of Pilecap	Bottom of Pilecap	Pilecap depth	Column Dowels
I2	22"X 22"	EL. 14'-0"	EL. 12'-9"	EL. 4'-9"	8'-0"	4 #10 X 12'-6" Dwls
I3	30"X30"	EL. 13'-9"	EL. 12'-9"	EL. 4'-9"	8'-0"	8 #8 X 11'-9" Dwls
I3A	34ø	EL. 13'-9"	EL. 12'-9"	EL. 4'-0"	8'-9"	8 #9 X 13'-0" Dwls
I4	30"X30"	EL. 13'-11 1/2"	EL. 12'-9"	EL. 4'-9"	8'-0"	8 #9 X 12'-0" Dwls
I5	24"X24"	EL. 13'-9"	EL. 12'-9"	EL. 4'-9"	8'-0"	4 #10 X 12'-6" Dwls

PILE CAP SCHEDULE

Mark	Size (W X L)	Pilecap Depth	Qty.	Top of Pilecap	Reinforcements
P6**	11'-0" X 7'-9"	8'-0"	2	EL. 12'-9"	2x11 #11 IU101 BOT SW 2x12 #11 IU1004 BOT LW 2x2x5 #7 TL1006 @8" Side bar (ES) 2x2x5 #7 TL703 @8" Side bar (ES)
P9**	11'-0" X 11'-0"	8'-9"	1	EL. 12'-9"	For Reinforcement Refer plan dwg. RA3B

RECEIVED 11/05/15 NOBLE

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical
Provide 2" Cover For Wall Reinforcements At Outer Face -Typical
Provide 3/4" Cover For Wall Reinforcements At Inner Face -Typical

RECEIVED 10/19/15 NOBLE

Note:
For Added Steel @ Lower mat see dwg. RA3

NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14-027
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	033000
DRAWING	OF 10
SUBMITTAL #	0005-033000.2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

☐ APPROVED ☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT ☐ REVIEWED
☐ APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all trades; and performing his work in a safe and satisfactory manner.

This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 BY: GH

FOR FILE & FIELD USE

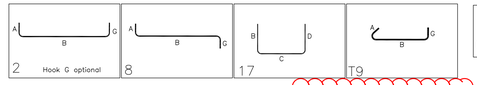
LABEL LEGENDS

6x2x6 #4 4C09 @12" B2
- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS
- EACH FACE/EACH SIDE
- NUMBER OF LOCATION

BENDING DETAILS

Release Number:

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
1L1404	418	#11	16'-4"	2	2'-0"	14'-4"										
1L1106	86	#11	13'-6"	2	2'-0"	11'-6"										
7L1106	372	#7	12'-8"	2	1'-2"	11'-6"										
6L706	88	#6	8'-6"	2	1'-0"	7'-6"										
7L806	32	#7	9'-8"	2	1'-2"	8'-6"										
1U1006	21	#11	14'-6"	2	2'-0"	10'-6"					2'-0"					
1L1300	48	#11	15'-0"	2	2'-0"	13'-0"										
1U1700	4	#11	21'-0"	2	2'-0"	17'-0"					2'-0"					
1L1800	4	#11	20'-0"	2	2'-0"	18'-0"										
1U1309	2	#11	17'-9"	2	2'-0"	13'-9"					2'-0"					
6L810	40	#6	9'-10"	2	1'-0"	8'-10"										
6L900	40	#6	10'-0"	2	1'-0"	9'-0"										
6L1108	40	#6	12'-8"	2	1'-0"	11'-8"										
1L1406	16	#11	16'-6"	2	2'-0"	14'-6"										
4L706	45	#4	8'-2"	2	0'-8"	7'-6"										
1L1600	8	#11	18'-0"	2	2'-0"	16'-0"										
9L1805	12	#9	20'-0"	2	1'-7"	18'-5"										
6L1100	28	#6	12'-0"	2	1'-0"	11'-0"										
4L1100	5	#4	11'-8"	2	0'-8"	11'-0"										
6L500	40	#6	6'-0"	2	1'-0"	5'-0"										
5L706	12	#5	8'-4"	2	0'-10"	7'-6"										
6Z1104	40	#6	13'-4"	8	1'-0"	11'-4"					1'-0"					
7L1006	20	#7	13'-9"	17		3'-3"	10'-6"									
7L703	20	#7	10'-6"	17		3'-3"	7'-3"									
11U701	22	#11	14'-7"	17		3'-9"	7'-1"	3'-9"								
1U1004	24	#11	17'-10"	17		3'-9"	10'-4"	3'-9"								
6U203	20	#6	6'-3"	17		2'-0"	2'-3"	2'-0"								
4L906	18	#4	10'-10 ⅜"	17		1'-4"	9'-6 ⅜"									
4L904	13	#4	10'-8"	17		1'-4"	9'-4"									
4L1301	45	#4	14'-5"	17		1'-4"	13'-1"									
1L2006	12	#11	27'-8"	17		7'-2"	20'-6"									
0L1500	8	#10	21'-1"	17		6'-1"	15'-0"									
6U109	20	#6	5'-9"	17		2'-0"	1'-9"	2'-0"								
5L1301	12	#5	14'-5"	17		1'-4"	13'-1"									
7U109A	86	#7	8'-3"	17		3'-3"	1'-9"	3'-3"								
4C203	40	#4	3'-0"	T9	0'-4 ⅜"	2'-3"					0'-4 ⅜"					
4C304	16	#4	4'-1"	T9	0'-4 ⅜"	3'-4"					0'-4 ⅜"					
4C109	76	#4	2'-6"	T9	0'-4 ⅜"	1'-9"					0'-4 ⅜"					
4C204	8	#4	3'-1"	T9	0'-4 ⅜"	2'-4"					0'-4 ⅜"					
4C110	8	#4	2'-7"	T9	0'-4 ⅜"	1'-10"					0'-4 ⅜"					
4C210	8	#4	3'-7"	T9	0'-4 ⅜"	2'-10"					0'-4 ⅜"					
4C009	6	#4	1'-6"	T9	0'-4 ⅜"	0'-9"					0'-4 ⅜"					
4C108	6	#4	2'-5"	T9	0'-4 ⅜"	1'-8"					0'-4 ⅜"					
4C106	16	#4	2'-3"	T9	0'-4 ⅜"	1'-6"					0'-4 ⅜"					
4C209	8	#4	3'-6"	T9	0'-4 ⅜"	2'-9"					0'-4 ⅜"					
4C205	8	#4	3'-2"	T9	0'-4 ⅜"	2'-5"					0'-4 ⅜"					



REFER TO TABLE 1.A FOR OUTER LAYER LAP SPLICES FOR 10KSI CONCRETE. - WSP

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

Lap Schedule for column (60 KSI)

Size	Others
#3	12"
#4	15"
#5	19"
#6	23"
#7	27"
#8	30"
#9	34"
#10	38"
#11	43"

Lap Schedule (10000 KSI) for Shear wall

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	60"	46"
#10	72"	55"
#11	84"	64"

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom Ist Layer
B2	- Bottom 2nd Layer
TI	- Top Ist Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC

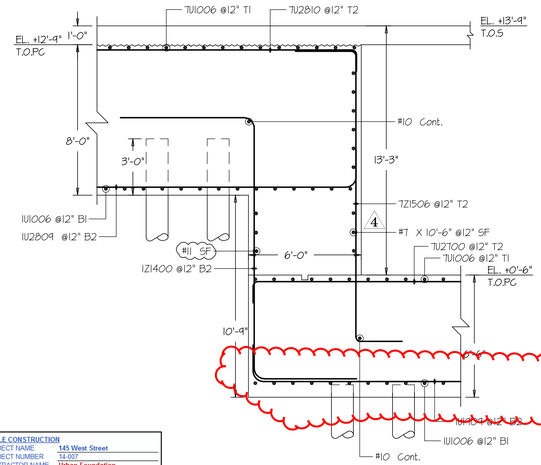
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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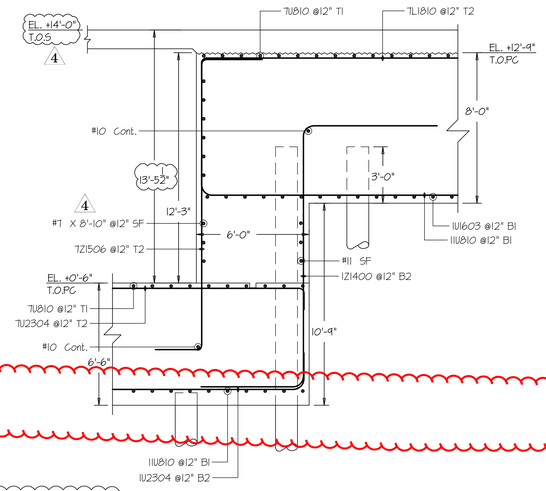
REV	REVISIONS	DATE	BY
5	REVISED AS PER AE COMMENTS	10.13.15	RDD
4	REVISED AS PER AE COMMENTS	09.30.15	RDD
3	REVISED AS PER GC COMMENTS	08.12.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A SHEAR WALL DOWELS & ADD'L BAR ARRANGEMENTS (SHEET 05 OF 10)
DRAWING NO.: RA3D

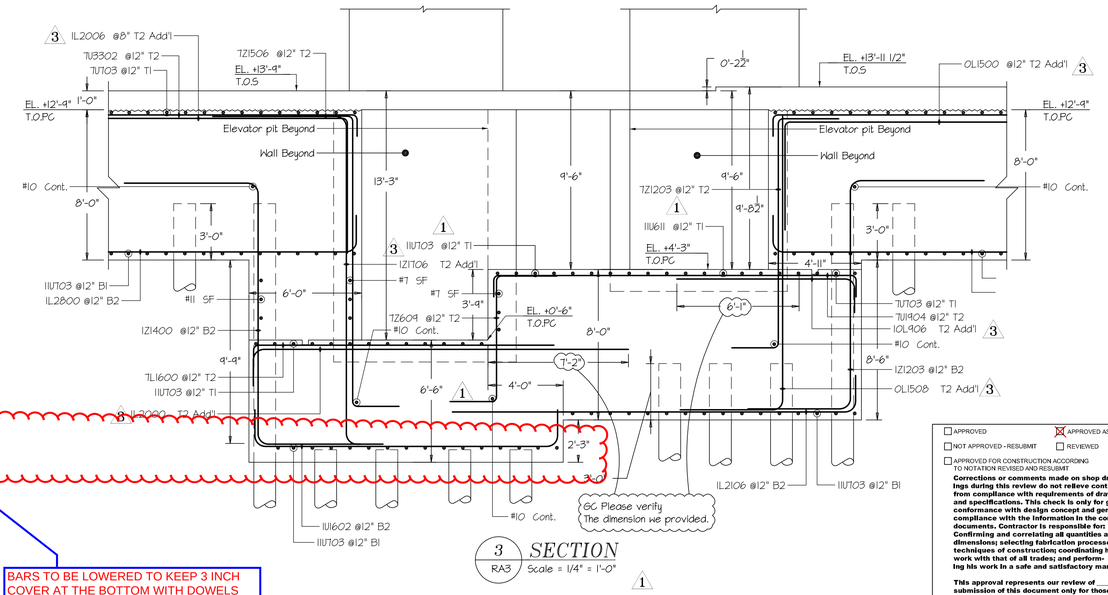


1 SECTION RA3 Scale = 1/4" = 1'-0"

Arch/GC Please verify the all dimensions & elevations we provided (Typ).



2 SECTION RA3 Scale = 1/4" = 1'-0"



3 SECTION RA3 Scale = 1/4" = 1'-0"

NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14.007
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	033000
DRAWING	5 OF 10
SUBMITTAL #	0005.033000.2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

RECEIVED 11/05/15 NOBLE

BARS TO BE LOWERED TO KEEP 3 INCH COVER AT THE BOTTOM WITH DOWELS INSTALLED ON TOP OF REINFORCING MAT

☐ APPROVED	☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT	☐ REVIEWED
☐ APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT	

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WSP
Building Structures
DATE: 11-2-15 BY: GH

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical

Provide 2" Cover For Pile Cap Reinforcements at Top -Typical

GC Please verify the cover value we provided.

Lap Schedule 6000 PSI for pile cap		
Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

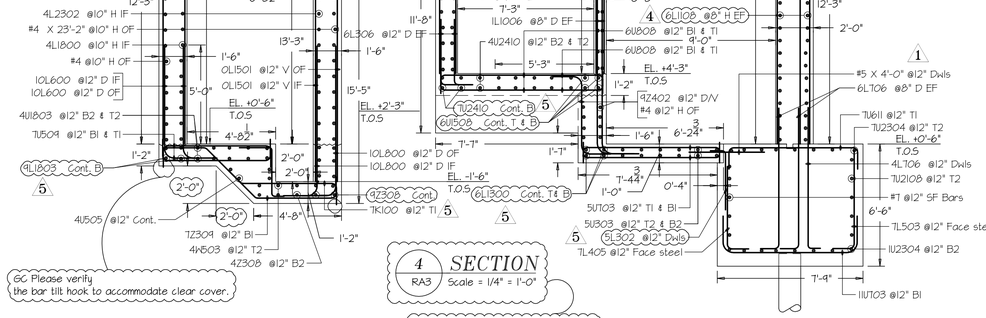
Lap Schedule (10000 KSI) for Shear wall		
Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	60"	46"
#10	72"	55"
#11	84"	64"

5

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

REFER TO TABLE 1.A FOR OUTER LAYER LAP SPLICES FOR 10KSI CONCRETE. - WSP

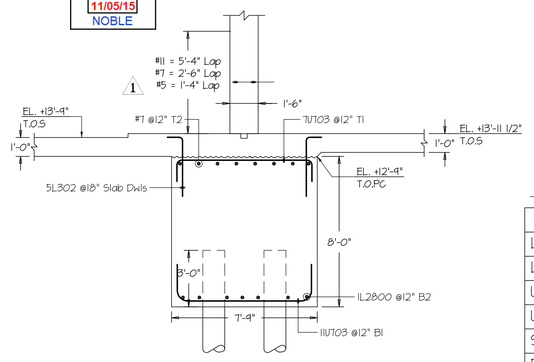


GC Please verify the bar tilt hook to accommodate clear cover.

4 SECTION RA3 Scale = 1/4" = 1'-0"

Arch/GC Please verify The pit locations we provided (Typ).

GC Please verify the bar arrangement we provided (Typ).

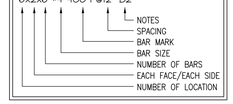


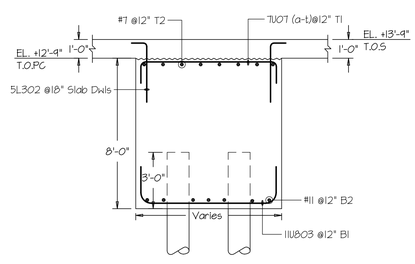
5 SECTION RA3B Scale = 1/4" = 1'-0"

OTHER DWG. REFERENCE

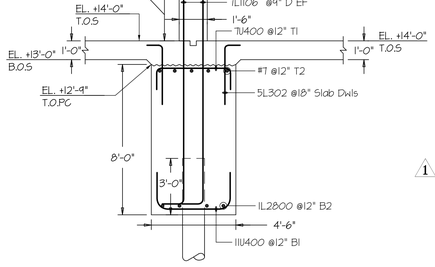
Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

LABEL LEGENDS

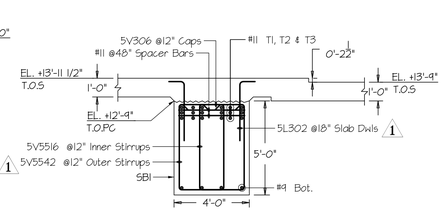




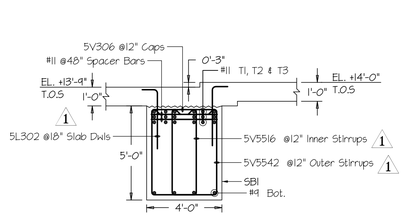
6 SECTION RA3B Scale = 1/4" = 1'-0"



7 SECTION RA3B Scale = 1/4" = 1'-0"



8 SECTION RA3B Scale = 1/4" = 1'-0"



9 SECTION RA3B Scale = 1/4" = 1'-0"

GC Please verify the bar arrangement we provided (Typ).

RECEIVED 10/19/15 NOBLE

FOR FILE & FIELD USE

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC		
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

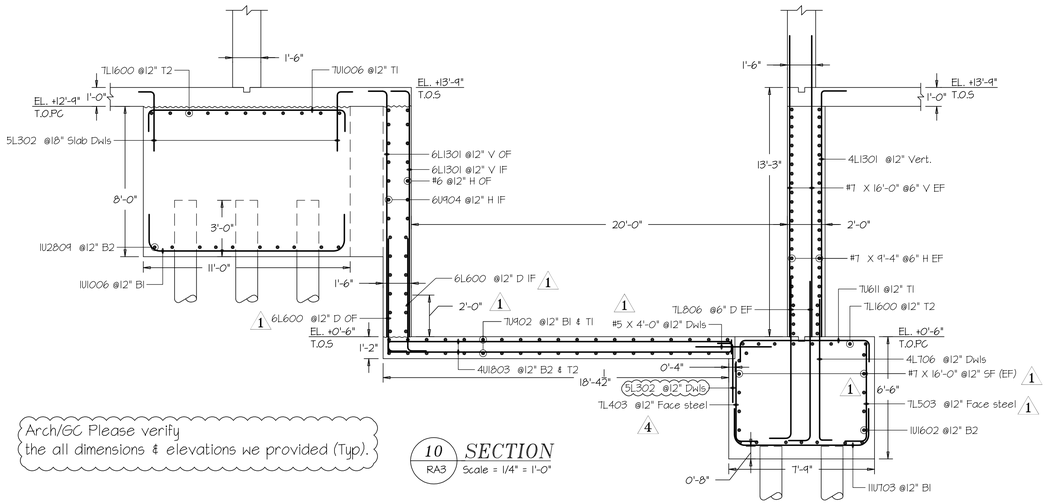
REV	REVISIONS	DATE	BY
5	REVISED AS PER AE COMMENTS	10.13.15	RDD
4	REVISED AS PER AE COMMENTS	09.30.15	RDD
3	REVISED AS PER GC COMMENTS	08.12.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

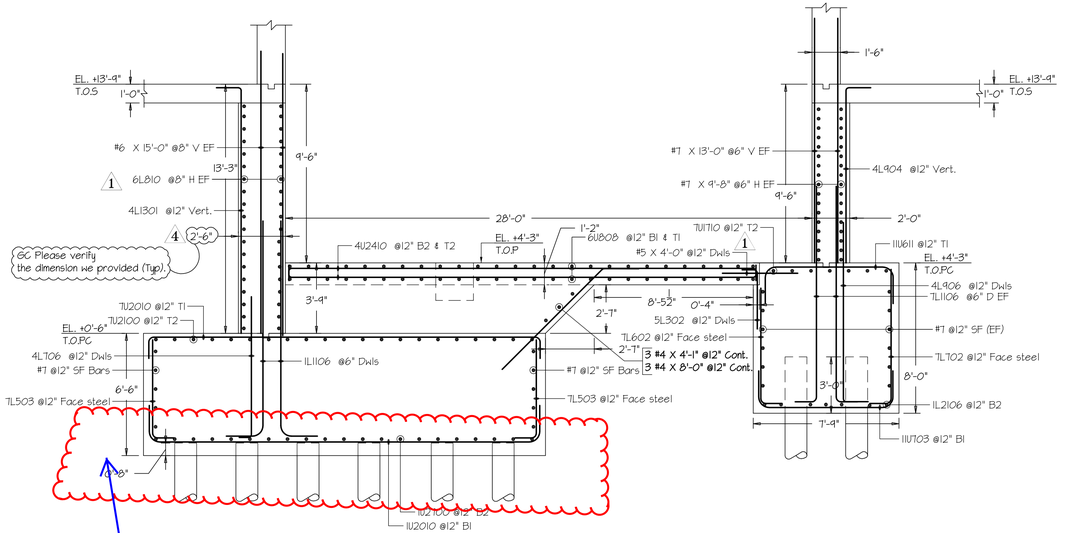
TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A SECTION DETAILS (SHEET 06 OF 10)

DRAWING NO.: RA3E

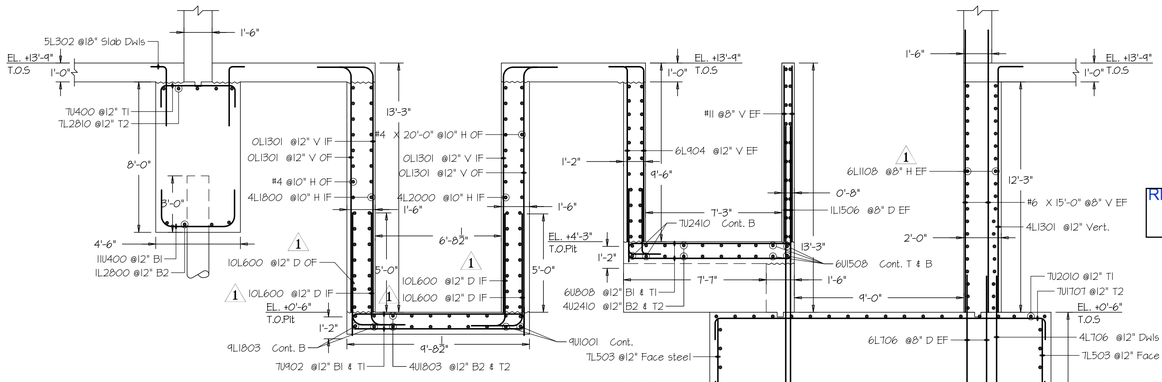


Arch/GC Please verify
the all dimensions & elevations we provided (Typ).

10 SECTION
RA3 Scale = 1/4" = 1'-0"



11 SECTION
RA3 Scale = 1/4" = 1'-0"



12 SECTION
RA3 Scale = 1/4" = 1'-0"

GC Please verify
the bar arrangement we provided (Typ).

13 SECTION
RA3 Scale = 1/4" = 1'-0"

RECEIVED
11/05/15
NOBLE

BARS TO BE LOWERED TO KEEP 3 INCH COVER AT THE BOTTOM WITH DOWELS INSTALLED ON TOP OF REINFORCING MAT

RECEIVED
10/19/15
NOBLE

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical

GC Please verify
the cover value we provided.

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

Lap Schedule (10000 KSI) for Shear wall

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
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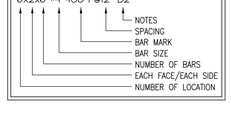
REFER TO TABLE 1.A FOR OUTER LAYER LAP SPLICES FOR 10KSI CONCRETE. - WSP

GC Please verify
the lap value we provided.

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
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Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

LABEL LEGENDS



OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

NOBLE CONSTRUCTION

PROJECT NAME	145 West Street
PROJECT NUMBER	14-007
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	033000
DRAWING	OF 10
SUBMITTAL #	0005.033000.2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

☐ APPROVED ☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT ☐ REVIEWED
☐ APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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This approval represents our review of _____ submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 BY: GH

FOR FILE & FIELD USE

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BAR SIZE CONVERSION
IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL
REINFORCING STEEL WIRE MESH

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

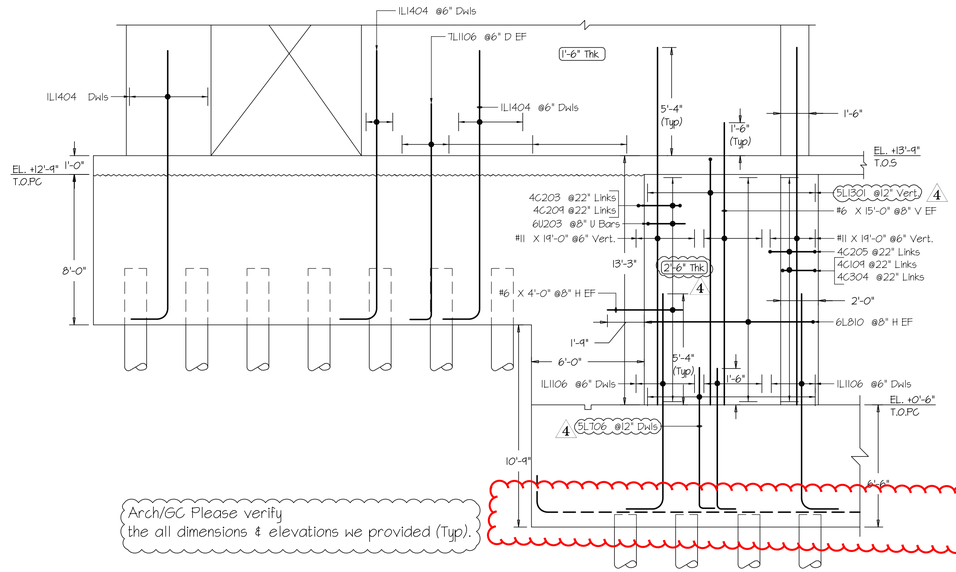
REV	REVISIONS	DATE	BY
4	REVISED AS PER AE COMMENTS	10.13.15	RDD
3	REVISED AS PER AE COMMENTS	09.30.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT
145 WEST STREET

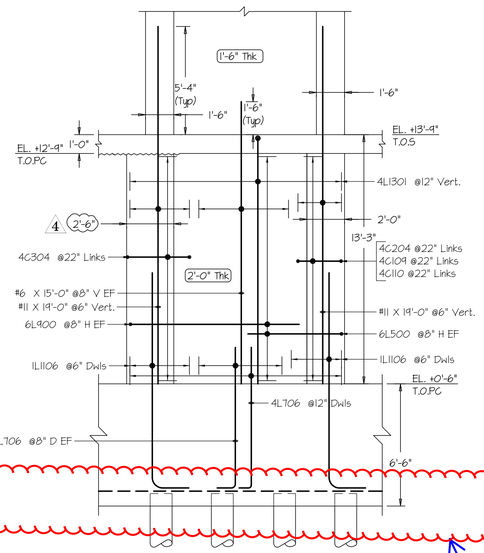
PROJECT NO.
35-083

TITLE OF DRAWING
PILE CAPS AT CORE WALLS - BUILDING A
SECTION DETAILS (SHEET 07 OF 10)

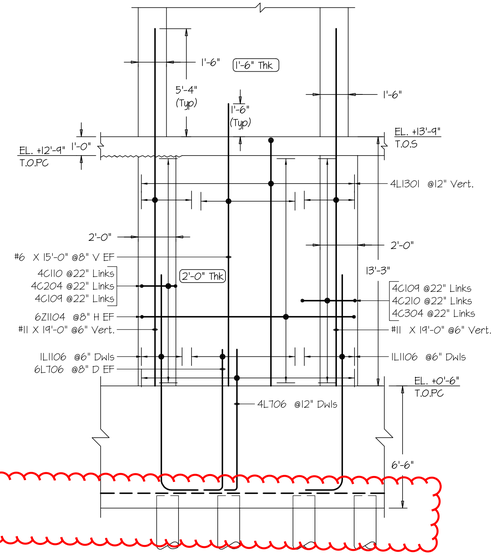
DRAWING NO.
RA3F



ELEVATION A 3
Scale = 1/4" = 1'-0"



ELEVATION B 3
Scale = 1/4" = 1'-0"



ELEVATION C 3
Scale = 1/4" = 1'-0"

Arch/GC Please verify the all dimensions & elevations we provided (Typ).

REFER TO TABLE 1.A FOR OUTER LAYER LAP SPLICES FOR 10KSI CONCRETE. - WSP

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical

GC Please verify the cover value we provided.

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

Lap Schedule (10000 KSI) for Shear wall 4

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	60"	46"
#10	72"	55"
#11	84"	64"

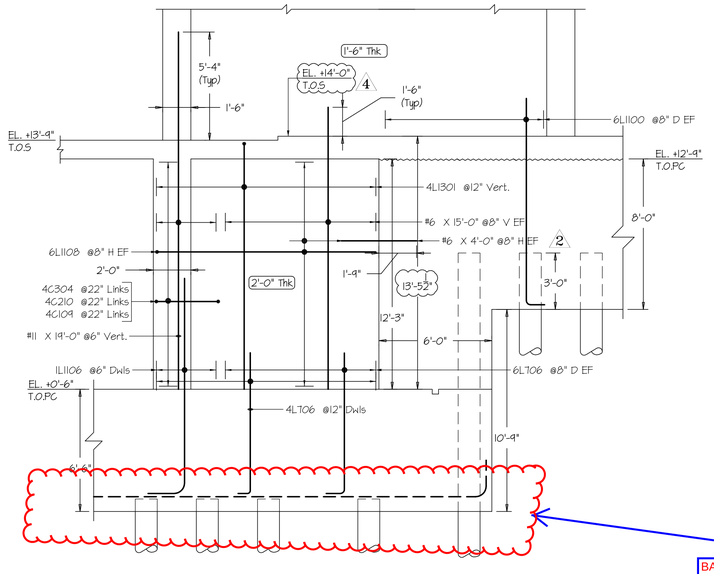
LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
B1	- Bottom 1st Layer
B2	- Bottom 2nd Layer
T1	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Add'l	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS
- EACH FACE/EACH SIDE
- NUMBER OF LOCATION



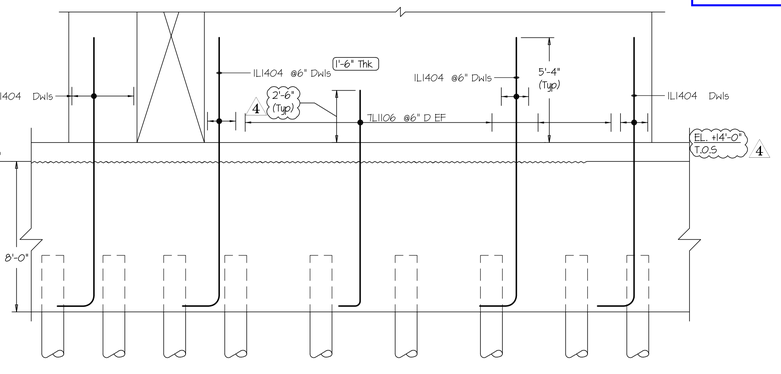
ELEVATION D 3
Scale = 1/4" = 1'-0"

BARS TO BE LOWERED TO KEEP 3 INCH COVER AT THE BOTTOM WITH DOWELS INSTALLED ON TOP OF REINFORCING MAT

NOBLE CONSTRUCTION
PROJECT NAME 145 West Street
PROJECT NUMBER 14-037
CONTRACTOR NAME Urban Foundation
CONTRACTOR TRADE Concrete
SPEC SECTION # 033000
DRAWING 8 OF 10
SUBMITTAL # 0005-033000-2
DATE RECEIVED 10/19/2015
RECEIVED BY Sean Hechler

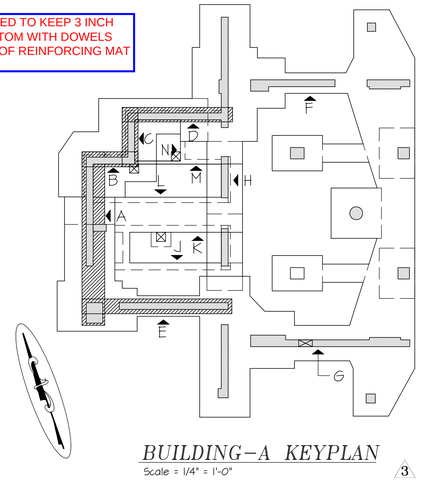
RECEIVED
11/05/15
NOBLE

BARS TO BE LOWERED TO KEEP 3 INCH COVER AT THE BOTTOM WITH DOWELS INSTALLED ON TOP OF REINFORCING MAT



ELEVATION E 3
Scale = 1/4" = 1'-0"

RECEIVED
10/19/15
NOBLE



BUILDING-A KEYPLAN 3
Scale = 1/4" = 1'-0"

OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

☐ APPROVED ☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT ☐ REVIEWED
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WSP
Building Structures
DATE: 11-2-15 BY: GH

FOR FILE & FIELD USE

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IMPERIAL / SOFT METRIC

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#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	REVISED AS PER AE COMMENTS	10.13.15	RDD
3	REVISED AS PER AE COMMENTS	09.30.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A SHEAR WALL ELEVATIONS A TO E (SHEET 08 OF 10)
DRAWING NO.: RA3G

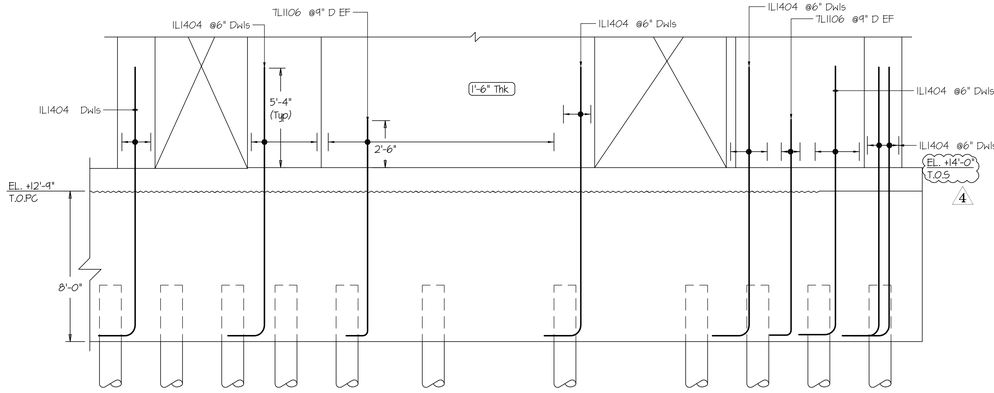
ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

REFER TO TABLE 1.A FOR OUTER LAYER LAP SPLICES FOR 10KSI CONCRETE. - WSP

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical

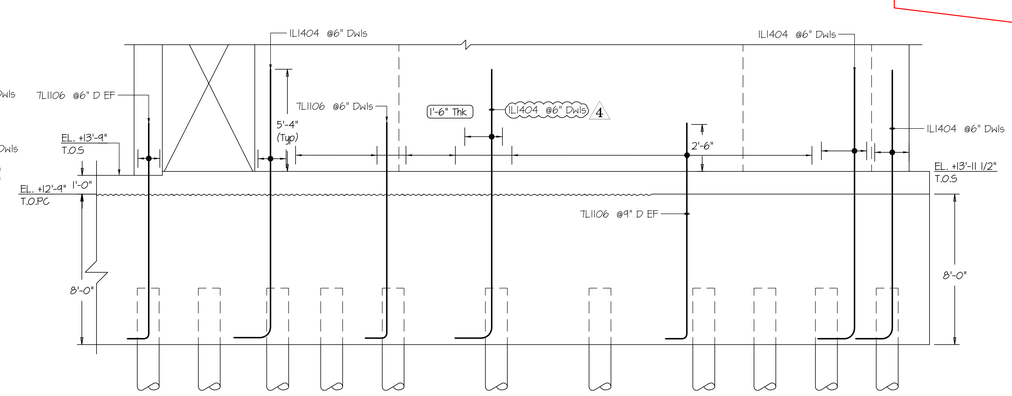
Provide 2" Cover For Pile Cap Reinforcements at Top -Typical

GC Please verify the cover value we provided.



ELEVATION F 3
Scale = 1/4" = 1'-0"

Arch/GC Please verify the all dimensions & elevations we provided (Typ).



ELEVATION G 3
Scale = 1/4" = 1'-0"

RECEIVED
11/05/15
NOBLE

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

Lap Schedule 10000 PSI for Shear wall 4

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
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#7	34"	30"
#8	50"	38"
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Dwls	- Dowels
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OF	- Outer Face
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Thk	- Thickness
T.O.PC	- Top Of Pile Cap
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Typ.	- Typical
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SW	- Short Way
SF	- Side Face

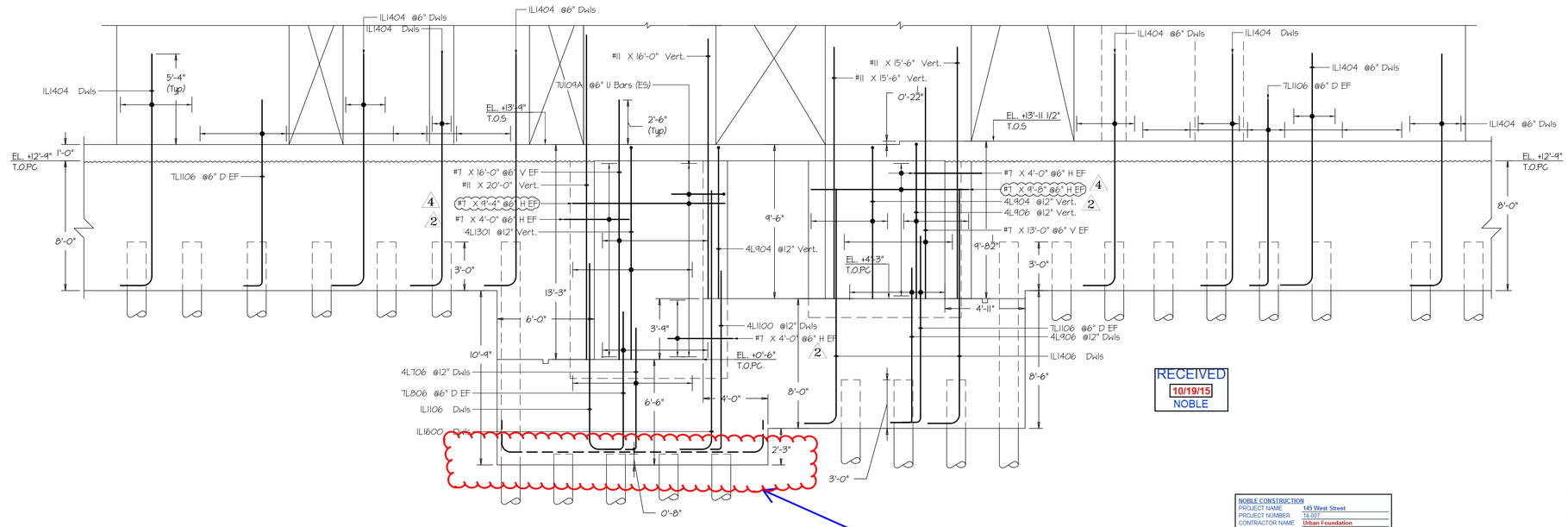
LABEL LEGENDS

6x2x6 #4 4C04 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS
- EACH FACE/EACH SIDE
- NUMBER OF LOCATION

OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

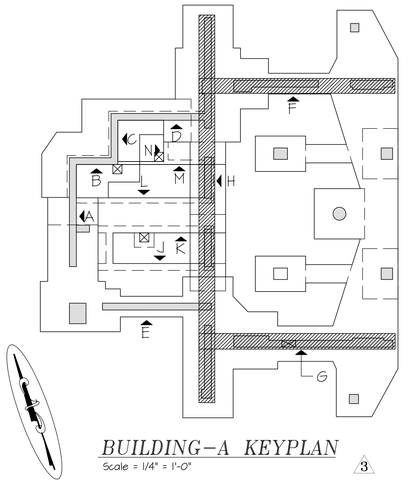


ELEVATION H 3
Scale = 1/4" = 1'-0"

BARS TO BE LOWERED TO KEEP 3 INCH COVER AT THE BOTTOM WITH DOWELS INSTALLED ON TOP OF REINFORCING MAT

RECEIVED
10/19/15
NOBLE

NOBLE CONSTRUCTION
PROJECT NAME: 145 West Street
PROJECT NUMBER: 14-007
CONTRACTOR NAME: Urban Foundation
CONTRACTOR TRADE: Concrete
SPEC SECTION #: 033000
DRAWING: 9 OF 10
SUBMITTAL #: 0005-033000.2
DATE RECEIVED: 10/19/2015
RECEIVED BY: Sean Hechler



BUILDING-A KEYPLAN
Scale = 1/4" = 1'-0"
3

☐ APPROVED ☒ APPROVED AS NOTED
☐ NOT APPROVED - RESUBMIT ☐ REVIEWED
☐ APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-2-15 BY: GH

FOR FILE & FIELD USE

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Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

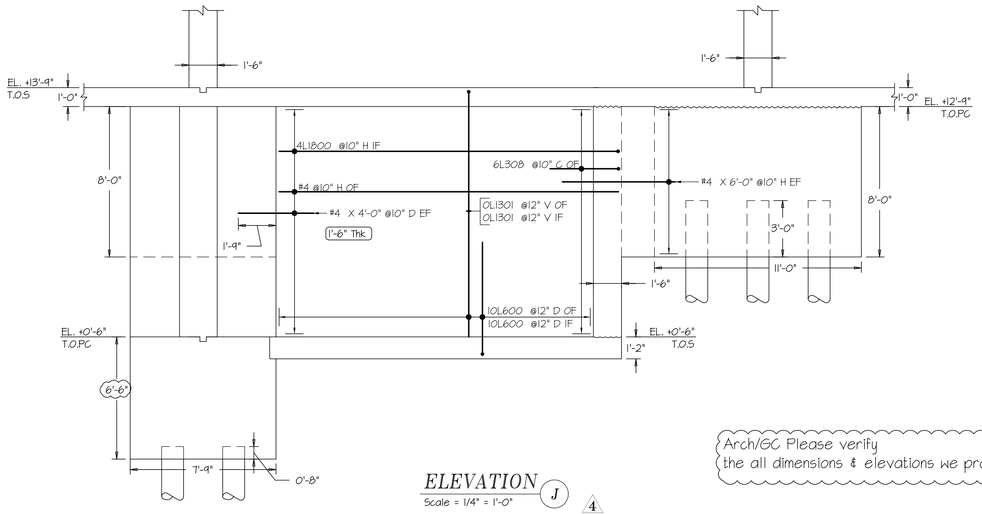
REV	REVISIONS	DATE	BY
4	REVISED AS PER AE COMMENTS	10.13.15	RDD
3	REVISED AS PER AE COMMENTS	09.30.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

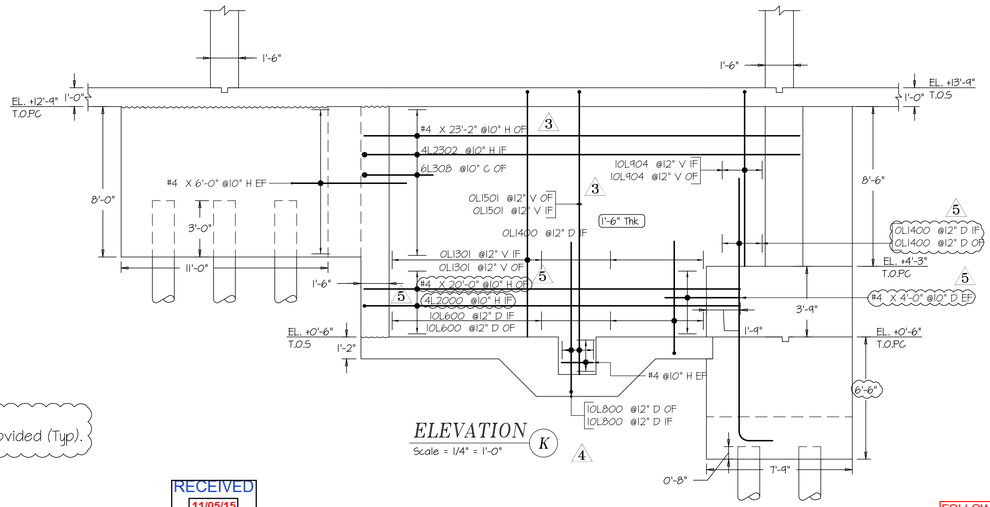
TITLE OF DRAWING: PILE CAPS AT CORE WALLS - BUILDING A SHEAR WALL ELEVATIONS F TO H (SHEET 09 OF 10)

DRAWING NO.: RA3H

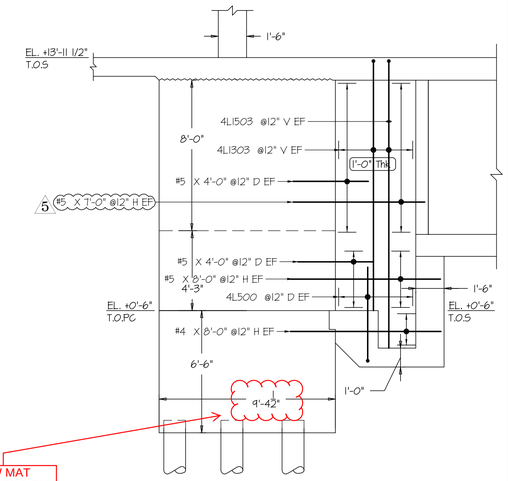


ELEVATION J 4
Scale = 1/4" = 1'-0"

Arch/GC Please verify
the all dimensions & elevations we provided (Typ).



