

710 GRAND STREET

BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC VCP Project Number: 16CVCP085K

OER Project Number: 16EH-N340K

Prepared For:

Jaroah Inc.
404 Broadway, Suite 304
New York, NY 10013

Prepared By:



ATHENICA ENVIRONMENTAL
SERVICES, INC.
Environmental Engineering Consultants

45-09 Greenpoint Avenue, Queens, NY 11104
ekarayel@athenica.com
(718) 784-7490

August 2016

REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

TABLE OF CONTENTS.....	i
LIST OF FIGURES	ii
LIST OF TABLES	ii
LIST OF APPENDICES.....	ii
LIST OF ACRONYMS	iii
CERTIFICATION	v
EXECUTIVE SUMMARY	1
COMMUNITY PROTECTION STATEMENT.....	8
REMEDIAL ACTION WORK PLAN	14
1.0 Project Background	14
1.1 Site Location and Background	14
1.2 Redevelopment Plan.....	14
1.3 Description of Surrounding Property	15
1.4 Summary of Past Site Uses and Areas of Concern	16
1.5 Summary of Work Performed under the Remedial Investigation.....	16
1.6 Summary of Findings of Remedial Investigation	16
2.0 Remedial Action Objectives	19
3.0 Remedial Alternatives Analysis	20
3.1 Threshold Criteria	22
3.2 Balancing Criteria	23
4.0 Remedial Action	31
4.1 Summary of Preferred Remedial Action.....	31
4.2 Soil Cleanup Objectives and Soil/ Fill Management	33
4.3 Engineering Controls.....	37
4.4 Institutional Controls.....	39
4.5 Site Management Plan.....	40
4.6 Qualitative Human Health Exposure Assessment.....	41
5.0 Remedial Action Management.....	46
5.1 Project Organization and Oversight	46
5.2 Site Security	46
5.3 Work Hours.....	46
5.4 Construction Health and Safety Plan	46
5.5 Community Air Monitoring Plan	47
5.6 Agency Approvals.....	49
5.7 Site Preparation	49
5.8 Traffic Control.....	53
5.9 Demobilization	53
5.10 Reporting and Record Keeping.....	54
5.11 Complaint Management	55
5.12 Deviations From The Remedial Action Work Plan	55
6.0 Remedial Action Report	56
7.0 Schedule.....	59

LIST OF FIGURES

Figure 1: Site Location Map

Figure 2: Site Boundary and Surrounding Land Usage Map

Figure 3: Proposed Development Plan

Figure 4: Site Excavation Diagram

Figure 5: Proposed End-point Sample Locations

Figure 6: Site-Wide Composite Cover System Plan and Detail

Figure 7: Vapor Barrier System Location

Figure 8: Joint Detail of VBS-Retro Coat

LIST OF TABLES

Table 1: Unrestricted Use Soil Cleanup Objectives

LIST OF APPENDICES

Appendix 1: Proposed Redevelopment Plan

Appendix 2: Citizen Participation Plan

Appendix 3: Sustainability Statement

Appendix 4: Soil/Materials Management Plan

Appendix 5: Construction Health and Safety Plan

Appendix 6: Vapor Barrier Manufacturer Specifications

LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C&D	Construction and Demolition
CEQR	City Environmental Quality Review
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering Controls and Institutional Controls
ELAP	Environmental Laboratory Accreditation Program
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IRM	Interim Remedial Measure
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYS DEC	New York State Department of Environmental Conservation
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYC OER	New York City Office of Environmental Remediation
NYC VCP	New York City Voluntary Cleanup Program
NYCRR	New York Codes Rules and Regulations
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of

	Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PCBs	Polychlorinated Biphenyls
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SSDS	Sub-Slab Depressurization System
SVOC	Semi-Volatile Organic Compound
TAL	Target Analyte List
TCL	Target Compound List
USGS	United States Geological Survey
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VOC	Volatile Organic Compound

CERTIFICATION

I, Spiro Dongaris, P.E., am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for designing the remedial program for the 710 Grand Street site, site number [OER Project Number: 16EH-N340K and VCP site number: 16CVCP085K]. I certify to the following:

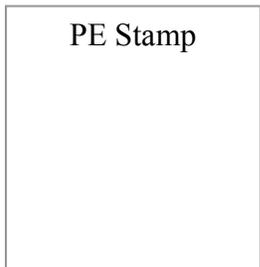
- I have reviewed this document and the Stipulation List, to which my signature and seal are affixed.
- Engineering Controls developed for this remedial action were designed by me or a person under my direct supervision and designed to achieve the goals established in this Remedial Action Work Plan for this site.
- The Engineering Controls to be constructed during this remedial action are accurately reflected in the text and drawings of the Remedial Action Work Plan and are of sufficient detail to enable proper construction.
- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

Name

PE License Number

Signature

Date



I, Ezgi Karayel, am a qualified Environmental Professional. I will have primary direct responsibility for implementation of the remedial program for the 710 Grand Street site, site number [OER Project Number: 16EH-N340K and VCP site number: TBD]. I certify to the following:

- This Remedial Action Work Plan (RAWP) has a plan for handling, transport and disposal of soil, fill, fluids and other materials removed from the property in accordance with applicable City, State and Federal laws and regulations. Importation of all soil, fill and other material from off-Site will be in accordance with all applicable City, State and Federal laws and requirements. This RAWP has provisions to control nuisances during the remediation and all invasive work, including dust and odor suppression.

QEP Name

QEP Signature

Date

EXECUTIVE SUMMARY

Jaroah Inc. is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program to investigate and remediate a 2,500-square foot site located at 710 Grand Street in Brooklyn, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Background

The Site is located at 710 Grand Street in the Williamsburg section in Brooklyn, New York and is identified as Block 2788 and Lot 19 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500-square feet and is bounded by Grand Street to the north, 159 Maujer Street to the south, 714 Grand Street to the east, and 706 Grand Street to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is used for ground-level commercial space and contains vacant upper floors (2nd and 3rd floors) and basement containing a boiler room and utilities. The top of the existing basement slab is 8'10" below grade surface (bgs).

Summary of Redevelopment Plan

The proposed future use of the Site will consist of vertical extension of three (3) stories via the addition of stories on the existing 3-story building. The proposed building will contain the existing commercial retail space on the ground floor and residential apartments on floors above. The total gross square footage of the proposed building will be approximately 12,900-square feet and will include 1,825-square feet commercial retail use. The remainder of the building other than the first floor storefront will be residential and storage/utility/mechanical space. The proposed cellar will be 9'4" bgs and be utilized for utility and meter rooms, and accessory use such as storage, bicycle storage and gym. The first floor will be used for commercial retail and residential lobby. The remaining five (5) floors will be utilized as residential apartments. Total of 10 class "A" apartments will be located in the new building.

Minor excavation for an elevator pit, footings, and lowering the slab will be performed. Minor excavation for an elevator pit, footings, and lowering the slab will be performed. The current elevation of the existing slab is 8'10" bgs and the proposed slab will be 9'4" bgs. After removing the 5-inch thick existing slab, the entire footprint of the Site will be excavated 12 inches to 10'3" bgs to accommodate the new 5-inch thick slab and compacted 6-inch thick gravel substrate. In addition to the 12-inch excavation across the Site; the new footings will require 12 inches of excavation to 11'3" bgs, the structural strap beams will require 10 inches of excavation to 11'1" bgs, and the elevator pit will require 4'11" of excavation to 15'2" bgs. Figure 4 shows the detail depths of excavation with regards to the street elevation. Approximately 250 tons of soil will be generated during the construction. The water table is determined to be at approximately 25 feet below grade surface. Layout of the proposed site development is presented in Figure 3. The current zoning designation is zoned as C4-4A denoting it as a commercial property outside the main commercial district with residential potential. The proposed use is consistent with existing zoning for the property.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

Summary of Surrounding Property

The Site is located within a primarily mixed-use, residential and commercial area of Brooklyn, New York. The Site is bounded by a 3-story residential and commercial building to the east, 4-story residential and commercial building to the west, 3-story residential building to the south, and a 3-story residential and commercial building to the north, across Grand Street.

According to the OER Searchable Property Environmental E-Database (SPEED), there is one sensitive receptor (such as schools, hospitals and day-care facilities) within a 500-foot radius of the Site. The receptor is JHS 049, William J. Gaynor Junior High School located approximately 430 feet south of the Site at 223 Graham Ave, Brooklyn, NY 11211.

Figure 2 shows the surrounding land usage.

Summary of Past Site Uses and Areas of Concern

Past use of the property has been mixed-use with commercial and residential tenants since the year 1905. The current on-Site building was constructed in 1920 and has consisted of commercial and residential tenants.

No AOCs were identified for this site during the RI

Summary of Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a Ground Penetrating Radar (GPR) survey prior to the RI;
3. Installed three (3) soil borings across the Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) soil vapor probes across the Site and collected three (3) soil vapor samples for chemical analysis.
5. Installed one (1) temporary groundwater monitoring well during the geotechnical investigation and collect one (1) groundwater sample for chemical analysis.

Summary of Findings of Remedial Investigation

1. Elevation of the property is approximately 38 feet above mean sea level.
2. Depth to groundwater was encountered at approximately 25 feet at the Site.
3. Groundwater flow is expected from southwest to northeast beneath the Site based on nearby monitoring wells elevation.
4. Bedrock was not encountered during this RI.
5. The stratigraphy of the Site, from the surface down, consists of 2 feet of brown to tan fine sand with clay/silt underlain by 3 feet of pebbles with a fine sand matrix. The soil encountered was universally dry at all soil borings.
6. Soil samples collected during this RI were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Soil Cleanup Objectives (SCOs) and Track 2 Restricted Residential Use SCOs. Only two (2) VOCs; toluene and acetone, were detected in the soil samples above their method detection limits (MDLs) but well below their respective Unrestricted Use SCOs. It should also be noted that acetone is a common laboratory contaminant. Several SVOCs, mainly consisting of polycyclic aromatic hydrocarbons (PAHs), were detected in soil samples above their respective MDLs; however none of them were above their

respective Unrestricted Use SCOs. Only one (1) pesticide; endrin aldehyde, was detected in one of the soil samples; however it does not have a defined cleanup objective. No PCBs were detected in any of the soil samples. Several metals were detected above their respective MDLs; however none of them were detected above their respective Unrestricted Use SCOs.

7. One groundwater sample collected during the geotechnical investigation analyzed and compared to NYSDEC 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GWS). No SVOCs, Pesticides or PCBs were detected in the groundwater sample. Three (3) VOCs, specifically; 2-butanone (3,600 µg/L), acetone (2,800 µg/L), and chloroform (15 µg/L) were detected above their respective GQS. The elevated concentrations of these three VOCs caused the dilution factor of the sample to be 100, therefore, the MDLs for several other VOCs are reported higher than the GQS values. The SVOCs with MDLs detected above GQS mainly consist of phenols and PAHs. In the NYSDEC Technical & Operational Guidance Series (TOGS), each individual phenolic compound is referred to the total phenol regulatory standard of 1 µg/L. However, low concentrations for PAHs and total phenol are not achievable by the current technology used in the lab. As a result, some SVOCs' MDLs are reported above their respective GQS. Several dissolved metals were detected above their respective MDLs with eight (8) of them exceeding their respective GQS. These dissolved metals include beryllium (6 µg/L), chromium (333 µg/L), copper (279 µg/L), lead (61 µg/L), manganese (7,410 µg/L), nickel (287 µg/L), selenium (21 µg/L), and sodium (35,000 µg/L).
8. Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the NYSDOH located in the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results detected elevated levels of petroleum compounds, including total BTEX ranging from a minimum concentration of 519 µg/m³ (SV-1) to a maximum concentration of 845 µg/m³ (SV-3). Benzene was detected at a maximum concentration of 39 µg/m³ (SV-1). 1,1,1-trichloroethane, carbon tetrachloride, and trichloroethylene (TCE) were not detected in any of the soil vapor samples. Tetrachloroethylene (PCE) was detected in two of the soil vapor samples with one

sample (SV-1) detected at a concentration of 180 µg/m³. Using the soil vapor concentration as a reference for a potential sub-slab soil vapor concentration, monitoring or mitigation may be required per the 2006 NYS DOH guidance. Since petroleum-related and chlorinated VOC exceedances were not identified in any of the soil samples, the source of the elevated VOCs concentration in soil vapor is most likely an off-site source.

Summary of the Remedial Action

The proposed remedial action achieves protection of public health and the environment for the intended use of the property. The proposed remedial action achieves all of the remedial action objectives established for the project and addresses applicable standards, criterion, and guidance; is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants; is cost effective and implementable; and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs). Collection and analysis of three end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. Excavation and removal of soil/fill exceeding Unrestricted Use (Track 1) SCOs. The current elevation of the existing slab is 8'10" bgs and the proposed slab will be 9'4" bgs. After removing the 5-inch thick existing slab, the entire footprint of the Site will be excavated 12 inches to 10'3" bgs to accommodate the new 5-inch thick slab and compacted 6-inch thick gravel substrate. In addition to the 12-inch excavation across the

Site; the new footings will require 12 inches of excavation to 11'3" bgs, the structural strap beams will require 10 inches of excavation to 11'1" bgs, and the elevator pit will require 4'11" of excavation to 15'2" bgs. Figure 4 shows the detail depths of excavation with regards to the street elevation. Approximately 250 tons of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.

7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls:

15. As part of development, construction of an engineered composite cover consisting of a five-inch thick concrete slab with a six-inch gravel or crushed stone layer beneath all building areas.
16. As part of development, installation of a vapor barrier system consisting of vapor barrier beneath the new building slab to mitigate soil vapor migration into the building. Additionally, the existing interior foundation walls will be sealed with Retro-Coat or an equal product. The vapor barrier system will consist of a minimum 20-mil vapor barrier below the slab throughout the full building area. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.
17. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The NYC Office of Environmental Remediation (OER) provides governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies, shows the location of identified contamination at the site, and describes the plans to clean up the site to protect public health and the environment.

This cleanup plan provides a very high level of protection for neighboring communities and also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Project Information:

- Site Address: 710 Grand Street, Brooklyn, NY 11211
- NYC Voluntary Cleanup Program Project Number: TBD

Project Contacts:

- OER Project Manager: Amanda Duchesne, 212-788-8841
- Site Project Manager: Jared Kedmi, 732-995-5606
- Site Safety Officer: Jared Kedmi, 732-995-5606
- Online Document Repository: <http://www.nyc.gov/html/oer/html/document-repository/document-repository.shtml>

Remedial Investigation and Cleanup Plan: Under the oversight of the NYC OER, a thorough study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and to identify contaminant sources present on the property. The cleanup plan has been designed to address all contaminant sources that have been identified during the study of this property.

Identification of Sensitive Land Uses: Prior to selecting a cleanup, the neighborhood was evaluated to identify sensitive land uses nearby, such as schools, day care facilities, hospitals and residential areas. The cleanup program was then tailored to address the special conditions of this community.

Qualitative Human Health Exposure Assessment: An important part of the cleanup planning for the Site is a study to find all of the ways that people might come in contact with contaminants at the Site now or in the future. This study is called a Qualitative Human Health Exposure Assessment (QHHEA). A QHHEA was performed for this project. This assessment has considered all known contamination at the Site and evaluated the potential for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

Health and Safety Plan: This cleanup plan includes a Construction Health and Safety Plan (CHASP) that is designed to protect community residents and on-Site workers. The elements of this RAWP are in compliance with applicable safety requirements of the United States Occupational Safety and Health Administration (OSHA). This RAWP includes many protective elements including those discussed below.

Site Safety Coordinator: This project has a designated Site safety coordinator to implement the CHASP. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is identified at the beginning of this Community Protection Statement.

Worker Training: Workers participating in cleanup of contaminated material on this project are required to be trained in a 40-hour hazardous waste operators training course and to take annual refresher training. This pertains to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan: Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC Office of Environmental Remediation. This cleanup plan also has a plan to address any unforeseen problems that might occur during the cleanup (called a ‘Contingency Plan’).

Odor, Dust and Noise Control: This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with applicable NYC noise control standards. If you observe problems in these areas, please contact the onsite Project Manager or NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document.

Quality Assurance: This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

Stormwater Management: To limit the potential for soil erosion and discharge, this cleanup plan has provisions for stormwater management. The main elements of the stormwater management include physical barriers such as tarp covers and erosion fencing, and a program for frequent inspection.

Hours of Operation: The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances

issued by that agency. For this cleanup project, the hours of operation will conform to requirements of the NYC Department of Buildings.

Signage: While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC Voluntary Cleanup Program and provides project contact names and numbers, and a link to the document repository where project documents can be viewed.

Complaint Management: The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager or the NYC Office of Environmental Remediation Project Manager listed on the first page of this Community Protection Statement document, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

Utility Mark-outs: To promote safety during excavation in this cleanup, the contractor is required to first identify all utilities and must perform all excavation and construction work in compliance with NYC Department of Buildings regulations.

Soil and Liquid Disposal: All soil and liquid material removed from the Site as part of the cleanup will be transported and disposed of in accordance with all applicable City, State and Federal regulations, and required permits will be obtained.

Soil Chemical Testing and Screening: All excavations will be supervised by a trained and properly qualified environmental professional. In addition to extensive sampling and chemical testing of soils on the Site, excavated soil will be screened continuously using hand-held instruments, by sight, and by smell to ensure proper material handling and management, and community protection.

Stockpile Management: Soil stockpiles will be kept covered with tarps to prevent dust, odor and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be

promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed, to protect storm water catch basins and other discharge points.

Trucks and Covers: Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with applicable laws and regulations.

Imported Material: All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on the Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

Equipment Decontamination: All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

Housekeeping: Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

Truck Routing: Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

Final Report: The results of all cleanup work will be fully documented in a final report (called the Remedial Action Report) that will be available for public review online. A link to the online document repository and the public library with Internet access nearest the Site are listed on the first page of this Community Protection Statement document

Long-Term Site Management: If long-term protection is needed after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined either in the property's deed or established through a city environmental designation registered with the Department of Buildings. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 Project Background

Jaroah Inc. is working with the NYC Office of Environmental Remediation (OER) in the New York City Voluntary Cleanup Program and/or in the “E” Designation Program to investigate and remediate a property located at 710 Grand Street in the Williamsburg section of Brooklyn, New York (the “Site”). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, and complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Background

The Site is located at 710 Grand Street in the Williamsburg section in Brooklyn, New York and is identified as Block 2788 and Lot 19 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500-square feet and is bounded by Grand Street to the north, 159 Maujer Street to the south, 714 Grand Street to the east, and 706 Grand Street to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is used for ground-level commercial space and contains vacant upper floors (2nd and 3rd floors) and basement containing a boiler room and utilities.

1.2 Redevelopment Plan

The proposed future use of the Site will consist of vertical extension of three (3) stories via the addition of stories on the existing 3-story building. The proposed building will contain the existing commercial retail space on the ground floor and residential apartments on floors above. The total gross square footage of the proposed building will be approximately 12,900-square feet and will include 1,825-square feet commercial retail use. The remainder of the building other than the first floor storefront will be residential and storage/utility/mechanical space. The cellar will be utilized for utility and meter rooms, and accessory use such as storage, bicycle storage

and gym. The first floor will be used for commercial retail and residential lobby. The remaining five (5) floors will be utilized as residential apartments. Total of 10 class “A” apartments will be located in the new building.

The current elevation of the existing slab is 8’10” bgs and the proposed slab will be 9’4” bgs. After removing the 5-inch thick existing slab, the entire footprint of the Site will be excavated 12 inches to 10’3” bgs to accommodate the new 5-inch thick slab and compacted 6-inch thick gravel substrate. In addition to the 12-inch excavation across the Site; the new footings will require 12 inches of excavation to 11’3” bgs, the structural strap beams will require 10 inches of excavation to 11’1” bgs, and the elevator pit will require 4’11” of excavation to 15’2” bgs. Figure 4 shows the detail depths of excavation with regards to the street elevation. Approximately 250 tons of soil will be generated during the construction. The water table is determined to be at approximately 25 feet below grade surface. Layout of the proposed site development is presented in Figure 3. The current zoning designation is zoned as C4-4A denoting it as a commercial property outside the main commercial district with residential potential. The proposed use is consistent with existing zoning for the property.

The remedial action contemplated under this RAWP may be implemented independently of the proposed redevelopment plan.

1.3 Description of Surrounding Property

The Site is located within a primarily mixed-use, residential and commercial area of Brooklyn, New York. The Site is bounded by a 3-story residential and commercial building to the east, 4-story residential and commercial building to the west, 3-story residential building to the south, and a 3-story residential and commercial building to the north, across Grand Street.

According to the OER Searchable Property Environmental E-Database (SPEED), there is one sensitive receptor (such as schools, hospitals and day-care facilities) within a 500-foot radius of the Site. The receptor is JHS 049, William J. Gaynor Junior High School located approximately 430 feet south of the Site at 223 Graham Ave, Brooklyn, NY 11211.

Figure 2 shows the surrounding land usage.

1.4 Summary of Past Site Uses and Areas of Concern

Past use of the property has been mixed-use with commercial and residential tenants since the year 1905. The current on-Site building was constructed in 1920 and has consisted of commercial and residential tenants.

No AOCs were identified for this site during the RI.

1.5 Summary of Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a Ground Penetrating Radar (GPR) survey prior to the RI;
3. Installed three (3) soil borings across the Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) soil vapor probes across the Site and collected three (3) soil vapor samples for chemical analysis.
5. Installed one (1) temporary groundwater monitoring well during the geotechnical investigation and collect one (1) groundwater sample for chemical analysis.

1.6 Summary of Findings of Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called “Remedial Investigation Report, 710 Grand Street”, dated May 2016 (RIR).

1. Elevation of the property is approximately 38 feet above mean sea level.
2. Depth to groundwater was encountered at approximately 25 feet at the Site.
3. Groundwater flow is expected from southwest to northeast beneath the Site based on nearby monitoring wells elevation.
4. Bedrock was not encountered during this RI.
5. The stratigraphy of the Site, from the surface down, consists of 2 feet of brown to tan fine sand with clay/silt underlain by 3 feet of pebbles with a fine sand matrix. The soil encountered was universally dry at all soil borings.

6. Soil samples collected during the RI were compared to 6NYCRR Part 375-6.8 Track 1 Unrestricted Soil Cleanup Objectives (SCOs) and Track 2 Restricted Residential Use SCOs. Only two (2) VOCs; toluene and acetone, were detected in the soil samples above their method detection limits (MDLs) but well below their respective Unrestricted Use SCOs. It should also be noted that acetone is a common laboratory contaminant. Several SVOCs, mainly consisting of polycyclic aromatic hydrocarbons (PAHs), were detected in soil samples above their respective MDLs; however none of them were above their respective Unrestricted Use SCOs. Only one (1) pesticide; endrin aldehyde, was detected in one of the soil samples; however it does not have a defined cleanup objective. No PCBs were detected in any of the soil samples. Several metals were detected above their respective MDLs; however none of them were detected above their respective Unrestricted Use SCOs.
7. Groundwater samples collected after the geotechnical investigation were compared to NYSDEC 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GWS). No SVOCs, Pesticides or PCBs were detected in the groundwater sample. Three (3) VOCs, specifically; 2-butanone (3,600 µg/L), acetone (2,800 µg/L), and chloroform (15 µg/L) were detected above their respective GQS. The elevated concentrations of these three VOCs caused the dilution factor of the sample to be 100, therefore, the MDLs for several other VOCs are reported higher than the GQS values. The SVOCs with MDLs detected above GQS mainly consist of phenols and PAHs. In the NYSDEC Technical & Operational Guidance Series (TOGS), each individual phenolic compound is referred to the total phenol regulatory standard of 1 µg/L. However, low concentrations for PAHs and total phenol are not achievable by the current technology used in the lab. As a result, some SVOCs' MDLs are reported above their respective GQS. Several dissolved metals were detected above their respective MDLs with eight (8) of them exceeding their respective GQS. These dissolved metals include beryllium (6 µg/L), chromium (333 µg/L), copper (279 µg/L), lead (61 µg/L), manganese (7,410 µg/L), nickel (287 µg/L), selenium (21 µg/L), and sodium (35,000 µg/L).
8. Soil vapor samples collected during the RI were compared to the compounds listed in Table 3.1 Air Guideline Values Derived by the NYSDOH located in the New York State

Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion dated October 2006. Soil vapor results detected elevated levels of petroleum compounds, including total BTEX ranging from a minimum concentration of 519 $\mu\text{g}/\text{m}^3$ (SV-1) to a maximum concentration of 845 $\mu\text{g}/\text{m}^3$ (SV-3). Benzene was detected at a maximum concentration of 39 $\mu\text{g}/\text{m}^3$ (SV-1). 1,1,1-trichloroethane, carbon tetrachloride, and trichloroethylene (TCE) were not detected in any of the soil vapor samples. Tetrachloroethylene (PCE) was detected in two of the soil vapor samples with one sample (SV-1) detected at a concentration of 180 $\mu\text{g}/\text{m}^3$. Using the soil vapor concentration as a reference for a potential sub-slab soil vapor concentration, monitoring or mitigation may be required per the 2006 NYS DOH guidance. Since petroleum-related and chlorinated VOC exceedances were not identified in any of the soil samples, the source of the elevated VOCs concentration in soil vapor is most likely an off-site source.

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

2.0 Remedial Action Objectives

Based on the results of the RI, the following Remedial Action Objectives (RAOs) have been identified for this Site:

Soil

- Prevent direct contact with contaminated soil.

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from contaminated groundwater.

Soil Vapor

- Prevent exposure to contaminants in soil vapor.
- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 Remedial Alternatives Analysis

The goal of the remedy selection process is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedance of applicable standards, criteria and guidance values (SCGs). Remedial alternatives are then developed and evaluated based on the following ten criteria:

- Protection of human health and the environment;
- Compliance with SCGs;
- Short-term effectiveness and impacts;
- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, or volume of contaminated material;
- Implementability;
- Cost effectiveness;
- Community acceptance;
- Land use; and
- Sustainability.

As required, a Track 1 Unrestricted Use scenario is evaluated for the remedial action. The following is a detailed description of the alternatives analyzed to address impacted media at the Site:

Alternative 1:

- Selection of NYSDEC 6NYCRR Part 375 Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavating the entire footprint of the Site to approximately 17 inches below the existing slab grade. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the

excavation after removal of all soil required for construction of the new building's cellar level is complete, additional excavation would be performed to ensure complete removal of soil/ fill that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls are required for a Track 1 cleanup. “As part of development, a vapor barrier would be installed to prevent potential exposures from soil vapor in the future.”

Alternative 2:

- Establishment of Restricted Residential (Track 2) SCOs;
- Removal of all soil/fill exceeding Track 2 Restricted Residential SCOs and confirmation that Track 2 Restricted Residential SCOs have been achieved with post-excavation end point sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would be achieved by excavating the entire footprint of the Site to approximately 17 inches below the existing slab. If soil/fill containing analytes at concentrations above Track 2 Restricted Residential SCOs is still present at the base of the excavation, additional excavation would be performed to meet Track 2 Restricted Residential SCOs.
- Placement of a composite cover system over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a vapor barrier system beneath the building slab to prevent potential exposures from soil vapor;
- Sealing the existing foundation walls to prevent potential exposures from soil vapor;
- Modifications to the engineering controls may be required if groundwater results warrant;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of restricted Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were

intended. The SMP will note that the property owner and property owner's successors and assigns must comply with the approved SMP; and

- The property will continue to be registered with an E-Designation at the NYC Buildings Department.

3.1 Threshold Criteria

Protection of Public Health and the Environment

This criterion is an evaluation of the remedy's ability to protect public health and the environment, and an assessment of how risks posed through each existing or potential pathway of exposure are eliminated, reduced or controlled through removal, treatment, and implementation of Engineering Controls or Institutional Controls. Protection of public health and the environment must be achieved for all approved remedial actions.

Alternative 1 would be protective of human health and the environment by removing all soil/fill exceeding Track 1 Unrestricted Use SCO's and groundwater protection standards, thus eliminating potential for direct contact with contaminated soil/fill once construction is complete and eliminating the risk of contaminants leaching into groundwater.

Alternative 2 would achieve comparable protections of human health and the environment by excavation and removal of most of the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 2 Restricted Residential SCO's, as well as by placement of Institutional and Engineering Controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and continuing the E-designation on the property would ensure that the composite cover system remains intact and protective of public health. Establishment of Track 2 Restricted Residential SCO's would minimize the risk of contamination leaching into groundwater.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a Construction Health and Safety Plan, an approved Soil/Materials Management Plan, and Community Air Monitoring Plan (CAMP).

Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier below the building slab and outside foundations walls below grade.

3.2 Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

This evaluation criterion assesses the ability of the alternative to achieve applicable standards, criteria and guidance.

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCO's and Protection of Groundwater SCO's. Compliance with SCGs for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the building's basement slab and sealing/coating the existing foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCG's and RAOs for soil through removal of soil to meet Track 2 Restricted Residential SCO's. Compliance with SCG's for soil vapor would also be achieved by installing a waterproofing/vapor barrier system below the new building's basement slab and sealing/coating the existing foundation walls. A Site Management Plan would ensure that these controls remained protective for the long term.

Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) will be implemented during Site redevelopment under this RAWP. For both Alternatives, focused attention on means and methods employed during the remedial action would ensure that handling and management of contaminated material would be in compliance with applicable SCGs. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants.

Short-Term Effectiveness and Impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their short term effects during the remedial action on public health and the environment during implementation of the remedial action, including protection of the community, protection of onsite workers and environmental impacts.

Both Alternative 1 and 2 have similar short-term effectiveness during their implementation, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short-term impacts could potentially be higher for Alternative 1 since excavation of greater amounts of historical fill material would take place. However, focused attention to means and methods during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flag persons will be used to protect pedestrians at Site entrances and exits.

The potential adverse impact to the community, workers and the environment for both alternatives would be minimized through implementation of control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short-term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Construction Health and Safety Plan (CHASP) would provide protection from on-Site contaminants by using personal protective equipment would be worn consistent with the documented risks within the respective work zones.

Long-term effectiveness and permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence and quantity/nature of waste or residual contamination remaining at the Site after response objectives have been met, such as permanence of the remedial alternative, magnitude of remaining contamination, adequacy of controls including the adequacy and suitability of Engineering Controls/Institutional Controls (ECs/ICs) that may be used to manage contaminant residuals that remain at the Site and assessment of containment systems and ICs that are designed to eliminate exposures to contaminants, and long-term reliability of ECs.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill above Track 1 Unrestricted Use SCO's. Removal of on-Site contaminant sources will also prevent future groundwater contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 2 Restricted Residential SCOs; installing a composite cover system across the Site; maintaining use restrictions; establishing an SMP to ensure long-term management of ICs and ECs; and maintaining registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended, assuring that protections designed into the remedy continue to provide the required level of protection.

Reduction of toxicity, mobility, or volume of contaminated material

This evaluation criterion assesses the remedial alternative's use of remedial technologies that permanently and significantly reduce toxicity, mobility, or volume of contaminants as their principal element. The following is the hierarchy of source removal and control measures that are to be used to remediate a Site, ranked from most preferable to least preferable: removal and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce

the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by removing all soil in excess of Track 1 Unrestricted Use SCO's.

Alternative 2 would remove most of the historic fill at the Site, and all remaining on-Site soil/fill beneath the new building will meet Track 2 Restricted Residential SCO's.

Alternative 1 would remove a greater total mass of contaminants from the Site. The removal of soil to 15 inches for the new development in both scenarios would lessen the difference in contaminant mass removal between these two alternatives.

Implementability

This evaluation criterion addresses the technical and administrative feasibility of implementing an alternative and the availability of various services and materials required during its implementation, including technical feasibility of construction and operation, reliability of the selected technology, ease of undertaking remedial action, monitoring considerations, administrative feasibility (e.g. obtaining permits for remedial activities), and availability of services and materials.

The techniques, materials and equipment to implement both Alternatives 1 and 2 are readily available and have been proven to be effective in remediating the contaminants present on the Site. They use standard equipment and technologies that are well established in the industry. The reliability of each remedy is also high. There are no special difficulties associated with any of the activities proposed.

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, and disposal costs, engineering expenses) and site

management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Since no historic fill at the Site was found during the RI, and the new building requires excavation of the entire Site to a depth of 15 inches, the costs associated with both Alternative 1 and Alternative 2 will likely be comparable. Costs associated with Alternative 1 could potentially be higher than Alternative 2 if soil with analytes above Track 1 Unrestricted Use SCOs is encountered below the excavation depth required for development. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.

The remedial plan would couple the remedial action with the redevelopment of the Site, lowering total costs. The remedial plan will also consider the selection of the most appropriate disposal facilities to reduce transportation and disposal costs during cleanup and redevelopment of the Site.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP.

This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Appendix 2. Observations here will be supplemented by public comment received on the RAWP. Under both alternatives, the overall goals of the remedial program, to protect public health and the environment and eliminate potential contaminant exposures, have been broadly supported by citizens in NYC communities.

Land use

This evaluation criterion addresses the proposed use of the property. This evaluation has considered reasonably anticipated future uses of the Site and takes into account: current use and historical and/or recent development patterns; applicable zoning laws and maps; NYS Department of State's Brownfield Opportunity Areas (BOA) pursuant to section 970-r of the general municipal law; applicable land use plans; proximity to real property currently used for residential use, and to commercial, industrial, agricultural, and/or recreational areas; environmental justice impacts, Federal or State land use designations; population growth patterns and projections; accessibility to existing infrastructure; proximity of the site to important cultural resources and natural resources, potential vulnerability of groundwater to contamination that might emanate from the site, proximity to flood plains, geography and geology; and current Institutional Controls applicable to the site.

The current, intended, and reasonably anticipated future land use of the Site and its surroundings are compatible with the selected remedy of soil remediation. The proposed future use of the Site includes a 6-story mixed-use building with basement utility, mechanical, and storage rooms, gym, ground-floor commercial retail space, and residential condominiums on the upper floors. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 2 Restricted Residential SCOs, both of which are protective of public health and the environment for its planned residential use. The proposed use is compliant with the property's zoning and is consistent with recent development patterns. The areas surrounding the site is urban and consists of predominantly mixed residential and commercial buildings in zoning districts designated for commercial and residential uses. The proposed development would clean up the property and make it safer, create new employment opportunities, living space and supportive housing and associated societal benefits to the community, and other economic benefits from land revitalization.

Temporary short-term project impacts are being mitigated through site management controls and truck traffic controls during remediation activities. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 2 Restricted Residential SCOs, both of which are protective of public health and the environmental for its planned use.

The Site is not in close proximity to important cultural resources, including federal or state historic or heritage sites or Native American religious sites, natural resources, waterways, wildlife refuges, wetlands, or critical habitats of endangered or threatened species. The Site is located in an urban area and not in proximity to fish or wildlife and neither alternative would result in any potential exposure pathways of contaminant migration affecting fish or wildlife. The remedial action is also protective of groundwater natural resources. The Site does not lie in a Federal Emergency Management Agency (FEMA)-designated flood plain. Both alternatives are equally protective of natural resources and cultural resources. Improvements in the current environmental condition of the property achieved by both alternatives considered in this plan are consistent with the City's goals for cleanup of contaminated land.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in PlaNYC: A Greener, Greater New York. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

While Alternative 2 would potentially result in lower energy usage based on reducing the volume of material transported off-Site, both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action. The remedial plan for either alternative would take into consideration the shortest trucking routes during off-Site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. The New York City Clean Soil Bank program is available for reuse of any clean native soils under either alternative. A complete list of green remedial activities considered as part of the NYC VCP is included in a Sustainability Statement.

Selection of the Preferred Remedy

The preferred remedy for the site is Alternative 1. Data generated during the site investigation support the conclusion that Alternative 1 is achievable. The Alternative 1 remedy will remove all soil/fill exceeding Track 1 SCOs throughout the Site, which will be confirmed with post-excavation sampling.

No engineering Controls are required for a Track 1 cleanup. A concrete slab covering the entire site and vapor barrier/waterproofing membrane will be installed as part of standard building development.

If Track 1 cleanup is not achieved, the Site will continue to be encumbered with an E-designation for hazardous material.

4.0 Remedial Action

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Alternative 1, the Track 1 remedial action. The preferred remedial action achieves protection of public health and the environment for the intended use of the property. The preferred remedial action will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Selection of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs). Collection and analysis of three end-point samples to determine the performance of the remedy with respect to attainment of Track 1 SCOs.
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Completion of a Waste Characterization Study prior to excavation activities. Waste characterization soil samples will be collected at a frequency dictated by disposal facility(s).
6. Excavation and removal of soil/fill exceeding Unrestricted Use (Track 1) SCOs. The current elevation of the existing slab is 8'10" bgs and the proposed slab will be 9'4" bgs. After removing the 5-inch thick existing slab, the entire footprint of the Site will be excavated 12 inches to 10'3" bgs to accommodate the new 5-inch thick slab and compacted 6-inch thick gravel substrate. In addition to the 12-inch excavation across the Site; the new footings will require 12 inches of excavation to 11'3" bgs, the structural strap beams will require 10 inches of excavation to 11'1" bgs, and the elevator pit will

require 4'11" of excavation to 15'2" bgs. Figure 4 shows the detail depths of excavation with regards to the street elevation. Approximately 250 tons of soil/fill will be removed from the Site and properly disposed at an appropriately licensed or permitted facility.

7. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.
8. Management of excavated materials including temporarily stockpiling and segregating in accordance with defined material types and to prevent co-mingling of contaminated material and non-contaminated materials.
9. Removal of all UST's that are encountered during soil/fill removal actions. Registration of tanks and reporting of any petroleum spills associated with UST's and appropriate closure of these petroleum spills in compliance with applicable local, State and Federal laws and regulations.
10. Transportation and off-Site disposal of all soil/fill material at licensed or permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. Performance of all activities required for the remedial action, including acquisition of required permits and attainment of pretreatment requirements, in compliance with applicable laws and regulations.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following construction elements implemented as part of new development will constitute Engineering and Institutional Controls:

15. As part of development, construction of an engineered composite cover consisting of a five-inch thick concrete slab with a six-inch gravel or crushed stone layer beneath all building areas.
16. As part of development, installation of a vapor barrier system consisting of vapor barrier beneath the new building slab to mitigate soil vapor migration into the building. Additionally, the existing interior foundation walls will be sealed with Retro-Coat or an equal product. The vapor barrier system will consist of a minimum 20-mil vapor barrier below the slab throughout the full building area. All welds, seams and penetrations will be properly sealed to prevent preferential pathways for vapor migration.
17. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/ Fill Management

The site already meets 6 NYCRR Part 375, Table 6.8(a) Track 1 Unrestricted Use SCO. Based on end-point results, if Track 1 is not achieved, Track 2 Residential SCOs will be used.

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Appendix 4. Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Soil/Fill Excavation and Removal

The current elevation of the existing slab is 8'10" bgs and the proposed slab will be 9'4" bgs. After removing the 5-inch thick existing slab, the entire footprint of the Site will be excavated 12 inches to 10'3" bgs to accommodate the new 5-inch thick slab and compacted 6-inch thick gravel substrate. In addition to the 12-inch excavation across the Site; the new footings will require 12

inches of excavation to 11'3" bgs, the structural strap beams will require 10 inches of excavation to 11'1" bgs, and the elevator pit will require 4'11" of excavation to 15'2" bgs. Figure 4 shows the detail depths of excavation with regards to the street elevation. The total quantity of soil/fill expected to be excavated and disposed off-Site is 250 tons. For each disposal facility to be used in the remedial action, a letter from the developer/QEP to the receiving facility requesting approval for disposal and a letter back to the developer/QEP providing approval for disposal will be submitted to OER prior to any transport and disposal of soil at a facility.

Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

End-point Sampling

End-point samples will be analyzed for compounds and elements as described below utilizing the following methodology:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;
- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

New York State ELAP certified labs will be used for all end-point sample analyses. Labs performing end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values.

Confirmation End-point Sampling

Removal actions for development purposes under this plan will be performed in conjunction with confirmation end-point soil sampling. Three confirmation samples will be collected from the base of the excavation at locations to be determined by OER. A location map of proposed end-point sampling locations is provided in Figure 5. To evaluate attainment of Track 1, samples will

be analyzed for VOCs, SVOCs, pesticides, PCBs and metals according to analytical methods described above.

Hotspot End-point Sampling

For any hotspots identified during this remedial program, including any hotspots identified during the remedial action, hotspot removal actions will be performed to ensure that hotspots are fully removed and end-point samples will be collected at the following frequency:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation end-point sample locations and depth will be biased towards the areas and depths of highest contamination identified during previous sampling episodes unless field indicators such as field instrument measurements or visual contamination identified during the remedial action indicate that other locations and depths may be more heavily contaminated. In all cases, post-remediation samples should be biased toward locations and depths of the highest expected contamination.

If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and “finger print analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

Quality Assurance/Quality Control

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol.

The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

One blind duplicate sample for every 20 samples collected will be submitted to the approved laboratory for analysis of the same parameters. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. One trip blank will be submitted to the laboratory with each shipment of soil samples. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4 degrees.

Dedicated disposable sampling materials will be used for the collection endpoint samples, eliminating the need to prepare field equipment (rinsate) blanks. However, if non-disposable equipment is used, (stainless steel scoop, etc.) field rinsate blanks will be prepared at the rate of 1 for every eight samples collected. Decontamination of non-dedicated sampling equipment will consist of the following:

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash withalconox® detergent solution and scrub

- Rinse with tap water
- Rinse with distilled or deionized water

Field blanks will be prepared by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers.

Import of Soils

Soil import is not planned on this project.

Reuse of Onsite Soils

Soil reuse is not planned on this project.

4.3 Engineering Controls

The remedial action will achieve Track 1 Unrestricted Use SCOs and no Engineering Controls are required. However, the following design elements will be incorporated into the project as part of the development:

- (1) Composite Cover System
- (2) Soil Vapor Barrier System

If Track 1 is not achieved, these elements will constitute Engineering Controls that will be employed in the remedial action to address residual contamination remaining at the Site.

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system will be comprised of 5 inches of concrete slab underlain by 6 inches of gravel or crushed stone over compacted soil. Figure 6 shows the location and detail of the Site-wide composite cover system used on this Site.

The composite cover system will be a permanent engineering control. The system will be inspected and its performance certified at specified intervals as required by this RAWP and the

Site Management Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the Remedial Action Report.

Vapor Barrier System

Migration of soil vapor from onsite or offsite sources into the building will be mitigated with a combination of building slab and vapor barrier. The vapor barrier will consist of a 20-mil vapor barrier that will be installed below and around the elevator pit and below the entire building slab. The barrier chosen for this project is manufactured by Stego Industries, LLC. The penetrations will be sealed with a manufacturer specified tape. Vertical and horizontal overlaps will be 3 inches. Where applicable, overlap of horizontal and vertical membranes at corners will be 4 inches. The interior of the foundation walls will be sealed with Retro-Coat or an equal product. The vapor barrier will be extended over the existing footing and between the new slab and existing foundation wall where it will meet the Retro-Coat. The installation of the VBS will be described in the RAR. The Remedial Action Report will include photographs of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty.

The project's Professional Engineer licensed by the State of New York will have primary direct responsibility for overseeing the implementation of the vapor barrier. The extent of the proposed vapor barrier membrane and interior wall sealant is provided in Figure 7 and the joint detail of the vapor mitigation systems is provided in Figure 8. Product specifications are provided in Appendix 6.

The Vapor Barrier System is a permanent engineering control and will be inspected and its performance certified at specified intervals as required by this RAWP and the Site Management

Plan. A Soil and Materials Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying vapor barrier system is disturbed after the remedial action is complete. Maintenance of these systems will be described in the Site Management Plan in the Remedial Action Report.

4.4 Institutional Controls

A Track 1 remedial action is proposed and Institutional Controls are not required. If a Track 1 remedial action is not achieved, Institutional Controls (IC's) will be incorporated in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. These IC's define the program to operate, maintain, inspect and certify the performance of Engineering Controls and Institutional Controls on this property. Institutional Controls would be implemented in accordance with a Site Management Plan included in the final Remedial Action Report (RAR). Institutional Controls would be:

- Continued registration of the E-Designation for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the SMP which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a SMP in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection, and certification of ECs and IC's. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; 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. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted at a frequency to be determine by OER in the SMP and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited in contact with residual soil materials;

- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for commercial tenants and residential condominiums and will not be used for a higher level of use without prior approval by OER.

4.5 Site Management Plan

A Track 1 remedial action is proposed and Site Management is not required. If a Track 1 remedial action is not achieved, Site Management will be required and will be the last phase of remediation. Site Management will begin with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) operation and maintenance of EC's; (3) inspection and certification of IC's and EC's.

Site management activities and EC/IC certification will be scheduled by OER on a periodic basis to be established in the RAR and the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by July 30 of the year following the reporting period.

4.6 Qualitative Human Health Exposure Assessment

The objective of the qualitative exposure assessment is to identify potential receptors and pathways for human exposure to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Data and information reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA) for this project. As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk under current and future conditions by characterizing the exposure setting, identifying exposure pathways, and evaluating contaminant fate and transport. This QHHEA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Contaminant Sources

Based on the results of the RIR, the contaminants of concern are:

Soil:

- VOCs, SVOCs, one pesticide, and metals were identified, but none exceeded Unrestricted Residential Use SCOs.

Groundwater:

- VOCs including 2-butanone, acetone, and chloroform above their GCOs in groundwater,
- Beryllium, chromium, copper, lead, manganese, nickel, selenium, and sodium above their GCOs in groundwater.

Soil Vapor:

- Trace to low levels of petroleum-related hydrocarbons including BTEX and chlorinated VOCs including one exceedance of tetrachloroethylene above NYS DOH Soil Vapor Matrix

Nature, Extent, Fate and Transport of Contaminants

Soil: Several VOCs and SVOCs, mainly consisting of polycyclic aromatic hydrocarbons (PAHs), were detected above their respective MDLs; however none of them were above their respective Unrestricted Use SCOs. Only one (1) pesticide; endrin aldehyde, was detected in one of the soil samples; however it does not have a defined cleanup objective. No PCBs were detected in any of the soil samples. Several metals were detected above their respective MDLs; however none of them were detected above their respective Unrestricted Use SCOs.

Groundwater: Groundwater sampling results did not detect any SVOCs, Pesticides or PCBs. Three (3) VOCs, specifically; 2-butanone, acetone, and chloroform were detected above their respective GQS. The elevated concentrations of these three VOCs caused the dilution factor of the sample to be 100, therefore, the MDLs for several other VOCs are reported higher than the GQS values. The SVOCs with MDLs detected above GQS mainly consist of phenols and PAHs. In the NYSDEC Technical & Operational Guidance Series (TOGS), each individual phenolic compound is referred to the total phenol regulatory standard of 1 µg/L. However, low concentrations for PAHs and total phenol are not achievable by the current technology used in the lab. As a result, some SVOCs' MDLs are reported above their respective GQS. Several dissolved metals were detected above their respective MDLs with eight (8) of them exceeding their respective GQS. These dissolved metals include beryllium, chromium, copper, lead, manganese, nickel, selenium, and sodium.

Soil Vapor: Soil vapor results detected elevated levels of petroleum compounds, including total BTEX ranging from a minimum concentration of 519 µg/m³ (SV-1) to a maximum concentration of 845 µg/m³ (SV-3). Benzene was detected at a maximum concentration of 39 µg/m³ (SV-1). 1,1,1-trichloroethane, carbon tetrachloride, and trichloroethylene (TCE) were not detected in any of the soil vapor samples. Tetrachloroethylene (PCE) was detected in two of the soil vapor samples with one sample (SV-1) detected at a concentration of 180 µg/m³.

Receptor Populations

On-Site Receptors: The site currently has one ground-floor commercial tenant with vacant second and Onsite receptors are limited to current workers trespassers, site representatives and visitors granted access to the property. During construction, potential on-site receptors include construction workers, site representatives, and visitors. Under proposed future conditions, potential on-site receptors include adult and child building residents, workers and visitors.

