

**45 INDIA STREET  
TAX BLOCK 2531, LOT 35  
BROOKLYN, NEW YORK**

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**Remedial Action Work Plan**

**NYC VCP Number: 13CVCP098K**

**Prepared for:**

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**DECEMBER 2012**

# REMEDIAL ACTION WORK PLAN

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## LIST OF ACRONYMS

<b>Acronym</b>	<b>Definition</b>
AOC	Area of Concern
AST	Aboveground Storage Tank
BOA	Brownfield Opportunity Area
BPMD	Borough President Manhattan Datum
CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
CHASP	Construction Health and Safety Plan
DCR	Declaration of Covenants and Restrictions
DNAPL	Dense Non-Aqueous Phase Liquids
ECs/ICs	Engineering and Institutional Controls
ELAP	Environmental Laboratory Approval Program
GQS	Groundwater Quality Standards
HASP	Health and Safety Plan
LNAPL	Light Non-Aqueous Phase Liquid
BCA	Brownfield Cleanup Agreement
NOC	Notice of Completion
NYC BCP	New York City Brownfield Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOB	New York City Department of Buildings
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYCT	New York City Transit
NYC VCP	New York City Voluntary Cleanup Program
NYS DEC	New York State Department of Environmental Conservation
NYS DOH	New York State Department of Health
OSHA	Occupational Health and Safety Administration
PCB	Polychlorinated Biphenyl
PE	Professional Engineer
PID	Photo Ionization Detector
PPE	Personal Protective Equipment

<b>Acronym</b>	<b>Definition</b>
QA/QC	Quality Control/Quality Assurance
QEP	Qualified Environmental Professional
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RI	Remedial Investigation
RIR	Remedial Investigation Report
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SPEED	Searchable Property Environmental E-Database
SVOC	Semi-Volatile Organic Compound
UST	Underground Storage Tank
VOC	Volatile Organic Compound

## CERTIFICATION

I, Richard Zaloum, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the 45 India Street, Brooklyn, NY Site (NYC VCP Site No. 13CVCP098K).

I, Paul McGaha, am a Qualified Environmental Professional, as defined in RCNY § 43-1402(ar). I have primary direct responsibility for implementation of the remedial action for the 45 India Street, Brooklyn, NY Site (NYC VCP Site No. 13CVCP098K).

I certify that 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

\_\_\_\_\_  
NYS PE License Number

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

PE Stamp

\_\_\_\_\_  
QEP Name

\_\_\_\_\_  
QEP Signature

\_\_\_\_\_  
Date

## **EXECUTIVE SUMMARY**

Kenry Corp. has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 0.15-acre site located at 45 India Street in the Greenpoint section of the borough of 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 Current Usage**

The Site is located at 45 India Street (Block 2531, Lot 35) on the city block between Huron Street, Franklin Street, India Street and West Street in the Greenpoint section of the borough of Brooklyn, New York. A Site Location Map is provided in Figure 1. The Site consists of vacant, unpaved land encompassing an approximate area of 5,000 square feet and is bound by multi-story residential buildings to the north, east and west, and India Street, followed by a multi-family residential building to the south. Beyond the adjoining properties, the Site is located in a predominantly industrial area. A map of the Site boundary is shown on Figure 2.

The Site is a vacant lot with approximately 50 feet of frontage along India Street. Based on our review of published topographic data (United States Geological Survey [USGS] Brooklyn Quadrangle Topographic Map, 1995), the topographic slope is in a westerly direction towards the East River, which is located approximately 850 feet west of the Site. The Site is topographically lower with respect to adjacent and surrounding properties to the east.

### **Summary of Proposed Redevelopment Plan**

The planned development consists of a 3,000 square foot 4-story residential building with Seven (7) Condominiums and a single cellar spanning about half of the Site. The balance of the Site will consist of a concrete patio and yard space. The depth of the cellar will extend approximately 10 feet below the existing Site grade. The cellar will be used for Storage, Elevator Mechanical Room, a Gym/Fitness Center, Gas Meter Room, Telecom, and Electric

Meter Room. The foundation will be supported on footings. The foundation will be supported on footings.

Excavation and foundation construction will involve the removal and off-site disposal of approximately 1,700 tons of material. Backfilling will involve approximately 250 cubic yards of clean fill.

### **Summary of the Remedy**

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 standard 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 (CAMP) for particulates and volatile organic compounds;
3. Establishment of Track 1 Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs. Excavations will be performed to 10 feet below grade within the building footprint and 5 to 6 feet below grade within the courtyard area;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
7. If encountered, removal of underground storage tanks and closure of petroleum spills in compliance with applicable local, State, and Federal laws and regulations;

8. Transportation and off-Site disposal of all soil/fill material at 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 onsite;
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs;
10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
11. Demarcation of residual soil/fill in the courtyard area if Track 1 SCOs are not achieved;
12. As part of development, installation of a waterproofing/vapor barrier membrane underneath the building foundation slab and behind the foundation walls up to grade;
13. As part of development, construction and maintenance of an engineered composite cover consisting of a concrete building foundation slab and two feet of clean fill in the courtyard area;
14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
15. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
16. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and, if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site; and
17. If Track 1 is not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency (only applicable if a complete Track 1 cleanup is not achieved).

18. If Track 1 is not achieved, Recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including 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 Office of Environmental Remediation (NYC OER) created the New York City Voluntary Cleanup Program (NYC VCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan (“cleanup plan”) describes the findings of prior environmental studies that show the location of 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. This cleanup plan 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.

**Remedial Investigation and Cleanup Plan.** Under the NYC VCP, a thorough cleanup 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 identify contaminant sources present on the property. The cleanup plan has been designed to address contaminant sources 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 the performance of 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 Health and Safety Plan that is designed to protect community residents and on-Site workers. The elements of this plan are in compliance with safety requirements of the United States Occupational Safety and Health Administration. This plan includes many protective elements including those discussed below.

**Site Safety Coordinator.** This project has a designated Site safety coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is Paul McGaha, CHMM, and can be reached at (917) 743-4789.

**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 monitoring will be performed in accordance with a detailed plan called the Community Air Monitoring Plan or CAMP. Results will be regularly reported to the NYC OER. 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 include 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 NYC noise control standards. If you observe problems in these areas, please contact the on-site Project Manager Andrew Gasparro at (917) 743-4789 or NYC OER Project Manager Michael Mandac at (212) 676-0754.

**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 (RAR). This report will be submitted to the NYC OER and will be thoroughly reviewed.

**Storm-Water Management.** To limit the potential for soil erosion and discharge, this cleanup plan has provisions for storm-water management. The main elements of the storm-water 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 (NYC DOB) construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation are 7:00 am to 5:00 pm Monday through Friday.

**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 VCP, provides project contact names and numbers, and locations of 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 Project Manager Andrew Gasparro at (917) 743-4789, the NYC OER Project Manager Michael Mandac at phone number (212) 676-0754, or call 311 and mention the Site is in the NYC VCP.

**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, odors 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 all 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 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 (RAR) that will be available for you to review in the public document repositories located at Greenpoint Branch Library.

**Long-Term Site Management.** If a Track 1 cleanup is not achieved, the property owner will be required to comply with an ongoing Site Management Plan (SMP) that calls for continued inspection of protective controls, such as Site covers, to provide long-term protection after the cleanup is complete. The SMP is evaluated and approved by the NYC OER. Requirements that the property owner must comply with are defined in the property's deed. 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 SITE BACKGROUND

Kenry Corp. has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 0.15-acre site located at 45 India Street in the Greenpoint section of the borough of 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.

### 1.1 Site Location and Current Usage

The Site is located at 45 India Street (Block 2531, Lot 35) on the city block between Huron Street, Franklin Street, India Street and West Street in the Greenpoint section of the borough of Brooklyn, New York. A Site Location Map is provided in Figure 1. The Site consists of vacant, unpaved land encompassing an approximate area of 5,000 square feet and is bound by multi-story residential buildings to the north, east and west, and India Street, followed by a multi-family residential building to the south. Beyond the adjoining properties, the Site is located in a predominantly industrial area. A map of the Site boundary is shown on Figure 2.

The Site is a vacant lot with approximately 50 feet of frontage along India Street. Based on our review of published topographic data (United States Geological Survey [USGS] Brooklyn Quadrangle Topographic Map, 1995), the topographic slope is in a westerly direction towards the East River, which is located approximately 850 feet west of the Site. The Site is topographically lower with respect to adjacent and surrounding properties to the east.

### 1.2 Proposed Redevelopment Plan

The planned development consists of a 3,000 square foot 4-story residential building with Seven (7) Condominiums and a single cellar spanning about half of the Site. The balance of the Site will consist of a concrete patio and yard space. The depth of the cellar will extend approximately 10 feet below the existing Site grade. The cellar will be used for Storage, Elevator Mechanical Room, a Gym/Fitness Center, Gas Meter Room, Telecom, and Electric Meter Room. The foundation will be supported on footings.

The foundation will be supported on footings. Excavation and foundation construction will involve the removal and off-site disposal of approximately 1,050 tons of material. Backfilling will involve approximately 250 cubic yards of material and 250 cubic yards of clean fill.

The Site is located within the Greenpoint-Williamsburg Rezoning District and its current zoning designation is R6-B. Development projects within this district must comply with Zoning Resolution, Article IX: Special Purpose Districts, Chapter 7: Special Mixed-Use – Greenpoint-Williamsburg District. The proposed Site use is consistent with existing zoning. The New York City Department of City Planning (NYCDCP) has assigned an E-designation (E-138) to the Site for Underground Storage Tank Testing Protocol and Window Wall Attenuation – Alternative Ventilation.

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 bordered by Huron Street to the north, multi-story residential buildings followed by Franklin Street to the east, India Street followed by multi-story residential buildings to the south, and multi-story residential buildings followed by West Street to the west. Beyond the adjoining properties, the Site is located in a predominantly industrial area.

The surrounding neighborhood is generally characterized by multi-story, mixed-use residential, commercial, manufacturing and retail properties. The major thoroughfares, India Street and Franklin Street, are zoned for commercial and residential usage and generally populated with commercial and retail properties with mixed-use residential and commercial buildings.

NYC OER's Searchable Property Environmental E-Database (SPEED) was utilized to research sensitive environmental receptors within a 500-foot radius of the Site. This evaluation revealed that no sensitive receptors such as schools, hospitals, and day care centers exist within the target radius.

### **1.4 Remedial Investigation**

A remedial investigation was performed and the results are documented in a companion document called "*Remedial Investigation Report, 45 India Street*", dated December 2012 (RIR).

### **Summary of Past Uses of Site and Areas of Concern**

The Site was developed with a residential building by 1887 and has had various uses since then, including a materials storage warehouse (1905), day nursery (1916), and a vacant lot (1978 – 1982).

The AOC identified for this site includes:

- Historic fill layer present at the Site from grade to a depth of approximately 5 feet below grade

### **Summary of the Work Performed under the Remedial Investigation**

1. Conducted a Site inspection to identify physical obstructions (i.e. structures, buildings, etc.);
2. Installed 9 soil borings from which 15 soil samples were collected for chemical analysis to evaluate soil quality;
3. Installed 3 permanent groundwater monitoring wells throughout the Site to establish groundwater flow direction and collected 3 groundwater samples for chemical analysis to evaluate groundwater quality;
4. Installed 5 soil vapor probes and collected 5 vapor samples for chemical analysis.

### **Summary of Environmental Findings**

1. Elevation of the Site is about 20 feet.
2. Depth to groundwater ranges from approximately 7.11 to 7.75 feet below grade surface (ft bgs).
3. Groundwater flow is generally from east to west, towards the East River.
4. Bedrock was not encountered in any of the borings performed at the Site.
5. The stratigraphy of the Site, from the surface down, consists of approximately 5 to 6 feet of historic fill containing varying amounts of silt, sand, brick and wood fragments, and other miscellaneous debris, underlain by glacial alluvium.
6. Soil/fill samples collected during the RI showed no detectable levels of VOCs and thus TCE, PCE, TCE and carbon tetrachloride were not detected in soil samples. SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and phenol were detected in shallow and

- deep samples exceeding the Track 2 Restricted-Residential SCOs. Pesticides (4,4'-DDD, 4,4'-DDE, 4,4'-DDT and dieldrin) were detected in shallow and deep samples exceeding the Track 1 Unrestricted Use SCOs but were below the Track 2 Restricted-Residential SCOs. PCB's were not detected in soil samples. Metals, including barium, lead, mercury, selenium, and zinc, were detected in shallow and deep samples above the Track 1 Unrestricted Use SCOs and of these lead and mercury also exceeded the Track 2 Restricted-Residential SCOs.
7. Groundwater samples collected during the RI showed that PCB's, pesticides and VOC's were not detected in groundwater samples and thus TCE, PCE, TCE and carbon tetrachloride were not detected in groundwater samples. One SVOC (bis(2-ethylhexyl)phthalate) was detected at a concentrations that slightly exceeded the GQS of 5.0 ug/L with a concentration of 5.2 ug/L. This SVOC is a common phthalate plasticizer, and is used in the production of PVC and other plastics. Therefore, these marginal detections of bis(2-ethylexyl)phthalate may be attributable to the well construction (PVC) or the sampling equipment.
  8. Soil vapor samples collected during the RI indicated that there were low detections of petroleum-related VOCs and were generally below 10 ug/m<sup>3</sup> for individual compounds. Tetrachloroethylene was detected in all of the samples, with a maximum concentration of 16 ug/m<sup>3</sup>. TCA and TCE were not detected in soil vapor samples. Carbon tetrachloride (maximum 0.75 ug/m<sup>3</sup>) was detected at extremely low concentrations.

For more detailed results, consult the RIR. Based on an evaluation of the data and information from the RIR and this RAWP, disposal hazardous waste is likely at this Site. Prior to disposal of hazardous soil, a notification of regulated waste activity form (EPA Form 8700-12) will be submitted to the EPA and a Resource Conservation and Recovery Act (RCRA) generator identification number will be assigned to the Site.

## **2.0 REMEDIAL ACTION OBJECTIVES**

Based on the results of the RI, the following RAOs have been identified for this Site:

### **Groundwater**

- Prevent direct exposure to contaminated groundwater.

### **Soil**

- Prevent direct contact with contaminated soil.
- Prevent migration of contaminants that would result in groundwater or surface water contamination.

### **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 at concentrations greater than applicable standards, criteria and guidance values (SCGs). A remedy is then developed 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 of the remedial action.

The following is a detailed description of the alternatives analysis and remedy selection to address impacted media at the Site. As required, a minimum of two remedial alternatives (including a Track 1 scenario) are evaluated, as follows:

Two remedial action alternatives are considered in this alternatives analysis. Alternative 1 is a Track 1 alternative that involves removal of all soil impacted above Track 1 Unrestricted Use SCOs. Alternative 2 removes all impacted soil above Track 4 Site-Specific SCOs.

Alternative 1 involves:

- Excavation and 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 require excavation to a depth of 5 feet across the Site to remove historic fill materials. Excavation for development purposes would take place to a depth of approximately 10 feet for the first 60 feet of the lot and 5 to 6 feet in the rear of the lot within the concrete patio and yard space, which would effectively remove all soil above Unrestricted Use SCOs from the property; and
- Installation of a vapor barrier beneath the basement foundation and behind foundation sidewalls as part of standard construction practice and to prevent any potential future soil vapor exposure.

Alternative 2 involves:

- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 has been achieved with post-excavation endpoint sampling. Based on the results of the remedial investigation, this alternative would allow the management of historic fill in place in the rear yard. Excavation for development purposes would take place to a depth of approximately 10 feet for the first 60 feet of the lot, therefore, it is anticipated that all historic fill in this portion of the lot would be removed;
- Placement of a final cover (building foundation slab and two feet of clean fill) over the entire Site to eliminate exposure to remaining soil/fill;
- Installation of a vapor barrier beneath the basement foundation and behind foundation sidewalls as part of standard construction practice and to prevent any potential future soil vapor exposure;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive site uses, such as farming or vegetable gardening, to eliminate future exposure pathways;
- 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; and
- Placement of a deed restriction to memorialize the remedial action and the Engineering and Institutional Controls to ensure that future owners of the Site continue to maintain these controls as required.

### **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 (EC/IC). Protection of public health and the environment must be achieved for all approved remedial actions.

Both remedial alternatives would be protective of human health and the environment by removing all soil above Track 1 SCOs beneath the building areas. Alternative 1 would also achieve Track 1 SCOs beneath the rear yards area while Alternative 2 would manage that material in place. Alternative 1 would eliminate the potential for human and environmental exposure to contaminated soil/fill once construction is complete and eliminating the risk of contamination leaching into groundwater. Alternative 2 would achieve Track 4 SCOs and would protect public health and the environment by the placement of two feet of clean soil meeting the Part 375 Unrestricted Use Soil Cleanup Objectives.

Potential exposure to contaminated soils during construction would be minimized by implementing an approved Soil/Materials Management Plan and Community Air Monitoring Plan (CAMP). There is minimal potential for contact with contaminated groundwater as it is neither used nor anticipated to be encountered during construction and the remedial action. Potential post-remediation exposures to potential offsite soil vapors would be addressed by installing a vapor barrier (W.R. Grace & Co. Constructions Products, Inc.'s Preprufe and Bituthene or equivalent) beneath the foundation and behind the foundation's walls of the new building as part of development. Under Alternative 2, implementing institutional controls including a deed notice and a Site Management Plan would ensure that the composite cover system remains intact and protective.

There is minimal potential for contact with groundwater as it will only be encountered at the bottom three-feet of the foundation excavation. There is potential for worker exposure to historic fill and groundwater during remedial activities. For both alternatives, such exposure will be mitigated by use of personal protective equipment (PPE) and implementation of the Construction Health and Safety Plan (CHASP) attached hereto in Appendix B. As such, future exposures to Site-related contaminants will be minimized; resulting in unrestricted future Site use and the Site RAOs will be met.

## **3.2 BALANCING CRITERIA**

### **Compliance with Standards, Criteria and Guidance (SCGs)**

Both Alternatives (Track 1 and Track 4) would address the chemical-specific SCGs, as soil/fill in excess of the NYSDEC Part 375 Unrestricted Use SCOs would be removed. Soil/fill excavated from the Site would be managed and disposed in accordance with applicable City, State, and Federal regulations. As an added protection against the potential for future soil vapor intrusion from offsite, a vapor barrier will be installed below the new building's basement slab and continuing the vapor barrier around foundation walls, as part of development.

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. Health and safety measures contained in the CHASP and Community Air Monitoring Plan (CAMP) that comply with the applicable SCGs shall be implemented during Site redevelopment under this RAWP. These measures will protect on-site workers and the surrounding community from exposure to Site-related contaminants. A site management plan under Alternative 2 would ensure that controls remained protective for the long term.

### **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 effects on public health and the environment during implementation of the remedial action, including protection of the community, environmental impacts, time until remedial response objectives are achieved, and protection of workers during remedial actions.

Both remedial alternatives 1 and 2 have similar-short term effectiveness during their respective implementations, as each requires excavation of all or most historic fill material. Short term impacts are likely to be higher for Alternative 1 due to excavation of greater amounts of historical fill material. However, focused attention to means and methods during the remedial action during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities and any differences between these alternatives. Alternatives 1 and 2 would both employ appropriate measures to prevent short term impacts, including a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would effectively prevent the release of significant 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 Health and Safety Plan (CHASP) will be protected from on-Site contaminants (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 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 Engineering Controls.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soil/fill and enabling unrestricted usage of the property.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs, establishing a composite cover system across the Site, establishing use restrictions, establishing an SMP to ensure long-term management of Institutional Controls (ICs) and Engineering Controls (ECs), and placing a deed restriction to memorialize these controls for the long term. Establishment of an SMP and a deed restriction will ensure that this protection remains effective for the long-term.

Both alternatives would result in removal of soil contamination exceeding the SCOs providing a high level, effective, and permanent remedy over the long-term and would address contaminated soil and, eliminate or minimize any leaching to groundwater. Potential sources of soil vapor and groundwater contamination will also be eliminated as part of the Track 1 remedy.

### **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.

The Alternative 1 provides the maximum reduction of toxicity, mobility, or volume of contaminated material through the removal of all historic fill and soil exceeding Track 1 Unrestricted Use SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site.

Alternative 2 will remove most of the impacted soil present on the Site and remaining soil under the rear yard beneath will meet Track 4 Site-Specific SCOs.

### **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.

Both alternatives will utilize standard methods that are commonly available and routinely applied by the industry. They use standard materials and services that are well established. The reliability of both alternatives is high. There are no special difficulties associated with any of the activities proposed in either case.

### **Cost effectiveness**

This evaluation criterion addresses the cost of alternatives, including capital costs (such as construction costs, equipment costs, disposal costs, and engineering expenses) and site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Initial costs associated with alternative 1 will be significantly higher than alternative 2 based on both the volume of soil that requires excavation and off-Site disposal and the volume of clean soil imported to the Site that would be required to raise the elevation of the rear yard for installation of a grade level lawn. However, long-term costs associated with Alternative 2 are likely higher than Alternative 1 based on implementation of an SMP and placement of a deed restriction as part of Alternative 2.

The Track 1 alternative poses no undo cost burden. Excavation and off-site disposal of historic fill is necessary to accommodate the proposed development. In both Alternatives, appropriate public health and environmental protections are achieved.

## **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.

Based on the overall goals of the remedial program and initial observations by the project team, the Track 1 alternative should be acceptable to the community. However, as with any remediation or construction project, the temporary impacts during implementation given the extended construction time period and disruption to traffic patterns due to the significantly increased truck traffic may cause some community concerns. This RAWP will be subject to and undergo public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedial action. This public comment will be considered by NYC OER prior to approval of this plan. A Citizen Participation Plan is included as Appendix C.

## **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 proposed use is consistent with the existing use and the zoning designation for the Site and surrounding area. Commercial, residential, and mixed-use properties currently surround the Site; the Track 1 alternative provides the highest level of protection for human health and the environment to these areas. Improvement to the current brownfield condition of the property achieved by the Track 1 alternative is consistent with the City's goals for cleanup of contaminated land and bringing such properties into productive use.

## **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 alternatives are comparable with respect to the opportunity to achieve sustainable remedial action. A complete list of green remedial activities considered as part of the NYC VCP is included in the Sustainability Statement, included as Appendix D.

## 4.0 REMEDIAL ACTION

### 4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is the Track 1 Alternative. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the RAOs established for the project and addresses applicable SCGs. The preferred remedial action alternative 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 (CAMP) for particulates and volatile organic compounds;
3. Establishment Track 1 Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs. Excavations will be performed to 10 feet below grade within the building footprint and 5 to 6 feet below grade within the courtyard area;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
7. If encountered, removal of underground storage tanks and closure of petroleum spills in compliance with applicable local, State, and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at 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 onsite; Collection and analysis of

- end-point samples to determine the performance of the remedy with respect to attainment of SCOs;
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs;
  10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
  11. Demarcation of residual soil/fill in the courtyard area if Track 1 SCOs are not achieved;
  12. As part of development, installation of a waterproofing/vapor barrier membrane underneath the building foundation slab and behind the foundation walls up to grade;
  13. As part of development, construction and maintenance of an engineered composite cover consisting of a concrete building foundation slab and two feet of clean fill in the courtyard area;
  14. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
  15. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
  16. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, lists any changes from this RAWP, and, if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site (only applicable if a complete Track 1 cleanup is not achieved); and
  17. If Track 1 is not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency (only applicable if a complete Track 1 cleanup is not achieved).
  18. If Track 1 is not achieved, Recording of a Declaration of Covenants and Restrictions that

includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including 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**

Track 1 SCOs are proposed for this project. In the event that Track 1 cannot be achieved, Track 4 SCOs, listed below, will be incorporated.

Track 4 Site-Specific SCOs proposed for this project consist of Track 2 the following:

<u>Contaminant</u>	<u>Track 4 Site Specific SCOs</u>
Total SVOCs	250 parts per million (ppm)
Barium	800 ppm
Lead	1,000 ppm
Mercury	2 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the attached Soil/Materials Management Plan. The planned excavation spans the entire Site and will extend into native sand.

The entire site will require excavation to a depth of 5 feet below grade. Excavation to a depth of 10 feet below grade will be required in the footprint area of the building. If there are discrete contaminant sources (such as USTs or hotspots), those will be identified during the remedial action by GPS or survey. This information will be provided in the Remedial Action Report.

#### **Estimated Soil/Fill Removal Quantities**

The estimated quantity of soil/fill expected to be excavated and disposed off-Site is 1,700 tons. Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

#### **End-Point Sampling**

Removal actions under this plan will be performed in conjunction with remedial end-point sampling. A

map of end-point sampling locations will be provided in the RAWP stipulation list. In the event that hotspot removal actions are to be performed in conjunction with remedial end-point sampling, its sampling frequency will consist of the following:

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:
  - a. 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.
  - b. 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.
  - c. 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.
  - d. 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 paragraphs a and b above.

Post-remediation 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.

New York State Environmental Laboratory Approval Program (ELAP) certified labs will be used for all end-point sample analyses. Labs for 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. End-point samples will be analyzed for Target Analyte List (TAL) metals by EPA Method 6010B and SVOCs by EPA Method 8270C. If either light non-aqueous phase liquid (LNAPL) and/or dense non-aqueous phase liquid (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**

Quality Assurance/Quality Control (QA/QC) sampling will consist of collecting blind field duplicates, and field blanks. Landmark will perform a completeness check of the analytical data packages and review QA/QC observations and deficiencies.

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 Celsius.

Dedicated disposable sampling materials will be used for the collection of 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 with Alconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

Prepare field blanks by pouring distilled or deionized water over decontaminated equipment and collecting the water in laboratory provided containers. Trip blanks will be used whenever samples are transported to the laboratory for analysis of VOCs. Trip blanks will not be used for samples to be analyzed for metals, SVOCs or pesticides. One blind duplicate sample will be prepared and submitted for analysis for every 20 samples of each matrix.

## **Import and Reuse of Soils**

Native soil that underlies historic fill will be reused in conformance with the Soil/Materials Management Plan in Appendix E. This material will be used to bring the concrete patio and yard areas to grade following excavation and offsite disposal of historic fill. The anticipated quantity of onsite soil expected to be reused on Site is less than 700 tons. Import of soil to the Site is not anticipated; however, if imported soil is required, it will be in conformance with the Soil/Materials Management Plan (Appendix E).

### **4.3 Engineering Controls**

The excavation required for the proposed Site development will achieve Track 1 Unrestricted Use SCOs. No engineering controls are required to address residual contamination at the Site. Since the development depth extends below the water table, a water-proofing membrane, which also acts as a vapor barrier for potential future off site vapor intrusion, will be incorporated into the foundation design. If Track 1 is not achieved, the following two elements will constitute engineering controls that will be employed in the remedial action to address residual contamination.

#### **Composite Cover System**

The entire property will be covered by an engineered permanent cover system comprised of a concrete-building slab beneath the proposed building, concrete patio, or at least two feet of soil that meets the Part 375 Unrestricted Use SCOs. The composite cover system is a permanent engineering control for the Site.

#### **Vapor Barrier**

Migration of soil vapor will be mitigated by incorporating a seamless waterproofing/vapor barrier system as part of the foundation construction. Site development plans include a waterproofing membrane installed underneath the building foundation slab and behind the sidewalls up to grade. The barrier planned for this project W.R. Grace and Co. Construction Products, Inc.'s Preprufe 300R, a HDPE sheet membrane that adheres to poured concrete. A copy of the Grace catalog cut sheets for this vapor barrier is included in Appendix G. A letter from Grace stating that the vapor barrier is compatible with the contaminants at the Site is included in Appendix G. The RAR will include photographs of the installation process as well as a manufacturer's warranty letter for the installation of the vapor barrier.

### **4.4 Institutional Controls**

The proposed remedy will achieve Track 1 Unrestricted Use SCOs; therefore, no institutional controls will be required. However, if Track 1 Unrestricted Use SCOs are not achieved, ICs 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. ICs are listed below. Long-term employment of EC/ICs will be established in a Declaration of Covenant and Restrictions (DCR) assigned to the property by the title holder and will be implemented under a site-specific SMP that will be included in the RAR.

Institutional Controls for this remedial action are:

- Recording of an NYC OER-approved DCR with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the SMP, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the RAR. The DCR will be recorded prior to the NYC OER issuance of the Notice of Completion;
- Submittal of a SMP in the RAR for approval by the NYC OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to the NYC 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 the NYC 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. The NYC OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted annually and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited;
- 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 restricted residential use and will not be used for a higher level of use (i.e., unrestricted residential) without prior approval by the NYC OER.

#### **4.5 Site Management Plan**

Site Management is the last phase of remediation and begins with the approval of the RAR and issuance of the Notice of Completion (NOC) for the Remedial Action. The SMP describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by the DCR and this RAWP. Because excavation efforts will remove impacted soil at the Site and achieve Track 1 Unrestricted Use SCOs, an SMP is not anticipated.

An SMP will be implemented under this Remedial Action if Track 1 Unrestricted Use SCOs are not achieved. The SMP describes appropriate methods and procedures to ensure implementation of all ECs

and ICs that are required by the DCR and this RAWP. The SMP is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management is required until terminated in writing by the NYC OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the DCR and the SMP 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 the NYC OER. This includes a plan for: (1) implementation of EC's and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of EC's; (4) inspection and certification of EC's; and (5) reporting.

Site management activities, reporting, and EC/IC certification will be scheduled on a periodic basis to be established in the SMP and will be subject to review and modification by the NYC OER. The SMP will be based on a calendar year and certification reports will be due for submission to the NYC OER by March 31 of the year following the reporting period.