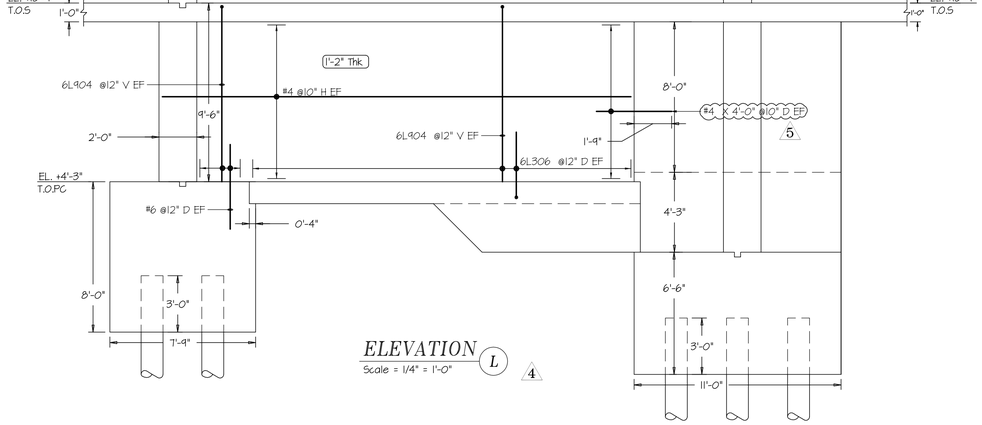
ELEVATION K 4
Scale = 1/4" = 1'-0"



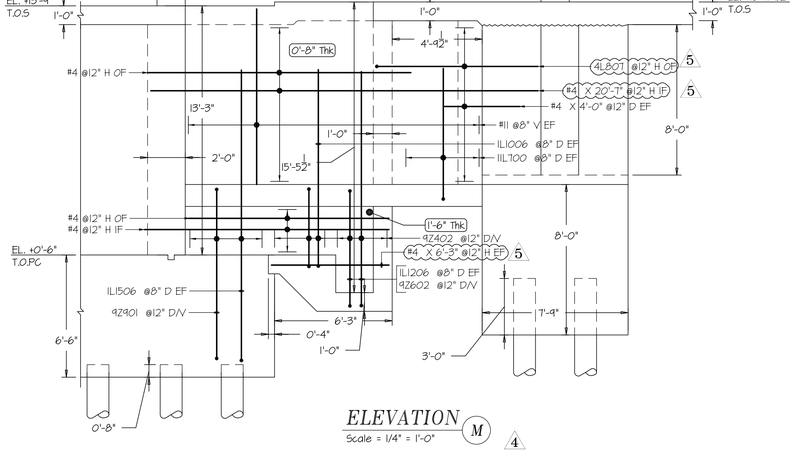
FOLLOW MAT DIMENSIONS ON FO-103. - WSP

ELEVATION N 4
Scale = 1/4" = 1'-0"

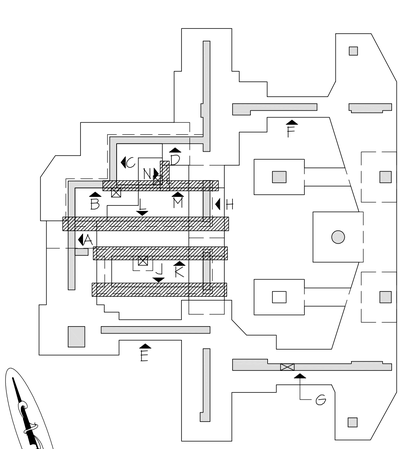
RECEIVED
11/05/15
NOBLE



ELEVATION L 4
Scale = 1/4" = 1'-0"



ELEVATION M 4
Scale = 1/4" = 1'-0"



BUILDING-A KEYPLAN 4
Scale = 1/4" = 1'-0"

OTHER DWG. REFERENCE

Description	Dwg. No.
Lower Caps - Bottom Bar Details	RA3
Lower Caps - Top Bar Details	RA3A
Upper Caps - Bottom Bar Details	RA3B
Upper Caps - Top Bar Details	RA3C
Shear wall dowels & Additional Bars	RA3D
Pile Cap & column Dowels Schedule	
Section Details	RA3E & RA3F
Shear Wall Elevations A to E	RA3G
Shear Wall Elevations F to H	RA3H 1
Elevator pit Wall Elevations J to N	RA3J 2

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
ES	- Each Side
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
Dwls	- Dowels
V	- Vertical
Addl	- Additional
OF	- Outer Face
IF	- Inner Face
C	- Corner
Thk	- Thickness
T.O.PC	- Top Of Pile Cap
T.O.S	- Top Of Slab
Typ.	- Typical
EE	- Each End
LW	- Long Way
SW	- Short Way
SF	- Side Face

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

Provide 3" Cover For Pile Cap Reinforcements At Bot & sides -Typical

Provide 2" Cover For Pile Cap Reinforcements at Top -Typical

Lap Schedule 6000 PSI for pile cap

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

Lap Schedule 10000 KSI for Shear wall 5

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	60"	46"
#10	72"	55"
#11	84"	64"

VERIFIED. - WSP

GC Please verify
the cover value we provided.

REFER TO TABLE 1.A FOR OUTER LAYER LAP SPLICES FOR 10KSI CONCRETE. - WSP

RECEIVED
10/19/15
NOBLE

NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14.017
CONTRACTOR NAME	Urban Foundation
CONTRACTOR TRADE	Concrete
SPEC SECTION #	033000
DRAWING	10 OF 10
SUBMITTAL #	0005.033000.2
DATE RECEIVED	10/19/2015
RECEIVED BY	Sean Hechler

APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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WSP
Building Structures
DATE: 11-2-15 BY: GH

FOR FILE & FIELD USE

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BAR SIZE CONVERSION
IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANTOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL
REINFORCING STEEL WIRE MESH

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

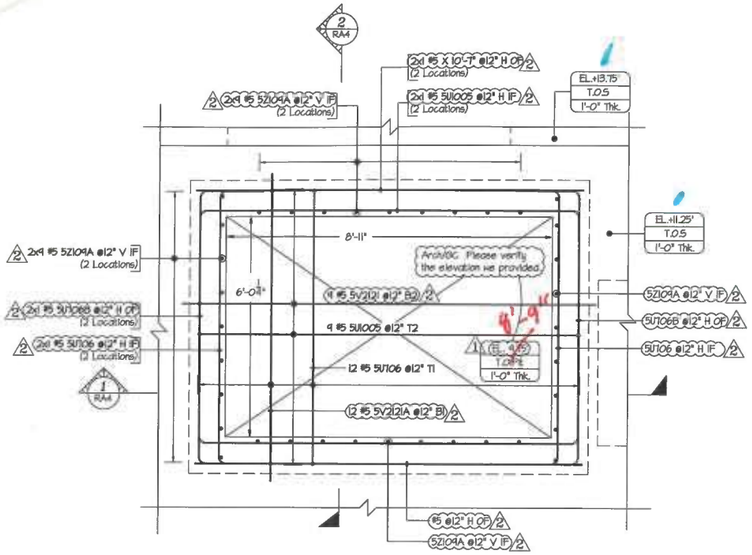
REV	REVISIONS	DATE	BY
5	REVISED AS PER AE COMMENTS	10.13.15	RDD
4	REVISED AS PER AE COMMENTS	09.30.15	RDD
3	REVISED AS PER GC COMMENTS	08.12.15	RDD
2	REVISED AS PER GC COMMENTS	08.04.15	RDD
1	REVISED AS PER GC COMMENTS	07.30.15	RDD
0	FOR APPROVAL	07.20.15	RDD

PROJECT
145 WEST STREET

PROJECT NO.
35-083

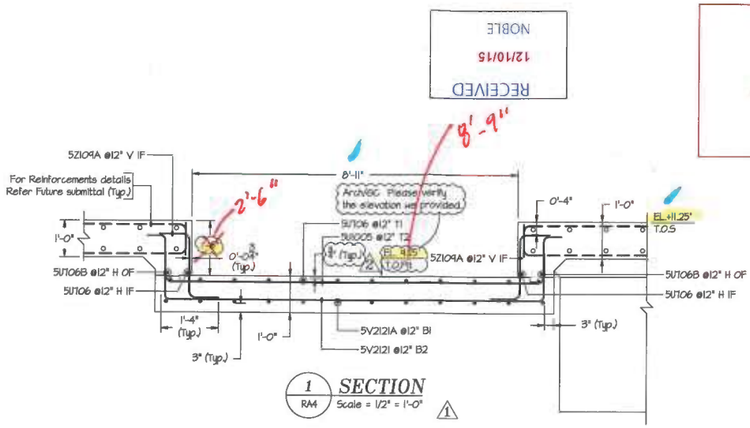
TITLE OF DRAWING
PILE CAPS AT CORE WALLS - BUILDING A
ELEVATOR PIT WALL ELEVATIONS J TO N (SHEET 10 OF 10)

DRAWING NO.
RA3J



DETAIL-A
GREASE PIT (NORTH) – PLAN

Scale = 1/2" = 1'-0"
SDR : F0-001.00, F0-101.00, F0-502.00 & F0-702.00



1 RA4 **SECTION**
Scale = 1/2" = 1'-0"

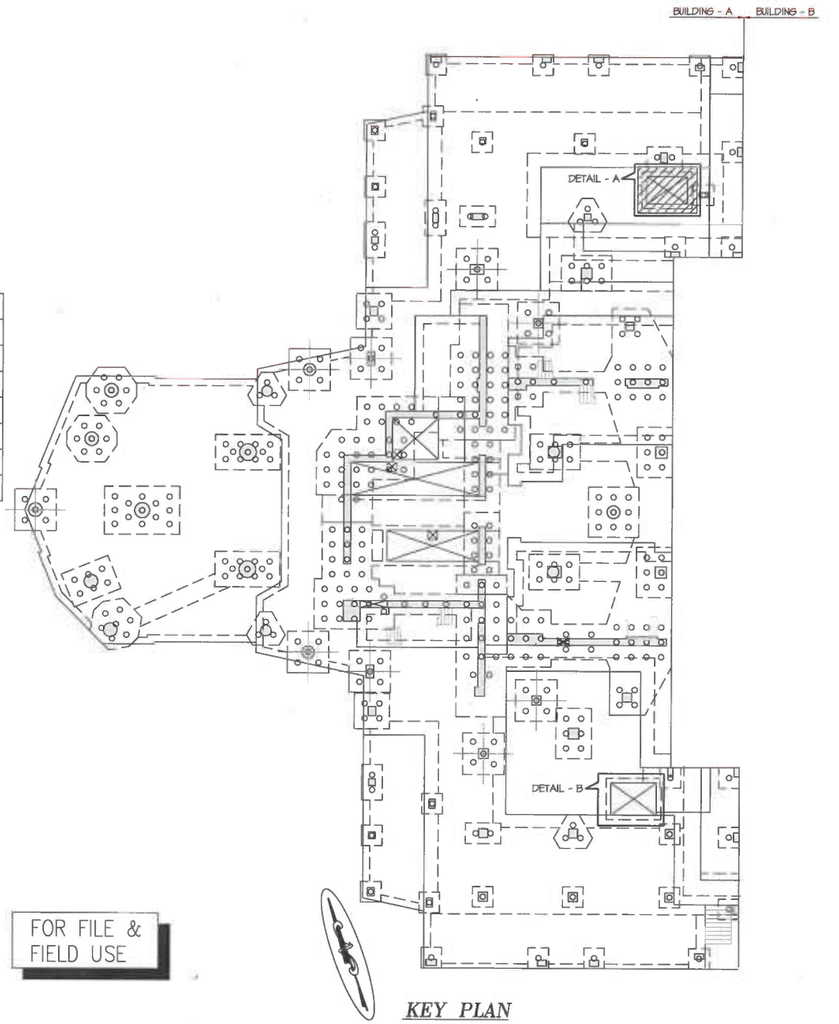
Arch/GC Please verify the grease pit Reinforcements & bar arrangements we provided (Typ.)

RECEIVED
12/10/15
NOBLE

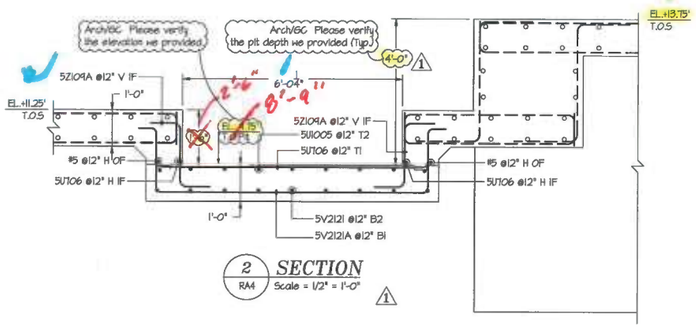
PROJECT NAME	145 West Street
PROJECT NUMBER	14-007
CONTRACTOR NAME	Urban
CONTRACTOR TRADE	Concrete Cast in Place
SPEC SECTION #	033000
DRAWING	1 OF 2
SUBMITTAL #	0009-033000
DATE RECEIVED	12/10/15
RECEIVED BY	Louis Pichardo

ZLA - Comments

✓ = Verified ok
Elevations of pits incorrect
see markup, approved as noted



KEY PLAN
Scale = N.T.S



2 RA4 **SECTION**
Scale = 1/2" = 1'-0"

Release Number:					BENDING DETAILS											
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U1005	11	#5	12'-1"	2	0'-10"	10'-5"					0'-10"					
5U706	14	#5	9'-2"	2	0'-10"	7'-6"					0'-10"					
5U706B	2	#5	11'-0"	17		1'-9"	7'-6"	1'-9"								
5V2121	9	#5	15'-0"	S4	0'-6"	1'-9 ½"	10'-5"	1'-9 ½"			0'-6"					
5V2121A	12	#5	12'-1"	S4	0'-6"	1'-9 ½"	7'-6"	1'-9 ½"			0'-6"					
5Z109A	36	#5	3'-5 ½"	8	0'-10"	1'-9 ½"					0'-10"					

2 Hook G optional | 17 | S4 Hook G optional | 8

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

- Provide 3" Cover For Base slab Reinforcements at Bot & Sides -Typical
- Provide 3/4" Cover For Base slab Reinforcements at Top -Typical
- Provide 3" Cover For Wall Reinforcements at outer Face -Typical
- Provide 3/4" Cover For Wall Reinforcements at inner Face -Typical

LEGENDS

BI	- Bottom Ist Layer
B2	- Bottom 2nd Layer
TI	- Top Ist Layer
T2	- Top 2nd Layer
EL.	- Elevation
Thk.	- Thickness
EF	- Each Face
ES	- Each Side
Sim.	- Similar
C	- Corner
Typ.	- Typical
H	- Horizontal
V	- Vertical
IF	- Inner face
OF	- Outer face

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2
- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

6G Please verify the lap value we provided (Typ.)

Lap Schedule 6000 PSI for Base Slab

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	23"	18"
#6	24"	18"
#7	39"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

FOR FILE & FIELD USE

ISMAEL LEYVA ARCHITECTS P.C.

	NO EXCEPTIONS TAKEN	REVISE & RESUBMIT
X	MAKE CORRECTIONS NOTED	REJECTED
	SUBMIT REV. RECORD COPY	REVIEWED

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Project No:	By:	Date:
14131	JS	1/22/16

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL REINFORCING STEEL WIRE MESH
CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

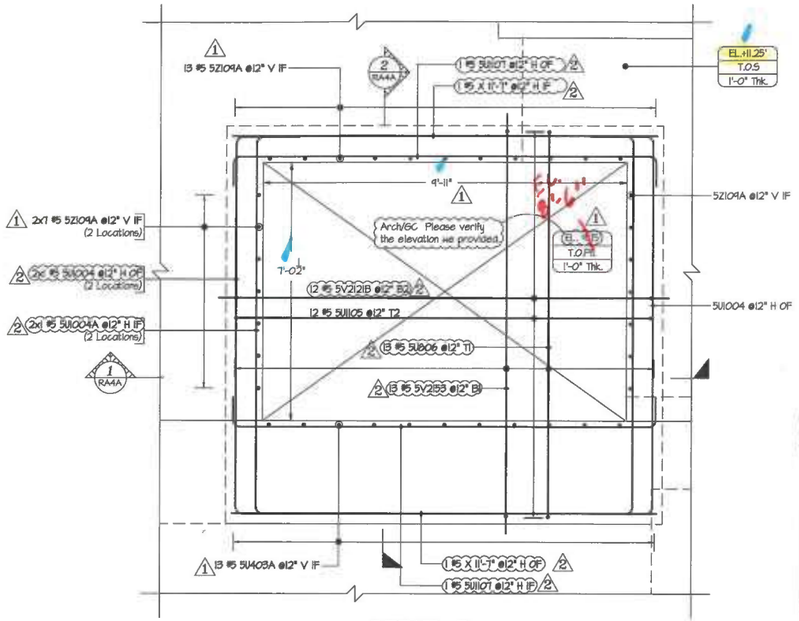
REV	REVISIONS	DATE	BY
4	–	–	–
3	–	–	–
2	REVISED AS PER AE COMMENTS	12.04.15	RDD
1	REVISED AS PER MAL INSTRUCTION DATED ON:10.08.15	10.08.15	RDD
0	FOR APPROVAL	10.07.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: GREASE PIT (NORTH) – BUILDING A (SHEET 01 OF 02)
DRAWING NO.: RA4

ILA - Comments

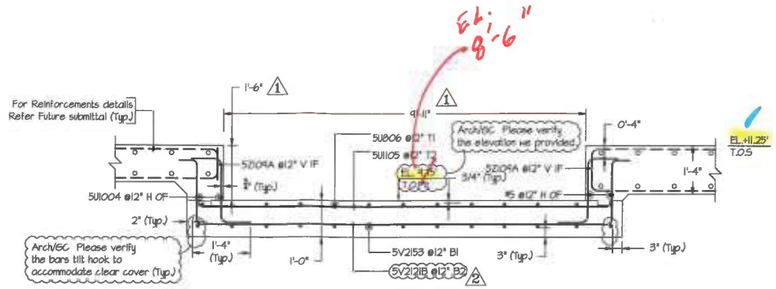
✓ = verified ok

Elevations of pits incorrect see markups



DETAIL–B
GREASE PIT (SOUTH) – PLAN

Scale = 1/2" = 1'-0"
SDR : F0-001.00, F0-101.00, F0-502.00 & F0-702.00



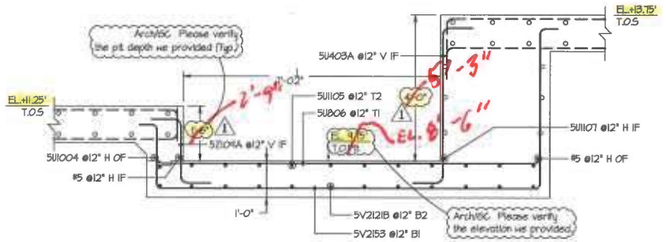
1 RAMA SECTION

Scale = 1/2" = 1'-0"

Arch/GC Please verify the
grease pit Reinforcements &
bar arrangements we provided (Typ.)

Release Number:	BENDING DETAILS																
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U1004	2	#5	13'-10"	17		1'-9"	10'-4"	1'-9"								
5U1004A	2	#5	12'-0"	2	0'-10"	10'-4"					0'-10"					
5U1105	12	#5	13'-1"	2	0'-10"	11'-5"					0'-10"					
5U1107	2	#5	13'-3 1/2"	2	0'-10"	11'-7 1/2"					0'-10"					
5U403A	13	#5	5'-11 1/2"	8	0'-10"	4'-3 1/2"					0'-10"					
5U806	13	#5	12'-2 1/2"	2	0'-10"	10'-6 1/2"					0'-10"					
5V2121B	12	#5	16'-0"	S4	0'-6"	1'-9 1/2"	11'-5"	1'-9 1/2"			0'-6"					
5V2153	13	#5	17'-9"	S4	0'-6"	1'-9 1/2"	10'-6 1/2"	4'-5"			0'-6"					
5Z109A	27	#5	3'-5 1/2"	8	0'-10"	1'-9 1/2"					0'-10"					

17 — 2 Hook G optional — 8 — S4 Hook G optional



2 RAMA SECTION

Scale = 1/2" = 1'-0"

Arch/GC Please verify the
section profile we provided (Typ.)

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

- Provide 3" Cover For Base slab Reinforcements at Bot & Sides -Typical
- Provide 3/4" Cover For Base slab Reinforcements at Top -Typical
- Provide 3" Cover For Wall Reinforcements at outer Face -Typical
- Provide 3/4" Cover For Wall Reinforcements at Inner Face -Typical

GC Please verify the
lap value we provided (Typ.)

Lap Schedule 6000 PSI
for Base Slab

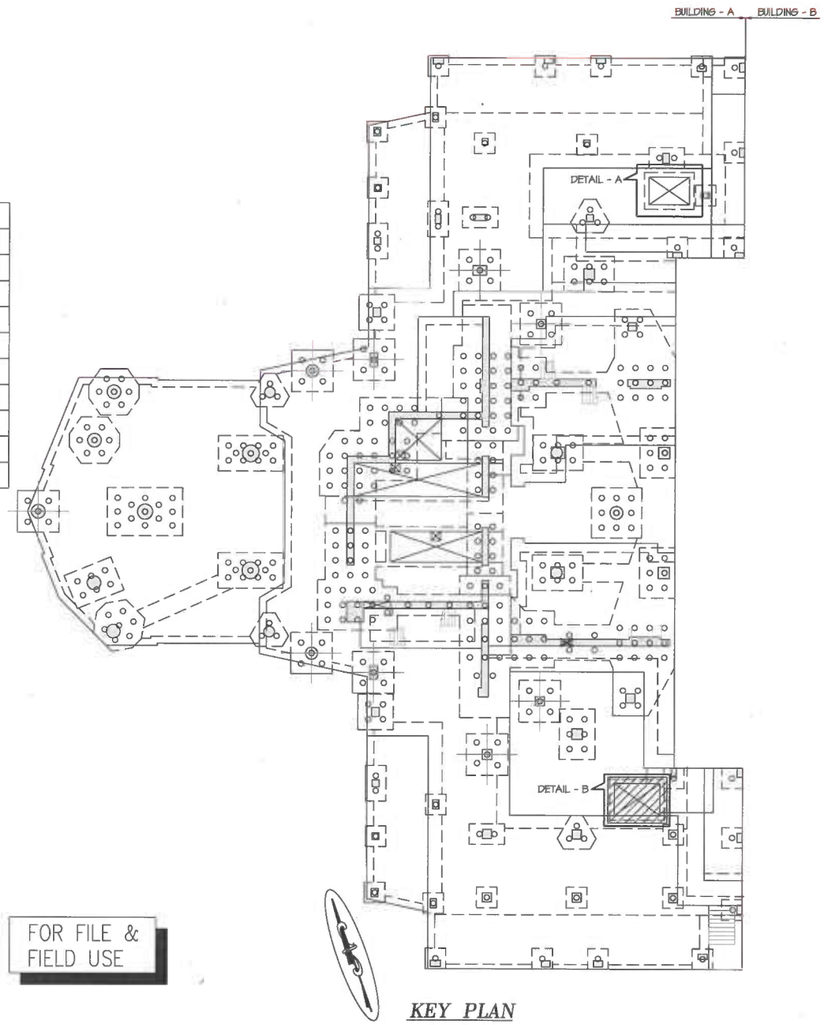
Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

LEGENDS

BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
EL.	- Elevation
Thk.	- Thickness
EF	- Each Face
ES	- Each Side
Sim.	- Similar
C	- Corner
Typ.	- Typical
H	- Horizontal
V	- Vertical
IF	- Inner face
OF	- Outer face

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2
- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION



KEY PLAN

Scale = N.T.S

FOR FILE & FIELD USE

RECEIVED
12/10/15
NOBLE

NOBLE CONSTRUCTION
PROJECT NAME 145 West Street
PROJECT NUMBER 14-007
CONTRACTOR TRADE Concrete Cast In Place
CONTRACTOR NAME Urban
SPEC SECTION # 033000
DRAWING OF 2
SUBMITTAL # 0009-033000
DATE RECEIVED 12/10/15
RECEIVED BY Louis Pichardo

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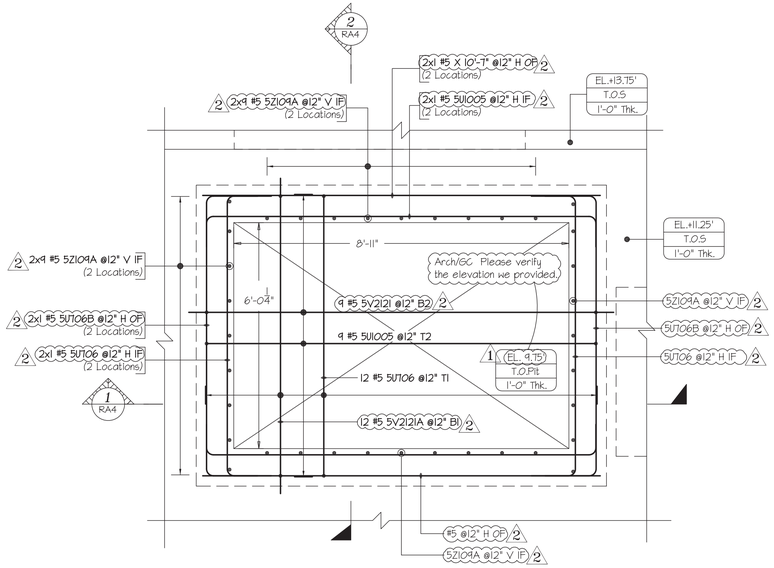
BAR SIZE CONVERSION IMPERIAL / SOFT METRIC		
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

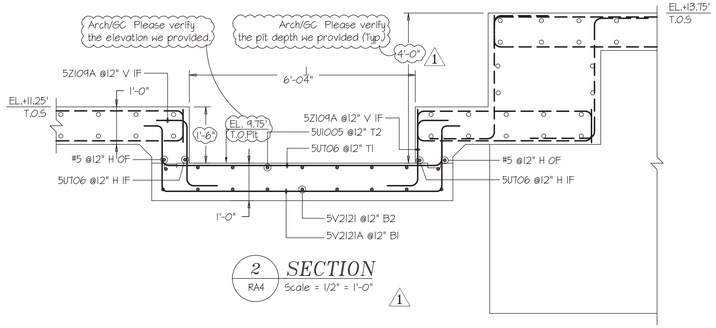
RSV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	12.04.15	RDD
1	REVISED AS PER MAIL INSTRUCTION DATED 09.08.15	10.08.15	RDD
0	FOR APPROVAL	10.07.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35–083
TITLE OF DRAWING: GREASE PIT (SOUTH) – BUILDING A (SHEET 02 OF 02)
DRAWING NO.: RA4A



DETAIL-A
GREASE PIT (NORTH) - PLAN

Scale = 1/2" = 1'-0"
SDR : F0-001.00, F0-101.00, F0-502.00 & F0-102.00

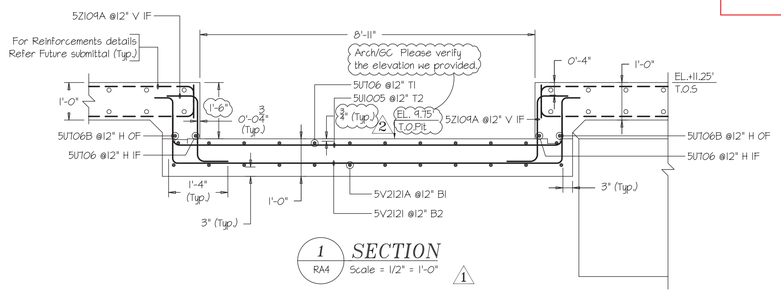


2 SECTION
2 RA4 Scale = 1/2" = 1'-0"

ARCH. PLS. VERIFY DIMENSIONS AND ELEVATIONS

RECEIVED
12/10/15
NOBLE

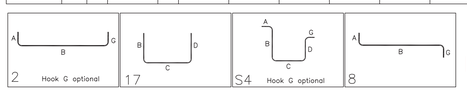
NOBLE CONSTRUCTION	
PROJECT NAME	145 West Street
PROJECT NUMBER	14-007
CONTRACTOR NAME	Urban
CONTRACTOR TRADE	Concrete Cast in Place
SPEC SECTION #	033000
SUBMITTAL #	0009-033000
DRAWING	1 OF 2
DATE RECEIVED	12/10/15
RECEIVED BY	Louis Pichardo



1 SECTION
1 RA4 Scale = 1/2" = 1'-0"

Arch/GC Please verify the
grease pit Reinforcements &
bar arrangements we provided (Typ.)

Release Number:					BENDING DETAILS											
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U1005	11	#5	12'-1"	2	0'-10"	10'-5"					0'-10"					
5U706	14	#5	9'-2"	2	0'-10"	7'-6"					0'-10"					
5U706B	2	#5	11'-0"	17		1'-9"	7'-6"	1'-9"								
5V2121	9	#5	15'-0"	S4	0'-6"	1'-9 ½"	10'-5"	1'-9 ½"			0'-6"					
5V2121A	12	#5	12'-1"	S4	0'-6"	1'-9 ½"	7'-6"	1'-9 ½"			0'-6"					
5Z109A	36	#5	3'-5 ½"	8	0'-10"	1'-9 ½"					0'-10"					



OK AS PROVIDED. - WSP

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Base slab Reinforcements at Bot. & Sides -Typical
Provide 3/4" Cover For Base slab Reinforcements at Top -Typical
Provide 3" Cover For Wall Reinforcements at outer Face -Typical
Provide 3/4" Cover For Wall Reinforcements at inner Face -Typical
2

GC Please verify the
lap value we provided (Typ.)

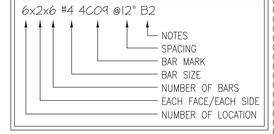
Lap Schedule 6000 PSI
for Base Slab

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

LEGENDS

BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
EL.	- Elevation
Thk	- Thickness
EF	- Each Face
ES	- Each Side
Sim.	- Similar
C	- Corner
Typ.	- Typical
H	- Horizontal
V	- Vertical
IF	- Inner face
OF	- Outer face

LABEL LEGENDS



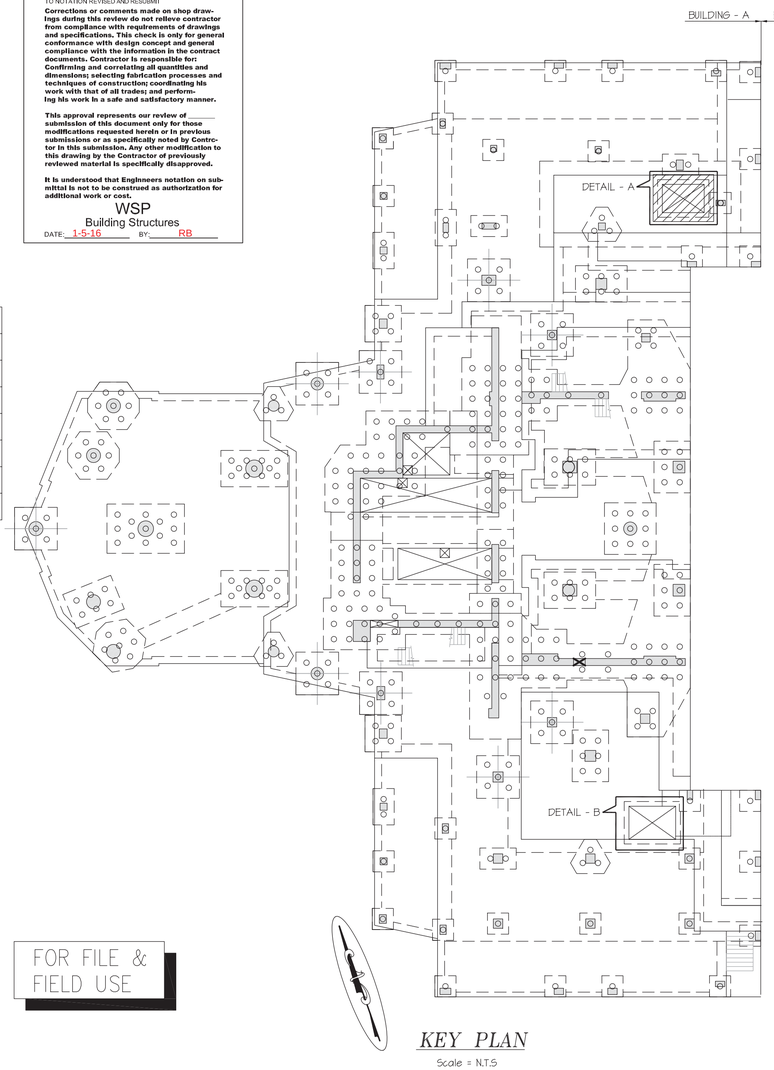
APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 1-5-16 BY: RB



FOR FILE & FIELD USE

KEY PLAN
Scale = N.T.S

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC		
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

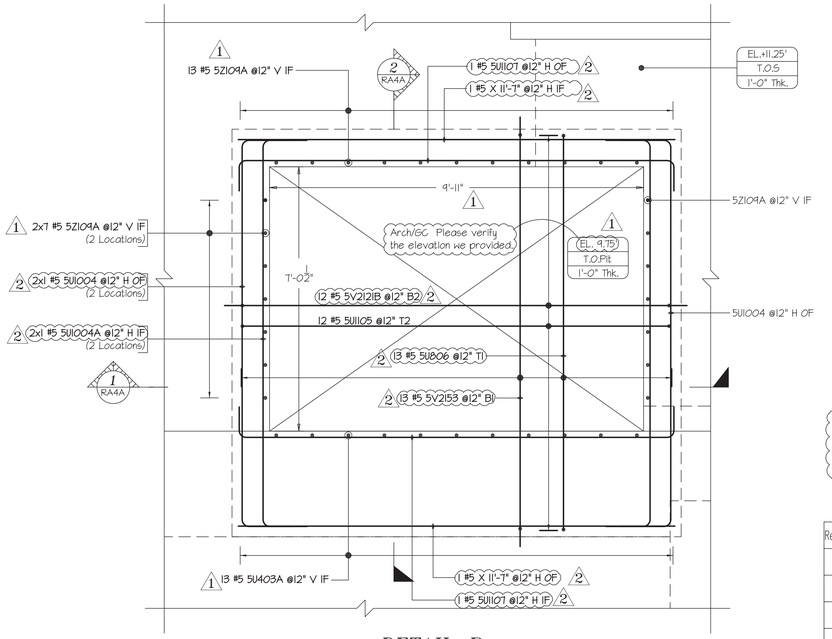
LOCATION	BROOKLYN NY
ARCHITECT	ISMABL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL
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REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	12.04.15	RDD
1	REVISED AS PER MAIL INSTRUCTION DATED ON:10.08.15	10.08.15	RDD
0	FOR APPROVAL	10.07.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: GREASE PIT (NORTH) - BUILDING A (SHEET 01 OF 02)
DRAWING NO.: RA4



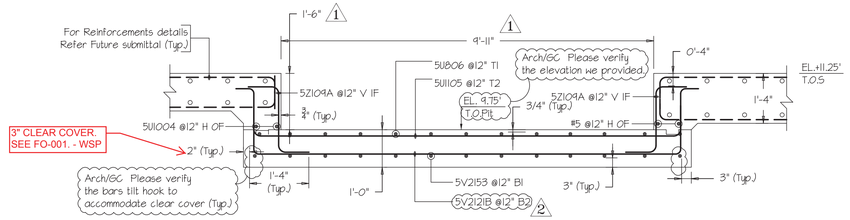
DETAIL–B

GREASE PIT (SOUTH) – PLAN

Scale = 1/2" = 1'-0"

SDR : FO-001.00, FO-101.00, FO-502.00 & FO-702.00

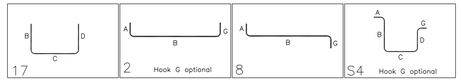
ARCH. PLS. VERIFY DIMENSIONS AND ELEVATIONS



1 RA4A *SECTION* Scale = 1/2" = 1'-0" 1

Arch/GC Please verify the
grease pit Reinforcements &
bar arrangements we provided (Typ.)

Release Number:					BENDING DETAILS											
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U1004	2	#5	13'-10"	17		1'-9"	10'-4"	1'-9"								
5U1004A	2	#5	12'-0"	2	0'-10"	10'-4"					0'-10"					
5U1105	12	#5	13'-1"	2	0'-10"	11'-5"					0'-10"					
5U1107	2	#5	13'-3 ½"	2	0'-10"	11'-7 ½"					0'-10"					
5U403A	13	#5	5'-11 ½"	8	0'-10"	4'-3 ½"					0'-10"					
5U806	13	#5	12'-2 ½"	2	0'-10"	10'-6 ½"					0'-10"					
5V2121B	12	#5	16'-0"	S4	0'-6"	1'-9 ½"	11'-5"	1'-9 ½"			0'-6"					
5V2153	13	#5	17'-9"	S4	0'-6"	1'-9 ½"	10'-6 ½"	4'-5"			0'-6"					
5Z109A	27	#5	3'-5 ½"	8	0'-10"	1'-9 ½"					0'-10"					



ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Provide 3" Cover For Base slab Reinforcements at Bot & Sides -Typical
Provide 3/4" Cover For Base slab Reinforcements at Top -Typical
Provide 3" Cover For Wall Reinforcements at outer Face -Typical
Provide 3/4" Cover For Wall Reinforcements at inner Face -Typical
2

GC Please verify the
lap value we provided (Typ.)

Lap Schedule 6000 PSI
for Base Slab

Size	Top	Others
#3	21"	16"
#4	21"	16"
#5	21"	16"
#6	24"	18"
#7	34"	30"
#8	50"	38"
#9	62"	47"
#10	73"	56"
#11	86"	66"

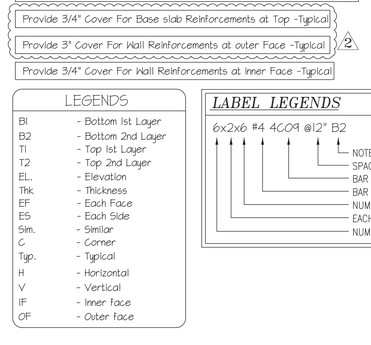
LEGENDS

BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
EL.	- Elevation
Thk.	- Thickness
EF	- Each Face
ES	- Each Side
Sim.	- Similar
C	- Corner
Typ.	- Typical
H	- Horizontal
V	- Vertical
IF	- Inner face
OF	- Outer face

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS
- EACH FACE/EACH SIDE
- NUMBER OF LOCATION



2 RA4A *SECTION* Scale = 1/2" = 1'-0" 1

Arch/GC Please verify the
section profile we provided (Typ.)

KEY PLAN

Scale = N.T.S

FOR FILE & FIELD USE

APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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WSP
Building Structures
DATE: 1-5-16 BY: RB

RECEIVED
12/10/15
NOBLE

NOBLE CONSTRUCTION
PROJECT NAME 145 West Street
PROJECT NUMBER 14-007
CONTRACTOR NAME Urban
CONTRACTOR TRADE Concrete Cast In Place
SPEC SECTION # 033000
DRAWING 2 OF 2
SUBMITTAL # 0009-033000
DATE RECEIVED 12/10/15
RECEIVED BY Louis Pichardo

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC		
#2 / #6	#6 / #19	#10 / #32
#3 / #10	#7 / #22	#11 / #36
#4 / #13	#8 / #25	#14 / #43
#5 / #16	#9 / #29	#18 / #57

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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REV	REVISIONS	DATE	BY
4	–	–	–
3	–	–	–
2	REVISED AS PER AE COMMENTS	12.04.15	RDD
1	REVISED AS PER MAIL INSTRUCTION DATED ON:10.08.15	10.08.15	RDD
0	FOR APPROVAL	10.07.15	RDD

PROJECT: 145 WEST STREET

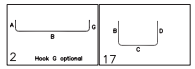
PROJECT NO.: 35–083

TITLE OF DRAWING: GREASE PIT (SOUTH) – BUILDING A (SHEET 02 OF 02)

DRAWING NO.: RA4A

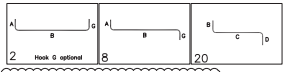
BAR BENDING SCHEDULE FOR GRADE 615/60

Drawing Sheet :					BENDING DETAILS											
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U506	16	#5	7'-2 ⅜"	2	0'-10"	5'-6 ⅜"					0'-10"					
5U506A	8	#5	13'-2 ⅜"	17		3'-10"	5'-6 ⅜"	3'-10"								



BAR BENDING SCHEDULE FOR GRADE 615/60E

Drawing Sheet :					BENDING DETAILS											
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U506B	14	#5	7'-2"	2	0'-10"	5'-6"					0'-10"					
5Z511	24	#5	7'-7 ⅜"	8	0'-10"	5'-11 ⅜"					0'-10"					
5Z600	24	#5	8'-2 ⅜"	20		0'-10"	6'-0 ⅜"	1'-4"								



Provide 3" Cover For Base slab Reinforcements at Bot & Sides -Typical

Provide 2" Cover For Base slab Reinforcements at Top -Typical

Provide 2" Cover For Wall Reinforcements at outer Face -Typical

Provide 3/4" Cover For Wall Reinforcements at Inner Face -Typical

ALL MATERIAL ON THIS DRAWING

ASTM A615
GRADE 60 BLACK U.N.O
EXCEPT
REINF. NOTED (EP) IS
EPOXY REBAR

2

LEGENDS	
BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
EL.	- Elevation
Thk.	- Thickness
EF	- Each Face
ES	- Each Side
Sim.	- Similar
Typ.	- Typical

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

2

Applies only in locations with cover 1 1/2" or greater. Provide tables for 3/4" cover. Refer to FO-703

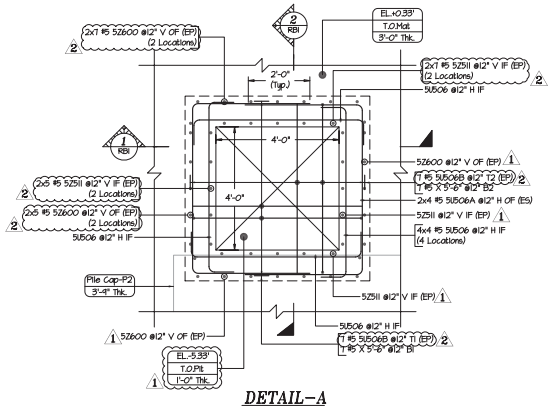
Lap Schedule 6000 PSI for Base Slab

Size	Top	Others
#3	26"	16"
#4	26"	16"
#5	26"	16"
#6	29"	18"
#7	47"	30"
#8	60"	38"
#9	75"	47"
#10	88"	56"
#11	104"	66"

OTHER DWGS. REFERENCE

Description	Dwg. No.
Ejector Pit Detail - A	RBI
Ejector Pit Detail - B	RBIA

Architect to verify pits, elevations, dimensions.