Off-Site Receptors: Potential off-site receptors within a 500 foot radius of the Site include adult and child residents; commercial and construction workers; pedestrians; and trespassers based on the following land uses within 500 feet of the Site:

1. Commercial Businesses – existing and future
2. Residential Buildings – existing and future
3. Building Construction/ Renovation – existing and future
4. Pedestrians, Trespassers, Cyclists – existing and future
5. Schools – existing and future

Potential Routes of Exposure

Three potential primary routes exist by which chemicals can enter the body: ingestion, inhalation, and dermal absorption. Exposure can occur based on the following potential media:

- Ingestion of groundwater or fill/ soil;
- Inhalation of vapors or particulates; and
- Dermal absorption of groundwater or fill/ soil.

Potential Exposure Points

Current Conditions: The site is currently capped with a concrete building slab so there are no potential exposure pathways from ingestion, inhalation, or dermal absorption of soil/ fill. Groundwater is not exposed at the site. The site is served by the public water supply and groundwater is not used at the site for potable supply and there is no potential for exposure. Because the site is currently developed with a commercial structure containing a concrete building slab, there is no potential for soil vapor intrusion to the site.

Construction/ Remediation Conditions: During the remedial action, onsite workers will come into direct contact with surface and subsurface soils as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with exposed impacted soil and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. Due to the depth of groundwater, direct contact with groundwater is not expected. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 1 SCOs will be removed. The site will be fully capped, preventing potential direct exposure to soil and groundwater remaining in place, and a vapor barrier system will prevent any potential exposure due to inhalation by preventing soil vapor intrusion. The site is served by the public water supply, and groundwater is not used at the site. There are no plausible off-site pathways for oral, inhalation, or dermal exposure to contaminants derived from the site.

Overall Human Health Exposure Assessment

There are potential complete exposure pathways for the current site condition. There are potential complete exposure pathways that require mitigation during implementation of the remedy. There are no complete exposure pathways under future conditions after the site is developed. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure, site-wide surface cover, and a subsurface vapor barrier system for the building. Under current conditions, on-Site exposure pathways exist for those with access to the Site and trespassers. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. Potential post-construction use of groundwater is not considered an option because groundwater in this area of

New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

Environmental Media & Exposure Route	Human Exposure Assessment for Proposed Remedial Action
Direct contact with surface and subsurface soils	<ul style="list-style-type: none"> • There is no direct contact because all soils in excess of Track 1 SCO's will be removed from the site
Ingestion of groundwater	<ul style="list-style-type: none"> • The area is served by an upstate water supply and groundwater is not being used for potable water supply. Groundwater use for potable supply onsite is prohibited by municipal law.
Direct contact with groundwater	<ul style="list-style-type: none"> • All soils in excess of Track 1 SCO's and Groundwater Protection Standards will be removed from the site. Groundwater is not impacted by site conditions.
Direct contact with soil vapor	<ul style="list-style-type: none"> • Contact with impacted soil vapor will be prevented by a soil vapor barrier system

5.0 Remedial Action Management

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Ezgi Karayel (Senior Project Manager), and Curtis Breuer (Environmental Scientist). The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Spiro Dongaris, P.E, and Ezgi Karayel, respectively.

5.2 Site Security

Site access will be controlled by DOB approved construction fence. For work areas of limited size, barrier tape will be sufficient to delineate and restrict access.

5.3 Work Hours

The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. The hours of operation will be conveyed to OER during the pre-construction meeting.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 5. OER will be notified upon determination of the site safety coordinator. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, such as 40-hour hazardous waste operator training and annual 8-hour refresher training. Site Safety Officer will be responsible for maintaining workers training records.

Personnel entering any exclusion zone will be trained in the provisions of the HASP and will comply with all requirements of 29 CFR 1910.120. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed.

Emergency telephone numbers will be posted at the site location before any remedial work begins. A safety meeting will be conducted before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

An emergency contact sheet with names and phone numbers is included in the CHASP. That document will define the specific project contacts for use in case of emergency.

5.5 Community Air Monitoring Plan

Real-time air monitoring for volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

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

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis during invasive work.

Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment will be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

All 15-minute readings must be recorded and be available for OER personnel to review.

Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The

equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m³ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m³ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m³ of the upwind level and in preventing visible dust migration.

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

5.6 Agency Approvals

All permits or government approvals required for remedial construction have been or will be obtained prior to the start of remedial construction. Approval of this RAWP by OER does not constitute satisfaction of these requirements and will not be a substitute for any required permit.

5.7 Site Preparation

Pre-Construction Meeting

OER will be invited to attend the pre-construction meeting at the Site with all parties involved in the remedial process prior to the start of remedial construction activities.

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility

mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed in compliance with applicable laws and regulations including NYC Building Code to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Mark-Out Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

Proper safety and protective measures pertaining to utilities and easements, and compliance with all laws and regulations will be employed during invasive and other work contemplated under this RAWP. The integrity and safety of on-Site and off-Site structures will be maintained during all invasive, excavation or other remedial activity performed under the RAWP.

Dewatering

Dewatering is not anticipated during remediation and construction.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations.

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete pads or use of stone or other

aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and clean water will be utilized for the removal of soil from vehicles and equipment, as necessary.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; loose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from excavated areas, trenches and depressions on the property to high ground or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes

will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, hay bales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

At the conclusion of an extreme storm event, as soon as it is safe to access the property, a complete inspection of the property will be performed. A site inspection report will be submitted to OER at the completion of site inspection and after the site security is assessed. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. Damage from storm conditions that result in acute public safety threats, such as downed power lines or imminent collapse of buildings, structures or equipment will be reported to public safety authorities via appropriate means such as calling 911. Petroleum spills will be reported to NYS DEC within 2 hours of identification and consistent with State regulations. Emergency and spill conditions will also be reported to OER. Public safety structures, such as construction security fences will be repaired promptly to eliminate public safety threats. Debris will be collected and removed. Dewatering will be performed in compliance with existing laws and regulations and consistent with emergency notifications, if any, from proper authorities. Eroded areas of soil including unsafe slopes will be stabilized and fortified. Dislocated materials will be collected and appropriately managed. Support of excavation structure will be inspected and fortified as necessary. Impacted stockpiles will be contained and damaged stockpile covers will be replaced. Stormwater control systems and structures will be inspected and maintained as necessary. If soil or fill materials are discharged off site to adjacent properties, property owners and OER will be notified and corrective measure plan designed to remove and clean dislocated material will be submitted to OER and implemented following approval by OER and granting of site access by the property owner. Impacted offsite areas may require characterization based on site conditions, at the discretion of OER. If onsite petroleum spills are identified, a qualified environmental professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362 within statutory defined timelines. If the source of the spill is

ongoing and can be identified, it should be stopped if this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

A site inspection report will be submitted to OER at the completion of site inspection. An inspection report established by OER is available on OER's website (www.nyc.gov/oer) and will be used for this purpose. Site conditions will be compared to the inventory of site conditions and material performed prior to the storm event and significant differences will be noted. The site inspection report will be sent to the OER project manager and will include the site name, address, tax block and lot, site primary and alternate contact name and phone number. Damage and soil release assessment will include: whether the project had stockpiles; whether stockpiles were damaged; photographs of damage and notice of plan for repair; report of whether soil from the site was dislocated and whether any of the soil left the site; estimates of the volume of soil that left the site, nature of impact, and photographs; description of erosion damage; description of equipment damage; description of damage to the remedial program or the construction program, such as damage to the support of excavation; presence of onsite or offsite exposure pathways caused by the storm; presence of petroleum or other spills and status of spill reporting to NYS DEC; description of corrective actions; schedule for corrective actions. This report should be completed and submitted to OER project manager with photographs within 24 hours of the time of safe entry to the property after the storm event.

5.8 Traffic Control

Drivers of trucks leaving the Site with soil/fill will be instructed to proceed without stopping in the vicinity of the Site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is along Grand Street onto Marcy Avenue/Williamsburg St West and onto I-278 (Brooklyn Queens Expressway).

5.9 Demobilization

Demobilization will include:

- As necessary, restoration of temporary access areas and areas that may have been disturbed to accommodate support areas (e.g., staging areas, decontamination areas, storage areas, temporary water management areas, and access area);
- Removal of sediment from erosion control measures and truck wash and disposal of materials in accordance with applicable laws and regulations;
- Equipment decontamination, and;
- General refuse disposal.

Equipment will be decontaminated and demobilized at the completion of all field activities. Investigation equipment and large equipment (e.g., soil excavators) will be washed at the truck inspection station as necessary. In addition, all investigation and remediation derived waste will be appropriately disposed.

5.10 Reporting and Record Keeping

Daily reports

Daily reports providing a general summary of activities for each day of active remedial work will be emailed to the OER Project Manager by the end of the following business day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of excavation and other remedial work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP results noting all excursions. CAMP data may be reported;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be

communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

Record Keeping and Photo Documentation

Job-site record keeping for all remedial work will be performed. These records will be maintained on-Site during the project and will be available for inspection by OER staff. Representative photographs will be taken of the Site prior to any remedial activities and during major remedial activities to illustrate remedial program elements and contaminant source areas. Photographs will be submitted at the completion of the project in the RAR in digital format (i.e. jpeg files).

5.11 Complaint Management

All complaints from citizens will be promptly reported to OER. Complaints will be addressed and outcomes will also be reported to OER in daily reports. Notices to OER will include the nature of the complaint, the party providing the complaint, and the actions taken to resolve any problems.

5.12 Deviations From The Remedial Action Work Plan

All changes to the RAWP will be reported to, and approved by, the OER Project Manager and will be documented in daily reports and reported in the Remedial Action Report. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from OER noting the following:

- Reasons for deviating from the approved RAWP;
- Effect of the deviations on overall remedy; and
- Determination with basis that the remedial action with the deviation(s) is protective of public health and the environment.

6.0 Remedial Action Report

A Remedial Action Report (RAR) will be submitted to OER following implementation of the remedial action defined in this RAWP. The RAR will document that the remedial work required under this RAWP has been completed and has been performed in compliance with this plan. The RAR will include:

- Information required by this RAWP;
- Text description with thorough detail of all engineering and institutional controls (if Track 1 remedial action is not achieved)
- As-built drawings for all constructed remedial elements;
- Manifests for all soil or fill disposal;
- Photographic documentation of remedial work performed under this remedy;
- Site Management Plan (if Track 1 remedial action is not achieved);
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results (including all soil test results from the remedial investigation for soil that will remain on site) and all soil/fill waste characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all soil or fill material removed from the Site including a map showing the location of these excavations and hotspots, tanks or other contaminant source areas;
- Full accounting of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material;
- Account of the origin and required chemical quality testing for material imported onto the Site;
- Continue registration of the property with an E-Designation by the NYC Department of Buildings (if Track 1 remedial action is not achieved);

- The RAWP and Remedial Investigation Report will be included as appendices to the RAR;
- Reports and supporting material will be submitted in digital form and final PDF's will include bookmarks for each appendix.

Remedial Action Report Certification

I, Spiro Dongaris, P.E., am currently a registered professional engineer licensed by the State of New York. I performed professional engineering services and had primary direct responsibility for implementation of the remedial program for the 710 Grand Street site, site number 16CVCP085K. I certify to the following:

- I have reviewed this document, to which my signature and seal are affixed.
- Engineering Controls implemented during this remedial action were designed by me or a person under my direct supervision and achieve the goals established in the Remedial Action Work Plan for this site.
- The Engineering Controls constructed during this remedial action were professionally observed by me or by a person under my direct supervision and (1) are consistent with the Engineering Control design established in the Remedial action Work Plan and (2) are accurately reflected in the text and drawings for as-built design reported in this Remedial Action Report.
- The OER-approved Remedial Action Work Plan dated [date] and Stipulations in a letter dated [date] were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

Name

PE License Number

Signature

Date

PE Stamp

I, Ezgi Karayel, am a Qualified Environmental Professional. I had primary direct responsibility for implementation of the remedial program for the 710 Grand Street site, site number 16CVCP085K. I certify to the following:

- The OER-approved Remedial Action Work Plan dated August 15, 2012 and Stipulations in a letter dated September 10, 2014 were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.

QEP Name

QEP Signature

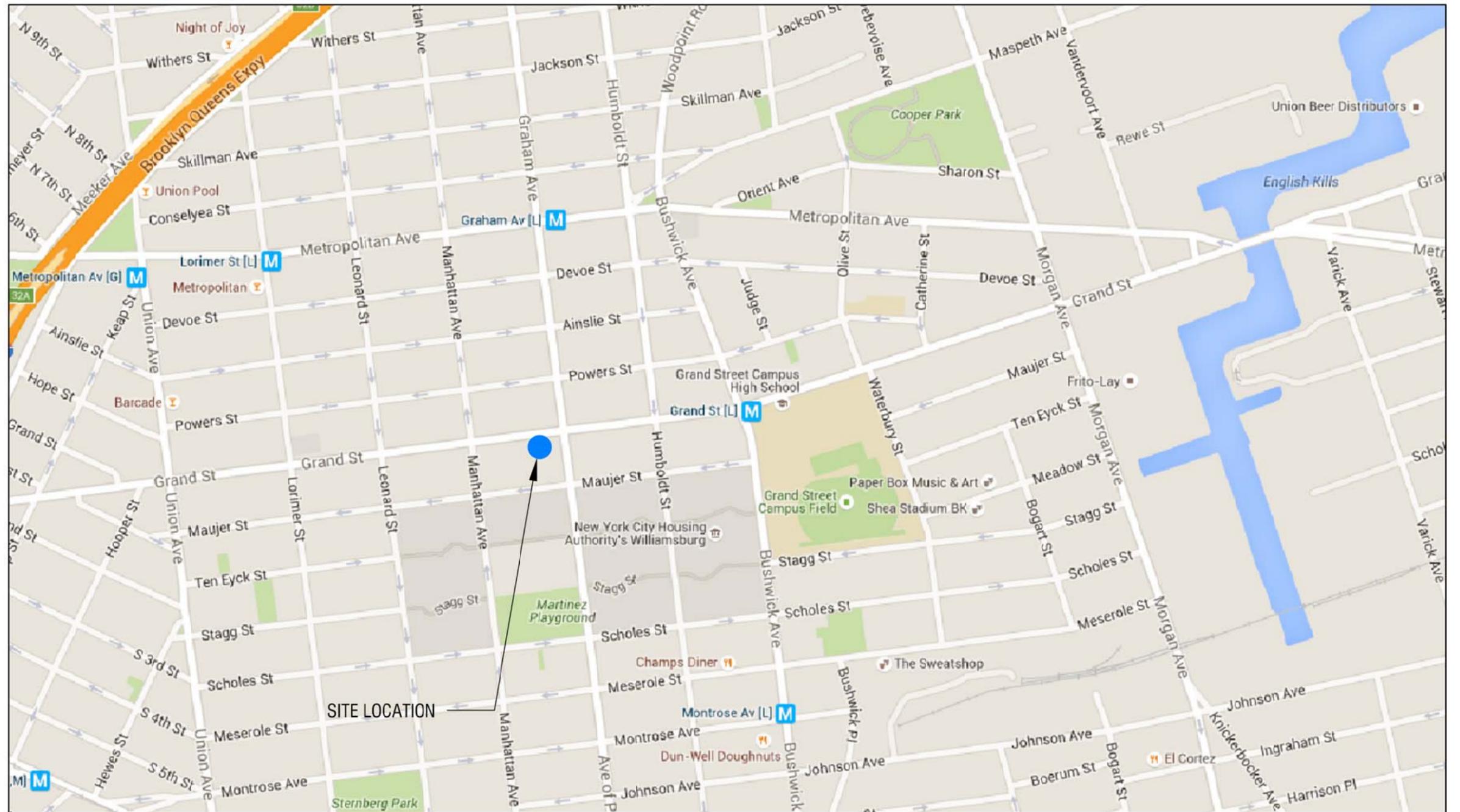
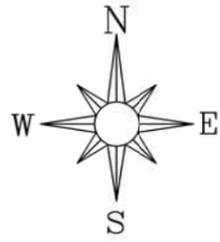
Date

7.0 Schedule

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a three month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	1	1
Remedial Excavation	2	6
Demobilization	8	1
Submit Remedial Action Report	9	3

FIGURES



Legend:

 SITE LOCATION



**ATHENICA
ENVIRONMENTAL
SERVICES, INC.**
Environmental Consultants

Date: AUGUST 5, 2016

Drawn by: CASEY BLUMBERG

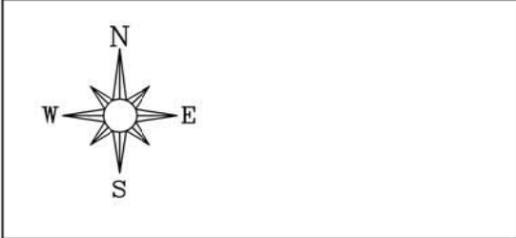
Checked by: CURTIS BREUER

Drawing Scale: NOT TO SCALE

Project No.: 16-133-0553

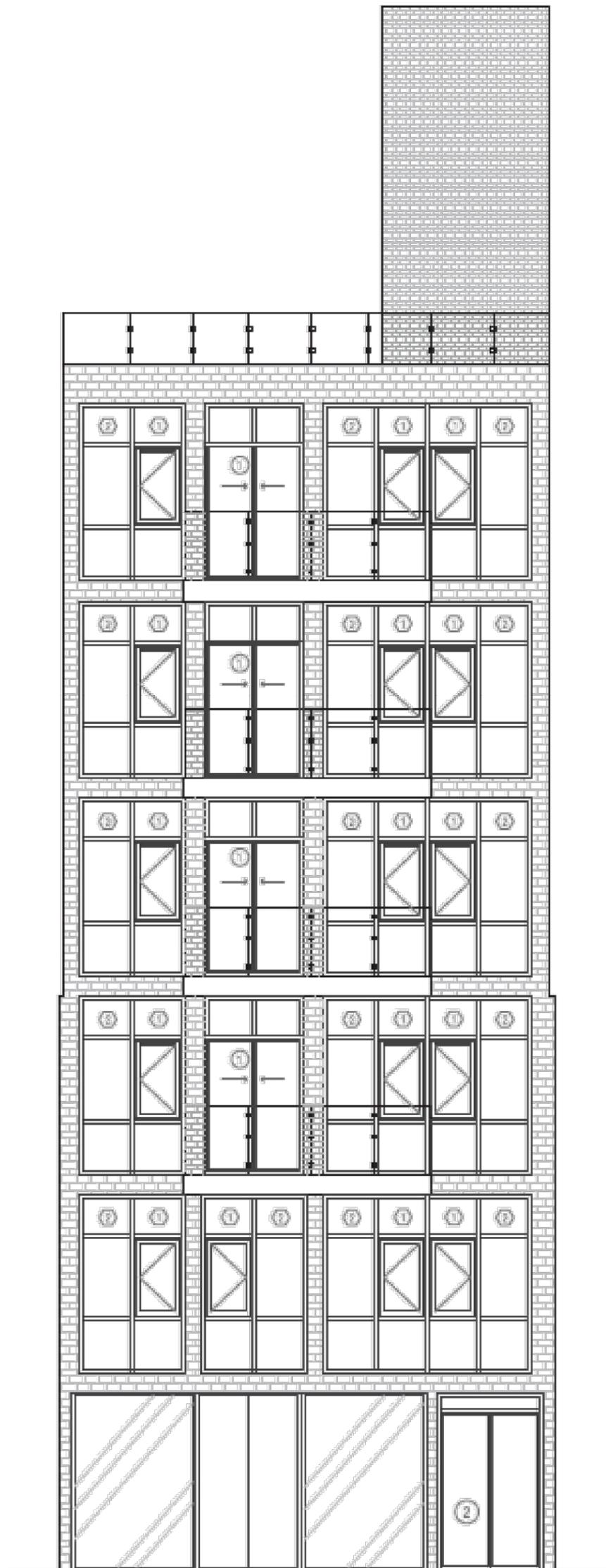
Site map: 710 GRAND STREET
BROOKLYN, NY 11211

Figure: 1
Title: REMEDIAL ACTION WORK PLAN
SITE LOCATION MAP



Date:	AUGUST 5, 2016
Drawn by:	CASEY BLUMBERG
Checked by:	CURTIS BREUER
Drawing Scale:	NOT TO SCALE
Project No.:	16-133-0553

Site map:	710 GRAND STREET, BROOKLYN, NY 11211
Figure:	2
Title:	REMEDIAL ACTION WORK PLAN SITE BOUNDARY MAP



The proposed development consists of adding 3 new floors to the existing 3-story mixed-use building with a basement.



**ATHENICA
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SERVICES, INC,**
Environmental Consultants

Site map: 710 GRAND STREET,
BROOKLYN, NY 11211

Figure: 3
Title: REMEDIAL ACTION WORK PLAN
PROPOSED SITE DEVELOPMENT

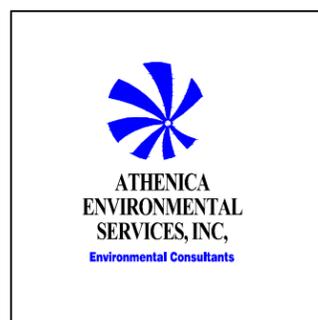
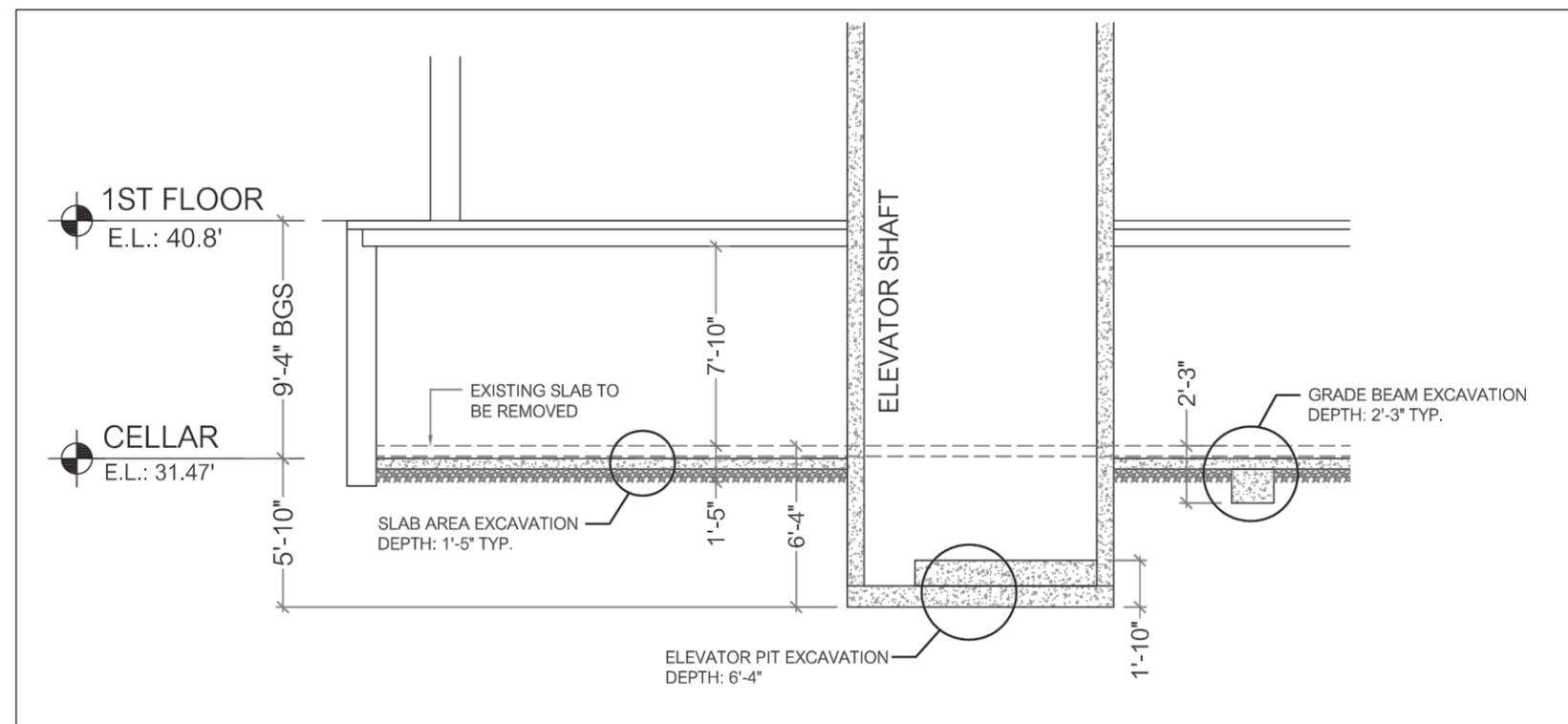
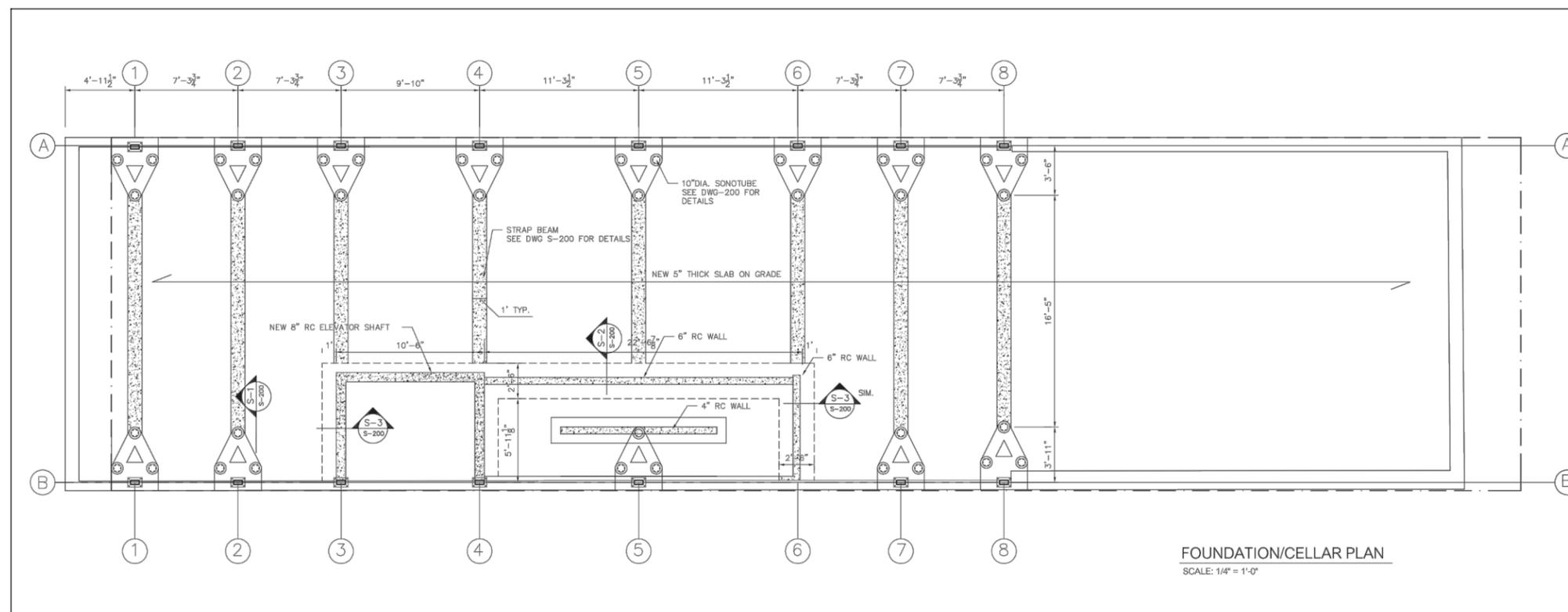
Date: AUGUST 5, 2016

Drawn by: CASEY BLUMBERG

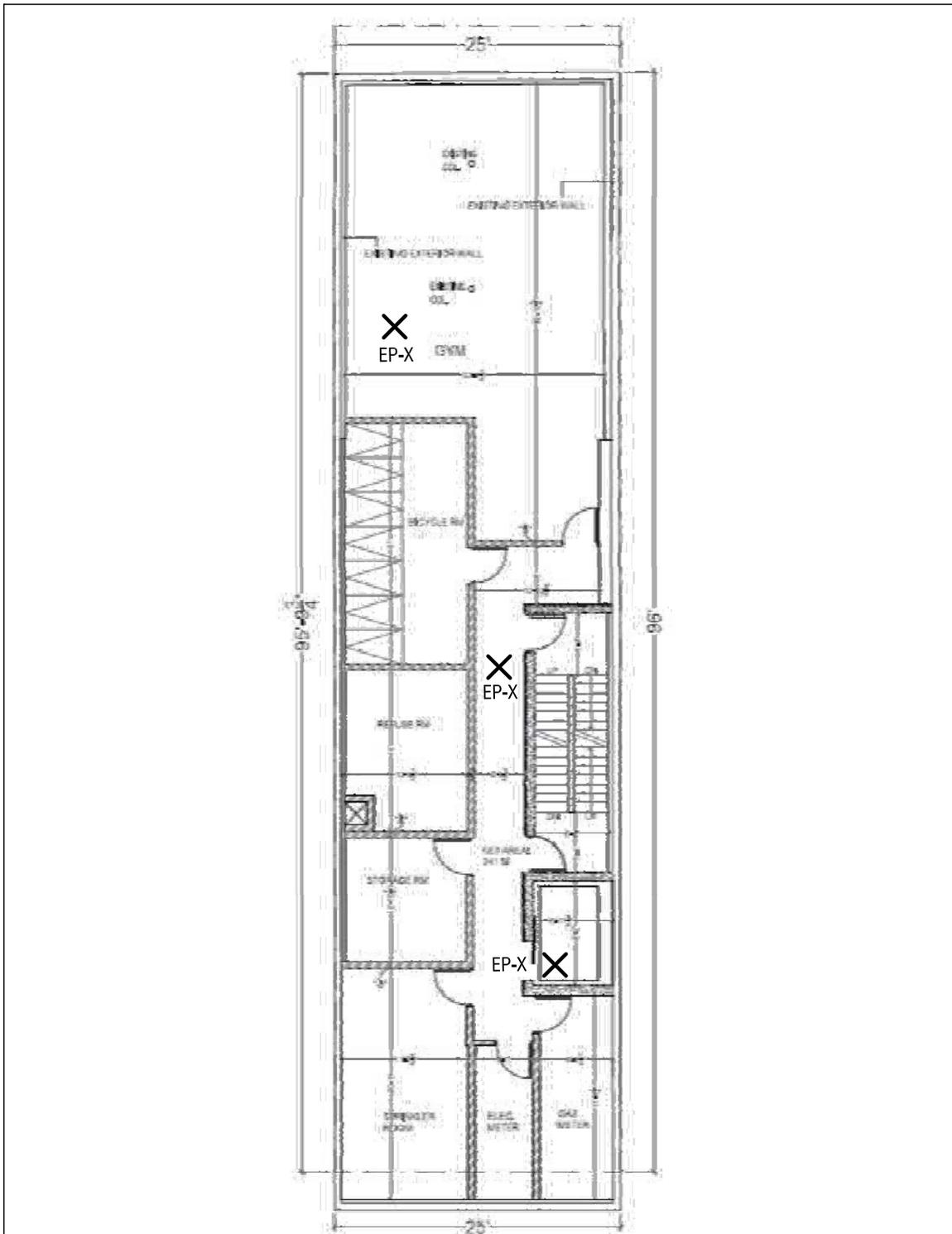
Checked by: CURTIS BREUER

Drawing Scale: N.T.S.

Project No.: 16-133-0533



Site map:	710 GRAND STREET BROOKLYN, NEW YORK 11211
Figure:	4
Title:	REMEDIAL ACTION WORK PLAN - SITE EXCAVATION DIAGRAM
Date:	AUGUST 24, 2016
Drawn by:	EZGI KARAYEL
Checked by:	CURTIS BREUER
Drawing Scale:	N.T.S.
Project No.:	16-133-0553



X EP-X

PROPOSED END POINT LOCATIONS



**ATHENICA
ENVIRONMENTAL
SERVICES, INC,**
Environmental Consultants

Site map: 710 GRAND STREET,
BROOKLYN, NY 11211

Figure: 5
Title: REMEDIAL ACTION WORK PLAN
PROPOSED END POINT SAMPLING LOCATIONS

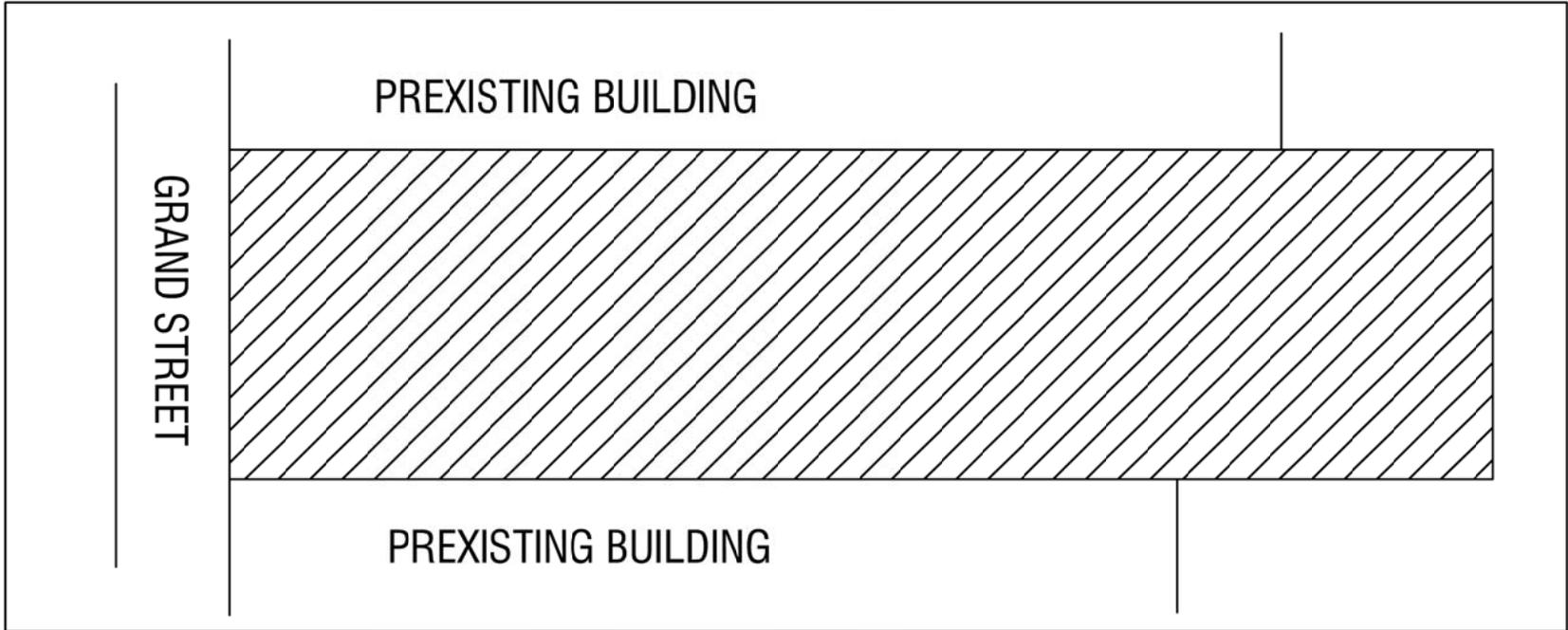
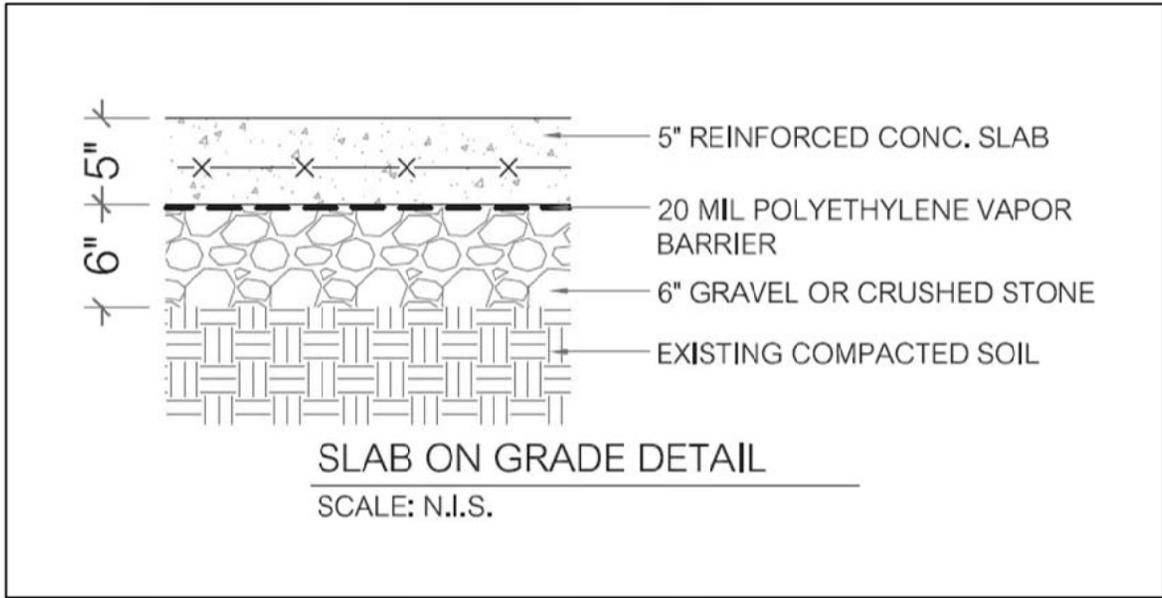
Date: AUGUST 5, 2016

Drawn by: CASEY BLUMBERG

Checked by: CURTIS BREUER

Drawing Scale: N.T.S.

Project No.: 16-133-0533



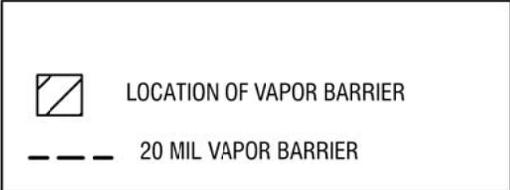
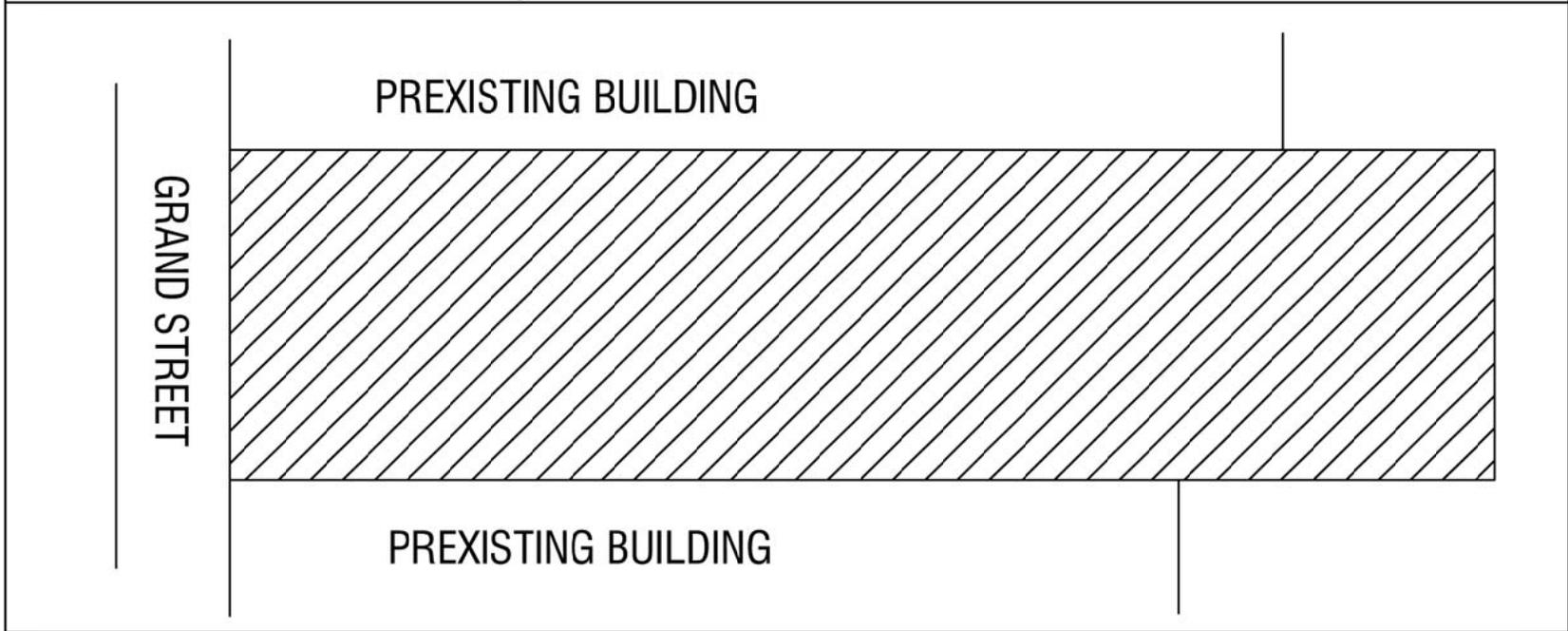
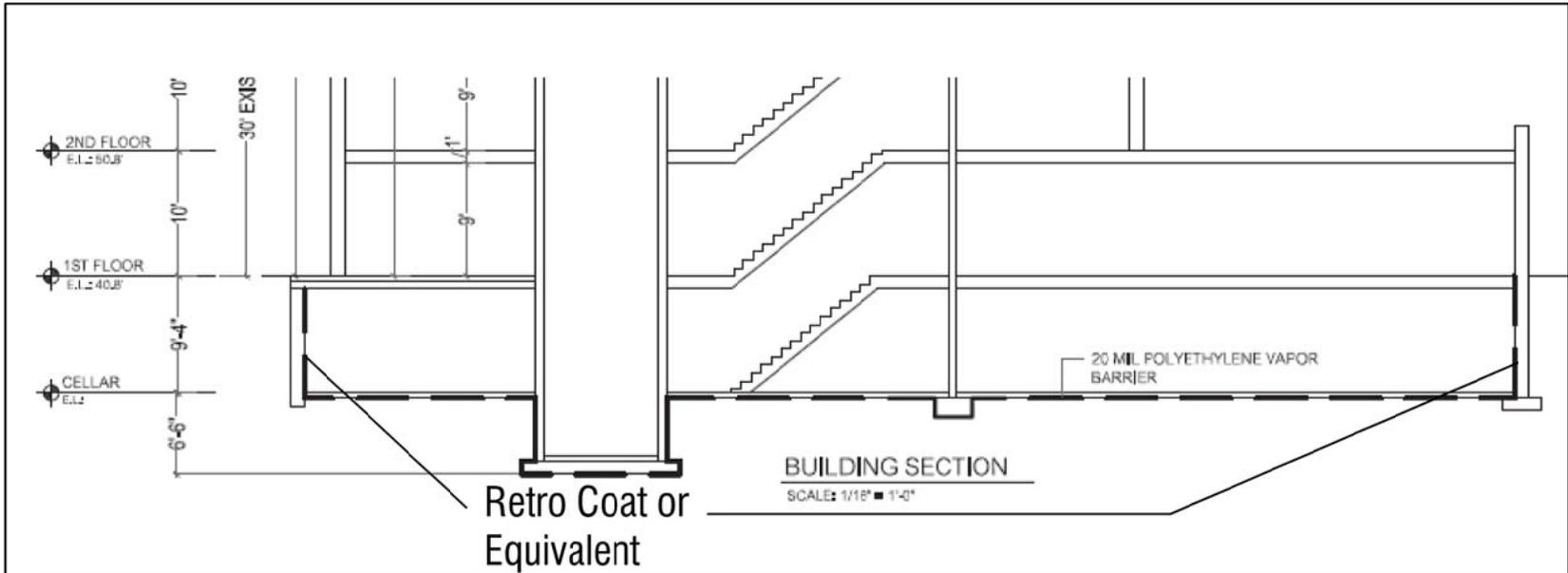
 LOCATION OF 5" CONCRETE SLAB



ATHENICA
ENVIRONMENTAL
SERVICES, INC.
Environmental Consultants

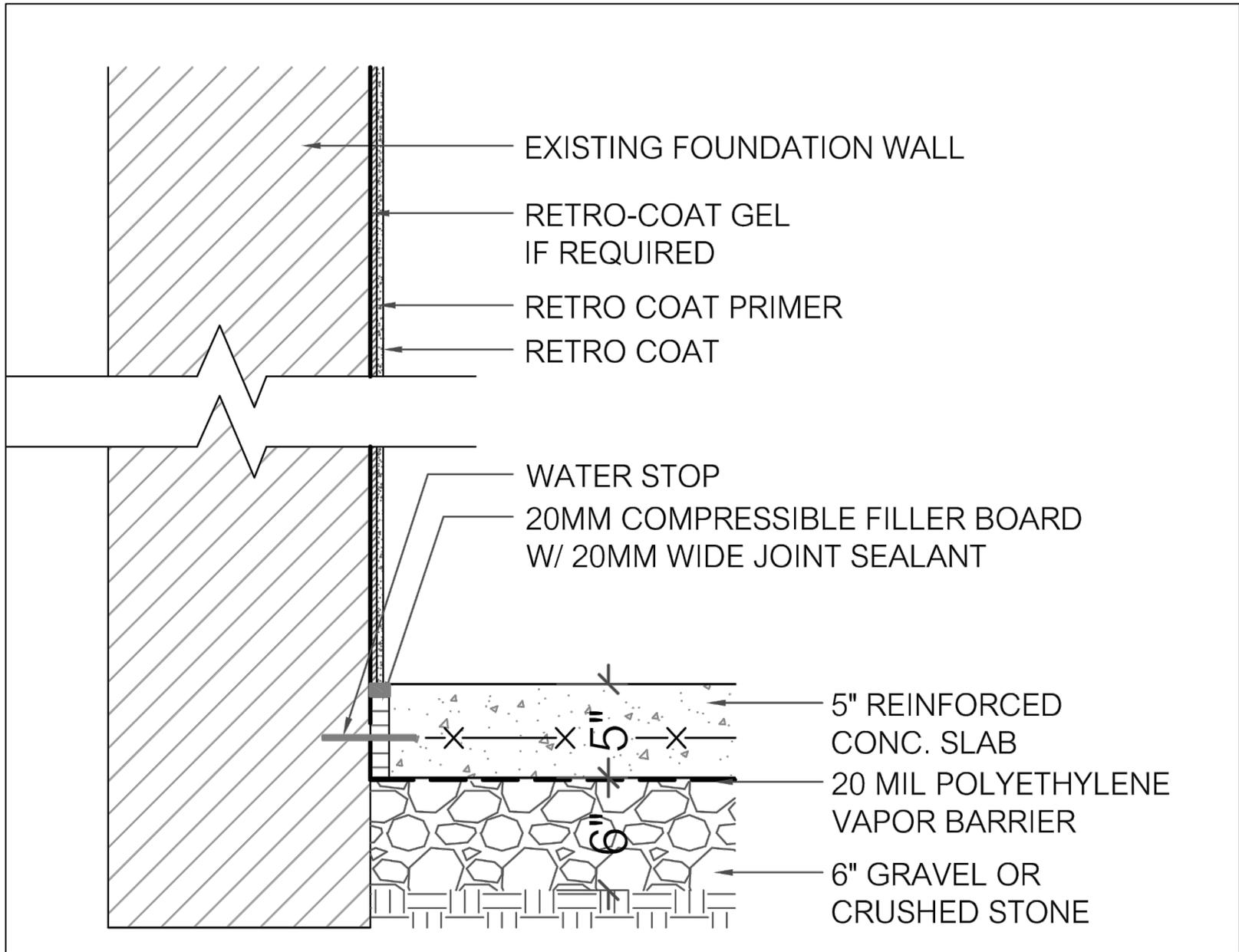
Date:	AUGUST 5, 2016
Drawn by:	CASEY BLUMBERG
Checked by:	CURTIS BREUER
Drawing Scale:	NOT TO SCALE
Project No.:	16-133-0553