#### **4.6 Qualitative Human Health Exposure Assessment**

Investigations reported in the RIR are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA).

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 pathways indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Investigation reported in the Remedial Investigation Report (RIR) are sufficient to complete a QHHEA. 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 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 DER-10 Technical Guidance for Site Investigation and Remediation.

#### **Known and Potential Sources**

Based on the results of the RIR, historic fill material is present at the Site from grade to approximately 5

feet below grade. The contaminants of concern found are:

Soil:

- Metals including barium, lead, mercury, selenium, and zinc exceeding Track 2 Restricted-Residential SCOs;
- SVOCs (including acenaphthene, anthracene benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, phenol, and pyrene) exceeding Track 2 Restricted-Residential SCOs; and
- Pesticides including 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT and dieldrin were detected in shallow and deep samples exceeding the Track 1 Unrestricted Use SCOs

Groundwater:

- VOC (bis(2-ethylhexyl)phthalate) exceeding GQS.

Soil vapor:

- Petroleum VOCs detected at low concentrations; and
- Chlorinated VOCs detected at low concentrations and below the NYSDOH monitoring thresholds including PCE.

### **Nature, Extent, Fate and Transport of Contaminants**

Metals and SVOCs are present in the historic fill throughout the site. The metals and SVOCs contaminants were not found in the groundwater samples, indicating that the contamination is not mobilizing into the groundwater or migrating off-site. The one VOC exceedance in groundwater is a plasticizer, whose source is most likely from the PVC pipe forming the monitoring well. The petroleum and chlorinated VOCs identified in the soil vapor were well below guidance issued by New York State DOH and were not found in any of the on-site soil samples collected and likely from an off-site or upgradient/cross gradient source.

### **Potential Routes of Exposure**

The five elements of an exposure pathway are: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a

receptor population. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill, or soil;
- Inhalation of vapors and particulates; and
- Dermal contact with water, fill, soil, or building materials.

### **Existence of Human Health Exposure**

*Current Conditions:* Potential exposure pathways include ingestion and dermal contact with soil/fill. Since the site is capped with asphalt, there is no exposure pathway for soil and groundwater. There is no potential for contaminated soil vapors to accumulate, as there are no structures currently on site. Access to the site is currently controlled by the use of a construction security fence.

*Construction/Remediation Activities:* Once redevelopment activities begin, construction workers could come into direct contact with surface and subsurface soils as a result of on-Site construction/excavation activities. Similarly, off-Site receptors could be exposed to dust from on-Site activities. The potential exposure pathways to onsite contamination are by ingestion, dermal, or inhalation exposure by onsite workers during the remedial action and offsite due to emission of fugitive dust. During the remedial action, on-site and offsite exposure pathways will be minimized by preventing access to the site, through implementation of soil/materials management, dust controls, PPE (if needed), and a CHASP.

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

for ingestion, inhalation, or dermal exposure to contaminants derived from the site under future conditions.

### **Receptor Populations**

*On-Site Receptors:* During construction, onsite receptors will include construction worker and visitors. After construction, onsite receptors will include child and adult residents.

*Off-Site Receptors:* Potential off-site receptors within a 0.25-mile radius of the Site include: adult and child residents, and commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

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

### **Overall Human Health Exposure Assessment**

The proposed development will consist of the construction of a 4-story residential building. The proposed building will span the 3,000 square feet (approximately 60% of the Site lot) and include a cellar level extending to a depth of 10 feet below the existing grade. Soil/fill material exceeding Part 375 Unrestricted Use SCOs will be removed during Site development, eliminating a threat to human health or the environment. Additionally, the impermeable cap (i.e., the proposed development), soil cap, and vapor barrier will eliminate threat to human health.

Based upon this analysis, complete on-Site exposure pathways appear to be present only during the current unremediated phase and the remedial action phase. Under current conditions, on-Site exposure pathways are minimized by preventing access to the Site. During remedial construction, on-Site and off-Site exposures to dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air-monitoring Program and a Construction Health and Safety Plan. After the remedial action is complete, there will be no remaining exposure pathways to on-Site soil/fill, as the entire Site will be capped with

an engineered composite cover system, and the vapor barrier and concrete building slab will interrupt potential for soil vapor intrusion.

## **5.0 REMEDIAL ACTION MANAGEMENT**

### **5.1 Project Organization and Oversight**

Principal personnel who will participate in the remedial action include Andrew Gasparro, field team leader. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Richard Zaloum and Paul McGaha, respectively.

### **5.2 Site Security**

Site access will be controlled through gated entrances to the fenced property.

### **5.3 Work Hours**

The hours for operation of remedial construction will be from 7:00 a.m. to 5:00 p.m. Monday through Friday. These hours conform to the New York City Department of Buildings construction code requirements or specific variances issued by that agency.

### **5.4 Construction Health and Safety Plan**

The Health and Safety Plan is included in Appendix B. The Site Safety Coordinator will be Paul McGaha, CHMM. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and United States Occupational Health and Safety Administration (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 Code of Federal Regulations (CFR) 1910.120, including 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 be required to sign a HASP acknowledgment. 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 HASP. 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 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. VOC and particulate concentrations that exceed the CAMP action levels will be reported to the NYC 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 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.

Monitoring for VOCs can be temporarily discontinued during active construction activity if:

- No active excavation of soils is taking place; and
- VOC levels have been evaluated and determined to be no greater than background levels

Monitoring for VOCs can be temporarily discontinued when handling or loading stockpiled soil that has already been subject to visual, olfactory and screening with a photo-ionization detector (PID) during the original excavation under the supervision of a PE/QEP, and the excavated soil did not exhibit gross contamination or elevated PID readings, and the original excavation did not result in elevated VOC levels in the community air. Appropriate segregation measures will be implemented to ensure that a mixing of petroleum impacted soil stockpiles with non-petroleum impacted soil stockpiles does not occur.

### **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 (PM10) 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 PM10 particulate level is 100 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) 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 PM10 particulate levels do not exceed 150  $\text{mcg}/\text{m}^3$  above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 particulate levels are greater than 150  $\text{mcg}/\text{m}^3$  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 PM10 particulate concentration to within 150 mcg/m<sup>3</sup> of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for NYC 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 the NYC 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**

NYC OER personnel 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 to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout 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**

Excavation is anticipated to extend below the groundwater table and will require dewatering. Submersible pumps will be used to extract groundwater from gravel lined sumps in the excavations or a system of well points will be used for groundwater extraction. Extracted groundwater will be conveyed to a storage tank or treatment system. Depending on the selected discharge option, a NYC DEP sewer use permit may be obtained to discharge treated groundwater to the sewer system.

### **Equipment and Material Staging**

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. Trucks will enter and exit the Site via temporary curb ramps. Direct load out of excavated materials is planned so stockpiling is not anticipated.

### **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 roads 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 NYC VCP 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 potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

## 5.8 Traffic Control

Drivers of trucks leaving the NYC VCP 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 shown on Figure 4.

## 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 NYC OER Project Manager by the end of the following day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of 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 excursions, if any;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with the NYC OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to NYC 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 NYC OER project manager by personal communication. Daily reports will be included as an Appendix in the RAR.

### **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 NYC 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 the NYC OER. Complaints will be addressed and outcomes will also be reported to the NYC OER in daily reports. Notices to the NYC 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 the NYC OER Project Manager and will be documented in daily reports and reported in the RAR. The process to be followed if there are any deviations from the RAWP will include a request for approval for the change from the NYC OER noting the following:

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

## 6.0 REMEDIAL ACTION REPORT

An 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;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- SMP (if required);
- 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 and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account 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.
- Recorded Declaration of Covenants and Restrictions (if required).
- Reports and supporting material will be submitted in digital form.

## Remedial Action Report Certification

The following certification will appear in front of the Executive Summary of the Remedial Action Report. The certification will include the following statements:

*I, Richard Zaloum, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the 45 India Street Site (NYC VCP Project #13CVCP098K).*

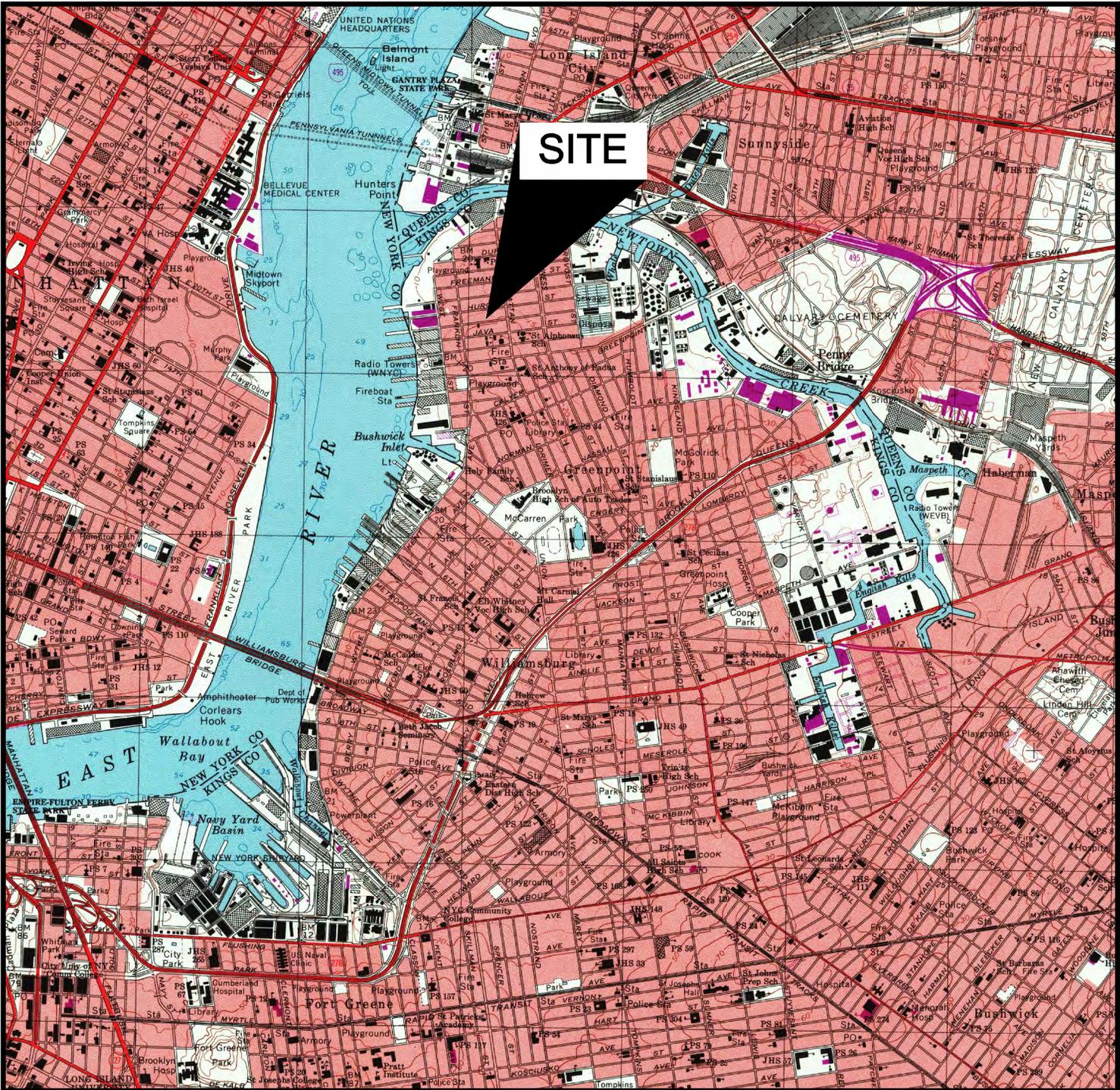
*I certify that the OER-approved Remedial Action Work Plan dated **OCTOBER 2012** and Stipulations in a letter dated **MONTH DAY, YEAR**; if any were implemented and that all requirements in those documents have been substantively complied with. I certify that contaminated soil, fill, liquids or other material from the property were taken to facilities licensed to accept this material in full compliance with applicable laws and regulations.*

## 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 6 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	4
Demobilization	5	1
Submit RAR	15	20

## **FIGURES**



SOURCE: USGS 7.5 MINUTE SERIES  
 TOPOGRAPHIC QUADRANGLE 1995  
 BROOKLYN, NEW YORK  
 CONTOUR INTERVAL = 10'



QUADRANGLE LOCATION



**LANDMARK**

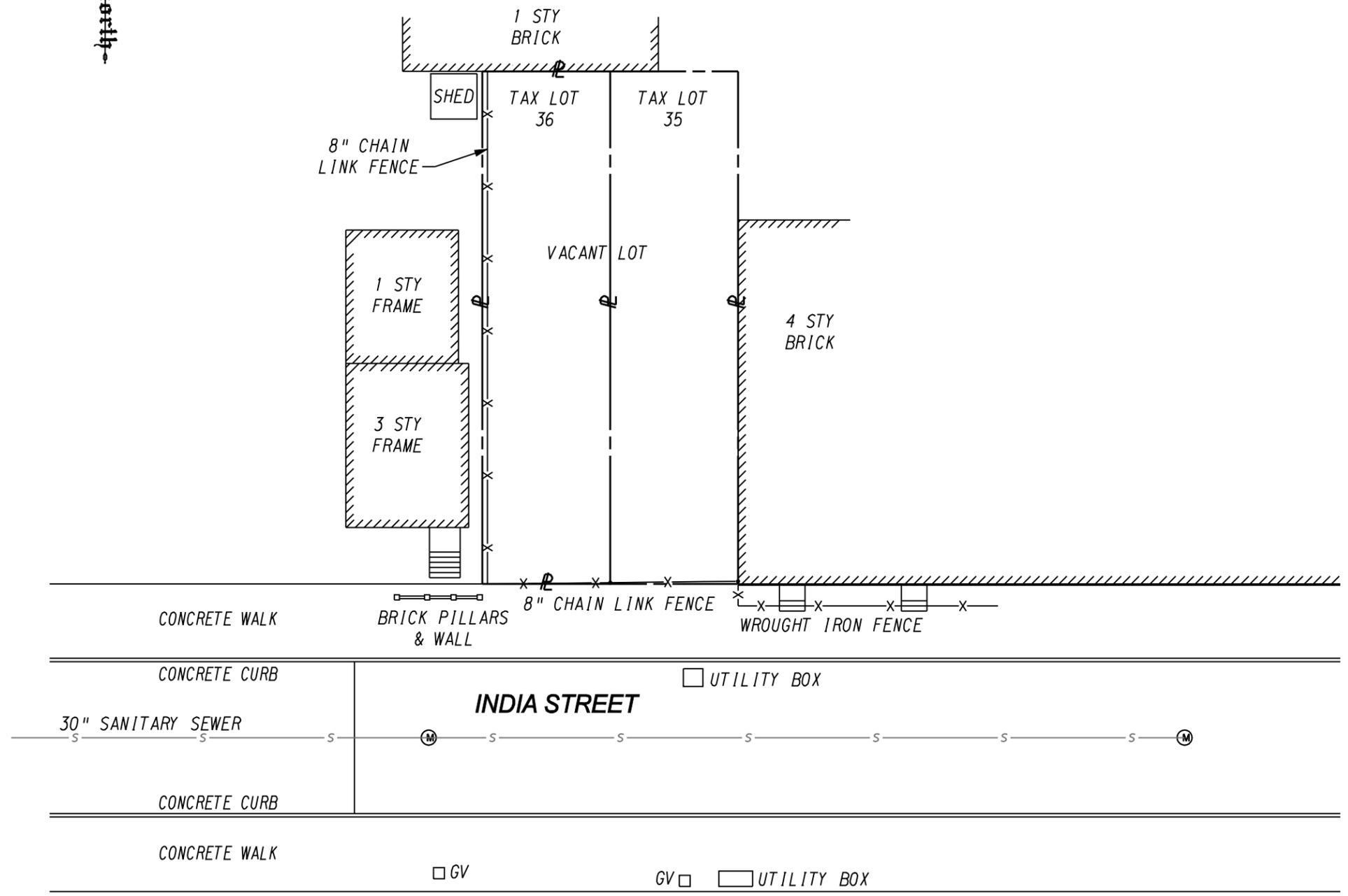
U.S.G.S. TOPOGRAPHIC MAP

**SITE LOCATION MAP**  
 45 INDIA STREET CONDOMINIUMS  
 BROOKLYN, NEW YORK



DATE  
 10/07/12

FIGURE  
 1



45 INDIA STREET CONDOMINIUMS  
BROOKLYN NEW YORK

SITE LAYOUT PLAN

FIGURE 2



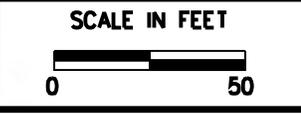
**SITE LOCATION:** 45 INDIA STREET, BROOKLYN, NY

**SOURCE:**

NY 2011 ORTHOPHOTOGRAPHY  
GIS.NY.GOV

**PROJECT NAME:** 45 INDIA STREET

**SURROUNDING LAND USE MAP**



**DATE**  
10/21/12

**FIGURE**  
**3**



**NEW**  
Kent Avenue  
 is a one-way  
 northbound  
 Local Truck Route

**LEGEND**

- Local Truck Routes
- - - Limited Local Truck Routes
- Through Truck Routes
- Through Truck Routes on Expressway
- COMMERCIAL VEHICLES PROHIBITED on Parkways and Other Highways
- Principal Streets
- Parks
- Open Space or Cemeteries
- Industrial or Institutional Areas
- Airports
- Interstate Route
- Interstate and Highway Exits
- MTA Bridges and Tunnels Transportation Facility Operator\*
- Port Authority of NY & NJ Transportation Facility Operator\*

**NOTE:**  
 INDIA STREET IS A  
 ONE WAY STREET.

**LANDMARK**

**45 INDIA STREET, BROOKLYN, NY**  
**TRUCK ROUTE MAP**

SCALE: NOT TO SCALE

DATE: 10/21/12

FIGURE **4**

## **TABLES**

**TABLE 1 - TRACK 1 SOIL CLEANUP OBJECTIVES  
 REMEDIAL ACTION WORK PLAN  
 45 INDIA STREET, BROOKLYN, NEW YORK**

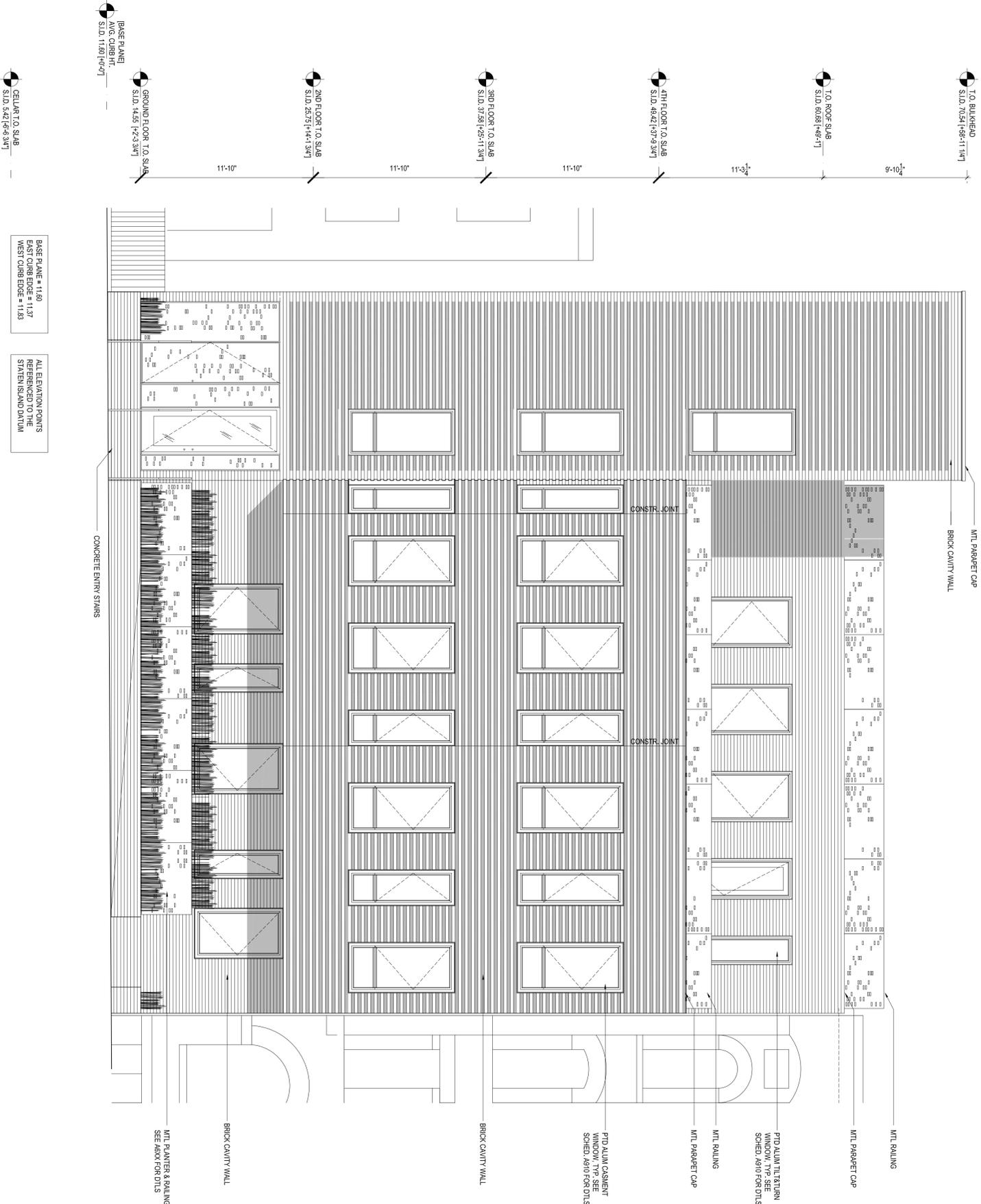
Contaminant	Unrestricted Use (mg/kg) <sup>(1)</sup>
4,4'-DDE	0.0033
4,4'-DDD	0.0033
4,4'-DDT	0.0033
Dieldrin	0.005
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(k)fluoranthene	0.8
Chrysene	1
Dibenzo(a,h)anthracene	0.33
Indeno(1,2,3-cd)pyrene	0.5
Phenol	0.33
Barium	350
Cadmium	2.5
Lead	63
Mercury	0.18
Zinc	109

<sup>(1)</sup> - Adapted from 6 NYCRR PART 375 Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

<sup>(2)</sup> - For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.



**APPENDIX A**  
Proposed Redevelopment Plans



BASE PLANE = 11.80  
EAST CURB EDGE = 11.37  
WEST CURB EDGE = 11.33

ALL ELEVATION POINTS  
REFERENCED TO THE  
STATEN ISLAND DATUM

BUILDING SOUTH ELEVATION  
SCALE: 1/4"=1'-0"

**GENERAL BRICK NOTES:**

1. ALL BRICK TO BE Laid PLUMB & TRUE TO LINES
2. ALL MORTAR JOINTS TO BE 3/8" TYP. & COMPLETELY FILLED. DO NOT FLUSH BED JOINTS.
3. KEEP ALL WALL CAVITIES CLEAN THROUGHOUT CONSTRUCTION. BRICKWORK SHALL BE CLEANED WITH A MIN. 2" CLEAR CAVITY BETWEEN REAR FACE OF BRICK & FACE OF INSULATION.
4. ALL CAVITY WALLS TO BE WEPTED @ 24" O.C. MAX. ABOVE GRADE CONDITION. WINDOW & DOOR HEADS & REAR FACE JOINTS SHALL BE WEPTED WITH AN ALUMINUM FLASHING. FLASHING SHALL BE SOLDERED OVER A WATER TIGHT CORNER.
5. RELIEFING ANGLES TO BE APPROPRIATELY FLASHED. PROVIDE END DAMS AT THE BASE OF BRICK FLASHING. FLASHING SHALL BE SOLDERED OVER A WATER TIGHT CORNER.
6. KEEP CONSTRUCTION JOINTS CLEAN OF ALL MORTAR & DEBRIS. ALIGNED WITH OUTSIDE EDGE OF WINDOW OPENINGS AS NOTICED ON DINGS. PROVIDE CONSISTENT SEALANT. COLOR TO BE SPECIFIED BY ARCHITECT.
7. ALL CONNECTIONS BETWEEN ALUMINUM & STEEL STRUCTURE TO BE SEPARATED BY NEOPRENE WASHERS TO AVOID GALVANIC CORROSION.
8. CONTRACTOR TO PROVIDE ALL COMPONENTS NECESSARY FOR INSTALLATION INCLUDING BUT NOT LIMITED TO BOLTS, ANCHORS, FLASHING, LINTELS, VENTS & EXPANSION JOINTS.
9. PROVIDE (1) LOCKING/SECURE FRAME FOR ARCHITECT APPROVED BRICK CORNER AND PARAPET CORNER JOINT SIZING & BOND PATTERN MOCKUP AREA (TB)

**CONSTRUCTION TOLERANCES:**

1. MAXIMUM VARIATION FROM PLUMB IN VERTICAL LINES & SURFACES OF COLUMNS, WALLS & ARCHESSES:
  - A. 1/2" IN 10 FT.
  - B. 1/2" IN A STORY HEIGHT NOT TO EXCEED 20 FT.
  - C. 1/2" IN 40 FT. OR MORE
2. MAXIMUM VARIATION FROM PLUMB FOR EXTERNAL CORNERS, EXPANSION JOINTS & OTHER CONSPICUOUS LINES:
  - A. 1/2" IN ANY STORY OR 20 FT. MAXIMUM
  - B. 1/2" IN 40 FT. OR MORE
3. MAXIMUM VARIATION FROM LEVEL OF GRUBES FOR EXPOSED LINTELS, SILLS, PARAPETS, HORIZONTAL GROOVES & OTHER CONSPICUOUS LINES:
  - A. 1/2" IN ANY BAY OR 20 FT.
  - B. 1/2" IN 40 FT. OR MORE
4. MAXIMUM VARIATION FROM PLAN LOCATION OF RELATED PORTIONS OF COLUMNS, WALLS & PARTITIONS:
  - A. 1/2" IN ANY BAY OR 20 FT.
  - B. 1/2" IN 40 FT. OR MORE
5. MAXIMUM VARIATION IN GROSS-SECTIONAL DIMENSIONS OF ALL STRUCTURAL MEMBERS FROM DIMENSIONS SHOWN ON DRAWINGS:
  - A. MINUS 1/2"
  - B. PLUS 1/2"

owner

**KENRY CORP.**  
33-35 SOUTH 8TH STREET, BROOKLYN, NY 11211  
phone: 718.599.0031 email: JIMMY@EUROSTRUCT.COM

architect

**lubrano ciavarra architects, pllc**  
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structural engineer

**YU ENGINEER PLLC**  
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phone: 917.217.4010 email: VIRGILYU@AOL.COM

mechanical engineer

**M.A. RUBIANO P.C.**  
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phone: 718.596.4108 email: marpepc@aol.com

code consultant

**JAM CONSULTING INC.**  
104 WEST 29TH STREET, NEW YORK NY 10001  
phone: 212.244.4427 email: canderson@jamny.com

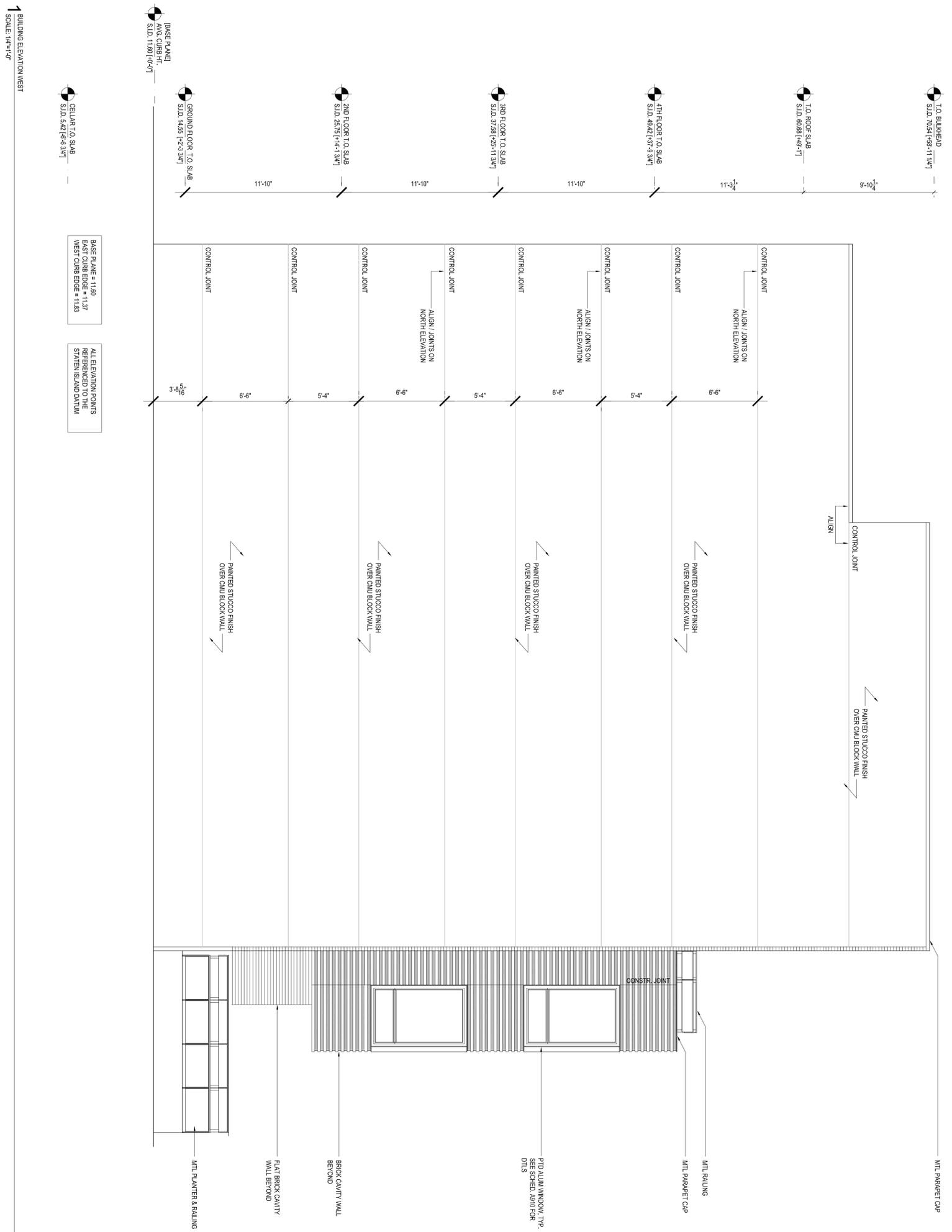
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**45 INDIA STREET CONDOMINIUMS**  
45 INDIA STREET BROOKLYN, NY 11222