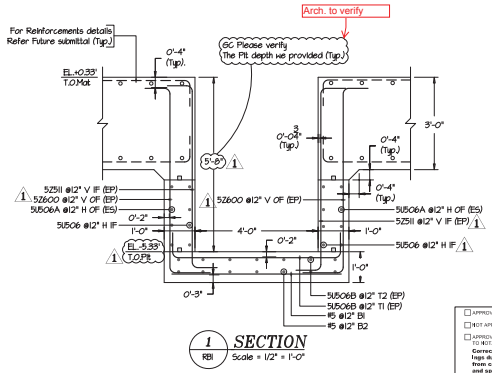


DETAIL-A
EJECTOR PIT - PLAN
Scale = 1/2" = 1'-0"
SDR : FO-001.00, FO-500.00, FO-502.00 & FO-702.00

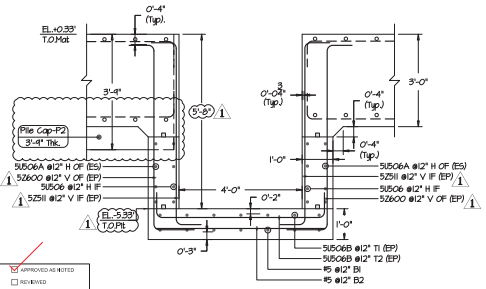
RECEIVED
10/29/15
NOBLE

RECEIVED
11/09/15
NOBLE

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.



1 SECTION
1 RBI
Scale = 1/2" = 1'-0"



2 SECTION
2 RBI
Scale = 1/2" = 1'-0"

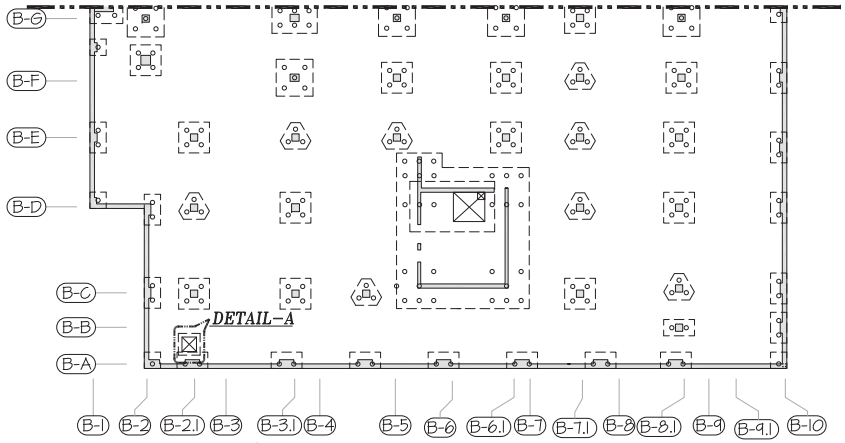
APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
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WSP
Building Structures
DATE: 11-6-15 BY: MD



PARTIAL KEY PLAN-BUILDING B
Scale = NTS

FOR FILE & FIELD USE

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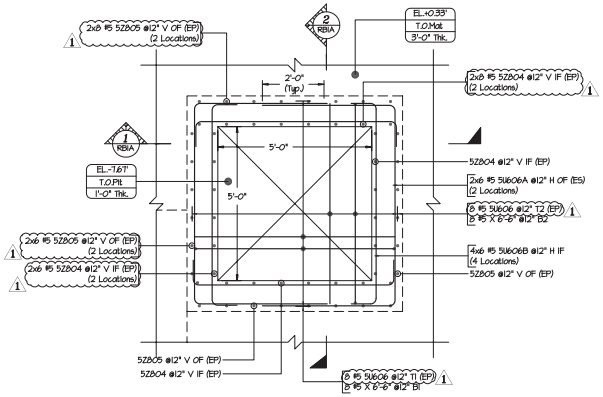
BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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REV	REVISIONS	DATE	BY
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2	REVISED AS PER AE COMMENTS	10.27.15	RDD
1	REVISED AS PER DOB RESTRICTION DATED ON 10.12.15	10.14.15	RDD
0	FOR APPROVAL	10.01.15	RDD

PROJECT: 145 WEST STREET
PROJECT NO.: 35-083
TITLE OF DRAWING: EJECTOR PIT - BUILDING B (SHEET 01 OF 02)
DRAWING NO.: RB1



DETAIL-B
EJECTOR PIT – PLAN

Scale = 1/2" = 1'-0"

SDR : FO-001.00, FO-500.00, FO-502.00 & FO-102.00

RECEIVED
10/29/15
NOBLE

RECEIVED
11/09/15
NOBLE



BAR BENDING SCHEDULE FOR GRADE 615/60

Drawing Sheet :				BENDING DETAILS												
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U606A	12	#5	15'-2 ¾"	17		4'-4"	6'-6 ¾"	4'-4"								
5U606B	24	#5	8'-2 ¾"	2	0'-10"	6'-6 ¾"					0'-10"					

17 — B, C, D

2 — A, B, G — Hook G optional

BAR BENDING SCHEDULE FOR GRADE 615/60E

Drawing Sheet :				BENDING DETAILS												
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
5U606	16	#5	8'-2"	2	0'-10"	6'-6"					0'-10"					
5ZB04	28	#5	10'-0 ¾"	8	0'-10"	8'-4 ¾"					0'-10"					
5ZB05	28	#5	10'-9"	20		0'-10"	8'-5"	1'-6"								

2 — A, B, G — Hook G optional

8 — A, B, G

20 — B, C, D

Provide 3" Cover For Base slab Reinforcements at Bot & Sides -Typical

Provide 2" Cover For Base slab Reinforcements at Top -Typical

Provide 2" Cover For Wall Reinforcements at outer Face -Typical

Provide 3/4" Cover For Wall Reinforcements at Inner Face -Typical

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O
EXCEPT
REINF. NOTED (EP) IS
EPOXY REBAR

LEGENDS

BI	- Bottom 1st Layer
B2	- Bottom 2nd Layer
TI	- Top 1st Layer
T2	- Top 2nd Layer
EL.	- Elevation
Thk	- Thickness
EF	- Each Face
ES	- Each Side
Sim.	- Similar
Typ.	- Typical

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS
- EACH FACE/EACH SIDE
- NUMBER OF LOCATION

Lap Schedule 6000 PSI for Base Slab

Size	Top	Others
#3	26"	16"
#4	26"	16"
#5	26"	16"
#6	29"	18"
#7	41"	30"
#8	60"	38"
#9	75"	47"
#10	88"	56"
#11	104"	66"

2

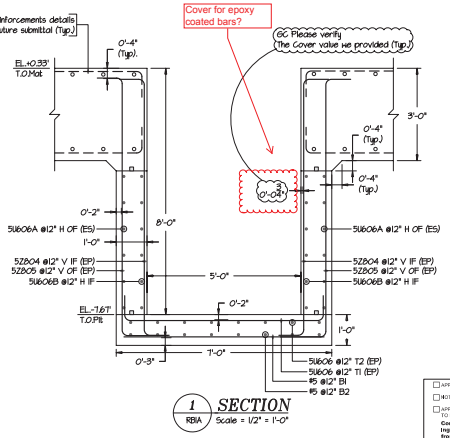
OTHER DWGS. REFERENCE

Description	Dwg. No.
Ejector Pit Detail - A	RBI
Ejector Pit Detail - B	RBIA

For Reinforcements details
Refer Future submittal (Typ.)

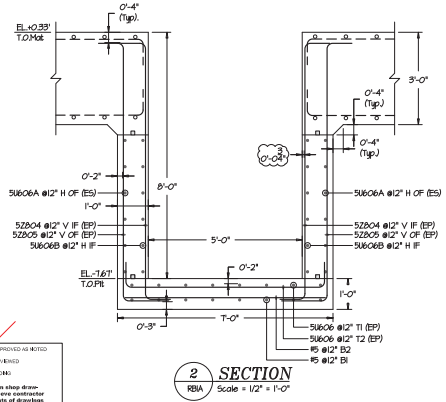
Cover for epoxy coated bars?

GC Please verify
The Cover value we provided (Typ.)



1 RBIA SECTION
Scale = 1/2" = 1'-0"

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.



2 RBIA SECTION
Scale = 1/2" = 1'-0"

APPROVED — APPROVED AS NOTED
NOT APPROVED - RESUBMIT — REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATIONS NOTED AND RESUBMIT

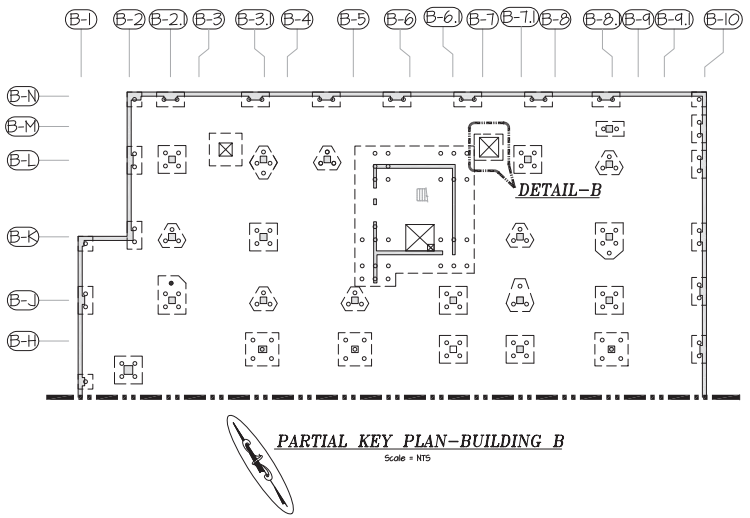
Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating its work with that of all trades; and performing its work in a safe and satisfactory manner.

This approval represents our review of _____ submission of this document only for those modifications requested herein or noted on the drawings. Specifically, it does not relieve Contractor from the responsibility to make modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-6-15 BY: MD

Architect to verify pits, elevations, dimensions.



PARTIAL KEY PLAN-BUILDING B

Scale = NTS

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFSSTEEL
REINFORCING STEEL WIRE MESH

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

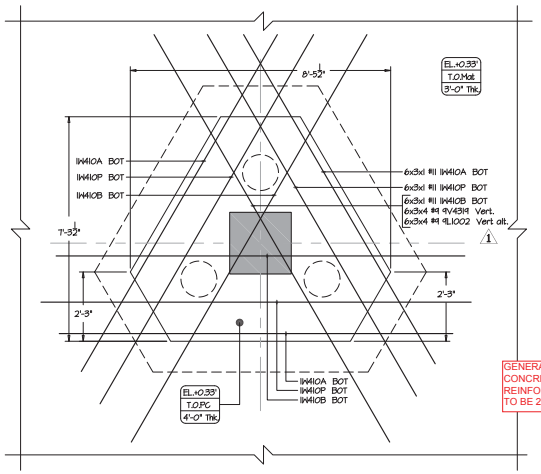
REV	REVISIONS	DATE	BY
4	-	-	RDD
3	-	-	RDD
2	-	-	RDD
1	REVISED AS PER AE COMMENTS	10.27.15	RDD
0	FOR APPROVAL	10.14.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: EJECTOR PIT – BUILDING B (SHEET 02 OF 02)

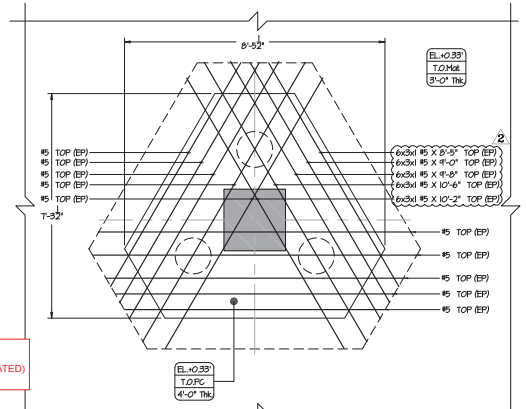
DRAWING NO.: RB1A



Depth = 4'-0"

P3 –PILE CAP BOTTOM LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500/FO-100
6 Req'd

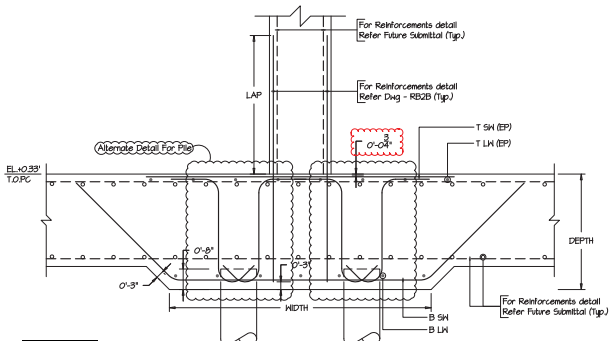


Depth = 4'-0"

P3 –PILE CAP TOP LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500/FO-100
6 Req'd

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.



TYPICAL PILE CAP DETAIL

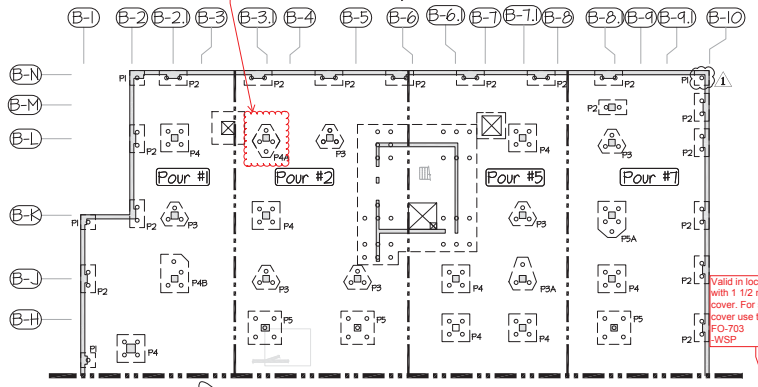
Scale = 1/2" = 1'-0"

RECEIVED
11/09/15
NOBLE

Architect to verify pits, elevations, dimensions.

RECEIVED
10/29/15
NOBLE

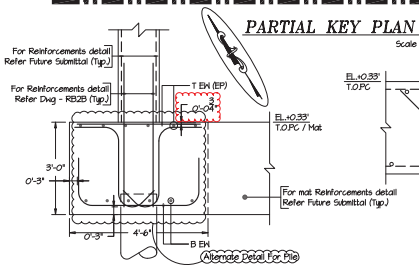
Refer to latest FO-700 dated 10-2-15



PARTIAL KEY PLAN – POUR 1, 2, 5 & 7

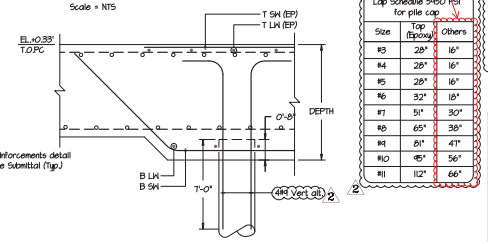
Scale = NTS

Valid in locations with 1 1/2 min. cover. For smaller cover use table 1.A FO-703 -WSP



TYPICAL PILE CAP P1 DETAIL

Scale = 1/2" = 1'-0"



ALTERNATE DETAIL FOR PILE

Scale = 1/2" = 1'-0"

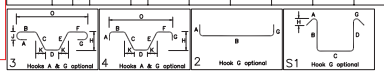
PILE CAP SCHEDULE

Mark	Size (H X L)	Pile cap Depth	Qty.	Top of Pile cap	Reinforcements	Remarks
P1	4'-6" X 4'-6"	3'-0"	4	EL. +0.33'	4x6 #4 4L490 B EH 4x2x6 #4 X 4'-0" T EH (EP) 2 4x4 #4 4V3H1 Vert. 4x4 #4 4L402 Vert alt. 1	Refer Typical Detail For P1 Pile cap
P2	8'-6" X 4'-6"	3'-4"	14	EL. +0.33'	14x6 #4 4K407 B SH 14x6 #11 1H405 B LH 14x6 #4 X 5'-0" T SH (EP) 14x4 #5 X 10'-0" T LH (EP) 2 14x2x4 #4 4V4O8 Vert. 14x2x4 #4 4L411 Vert alt. 1	-
P2	8'-6" X 4'-6"	3'-4"	1	EL. +0.33'	6 #4 4H406 B SH 4 #11 1H405 B LH 6 #4 X 5'-0" T SH (EP) 4 #5 X 10'-0" T LH (EP) 2 2x4 #4 4V4O8 Vert. 2x4 #4 4L411 Vert alt. 1	Along Grid Lines B-B.1 & B-M
P2	8'-6" X 4'-6"	3'-4"	1	EL. +0.33'	3 #4 4K407 B SH 3 #4 4H406 B SH 4 #11 1H405 B LH 3 #4 X 5'-0" T SH (EP) 3 #4 X 6'-0" T SH (EP) 4 #5 X 10'-0" T LH (EP) 2 2x4 #4 4V4O8 Vert. 2x4 #4 4L411 Vert alt. 1	Along Grid Lines B-2 & B-K
P4	8'-6" X 8'-6"	3'-4"	8	EL. +0.33'	8x7 #11 1H405A B SH 8x3 #11 1H403 B LH 8x2x11 #5 X 10'-0" T EH (EP) 2 8x4x4 #4 4V4O8 Vert. 8x4x4 #4 4L411 Vert alt. 1	-
P4B	Refer Plan	4'-0"	1	EL. +0.33'	Refer Detail - A Dwg No RB2A	-
P5	10'-2" X 10'-2"	4'-0"	3	EL. +0.33'	3x4 #11 1H410 B SH 3x3 #11 1H403 B LH 3x2x20 #5 X 10'-2" T EH (EP) 2 3x5x4 #4 4V4O8 Vert. 3x5x4 #4 4L1002 Vert alt. 1	-

BENDING DETAILS

Drawing Sheet :

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
11W403	56	#11	17'-1 ⅜"	3			4'-3 ⅜"	8'-6 ⅜"	4'-3 ⅜"			3'-1 ⅜"		2'-11 ⅜"	14'-5 ⅜"	
11W405	64	#11	17'-2 ⅜"	3			4'-5"	8'-4 ⅜"	4'-5"			3'-2 ⅜"		3'-0 ⅜"	14'-5 ⅜"	
11W409	27	#11	19'-9 ⅜"	3			4'-9 ⅜"	10'-2 ⅜"	4'-9 ⅜"			3'-5 ⅜"		3'-3 ⅜"	16'-9 ⅜"	
11W410	27	#11	19'-7 ⅜"	3			4'-10"	9'-11 ⅜"	4'-10"			3'-6"		3'-4"	16'-7 ⅜"	
11W405A	56	#11	17'-3"	3			4'-5 ⅜"	8'-3 ⅜"	4'-5 ⅜"			3'-3"		3'-1"	14'-5 ⅜"	
11W410A	18	#11	15'-7"	3			4'-10"	5'-11"	4'-10"			3'-6"		3'-4"	12'-7"	
11W410B	18	#11	17'-3 ⅜"	3			4'-10"	7'-7 ⅜"	4'-10"			3'-6"		3'-4"	14'-3 ⅜"	
11W410P	18	#11	16'-9 ⅜"	3			4'-10"	7'-1 ⅜"	4'-10"			3'-6"		3'-4"	13'-9 ⅜"	
4K407	87	#4	9'-5"	4	0'-8"	4'-1 ⅜"	4'-7 ⅜"					3'-3 ⅜"		3'-2 ⅜"	7'-4 ⅜"	
4W406	9	#4	13'-5"	3			4'-6 ⅜"	4'-3 ⅜"	4'-6 ⅜"			3'-3"		3'-2 ⅜"	10'-8"	
9L1002	132	#9	11'-9"	2	1'-7"	10'-2"										
9L902	16	#9	10'-9"	2	1'-7"	9'-2"										
9L911	256	#9	11'-6"	2	1'-7"	9'-11"										
9U400	24	#9	7'-2"	2	1'-7"	4'-0"					1'-7"					
9V3119	16	#9	4'-11 ⅜"	S1	0'-9 ⅜"	2'-7"	1'-7"					0'-8"				
9V4019	256	#9	5'-8 ⅜"	S1	0'-9 ⅜"	3'-4"	1'-7"					0'-8"				
9V4319	132	#9	5'-11 ⅜"	S1	0'-9 ⅜"	3'-7"	1'-7"					0'-8"				



ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O
"EXCEPT"
REINF. NOTED (EP) IS EPOXY REBAR

Provide 3" Cover For P1e cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For P1e cap Reinforcement at Top -Typical

Lap Schedule 5450 PSI for pile cap

Size	Top (Epoxy)	Others
#3	28"	16"
#4	28"	16"
#5	28"	16"
#6	32"	18"
#7	51"	30"
#8	65"	38"
#9	81"	47"
#10	95"	56"
#11	112"	66"

LABEL LEGENDS

6x2x6 #4 4C04 @12" B2

NOTES
SPACING
BAR MARK
BAR SIZE
NUMBER OF BARS EACH FACE/EACH SIDE
NUMBER OF LOCATION

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LH	- Long Way
SH	- Short Way
Vert.	- Vertical
Thk.	- Thickness
Typ.	- Typical

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB2
PILE CAP P3A DETAILS	RB2A
COLUMN DOWELS	RB2B
PILE CAP DETAILS P4A & P5A	RB2C

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	10.29.15	RDD
1	REVISED AS PER RFI - 057	10.14.15	RDD
0	FOR APPROVAL	10.06.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAP DETAILS POUR 1, 2, 5 & 7 – BUILDING B
SHEET (01 OF 04)

DRAWING NO.: RB2

NOBLE CONSTRUCTION
PROJECT NAME: 145 West Street
PROJECT NUMBER: 14-351
CONTRACTOR NAME: Urban Foundation
CONTRACTOR TRADE: Concrete
SPEC SECTION #: 03 3300
DRAWING #: RB2
SUBMITTAL #: 4
DATE RECEIVED: 10/29/2015
RECEIVED BY: Sean Hanlon

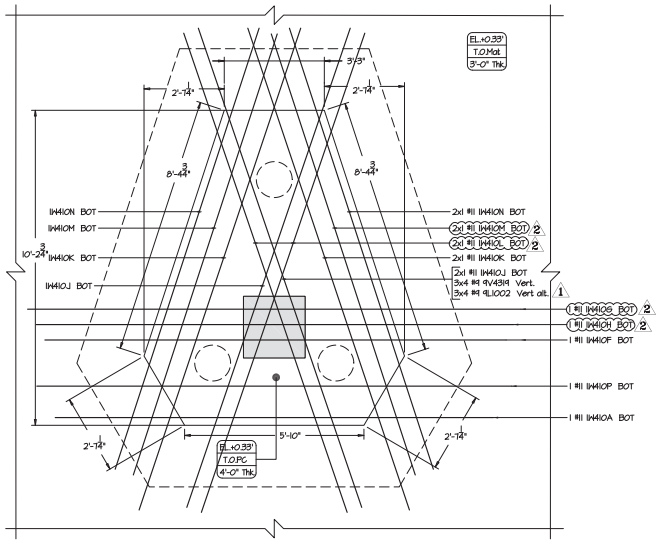
APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATIONS NOTED AND REMARKS

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions selecting fabrication processes and techniques of construction coordinating its work with that of all trades and performing his work in a safe and satisfactory manner.

This approval represents our review of ____ submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

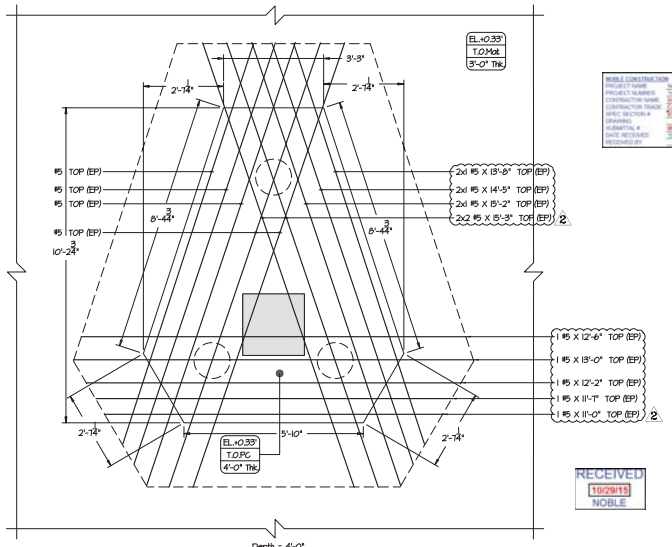
It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or costs.

WSP
Building Structures
DATE: 11-6-15 BY: MD



P3A –PILE CAP BOTTOM LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500/FO-100

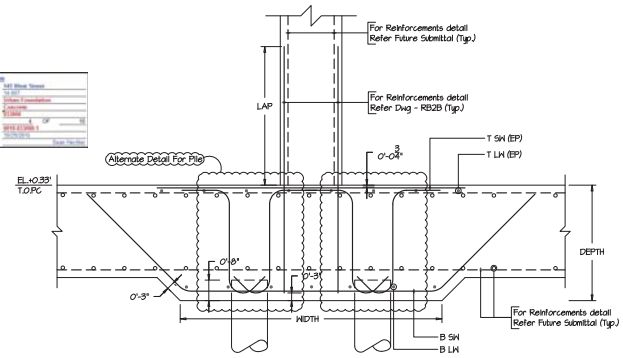


P3A –PILE CAP TOP LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500/FO-100

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.

RECEIVED
10/29/15
NOBLE



TYPICAL PILE CAP DETAIL

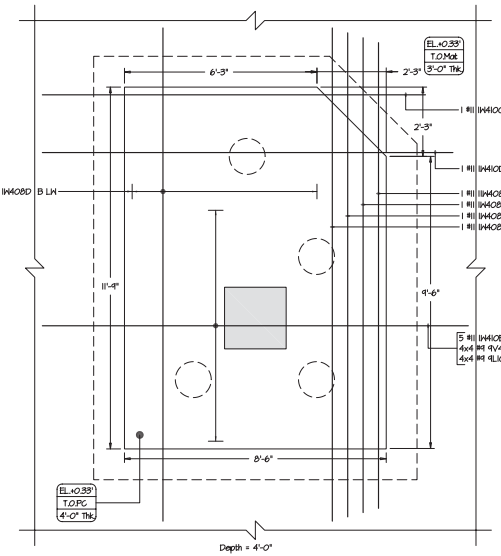
Scale = 1/2" = 1'-0"

RECEIVED
11/09/15
NOBLE

Drawing Sheet :

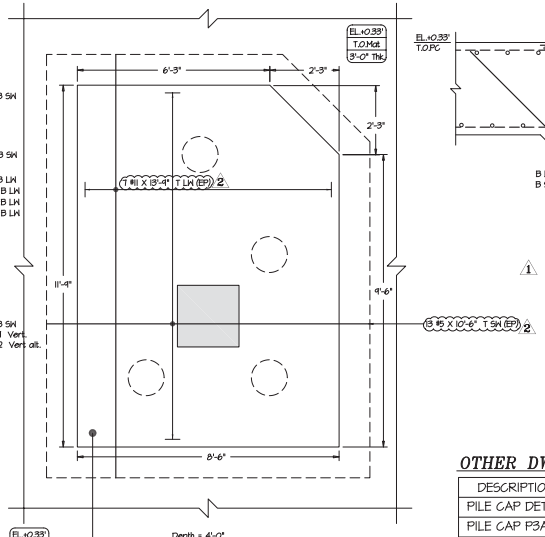
BENDING DETAILS

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
1W408	1	#11	19'-1 X"	3			4'-8"	9'-9 X"	4'-8"			3'-4 X"		3'-2 X"	16'-2 X"	
1W408A	1	#11	19'-7 X"	3			4'-8"	10'-3 X"	4'-8"			3'-4 X"		3'-2 X"	16'-8 X"	
1W408B	1	#11	20'-1 X"	3			4'-8"	10'-9 X"	4'-8"			3'-4 X"		3'-2 X"	17'-2 X"	
1W408C	1	#11	20'-7 X"	3			4'-8"	11'-3 X"	4'-8"			3'-4 X"		3'-2 X"	17'-8 X"	
1W408D	13	#11	21'-1 X"	3			4'-8"	11'-9 X"	4'-8"			3'-4 X"		3'-2 X"	18'-2 X"	
1W410C	1	#11	15'-11"	3			4'-10"	6'-3"	4'-10"			3'-6"		3'-4"	12'-11"	
1W410D	1	#11	17'-9 X"	3			4'-10"	8'-1 X"	4'-10"			3'-6"		3'-4"	14'-9 X"	
1W410E	5	#11	17'-11 X"	3			4'-10"	8'-3 X"	4'-10"			3'-6"		3'-4"	14'-11 X"	
9LL002	16	#3	11'-9"	2	1'-7"	10'-2"										
9V4319	16	#3	5'-11 X"	S1	0'-9 X"	3'-7"	1'-7"					0'-8"				
1W410A	1	#11	15'-7"	3			4'-10"	5'-11"	4'-10"			3'-6"		3'-4"	12'-7"	
1W410F	1	#11	17'-7"	3			4'-10"	7'-11"	4'-10"			3'-6"		3'-4"	14'-7"	
1W410G	1	#11	16'-11"	3			4'-10"	7'-3"	4'-10"			3'-6"		3'-4"	13'-11"	
1W410H	1	#11	17'-3"	3			4'-10"	7'-7"	4'-10"			3'-6"		3'-4"	14'-3"	
1W410J	2	#11	20'-3 X"	3			4'-10"	10'-7 X"	4'-10"			3'-6"		3'-4"	17'-3 X"	
1W410K	2	#11	19'-7 X"	3			4'-10"	9'-11 X"	4'-10"			3'-6"		3'-4"	16'-7 X"	
1W410L	2	#11	19'-6 X"	3			4'-10"	9'-10 X"	4'-10"			3'-6"		3'-4"	16'-6 X"	
1W410M	2	#11	18'-10 X"	3			4'-10"	9'-2 X"	4'-10"			3'-6"		3'-4"	15'-10 X"	
1W410N	2	#11	18'-1 X"	3			4'-10"	8'-5 X"	4'-10"			3'-6"		3'-4"	15'-1 X"	
1W410P	1	#11	16'-9 X"	3			4'-10"	7'-1 X"	4'-10"			3'-6"		3'-4"	13'-9 X"	
9LL002	12	#3	11'-9"	2	1'-7"	10'-2"										
9V4319	12	#3	5'-11 X"	S1	0'-9 X"	3'-7"	1'-7"					0'-8"				



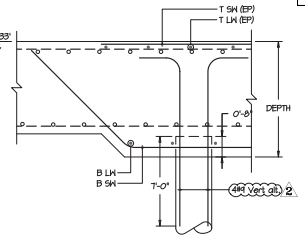
DETAIL–A
P4B –PILE CAP BOTTOM LAYERS ARRANGEMENT

Scale = 1/2" = 1'-0"
SDR = FO-500/FO-100



DETAIL–A
P4B –PILE CAP TOP LAYERS ARRANGEMENT

Scale = 1/2" = 1'-0"
SDR = FO-500/FO-100



ALTERNATE DETAIL

1

Scale = 1/2" = 1'-0"

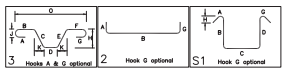
OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB2
PILE CAP P3A DETAILS	RB2A
COLUMN DOWELS	RB2B
PILE CAP DETAILS P4A & P5A	RB2C

Lap Schedule 5450 PSI for pile cap

Size	Top (Epoxy)	Others
#3	28"	16"
#4	28"	16"
#5	28"	16"
#6	32"	18"
#7	51"	30"
#8	65"	38"
#9	81"	47"
#10	95"	56"
#11	112"	66"

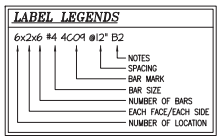
2



Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

LABEL LEGENDS



LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LH	- Long Way
SW	- Short Way
Vert.	- Vertical
Thk.	- Thickness
Typ.	- Typical

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O
"EXCEPT"
REINF. NOTED (EP) IS
EPOXY REBAR

Architect to verify pits, elevations, dimensions.

REVIEWED AS NOTED
DO NOT RESUBMIT
ISSUED FOR CONSTRUCTION

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating its work with that of all trades and performing its work in a safe and satisfactory manner.

This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Consultant in this submission. Any other modifications to this drawing by the Contractor at previously reviewed material is specifically disapproved.

It is understood that Engineers notation on material is not to be construed as authorization for additional work or costs.

WSP
Building Structures
DATE: 11-6-15 BY: MD

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC				
#2 / #6	#6 / #19	#10 / #32		
#3 / #10	#7 / #22	#11 / #36		
#4 / #13	#8 / #25	#14 / #43		
#5 / #16	#9 / #29	#18 / #57		

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-0110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	10.29.15	RDD
1	REVISED AS PER RFI - 057	10.14.15	RDD
0	FOR APPROVAL	10.06.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35–083

TITLE OF DRAWING: PILE CAP DETAILS (POUR 1, 2, 5 & 7 – BUILDING B
SHEET (02 OF 04)

DRAWING NO.: RB2A

COLUMN DOWELS SCHEDULE – POUR #1

Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
501	B52" X 28"	EL. +0.33'	EL. +0.33'	EL.-2.67'	3'-0"	10 #8 X 5'-6" Dwls
502	B47" X 20"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	10 #8 X 6'-3" Dwls
537	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	6 #8 X 6'-3" Dwls
538	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	4 #4 X 6'-7" Dwls
535	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-2.67'	3'-0"	6 #8 X 5'-6" Dwls
536	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	6 #8 X 6'-3" Dwls
563	26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	8 #6 X 6'-0" Dwls
534	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls
562	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
533	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-2.67'	3'-0"	8 #8 X 5'-6" Dwls
561	32" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls

COLUMN DOWELS SCHEDULE – POUR #2

Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
503	B44" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls
504	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	10 #8 X 6'-3" Dwls
505	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	10 #8 X 6'-3" Dwls
534	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	(4'-0") 2	(4 #4 X 6'-10" Dwls) 2
540	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #4 X 6'-10" Dwls
564	26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	10 #6 X 5'-8" Dwls
577	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
578	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
576	30" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
581	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls

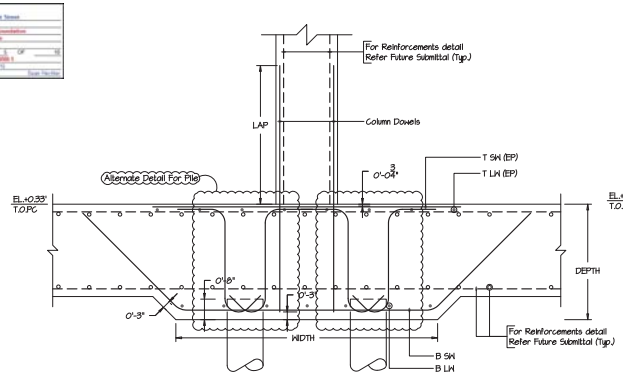
COLUMN DOWELS SCHEDULE – POUR #5

Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
506	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	10 #8 X 6'-3" Dwls
507	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	10 #8 X 6'-3" Dwls
541	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	6 #4 X 6'-7" Dwls
565	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
579	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	4 #8 X 6'-3" Dwls
566	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
580	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	4 #8 X 6'-3" Dwls
567	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	4 #8 X 6'-3" Dwls

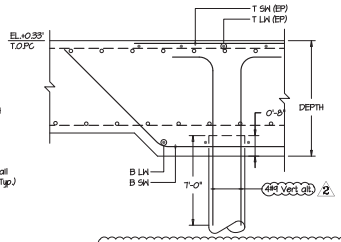
COLUMN DOWELS SCHEDULE – POUR #7

Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
508	B43" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls
542	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	4 #8 X 6'-3" Dwls
543	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
509	B24" X 36"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #7 X 6'-0" Dwls
510	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #7 X 6'-0" Dwls
544	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	(3'-4") 2	(2 #8 X 6'-3" Dwls) 2
511	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #7 X 6'-0" Dwls
545	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls
512	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls
546	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
513	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-4"	8 #8 X 6'-3" Dwls

RECEIVED 11/09/15 NOBLE



TYPICAL PILE CAP DETAIL
Scale = 1/2" = 1'-0"



ALTERNATE DETAIL FOR PILE 1
Scale = 1/2" = 1'-0"

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Lap Schedule for column (60 KSI)	
Size	Splice
#3	12"
#4	15"
#5	19"
#6	23"
#7	27"
#8	30"
#9	34"
#10	38"
#11	43"

Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

LABEL LEGENDS

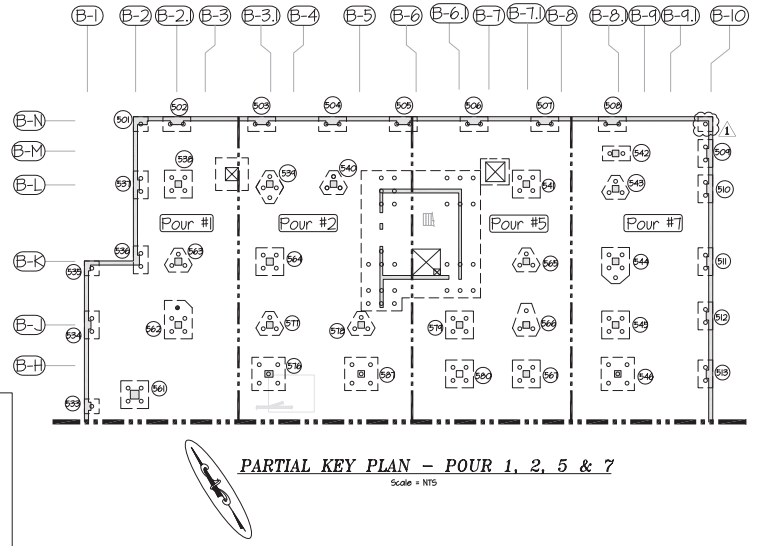
6x2x6 #4 4C09 @12" B2
- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LH	- Long Hay
SH	- Short Hay
Dwls	- Dowels
Typ.	- Typical

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB2
PILE CAP P3A DETAILS	RB2A
COLUMN DOWELS	RB2B
PILE CAP DETAILS P4A & P5A	RB2C



PARTIAL KEY PLAN – POUR 1, 2, 5 & 7
Scale = NTS

RECEIVED 10/29/15 NOBLE

APPROVED / APPROVED AS NOTED / NOT APPROVED - RESUBMIT / REVIEWED / APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVIEWED AND RESUBMIT

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It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-6-15 BY: MD

Architect to verify pits, elevations, dimensions.

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
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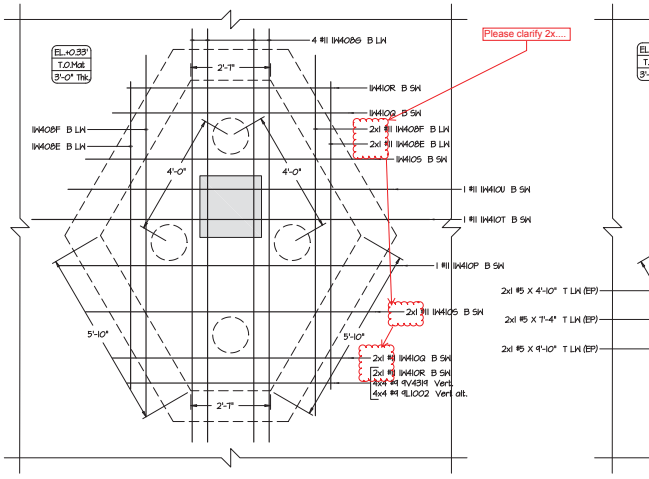
REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	10.29.15	RDD
1	REVISED AS PER RFI - 057	10.14.15	RDD
0	FOR APPROVAL	10.06.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: COLUMN DOWELS (POUR 1, 2, 5 & 7 – BUILDING B SHEET (03 OF 04)

DRAWING NO.: RB2B

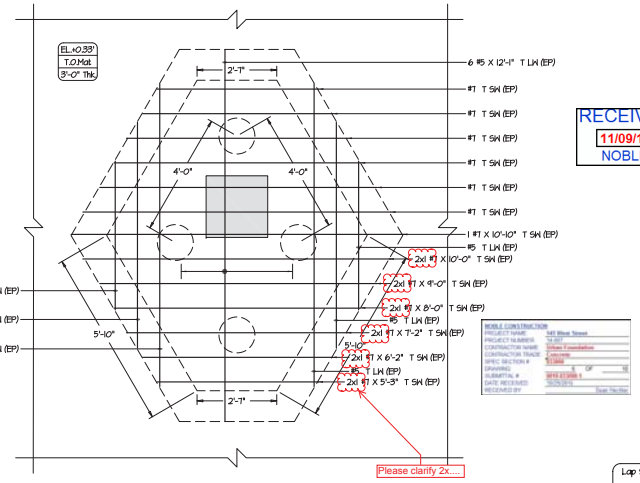


Depth = 4'-0"

P4A –PILE CAP BOTTOM LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

A/E/C Please verify
The bar arrangement we provided (Typ.)



Depth = 4'-0"

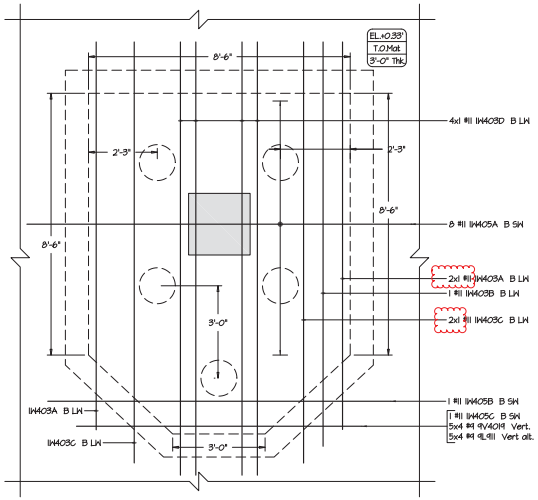
P4A –PILE CAP TOP LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

RECEIVED
11/09/15
NOBLE

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE

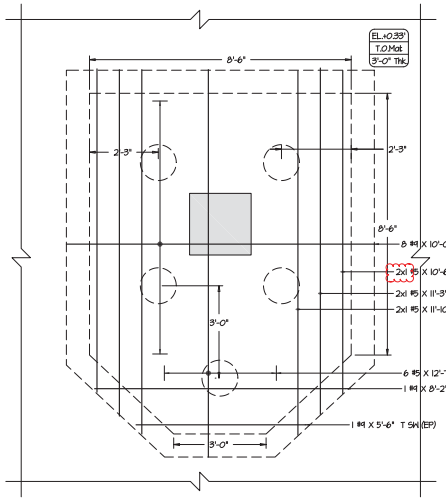
Lap Schedule 5450 PSI for pile cap		
Size	Top (Epoxy)	Others
#3	28"	16"
#4	28"	16"
#5	28"	16"
#6	32"	18"
#7	51"	30"
#8	65"	38"
#9	81"	47"
#10	95"	56"
#11	112"	66"



Depth = 3'-9"

P5A –PILE CAP BOTTOM LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100



Depth = 3'-9"

P5A –PILE CAP TOP LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

RECEIVED
10/29/15
NOBLE

Architect to verify pits, elevations, dimensions.