Site map:	710 GRAND STREET, BROOKLYN, NY 11211
Figure:	6
Title:	REMEDIAL ACTION WORK PLAN COMPOSITE COVER SYSTEM LOCATION AND DETAIL



Date:	AUGUST 5, 2016
Drawn by:	CASEY BLUMBERG
Checked by:	CURTIS BREUER
Drawing Scale:	NOT TO SCALE
Project No.:	16-133-0553

Site map:	710 GRAND STREET, BROOKLYN, NY 11211
Figure:	7
Title:	REMEDIAL ACTION WORK PLAN VAPOR BARRIER SYSTEM LOCATIONS



Date:	AUGUST 24, 2016
Drawn by:	EZGI KARAYEL
Checked by:	CURTIS BREUER
Drawing Scale:	NOT TO SCALE
Project No.:	16-133-0553

Site map:	710 GRAND STREET, BROOKLYN, NY 11211
Figure:	8
Title:	REMEDIAL ACTION WORK PLAN JOINT DETAIL OF VAPOR MITIGATION SYSTEMS

TABLES

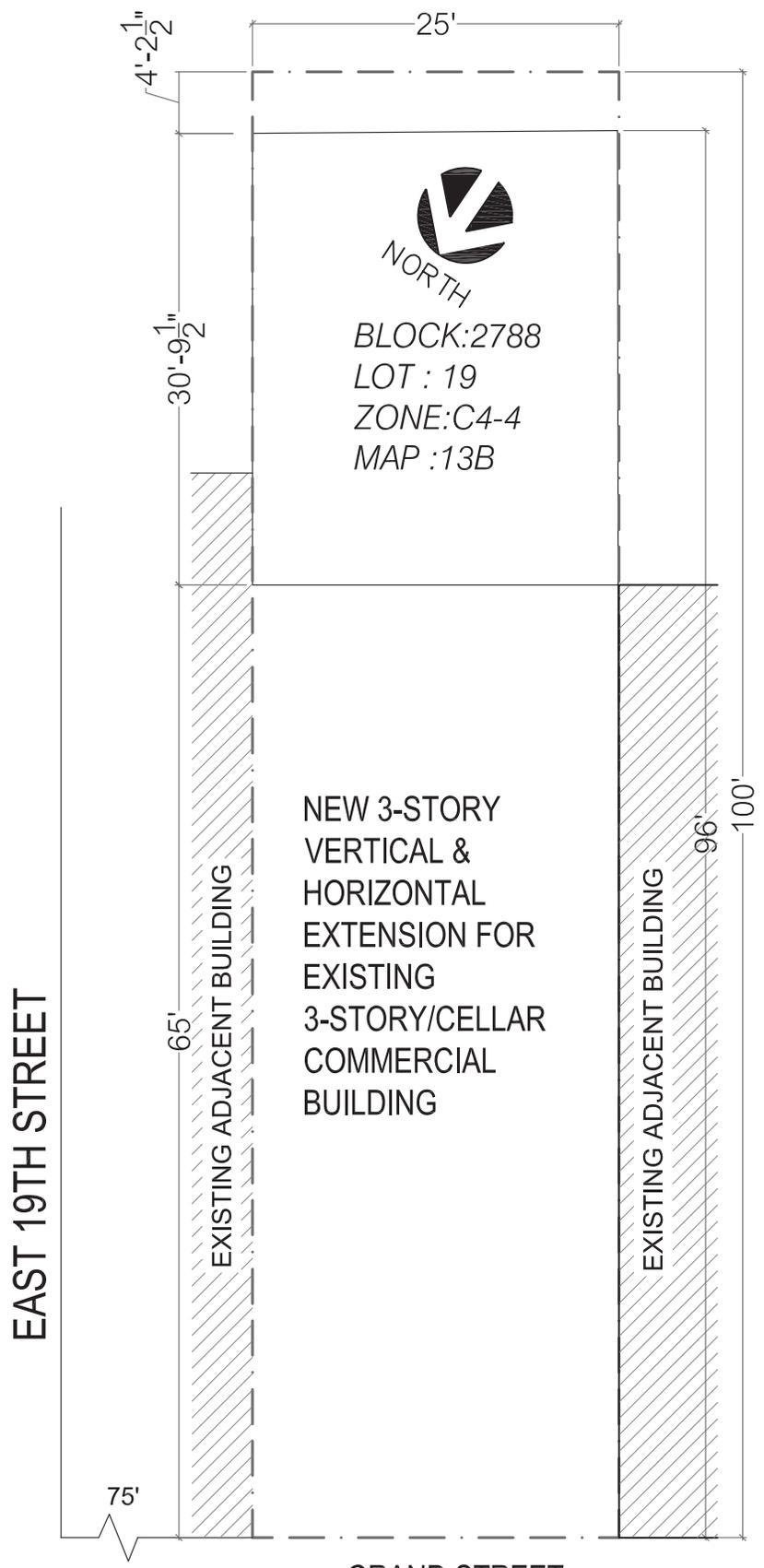
Table 1
Soil Cleanup Objectives (SCOs)

Contaminant	CAS Number	NYSDEC Part 375-6 SCOs for Unrestricted Use (ppm)
Volatile Organic Compounds		
1,1,1-Trichloroethane	71-55-6	0.68
1,1-Dichloroethane	75-34-3	0.27
1,1-Dichloroethene	75-35-4	0.33
1,2-Dichlorobenzene	95-50-1	1.1
1,2-Dichloroethane	107-06-2	0.02
cis-1,2-Dichloroethene	156-59-2	0.25
trans-1,2-Dichloroethene	156-60-5	0.19
1,3-Dichlorobenzene	541-73-1	2.4
1,4-Dichlorobenzene	106-46-7	1.8
1,4-Dioxane	123-91-1	0.1
Acetone	67-64-1	0.05
Benzene	71-43-2	0.06
Butylbenzene	104-51-8	12
Carbon tetrachloride	56-23-5	0.76
Chlorobenzene	108-90-7	1.1
Chloroform	67-66-3	0.37
Ethylbenzene	100-41-4	1
Hexachlorobenzene	118-74-1	0.33
Methyl ethyl ketone	78-93-3	0.12
Methyl tert-butyl ether	1634-04-4	0.93
Methylene chloride	75-09-2	0.05
n-Propylbenzene	103-65-1	3.9
sec-Butylbenzene	135-98-8	11
tert-Butylbenzene	98-06-6	5.9
Tetrachloroethene	127-18-4	1.3
Toluene	108-88-3	0.7
Trichloroethene	79-01-6	0.47
1,2,4-Trimethylbenzene	95-63-6	3.6
1,3,5-Trimethylbenzene	108-67-8	8.4
Vinyl chloride	75-01-4	0.02
Xylene (mixed)	1330-20-7	0.26
Semivolatile Organic Compounds		
Acenaphthene	83-32-9	20
Acenaphthylene	208-96-8	100
Anthracene	120-12-7	100
Benz(a)anthracene	56-55-3	1
Benzo(a)pyrene	50-32-8	1
Benzo(b)fluoranthene	205-99-2	1
Benzo(g,h,i)perylene	191-24-2	100
Benzo(k)fluoranthene	207-08-9	0.8
Chrysene	218-01-9	1
Dibenz(a,h)anthracene	53-70-3	0.33
Fluoranthene	206-44-0	100
Fluorene	86-73-7	30
Ideno(1,2,3-cd)pyrene	193-39-5	0.5
m-Cresol	108-39-4	0.33
Naphthalene	91-20-3	12
o-Cresol	95-48-7	0.33
p-Cresol	106-44-5	0.33
Pentachlorophenol	87-86-5	0.8
Phenanthrene	85-01-8	100
Phenol	108-95-2	0.33
Pyrene	129-00-0	100

Table 1
Soil Cleanup Objectives (SCOs)

Contaminant	CAS Number	NYSDEC Part 375-6 SCOs for Unrestricted Use (ppm)
Pesticides/PCBs		
2,4,5-TP Acid (Silvex)	93-72-1	3.8
4,4'-DDE	72-55-9	0.0033
4,4'-DDT	50-29-9	0.0033
4,4'-DDD	72-54-8	0.0033
Aldrin	309-00-2	0.005
alpha-BHC	319-84-6	0.02
beta-BHC	319-85-7	0.036
Chlordane (alpha)	5103-71-9	0.094
delta-BHC	319-86-8	0.04
Dibenzofuran	132-64-9	7
Dieldrin	60-57-1	0.005
Endosulfan I	959-98-8	2.4
Endosulfan II	33213-65-9	2.4
Endosulfan sulfate	1031-07-8	2.4
Endrin	72-20-8	0.014
Heptachlor	76-44-8	0.042
Lindane	58-89-9	0.1
Polychlorinated biphenyls	1336-36-3	0.1
Metals		
Arsenic	7440-38-2	13
Barium	7440-39-3	350
Beryllium	7440-41-7	7.2
Cadmium	7440-43-9	2.5
Chromium hexavalent	18540-29-9	1
Chromium trivalent	16065-83-1	30
Copper	7440-50-8	50
Total Cyanide		27
Lead	7439-92-1	63
Manganese	7439-96-5	1600
Total Mercury		0.18
Nickel	7440-02-0	30
Selenium	7782-49-2	3.9
Silver	7440-22-4	2
Zinc	7440-66-6	109

APPENDIX 1
PROPOSED DEVELOPMENT PLANS



GRAND STREET
SITE PLAN
SCALE: N.I.S

JUNG WOR CHIN - ARCHITECT

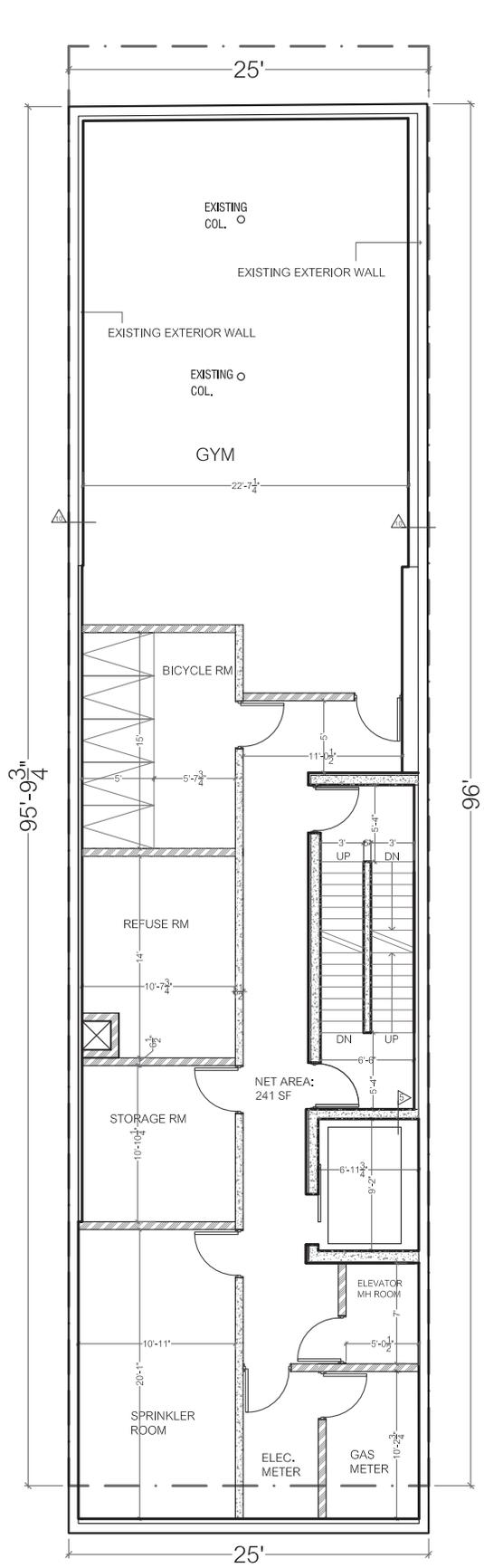
41 MOTT STREET, 4TH FL
NEW YORK, NY 10013
TEL: 212-334-9897
EMAIL: JWCHINAIA@GMAIL.COM



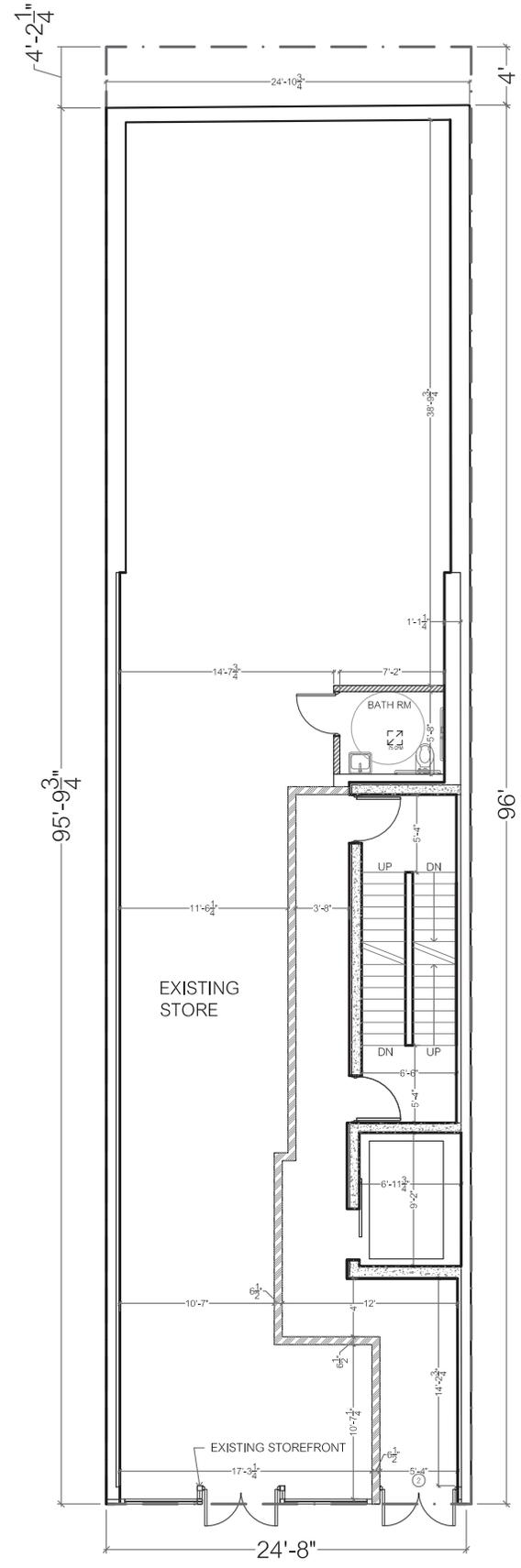
SHEET TITLE:
SITE PLAN

SHEET NO.:
1 OF 11

DATE: 8-3-16



CELLAR PLAN
SCALE: N.I.S



1ST FLOOR PLAN
SCALE: N.I.S

JUNG WOR CHIN - ARCHITECT
 41 MOTT STREET, 4TH FL
 NEW YORK, NY 10013
 TEL: 212-334-9897
 EMAIL: JWCHINAIA@GMAIL.COM

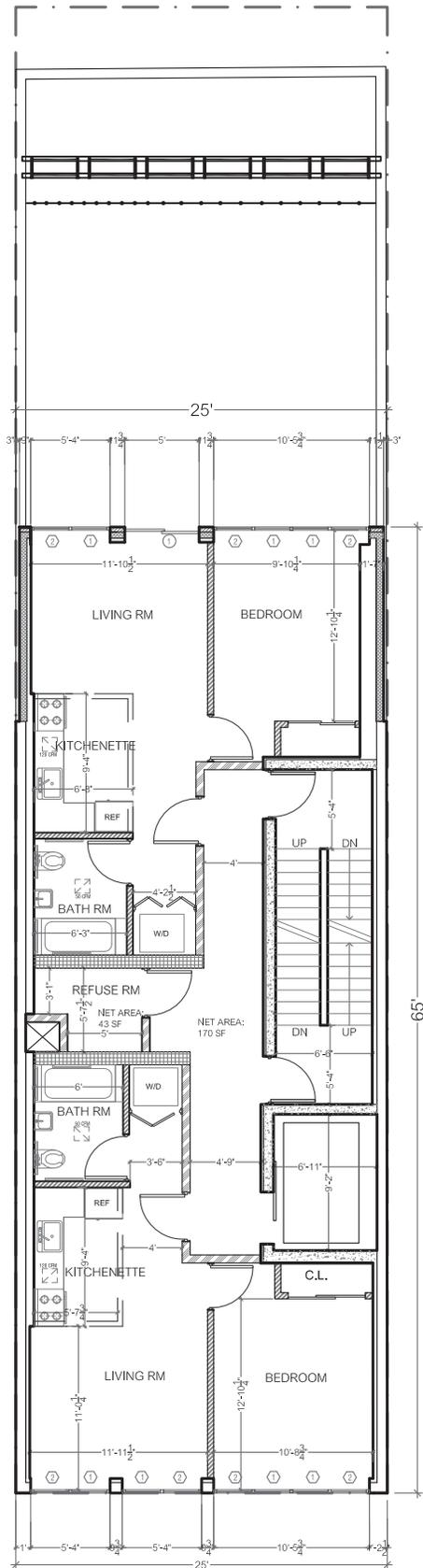


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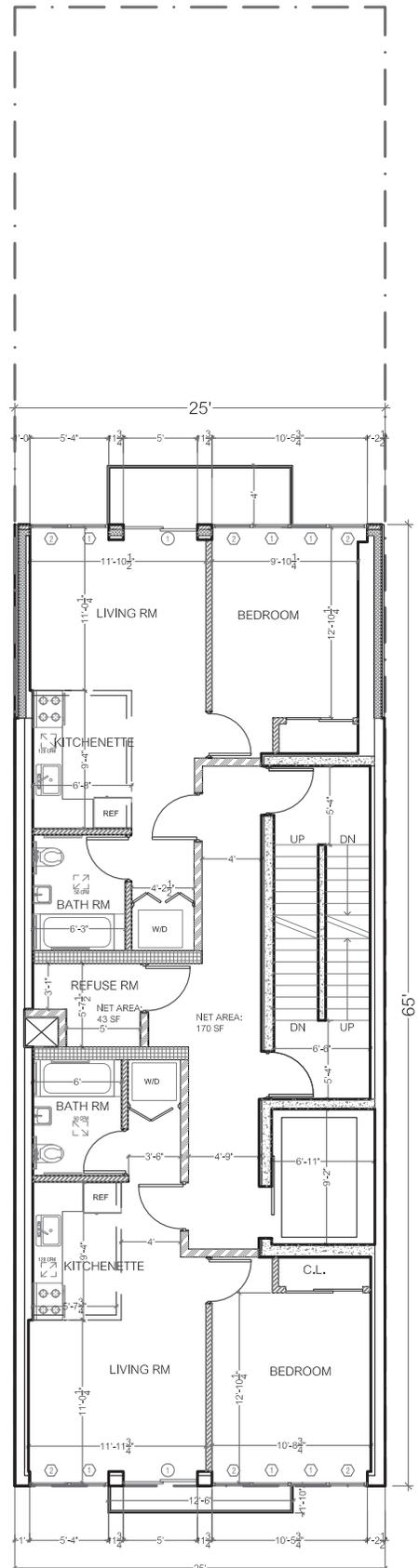
SHEET TITLE:
 CEL & 1ST
 FLOOR PLAN

SHEET NO.:

2 OF 11



2ND FLOOR PLAN
SCALE: N.I.S



3RD FLOOR PLAN
SCALE: N.I.S

JUNG WOR CHIN - ARCHITECT

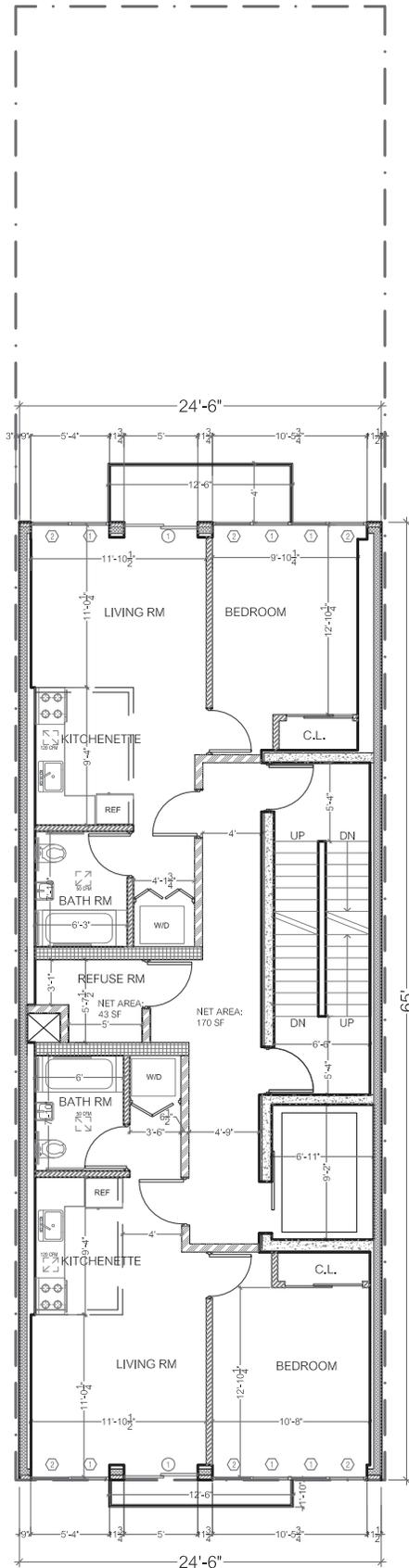
41 MOTT STREET, 4TH FL
NEW YORK, NY 10013
TEL: 212-334-9897
EMAIL: JWCHINAIA@GMAIL.COM



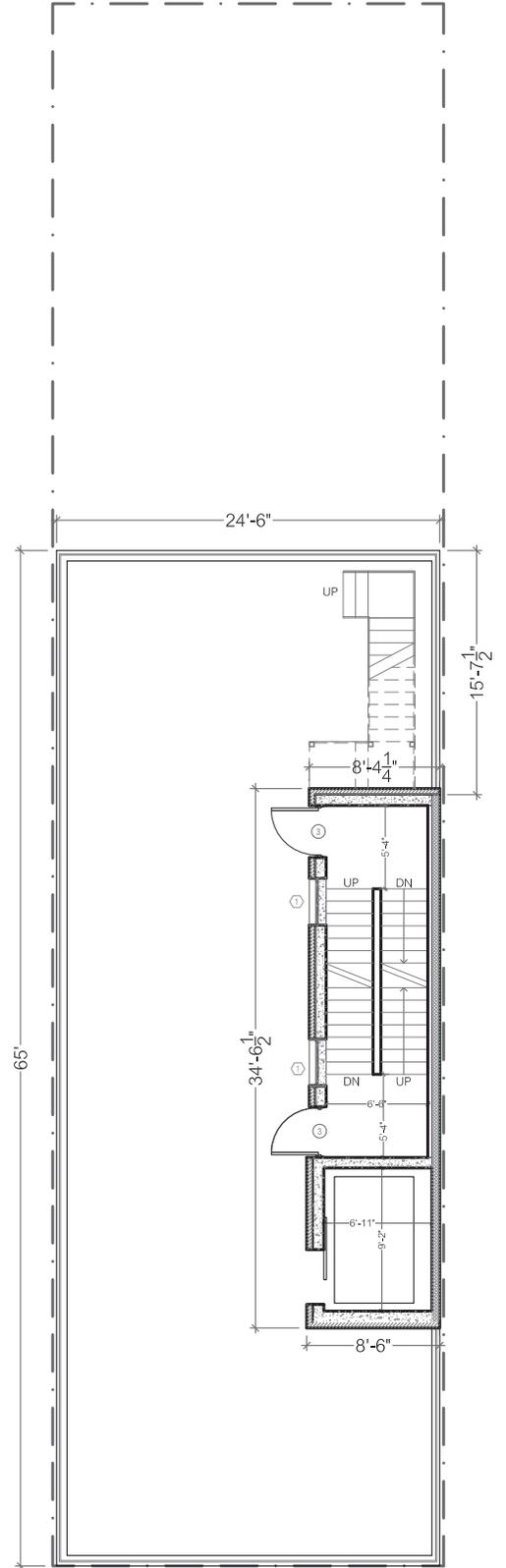
DATE: 8-3-16

SHEET TITLE:
2ND & 3RD
FLOOR PLAN

SHEET NO.:
3 OF 11



4TH TO 6TH FLOOR PLAN
SCALE: N.I.S



ROOF PLAN
SCALE: N.I.S

JUNG WOR CHIN - ARCHITECT

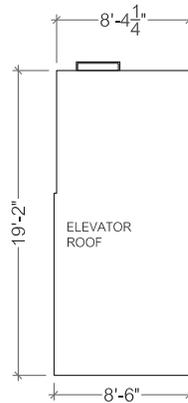
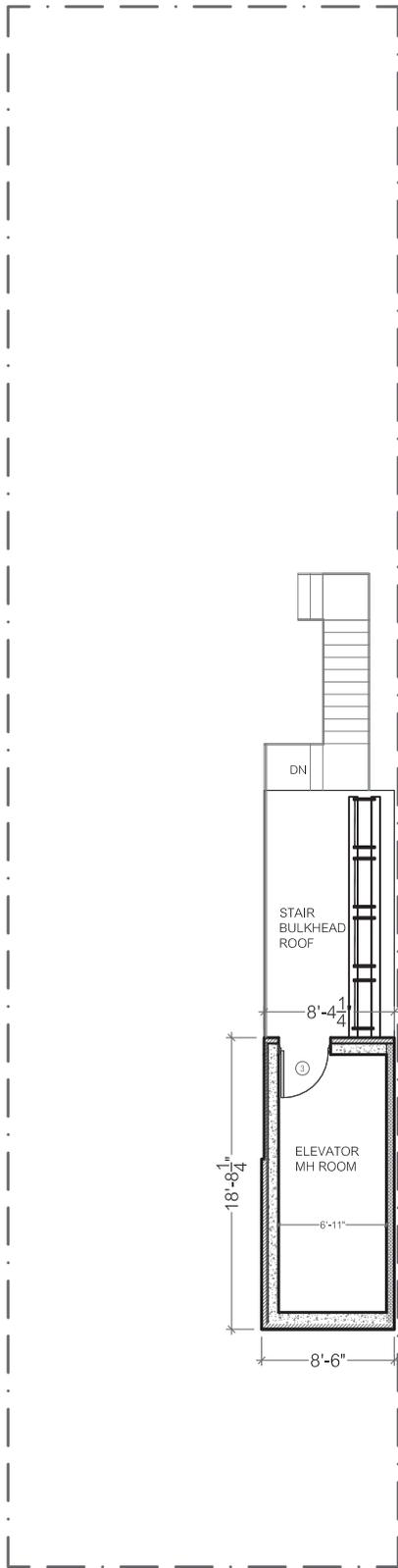
41 MOTT STREET, 4TH FL
NEW YORK, NY 10013
TEL: 212-334-9897
EMAIL: JWCHINAIA@GMAIL.COM



DATE: 8-3-16

SHEET TITLE:
4 TO 6TH & ROF.
FLOOR PLAN

SHEET NO.:
4 OF 11



ELEVATOR ROOM
SCALE: N.I.S

JUNG WOR CHIN - ARCHITECT

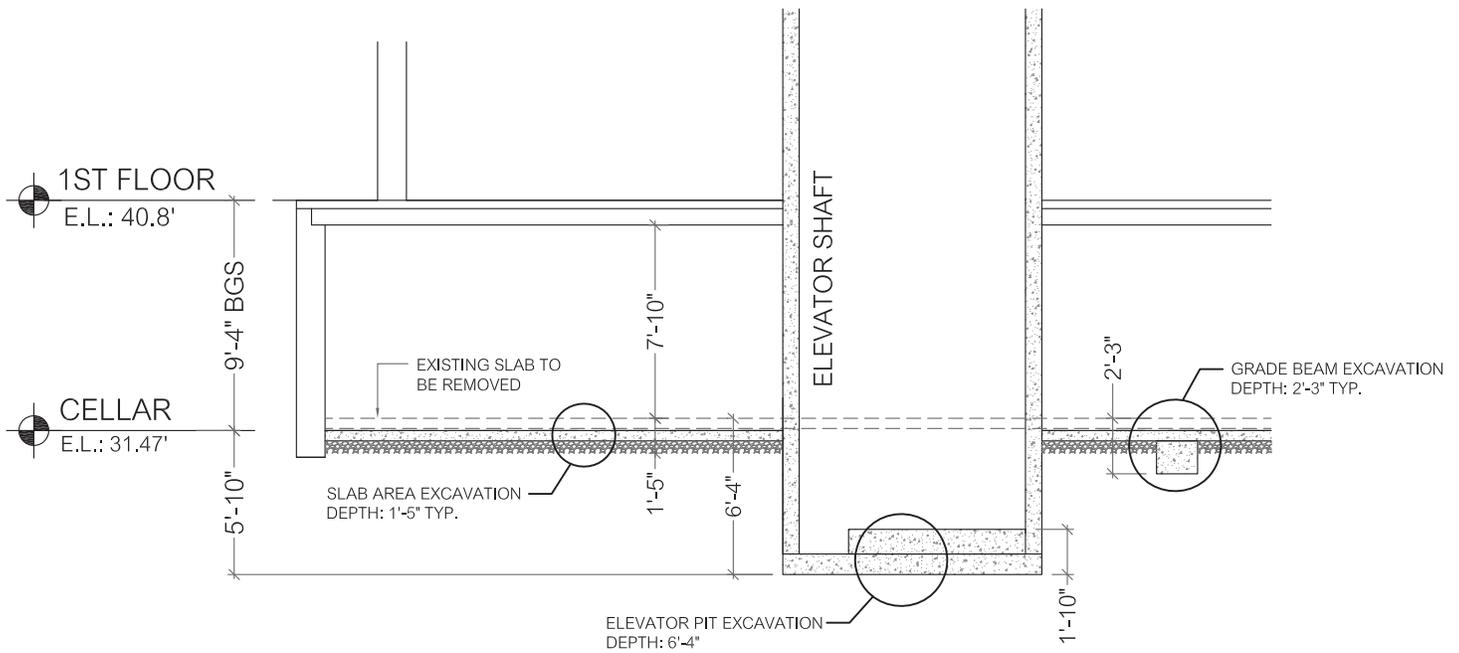
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 NEW YORK, NY 10013
 TEL: 212-334-9897
 EMAIL: JWCHINAIA@GMAIL.COM



DATE: 8-3-16

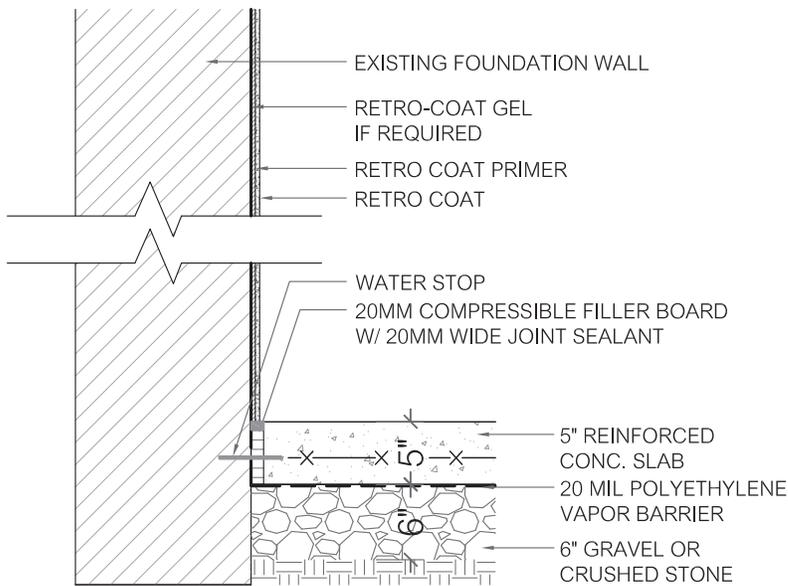
SHEET TITLE:
 ELEVATOR
 MH ROOM PLAN

SHEET NO.:
 5 OF 11

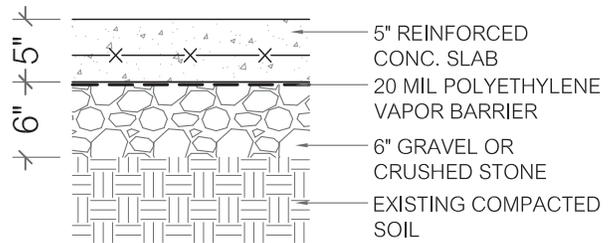


CELLAR EXCAVATION DETAIL

SCALE: NOT IN SCALE



1
7 SLAB & WALL DETAIL
SCALE: N.I.S.



2
7 SLAB ON GRADE DETAIL
SCALE: N.I.S.

JUNG WOR CHIN - ARCHITECT

41 MOTT STREET, 4TH FL
NEW YORK, NY 10013
TEL: 212-334-9897
EMAIL: JWCHINAIA@GMAIL.COM



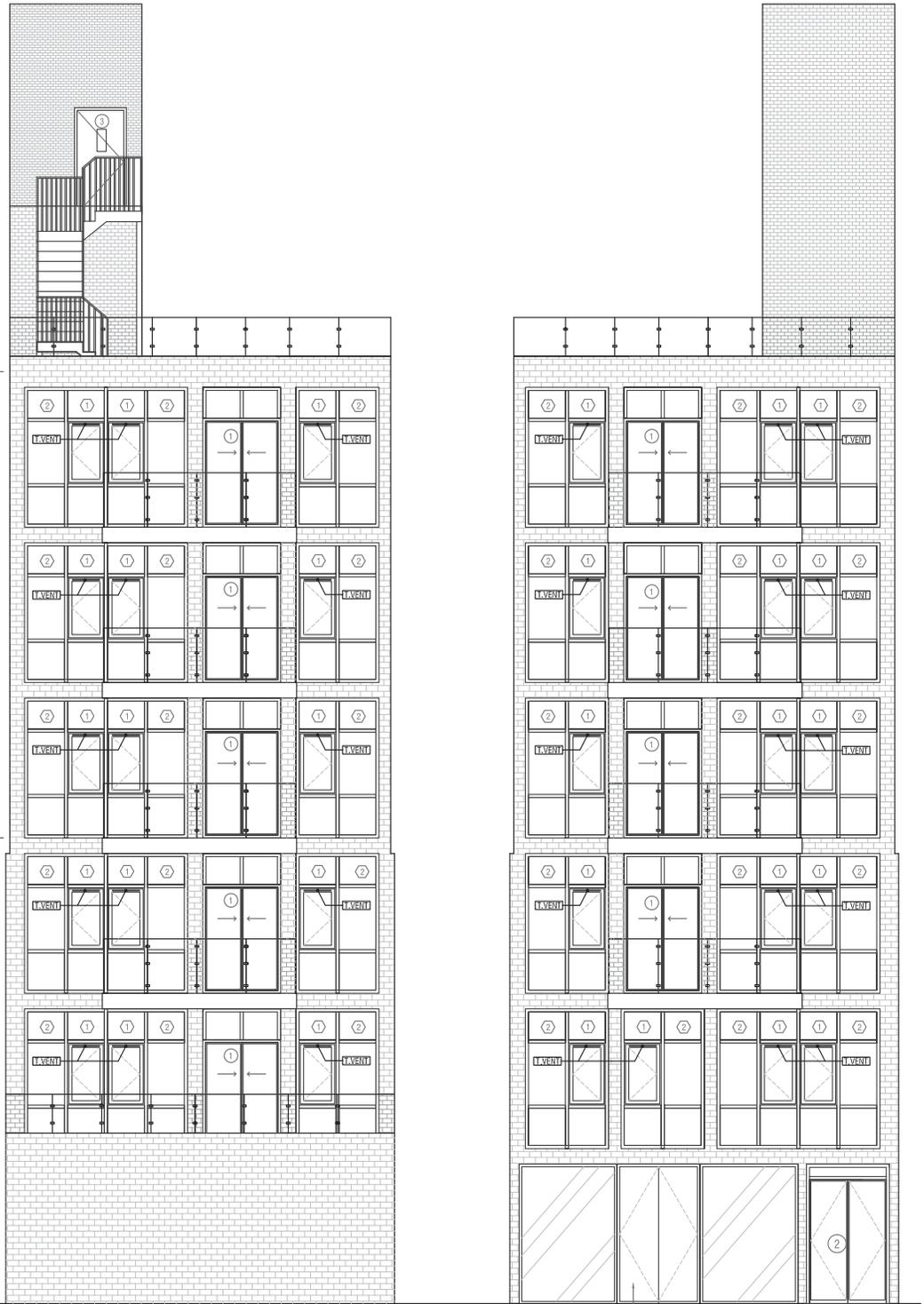
DATE: 8-3-16

SHEET TITLE:
ELEVATION

SHEET NO.:
7 OF 11

ROOF ELEVATOR
 E.L.: 123.8'
 13'
 ROOF STAIR BULKHEAD
 E.L.: 110.8'
 10'
 ROOF
 E.L.: 100.8'
 10'
 6TH FLOOR
 E.L.: 90.8'
 10'
 5TH FLOOR
 E.L.: 80.8'
 10'
 4TH FLOOR
 E.L.: 70.8'
 10'
 3RD FLOOR
 E.L.: 60.8'
 10'
 2ND FLOOR
 E.L.: 50.8'
 10'
 1ST FLOOR
 E.L.: 40.8'

30' NEW EXTENSION
 60'
 30' EXISTING



EXISTING STOREFRONT

REAR ELEVATION PLAN

SCALE: 3/32" = 1'-0"

FRONT ELEVATION PLAN

SCALE: 3/32" = 1'-0"

T.VENT : TRICKLE VENT
 MANUFACTURER: TITON
 MODEL#: AIRSTRIP 200

JUNG WOR CHIN - ARCHITECT

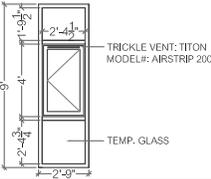
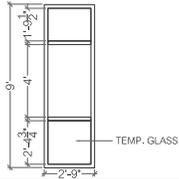
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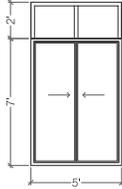
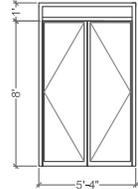
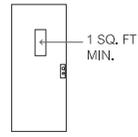


SHEET TITLE:
ELEVATION

SHEET NO.:
8 OF 11

DATE: 8-3-16

WINDOW SCHEDULE		
ELEVATION		
DESIGNATION	①	②
SIZE	2'-9" X 9'-0"	2'-9" X 9'-0"
WIN. TYPE	<ul style="list-style-type: none"> CASEMENT DOUBLE PANEL MANU. ALL SEASON SERIAL#: A3250 OITC: 35 FIXED WINDOW: A3250 OITC: 35 WEATHER STRIPPING (FROST KING EPDM V25M INSULATION : HANDI-SEAL MODEL# P10131 FIXED FENESTRATION: U = 0.38 OPERABLE FENESTRATION: U = 0.45 SHGC = 0.4 WINDOW AIR LEAKAGE: 0.2 CFM/SF CURTAIN WALL AIR LEAKAGE: 0.06 CFM/SF 	<ul style="list-style-type: none"> FIXED GLAZING PANEL DOUBLE PANEL MANU. ALL SEASON SERIAL#: A3250 OITC: 35 WEATHER STRIPPING (FROST KING EPDM V25M INSULATION : HANDI-SEAL MODEL# P10131 FIXED FENESTRATION: U = 0.38 SHGC = 0.4 CURTAIN WALL AIR LEAKAGE: 0.06 CFM/SF
QUANTITY	31	31
<p>*NOTE:</p> <ol style="list-style-type: none"> DIMENSIONS SHOWN ON THIS SCHEDULE ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD MEASURE ALL WINDOW OPENINGS. MAX INFILTRATION RATE FOR WINDOW AND SLIDING DOOR IS PERMITTED TO BE 0.3 CFM/ SF FOR FENESTRATION OR DOOR AREA WHEN TESTED IN ACCORDANCE AAMA/WDMA/CSA101/LS.2/A440 AT 6.4 PSF (300PA) WEATHER STRIPPING (FROST KING EPDM V25M) AND INSULATION REQUIRED. INSULATION AND SEALANT: HANDI-SEAL SEALANT MODEL#: P10131, R=5.16 PER INCH 		

DOOR SCHEDULE			
ELEVATION			
DESIGNATION	①	②	③
LOCATION	BALCONY	MAIN ENTRANCE	STAIRWELL /UTILITY
SIZE	5'-0" X 7'-0" X 0'-1 1/2"	5'-4" X 8'-0" X 0'-1 1/2" & 7'-4" X 5'-4" X 1'-2" FIXED WINDOW	3'-0" X 7'-0" X 0'-1 1/2"
DOOR MATERIAL	TEMP GLASS	TEMP GLASS	HOLLOW METAL
BUCK MATERIAL	ALUMINUM	ALUMINUM	HOLLOW METAL
SADDLE	ALUMINUM	ALUMINUM	ALUMINUM
QUANTITY	9	1	16
REMARK	<ol style="list-style-type: none"> PROVIDE SELF CLOSING HARDWARE TRANSOM WEATHER STRIPPING: FROST KING EPDM V25M INSULATION : HANDI-SEAL MODEL# P10131 INFILTRATION RATE: <0.01 CFM/SF @ 6.2 PSF SLIDING DOOR: ALL SEASON 1200 OITC: 31 FIXED WINDOW: ALL SEASON A3250 OITC: 35 AIR LEAKAGE: 0.2 CFM/SF 	<ol style="list-style-type: none"> PROVIDE SELF CLOSING HARDWARE TRANSOM WEATHER STRIPPING: FROST KING EPDM V25M INSULATION : HANDI-SEAL MODEL# P10131 INFILTRATION RATE: <0.01 CFM/SF @ 6.2 PSF MODEL#: SERIES 1200 OITC: 31 FIXED WINDOW: ALL SEASON A3250 OITC: 35 AIR LEAKAGE: 0.2 CFM/SF 	<ol style="list-style-type: none"> 1.5 HR FPSC PROVIDE SELF CLOSING HARDWARE WEATHER STRIPPING: FROST KING EPDM V25M INSULATION : HANDI-SEAL MODEL# P10131 U = 0.35 AIR LEAKAGE: 0.2 CFM/SF
<p>*NOTE:</p> <ol style="list-style-type: none"> DIMENSIONS SHOWN ON THIS SCHEDULE ARE APPROXIMATE. CONTRACTOR SHALL BE RESPONSIBLE TO FIELD MEASURE ALL WINDOW OPENINGS. WEATHER STRIPPING MODEL#: FROST KING, EPDM V25W INSULATION AND SEALANT: HANDI-SEAL SEALANT MODEL#: P10131, R=5.16 PER INCH MAX INFILTRATION RATE FOR WINDOW AND SLIDING DOOR IS PERMITTED TO BE 0.3 CFM/ SF FOR FENESTRATION OR DOOR AREA WHEN TESTED IN ACCORDANCE AAMA/WDMA/CSA101/LS.2/A440 AT 6.4 PSF (300PA) 			

JUNG WOR CHIN - ARCHITECT

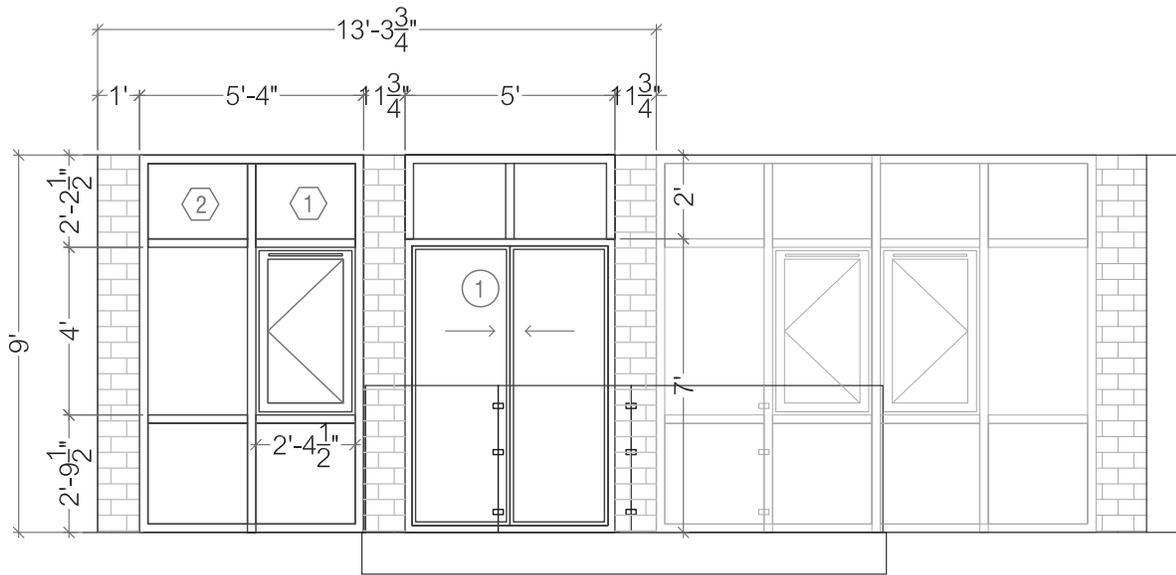
41 MOTT STREET, 4TH FL
 NEW YORK, NY 10013
 TEL: 212-334-9897
 EMAIL: JWCHINAIA@GMAIL.COM



SHEET TITLE:
 ELEVATION

SHEET NO.:
 9 OF 11

DATE: 8-3-16



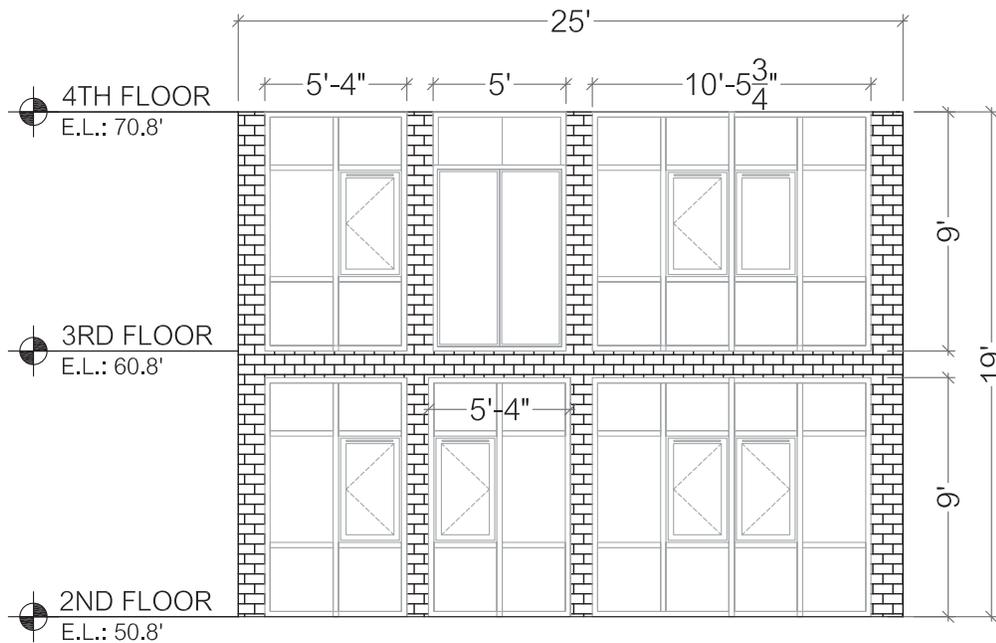
LIVING ROOM FACADE AREA: $13'-3\frac{3}{4}'' \times 9'-0'' = 119.84 \text{ SF}$

CONCRETE BLOCK UNIT AREA (OITC:46): $(1'-0'' + 11\frac{3}{4}'' \times 2) \times 9'-0'' = 26.76 \text{ SF}$

SLIDING DOOR AREA (OITC:31): $5'-0'' \times 7'-0'' = 35 \text{ SF}$

OPERABLE WINDOW AREA (OITC:35): $2'-4\frac{1}{2}'' \times 4'-0'' = 9.48 \text{ SF}$

FIXED WINDOW AREA (OITC: 35): $119.84 \text{ SF} - 26.76 \text{ SF} - 35 \text{ SF} - 9.48 \text{ SF} = 48.6 \text{ SF}$



EXISTING MASONRY AREA CALCULATION:

2ND & 3RD FLOOR FACADE AREA: $25'-0'' \times 19'-0'' = 475 \text{ SF}$
 NEW WINDOW, DOOR & CURTAIN WALL AREA: $((5'-4'' \times 3) + 10'-5\frac{3}{4}'' \times 2 + 5'-0'') \times 9'-0'' = 25'-0'' = 377.92 \text{ SF}$
 EXISTING MASONRY AREA: $475 \text{ SF} - 377.92 \text{ SF} = 97.08 \text{ SF}$

JUNG WOR CHIN - ARCHITECT

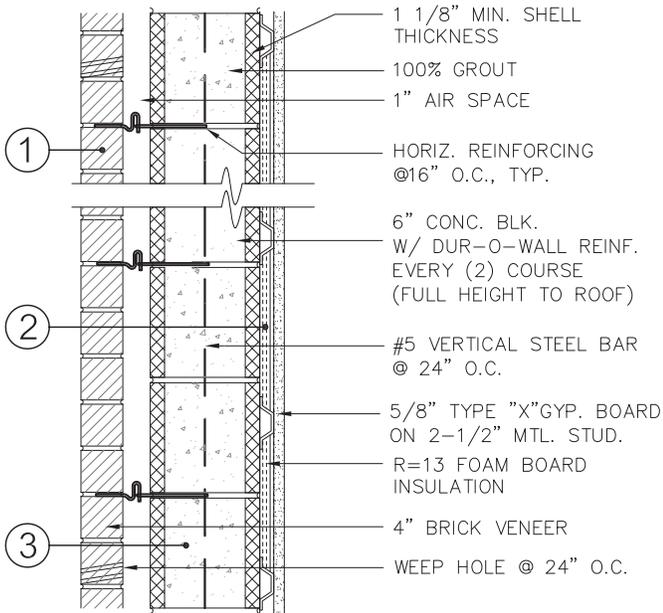
41 MOTT STREET, 4TH FL
 NEW YORK, NY 10013
 TEL: 212-334-9897
 EMAIL: JWCHINAIA@GMAIL.COM



SHEET TITLE:
 TYP. LIVING RM
 FACADE AREA CAL.