ISSUED FOR DOB APPROVAL	30 APRIL 2012
SEAL	ARCHITECT
AM	PROJECT MANAGER
TC	TC
TC	DRAWN BY
TC	TC

SOUTH ELEVATION  
BUILDING ELEVATION  
A-200.00  
PAGE 14 OF 31



- GENERAL BRICK NOTES:**
1. ALL BRICK TO BE Laid PLUMB & TRUE TO LINES
  2. ALL MORTAR JOINTS TO BE 3/4" TYP. & COMPLETELY FILLED. DO NOT FORM ON BED JOINTS.
  3. KEEP ALL WALL CAVITIES CLEAN THROUGHOUT CONSTRUCTION. ALL BRICK CAVITY WALLS TO MAINTAIN MIN. 2" CLEAR CAVITY BETWEEN REAR FACE OF BRICK & FACE OF INSULATION.
  4. ALL CAVITY WALLS TO BE WEEDED @ 24" O.C. MAX ABOVE GRADE CONDITION. WINDOW & DOOR HEADS & RELIEFING ANGLES. INSTALL MORTAR CONTROL DEVICES TO KEEP ALL WEED HOLES & AREA ABOVE FLASHING FREE OF MORTAR DROPPINGS.
  5. RELIEFING ANGLES TO BE APPROPRIATELY FLASHED. PROVIDE END DAMS AT THE BASE OF BRICK FLASHING. TERMINATIONS AT ALL OPENINGS. END DAMS TO BE SS FLASHING. BENT & SOLDERED FOR A WATER-TIGHT CORNER.
  6. KEEP CONSTRUCTION JOINTS CLEAN OF ALL MORTAR & DEBRIS. ALIGN WITH OUTSIDE EDGE OF WINDOW OPENINGS AS INDICATED ON DWGS. PROVIDE CONSISTENT & CONTINUOUS CALK/Joint W/ EXTERIOR GRADE SEALANT. COLOR TO BE SPECIFIED BY ARCHITECT.
  7. ALL CONNECTIONS BETWEEN ALUMINUM & STEEL STRUCTURE TO BE SEPARATED BY REINFORCE WASHERS TO AVOID GALVANIC CORROSION.
  8. CONTRACTOR TO PROVIDE ALL COMPONENTS NECESSARY FOR INSTALLATION INCLUDING BUT NOT LIMITED TO: FLASHING, ANCHORS, FLASHING, LINTELS, VENTS & EXPANSION JOINTS.
  9. PROVIDE (1) MOCKUP/SAMPLE PANEL FOR ARCHITECT APPROVAL OF BRICK COLOR, MORTAR COLOR, JOINT SIZING & BOND PATTERN. MOCKUP AREA 1'00"
- CONSTRUCTION TOLERANCES:**
1. MAXIMUM VARIATION FROM PLUMB IN VERTICAL LINES & SURFACES OF COLUMNS, WALLS & ARCHES:
    - A. 1/2" IN 10 FT.
    - B. 3/4" IN A STORY HEIGHT NOT TO EXCEED 20 FT.
    - C. 1/2" IN 40 FT. OR MORE.
  2. MAXIMUM VARIATION FROM PLUMB FOR EXTERNAL CORNERS, EXPANSION JOINTS & OTHER CONSPICUOUS LINES:
    - A. 1/2" IN ANY STORY OR 20 FT. MAXIMUM
    - B. 3/4" IN 40 FT. OR MORE
  3. MAXIMUM VARIATION FROM LEVEL OF GRADES FOR EXPOSED LINTELS, SILL, PARAPETS, HORIZONTAL GROOVES & OTHER CONSPICUOUS LINES:
    - A. 1/2" IN ANY BAY OR 20 FT.
    - B. 3/4" IN 40 FT. OR MORE.
  4. MAXIMUM VARIATION FROM PLAN LOCATION OF REINFORCED PORTIONS OF COLUMNS, WALLS & PARTITIONS:
    - A. 1/2" IN 10 FT. OR 20 FT.
    - B. 3/4" IN 40 FT. OR MORE
  5. MAXIMUM VARIATION IN CROSS-SECTIONAL DIMENSIONS OF COLUMNS & THICKNESSES OF WALLS FROM DIMENSIONS SHOWN ON DRAWINGS:
    - A. MINUS 1/2"
    - B. PLUS 3/2"

**BASE PLANE = 1150**  
EAST CURB EDGE = 11.37  
WEST CURB EDGE = 11.83

ALL ELEVATION POINTS REFERENCED TO THE STATEN ISLAND DATUM

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

BUILDING ELEVATION WEST

BASE PLANE  
AVG CURB Ht.  
SID. 11.80 [14'-0"]

GROUND FLOOR TO SLAB  
SID. 14.39 [12'-9 3/4"]

2ND FLOOR TO SLAB  
SID. 25.75 [14'-1 3/4"]

3RD FLOOR TO SLAB  
SID. 37.38 [14'-1 3/4"]

4TH FLOOR TO SLAB  
SID. 48.42 [14'-9 3/4"]

T.O. BULKHEAD  
SID. 70.54 [14'-8 11/16"]

T.O. ROOF SLAB  
SID. 80.88 [14'-9 1/2"]

CEILING TO SLAB  
SID. 4.42 [4'-6 3/4"]

CONSTRUCTION TOLERANCES:

1. MAXIMUM VARIATION FROM PLUMB IN VERTICAL LINES & SURFACES OF COLUMNS, WALLS & ARCHES:
  - A. 1/2" IN 10 FT.
  - B. 3/4" IN A STORY HEIGHT NOT TO EXCEED 20 FT.
  - C. 1/2" IN 40 FT. OR MORE.
2. MAXIMUM VARIATION FROM PLUMB FOR EXTERNAL CORNERS, EXPANSION JOINTS & OTHER CONSPICUOUS LINES:
  - A. 1/2" IN ANY STORY OR 20 FT. MAXIMUM
  - B. 3/4" IN 40 FT. OR MORE
3. MAXIMUM VARIATION FROM LEVEL OF GRADES FOR EXPOSED LINTELS, SILL, PARAPETS, HORIZONTAL GROOVES & OTHER CONSPICUOUS LINES:
  - A. 1/2" IN ANY BAY OR 20 FT.
  - B. 3/4" IN 40 FT. OR MORE.
4. MAXIMUM VARIATION FROM PLAN LOCATION OF REINFORCED PORTIONS OF COLUMNS, WALLS & PARTITIONS:
  - A. 1/2" IN 10 FT. OR 20 FT.
  - B. 3/4" IN 40 FT. OR MORE
5. MAXIMUM VARIATION IN CROSS-SECTIONAL DIMENSIONS OF COLUMNS & THICKNESSES OF WALLS FROM DIMENSIONS SHOWN ON DRAWINGS:
  - A. MINUS 1/2"
  - B. PLUS 3/2"

# 45 INDIA STREET CONDOMINIUMS

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ISSUED FOR DOB APPROVAL

30 APRIL 2012

ARCHITECT

PROJECT MANAGER

DRAWN BY

WEST ELEVATION

BUILDING ELEVATION

A-210.00

PAGE 15 OF 31

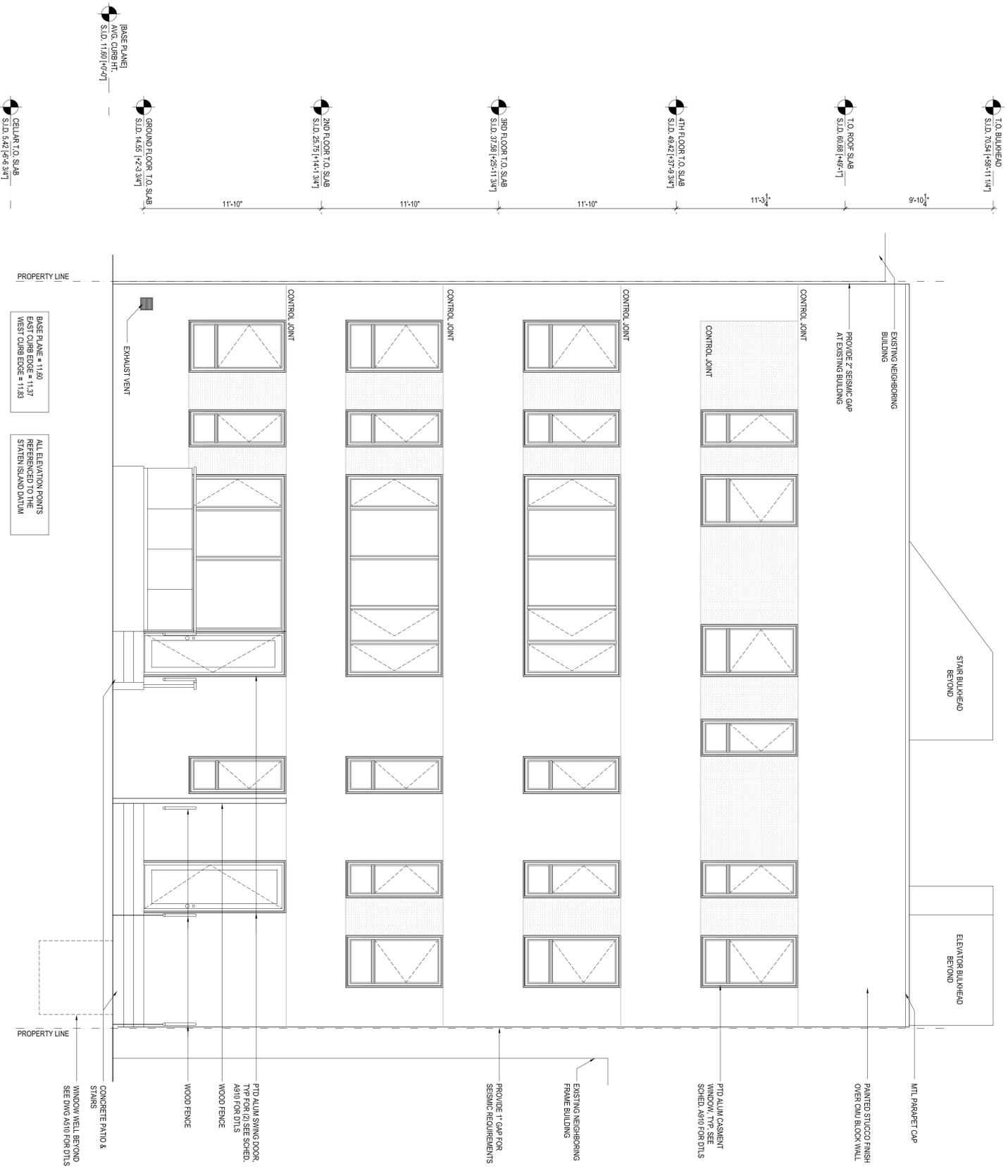
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PROJECT



BASE PLANE = 11.89'  
 FINISH FLOOR TO WEST CURB EDGE = 11.37'  
 ALL ELEVATION POINTS REFER TO THE STATION ISLAND DATUM

NOTE: ALIGN CONTROL JOINTS IN STUCCO FINISH WITH EDGES OF WINDOW OPENINGS TYP.

BUILDING ELEVATION NORTH  
 SCALE: 1/4" = 1'-0"

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ISSUED FOR DOB APPROVAL	30 APRIL 2012
ARCHITECT	AM
PROJECT MANAGER	TC
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# 45 INDIA STREET CONDOMINIUMS

45 INDIA STREET BROOKLYN, NY 11222

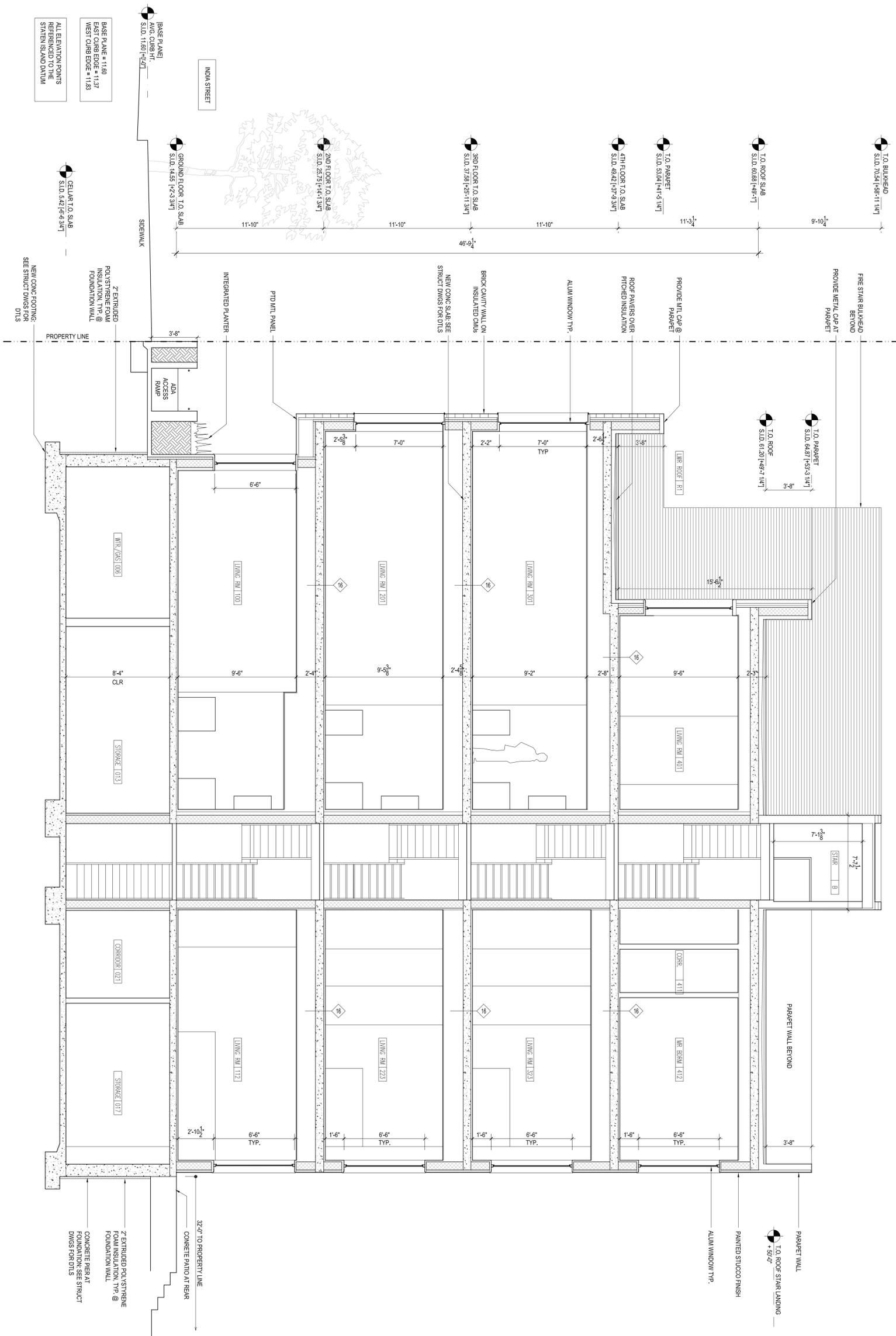
PROJECT

NORTH ELEVATION

BUILDING ELEVATION

**A-220.00**

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BUILDING SECTION  
SCALE: 1/4"=1'-0"

ALL ELEVATION POINTS REFERENCED TO THE STATEN ISLAND DATUM

BASE PLANE = 11.81  
EAST CURB EDGE = 11.37  
WEST CURB EDGE = 11.83

CELANAR TO SLAB  
S.I.D. 5.42 (5'-4" 3/4")

# 45 INDIA STREET CONDOMINIUMS

45 INDIA STREET BROOKLYN, NY 11222

BUILDING SECTION	PROJECT
A-300.00	PAGE 17 OF 31
SEAL	ISSUED FOR DOB APPROVAL
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PROJECT MANAGER	AM
TC	TC
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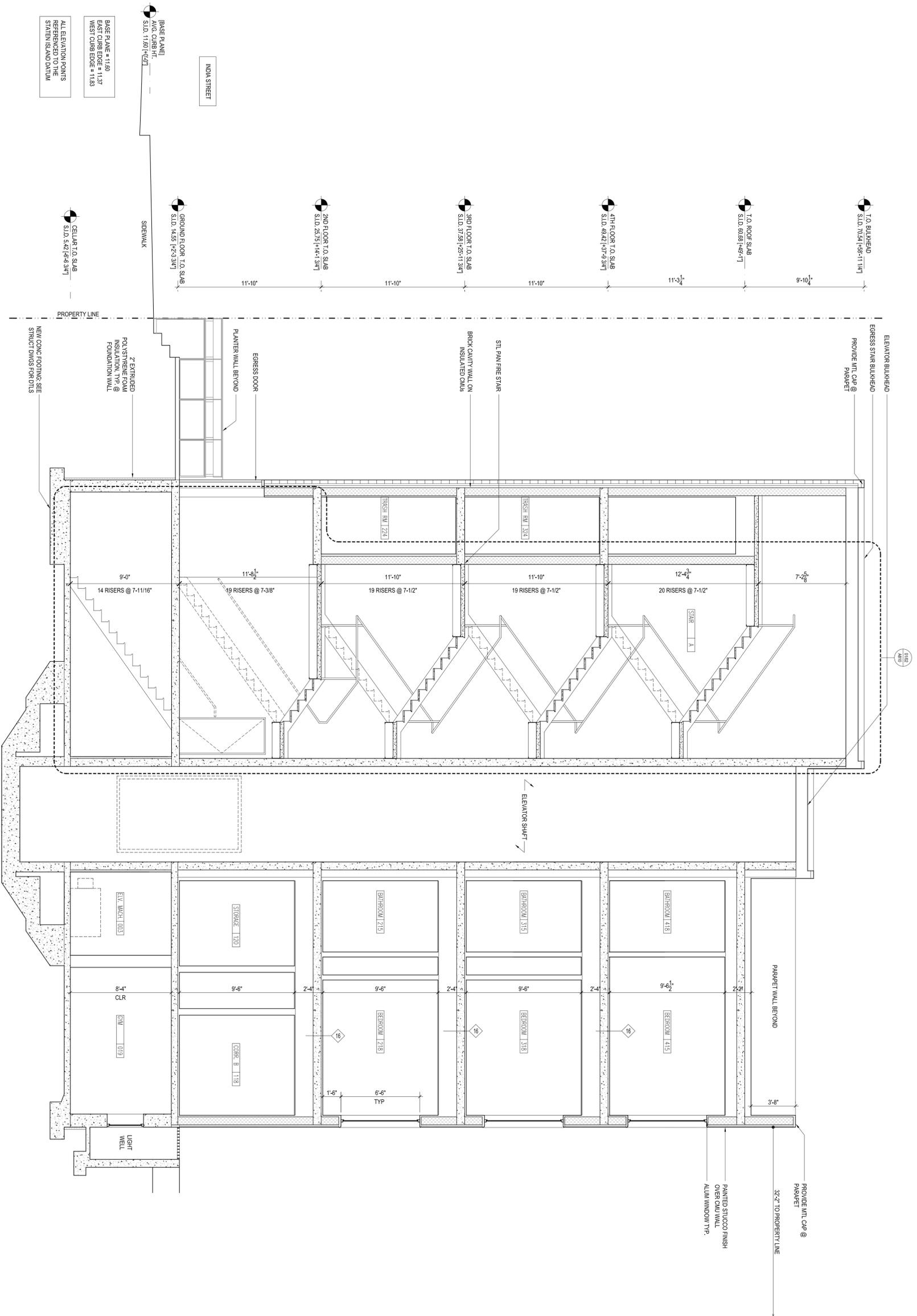
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BUILDING SECTION  
SCALE: 1/4"=1'-0"

BASE PLANE  
AVG. CURB HT.  
S.I.D. 115.91 [4'-0.27']

BASE PLANE  
EAST CURB EDGE = 11.83  
WEST CURB EDGE = 11.83

ALL ELEVATION POINTS  
REFERENCED TO THE  
STATENS/LAND DATUM

# 45 INDIA STREET CONDOMINIUMS

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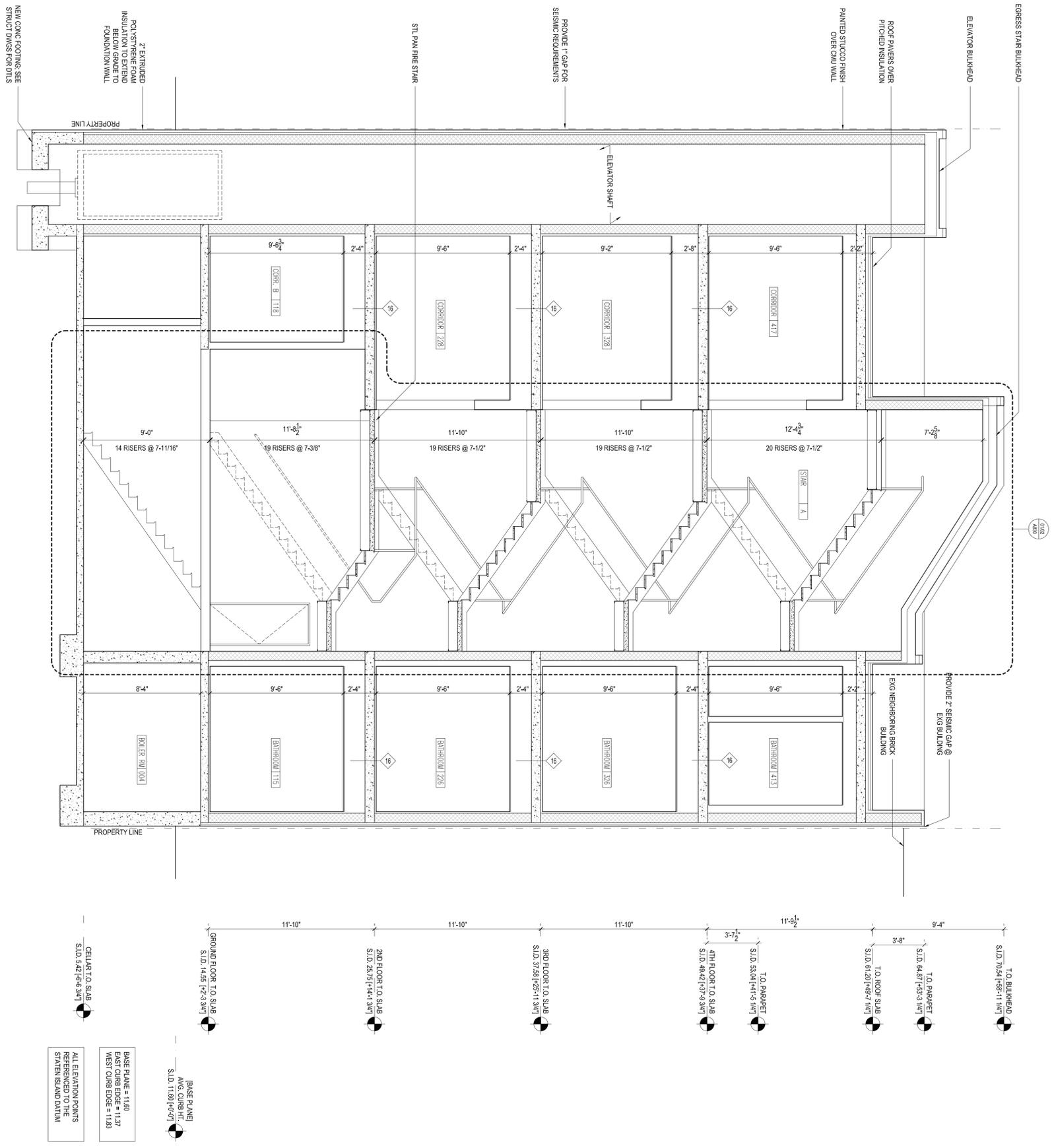
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PROJECT MANAGER	TC
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BUILDING SECTION	A-310.00
PAGE	18 OF 31



BUILDING SECTION  
SCALE: 1/4"=1'-0"

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AM

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BUILDING SECTION

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PAGE 19 OF 31

SEAL

PROJECT MANAGER

ARCHITECT

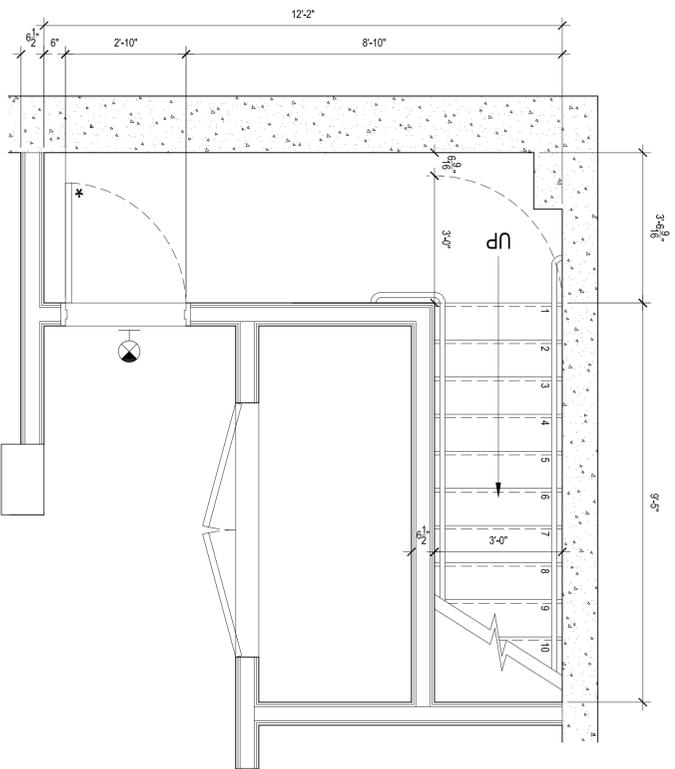
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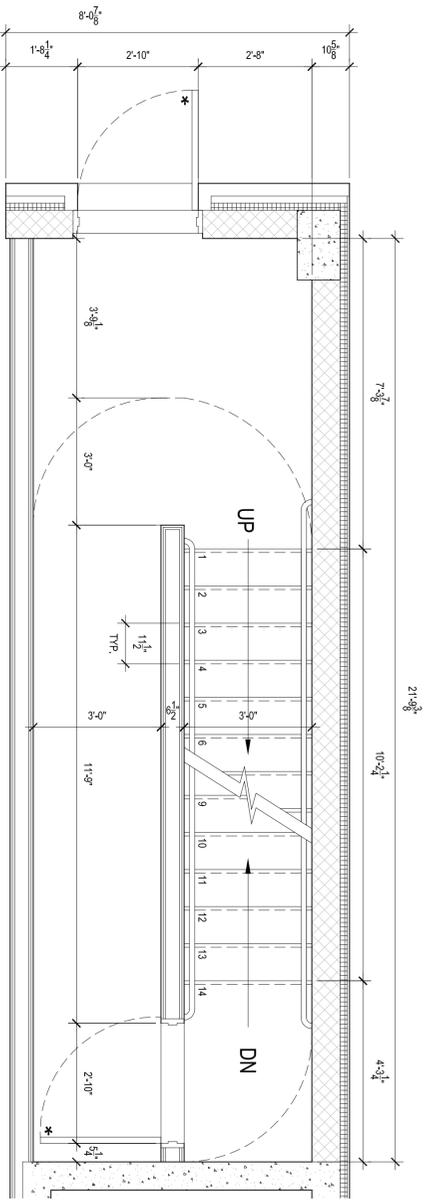
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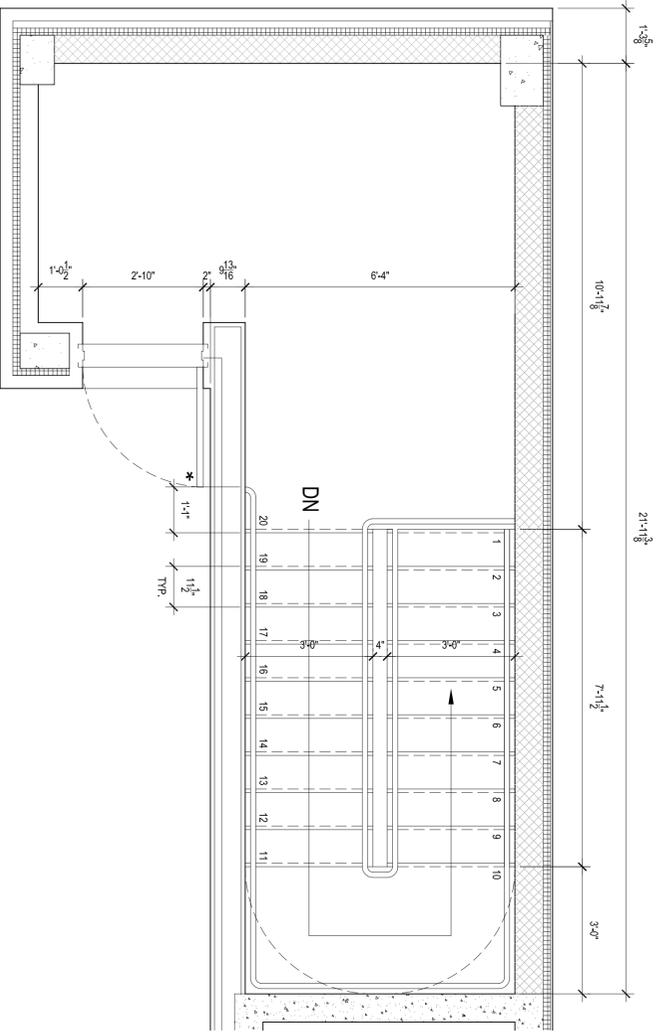
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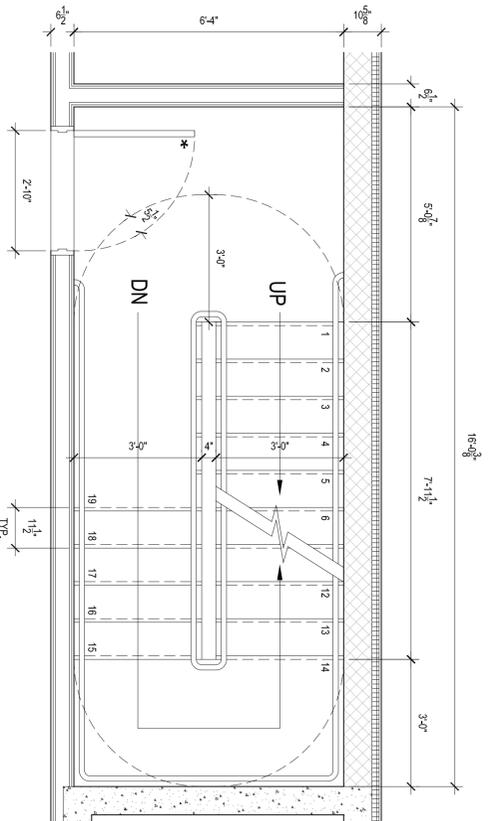
1 CORE A DETAIL CELLAR PLAN  
SCALE: 1/2"=1'-0"