APPROVED
APPROVED AS NOTED
NOT APPROVED - RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATIONS REVISED AND RESUBMIT

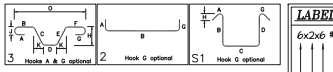
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WSP
Building Structures
DATE 11-6-15 BY MD

BENDING DETAILS																	
Drawing Sheet :																	
Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
1W403A	2	#11	17'-4 ⅜"	3			4'-3 ⅜"	8'-8 ⅜"	4'-3 ⅜"			3'-1 ⅜"		2'-11 ⅜"	14'-7 ⅜"	
1W403B	1	#11	17'-11 ⅜"	3			4'-3 ⅜"	9'-4"	4'-3 ⅜"			3'-1 ⅜"		2'-11 ⅜"	15'-3"	
1W403C	2	#11	18'-5 ⅜"	3			4'-3 ⅜"	9'-9 ⅜"	4'-3 ⅜"			3'-1 ⅜"		2'-11 ⅜"	15'-8 ⅜"	
1W403D	4	#11	19'-8 ⅜"	3			4'-3 ⅜"	11'-1"	4'-3 ⅜"			3'-1 ⅜"		2'-11 ⅜"	17'-0"	
1W405A	8	#11	17'-3"	3			4'-5 ⅜"	8'-3 ⅜"	4'-5 ⅜"			3'-3"		3'-1"	14'-5 ⅜"	
1W405B	1	#11	14'-0 ⅜"	3			4'-5 ⅜"	5'-0 ⅜"	4'-5 ⅜"			3'-3"		3'-1"	11'-2 ⅜"	
1W405C	1	#11	12'-3 ⅜"	3			4'-5 ⅜"	3'-4"	4'-5 ⅜"			3'-3"		3'-1"	9'-6"	
1W408E	2	#11	12'-8 ⅜"	3			4'-8"	3'-4 ⅜"	4'-8"			3'-4 ⅜"		3'-2 ⅜"	9'-9 ⅜"	
1W408F	2	#11	14'-5 ⅜"	3			4'-8"	5'-1 ⅜"	4'-8"			3'-4 ⅜"		3'-2 ⅜"	11'-6 ⅜"	
1W408G	4	#11	19'-5 ⅜"	3			4'-8"	10'-1 ⅜"	4'-8"			3'-4 ⅜"		3'-2 ⅜"	16'-6 ⅜"	
1W410P	1	#11	16'-9 ⅜"	3			4'-10"	7'-1 ⅜"	4'-10"			3'-6"		3'-4"	13'-9 ⅜"	
1W410Q	2	#11	13'-3 ⅜"	3			4'-10"	3'-7 ⅜"	4'-10"			3'-6"		3'-4"	10'-3 ⅜"	
1W410R	2	#11	12'-4"	3			4'-10"	2'-8"	4'-10"			3'-6"		3'-4"	9'-4"	
1W410S	2	#11	15'-0 ⅜"	3			4'-10"	5'-4 ⅜"	4'-10"			3'-6"		3'-4"	12'-0 ⅜"	
1W410T	1	#11	17'-3 ⅜"	3			4'-10"	7'-7 ⅜"	4'-10"			3'-6"		3'-4"	14'-3 ⅜"	
1W410U	1	#11	16'-2"	3			4'-10"	6'-6"	4'-10"			3'-6"		3'-4"	13'-2"	
9L1002	16	#9	11'-9"	2	1'-7"	10'-2"										
9L911	20	#9	11'-6"	2	1'-7"	9'-11"										
9W4019	20	#9	5'-8 ⅜"	S1	0'-9 ⅜"	3'-4"	1'-7"					0'-8"				
9W4319	16	#9	5'-11 ⅜"	S1	0'-9 ⅜"	3'-7"	1'-7"					0'-8"				



ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O
"EXCEPT"
REINF. NOTED (EP) IS EPOXY REBAR

Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

LABEL LEGENDS

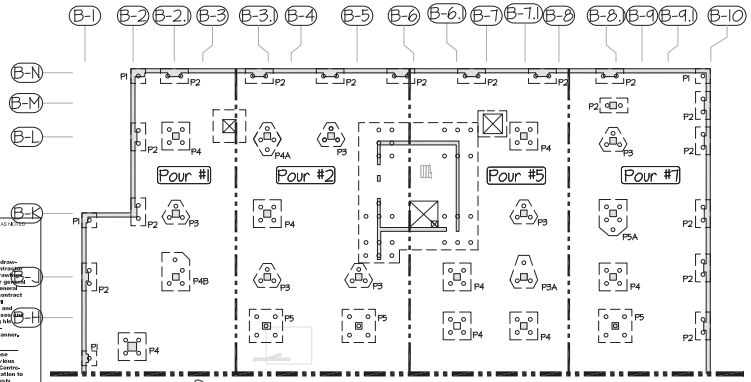
6x2x6 #4 4C04 @12" B2
- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LW	- Long Way
SW	- Short Way
Vert.	- Vertical
Thk.	- Thickness
Typ.	- Typical

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB2
PILE CAP P3A DETAILS	RB2A
COLUMN DOWELS	RB2B
PILE CAP DETAILS P4A & P5A	RB2C



PARTIAL KEY PLAN – POUR 1, 2, 5 & 7

Scale = NTS

FOR APPROVAL

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-8500 | Fax 718-841-6110
www.cfssteel.com

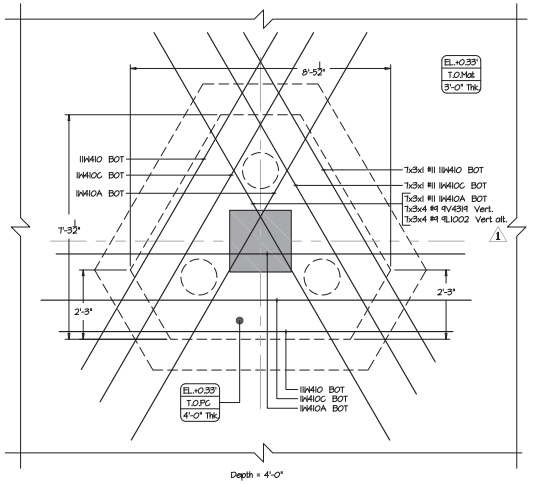
REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	-	-	-
1	-	-	-
0	FOR APPROVAL	10.29.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAP DETAILS POUR 1, 2, 5 & 7 – BUILDING B
SHEET (04 OF 04)

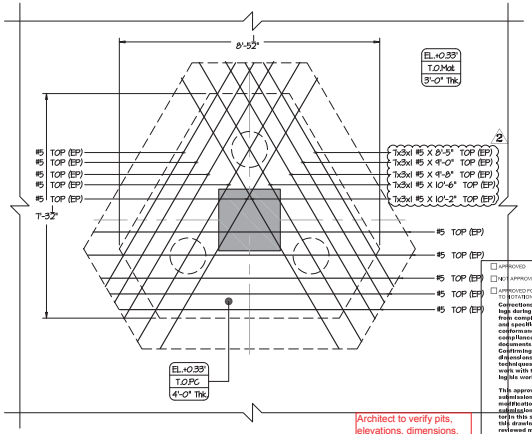
DRAWING NO.: RB2C



Depth = 4'-0"

P3 –PILE CAP BOTTOM LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = F0-500F0-100
T Req'd



Depth = 4'-0"

P3 –PILE CAP TOP LAYER DETAIL

Scale = 1/2" = 1'-0"
SDR = F0-500F0-100
T Req'd

Architect to verify pits, elevations, dimensions.

APPROVED / APPROVED AS NOTED / NOT APPROVED - RESUBMIT / REVIEWED / APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

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This approval represents our review of ___ submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or costs.

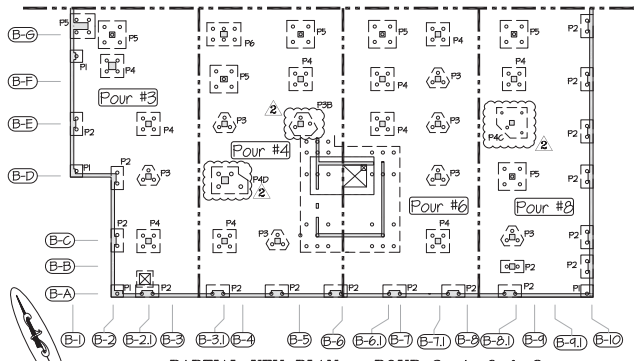
WSP
Building Structures
DATE: 11-6-15 BY: MD

RECEIVED
11/09/15
NOBLE



GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.

RECEIVED
10/29/15
NOBLE

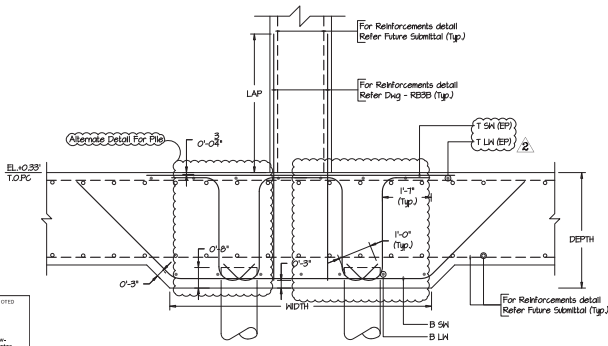


PARTIAL KEY PLAN – POUR 3, 4, 6 & 8

Scale = NTS

TYPICAL PILE CAP DETAIL

Scale = 1/2" = 1'-0"



TYPICAL PILE CAP DETAIL

Scale = 1/2" = 1'-0"

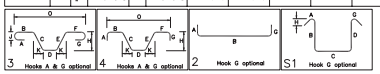
PILE CAP SCHEDULE

Mark	Size (H X L)	Pile cap Depth	Qty.	Top of Pile cap	Reinforcements	Remarks
P1	4'-6" X 4'-6"	3'-0"	4	EL. +0.33'	4x2x6 #8 9L1420 B EW 4x2x6 #4 X 4'-0" T EW (EP) 2 4x2 #4 9V4018 Vert. 4x4 #4 4L1402 Vert alt. 1	Refer Typical Detail For P1 Pile cap
P2	8'-6" X 4'-6"	3'-4"	14	EL. +0.33'	14x6 #4 4K4OT B SW 14x6 #11 11H405 B LH 14x6 #4 X 5'-0" T SW (EP) 14x4 #5 X 10'-0" T LH (EP) 2 14x2x4 #4 9V4018 Vert. 14x2x4 #4 9L4111 Vert alt. 1	-
P2	8'-6" X 4'-6"	3'-4"	1	EL. +0.33'	6 #4 4H4O6 B SW 4 #11 1H405 B LH 6 #4 X 6'-0" T SW (EP) 4 #5 X 10'-0" T LH (EP) 2 2x4 #4 9V4018 Vert. 2x4 #4 9L4111 Vert alt. 1	Along Grid Lines B-B.1, B-B
P2	8'-6" X 4'-6"	3'-4"	1	EL. +0.33'	3 #4 4K4OT B SW 3 #4 4H4O6 B SW 4 #11 1H405 B LH 3 #4 X 5'-0" T SW (EP) 3 #4 X 6'-0" T SW (EP) 4 #5 X 10'-0" T LH (EP) 2 2x4 #4 9V4018 Vert. 2x4 #4 9L4111 Vert alt. 1	Along Grid Lines B-2, B-D
P2	Refer Plan Detail-A	3'-4"	1	EL. +0.33'	Refer detail-A Dwg No RB3A	Along Grid Lines B-2.1, B-A
P4	8'-6" X 8'-6"	3'-4"	10 2	EL. +0.33'	10x1 #11 1H405A B SW 10x1 #11 1H403 B LH 10x2x11 #5 X 10'-0" T EH (EP) 2 10x4x4 #4 9V4018 Vert. 10x4x4 #4 9L4111 Vert alt.	-
P5	10'-2" X 10'-2"	4'-0"	6	EL. +0.33'	6x4 #11 1H410B B SW 6x4 #11 1H403 B LH 6x2x20 #5 X 12'-2" T EH (EP) 2 6x5x4 #4 9V4318 Vert. 6x5x4 #4 9L1002 Vert. 1	-
P5	9'-1" X 9'-1"	4'-1"	1	EL. +0.33'	Refer detail-B Dwg No RB3A	Along Grid Lines B-6, B-1
P6	12'-6" X 8'-6"	4'-6"	1	EL. +0.33'	12 #10 10K606 B SW 10 #11 1K604 B LH 24 #5 X 11'-6" T SW (EP) 15 #6 X 15'-6" T LH (EP) 2 6x4 #4 9V4818 Vert. 6x4 #4 9L1008 Vert alt. 1	-

BENDING DETAILS

Drawing Sheet :

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
10M506	12	#10	19'-4 ½"	3			5'-6 ½"	8'-3 ½"	5'-6 ½"			4'-0"		3'-10 ½"	16"-0"	
11M403	70	#11	17'-1 ½"	3			4'-3 ½"	8'-6 ½"	4'-3 ½"			3'-1 ½"		2'-11 ½"	14"-5 ½"	
11M405	64	#11	17'-2 ½"	3			4'-5"	8'-4 ½"	4'-5"			3'-2 ½"		3'-0 ½"	14"-5 ½"	
11M409	54	#11	19'-9 ½"	3			4'-9 ½"	10'-2 ½"	4'-9 ½"			3'-5 ½"		3'-3 ½"	16"-9 ½"	
11M410	21	#11	15'-7"	3			4'-10"	5'-11"	4'-10"			3'-6"		3'-4"	12"-7"	
11M504	10	#11	23'-3 ½"	3			5'-4 ½"	12'-6"	5'-4 ½"			3'-10 ½"		3'-8 ½"	19'-11 ½"	
1M405A	70	#11	17'-3½"	3			4'-5 ½"	8'-3 ½"	4'-5 ½"			3'-3"		3'-1"	14"-5 ½"	
1M410A	21	#11	17'-3 ½"	3			4'-10"	7'-7 ½"	4'-10"			3'-6"		3'-4"	14"-3 ½"	
1M410B	54	#11	19'-7 ½"	3			4'-10"	9'-11 ½"	4'-10"			3'-6"		3'-4"	16"-7 ½"	
1M410C	21	#11	16'-9 ½"	3			4'-10"	7'-1 ½"	4'-10"			3'-6"		3'-4"	13"-9 ½"	
4K407	87	#4	9'-5"	4	0'-8"	4'-1 ½"	4'-7 ½"					3'-3 ½"		3'-2 ½"	7"-4 ½"	
4M406	9	#4	13'-5"	3			4'-6 ½"	4'-3 ½"	4'-6 ½"			3'-3"		3'-2 ½"	10"-8"	
9L1002	204	#9	11'-9"	2	1'-7"	10'-2"										
9L1008	24	#9	12'-3"	2	1'-7"	10'-8"										
9L902	16	#9	10'-9"	2	1'-7"	9'-2"										
9L911	288	#9	11'-6"	2	1'-7"	9'-11"										
9U400	48	#9	7'-2"	2	1'-7"	4'-0"						1'-7"				
9V3119	16	#9	4'-11 ½"	S1	0'-9 ½"	2'-7"	1'-7"					0'-8"				
9V4019	288	#9	5'-8 ½"	S1	0'-9 ½"	3'-4"	1'-7"					0'-8"				
9V4319	204	#9	5'-11 ½"	S1	0'-9 ½"	3'-7"	1'-7"					0'-8"				
9V4919	24	#9	6'-5 ½"	S1	0'-9 ½"	4'-1"	1'-7"					0'-8"				



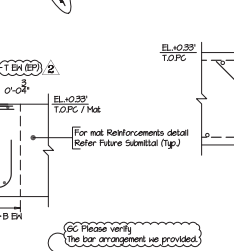
ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O
"EXCEPT"
REINF. NOTED (EP) IS EPOXY REBAR

Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

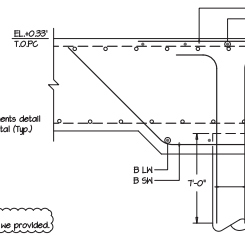
OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB3
PILE CAP P3B DETAILS	RB3A
COLUMN DOWELS	RB3B
PILE CAP DETAILS P4C & P4D	RB3C



TYPICAL PILE CAP P1 DETAIL

Scale = 1/2" = 1'-0"



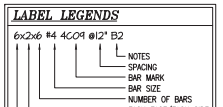
ALTERNATE DETAIL FOR PILE

1 Scale = 1/2" = 1'-0"

Lap Schedule 5450 PSI for pile cap

Size	Top (Epoxy)	Others
#3	28"	16"
#4	28"	16"
#5	28"	16"
#6	32"	18"
#7	51"	30"
#8	65"	38"
#9	81"	47"
#10	95"	56"
#11	112"	66"

LABEL LEGENDS



LEGENDS

Bot.	- Bottom
H.	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LW	- Long Way
SW	- Short Way
Vert.	- Vertical
Thk.	- Thickness
Typ.	- Typical

FOR FILE & FIELD USE

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BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

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695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
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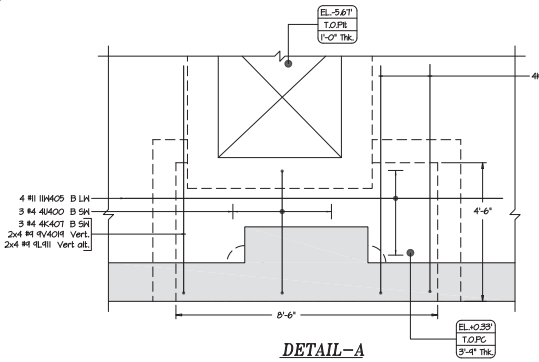
REV	REVISIONS	DATE	BY
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3	-	-	-
2	REVISED AS PER AE COMMENTS	10.29.15	RDD
1	REVISED AS PER RFI - 057	10.14.15	RDD
0	FOR APPROVAL	10.09.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAP DETAILS POUR 3, 4, 6 & 8 – BUILDING B SHEET (01 OF 04)

DRAWING NO.: RB3

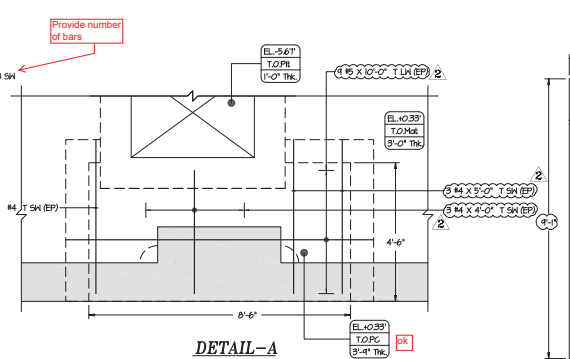


DETAIL-A

P2 -PILE CAP BOTTOM LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"

SDR = FO-500FO-100

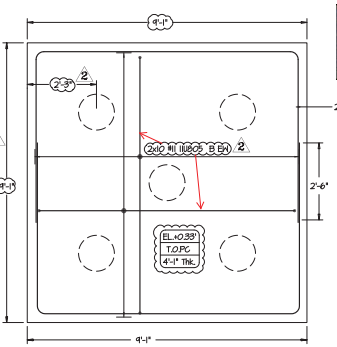


DETAIL-A

P2 -PILE CAP TOP LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"

SDR = FO-500FO-100

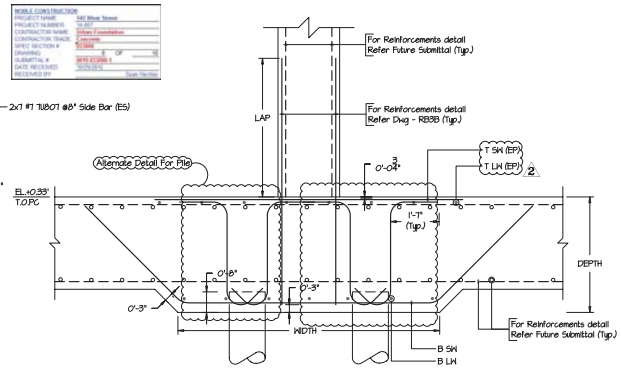


DETAIL-B

P5 -PILE CAP BAR ARRANGEMENT

Scale = 1/2" = 1'-0"

SDR = FO-500FO-100

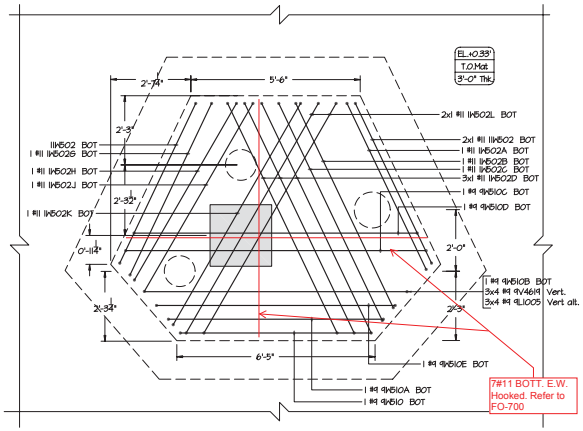


TYPICAL PILE CAP DETAIL

Scale = 1/2" = 1'-0"

GC Please verify The bar arrangement we provided.

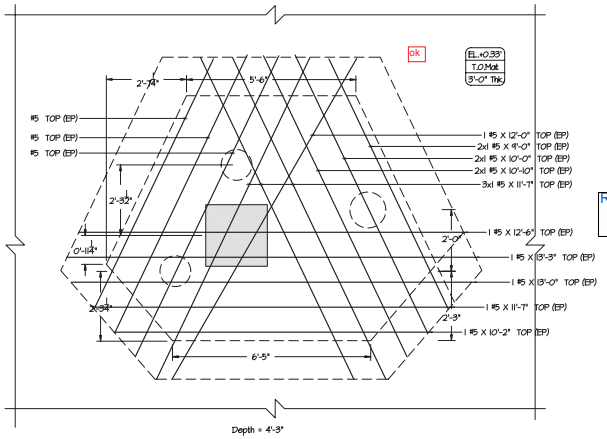
GC Please verify The Pile cap size & reinforcement we provided.



P3B -PILE CAP BOTTOM LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"

SDR = FO-500FO-100



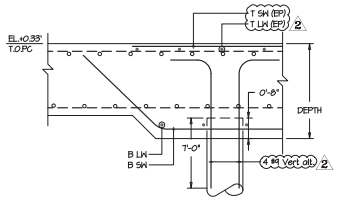
P3B -PILE CAP TOP LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"

SDR = FO-500FO-100

RECEIVED 11/09/15 NOBLE

GENERAL NOTE: CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.



ALTERNATE DETAIL FOR PILE

Scale = 1/2" = 1'-0"

GC Please verify The bar arrangement we provided (Typ).

RECEIVED 10/29/15 NOBLE

APPROVED AS NOTED

APPROVED FOR CONSTRUCTION ACCORDING TO NOTATIONS NOTED AND RESUBMIT

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WSP Building Structures

DATE: 11-6-15 BY: MD

Architect to verify pits, elevations, dimensions.

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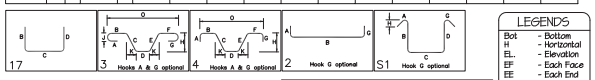
OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB3
PILE CAP P3B DETAILS	RB3A
COLUMN DOWELS	RB3B
PILE CAP DETAILS P4C & P4D	RB3C

BENDING DETAILS

Drawing Sheet :

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
11U805	20	#11	15'-11"	17		3'-9"	8'-5"	3'-9"								
11K405	4	#11	17'-2 K"	3			4'-5"	8'-4 K"	4'-5"			3'-2 K"		3'-0 K"	14'-5 K"	
4K407	3	#4	9'-5"	4	0'-8"	4'-1 K"	4'-7 K"					3'-3 K"		3'-2 K"	7'-4 K"	
4U400	3	#4	5'-4"	2	0'-8"	4'-0"					0'-8"					
7U807	14	#7	19'-9"	17		5'-7"	8'-7"	5'-7"								
9L911	8	#9	11'-6"	2	1'-7"	9'-11"										
9V4019	8	#9	5'-8 K"	S1	0'-9 K"	3'-4"	1'-7"					0'-8"				
11W502	2	#11	16'-5 K"	3			5'-2 K"	6'-1"	5'-2 K"			3'-9"		3'-7"	13'-3"	
1W502A	1	#11	16'-8 K"	3			5'-2 K"	6'-3 K"	5'-2 K"			3'-9"		3'-7"	13'-5 K"	
1W502B	1	#11	18'-0 K"	3			5'-2 K"	7'-8 K"	5'-2 K"			3'-9"		3'-7"	14'-10 K"	
1W502C	1	#11	18'-6 K"	3			5'-2 K"	8'-1 K"	5'-2 K"			3'-9"		3'-7"	15'-3 K"	
1W502D	3	#11	18'-11 K"	3			5'-2 K"	8'-7 K"	5'-2 K"			3'-9"		3'-7"	15'-9 K"	
1W502G	1	#11	16'-10 K"	3			5'-2 K"	6'-6"	5'-2 K"			3'-9"		3'-7"	13'-8"	
1W502H	1	#11	17'-4"	3			5'-2 K"	6'-11 K"	5'-2 K"			3'-9"		3'-7"	14'-1 K"	
1W502J	1	#11	17'-9 K"	3			5'-2 K"	7'-4 K"	5'-2 K"			3'-9"		3'-7"	14'-6 K"	
1W502K	1	#11	18'-0 K"	3			5'-2 K"	8'-7 K"	5'-2 K"			3'-9"		3'-7"	15'-9 K"	
1W502L	2	#11	18'-4 K"	3			5'-2 K"	8'-11 K"	5'-2 K"			3'-9"		3'-7"	16'-1 K"	
9L1005	12	#9	12'-0"	2	1'-7"	10'-5"										
9V4619	12	#9	6'-2 K"	S1	0'-9 K"	3'-10"	1'-7"					0'-8"				
9W510	1	#9	17'-0 K"	3			5'-2 K"	6'-6"	5'-2 K"			3'-9"		3'-7"	13'-10"	
9W510A	1	#9	17'-10"	3			5'-2 K"	7'-5 K"	5'-2 K"			3'-9"		3'-7"	14'-7 K"	
9W510B	1	#9	19'-4 K"	3			5'-2 K"	9'-0"	5'-2 K"			3'-9"		3'-7"	16'-2"	
9W510C	1	#9	20'-5 K"	3			5'-2 K"	10'-1"	5'-2 K"			3'-9"		3'-7"	17'-3"	
9W510D	1	#9	19'-11"	3			5'-2 K"	9'-6 K"	5'-2 K"			3'-9"		3'-7"	16'-8 K"	
9W510E	1	#9	18'-7"	3			5'-2 K"	8'-2 K"	5'-2 K"			3'-9"		3'-7"	15'-4 K"	



LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LH	- Long Hay
SH	- Short Hay
Vert.	- Vertical
Thk.	- Thickness
Typ.	- Typical

ALL MATERIAL ON THIS DRAWING ASTM A615 GRADE 60 BLACK U.N.O "EXCEPT" REINF. NOTED (EP) IS EPOXY REBAR

Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2

NOTES SPACING
BAR MARK
BAR SIZE
NUMBER OF BARS EACH FACE/EACH SIDE
NUMBER OF LOCATION

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	10.29.15	RDD
1	REVISED AS PER RFI - 057	10.14.15	RDD
0	FOR APPROVAL	10.09.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAP DETAILS (POUR 3, 4, 6 & 8 - BUILDING B SHEET (02 OF 04)

DRAWING NO.: RB3A

COLUMN DOWELS SCHEDULE – POUR #3

Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
538	78" X 30"	EL. +0.33'	EL. +0.33'	EL.-3.75'	4'-1"	6 #10 X 7'-2" Dwls (7 #7 X 6'-6" Dwls) 2
560	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
532	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-2.67'	3'-0"	8 #8 X 5'-6" Dwls
554	32" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #8 X 6'-3" Dwls
531	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #8 X 6'-3" Dwls
558	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #10 X 7'-0" Dwls
530	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-2.67'	3'-0"	6 #8 X 5'-6" Dwls
529	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	6 #8 X 6'-3" Dwls
557	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
528	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	6 #8 X 6'-3" Dwls
556	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
527	B53" X 28"	EL. +0.33'	EL. +0.33'	EL.-2.67'	3'-0"	10 #8 X 5'-6" Dwls
526	B41" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	10 #8 X 6'-3" Dwls

COLUMN DOWELS SCHEDULE – POUR #4

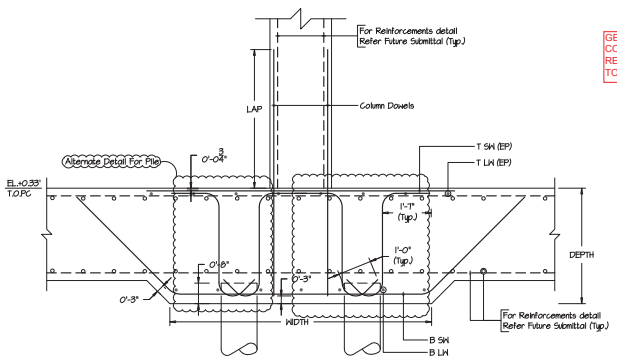
Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
575	30" X 24"	EL. +0.33'	EL. +0.33'	EL.-4.12'	4'-6"	6 #8 X 7'-0" Dwls
586	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
574	30" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
585	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
573	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
584	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	4'-3"	6 #8 X 6'-9" Dwls
572	26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #7 X 6'-0" Dwls
555	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	6 #8 X 6'-3" Dwls
554	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
525	B44" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #8 X 6'-3" Dwls
524	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	10 #8 X 6'-3" Dwls
523	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	10 #8 X 6'-3" Dwls

COLUMN DOWELS SCHEDULE – POUR #6

Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
581	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
568	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
582	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
569	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
583	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
570	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
571	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	6 #8 X 6'-6" Dwls
553	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	6 #8 X 6'-3" Dwls
522	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	10 #8 X 6'-3" Dwls
521	B46" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	10 #8 X 6'-3" Dwls

COLUMN DOWELS SCHEDULE – POUR #8

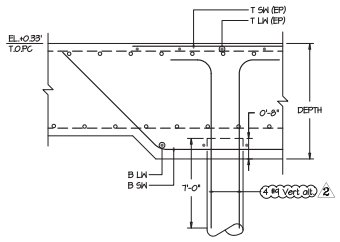
Column Mark	Size	Top of slab	Top of Pile cap	Bottom of Pile cap	Pile cap depth	Column Dowels
547	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
514	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	6 #8 X 6'-3" Dwls
548	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
515	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #8 X 6'-3" Dwls
544	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	4'-3" 2	6 #8 X 6'-6" Dwls 2
516	B26" X 26"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #8 X 6'-3" Dwls
550	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	8 #8 X 6'-6" Dwls
517	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #7 X 6'-0" Dwls
551	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.67'	4'-0"	4 #8 X 6'-6" Dwls
518	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #7 X 6'-0" Dwls
552	24" X 24"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	4 #8 X 6'-3" Dwls
519	B24" X 32"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #7 X 6'-0" Dwls
520	B43" X 28"	EL. +0.33'	EL. +0.33'	EL.-3.42'	3'-9"	8 #8 X 6'-3" Dwls



TYPICAL PILE CAP DETAIL

Scale = 1/2" = 1'-0"

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.



1 ALTERNATE DETAIL FOR PILE

Scale = 1/2" = 1'-0"

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O

Lap Schedule for column (60 KSI)

Size	Splice
#3	12"
#4	15"
#5	19"
#6	23"
#7	27"
#8	30"
#9	34"
#10	38"
#11	43"

Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical

Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

LABEL LEGENDS

6x2x6 #4 4@9 @12" B2

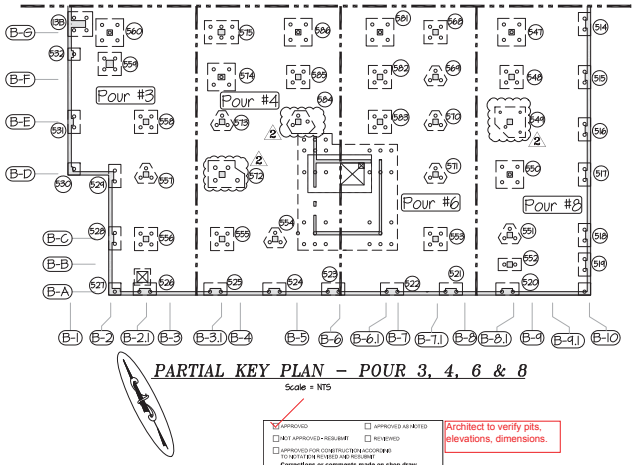
- NOTES
- SPACING
- BAR MARK
- BAR SIZE
- NUMBER OF BARS EACH FACE/EACH SIDE
- NUMBER OF LOCATION

LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LH	- Long Way
SH	- Short Way
Dwls	- Dowels
Typ.	- Typical

OTHER DWGS. REFERENCE

DESCRIPTION	DWG. NO.
PILE CAP DETAILS	RB3
PILE CAP P3B DETAILS	RB3A
COLUMN DOWELS	RB3B
PILE CAP DETAILS P4C & P4D	RB3C



PARTIAL KEY PLAN – POUR 3, 4, 6 & 8

Scale = NTS

RECEIVED 11/09/15 NOBLE

RECEIVED 10/29/15 NOBLE



APPROVED / APPROVED AS NOTED / NOT APPROVED - RESUBMIT / REVIEWED / APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all trades and performing his work in a safe and satisfactory manner.

This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in this submission. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or costs.

WSP
Building Structures
DATE: 11-6-15 BY: MD

Architect to verify pits, elevations, dimensions.

FOR FILE & FIELD USE

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION IMPERIAL / SOFT METRIC			
#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

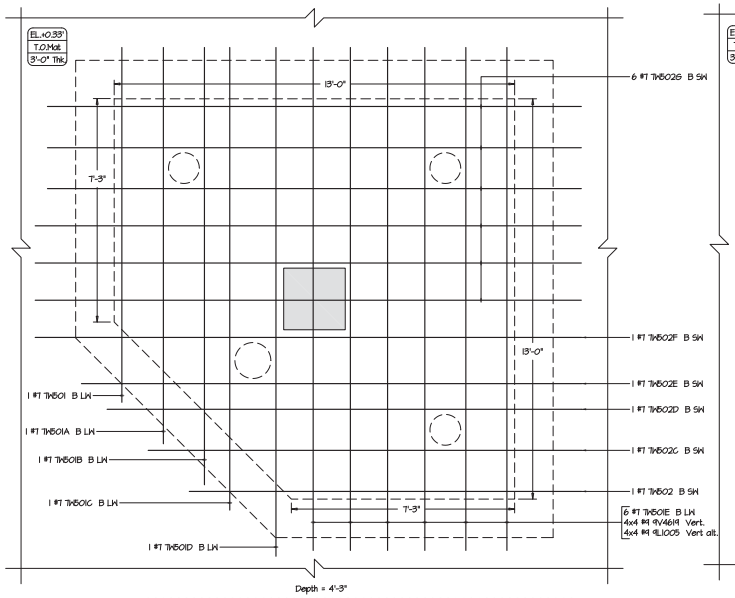
REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	REVISED AS PER AE COMMENTS	10.29.15	RDD
1	REVISED AS PER RFI - 057	10.14.15	RDD
0	FOR APPROVAL	10.09.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: COLUMN DOWELS (POUR 3, 4, 6 & 8 – BUILDING B
SHEET (03 OF 04)

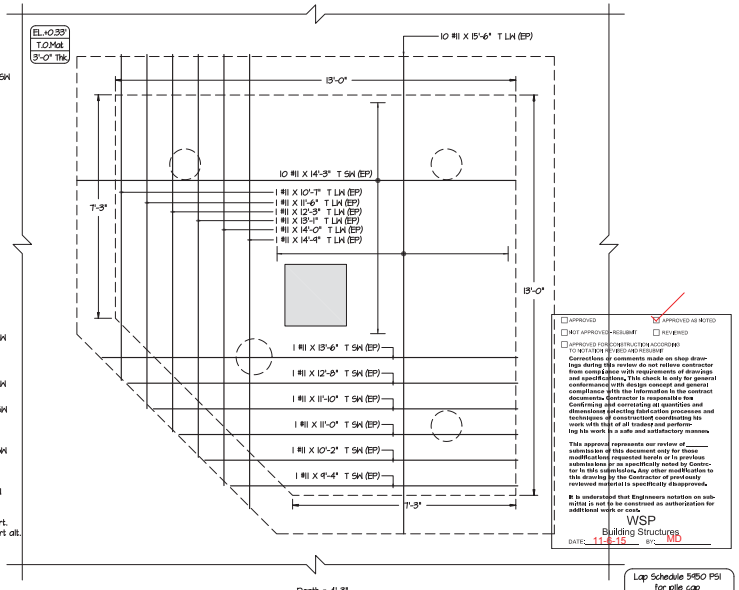
DRAWING NO.: RB3B



P4C –PILE CAP BOTTOM LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

A/E/C Please verify
The bar arrangement we provided (Typ).



APPROVED
APPROVED AS NOTED
NOT APPROVED-RESUBMIT
REVIEWED
APPROVED FOR CONSTRUCTION ACCORDING TO NOTATION REVISED AND RESUBMIT

Corrections or comments made on shop drawings during this review do not relieve contractor from compliance with requirements of drawings and specifications. This check is only for general conformance with design concept and general compliance with the information in the contract documents. Contractor is responsible for: Confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his work with that of all trades and performing his work in a safe and satisfactory manner.

This approval represents our review of submission of this document only for those modifications requested herein or in previous submissions or as specifically noted by Contractor in his submittals. Any other modification to this drawing by the Contractor of previously reviewed material is specifically disapproved.

It is understood that Engineers notation on submittal is not to be construed as authorization for additional work or cost.

WSP
Building Structures
DATE: 11-6-15 BY: MD

P4C –PILE CAP TOP LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

RECEIVED
10/29/15
NOBLE

Lap Schedule 5450 PSI for pile cap

Size	Top (Epoxy)	Others
#3	28"	16"
#4	28"	16"
#5	28"	16"
#6	32"	18"
#7	51"	30"
#8	65"	38"
#9	81"	47"
#10	95"	56"
#11	112"	66"

BENDING DETAILS

Drawing Sheet :

Bar Mark	Qty	Size	Total Length	Type	'A'	'B'	'C'	'D'	'E'	'F'	'G'	'H'	'J'	'K'	'O'	'R'
1W403A	8	#11	20'-1 X"	3			4'-3 X"	11'-6 X"	4'-3 X"			3'-1 X"		2'-11 X"	17'-5 X"	
1W403B	1	#11	19'-10 X"	3			4'-3 X"	11'-3"	4'-3 X"			3'-1 X"		2'-11 X"	17'-2"	
1W403C	1	#11	19'-4 X"	3			4'-3 X"	10'-8 X"	4'-3 X"			3'-1 X"		2'-11 X"	16'-7 X"	
1W403D	1	#11	18'-9 X"	3			4'-3 X"	10'-2 X"	4'-3 X"			3'-1 X"		2'-11 X"	16'-1 X"	
1W403E	1	#11	18'-3 X"	3			4'-3 X"	9'-7 X"	4'-3 X"			3'-1 X"		2'-11 X"	15'-6 X"	
1W403F	4	#11	17'-1 X"	3			4'-3 X"	8'-6 X"	4'-3 X"			3'-1 X"		2'-11 X"	14'-5 X"	
1W405D	5	#11	20'-3"	3			4'-5 X"	11'-3 X"	4'-5 X"			3'-3"		3'-1"	17'-5 X"	
1W405E	1	#11	14'-0"	3			4'-5 X"	5'-0 X"	4'-5 X"			3'-3"		3'-1"	11'-2 X"	
1W405F	1	#11	13'-2"	3			4'-5 X"	4'-2 X"	4'-5 X"			3'-3"		3'-1"	10'-4 X"	
7W501	1	#7	17'-8 X"	3			5'-1 X"	7'-5 X"	5'-1 X"			3'-8 X"		3'-7"	14'-7 X"	
7W501A	1	#7	19'-0 X"	3			5'-1 X"	8'-9 X"	5'-1 X"			3'-8 X"		3'-7"	15'-11 X"	
7W501B	1	#7	20'-4 X"	3			5'-1 X"	10'-1 X"	5'-1 X"			3'-8 X"		3'-7"	17'-3 X"	
7W501C	1	#7	21'-2 X"	3			5'-1 X"	10'-11 X"	5'-1 X"			3'-8 X"		3'-7"	18'-1 X"	
7W501D	1	#7	22'-8 X"	3			5'-1 X"	12'-5 X"	5'-1 X"			3'-8 X"		3'-7"	19'-7 X"	
7W501E	6	#7	23'-2 X"	3			5'-1 X"	12'-11 X"	5'-1 X"			3'-8 X"		3'-7"	20'-1 X"	
7W502	1	#7	17'-9"	3			5'-2 X"	7'-3 X"	5'-2 X"			3'-9"		3'-7 X"	14'-7"	
7W502C	1	#7	19'-1"	3			5'-2 X"	8'-7 X"	5'-2 X"			3'-9"		3'-7 X"	15'-11"	
7W502D	1	#7	20'-5"	3			5'-2 X"	9'-11 X"	5'-2 X"			3'-9"		3'-7 X"	17'-3"	
7W502E	1	#7	21'-3"	3			5'-2 X"	10'-9 X"	5'-2 X"			3'-9"		3'-7 X"	18'-1"	
7W502F	1	#7	22'-9"	3			5'-2 X"	12'-3 X"	5'-2 X"			3'-9"		3'-7 X"	19'-7"	
7W502G	6	#7	23'-3"	3			5'-2 X"	12'-9 X"	5'-2 X"			3'-9"		3'-7 X"	20'-1"	
9L1005	16	#9	12'-0"	2	1'-7"	10'-5"										
9L911	16	#9	11'-6"	2	1'-7"	9'-11"										
9W4019	16	#9	5'-8 X"	S1	0'-9 X"	3'-4"	1'-7"					0'-8"				
9W4619	16	#9	6'-2 X"	S1	0'-9 X"	3'-10"	1'-7"					0'-8"				

3 Hooks A & G optional | 2 Hook G optional | S1 Hook G optional

ALL MATERIAL ON THIS DRAWING
ASTM A615
GRADE 60 BLACK U.N.O
"EXCEPT"
REINF. NOTED (EP) IS
EPOXY REBAR

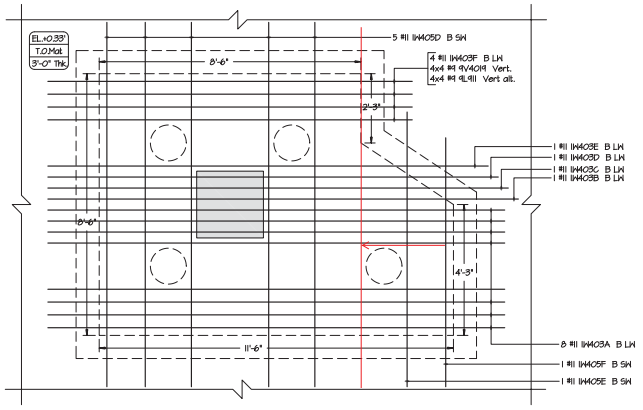
Provide 3" Cover For Pile cap Reinforcement at Bot & Sides -Typical
Provide 3/4" Cover For Pile cap Reinforcement at Top -Typical

LABEL LEGENDS

6x2x6 #4 4C09 @12" B2
NOTES
SPACING
BAR MARK
BAR SIZE
NUMBER OF BARS
EACH FACE/EACH SIDE
NUMBER OF LOCATION

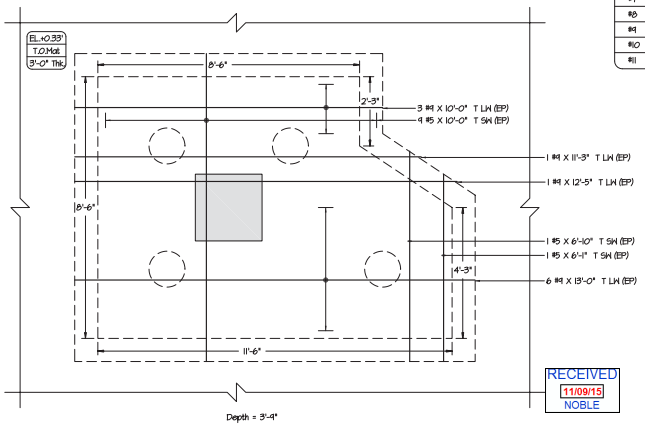
LEGENDS

Bot	- Bottom
H	- Horizontal
EL.	- Elevation
EF	- Each Face
EE	- Each End
ES	- Each Side
LW	- Long Way
SW	- Short Way
Vert.	- Vertical
Thk.	- Thickness
Typ.	- Typical



P4D –PILE CAP BOTTOM LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

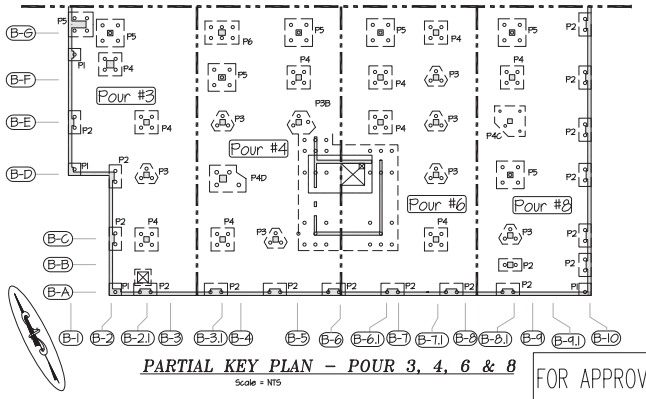


RECEIVED
11/09/15
NOBLE

P4D –PILE CAP TOP LAYER ARRANGEMENT

Scale = 1/2" = 1'-0"
SDR = FO-500FO-100

GENERAL NOTE:
CONCRETE COVER TO TOP REINFORCEMENT (EPOXY-COATED) TO BE 2" TYP.