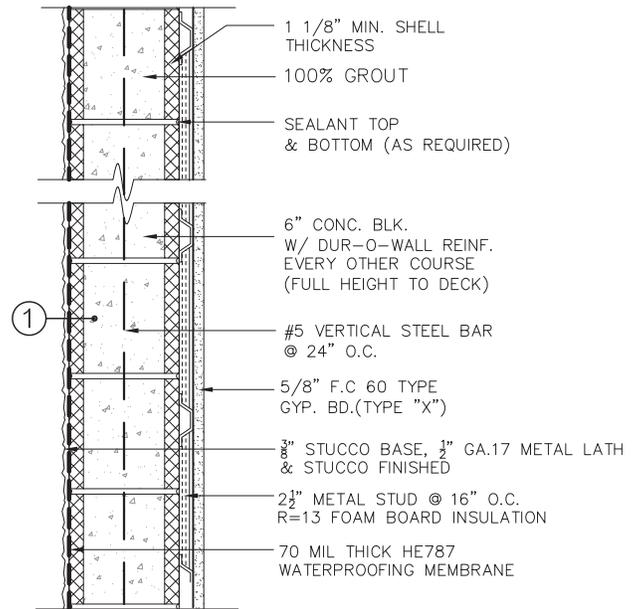
SHEET NO.:
 10 OF 11

DATE: 8-3-16



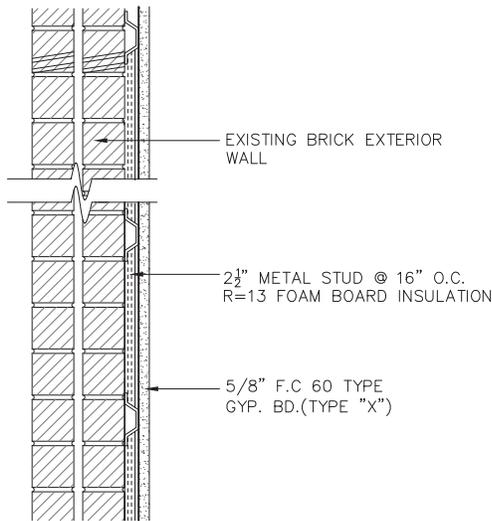
1. BRICK VENEER:
DIMENSION: $2\frac{1}{4}'' \times 3\frac{3}{8}'' \times 8\frac{1}{4}''$
AVERAGE WEIGHT: 38.7 PSF
STC: 45 TEST: TL67-70
2. HIGH DENSITY FOAMBOARD INSULATION:
THICKNESS: $2\frac{1}{2}''$ FOAMULAR EXTRUDED POLYSTYRENE
3. 6" CONCRETE BLOCK (100% GROUT-FILLED):
DENSITY: 85 PCF
OITC: 46

FRONT & REAR EXTERIOR WALL DETAIL



1. C.M.U EXTERIOR WALL:
DIMENSION: $5\frac{5}{8}'' \times 5\frac{5}{8}'' \times 7\frac{5}{8}''$
DENSITY: 85 PCF
GROUT-FILLED: 100% FILLED
OITC: 46

SIDE EXTERIOR WALL DETAIL



EXISTING EXTERIOR WALL DETAIL

JUNG WOR CHIN - ARCHITECT
41 MOTT STREET, 4TH FL
NEW YORK, NY 10013
TEL: 212-334-9897
EMAIL: JWCHINAIA@GMAIL.COM



SHEET TITLE:
DETAILS

SHEET NO.:
11 OF 11

DATE: 8-3-16

HVAC SPECIFICATIONS

GENERAL

- A. WORK INCLUDES HVAC INSTALLATION FOR 710 GRAND STREET BROOKLYN NY.
- B. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF NYC BUILDING CODE.
- C. PRIOR TO SUBMISSION OF HIS FORMAL BID, THIS CONTRACTOR SHALL REVIEW ALL DRAWINGS OF THE ENTIRE PROJECT INCLUDING GENERAL CONSTRUCTION.
- D. PRIOR TO SUBMISSION OF THIS BID, THIS CONTRACTOR SHALL VISIT THE JOB SITE IN ORDER TO ACQUAINT THEMSELVES WITH ACTUAL FIELD CONDITIONS AS IT RELATES TO THE SCOPE OF WORK. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO THE SUBMISSION OF HIS BID.
- E. DISCREPANCIES NOT RESOLVED TO THE SATISFACTION OF THIS CONTRACTOR SHALL BE INCLUDED AS A WRITTEN DOCUMENT OF THE BID PACKAGE.
- F. ALL WORK SHALL BE INSTALLED IN A NEAT WORKMAN LIKE MANNER. ALL EQUIPMENT SHALL BE INSTALLED WITH ADEQUATE CLEARANCE FOR PROPER BALANCING, MAINTENANCE AND REPAIR OF THE EQUIPMENT.
- G. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK AND EQUIPMENT. FINAL LOCATIONS OF AIR OUTLETS AND GRILLES SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS.
- H. INSTALLATION OF ALL HVAC EQUIPMENT, DUCTWORK AND PIPING SHALL BE COORDINATED WITH ALL TRADES. CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND GENERAL CONTRACTOR.
- I. ALL MATERIALS AND WORKMANSHIP SHALL BE QUARANTEED FOR A PERIOD OF ONE YEAR DATE OF FINAL ACCEPTANCE OF OWNER AND ENGINEER. THIS CONTRACTOR IS TO PROCURE MANUFACTURER REPRESENTATIVES FOR PROPER START UP AND OPERATION OF INSTALLED EQUIPMENT.

SCOPE OF WORK

- A. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR'S SURVEYS NECESSARY FOR A COMPLETE SAFE INSTALLATION OF THIS SCOPE OF WORK. ALL WORK SHALL CONFORM WITH THE NEW YORK CITY BUILDING CODE AND ALL AUTHORITIES HAVING JURISDICTION.
- B. PAY ALL FEES AND CHARGES FOR ALL WORK INSTALLED CERTIFYING COMPLIANCE WITH THE NEW YORK CITY BUILDING CODE 27-132 AND 27-779 AND AUTHORITIES HAVING JURISDICTION. THIS CONTRACTOR SHALL PROCURE A LICENSED ENGINEER TO PERFORM CONTROLLED INSPECTION IN A TIMELY MANNER.
- C. SCOPE OF WORK SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING:
 - 1. REVIEW OF PROJECT DOCUMENTS AND VISIT TO JOB SITE PRIOR TO SUBMISSION OF BID.
 - 2. PROVIDE AND INSTALL NEW AIR HANDLERS AND NEW CONDENSORS ON THE ROOF.
 - 3. DUCTWORK, PIPING, EQUIPMENT, INSULATION AND ACCESSORIES AS SHOWN ON PLAN AS REQUIRED FOR A COMPLETE JOB.
 - 4. PROCURE CSI CONTROL SYSTEMS CONTRACTOR TO PROVIDE AND INSTALL ALL CONTROLS AND COMPONENTS TO MEET SEQUENCE OF OPERATION.
 - 5. BALANCE ALL AIR SYSTEMS QUANTITIES SHOWN.
 - 6. SUBMIT COORDINATED SHOP DRAWINGS AS-BUILTS, TEST REPORTS AND EQUIPMENT MANUALS TO ENGINEER FOR REVIEW.
 - 7. PAY ALL FEE AND COORDINATE ALL FORMS AND PLANS FOR COMPLETE FILING OF ALL WORK WITH THE NEW YORK CITY DEPARTMENT OF BUILDINGS.

GENERAL

- A. ALL NECESSARY CUTTING CORE DRILLING AND PATCHING FOR THE INSTALLATION OF THE HVAC WORK SHALL BE PERFORMED BY THIS CONTRACTOR.
- B. COORDINATE ALL CUTTING AND PATCHING FOR INSTALLATION FOR HVAC EQUIPMENT WITH BUILDING TENANTS WHICH WILL BE EFFECTED BY THE WORK.

DUCTWORK

- A. DUCTWORK SHOULD BE FABRICATED AS CODE REQUIREMENTS AND INSTALLED IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS.
- B. ALL SUPPLY DUCT SHALL BE BSI APPROVED MATERIALS.
- C. VOLUME DAMPERS-GALVANIZED STEEL, PER SMACNA STANDARDS. DAMPER ROD TO HAVE BEARING AT ONE END AND LEVER AND LOCK SCREW AT OTHER END.
- D. DUCTWORK ACCESS DOOR TO BE FABRICATED OF GALVANIZED STEEL, 14X14, LATCHED ALL AROUND. SIMILAR TO VENTLOCK MANUFACTURER. PROVIDE INSULATED ACCESS DOOR FOR ACOUSTICALLY LINED DUCTWORK INSTALLATION.

DIFFUSERS, GRILLES AND REGISTERS

- A. SUPPLY AIR DIFFUSERS SHALL BE NYC DOB CODE AND BSI APPROVED.
- B. RETURN GRILLES TO BE APPROVED BY ARCHITECT.
- C. FINISH TO BE APPROVED BY THE ARCHITECT AS SPECIFIED BY THE ARCHITECT.

PIPING

- A. REFRIGERANT PIPING: COPPER, TYPE K, WROUGHT COPPER FITTINGS, SILVER
- B. CONDENSATE DRAIN PIPING: COPPER, TYPE L, 95-5 SOLDER, MINIMUM SIZE 1-1/4". ALL CHANGES IN DIRECTION MADE WITH CROSSES OR PLUGGED TEES.

CHANGES IN DIRECTION MADE WITH CROSSES OR PLUGGED TEES.

- C. PIPING SHALL BE SUPPORTED WITH APPROVED CLEVIS HANGERS WITH ADJUSTABLE THREADED RODS AND SUITABLE CLAMPS OR MEANS OF BOLTING TO THE BUILDING STRUCTURE. MAXIMUM SPACING SHALL BE EIGHT FEET. HANGERS FOR INSULATED PIPE SHALL FIT OVER OUTSIDE OF THE INSULATION AND SHALL BE PROVIDED WITH PROTECTING SADDLES. HANGERS SHALL BE MASON, OR APPROVED EQUAL.

CLEANING, BALANCING AND ADJUSTMENT

- A. AIR BALANCING WORK SHALL BE PERFORMED BY AN INDEPENDENT AABC CERTIFIED COMPANY, NOT ASSOCIATED WITH THE CONTRACTOR, AND SHALL INCLUDE THE FOLLOWING:

- 1. MEASURE PREASSURE, TEMPERATURE, AND VOLUME OF AIR FROM EXISTING BASE BUILDING SYSTEM BEFORE STARTING WORK. SUBMIT REPORT TO ENGINEER IMMEDIATELY AFTER COMPLETION OF TEST.
- 2. UPON COMPLETION OF ALL HVAC WORK, TEST, ADJUST AND BALANCE NEW AIR DISTRIBUTION SYSTEMS TO PROVIDE AIR QUANTITIES INDICATED WITHIN PLUS OR MINUS 5 PERCENT.
- 3. SUBMIT A CERTIFIED TEST REPORT INDICATING THE FOLLOWING:
 - QUANTITY OF AIR AND STATIC PRESSURE AT SUPPLY TRUNK DUCT
 - QUANTITY OF AIR AND STATIC PRESSURE AT RETURN DUCT IN MER
 - QUANTITY OF AIR FROM MIN OUTSIDE AIR DUCT
 - QUANTITY OF AIR AT EACH OUTLET AFTER BALANCING

EQUIPMENT

- A. PROVIDE ALL EQUIPMENT AND ACCESSORIES OF THE SIZES AND CAPACITIES AS SCHEDULED AND AS INDICATED ON THE DRAWINGS.
- B. INSTALL EQUIPMENT IN ACCORDANCE WITH APPROVED SHOP DRAWINGS, MANUFACTURER'S INSTRUCTIONS AND ALL CODES AND REGULATIONS WHICH APPLY.
- C. FOR ALL FLOOR MOUNTED EQUIPMENT PROVIDE A 4 INCH HIGH CONCRETE HOUSKEEPING PAD; WHERE FLOOR STANDS ARE INDICATED. PROVIDE FLOOR STAND OF STRUCTURAL STEEL OR STEEL PIPES AND FITTINGS AND BOLT TO FLOOR.
- D. EQUIPMENT SHALL BE INSTALLED ON VIBRATION ISOLATORS IN ACCORDANCE WITH THE FOLLOWING SCHEDULE (BASED ON MASON INDUSTRIES)

-PIPING-TYPE HD

ELECTRICAL WORK

- A. ELECTRICAL POWER AND CONTROL WIRING SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR. CONTROL WIRING DIAGRAMS SHALL BE PROVIDED BY THE HVAC CONTRACTOR.
- B. HOA STARTERS SHALL BE FURNISHED BY THE HVAC CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
- C. DUCT MOUNTED SMOKE DETECTORS WHERE REQUIRED SHALL BE PROVIDED AND MOUNTED BY THE HVAC CONTRACTOR. ALL ASSOCIATED WIRING SHALL BE BY THE ELECTRICAL CONTRACTOR.

SHOP DRAWINGS

- A. SUBMIT A SEPIA AND TWO PRINTS OF SHEET METAL AND/OR PIPING SHOP DRAWINGS, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT CERTIFIED EQUIPMENT CUTS WITH CONSTRUCTION WIRING DIAGRAM AND AUTOMATIC TEMPERATURE CONTROL SHOP DRAWINGS. SUBMIT FOUR BOOK BOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:

- AIR CONDITIONING EQUIPMENT
- DUCTWORK
- PIPING LAYOUT
- DIFFUSERS, REGISTERS, GRILLES

-AUTOMATIC TEMPERATURE CONTROL DIAGRAM

INSULATION

- A. DUCTWORK: FIBROUS CLASS BLANKET, FOIL-SCRIM KRAFT FACING: 1-1/2 INCH THICK.
- B. FLEXIBLE DUCTWORK: FACTORY PRE-INSULATED. 1-1/2 INCH FOIL-SCRIM KRAFT FACING.
- C. REFRIGERANT PIPING: 1-INCH THICK MOLDED GLASS FIBER WITH ALL SERVICE JACKET. OUTDOOR PIPING FINISHED WITH TWO COATS OF BITUMASTIC.
- D. FRESH AIR INTAKE DUCTS: 1-1/2 INCH THICK, 6 LB. DENSITY RIGID BOARD WITH FACTORY APPLIED WHITE FIRE RETARDING JACKET WITH MECHANICAL FASTENERS.

DRYER DUCT SPECIFICATION:

All dryer ducting must be a minimum of 4" in diameter. Flexible transition hose between the dryer and the wall outlet should be either the foil type or the aluminum flexible duct (most preferred). Do not use the plastic or vinyl. Concealed ducting must be rigid metal (galvanized or aluminum) duct. Duct joints shall be installed so that the male end of the duct points in the direction of the airflow. Joints should be secured with metal tape (not duct tape). Do not use rivets or screws in the joints or anywhere else in the duct as these will encourage lint collection. Length of concealed rigid metal ducting shall not exceed 35 feet (25' for IRC). Termination of dryer venting must be to the exterior with a proper hood or roof cap equipped with a backdraft damper. Small orifice metal screening should not be part of the hood or roof cap as this will catch lint and block the opening in a very short time. The hood opening should point down and exhibit 12 inches of clearance between the bottom of the hood and the ground or other obstruction.

NYC FIRE CODE REQUIREMENTS. NOTES PER NYC FIRE CODE SECTION 504.4(ROOFTOP ACCESS & OBSTRUCTIONS)

504.4.1 Rooftop access. Access to building rooftop shall be provided as follows:

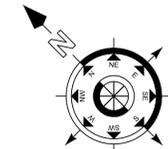
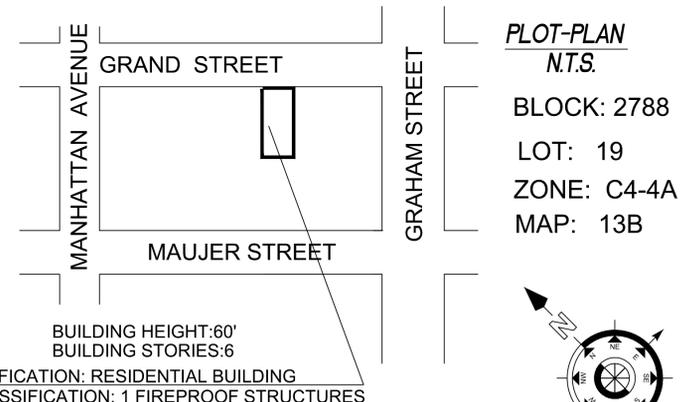
1. For each 12 linear feet (3658mm) of building perimeter accessible from the frontage space of the building and from any other exposure accessible to fire apparatus, a minimum clearance of 6 feet (1829mm) in width and 6 feet (1829mm) in depth from any obstruction shall be provided at the parapet wall or other perimeter of the rooftop. where the building perimeter is 24 linear feet (97315mm) or greater, but less than 36 linear feet (10973mm), the required clearance openings shall be separated by a distance of not less than 12 linear feet (3658mm) and shall be separated from other required clearance openings by a distance of not less than 12 linear feet (3658mm).

2. A minimum clearance of 6 feet (1829mm) in all directions shall be provided from each door opening onto a rooftop from a dwelling unit, stairway, bulkhead, or other occupied space or means of egress, as measured from the door hinge.

3. A minimum clearance of 3 feet (914mm) in all directions shall be provided from any fire escape or rooftop access ladder, as measured from each side of the ladder or landing.

504.4.2 rooftop obstructions. unobstructed space shall be provided on rooftops sufficient to allow firefighting operations, as follows:

4. A clear path of not less than 6 feet (1829mm) horizontal width and 9 feet (2743mm) in height shall be provided from the front of the building to the rear of the building and from one side of the building to the other, except that a conduit or pipe in compliance with the requirements of this section may cross this path. such clear path shall be accessible from each point of the rooftop access from which clearance is required pursuant to Section 504.4.1.



THIS PLAN IS APPROVED ONLY FOR THE WORK INDICATE ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

REVISION	DATA	DESCRIPTION
PROJECT:		
710 GRAND STREET BROOKLYN N.Y.		
SHEET TITLE:		
SPECIFICATION 1		
Date:	6-22-16	
Project NO:		
Drawing BY:	EG	
CHECKED BY:	VJL	
DWG NO:	M-001.00	
SHEET: 10F8		

General Notes:

- Scope of Work: Installation of Split air conditioning system.
- All work shall conform to the requirements of New York City Building Code, Fire Department Rules and Regulations, utility company requirements, and the best trade practices.
- Before commencing work, the contractor shall file all required insurance certificates with the Department of Buildings, obtain all required permits, and pay all fees required by the governing New York City agencies.
- Minor details not usually shown or specified, but required for proper construction of any part of the work shall be included as if they were indicated in the drawings.
- The contractor shall coordinate all work procedures with the stipulations of local authorities, building management or board of directors.
- The contractor shall be responsible for the protection of all conditions and materials within the proposed construction area, the contractor shall design and install adequate shoring and bracing for all structural or removal tasks, the contractor shall have sole responsibility for any damage or injuries caused by or during the execution of work.
- The contractor shall lay out his own work, and shall provide all dimensions required for other trades: plumbing, electrical, etc.
- Plumbing work shall be performed by persons licensed in their trades, who shall arrange for and obtain through the Department of buildings all required permits, inspections and required sign offs.
- Electrical work shall be performed by persons licensed in their trades, who shall arrange for and obtain through the Bureau of Electrical Control all required permits, inspections and required sign offs.
- The contractor shall do all cutting, patching, repairing as required to perform all the work indicated on the drawings, and other work that may be required to complete the job.
- All piping and wiring shall be removed to a point of concealment and shall be properly capped or plugged.
- Within 90 days of the date of receipt of the certificate of occupancy. Building owner shall be provided with all operational and maintenance manuals as set forth in c408.2.5.2 of the NYCECC-2014.

SPECIAL INSPECTIONS:
 MECHANICAL SYSTEM COMPLIES WITH BC1704.16
 NYC DOB CODE 2014.
 ENERGY CODE COMPLIANCE INSPECTIONS BC 110.3.5
 HVAC & SERVICE WATER HEATING EQUIPMENT (IB3),(IIB3)
 HVAC & SERVICE WATER HEATING SYSTEM CONTROLS (IB4),(IIB4)
 HVAC INSULATION AND TESTING (IB5),(IIB5)
 MAINTAINANCE INFORMATION (ID1),(IID1)
 FINAL INSPECTION : 28-116.24.2 AND BC 109.5 AND
 DIRECTIVE 14 OF 1975

VENTILATION NOTES:

- INSTALLATION OF ALL EQUIPMENT AND APPLIANCES THAT COMPRISE PARTS OF THE BUILDING MECHANICAL SYSTEMS SHOULD BE IN ACCORDANCE WITH SECTION 101.2 AND 301.1 SECTION MC301, CHAPTER 3 CODE 2014.
- ENERGY UTILIZATION OR EXEMPTIONS SHOULD COMPLY WITH "ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE"
- PROTECTION OF STRUCTURE SHOULD COMPLY WITH 302.1 SECTION MC302 CODE 2014
- EQUIPMENT AND APPLIANCE LOCATION SHOULD COMPLY WITH SEC. MC303 AND SEC. MC304 CODE 2014
- OPENING LOCATION SHOULD COMPLY WITH 401.5 SEC.MC401, CHAPTER 4.
- THE MINIMUM VENTILATION RATE OF REQUIRED OUTDOOR AIR SHALL BE DETERMINED IN ACCORDANCE WITH SEC.403.3 SEC.403 CODE 2014.
- DUCT CONSTRUCTION AND INSTALLATION SHOULD COMPLY WITH SEC.MC603 CODE 2014.
- AIR OUTLETS AND AIR INLETS SHOULD COMPLY WITH SEC.MC608 CODE 2014.
- ALL EXTERIOR MECHANICAL EQUIPMENT SHOULD COMPLY WITH NOISE CONTROL REQUIREMENTS 926.1.1 SEC SEC.MC926 CODE 2014.

ENERGY CODE COMPLIANCE NOTE:
 TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THIS PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE "ENERGY CONSERVATION CODE OF NEW YORK CITY 2014".

REQUIRED OUTDOOR VENTILATION AIR TABLE 403.3 NYC DOB CODE

OCCUPANCY CLASSIFICATION	ESTIMATED MAXIMUM OCCUPANT LOAD, PERSONS PER 1,000 SQUARE FEET	OUTDOOR AIR
KITCHEN	—	100CFM INTERMITTED OR 25CFM CONTINUOUS
LIVING AREA	—	0.35 CHANGES PER HOUR OR 15 CFM PER PERSON WHICHEVER IS GREATER
BATHROOM	—	50CFM/H MECHANICAL EXHAUST
PUBLIC SPACES CORRIDOR	—	0.06CFM PER SQ/FT

ITEM DESCRIPTION	PROPOSED DESIGN VALUE	CODE PRESCRIBED VALUE AND CITATION
INSTALLATION OF AIR COOLED SPLIT SYSTEM	DAIKIN AIR COOLED SPLIT SYSTEM 3 & 4 TONS EER18	AIR COOLED SPLIT SYSTEM WITH COOLING CAPACITY <= 65,000 BTU/H. SHALL HAVE A MINIMUM SEER OF 13 (TABLE 503.2.3(1) OF THE NYCECC-2014
INSTALLATION OF THERMOSTAT	A LOCAL 7-DAY PROGRAMMABLE THERMOSTAT WITH SETBACK CAPACITY	EACH COOLING SYSTEM SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE IN ZONE PER § 503.2.4.1 OF THE ECODECC.
NEW DUCTWORK FROM EACH UNIT FOR SUPPLY AND RETURN AIR.	THE PROJECT IS EXEMPT FROM DUCT AND PLENUM INSULATION AND SEALING REQUIREMENTS OF §503.2.7 OF THE ECODECC PER EXEMPTION #2 BECAUSE ALL DUCTING WILL BE ENTIRELY WITHIN THE CONDITIONED SPACE AND THE TEMPERATURE DIFFERENCE BETWEEN THE INTERIOR AND EXTERIOR OF THE DUCT WILL NOT EXCEED FIFTEEN (15) DEGREES FAHRENHEIT.	

EQUIPMENT USE PERMIT IS REQUIRED!

MINIMUM PIPE INSULATION THICKNESS (thickness in inches)
 TABLE C403.2.8
 CHAPTER C4 NYCECC - 2014

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (inches)				
	CONDUCTIVITY BTU · IN. / (H · FT ² · °F) B	MEAN RATING TEMPERATURE, °F	<1	1 to < 1 1/2	1 1/2 to < 4	4 to < 8	≥ 8
> 350	.032 - 0.34	250	4.5	5.0	5.0	5.0	5.0
251 - 350	.029 - 0.32	200	3.0	4.0	4.5	4.5	4.5
201 - 250	.027 - 0.30	150	2.5	2.5	2.5	3.0	3.0
141 - 200	.025 - 0.29	120	1.5	1.5	2.0	2.0	2.0
105 - 140	.021 - 0.28	100	1.0	1.0	1.5	1.5	1.5
40 - 60	.021 - 0.27	75	0.5	0.5	1.0	1.0	1.0
< 40	.020 - 0.26	75	0.5	1.0	1.0	1.0	1.5

REQUIRED INSPECTIONS FOR ENERGY CODE COMPLIANCE- COMMERCIAL BUILDINGS

	INSPECTION/TEST	FREQUENCY (MINIMUM)	REFERENCE STANDARD (SEE ECC CHAPTER6) OR OTHER CRITERIA	NYCECC 2014 OR OTHER CITATION
IB3 1RCNY §5000-01	HVAC, service water heating and pool equipment sizing and performance: Equipment sizing, efficiencies and other performance factors of all major equipment units, as determined by the Applicant of record, and no less than 15% of minor equipment units, shall be verified by visual inspection and, where necessary, review of manufacturer's data.	PRIOR TO FINAL CONSTRUCTION INSPECTION	APPROVED CONSTRUCTION DOCUMENTS	C403.2; C404.2; C404.7.
IB4 1RCNY §5000-01	HVAC system controls and economizers and service hot water system controls: No less than 20% of each type of required controls and economizers shall be verified by visual inspection and tested for functionality and proper operation.	AFTER INSTALLATION AND PRIOR TO FINAL CONSTRUCTION INSPECTION	APPROVED CONSTRUCTION DOCUMENTS	C403.2.4; C403.2.5.1; C403.2.11; C403.3; C403.4; C404.3; C404.6; C404.7.
ID1 1RCNY §5000-01	Maintenance information: Maintenance manuals for equipment and systems requiring preventive maintenance shall be reviewed for applicability to installed equipment and systems before such manuals are provided to the owner. Labels required for such equipment or systems shall be inspected for accuracy and completeness.	Prior to signoff or issuance of Certificate of Occupancy	APPROVED CONSTRUCTION DOCUMENTS	C303.3.
IID1 1RCNY §5000-01	Maintenance information: Maintenance manuals for mechanical, service hot water and electrical equipment and systems requiring preventive maintenance shall be reviewed for applicability to installed equipment and systems before such manuals are provided to the owner. Labels required for such equipment or systems shall be inspected for accuracy and completeness.	Prior to signoff or issuance of Final Certificate of Occupancy	Approved construction documents, including electrical drawings where applicable; ASHRAE Guideline 4; Preparation of Operating and Maintenance Documentation for Building Systems	C303.3, C408.2.5.2; ASHRAE 90.1 – 4.2.2.3, 6.7.2.2, 8.7.2, 9.7.2.2
IB5 1RCNY §5000-01	HVAC insulation and sealing: Installed duct and piping insulation shall be visually inspected to verify proper insulation placement and values. Joints, longitudinal and transverse seams and connections in ductwork shall be visually inspected for proper sealing.	After installation and prior to closing shafts, ceilings and walls	Approved construction documents; SMACNA Duct Construction Standards, Metal and Flexible	C403.2.7, C403.2.8, C404.5, MC 603.9; ASHRAE 90.1 – 6.3, 6.4.4, 6.8.2, 6.8.3; 7.4.3

REVISION	DATA	DESCRIPTION

PROJECT:
**710 GRAND STREET
 BROOKLYN N.Y.**

SHEET TITLE:
SPECIFICATION 2

Date: **6-22-16**
 Project NO:
 Drawing BY EG
 CHECKED BY VJL
 DWG NO:
M-002.00
 SHEET: 20F8

COMMISSIONING STATEMENT:
 THE WORK DESCRIBED/ PERFORMED AS PER THESE CONSTRUCTION DOCUMENTS IS NOT SUBJECT TO COMMISSIONING AND TESTING AS DESCRIBED PER SEC. C408 - 2014 NYCECC

DESIGN STATEMENT:
 MECHANICAL LOAD CALCULATIONS HAVE BEEN PERFORMED IN ACCORDANCE WITH ANSI/ASHRAE/ACCA Standard 183. AS SET FORTH IN C403.2.1 OF THE NYCECC-2014

FLOOD ZONE STATEMENT:
 THIS PROJECT IS NOT IN A (SFHA) SPECIAL FLOOD HAZARD AREA.

THIS PLAN IS APPROVED ONLY FOR THE WORK INDICATE ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

EQUIPMENT SCHEDULE													
UNIT	LOCATION	MAKE	MODEL	CFM/TONS	COOLING BTU/H	HEATING BTU/H	DIMENSIONS (IN)			POWER V/PHZ	WEIGHT LB	SERVES	MEA#/SER#
							W	D	H				
AHU-C-1	CELLAR	DAIKIN	FTXS24LVJU	643CFM	21500	25400	41-5/16	9-3/4	13-3/8	208/1/60	31	GYM	
AHU-1-1,AHU-1-2	1ST FLOOR	DAIKIN	FTXS12LVJU	381CFM	12000	14400	31-1/2	8-7/16	11-5/8	208/1/60	22	PUBLIC CORRIDOR	
AHU-1-3	1ST FLOOR	DAIKIN	FTXS24LVJU	643CFM	24000	24000	41-5/16	9-3/4	13-3/4	208/1/60	31	DOOR CURTAIN	
AHU-1-4,AHU-1-5 AHU-1-6,AHU-1-7	1ST FLOOR	DAIKIN	FFQ18LVJU	530CFM	18000	18000	22-5/8	22-5/8	11-1/8	208/1/60	38.5	STORE	
AHU-2-1	2ND FLOOR	DAIKIN	FTXS12LVJU	381CFM	12000	14400	31-1/2	8-7/16	11-5/8	208/1/60	22	PUBLIC CORRIDOR	
AHU-2-2,AHU-2-4	2ND FLOOR	DAIKIN	FTXS18LVJU	580CFM	18000	18000	41-5/8	9-1/2	13-1/8	208/1/60	31	APARTMENTS	
AHU-2-3,AHU-2-5	2ND FLOOR	DAIKIN	FTXS09LVJU	381CFM	9000	9000	31-1/2	8-7/16	11-5/8	208/1/60	20	APARTMENTS	
AHU-3-1	3RD FLOOR	DAIKIN	FTXS12LVJU	381CFM	12000	14400	31-1/2	8-7/16	11-5/8	208/1/60	22	PUBLIC CORRIDOR	
AHU-3-2,AHU-3-4	3RD FLOOR	DAIKIN	FTXS18LVJU	580CFM	18000	18000	41-5/8	9-1/2	13-1/8	208/1/60	31	APARTMENTS	
AHU-3-3,AHU-3-5	3RD FLOOR	DAIKIN	FTXS09LVJU	381CFM	9000	9000	31-1/2	8-7/16	11-5/8	208/1/60	20	APARTMENTS	
AHU-4-1	4TH FLOOR	DAIKIN	FTXS12LVJU	381CFM	12000	14400	31-1/2	8-7/16	11-5/8	208/1/60	22	PUBLIC CORRIDOR	
AHU-4-2,AHU-4-4	4TH FLOOR	DAIKIN	FTXS18LVJU	580CFM	18000	18000	41-5/8	9-1/2	13-1/8	208/1/60	31	APARTMENTS	
AHU-4-3,AHU-4-5	4TH FLOOR	DAIKIN	FTXS09LVJU	381CFM	9000	9000	31-1/2	8-7/16	11-5/8	208/1/60	20	APARTMENTS	
AHU-5-1	5TH FLOOR	DAIKIN	FTXS12LVJU	381CFM	12000	14400	31-1/2	8-7/16	11-5/8	208/1/60	22	PUBLIC CORRIDOR	
AHU-5-2,AHU-5-4	5TH FLOOR	DAIKIN	FTXS18LVJU	580CFM	18000	18000	41-5/8	9-1/2	13-1/8	208/1/60	31	APARTMENTS	
AHU-5-3,AHU-5-5	5TH FLOOR	DAIKIN	FTXS09LVJU	381CFM	9000	9000	31-1/2	8-7/16	11-5/8	208/1/60	20	APARTMENTS	
AHU-6-1	6TH FLOOR	DAIKIN	FTXS12LVJU	381CFM	12000	14400	31-1/2	8-7/16	11-5/8	208/1/60	22	PUBLIC CORRIDOR	
AHU-6-2,AHU-6-4	6TH FLOOR	DAIKIN	FTXS18LVJU	580CFM	18000	18000	41-5/8	9-1/2	13-1/8	208/1/60	31	APARTMENTS	
AHU-6-3,AHU-6-5	6TH FLOOR	DAIKIN	FTXS09LVJU	381CFM	9000	9000	31-1/2	8-7/16	11-5/8	208/1/60	20	APARTMENTS	
CU-C-1	LOW ROOF	DAIKIN	RXS24LVJU	2 TONS	24000	24000	35-5/16	12-5/8	30-5/16/8	208/1/60	159	AHU-C-1 GYM	
CU-1-1,CU-1-2	LOW ROOF	DAIKIN	RMXS48GVJU	4 TONS	48000	54000	35-15/16	12-5/8	52-15/16	208/1/60	129	AHU-1-4,AHU-1-5 AHU-1-6,AHU-1-7 STORE	
CU-2-1,CU-2-2 CU-3-1,CU-3-2	LOW ROOF	DAIKIN	4MXS36GVJU	3 TONS	36000	36000	34-1/2	15-5/8	29	208/1/60	137	APARTMENTS	
CU-4-1,CU-4-2	ROOF	DAIKIN	4MXS36GVJU	3 TONS	36000	36000	34-1/2	15-5/8	29	208/1/60	137	APARTMENTS	
CU-COM-1, CU-COM-2	ROOF	DAIKIN	RMXS48GVJU	4 TONS	48000	54000	35-15/16	12-5/8	52-15/16	208/1/60	129	PUBLIC CORRIDOR	
CU-5-1,CU-5-2 CU-6-1,CU-6-2	ROOF	DAIKIN	4MXS36GVJU	3 TONS	36000	36000	34-1/2	15-5/8	29	208/1/60	137	APARTMENTS	

NOTES:

- BRANCH PROVIDER BOXES ARE DAIKIN BPMKS048A2U (2 PORTS);48000BTU/H AND BPMKS049A3U(3 PORTS); 48000BTU/H
- AIR HANDLERS TO BE PROVIDED WITH CONDENSATE PUMPS.

FANS SCHEDULE															
MARK	Q-TY	SERVICE	TYPE	CFM	FAN RPM	BHP	HP	SP IN WC	DRIVE	ROOF OR CEILING MOUNTED	POWER	AMP	SONES	MODEL & SIZE	REMARKS
F-1,F-4,F-5,F-8 F-9,F-12,F-13,F-16 F-17,F-20	10	KITCHEN	IN LINE	120	1550	0.02	1/40	0.2	DIRECT	CEILING MOUNTED			3.9	SQ 60	GREENHECK
F-21	1	CELLAR, 1ST FLOOR	IN LINE	300	1550	0.05	1/12	0.25	DIRECT	CEILING MOUNTED			7.2	SQ 80	GREENHECK
F-22 (AIR SUPPLY)	1	CELLAR, 1st-6th floors	IN LINE	96				1.25	DIRECT	ROOF	120/60/1	0.75		FG4XL	FANTECH
F-23,F-24	2	2nd-6th floors LIVING AREA	IN LINE	620	1550	0.07	1/15	0.3	DIRECT	ROOF				G-095	GREENHECK
F-25,F-26	2	DRYERS	IN LINE	750	1550	0.07	1/15	0.25	DIRECT	ROOF				G-095	GREENHECK

ELECTRIC HEATERS SCHEDULE											
UNIT	Q-TY	SERVICE	TYPE	KW	POWER	DRIVE	DIMENSIONS IN.			MODEL & SIZE	REMARKS
							W	D	H		
ELECTRIC HEATER	10	BATHROOM	ELECTRIC	1.5	208/1/60	DIRECT	11-3/4	4-3/4	16	EF-12	DELUXE/DIMPLEX

ELECTRIC WATER HEATERS SCHEDULE												
UNIT	Q-TY	TYPE	KW	AMPS	POWER	DRIVE	DIMENSIONS IN.			MAKE	WEIGHT LBS	ETL#
							W	D	H			
ELECTRIC WATERHEATER	10	ELECTRIC	18	75	240/1/60	DIRECT	14	3-3/4	17	ECO SMART	11.25	UL499

REVISION	DATA	DESCRIPTION

PROJECT:
**710 GRAND STREET
BROOKLYN N.Y.**

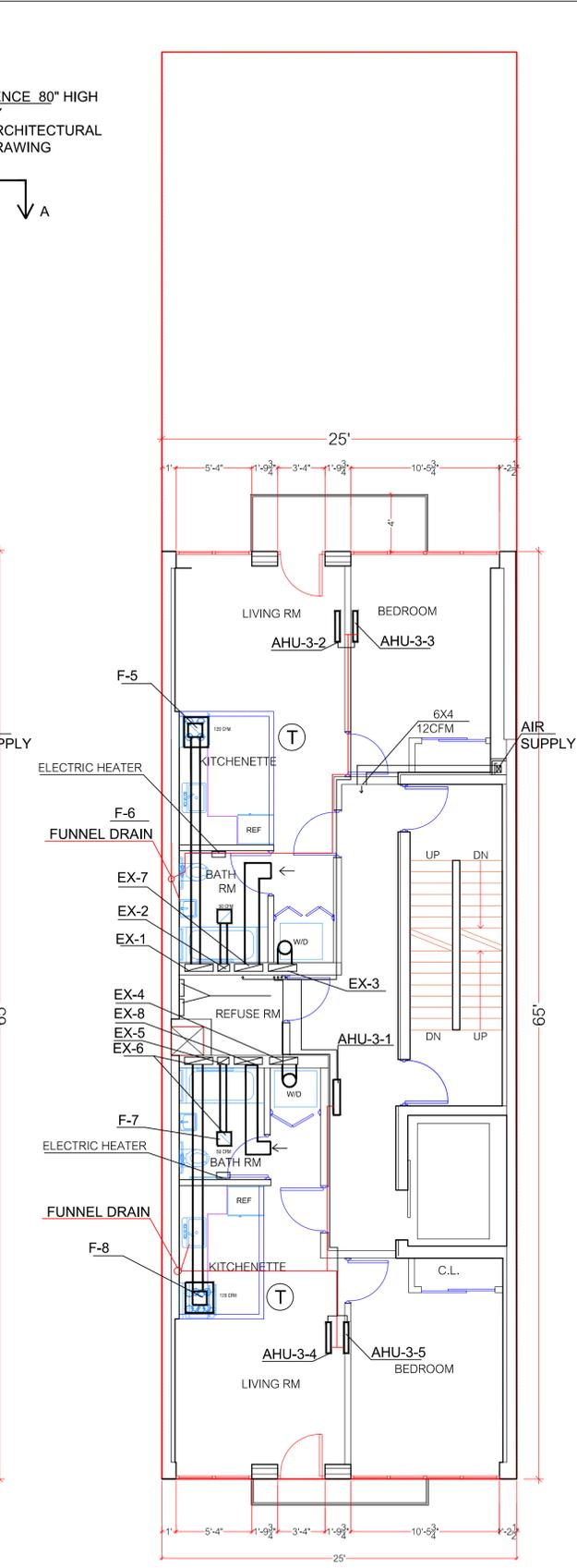
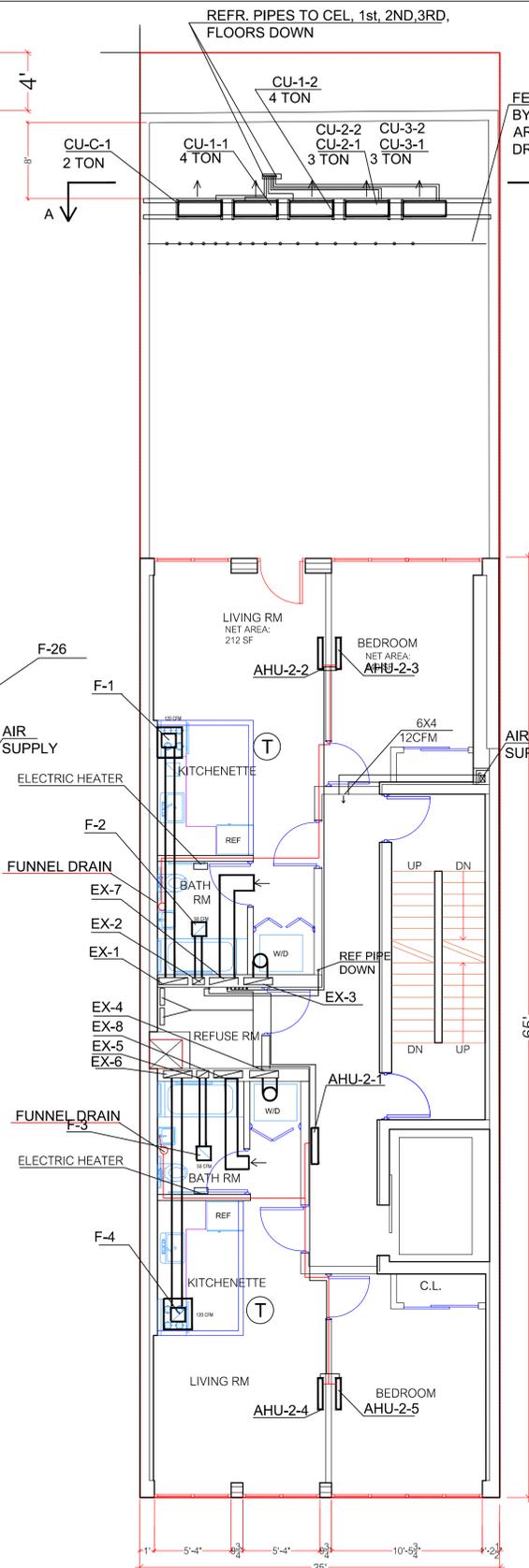
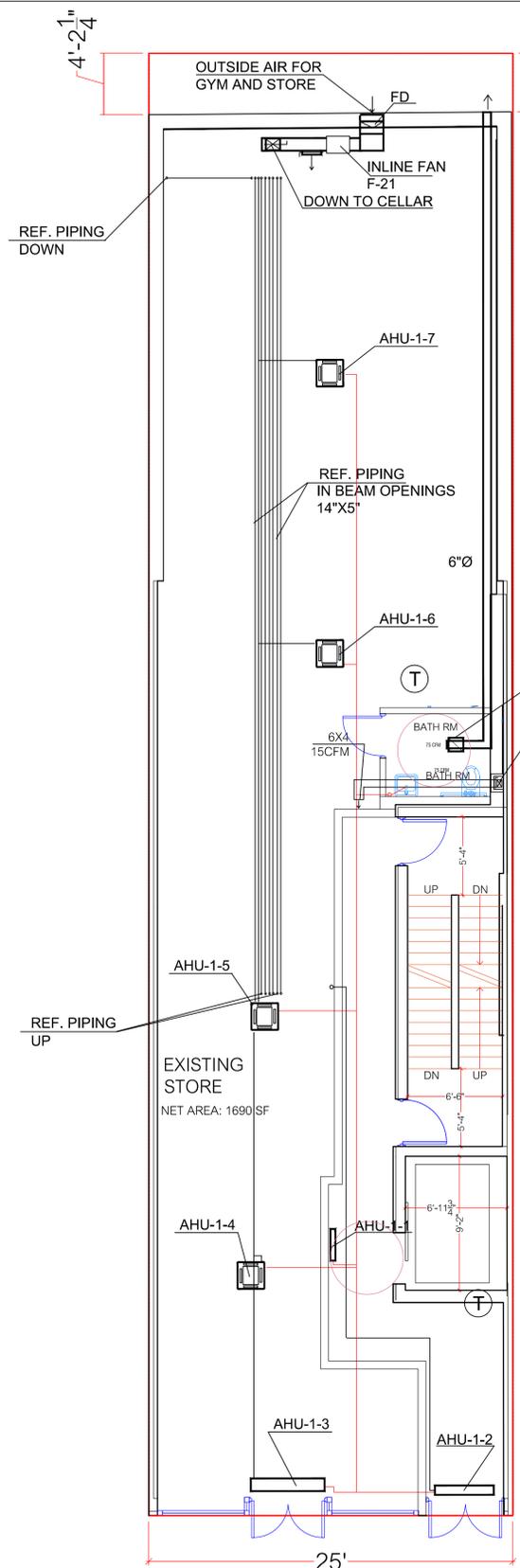
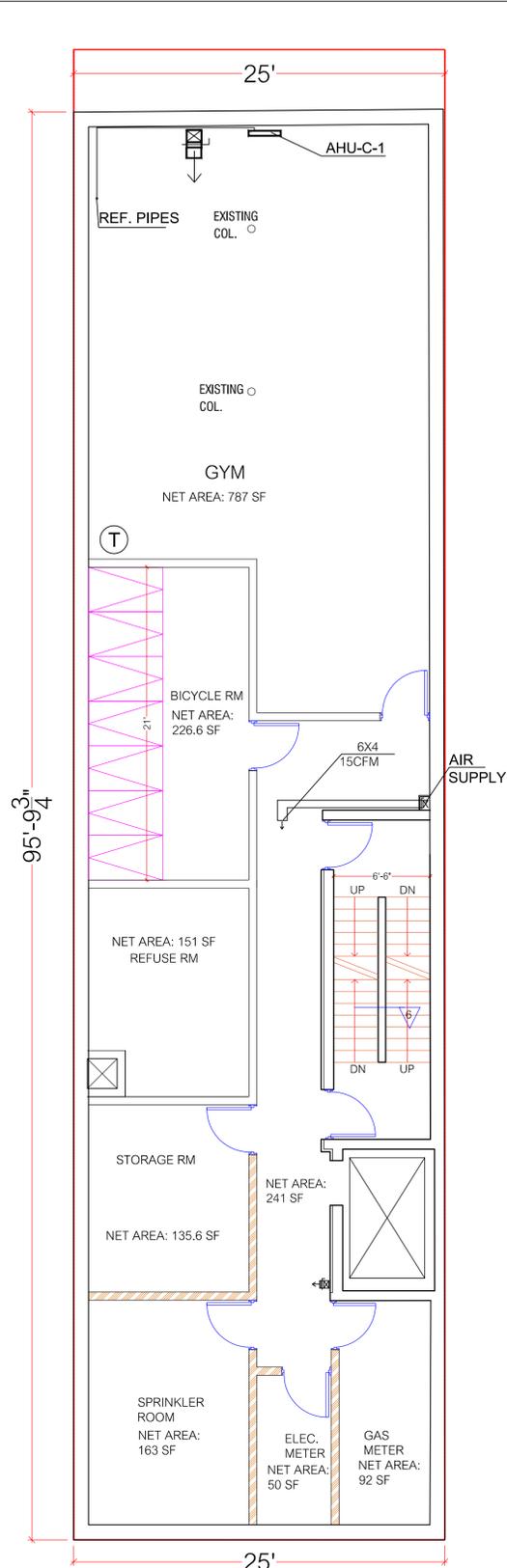
SHEET TITLE:
SPECIFICATION 3

Date: **6-22-16**

Project NO:
Drawing BY EG
CHECKED BY VJL

DWG NO:
M-003.00

SHEET:30F8



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REVISION	DATA	DESCRIPTION
PROJECT: 710 GRAND STREET BROOKLYN N.Y.		
SHEET TITLE: MECHANICAL PLANS CELLAR, 1ST FLOOR, 2nd & 3rd FLOOR		
Date:	6-22-16	
Project NO:		
Drawing BY:	EG	
CHECKED BY:	VJL	
DWG NO:	M-004.00	
SHEET:4OF8		

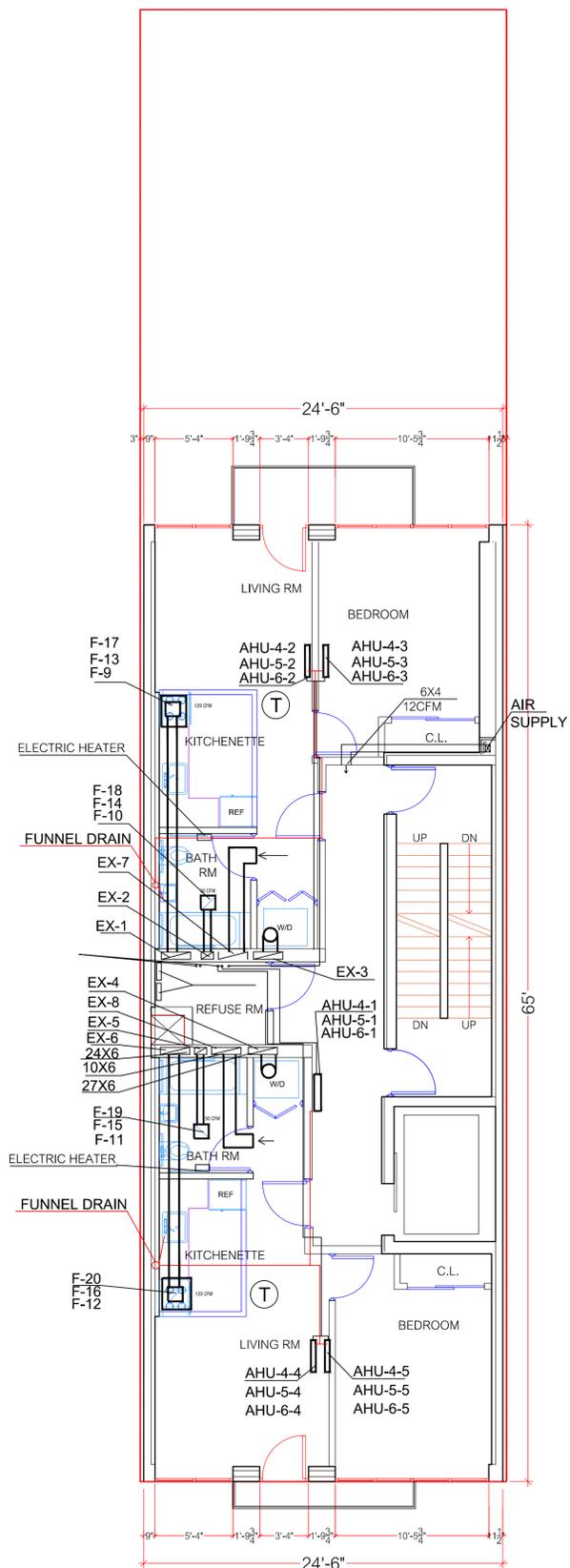
NOTES:

ALL DUCT SIZES ARE INTERNAL.