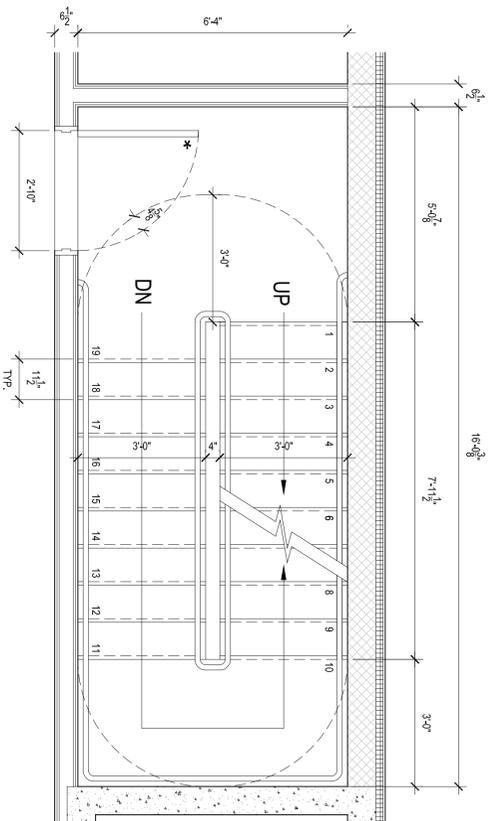
2 CORE A DETAIL GROUND FLOOR PLAN  
SCALE: 1/2"=1'-0"



3 CORE A DETAIL ROOF BULKHEAD PLAN  
SCALE: 1/2"=1'-0"



4 CORE A DETAIL SECOND FLOOR PLAN  
SCALE: 1/2"=1'-0"



5 CORE A DETAIL THIRD & FOURTH FLOOR PLAN  
SCALE: 1/2"=1'-0"

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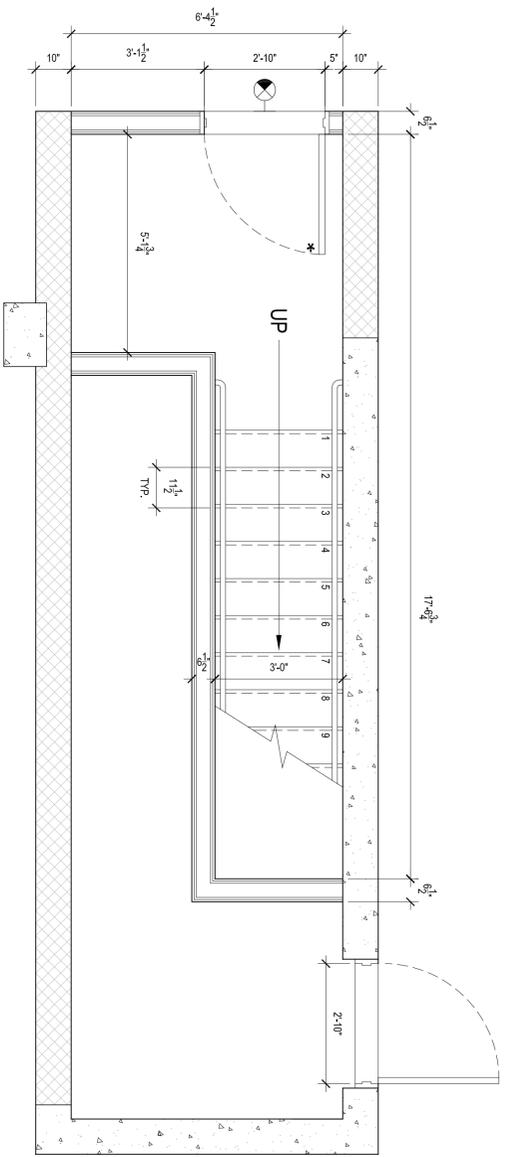
PLANS  
 SERVICE CORE A DETAILS  
**A-800.00**  
 PAGE 20 OF 31

# 45 INDIA STREET CONDOMINIUMS

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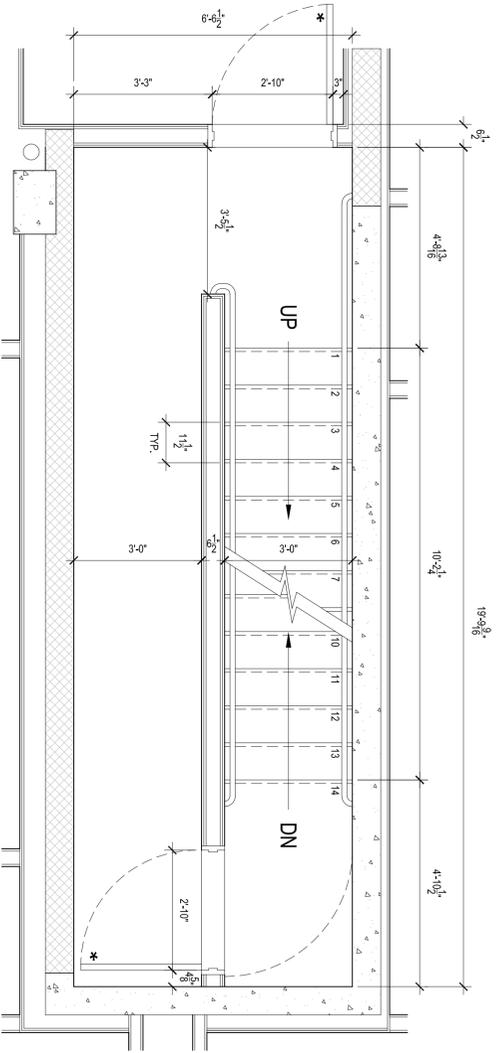
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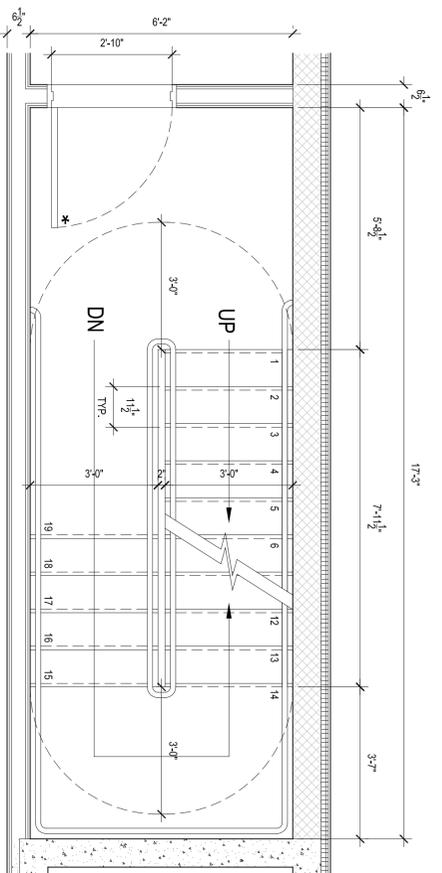
1 CORE B DETAIL CELLAR PLAN

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



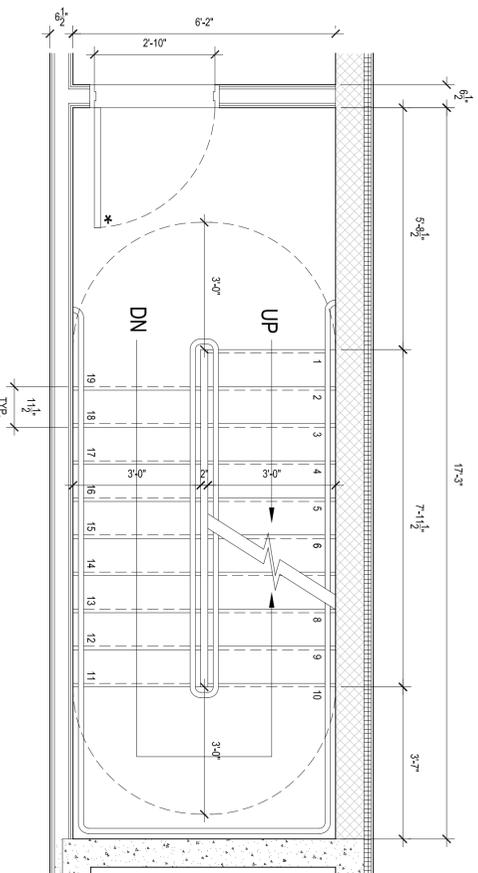
2 CORE B DETAIL GROUND FLOOR PLAN

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



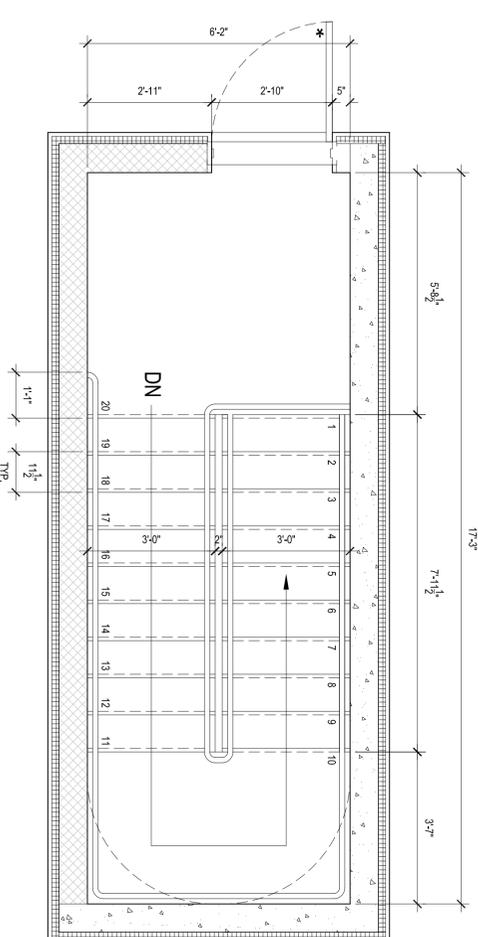
3 CORE B DETAIL SECOND FLOOR PLAN

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



4 CORE B DETAIL THIRD & FOURTH FLOOR PLAN

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



5 CORE B DETAIL ROOF BALCONY PLAN

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

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ISSUED FOR DOB APPROVAL

30 APRIL 2012

SEAL

ARCHITECT

AM

PROJECT MANAGER

TC

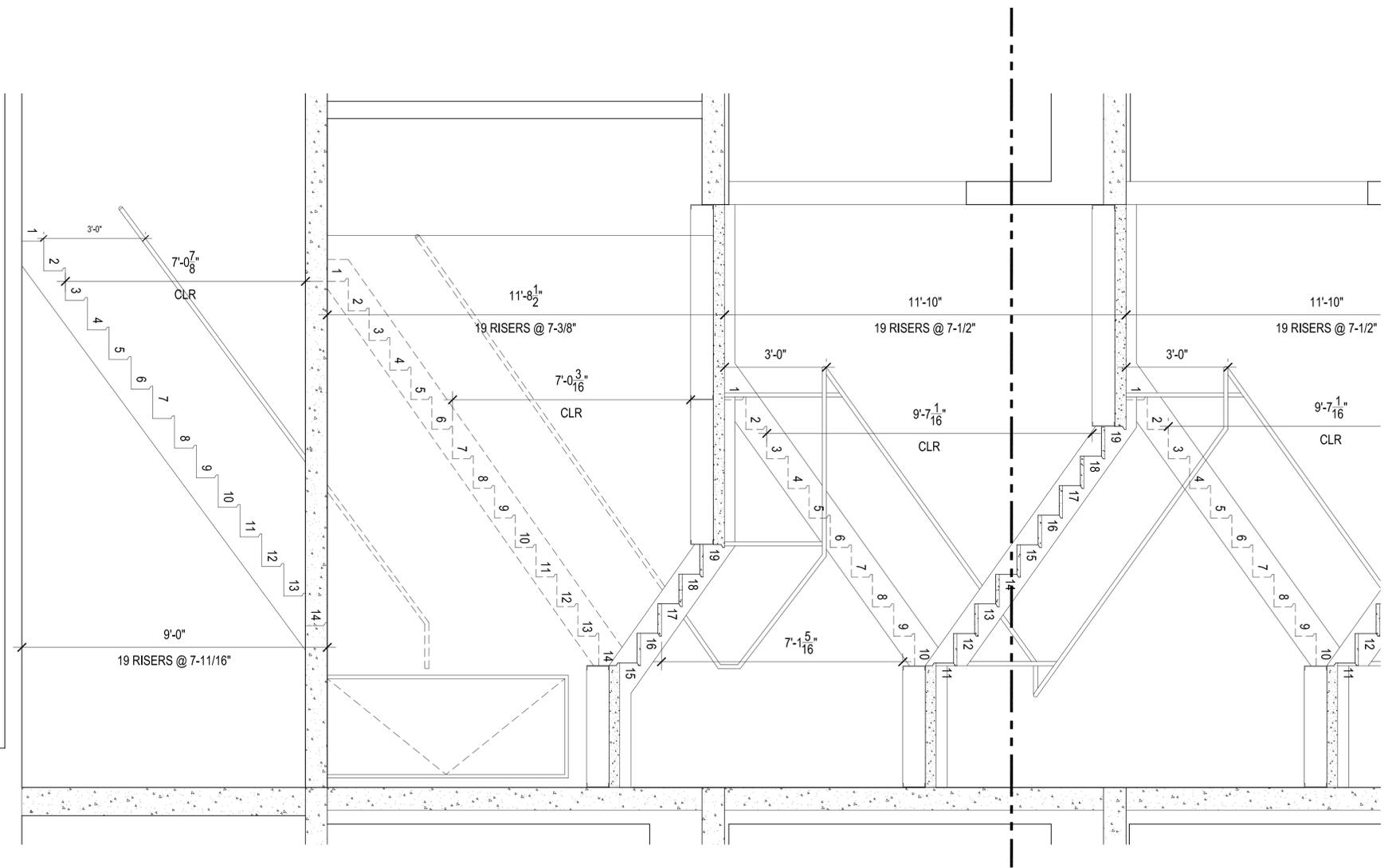
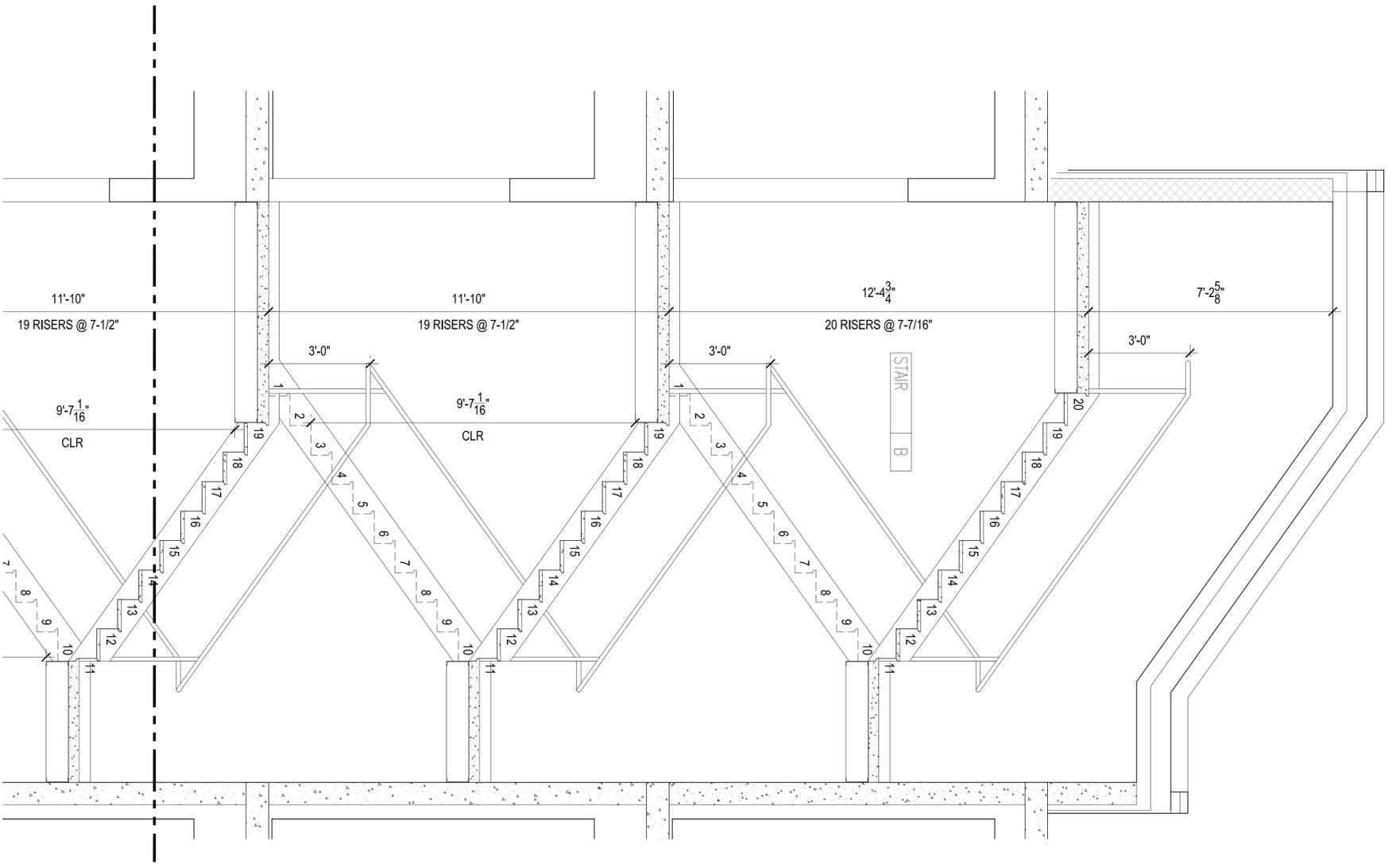
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PLANS  
SERVICE CORE | B | DETAILS

**A-820.00**  
PAGE 22 OF 31



CORE A DETAIL SECTION  
SCALE: 1/2"=1'-0"

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SECTION SERVICE CORE [B] DETAILS	ISSUED FOR DOB APPROVAL	30 APRIL 2012
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PROJECT MANAGER	TC	TC
DRAWN BY	TC	TC

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PAGE 23 OF 31

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**DOOR SCHEDULE**

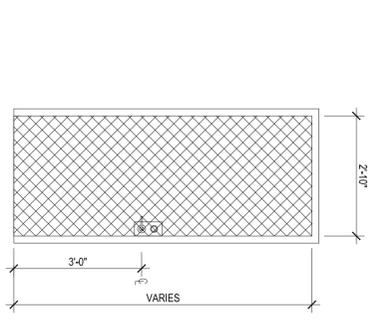
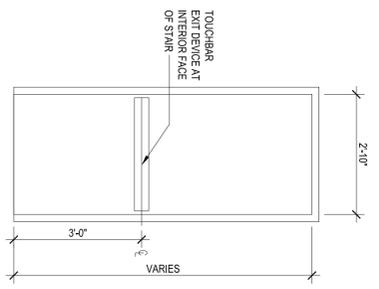
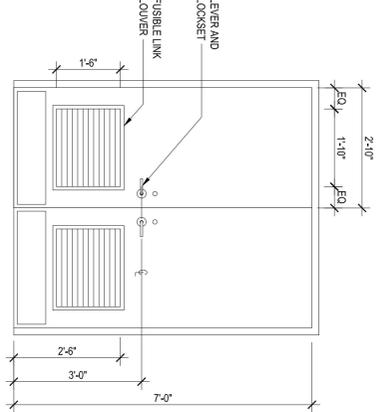
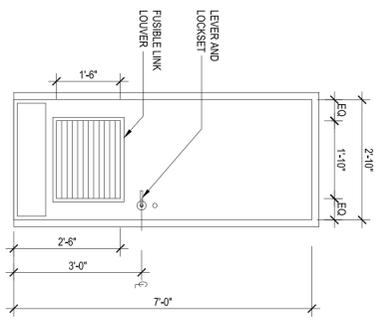
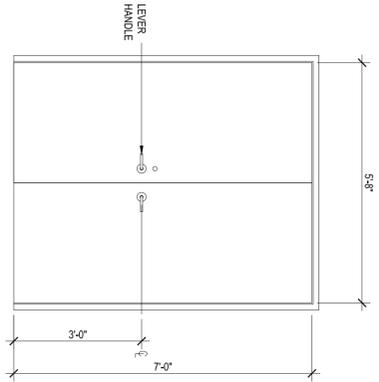
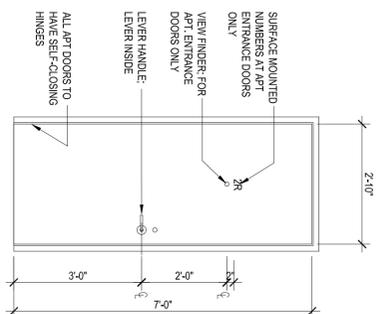
(SEE REFERENCE PLANS FOR UNIT LOCATIONS AND DIRECTION OF DOOR SWING)

UNIT #	LOCATION	TYPE	MATERIAL	DOOR			GLAZING TYPE	FINISH	DETAILS		DESCRIPTION	FIRE RATING	TYPE	FRAME		DETAILS		FRAME #	SET #	DESCRIPTION	HARDWARE		REMARKS	
				WIDTH	HEIGHT	THK.			PLAN	SECTION				HEAD	JAMB	FINISH	OPERATOR							
000	ELEVATOR	E	HOLLOW METAL	3'-6"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE SLIDING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	N/A			PROVIDED BY INSTALLER		000	
A000	STAR A	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC HARDWARE					A000	
B000	STAR B	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC HARDWARE					B000	
002	STAR B	B	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING LOUVERED HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK			SELF CLOSING SELF-LOOKING		002	
003	ELEVATOR MACHINE ROOM 003	B	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING LOUVERED HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK & DROP					003	
004	CELLAR BOILER ROOM 004	B	HOLLOW METAL	5'-8"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE OUTSWING LOUVERED HOLLOW METAL DOORS	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK & DROP					004	
005	ELECTRICAL METER ROOM 005	B	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING LOUVERED HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					005	
006	VALET / GAS ROOM 006	B	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING LOUVERED HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					006	
007	TELECOM CLOSET 007	BB	HOLLOW METAL	5'-8"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE OUTSWING LOUVERED HOLLOW METAL DOORS	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK & DROP					007	
008	REFRESHMENT CLOSET 008	BB	HOLLOW METAL	5'-8"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE OUTSWING LOUVERED HOLLOW METAL DOORS	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK & DROP					008	
009	STORAGE 009	AA	HOLLOW METAL	5'-8"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE OUTSWING LOUVERED HOLLOW METAL DOORS	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK & DROP					009	
010	STORAGE 010	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					010	
011	STORAGE 011	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					011	
012	STORAGE 012	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					012	
013	STORAGE 013	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					013	
014	STORAGE 014	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					014	
015	STORAGE 015	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					015	
016	STORAGE 016	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					016	
017	STORAGE 016	D	CHAN-LINK	2'-10"	7'-4"	1 3/4"	NA	NA			SINGLE OUTSWING CHAN-LINK METAL DOOR	NA	METAL CHAIN	NA	NA	NA	BRUSHED CHROME	KEY LOCK					017	
018	JANITOR CLOSET 018	D	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING LOUVERED HOLLOW METAL DOOR	NA	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					018	
019	OM 020	B	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING LOUVERED HOLLOW METAL DOOR	NA	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					019	
100	ELEVATOR	E	HOLLOW METAL	3'-6"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE SLIDING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	N/A			PROVIDED BY INSTALLER		100	
A100	STAR A	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	BRKX-PTD	NA	NA	BRUSHED CHROME	PANIC HARDWARE					A100	
A101	STAR A	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC HARDWARE					A101	
B100	STAR B	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC HARDWARE					B100	
B101	STAR B	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC HARDWARE					B101	
101	1F-LIVING ROOM 100	A	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					101	
102	1F-KITCHEN 102	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					102	
103	1F-CLOSET 103	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					103	
104	1F-MASTER BEDROOM 104	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PRIVACY					104	
105	1F-CLOSET 105	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					105	
106	1F-MECHANICAL CLOSET 105	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					106	
107	1F-BATHROOM 107	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					107	
108	1F-CLOSET 108	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					108	
109	1F-KITCHEN 109	A	HOLLOW METAL	3'-0"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK			BALL CATCH - BALL CATCH		109	
110	1F-CLOSET 110	GG	SCWD-BIRCH VENEER	3'-0"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE OUTSWING SOLID CORE WOOD DOORS	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	DUMMY - DUMMY			BALL CATCH - BALL CATCH		110	
111	1F-MECHANICAL CL. 111	GG	SCWD-BIRCH VENEER	3'-0"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE OUTSWING SOLID CORE WOOD DOORS	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	DUMMY - DUMMY					111	
112	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					112	
113	1F-MASTER BEDROOM 113	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PRIVACY					113	
114	1F-MASTER CLOSET 114	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					114	
115	1F-BATHROOM 115	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PRIVACY					115	
116	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					116	
117	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					117	
118	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					118	
119	REBUSE ROOM 119	A	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	NA	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					119	
120	STORAGE CLOSET 120	A	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	NA	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					120	
121	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					121	
122	LAUNDRY 122	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					122	
123	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					123	
124	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					124	
200	ELEVATOR	E	HOLLOW METAL	3'-6"	7'-4"	1 3/4"	NA	PAINTED			DOUBLE SLIDING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	N/A			PROVIDED BY INSTALLER		200	
A200	STAR A	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC					A200	
B200	STAR B	C	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	PANIC					B200	
201	2F-LIVING ROOM 201	A	HOLLOW METAL	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2 HOUR	HOLLOW METAL	PAINTED	NA	NA	BRUSHED CHROME	KEY LOCK					201	
202	---	---	---	---	---	---	---	---			---	---	---	---	---	---	---	---					202	
203	2F-CLOSET 203	G	SCWD-BIRCH VENEER	1'-9"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					203	
204	2F-MASTER BEDROOM 204	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PRIVACY					204	
205	2F-MASTER CLOSET 205	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					205	
206	2F-MECHANICAL CLOSET 206	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE OUTSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PASSAGE					206	
207	2F-MASTER BATH 207	G	SCWD-BIRCH VENEER	2'-10"	7'-4"	1 3/4"	NA	PAINTED			SINGLE INSWING SOLID CORE WOOD DOOR	NA	WOOD	PAINTED	NA	NA	BRUSHED CHROME	PRIVACY						