PARTIAL KEY PLAN – POUR 3, 4, 6 & 8

Scale = NTS

FOR APPROVAL

The full intent and purpose of this drawing is the placing and fabrication of reinforcing steel bars ONLY. It is NOT to be used as a means of communication between the Architect, Engineer, Contractor or any other Sub-trade.

Reinforcing steel placing drawings only. Use in conjunction with contract drawings & specifications. Elevations & dimensions shown on this drawing are for detailing purposes only and should not be used for construction unless verified by engineer or contractor.

BAR SIZE CONVERSION
IMPERIAL / SOFT METRIC

#2 / #6	#6 / #19	#10 / #32	
#3 / #10	#7 / #22	#11 / #36	
#4 / #13	#8 / #25	#14 / #43	
#5 / #16	#9 / #29	#18 / #57	

LOCATION	BROOKLYN NY
ARCHITECT	ISMAEL LEYVA
ENGINEER	WSP CANLOR SEINUK
CUSTOMER	URBAN FOUNDATION/ENGINEERING,LLC
DRAWN BY	RDD

CFS Steel Company
695 E. 132 Street - Bronx, NY 10454
Phone 718-585-0500 | Fax 718-841-6110
www.cfssteel.com

REV	REVISIONS	DATE	BY
4	-	-	-
3	-	-	-
2	-	-	-
1	-	-	-
0	FOR APPROVAL	10.29.15	RDD

PROJECT: 145 WEST STREET

PROJECT NO.: 35-083

TITLE OF DRAWING: PILE CAP DETAIL (POUR 3, 4, 6 & 8 – BUILDING B SHEET (04 OF 04)

DRAWING NO.: RB3C

APPENDIX C
EXCAVATION WORK PLAN

EXCAVATION WORK PLAN

C-1 NOTIFICATION

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination, the Site owner or their representative will notify the Department. Currently, this notification will be made to:

Jane O'Connell
Chief, Superfund and Brownfield Cleanup Section
New York State Department of Environmental Conservation Region 2
47-40 21st Street, Long Island City, NY 11101
P: 718.482.4599 | F: 718.482.6358
Jane.oconnell@dec.ny.gov

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent, plans for Site re-grading, intrusive elements or utilities to be installed below the Site cover, estimated volumes of contaminated soil to be excavated and any work that may impact an engineering control;
- A summary of environmental conditions anticipated in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work;
- A summary of the applicable components of this Excavation Work Plan (EWP);
- A statement that the work will be performed in compliance with this EWP and 29 CFR 1910.120;
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the Health and Safety Plan (HASP) provided in Appendix D of the Site Management Plan (SMP);
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with all required chemical testing results.

C-2 SOIL SCREENING METHODS

Visual, olfactory and instrument-based soil screening will be performed by a Qualified Environmental Professional during all remedial and development excavations into known or potentially contaminated material (remaining contamination). Soil screening will be performed regardless of when the invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the Certificate of Completion (COC).

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal, material that requires testing, material that can be returned to the subsurface, and material that can be used as cover soil.

C-3 STOCKPILE METHODS

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC.

C-4 MATERIALS EXCAVATION AND LOAD OUT

A Qualified Environmental Professional or person under their supervision will oversee all invasive work and the excavation and load-out of all excavated material.

The owner of the property and its contractors are solely responsible for safe execution of all invasive and other work performed under this SMP.

The presence of utilities and easements on the Site will be investigated by the Qualified Environmental Professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by utilities or easements on the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and NYSDOT requirements (and all other applicable transportation requirements).

A truck wash will be operated on-Site. The Qualified Environmental Professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of off-site soil tracking.

The Qualified Environmental Professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials.

C-5 MATERIALS TRANSPORT OFF-SITE

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with tight-fitting covers. Loose-fitting canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

All trucks will be washed prior to leaving the Site. Truck wash water will be collected and disposed of off-Site in an appropriate manner.

Truck transport routes are as follows: Trucks will travel to the Site from West Street and leave the Site from India Street. Arriving trucks will proceed to the Site from the Verrazano Bridge and the Brooklyn-Queens Expressway (I-278). Arriving trucks will proceed north on McGuinness

Boulevard, west onto Greenpoint Avenue and continue north onto West Street. All trucks loaded with Site materials will exit the vicinity of the Site using only these approved truck routes. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside the project Site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during Site remediation and development.

Queuing of trucks will be performed on-site to minimize off-site disturbance. Off-site queuing will be prohibited.

C-6 MATERIALS DISPOSAL OFF-SITE

All soil/fill/solid waste excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed in accordance with all local, State (including 6NYCRR Part 360) and Federal regulations. If disposal of soil/fill from this Site is proposed for unregulated off-site disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC. Unregulated off-site management of materials from this Site will not occur without formal NYSDEC approval.

Off-site disposal locations for excavated soil will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate, i.e., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, C&D recycling facility, etc. Actual disposal quantities and associated documentation will be reported to the NYSDEC in the Periodic Review Report. This documentation will include: waste profiles, test results, facility acceptance letters, manifests, bills of lading and facility receipts.

Non-hazardous historic fill and contaminated soils taken off-Site will be handled, at minimum, as a Municipal Solid Waste per 6NYCRR Part 360-1.2. Material that does not meet Track 1 unrestricted SCOs is prohibited from being taken to a New York State recycling facility (6NYCRR Part 360-16 Registration Facility).

C-7 MATERIALS REUSE ON-SITE

Chemical criteria for on-site reuse of material have been approved by NYSDEC and are listed in Table 7 of the SMP. The Qualified Environmental Professional will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material does not remain on-Site. Contaminated on-Site material, including historic fill and contaminated soil, that is acceptable for re-use on-Site will be placed below the demarcation layer or impervious surface, and will not be reused within a cover soil layer, within landscaping berms, or as backfill for subsurface utility lines.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) or other solid waste derived from clearing and grubbing of the Site will not be reused on-site.

C-8 FLUIDS MANAGEMENT

All liquids to be removed from the Site, including excavation dewatering and groundwater monitoring well purge and development waters, will be handled, transported and disposed in accordance with applicable local, State, and Federal regulations. Dewatering, purge and development fluids will not be recharged back to the land surface or subsurface of the Site, but will be managed off-site.

Discharge of water generated during large-scale construction activities to surface waters (i.e., a local pond, stream or river) will be performed under a SPDES permit.

C-9 REMEDIAL COVER SYSTEM RESTORATION

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with this SMP. The demarcation layer, consisting of orange snow fencing material, non-woven geotextile fabric, concrete, or clean stone will be replaced to provide a visual reference to the top of the 'Remaining Contamination Zone', the zone that requires adherence to special conditions for disturbance of remaining contaminated soil defined in this SMP. If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the 'Remaining Contamination'. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in any updates to this SMP.

C-10 BACKFILL FROM OFF-SITE SOURCES

All materials proposed for import onto the Site will be approved by the qualified environmental professional and will be in compliance with provisions in this SMP prior to receipt at the Site.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site.

All imported soil will meet the backfill and cover soil quality standards established in 6NYCRR 375-6.7(d). Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 7. Soils that meet 'exempt' fill requirements under 6 NYCRR Part 360, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by NYSDEC. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soil will be securely covered with tight fitting covers. Imported soil will be stockpiled separately from excavated materials and covered to prevent dust releases.

C-11 STORMWATER POLLUTION PREVENTION

Barriers and hay bale checks will be installed and inspected once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by NYSDEC. All necessary repairs shall be made immediately.

Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.

All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.

Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

C-12 CONTINGENCY PLAN

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition.

Sampling will be performed on product, sediment and surrounding soils, etc. as necessary to determine the nature of the material and proper disposal method. Chemical analysis will be performed for full a full list of analytes [TAL metals; TCL volatile organic compounds (VOCSs) and semivolatile organic compounds (SVOCs), TCL pesticides and PCBs], unless the Site history and previous sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC for approval prior to sampling.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone to NYSDEC's Project Manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the periodic reports prepared pursuant to Section 5 of the SMP.

C-13 COMMUNITY AIR MONITORING PLAN

The locations of community air sampling stations are based on the extent and location of the work zone and prevailing wind conditions. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations. Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

C-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site and on-site. Specific odor control methods to be used on a routine basis will include periodic walk-around monitoring to observe perceptible odor that may be a nuisance to nearby sensitive receptors. If nuisance odors are identified at the Site boundary, or if odor complaints are received, work will be halted and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. Implementation of all odor controls, including the halt of work, is the responsibility of the property owner's Remediation Engineer, and any measures that are implemented will be discussed in the Periodic Review Report.

All necessary means will be employed to prevent on- and off-site nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and/or (c) wetting removed/exposed material. If odors develop and cannot be otherwise controlled, additional means to eliminate odor

nuisances will include: (d) direct load-out of soils to trucks for off-site disposal; (e) use of chemical odorants in spray or misting systems; (f) use of staff to monitor odors in surrounding neighborhoods; and/or (g) using foams to cover exposed odorous materials.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to on-site conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

C-15 DUST CONTROL PLAN

A dust suppression plan that addresses dust management during invasive on-site work will include, at a minimum, the items listed below:

- If the area of soil disturbance is large enough for a water truck, dust suppression will be achieved through the use of a dedicated on-site water truck for road wetting. For larger work sites, the truck will be equipped with a water cannon capable of spraying water directly onto off-road areas including excavations and stockpiles.
- Clearing and grubbing of larger areas will be done in stages to limit the area of exposed, unvegetated soil vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

C-16 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and site grubbing, and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

APPENDIX D
HEALTH AND SAFETY PLAN AND
COMMUNITY AIR MONITORING PLAN

HEALTH AND SAFETY PLAN

Huxley Envelope Industrial Site

Brooklyn, New York

AKRF Project Number: 11884

NYSDEC Site Number: C224147

Prepared by:

AKRF Engineering, P.C.

440 Park Avenue South, 7th Floor
New York, NY 10016
(212) 696-0670

Prepared for:

MP 145 WS Owner LLC
c/o Mack Real Estate Group
60 Columbus Circle, 20th Floor
New York, NY 10023

AUGUST 2016

APPROVALS

By their signature, the undersigned hereby certify that this HASP has been reviewed and approved for use at the Huxley Envelope Industrial Site.

Marc Godick, LEP – AKRF	DATE
Eric Park - AKRF	DATE

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1.0 INTRODUCTION

1.1 Purpose

This Health and Safety Plan (HASP) has been prepared by AKRF Engineering, P.C. (AKRF) for the Huxley Envelope Industrial Site located at 145 West Street, Brooklyn, New York (the "Site"). This HASP is part of the Site Management Plan (SMP) that details the procedures required to manage known or potential residual contamination following completion of the remedial action at the Site. The SMP consists of an Engineering and Institutional Control Plan, a Monitoring Plan, an Operation and Maintenance Plan, and a Site Management Reporting Plan. An Excavation Work Plan, which includes provisions for managing excavated material, is also attached to the SMP.

The 2.65-acre Site is bounded to the north by Huron Street, followed by a warehouse; to the east by West Street, followed by residential buildings; to the south by India Street, followed by a shipping and receiving warehouse; and to the west by the East River and the East River Ferry station (See Figure 1 for the project Site location).

The surrounding area is primarily industrial north and south of the Site, with residential buildings and few commercial uses to the east. The Site is owned by MP 145 WS Owner LLC $^{c}/_{o}$ Mack Real Estate Group and investigation and remedial activities have been managed under the oversight of the New York State Department of Environmental Conservation (NYSDEC) in accordance with Brownfield Cleanup Agreement (BCA) Index No. C224147-05-11, which was executed on June 6, 2011. The BCA was amended on October 21, 2014 to add an additional Volunteer, MP 145 West Street LLC. The BCA was amended a second time on March 24, 2016 to add two additional Volunteers, 10 Huron FS Condo LLC and 19 India Fee Owner LLC. The BCA was amended a third time on May 17, 2016 to change the tax block and lot numbers to Block 2530 Lots 1, 7, and 8, and to slightly reduce the size of the Site to 2.65 acres due to the new bulkhead which was constructed east of the previous bulkhead line, and will be amended a fourth time to add MP 145 WS Lessee LLC, which entity will be the ground lessee of the affordable housing building was submitted for approval.

The purpose of the HASP is to assign responsibilities, establish personnel protection standards and mandatory safety practices and procedures, and provide contingencies that may arise associated with the post-remediation inspections, operation and maintenance (O&M), periodic sampling activities, and potential soil disturbance activities conducted at the Site. The HASP takes into account the specific hazards inherent to the Site, and presents procedures to be followed by AKRF and contractors in order to avoid and if necessary, protect against health and/or safety hazards. Application of this HASP should be considered on a task-by-task basis as not all measures are necessary for all activities on-site. Work activities on-site should comply with applicable parts of OSHA Regulations, primarily 29 CFR Parts 1910 and 1926. A copy this HASP will be maintained on-site during work performed under the SMP.

All workers who may participate in activities at the Site that are under the direction of AKRF or the Owner are required to comply with the provisions specified in this HASP. All Site visitors who enter designated work zones must also comply with this HASP. Refusal or failure to comply with the HASP or violation of any safety procedures by field personnel and/or subcontractors performing work covered by this HASP may result in immediate removal from the Site following consultation with the Owner's Representative. No personnel are permitted to enter permit confined spaces under this HASP.

1.2 Scope

This HASP has been developed to address the health and safety concerns during Site operations and maintenance, monitoring and inspections after completion of the site remedy, under the direction of AKRF and the contractor as specified in the Site Management Plan (SMP) dated September 2015. Although the HASP addresses all activities listed herein, work at the individual locations may include all, or only some of these tasks. On-site work anticipated under the SMP includes the following tasks:

- Assessing achievement of the remedial performance criteria (e.g., inspections of passive venting system and composite cover system).
- Sampling and analysis of appropriate media (e.g., groundwater, soil vapor, or indoor air); and
- Potential operations and maintenance to the Site engineering controls (passive venting system and site cover) which may include disturbance and handling of Site soil, sub-slab insulation material or groundwater.

1.3 Application

The HASP applies to all personnel involved in the above tasks, that are under the direction of the Owner or AKRF, who wish to gain access to active intrusive work areas, including but not limited to:

- Owner's representatives, contractors, and subcontractors performing tasks under the direction of AKRF, the Owner or the Owner's representative;
- Federal, State or local representatives;
- AKRF or the contractor's employees; and
- AKRF or the contractor's subcontractors.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section specifies the project team's Project Organization:

2.1 Project Manager (PM)

The Project Manager is anticipated to be Eric Park of AKRF. The PM's responsibilities include the following:

- Plans, schedules, and manages implementation of remediation activities;
- Coordinates with the Site Manager (SM), Site Supervisor, and Project Environmental Safety Manager (PESM) to ensure that health and safety requirements are met;
- Ensures that field work is scheduled with adequate personnel and equipment resources to complete the job safely and enforce Site health and safety rules;
- Conducts periodic inspections;
- Participates in incident investigations;
- Ensures the HASP has all of the required approvals before any Site work is conducted;

- Ensures that the Site Manager is informed of project changes that require modifications of the HASP; and
- Has overall project responsibility for Project Health and Safety.

2.2 Site Manager (SM)

The Site Manager is anticipated to be Adrianna Bosco of AKRF. The SM responsibilities include the following:

- Manages day-to-day implementation of the Site safety measures specified in the HASP;
- Ensures that adequate communication between field crews, health and safety monitoring personnel, and emergency response personnel is maintained;
- Confirms that field Site personnel are adequately trained and qualified to work at the Site and that proper personal protective equipment is utilized by field teams;
- Investigates and report all accidents/incidents to the PM and Project Environmental Safety Manager (PESM);
- Conducts and documents periodic safety briefings;
- Stops work if necessary based on health and safety monitoring;
- Acts as the primary point of contact for Site-related activities and coordination with non-project-related Site operations;
- Identifies operational changes that require potential modifications to health and safety procedures and Site safety plans, and reports such changes to the PM and PESM;
- Conducts health and safety monitoring activities;
- Determines upgrades or downgrades of personal protective equipment (PPE) based on Site conditions and/or real-time monitoring results;
- Ensures that monitoring instruments are calibrated; and
- Reports to the PM and PESM to provide summaries of field operations and progress.

2.3 Project Environmental and Safety Manager (PESM)

The PESM is a qualified health and safety professional with experience in hazardous waste Site remediation activities. The PESM is anticipated to be Marc Godick of AKRF. The PESM responsibilities include the following:

- Provides for the development and approval of the HASP;
- Serves as the primary contact to review health and safety matters that may arise;
- Approves revised or new safety protocols for field operations;
- Coordinates revisions of this HASP with field personnel;
- Coordinates upgrading or downgrading of personal protective equipment with the SM;
- Assists in the investigation of all accidents/incidents; and
- Enforces work stoppage following reporting of on-site activities from the PM and SM.

2.4 Site Supervisor

The Site Supervisor will be appointed from the Owner's contractor. If work is being performed solely by AKRF, the Site Supervisor tasks would be performed by the Site Manager (see Section 2.2). The Site Supervisor responsibilities include the following:

- Provide for the necessary training of field crews in accordance with OSHA regulations and provides proof of training to the SM prior to entering the Site;
- Conduct routine safety inspections of their work areas;
- Conduct incident investigations and together with the SM, prepares appropriate reports;
- Enforces health and safety rules and compliance with the HASP; and
- Plans field work using appropriate safe procedures and equipment.

2.5 Site Personnel

The Site Personnel responsibilities include the following:

- Report any unsafe or potentially hazardous conditions to the SM;
- Maintain knowledge of the information, instructions and emergency response actions contained in the HASP;
- Comply with rules, regulations and procedures as set forth in this HASP and any revisions;
- Prevent admittance to work Sites by unauthorized personnel; and
- Inspect all tools and equipment, including PPE, prior to use.

3.0 SITE HISTORY AND BACKGROUND

The Site is identified as Block 2530, Lots 1, 7, and part of Lot 8 on the New York City Tax assessor's map. Historically, the Site comprised three lots (former Lots 1, 55, and 56), which were reconfigured in support of the redevelopment. Former Lot 1, which occupied a majority of the Site, was initially developed as a lumber yard and shipyard, with various carpenter and woodworking facilities as early as 1887 through approximately 1965. In approximately 1970, former Lot 1 consisted of a warehouse building for Huxley Envelope Corporation and later as an ornament factory until approximately 2006. Former Lots 55 and 56, formerly located in the northeastern corner of the Site, were historically developed with residential stores, and partial lumber storage in former Lots 55 and 56 between approximately 1905 and 1942. Former Lot 55 was most recently utilized as a seafood distribution facility up until approximately 2011. Former Lot 56 was utilized as an office, apartment, and garage. By 2015, all former Site buildings and associated features were demolished.

Remedial investigations, consisting of groundwater and soil sampling, were performed on the subject Site between 2012 and 2015. Contaminants historically found at the Site include volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), and metals including arsenic, barium, copper, lead, mercury and zinc. Some evidence of petroleum contamination was also detected around the former 20,000-gallon fuel oil underground storage tank (UST) and in select "hotspot" locations in the southwestern and northeastern portions of the Site.

Between May 2015 and August 2016, the Site was remediated in accordance with the NYSDEC-approved Remedial Action Work Plan dated July 2013, the March 2014 Decision Document, and the subsequent

Minor Modification to the Decision Document dated March 2015. The remedial elements performed in 2015 and 2016 consisted of the following:

1. Permanent sheeting, shoring, and underpinning required to stabilize the Site for the large scale remediation effort requiring excavation;
2. Excavation of soil/fill in Building C to a depth of 17 feet below grade (and to 20 feet below grade for two petroleum hotspots in grids R2 and P4) and comparison of endpoint samples to the Part 375 UUSCOs listed in Table 1a to achieve a Track 1 remedy;
3. Excavation of soil/fill in Building B to a depth of approximately 16 feet below grade and comparison of endpoint samples to the Part 375 RRSCOs listed in Table 1b to achieve a Track 2 remedy;
4. Excavation of soil/fill in Building A and the Park to a depth of two feet below grade (and to 5 feet below grade for three lead and mercury hotspots in grids X2, X3, X4, and Y2, and between 10 and 12 feet below grade for one petroleum hotspot in grid W3) and comparison of endpoint samples to RRSCOs and Site-specific action levels (SSALs) listed in Table 1c, to achieve a Track 4 remedy;
5. Dewatering during excavation below the water table in Buildings B and C, and treatment prior to discharging;
6. Removal of the former 20,000-gallon UST and all associated piping in the southeastern portion of the Site;
7. Removal of four additional fuel oil storage tanks encountered during soil excavation;
8. Installation of a vapor barrier/waterproofing (also acting as a demarcation layer) in the Site buildings in accordance with the RAWP and to address potential vapor intrusion concerns as caused by potential future groundwater contamination within the zone of influence;
9. Installation of a demarcation layer and sub-slab venting system in portions of the Site that do not meet Track 2 cleanup standards (Building A) in accordance with the RAWP;
10. Installation of a dedicated demarcation layer and a minimum of two feet of approved cap material (including on-site reuse material, concrete, and/or approved virgin stone) in the Park;
11. Construction and maintenance of a Site-wide cover system to prevent human exposure to remaining contaminated soil/fill remaining at the Site consisting of the demarcation layer and a minimum of two feet of approved cap material (including on-site reuse material, or virgin stone) in the Park, the demarcation layer, sub-slab venting system, vapor barrier, and concrete building foundations in Building A, and concrete building foundations and vapor barrier/waterproofing in Buildings B and C to address potential vapor intrusion concerns related to potential future groundwater contamination in the zone of influence;
12. Execution and recording of an Environmental Easement to restrict land use in the Track 2 and Track 4 areas to prevent future exposure to any contamination remaining at the Site or potential future contamination;
13. Development and implementation of a Site Management Plan for long term management of remaining contamination as required by the Environmental Easement, which includes plans for: (1) Institutional and Engineering Controls, (2) monitoring, (3) operation and maintenance and (4) reporting; and
14. Periodic certification of the institutional and engineering controls listed above.

Full documentation of remedial activities is provided in the Final Engineering Report (FER).

4.0 POTENTIAL HAZARDS AT THE SITE

This section presents an assessment of the chemical, biological, and physical hazards that may be encountered during the tasks specified under HASP Section 1.2.

4.1 Hazard Potential

The remediation has been completed; however, some residual soil contamination remains with elevated SVOC and metals concentrations. Exposure to residual contamination is mitigated by operation of a sub-slab venting system in Building A and the composite Site-wide cover system.

In the Park, the cover system comprises a demarcation layer indicating the depth of remaining contamination and extent of soil excavation, overlain by a minimum of 24 inches of approved on-site reuse material, concrete, or clean stone. In Building A, the cover system comprises a demarcation layer overlain by a minimum 6-inch thick layer of permeable aggregate and slotted PVC pipe (for the sub-slab venting system), Grace Florprufe® (vapor barrier), and the concrete building slab.

The composite remedial cover system is designed to remain intact long-term. Disturbance of the concrete floor slab, vapor barrier and sub-slab venting system EC components without prior NYSDEC approval is prohibited by the Environmental Easement. In the unlikely event of an unanticipated, accidental or required disturbance of the composite cover system, or if any cracks or openings in the floor occur they shall be properly sealed immediately.

4.2 Properties of Chemical Contamination

4.2.1 Chemical Hazards in Soil and/or Groundwater

Potential chemical issues related to work at this Site include but are not limited to: dermal contact and/or ingestion hazards associated with the handling of VOC/SVOC contaminated material; vapor phase volatile organic compounds encountered during soil disturbance; and petroleum related contamination in on Site groundwater. VOCs, SVOCs and metals may be present in soil and groundwater.

The potential health effects from on-Site contamination are summarized in Table 1 and detailed in the U.S. Department of Health and Human Services Agency for Toxic Substances and Disease Registry (ATSDR) fact sheets attached in Appendix A.

TABLE 1
CHEMICAL DATA

Chemicals	REL /PEL/STEL			Health Hazards
Benzene	REL = 0.1 ppm	PEL = 1 ppm	STEL = 5 ppm	Irritation eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude, dermatitis; bone marrow depression, potential occupational carcinogen.
Ethylbenzene	REL = 100 ppm	PEL = 100 ppm		Irritation eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma.
Xylenes	REL = 100 ppm	PEL = 100 ppm		Irritation eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; anorexia, nausea, vomiting, abdominal pain;

Chemicals	REL /PEL/STEL			Health Hazards
				dermatitis
Lead	REL =0.050 mg/m3	PEL= 0.050 mg/m3	IDLH=100 mg/m3	Lassitude (Weakness, Exhaustion), Insomnia; Facial Pallor; Anorexia, Weight Loss, Malnutrition; Constipation, Abdominal Pain, Colic; Anemia; Gingival Lead Line; Tremor; Paralysis Wrist, Ankles; Encephalopathy; Kidney Disease; Irritation Eyes; Hypotension
Mercury	REL =0.050 mg/m^3	PEL =0.1 mg/m^3	IDLH=10 mg/m3	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria
Comments: REL = NIOSH Recommended Exposure Limit, PEL = OSHA Permissible Exposure Limit, STEL = OSHA Short Term Exposure Limit, IDLH = Immediately Dangerous to life and health, ppm = parts per million				

4.2.2 Other Chemical Hazards

Chemicals not identified in this HASP may be used during investigation and remediation activities. Prior to the initiation of these tasks, Material Safety Data Sheets (MSDSs) will be obtained for each of the chemicals to be used and all Site workers and visitors who may potentially be exposed will be made aware of these hazards.

4.3 Physical Hazards

Physical hazards will be addressed as necessary. More detailed safety procedures are provided as appendices to this HASP, where applicable.

4.3.1 Cold Stress

At certain times of the year, workers may be exposed to the hazards of working in cold environments. Potential hazards in cold environments include frostbite, trench foot or immersion foot, hypothermia as well as slippery surfaces, brittle equipment, poor judgment and unauthorized procedural changes. The procedures to be followed as part of the cold stress program are included in Appendix B.

4.3.2 Heat Stress

Heat stress is a significant potential hazard, which is greatly exacerbated with the use of PPE in hot environments. The potential hazards of working in hot environments include dehydration, cramps, heat rash, heat exhaustion, and heat stroke. A heat stress prevention program will be implemented when ambient temperatures exceed 70 ºF for personnel wearing impermeable clothing. The procedures to be followed as part of the heat stress program are found in Appendix C.

4.3.3 Noise

Noise is a potential hazard associated with the operation of heavy equipment, power tools, pumps and generators. Operations that require the use of hearing protection include operation of heavy equipment, generators, jackhammers, chain saws, sheetpile drivers, dewatering equipment, and pressure washers. Site workers who will perform suspected high noise tasks and operations will be provided with earplugs. Workers not

performing those tasks but working in close proximity to that equipment will also be required to wear hearing protection. If deemed necessary by the SM, the PESM will be consulted on the need for additional hearing protection and the need to monitor sound levels for Site activities.

4.3.4 Hand and Power Tools

To complete the various tasks for the project, personnel will utilize hand and power tools. The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut or struck by the tool, fire, and electrocution. Work gloves, safety glasses, and hard hats will be worn by the operating personnel at all times when utilizing hand and power tools, and GFI-equipped circuits will be used for all power tools.

4.3.5 Slips, Trips, and Falls

Working in and around the Site will pose slip, trip and fall hazards due to slippery surfaces that may be oil covered, or from surfaces that are wet from rain or ice. Excavation at the Sites will cause uneven footing in the trenches and around the spoil piles. Care should be exercised when walking at the Site, especially when carrying equipment.

4.3.6 Fire and Explosion

The use of cutting/grinding tools which may spark in the vicinity of flammable building materials, use of gasoline-powered instruments, or a diesel engine on equipment could present the possibility of encountering fire and explosion hazards. Care should be exercised and fire extinguishers available during work which presents fire or explosion hazard.

4.3.7 Manual Lifting

Manual lifting of heavy objects such as sections of pipe or blower supplies may be required. Failure to follow proper lifting technique can result in back injuries and strains. Site workers will be instructed to use power equipment to lift heavy loads whenever possible and to evaluate loads before trying to lift them (i.e., they should be able to easily tip the load and then return it to its original position). Heavy loads should be carried with a buddy and the following proper lifting techniques will be stressed: 1) make sure footing is solid, 2) make back straight with no curving or slouching, 3) center body over feet, 4) grasp the object firmly and as close to your body as possible, 5) lift with legs, and 6) turn with your feet, don't twist. Back injuries are a serious concern as they are the most common workplace injury, often resulting in lost or restricted work time, and long treatment and recovery periods. In addition, hand digging for pipes may present lifting/ergonomic hazards.

4.3.8 Steam, Heat, Splashing

Exposure to steam/heat/splashing hazards can occur during steam cleaning activities. Exposure to steam/heat/splashing can result in scalding/burns, eye injury, and puncture wounds. Proper PPE will be worn during all steam cleaning activities such as rain gear or Tyvek, hardhat equipped with splashguard, and water resistant gloves and boots.

4.3.9 Utilities (Electrocution and Fire Hazards)

Underground utilities at the Site pose fire, explosion, and electrocution hazards. Potential adverse effects of electrical hazards include burns and electrocution, which could result in death. Underground utilities, facilities, equipment, and structures will be located prior to start of remedial excavation activities. The Underground Utilities Call Center will be notified a minimum of three (3) days before any subsurface disturbance. Care shall be exercised to avoid damage to utilities beneath the surface slab.

4.4 Task Hazard Analysis

The scope of work described in Section 1.2 will be accomplished with the following tasks:

1. Mobilization/Demobilization: mobilize equipment; establish Site security, work zones, and staging areas.
2. Site Preparation: locate utilities; construct decontamination pad; construct negative pressure environmental enclosure around excavation area.
3. Sampling of All Media: use of appropriate personal protection equipment (PPE) (e.g., nitrile gloves, safety glasses, ear plugs, hard hats);
4. Soil Excavation and Loading: in the event soil removal is necessary, remove floor slab in designated area; excavate material and segregate dissimilar materials; load dump trucks or drums; decontaminate heavy equipment; backfill excavations.
5. Site Restoration Activities: restore flooring in excavation area and any damaged adjacent floors/walls to original condition.
6. LNAPL Gauging and Monitoring: if light non-aqueous phase liquid (LNAPL) is encountered during gauging or dewatering, it will be removed using oil-absorbent materials such as pads or socks and drummed accordingly pending off-site disposal.

All of these tasks include the potential for the chemical and physical hazards, and care should be taken within the work zone to avoid these hazards as described above. There is a higher potential for chemical hazards to occur during activities that involve the removal and handling of contaminated material; however, exposure to vapors may occur to a lesser degree as soon as the top concrete slab is removed. All tasks should be conducted using the appropriate PPE for the associated exposure, as described in Section 6.0.

5.0 PROCESS SAFETY MANAGEMENT

Process Safety Management is a systematic way of identifying the potential health and safety hazards associated with major phases of work on the project and the methods to avoid, control and mitigate those hazards. Process Safety Management guidelines will be developed for all activities as necessary, prior to start-up. Process Safety Management will be used to train work crews in proper safety procedures during phase preparatory meetings.

6.0 PERSONAL PROTECTIVE EQUIPMENT

The personal protection equipment required for various remediation tasks are based on 29 CFR 1910.120, Hazardous Waste Operations and Emergency Response, Appendix B, "General Description and

Discussion of the Levels of Protection and Protective Gear." All on-site personnel shall wear, at a minimum, Level D personal protective equipment. When work is conducted in areas where potential NAPL contamination is present, workers shall wear, at a minimum, Level D modified personal protective equipment. The protection will be based on the air monitoring described in Section 7.0. Table 2 lists the required PPE for the anticipated remediation tasks:

TABLE 2

PERSONAL PROTECTIVE EQUIPMENT SELECTION

LEVEL OF PROTECTION & PPE		WORK ACTIVITY/CONDITIONS
Level D (x) Steel Toe Boots (x) Hard Hat (as needed) (x) Leather Work Gloves (as needed) (x) Reflective Vest (as needed)	(x) Safety Glasses -or- (x) Face Shield (x) Ear Plugs (as needed) (x) Latex or nitrile Gloves (as needed)	• All activities except those noted under Levels D modified and C
Level D – Modified ***(in addition to Level D)*** (x) Nitrile Gloves (x) Overboots	(x) Tyvek Coveralls (as needed) -or- (x) Saranex/Polyethylene-coated Tyvek Coveralls (as needed)	• Activities with potential for contact with grossly contaminated material
Level C – ***(in addition to Level D – Modified)*** (x) Half-Face Respirator ( ) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge (P100) ( ) Organic Cartridge (x) Dual Organic/Particulate Cartridge	• If PID > 10 ppm and/or • If PM10 > 5.0 mg/m^3
Level C - Modified ***(in addition to Level D – Modified)*** ( ) Half-Face Respirator (x) Full Face Respirator ( ) Full-Face PAPR	( ) Particulate Cartridge (P100) ( ) Organic Cartridge (x) Dual Organic/Particulate Cartridge	• If PID >50 ppm; or • Eye irritation occurs
Notes: Vapor (PID) and particulate (PM_{10}) measurements are work zone action levels sustained for >15 minutes		

The personal protective equipment (PPE) specified in Table 2 reflects the hazard analysis presented in Section 4.0 and PPE selection required by 29 CFR 1910.132. For the purposes of PPE selection, the PESM and SM are considered competent persons. The signatures on the front of the HASP constitute certification of the hazard assessment. For activities not covered by Table 2, the SM will conduct the hazard assessment and select the PPE in consultation with the PESM.

6.1 OSHA Requirements for Personal Protective Equipment

All personal protective equipment used during the course of this field investigation must meet the following OSHA standards:

Type of Protection	Regulation	Source
Eye and Face	29 CFR 1910.133	ANSI Z87.1 1968
Respiratory	29 CFR 1910.134	ANSI Z88.1 1980
Head	29 CFR 1910.135	ANSI Z89.1 1969
Foot	29 CFR 1910.136	ANSI Z41.1 1967

ANSI = American National Standards Institute

Any on-site personnel who have the potential to don a respirator must have a valid fit test certification and documentation of medical clearance. The PESM will maintain such information on file for on-site personnel. The SM will obtain such information from the contractor's Site supervisor prior to the initiation of any such work. Both the respirator and cartridges specified for use in Level C protection must be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910.1025; 29 CFR 1910.134). Air purifying respirators cannot be worn under the following conditions:

- Oxygen deficiency;
- IDLH concentrations; and
- If contaminant levels exceed designated use concentrations.

When work is conducted in areas where exposed sub-slab insulation material is anticipated, workers shall wear, at a minimum, Level D modified personal protective equipment. The level of respiratory protection will be based on the air monitoring described in Section 7.0.

7.0 MONITORING

7.1 Monitoring Requirements

Environmental Health and Safety Monitoring will be performed during all soil disturbance activities in accordance with this section.

7.1.1 Work Zone Monitoring

The following monitoring instruments will be available for use during field operation as necessary:

- Photoionization detector (PID), Thermo 580B with 10.6 eV lamp or equivalent;
- Dust meter, TSI DustTrak or equivalent; and
- Sound Level Meter if deemed necessary by the SM and PESM, type to be appropriate to the activities performed.

All air monitoring equipment will be calibrated and maintained in accordance with manufacturer's requirements and the Monitoring Instruments: Use, Care, and Calibration program included in Appendix D. All calibrations will be recorded by the SM in the daily log.

Organic vapor concentrations shall be measured using the PID during excavating and other intrusive activities. During intrusive operations, organic vapor concentrations shall be taken at least once every hour. Organic vapor concentrations shall be measured upwind of the work zone to determine background concentrations at least twice a day, (once in the morning and once in the afternoon). The SM will interpret monitoring results using professional judgment.

A dust meter will be used to measure airborne particulate matter during intrusive activities. Monitoring will be at least once per hour and readings will be averaged over a 15-minute period for comparison with the action levels. Monitoring personnel will make a best effort to collect dust monitoring data from downwind of the intrusive activity. If off-site sources are considered to be the source of the measured dust, upwind readings will also be collected.

All trenches and excavations will be monitored before potential entry at the beginning of each shift. Trenches are not expected to be entered on a regular basis during the remediation.

Measurements will be taken prior to commencement of work and periodically or continuously during the work, depending on the contaminant being monitored, as outlined in Table 3. Measurements will be made as close to the workers as practicable and at the breathing height of the workers.

The SM shall set up the equipment and confirm that it is working properly. His/her designee may oversee the air measurements during the day. The initial measurement for the day will be performed before the start of work and will establish the background level for that day. The final measurement for the day will be performed after the end of work. The action levels and required responses are listed in the following table:

TABLE 3
WORK ZONE AIR MONITOING ACTION LEVELS

Air Monitoring Instrument	**Monitoring Location**	**Action Level** (sustained for >15 min)	**Site Action**
PID	Breathing Zone	0 - 10 ppm	No respiratory protection is required
		10 – 500 ppm	Upgrade to Level C PPE. OR Stop work, withdraw from work area.
		> 500 ppm	Stop Work. Resume work when readings are less than 500 ppm.
Dust Meter	Excavation	< 5 mg/m^3	No respiratory protection is required Implement work practices to reduce/minimize airborne dust generation, e.g., spray/misting of soil with water
		Between 5 mg/m^3 and 125 mg/m^3	Upgrade to Level C PPE. Apply additional dust suppression measures. If < 2.5 mg/m^3 resume work using level D. Otherwise, use level C.
		> 125 mg/m^3	Stop Work. Apply additional dust suppression measures. Resume work when less than 125 mg/m^3.

Notes: ppm = parts per million, mg/m^3 = milligrams per cubic meter

7.2 Noise Monitoring

Work areas or tasks that pose an exposure risk greater than 85 dBA will require hearing protection. If there is a reasonable possibility that workers may be exposed to an 8-hour time-weighted average exceeding 85 dBA, noise monitoring will be conducted.

8.0 ZONES, PROTECTION, AND COMMUNICATION

8.1 Site Control

Site zones are intended to control the potential spread of contamination and to assure that only authorized individuals are permitted into potentially hazardous areas. A three-zone approach will be utilized. It will include an Exclusion Zone (EZ), Contamination Reduction Zone (CRZ) and a Support Zone (SZ). Specific zones will be established on the work Site when operations begin for each task requiring such delineation (i.e., intrusive work beneath the site cover or handling of contaminated materials). For larger scale subgrade work the work zones will be sketched out and maps delineating the various work zones will be available at the Site and used during initial Site-specific training.

This project is being conducted under the requirements of 29 CFR 1910.120, and any personnel working in an area where the potential for exposure to Site contaminants exists, will only be allowed access after proper training and medical documentation is provided to the SM. These records will be maintained by the SM and copies should be provided to the SM prior to mobilization for project activities.

The following will be used for guidance in revising these preliminary zone designations, if necessary:

- Support Zone (SZ) - The SZ is an uncontaminated area that will be the field support area for most operations. The SZ provides for field team communications and staging for emergency response. Appropriate sanitary facilities and safety equipment will be located in this zone. Potentially contaminated personnel/materials are not allowed in this zone. The only exception will be appropriately packaged/decontaminated and labeled samples.
- Contamination Reduction Zone (CRZ) - The CRZ is established between the EZ and the SZ. The CRZ contains the contamination reduction corridor and provides an area for decontamination of personnel and portable hand-held equipment, tools and heavy equipment. A personnel decontamination area will be prepared at each exclusion zone. The CRZ will be used for Exclusion Zone entry and egress in addition to access for heavy equipment and emergency support services.
- Exclusion Zone (EZ) - All activities that may involve exposure to Site contaminants, hazardous materials and/or conditions should be considered an exclusion zone. This zone will be clearly delineated by cones, tapes or other means. The SM may establish more than one EZ where different levels of protection may be employed or different hazards exist. The size of the EZ shall be determined by the Site SM allowing adequate space for the activity to be completed, field members and emergency equipment.

8.2 Contamination Control

8.2.1 Personnel Decontamination Station

Personnel hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

8.2.2 Minimization of Contact With Contaminants

During completion of all Site activities, personnel should attempt to minimize the degree of contact with contaminated materials. This involves a conscientious effort to keep "clean" during Site activities. All personnel should minimize kneeling, splash

generation, and other physical contact with contamination. This may ultimately minimize the degree of decontamination required and the generation of waste materials from Site operations.

Field procedures will be developed to control over spray and runoff and to ensure that unprotected personnel working nearby are not affected.