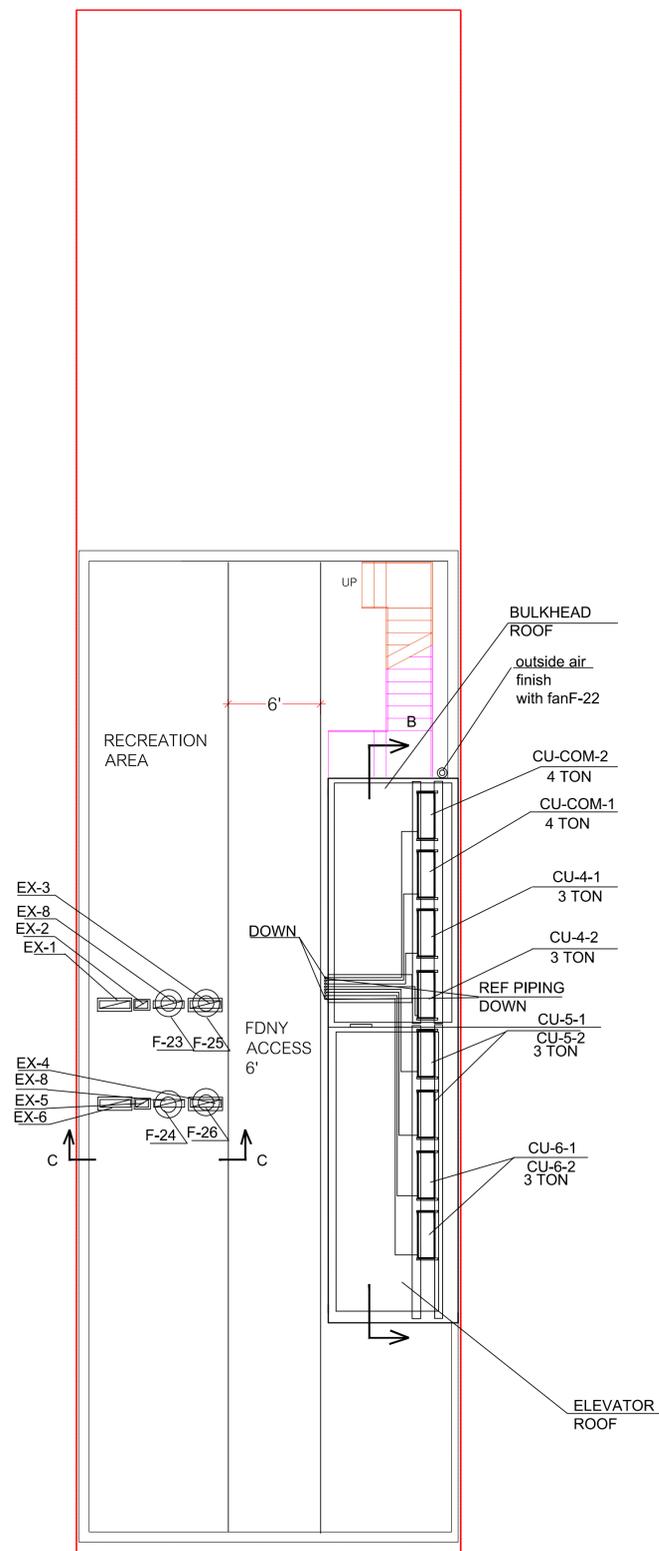
LEGEND:

DUCT

WI-FI ENABLE CONTROL THERMOSTAT



4TH TO 6TH FLOOR PLAN
SCALE: 3/16" = 1'-0"

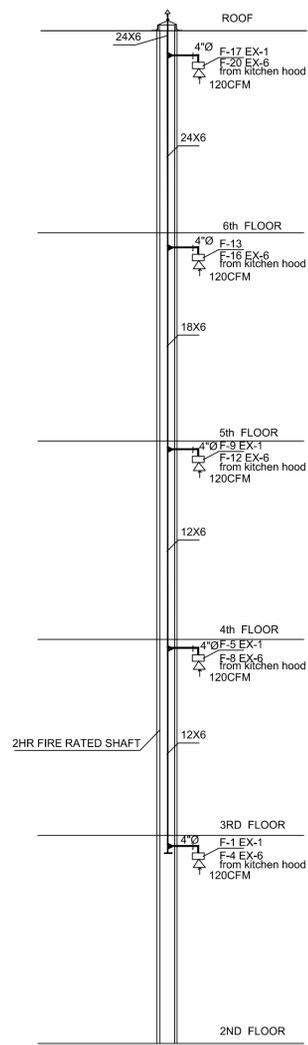


ROOF PLAN (FOR 8-STORY)
SCALE: 3/16" = 1'-0"

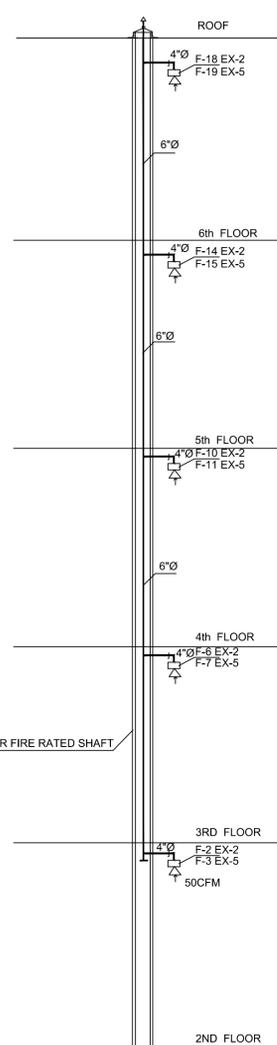
NOTES:
SUPPLY AIR TO THE LIVING AREA TO BE THROUGH THE WINDOWS SPECIFIED BY THE ARCHITECT.

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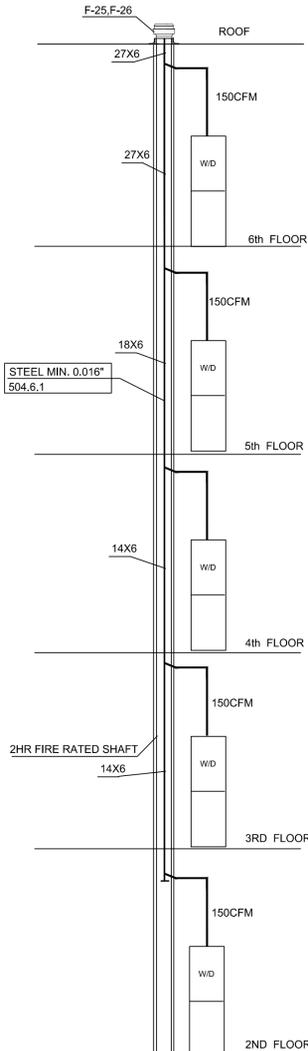
REVISION	DATA	DESCRIPTION
PROJECT: 710 GRAND STREET BROOKLYN N.Y.		
SHEET TITLE: MECHANICAL PLANS FROM 4th TO 6th FLOORS, ROOF		
Date:	6-22-16	
Project NO:		
Drawing BY:	EG	
CHECKED BY:	VJL	
DWG NO:	M-005.00	
SHEET:	50F8	



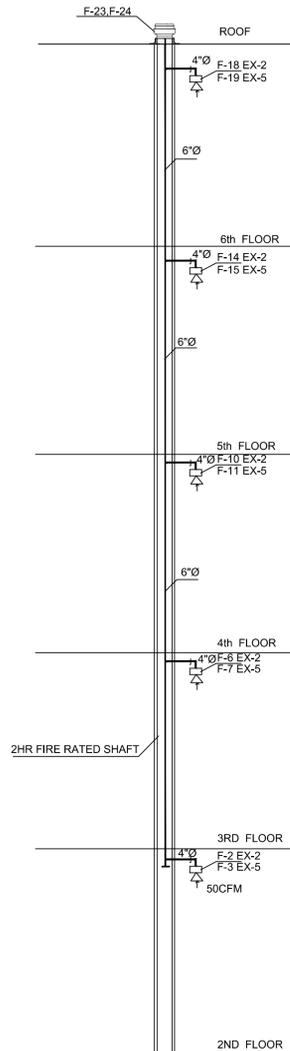
EX-1 EX-6 KITCHEN EXHAUST SYSTEM
RISER DIAGRAM



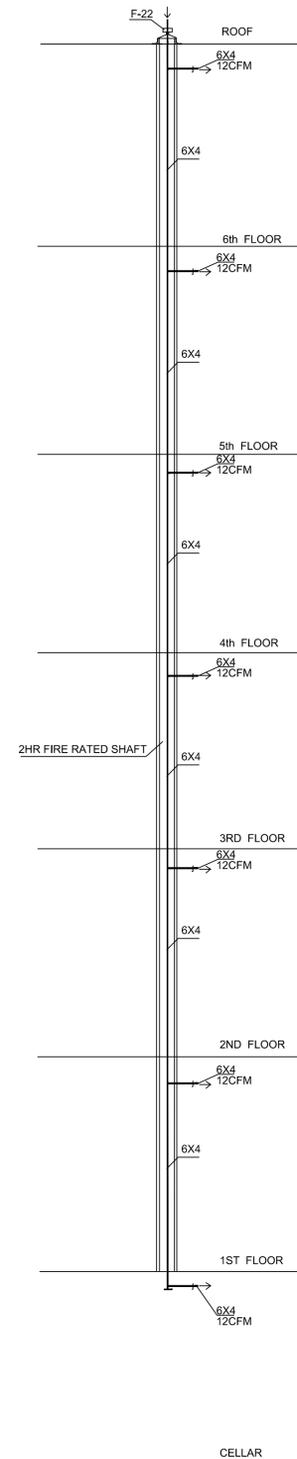
EX-2 EX-5 BATHROOM EXHAUST
SYSTEM RISER DIAGRAM



EX-3 EX-4 WASHER/DRYER EXHAUST
SYSTEM RISER DIAGRAM



EX-7 EX-8 LIVING AREA EXHAUST
SYSTEM RISER DIAGRAM



PUBLIC SPACES CORRIDOR SUPPLY
SYSTEM RISER DIAGRAM

DRYER EXHAUST NOTES:

- 1.Exhaust ducts shall be supported at 4-foot intervals and secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Ducts shall not be joined with screws or similar fasteners that protrude into the inside of the duct. 504.6.2 NYC DOB CODE 2014
- 2.Fan F-25 to be installed because the riser's length more than required maximum length of the exhaust duct that shall be 35 feet from the connection to the transition duct from the dryer to the outlet terminal. Where fittings are used, the maximum length of the exhaust duct shall be reduced. 504.6.4.1 NYC DOB CODE 2014

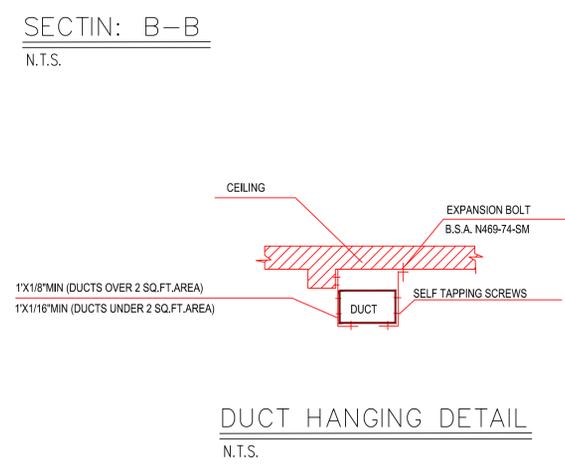
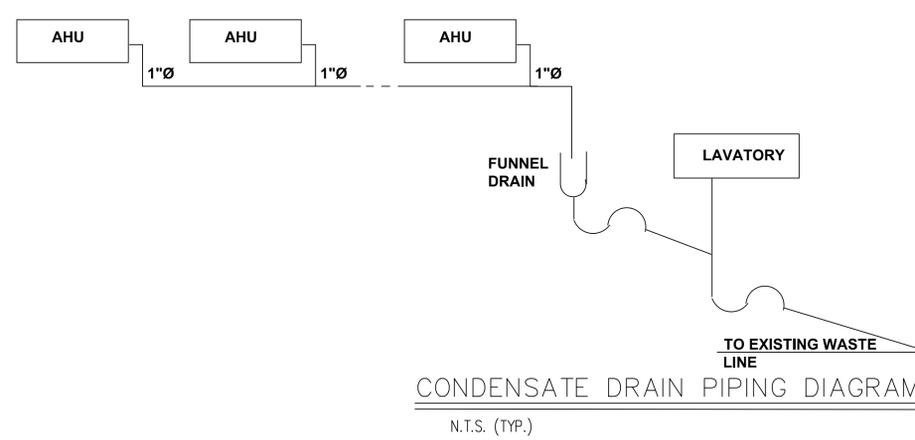
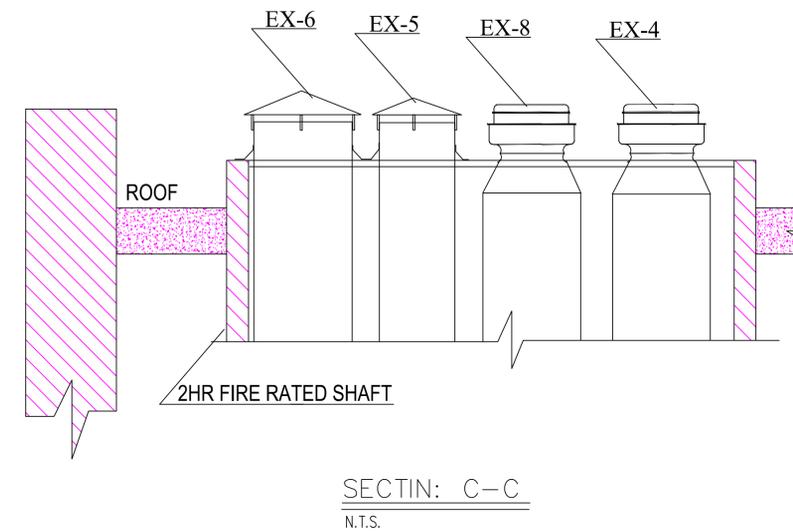
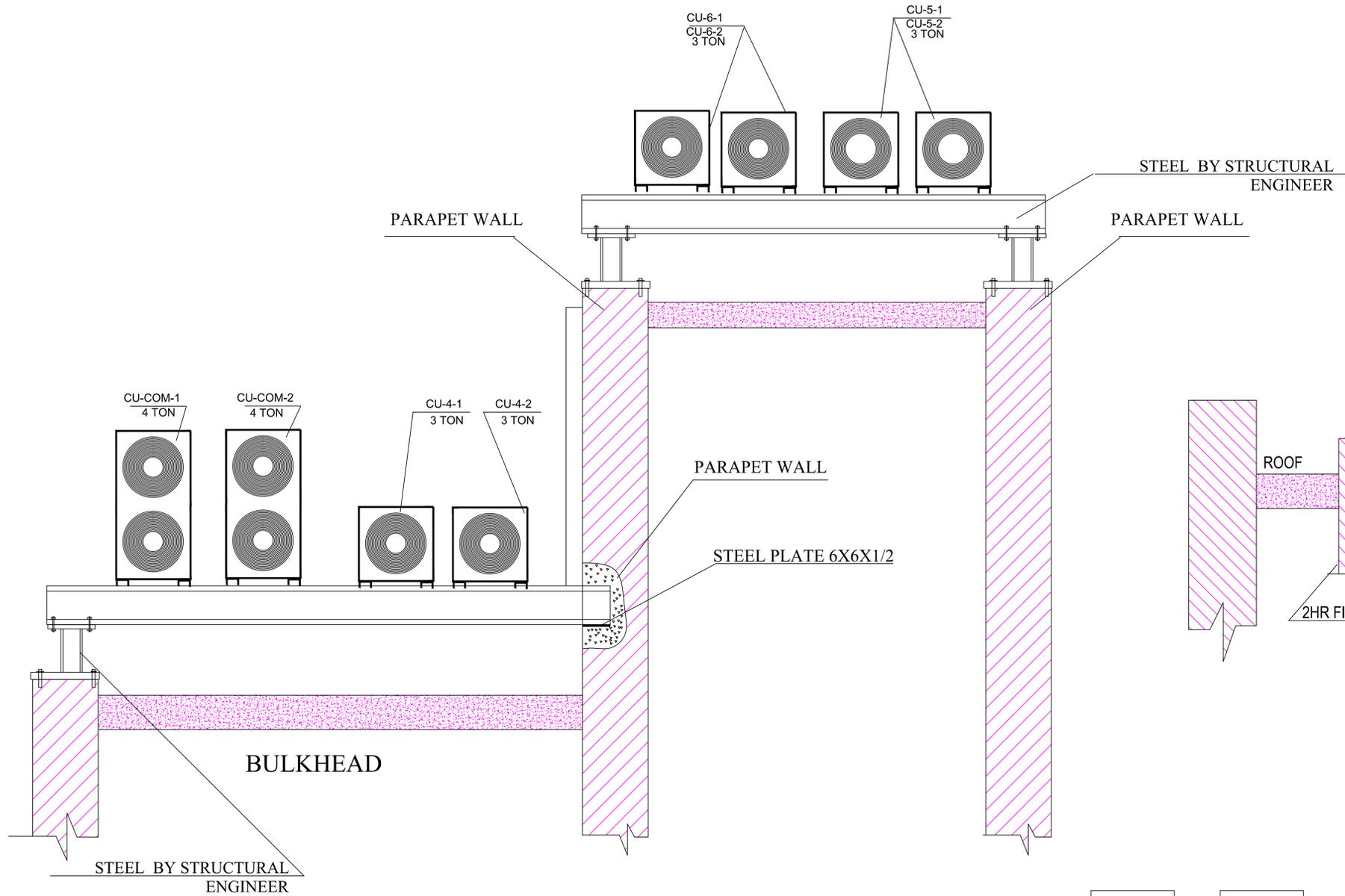
THIS PLAN IS APPROVED ONLY FOR THE WORK INDICATE ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

REVISION	DATA	DESCRIPTION

PROJECT:
**710 GRAND STREET
BROOKLYN N.Y.**

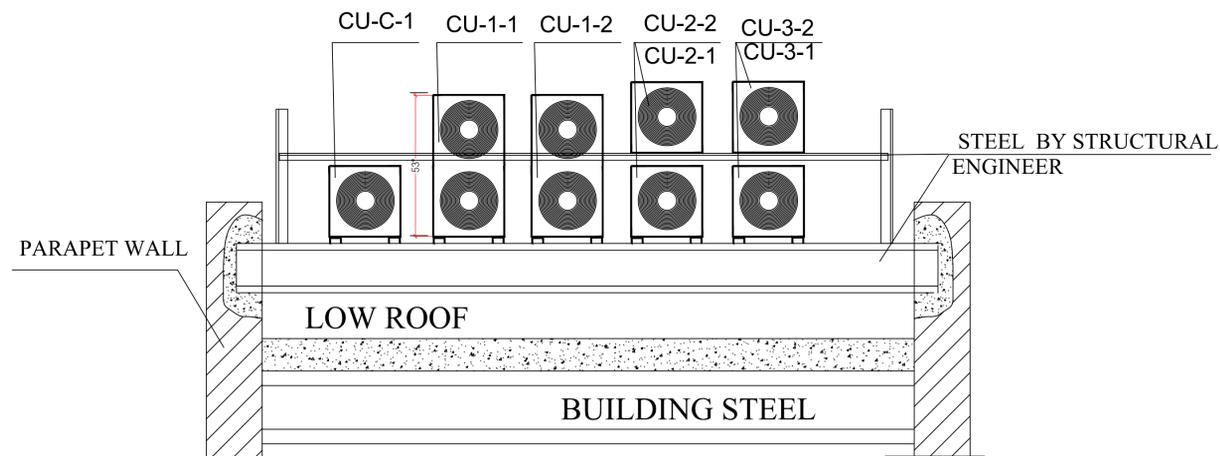
SHEET TITLE:
**EXHAUST & SUPPLY
RISERS DIAGRAMS**

Date: **6-22-16**
Project NO:
Drawing BY EG
CHECKED BY VJL
DWG NO:
M-006.00
SHEET:6OF8

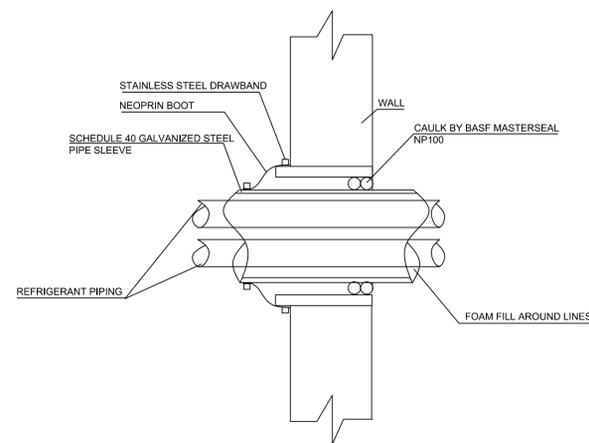


REVISION	DATE	DESCRIPTION
PROJECT: 710 GRAND STREET BROOKLYN N.Y.		
SHEET TITLE: SECTIONS, DETAILS		
Date:	6-22-16	
Project NO:		
Drawing BY:	EG	
CHECKED BY:	VJL	
DWG NO:	M-007.00	
SHEET:	70F8	

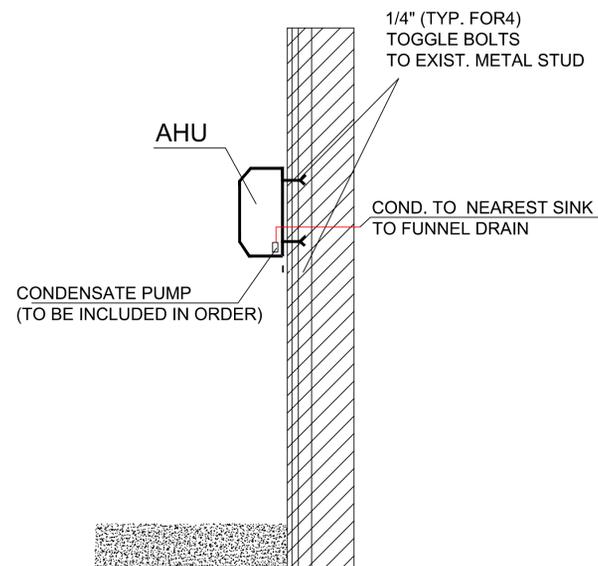
THIS PLAN IS APPROVED ONLY FOR THE WORK INDICATE ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.



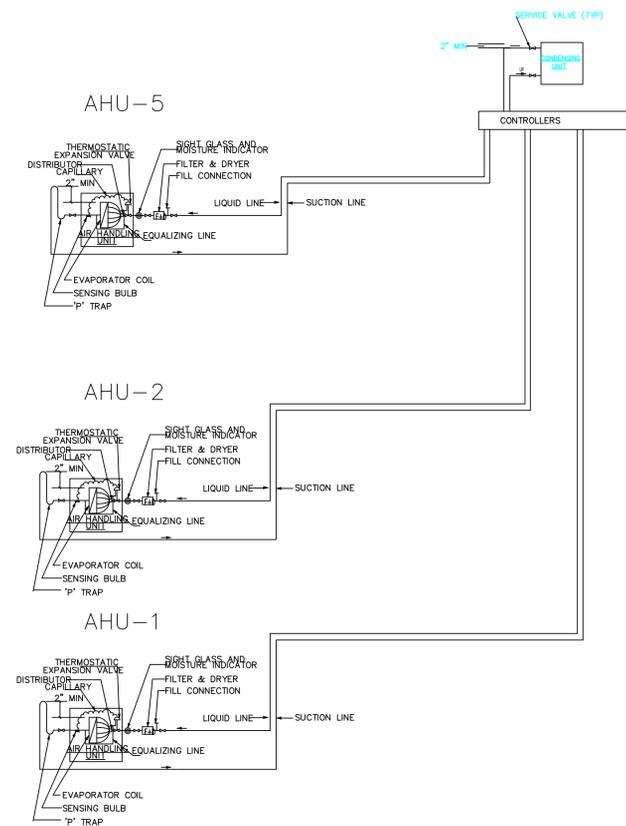
SECTIN: A-A
N.T.S.



REFRIGERANT PIPING WALL
PENETRATION DETAIL
N.T.S.



WALL MOUNTED AIR HANDLER INSTALLATION
N.T.S. (TYP)



REFRIGERATION PIPING
N.T.S. (TYP.)

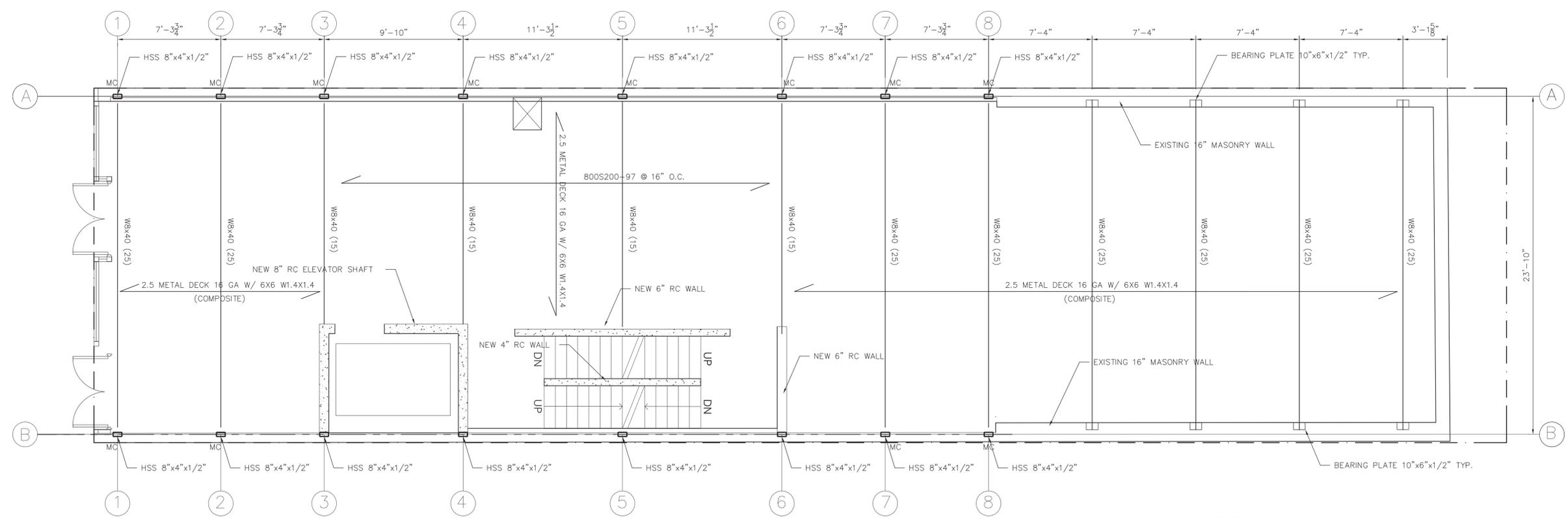
THIS PLAN IS APPROVED ONLY FOR THE WORK INDICATE ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

REVISION	DATA	DESCRIPTION
PROJECT: 710 GRAND STREET BROOKLYN N.Y.		
SHEET TITLE: SECTIONS,DETAILS		
Date:		6-22-16
Project NO:		
Drawing BY EG		
CHECKED BY VJL		
DWG NO:		M-008.00
		SHEET:80F8

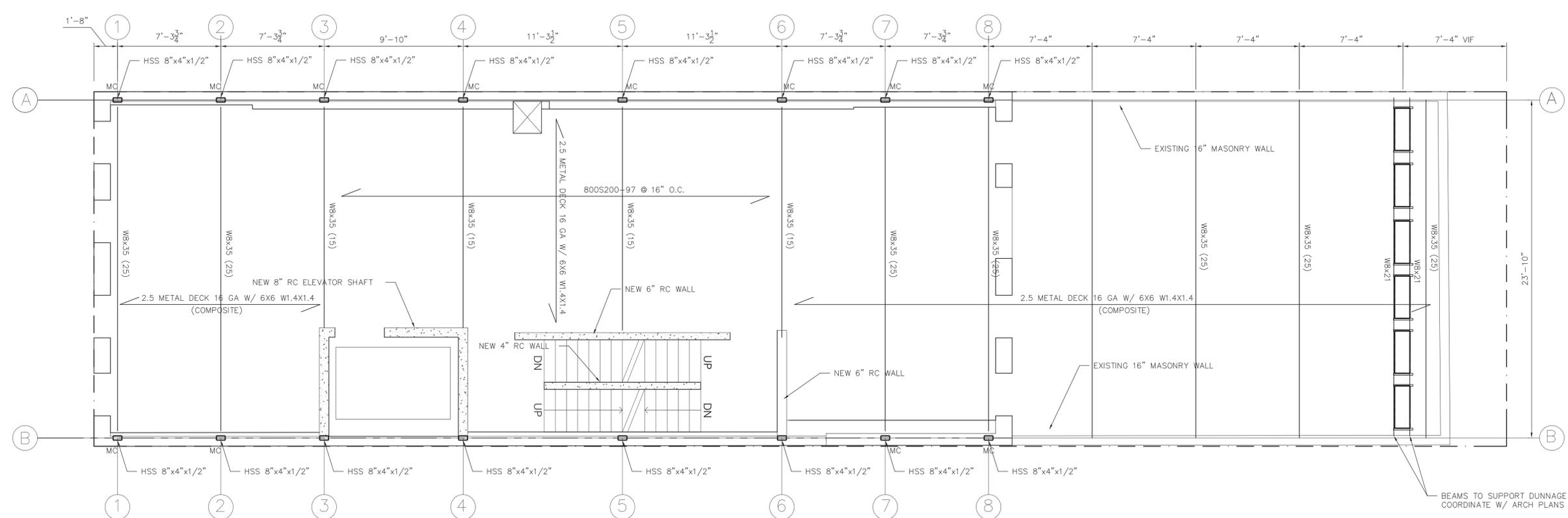
1. ALL HSS COLUMNS AT 1ST AND 2ND FLOOR TO BE FULLY GROUTED WITH 4,000 PSI GROUT
 2. GC TO

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STRUCTURAL ENGINEERING INTEGRATED P.C. AND ITS PRINCIPAL OR EMPLOYEES SHALL NOT HAVE CONTROL OR CHARGE OF AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, SEQUENCES, TECHNIQUES, SCHEDULES OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTIONS WITH THE WORK, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUB-CRONTACTORS OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ALWAYS USE DIMENSIONS AS SHOWN. DRAWINGS ARE NOT TO BE SCALED.



1ST FLOOR PLAN
 SCALE: 1/4" = 1'-0"



2ND FLOOR PLAN
 SCALE: 1/4" = 1'-0"

NO.	DATE	REVISION

STRUCTURAL ENGINEERING INTEGRATED, P.C.
 151 GREEN STREET
 BROOKLYN, NY 11222

PROJECT LOCATION:
 710 GRAND STREET
 BROOKLYN, NY 11211

OWNER:
 Haim Hedmi

PROJECT:
 ENLARGEMENT OF EXISTING
 3 STORY BUILDING

DRAWING TITLE:
 FIRST AND SECOND
 FLOOR PLAN

DOB No:

PROJECT No: BR-022
 DATE: 6/28/2016
 SCALE: AS SHOWN
 DRAWN BY: BB
 CHECKED BY: WW

S-101.00

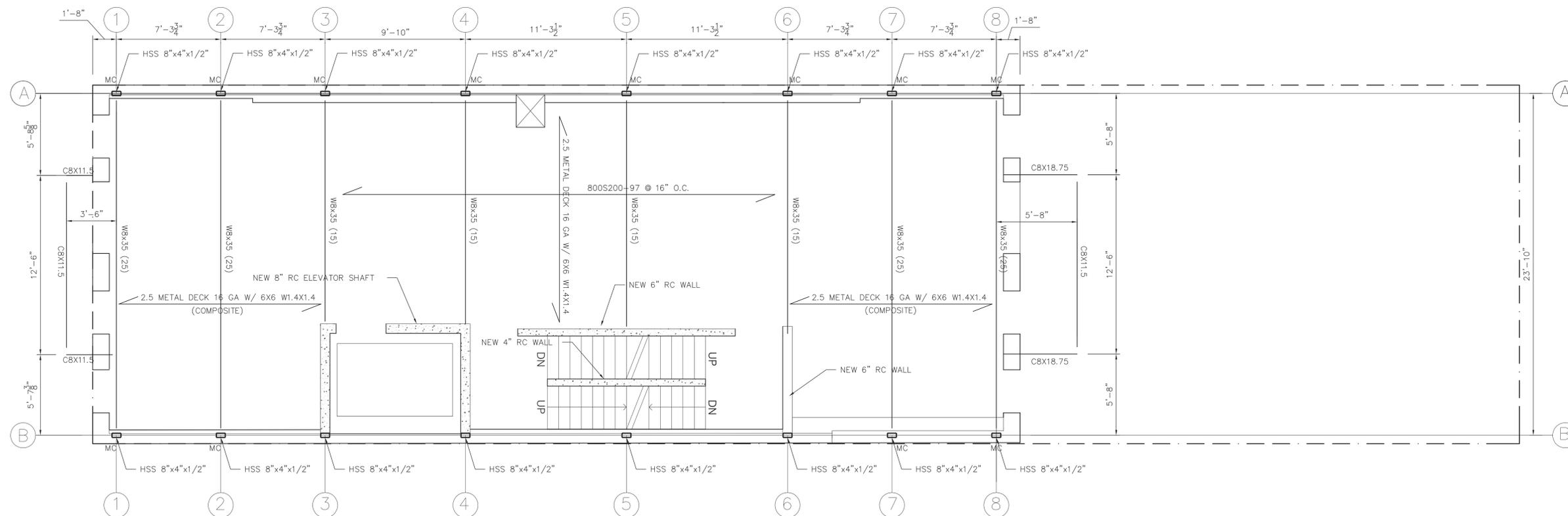
PAGE: 4 of 9



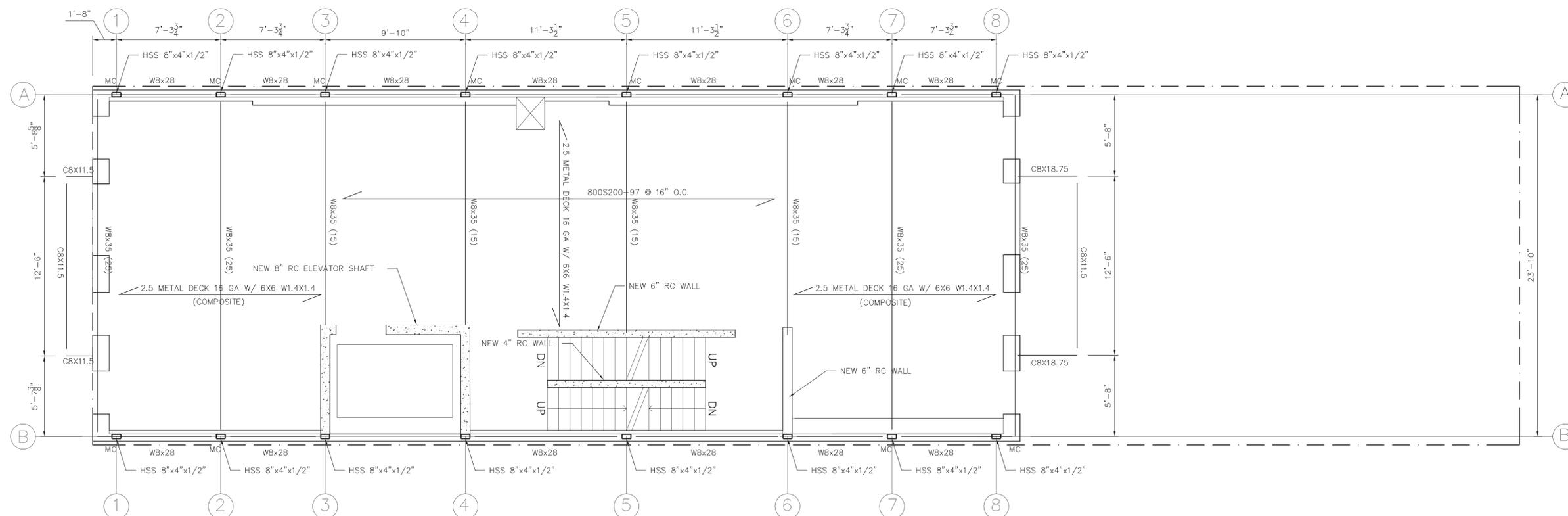
BEAMS TO SUPPORT DUNNAGE
 COORDINATE W/ ARCH PLANS FOR EXACT LOCATION

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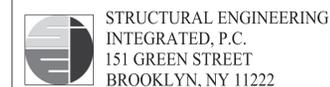


3RD FLOOR PLAN
SCALE: 1/4" = 1'-0"



4TH TO 6TH FLOOR PLAN
SCALE: 1/4" = 1'-0"

NO.	DATE	REVISION



PROJECT LOCATION:
710 GRAND STREET
BROOKLYN, NY 11211

OWNER:
Haim Hedmi

PROJECT:
ENLARGEMENT OF EXISTING
3 STORY BUILDING

DRAWING TITLE:
THIRD,FOURTH
FLOOR TO ROOF PLAN

DOB No:

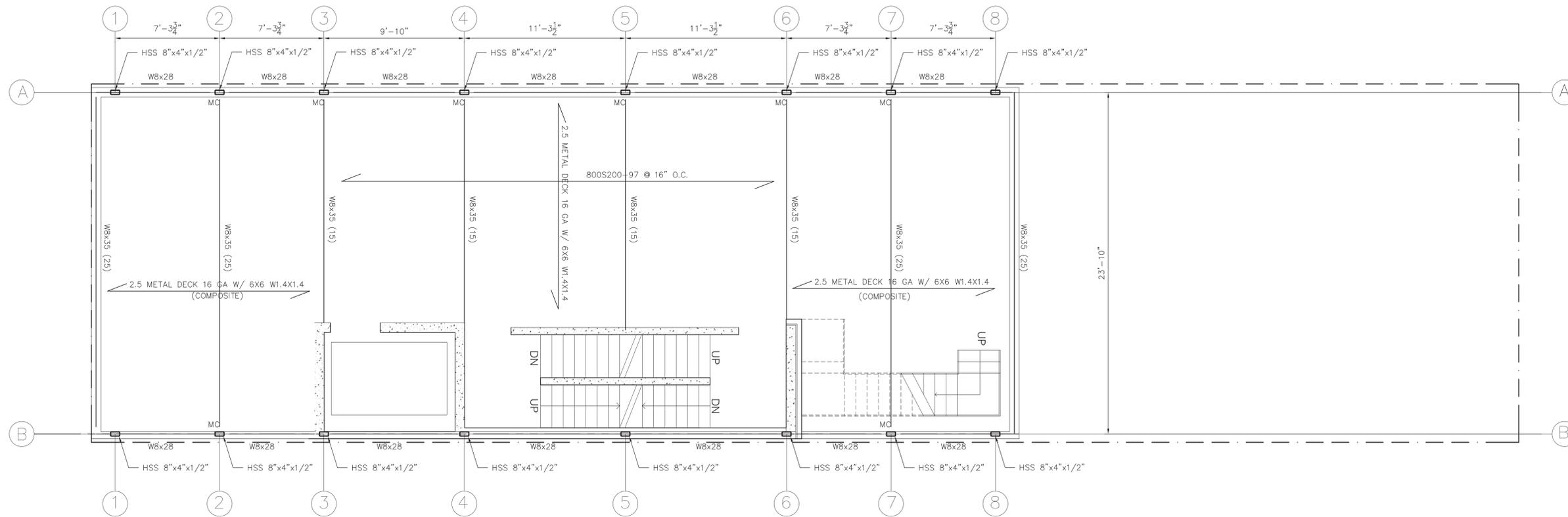
PROJECT No: BR-022
DATE: 6/28/2016
SCALE: AS SHOWN
DRAWN BY: BB
CHECKED BY: WW

PAGE: 5 of 9

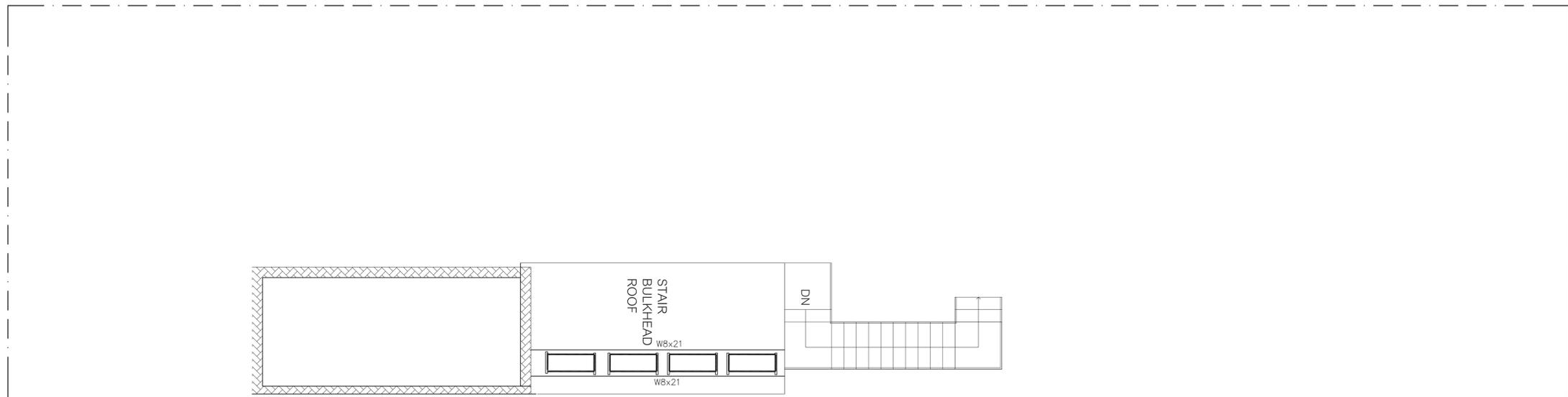


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ROOF PLAN
SCALE: 1/4" = 1'-0"