**DOOR SCHEDULE** (SEE REFERENCE PLANS FOR UNIT#14 LOCATIONS AND DIRECTION OF DOOR SWING)

UNIT #	LOCATION	TYPE	MATERIAL	DOOR			GLAZING TYPE	FINISH	DETAILS		DESCRIPTION	FIRE RATING	FRAME		DETAILS		FRAME	#	SET DESCRIPTION	HARDWARE		REMARKS	UNIT #
				WIDTH	HEIGHT	THK.			PLAN	SECTION			HEAD	JAMB	OPERATOR								
300	ELEVATOR	E	HOLLOW METAL	3'-6"	7'-0"	1 3/4"	N/A	PAINTED			DOUBLE SLIDING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	NA	PROVIDED BY INSTALLER	300
A300	STAIR A	C	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PANIC		A300
B300	STAIR B	C	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PANIC		B300
301	3F LIVING ROOM 301	A	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	KEYED LOCK		301
302	----																						302
303	3F CLOSET 303	G	SCOND-BIRCH VENEER	1'-6"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		303
304	3F MASTER BEDROOM 304	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		304
305	3F MASTER CLOSET 305	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		305
306	3F MECHANICAL CLOSET 306	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		306
307	3F MASTER BATH 307	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		307
308	3F BEDROOM 308	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		308
309	3F CLOSET 309	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		309
310	3F BATHROOM 310	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		310
311	----																						311
312	3F CLOSET 312	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		312
313	3F CLOSET 313	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		313
314	3F HALL 314	A	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING SOLID CORE WOOD DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	KEYED LOCK		314
315	3F BATHROOM 315	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		315
316	3F CLOSET 316	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		316
317	3F CLOSET 317	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		317
318	3F BEDROOM 318	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		318
319	----																						319
320	3F CLOSET 320	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		320
321	3F CLOSET 321	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		321
322	3F MECH CLOSET 322	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		322
323	----																						323
324	3F GUEST BEDROOM 324	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		324
325	3F CLOSET 325	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		325
326	3F BATHROOM 326	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		326
327	3F CLOSET 327	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		327
328	----																						328
329	3F TRASH ROOM 329	A	HOLLOW METAL	3'-0"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	N/A	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PASSAGE		329
400	ELEVATOR	E	HOLLOW METAL	3'-6"	7'-0"	1 3/4"	N/A	PAINTED			DOUBLE SLIDING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	NA	PROVIDED BY INSTALLER	400
A400	STAIR A	C	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PANIC		A400
B400	STAIR B	C	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PANIC		B400
401	4F LIVING ROOM 401	A	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	KEY LOCK		401
402	----																						402
403	4F CLOSET 403	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		403
404	4F CLOSET 404	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		404
405	4F BATHROOM 405	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		405
406	4F BATHROOM 406	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		406
407	4F BEDROOM 407	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		407
408	4F CLOSET 408	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOORS	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		408
409	4F CLOSET 409	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			DOUBLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		409
410	----																						410
411	4F HALL 411	A	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE INSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	KEY LOCK		411
412	4F BEDROOM 412	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		412
413	4F CLOSET 413	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			DOUBLE OUTSWING SOLID CORE WOOD DOORS	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		413
414	4F CLOSET 414	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			DOUBLE OUTSWING SOLID CORE WOOD DOORS	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		414
415	4F BEDROOM 415	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		415
416	4F CLOSET 416	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		416
417	4F CLOSET 417	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		417
418	4F BATHROOM 418	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE INSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PRIVACY		418
419	4F CLOSET 419	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		419
420	4F CLOSET 420	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		420
421	4F MECH CLOSET 421	G	SCOND-BIRCH VENEER	2'-10"	7'-0"	1 3/4"	N/A	STAIN & POLY			SINGLE OUTSWING SOLID CORE WOOD DOOR	N/A	WOOD	PAINTED			N/A			BRUSHED CHROME	PASSAGE		421
422	----																						422
423	4 TRASH 423	A	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	N/A	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PASSAGE		423
A500	ROOF FLOOR STAIR A	C	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PANIC		A500
B500	ROOF FLOOR STAIR B	C	HOLLOW METAL	2'-10"	7'-0"	1 3/4"	N/A	PAINTED			SINGLE OUTSWING HOLLOW METAL DOOR	2-HOUR	HOLLOW METAL	PAINTED			N/A			BRUSHED CHROME	PANIC		B500

INTERIOR DOOR TYPES:



**A** SINGLE HOLLOW METAL DOOR  
SCALE: 1/2"=1'-0"

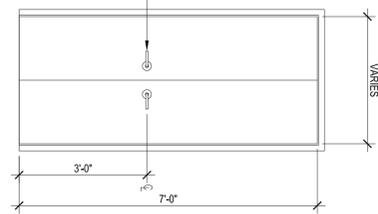
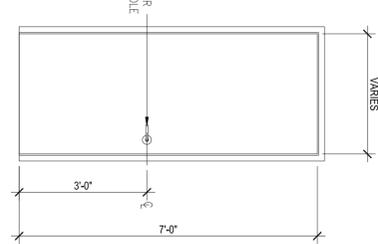
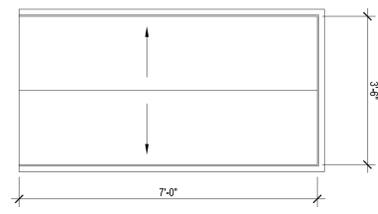
**AA** DOUBLE HOLLOW METAL DOORS  
SCALE: 1/2"=1'-0"

**B** SINGLE HOLLOW METAL DOOR WITH LOUVER  
SCALE: 1/2"=1'-0"

**BB** DOUBLE HOLLOW METAL DOORS WITH LOUVER (HANDING VARIES)  
SCALE: 1/2"=1'-0"

**C** SINGLE HOLLOW METAL FIRE STAIR DOOR  
SCALE: 1/2"=1'-0"

**D** DOUBLE STEEL PANEL DOOR WITH CHAIN LINK  
SCALE: 1/2"=1'-0"

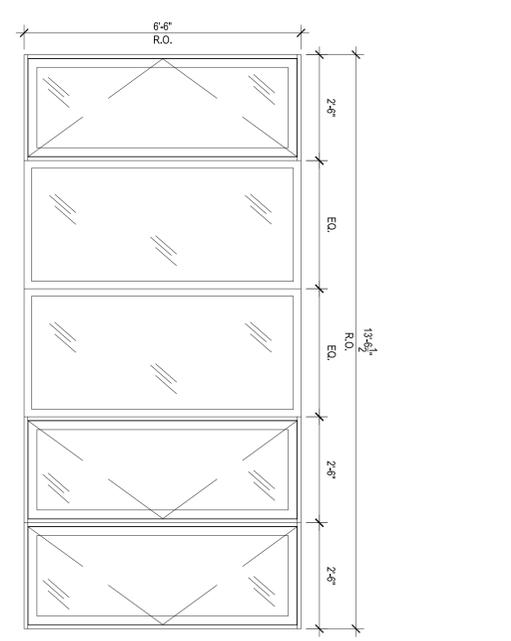
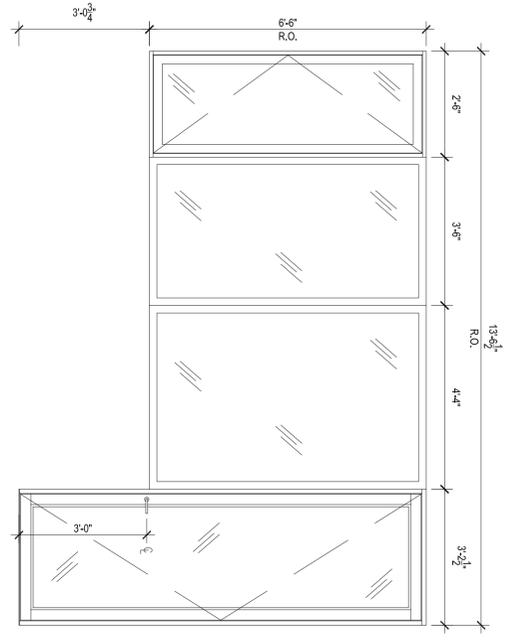
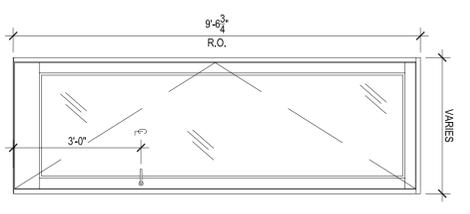
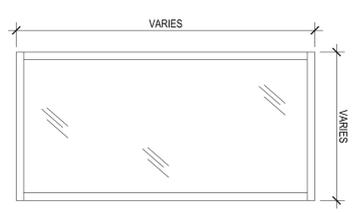
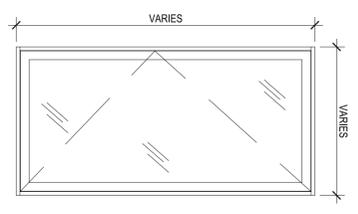
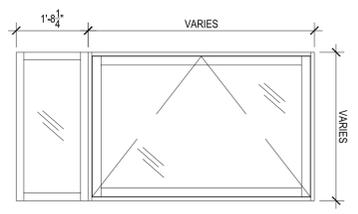


**E** HOLLOW METAL ELEVATOR DOOR  
SCALE: 1/2"=1'-0"

**G** SINGLE SOLID CORE WOOD INTERIOR DOOR  
SCALE: 1/2"=1'-0"

**GG** DOUBLE SOLID CORE WOOD INTERIOR DOORS  
SCALE: 1/2"=1'-0"

EXTERIOR DOOR & WINDOW TYPES:



**A** INSWING CASEMENT OVER FIXED  
SCALE: 1/2"=1'-0"

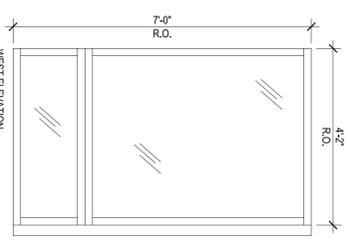
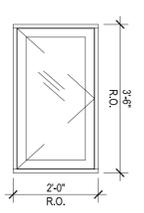
**B** INSWING CASEMENT OVER FIXED  
SCALE: 1/2"=1'-0"

**C** INSWING CASEMENT  
SCALE: 1/2"=1'-0"

**D** OUTSWING DOOR  
SCALE: 1/2"=1'-0"

**E** INSWING CASEMENT + (1) FIXED + OUTSWING DOOR  
SCALE: 1/2"=1'-0"

**F** INSWING CASEMENT + (2) FIXED  
SCALE: 1/2"=1'-0"



**G** AWNING  
SCALE: 1/2"=1'-0"

**H** FIXED CORNER WINDOW  
SCALE: 1/2"=1'-0"

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# 45 INDIA STREET CONDOMINIUMS

45 INDIA STREET BROOKLYN, NY 11222

ISSUED FOR DOB APPROVAL	30 APRIL 2012
SEAL	ARCHITECT
AM	PROJECT MANAGER
TC	TC
DRAWN BY	TC
DOOR TYPES SCHEDULES	
<b>A-910.00</b>	
PAGE 26 OF 31	

GLAZED DOOR & WINDOW SCHEDULE (SEE REFERENCE PLANS FOR UNIT LOCATIONS AND DIRECTION OF DOOR SWING)

UNIT #	LOCATION / DESCRIPTION	WINDOW TYPE	MATERIAL	WINDOW SIZE		ROUGH OPENING		GLAZING TYPE	FINISH	DETAILS		REMARKS	FRAME	SCREEN	HARDWARE			
				WIDTH	HEIGHT	WIDTH	HEIGHT			PLAN	SECTION				FRAME	SET #	DESCRIPTION	FINISH
001	REAR FACADE CELLAR WINDOW	G	ALUMINUM			3'-2"	3'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
100	VESTIBULE 116	D	ALUMINUM			3'-2 1/2"	6'-6 3/4"	TEMPERED VISION	PAINTED				ALUMINUM					
101	VESTIBULE 116	D	ALUMINUM			3'-2 1/2"	6'-6 3/4"	TEMPERED VISION	PAINTED				ALUMINUM					
102	LIVING ROOM 101	B	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
103	LIVING ROOM 101	B	ALUMINUM			2'-0"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
104	LIVING ROOM 101	B	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
105	MASTER BEDROOM 104	B	ALUMINUM			2'-0"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
106	MASTER BEDROOM 104	B	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
107	MASTER BEDROOM 113	B	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
108	MASTER BEDROOM 113	B	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
109	LIVING ROOM 112	E	ALUMINUM			13'-6 1/2"	9'-6 3/4"	TEMPERED VISION	PAINTED				ALUMINUM					
110	KITCHEN 109	B	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
111	CORRIDOR 101	D	ALUMINUM			3'-6"	9'-6 3/4"	TEMPERED VISION	PAINTED				ALUMINUM					
201	CORRIDOR 226	C	ALUMINUM			3'-2 1/2"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
202	LIVING ROOM 201	H	ALUMINUM			---	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
203	LIVING ROOM 201	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
204	LIVING ROOM 201	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
205	GUEST BEDROOM 208	A	ALUMINUM			2'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
206	GUEST BEDROOM 208	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
207	MASTER BEDROOM 204	A	ALUMINUM			2'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
208	MASTER BEDROOM 204	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
209	GUEST BEDROOM 223	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
210	GUEST BEDROOM 223	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
211	LIVING ROOM 221	F	ALUMINUM			13'-6 1/2"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
212	KITCHEN 212	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
213	MASTER BEDROOM 216	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
214	MASTER BEDROOM 216	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
301	CORRIDOR 326	C	ALUMINUM			3'-2 1/2"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
302	LIVING ROOM 301	H	ALUMINUM			---	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
303	LIVING ROOM 301	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
304	LIVING ROOM 301	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
305	GUEST BEDROOM 308	A	ALUMINUM			2'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
306	GUEST BEDROOM 308	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
307	MASTER BEDROOM 304	A	ALUMINUM			2'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
308	MASTER BEDROOM 304	A	ALUMINUM			3'-6"	7'-0"	TEMPERED VISION	PAINTED				ALUMINUM					
309	GUEST BEDROOM 323	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
310	GUEST BEDROOM 323	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
311	LIVING ROOM 321	F	ALUMINUM			13'-6 1/2"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
312	KITCHEN 322	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
313	MASTER BEDROOM 316	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
314	MASTER BEDROOM 316	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
401	CORRIDOR 420	C	ALUMINUM			3'-2 1/2"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
402	LIVING ROOM 401	B	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
403	LIVING ROOM 401	B	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
404	LIVING ROOM 401	D	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
405	LIVING ROOM 401	D	ALUMINUM			2'-10"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
406	KITCHEN 402	B	ALUMINUM			2'-0"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
407	MASTER BEDROOM 407	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
408	MASTER BEDROOM 407	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
409	BEDROOM 412	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
410	BEDROOM 415	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
411	BEDROOM 415	A	ALUMINUM			2'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					
412	BEDROOM 415	A	ALUMINUM			3'-6"	6'-6"	TEMPERED VISION	PAINTED				ALUMINUM					

- GENERAL NOTES
1. GENERAL CONTRACTOR TO CONFIRM ALL SIZES OF WINDOWS, DOORS AND ROUGH OPENINGS PRIOR TO CONSTRUCTION AND PURCHASE
  2. ALL ROUGH OPENINGS TO CORRESPOND WITH BRICK ROW - DO NOT CUT ANY BRICK IN THE VERTICAL DIMENSION
  3. ALL WINDOWS TO HAVE MAX. U-VALUE OF U-0.48 & MIN. SOLAR HEAT GAIN COEFFICIENT OF 0.40

# 45 INDIA STREET CONDOMINIUMS

45 INDIA STREET BROOKLYN, NY 11222

ISSUED FOR DOB APPROVAL

30 APRIL 2012

ARCHITECT

AM

PROJECT MANAGER

TC

DRAWN BY

TC

GLAZING SCHEDULE SCHEDULES

**A-915.00**

PAGE 27 OF 31

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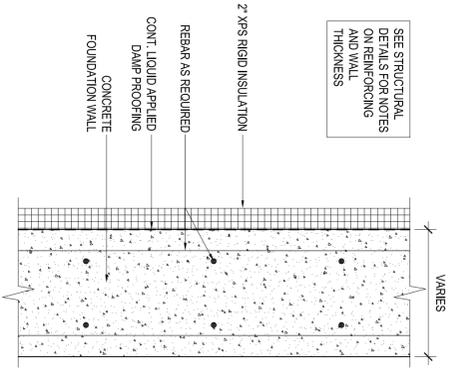
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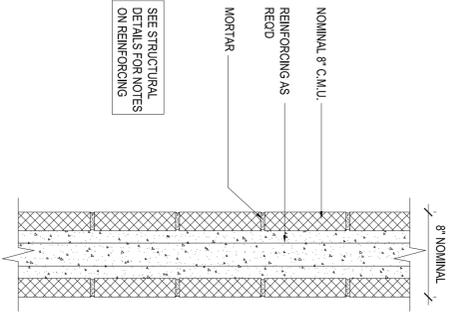
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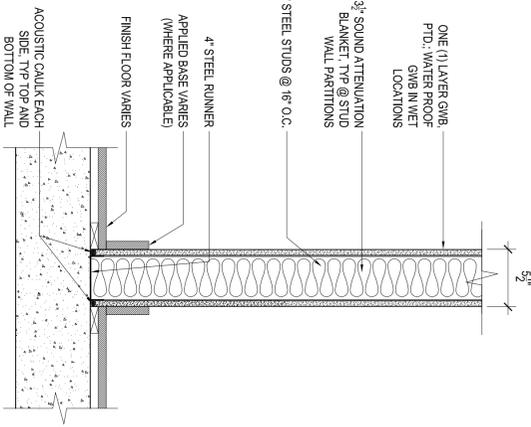
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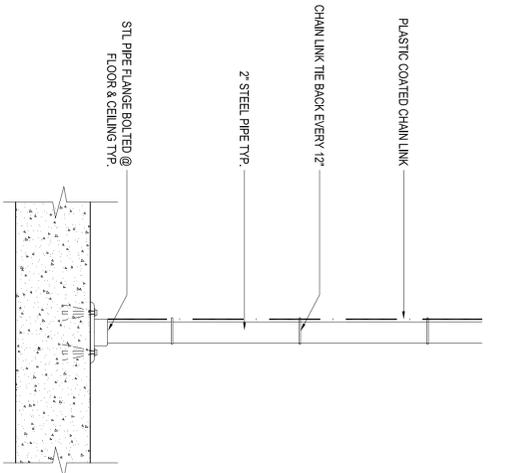
1 CONCRETE FOUNDATION WALL  
SCALE: 1/2"=1'-0"



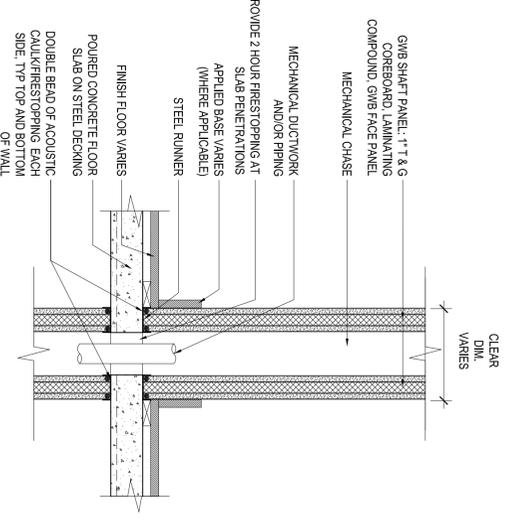
2 2HR RATED 8' CMU WALL / CMU BEARING WALL (UL TYPE: U985)  
SCALE: 1/2"=1'-0"



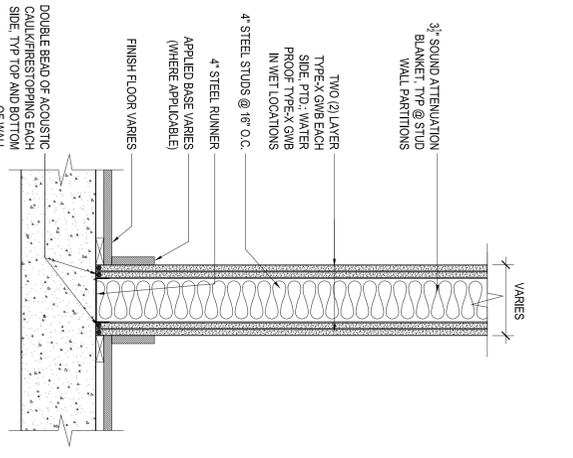
3 INTERIOR GMB NON-RATED PARTITION  
SCALE: 1/2"=1'-0"



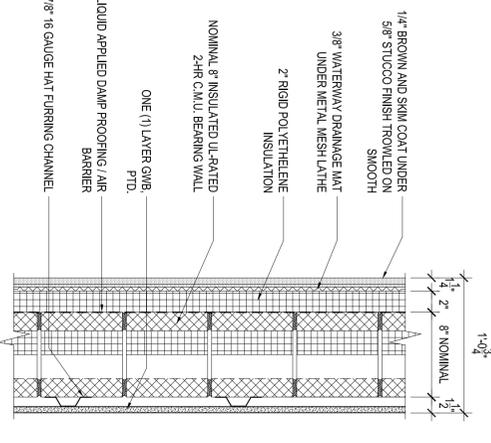
4 INTERIOR CHAIN LINK PARTITION  
SCALE: 1/2"=1'-0"



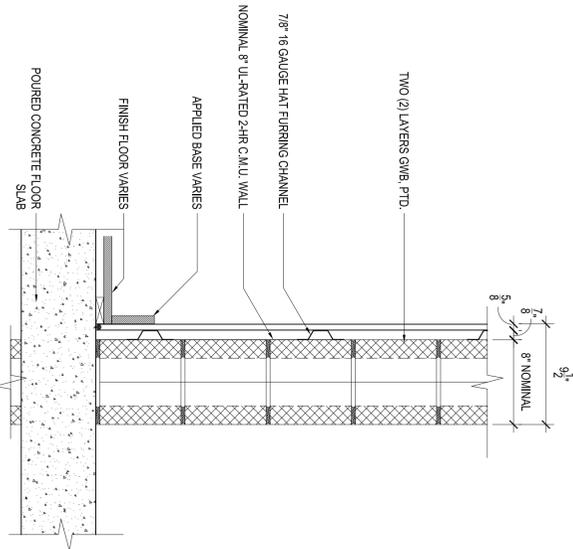
5 2HR RATED GMB SHAFT WALL (UL TYPE: U420)  
SCALE: 1/2"=1'-0"



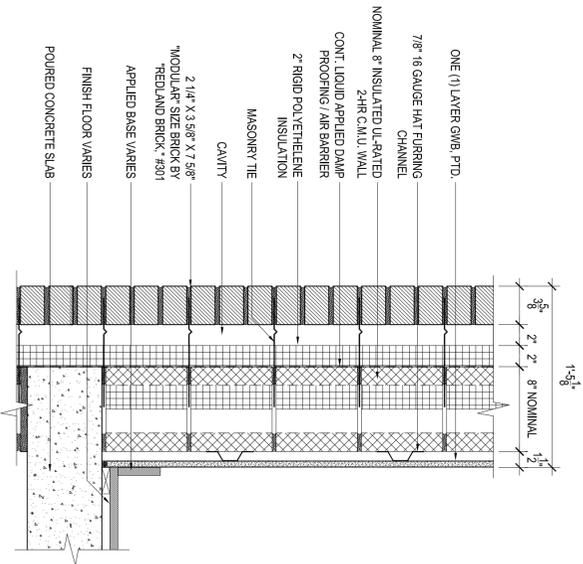
6 2HR RATED GMB PARTITION (UL TYPE: U440)  
SCALE: 1/2"=1'-0"



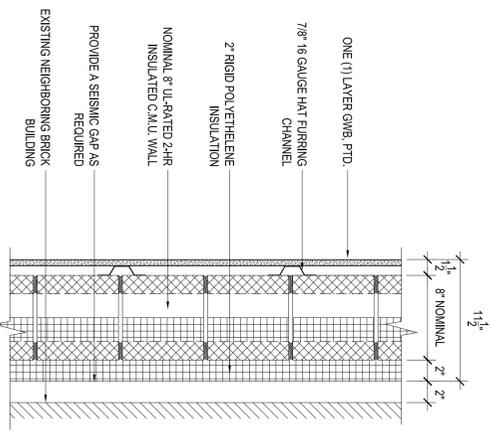
7 2HR RATED CMU EXTERIOR WALL (UL TYPE: U980)  
SCALE: 1/2"=1'-0"



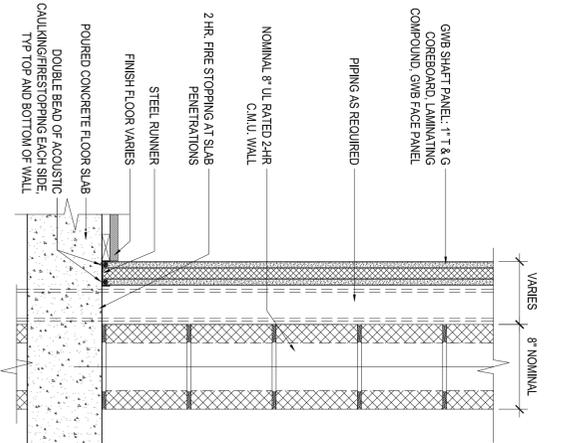
8 2HR RATED 8' CMU W/ GMB FINISH (ONE SIDE) (UL TYPE: U990)  
SCALE: 1/2"=1'-0"



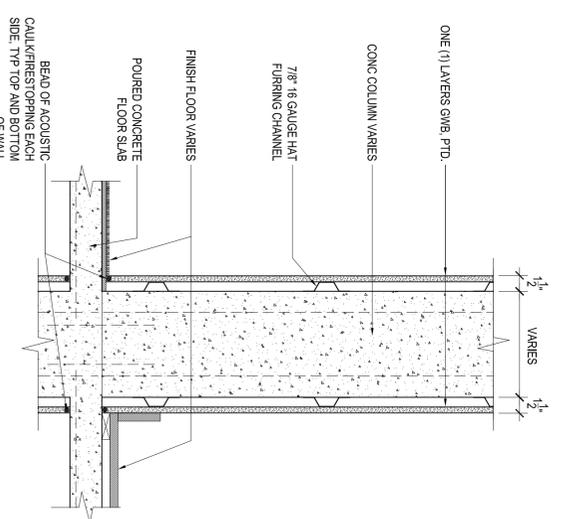
9 2HR RATED BRICK CAVITY WALL (UL TYPE: U990)  
SCALE: 1/2"=1'-0"



10 2HR RATED CMU PARTY WALL (UL TYPE: U986)  
SCALE: 1/2"=1'-0"



11 2HR RATED GMB CMU CHASE WALL (UL TYPE: U420 / U990)  
SCALE: 1/2"=1'-0"



12 GMB ENCLOSURE AT CONCRETE COLUMN  
SCALE: 1/2"=1'-0"

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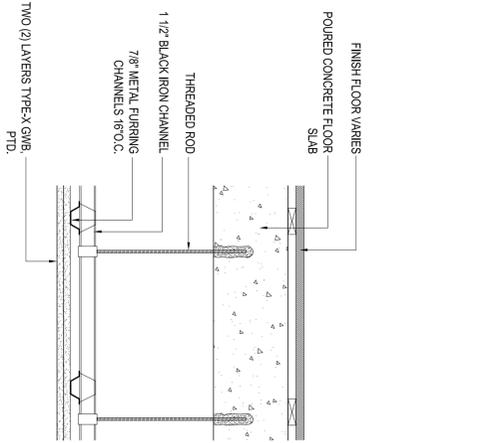
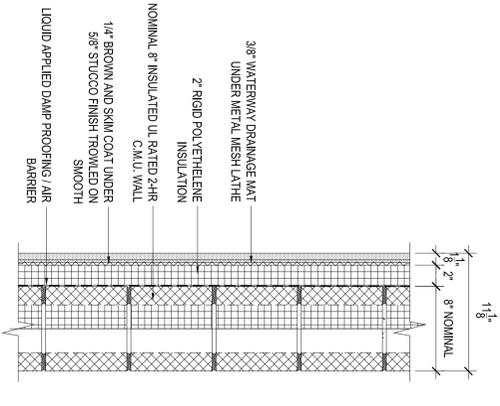
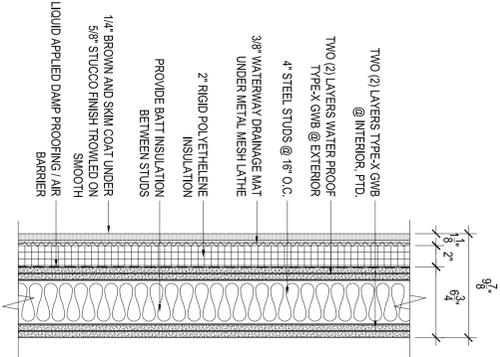
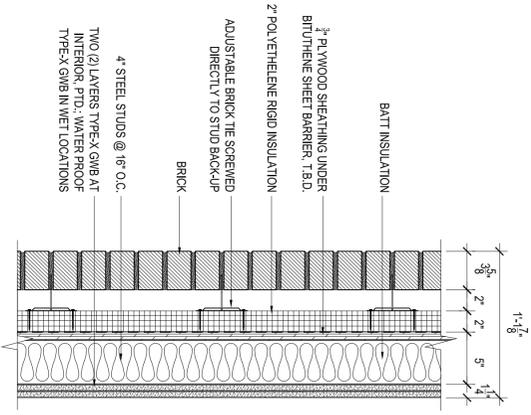
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# 45 INDIA STREET CONDOMINIUMS

45 INDIA STREET BROOKLYN, NY 11222

ISSUED FOR DOB APPROVAL	30 APRIL 2012
ARCHITECT	AM
PROJECT MANAGER	TC
DRAWN BY	TC
WALL TYPES	A-950.00 PAGE 28 OF 31



**GENERAL PARTITION NOTES:**

1. ALL CONCRETE MASONRY UNITS TO BE RATED FOR 2-HOUR FIRE RESISTANCE BY UNDERWRITER LABORATORY, SOURCE RATED & INSULATED CONCRETE BLOCK THROUGH WESTBROOK BLOCK COMPANY (960.393.9501) OR EQUIVALENT.
2. MAINTAIN A MINIMUM OF 2" CLEAR CAVITY WIDTH IN ALL CAVITY ASSEMBLIES.
3. INSTALLATION OF INSULATION & AIR BARRIER TO BE CONTINUOUS AROUND THE EXTERIOR ENVIRONMENT.
4. COORDINATE ALL BEARING WALL TYPES WITH STRUCTURAL DIVS.