8.2.3 Personnel Decontamination Sequence

Consideration will be given to prevailing wind directions so that the decontamination line, the support zone, and contamination reduction zone exit is upwind from the exclusion zone and the first station of the decontamination line. Decontamination will be performed by removing all PPE used in EZ and placing in drums/trash cans within the CRZ. Baby wipes will be available for washing hands and face after PPE removal. In addition, brushes will be available for removing mud/soil from boots.

8.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination; wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment.

If the injured person can be moved, he/she will be moved to the EZ boundary and decontaminated by Site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury) provisions shall be made to ensure that emergency response personnel will be able to respond to victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exist, such as with open excavation, this area will be covered with poly to eliminate any potential inhalation hazards. All emergency personnel are to be immediately informed of the injured person's condition, potential contaminants, and provided with all pertinent chemical data.

8.2.5 Heavy Equipment Decontamination

Decontamination of chemically contaminated heavy equipment will be accomplished using high-pressure steam or dry decontamination with brushes and shovels. Decontamination shall take place on a decontamination pad and all liquids used in the decontamination procedure will be collected. Vehicles or equipment brought into an exclusion zone will be treated as contaminated, and will be decontaminated prior to removal. All liquids used in the decontamination procedure will be collected, stored and disposed of in accordance with federal, state and local regulations. Personnel performing this task will wear the proper PPE as prescribed in Table 2.

8.3 Communications

The following communications equipment shall be specified as appropriate:

- Telephones - A cellular telephone will be located in the SZ for communication with emergency support services/facilities and the home office. Personnel in the EZ can carry cellular telephones for communication as well if Level D PPE has been determined to be appropriate.

- Hand Signals - Hand signals shall be used by field teams along with the buddy system. They shall be known by the entire field team before operations commence and their use covered during Site-specific training. Typical hand signals are described in Table 4:

TABLE 4
HAND SIGNALS

Signal	Meaning
Hand gripping throat	Out of air, can't breathe
Grip on a partner's wrist or placement of both hands around a partner's waist	Leave area immediately, no debate
Hands on top of head	Need assistance
Thumbs up	Okay, I'm all right, I understand
Thumbs down	No, negative

9.0 MEDICAL SURVEILLANCE PROCEDURES

All personnel performing field work where potential exposure to contaminants exists at the Site are required to have passed a complete medical surveillance examination in accordance with 29 CFR 1910.120(f) and, where applicable, expanded health standards.

9.1 Medical Surveillance Requirements

A physician's medical release for work will be confirmed by the SM before a worker can enter the exclusion zone. The medical release shall consider the type of work to be performed and the required PPE. The examination will be conducted annually at a minimum. Additional medical testing may be required by the PESM in consultation with the SM if an over-exposure or accident occurs, if an employee exhibits symptoms of exposure, or if other Site conditions warrant further medical surveillance.

10.0 SAFETY CONSIDERATIONS

10.1 High Loss Potential Hazards

Activities to be conducted at the Site may involve operations that have the potential for a serious injury to occur, to include the following:

- Lockout/Tagout
- Heavy Equipment Operation
- Excavation and Trenching
- Line Breaking

10.1.1 Lockout-Tagout

Site personnel will assume that all electrical equipment at surface and overhead locations is energized, until the equipment has been designated as de-energized by a qualified representative of the remedial contractor. If the equipment cannot be de-energized, work will stop and the SM will consult with the PM, PESM, and contractor. All applications of lockout devices shall be accomplished using procedures equivalent to those shown in The Control of Hazardous Energy Program "Lockout/Tagout" included in Appendix E.

All power lines which have been de-energized must be locked out, such that the lines cannot be energized when personnel are working near them. The lines shall not be unlocked and re-energized until both AKRF and the contractor confirm that work is completed work in the area and that all personnel are clear of the area. The lockout procedures must be equivalent in effectiveness to those found in Appendix E.

If power lines cannot be de-energized, the SM will consult with ConEd to determine the safe working distance from the energized line. Work tasks will only commence after determination that a safe working distance can be maintained and all personnel working in the area have been informed of the limitation. Caution tape, other warning devices or physical barriers will be placed at the perimeter to the safe zone.

10.1.2 Heavy Equipment Operation

Working with large motor vehicles and heavy equipment (e.g., drill rig, excavator) could be a major hazard at this Site. Injuries can result from equipment hitting or running over personnel, impacts from flying objects, or overturning of vehicles. Vehicle and heavy equipment design and operation will be in accordance with 29 CFR, Subpart O, 1926.600 through 1926.602. In particular, the following precautions will be utilized to help prevent injuries/accidents:

- Brakes, hydraulic lines, light signals, fire extinguishers, fluid levels, steering, tires, horn, and other safety devices will be checked at the beginning of each shift.
- The operation of heavy equipment will be limited to authorized personnel specifically trained in its operation. The contractor must provide this information to the SM.
- The operator will use the safety devices provided with the equipment, including seat belts. Backup warning indicates and horns will be operable at all times.
- While in operation, all personnel not directly required in the area will keep a safe distance from the equipment.
- A large construction motor vehicle will not be backed up unless it has a reverse signal alarm audible above the surrounding noise level; or it is backed up only when an observer signals that it is safe to do so.
- Personnel directly involved in activity will avoid moving in the path of operating equipment or any portion thereof. Areas blinded from the operator's vision will be avoided. Spotters will be used when personnel may be in areas where the operator’s view is obstructed.
- Heavy equipment cabs or motor vehicles will be kept free of all nonessential items, and all loose items will be secured.
- Large construction motor vehicles and heavy equipment will be provided with necessary safety equipment (such as seat belts, roll-over protection, emergency shut-off in case of roll-over, backup warning lights and audible alarms).
- Additional riders will not be allowed on equipment unless it is specifically designed for that purpose.

10.1.3 Excavation and Trenching

The safety requirements for each excavation must be determined by a competent person who is capable of identifying existing and predictable hazards and work conditions that are unsanitary, hazardous, or dangerous to employees. The competent person must also have the authorization to take prompt corrective measures to eliminate unsatisfactory conditions.

The following are general requirements for work activities in and around excavations:

- Prior to initiation of any excavation activity, the location of underground installations will be determined. The New York State one-call center will be contacted by the excavation subcontractor a minimum of 72 hours prior to excavation activities.
- All excavations will be inspected daily and after each period of rain by the competent person prior to commencement of work activities. Evidence of cave-ins, slides, sloughing, or surface cracks or excavations will be cause for work to cease until necessary precautions are taken to safeguard employees.
- Excavated and other materials or equipment that could fall or roll into the excavation shall be placed at least 5 feet from the edge of the excavation.
- Spoils and heavy equipment will be kept at least 5 feet from the edge to prevent cave-in.
- Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with CFR 1926.652 (b) or (c) except when excavations are less than 5 feet in depth and examination of the ground by a competent person provides no indication of a potential cave-in or excavation is made entirely in stable rock.
- Ladders will be positioned no further than 25 feet from the furthest individual working in the trench.

11.0 DISPOSAL PROCEDURES

All discarded materials, waste materials or other objects shall be handled in such a way as to preclude the potential for spreading contamination, creating a sanitary hazard or causing litter to be left on-site. All potentially contaminated materials, e.g., clothing, gloves, etc., will be bagged or drummed as necessary, labeled and segregated for disposal. All non-contaminated materials shall be collected and bagged for appropriate disposal. The waste management procedures as specified in the applicable specifications and RAWP-Phase 2 for activities being performed, shall be complied with.

12.0 EMERGENCY RESPONSE / CONTINGENCY PLAN

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly, and require an immediate response; therefore, contingency planning and advanced training of staff are essential. Specific elements of emergency support procedures addressed in the following subsections include communications, local emergency support units, preparation for medical emergencies, first aid for injuries incurred on-site, record keeping, and emergency Site evacuation procedures.

12.1 Responsibilities

12.1.1 Project Environmental and Safety Manager (PESM)

The PESM oversees and approves the Emergency Response/Contingency Plan and performs audits to determine that the plan is in effect and that all pre-emergency requirements are met. The PESM acts as a liaison to applicable regulatory agencies and notifies OSHA of reportable accidents.

12.1.2 Site Manager (SM)

The SM is responsible for ensuring that all personnel are evacuated safely and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The SM is required to immediately notify the PM and PESM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the PESM can notify OSHA within the required time frame. The PESM will be notified of all OSHA recordable injuries, fires, spills, releases or equipment damage in excess of $500 within 24 hours. The SM also serves as the Alternate Emergency Coordinator.

12.1.3 Emergency Coordinator

In the event of an emergency, the Emergency Coordinator, shall make contact with Local Emergency Response personnel. In these contacts, the Emergency Coordinator will inform response personnel about the nature of work on the Site, the type of contaminants and associated health or safety effects, and the nature of the emergency, particularly if it is related to exposure to contaminants.

The Emergency Coordinator shall review this plan and verify emergency phone numbers and identify hospital routes prior to beginning work on-site. The Emergency Coordinator shall make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator shall implement the Emergency Response/Contingency Plan whenever conditions at the Site warrant such action.

12.1.4 Site Personnel

Site personnel are responsible for knowing the Emergency Response/Contingency Plan and the procedures contained herein. Personnel are expected to notify the Emergency Coordinator of situations that could constitute a Site emergency.

12.2 Communications

A variety of communication systems may be utilized during emergency situations. These are discussed in the following sections.

The primary form of communication during an emergency between field groups in the exclusion zone and the Emergency Coordinator will be verbal communications. During an emergency situation, the lines will be kept clear so that instructions can be received by all field teams.

12.2.1 Telephone Communications

A cellular telephone will be available on-site.

12.2.2 Hand Signals

Hand signals will be employed by downrange field teams where necessary for communication during emergency situations. Hand signals are found in Section 8.3.

12.3 Pre-Emergency Planning

Before the field activities begin, the local emergency response personnel may be notified by the Owner's Representative or Owner's contractor of the schedule for field activities and about the materials that are thought to exist on the Site so that they will be able to respond quickly and effectively in the event of a fire, explosion, or other emergency.

To be able to deal with any emergency that might occur during remedial activities at the Site, emergency telephone numbers will be readily available in the SM vehicle or the Site office. These telephone numbers are presented Section 12.16. The Emergency phone numbers listed are preliminary and will be updated as needed prior to the start of work. Immediately prior to mobilization the SM shall verify all numbers, and document any changes in the Site Logbook. Hospital route maps will also be readily available in the SM vehicle and/or Site office.

12.4 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, should an injury occur, no matter how slight, it will be reported to the SM immediately. First-aid equipment such as a first aid kit and disposable eye washes will be available on-site.

During the Site safety briefing, project personnel will be informed of the location of the first aid station(s) that have been set up. In the case of a medical emergency, the SM will determine the nature of the emergency and he/she will have someone call for an ambulance, if needed. If the nature of the injury is not serious, i.e., the person can be moved without expert emergency medical personnel, he/she should be driven to a hospital by on-site personnel. Directions to the hospital with a hospital route map are provided in Section 12.15. Unless they are in immediate danger, severely injured persons will not be moved until paramedics can attend to them. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. Any first aid instructions that can be obtained from doctors or paramedics, before an emergency-response squad arrives at the Site or before the injured person can be transported to the hospital, will be followed closely.

12.5 Emergency Site Evacuation Routes and Procedures

In the event of a Site Emergency that would require the evacuation of personnel, the Emergency Coordinator will immediately contact the Owner's Representative (this person may or may not be on-site). All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial Site safety meeting. If an emergency occurs at the work area, including but not limited to fire, explosion or significant release of toxic gas into the atmosphere, immediate evacuation of all personnel is necessary due to an immediate or impending danger. The following evacuation procedures will be used:

- The Field Team Leader will initiate evacuation procedures by signaling to leave the Site or exclusion zone. The signal for Site evacuation will consist of three long blasts on an air horn.
- All heavy equipment will be shut down and all personnel will evacuate the work areas and assemble at a pre-determined meeting location. The designated meeting location for the Site will be at the sidewalk along the west side of West Street.
- All personnel suspected to be in or near the contract work area should be accounted for and the whereabouts or missing persons determined immediately.
- The Field Team Leader will then give further instruction.

If any task covered under this HASP has the potential for significant hazards, evacuation drills will be performed as deemed necessary by the SM and PESM.

12.6 Fire Prevention and Protection

In the event of a fire or explosion, the work area will be evacuated immediately and the Emergency Coordinator will notify the local fire and police departments. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases will be stored in flammable storage cabinets away from oxidizers when not in use.
- Oxygen will be stored at least 25 feet away from acetylene cylinders when not in use. Oxygen and acetylene may not be stored on welding carts.
- No smoking in the exclusion zone or any work area.
- No hot work without a properly executed hot work permit.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds Class A, B, and C located on all heavy equipment, in all trailers and near all hot work activities.
- Monthly inspections of all fire extinguishers.

The contractor is responsible for the maintenance of fire prevention and/or control equipment and the control of fuel source hazards.

12.7 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet will be followed as necessary. If first aid or emergency medical treatment is necessary, the Emergency Coordinator will contact the appropriate emergency facilities. All chemical exposure incidents must be reported in writing to the PESM. If a member of the field crew demonstrates symptoms of chemical exposure, another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should communicate to the SM (via voice and hand signals) of the chemical exposure. The SM should contact the appropriate emergency response agency. The procedures outlined below should be followed:

TABLE 5
CHEMICAL EXPOSURE TREATMENT PROCEDURES

EXPOSURE PATHWAY	TREATMENT PROCEDURE
SKIN AND EYE CONTACT	Use copious amounts of soap and water. Wash/rinse affected areas thoroughly, and then provide appropriate medical attention. Eyes should be rinsed for 15 minutes upon chemical contamination. Skin should also be rinsed for 15 minutes if contact with caustics, acids or hydrogen peroxide occurs.

EXPOSURE PATHWAY	TREATMENT PROCEDURE
INHALATION	Move to fresh air. Decontaminate and transport to hospital or local medical provider.
INGESTION	Decontaminate and transport to emergency medical facility.
PUNCTURE WOUND OR LACERATION	Decontaminate and transport to emergency medical facility.

12.8 Personal Injury

In case of personal injury at the Site, the following procedures should be followed:

- Another team member (buddy) should signal the Field Team Leader that an injury has occurred.
- A field team member trained in first aid can administer treatment to an injured worker.
- If deemed necessary, the victim should then be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.
- The Field Team Leader or FSO is responsible for making certain that an Incident Report Form is completed. This form is to be submitted to the AKRF HSO. Follow-up action should be taken to correct the situation that caused the accident.
- Any incident (near miss, property damage, first aid, medical treatment, etc.) must be reported.
- A first-aid kit, eye-wash, and blood-born pathogens kit will be kept on-Site during the field activities.

12.9 Decontamination During Medical Emergencies

If emergency life-saving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or postponed. The SM or designee will accompany contaminated victims to the medical facility to advise on matters involving decontamination, when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on Site, a plastic barrier between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening, unless it is known that the individual has been contaminated with an extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, the normal decontamination procedures will be followed.

12.10 Accident/Incident Reporting

Written confirmation of verbal reports of injuries or other emergencies are to be submitted to the PESM within 24 hours. The accident/incident report form is found in Appendix F.

In addition to the incident reporting procedures and actions described in the HASP, the SM will coordinate with the Owner's Representative for reporting and notification for all environmental, safety, and other incidents.

If necessary, a Site safety briefing will be held to discuss accidents/incidents and any findings from the investigation of the incident. The HASP will be modified if deemed necessary by the PESM.

12.11 Spill Control and Response

All small hazardous spills/environmental releases shall be contained as close to the source as possible. Whenever possible, the MSDS will be consulted to assist in determining the best means of containment and cleanup. For small spills, absorbent materials such as sand, sawdust or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. Drains or drainage areas should be blocked. All spill containment materials will be properly disposed. An exclusion zone of 50-100 feet around the spill area should be established depending on the size and type of the spill.

The following steps should be taken by the Emergency Coordinator:

1. Determine the nature, identity and amounts of major spill components;
2. Make sure all unnecessary persons are removed from the spill area;
3. Notify appropriate response teams and authorities;
4. Use proper PPE in consultation with the SM;
5. If a flammable liquid, gas or vapor is involved, remove all ignition sources and use non-sparking and/or explosive proof equipment to contain or clean up the spill (diesel only vehicles, air operated pumps, etc.);
6. If possible, try to stop the leak with appropriate material;
7. Remove all surrounding materials that can react or compound with the spill; and
8. Notify the Owner and determine who will report the spill to the NYSDEC Hotline, as applicable.

12.12 Emergency Equipment

The following minimum emergency equipment shall be kept and maintained on-site:

- Industrial first aid kit
- Portable eye washes
- Fire extinguishers (one per vehicle and heavy equipment)
- Absorbent material

12.13 Postings

The following information shall be posted or be readily visible and available at conspicuous locations throughout the Site:

- Emergency telephone numbers
- Hospital Route Map

12.14 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers
- Refilling medical supplies
- Recharging eyewashes and/or showers
- Replenishing spill control supplies
- Replacing used air horns

12.15 Hospital Directions

The address and directions to the nearest hospital to the project Site are provided below:

Hospital Name:	Woodhull Medical Center
Phone Number:	(718) 963-8000
Address/Location:	760 Broadway Brooklyn, NY 11206
Directions:	RIGHT from Site onto WEST STREET LEFT onto GREENPOINT AVENUE RIGHT onto LEONARD STREET LEFT onto BROADWAY RIGHT onto FLUSHING AVENUE Emergency room is on your LEFT, at FLUSHING AVENUE and THROOP AVENUE.

A map showing the Site evacuation meeting point and driving route to the hospital is provided as Figure 1.

12.16 Emergency Contacts

Company	Individual Name	Title	Contact Number
AKRF	Marc Godick	Project Principal	914-922-2356 (office)
	Eric Park	Project Manager	917-923-9182 (cell)
	Adrianna Bosco	Assistant Project Manager	914-874-3358 (cell)
Urban Development Partners New York, LLC	Darryl Herring	Owner's Representative	212-767-0960
NYSDEC	Brian Davidson	Project Manager	518-402-9767
NYSDOH	Stephanie Selmer	Public Health Engineer	518-402-7860
Ambulance, Fire Department & Police Department	-	-	911
NYSDEC Spill Hotline	-	-	800-457-7362

The emergency contact list will be updated as needed.

13.0 TRAINING

13.1 General Health and Safety Training

In accordance with 29 CFR 1910.120, hazardous waste Site workers shall, at the time of job assignment, have received a minimum of 40 hours of initial health and safety training for hazardous waste Site operations unless otherwise noted in the above reference. At a minimum, the training will have consisted of instruction in the topics outlined in the standard. Personnel who have not met the requirements for initial training shall not be allowed to work in any Site activities during which they may be exposed to hazards (chemical or physical). Proof of training shall be submitted to the SM prior to the start of field activities. Other personnel involved in ancillary, or support activities, including transportation of material for disposal, shall have the proper training as required by Federal, State and local regulations.

13.2 Annual Eight-Hour Refresher Training

Annual eight-hour refresher training will be required of all hazardous waste Site field personnel in order to maintain their qualifications for fieldwork. The training will cover a review of 29 CFR 1910.120 requirements and related company programs and procedures.

13.3 Supervisor Training

Personnel acting in a supervisory capacity shall have received 8 hours of instruction in addition to the initial 40 hours training.

13.4 Site-Specific Training

Prior to commencement of field activities, all field personnel assigned to the project will have completed training that will specifically address the activities, procedures, monitoring, and equipment used in the Site operations. The training will cover Site and facility layout, hazards and emergency services, and all provisions contained within this HASP. This training will also allow field workers to clarify anything they do not understand and to reinforce their responsibilities regarding safety and operations for their particular activity. The training should include the following topics:

- General requirements of this HASP;
- Review of the scope of work;
- Names of personnel responsible for Site safety and health;
- Potential hazards and acute effects of compounds present at the Site;
- Air monitoring procedures;
- Proper use of personal protective equipment;
- Safe use of engineering controls and equipment on the Site;
- Decontamination procedures; and
- Work practices by which the employee can minimize risk from hazards. This may include a specific review of heavy equipment safety, safety during inclement weather, changes in common escape rendezvous point, Site security measures, or other Site-specific issues that need to be addressed before work begins.

Personnel that have not received Site-specific training will not be allowed in the work zone.

13.5 On-Site Safety Briefings

Project personnel working in designated work zones on-site will be given health and safety briefings periodically by the SM to assist Site personnel in safely conducting their work activities. The briefings will include information on new operations to be conducted, changes in work practices or changes in the Site's environmental conditions, as well as periodic reinforcement of previously discussed topics. The briefings will also provide a forum to facilitate conformance with safety requirements and to identify performance deficiencies related to safety during daily activities or as a result of safety inspections. The meetings will also be an opportunity to periodically update the crews on monitoring results.

14.0 LOGS, REPORTS, AND RECORD KEEPING

The following is a summary of required health and safety logs, reports, and record keeping.

14.1 Medical and Training Records

Copies or verification of training (40 hour, 8 hour, supervisor, and Site-specific training) and medical clearance for hazardous waste Site work and respirator use will be maintained by the SM.

14.2 On-Site Log

A log of personnel on-site each day will be kept by the SM in a field logbook.

14.3 Exposure Records

The SM will periodically notify the PESM of exposure monitoring results that require workers to upgrade to Level C. All personal monitoring results, laboratory reports, calculations and air sampling data sheets will be maintained by the SM during Site work.

14.4 Accident/Incident Reports

The incident reporting and investigation during Site work will be completed using an Incident Report Form, provided in Appendix F.

14.5 OSHA Form 300

An OSHA Form 300 will be kept at the home office. All recordable injuries or illnesses will be recorded on this form. The Incident Report Form in Appendix F meets the requirements of the OSHA Form 101 (supplemental record) and must be must be copied to the home office for inclusion on the OSHA Form 300 for all recordable injuries or illnesses.

14.6 Hazard Communication Program/MSDS

Material Safety Data Sheets (MSDSs) will be obtained for applicable substances and included in the Site hazard communication file. The hazard communication program will be maintained on-Site in accordance with 29 CFR 1910.1200.

14.7 Work Permits

All work permits, including lockout/tagout, sidewalk permits, and debris container permits (if necessary) will be maintained in the project files. Copies of the work permits shall also be provided to the SM, and the Owner’s Representative.

15.0 FIELD PERSONNEL REVIEW

This form serves as documentation that field personnel have read, or have been informed of, and understand the provisions of this HASP for the Site at 145 West Street, Brooklyn, NY. It is maintained on-site by the SM as a project record. Each field team member shall sign this section after training in the contents of this HASP has been completed. Site workers must sign this form after Site-specific training is completed and before being permitted to work on-site.

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I have also completed Site-specific training for the work detailed in the project Specifications. I will comply with the provisions contained therein.

NAME (PRINT AND SIGN)	DATE

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I have also completed Site-specific training for the work detailed in the project Specifications. I will comply with the provisions contained therein.

NAME (PRINT AND SIGN)	DATE

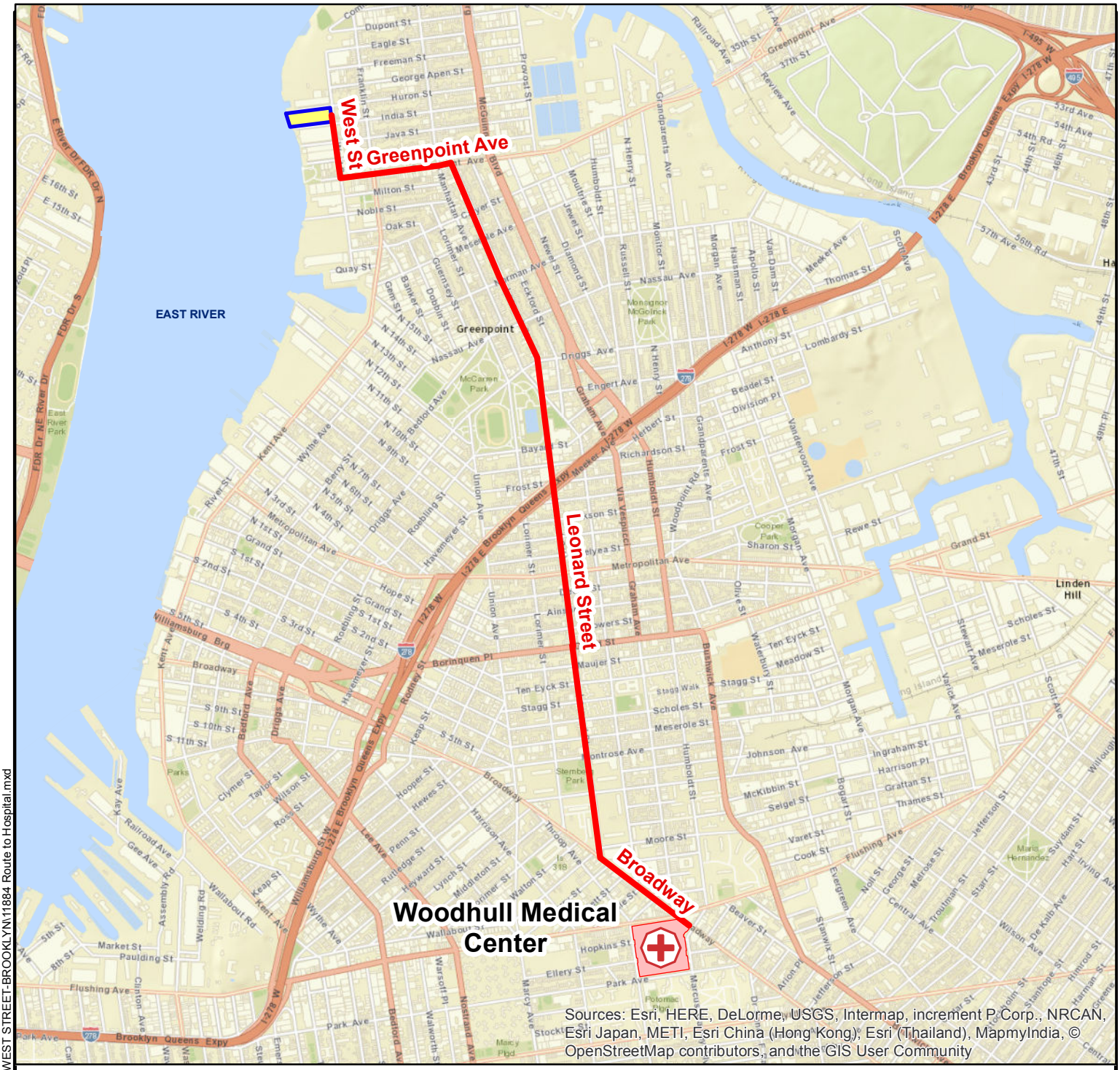
I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I have also completed Site-specific training for the work detailed in the project Specifications. I will comply with the provisions contained therein.

NAME (PRINT AND SIGN)	DATE

I have read, or have been informed of, the Health and Safety Plan and understand the information presented. I have also completed Site-specific training for the work detailed in the project Specifications. I will comply with the provisions contained therein.

NAME (PRINT AND SIGN)	DATE

FIGURES



Legend

Project Site Location

Hospital Location 2013

0 2,000 4,000 Feet

WOODHULL MEDICAL CENTER
760 Broadway
Brooklyn, NY 11206

Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

HOSPITAL LOCATION MAP

AKRF Engineering, P.C.
440 Park Avenue South, New York, N.Y. 10016

DATE **8/11/2015**

PROJECT No. **11884**

FIGURE **1**

O:\Projects\11884 - 145 WEST STREET-BROOKLYN\11884 Route to Hospital.mxd

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APPENDIX A
ASTDR CHEMICAL FACT SHEETS

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

BENZENE
CAS # 71-43-2

This fact sheet answers the most frequently asked health questions (FAQs) about benzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Benzene is a widely used chemical formed from both natural processes and human activities. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. Benzene has been found in at least 813 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is benzene?

(Pronounced bĕn′zēn′)

Benzene is a colorless liquid with a sweet odor. It evaporates into the air very quickly and dissolves slightly in water. It is highly flammable and is formed from both natural processes and human activities.

Benzene is widely used in the United States; it ranks in the top 20 chemicals for production volume. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also used to make some types of rubbers, lubricants, dyes, detergents, drugs, and pesticides. Natural sources of benzene include volcanoes and forest fires. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke.

What happens to benzene when it enters the environment?

- Industrial processes are the main source of benzene in the environment.
- Benzene can pass into the air from water and soil.
- It reacts with other chemicals in the air and breaks down within a few days.
- Benzene in the air can attach to rain or snow and be carried back down to the ground.
- It breaks down more slowly in water and soil, and can pass through the soil into underground water.
- Benzene does not build up in plants or animals.

How might I be exposed to benzene?

- Outdoor air contains low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions.
- Indoor air generally contains higher levels of benzene from products that contain it such as glues, paints, furniture wax, and detergents.
- Air around hazardous waste sites or gas stations will contain higher levels of benzene.
- Leakage from underground storage tanks or from hazardous waste sites containing benzene can result in benzene contamination of well water.
- People working in industries that make or use benzene may be exposed to the highest levels of it.
- A major source of benzene exposures is tobacco smoke.

How can benzene affect my health?

Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death.

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

The major effect of benzene from long-term (365 days or longer) exposure is on the blood. Benzene causes harmful effects on the bone marrow and can cause a decrease in red blood cells leading to anemia. It can also cause excessive bleeding and can affect the immune system, increasing the chance for infection.

Some women who breathed high levels of benzene for many months had irregular menstrual periods and a decrease in the size of their ovaries. It is not known whether benzene exposure affects the developing fetus in pregnant women or fertility in men.

Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.

How likely is benzene to cause cancer?

The Department of Health and Human Services (DHHS) has determined that benzene is a known human carcinogen. Long-term exposure to high levels of benzene in the air can cause leukemia, cancer of the blood-forming organs.

Is there a medical test to show whether I've been exposed to benzene?

Several tests can show if you have been exposed to benzene. There is test for measuring benzene in the breath; this test must be done shortly after exposure. Benzene can also be measured in the blood, however, since benzene disappears rapidly from the blood, measurements are accurate only for recent exposures.

In the body, benzene is converted to products called metabolites. Certain metabolites can be measured in the urine. However, this test must be done shortly after exposure and is not a reliable indicator of how much benzene you have been exposed to, since the metabolites may be present in urine from other sources.

Has the federal government made recommendations to protect human health?

The EPA has set the maximum permissible level of benzene in drinking water at 0.005 milligrams per liter (0.005 mgL). The EPA requires that spills or accidental releases into the environment of 10 pounds or more of benzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set a permissible exposure limit of 1 part of benzene per million parts of air (1 ppm) in the workplace during an 8-hour workday, 40-hour workweek.

Glossary

Anemia: A decreased ability of the blood to transport oxygen.

Carcinogen: A substance with the ability to cause cancer.

CAS: Chemical Abstracts Service.

Chromosomes: Parts of the cells responsible for the development of hereditary characteristics.

Metabolites: Breakdown products of chemicals.

Milligram (mg): One thousandth of a gram.

Pesticide: A substance that kills pests.

References

This ToxFAQs information is taken from the 1997 Toxicological Profile for Benzene (update) produced by the Agency for Toxic Substances and Disease Registry, Public Health Service, U.S. Department of Health and Human Services, Public Health Service in Atlanta, GA.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

ETHYLBENZENE
CAS # 100-41-4

Agency for Toxic Substances and Disease Registry ToxFAQs **June 1999**

This fact sheet answers the most frequently asked health questions (FAQs) about ethylbenzene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Ethylbenzene is a colorless liquid found in a number of products including gasoline and paints. Breathing very high levels can cause dizziness and throat and eye irritation. Ethylbenzene has been found in at least 731 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is ethylbenzene?

(Pronounced ĕth′ əl bĕn′ zēn′)

Ethylbenzene is a colorless, flammable liquid that smells like gasoline. It is found in natural products such as coal tar and petroleum and is also found in manufactured products such as inks, insecticides, and paints.

Ethylbenzene is used primarily to make another chemical, styrene. Other uses include as a solvent, in fuels, and to make other chemicals.

What happens to ethylbenzene when it enters the environment?

- Ethylbenzene moves easily into the air from water and soil.
- It takes about 3 days for ethylbenzene to be broken down in air into other chemicals.
- Ethylbenzene may be released to water from industrial discharges or leaking underground storage tanks.
- In surface water, ethylbenzene breaks down by reacting with other chemicals found naturally in water.
- In soil, it is broken down by soil bacteria.

How might I be exposed to ethylbenzene?

- Breathing air containing ethylbenzene, particularly in areas near factories or highways.
- Drinking contaminated tap water.
- Working in an industry where ethylbenzene is used or made.
- Using products containing it, such as gasoline, carpet glues, varnishes, and paints.

How can ethylbenzene affect my health?

Limited information is available on the effects of ethylbenzene on people's health. The available information shows dizziness, throat and eye irritation, tightening of the chest, and a burning sensation in the eyes of people exposed to high levels of ethylbenzene in air.

Animals studies have shown effects on the nervous system, liver, kidneys, and eyes from breathing ethylbenzene in air.

How likely is ethylbenzene to cause cancer?

The EPA has determined that ethylbenzene is not classifiable as to human carcinogenicity.

ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html

No studies in people have shown that ethylbenzene exposure can result in cancer. Two available animal studies suggest that ethylbenzene may cause tumors.

How can ethylbenzene affect children?

Children may be exposed to ethylbenzene through inhalation of consumer products, including gasoline, paints, inks, pesticides, and carpet glue. We do not know whether children are more sensitive to the effects of ethylbenzene than adults.

It is not known whether ethylbenzene can affect the development of the human fetus. Animal studies have shown that when pregnant animals were exposed to ethylbenzene in air, their babies had an increased number of birth defects.

How can families reduce the risk of exposure to ethylbenzene?

Exposure to ethylbenzene vapors from household products and newly installed carpeting can be minimized by using adequate ventilation.

Household chemicals should be stored out of reach of children to prevent accidental poisoning. Always store household chemicals in their original containers; never store them in containers children would find attractive to eat or drink from, such as old soda bottles. Gasoline should be stored in a gasoline can with a locked cap.

Sometimes older children sniff household chemicals, including ethylbenzene, in an attempt to get high. Talk with your children about the dangers of sniffing chemicals.

Is there a medical test to show whether I've been exposed to ethylbenzene?

Ethylbenzene is found in the blood, urine, breath, and some body tissues of exposed people. The most common way to test for ethylbenzene is in the urine. This test measures substances formed by the breakdown of ethylbenzene. This test needs to be done within a few hours after exposure occurs, because the substances leave the body very quickly.

These tests can show you were exposed to ethylbenzene, but cannot predict the kind of health effects that might occur.

Has the federal government made recommendations to protect human health?

The EPA has set a maximum contaminant level of 0.7 milligrams of ethylbenzene per liter of drinking water (0.7 mg/L).

The EPA requires that spills or accidental releases into the environment of 1,000 pounds or more of ethylbenzene be reported to the EPA.

The Occupational Safety and Health Administration (OSHA) has set an occupational exposure limit of 100 parts of ethylbenzene per million parts of air (100 ppm) for an 8-hour workday, 40-hour workweek.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for ethylbenzene. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ **August 2007**

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- ❏ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- ❏ When lead is released to the air, it may travel long distances before settling to the ground.
- ❏ Once lead falls onto soil, it usually sticks to soil particles.
- ❏ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- ❏ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- ❏ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- ❏ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- ❏ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❏ Avoid exposure to sources of lead.

❏ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❏ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❏ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❏ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

MERCURY
CAS # 7439-97-6

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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XYLENE
CAS # 1330-20-7

This fact sheet answers the most frequently asked health questions (FAQs) about xylene. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

SUMMARY: Exposure to xylene occurs in the workplace and when you use paint, gasoline, paint thinners and other products that contain it. People who breathe high levels may have dizziness, confusion, and a change in their sense of balance. This substance has been found in at least 658 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is xylene?

(Pronounced zī′lēn)

Xylene is a colorless, sweet-smelling liquid that catches on fire easily. It occurs naturally in petroleum and coal tar and is formed during forest fires. You can smell xylene in air at 0.08–3.7 parts of xylene per million parts of air (ppm) and begin to taste it in water at 0.53–1.8 ppm.

Chemical industries produce xylene from petroleum. It's one of the top 30 chemicals produced in the United States in terms of volume.

Xylene is used as a solvent and in the printing, rubber, and leather industries. It is also used as a cleaning agent, a thinner for paint, and in paints and varnishes. It is found in small amounts in airplane fuel and gasoline.

What happens to xylene when it enters the environment?

- Xylene has been found in waste sites and landfills when discarded as used solvent, or in varnish, paint, or paint thinners.
- It evaporates quickly from the soil and surface water into the air.
- In the air, it is broken down by sunlight into other less harmful chemicals.
- It is broken down by microorganisms in soil and water.
- Only a small amount of it builds up in fish, shellfish, plants, and animals living in xylene-contaminated water.

How might I be exposed to xylene?

- Breathing xylene in workplace air or in automobile exhaust.
- Breathing contaminated air.
- Touching gasoline, paint, paint removers, varnish, shellac, and rust preventatives that contain it.
- Breathing cigarette smoke that has small amounts of xylene in it.
- Drinking contaminated water or breathing air near waste sites and landfills that contain xylene.
- The amount of xylene in food is likely to be low.

How can xylene affect my health?

Xylene affects the brain. High levels from exposure for short periods (14 days or less) or long periods (more than 1 year) can cause headaches, lack of muscle coordination, dizziness, confusion, and changes in one's sense of balance. Exposure of

people to high levels of xylene for short periods can also cause irritation of the skin, eyes, nose, and throat; difficulty in breathing; problems with the lungs; delayed reaction time; memory difficulties; stomach discomfort; and possibly changes in the liver and kidneys. It can cause unconsciousness and even death at very high levels.

Studies of unborn animals indicate that high concentrations of xylene may cause increased numbers of deaths, and delayed growth and development. In many instances, these same concentrations also cause damage to the mothers. We do not know if xylene harms the unborn child if the mother is exposed to low levels of xylene during pregnancy.

How likely is xylene to cause cancer?

The International Agency for Research on Cancer (IARC) has determined that xylene is not classifiable as to its carcinogenicity in humans.

Human and animal studies have not shown xylene to be carcinogenic, but these studies are not conclusive and do not provide enough information to conclude that xylene does not cause cancer.

Is there a medical test to show whether I've been exposed to xylene?

Laboratory tests can detect xylene or its breakdown products in exhaled air, blood, or urine. There is a high degree of agreement between the levels of exposure to xylene and the levels of xylene breakdown products in the urine. However, a urine sample must be provided very soon after exposure ends because xylene quickly leaves the body. These tests are not routinely available at your doctor's office.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 10 ppm of xylene in drinking water.

The EPA requires that spills or accidental releases of xylenes into the environment of 1,000 pounds or more must be reported.

The Occupational Safety and Health Administration (OSHA) has set a maximum level of 100 ppm xylene in workplace air for an 8-hour workday, 40-hour workweek.

The National Institute for Occupational Safety and Health (NIOSH) and the American Conference of Governmental Industrial Hygienists (ACGIH) also recommend exposure limits of 100 ppm in workplace air.

NIOSH has recommended that 900 ppm of xylene be considered immediately dangerous to life or health. This is the exposure level of a chemical that is likely to cause permanent health problems or death.

Glossary

Evaporate: To change from a liquid into a vapor or a gas.

Carcinogenic: Having the ability to cause cancer.

CAS: Chemical Abstracts Service.

ppm: Parts per million.

Solvent: A liquid that can dissolve other substances.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for xylenes (update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone:1-888-422-8737, FAX: 404-498-0093. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

APPENDIX B

COLD STRESS PROGRAM

1.0 PURPOSE & INTRODUCTION

The purpose of this document is to educate the employee about exposure to cold environments and the effects of hypothermia and other cold-related injuries. Through proper use of Personal Protective Equipment (PPE); engineering and administrative controls; and education, cold injury, both to the extremities and the body's core temperature, can be prevented.

2.0 SCOPE

This program is intended for use by employees engaged in work with the potential for exposure to cold environments. Training will be provided annually to all those potentially affected prior to the start of field work potentially involving cold exposure.

3.0 WORKING IN COLD ENVIRONMENTS

3.1 Metabolic Responses

The human body is designed to function best at a rectal temperature of 99-100 ºF. The body maintains this temperature in two ways: by gaining heat from food and muscular work; or, by losing it through radiation and sweating. By constricting blood vessels of the skin and/or shivering, the body uses its first line of cold defense.

Temperature control of the body is better understood by dividing the body into two main parts: the shell; and the core. The shell is comprised of the skin, capillaries, nerves, muscles and fat. Other internal organs such as the heart, lungs, brain and kidneys make up the core.

During exposure to cold, the skin is first affected. Blood in the peripheral capillaries is cooled, sending a signal to a portion of the brain called the hypothalamus. Regulating body temperature is one of the many basic body functions of the hypothalamus. Acting like a thermostat, adjustments are performed in order to maintain normal body temperatures. When a chill signal is received, two processes are begun by the hypothalamus: conserve heat already in the body; and generate new heat.

Heat conservation is performed through constriction of the blood vessels in the skin (shell), thus reducing heat loss from the shell and acting as an insulator for the core. Sweat glands are also inhibited, thus preventing heat loss by evaporation.

Additional fuel for the body is provided in the form of glucose. Glucose causes the heart to beat faster, sending oxygen and glucose-rich blood to the tissue where needed. In an attempt to produce heat, the muscles rapidly contract. This process is better known as "shivering", and generates heat similarly to that created by strenuous activity, raising the body's metabolic rate.

During physical activity and fatigue, the body is more prone to heat loss. As exhaustion approaches, blood vessels can suddenly enlarge, resulting in rapid loss of heat. Exposure to extreme cold causes nerve pulses to be slowed, resulting in fumbling, sluggish and clumsy reactions.

4.0 COLD INJURIES

Cold injuries are classified into two categories: local; or, general. Local injuries include frostbite, frostnip, chilblain and trenchfoot. General injuries include hypothermia and blood vessel abnormalities (genetically or chemically induced). Factors contributing to cold injury include: exposure to humidity and high winds; contact with wetness or metal; inadequate clothing; age; and, general health. Allergies, vascular disease, excessive smoking and/or drinking, and certain drugs and medicines are physical conditions that can compound the effects of exposure to a cold environment.

4.1 Hypothermia

Hypothermia is a condition of reduced body temperature. Most cases develop in air temperatures between 30-50 °F, not taking wind-chill factor in consideration.

Symptoms of hypothermia are uncontrolled shivering and the sensation of cold. The heartbeat slows and sometimes becomes irregular, weakening the pulse and changing blood pressure. Changes in the body chemistry cause severe shaking or rigid muscles; vague or slow slurred speech; memory lapses; incoherence; and drowsiness. Cool skin, slow irregular breathing, low blood pressure, apparent exhaustion, and fatigue after rest can be seen before complete collapse.

As the core temperature drops, the victim can become listless, confused, and make little or no effort to keep warm. Pain in the extremities can be the first warning of dangerous exposure to cold. Severe shivering must be taken as a sign of danger. At a core body temperature of about 85°F, serious problems develop due to significant drops in blood pressure, pulse rate and respiration. In some cases, the victim may die.

Sedative drugs and alcohol increase the risk of hypothermia. Sedative drugs interfere with the transmission of impulses to the brain. Alcohol dilates blood vessels near the skin's surface, increasing heat loss and lowering body temperature.

Table I provides information on the onset of hypothermia and metabolic responses at different body temperatures.