BULKHEAD
SCALE: 1/4" = 1'-0"

NO.	DATE	REVISION

STRUCTURAL ENGINEERING INTEGRATED, P.C.
151 GREEN STREET
BROOKLYN, NY 11222

PROJECT LOCATION:
710 GRAND STREET
BROOKLYN, NY 11211

OWNER:
Haim Hedmi

PROJECT:
ENLARGEMENT OF EXISTING
3 STORY BUILDING

DRAWING TITLE:
ROOF
FLOOR PLAN

DOB No:

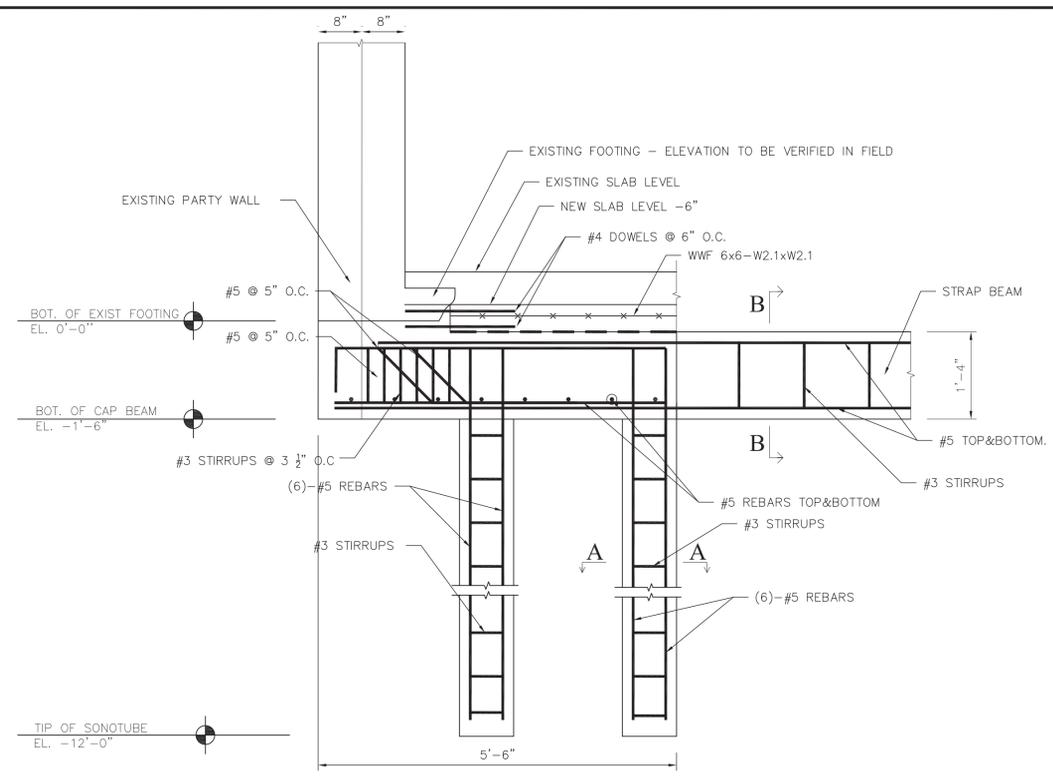
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PAGE: 6 of 9

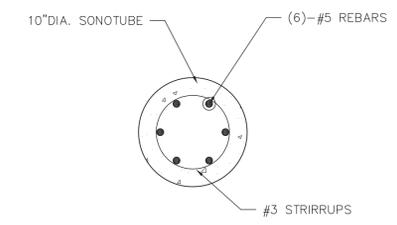


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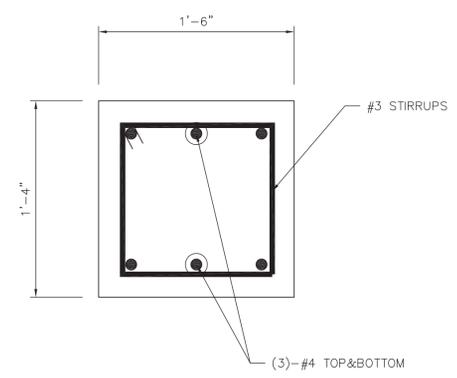
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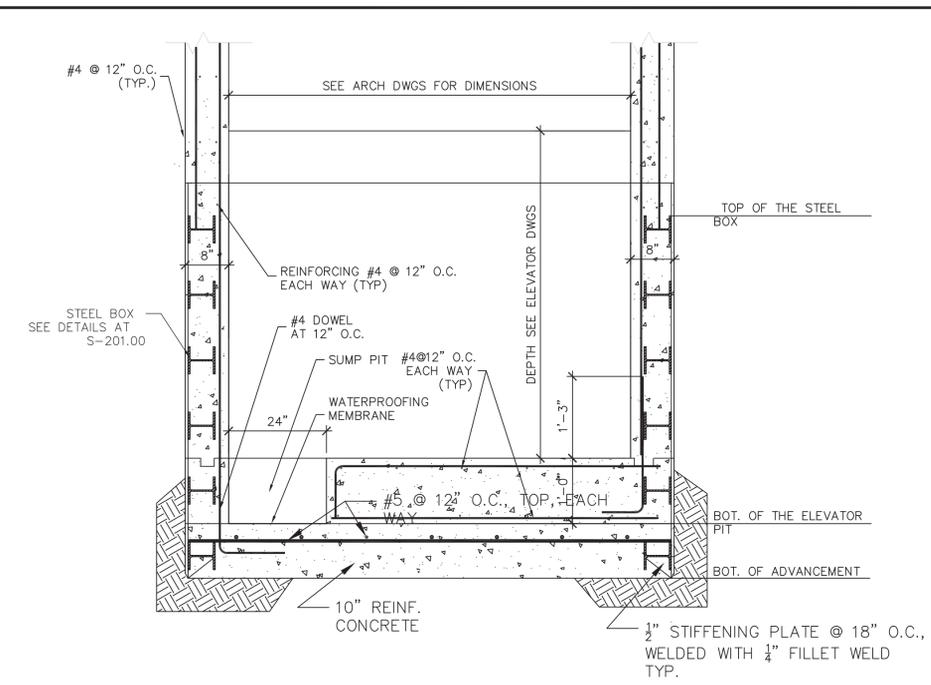
SECTION S-1 - RC WALL AND FOOTING REINF.
SCALE: 3/4" = 1'-0"



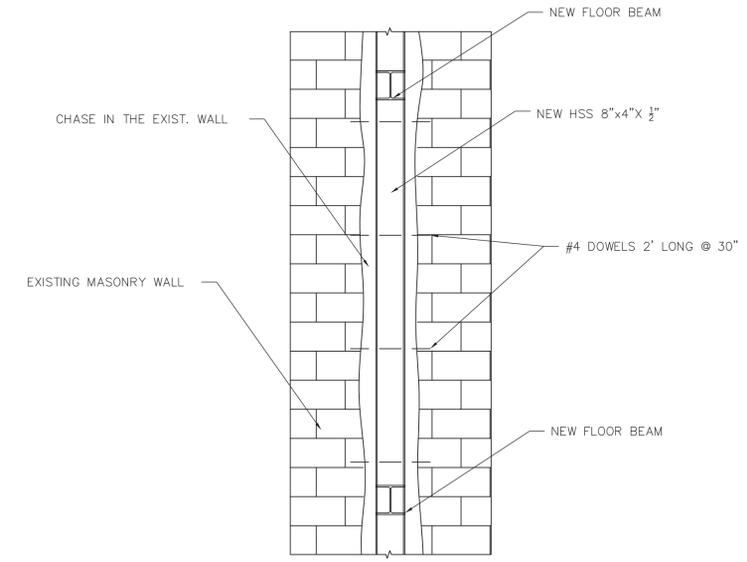
SECTION A-A - SONOTUBE REINFORCEMENT
SCALE: 1-1/2" = 1'-0"



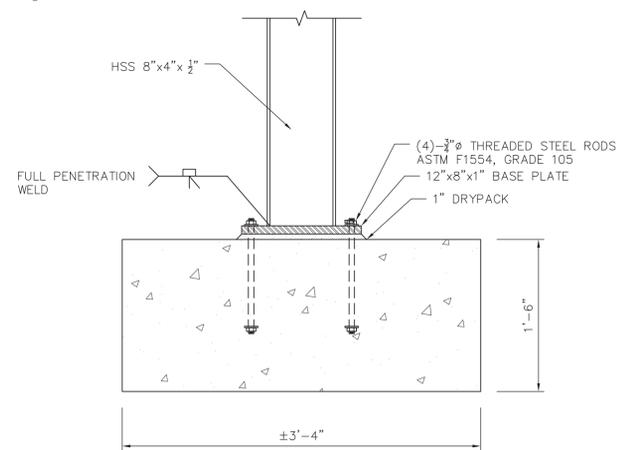
SECTION B-B - STRAP BEAM REINFORCEMENT
SCALE: 1-1/2" = 1'-0"



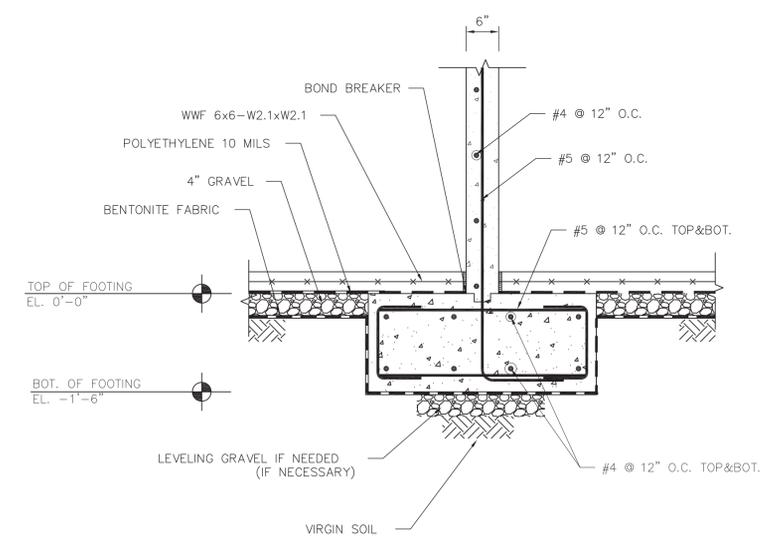
SECTION S-3 - ELEVATOR SHAFT REINFORCEMENT
SCALE: 3/4" = 1'-0"



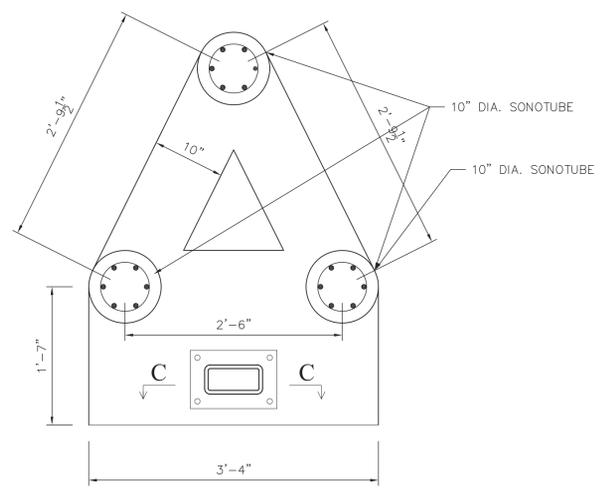
COLUMN ANCHORAGE TO THE EXISTING MASONRY WALL
SCALE: 1/2" = 1'-0"



SECTION C-C
SCALE: 3/4" = 1'-0"



SECTION S-2 - RC WALL AND FOOTING REINF.
SCALE: 3/4" = 1'-0"



SONOTUBES FOOTING DIMENSIONS
SCALE: 1" = 1'-0"

Nr.	Dim	Rmmm

STRUCTURAL ENGINEERING INTEGRATED, P.C.
151 GREEN STREET
BROOKLYN, NY 11222

PROJECT LOCATION:
710 GRAND STREET
BROOKLYN, NY 11211

OWNER:
Haim Hedmi

PROJECT:
ENLARGEMENT OF EXISTING
3 STORY BUILDING

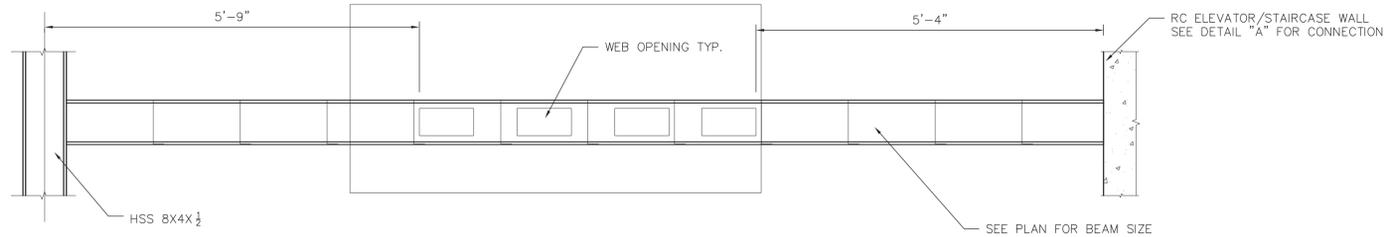
DRAWING TITLE:
DETAILS

DOB No:

PROJECT No: BR-022
DATE: 6/28/2016
SCALE: AS SHOWN
DRAWN BY: BB
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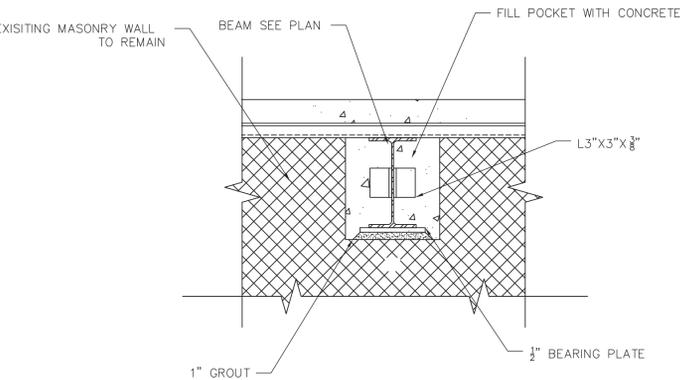
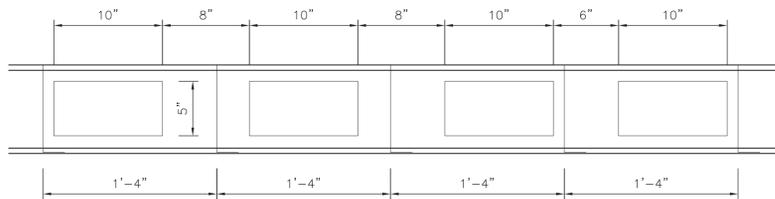
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PAGE: 7 of 9



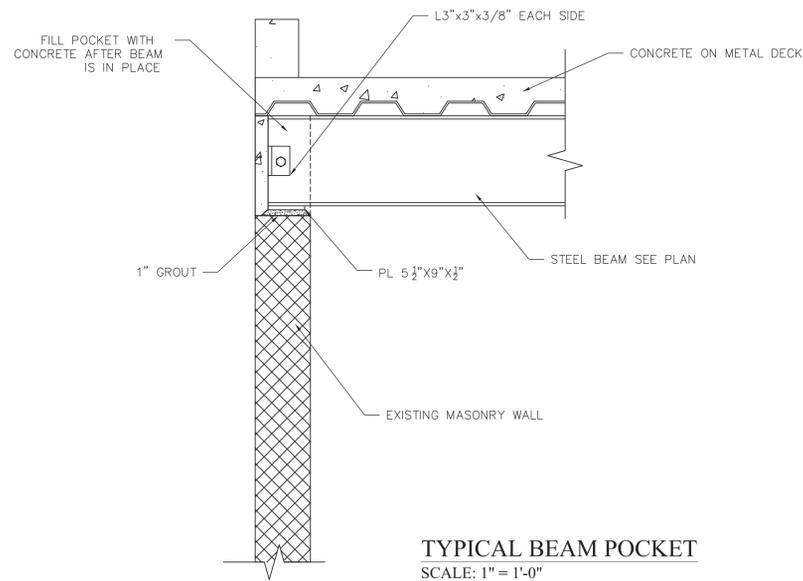


PROPOSED OPENINGS IN THE EAST-WEST BEAM

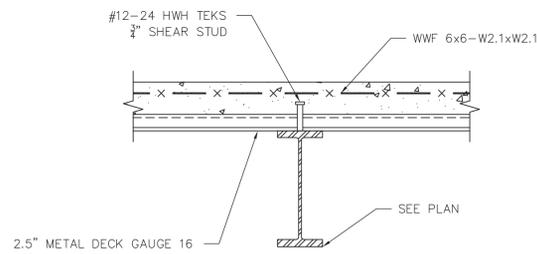
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SECTION @ MASONRY POCKET
scale: 3/4" = 1'-0"

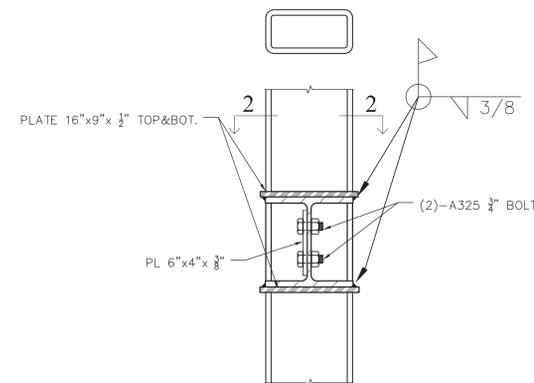


TYPICAL BEAM POCKET
SCALE: 1" = 1'-0"



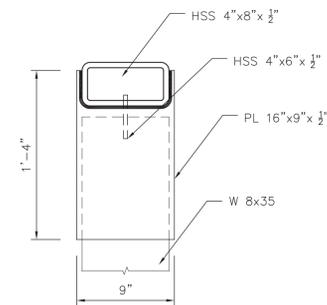
TYPICAL SLAB DETAIL

SCALE: 3/4" = 1'-0"



SECTION 1-1

scale: 1-1/2" = 1'-0"

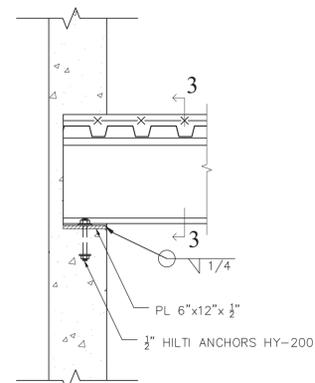
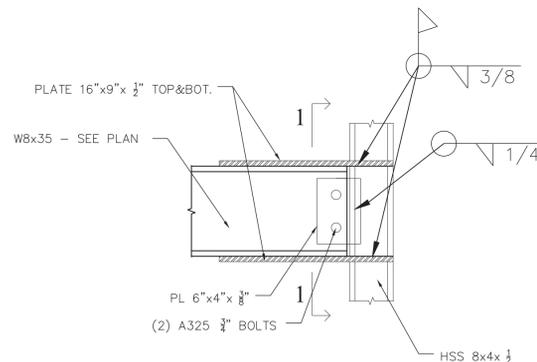


SECTION 2-2

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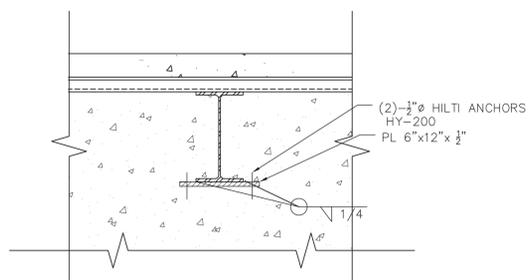
MOMENT CONNECTION DETAIL

scale: 1-1/2" = 1'-0"



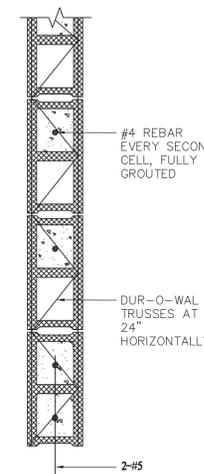
BEAM ANCHORAGE TO RC WALL

scale: 1" = 1'-0"



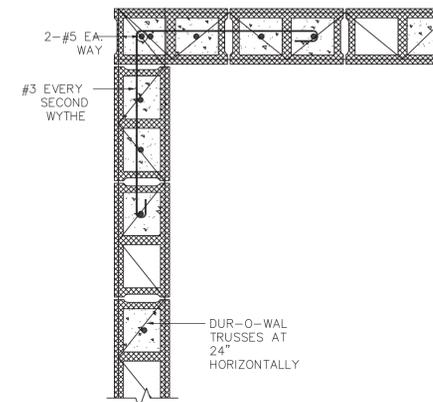
SECTION 3-3 @ RC WALL POCKET

scale: 1" = 1'-0"



TYPICAL END OF CMU WALL REINFORCING DETAIL

SCALE: 1" = 1'-0"



TYPICAL CENTER OF CMU WALL REINFORCING DETAIL

SCALE: 1" = 1'-0"

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Dr. Dmm Rmm

STRUCTURAL ENGINEERING INTEGRATED, P.C.
151 GREEN STREET
BROOKLYN, NY 11222

PROJECT LOCATION:
710 GRAND STREET
BROOKLYN, NY 11211

OWNER:
Haim Hedmi

PROJECT:
ENLARGEMENT OF EXISTING
3 STORY BUILDING

DRAWING TITLE:
DETAILS

DOB No:

PROJECT No: BR-022
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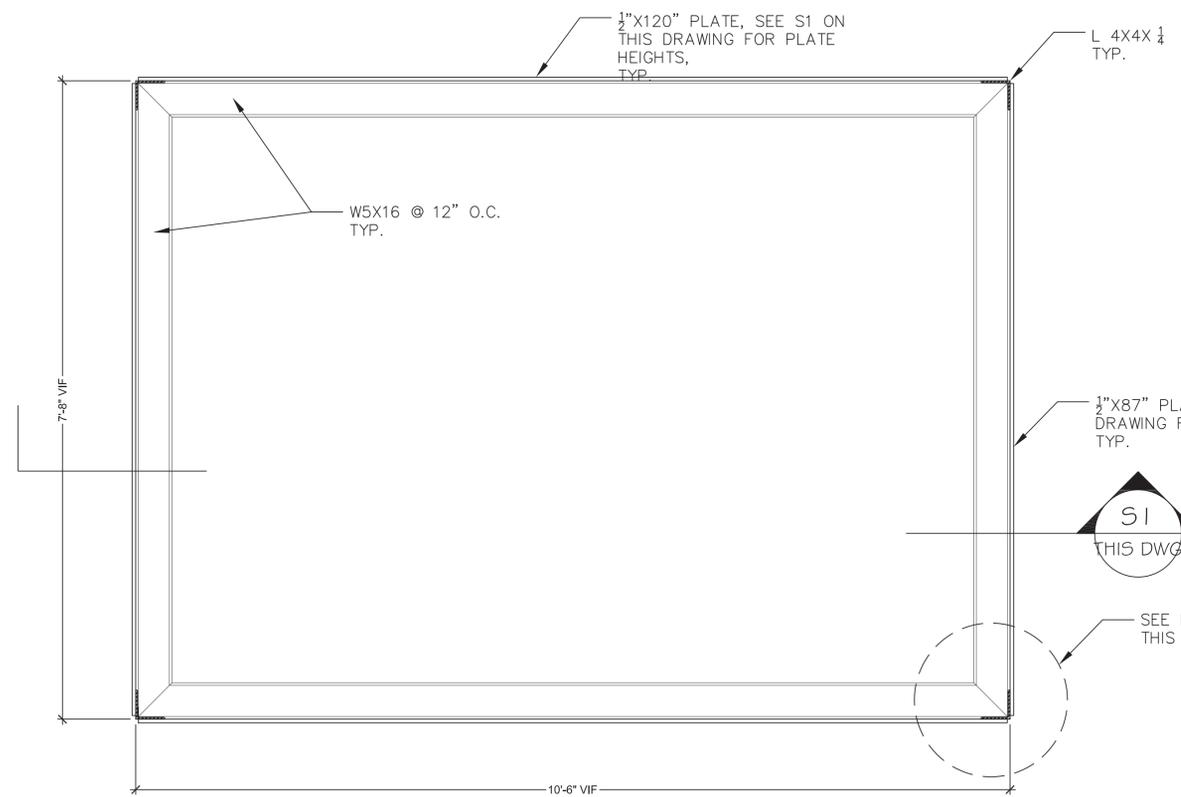
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PAGE: 8 of 9



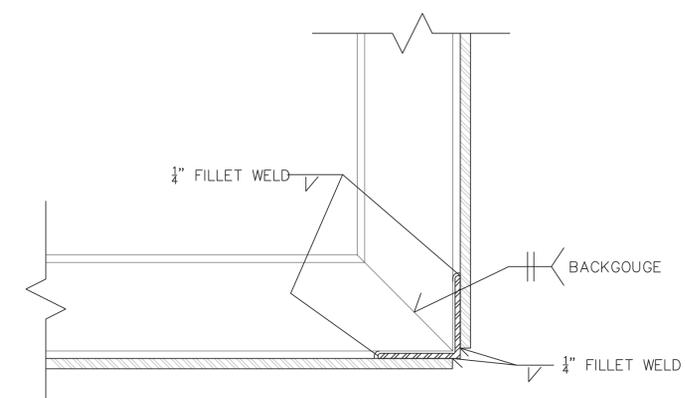
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STEEL BOX - TOP VIEW
SCALE: 1"=1'-0"

- SEQUENCE OF INSTALLATION:**
1. STEEL BOX SEGMENTS SHALL BE PREFABRICATED IN SHOP.
 2. ONCE DELIVERED TO THE JOB SITE, "SEGMENT 1" SHALL BE PLACED IN THE LOCATION OF THE ELEVATOR PIT, ON THE TOP OF THE EXISTING SOIL.
 3. SOIL SHALL BE REMOVED FROM THE INSIDE OF THE BOX TO COMMENCE LOWERING.
 4. ONCE "SEGMENT 1" REACHES IT'S DESIGNATED DEPTH OF LOWERING, "SEGMENT 2" SHALL BE INSTALLED ON TOP OF "SEGMENT 1".
 5. THE BOX SHALL BE ENCLOSED AT IT'S BASE BY POURING 10" OF REINFORCED CONCRETE.
 6. STEEL BOX TO BE LEFT IN PLACE AND INCORPORATED INTO THE WALLS OF THE ELEVATOR PIT.



DETAIL 1- STEEL BOX CORNER

NOTE: ALL DIMENSIONS OF STEEL BOX SHALL BE CONFIRMED IN FIELD BY CONTRACTOR PRIOR TO FABRICATION.

NO.	DATE	REVISION

STRUCTURAL ENGINEERING INTEGRATED, P.C.
151 GREEN STREET
BROOKLYN, NY 11222

PROJECT LOCATION:
710 GRAND STREET
BROOKLYN, NY 11211

OWNER:
Haim Hedmi

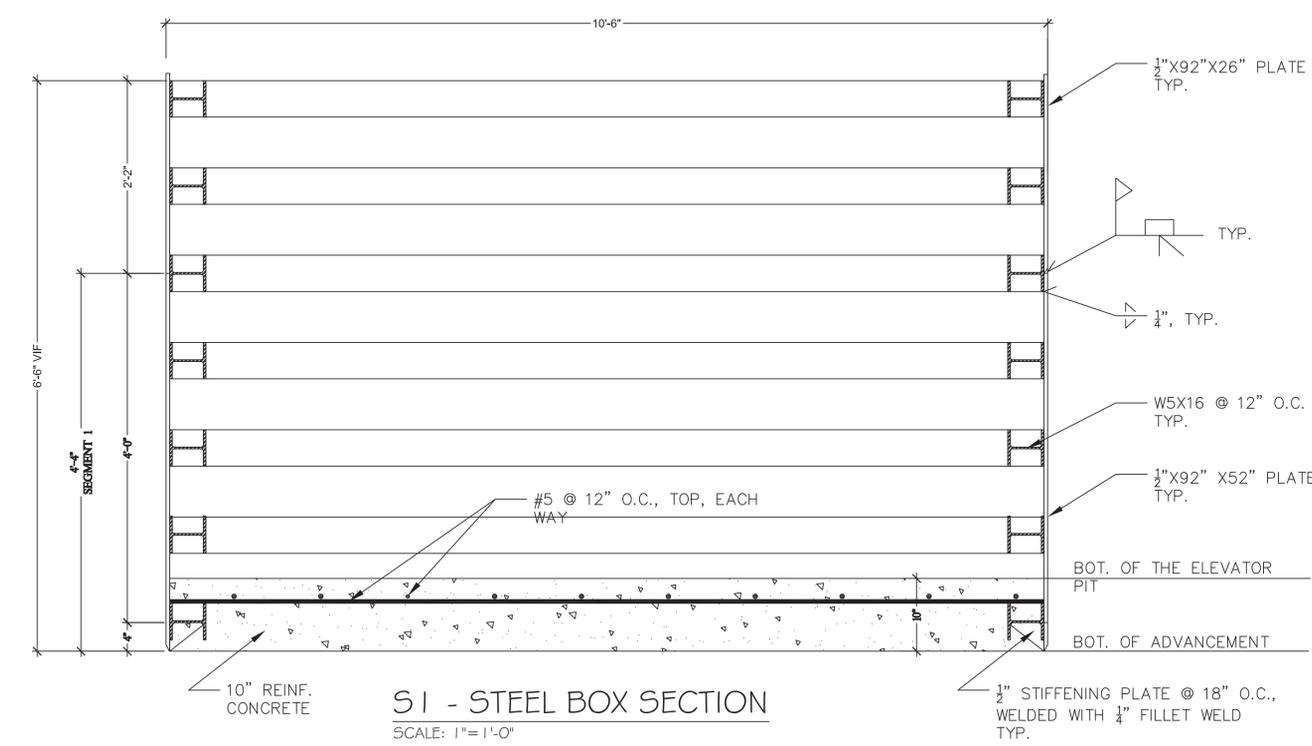
PROJECT:
ENLARGEMENT OF EXISTING
3 STORY BUILDING

DRAWING TITLE:
DETAILS

DOB No:

PROJECT No: BR-022
DATE: 6/28/2016
SCALE: AS SHOWN
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CHECKED BY: WW

S-202.00
PAGE: 9 of 9



S1 - STEEL BOX SECTION
SCALE: 1"=1'-0"

APPENDIX 2

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Jaroah Inc. have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, Jaroah Inc. will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Amanda Duchesne, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841.

Project Contact List: OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you

would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at brownfields@cityhall.nyc.gov.

Repositories: A document repository is maintained online. Internet access to view OER's document repositories is available at public libraries. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. The library nearest the Site is:

Brooklyn Public Library – Leonard Branch

81 Devoe Street, Brooklyn NY 11211

718-486-3365

Monday: 10:00am to 6:00pm

Tuesday: 1:00pm to 8:00pm

Wednesday: 10:00am to 6:00pm

Thursday: 10:00am to 8:00pm

Friday: 10:00am to 6:00pm

Saturday: 10:00am to 5:00pm

Sunday: Closed

Digital Documentation: NYC OER requires the use of digital documents in our repository as a means of minimizing paper use while also increasing convenience in access and ease of use.

Issues of Public Concern: The major issues of concern to the public will be potential impacts of nuisance odors and dust during the disturbance of soil at the Site. This work will be performed in accordance with procedures that will be specified under a Remedial Program and considers and takes preventive measures for exposure to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a HASP and a CAMP are required components of the remedial program. Implementation of these plans will be under the direct oversight of the NYCOER.

Public Notice and Public Comment: Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be reviewed and approved by OER prior to distribution and mailed by the Enrollee. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

Citizen Participation Milestones: Public notice and public comment activities occur at several steps during a typical NYC VCP project. These steps include:

- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.
- **Public Notice announcing the approval of the RAWP and the start of remediation:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.
- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion:** Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.

APPENDIX 3

SUSTAINABILITY STATEMENT

This Sustainability Statement documents sustainable activities and green remediation efforts planned under this remedial action.

Reuse of Clean, Recyclable Materials and Reduced Consumption of Non-Renewable Resources: Reuse of clean, locally-derived recyclable materials reduces consumption of non-renewable virgin resources and can provide energy savings and greenhouse gas reduction.

An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

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

Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Conversion to Clean Fuels: Use of clean fuel improves NYC's air quality by reducing harmful emissions.

Natural gas will be utilized for fuel in the new building.

An estimate of the volume of clean fuels used during remedial activities will be quantified and reported in the RAR.

Recontamination Control: Recontamination after cleanup and redevelopment is completed undermines the value of work performed, may result in a property that is less protective of public health or the environment, and may necessitate additional cleanup work later or impede future redevelopment. Recontamination can arise from future releases that occur within the property or by influx of contamination from off-Site.

An estimate of the area of the Site that utilizes recontamination controls under this plan will be reported in the RAR in square feet.

Stormwater Retention: Stormwater retention improves water quality by lowering the rate of combined stormwater and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced stormwater retention capability of the redevelopment project will be included in the RAR.

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

The number of Green Buildings that are associated with this brownfield redevelopment property will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

Paperless Voluntary Cleanup Program: Jaroah Inc. is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents

will replace submission of hard copies for the review of project documents, communications and milestone reports.

Low-Energy Project Management Program: Jaroah Inc. is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

Trees and Plantings: Trees and other plantings provide habitat and add to NYC's environmental quality in a wide variety of ways. Native plant species and native habitat provide optimal support to local fauna, promote local biodiversity, and require less maintenance.

An estimate of the land area that will be vegetated, including the number of trees planted or preserved, will be reported in square feet in the RAR.

APPENDIX 4

SOIL/MATERIALS MANAGEMENT PLAN

1.1 Soil Screening Methods

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the final remedial report. Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of final signoff by OER.

1.2 Stockpile Methods

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials.

Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event.

Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

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

1.3 Characterization of Excavated Materials

Soil/fill or other excavated media that is transported off-Site for disposal will be sampled in a manner required by the receiving facility, and in compliance with applicable laws and regulations. Soils proposed for reuse on-Site will be managed as defined in this plan.

1.4 Materials Excavation, Load-Out, and Departure

The PE/QEP overseeing the remedial action will:

- oversee remedial work and the excavation and load-out of excavated material;
- ensure that there is a party responsible for the safe execution of invasive and other work performed under this work plan;
- ensure that Site development activities and development-related grading cuts will not interfere with, or otherwise impair or compromise the remedial activities proposed in this RAWP;
- ensure that the presence of utilities and easements on the Site has been investigated and that any identified risks from work proposed under this plan are properly addressed by appropriate parties;
- ensure that all loaded outbound trucks are inspected and cleaned if necessary before leaving the Site;
- ensure that all egress points for truck and equipment transport from the Site will be kept clean of Site-derived materials during Site remediation.

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

Open and uncontrolled mechanical processing of historical fill and contaminated soil on-Site will not be performed without prior OER approval.

1.5 Off-Site Materials Transport

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will

be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

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

1.6 Materials Disposal Off-Site

The following documentation will be established and reported by the PE/QEP for each disposal destination used in this project to document that the disposal of regulated material exported from the Site conforms with applicable laws and regulations: (1) a letter from the PE/QEP or Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in New York City under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the final remedial report.

The Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the final remedial report.

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations.

Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

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

If disposal of soil/fill from this Site is proposed for unregulated disposal (i.e., clean soil removed for development purposes), including transport to a Part 360-16 Registration Facility, a formal request will be made for approval by OER with an associated plan compliant with 6NYCRR Part 360-16. This request and plan will include the location, volume and a description of the material to be recycled, including verification that the material is not impacted by site uses and that the material complies with receipt requirements for recycling under 6NYCRR Part 360. This material will be appropriately handled on-Site to prevent mixing with impacted material.

1.7 Materials Reuse On-Site

Soil and fill that is derived from the property that meets the Soil Cleanup Objectives (SCOs) established in this plan may be reused on-Site. The SCOs for on-Site reuse are listed in Section 4.2 of this cleanup plan. 'Reuse on-Site' means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on land with comparable levels of contaminants in soil/fill material, compliant with applicable laws and regulations, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this remedial plan are followed. Reuse of soil/fill material is not expected at this project.

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

1.8 Demarcation

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

1.9 Import of Backfill Soil From Off-Site Sources

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. Imported soils will not exceed groundwater protection standards established in Part 375. Imported soils for Track 1 remedial action projects will not exceed Track 1 SCO's.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

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

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;

- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.
- All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this remedial plan. The final remedial report will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.
- All material will be subject to source screening and chemical testing.
- Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:
 - Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
 - The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
 - Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the final remedial report. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

1.10 Fluids Management

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

1.11 Stormwater Pollution Prevention

Applicable laws and regulations pertaining to stormwater pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this remedial plan (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

1.12 Contingency Plan for Unknown Contamination Sources

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

1.13 Odor, Dust, and Nuisance Control

Odor Control

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

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

Dust Control

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

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.

- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the responsibility of the PE/QEP's responsible for certifying this remedial plan.

Other Nuisances

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

Rodent control will be provided during Site clearing and grubbing and during the remedial program, as necessary, to prevent nuisances.

APPENDIX 5

CONSTRUCTION HEALTH AND SAFETY PLAN

CONSTRUCTION HEALTH & SAFETY PLAN

**710 GRAND STREET
BROOKLYN, NEW YORK**

Prepared For:

Jaroah Inc.
404 Broadway, Suite 304
New York, NY 10013

Prepared By:



ATHENICA ENVIRONMENTAL
SERVICES, INC.
Environmental Engineering Consultants

45-09 Greenpoint Avenue, Queens, NY 11104
ekarayel@athenica.com
(718) 784-7490

TABLE OF CONTENTS

1.0	GLOSSARY OF TERMS.....	1-5
2.0	INTRODUCTION.....	2-7
2.1	SITE HISTORY.....	2-8
2.2	SCOPE OF WORK.....	2-8
3.0	KEY PERSONNEL	3-10
3.1	PROJECT MANAGER (PM).....	3-10
3.2	CONSTRUCTION SUPERINTENDENT (CS).....	3-11
3.3	HEALTH AND SAFETY OFFICER (HSO).....	3-11
3.4	PROJECT SAFETY MANAGER (PSM).....	3-12
3.5	EMPLOYEE SAFETY RESPONSIBILITIES.....	3-12
4.0	ACTIVITY HAZARD ANALYSIS.....	4-1
4.1	CHEMICAL HAZARDS.....	4-1
4.2	PHYSICAL HAZARDS.....	4-3
4.3	ENVIRONMENTAL HAZARDS.....	4-3
4.3.1	Heat Stress.....	4-4
4.3.2	Exposure to Cold.....	4-6
	4.3.2.1 Cold Stress Conditions and Symptoms.....	4-6
	4.3.2.2 Monitoring and Preventative Actions.....	4-8
4.3.3	Biological Hazards.....	4-11
4.3.4	Noise.....	4-11
4.4	VEHICLE AND HEAVY EQUIPMENT SAFETY.....	4-11
4.4.1	Vehicle Safety.....	4-11
4.4.2	Heavy Equipment Safety.....	4-11
4.5	TASK-SPECIFIC ACTIVITY HAZARD ANALYSES (AHA).....	4-12
5.0	WORK AND SUPPORT AREAS.....	5-1
5.1	EXCLUSION ZONE (EZ).....	5-1
5.2	CONTAMINATION - REDUCTION ZONE (CRZ).....	5-1
5.3	SUPPORT ZONE (SZ).....	5-1
5.4	SITE CONTROL LOG.....	5-1
5.5	GENERAL.....	5-2
6.0	PROTECTIVE EQUIPMENT	6-1
6.1	ANTICIPATED PROTECTION LEVELS.....	6-1
6.2	PROTECTION LEVEL DESCRIPTIONS.....	6-2
	6.2.1 Level D.....	6-2
7.0	DECONTAMINATION PROCEDURES.....	7-1
7.1	PERSONNEL DECONTAMINATION.....	7-1

7.1.1	Suspected Contamination.....	7-1
7.1.2	Personal Hygiene	7-1
7.2	EQUIPMENT DECONTAMINATION	7-1
7.3	DISPOSAL OF WASTES	7-2
7.4	DUST /EROSION CONTROL.....	7-2
8.0	AIR MONITORING.....	8-1
8.1	WORK AREA AIR MONITORING.....	8-1
8.1.1	Direct Reading Air Monitoring.....	8-1
8.1.2	Instrumentation	8-1
8.1.3	Use And Maintenance Of Survey Equipment.....	8-1
8.1.4	Air Monitoring Recordkeeping.....	8-2
8.1.5	Action Levels	8-2
9.0	EMERGENCY RESPONSE AND CONTINGENCY PLAN (ERCP)	9-4
9.1	PRE-EMERGENCY PLANNING.....	9-4
9.2	EMERGENCY RECOGNITION AND PREVENTION.....	9-5
9.3	EMERGENCY TELEPHONE NUMBERS	9-5
9.4	PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS.....	9-8
9.4.1	Responsibilities and Duties.....	9-8
9.4.2	On-Site Emergency Coordinator Duties	9-9
9.5	SAFE DISTANCES AND PLACES OF REFUGE.....	9-10
9.6	EVACUATION ROUTES AND PROCEDURES	9-11
9.6.1	Evacuation Signals and Routes.....	9-11
9.6.2	Evacuation Procedures.....	9-11
9.7	EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT	9-12
9.7.1	Notification Procedures	9-13
9.7.2	Procedure for Containing/Collecting Spills.....	9-13
9.7.3	Emergency Response Equipment	9-14
9.7.4	Emergency Spill Response Clean-Up Materials and Equipment	9-15
9.8	EMERGENCY CONTINGENCY PLAN	9-15
9.9	MEDICAL EMERGENCY CONTINGENCY MEASURES	9-15
9.9.1	Response	9-15
9.9.2	Notification	9-17
9.10	FIRE CONTINGENCY MEASURES.....	9-17
9.10.1	Response	9-18
9.11	HAZARDOUS WEATHER CONTINGENCY MEASURES	9-18
9.11.1	Response	9-18
9.11.2	Notification	9-18
9.12	SPILL/RELEASE CONTINGENCY MEASURES.....	9-19
9.12.1	Response	9-19

10.0	TRAINING REQUIREMENTS	10-1
10.1	SITE-SPECIFIC TRAINING ORIENTATION	10-1
10.2	DAILY SAFETY MEETINGS.....	10-1

FIGURES

FIGURE 2-1	SITE LOCATION MAP
FIGURE 9-1	DIRECTIONS AND HOSPITAL ROUTE MAP

TABLES

TABLE 4-1	CHEMICAL DATA
TABLE 4.3.2A	COLD WEATHER INJURIES
TABLE 4.3.2B	COLD STRESS PREVENTION
TABLE 4.3.2C	COLD WEATHER CLOTHING REQUIREMENTS
TABLE 4.3.2D	COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS EQUIVALENT TEMPERATURE
TABLE 4.3.2E	TLV WORK/WARMUP SCHEDULE FOR FOUR-HOUR SHIFT
TABLE 9-1	EMERGENCY TELEPHONE NUMBERS

APPENDICES

APPENDIX A	HEALTH AND SAFETY PLAN CERTIFICATION
	HEALTH & SAFETY PLAN ACKNOWLEDGEMENT
	NOTICE OF SAFETY VIOLATION
	PRE-JOB SAFETY CHECKLIST
APPENDIX B	HEALTH AND SAFETY PLAN AMENDMENTS AND DOCUMENTATION FORM
APPENDIX C	SAFETY MEETING FORMS
	AIR MONITORING FORMS

1.0 *GLOSSARY OF TERMS*

AHA:	Activity Hazard Analysis
BZ:	Breathing Zone
C:	Ceiling Limit
CNS	Central Nervous System
CTPV:	Coal tar pitch volatiles
CRZ:	Contamination Reduction Zone
CSP:	Construction Superintendent
CZ:	Clean Zone
dBA:	Decibels Adjusted
ERCP:	Emergency Response and Contingency Plan
EZ:	Exclusion Zone
FDNY:	New York City Fire Department
GI:	Gastrointestinal
HSO:	Health & Safety Officer
IP:	Ionization Potential
Mg/m ³ :	Micrograms per cubic meter
MPH:	Miles per hour

NIOSH:	National Institute for Occupational Safety and Health
OSHA:	Occupational Health and Safety Administration
Owner:	Crescent Owners, LLC
PAHs:	Poly aromatic hydrocarbons
PEL:	Permissible Exposure Limit
PM:	Project Manager
PPE:	Personal Protective Equipment
PPM:	Parts per Million
PSM:	Project Safety Manager
SHASP:	Site-Specific Health and Safety Plan:
SITE:	710 Grand Street, Brooklyn, NY
STEL:	Short-term exposure limit (15 minutes)
SZ:	Support Zone
TLV:	Threshold Limit Value
TWA:	Time-weighted average (8 hours)
USEPA:	United States Environmental Protection Agency
VP:	Vapor Pressure at approximately 68 F° in mm Hg

2.0 *INTRODUCTION*

The Site is located at 710 Grand Street, Brooklyn, New York (the “Site”). The Site is approximately 2,500-square feet. Currently, The Site contains one 2-story building with partial basement and one 1-story building with no basement. A map of the site boundary is shown in Figure 2-1.

This Site-Specific Construction Health and Safety Plan (CHASP) has been developed by Athenica Environmental Services (“Athenica”) for specific activities associated with the construction of a new residential building at the Site.

This CHASP documents the policies and procedures which will protect workers from potential chemical hazards associated with the soils and/or fill at this Site. Other plans and documentation will establish the policies and procedures that will protect workers from potential physical hazards associated with traditional demolition and construction activities at the Site.

This plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise during the disturbance of soil/fill at the Site. This CHASP was prepared by the general contractor’s Environmental Consultant, Athenica Environmental Services (Athenica). The general contractor and its subcontractors will be required to utilize this plan when working at the site.

Although this plan focuses on the specific work activities planned for this site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations may arise that require modifications from the original plan. Therefore, Athenica only makes representations or warranties as to the adequacy of this CHASP for currently anticipated activities and conditions. This flexibility allows modification by authorized personnel, e.g. Project Manager, Project Safety Manager. All changes to procedures in this plan will be documented in writing using the form provided in Appendix B.

Refusal or failure to comply with this CHASP or violation of any safety procedures by field personnel and/or subcontractors may result in immediate removal from the Site following consultation with the Project Safety Manager (PSM) and the Project Manager (PM).

It is expected that this CHASP will be implemented at a multi-employer work site. Information and references within this plan shall in no way imply or alleviate any other Site contractor from their responsibility to comply with any and all applicable State or Federal statutes or regulations regarding the completion of this project. It is the responsibility of each employer to communicate and coordinate work planning so as to prevent their work activities from becoming

a potential hazard to other workers at the project site. Failure to communicate will not alter an employer's responsibilities or obligations for any resulting injuries to their employees.

2.1 SITE HISTORY

A Phase I Environmental Site Assessment was performed by Merritt Environmental Consulting Corp in March 2016. Historical Sanborn maps show the Site was developed from at least 1920. The Site was shown as developed with various commercial uses with residential tenants since the year 1905. Historical City Directories list residential and commercial occupants from 1928-2013.

Summary of work performed under the Remedial Investigation is as follows:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Performed a Ground Penetrating Radar (GPR) survey prior to the RI;
3. Installed three (3) soil borings across the Site, and collected six (6) soil samples for chemical analysis from the soil borings to evaluate soil quality;
4. Installed three (3) soil vapor probes across the Site and collected three (3) soil vapor samples for chemical analysis.
5. Installed one (1) temporary groundwater monitoring well after the geotechnical investigation and collect one (1) groundwater sample for chemical analysis.