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SEAL	ARCHITECT
AM	PROJECT MANAGER
TC	DRAWN BY
TC	
WALL TYPES	
<b>A-955.00</b>	
PAGE 29 OF 31	

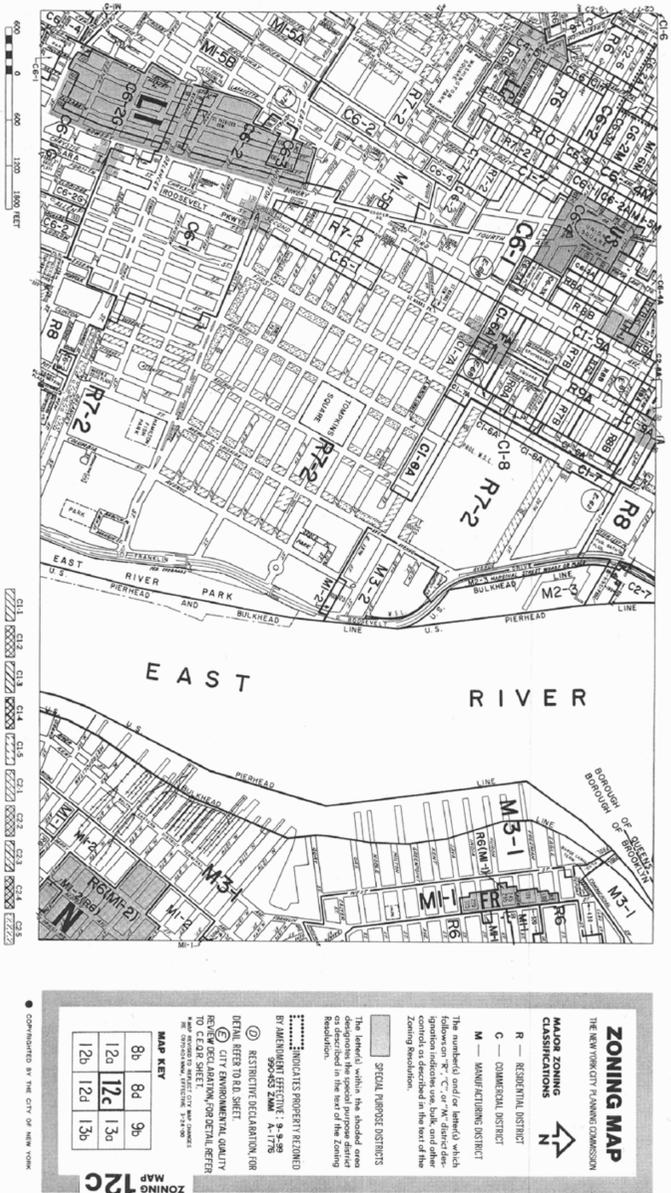
PROJECT

# ZONING ANALYSIS

ZONE: R6B  
BLOCK: 2531  
LOT: 35

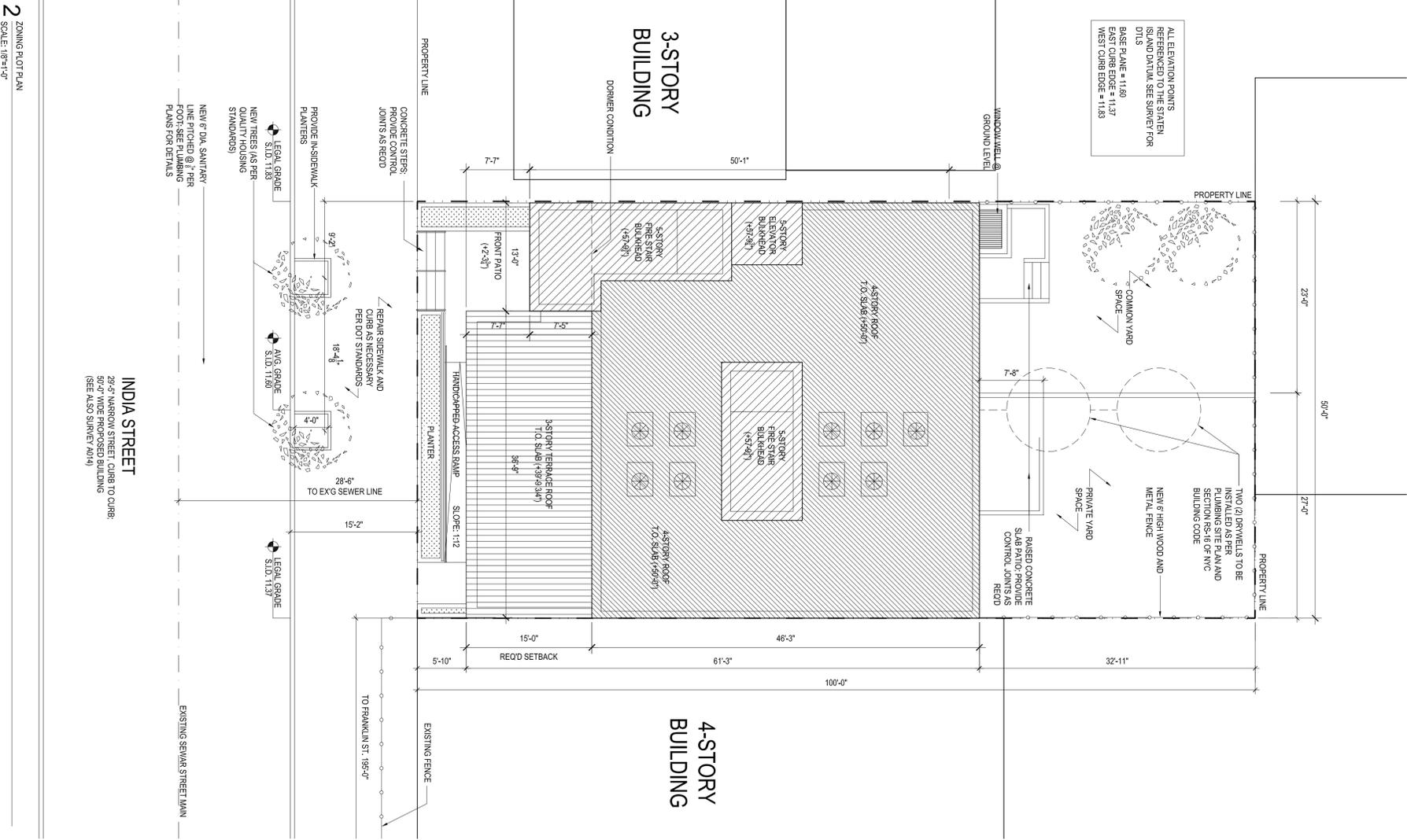
ZONING MAP: 12C

NEW CONSTRUCTION OF A PROPOSED 4-STORY  
MULTI-FAMILY DWELLING W/ 7 RESIDENTIAL UNITS



1 ZONING MAP 12C  
SCALE: NTS

LOT SIZE	CALCULATIONS	ZONING NOTES & REMARKS
LOT WIDTH: 50'-0" LOT DEPTH: 100'-0" EXISTING LOT AREA: 5,000 SF 50'-0" x 100'-0" = 5,000 SF	ZR 23-32 RECD LOT WIDTH 18'-0" < EXG LOT WIDTH 50'-0" COMPLIES RECD LOT AREA 1,700 SF < EXG LOT AREA 5,000 SF COMPLIES	
USE	ZR 22-11 USE GROUP 2 (RESIDENTIAL USES) PERMITTED AS OF RIGHT COMPLIES	
FLOOR AREA	ZR 23-145 MAX FAR: 2.00 2.00 FAR x 5,000 SF = 10,000 MAX SF PROPOSED: CELLAR: 1ST FLOOR: 2ND FLOOR: 3RD FLOOR: 4TH FLOOR: PROPOSED TOTAL: MECHANICAL DEDUCTIONS: QUALITY HOUSING REFUSE AM DEDUCTIONS: QUALITY HOUSING CORRIDOR DEDUCTIONS: PROPOSED NET TOTAL: (65'-0" x 49'-11" + 44'-1" x 45'-0" = 2994 SF (NO. OCCUPYABLE)) (67'-0" x 49'-0" = 3287 SF FACADE INDEXT) = 2820 SF (61'-0" x 49'-0" = 2991 SF FACADE INDEXT) = 2949 SF (61'-0" x 49'-0" = 2991 SF FACADE INDEXT) = 2949 SF (48'-0" x 49'-0" + (7'-0" x 12'-11") = 2393 SF 11,111 SF 48 SF 179 SF 922 SF 9,917 SF	
LOT COVERAGE / OPEN SPACE	ZR 23-145 LOT COVERAGE FOR QUALITY HOUSING BUILDINGS COMPLIES 59% < 60% MAX	
YARDS & SETBACKS	ZR 23-45 (FRONT YARD) ZR 23-46(2)(c) (SIDE YARD) ZR 23-47 (REAR YARD) A REAR YARD WITH A DEPTH OF NOT LESS THAN 30' SHALL BE PROVIDED AT EVERY REAR LOT LINE ON ANY ZONING LOT 36'-0" > 30'-0" MIN. ZR 23-633 (SETBACK) A SETBACK OF AT LEAST 15 FEET SHALL BE PROVIDED FROM ANY STREET WALL FRONTING ON A NARROW STREET 30'-0" MIN. < 37'-0" BASE HEIGHT < 40'-0" MAX. 15'-0" SETBACK = 15'-0" MIN. COMPLIES	



# 45 INDIA STREET CONDOMINIUMS

45 INDIA STREET BROOKLYN, NY 11222

PROJECT	ZONING CALCULATIONS	Z-100.00 PAGE 30 OF 31
ARCHITECT	ARCHITECT	AM
PROJECT MANAGER	PROJECT MANAGER	TC
DRAWN BY	DRAWN BY	TC
ISSUED FOR DOB APPROVAL	ISSUED FOR DOB APPROVAL	30 APRIL 2012
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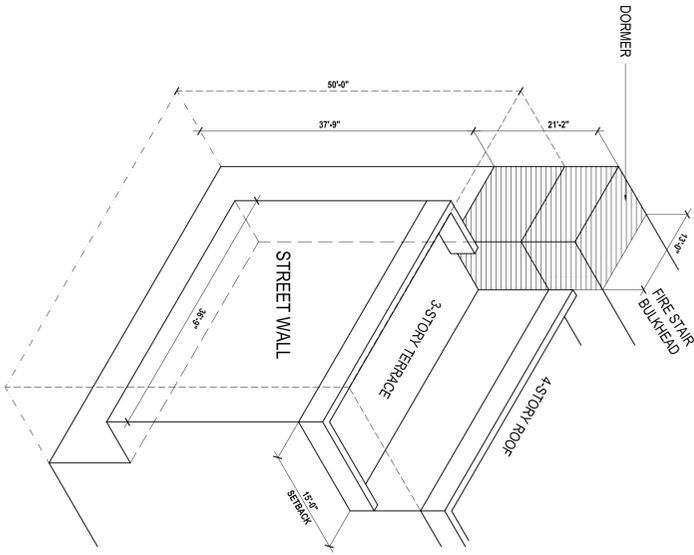
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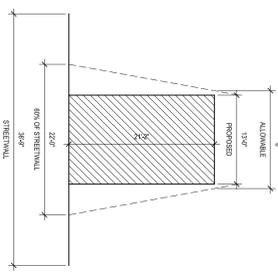
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CALCULATIONS	ZONING NOTES & REMARKS
<b>STREET TREES / PLANTING STRIP</b> REQUIRED STREET TREES: INDIA STREET FRONTAGE: 50'-0" / 25' = 2 PROPOSED STREET TREES: INDIA STREET FRONTAGE: (2) TREES PROVIDED PLANTING STRIP: EXG PLANTING STRIP 8'-0" WIDE ALONG ENTIRE LENGTH OF JOSEPHLEMON LOT LINE (NO CHANGE)	<b>ZR 26-42</b> ONE STREET TREE SHALL BE PROVIDED FOR EVERY 25 FEET OF STREET FRONTAGE OF THE ZONING LOT <b>COMPLIES</b> <b>ZR 23-892</b> <b>COMPLIES</b>
<b>PARKING / BICYCLE PARKING</b> <b>PARKING SPACES REQ'D</b> PARKING SPACES PROVIDED: NONE ZR 25-241: FOR ZONING LOTS OF 10,000 SF OR LESS THE REQUIRED ACCESSORY OFF-STREET PARKING SPACES IS: LOT AREA = 5,000 SF < 10,000 SF PARKING SPACES REQ'D AS A PERCENTAGE OF TOTAL DWELLING UNITS: 50% 7 DWELLING UNITS x 50% = 3.5 = <b>4 PARKING SPACES</b> ZR 25-26: FOR DEVELOPMENT IN AN R8 DISTRICT, THE MAXIMUM NUMBER OF OFF-STREET PARKING SPACES FOR WHICH REQUIREMENTS ARE WAIVED = 5 SPACES: REQUIRED NUMBER OF SPACES = 4 MAXIMUM NUMBER OF SPACES WAIVED IN R8 DISTRICT = 5 PROPOSED NUMBER OF SPACES = NONE <b>BICYCLE PARKING SPACES REQ'D</b> ENCLOSED BICYCLE PARKING SPACES PROVIDED: NONE ZR 25-811: USE GROUP (2) FOR DEVELOPMENTS IN AN R8 DISTRICT, RESIDENTIAL USE GROUP 2 WILL REQUIRE 1 SPACE PER 2 DWELLING UNITS 7 DWELLING UNITS / 2 = 3.5 = <b>4 SPACES</b> (a) 4 PARKING SPACES WAIVED FOR BUILDING W/ 10 DWELLING UNITS OR LESS	<b>ZR 25-241</b> REDUCED REQUIREMENTS (PRI) <b>ZR 25-26</b> <b>COMPLIES</b> 0 = 4 REQ'D SPACES - 5 WAIVED SPACES <b>COMPLIES</b> <b>ZR 25-811</b> 7 DWELLING UNITS < 10 DWELLING UNITS = 4 SPACES WAIVED <b>COMPLIES</b>
<b>BUILDING HEIGHT / SETBACKS</b> <b>MAX BUILDING HT: 50'-0"</b> <b>MIN BASE HT: 30'-0"</b> <b>MAX BASE HT: 40'-0"</b> <b>MIN SETBACK: 15'-0"</b>	<b>ZR 23-633</b> <b>COMPLIES</b> <b>ZR 23-633 (b) (1)</b> SETBACK WITH A DEPTH OF AT LEAST 15 FEET FROM THE STREET WALL FRONTING ON A NARROW STREET <b>COMPLIES</b>
<b>DENSITY / DWELLING UNITS</b> <b>DWELLING UNIT FACTOR: 680</b> 2.0 PAK x 3,000 SF = 10,000 MAX SF 10,000 MAX SF / 680 = 14.7 = 14 DWELLING UNITS PROPOSED: 7 DWELLING UNITS <b>DWELLING UNIT SIZE: 400 SF MIN.</b> MINIMUM SIZE OF DWELLING UNIT PROVIDED: 778 SF	<b>ZR 23-22</b> R8 DWELLING UNIT FACTOR: 680 7 DWELLING UNITS < 14 DWELLING UNITS <b>COMPLIES</b> <b>ZR 28-21</b> A DWELLING UNIT SHALL HAVE AN AREA OF AT LEAST 400 SQUARE FEET OF FLOOR AREA 778 SF > 400 SF <b>COMPLIES</b>
<b>QUALITY HOUSING PROGRAM</b> IN R88 DISTRICTS, ANY DEVELOPMENT SHALL COMPLY WITH THE APPLICABLE DISTRICT BULK REGULATIONS AS SET FORTH IN ARTICLE II CHAPTER 3, AND SHALL ALSO COMPLY WITH THE REQUIREMENTS OF ARTICLE II CHAPTER 8	<b>ZR 23-011</b>
<b>WINDOWS</b>	<b>ZR 28-22</b> ALL WINDOWS IN THE RESIDENTIAL PORTION OF A DEVELOPMENT OR ENLARGEMENT SHALL BE DOUBLE GLAZED <b>COMPLIES</b>
<b>REFUSE STORAGE AND DISPOSAL</b>	<b>ZR 28-23</b> A CONSERVING REFUSE ROOM IS PROVIDED ON EACH FLOOR THAT HAS A COMMON CORRIDOR RESIDENTIAL REMOVAL LOCATION IS PROVIDED IN THE BASEMENT <b>COMPLIES</b>
<b>LAUNDRY FACILITIES</b>	<b>ZR 28-24</b> 2 WASHERS & DRYERS = 1 WASHER & DRYER <b>COMPLIES</b>
<b>DAYLIGHT IN CORRIDORS</b>	<b>ZR 28-25</b> WINDOWS PROVIDED AT ALL CORRIDORS
<b>RECREATION SPACE</b>	<b>ZR 28-31</b> ALL DEVELOPMENTS WITH NINE OR MORE DWELLING UNITS SHALL PROVIDE RECREATION SPACE FOR AT LEAST 3.3% OF THE TOTAL RESIDENTIAL FLOOR AREA OF THE DEVELOPMENT IN IN R88 DISTRICTS 7 UNITS < 9 UNITS = NO RECREATION SPACE REQ'D <b>COMPLIES</b>
<b>CORRIDOR DENSITY</b>	<b>ZR 28-41</b> IF THE NUMBER OF DWELLING UNITS SERVED BY VERTICAL CIRCULATION CORE AND STAIRS ON EACH STORY EXCEEDS 11 DWELLING UNITS, SUCH A STAIRWAY OR CORRIDOR SERVING SUCH DWELLING UNITS ON SUCH A STORY MAY BE EXCLUDED FROM THE DEFINITION OF FLOOR AREA MAX DWELLING UNITS SERVED = 2 UNITS 50% AREA OF CORRIDORS EXCLUDED IN FLOOR AREA



PROPOSED DORMER AS PER ZR 23-621(g)  
 STREET WALL @ HIGHEST STORY = 37'-4"  
 36'-9" x 60% = 22'-0" MAXIMUM DORMER AGGREGATE BASE  
 36'-9" x 1% = 4 1/2" WIDTH DECREASE PER 1' HEIGHT  
 21'-2" x (4 1/2" PER FOOT) = 7'-8 1/2" WIDTH DECREASE @ 21'-2"  
 NET ALLOWABLE WIDTH @ 21'-2" = 22'-0" - 7'-8 1/2" = 14'-3 1/2"  
 14'-3 1/2" ALLOWABLE > 13'-0" PROPOSED



1 DORMER CALCULATIONS & DIAGRAM  
 SCALE: NTS

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PROJECT

ZONING CALCULATIONS

**Z-105.00**  
 PAGE 31 OF 31

ISSUED FOR DOB APPROVAL

30 APRIL 2012

ARCHITECT

PROJECT MANAGER

DRAWN BY

TC

SEAL

TC

**APPENDIX B**  
Construction Health and Safety Plan

# Health and Safety Plan (HASP)

Subject property:

## 45 India St. Condominiums

45 India St.  
Brooklyn, NY 11222  
CEQR# 04DCP003K

Prepared For:

NYC Office of Environmental Remediation  
Brownfield Cleanup Program  
100 Gold Street 2<sup>nd</sup> Floor  
New York, NY 10038

Attn: Mr. Shaminder Chawla

Landmark Project No.: 12-1804

October 23, 2012

Prepared By:



LANDMARK

Landmark Consultants, Corp.

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Certified By:

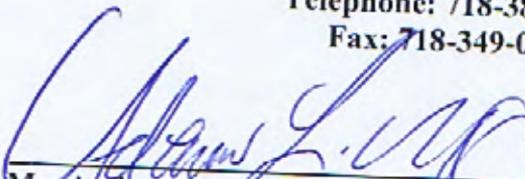
  
Mr. Andrew L. Gasparro/Industrial Hygienist

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## 1.0 INTRODUCTION

Landmark Consultants, Inc. (Landmark) has been retained by Kenry Corp. to prepare this Health and Safety Plan (HASP) to be utilized during proposed construction activities for approximate 5,000 square foot parcel of land that consist of a vacant lot (Block 2531 Lot 35/36) located near the intersection of India Street and West Street in Brooklyn, New York (see Project Location Plan). The planned development consists of a 4-story residential building with a single cellar spanning about half of the Site. The balance of the Site will consist of a concrete patio and yard space. The depth of the cellar will extend approximately 10 feet below the existing Site grade. The foundation will be supported on footings. Excavation and foundation construction will involve the removal and off-site disposal of approximately 1,700 tons of material.

The HASP was prepared in general conformance with New York City Department of Environmental Protection (NYCDEP) and New York State Department of Environmental Conservation (NYSDEC) protocols.

This document has been developed, in accordance with the requirements of 29 CFR 1910.120 ("HAZWQPER"), to establish the procedures necessary for protecting on-site personnel from potential hazards resulting from all activities that will in any way disturb Kurficial soil formations on the subject property, i.e., excavation of building foundations, installation of site improvements, excavation of utility trenches,' stockpiling, backfilling, etc.

LANDMARK has developed the following health and safety procedures for all on-site personnel to follow during construction activities. LANDMARK Site Safety Officer (SSO) Andrew L. Gasparro or his representative will be on the subject property, on a daily basis, until exposure pathways for identified contaminants have been eliminated. The SSO will be responsible for informing all on-site construction and technical personnel of the pertinent level of personal protection required and work rules to be observed. The SSO will have the authority *to* stop all work activities as deemed necessary based on: a) visual assessment of the work activity; or b) data obtained from field screening instrumentation. The Project Superintendent or his representative will also maintain a daily sign in sheet to document all on-site personnel and visitors. No smoking, eating, or chewing of gum/tobacco will be permitted on the subject site during any activity that will disturb the site's surficial soil formations. Under no circumstance will excavation activities commence prior to completion of utility mark-out activities. Confined spate entry will not be attempted, by any party, daring site development activities. In the event a confined space entry becomes necessary during the aforementioned site development activities, the SSO will be contacted 48-hours prior to it in order that appropriate measures can be implemented. The health and safety requirements discussed herein are based on currently available information obtained during an assessment of the subject property by LANDMARK and a preliminary analysis of associated potential hazards. This plan establishes the minimum protocols necessary for protecting all construction workers and technicians on-site.

All contractors and subcontractors will be responsible for supplying their personnel on-site with safety equipment that, at a minimum, meets the requirements of this site (HSP). The SSO or his representative will conduct all monitoring and testing discussed in this HSP. The SSO will be authorized to remove or have removed any and all personnel working on the subject property who do not comply with the minimum standards outlined in this HASP.

## 2.0 PREVIOUS INVESTIGATIONS

A sub surface Remedial Investigation was performed by Landmark Consultants Corp. in September of 2012. The general goals associated with the Subsurface Investigation (09/2012) were to characterize surficial soil formations at selected locations on the subject property via the drilling of soil test borings and laboratory analysis of suspect soil samples. The investigation also included the installation of three monitoring wells on site.

Based on the available city directory listings, the Subject Property appears to have only residential listings in 1934, 1945, 1949, 1960, and 1965. No listings for the Subject Property were noted after 1965.

The surrounding properties also appear to have been used for residential purposes. Only residential listings are noted for 39 India Street (1934-1997), 41 India Street (1934-1997), 43 India Street (1934-1960), 44 India Street (1928-1992), 46 India Street (1928-1997), 47 India Street (1934-1997), 48 India Street (1934-1997), 49 India Street (1934-1997), 50 India Street (1934-1992), and 52 India Street (1934 only).

## 3.0 HAZARD EVALUATION/POTENTIAL CHEMICAL EXPOSURE

The subject property was formerly utilized for residential purposes. Notably, however, various businesses of environmental concern occupied portions of the property between 1887 and 1996. These businesses included a chemical company, iron foundry, and various manufacturing operations. Based on the aforementioned, potential chemical exposure on-site is suspected to be volatile organic compounds, semi-volatile organic compounds, and arsenic and beryllium, and metals.

The most likely routes of exposure are breathing of volatile and semi-volatile organic compounds or particulate-laden air released during soil disturbing activities. Dermal contact is also a potential exposure pathway. The remaining sections of this HASP address procedures (including training, air monitoring, work practices and emergency response) to reduce the potential for unnecessary and unacceptable exposure to these contaminants.

The potential adverse health effects from the broad classes of chemicals potentially present at the site are diverse and potentially severe. Although many of these chemicals are known or suspected to result in chronic illness from long-duration exposures, due to the limited nature of the field work, acute effects are both more likely to be of concern and noticeable.

- A. PAH's, such as Bernzo(a)anthracene, are carcinogens and need to be treated as such.
- B. Heavy metals and Pesticides, such as lead and Mercury as well as DDE, DDT and DDD, can affect the central nervous system, kidneys, and immune system, particularly young children. In adults, these metals may decrease reaction time, cause weakness in fingers, wrists, or ankles, and possibly affect the memory.

This Health and Safety Plan addresses potential environmental hazards from the presence of potential hazardous materials. It is not intended to address the normal hazards of construction work, which are covered by OSHA regulations and/or local and state construction codes or

regulations.

#### **4.0 DUST CONTROL**

To prevent the potential off-site transport of dust, which may contain above-background levels of volatile and semi-volatile organic compounds and metals, the following dust control measures will be implemented during all earth disturbing operations:

- Applying water and/or gravel to all haul roads.
- Wetting down of all exposed soil surfaces to suppress dust in dry weather.
- Wetting down of all open excavations to suppress dust in dry weather.
- All haul trucks will have tarp covers.
- All on site vehicles will be limited to 10 MPH.
- Gravel pads will be placed at egress points to prevent tracking out of dust.

#### **5.0 HAZARDOUS MATERIALS CONTINGENCIES**

All known potentially hazardous materials will be removed from work areas prior to the beginning of excavation. However, because of historic backfilling activities at the site, there is a potential for the discovery of additional materials during site excavation activities. In the event that previously unidentified potentially hazardous materials are discovered during excavation, then the following contingency procedures will be followed. All excavations will be continuously monitored for the presence of buried tanks, drums or other containers, sludges, or soil, which show evidence of potential contamination, such as discoloration, staining, or odors. If any of these are detected, excavation in the area will be halted. The SSO will immediately notify the owner's representative and the LANDMARK - Hazardous Materials Response Team.

The affected area will be cordoned off and no further work will be performed at that location until the appropriate contingency response plan, described below, is implemented. All contingency response actions will be carried out in accordance with the contingency Health and Safety procedures specified below.

##### **5.1 Drum/Container Contingency Plan**

If drums or other containers are encountered, the area will be cordoned off and the below listed steps will be followed. In the event additional tanks are identified, they will be decommissioned as outlined in 40 CFR part 280 and 6NYCRR parts 612-614 (see Section 13).

1. If there is evidence of a petroleum spill, notify the NYSDEC Spill Hotline within two (2) hours.
2. Examine the drum to determine its condition and whether it contains any materials. If the drum is empty, remove and dispose of as scrap.
3. If the drum contains any material, sample the contents using procedures appropriate to the condition of the drum. All samples will be analyzed for volatile and semi-volatile organic compounds, PCB's, metals, reactivity, and flash point following NYSDEC ASP procedures by a New York State

Department of Health ELAP-certified laboratory.

4. Move the drum using appropriate precautions to a secure location with secondary containment.
5. Following NYSDEC approval, the drum will be disposed of in accordance with all applicable regulations.

## **6.0 MEDICAL EMERGENCY**

Medical emergencies can be described as situations that present a significant threat to the health of personnel involved in the implementation of the subsurface assessment activities. These can result from exposure to chemicals, heat stress, cold stress, and poisonous insect bites. Medical emergencies must be dealt with immediately and proper care should be administered. This may be in the form of first aid and emergency hospitalization.

In the event of a medical emergency, assess whether or not the victim can be safely transported to medical facilities. If the victim cannot be moved without the risk of aggravating their condition, refer to Section 8 "Emergency Notification" and summon an ambulance and appropriate emergency response personnel.

## **7.0 TRANSPORTING VICTIMS**

If the victim can be safely transported without risk of additional injury, the nearest hospital is NYU Medical located at 400 East 34th Street New York, NY 10016 (212) 263-8830 the hospital is located on the Southeast corner of East 34<sup>th</sup> St and 1<sup>st</sup> Ave in New York City. The most direct emergency route from the subject property to the hospital is as follows (see Emergency Route to NYU Medical Center):

- 1). East on India St to McGuinness Blvd Turn Left
- 2). Over the Pulaski Bridge and veer Right to the Midtown Tunnel
- 3). Exit Left out of Tunnel to 34<sup>th</sup> St and Make a left on 34<sup>th</sup> St Hospital is on Right

Total mileage to the hospital is approximately 3.8 miles. Travel time is less than 11 minutes.

## **8.0 EMERGENCY NOTIFICATION**

The following is a list of telephone numbers for the nearest hospital and emergency response personnel:

Metropolitan Hospital Center	212-423-6262
Fire Emergency	911
Ambulance/Rescue Squad	911
New York City Police	911

NYSDEC Spill Hotline	1-800-457-7362
NYC Department of Health	1-212-442-9666
NYSDEC Region H Headquarters Division of Hazardous Waste Remediation	1-718-482-4933
LANDMARK Project Manager Peter Bulla	1-212-967-2484 (office) 1-718-208-0129 (cellular)
LANDMARK Site Safety Officer Andrew L. Gasparro	1-212-967-2484 (office) 1-917-743-4789 (cellular)

**9.0 EMERGENCY MEDICAL TREATMENT**

A first aid kit will be provided on-site for emergency medical treatment. The SSO will assume responsibility for determining the need to call the hospital. It will also be the SSO's responsibility to monitor site personnel for heat and cold stress.