4.2 Raynaud's Phenomenon

Raynaud's Phenomenon is the abnormal constriction of the blood vessels of the fingers on exposure to cold temperatures, resulting in blanching of the ends of the fingers. Numbness, itching, tingling or a burning sensation may occur during related attacks. The disease is also associated with the use of vibrating hand tools in a condition sometimes called White Finger Disease. Persistent cold sensitivity, ulceration and amputations can occur in severe cases.

4.3 Acrocyanosis

Acrocyanosis is caused by exposure to the cold and reduces the level of hemoglobin in the blood, resulting in a slightly blue, purple or gray coloring of the hands and/or feet.

4.4 Thromboangitis Obliterans

Thromboangitis obliterans is clotting of the arteries due to inflammation and fibrosis of connective tissue surrounding medium-sized arteries and veins. This is one of the many disabling diseases that can also result from tobacco use. Gangrene of the affected limb often requires amputation.

4.5 Frostbite

Frostbite is the freezing of the body tissues due to exposure to extremely low temperatures, resulting in damage to and loss of tissue. Frostbite occurs because of inadequate circulation and/or insulation, resulting in freezing of fluids around the cells of the body tissues. Most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Frostbite can affect outer layers of skin or can include the tissues beneath. Damage can be serious, with permanent loss of movement in the affected parts, scarring, necrotic tissue, and amputation are all possibilities. Skin and nails that slough off can grow back.

The freezing point of the skin is about 30 °F. As wind velocity increases, heat loss is greater and frostbite will set in more rapidly.

There are three degrees of frostbite: first degree, freezing without blistering and peeling; second degree, freezing with blistering and peeling; and, third degree, freezing with death of skin tissues and possibly the deeper tissues.

The following are symptoms of frostbite:

1. Skin changes color to white or grayish-yellow, progresses to reddish-violet, and finally turns black as the tissue dies;
2. Pain may be felt at first, but subsides;
3. Blisters may appear; and
4. Affected part is cold and numb.

The first symptom of frostbite is usually an uncomfortable sensation of coldness followed by numbness. Tingling, stinging, cramping and aching feelings will be experienced by the victim. Frostbite of the outer layer of the skin has a waxy or whitish look and is firm to the touch. Cases of deep frostbite cause severe injury. The tissues are cold, pale and solid. The victim is often unaware of the frostbite until someone else observes these symptoms. It is therefore important to use the "buddy system" when working in cold environments, so that any symptoms of overexposure can be noted.

Table II describes the cooling power of wind on exposed flesh. This information can be used as a guide for determining equivalent chill temperatures when the wind is present in cold environments.

4.6 Trench Foot and Chilblains

Trench foot is swelling of the foot caused by long, continuous exposure to cold without freezing, combined with persistent dampness or immersion in water. Edema (swelling), tingling, itching and severe pain occurs, followed by blistering, necrotic tissue and ulcerations. Chilblains have similar symptoms as trench foot, except that other areas of the body are affected.

4.7 Frostnip

Frostnip occurs when the face or extremities are exposed to a cold wind, causing the skin to turn white.

5.0 PREVENTION OF COLD STRESS

Cold stress can be prevented through a combination of various factors: acclimation; water and salt displacement; medical screening; proper clothing selection; and training and education. Through the use of engineering controls, work practices, work/rest schedules, environmental monitoring and consideration of the wind-chill temperature, the employee can be protected.

5.1 Acclimation

Acclimation can be achieved to some degree. Sufficient exposure to cold causes the body to undergo changes to increase comfort and reduce the risk of injury. However, these changes are minor and require repeated exposure to cold and uncomfortable temperatures to induce them.

5.2 Dehydration

The dryness of cold air causes the body to lose a significant amount of water through the skin and lungs. It is essential that caffeine-free, non-alcoholic beverages be available at the worksite for fluid replacement. Dehydration also increases the risk of injury due to cold and affects blood flow to the extremities.

5.3 Diet

A well-balanced diet is important for employees working in cold environments. Diets restricted only to certain foods may not provide the necessary elements for the body to withstand cold stress, leaving the worker vulnerable.

5.4 Control Measures

When the windchill factor results in an equivalent temperature of -26 °F, continuous exposure of the skin will not be permitted. Any worker exposed to temperatures of 36 °F or less who becomes immersed in water will be given dry clothing immediately and treated for hypothermia at the local hospital if any symptoms of hyperthermia are present. Notification of this incident will be provided to the Health and Safety Division immediately after sending the worker to the hospital.

5.5 Engineering Controls

The following are some ways that environmental controls can be used to reduce the effects of a cold environment:

1. General or spot heating should be used to increase temperature in certain areas in the workplace;
2. Warm air jets, radiant heaters or contact warm plates can be used to warm the worker's hands if fine work is to be performed with bare hands for 10 to 20 minutes or more;
3. Shield the work area if air velocity at the work Site is increased by wind, draft or ventilating equipment;
4. Metal handles of tools and control bars should be covered with thermal insulating material at temperatures below 30 °F;
5. Unprotected metal chair seats will not be used in cold environments;
6. When appropriate and feasible, equipment and processes will be substituted, isolated, relocated, or redesigned;

7. Power tools, hoists, cranes or lifting aids will be used to reduce the metabolic workload;
8. Heated warming shelters will be made available for continuous work being performed in an equivalent temperature of 20 °F or below, workers will be encouraged to use the shelters regularly; and
9. Administrative work practice controls.

Work practices and guidelines can be designed and developed to reduce exposure to cold stress. Some of these may include:

1. Work-rest schedules to reduce the peak of cold stress;
2. Enforce scheduled breaks;
3. Enforce intake of caffeine-free, non-alcoholic beverages;
4. Schedule work that has potential exposure to cold stress for the warmest part of the day;
5. Move work to warmer areas, whenever possible;
6. Assign extra workers for high-demand tasks;
7. Provide relief workers for other workers needing breaks;
8. Teach basic principles of recognizing and preventing cold stress;
9. Use the buddy system for work at 10 °F or below, and keep within eyeshot;
10. Allow new employees to adjust to the conditions before they work full-time in cold environments;
11. Minimize sitting and standing in one place for long periods of time; and
12. Include weight and bulkiness of clothing when estimating work performance requirements and weights to be lifted;

Table III provides a work/warm-up schedule for cold environments, with wind chill taken into account.

5.6 Special Considerations

Older workers and workers with circulatory problems should be extra careful in cold environments. Sufficient sleep and good nutrition are important preventive measures for maintenance tolerance to the cold. Double shifts and overtime work should be avoided when working in cold environments.

If any of the following symptoms are observed on-site, the affected worker will immediately go to warm shelter:

- Onset of heavy shivering;
- Frostnip;
- Feeling of excessive fatigue;
- Drowsiness; and
- Euphoria.

After entering the warm shelter, the outer layer of clothing should be removed. If the clothing is wet from sweat and perspiration, dry clothing should be provided. If this is not feasible, then the clothing should be loosened to allow sweat to evaporate.

Anyone working in cold environments and on prescribed medication should consult their physician concerning any possible side effects due to cold stress. Those individuals suffering from diseases and/or taking medication that interferes with normal body temperature regulation or reduces the tolerance to cold will not be allowed to work in temperatures of 30 °F or below.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

In choosing PPE for cold environments, it is important to maintain airspace between the body and outer layer of clothing to retain body heat. The more air pockets, the better the insulation. The clothing should also allow for the evaporation of sweat if the skin is wet.

The most important parts of the body to protect are the feet, hands, head and face. Hands and feet become cooled most easily, because of their distance from the heart. Keeping the head covered is equally important. As much as 40% of body heat loss is through the head when it is exposed.

Ideal clothing for exposure to cold environments is made of wool, polypropylene, or other wicking fabrics. Loosely fitted clothing also aids in sweat evaporation. Recommended clothing may include the following:

1. Polypropylene under shirt and shorts under thermal underwear (preferably two-piece);
2. Wool socks;
3. Wool or thermal pants, lapped over boot tops to keep out snow and water;
4. Suspenders (belts can constrict and reduce circulation);
5. Insulated work boots, preferably waterproof. Safety toe, if necessary;
6. Wool or cotton shirt;
7. Parka;
8. Knit cap/hard hat liner;
9. Wool mittens or gloves (depending on the dexterity required); and
10. Face mask or scarf.

Dirty or greasy clothing loses much of its insulation value. Dirty clothing crushes air pockets, allowing air to escape more easily. Also, denim is not a good protective fabric. It is loosely woven and allows water to penetrate and wind to blow away body heat.

TABLE I

PROGRESSIVE CLINICAL PRESENTATION OF HYPOTHERMIA*

Core Temperature		Clinical Signs
Deg. C	Deg. F	
37.6	99.6	"Normal" Rectal Temperature
37	98.6	"Normal" Oral Temperature
36	96.8	Metabolic rate increases in an attempt to compensate for heat loss.
35	95.0	Maximum shivering.
34	93.2	Victim conscious and responsive, with normal blood pressure.
33	91.4	Severe hypothermia below this temperature.
32	89.6	Consciousness clouded, blood pressure becomes difficult to obtain,
31	87.8	Pupils dilated but react to light, shivering ceases.
30	86.0	Progressive loss of consciousness, muscular rigidity increases,
29	84.2	Pulse and blood pressure difficult to obtain, respiratory rate decreases
28	82.4	Ventricular fibrillation possible with myocardial irritability.
27	80.6	Voluntary motion ceases, pupils non-reactive to light, deep tendon
26	78.8	And superficial reflexes absent.
25	77.0	Ventricular fibrillation may occur spontaneously.
24	75.2	Pulmonary edema.
22	71.6	Maximum risk of ventricular fibrillation.
20	68.0	Cardiac standstill.
18	64.4	Lowest accidental hypothermia victim to recover.
17	62.6	Isoelectric electroencephalogram.
9	48.2	Lowest artificially cooled hypothermia patient to recover.

* Presentations approximately related to core temperature. Reprinted from the January 1982 issue of American Family Physician, published by the American Academy of Family Physicians.

TABLE II

Cooling Power of Wind on Exposed Flesh as Equivalent Temperature

(Under calm conditions)*

Estimated Wind Speed (mph)	Actual Temperature Reading (Degrees Fahrenheit)											
	50	**40**	**30**	**20**	**10**	**0**	**-10**	**-20**	**-30**	**-40**	**-50**	**-60**
	Equivalent Chill Temperature (□F)											
Calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect).	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.			GREAT DANGER Flesh may freeze within 30 seconds.				

* Developed by the U.S. Army Research Institute of Environmental Medicine, Natick, MA

Note #1: Wind speeds greater than 40 mph have little additional effect.

Note #2: Trenchfoot and immersion foot may occur at any point on this chart

TABLE III

Threshold Limit Values Work/Warm-up Schedule for 4-Hour Shift (*)

Air Temp.-Sunny Sky		**No Noticeable Wind**		**5 mph Wind**		**10 mph Wind**		**15 mph Wind**		**20 mph Wind**	
˚C (approx)	**˚F (approx)**	**Max. Work Period**	**No. of Breaks**	**Max. Work Period**	**No. of Breaks**	**Max. Work Period**	**No. of Breaks**	**Max. Work Period**	**No. of Breaks**	**Max. Work Period**	**No. of Breaks**
-26˚ to -28˚	-15˚ to -19˚	(Norm. Breaks) 1		(Norm.Breaks) 1		75 min.	2	55 min.	3	40 min.	4
-29˚ to -31˚	-20˚ to -24˚	(Norm. Breaks) 1		75 min	2	55 min.	3	40 min.	4	30 min.	5
-32˚ to -34˚	-25˚ to -29˚	75 min	2	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease	
-35˚ to -37˚	-30˚ to -34˚	55 min.	3	40 min.	4	30 min.	5	Non-emergency work should cease			
-38˚ to -39˚	-35˚ to -39˚	40 min.	4	30 min.	5	Non-emergency work should cease					
-40˚ to -42˚	-40˚ to -44˚	30 min.	5	Non-emergency work should cease							
-43˚ & below	-45˚ & below	Non-emergency work should cease									

Notes for TABLE III:

1. Schedule applies to moderate to heavy work activity with warm-up breaks of 10 minutes in a warm location. For light to moderate work (limited physical motion), apply the schedule one step lower. For example, at -30 °F with no noticeable wind (step 4, a worker at a job with little physical movement should have a maximum work period of 40 minutes with 4 breaks in a 4 hour period.
2. The following is suggested as a guide for estimating wind velocity if accurate information is not available: 5 mph, light flag moves; 10 mph, light flag fully extended; 15 mph, raises newspaper sheet; 20 mph, blowing drifting snow.
3. If only the wind-chill cooling rate is available, a rough rule of thumb for applying it rather than the temperature and wind velocity factors given above would be: 1) special warm-up breaks should be initiated at a wind-chill cooling rate of about 17 watts per square meter (W/m^2); 2) all non-emergency work should have ceased at or before a wind-chill of 2250 W/m^2. In general the warm-up schedule provided above slightly under-compensates for the wind at the warmer temperatures, assuming acclimatization and clothing appropriate for winter work. On the other hand, the chart over-compensates for the actual temperatures in the colder ranges, since windy conditions prevail at extremely low temperatures.
4. TLVs apply only for workers in dry clothing.

* Adapted from Occupational Health and Safety Division, Saskatchewan Department of Labour.

APPENDIX C
HEAT STRESS PROGRAM

1.0 INTRODUCTION

Heat stress is one of the most common (and potentially serious) illnesses at job Sites. Although it is caused by a number of interacting factors, the wearing of PPE puts the worker at a much higher risk during warmer environmental conditions. The results of heat stress range from fatigue to serious illness or death. Through regular fluid replacement and other preventive measures, heat stress can be controlled, leading to increased efficiency and a higher level of safety on the job.

2.0 PURPOSE

To create an awareness among employees concerning the body's physiologic responses to heat; different types of heat stress that can affect the body; recognition of signs and symptoms; first aid treatment; and preventive measures.

3.0 SOURCES OF HEAT

There are two sources of heat that are important to anyone working in a hot environment:

- Internally generated metabolic heat; and
- Externally imposed environmental heat.

4.0 PHYSIOLOGIC RESPONSES TO HEAT

The human body maintains a fairly constant internal temperature, even though it is exposed to varying environmental temperatures. To keep internal body temperatures within safe limits, the body must get rid of its excess heat, primarily through varying the rate and amount of blood circulation through the skin and the release of fluid onto the skin by the sweat glands. These automatic responses usually occur when the temperature of the blood exceeds 98.6 °F and are kept in balance and controlled by the brain. In this process of lowering internal body temperature, the heart begins to pump more blood, blood vessels expand to accommodate the increased flow, and the microscopic blood vessels (capillaries) which thread through the upper layers of the skin begin to fill with blood. The blood circulates closer to the surface of the skin, and the excess heat is lost to the cooler environment.

If the heat loss from increased blood circulation through the skin is not adequate, the brain continues to sense overheating and signals the sweat glands in the skin to release large quantities of sweat onto the skin surface. Evaporation of sweat cools the skin, eliminating large quantities of heat from the body.

As environmental temperatures approach normal skin temperature, cooling of the body becomes more difficult. If air temperature is as warm as or warmer than the skin, blood brought to the body surface cannot lose its heat. Under these conditions, the heart continues to pump blood to the body surface, the sweat gland pour liquids containing electrolytes onto the surface of the skin, and the evaporation of the sweat becomes the principal effective means of maintaining a constant body temperature. Sweating does not cool the body unless the moisture is removed from the skin by evaporation. In high humidity, the evaporation of sweat from the skin is decreased and the body's efforts to maintain an acceptable body temperature may be significantly impaired. These conditions adversely affect an individual's ability to work in the hot environment. With so much blood going to the external surface of the body, relatively less goes to the active muscles, the brain, and other internal organs; strength declines; and fatigue occurs sooner than it would otherwise. Alertness and mental capacity also may be affected. Workers who must

perform delicate or detailed work may find their accuracy suffering, and others may find their comprehension and retention of information lowered.

When temperature differences exist between two or more bodies, heat can be transferred. Net heat transfer is always from the body (or object) of higher temperature to that of lower temperature and occurs by one or more of the following mechanisms:

- Conduction. The transfer of heat from one point to another within the body, or from one body to another when both bodies are in physical contact. Conduction can be a localized source of discomfort from direct physical contact with a hot or cold surface, it is normally not a significant factor to total heat stress.
- Convection. The transfer of heat from one place to another by moving gas or liquid. Natural convection results from differences in density caused by temperature differences. Thus warm air is less dense than cool air.
- Radiation. The process by which energy, electromagnetic (visible and infrared), is transmitted through space without the presence or movement of matter in or through this space.

5.0 PREDISPOSING FACTORS TO HEAT STRESS

Factors that may predispose an individual to heat stress vary according to the individual. These factors include:

- Lack of physical fitness;
- Lack of acclimatization;
- Age;
- Dehydration;
- Obesity;
- Drug/alcohol abuse;
- Infection;
- Sunburn;
- Diarrhea; and
- Chronic disease.

Predisposing factors and an increased risk of excessive heat stress are both directly influenced by the type and amount of PPE worn. PPE adds weight and bulk, reduces the body's access to normal heat exchange mechanisms (evaporation, convection and radiation) and increases energy expenditure.

6.0 FORMS OF HEAT STRESS AND FIRST AID

(The following excerpts were taken from NIOSH Publication No. 86-112, Working in Hot Environments):

"Excessive exposure to a hot work environment can bring about a variety of heat-induced disorders. Among the most common are heat stroke, heat exhaustion, heat cramps, fainting and heat rash.

6.1 Heat Stroke

Heat Stroke is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105 °F or higher, and the victim is mentally confused, delirious perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

Individuals with signs or symptoms of heat stroke require immediate hospitalization. First aid should be immediately administered. This includes removing the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment, at a medical facility, should be directed to the continuation of the cooling process and the monitoring of complications that often accompany heat stroke. Early recognition and treatment are the only means of preventing permanent brain damage or death.

6.2 Heat Exhaustion

Heat Exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from heat exhaustion still sweats but experiences weakness or fatigue, giddiness, nausea or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

In most cases, treatment involves having the victim rest in a cool place and drink plenty of liquids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.

6.3 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. The drinking of large amounts of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly after, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs, or abdomen; but tired muscles (those used in performing the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth.

6.4 Fainting

Fainting occurs in workers not accustomed to hot environments and who stand erect and immobile in the heat.

With enlarged blood vessels in the skin and in the lower part of the body due to the body's attempts to control internal temperature, blood may pool there rather than return to the heart to be pumped to the brain. Upon lying down, the worker should soon recover. By moving around, and thereby preventing blood from pooling, the patient can prevent further fainting.

6.5 Heat Rash (Prickly Heat)

Heat rash, also known as prickly heat, is likely to occur in hot, humid environments where sweat is not as easily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin."

7.0 SELECTION OF PERSONAL PROTECTIVE EQUIPMENT (PPE)

During work periods where the increased risk of heat stress exists, each item's benefit will be carefully evaluated. Once the PPE is chosen, safe work durations/rest periods will be determined based on the following conditions:

- Anticipated work rate;
- Ambient temperature and humidity; and
- Level of protection.

8.0 PREVENTION OF HEAT STRESS

Prevention of heat stress will be addressed in the following manner:

- Adjustment of work schedules.
- Modify work/rest schedules.
    1. Enforce work slowdowns, as needed.
    2. Rotate personnel to minimize overstress or overexertion.
    3. When possible, work will be scheduled and performed during cooler hours.
- Provide shelter or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels.
    1. Drink approximately 12 to 16 ounces of non-caffeinated liquid (preferably water, Gatorade or equivalent) prior to the start of work. Caffeinated fluids act to dehydrate the worker.
    2. Workers will be urged to drink a cup or two every 15 to 20 minutes, or at each break. A total of 1 to 1.5 gallons of water per individual per day are recommended for fluid replacement under heat stress conditions, but more may be required.
- Encourage physical fitness among the workers.
- Gradually acclimatize workers on Site to help build up an "immunity" to the conditions.
    1. Heat acclimatization can usually be induced in 5 to 7 days of exposure at a hot job. For workers with previous experience with the job, acclimatization will include exposures of 50% for day 1, 60% for day 2, 80% for day 3, and 100% for the remaining additional days.

- Provide cooling devices during prolonged work or severe heat exposure.
    1. Supply field showers or hose down areas.
    2. Supply personnel with cooling jackets, vests, and suits.

- Train workers in recognition and treatment of heat stress.
- Use of the buddy system that depends on the recognition of signs and symptoms of heat stress.

Identification of heat-intolerant individuals through medical screening.

APPENDIX D

MONITORING INSTRUMENTS: USE, CARE, AND CALIBRATION

1.0 INTRODUCTION

Prior to beginning any work at contaminated Sites, a preliminary Site evaluation must be conducted to identify the hazards or suspected hazards of the Site. Hazardous conditions can be evaluated via air monitoring with direct-reading instruments, to allow section of the proper level of protection for the specific type of work activity. Monitoring equipment used by AKRF personnel includes Photoionization Detectors (PID) and Dust Monitors. If necessary for specific work tasks, monitr5ong equipment may also include carbon monoxide meters, oxygen meters, lower explosive limit (LEL) meters, or combustible gas indicators (CGI). This program contains a description of each type of monitoring equipment; hazards for which it can be used to monitor; Applications; Care and Maintenance; Limitations; and, Calibration.

2.0 SCOPE

This program covers the use, application, care and maintenance, limitations and calibration of CGIs, Multigas meters, PIDs and Dust Monitors used by AKRF employees involved in hazardous materials operations.

3.0 INSTRUMENTATION

3.1 Photoionization Detectors (PIDs)

3.1.1 Introduction

PIDs measure a variety of gases in many industrial, as well as hazardous material, operations. These analyzers employ the principle of photoionization, which is the absorption of ultraviolet light by molecules, for detection.

The sensor consists of a sealed ultraviolet light. The energy ionizes many trace species (particularly organics) but does not ionize the major components of air, such as O_2, N_2, CO, CO_2, or H_2O. A chamber adjacent to the ultraviolet source contains a pair of electrodes. When a positive potential is applied to one electrode, the field created drives any ions, which are formed by absorption of the UV light, to the collector electrode, where the current (proportional to the concentration) is measured.

To minimize absorption of various sample gases, the ion chamber is made up of an inert fluorocarbon material, located at the sampling point, and a rapid flow of sampling gas is maintained through the small ion chamber volume.

The analyzer will operate either from a rechargeable battery for up to 10 hours, or continuously from the AC battery charger.

The useful linear range of the instrument is from a fraction of a part per million (PPM) to about 2000 PPM.

3.1.2 Theory

AKRF utilizes the Thermo 580B Organic Vapor Meter (OVM) as its PID. The 580B OVM is a portable, non-specific vapor/gas detector, which employs the principle of photoionization to detect a variety of organic chemical compounds.

The 580B contains an ultraviolet light source within its sensor chamber. Ambient air is drawn into the chamber with the aid of a small fan or positive displacement pump. If the ionization potential (IP) of any contaminant present in the ambient air is equal to or lower than the energy of the UV light source, ionization will take place, causing a deflection in the meter.

The 580B OVM readings are expressed in parts per million (PPM) relative to the calibration gas. All readings must be stated as equivalent readings that depend on the calibration gas being used to calibrate the meter. The calibration gas used is Isobutylene, which is used as an equivalent in place of benzene, and allows the instrument to provide results in benzene equivalents.

3.1.3 Basic Operation of the 580B OVM

A sample of air is drawn through a chamber and an ultraviolet light causes certain contaminants present to be broken apart into positive and negative charged particles. These charged particles are passed between electrodes and converted into an electrical impulse displayed on the readout.

3.1.4 Checkout and Use Procedures

Attach the probe to the readout assembly. Turn the instrument on by inserting the power plug into the "RUN/CHG" connector and pressing the ON/OFF button on the key pad. Listen for the humming of the pump. Hold a permanent marker to the probe tip to make sure it is working properly.

3.1.5 Field Applications/Limitations

- The 580B OVM will only detect organic materials with an ionization potential less than 10.2eV, unless a lamp with a higher eV is installed.
- It is a non-specific detection device, but provides continuous information on airborne concentrations.
- It will not respond equally to all contaminants, and does not detect methane.
- High humidity will cause the instrument to give lower readings than the actual airborne concentration.
- Transfer of the instrument from a cold to a warm environment may cause condensation to form on the UV light source window, causing erroneous results.
- The readout may also be affected by electrical power lines or power transformers.
- Total concentrations are relative to the calibration gas used (isobutylene). Therefore, true concentrations cannot be identified.

3.1.6 Calibration Procedure

Calibration Checklist: 580B OVM (probe and meter); span gas (100 PPM isobutylene); regulator; tygon tubing; Tedlar bag.

Inventory Items: Battery; Lamp; ION chamber; O-Rings; Screws.

- Obtain calibration gas: Zero Gas and 100 PPM isobutylene Span Gas.

- Connect the Zero Gas to a dedicated 1-liter Tedlar bag using tygon tubing. Open the gas regulator and the sample bag valve. Allow the bag to fill with gas, then close the gas regulator and the sample bag valve. Follow the same procedures to fill a dedicated Tedlar bag with Span Gas.
- Put the 580B into calibration mode in accordance with the instruction manual toggle press the +/INC button until it displays "Zero Gas/Reset When Ready". Connect the Tedlar bag containing Zero Gas to the probe tip (using the Tygon tubing), open the gas regulator and sample bag valve, and press the "Reset" button on the OVM. The instrument will read "Model 580B Zeroing". Once the instrument is finished zeroing, it will read "Span PPM = 100". (If it does not read 100 PPM, consult the instruction manual to change the span gas value).
- Press the +/INC button, and the instrument should read "Span Gas/Reset When Read". Connect the Tedlar bag containing Span Gas to the probe tip (using the Tygon tubing), open the gas regulator and sample bag valve, and press the "Reset" button on the OVM. The instrument will read "Model 580B Calibrating". Once the instrument is finished calibrating, it will return to the beginning of the calibration mode and will read "Reset to Calibrate".

3.1.7 Maintenance and Calibration Records

- Protect the instrument from excessive abuse, such as moisture, shock, vibration, etc.
- Maintenance and calibration records will be recorded in a logbook specific to the OVM.

3.1.8 Troubleshooting

Below are some points that should be considered if the instrument is not running appropriately:

- Check the battery condition. Recharge it if necessary.
- If unstable readings are obtained, a faulty probe cable or electrical connection could be the problem. To check this, hold the probe normally and flex the cable firmly. Watch the meter needle for fluctuations as the cable is flexed. Individual wires in the readout can be checked in a similar way.
- Check the coaxial connector on the amplifier board in the probe for any separation.
- No response on any setting may mean that the meter movement is broken. Tip the instrument from side-to-side. The needle should move freely and return to zero.
- No response may mean that the electrical connection to the meter is broken. Check all wires leading to the meter and clean the contacts of the quick-disconnects.
- No response may mean that the battery is completely dead. Disconnect the battery and check the voltage with a volt-ohm meter. Also check the 2-amp fuse.

- If the instrument responds correctly in all settings, but the signal is lower than expected:
    1. Check the span setting.
    2. Clean the window of the light source.
    3. Check the fan for proper insertion.
- If the instrument response is slow and/or not reproducible, either the pump is operating improperly or the instrument needs to be recalibrated.

A low battery indication comes on if the battery charge is low. It will also come on if the ionization voltage is too high.

3.2 MultiGas Meter

Combination meters measure the concentration of combustible gas or vapor present in an area, as well as the oxygen, carbon monoxide, and hydrogen sulfide content. The LEL concentrations are reported as a percent, and the O_2, CO, and H_2S concentrations are reported in ppm. Although it is an easy instrument to operate, its effective use requires that the operator understand the operating principles and procedures behind the instrument. Certain atmospheres may cause erroneous readings or damage to the instrument. Typically, the instrument can be used as long as the battery lasts, or for the recommended interval between calibrations.

3.2.1 Detection Method

AKRF uses the Rae Systems Q-Rae or similar as a multi-gas meter. The Q-Rae uses four different sensors to measure a variety of gases. A catalytic bead sensor is used to measure combustible gases, and an electrochemical sensor is used to measure oxygen concentration. Electrochemical, toxic-gas sensors are used to measure CO and H_2S. A diaphragm pump draws the air sample into the sensor manifold and then distributes it to all sensors.

3.2.2 Maintenance

Maintenance of combination meters is fairly simple. Batteries must be recharged at the end of a continuous day's use. Occasionally, the rechargeable battery must be replaced. Most batteries last for approximately 2 years of continued use. Also, oxygen and combustible gas sensors will need to be replaced periodically. These sensors last approximately 1-2 yrs with continued use. Sensors that can no longer be calibrated within the manufacturers' acceptable range indicate the need for replacement.

If, after an attempted calibration, the instrument cannot be calibrated due to problems other than the need for battery or sensor replacement, the problem must be reported to the Facility Manager immediately, so that the instrument can be sent out for repair.

3.2.3 Calibration

The Q-Rae is calibrated using a two-point calibration process using “fresh air” and the standard reference gas. First, “fresh air” containing 20.9% oxygen and no detectable toxic or combustible gasses is used to set the zero point for the LEL, CO and H_2S sensors and the span for the O_2 sensor. Then a standard reference gas, containing a known concentration of each given gas, is used to set the second point of reference for the first 3 sensors. The two-point calibration procedure is detailed in the instrument manual.

Calibration should be performed each day that the Q-Rae is used using manufacturer-recommended zero and calibration gasses.

3.2.4 Limitations

The combination meter contains some inherent limitations. Knowledge of these limitations will help the user make an educated decision regarding the accuracy of the instrument.

Accuracy of the instrument depends, in part, on the difference between the calibration and sampling temperatures. Differences in temperature may cause a lack of sensitivity in the instrument when brought from a warm to a cold environment.

The filament can be damaged by certain compounds such as silicones, halides, tetraethyl lead, and oxygen enriched atmospheres. Each manufacturer's instrument handbook should contain a listing of compounds that should not be sampled with this instrument, or serious damage could result.

Under oxygen deficient atmospheres, the oxygen analyzer must be read first. Otherwise, the CGM analyzer may not provide a valid reading and give the user a false sense of security.

3.3 Dust Meter

AKRF uses a TSI DustTrak as a dust meter. The DustTrak is a single channel basic photometric instrument used to determine the mass concentration of aerosols in real time.

3.3.1 Theory of Operation

The DustTrak measures particulates by drawing aerosols into the sensing chamber in a continuous stream using a diaphragm pump. Part of the aerosol stream is split ahead of the sensing chamber and passed through a HEPA filter and injected back in to the chamber around the inlet nozzle as sheath flow. The remaining flow, called the sample flow passes through the inlet entering the sensing chamber. Here, it is illuminated by a sheet of laser light. This sheet of laser light is formed from a laser diode. First, the light emitted from the laser diode passes through a collimating lens and then through a cylindrical lens to create a thin sheet of light. A gold coated spherical mirror captures a significant fraction of the light scattered by the particles and focuses it on to a photo detector. The voltage across the photo detector is proportional to the mass concentration of the aerosol over a wide range of concentrations. The voltage is then multiplied by a calibration constant which is determined from the ratio of a known mass concentration of the test aerosol to the voltage response of the DustTrak.

3.3.2 Maintenance

The DustTrak requires maintenance on a regular basis, in accordance with the factory recommended maintenance schedule listed in the instrument manual. Some maintenance items are required each time the DustTrak monitor is used or on an annual basis. Other items are scheduled according to how much aerosol is drawn through the instrument. For example, cleaning the inlet sample tube is recommended after 350 hours of sampling a 1 mg/m^3 concentration of aerosol. This recommendation should be pro-rated according to how the instrument is used as specified in the manual. The following table summarizes the recommended maintenance schedule assuming that particulates are drawn through the meter at an average concentration of 1 mg/m^3:

TABLE 1

DUSTTRAK MAINTENANCE SCHEDULE

Item	Frequency
Clean 1.0 µm nozzle	Every 5 hours
Clean 2.5 µm nozzle	Every 30 hours
Clean 10 µm nozzle, inlet, and sample tube	Every 350 hours
Replace internal filters	Every 700 hours
Clean cyclone	Before each use
Return to factory for cleaning and calibration	Annually

Notes: µm = micrometer

The DustTrak monitor keeps track of the accumulated amount of aerosol drawn through it since its last cleaning. When sample tube cleaning or internal filter replacement is due, the display shows the message "Service 4" or "Service 5" respectively, during power-up. Press any key to bypass the message, but be sure to perform the maintenance procedures at your earliest convenience.

3.3.3 Zero Checking/Re-Zeroing

The manufacturer recommends that the DustTrak be zero-checked each day it is used, before running any extended tests, and after the instrument experiences a significant environmental change. Examples of significant environmental changes would be ambient temperature changes that exceed 15 °F (8 °C) or moving from locations with high aerosol concentrations to low concentrations. The Zero-Check procedures are as follows:

- Put the DustTrak monitor in Survey mode.
- Put zero filter on aerosol sample inlet.
- Set the time-constant to 10 seconds. Press and hold the TIME CONSTANT key until "10" is displayed, then release.
- Wait 10 to 60 seconds for displayed values to settle to zero.
- If the displayed value is between -0.001 and +0.001 mg/m3, the DustTrak monitor does not need adjustment. If the displayed value exceeds this limit, follow steps 7 to 9 below to re-zero the instrument. Press and hold the CALIBRATE key and wait for the displayed countdown to reach 0, then immediately release the key. The message "CALIBRATE ZERO" is displayed. If not, try again.
- Press the SAMPLE key and wait for the 60-second countdown. When the countdown is completed, the current calibration constant will be displayed.
- Press the CALIBRATE key again to return to survey mode. The re-zeroing process is now completed.

APPENDIX E
LOCKOUT/TAGOUT

1.0 INTRODUCTION

The Lockout/Tagout Standard, 29 CFR 1910.147, is believed to prevent about 120 deaths and 60,000 injuries per year, according to OSHA officials. Although this standard is aimed at the industrial community, in environmental engineering applications, it is very important that employees understand and implement these procedures when working with and around energized equipment. Under this standard, the contractor is required to establish a program that utilizes procedures for locking out and/or tagging to isolate and disable the equipment to prevent accidental start-up or release of stored energy. The contractor's employees will identify, locate and control these energy sources, as necessary.

2.0 PURPOSE

The purpose of this Lockout/Tagout plan is to establish procedures for locking out and/or tagging to isolate and disable equipment to prevent accidental startup or release of stored energy, and possible injury to employees.

3.0 SCOPE

This procedure applies to all field/facility operations that require all operative energy sources, including line breaking, in the work area to be shut down, locked out and tagged, so that the contractor's employees may safely perform their job. Contractors and subcontractors performing work on this project will be required to comply with these requirements if their employer does not have a comparable lockout/tagout program already in place.

4.0 PROCEDURE

1. The authorized employee will evaluate the scope of work and all equipment, machines or industrial processes in the area that require the use of stored energy. Energized equipment that may cause a safety hazard will be shut down as required to eliminate the potential for injury.
2. Prior to beginning the work, the authorized employee will be sure that appropriate lockout/tagout equipment is available to isolate the energy source.
3. The authorized employee will ensure that all affected employees have been advised of the following topics:
    - Scope of Work;
    - Energy sources;
    - Energy isolation devices;
    - Lockout devices;
    - Tags;
    - Test procedures; and
    - Authorized personnel. (Those individuals charged with the responsibility for de-energizing and re-energizing energy sources).

4. Documentation of the safety meeting will be placed in the job folder for future reference. All employees will sign the Lockout Worksheet prior to starting the work. See Attachment A for a copy of the Lockout Worksheet.
5. The specified energized equipment will be shut down before the contractor's personnel or its subcontractors begin work on Site. Shut down will take place in the following manner:
    - The authorized employee will inform the client's representative of the need to shut down the equipment.
    - The authorized employee, with assistance from the client's representative, will locate all power sources on the process or equipment.
    - All power sources will be shut down and verified as such by the authorized employee.
    - When possible, a lockout device will be applied by both parties to isolate each source.
    - Any necessary testing of equipment will be conducted to ensure that the process or equipment is free of residual energy (per item 6).
    - The authorized employee will attempt to operate the machine to be sure that it remains inoperative. All activation controls will be returned to the "off" position after testing.
    - The authorized employee will apply a tag that bears the following warning, "DANGER - EQUIPMENT LOCKOUT" along with the authorized employee's name, the date, and the time of the lockout.
    - The authorized employee will complete the Lockout Worksheet.
    - Equipment may now be released for work by the authorized employee. No release will be given until all required inspections and testing are performed.
6. Residual energy: Pneumatic/hydraulic power, spring compression, and residual electrical energy in transformers are examples of residual energy that, when not accounted for, may present a greater hazard to the employee. These sources of energy will be identified, located and controlled in the following manner:
    - Residual electrical energy can be controlled through grounding.
    - Pneumatic/hydraulic line pressure can be released, allowing the weight to come to a rest.
    - Spring tensions can be relieved.
    - Product lines will be double blocked (panned) and bled to prevent product from being released.
    - A lockout device and tag will be applied and secured by the authorized employee for the duration of the job to prevent residual energy from re-accumulating and creating a hazard to employees.
    - The lockout/tagout will be documented by the authorized employee on the Lockout Worksheet.
7. After all work is completed, the authorized employee will perform the following:
    - The authorized employee will inform everyone that the job is complete.
    - The Lockout Worksheet will be reviewed by the authorized employee with all employees to make sure that all employees are accounted for before re-energizing the equipment.

- The authorized employee will be sure that all tools, debris or other material that could be placed into motion are removed before the equipment or process is re-energized. All employees will be instructed to stay clear of movable parts of the equipment or process.
- All residual energy controls will be removed by the authorized employee, as well as all energy isolation lockouts and tags.
- In the presence of the client's representative, energy will be restored to the equipment or process.
- All lockout equipment removal will be documented on the Lockout Worksheet by the authorized employee. The Lockout Sheet will be placed in the job file at the end of the shift.

8. All employees must be accounted for before re-energizing equipment. When employees that have worked on the job are absent from the final inspection before re-energizing the equipment, the authorized employee will initiate the following:
    - The lockout sheet will be checked to account for all employees.
    - The authorized employee will obtain a Lockout/Tagout Absent Employee form (See Attachment B).
    - The authorized employee will appoint employees to look for the individual, paying special attention to high hazard areas where physical harm could result from the start-up of the equipment or process.
    - After a complete search of the equipment or process, and it has been determined by the authorized employee that the employee is not present, all outlying areas surrounding the Site will be searched.
    - The area surrounding the Site will be guarded to prevent the absent employee from inadvertently entering a hazardous situation.
    - The equipment or process will be cleared for re-energization only by the authorized employee once all of the above conditions are met.
    - A copy of the completed Absent Employee form will be posted conspicuously in the work area, and not removed until the employee has been located. The client's representative will be notified of the situation so that the absent employee does not endanger himself/herself by entering an energized process or equipment.
9. When appropriate, contractors and subcontractors working under the contractor’s direction will be informed of their responsibilities, under the Lockout/Tagout Standard, to provide protection against hazardous energy.
    - When necessary within the scope of work, contractors and subcontractors without such a program, at the discretion of the contractor, will be disqualified from working on these projects.
    - The contractor or subcontractor program must be comparable or more strict than the contractor's program.
        1. Programs found to be insufficient in some areas will be returned, with the requested changes to be made before the program is acceptable for implementation.
        2. The copy of the program will be returned to the contractor or subcontractor, and will not be duplicated by the contractor or any of its employees.

- All affected employees will be given training in these procedures prior to performing any lockout/tagout work. This training will be documented and maintained in the employees' training file with the Health and Safety Division.
- This procedure will be reviewed annually to ensure that it remains relevant to the contractor's operations.

5.0 DEFINITIONS

Affected Employee: An employee whose job requires operation/use of equipment or machines on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed. All personnel or subcontractors working in these circumstances are "affected employees".

Authorized Employee: A person who locks out or implements a tagout system procedure on machines or equipment in connection with the servicing or maintenance on that machine or equipment. An authorized person and an affected employee may be the same person when the affected employee's duties also include performing a lockout or tagout on a machine or equipment.

Capable of being Locked Out: An energy isolating device will be considered to be capable of being locked out either if it designed with a hasp or other attachment or integral part to which, or through which, a lock can be affixed, or if it has a locking mechanism built into it. Other energy isolating devices will also be considered to be capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energized: Connected to an energy source or containing residual or stored energy.

Energy Isolating Device: A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: a manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a slide gate; a slip blind; a line valve; a block; and, any similar device used to block or isolate energy. The term does not include a push button, selector switch, and other control circuit type devices.

Energy Source: Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Lockout: The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout Device: A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment.

Tagout: The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout Device: A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

ATTACHMENT A

LOCKOUT WORKSHEET

LOCKOUT WORKSHEET

Job Location: _____ Project Manager: _____

Date: _____ Time: _____ a.m./p.m.

Description of Lockout to be Performed: _____

Energy source(s): _____

Pre-Work Safety Meeting Minutes: _____

Lockout Hardware Used: _____

Energy Restoration (Check each as you Progress):	**Time Completed**
_____ All personnel accounted for and in the clear	_____
_____ Point(s) of operation free of tools and debris.	_____
_____ Lockout hardware removed.	_____
_____ Personnel clear of points of operation.	_____
_____ Energy restored.	_____
_____ Equipment operation verified. Client's rep on Site.	_____
_____ Lockout terminated	_____

Employees' Signatures: _____

_____

_____

ATTACHMENT B

LOCKOUT/TAGOUT ABSENT EMPLOYEE FORM

LOCKOUT/TAGOUT ABSENT EMPLOYEE FORM

NOTICE

Upon completion of work performed under lockout/tagout conditions, the following employee(s) listed below could not be located or accounted for:

_____

_____

_____

All attempts have been made to locate this employee at the jobsite. It has been verified that this employee is not in the vicinity of the hazardous energy source and will not be affected by the startup of equipment which was under lockout conditions.

_____ _____

Signature of Authorized Employee Date

APPENDIX F

INCIDENT REPORT FORM

SUPERVISOR'S REPORT OF ACCIDENT

Supervisor's Name: _____

Basic Rules for Accident Investigation

- Find the cause to prevent future accidents - Use an unbiased approach during investigation.
- Interview witnesses & injured employees at the scene - conduct a walkthrough of the accident.
- Conduct interviews in private - Interview one witness at a time.
- Get signed statements from all involved.
- Take photos or make a sketch of the accident scene.
- What hazards are present - what unsafe acts contributed to accident?
- Ensure hazardous conditions are corrected immediately.

Date & Time		**Location**	
Task Performed		**Witnesses**	
Resulted in	___ **Injury** ___ **Fatality** ___ **Property Damage**	**Property Damage**	
Injured		**Injured**	
Describe Accident Facts & Events			

Supervisors Root Cause Analysis (Check ALL that apply to this accident)			
Unsafe Act		**Unsafe Conditions**	
Improper work technique		Poor workstation design	
Safety rule violation		Unsafe operation method	
Improper PPE or PPE not used		Improper maintenance	
Operating without authority		Lack of direct supervision	
Failure to warn or secure		Insufficient training	
Operating at improper speeds		Lack of experience	
By-passing Safety device		Insufficient knowledge of job	
Protective equipment not in use		Slippery conditions	
Improper loading or placement		Excessive noise	

Improper lifting		Inadequate guarding of hazards	
Servicing Machinery in motion		Defective tools/equipment	
Horseplay		Poor housekeeping	
Drug or alcohol use		Insufficient lighting	

Unsafe Acts require a written warning and re-training before the Employee resumes work.