2.2 SCOPE OF WORK

Although the construction of the new residential and commercial mix use building involves many different activities, only those activities associated with the disturbance and handling of urban fill are addressed in this CHASP.

The principal tasks covered in this HASP include the following:

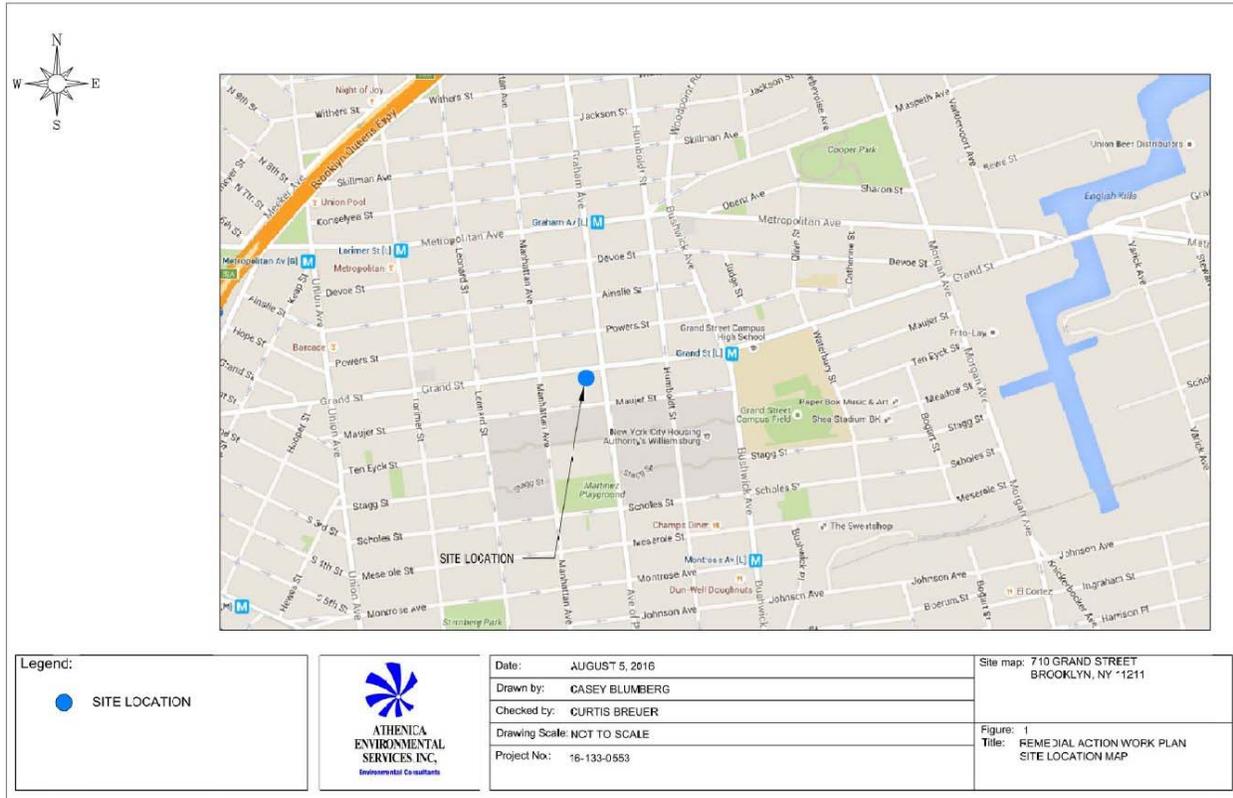
- Mobilization/demobilization,
- Sheeting and shoring,
- Excavation of urban fill and/or soil,
- Loading of urban fill into trucks for disposal,

- Installation of footings for new building, and
- Heavy equipment decontamination

Activity Hazard Analyses for these tasks are provided in Section 4.5.

This CHASP has been prepared and approved for the above scope of work. In order to remain approved, any changes to the scope of work will require amendment of the plan. The Site Health and Safety Amendment Documentation form (Appendix B) will be used for all revisions/amendments to this plan.

**FIGURE 2-1
SITE LOCATION MAP**



3.0 *KEY PERSONNEL*

The Project Manager (PM), Construction Superintendent (CS), Health & Safety Officer (HSO), and Project Safety Manager (PSM) all share responsibilities for formulating and enforcing health and safety requirements, and assuring that the CHASP is implemented as intended. This section outlines the responsibilities for each of these positions. Responsibilities for site employees and subcontractor personnel are also outlined in this section. The General Contractor and/or other authorized personnel may also be involved and identified in future CHASP documents, as appropriate.

3.1 PROJECT MANAGER (PM)

The PM has the overall responsibility for the project and to assure that the requirements of the contract are attained in a manner consistent with the CHASP requirements. The PM will coordinate with the CS and the HSO to assure that the work is completed in a manner consistent with the HASP. The PM will supervise the allocation of resources and staffing to implement specific aspects of the HASP and may delegate authority to expedite and facilitate any

application of the program. This role will be filled by the General Contractor or Excavation Subcontractor. OER will be notified in the future who the PM will be for this project.

3.2 CONSTRUCTION SUPERINTENDENT (CS)

The CS is responsible for field implementation of the CHASP and Site Emergency Response and Contingency Plan and will act as the HSO in his/her absence. This role will be filled by the general contractor or primary subcontractor. OER will be notified in the future who the CS will be for this project.

Specific responsibilities for the CS include:

- Ensures that the CHASP is implemented;
- Ensures that field work is scheduled with adequate equipment to complete the job safely;
- Enforces site health and safety rules;
- Ensures that proper personal protective equipment is utilized;
- Ensures that the PSM is informed of project changes which require modifications to the CHASP;
- Ensures that the procedure modifications are implemented;
- Investigates incidents;
- Conducts the daily site safety briefing;
- Reports to PSM to provide summaries of field operations and progress; and
- Acts as Emergency Coordinator.

3.3 HEALTH AND SAFETY OFFICER (HSO)

The HSO is authorized to administer the HASP. The HSO's primary operational responsibilities include personal and environmental monitoring, selection and monitoring of personal protective equipment, assignment of protection levels, coordination/review of work permits and observation of work activities. The HSO is authorized to stop work when an imminent health or safety risk exists. The HSO will review the essential safety requirements with all on-site personnel and will facilitate the daily safety meetings. OER will be notified in the future who the HSO will be for this project.

Specific responsibilities for HSO performance include:

- Monitoring workers for signs of stress, such as cold stress, heat stress, and fatigue. Reevaluating site conditions on an on-going basis.
- Coordinating protective measures including engineering controls, work practices and personal protective equipment.

- Assisting the CS in the preparation, presentation and documentation of daily safety meetings.
- Conducting and preparing reports of daily safety inspections of work processes, site conditions, and equipment conditions. Discussing any necessary corrective actions with the CS and reviewing new procedures.
- Initiating revisions of the CHASP as necessary for new tasks or modifications of existing operations and submitting to the Project Safety Manager for approval (see Appendix B).
- Performing air monitoring as required by the CHASP.
- Assisting the PM and CS in incident investigations.
- Preparing permits for special operations, e.g., hot work, confined spaces, line breaking, etc.
- Maintaining site safety records.
- Conducting inspections of all fire extinguishers, first-aid kits and eye washes on a regular basis.
- Informing subcontractors of the elements of the CHASP.

3.4 PROJECT SAFETY MANAGER (PSM)

The Project Safety Manager (PSM) is responsible for developing/reviewing the CHASP and ensuring that it is complete and accurate. The PSM provides technical and administrative support and will be available for consultation when required. If necessary, the PSM will direct modifications (Appendix B) to specific aspects of the HASP to adjust for on-site changes that affect safety. The HSO will coordinate with the PSM on necessary modifications to the HASP. The PSM may make periodic visits to the project site to review implementation of this HASP. This role is role will be filled by the General Contractor's representative.

3.5 EMPLOYEE SAFETY RESPONSIBILITIES

Each employee is responsible for personal safety as well as the safety of others in the work area and is expected to participate fully in the site safety and health program. Employees will use all equipment provided in a safe and responsible manner as directed by the CS. Employees shall report any hazardous conditions which might affect the health and safety of site personnel to the CS and/or HSO. To protect the health and safety of all personnel, site employees that knowingly disregard safety policies/procedures will be subject to removal.

Specific requirements include:

- Reading the CHASP and any amendments prior to the start of on-site work.

- Providing documentation of any applicable medical surveillance and training to the CS/HSO prior to the start of work.
- Attending the pre-entry briefing prior to beginning on-site work as well as other scheduled safety meetings.
- Asking any questions or reporting concerns regarding the content of the CHASP to the CS/HSO prior to the start of work.
- Reporting all potentially dangerous situations, incidents, injuries, and illnesses, regardless of their severity, to the CS/HSO.
- Complying with the requirements of this CHASP and the requests of the CS/HSO.

4.0 *ACTIVITY HAZARD ANALYSIS*

This section outlines the potential chemical and physical hazards which workers may be exposed to during work on this project. The assessment of chemical hazards in this section is based on the results provided on the Remedial Investigation by Athenica for the Site. This is a representative list of contaminants that have been identified through extensive soil and groundwater testing at this site.

4.1 **CHEMICAL HAZARDS**

Based on review of the Remedial Investigation, workers at this Site have the potential to be exposed to chemicals in soil including several VOCs and SVOCs, mainly consisting of polycyclic aromatic hydrocarbons (PAHs), were detected above their respective MDLs; however none of them were above their respective Unrestricted Use SCOs. Only one (1) pesticide; endrin aldehyde, was detected in one of the soil samples; however it does not have a defined cleanup objective. No PCBs were detected in any of the soil samples. Several metals were detected above their respective MDLs; however none of them were detected above their respective Unrestricted Use SCOs. All listed compounds will be considered as potential contaminants of concern.

Potential exposure to the contaminants of concern may occur during intrusive soil activities or where direct contact with the contaminated soil takes place. Metals and PAHs are primarily inhalation hazards and exposure can be minimized with simple dust control measures. A summary of hazard information is listed in Table 4-1

**TABLE 4-1
CHEMICAL DATA**

COMPOUND	ACGIH TLV	OSHA PEL	ROUTE OF EXPOSURE	SYMPTOMS OF EXPOSURE	TARGET ORGANS	PHYSICAL DATA
PAHs	0.2 mg/m ³	0.2 mg/m ³	Inhalation Ingestion Skin contact	Headache, nausea, vomiting, and diaphoresis	Genitourinary system, Hematopoietic system, GI Tract, Respiratory system, eyes, skin	Liquid, gas and solid, can be combustible
Lead	0.05 mg/m ³	0.05 mg/m ³	Inhalation Ingestion Skin contact	Weakness, lassitude, insomnia; facial pallor; eye irritation, anorexia, low-weight, malnutrition; constipation; abdominal pain; colic; hypertension, anemia; gingival lead line; tremors; paralysis of wrist, ankles; encephalopathy; neuropathy	GI Tract, CNS, kidneys, blood, gingival tissue	Noncombustible Solid

Abbreviations

ACGIH = American Conference of Governmental Industrial Hygienists

C = Ceiling Unit

CNS = Central Nervous System

CVS = Cardiovascular System

GI = Gastrointestinal

TLV = Threshold Level Value

mg/m³ = milligrams per cubic meter

OSHA = Occupational Safety and Health Administration

PNS = Peripheral Nervous System

ppm = parts per million

PEL – Permissible Exposure Level

The following general symptoms may indicate exposure to a hazardous material. Personnel will be removed from the work site and provided immediate medical attention should any of the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

4.2 PHYSICAL HAZARDS

To minimize physical hazards, standard safety protocols will be followed at all times. Failure to follow safety protocols may result in removal of the employee from the site. All personnel shall be familiar with the physical hazards presented by each of the tasks they perform. Task specific hazard analyses are provided in Section 4.5. These hazard analyses shall be reviewed prior to beginning each task and periodically throughout the task. It must be noted that these activity hazard analyses are general in nature. It is the responsibility of the CS to revise and adapt them as necessary to reflect site-specific conditions.

The CS and HSO will observe the general work practices of each crew member and enforce safe procedures. Work areas will be inspected by the crew leaders, CS and HSO. All hazards will be corrected in a timely manner. A variety of physical hazards may be encountered during work activities at this site. Activity Hazard Analyses will be developed for each principal activity and will identify all major hazards to which employees may be exposed. Hard hats, safety glasses, and steel-toe safety boots are required in all work areas of the site. Site-specific hazards and all necessary precautions will be discussed at the daily safety meetings. The General Contractor's Safety Manual will be maintained at the project site as a reference document.

4.3 ENVIRONMENTAL HAZARDS

Environmental factors such as weather, wild animals, insects, and irritant plants may pose a hazard when performing outdoor tasks. The HSO and CS will take necessary actions to alleviate these hazards should they arise.

4.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. Heat stress disorders include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke

This information will be reviewed during safety meetings. Workers are encouraged to increase consumption of water and electrolyte-containing beverages, e.g. Gatorade™. Heat stress can be prevented by assuring an adequate work/rest schedule. Guidelines are presented below.

The CS and HSO will determine the specific work-rest schedule based on project specific conditions. In addition, workers are encouraged to take rests and report symptoms whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the HSO and CS. The CS and HSO will determine the specific work-rest schedule based on project specific conditions. In addition, workers are encouraged to take rests and report symptoms whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased based on worker recommendation to the HSO and CS.

Heat stress can be prevented by assuring an adequate work/rest schedule and adequate fluid consumption. A guide for work-rest schedules for various protection levels (defined in Section 5.0) is given below. The number of hours before a work-rest period is based on experience with similar work. The time periods should be considered maximum. It must also be remembered that individual physical variability and differences in physical work activities may require revisions to site plans. This table should be used as a guide. Professional judgment (evaluation of individual work load, ambient weather conditions, worker acclimatization and PPE levels) of the CS and HSO is necessary to assure a fully protective plan to prevent heat stress disorders.

GUIDELINES FOR WORK-REST PERIODS FOR VARIOUS PROTECTION LEVELS (A-D) NUMBER OF HOURS BEFORE REST PERIOD				
Temperature	Level D	Level C	Level B	Level A
90+ F*	2.0	1.5	1.0	0.5
87.5 F	2.5	2.0	1.5	1.0
82.5 F	3.0	2.5	2.0	1.5
77.5 F	3.5	3.0	2.5	1.5
72.5	4.0	3.5	2.5	1.5

**Work above 100 F will be reviewed with the Project Safety Manager to determine specific requirements.*

Alternately the work/rest schedule can be calculated based on heat stress monitoring results. Monitoring consists of taking the radial pulse of a worker for 30 seconds immediately after exiting the work area. The frequency of monitoring is described below.

If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by 1/3 and keep the rest period the same. If the heart rate still exceeds 110 beats per minute at the next rest period, increase the following rest period by 1/3. The initial rest period should be at least 5 minutes.

Body temperature, measured orally or through the ear canal, may also be monitored to assess heat stress. Workers should not be permitted to continue work when their body temperature exceeds 100.4 F (38C). Monitoring should be conducted at the beginning of each break period as noted above.

Monitoring for heat stress will begin when the ambient temperature reaches or exceeds 72.5 degrees Fahrenheit when wearing chemical protective clothing (Level C, B, A), or 80 degrees Fahrenheit for site activities performed with no chemical protective clothing (Level D). Monitoring should include pulse rate, weight loss, oral/ or ear canal temperature, signs and symptoms of heat stress and fluid intake.

An additional measure that can be employed to minimize heat stress is through the utilization of Heat Stress Relief Stations. A Heat Stress Relief Station (HSRS) is a location inside the exclusion zone where workers can partially remove their personal protective equipment, rest and take in fluids. Since the HSRS is established inside the exclusion zone, it is imperative that its use be closely monitored and controlled to ensure that workers do not ingest contamination during use.

The following is a detailed description of the Heat Stress Relief Station:

- Location- The HSRS should be located in an area of the exclusion zone where it will be predominantly upwind of site activities. This can typically be adjacent to the contamination reduction zone.
- Delineation- The HSRS must be separated from the exclusion zone by temporary fencing and must be labeled as “Heat Stress Relief Station”.
- Elements- The HSRS contains several elements:
 - A tarp or tent for shade;
 - A bench or chairs for workers to sit on;
 - A wash station;
 - A table for fluids, cups and clean personal protective equipment (PPE); and
 - A trash can for contaminated PPE.
- Set-Up- Proper set up of the HSRS is imperative to its successful use.

- In the Support Zone, prepare the water cooler with ice and water or Gatorade.
 - The person bringing the items to the HSRS must don the appropriate PPE required for the Exclusion Zone.
 - Bring the following items to the HSRS:
 - Cooler;
 - Clean disposable cups;
 - Disinfectant wipes;
 - A clean trash bag;
 - Surgical gloves; and
 - Duct tape.
 - Ensure the wash station has clean water and paper towels for drying hands/face.
- Procedure for Use- In order for the HSRS to be effective, it must be properly used. It is imperative that workers decontaminate properly before drinking fluids so that ingestion of site contaminants does not take place. The following are the steps to properly use the HSRS:
 - Upon entering the HSRS:
 - If wearing a Tyvek, remove duct tape on wrists and unzip and tie around waist;
 - Remove your outer gloves and surgical gloves; set outer gloves aside and throw surgical gloves into trash;
 - Wash hands and/or face at Wash Station;
 - Use disinfectant wipe on hands;
 - Get drink and/or rest on bench/chair.
 - Before re-entering the Exclusion Zone:
 - Dispose of cups in trash;
 - Put on a clean pair of surgical gloves;
 - If wearing a Tyvek, pull up and rezip;
 - Re-apply duct tape to wrists;
 - Put on outer gloves.
 - Monitoring- The CS and HSO are both responsible for monitoring the use of the Heat Stress Relief Station. The HSO should review the procedures for use of the HSRS with the workers before its use begins to ensure that everyone understands the parameters for proper use.

4.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite. Several forms of cold stress as well as preventative measures are described in this section of the HASP.

4.3.2.1 Cold Stress Conditions and Symptoms

Typical cold stress conditions are included in the tables below, including symptoms and first aid precautions. If cold stress conditions develop, professional medical attention will be sought.

**TABLE 4.3.2A
COLD WEATHER INJURIES**

Cause	Symptoms	First Aid
Frostbite		
Freezing of tissue, normally due to exposure below 32°F	Numbness in affected area. Tingling, blistered, swollen or tender areas. Pale, yellowish waxy-looking skin.	Warm affected area with direct body heat. Consult with medical personnel ASAP. Do not thaw frozen area if treatment will be delayed. Do not massage or rub affected area. Do not wet area or rub with snow or ice.
Chilblain		
Repeated exposure of bare skin for prolonged periods to temperatures 20° to 60°F (for those not acclimated to cold weather).	Swollen, red skin. Tender, hot skin, usually accompanied by itching.	Warm affected area with direct body heat. Do not massage or rub. Do not wet area or rub with snow or ice. Do not expose affected area to open fire, stove or any other intense heat source.
Immersion Foot (Trench Foot)		
Prolonged exposure of the feet to wet conditions at temperatures between 32° to 50°F. Inactivity and damp socks (or tightly laced boots that impair circulation) speed onset and severity.	Cold numb feet may progress to hot with shooting pains. Swelling redness and bleeding.	Rewarm feet by exposing them to warm air. Evacuate victim to a medical facility. Do not massage, rub, moisten or expose affected area to extreme heat source.
Dehydration		
Depletion of body fluids.	Dizziness. Weakness.	Replace lost water. Water should be sipped not gulped. Get medical treatment.
Hypothermia		
Prolonged cold exposure and body heat loss. May occur at well above freezing, especially when a person is immersed in water.	Lack of shivering. Drowsiness, mental slowness, lack of coordination. Can progress to unconsciousness, irregular heartbeat and death.	Strip off clothing and wrap victim in blankets or a sleeping bag. Get victim to a heated location and medical treatment as soon as possible.

In cold weather, the potential for frostbite exists, especially in body extremities. Personnel will be instructed to pay particular attention to hands, feet, and any exposed skin when dressing. Personnel will be advised to obtain more clothing if they begin to experience loss of sensation due to cold exposure.

4.3.2.2 Monitoring and Preventative Actions

Typical cold stress monitoring procedures are included in the tables below, including temperatures to initiate monitoring, protective clothing uses and administrative practices to prevent or reduce the potential for cold stress related injury/illness. For weather conditions below -43 °C or -45 °F with no wind and/or similar conditions (see Work/Warm-up Table) all work will cease.

TABLE 4.3.2B COLD STRESS PREVENTION*		
	Temperature	Preventative Action
1	<61°F	Use thermometer to measure ambient temperature.
2	<40°F	Cold weather protective clothing available; check core body temperature at breaks using oral or ear canal thermometer. Maintain core body temperature above 96.8°F to avoid hypothermia.
3	<30°F	Record ambient temperature and wind speed every 4 hours; compare to wind chill chart when below 19.4°F.
4	<19°F	Provide and use heated warming shelters for work breaks and when cold stress symptoms appear.
5	<10°F	Constant observation of workers, i.e. “buddy system”; rest in heated shelters (see work-rest schedule); dry clothing available for change-out; acclimate new workers.
6	<0°F/ >5 mph winds	Obtain medical certification for workers subject to hypothermia risk.

* Based on “2009 ACGIH Threshold Limit Values... for Physical Agents.”

Note: refer to wind-chill and work-warmup charts in Table 4.3.2E

TABLE 4.3.2C COLD WEATHER CLOTHING REQUIREMENTS	
1	If wind chill is a factor at a work location, the cooling effect of the wind shall be reduced by shielding the work area or providing employees an outer windbreak layer garment.
2	Extremities, ears, toes, and nose shall be protected from extreme cold by protective clothing.
3	Employees performing light work whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water.
4	Employees performing moderate to heavy work whose clothing may become wet shall wear an outer layer of clothing which is impermeable to water.
5	Outer garments must provide for ventilation to prevent wetting of inner clothing by sweat, or if not possible, a heated shelter for warming/drying clothing, or a change of clothing, shall be provided prior to returning to work in a cold environment.

Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

Employees will be instructed to use heated shelters on site, at regular intervals, depending upon the severity of ambient temperatures. Symptoms of cold stress, including heavy shivering, excessive fatigue, drowsiness, irritability, or euphoria necessitate immediate return to the shelter.

TABLE 4.3.2D COOLING POWER OF WIND ON EXPOSED FLESH EXPRESSED AS EQUIVALENT TEMPERATURE (under calm conditions)*												
Actual Temperature Reading (F)												
Estimated Wind Speed (in MPH)	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 of freezing of exposed flesh within one minute.				Great Danger Flesh may freeze within 30 seconds.				
Trench foot and immersion foot may occur at any point on this chart.												

*Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA. (Shaded area) Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36 C (98.6 F) per cold stress TLV.

TABLE 4.3.2E TLV WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT*											
Air Temperature – Sunny Sky		No Noticeable Wind		5 mph wind		10 mph wind		15 mph wind		20 mph wind	
C (appx.)	F (appx.)	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	Normal	1	Normal	1	75 min	2	55 min	3	40 min	4
-29 to -31	-20 to -24	Normal	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					

**TABLE 4.3.2E
TLV WORK/WARM-UP SCHEDULE FOR FOUR-HOUR SHIFT***

Air Temperature – Sunny Sky	No Noticeable Wind		5 mph wind		10 mph wind		15 mph wind		20 mph wind	
	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
C (appx.) F (appx.)										
< -43 < -45	Non-emergency work should cease		cease							

* Adapted from Occupational Health and Safety Division, Saskatchewan Department of Labor

4.3.3 Biological Hazards

The contractor will be required to monitor and control insects, rodents, and other pests identified on site. Standing water will not be allowed on-site, in an effort to control insects. Pest control procedures used by the contractor will include bait, trap, spray, or other means to abate pest problems that develop on site during disruption activities.

4.3.4 Noise

Hearing protection is required for workers operating or working near heavy equipment, where the noise level is greater than 85 dbA (Time Weighted Average) as well as personnel working around heavy equipment. The HSO will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement. The provisions for noise protection for workers are presented in other safety-related documents for the Site.

4.4 VEHICLE AND HEAVY EQUIPMENT SAFETY

4.4.1 Vehicle Safety

Motor vehicle incidents are the number one cause of occupational fatalities, accounting for one in three deaths. The safety provisions for vehicle use at the Site are presented in other safety-related documents for the Site.

4.4.2 Heavy Equipment Safety

The use of backhoes, front-end loaders, etc. for excavation and other material handling equipment will present various physical hazards. The safety provisions for heavy equipment use at the Site are presented on other safety-related documents for the Site.

4.5 TASK-SPECIFIC ACTIVITY HAZARD ANALYSES (AHA)

This section of the HASP provides a breakdown of the hazards and control measures for each principal task. These Activity Hazard Analyses (AHAs) are general in nature and must be made project specific by the Construction Superintendent prior to each task. The AHAs will be field checked by the supervisor on an ongoing basis and revised as necessary. All revisions will be communicated to the work crew.

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Mobilization/ Demobilization		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Mobilization and demobilization of equipment site tools, personnel. 2. Set up/remove staging and decontamination areas.	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Manual lifting/ material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Temperature extremes	<ul style="list-style-type: none"> • Drink plenty of fluids • Train personnel of signs/symptoms of cold/heat stress • Monitor air temperatures when extreme weather conditions are present • Stay in visual and verbal contact with your buddy
	Hand tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions.
	Biological hazards	<ul style="list-style-type: none"> • Be alert to the presence of biological hazards • Wear insect repellent • CS/HSO should be aware of on-site personnel with allergic reactions in insect bites and stings.

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Trenching/Excavation		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Trenching and excavation. 2. Install shoring/ sheeting protective system.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 5.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 7.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Cave-in	<ul style="list-style-type: none"> • Do not allow entry into the trench unless approved protective system is in place and has been inspected by the competent person. • Follow OSHA excavation regulations • Place ladder or entry device every 25 feet of lateral travel
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Slips/trips/falls	<ul style="list-style-type: none"> • Clear walkways, work areas of equipment and tools • Mark, identify, or barricade other obstructions • Use barricades or fencing for trenches greater than 6 feet deep • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Electrical hazards	<ul style="list-style-type: none"> • Maintain 10 foot minimum clearance to any overhead power lines • Call for Utility mark out prior to digging

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Trenching/Excavation		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Trenching and excavation. 2. Install shoring/sheeting protective system.	Hand and power tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed on tools and cords • Ensure all guards are in place • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions
	Noise	<ul style="list-style-type: none"> • Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear hearing protective devices. • Disposable ear plugs or other hearing protection required while around noisy equipment.
	Manual lifting/ Material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Temperature extremes.	<ul style="list-style-type: none"> • Drink plenty of fluids: • Train personnel of signs/symptoms of cold/heat stress; • Monitor air temperatures when extreme weather conditions are present; • Stay in visual and verbal contact with your buddy; and • Use procedures in Sections 3.3.1 and 3.3.2

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Loading of Trucks		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Load trucks with contaminated soils. 2. Cover and clean trucks.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 6.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 8.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Manual lifting/ material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Temperature extremes	<ul style="list-style-type: none"> • Drink plenty of fluids • Train personnel of signs/symptoms of cold/heat stress • Monitor air temperatures when extreme weather conditions are present • Stay in visual and verbal contact with your buddy • Use procedures in Sections 4.3.1 and 4.3.2
	Noise	<ul style="list-style-type: none"> • Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear hearing protective devices. • Disposable ear plugs or other hearing protection required while around noisy equipment.

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Installation of Footers		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Build forms. 2. Pour concrete. 3. Remove forms.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 6.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 8.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Concrete pumper	<ul style="list-style-type: none"> • Make sure nozzle man has eye contact with pump truck operator. • Ensure steady control over nozzle
	Splashing concrete	<ul style="list-style-type: none"> • Ensure eye protection is worn and other PPE as required by Section 6.1 • A portable eyewash will be maintained in the work area
	Falls from heights	<ul style="list-style-type: none"> • Fall protection is required over 6 feet when removing forms • Use PFAS where needed • OSHA required training before use of PFAS, scaffold or lift • Competent person inspects PFAS and scaffold
	Sharp Objects	<ul style="list-style-type: none"> • Wear cut resistant work gloves when the possibility of lacerations or other injury may be caused by sharp edges or objects being handled • Maintain all hand and power tools in a safe condition • Keep guards in place during use

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Installation of Footers		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Build forms. 2. Pour concrete. 3. Remove forms.	Hand and power tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed on tools and cords • Ensure all guards are in place • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions
	Noise	<ul style="list-style-type: none"> • Hearing protection mandatory at or above 85 dBA. • Instruct personnel how to properly wear hearing protective devices. • Disposable ear plugs or other hearing protection required while around noisy equipment.
	Manual lifting/ material handling	<ul style="list-style-type: none"> • Observe proper lifting techniques • Obey sensible lifting limits (50 lb. maximum per person manual lifting) • Use mechanical lifting equipment (hand carts, trucks) to move large, awkward loads
	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Temperature extremes.	<ul style="list-style-type: none"> • Drink plenty of fluids: • Train personnel of signs/symptoms of cold/heat stress; • Monitor air temperatures when extreme weather conditions are present; • Stay in visual and verbal contact with your buddy; and • Use procedures in Sections 4.3.1 and 4.3.2

Project Identification 710 Grand Street	Location Brooklyn, NY	Estimated Dates October 2016 – October 2017
Phase of Work Heavy Equipment Decontamination		Analysis Approved by Spiro Dongaris
TASKS	HAZARDS	CONTROL MEASURES
1. Pressure wash or steam clean heavy equipment and vehicles.	Chemical hazards	<ul style="list-style-type: none"> • Wear appropriate PPE per Section 6.1 • Practice contamination avoidance • Conduct real-time air monitoring per section 8.1.1 • Follow proper decontamination procedures • Wash hands/face before eating, drinking, smoking
	Struck By/ Against Motor Vehicles/ Operating Equipment	<ul style="list-style-type: none"> • Wear reflective warning vests when exposed to vehicular traffic • Isolate potential equipment swing areas • Make eye contact with vehicle operators before approaching/crossing high traffic areas • Understand and review hand signals • Use a spotter to direct equipment movement in high traffic areas • Audible back-up alarms on equipment • Operator inspects equipment daily for safety defects, including the braking system
	Steam/heat/splashing	<ul style="list-style-type: none"> • Wear face shield + safety glasses • Stay out of splash radius to minimize exposure • Do not direct steam/spray at anyone
	Hand and power tool usage	<ul style="list-style-type: none"> • Daily inspections will be performed on tools and cords • Ensure all guards are in place • Remove broken or damaged tools from service • Use the tool for its intended purpose • Use in accordance with manufacturer instructions
	Slips/trips/falls	<ul style="list-style-type: none"> • Maintain alertness to slip/trip/fall hazards • Maintain good housekeeping • Walk, do not run • Wear footwear with soles that grip
	Temperature extremes	<ul style="list-style-type: none"> • Drink plenty of fluids • Train personnel of signs/symptoms of cold/heat stress • Monitor air temperatures when extreme weather conditions are present • Stay in visual and verbal contact with your buddy • Use procedures in Sections 4.3.1 and 4.3.2

5.0 *WORK AND SUPPORT AREAS*

To prevent migration of contamination from personnel and equipment, work areas will be clearly specified as designated below prior to beginning operations. Each work area will be clearly identified using signs or physical barriers.

5.1 **EXCLUSION ZONE (EZ)**

The EZ is the area suspected of contamination and presents the greatest potential for worker exposure. Personnel entering the area must wear the mandated level of protection for that area. In certain instances, different levels of protection will be required depending on the tasks and monitoring performed within that zone. The EZ for this project will include the excavation areas, any stockpiling/staging areas, and areas where disturbance of urban fill is likely occurring.

5.2 **CONTAMINATION - REDUCTION ZONE (CRZ)**

The CRZ or transition zone will be established between the EZ and support zone (SZ). In this area, personnel will begin the sequential decontamination process required to exit the EZ. To prevent off-site migration of contamination and for personnel accountability, all personnel will enter and exit the EZ through the CRZ. The CRZ for this project will be the access/egress routes to/from the EZ and the personnel and equipment decontamination stations.

5.3 **SUPPORT ZONE (SZ)**

The SZ serves as a clean, control area. Operational support facilities are located within the SZ. Normal work clothing and support equipment are appropriate in this zone. Contaminated equipment or clothing will not be allowed in the SZ. There will be a clearly marked controlled access point from the SZ into the CRZ and EZ that is monitored closely by the HSO and the CS to ensure proper safety protocols are followed. The SZ will be any office areas/trailers and the parking and visitor access ways to the project site.

5.4 **SITE CONTROL LOG**

A log of all personnel visiting, entering or working on the site shall be maintained in the main office location. The log will record the date, name, company or agency, and time entering or exiting the site.

No visitor will be allowed in the EZ without showing proof of training and compliance with applicable medical monitoring requirements. Visitors will supply their own protective equipment, including hard hat, boots and respiratory equipment, if required. Visitors will attend a site orientation given by the HSO and sign the HASP.

5.5 GENERAL

The following items are requirements to protect the health and safety of workers and will be discussed in the safety briefing prior to initiating work on the site.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination is prohibited in the EZ and CRZs.
- Hands and face must be washed upon leaving the EZ and before eating, drinking, chewing gum or tobacco and smoking or other activities which may result in ingestion of contamination.
- During site operations, each worker will consider himself as a safety backup to his partner. All personnel will be aware of dangerous situations that may develop.
- Visual contact will be maintained between workers on site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any site personnel, who do not comply with safety policy, as established by the HSO or the CS, will be dismissed from the site.
- Proper decontamination procedures must be followed before leaving the site.
- All site workers are authorized to stop work if they observe unsafe actions of workers or other unsafe conditions on site which may cause an imminent danger.
- All workers and visitors must sign in and out of the site.

6.0 *PROTECTIVE EQUIPMENT*

This section specifies the levels of personal protective equipment (PPE) which are or may be required for each principal activity performed at this site. All site personnel must be trained in the use of all PPE utilized.

6.1 ANTICIPATED PROTECTION LEVELS

The following protection levels have been established for the site work activities based on site information concerning the levels of contaminants and the scope of work. Results of site air monitoring and visual inspection of the work activities may indicate the need for changes in final PPE level(s). Changes in the initial PPE Levels prescribed in the Table below require completion of the HASP amendment form in Appendix B.

Task	Initial PPE Level	Upgrade/ Downgrade PPE Level	Skin Protection	Respiratory Protection	Other PPE
General Support Zone Activities	Level D	—	Generally none	None	Hard-hat, Steel-toe work boots, safety glasses, safety vests. Leather work gloves as needed. Hearing protection when >85 dBA.
Mobilization/ Demobilization	Level D	—	Generally none	None	Hard-hat, Steel-toe work boots, safety glasses, safety vests. Leather work gloves as needed. Hearing protection when >85 dBA.
Excavation, Loading of Trucks with Contaminated Soil/Fill, Equipment Decontamination	Level D		Generally none,	Initial: None (See Section 7)	Hard-hat, Steel-toe work boots, safety glasses, leather work gloves for material handling, hearing protection >85 dBA

6.2 PROTECTION LEVEL DESCRIPTIONS

This section lists the minimum requirements for each protection level. Modification to these requirements may have been noted in the Table shown above.

6.2.1 *Level D*

Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work clothing as prescribed by weather
- Leather work gloves when material handling

7.0 ***DECONTAMINATION PROCEDURES***

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work site.

7.1 **PERSONNEL DECONTAMINATION**

Decontamination procedures will ensure that material which workers may have contacted in the EZ does not result in personal exposure and is not spread to clean areas of the site. This sequence describes the general decontamination procedures for Level D. The specific stages will vary depending on the site, the task, the protection level, etc. Dry decontamination may be used if there is insufficient space to support a full decontamination station as delineated with the steps below and approved by the HSO. The CS and the HSO will ensure that the decontamination procedures are adequate.

Level D Decontamination

1. Go to end of EZ
2. Cross into CRZ
3. Wash face and hands

7.1.1 ***Suspected Contamination***

Any employee suspected of sustaining skin contact with chemical materials will first use the emergency shower. Following a thorough drenching, the worker will proceed to the decontamination area. Here the worker will remove clothing and don clean clothing. Medical attention will be provided as determined by the degree of injury.

7.1.2 ***Personal Hygiene***

Personnel will wash hands, arms, neck and face, following decontamination and before any eating, smoking, or drinking.

7.2 **EQUIPMENT DECONTAMINATION**

Heavy equipment and other vehicles operated within the EZ will be decontaminated before being removed from the site. Workers operating the equipment/vehicles will move the equipment to a gross decontamination location near the exit of the EZ. Following gross decontamination the equipment/vehicle will be moved to the decontamination pad. Equipment decontamination will be performed on the pad until the equipment is visually clean. Following decontamination

activities equipment will be inspected by the HSO or CS prior to leaving the site. Once the equipment is inspected it will be removed from the site.

Heavy Equipment / Vehicle Decontamination

1. Equipment operator will move the heavy equipment / vehicle to a position near the EZ / CRZ interchange
2. Worker will use manual equipment (shovel, track spade) to remove gross contamination from tracks, bucket, dump box, and vehicle undercarriage (as required)
3. Following removal of gross decontamination equipment will be moved onto the decontamination pad and pressure washed / steam cleaned until equipment / vehicle is visually clean.
4. Equipment / vehicle decontaminated for removal from the site will be moved to a clean area for the HSO / CS inspection.
5. Once the equipment / vehicle is inspected and approved it will be removed from the site. Vehicles that fail inspection will be returned to the decontamination pad for further cleaning and re-inspected.

7.3 DISPOSAL OF WASTES

Wastes will be disposed according to applicable Local, State and Federal regulations.

7.4 DUST /EROSION CONTROL

The contractor will control dust and implement erosion control measures to be protective of nearby ecologically sensitive areas and sensitive receptors.

8.0 ***AIR MONITORING***

Air monitoring will be conducted in order to characterize personnel exposures and fugitive emissions from site contaminants. Principal contaminants of concern are listed in Section 4.0 of this HASP. The target compounds selected for air monitoring purposes for this site include particulates. Results of air monitoring will be used to ensure the proper selection of protective clothing and equipment, including respiratory protection, to protect on-site personnel and off-site receptors from exposure to unacceptable levels of site contaminants. Descriptions of air monitoring strategies, procedures and equipment are provided below. Modification of this plan, including additional monitoring, may be considered as judged necessary by the PSM, in conjunction with the HSO.

8.1 **WORK AREA AIR MONITORING**

Work area air monitoring will include direct reading methods and personal exposure monitoring. Air monitoring will be conducted during soil/waste excavation, transportation, relocation and/or staging, and any other intrusive activities.

8.1.1 ***Direct Reading Air Monitoring***

During active sifting operations, direct reading air monitoring will be performed to determine the potential for worker exposure to airborne hazards. A summary of air monitoring information is provided in section 8.1.5. Real-time air samples will be taken at least four times each 8-hour worker shift in the workers breathing zone (BZ).

8.1.2 ***Instrumentation***

The following is a description of the air monitoring equipment to be used:

- MIE PDR-1000 Personal DataRAM, Dust trak or equivalent unit for real-time measuring particulates.

8.1.3 ***Use And Maintenance Of Survey Equipment***

All personnel using field survey equipment must have training in its operation, limitations, and maintenance. Maintenance and internal or electronic calibration will be performed in accordance with manufacturer recommendations by individuals familiar with the devices before their use on site. Repairs, maintenance, and internal or electronic calibration of these devices will be recorded in an equipment maintenance logbook. The equipment maintenance logbook for each instrument will be kept in that instrument's case. For rented monitoring equipment, repairs and

maintenance will be conducted by the rental company. Daily calibration records will be documented on a log sheet found in Appendix D.

Air monitoring equipment will be calibrated before work begins. Only basic maintenance (such as changing batteries) will be performed by on-site personnel. Any additional maintenance or repairs will be performed by a trained service technician.

8.1.4 Air Monitoring Recordkeeping

The HSO will ensure that all air-monitoring data is recorded on a data sheet found in Appendix D. The PSM may periodically review this data.

8.1.5 Action Levels

During soil/waste excavation, transportation, relocation and/or staging or any intrusive activities, direct reading air monitoring will be performed in the EZ to determine exposure to workers. A summary of air monitoring information is provided in the table below.

Monitoring Device	Monitoring Location/ Personnel	Monitoring Frequency	Action Level	Action
pDr-1000 (Dust)	Soil excavation areas/laborers, technicians, equipment operators	Four times every 8-hour shift during soil disturbance activities	<5.0 mg/m ³ * ≥5.0 mg/m ³ *	Level D Stop work; notify PSM Implement dust suppression measures and resume work after dust levels are below action level

* Sustained levels in the breathing zone for 5 minutes

As indicated by the below calculations, the action level for PAHs and the metals of concern was selecting based on the OSHA PEL for respirable dust, which was found to be significantly lower than the calculated actions levels for PAHs and copper, lead, mercury, and zinc based on utilizing the highest concentrations of these contaminants found in soil.

- OSHA PEL for respirable dust: 5 mg/m³,
- Maximum concentration of PAHs found in soil is 1.34 ppm or 0.000134%.
 - 5.0 mg/m³ multiplied by 0.000134% = 0.000067 mg/m³
 - OSHA PEL for PAHs is 0.2 mg/m³
- Maximum concentration of Lead found in soil is 80 ppm or 0.008%.
 - 5.0 mg/m³ multiplied by 0.008% = 0.04 mg/m³

- OSHA PEL for PAHs is 0.05 mg/m^3
- Maximum concentration of Zinc found in soil is 113 ppm or 0.0113%.
 - 5.0 mg/m^3 multiplied by 0.0113% = 0.0565 mg/m^3
 - OSHA PEL for Zinc not established mg/m^3

9.0 *EMERGENCY RESPONSE AND CONTINGENCY PLAN (ERCP)*

9.1 PRE-EMERGENCY PLANNING

Prior to engaging in construction/remediation activities at the site, the CS will plan for possible emergency situations and have adequate supplies and manpower to respond. In addition, site personnel will be briefed on proper emergency response procedures during the site orientation.

The following situations would warrant implementation of the emergency plan:

Fire/Explosion	<ul style="list-style-type: none">• The potential for human injury exists.• Toxic fumes or vapors are released.• The fire could spread on site or off site and possibly ignite other flammable materials or cause heat-induced explosions.• The use of water and/or chemical fire suppressants could result in contaminated run-off.• An imminent danger of explosion exists.
Spill or Release of Hazardous Materials	<ul style="list-style-type: none">• The spill could result in the release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.• The spill could cause the release of toxic liquids or fumes in sufficient quantities or in a manner that is hazardous to or could endanger human health.
Natural Disaster	<ul style="list-style-type: none">• A rain storm exceeds the flash flood level.• The facility is in a projected tornado path or a tornado has damaged facility property.• Severe wind gusts are forecasted or have occurred and have caused damage to the facility.
Medical Emergency	<ul style="list-style-type: none">• Overexposure to hazardous materials.• Trauma injuries (broken bones, severe lacerations/bleeding, burns).• Eye/skin contact with hazardous materials.• Medical Conditions e.g., loss of consciousness, heat stress (heat stroke), heart attack, respiratory failure, allergic reaction.

The following measures will be taken to assure the availability of adequate equipment and manpower resources:

- Sufficient equipment and materials will be kept on site and dedicated for emergencies only. The inventory will be replenished after each use.

- It will be the responsibility of the CS/HSO to brief on site personnel on anticipated hazards at the site. The CS/HSO shall also be responsible for anticipating and requesting equipment that will be needed for response activities.

Communications will be established prior to commencement of any activities at the remediation site. Communication will be established so that all responders on site have availability to all pertinent information to allow them to conduct their activities in a safe and healthful manner. A telephone will be available to summon assistance in an emergency.

Primary communication with local responders in the event of an emergency will be accomplished using commercial telephone lines.

9.2 EMERGENCY RECOGNITION AND PREVENTION

Because unrecognized hazards may result in emergency incidents, it will be the responsibility of the CS and Health & Safety Officer (HSO), through daily site inspections and employee feedback to recognize and identify hazards that are found at the site. These may include:

Chemical Hazards	<ul style="list-style-type: none"> • Materials at the site • Materials brought to the site
Physical Hazards	<ul style="list-style-type: none"> • Fire/explosion • Slip/trip/fall • Electrocution • Confined space • IDLH atmospheres • Excessive noise
Mechanical Hazards	<ul style="list-style-type: none"> • Heavy equipment • Stored energy system • Pinch points • Electrical equipment • Vehicle traffic
Environmental Hazards	<ul style="list-style-type: none"> • Electrical Storms • High winds • Heavy Rain/Snow • Heat Stress • Vehicle traffic

9.3 EMERGENCY TELEPHONE NUMBERS

Emergency telephone numbers can be found in Table 9-1. The emergency numbers will be posted in all site trailers.

Figure 9-1 is the Hospital Route Map with directions to the nearest hospital. Only in a non-emergency situation are personnel to be transported to the hospital by site representatives.

FIGURE 9-1

**TABLE 9-1
EMERGENCY TELEPHONE NUMBERS**

Emergency Medical Service.....	911
<u>Police</u> : New York City Police Department (NYPD).....	911
<u>Hospital</u> : NYC Health + Hospitals Woodhull	(718) 963-8000
<u>Fire</u> : New York City Fire Department (FDNY).....	911
New York City Office of Emergency Management.....	911
National Response Center.....	(800) 424-8802
Poison Control Center.....	(800) 222-1222
Chemtrec.....	(800) 262-8200
Center for Disease Control.....	(800) 311-3435
USEPA(Region II).....	(212) 637-5000
NYSDEC Emergency Spill Response.....	(800) 457-7362

DIRECTIONS AND HOSPITAL ROUTE MAP

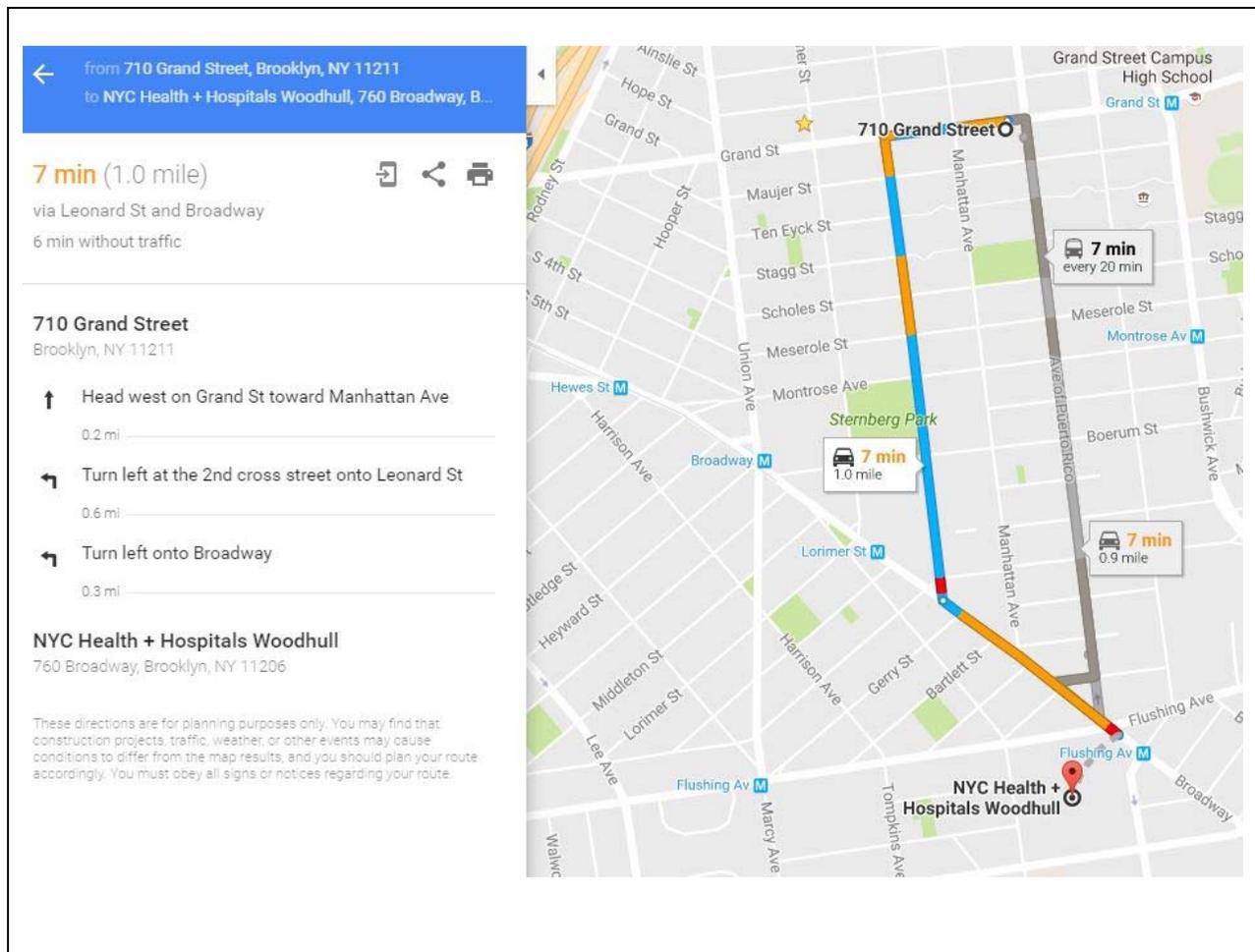
FIGURE 1 – HOSPITAL ROUTE PLAN

Site Location: 710 Grand Street, Brooklyn NY 11211

Hospital Location: NYC Health + Hospitals Woodhull, 760 Broadway, Brooklyn, NY 11206

Information Line: (718) 963-8000

Steps	Maneuvers	Dist.
1	Head west on Grand Street towards Manhattan Ave	0.2 mi
2	Turn left on to Leonard Avenue	0.6 mi
3	Turn Left onto Broadway	0.3 mi
	Follow signs to the Emergency Room	
Total Est. Time: 6 minutes		Total Est. Distance: 1.0 miles



Once a hazard has been recognized, the CS and/or the HSO will take immediate action to prevent the hazard from becoming an emergency. This may be accomplished by the following:

- Daily safety meeting
- Task-specific training prior to commencement of activity
- Personal Protective Equipment (PPE) selection/use
- Written and approved permits for hot work, confined space
- Trenching/shoring procedure
- Air monitoring
- Following all standard operating procedures

9.4 PERSONNEL ROLES, LINES OF AUTHORITY, AND COMMUNICATIONS

This section of the ERCP describes the various roles, responsibilities, and communication procedures that will be followed by personnel involved in emergency responses.