**Heat Stress** - Wearing personal protection equipment, such as Tyvek coveralls, can contribute to heat stress. There are five major categories of heat-related disorders:

- Transient heat fatigue, caused by non-acclimation of workers to heat, is characterized by decline in the workers' alertness and concentration.
- Heat rash, also known as prickly heat, is caused by the body's inability to remove sweat by evaporation. This is aggravated more by the wearing of protective clothing, which prevents the sweat from evaporating. Frequent showers, the use of baby powder, and resting at regular intervals can alleviate the condition.
- Heat cramps are painful spasms caused by loss of salt and other electrolytes from the body. Relief is provided by drinking half a glass of water containing half a teaspoon of salt every 15 minutes. Cramps can also be prevented by drinking an electrolyte mixture (such as Gatorade) while working. Persons who have heart problems or are on low sodium diets must consult a physician for relief of heat cramps.
- Heat exhaustion is caused by excessive sweating. The worker will continue to sweat, but experience extreme weakness, fatigue, giddiness, nausea, or headache. The worker may vomit or faint. The skin will be clammy or moist, complexion will be flushed or pale and body temperature will be normal or slightly higher. The victim should lie down in a cool place, with the feet elevated 8-12 inches. Lightly salted liquids - i.e., half a glass of water with half a teaspoon of salt - should be administered every 15 minutes. Cool, wet cloths can also be applied. If vomiting occurs, discontinue fluids and take victim to the hospital.
- Heat stroke, the most dangerous form of heat-related injury, is life threatening. Body

temperature will rise significantly and rapidly, i.e., >105°F; the skin will be hot, dry, and usually red in spots; pulse will be rapid and strong. The victim will no longer be sweating. An ambulance must be summoned immediately but in the meantime, move the victim to a cool place, soak his/her clothes with water, and fan his/her body vigorously to promote cooling and quickly reduce body temperature.

Prevention is the first and foremost means of handling heat stress problems. Workers should drink 1 to 1.6 gallon of fluid per day to maintain body fluids and body weight.

**Cold Stress** - Frostbite is characterized by white to grayish-yellow skin color and should be treated by rapidly warming the affected part in running water at 102 to 105°F. Hypothermia is characterized by excessive shivering and, in severe cases, unconsciousness may result. Warm the victim as quickly as possible by moving to a warm, sheltered area and/or placing him/her in a tub of water 102 to 105 F.

Field crewmembers and contractors should inform the HSO if they feel excessively chilled. The HSO should be alert to cold weather, and assure that workers are warmly dressed and take shelter periodically.

## **10.0 PERSONAL PROTECTION ON-SITE**

Based on currently available information, Level D protection should be adequate for most of the work to be performed on-site. For the purpose of this HASP, Level D areas are defined as areas where gross ambient organic vapor levels (monitored in real time) range from site background to 5 ppm over background. Background readings will be obtained each day within the work area prior to commencement of work and along the perimeter of the work site. For the purpose of this HASP, during the site assessment activities, Level D protection consists of: work cloths/coveralls, gloves, safety boots, and a hard hat.

If concentrations of organic vapors, as monitored in real time, exceed 5 ppm over site background, or toxic airborne substances are known to exist, personal protection will be upgraded to Level C.

For the purpose of the HASP, Level C areas are defined as areas where gross ambient organic vapor levels, monitored in real time, exceed 5 ppm over background but are less than 500-ppm, or where the presence of toxic/explosive airborne substances are known or suspected.

Level C protection adds a full-face air-purifying respirator to the Level D protection described above and requires Tyvek coveralls, chemical resistant gloves, and boots.

During the course of excavation activities, all efforts will be made to minimize activities that will create dust. Dust suppression, including wetting down the work area, will be utilized as necessary.

### **10.1 Basic Equipment**

Basic safety equipment will be kept on-site to monitor site conditions and respond to emergency situations. This equipment includes, but is not limited to, the following:

- 1.) First Aid Kits
- 2.) Portable eyewash
- 3.) Type ABC fire extinguisher
- 4.) Photo Ionization Detector (PID)
- 5.) Dust Trak dust monitor

## 10.2 Personnel Training

All personnel working on-site that are involved with any activity that brings them into contact with the site's surficial soils will have received a minimum of 40 hours of Health and Safety training in accordance with OSHA 1910.120(E)(2).

Craft Labor who will be working on-site are responsible for understanding and complying with HASP requirements and for notifying either the SSO or their supervisor of any concerns they might have for their health and safety on the job. Craft Labor and all other support personnel are responsible for conducting themselves in a safe manner, mindful of the inherent hazards associated with working around contaminated materials, heavy equipment, and extreme environmental conditions.

## 11.0 FIELD PROCEDURES

Work areas will be initially defined as Level 'D'. If conditions warrant, personnel protection will be upgraded as deemed necessary by the SSO. Level 'C' will be cordoned off while work is taking place. Access to areas designated will be provided only to those persons directly involved in the field operations and only if the appropriate level of personal protection is worn. All equipment and personnel will be subjected to decontamination procedures before leaving an area of restricted access. Separate work zones and decontamination zones will be pre-designated in areas requiring Level C protection.

### 11.1 Air Monitoring

Air monitoring shall be conducted in accordance with requirements specified in 29 CFR 1910.134 to assure proper selection of engineering controls, work practices and personal protective equipment so that workers are not exposed to levels which exceed permissible exposure limits, or published exposure limits. Air monitoring, with respect to volatile organic contaminants and dust, will be conducted concurrent to work activities at the site and for the duration of it.

Once having identified concentrations of specific contaminants and their respective permissible exposure limits (PEL), as identified by NIOSH and/or OSHA, appropriate respiratory protection will be selected. In cases pertaining to oxygen deficient environments, pressure demand supplied air will be utilized accordingly. In cases where oxygen deficiency is not an issue,

individual contaminants and their respective concentrations must be determined.

Monitoring equipment to be utilized, as deemed necessary, will include: a PE) and dust monitor. Site Safety Officer(s) and any other personnel within the work area or area of restricted access, will modify personal levels of protection, as deemed appropriate, relative to 29 CFR 1910.134.

### 11.2 Explosivity

The work area will also be monitored by the SSO for the presence of explosive gases, utilizing a combustible gas indicator.

When levels approach 25 percent of the lower explosive limit (LEL), work will stop until explosive gases have dissipated sufficiently to resume work.

### 11.3 Community Air Monitoring - Volatile Organic Compounds

Air quality will be continuously monitored, by the owner of the owner's representative, at downwind perimeter of the contaminated work area while soil-disturbing activities are occurring. The action levels and required responses are listed below:

ACTION LEVEL	RESPONSE ACTION
Less than 5 ppm above background*	Continue work.
More than 5 ppm, but less than 10 ppm above background	Implement vapor emission response plan.
More than 10 ppm above background	Stop work. Perform downwind monitoring in accordance with vapor emission response plan.

### Vapor Emission Response Plan

When vapor concentrations at the downwind edge of the work area exceed 5 ppm over background then work will be temporarily suspended and the SSO will notify the owner or the owner's representative. Work may be resumed if:

1. Concentrations at the downwind edge of the work area fall below 5 ppm over background; **OR,**
2. Concentrations measured 200 feet downwind or at half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the downwind concentrations measured 200 feet downwind or at half the distance to the nearest downwind residential or commercial structure, whichever is less, exceed 5 ppm over background, then all work will be halted and the SSO will notify the owner or the owner's representative.

### **Community Air Monitoring - Particulates**

Real-time particulate monitors will be used to monitor airborne total particulate levels during all excavation and all moving or loading of soil from contaminated areas (TSI Dust Trak Model 8520, MIE PDR 1,000 or equivalent). Particulate levels will be continuously monitored within, and at the upwind and downwind ends of the work area.

If the work area is limited to under a 50-foot radius, then only upwind and downwind levels will be measured.

If downwind dust particulate levels, integrated over a period of 15 minutes, are more than 0.15 mg/m<sup>3</sup> greater than the upwind particulate level, then appropriate dust suppression measures will be implemented.

#### **11.4 Record Keeping**

The SSO will maintain a record of all individuals present at the work site, levels of worker protection, and general conformance with this HSP. Meter readings will be periodically recorded in addition to noting observed peak readings.

### **12.0 DECONTAMINATION**

All equipment and personnel will be subjected to decontamination procedures before leaving an area of restricted access. Separate work zones and decontamination zones will be pre-designated, if needed, in areas requiring Level C protection.

#### **12.1 Level C Areas**

The decontamination zone within a Level C area will be lined with plastic to contain wash waters. Reusable equipment will be cleaned with appropriate solutions. Disposable equipment, coveralls, gloves, etc. will be placed in plastic bags and disposed of as household waste in available on-site receptacles. Respirators will be worn throughout the decontamination process. Liquid wastes, contained in the process of Level C decontamination, will be placed in drums to be supplied by the contractor for disposal in accordance with applicable regulations.

#### **12.2 Level D Areas**

Before leaving Level D work areas, loose soil will be brushed from equipment and clothing. Equipment will be washed with detergent and water. Disposable coveralls, gloves, etc. will be placed in plastic bags and disposed of as household waste in available on-site receptacles.

### **13.0 GENERAL WORK PRACTICES**

To protect the health and safety of the field personnel, all field personnel will adhere to the guidelines listed below during activities involving subsurface disturbance in contaminated areas:

- Eating, drinking, chewing gum, or tobacco, and smoking are prohibited, except in designated areas on the site. These areas will be designated by the SSO.

- Workers must wash their hands and face thoroughly upon leaving the work area and before eating, drinking, or any other such activity. The workers should shower as soon as possible after leaving the site.
- Contact with contaminated or suspected surfaces should be avoided.
- The buddy system should always be used; each buddy should watch for signs of fatigue, exposure, and heat stress.

#### **14.0 UST CLOSURE PROTOCOL**

In the event any USTs are identified during site development activities, they will be decommissioned in accordance with local, state, and federal regulations. The following procedures will be implemented:

- 1) Prior to any excavation, a utility mark out will be ordered from New York Dig Safe. Once the USTs are uncovered, all product piping will be drained into the tank. The piping will then be removed.
- 2) All liquids and residues will be removed from USTs by using explosion-proof or air driven pumps. Pump motors and suction hoses will be bonded to the tank or otherwise grounded to prevent electrostatic ignition hazards. It may be necessary to use a hand pump to remove the last few inches of liquid from the bottom of the tank. If a vacuum truck is used for removal of liquids or residues, the area of operation for the vacuum truck will be vapor-free. The truck will be located upwind from the tank and outside the path of probable vapor travel. The vacuum pump exhaust gases will be discharged through hose of adequate size and length downwind of the truck, tank, and building.
- 3) All fill pipes, return/feed lines and other non-product lines except the vent line will be removed. The vent line will remain connected until the tank is purged. All other tank openings will be temporarily plugged so that all vapors will exit through the vent line during vapor-freeing process.
- 4) All flammable vapors will be removed by one of the methods described below. These methods provide a means for temporary vapor freeing of the tanks.
  - Flammable and combustible vapors may be purged with an inert gas, such as carbon dioxide (CO<sub>2</sub>) or nitrogen (N<sub>2</sub>).
  - The vapors in the tank may be displaced by adding solid CO<sub>2</sub> ("dry ice") to the tanks in an amount of at least 1.5 pounds per 100 gallons of tanks capacity.
  - Ventilation using an educator-type air mover usually driven by compressed air.
  - Ventilation with a diffused air blower.
- 5) The tank's atmosphere and the excavation area will be regularly tested for flammable vapor concentrations until the tank is removed from both the excavation and the Site.
- 6) The tank's vapor space will be tested by placing the combustible gas indicator probe into the fill opening with the drop tube removed. Readings will be taken at the bottom, middle, and upper portions of the tanks, and the instrument shall be cleared after reading.

Readings of 10% or less of the lower flammable limits will be obtained before the tank is considered safe for removal from the ground. OSHA requires a lower flammable limit of 10% or less prior to removing the tank from the ground.

- 7) After the tank has been purged of vapors and before it is removed from the excavation, all accessible holes will be temporarily plugged or capped, to prevent soil or other objects from entering the tank. The tank will always be positioned with the vent plug on top of the tank during subsequent transport and storage.
- 8) The area around the tank will be excavated to facilitate removal. The tank will be removed from the excavation and placed on a level surface. Wooden blocks will be used to prevent movement of the tanks after removal and prior to loading on a truck for transportation.
- 9) Following venting of the UST, the tanks will be cut open and cleaned of any residual petroleum by a confined space certified person. The tank will be removed from the Site as promptly as possible after vapor-freeing procedures have been completed.
- 10) The tank will be sold to a scrap dealer for recycling. Sufficient holes will be made in the tanks to render them unfit for reuse. A bill of sale will be used to transfer tank ownership.
- 11) All bottom sludge will be transferred to DOT approved 55-gallon drums and secured on-site. The drums will be properly labeled once closed. All bottom sludge drums will be properly transported to a licensed disposal/treatment facility.
- 12) Site assessment confirmatory soil samples will be collected from the four (4) walls and bottom of all tank(s) excavations. The soil samples will be screened in the field with a photo ionization detector (PID) for the presence of petroleum contamination. All samples will be transferred into laboratory supplied glassware and hand delivered, under chain of custody procedures, to a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP) certified laboratory for analysis for volatile organic compounds and PAHs, in accordance with USEPA Methods 8021 and 8270. The NYSDEC Spill Technology and Remediation Series Memo No. 1 (STARS) analyte list will be used for these analyses.

During excavation and removal of the USTs, SSO personnel will be on-site to field screen disturbed soils with a PID for the presence of petroleum contamination. If soils are encountered that exhibit PID readings greater than 10 parts per million, or exhibit petroleum odors, the material will be stockpiled separately. The material will be placed on and covered with 10-mil polyethylene sheeting. Composite sample will be collected from the stockpiled soils for laboratory analysis of NYSDEC STARS analytes, as well as parameters required by the designated waste disposal facility. Once the laboratory results are available, the proper disposal facility will be selected and the soil will be transported to the disposal facility in accordance with all local, state, and federal regulation. Non-hazardous/regulated waste manifests will be prepared at the Site prior to transport to the approved facility. The hauler will have all necessary permits and licenses to transport the material, including a NYSDEC 364 permit. All manifests will be signed at the facility to show receipt of the material.

Finally, in the event a release of contaminants into the environment is identified, the NYSDEC Spills Hotline will be immediately contacted.

## **15.0 ACKNOWLEDGMENTS OF HASP**

This is an affidavit that must be signed by all workers who enter the site. A copy of the HSP

**Landmark Consultants, Inc**

must be on-site at all times and will be kept by the project superintendent or his representative.

**AFFIDAVIT**

I, (NAME), of Landmark Consultants Corp. have read the "Health and Safety Plan" (HASP) for the site. I agree to conduct all on-site work in accordance with the requirements set forth in this HSP and understand that failure to comply with this HSP could lead to my removal from the site.

Additional on-site personnel, please read the above affidavit and sign below:

NAME	COMPANY	DATE
*For additional on-site personnel, copy this page and attach to HSP.		

**16.0 DIRECTIONS TO HOSPITAL**

Please see Attached.





45 India St, Brooklyn, NY 11222

1. Head **east** on **India St** toward **Franklin St**  
About 1 min go 0.4 mi  
total 0.4 mi
-  2. Take the 3rd left onto **McGuinness Blvd**  
About 56 secs go 0.2 mi  
total 0.5 mi
3. Continue onto **Pulaski Bridge**  
About 2 mins go 0.5 mi  
total 1.1 mi
-  4. Slight right onto **11th St** go 282 ft  
total 1.1 mi
-  5. Turn right onto **Jackson Ave** go 0.2 mi  
total 1.3 mi
-  6. Take the 2nd right onto **21st St**  
About 1 min go 0.2 mi  
total 1.5 mi
7. Take the ramp to **Midtown Tun/Manhattan**  
Toll road go 0.1 mi  
total 1.6 mi
-  8. Slight right onto **I-495 W**  
Toll road  
About 2 mins go 1.4 mi  
total 3.0 mi
-  9. Exit on the left onto **Tunnel Exit St**  
Partial toll road go 0.2 mi  
total 3.3 mi
-  10. Turn left onto **E 34th St** go 466 ft  
total 3.3 mi
-  11. Take the 1st right onto **2nd Ave**  
About 45 secs go 0.2 mi  
total 3.5 mi
-  12. Turn left onto **E 30th St**  
About 46 secs go 0.1 mi  
total 3.7 mi
-  13. Turn left onto **1st Avenue**  
Destination will be on the right  
About 46 secs go 469 ft  
total 3.8 mi



**NYU School of Medicine**  
530 1st Avenue, New York, NY 10016

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2012 Google, Sanborn

Directions weren't right? Please find your route on [maps.google.com](http://maps.google.com) and click "Report a problem" at the bottom left.

TABLE 1 - TRACK 1 SOIL CLEANUP OBJECTIVES  
 REMEDIAL ACTION WORK PLAN  
 45 INDIA STREET, BROOKLYN, NEW YORK

Contaminant	Unrestricted Use (mg/kg) <sup>(1)</sup>
4,4'-DDE	0.0033
4,4'-DDD	0.0033
4,4'-DDT	0.0033
Dieldrin	0.005
Benzo(a)anthracene	1
Benzo(a)pyrene	1
Benzo(b)fluoranthene	1
Benzo(k)fluoranthene	0.8
Chrysene	1
Dibenzo(a,h)anthracene	0.33
Indeno(1,2,3-cd)pyrene	0.5
Phenol	0.33
Barium	350
Cadmium	2.5
Lead	63
Mercury	0.18
Zinc	109

<sup>(1)</sup> - Adapted from 6 NYCRR PART 375 Table 375-6.8(a):Unrestricted Use Soil Cleanup Objectives

<sup>(2)</sup> - For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

This fact sheet answers the most frequently asked health questions (FAQs) about DDT, DDE, and DDD. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to DDT, DDE, and DDD occurs mostly from eating foods containing small amounts of these compounds, particularly meat, fish and poultry. High levels of DDT can affect the nervous system causing excitability, tremors and seizures. In women, DDE can cause a reduction in the duration of lactation and an increased chance of having a premature baby. DDT, DDE, and DDD have been found in at least 441 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What are DDT, DDE, and DDD?

DDT (dichlorodiphenyltrichloroethane) is a pesticide once widely used to control insects in agriculture and insects that carry diseases such as malaria. DDT is a white, crystalline solid with no odor or taste. Its use in the U.S. was banned in 1972 because of damage to wildlife, but is still used in some countries.

DDE (dichlorodiphenyldichloroethylene) and DDD (dichlorodiphenyldichloroethane) are chemicals similar to DDT that contaminate commercial DDT preparations. DDE has no commercial use. DDD was also used to kill pests, but its use has also been banned. One form of DDD has been used medically to treat cancer of the adrenal gland.

### What happens to DDT, DDE, and DDD when they enter the environment?

- DDT entered the environment when it was used as a pesticide; it still enters the environment due to current use in other countries.
- DDE enters the environment as contaminant or breakdown product of DDT; DDD also enters the environment as a breakdown product of DDT.
- DDT, DDE, and DDD in air are rapidly broken down by sunlight. Half of what's in air breaks down within 2 days.
- They stick strongly to soil; most DDT in soil is broken down slowly to DDE and DDD by microorganisms; half the DDT in soil will break down in 2-15 years, depending on the type of soil.

- Only a small amount will go through the soil into groundwater; they do not dissolve easily in water.
- DDT, and especially DDE, build up in plants and in fatty tissues of fish, birds, and other animals.

### How might I be exposed to DDT, DDE, and DDD?

- Eating contaminated foods, such as root and leafy vegetables, fatty meat, fish, and poultry, but levels are very low.
- Eating contaminated imported foods from countries that still allow the use of DDT to control pests.
- Breathing contaminated air or drinking contaminated water near waste sites and landfills that may contain higher levels of these chemicals.
- Infants fed on breast milk from mothers who have been exposed.
- Breathing or swallowing soil particles near waste sites or landfills that contain these chemicals.

### How can DDT, DDE, and DDD affect my health?

DDT affects the nervous system. People who accidentally swallowed large amounts of DDT became excitable and had tremors and seizures. These effects went away after the exposure stopped. No effects were seen in people who took small daily doses of DDT by capsule for 18 months. A study in humans showed that women who had high amounts of a form of DDE in their breast milk were unable to

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breast feed their babies for as long as women who had little DDE in the breast milk. Another study in humans showed that women who had high amounts of DDE in breast milk had an increased chance of having premature babies. In animals, short-term exposure to large amounts of DDT in food affected the nervous system, while long-term exposure to smaller amounts affected the liver. Also in animals, short-term oral exposure to small amounts of DDT or its breakdown products may also have harmful effects on reproduction.

### How likely are DDT, DDE, and DDD to cause cancer?

Studies in DDT-exposed workers did not show increases in cancer. Studies in animals given DDT with the food have shown that DDT can cause liver cancer. The Department of Health and Human Services (DHHS) determined that DDT may reasonably be anticipated to be a human carcinogen. The International Agency for Research on Cancer (IARC) determined that DDT may possibly cause cancer in humans. The EPA determined that DDT, DDE, and DDD are probable human carcinogens.

### How can DDT, DDE, and DDD affect children?

There are no studies on the health effects of children exposed to DDT, DDE, or DDD. We can assume that children exposed to large amounts of DDT will have health effects similar to the effects seen in adults. However, we do not know whether children differ from adults in their susceptibility to these substances.

There is no evidence that DDT, DDE, or DDD cause birth defects in people. A study showed that teenage boys whose mothers had higher DDE amounts in the blood when they were pregnant were taller than those whose mothers had lower DDE levels. However, a different study found the opposite in preteen girls. The reason for the discrepancy between these studies is unknown.

Studies in rats have shown that DDT and DDE can mimic the action of natural hormones and in this way affect the development of the reproductive and nervous systems. Puberty was delayed in male rats given high amounts of DDE as juveniles. This could possibly happen in humans.

A study in mice showed that exposure to DDT during the first weeks of life may cause neurobehavioral problems later in life.

### How can families reduce the risk of exposure to DDT, DDE, and DDD?

- Most families will be exposed to DDT by eating food or drinking liquids contaminated with small amounts of DDT.
- Cooking will reduce the amount of DDT in fish.
- Washing fruit and vegetables will remove most DDT from their surface.
- Follow health advisories that tell you about consumption of fish and wildlife caught in contaminated areas.

### Is there a medical test to show whether I've been exposed to DDT, DDE, and DDD?

Laboratory tests can detect DDT, DDE, and DDD in fat, blood, urine, semen, and breast milk. These tests may show low, moderate, or excessive exposure to these compounds, but cannot tell the exact amount you were exposed to, or whether you will experience adverse effects. These tests are not routinely available at the doctor's office because they require special equipment.

### Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) sets a limit of 1 milligram of DDT per cubic meter of air (1 mg/m<sup>3</sup>) in the workplace for an 8-hour shift, 40-hour workweek.

The Food and Drug Administration (FDA) has set limits for DDT, DDE, and DDD in foodstuff at or above which the agency will take legal action to remove the products from the market.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for DDT/DDE/DDD (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about aldrin and dieldrin. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to aldrin and dieldrin happens mostly from eating contaminated foods, such as root crops, fish, or seafood. Aldrin and dieldrin build up in the body after years of exposure and can affect the nervous system. Aldrin has been found in at least 207 of the 1,613 National Priorities List sites identified by the Environmental Protection Agency (EPA). Dieldrin has been found in at least 287 of the 1,613 sites.

### What are aldrin and dieldrin?

Aldrin and dieldrin are insecticides with similar chemical structures. They are discussed together in this fact sheet because aldrin quickly breaks down to dieldrin in the body and in the environment. Pure aldrin and dieldrin are white powders with a mild chemical odor. The less pure commercial powders have a tan color. Neither substance occurs naturally in the environment.

From the 1950s until 1970, aldrin and dieldrin were widely used pesticides for crops like corn and cotton. Because of concerns about damage to the environment and potentially to human health, EPA banned all uses of aldrin and dieldrin in 1974, except to control termites. In 1987, EPA banned all uses.

### What happens to aldrin and dieldrin when they enter the environment?

- Sunlight and bacteria change aldrin to dieldrin so that we mostly find dieldrin in the environment.
- They bind tightly to soil and slowly evaporate to the air.
- Dieldrin in soil and water breaks down very slowly.
- Plants take in and store aldrin and dieldrin from the soil.
- Aldrin rapidly changes to dieldrin in plants and animals.
- Dieldrin is stored in the fat and leaves the body very slowly.

### How might I be exposed to aldrin or dieldrin?

- Dieldrin is everywhere in the environment, but at very low levels.

- Eating food like fish or shellfish from lakes or streams contaminated with either chemical, or contaminated root crops, dairy products, or meats.
- Air, surface water, or soil near waste sites may contain higher levels.
- Living in homes that were once treated with aldrin or dieldrin to control termites.

### How can aldrin and dieldrin affect my health?

People who have intentionally or accidentally ingested large amounts of aldrin or dieldrin have suffered convulsions and some died. Health effects may also occur after a longer period of exposure to smaller amounts because these chemicals build up in the body.

Some workers exposed to moderate levels in the air for a long time had headaches, dizziness, irritability, vomiting, and uncontrolled muscle movements. Workers removed from the source of exposure rapidly recovered from most of these effects.

Animals exposed to high amounts of aldrin or dieldrin also had nervous system effects. In animals, oral exposure to lower levels for a long period also affected the liver and decreased their ability to fight infections. We do not know whether aldrin or dieldrin affect the ability of people to fight disease.

Studies in animals have given conflicting results about whether aldrin and dieldrin affect reproduction in male animals and whether these chemicals may damage the sperm.

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We do not know whether aldrin or dieldrin affect reproduction in humans.

### How likely are aldrin and dieldrin to cause cancer?

There is no conclusive evidence that aldrin or dieldrin cause cancer in humans. Aldrin and dieldrin have been shown to cause liver cancer in mice. The International Agency for Research on Cancer (IARC) has determined that aldrin and dieldrin are not classifiable as to human carcinogenicity. The EPA has determined that aldrin and dieldrin are probable human carcinogens.

### How can aldrin and dieldrin affect children?

Children can be exposed to aldrin and dieldrin in the same way as adults. There are no known unique exposure pathways for children. Children who swallowed amounts of aldrin or dieldrin much larger than those found in the environment suffered convulsions and some died, as occurred in adults. However, we do not know whether children are more susceptible than adults to the effects of aldrin or dieldrin.

We do not know whether aldrin or dieldrin cause birth defects in humans. Pregnant animals that ingested aldrin or dieldrin had some babies with low birth weight and some with alterations in the skeleton. Dieldrin has been found in human breast milk, therefore, it can be passed to suckling infants.

### How can families reduce the risk of exposure to aldrin and dieldrin?

- Since aldrin and dieldrin are no longer produced or used, exposure to these compounds will occur only from past usage.
- Because aldrin and dieldrin were applied to the basement of some homes for termite protection, before buying a home families should investigate what, if any, pesticides have been used within the home.

### Is there a medical test to show whether I've been exposed to aldrin and dieldrin?

There are laboratory tests that can measure aldrin and dieldrin in your blood, urine, and body tissues. Because aldrin changes to dieldrin fairly quickly in the body, the test has to be done shortly after you are exposed to aldrin. Since dieldrin can stay in the body for months, measurements of dieldrin can be made much longer after exposure to either aldrin or dieldrin. The tests cannot tell you whether harmful health effects will occur. These tests are not routinely available at the doctor's office because they require special equipment.

### Has the federal government made recommendations to protect human health?

The EPA limits the amount of aldrin and dieldrin that may be present in drinking water to 0.001 and 0.002 milligrams per liter (mg/L) of water, respectively, for protection against health effects other than cancer. The EPA has determined that a concentration of aldrin and dieldrin of 0.0002 mg/L in drinking water limits the lifetime risk of developing cancer from exposure to each compound to 1 in 10,000.

The Occupational Safety and Health Administration (OSHA) sets a maximum average of 0.25 milligrams of aldrin and dieldrin per cubic meter of air (0.25 mg/m<sup>3</sup>) in the workplace during an 8-hour shift, 40 hour week. The National Institute for Occupational Safety and Health (NIOSH) also recommends a limit of 0.25 mg/m<sup>3</sup> for both compounds for up to a 10-hour work day, 40-hour week.

The Food and Drug Administration (FDA) regulates the residues of aldrin and dieldrin in raw foods. The allowable range is from 0 to 0.1 ppm, depending on the type of food product.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2002. Toxicological Profile for Aldrin/Dieldrin (Update). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about polycyclic aromatic hydrocarbons (PAHs). For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY:** Exposure to polycyclic aromatic hydrocarbons usually occurs by breathing air contaminated by wild fires or coal tar, or by eating foods that have been grilled. PAHs have been found in at least 600 of the 1,430 National Priorities List sites identified by the Environmental Protection Agency (EPA).

## What are polycyclic aromatic hydrocarbons?

(Pronounced pŏl'i-si'klik ăr'a-măt'ik hi'drə-kar'bənz)

Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or charbroiled meat. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides.

## What happens to PAHs when they enter the environment?

- PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- PAHs can occur in air attached to dust particles.
- Some PAH particles can readily evaporate into the air from soil or surface waters.
- PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days to weeks.