Date		**Date**	
Retraining Assigned		**Unsafe Condition Guarded**	
Retraining Completed		**Unsafe Condition Corrected**	
Supervisor Signature		**Supervisor Signature**	

Accident Report Review

Supervisor _____ Date _____

Department Superintendant _____ Date _____

Safety Manager _____ Date _____

Plant Manager _____ Date _____

Huxley Envelope Industrial Site

BROOKLYN, NEW YORK

Community Air Monitoring Plan

AKRF Project Number: 11884

NYSDEC Site Number: C224147

Prepared for:

MP 145 WS Owner LLC
c/o Mack Real Estate Group
60 Columbus Circle, 20th Floor
New York, NY 10023

Prepared by:

AKRF Engineering, P.C.
440 Park Avenue South
New York, NY 10016
(212)696-0670

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1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) provides details for the work zone perimeter air monitoring during the implementation of field activities conducted at the Huxley Envelope Industrial site lcoated at 145 West Street, Brooklyn, New York (the "Site").

The 2.65-acre Site is bounded to the north by Huron Street, followed by a warehouse; to the east by West Street, followed by residential buildings; to the south by India Street, followed by a shipping and receiving warehouse; and to the west by the East River and the East River Ferry station (See Figure 1 for the project Site location). The surrounding area is primarily industrial north and south of the Site, with residential buildings and few commercial uses to the east. The Site is owned by MP 145 WS Owner LLC c/o Mack Real Estate Group and investigation and remedial activities have been managed under the oversight of the New York State Department of Environmental Conservation (NYSDEC) in accordance with Brownfield Cleanup Agreement (BCA) Index No. C224147-05-11 which was originally executed on June 6, 2011.

This CAMP is part of the Site Management Plan (SMP) that details the procedures required to manage known or potential residual contamination following completion of the remedial action at the Site. The SMP consists of an Engineering and Institutional Control Plan, a Monitoring Plan, an Operation and Maintenance Plan, and a Site Management Reporting Plan. An Excavation Work Plan, which includes provisions for managing excavated material, and a Health and Safety Plan, which provides provisions to address the worker health and safety are also attached to the SMP.

Details on the Site environmental history and remedial activities performed are provided in the SMP. The main contaminants of concern of concern were volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals including lead, and mercury.

Engineering Controls have been incorporated into the Site remedy to control exposure to remaining contamination during the use of the Site to ensure protection of public health and the environment. The following long-term engineering controls have been implemented: a sub-slab depressurization system (SSDS) in Building A in the western portion of the Site, to mitigate the potential for soil vapor intrusion; and a composite cover consisting of concrete or soil.

An Environmental Easement granted to the NYSDEC, and recorded with the Kings County Clerk, will require compliance with this SMP and all ECs and ICs placed on the Site. The ICs place restrictions on Site use, and mandate operation, maintenance, monitoring and reporting measures for all ECs and ICs. This SMP specifies the methods necessary to ensure compliance with all ECs and ICs required by the Environmental Easement for contamination that remains at the Site. The SMP has been approved by the NYSDEC, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC.

1.1 Purpose and Objectives

The principal purpose of the CAMP is to monitor air quality in the vicinity of intrusive activities (below the Site cover). The CAMP consists of monitoring dust, vapors and nuisance odors on a periodic/roving basis. Monitoring of this project will include real-time air monitoring for particulate matter/dust and VOCs, observations for visible emissions and odors, inspection and monitoring of the contractor's work practices, and reporting to the NYSDEC and the NYSDOH. Monitoring will be performed during all slab-intrusive activities.

Principal objectives of the CAMP are as follows:

- Monitor VOC vapors such that vapors associated with the remedial actions are maintained below action levels.

- Monitor dust as PM_{10} such that dust associated with the remedial actions is maintained below action levels.
- Monitor VOCs and visible emissions so that vapors and dust from the excavation operations do not leave the Site.
- Monitor for nuisance odors to prevent odors that could impact the surrounding community.
- In the event that VOCs, dust or odors exceed action levels, construction personnel will be immediately notified so that all necessary corrective actions can be taken.

1.2 Operations to be Monitored

The remedial actions to be performed under this CAMP consist of air monitoring to address the community health and safety concerns during intrusive activities after completion of the site remedy, under the direction of AKRF. The locations and frequency of monitoring will be established on a task-by-task basis depending on the extent and location of the intrusive relative work to publicly-accessible areas.

2.0 COMMUNITY AIR MONITORING PROCEDURES

Work zone air monitoring will be performed continuously during all invasive work in accordance with the Health and Safety Plan (HASP) provided as an attachment to the SMP. Community air monitoring will be performed periodically (at a minimum once per hour) on a roving basis around any active intrusive work areas. Community air monitoring will be upgraded to continuous monitoring using permanent stations if action levels are encountered within the work zone or during roving periodic community air monitoring.

The action levels specified herein require increased monitoring, corrective actions to abate emissions (see Sections 3.0 and 4.0), and/or work shutdown. Table 1 summarizes dust, VOC and odor action levels and appropriate actions.

2.1 VOC Direct Reading Monitoring

VOC monitoring equipment will consist of a photoionization detector (PID) capable of detecting potential VOCs found in disturbed soil. The monitoring equipment will be calibrated on a daily basis and documented in a dedicated field log book. The instrument will be capable of calculating 15-minute running average concentrations, which will be compared to the prescribed action levels.

Readings will be subtracted from the background concentrations, to be measured each day prior to the start of work, to establish concentrations reflective of work activities during the periods between collection of background readings.

The 15-minute average concentrations will be compared to the following:

- If the ambient air concentration of total organic vapors exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with measures taken to reduce vapors and continue monitoring.
- If total organic vapor levels persist at levels in excess of 5 ppm over background, work activities must be halted, the source of vapors identified, corrective actions taken to abate

emissions, and monitoring continued. If the organic vapor level is repeatedly over 25 ppm above background, activities must be shutdown and the engineering controls and the Site work plan re-evaluated.

2.2 Particulate (Dust) Direct Reading Monitoring

The particulate monitoring will be performed using real-time aerosol or particulate monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM_{10}) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level established below. The dust monitor will be equipped with an alarm to indicate exceedance of the action level, and will be zeroed on a daily basis in accordance with the manufacturer's operating instructions and documented in a dedicated logbook. In addition, fugitive dust migration will be visually assessed during all work activities.

The primary standards for PM_{10} are 150 micrograms per cubic meter ($\mu g/m^3$) over a 24-hour averaging time and 50 $\mu g/m^3$ over an annual averaging time. Both of these standards are averaged arithmetically. The action level will be established at 150 $\mu g/m^3$ above background, over 15-minute time weighted average (TWA). While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety.

The 15-minute average concentrations will be compared to the following:

- If the particulate measurement is between 100 $\mu g/m^3$ and 150 $\mu g/m^3$ above the background level, additional dust suppression techniques will be implemented to reduce the generation of fugitive dust and corrective action taken to protect Site personnel and reduce the potential for contaminant migration.
- If the dust suppression measures being utilized at the Site do not lower particulates to an acceptable level (e.g., below 150 $\mu g/m^3$ above the background level, and no visible dust from the work area), work will be suspended until appropriate corrective measures are implemented to remedy the situation.

2.3 Odor Monitoring

Subsurface excavation work exposing contaminated materials may cause odors to be detectable. This may cause concern among the on-site workers, visitors to the Site, and the nearby community regarding potential health risks. Health risks or the potential for health risks do not rely strictly on detectable odors. However, controlling odor emissions from a site can allay public fears about health risks and provide additional means of controlling nuisance emissions during remediation activities. Periodic walk-around monitoring will be performed to observe perceptible odor that may be a nuisance to nearby sensitive receptors. If perceptible odors are noted adjacent to a nearby receptor or a complaint is received, work will be suspended until appropriate corrective measures are implemented to remedy the situation.

2.4 Equipment Operational Requirements

The air monitoring equipment must be operated by trained and qualified personnel. Personnel who perform air monitoring functions described in this section shall be experienced in the use of field air monitoring equipment, as well as the air monitoring procedures described above. There must also be appropriate staff (chemist, industrial hygienist or environmental scientist) for assessing the results of air monitoring and advising field personnel of air quality considerations.

3.0 ENHANCED MONITORING/CONTROL PROCEDURES

The following enhanced procedures would be implemented in the event that the building is occupied during intrusive work to minimize exposure to potential sub-slab or intra-slab vapors:

1. Prior to the start of any intrusive work inside the site building, the total VOC concentration will be measured from perimeter air monitoring zones within the site building as a background reading.
2. If a PID reading of 5.0 ppm or less is registered in the perimeter air monitoring zones and 10 ppm or less in the work zone, the intrusive work will proceed with no further engineering controls unless further monitoring during the intrusive work results in a PID reading greater than 5.0 ppm. Continuous work zone and periodic community air monitoring will be performed in accordance with the HASP and as described in Section 2.1 and the work area will be cordoned off with cones, caution tape or similar barriers to pedestrians.
3. If a PID reading of greater than 5.0 ppm is measured during the initial Site background reading, the source of the elevated concentration will be pursued. Inspections of the SSDS will be conducted to identify and repair any system malfunctions or problems (i.e. leaks, cracks, collection of condensation, etc.). Non-routine maintenance will be performed to repair any problems or incidents, or make adjustments to the system.
4. If intrusive, subsurface work occurs during times the buildings are occupied and elevated readings are noted during work zone or community air monitoring, engineering controls to control vapors would be implemented, as described below, for the areas with elevated vapors measured during the baseline monitoring or during monitoring of the invasive work.
    a. Access to work zones will be temporarily limited to workers with HAZWOPER training and site-specific briefing in accordance with the HASP. Any open wall penetrations will be sealed using products such as caulk or expandable foam.
    b. All personnel entering the work zone will upgrade personal protective equipment (PPE) to Level C when appropriate in accordance with the HASP. Penetrations to the surface slab would be repaired with concrete, caulk, caps or other construction materials to seal the opening, as appropriate.

These procedures will be repeated at each intrusive work area and will be documented in accordance with Section 5.0.

4.0 VOC, DUST AND ODOR CONTROLS

The information and procedures presented in this section will be used for VOC, dust, and odor control during activities summarized in Section 1.1. The construction manager for the project will be responsible for implementing these procedures based on the air monitoring results and required Action Levels described in Table 1. The information and procedures that are to be used for VOC, dust and odor control are presented in the following sub-sections.

4.1 VOC Controls

Control of VOCs during excavation work or other soil disturbance activities will consist of the construction manager implementing one or more of the following methods or measures:

- Covering stockpile or other material staging areas;
- Covering the exposed excavation/exposed subsurface areas;

- Backfilling or capping the exposed area;
- Wetting exposed contaminated material; and
- Isolating heating, ventilation and air conditioning (HVAC) system in the active work area.

4.2 Dust Controls

The primary measure of preventing exposure to dust during excavation or other soil disturbance activities will be wetting techniques. The Contractor will provide for engineering controls (wet techniques) or other techniques (e.g., covering exposed soil surfaces, limiting active work areas) to control dust during work tasks that have the potential for generating dust. Dust controls involving the use of water (wetting or water spraying) will be employed at potential dust generating activity areas as follows:

- Before each task is initiated;
- During the tasks to keep the materials damp; and
- When air monitoring results dictate the need for dust control.

4.3 Odor Controls

Control of odors during excavation work or other subsurface disturbance activities will consist of one or more of the following measures:

- Covering stockpile or other material staging areas;
- Covering the exposed excavation/removal areas;
- Wetting exposed material; and
- Backfilling the excavation.

5.0 COMMUNITY AIR MONITORING RECORDKEEPING

The qualified safety officer or technician will ensure that all air monitoring data is logged in a book or on daily field log sheets to document observations as part of the community air monitoring program. Documentation shall be made clear, concise, and provide the date, time of entry, location, personnel, weather conditions, and measured concentrations. Documentation will also include all observational data that has potential for impacting results, such as potential off-site interferences, on-site public interferences, damage to instruments, Site equipment problems, or weather related interferences.

All pages must be numbered; no lines shall be left blank (or put a line through it), and must be initialed on each page in ink. The last entry page for the shift or day that has blank space left at the bottom shall have a line drawn diagonally across it and signed at the bottom of the page. All corrections must be made with a single line, initialed, and dated.

Copies of the log book or field log sheets documenting community air monitoring will be submitted to NYSDEC with the Periodic Review Report. The Owner and NYSDEC will be notified promptly via phone and electronic mail of any exceedance of an Action Level and of the corrective actions taken in connection with the exceedance. If an exceedance occurs, the Environmental Consultant will ensure corrective actions are taken the actions and results will be documented in the Periodic Review Report.

All monitoring equipment must be calibrated on a daily basis in accordance with the manufacturer's operating instructions. The date, time, calibration gas, or other standard, and name of person performing the calibration will be documented in a log book.

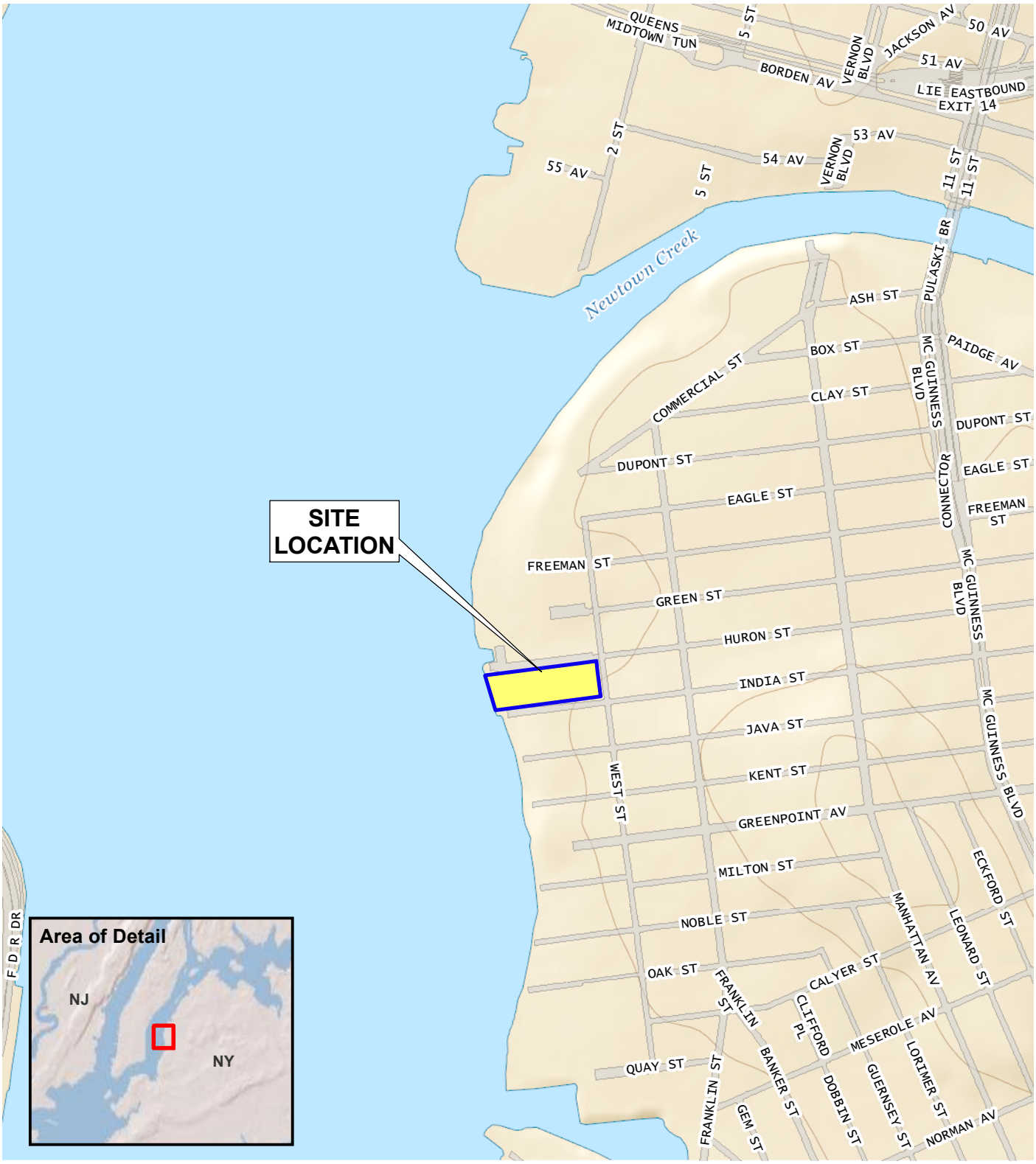
TABLE

Table 1
Community Air Monitoring Summary
145 West Street, Brooklyn, NY

Monitoring Device	Monitoring Location	Monitoring Frequency	Action Level	Action
PID	Perimeter of Work Area	Continuous during intrusive work with work zone exceedances Periodic during all other disturbance activities [Background is the most recent upwind/ambient 15-minute average reading]	< 5 ppm above background at the downwind perimeter of the work zone (15-min TWA) > 5 ppm but < 25 ppm above background at the downwind perimeter of the work zone (15-min TWA) > 25 ppm above background at the downwind perimeter of the work zone (15-min TWA)	Continue normal operations Suspend operations until readings indicate < 5 ppm for 15-minute TWA. Take steps to abate emissions* Shut down operations and reevaluate work and controls
PM-10 Aerosol/ Particulate Air Monitoring Unit with Audible Alarm	Perimeter of Work Area	Periodic during all disturbance activities Continuous during intrusive work with work zone exceedances [Background is the most recent upwind/ambient 15-minute average reading]	< 100 $\mu g/m^3$ above background at the downwind perimeter of the work zone (15-min TWA) > 100 $\mu g/m^3$ above background at the downwind perimeter of the work zone (15-min TWA), or visible dust leaving the excavation area > 150 $\mu g/m^3$ above upwind background level downwind perimeter of the work zone (15-min TWA)	Continue normal operations Implement dust control measures* Halt all soil disturbance work until downwind perimeter of excavation area reading is <150 $\mu g/m^3$ above background (upwind perimeter).
Olfactory	Perimeter of Work Area	Periodic during all disturbance activities	Perceptible odors outside work zone, adjacent to receptor, or complaint	Suspend operations until odor condition abated. Take steps to abate odor*

NOTES:
*See VOC, dust and odor control measures in Sections 3.0 and 4.0 of the CAMP
TWA - Time weighted average
PID – Photoionization detector
$\mu g/m^3$ – Microgram per cubic meter
ppm – Parts per million

FIGURE



SOURCE
USGS 7.5 Minute Topographic Map
Brooklyn Quad 2011

0 800 1,600 Feet

Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

SITE LOCATION MAP

AKRF Engineering, P.C.
440 Park Avenue South, New York, N.Y. 10016

DATE
8/11/2015

PROJECT No.
11884

FIGURE
1

O:\Projects\11884 - 145 WEST STREET-BROOKLYN\11884 Fig 1 site loc map.mxd

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AKRF Engineering, P.C.
440 Park Avenue South, New York, NY 10016

Huxley Envelope Industrial Site
145 West Street
Brooklyn, New York

SITE PLAN WITH ALPHANUMERIC GRID

DATE
6/02/2016

PROJECT NO.
11884

SCALE
as shown

FIGURE
2

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M:\AKRF Project Files\11884 - 145 West St (Urban-MREG)\Figures\2016 DWGs\11884 Fig 3 (FER) Fig 2 (SMP) Site Plan.dwg

APPENDIX E
REMEDIAL COVER SYSTEM INSPECTION FORM

SITE REMEDIAL COVER INSPECTION FORM

Huxley Envelope Industrial Site

145 West Street, Brooklyn, New York

NAME:	DATE:
TIME:	WEATHER:
Annual Inspection or Emergency Inspection (if emergency, specify nature)?	

Park Area

Description of soil/landscaped area condition:

_____

_____

Note any changes to or any unusual conditions of Site cover system component:

_____

_____

_____

Building A First Floor Concrete Slab

Description of floor condition:

_____

_____

Note any changes to or any unusual conditions of Site cover system component:

_____

_____

_____

_____

Building A Sub-Slab Venting System Abovegrade Components

Description of piping condition:

_____

_____

Monitoring point PID readings:

MP-1: _____

MP-2: _____

MP-3: _____

Note any changes to or any unusual conditions of abovegrade piping components:

_____

_____

_____

_____

Building B Basement Floor Concrete Slab and Basement Sidewalls

Description of floor and sidewall conditions:

_____

_____

Note any changes to or any unusual conditions of Site cover system component:

_____

_____

_____

Building C Basement Floor Concrete Slab and Basement Sidewalls

Description of floor and sidewall conditions:

_____

_____

Note any changes to or any unusual conditions of Site cover system component:

_____

_____

_____

_____

_____

Provide images to document conditions of each area and any unusual conditions.

APPENDIX F
SITE-WIDE INSPECTION FORM

SITE-WIDE INSPECTION FORM

Huxley Envelope Industrial Site, Brooklyn, New York

Overview of Site-Wide Inspection requirements:

1) General Site conditions at time of inspection;

2) Any Site activities currently being conducted;

3) Last Site Management Plan (SMP)-related Site Activity conducted, upcoming SMP-related tasks;

4) Institutional Control Checklist (SMP with Excavation Work Plan (EWP) maintained on-Site, routine SMP tasks being conducted);

5) Evaluation of Engineering Controls (in office); and

6) Site Documentation.

---

1) General Site conditions at time of inspection:

NAME:	DATE:
TIME:	WEATHER:
Annual Inspection or Emergency Inspection (if emergency, specify nature)?	

Notes: _____

_____

_____

_____

2) Any SMP-related site activities currently being conducted

Notes: _____

_____

_____

_____

3) Last SMP-related Site Activity conducted, next SMP-related task

Notes: _____

_____

_____

_____

4) IC Checklist (SMP with EWP maintained on-Site, routine SMP tasks being conducted)

Copy of SMP with EWP on-Site?	

Routine SMP tasks being conducted?

Annual cover system monitoring __

Notes: _____

_____

_____

_____

5) Evaluation of ECs

Remedial cover system and vapor barrier and sub-slab venting system component summaries (details to be evaluated in office):

Notes: _____

_____

_____

_____

6) Site documentation

Updates regarding new Site hazardous materials usage, notification to NYSDEC regarding any changes to Site conditions/operations, quarterly/annual hazardous waste tax/fee filings, routine reporting to NYSDEC.

Notes: _____

_____

_____

_____

_____

Attachments:

Cover System Inspection Form

Others: _____

_____

APPENDIX G
QUALITY ASSURANCE PROJECT PLAN

Huxley Envelope Industrial Site

BROOKLYN, NEW YORK

Quality Assurance Project Plan

AKRF Project Number: 11884

NYSDEC Site Number: C224147

Prepared for:

MP 145 WS Owner LLC
c/o Mack Real Estate Group
60 Columbus Circle, 20th Floor
New York, NY 10023

Prepared by:

AKRF Engineering, P.C.
440 Park Avenue South, 7th Floor
New York, New York 10016
212-696-0670

AUGUST 2016

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) describes the protocols and procedures that will be followed during implementation of the Site Management Plan (SMP) at the Huxley Envelope Industrial Site (the "Site") located at 145 West Street, Brooklyn, New York. The objective of the QAPP is to provide for Quality Assurance (QA) and maintain Quality Control (QC) during sampling performed to evaluate the performance and effectiveness of the remedy (including treatments and Engineering Controls as described in the SMP) to reduce or mitigate contamination at the Site. Adherence to the QAPP will ensure that defensible data will be obtained to confirm the successful operation and maintenance of remedial systems.

2.0 PROJECT TEAM

The project team will be drawn from AKRF professional and technical personnel and AKRF's subcontractors. All field personnel and subcontractors will have completed a 40-hour training course and updated 8-hour refresher course that meet the Occupational Safety and Health Administration (OSHA) requirements of 29 CFR Part 1910. The following sections describe the key project personnel and their responsibilities.

2.1 Project Director

The project director will be responsible for the general oversight of all aspects of the project, including scheduling, budgeting, data management, and decision-making regarding the field program. The project director will communicate regularly with all members of the AKRF project team and the New York State Department of Environmental Conservation (NYSDEC) to ensure a smooth flow of information between involved parties. Marc Godick will serve as the project director for the SMP. Mr. Godick's resume is included in Attachment A.

2.2 Project Manager

The project manager will be responsible for directing and coordinating all elements of the SMP. The project manager will prepare reports and participate in meetings with the Site owner and/or the NYSDEC. Eric Park will serve as the project manager for the SMP. Mr. Park's resume is included in Attachment A.

2.3 Field Team Leader

The field team leader will be responsible for supervising the daily sampling and health and safety activities in the field and will ensure adherence to the work plan and HASP. He/She will report to the Project Manager on a regular basis regarding daily progress and any deviations from the SMP. The field team leader will be a qualified, responsible person, able to act professionally and promptly during required activities. The field team leader will be established for each task; however, Adrianna Bosco is expected to be a field team leader for much of the work under the SMP.

2.4 Project Quality Assurance/Quality Control Officer

The Quality Assurance/Quality Control (QA/QC) Officer will be responsible for adherence to the QAPP. He/She will review the procedures with all personnel prior to commencing any fieldwork and will assess implementation of the required procedures. Marcus Simons will serve as the QA/QC officer for the SMP.

2.5 Laboratory Quality Assurance/Quality Control Officer

The laboratory QA/QC officer will be responsible for quality control procedures and checks in the laboratory and ensuring adherence to laboratory protocols. He/She will track the movement of samples from the time they are checked in at the laboratory to the time that analytical results are issued. He/She will conduct a final check on the analytical calculations and sign off on the laboratory reports. The laboratory QA/QC officer will be determined upon selection of a contract laboratory(s) for the SMP.

3.0 STANDARD OPERATING PROCEDURES

The following sections describe the standard operating procedures (SOPs) for the monitoring activities included in the SMP. During these operations, all field personnel will wear appropriate personal protective equipment and safety monitoring will be performed as described in the Site specific Health and Safety Plan (HASP) provided as Appendix D to the SMP. The SMP includes inspections of the passive venting system and the Site cover, and an Excavation Work Plan and other provisions and appropriate actions to be taken in the event that future renovation or redevelopment of the Site requires the breaching of the composite cover system and excavation/removal of underlying soil.

In all instances, all atypical or unexpected findings noted during inspections, sampling events, or SMP-governed field work should be communicated immediately to the environmental professional managing the Site work and, as necessary, to the NYSDEC project manager.

3.1 Sub-slab Venting System Pipe Reconnection

Replaced sub-slab venting system components must be reconnected to maintain the venting system pathway from sub-slab to the fourth floor mechanical roof. All subgrade work will be conducted in accordance with the Excavation Work Plan, provided as Appendix C to the SMP.

Existing or spare piping and tubing will be pressure tested and connected to the sub-slab venting system point, based on the following procedures:

- Break surface to expose replacement installation area for sub-slab venting system lines.
- Excavate soil as needed for reinstallation: approximately 16 inches below grade for sub-slab venting system lines.
- Salvage existing sub-slab venting system piping that can be used for reconnecting to the existing system.
- If new solid piping is installed between the slotted sub-slab venting system piping and the aboveground manifold, a pressure test must be conducted. Any deviation from the pressure testing methodology presented below will be scoped and submitted to NYSDEC for pre-approval. During each test, Contractor shall soap test all test fittings and any other fittings and inspect for leaks.
- Sub-slab venting system lines will be capped within the excavated area and prior to reconnection to the manifold. An air compressor must then be attached to the sample port or other access point and used to pressurize the newly installed portion of the line. Each line shall be pressure tested for a minimum of 30 minutes maintaining a pressure of 5 psi. The leak must be identified (by soap testing accessible piping and listening for air leaks along the exposed portions of the line), remedied, and the line retested.

- Following successful pressure testing, reconnect piping/tubing to the new sub-slab venting system point. In some instances, the additional excavation may be necessary to expose the connection to the manifold.
- The excavation must be restored with a minimum of 6 inches of clean gravel backfill and a concrete cover matching the thickness of the existing concrete at that location. In general, the restoration types must match or exceed the existing material and thickness conditions of the Site cover types discussed in the SMP in order to maintain Site Cover System integrity throughout the Site.

3.2 Decontamination of Sampling Equipment

All sampling equipment (drilling rods and casing, macro core samplers, probe rods and pumps, etc.) will be either dedicated or decontaminated between sampling locations. The decontamination procedure will be as follows:

1. Scrub using tap water/Simple Green® mixture and bristle brush.
2. Rinse with tap water.
3. Scrub again with tap water/ Simple Green® and bristle brush.
4. Rinse with distilled water.
5. Air-dry the equipment, if possible.

Decontamination will be conducted within 55-gallon drums or on plastic sheeting (or equivalent) that is bermed to prevent discharge to the ground or drains.

3.3 Heavy Equipment Decontamination

Decontamination of chemically contaminated heavy equipment (e.g., augers, excavator buckets) will be accomplished using high-pressure steam or dry decontamination with brushes and shovels. Decontamination will take place on a decontamination pad and all liquids used in the decontamination procedure will be collected. Vehicles or equipment brought into an exclusion zone will be treated as contaminated, and will be decontaminated prior to removal. All liquids used in the decontamination procedure will be collected, stored and disposed of in accordance with Federal, State and local regulations. Personnel performing this task will wear the proper PPE as prescribed in the HASP in Appendix D.

A decontamination area will be established around the planned excavation area, adjacent to the environmental enclosure. The floor of the decontamination area will be covered with 6-mil plastic sheeting, as necessary, and bermed to prevent spreading of decontamination fluids or potential discharge to the ground surface.

All equipment in direct contact with known or potentially contaminated material will be either dedicated or decontaminated prior to handling less contaminated material or removal from the Site. Decontamination of chemically contaminated heavy equipment will be accomplished using high-pressure steam or by dry decontamination with brushes and shovels. All liquids used in the decontamination procedure will be collected, stored and disposed of in accordance with Federal, State and local regulations.

3.4 Management of Investigation-Derived Waste and Remedial O&M Waste

All investigation-derived waste (IDW) and remedial operations and maintenance waste will be containerized in DOT-approved 55-gallon drums or other appropriate containers. The drums will be sealed at the end of each work day and labeled with the date, the well or boring number(s), the

type of waste (i.e., drill cuttings, development water or purge water) and the name of an AKRF point-of-contact. Drums will be staged in secure areas, away from public access to the extent practicable.

Soil samples collected from soil boring activities will be used for waste characterization of soils, since such data would be biased towards areas which are expected to be most contaminated. Groundwater data from groundwater samples collected during the monitoring program will be used to characterize development and purged groundwater. Additional waste characterization soil, water, or carbon samples may be collected, if requested by the disposal facility. All IDW and remedial waste will be disposed of or treated according to applicable local, state and federal regulations.

4.0 SAMPLING AND LABORATORY PROCEDURES

4.1 Reuse Sampling

Prior to reuse as backfill, excavated material (such as material removed as part of piping installation for the sub-slab venting system) will be evaluated using the criteria below:

- Concrete or demolition debris that does not exhibit signs of contamination will be sampled for asbestos prior to reuse on-Site. No other sampling is required for this material.
- Soil/fill material proposed for reuse will be sampled at a frequency and for the required parameters as outlined in NYSDEC's DER-10, Table 5.4.
- Samples will be collected into laboratory-supplied containers.
- Samples will be kept in an ice-filled cooler or refrigerator (not asbestos samples) until receipt by the laboratory.
- Decontaminate all sampling equipment between sampling locations as described in Section 3.3 of this QAPP.

4.2 Endpoint Soil Sampling

In the event that evidence of contamination (odors, staining, elevated PID readings, or analytical results of soil samples above NYSDEC Part 375 Restricted Residential SCOs) is identified during any breach to the composite cover system or excavation of soil/fill as part of the redevelopment or renovation of the Site, endpoint soil sampling activities will be performed in accordance with NYSDEC DER-10. Per NYSDEC DER-10 Section 5.4, sidewall samples will be collected a minimum one sample for every 30 linear feet and bottom samples will be collected at a frequency of one every 900 square feet. As outlined in Section 4.4 of this QAPP, endpoint soil samples will be analyzed for NYSDEC Final Commissioner's Policy - Soil Cleanup Guidance (CP-51) volatile organic compounds (VOCs) by EPA Method 8260 VOCs, target compound list (TCL) semi-volatile organic compounds/base-neutrals (SVOCs/BNs) by EPA Method 8270D and Toxicity Characteristic Leaching Procedure (TCLP) Metals by EPA Method 6010C.

Soil sampling will be conducted according to the following procedures:

- Characterize the sample according to the modified Burmister soil classification system.
- While advancing soil borings or completing excavation activities and field screening for evidence of contamination (e.g. odors, staining, elevated PID measurements), collect an aliquot of soil from each sampling interval and place in labeled sealable plastic bags. The bag should be labeled with the soil boring number and the depth the sample was collected. Place the plastic bags in a chilled cooler to await selection of samples for laboratory analysis.
- After selecting which samples will be analyzed in the laboratory, fill the required laboratory-supplied sample jars with the soil from the selected sampling location or labeled sealable plastic bags. Seal and label the sample jars as described in Section 4.6 of this QAPP and place in an ice-filled cooler.
- Decontaminate any reusable soil sampling equipment between sample locations as described in Section 3.3 of this QAPP.
- Record boring number, sample depth and sample observations (evidence of contamination, PID readings, soil classification) in field log book and boring log data sheet, if applicable.

4.3 Sub-slab Venting System Operations and Maintenance Sampling

4.3.1 System Vacuum Monitoring

A network of three sub-slab vacuum monitoring points was installed during remedial action implementation at strategic locations to inspect induced vacuum conditions during the operation of the sub-slab venting system. Vacuum may be monitored at these locations if required by NYSDEC. The procedures for instantaneously screening the vacuum monitoring points are as follows:

- Remove the flush-mount access manhole cover.
- Attach the analog vacuum gauge or digital manometer with male Quik-Connect fitting to the female Quik-Connect fitting at the monitoring point well head and document reading.
- Detach vacuum gauge/manometer and confirm that Quik-Connect female fitting is closed.
- Replace the access manhole cover and reseal.

4.3.2 Voluntary Vapor Intrusion Sampling

The Volunteer may conduct a voluntary vapor intrusion assessment, comprising on-site chemical storage inventory, and soil gas and/or indoor air sampling, to confirm on-Site vapor conditions. Sampling will be performed in accordance with the NYSDOH Vapor Intrusion Guidance and as follows:

4.3.2.1. Indoor Air Sampling

- Conduct pre-sampling inspection and chemical inventory of the Site building.
- Place a labeled 6-liter Summa canister near the breathing zone level (3 to 4 feet above ground surface) in designated sampling locations throughout the first floor of the Site building.
- Record the vacuum reading from the vacuum gauge on the canister at the beginning of the 8-hour sampling period.
- Open the valve of the canister and record the time in the field book. Monitor canister vacuum and breathing space PID throughout sampling period. If the vacuum drops to -5 inches of mercury, the regulator valve should be closed to end the sampling (Note: ideal canister vacuum is approximately -5 to -10 inches of mercury.
- At the end of the 8-hour sampling period, close valve, remove flow-rate controllers and vacuum gauges, install caps on canisters, and record final vacuum and time.
- Place canisters in shipping containers for transportation to laboratory.
- Repeat procedure for all of the sampling locations.

4.3.2.2. Sub-Slab Vapor Sampling

Simultaneously, sub-slab vapor samples will be collected from the sub-slab venting system monitoring points according to the following procedure:

- A peristaltic pump will be used to extract sample volume from each of the monitoring points. A 1-liter tedlar bag will be filled with extracted vapors by attaching dedicated silicon-lined or silicon tubing from the monitoring point to the inlet of the peristaltic pump. The tedlar bag fill port will be attached to the outlet of the peristaltic pump. Both ports will be opened and the peristaltic pump will be started. The pump rate will be throttled to fill the one liter Tedlar bag in approximately 10 minutes, resulting in an approximate air flow rate of 0.1 liters per minute. The tedlar bag will be removed after its fill port has been closed.
- The tedlar bag will be properly labeled and enclosed in a zip-lock bag which will be used as an added protection layer to ensure safety in transit to the laboratory.
- The silicone tubing used in the peristaltic pump will be replaced after each sample collected.
- Tedlar bars will be placed in a shipping container for transportation to laboratory. Ice will not be used as a sample preservation method.
- Samples will be analyzed for VOCs by EPA Method TO-15.
- All non-dedicated sampling equipment will be decontaminated between sampling locations as described in Section 3.3 of this QAPP.

4.4 Laboratory Methods

Table 2 summarizes the laboratory methods that will be used to analyze field samples as well as the sample container type, preservation, and applicable holding times. Other analytes may be added if required by the disposal facility. An ELAP Certified laboratory will be used for all chemical analyses in accordance with DER-10 2.1(b) and 2.1(f), including NYSDEC July 2005 Analytical Services Protocol (ASP) Category B Deliverables.

Table 2
Laboratory Analytical Methods for Analysis Groups

+	Analysis	Method	Container Type	Preservative	Hold Time
Soil (Reuse/Backfill)	TCL VOCs	8260C	EnCore sampler	4°C	48 hours
	SVOCs,	8270D	Min. 4 oz. clear glass jar	4°C	5 days to extract, 49 days for analysis
	TAL Metals Mercury	6010C 7471B	Min. 4 oz. clear glass jar	4°C	14 days 26 days
	PCBs	8082A	Min.4 oz. clear glass jar	4°C	14 days
	Pesticides	8081B	Min.4 oz. clear glass jar	4°C	5 days to extract, 49 days for analysis
Soil (Endpoint Sampling)	CP-51 VOCs	8260	EnCore sampler	4°C	48 hours
	TCL SVOCs-BNs	8270D	Min. 4 oz. clear glass jar	4°C	5 days to extract, 49 days for analysis
	TCLP Metals	6010C	Min. 4 oz. clear glass jar	4°C	14 days 26 days
Indoor Air	TCL VOCs	TO-15	6L Summa Canisters (8-hr flow controllers)	None	30 days

4.5 Quality Control Sampling

In addition to the laboratory analysis of the investigative soil samples, additional analysis will be included for quality control measures, as required by the NYSDEC July 2005 ASP Category B sampling techniques. These samples will include equipment rinseate blanks, trip blanks, matrix spike/matrix spike duplicates (MS/MSD), and duplicate/blind duplicate samples at a frequency of one sample per 20 field samples collected. Note that no additional quality control samples will be collected for waste characterization sampling unless required by the disposal facility. Table 3 provides a summary of the field samples and QA/QC samples to be analyzed by the laboratory.

Table 3
Field Sample and QC Sample Quantities

Sample Type	Parameters	Analytical Method[1]	Field Samples	QC Samples			
				Equipment Blank[2]	Trip Blank[2]	MS/MSD[3]	Duplicate[3]
Soil	VOCs	EPA 8260C	TBD	NA	1 (Laboratory-Supplied)	1/20 (TBD)	1/20 (TBD)
	SVOCs, TAL Metals, Mercury, PCBs, and Pesticides	EPA 8270D, 6010C/7471B, 8082A, and 8081B	TBD	NA	NA	1/20	1/20
Indoor Air	VOCs	TO-15	TBD, 1 ambient air	NA	1 (Unused Summa Canister)	NA	1 (Location TBD)

Notes:

Table 3

MS/MSD - matrix spike/matrix spike duplicate
TBD – To be determined based on planned work activities
NA – Not Applicable
[1] - NYSDEC July 2005 ASP Category B deliverables
[2] – One trip blank per shipment with VOC analyses
[3] - One MS/MSD and Duplicate sample per twenty field samples or sample shipment

4.6 Sample Handling

4.6.1 Sample Identification

All samples will be consistently identified in all field documentation, chain-of-custody documents and laboratory reports using an alpha-numeric code. Soil boring samples will be identified by the soil boring location followed by the sample depth interval (in parenthesis).

The designation "MS/MSD" will be added to the designation for matrix spike/matrix spike duplicate samples. The field duplicate samples will be labeled with a dummy sample location to ensure that they are submitted as blind samples to the laboratory. Trip blanks and equipment blanks will be identified with "TB" and "EB", respectively.

Table 4 provides examples of the sampling identification scheme:

Table 4
Examples of Sample Names

Sample Description	Sample Designation*
Soil endpoint sample collected from 1 to 2 feet below grade at the north wall of an excavation	EP-NW(1-2')-MMDDYY
Duplicate soil sample collected from 1 to 2 feet at the north wall of the excavation	EP-WN(1-2')-MMDDYY
Sub-slab vapor sample collected from monitoring points.	MP-1-MMDDYY
Indoor Air sample	IA-1-MMDDYY

* - MMDDYY represents the two digit month (mm), day (dd), and year (yy) for sample names, per NYSDEC standard sample naming procedures.

4.6.2 Sample Labeling and Shipping

All sample containers will be provided with labels containing the following information:

- Project identification
- Sample identification
- Date and time of collection
- Analysis(es) to be performed
- Sampler's initials

Once the soil samples are collected and labeled, they will be placed in chilled coolers and stored in a cool area away from direct sunlight to await shipment to the laboratory. All

samples will be shipped to the laboratory twice per week. At the start and end of each workday, field personnel will add ice to the coolers as needed.

The samples will be prepared for shipment by placing each sample in a sealable plastic bag, then wrapping each container in bubble wrap to prevent breakage, adding freezer packs and/or fresh ice in sealable plastic bags and the chain-of-custody (COC) form. Tedlar bags will be enclosed in a zip lock bag as an added protection prior to being placed in a cooler or shipment container without ice. Summa canisters will also be placed into their appropriate shipment containers and do not require preservation with ice. All samples will be shipped overnight (e.g., Federal Express) or transported by a laboratory courier. All coolers and shipment containers shipped to the laboratory will be sealed with mailing tape and a COC seal to ensure that they remain sealed during delivery.

4.6.3 Sample Custody

Field personnel will be responsible for maintaining the sample coolers and Summa canisters in a secured location until they are picked up and/or sent to the laboratory. The record of possession of samples from the time they are obtained in the field to the time they are delivered to the laboratory or shipped off-site will be documented on COC forms. The COC forms will contain the following information: project name; names of sampling personnel; sample number; date and time of collection and matrix; and signatures of individuals involved in sample transfer, and the dates and times of transfers. Laboratory personnel will note the condition of the custody seal and sample containers at sample check-in.

4.7 Field Instrumentation

Field personnel will be trained in the proper operation of all field instruments at the start of the field program. Instruction manuals for the equipment will be on file at the site for referencing proper operation, maintenance and calibration procedures. The equipment will be calibrated according to manufacturer specifications at the start of each day of fieldwork, if applicable. If an instrument fails calibration, the project manager or QA/QC officer will be contacted immediately to obtain a replacement instrument. A calibration log will be maintained to record the date of each calibration, any failure to calibrate and corrective actions taken. The PID will be calibrated each day using 100 parts per million (ppm) isobutylene standard gas.

4.8 Data Review

In accordance with DER-10, each of the samples collected will undergo a third-party data review process to ensure the usability of the data collected. Data usability summary reports documenting any issues with QA/QC will be prepared and included in the Periodic Review Report (PRR). The resume for Lori Beyer of L.A.B. Validation Corp., the anticipated third-party data reviewer, is included in Attachment A.

4.9 Reporting of Data

All data generated during the monitoring activities will be submitted in the appropriate EQuIS EDD format.

ATTACHMENT A

RESUMES OF PROJECT QA/QC OFFICER, PROJECT DIRECTOR, AND PROJECT MANAGER