The primary emergency coordinator for this site is the CS. In the event an emergency occurs and the emergency coordinator is not on site, the HSO will serve as the emergency coordinator until the CS arrives. The emergency coordinator will determine the nature of the emergency and take appropriate action as defined by this ERCP.

The emergency coordinator will implement the ERCP immediately as required. The decision to implement the plan will depend upon whether the actual incident threatens human health or the environment.

Immediately after being notified of an emergency incident, the emergency coordinator or his designee will evaluate the situation to determine the appropriate action.

9.4.1 *Responsibilities and Duties*

This section describes the responsibilities and duties assigned to the emergency coordinator.

It is recognized that the structure of the "Incident Command System" will change as additional response organizations are added. Personnel will follow procedures as directed by the fire department, LEPC, State and Federal Agencies as required.

9.4.2 *On-Site Emergency Coordinator Duties*

The on-site emergency coordinator is responsible for implementing and directing the emergency procedures. All emergency personnel and their communications will be coordinated through the emergency coordinator. Specific duties are as follows:

- Identify the source and character of the incident, type and quantity of any release. Assess possible hazards to human health or the environment that may result directly from the problem or its control.
- Discontinue operations in the vicinity of the incident if necessary to ensure that fires, explosions, or spills do not recur or spread to other parts of the site. While operations are dormant, monitor for leaks, pressure build-up, gas generation, or ruptures in valves, pipes, or other equipment, where safe and appropriate.
- Notify the Client Representative and local Emergency Response Teams if their help is necessary to control the incident. Table 9-1 provides telephone numbers for emergency assistance.
- Direct on-site personnel to control the incident until, if necessary, outside help arrives. Specifically: Ensure that the building or area where the incident occurred and the surrounding area are evacuated and shut off possible ignition sources, if safe and appropriate. The Emergency Response Coordinator is responsible for directing site personnel such that they avoid the area of the incident and leave emergency control procedures unobstructed.
- If fire or explosion is involved, notify local Fire Department.
- Have protected personnel, in appropriate PPE, on standby for rescue.

If the incident may threaten human health or the environment outside of the site, the emergency coordinator should immediately determine whether evacuation of area outside of the site may be necessary and, if so, notify the Police Department and the Office of Emergency Management.

When required, notify the National Response Center. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility.

The emergency telephone number for the National Response Center is 800-424-8802.

If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained.
- Containers of waste are removed or isolated from the immediate site of the emergency.
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided.
- Ensure that no waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed.
- Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.
- Notify the USEPA Regional Administrator that cleanup procedures have been completed and that all emergency equipment is fit for its intended use before resuming operations in the affected area of the facility. The USEPA Regional Administrator's telephone number is included in the Emergency Contacts.
- Record date, time, details of the incident, and submit a written report to the USEPA Regional Administrator. The report is due to the USEPA within 15 days of the incident.

9.5 SAFE DISTANCES AND PLACES OF REFUGE

The emergency coordinator for all activities will be the CS. No single recommendation can be made for evacuation or safe distances because of the wide variety of emergencies which could occur. Safe distances can only be determined at the time of an emergency based on a combination of site and incident-specific criteria. However, the following measures are established to serve as general guidelines.

In the event of minor hazardous materials releases (small spills of low toxicity), workers in the affected area will report initially to the contamination reduction zone. Small spills or leaks (generally less than 55 gallons) will require initial evacuation of at least 50 feet in all directions to allow for cleanup and to prevent exposure. After initial assessment of the extent of the release and potential hazards, the emergency coordinator or his designee will determine the specific boundaries for evacuation. Appropriate steps such as caution tape, rope, traffic cones, barricades, or personal monitors will be used to secure the boundaries.

If a major incident may threaten the health or safety of the surrounding community, the public will be informed and, if necessary, evacuated from the area. The emergency coordinator, or his designee will inform the proper agencies in the event that this is necessary. Telephone numbers are listed in Table 9-1.

Places of refuge will be established prior to the commencement of activities. These areas must be identified for the following incidents:

- Chemical release
- Fire/explosion
- Power loss
- Medical emergency
- Hazardous weather

In general, evacuation will be made to the site entrance, unless the emergency coordinator determines otherwise. It is the responsibility of the emergency coordinator to determine when it is necessary to evacuate personnel to off-site locations.

In the event of an emergency evacuation, all the employees will gather at the entrance to the site until a head count establishes that all are present and accounted for. No one is to leave the site without notifying the emergency coordinator.

9.6 EVACUATION ROUTES AND PROCEDURES

All emergencies require prompt and deliberate action. In the event of an emergency, it will be necessary to follow an established set of procedures. Such established procedures will be followed as closely as possible. However, in specific emergency situations, the emergency coordinator may deviate from the procedures to provide a more effective plan for bringing the situation under control. The emergency coordinator is responsible for determining which situations require site evacuation.

9.6.1 *Evacuation Signals and Routes*

Two-way radio communication or equivalent will be used to notify employees of the necessity to evacuate an area or building involved in a release/spill of a hazardous material. As necessary, each crew supervisor will have a two-way radio. Total site evacuation will be initiated only by the emergency coordinator, however, in his absence, decision to preserve the health and safety of employees will take precedence.

9.6.2 *Evacuation Procedures*

In the event evacuation is necessary the following actions will be taken:

- The emergency signal will be activated.

- No further entry of visitors, contractors, or trucks will be permitted. Vehicle traffic within the site will cease in order to allow safe exit of personnel and movement of emergency equipment.
- Shut off all machinery if safe to do so.
- ALL on-site personnel, visitors, and contractors in the support zone will assemble at the entrance to the site for a head count and await further instruction from the emergency coordinator.
- ALL persons in the exclusion zone and contamination reduction zone will be accounted for by their immediate crew leaders. Leaders will determine the safest exits for employees and will also choose an alternate exit if the first choice is inaccessible.
- During exit, the crew leader should try to keep the group together. Immediately upon exit, the crew leader will account for all employees in his crew.
- Upon completion of the head count, the crew leader will provide the information to the emergency coordinator.
- Contract personnel and visitors will also be accounted for.
- The names of emergency response team members involved will be reported to the emergency coordinator.
- A final tally of persons will be made by the emergency coordinator or designee. No attempt to find persons not accounted for will involve endangering lives of site personnel by re-entry into emergency areas.
- In all questions of accountability, immediate crew leaders will be held responsible for those persons reporting to them. Visitors will be the responsibility of those employees they are seeing. Contractors and truck drivers are the responsibility of the Construction Superintendent.
- Personnel will be assigned by the emergency coordinator to be available at the main gate to direct and brief emergency responders.
- Re-entry into the site will be made only after clearance is given by the emergency coordinator. At his direction, a signal or other notification will be given for re-entry into the facility.

9.7 EMERGENCY SPILL RESPONSE PROCEDURES AND EQUIPMENT

In the event of an emergency involving a hazardous material spill or release, the following general procedures will be used for rapid and safe response and control of the situation. Emergency contacts found in Table 9-1 provide a quick reference guide to follow in the event of a major spill.

9.7.1 Notification Procedures

If an employee discovers a chemical spill or process upset resulting in a vapor or material release, he or she will immediately notify the on-site emergency coordinator.

On-site Emergency Coordinator will obtain information pertaining to the following:

- The material spilled or released.
- Location of the release or spillage of hazardous material.
- An estimate of quantity released and the rate at which it is being released.
- The direction in which the spill, vapor or smoke release is heading.
- Any injuries involved.
- Fire and/or explosion or possibility of these events.
- The area and materials involved and the intensity of the fire or explosion.

This information will help the on-site emergency coordinator to assess the magnitude and potential seriousness of the spill or release.

9.7.2 Procedure for Containing/Collecting Spills

The initial response to any spill or discharge will be to protect human health and safety, and then the environment. Identification, containment, treatment, and disposal assessment will be the secondary response.

If for some reason a chemical spill is not contained within a dike or sump area, an area of isolation will be established around the spill. The size of the area will generally depend on the size of the spill and the materials involved. If the spill is large (greater than 55 gallons) and involves a tank or a pipeline rupture, an initial isolation of at least 100 ft. in all directions will be used. Small spills (less than or equal to 55 gallons) or leaks from a tank or pipe will require evacuation of at least 50 ft. in all directions to allow cleanup and repair and to prevent exposure. When any spill occurs, only those persons involved in overseeing or performing emergency operations will be allowed within the designated hazard area. If possible the area will be roped or otherwise blocked off.

If the spill results in the formation of a toxic vapor cloud (by reaction with surrounding materials or by outbreak of fire) and its release (due to high vapor pressures under ambient conditions), further evacuation will be necessary. In general an area at least 500 feet wide and 1,000 feet long will be evacuated downwind if volatile materials are spilled. (Consult the DOT Emergency Response Guide for isolation distances for listed hazardous materials.)

If an incident may threaten the health or safety of the surrounding community, the public will be informed and possibly evacuated from the area. The on-site emergency coordinator will inform the proper agencies in the event this is necessary. (Refer to Table 9-1)

As called for in regulations developed under the Comprehensive Environmental Response Compensation Liability Act of 1980 (Superfund), a spill of a pound or more of any hazardous material for which a reportable quantity has not been established and which is listed under the Solid Waste Disposal Act, Clean Air Act, Clean Water Act, or TSCA shall be reported.

Clean up personnel will take the following measures:

- Make sure all unnecessary persons are removed from the hazard area.
- Put on protective clothing and equipment.
- If a flammable material is involved, remove all ignition sources, and use spark and explosion proof equipment for recovery of material.
- Remove all surrounding materials that could be especially reactive with materials in the waste. Determine the major components in the waste at the time of the spill.
- If wastes reach a storm sewer, try to dam the outfall by using sand, earth, sandbags, etc. If this is done, pump this material out into a temporary holding tank or drums as soon as possible.
- Place all small quantities of recovered liquid wastes (55 gallons or less) and contaminated soil into drums for incineration or removal to an approved disposal site.
- Spray the spill area with foam, if available, if volatile emissions may occur.
- Apply appropriate spill control media (e.g. clay, sand, lime, etc.) to absorb discharged liquids.

For large spills, establish diking around leading edge of spill using booms, sand, clay or other appropriate material. If possible, use diaphragm pump to transfer discharged liquid to drums or holding tank.

9.7.3 *Emergency Response Equipment*

The following equipment will be staged in the support zone and throughout the site, as needed, to provide for safety and first aid during emergency responses.

- ABC-type fire extinguisher
- First-aid kit, industrial size
- Portable eyewash

9.7.4 *Emergency Spill Response Clean-Up Materials and Equipment*

A sufficient supply of appropriate emergency response clean-up and personal protective equipment will be available as needed.

The materials listed below may be kept on site for spill control, depending on the types of hazardous materials present on site. The majority of this material will be located in the support zone, in a supply trailer or storage area. Small amounts, as necessary, will be placed on pallets and located in the active work areas.

- Sand or clay to solidify/absorb liquid spills.

- * **Note: All contaminated soils, absorbent materials, solvents and other materials resulting from the clean-up of spilled or discharged substances shall be properly stored, labeled, and disposed of off-site.**

9.8 EMERGENCY CONTINGENCY PLAN

This section of the ERCP details the contingency measures the Site Contractor will take to prepare for and respond to fires, explosions, spills and releases of hazardous materials, hazardous weather, and medical emergencies.

9.9 MEDICAL EMERGENCY CONTINGENCY MEASURES

The procedures listed below will be used to respond to medical emergencies. A minimum of one First-Aid/CPR trained personnel should be available on site.

9.9.1 *Response*

The nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident. The work crew supervisor will be summoned.

The work crew supervisor will immediately make radio contact with the on-site emergency coordinator to alert him of a medical emergency situation. The supervisor will advise the following information:

- Location of the victim at the work site
- Nature of the emergency
- Whether the victim is conscious
- Specific conditions contributing to the emergency, if known

The Emergency Coordinator will notify the Health & Safety Officer. The following actions will then be taken depending on the severity of the incident:

- *Life-Threatening Incident* – If an apparent life-threatening condition exists, the crew supervisor will inform the emergency coordinator by radio, and the local Emergency Response Services (EMS) will be immediately called. An on-site person will be appointed who will meet the EMS and have him/her quickly taken to the victim. Any injury within the EZ will be evacuated by personnel to a clean area for treatment by EMS personnel. No one will be able to enter the EZ without showing proof of training, medical surveillance and site orientation.
- *Non Life-Threatening Incident* – If it is determined that no threat to life is present, the Health & Safety Officer will direct the injured person through decontamination procedures (see below) appropriate to the nature of the illness or accident. Appropriate first aid or medical attention will then be administered.
- * **Note: The area surrounding an accident site must not be disturbed until the scene has been cleared by the Health & Safety Officer.**

Any personnel requiring emergency medical attention will be evacuated from exclusion and contamination reduction zones if doing so would not endanger the life of the injured person or otherwise aggravate the injury. Personnel will not enter the area to attempt a rescue if their own lives would be threatened. The decision whether or not to decontaminate a victim prior to evacuation is based on the type and severity of the illness or injury and the nature of the contaminant. For some emergency victims, immediate decontamination may be an essential part of life-saving first aid. For others, decontamination may aggravate the injury or delay life-saving first aid. Decontamination will be performed if it does not interfere with essential treatment.

If decontamination can be performed, observe the following procedures:

- Wash external clothing and cut it away.

If decontamination cannot be performed, observe the following procedures:

- Wrap the victim in blankets or plastic to reduce contamination of other personnel.
- Alert emergency and off-site medical personnel to potential contamination, instruct them about specific decontamination procedures.
- Send site personnel familiar with the incident and chemical safety information, e.g. MSDS, with the affected person.

All injuries, no matter how small, will be reported to the HSO or the CS. An accident/injury/illness report will be completely and properly filled out and submitted to the Corporate Health and Safety Manager.

A list of emergency telephone numbers is given in Table 9.1.

9.9.2 Notification

The following personnel/agencies will be notified in the event of a medical emergency:

- Local Fire Department or EMS
- On-site Emergency Coordinator
- Workers in the affected areas
- Client Representative

9.10 FIRE CONTINGENCY MEASURES

Because flammable/combustible materials are present at this site, fire is an ever-present hazard. Safety personnel are not trained professional firefighters. Therefore, if there is any doubt that a fire can be quickly contained and extinguished, personnel will notify the emergency coordinator by radio and vacate the structure or area. The emergency coordinator will immediately notify the local Fire Department.

The following procedures will be used to prevent the possibility of fires and resulting injuries:

- Sources of ignition will be kept away from where flammable materials are handled or stored.
- The air will be monitored for explosivity before and during hot work and periodically where flammable materials are present. Hot work permits will be required for all such work.
- "No smoking" signs will be conspicuously posted in areas where flammable materials are present.
- Fire extinguishers will be placed in all areas where a fire hazard may exist.
- Before workers begin operations in an area the foreman will give instruction on egress procedures and assembly points. Egress routes will be posted in work areas and exit points clearly marked.

9.10.1 *Response*

The following procedures will be used in the event of a fire:

- Anyone who sees a fire will notify their supervisor who will then contact the Emergency Coordinator by radio. The emergency coordinator will activate the emergency air horns and contact the local Fire Department.
- When the emergency siren sounds, workers will disconnect electrical equipment in use (if possible) and proceed to the nearest fire exit.
- Work crews will be comprised of pairs of workers (buddy system) who join each other immediately after hearing the fire alarm and remain together throughout the emergency. Workers will assemble at a predetermined rally point for a head count.
- When a small fire has been extinguished by a worker, the emergency coordinator will be notified.

9.11 HAZARDOUS WEATHER CONTINGENCY MEASURES

Operations outside will not be started or continued when the following hazardous weather conditions are present:

- Lightning
- Heavy Rains/Snow
- High Winds

9.11.1 *Response*

- Excavation/soil stock piles will be covered with plastic liner.
- All equipment will be shut down and secured to prevent damage.
- Personnel will be moved to safe refuge. The emergency coordinator will determine when it is necessary to evacuate personnel to off-site locations and will coordinate efforts with fire, police and other agencies.

9.11.2 *Notification*

The emergency coordinator will be responsible for assessing hazardous weather conditions and notifying personnel of specific contingency measures. Notifications will include:

- Site workers and subcontractors
- Client Representative
- Local Emergency Management Agency

9.12 SPILL/RELEASE CONTINGENCY MEASURES

In the event of release or spill of a hazardous material the following measures will be taken:

9.12.1 *Response*

Any person observing a spill or release will act to remove and/or protect injured/contaminated persons from any life-threatening situation. First aid and/or decontamination procedures will be implemented as appropriate.

First aid will be administered to injured/contaminated personnel. All personnel will act to prevent any unsuspecting persons from coming in contact with spilled materials by alerting other nearby persons. Attempt to stop the spill at the source, if possible. Without taking unnecessary risks, personnel will attempt to stop the spill at the source. This may involve activities such as uprighting a drum, closing a valve or temporarily sealing a hole with a plug.

The emergency coordinator will be notified of the spill/release, including information on material spilled, quantity, personnel injuries and immediate life threatening hazards. Air monitoring will be implemented by the emergency coordinator and HSO to determine the potential impact on the surrounding community. Notification procedures will be followed to inform on-site personnel and off-site agencies. The emergency coordinator will make a rapid assessment of the spill/release and direct confinement, containment and control measures. Depending upon the nature of the spill, measures may include:

- Construction of a temporary containment berm utilizing on-site clay absorbent earth
- Digging a sump, installing a polyethylene liner and
- Diverting the spill material into the sump placing drums under the leak to collect the spilling material before it flows over the ground
- Transferring the material from its original container to another container

The emergency coordinator will notify the Client Representative of the spill and steps taken to institute clean-up. Emergency response personnel will clean-up all spills following the spill clean-up plan developed by the emergency coordinator. Supplies necessary to clean up a spill may include, but are not limited to:

- Shovel, rake
- Clay absorbent
- Polyethylene liner
- Personal safety equipment
- Steel drums

- Pumps and miscellaneous hand tools

The emergency coordinator will inspect the spill site to determine that the spill has been cleaned up to the satisfaction of the Client Representative. If necessary, soil, water or air samples may be taken and analyzed to demonstrate the effectiveness of the spill clean-up effort. The emergency coordinator will determine the cause of the spill and determine remedial steps to ensure that recurrence is prevented. The emergency coordinator will review the cause with the Client Representative and obtain his concurrence with the remedial action plan.

10.0 TRAINING REQUIREMENTS

All personnel entering the exclusion zone will be trained in the provisions of this site safety plan and be required to sign the CHASP Acknowledgment form in Appendix A.

10.1 SITE-SPECIFIC TRAINING ORIENTATION

Outlines of the orientation for site workers, subcontractor personnel and visitors are presented below:

CONTRACTOR WORKERS	VISITORS
<ul style="list-style-type: none"> • HASP sign off • Sign in/out procedures • Site background/characterization • Chain of command • Rules and regulations • Hours of work • Absences • Personal Protective Equipment/respirator fit test (if applicable) • Emergency Information <ul style="list-style-type: none"> • Emergency signal • Gathering point • Responsibilities/roles • Emergency phone numbers • Site Control/Work Zones • Hazards/AHAs • Air Monitoring Program • Forms, site-specific • Incident Reporting • Lead Awareness (Appendix C) 	<ul style="list-style-type: none"> • Sign in/out procedures • Site Background/Characterization • Review of Site map • Work Zones in progress • Emergency plan/signals • Training/medical requirements • Zones/areas open to visitors

10.2 DAILY SAFETY MEETINGS

A safety meeting will be conducted by the CS and the HSO before each shift begins. Topics to be discussed include task hazards and protective measures (physical, chemical, environmental); emergency procedures; PPE levels and other relevant safety topics. Meetings will be documented in a log book or specific form.

APPENDIX A

- *HEALTH AND SAFETY PLAN CERTIFICATION*
- *GENERAL/SUB-CONTRACTOR HEALTH & SAFETY PLAN ACKNOWLEDGEMENT*
- *NOTICE OF SAFETY VIOLATION*
- *PRE-JOB SAFETY CHECKLIST*

NOTICE OF SAFETY VIOLATION

TO: _____ (Name of Contractor/Subcontractor Supervisor)
FROM: _____ (Name of Owner/Contractor's Project Manager)
DATE: _____
SUBJECT: *Notice of Safety Violations*

The following Safety Violations were observed at the Name of Site/Project on Date.

1. _____
2. _____
3. _____
4. _____
5. _____

You are requested to take the necessary corrective action to alleviate these safety violations by _____ (Date).

Please notify _____ (Name of Contractor/Subcontractor's Project Manager) when you have completed this corrective action.

Thank you in advance for your cooperation in this effort.

CONTRACTOR/SUBCONTRACTOR
PRE-JOB SAFETY CHECKLIST

JOB:

SUBCONTRACTOR:

LOCATION:

PROJECT NO.

		<u>Yes</u>	<u>No</u>
1.	Standard emergency signals fully understood?	<input type="checkbox"/>	<input type="checkbox"/>
2.	Subcontractor responsibility in time of emergency understood?	<input type="checkbox"/>	<input type="checkbox"/>
3.	Fire and ambulance telephone numbers known?	<input type="checkbox"/>	<input type="checkbox"/>
4.	Areas for possible evacuation designated?	<input type="checkbox"/>	<input type="checkbox"/>
5.	Special safety rules for the plant or area known?	<input type="checkbox"/>	<input type="checkbox"/>
6.	Nature of Chemical or special hazards for area reviewed with safety officer?	<input type="checkbox"/>	<input type="checkbox"/>
7.	Special safety equipment for the area of job known?	<input type="checkbox"/>	<input type="checkbox"/>
8.	Safety shower and eye wash locations known?	<input type="checkbox"/>	<input type="checkbox"/>
9.	Smoking area designated?	<input type="checkbox"/>	<input type="checkbox"/>
10.	Have you been advised of potential hazards, protective Measures and availability of hazard information? e.g. Health & Safety Plan	<input type="checkbox"/>	<input type="checkbox"/>
11.	Do you understand you are required to provide your employees with the information in (10) above?	<input type="checkbox"/>	<input type="checkbox"/>
12.	Have you provided MSDSs to Athenica for any hazardous material you intend to bring on site?	<input type="checkbox"/>	<input type="checkbox"/>
13.	Have you submitted training/medical certification records?	<input type="checkbox"/>	<input type="checkbox"/>
14.	Are your subcontractors aware of the above rules?	<input type="checkbox"/>	<input type="checkbox"/>

Remarks: (Explain all No Answers) _____

Subcontractor's Supervisor

Date

Contractor's Project Manager

Date

Contractor's Project Supervisor

Date

Health & Safety Officer

Date

APPENDIX B

HEALTH AND SAFETY PLAN AMENDMENTS AND DOCUMENTATION FORM

**SITE-SPECIFIC HEALTH AND SAFETY PLAN
AMENDMENT DOCUMENTATION**

Project Name: _____ **Project No.:** _____

Amendment No.: _____ **Date:** _____

Amendment Page(s): _____ **Revises:** _____ **Section(s):** _____

Task(s) Amendment Affects:* _____

**(Attach new/revised Job Safety Analyses)*

Reason For Amendment:

Amendment: *(Attach separate sheet(s) as necessary)*

Completed by: _____ **Approved by:** _____

**SITE-SPECIFIC HEALTH AND SAFETY PLAN
AMENDMENT DOCUMENTATION**

Project Name: _____ **Project No.:** _____

Amendment No.: _____ **Date:** _____

Amendment Page(s): _____ **Revises:** _____ **Section(s):** _____

**SITE-SPECIFIC HEALTH AND SAFETY PLAN
AMENDMENT DOCUMENTATION**

Project Name: _____ **Project No.:** _____

Amendment No.: _____ **Date:** _____

Amendment Page: _____ **Revises:** _____ **Section:** _____

Task(s) Amendment Affects:* _____

**(Attach new/revised Job Safety Analyses)*

Reason For Amendment:

Amendment: *(Attach separate sheet(s) as necessary)*

Completed by: _____ **Approved by:** _____

APPENDIX C

DAILY SAFETY REPORT FORM

AIR MONITORING FORMS

	equivalent						
	pDR-1500, Dusttrack or equivalent			Filter			
	pDR-1500, Dusttrack or equivalent			Filter			
	pDR-1500, Dusttrack or equivalent			Filter			
	pDR-1500, Dusttrack or equivalent			Filter			

Calibration gases: 1. 100 ppm isobutylene, 2. 50% LEL methane, 3. 50 ppm CO, 4. 25 ppm H₂S

APPENDIX D

TAILGATE SAFETY MEETING FORM

Daily Safety Meeting Report

Project Name:

Location:

Date:

Today's Tasks/Activities:

Potential Chemical/Physical Hazards:

Personal Protective Equipment:

Attendees:

<hr/>	<hr/>

HSO: _____ Const. Supt:

(Signature) (Signature)

APPENDIX 6

VAPOR BARRIER MANUFACTURER SPECIFICATIONS



Stego® Wrap 20-Mil Vapor Barrier

STEGO INDUSTRIES, LLC



Vapor Retarders
07 26 00, 03 30 00

1. Product Name

Stego Wrap 20-Mil Vapor Barrier

2. Manufacturer

Stego Industries, LLC
216 Avenida Fabricante, Suite 101
San Clemente, CA 92672
Sales, Technical Assistance
Ph: (877) 464-7834
Fx: (949) 257-4113
www.stegoindustries.com

3. Product Description

USES: Stego Wrap 20-Mil Vapor Barrier is used as a below-slab vapor barrier, and as a protection course for below grade waterproofing applications.

COMPOSITION: Stego Wrap 20-Mil Vapor Barrier is a multi-layer plastic extrusion manufactured with only the highest grade of prime, virgin, polyolefin resins.

ENVIRONMENTAL FACTORS:

Stego Wrap 20-Mil Vapor Barrier can be used in systems for the control of soil gases (radon, methane), soil poisons (oil by-products) and sulfates.

5. Installation

UNDER SLAB: Unroll Stego Wrap 20-Mil Vapor Barrier over an aggregate, sand or tamped earth base. Overlap all seams a minimum of six inches and tape using Stego Tape or Crete Claw® Tape. All penetrations must be sealed using a combination of Stego Wrap and Stego accessories.

For additional information, please refer to Stego's complete installation instructions.

6. Availability & Cost

Stego Wrap 20-Mil Vapor Barrier is available nationally via building supply distributors. For current cost information, contact your local Stego Wrap distributor or Stego Industries' sales department.

7. Warranty

Stego Industries, LLC believes to the best of its knowledge, that specifications and recommendations herein are

accurate and reliable. However, since site conditions are not within its control, Stego Industries does not guarantee results from the use of the information provided and disclaims all liability from any loss or damage. NO WARRANTY, EXPRESS, IMPLIED OR STATUTORY, IS GIVEN AS TO THE MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OTHERWISE WITH RESPECT TO THE PRODUCTS REFERRED TO. Please see www.stegoindustries.com/legal.

8. Maintenance

None required.

9. Technical Services

Technical advice, custom CAD drawings, and additional information can be obtained by contacting Stego Industries' technical assistance department or via the website.

10. Filing Systems

• www.stegoindustries.com



4. Technical Data

TABLE 1: PHYSICAL PROPERTIES OF STEGO WRAP 20-MIL VAPOR BARRIER

PROPERTY	TEST	RESULTS
Under Slab Vapor Retarders	ASTM E1745 Class A, B & C - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs	Exceeds Class A, B & C
Water Vapor Permeance	ASTM F1249 - Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor	0.0071 perms
Puncture Resistance	ASTM D1709 - Test Methods for Impact Resistance of Plastic Film by Free-Falling Dart Method	3500+ grams*
Tensile Strength	ASTM D882 - Test Method for Tensile Properties of Thin Plastic Sheeting	97.7 lbf/in.
Permeance After Conditioning (ASTM E1745 Sections 7.1.2 - 7.1.5)	ASTM E154 Section 8, F 1249 - Permeance after wetting, drying, and soaking ASTM E154 Section 11, F 1249 - Permeance after heat conditioning ASTM E154 Section 12, F 1249 - Permeance after low temperature conditioning ASTM E154 Section 13, F 1249 - Permeance after soil organism exposure	0.0088 perms 0.0081 perms 0.0084 perms 0.0077 perms
Radon Diffusion Coefficient	K124/02/95	9.9 x 10 ⁻¹² m ² /second
Thickness		20 mils
Roll Dimensions		14 ft. wide x 105 ft. long or 1,470 ft ²
Roll Weight		140 lbs.

Note: perm unit = grains/(ft² *hr* in.Hg)

* The material maxed out the testing equipment and did not fail at 3746 grams.



Retro-Coat™

Vapor Intrusion Coating

Vapor Intrusion Coating System for Existing Structures



Product Description

The Retro-Coat™ Vapor Intrusion Coating System is a complete product line that consists of chemically resistant materials to properly protect existing structures from the threat of contaminant vapor intrusion without the need for additional concrete protection. Developed by the R&D team of Land Science®, the Retro-Coat system has been subjected to rigorous testing procedures to prove its ability to combat the most aggressive chemical vapors. The main component of the Retro-Coat system is the Retro-Coat coating which is a two part, odorless, no VOC, 100% solids coating.

Retro-Coat finishes to a high gloss, easy-to-clean surface that is impervious to vapor and moisture transmission. Available in a variety of colors, Retro-Coat can be applied on damp as well as dry concrete, concrete masonry units, tile, brick and metal. For enhanced slip resistance, a suitable aggregate can be added. In addition, other additives or materials can be utilized to achieve a desired performance or aesthetic look.



Typical Application

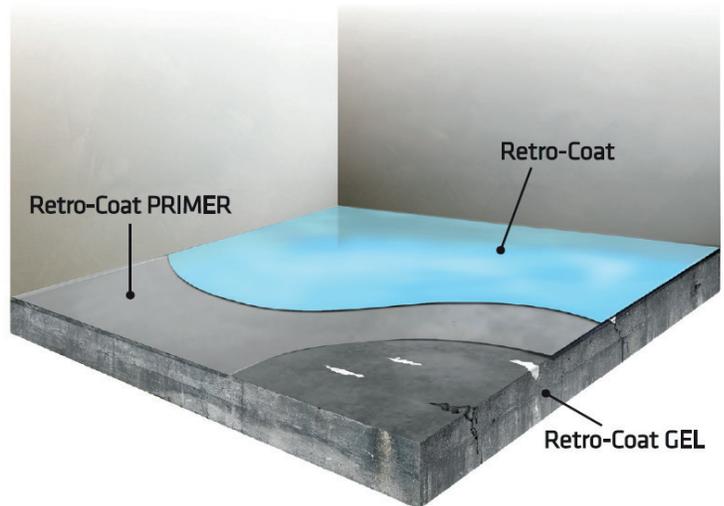
Retro-Coat is suitable as a barrier to block contaminated vapors from entering existing structures. Particular uses include coating the horizontal surfaces of existing structures where contamination under, or adjacent to, a structure can potentially migrate inside the structure and create a vapor encroachment condition. This condition is most commonly found when the existing structure was operated as a dry cleaner, gas station, manufacturing facility or located in close proximity to any structure where carcinogenic chemicals were utilized.

A typical application consists of a minimum 20 mil thick system; consisting of two 10 mil coats of Retro-Coat at 160 SF/gallon per coat and is recommended along with a 6 mil coat of Retro-Coat PRIMER. The typical 20 mil application can withstand forklift traffic, other machinery and even act as secondary containment. However, if Retro-Coat is exposed to harsh conditions over a longer period of time and/or used for a unique application, please consult with a LST representative to discuss options and a recommended approach.

Retro-Coat Advantages

- Our R&D team developed all of the Retro-Coat system components specifically for vapor intrusion protection in existing structures
- Retro-Coat is resistant to both TCE and PCE, the vast majority of coatings cringe at such aggressive chemicals
- Retro-Coat is a wearing surface, meaning no additional concrete protection is necessary
- No odor and fast cure time reduce building downtime
- Carpet, tile, linoleum or other floor coverings can be applied directly over Retro-Coat, if desired
- Eliminates the need to remove the existing slab and when combined with *in situ* treatment, lowers overall remediation cost
- Retro-Coat can increase the performance of an existing active sub-slab depressurization system
- Retro-Coat can aid in the retiring of existing active systems
- Available and installed by Land Science certified contractors

Retro-Coat™ Vapor Intrusion Coating



Installation

Particular care must be taken to follow those instructions precisely to assure proper installation. These instructions pertain to a standard 20 mil application; please contact us if the desired application is different.

1. New concrete should be allowed to cure a minimum of 28 days and/or be checked with a rubber mat or plastic sheet to ensure adequate curing time has occurred.
2. All surfaces to be covered should be power washed, shot blasted, acid etched, scarified or sanded to present a clean, sound substrate to which to bond to. The prepared surface should have a ph of 7.
3. Any bugholes and cracks wider than 1/8" should be filled with Retro-Coat PREP and allowed to dry before coating. More severely damaged concrete or other special conditions will require the proper Retro-Coat product.
4. When installing the standard 20 mil application of Retro-Coat, apply a 6 mil coat of Retro-Coat PRIMER and allow to dry prior to applying the initial coat of Retro-Coat. Priming may not be necessary when Retro-Coat is applied to a thickness greater than 20 mils. On new concrete or old concrete with an open porosity and on wood surfaces apply Retro-Coat PRIMER and allow to dry.
5. The two Retro-Coat ingredients should be mixed in the prescribed ratios, using a low speed "jiffy-style" mixer, (maximum 750 rpm). Mix Part A for about 1 minute then, add Part B and mix until uniform in color and consistency (at least one additional minute.)
6. Do not mix less than the prescribed amount of any ingredient or add any solvent to the mix.
7. Apply the mixed Retro-Coat material with a short nap roller, a squeegee or a brush. Apply approximately 160 SF per gallon per coat to achieve 10 mils of coating.
8. Apply a second coat while the first coat is still tacky if using spike shoes or dry enough to walk on, but before 7 hours at 75°F. If the first coat has set and is no longer tacky then the first coat should be sanded before recoating.
9. A suitable aggregate may be broadcast onto the surface after backrolling to provide more anti-slip profile to the finished surface. It is advisable to test various types and sizes of aggregate to achieve the desired finished profile.





Product Specification

The specified area shall receive an application of Retro-Coat as manufactured by Land Science. The material shall be installed by precisely following the manufacturer's published recommendations pertaining to surface preparation, mixing and application. The material shall be a low odor, two part, solvent free 100% solids, high gloss flexibilized system with good resilience to resist thermal and mechanical shock. It should be able to be roller applied at a minimum of 10 mils thickness per coat on vertical surfaces without sagging (at ambient conditions). The system must adhere to damp as well as dry concrete, wood, metal tile, terrazzo and sound existing epoxy and urethane coatings. It shall have tensile elongation of at least 6.0% when tested under ASTM-638. Its bond strength to quarry tile shall exceed 1000 psi when tested with an Elcometer pull test. Its hardness shall not exceed 83, as measured on the Shore D scale. The system shall be unaffected by oils and greases and shall withstand chemical attack for at least 72 hours against 98% sulfuric, 50% hydrofluoric acid, glacial acetic acid and acrylonitrile.

Precautions

1. This is a fast reacting product; immediately pour onto floor after mixing and spread with notched squeegee.
Recoat window without sanding at 70°F: 8 hours
2. A severe skin and eye irritant; check MSDS before use
3. Do not apply below 50°F

Note: Failure to follow the above instruction, unless expressly authorized by a Land Science Representative, will void our material warranty.

Chemical Resistance

Retro-Coat™ is considered chemically resistant to neat concentrated acids, caustics and solvents. For permeation or diffusion coefficients please contact Land Science.

Physical Properties

Tensile Strength (ASTM D-638) : 9800 psi	Bond Strength to Quarry Tile : >1000 psi
Tensile Elongation (D-638) : 6.0%	Vapor Transmission Rate (E-96) : .027 perms
Flexural Strength (D-790) : 7035 psi	Water Absorption (D-570) : 0.2% in 24hrs.
Hardness, Shore D (D-2240) : 83	Taber Abrasion (D-1044) : 86 mg loss.
Gardner Impact Strength (D-2794) : 80 in. lbs.	60° Gloss : 100

Physical Characteristics

Density, lbs/gal.	Mixing Ratios	By Volume	By Weight	
Pt. A : 11.0	Pt. A : Pt. B	2:1	2.3:1	
Pt. B : 8.9				
A&B Mixed : 9.3	Curing Times @	50°F	77°F	90°F
Viscosity @ 77°F, cps	Pot Life	35 min.	30 min.	20 min.
Pt. A : 18,400	Working Times	20 min.	20 min.	15 min.
Pt. B : 500	Hard, Foot Traffic	14 hrs.	7 hrs.	3 ½ hrs.
A&B Mixed : 4800	Maximum hardness and chemical resistance are achieved after 7 days at 77°F			

Color Availability

Standard colors: beige, black, blue, dark gray, green, gray, red, white, yellow

Shelf Life: 1 Year at 77°F in unopened containers

Packaging and Coverage Rates (for 20 mil coverage)

4 Gallon Kit : 320 SF

20 Gallon Kit : 1600 SF

100 Gallon Kit : 8,000 SF

The data, statements and recommendations set forth in this product information sheet are based on testing, research and other development work which has been carefully conducted by Land Science, and we believe such data, statements and recommendations will serve as reliable guidelines. However, this product is subject to numerable uses under varying conditions over which we have no control, and accordingly, we do NOT warrant that this product is suitable for any particular use. Users are advised to test the product in advance to make certain it is suitable for their particular production conditions and particular use or uses.

WARRANTY – All products manufactured by us are warranted to be first class material and free from defects in material and workmanship.

Liability under this warranty is limited to the net purchase price of any such products proven defective or, at our option, to the repair or replacement of said products upon their return to us transportation prepaid. All claims hereunder on defective products must be made in writing within 30 days after the receipt of such products in your plant and prior to further processing or combining with other materials and products. WE MAKE NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE SUITABILITY OF ANY OF OUR PRODUCTS FOR ANY PARTICULAR USE, AND WE SHALL NOT BE SUBJECT TO LIABILITY FROM ANY DAMAGES RESULTING FROM THEIR USE IN OPERATIONS NOT UNDER OUR DIRECT CONTROL.

THIS WARRANTY IS EXCLUSIVE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND NO REPRESENTATIVE OF OURS OR ANY OTHER PERSON IS AUTHORIZED TO ASSUME FOR US ANY OTHER LIABILITY IN CONNECTION WITH THE SALE OF OUR PRODUCTS

World Class Clients

Environmental consultants, engineers, and real estate professionals trust Land Science to produce results knowing our expertise and industry knowledge has been proven time and again at the job site. Our world class clients include leaders in the food, banking, government, and housing industries.



Get Started Today

To receive a custom vapor intrusion solution, please call 949.481.8118 or email info@landsciencetech.com

One of our Technical Solutions Managers will review your project details and provide you with a customized vapor intrusion solution designed to achieve your goals.

EXPERTS IN VAPOR INTRUSION MITIGATION

Land Science® develops vapor intrusion mitigation solutions that protect people and invigorate renewal of contaminated properties.

We leverage our industry expertise to assist clients in developing site specific solutions that are technically sound and cost-effective.



www.landsciencetech.com
1011 Calle Sombra, San Clemente, CA 92673 T: 949.481.8118

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Land Science Technologies Specifications for Retro-Coat™ Version 1.0

Part 1 – Scope

1.1 Product and Application

This specification describes the application of the Retro-Coat™ System. The minimum thickness of the system is between 25-30 mils, including a 20 mil minimum application of Retro-Coat.

1.2 Acceptable Manufacturers

- A. Retro-Coat as manufactured by Land Science Technologies San Clemente, CA.

1.3 Performance Criteria

- A. Retro-Coat as manufactured by Land Science Technologies San Clemente, CA.
 - 1. Diffusion Coefficient (Columbia Labs)
PCE: 7.6×10^{-14} m²/s
TCE: 8.2×10^{-14} m²/s
 - 2. Tensile Elongation (ASTM D-638)
Minimum: 6000 psi
 - 3. Tensile Elongation (ASTM D-638)
Minimum: 6 %
 - 4. Flexural Strength (ASTM D-790)
Minimum: 7000 psi
 - 5. Hardness, Shore D (ASTM D-2240)
Maximum: 85
 - 6. Gardner Impact (ASTM D-2794)
Minimum: 80 inch-pounds
 - 7. Bond Strength to Quarry Tile
Minimum: 1000 psi
 - 8. Vapor Transmission Rate (ASTM E-96)
Maximum: .07 perms
 - 9. Water Absorption (ASTM D-570)
Maximum: .02% in 24 hours
 - 10. 60° Gloss
Minimum: 100.

1.4 Materials

- A. Retro-Coat "A" shall be a modified epoxy containing special flexibilizers and specially formulated resins for superior chemical resistance and enhanced resilience. No solvents are allowed.
- B. Retro-Coat "B" shall be customized blend of hardeners specifically formulated to maximize chemical resistance. No solvents are allowed.

1.5 Applicator

- A. Applicator must be a certified contractor of Land Science Technologies.

Part 2 – Application

2.1 Surface Preparation

- A. All existing surfaces that will be covered with the systems specified herein should be mechanically ground, shot blasted or sand blasted to yield a minimum 60 grit surface texture. All loosely adhered coatings will be removed. Any grease and other contaminants found on the concrete must also be removed.
- B. All open cracks 1/2" and greater should be v-notched to a 3/4" width by 1/2" depth and cleaned of any debris. Such cracks should be filled with Retro-Coat Gel and struck off flush with the surrounding surface.
- C. Cut back and/or remove any expansion joint backing or filler strips to a minimum of 1 1/2" deep. Insert disposable filler in the joints to prevent filling with the overlayment materials and to allow for accurate location of final saw cuts in the overlayment.

2.2 Material Application

- A. Retro-Coat CAULK
 1. Apply Retro-Coat CAULK around the base of all pipe penetrations making sure to fill any gap between the penetration and concrete slab
 2. Apply Retro-Coat CAULK to the joint created between horizontal and vertical transitions. The caulking material should be applied and pressed into the joint filling any gaps that might be present.
- B. Retro-Coat PRIMER
 1. Apply Retro-Coat PRIMER to all areas at a thickness of 6 mil and allow to dry tack free. In areas where the concrete surface is in need of slight repair or needs to be leveled, a slurry form of Retro-Coat PRIMER called Retro-Coat PRIMER-S can be applied with a flat squeegee. Retro-Coat PRIMER-S is self priming and does not need to be primed again.
- C. Retro-Coat
 1. Mix Retro-Coat, Part A with a low-speed (<750 rpm) jiffy-style mixer for about 30 seconds, or until uniform in color, then mix in Retro-Coat Coating, Part B for another 30-60 seconds.
 2. Dump contents onto floor in a ribbon pattern, squeegee, and then back roll at a coverage rate of 160 SF/gallon to achieve a film thickness of 10 mils.
 3. Apply second coat 10 mil coat to achieve a total thickness of 20 mils. Repeat as necessary to achieve specified thickness.
 4. If a flooring material will be placed over Retro-Coat after it is applied, or appearance is not a priority, (1) 20 mil coat can be applied.

2.3 Protection of Finished Work

- A. Prohibit foot traffic on floor for 24 hours after laying (at 70°F). At 50°F, this time should be extended to 48 hours.
- B. Rinse off any chemicals that may come in contact within 7 days of installation with the freshly laid floor immediately.

2.4 Cleanup

- A. Properly dispose of all unused and waste materials.
- B. Tools can be washed in warm, soapy water when wet, but after drying, can only be cleaned by grinding or with a paint stripper.
- C. Unused resin can be set off with proper amount of hardener and disposed of in regular trash bins.

Part 3 – Quality Control

3.1 Warranty

- A. Installer shall provide a one year warranty against delamination, chemical attack and normal wear and tear.
- B. Manufacturer will provide a one year material warranty.

3.2 Quality Control

- A. Installer shall use a notched squeegee to apply Retro-Coat to the specified mil thickness and calculations shall be done to determine if the correct amount of material has been applied. Retro-Coat contains 100% solids at the time of application; therefore no material shrinkage will occur during the curing process. One gallon will cover 80 square feet.
- B. A wet mil film gauge can be used to spot check the Retro-Coat thickness to make certain the minimum 20 mil thickness has been applied, though some discretion should be used because high points or low points on the underlying surface can adversely affect the thickness measurements.

3.3 Floor Care

- A. The standard smooth surface of Retro-Coat should be cleaned on a regular basis by damp mopping the floor with conventional commercial cleaners. It is important to first remove any grease or oils by a suitable cleaner, preferably a citrus based cleaner. Rinse with clear water to help eliminate film buildup and then allow to dry. Never use abrasive powder cleaners like Ajax or Comet as they tend to scratch the floor.
- B. Additional steps can also be taken to prolong the look and life of a seamless floor:
 - 1. Protect the floor during transference of heavy equipment
 - 2. Educate the drivers inside the building the importance of avoiding "jack-rabbit" starts and stops, as well as keeping the metal forks lifted
 - 3. Regular cleaning should take place as to not allow the buildup of abrasive material, such as sand or dirt, on the coating
 - 4. Eliminate all metal wheels
 - 5. Change over to light-colored polyurethane wheels
 - 6. Do not slide heavy metal totes, drums or bins across the floor
 - 7. Immediately hose down chemical spills, especially on newly laid floors.