- PAHs enter water through discharges from industrial and wastewater treatment plants.
- Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- Microorganisms can break down PAHs in soil or water after a period of weeks to months.
- In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live.

## How might I be exposed to PAHs?

- Breathing air containing PAHs in the workplace of coking, coal-tar, and asphalt production plants; smoke-houses; and municipal trash incineration facilities.
- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, asphalt roads, or agricultural burn smoke.
- Coming in contact with air, water, or soil near hazardous waste sites.
- Eating grilled or charred meats; contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.
- Drinking contaminated water or cow's milk.

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- Nursing infants of mothers living near hazardous waste sites may be exposed to PAHs through their mother's milk.

### How can PAHs affect my health?

Mice that were fed high levels of one PAH during pregnancy had difficulty reproducing and so did their offspring. These offspring also had higher rates of birth defects and lower body weights. It is not known whether these effects occur in people.

Animal studies have also shown that PAHs can cause harmful effects on the skin, body fluids, and ability to fight disease after both short- and long-term exposure. But these effects have not been seen in people.

### How likely are PAHs to cause cancer?

The Department of Health and Human Services (DHHS) has determined that some PAHs may reasonably be expected to be carcinogens.

Some people who have breathed or touched mixtures of PAHs and other chemicals for long periods of time have developed cancer. Some PAHs have caused cancer in laboratory animals when they breathed air containing them (lung cancer), ingested them in food (stomach cancer), or had them applied to their skin (skin cancer).

### Is there a medical test to show whether I've been exposed to PAHs?

In the body, PAHs are changed into chemicals that can attach to substances within the body. There are special tests that can detect PAHs attached to these substances in body tissues or blood. However, these tests cannot tell whether any

health effects will occur or find out the extent or source of your exposure to the PAHs. The tests aren't usually available in your doctor's office because special equipment is needed to conduct them.

### Has the federal government made recommendations to protect human health?

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.2 milligrams of PAHs per cubic meter of air ( $0.2 \text{ mg/m}^3$ ). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist that contains PAHs is  $5 \text{ mg/m}^3$  averaged over an 8-hour exposure period.

The National Institute for Occupational Safety and Health (NIOSH) recommends that the average workplace air levels for coal tar products not exceed  $0.1 \text{ mg/m}^3$  for a 10-hour workday, within a 40-hour workweek. There are other limits for workplace exposure for things that contain PAHs, such as coal, coal tar, and mineral oil.

### Glossary

Carcinogen: A substance that can cause cancer.

Ingest: Take food or drink into your body.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.





## PUBLIC HEALTH STATEMENT POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

Division of Toxicology

August 1995

This Public Health Statement is the summary chapter from the Toxicological Profile for Polycyclic Aromatic Hydrocarbons (PAHs). It is one in a series of Public Health Statements about hazardous substances and their health effects. A shorter version, the ToxFAQs™, is also available. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present. For more information, call the ATSDR Information Center at 1-888-422-8737.

This statement was prepared to give you information about polycyclic aromatic hydrocarbons (PAHs) and to emphasize the human health effects that may result from exposure to them. The Environmental Protection Agency (EPA) has identified 1,408 hazardous waste sites as the most serious in the nation. These sites make up the National Priorities List (NPL) and are the sites targeted for long-term federal clean-up activities. PAHs have been found in at least 600 of the sites on the NPL. However, the number of NPL sites evaluated for PAHs is not known. As EPA evaluates more sites, the number of sites at which PAHs are found may increase. This information is important because exposure to PAHs may cause harmful health effects and because these sites are potential or actual sources of human exposure to PAHs.

When a substance is released from a large area, such as an industrial plant, or from a container, such as a drum or bottle, it enters the environment. This release does not always lead to exposure. You can

be exposed to a substance only when you come in contact with it. You may be exposed by breathing, eating, or drinking substances containing the substance or by skin contact with it.

If you are exposed to substances such as PAHs, many factors will determine whether harmful health effects will occur and what the type and severity of those health effects will be. These factors include the dose (how much), the duration (how long), the route or pathway by which you are exposed (breathing, eating, drinking, or skin contact), the other chemicals to which you are exposed, and your individual characteristics such as age, sex, nutritional status, family traits, lifestyle, and state of health.

### 1.1 WHAT ARE PAHs?

PAHs are a group of chemicals that are formed during the incomplete burning of coal, oil, gas, wood, garbage, or other organic substances, such as tobacco and charbroiled meat. There are more than 100 different PAHs. PAHs generally occur as complex mixtures (for example, as part of combustion products such as soot), not as single compounds. PAHs usually occur naturally, but they can be manufactured as individual compounds for research purposes; however, not as the mixtures found in combustion products. As pure chemicals, PAHs generally exist as colorless, white, or pale yellow-green solids. They can have a faint, pleasant odor. A few PAHs are used in medicines and to make dyes, plastics, and pesticides. Others are contained in asphalt used in road construction. They can also be found in substances such as crude oil, coal, coal tar pitch, creosote, and roofing tar. They are found throughout the environment in the air, water, and soil. They can occur in the air, either

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# PUBLIC HEALTH STATEMENT

## POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

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attached to dust particles or as solids in soil or sediment.

Although the health effects of individual PAHs are not exactly alike, the following 17 PAHs are considered as a group in this profile:

acenaphthene  
acenaphthylene  
anthracene  
benz[a]anthracene  
benzo[a]pyrene  
benzo[e]pyrene  
benzo[b]fluoranthene  
benzo[g,h,i]perylene  
benzo[j]fluoranthene  
benzo[k]fluoranthene  
chrysene  
dibenz[a,h]anthracene  
fluoranthene  
fluorene  
indeno[1,2,3-c,d]pyrene  
phenanthrene  
pyrene

These 17 PAHs were chosen to be included in this profile because (1) more information is available on these than on the others; (2) they are suspected to be more harmful than some of the others, and they exhibit harmful effects that are representative of the PAHs; (3) there is a greater chance that you will be exposed to these PAHs than to the others; and (4) of all the PAHs analyzed, these were the PAHs identified at the highest concentrations at NPL hazardous waste sites.

### 1.2 WHAT HAPPENS TO PAHs WHEN THEY ENTER THE ENVIRONMENT?

PAHs enter the environment mostly as releases to air from volcanoes, forest fires, residential wood

burning, and exhaust from automobiles and trucks. They can also enter surface water through discharges from industrial plants and waste water treatment plants, and they can be released to soils at hazardous waste sites if they escape from storage containers. The movement of PAHs in the environment depends on properties such as how easily they dissolve in water, and how easily they evaporate into the air. PAHs in general do not easily dissolve in water. They are present in air as vapors or stuck to the surfaces of small solid particles. They can travel long distances before they return to earth in rainfall or particle settling. Some PAHs evaporate into the atmosphere from surface waters, but most stick to solid particles and settle to the bottoms of rivers or lakes. In soils, PAHs are most likely to stick tightly to particles. Some PAHs evaporate from surface soils to air. Certain PAHs in soils also contaminate underground water. The PAH content of plants and animals living on the land or in water can be many times higher than the content of PAHs in soil or water. PAHs can break down to longer-lasting products by reacting with sunlight and other chemicals in the air, generally over a period of days to weeks. Breakdown in soil and water generally takes weeks to months and is caused primarily by the actions of microorganisms.

### 1.3 HOW MIGHT I BE EXPOSED TO PAHs?

PAHs are present throughout the environment, and you may be exposed to these substances at home, outside, or at the workplace. Typically, you will not be exposed to an individual PAH, but to a mixture of PAHs.

In the environment, you are most likely to be exposed to PAH vapors or PAHs that are attached to dust and other particles in the air. Sources include

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cigarette smoke, vehicle exhausts, asphalt roads, coal, coal tar, wildfires, agricultural burning, residential wood burning, municipal and industrial waste incineration, and hazardous waste sites. Background levels of some representative PAHs in the air are reported to be 0.02–1.2 nanograms per cubic meter (ng/m<sup>3</sup>; a nanogram is one-millionth of a milligram) in rural areas and 0.15–19.3 ng/m<sup>3</sup> in urban areas. You may be exposed to PAHs in soil near areas where coal, wood, gasoline, or other products have been burned. You may be exposed to PAHs in the soil at or near hazardous waste sites, such as former manufactured-gas factory sites and wood-preserving facilities. PAHs have been found in some drinking water supplies in the United States. Background levels of PAHs in drinking water range from 4 to 24 nanograms per liter (ng/L; a liter is slightly more than a quart).

In the home, PAHs are present in tobacco smoke, smoke from wood fires, creosote-treated wood products, cereals, grains, flour, bread, vegetables, fruits, meat, processed or pickled foods, and contaminated cow's milk or human breast milk. Food grown in contaminated soil or air may also contain PAHs. Cooking meat or other food at high temperatures, which happens during grilling or charring, increases the amount of PAHs in the food. The level of PAHs in the typical U.S. diet is less than 2 parts of total PAHs per billion parts of food (ppb), or less than 2 micrograms per kilogram of food (µg/kg; a microgram is one-thousandth of a milligram).

The primary sources of exposure to PAHs for most of the U.S. population are inhalation of the compounds in tobacco smoke, wood smoke, and ambient air, and consumption of PAHs in foods. For some people, the primary exposure to PAHs occurs

in the workplace. PAHs have been found in coal tar production plants, coking plants, bitumen and asphalt production plants, coal-gasification sites, smoke houses, aluminum production plants, coal tarring facilities, and municipal trash incinerators. Workers may be exposed to PAHs by inhaling engine exhaust and by using products that contain PAHs in a variety of industries such as mining, oil refining, metalworking, chemical production, transportation, and the electrical industry. PAHs have also been found in other facilities where petroleum, petroleum products, or coal are used or where wood, cellulose, corn, or oil are burned. People living near waste sites containing PAHs may be exposed through contact with contaminated air, water, and soil.

### 1.4 HOW CAN PAHs ENTER AND LEAVE MY BODY?

PAHs can enter your body through your lungs when you breathe air that contains them (usually stuck to particles or dust). Cigarette smoke, wood smoke, coal smoke, and smoke from many industrial sites may contain PAHs. People living near hazardous waste sites can also be exposed by breathing air containing PAHs. However, it is not known how rapidly or completely your lungs absorb PAHs. Drinking water and swallowing food, soil, or dust particles that contain PAHs are other routes for these chemicals to enter your body, but absorption is generally slow when PAHs are swallowed. Under normal conditions of environmental exposure, PAHs could enter your body if your skin comes into contact with soil that contains high levels of PAHs (this could occur near a hazardous waste site) or with used crankcase oil or other products (such as creosote) that contain PAHs. The rate at which PAHs enter your body by eating, drinking, or

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through the skin can be influenced by the presence of other compounds that you may be exposed to at the same time with PAHs. PAHs can enter all the tissues of your body that contain fat. They tend to be stored mostly in your kidneys, liver, and fat. Smaller amounts are stored in your spleen, adrenal glands, and ovaries. PAHs are changed by all tissues in the body into many different substances. Some of these substances are more harmful and some are less harmful than the original PAHs. Results from animal studies show that PAHs do not tend to be stored in your body for a long time. Most PAHs that enter the body leave within a few days, primarily in the feces and urine.

### 1.5 HOW CAN PAHs AFFECT MY HEALTH?

PAHs can be harmful to your health under some circumstances. Several of the PAHs, including benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene, have caused tumors in laboratory animals when they breathed these substances in the air, when they ate them, or when they had long periods of skin contact with them. Studies of people show that individuals exposed by breathing or skin contact for long periods to mixtures that contain PAHs and other compounds can also develop cancer.

Mice fed high levels of benzo[a]pyrene during pregnancy had difficulty reproducing and so did their offspring. The offspring of pregnant mice fed benzo[a]pyrene also showed other harmful effects, such as birth defects and decreased body weight. Similar effects could occur in people, but we have no information to show that these effects do occur.

Studies in animals have also shown that PAHs can cause harmful effects on skin, body fluids, and the body's system for fighting disease after both short- and long-term exposure. These effects have not been reported in people.

The Department of Health and Human Services (DHHS) has determined that benz[a]anthracene, benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, benzo[a]pyrene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene are known animal carcinogens. The International Agency for Research on Cancer (IARC) has determined the following: benz[a]anthracene and benzo[a]pyrene are probably carcinogenic to humans; benzo[b]fluoranthene, benzo[j]fluoranthene, benzo[k]fluoranthene, and indeno[1,2,3-c,d]pyrene are possibly carcinogenic to humans; and anthracene, benzo[g,h,i]perylene, benzo[e]pyrene, chrysene, fluoranthene, fluorene, phenanthrene, and pyrene are not classifiable as to their carcinogenicity to humans. EPA has determined that benz[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, benzo[k]fluoranthene, chrysene, dibenz[a,h]anthracene, and indeno[1,2,3-c,d]pyrene are probable human carcinogens and that acenaphthylene, anthracene, benzo[g,h,i]perylene, fluoranthene, fluorene, phenanthrene, and pyrene are not classifiable as to human carcinogenicity. Acenaphthene has not been classified for carcinogenic effects by the DHHS, IARC, or EPA.

### 1.6 IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO PAHs?

In your body, PAHs are changed into chemicals that can attach to substances within the body. The presence of PAHs attached to these substances can

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[www.atsdr.cdc.gov/](http://www.atsdr.cdc.gov/)

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## PUBLIC HEALTH STATEMENT POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)

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then be measured in body tissues or blood after exposure to PAHs. PAHs or their metabolites can also be measured in urine, blood, or body tissues. Although these tests can show that you have been exposed to PAHs, these tests cannot be used to predict whether any health effects will occur or to determine the extent or source of your exposure to the PAHs. It is not known how effective or informative the tests are after exposure is discontinued. These tests to identify PAHs or their products are not routinely available at a doctor's office because special equipment is required to detect these chemicals.

### 1.7 WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

The federal government has set regulations to protect people from the possible health effects of eating, drinking, or breathing PAHs. EPA has suggested that taking into your body each day the following amounts of individual PAHs is not likely to cause any harmful health effects: 0.3 milligrams (mg) of anthracene, 0.06 mg of acenaphthene, 0.04 mg of fluoranthene, 0.04 mg of fluorene, and 0.03 mg of pyrene per kilogram (kg) of your body weight (one kilogram is equal to 2.2 pounds). Actual exposure for most of the United States population occurs from active or passive inhalation of the compounds in tobacco smoke, wood smoke, and contaminated air, and from eating the compounds in foods. Skin contact with contaminated water, soot, tar, and soil may also occur. Estimates for total exposure in the United States population have been listed as 3 mg/day.

From what is currently known about benzo[a]pyrene, the federal government has developed regulatory standards and guidelines to protect people from the potential health effects of PAHs in drinking water. EPA has provided estimates of levels of total cancer-causing PAHs in lakes and streams associated with a risk of human cancer development. If the following amounts of individual PAHs are released to the environment within a 24-hour period, EPA must be notified: 1 pound of benzo[b]fluoranthene, benzo[a]pyrene, or dibenz[a,h]anthracene; 10 pounds of benz[a]anthracene; 100 pounds of acenaphthene, chrysene, fluoranthene, or indeno[1,2,3-c,d]pyrene; or 5,000 pounds of acenaphthylene, anthracene, benzo[k]fluoranthene, benzo[g,h,i]perylene, fluorene, phenanthrene, or pyrene.

PAHs are generally not produced commercially in the United States except as research chemicals. However, PAHs are found in coal, coal tar, and in the creosote oils, oil mists, and pitches formed from the distillation of coal tars. The National Institute for Occupational Safety and Health (NIOSH) concluded that occupational exposure to coal products can increase the risk of lung and skin cancer in workers. NIOSH established a recommended occupational exposure limit, time-weighted average (REL-TWA) for coal tar products of 0.1 milligram of PAHs per cubic meter of air (0.1 mg/m<sup>3</sup>) for a 10-hour workday, within a 40-hour workweek. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends an occupational exposure limit for coal tar products of 0.2 mg/m<sup>3</sup> for an 8-hour workday, within a 40-hour workweek. The Occupational Safety and Health Administration (OSHA) has

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Division of Toxicology

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established a legally enforceable limit of 0.2 mg/m<sup>3</sup> averaged over an 8-hour exposure period.

Mineral oil mists have been given an IARC classification of 1 (sufficient evidence of carcinogenicity). The OSHA Permissible Exposure Limit (PEL) for mineral oil mist is 5 mg/m<sup>3</sup> averaged over an 8-hour exposure period. NIOSH has concurred with this limit, and has established a recommended occupational exposure limit (REL-TWA) for mineral oil mists of 5 mg/m<sup>3</sup> for a 10-hour work day, 40-hour work week, with a 10 mg/m<sup>3</sup> Short Term Exposure Limit (STEL).

### 1.8 WHERE CAN I GET MORE INFORMATION?

If you have any more questions or concerns, please contact your community or state health or environmental quality department or:

Agency for Toxic Substances and Disease Registry  
Division of Toxicology  
1600 Clifton Road NE, Mailstop F-32  
Atlanta, GA 30333

#### Information line and technical assistance:

Phone: 888-422-8737  
FAX: (770)-488-4178

ATSDR can also tell you the location of occupational and environmental health clinics. These clinics specialize in recognizing, evaluating, and treating illnesses resulting from exposure to hazardous substances.

#### To order toxicological profiles, contact:

National Technical Information Service  
5285 Port Royal Road  
Springfield, VA 22161  
Phone: 800-553-6847 or 703-605-6000

#### Reference

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for polycyclic aromatic hydrocarbons (PAHs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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This fact sheet answers the most frequently asked health questions (FAQs) about chlorophenols. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Chlorophenols are a group of compounds that are used in a number of industries and products. Exposure to high levels can cause damage to the liver and immune system. These substances have been found in at least 166 of the 1,467 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### What are chlorophenols?

(Pronounced klôr'ə-fī-nōlz')

Chlorophenols are a group of chemicals that are produced by adding chlorines to phenol. Phenol is an aromatic compound derived from benzene. There are 5 basic types of chlorophenols and 19 different chlorophenols.

Most chlorophenols are solid at room temperature. They have a strong, medicinal taste and smell. Small amounts can be tasted in water.

Some chlorophenols are used as pesticides. Others are used in antiseptics. Small amounts are produced when water is disinfected with chlorine. They are also produced while bleaching wood pulp with chlorine to make paper.

### What happens to chlorophenols when they enter the environment?

- Chlorophenols can enter the environment when they are being made or used as pesticides.
- Most chlorophenols released to the environment go into water.
- Small amounts of chlorophenols enter the air.
- In the air, sunlight helps destroy these compounds and rain washes them out of the air.

- Chlorophenols stick to soil and sediments at the bottom of lakes, streams, and rivers.
- Low levels of chlorophenols in water, soil, or sediment are broken down and removed from the environment in a few days to weeks by microorganisms.

### How might I be exposed to chlorophenols?

- Most people are exposed to very low levels of chlorophenols in chlorinated drinking water.
- There are some chlorophenols in city air.
- You can be exposed if you work with chlorophenols or use them as pesticides.
- You can be exposed if you make or use treated wood.

### How can chlorophenols affect my health?

Workers exposed to pesticides that contain chlorophenols have developed acne and mild injury to their livers.

In laboratory studies, animals that received high levels of chlorophenols in food or water developed liver and immune system effects. They did not gain as much weight as animals not fed the compounds.

High levels of chlorophenols given to pregnant female

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rats in their drinking water reduced the number of babies they had, and caused low birth weights. Chlorophenols have not been shown to cause birth defects in animals.

### How likely are chlorophenols to cause cancer?

There is evidence to suggest that people exposed to chlorophenols for a long time may have slightly higher incidences of cancer. However, the people studied were exposed to other chemicals as well.

In animal studies, one chlorophenol, 2,4,6-trichlorophenol, caused leukemia in rats and liver cancer in mice. The Department of Health and Human Services (DHHS) has determined that 2,4,6-trichlorophenol may reasonably be anticipated to be a carcinogen.

### How can chlorophenols affect children?

Children can be exposed in the same ways as adults; however, children may be more sensitive than adults to the effects of chlorophenol-based pesticides and herbicides. Chlorophenols leave the body quickly, so they are not likely to accumulate in the mother's tissues or breast milk.

There are no human studies on the effects of chlorophenols on developing fetuses. Studies in rats showed that chlorophenols can pass through the placenta and produce toxic effects to the developing fetuses. The most common problems are delayed hardening of the bones of the breastbone, spine, and skull.

### How can families reduce the risk of exposure to chlorophenols?

Parents should keep children away from areas where chlorophenols have been used as pesticides. Always check labels on household products, and store them safely in their

original containers. Never store chemicals in containers that children might find attractive to eat or drink from, such as soda bottles.

### Is there a medical test to show whether I've been exposed to chlorophenols?

There is no test to show if you have been exposed to chlorophenols. There are tests for certain compounds that are produced in your body when chlorophenols break down. However, exposure to other substances could also produce the same test results.

### Has the federal government made recommendations to protect human health?

EPA recommends that drinking water contain no more than 0.04 milligrams per liter (0.04 mg/L) of 2-chlorophenol for a lifetime exposure for an adult, and 0.05 mg/L for a 1-day, 10-day, or longer exposure for a child.

For 2,4-dichlorophenol, EPA recommends that drinking water contain no more than 0.03 mg/L for a 1-day, 10-day, or longer exposure for a child.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for chlorophenols. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.



This fact sheet answers the most frequently asked health questions (FAQs) about barium and barium compounds. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because these substances may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting drinking water containing levels of barium above the EPA drinking water guidelines for relatively short periods of time can cause gastrointestinal disturbances and muscle weakness. Ingesting high levels for a long time can damage the kidneys. Barium and barium compounds have been found in at least 798 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

## What is barium?

Barium is a silvery-white metal which exists in nature only in ores containing mixtures of elements. It combines with other chemicals such as sulfur or carbon and oxygen to form barium compounds.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, ceramics, glass, and rubber.

Barium sulfate is sometimes used by doctors to perform medical tests and to take x-rays of the gastrointestinal tract.

## What happens to barium when it enters the environment?

- Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- The length of time that barium will last in air, land, water, or sediments depends on the form of barium released.
- Barium compounds, such as barium sulfate and barium carbonate, which do not dissolve well in water, can last a long time in the environment.

- Barium compounds, such as barium chloride, barium nitrate, or barium hydroxide, that dissolve easily in water usually do not last in these forms for a long time in the environment. The barium in these compounds that is dissolved in water quickly combines with sulfate or carbonate that are naturally found in water and become the longer lasting forms (barium sulfate and barium carbonate).

- Fish and aquatic organisms can accumulate barium.

## How might I be exposed to barium?

- Ingesting small amounts present in your food and water or breathing air containing very low levels of barium.
- Living in areas with unusually high natural levels of barium in the drinking water.
- Working in a job that involves barium production or use.
- Living or working near waste sites where barium has been disposed of.

## How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water or in the stomach contents. Barium compounds that do not dissolve well, such as barium sulfate, are not generally harmful.

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Barium has been found to potentially cause gastrointestinal disturbances and muscular weakness when people are exposed to it at levels above the EPA drinking water standards for relatively short periods of time. Some people who eat or drink amounts of barium above background levels found in food and water for a short period may experience vomiting, abdominal cramps, diarrhea, difficulties in breathing, increased or decreased blood pressure, numbness around the face, and muscle weakness. Eating or drinking very large amounts of barium compounds that easily dissolve can cause changes in heart rhythm or paralysis and possibly death. Animals that drank barium over long periods had damage to the kidneys, decreases in body weight, and some died.

### How likely is barium to cause cancer?

The Department of Health and Human Services (DHHS) and the International Agency for Research on Cancer (IARC) have not classified barium as to its carcinogenicity. The EPA has determined that barium is not likely to be carcinogenic to humans following ingestion and that there is insufficient information to determine whether it will be carcinogenic to humans following inhalation exposure.

### How can barium affect children?

We do not know whether children will be more or less sensitive than adults to barium toxicity. A study in rats that swallowed barium found a decrease in newborn body weight; we do not know if a similar effect would be seen in humans.

### How can families reduce the risks of exposure to barium?

The greatest potential source of barium exposure is through food and drinking water. However, the amount of barium in foods and drinking water are typically too low to be of concern.

### Is there a medical test to determine whether I've been exposed to barium?

There is no routine medical test to determine whether you have been exposed to barium. Doctors can measure barium in body tissues and fluids, such as bones, blood, urine, and feces, using very complex instruments. These tests cannot be used to predict the extent of the exposure or potential health effects.

The geometric mean barium level measured in the U.S. general population aged 6 and older is reported by the Centers for Disease Control and Prevention (CDC) as 1.44 µg/g creatinine (measured in urine).

### Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2.0 milligrams of barium per liter of drinking water (2.0 mg/L), which is the same as 2 ppm.

The Occupational Safety and Health Administration (OSHA) has set Permissible Exposure Limits (PELs) of 0.5 milligrams of soluble barium compounds per cubic meter of workplace air (0.5 mg/m<sup>3</sup>) for 8 hour shifts and 40 hour work weeks. The OSHA limits for barium sulfate dust are 15 mg/m<sup>3</sup> of total dust and 5 mg/m<sup>3</sup> for respirable fraction.

The National Institute for Occupational Safety and Health (NIOSH) has set Recommended Exposure Limits (RELs) of 0.5 mg/m<sup>3</sup> for soluble barium compounds. The NIOSH has set RELs of 10 mg/m<sup>3</sup> (total dust) for barium sulfate and 5 mg/m<sup>3</sup> (respirable fraction).

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for Barium and Compounds (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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Coatings, and plastics.

**What happens to cadmium when it enters the environment?**

Breathing high levels of cadmium can severely damage the lungs. Eating food or drinking water with very high levels severely irritates the stomach, leading to vomiting

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### How can cadmium affect children?

The health effects in children are expected to be similar to the effects seen in adults (kidney, lung, and bone damage depending on the route of exposure).

A few studies in animals indicate that younger animals absorb more cadmium than adults. Animal studies also indicate that the young are more susceptible than adults to a loss of bone and decreased bone strength from exposure to cadmium.

We don't know if cadmium causes birth defects in people. The babies of animals exposed to high levels of cadmium during pregnancy had changes in behavior and learning ability. There is also some information from animal studies that high enough exposures to cadmium before birth can reduce body weights and affect the skeleton in the developing young.

### How can families reduce the risks of exposure to cadmium?

- In the home, store substances that contain cadmium safely, and keep nickel-cadmium batteries out of reach of young children.
- Cadmium is a component of tobacco smoke. Avoid smoking in enclosed spaces like inside the home or car in order to limit exposure to children and other family members.
- If you work with cadmium, use all safety precautions to avoid carrying cadmium-containing dust home from work on your clothing, skin, hair, or tools.
- A balanced diet can reduce the amount of cadmium taken into the body from food and drink.

### Is there a medical test to determine whether I've been exposed to cadmium?

Cadmium can be measured in blood, urine, hair, or nails. Urinary cadmium has been shown to accurately reflect the amount of cadmium in the body.

The amount of cadmium in your blood shows your recent exposure to cadmium. The amount of cadmium in your urine shows both your recent and your past exposure.

### Has the federal government made recommendations to protect human health?

The EPA has determined that exposure to cadmium in drinking water at concentrations of 0.04 ppm for up to 10 days is not expected to cause any adverse effects in a child.

The EPA has determined that lifetime exposure to 0.005 ppm cadmium is not expected to cause any adverse effects.

The FDA has determined that the cadmium concentration in bottled drinking water should not exceed 0.005 ppm.

The Occupational Health and Safety Administration (OSHA) has limited workers' exposure to an average of 5 µg/m<sup>3</sup> for an 8-hour workday, 40-hour workweek.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2008. Toxicological Profile for Cadmium (Draft for Public Comment). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

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This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**HIGHLIGHTS:** Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

#### What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

#### What happens to lead when it enters the environment?

- Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- When lead is released to the air, it may travel long distances before settling to the ground.
- Once lead falls onto soil, it usually sticks to soil particles.
- Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

#### How might I be exposed to lead?

- Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.

- Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- Using health-care products or folk remedies that contain lead.

#### How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

#### How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

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(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

#### How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead. Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

#### How can families reduce the risks of exposure to lead?

- Avoid exposure to sources of lead.
- Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.
- If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.
- Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children.
- If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces

often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

#### Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

#### Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10  $\mu\text{g}/\text{dL}$  to be a level of concern for children.

EPA limits lead in drinking water to 15  $\mu\text{g}$  per liter.

#### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

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Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury

#### How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.

**END OF HEALTH AND SAFETY PLAN**

**APPENDIX C**  
Citizen Participation Plan

# APPENDIX C

## CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Kenry Corp. have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program (VCP). 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, Kenry Corp. 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 (NYC 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 NYC OER's project manager assigned to this Site, TBD, 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.** NYC 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 NYC 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](mailto:brownfields@cityhall.nyc.gov).

**Repositories.** A document repository is maintained in the nearest public library that maintains evening and weekend hours. 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. Kenry Corp. will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Address: Greenpoint Library  
107 Norman Avenue  
Brooklyn, New York 11222

Phone: 718.349.8504

Hours of Operation: Sunday – Closed  
Monday, Tuesday, and Friday – 10 a.m. to 6 p.m.  
Wednesday – 10 a.m. to 8 p.m.  
Thursday – 1 p.m. to 8 p.m.  
Saturday – 10 a.m. to 5 p.m.

**Digital Documentation.** NYC OER strongly encourages the use of digital documents in repositories as a means of minimizing paper use while also increasing convenience in access and ease of use.

**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 NYC 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 prepared by Kenry Corp., reviewed and approved by NYC OER prior to distribution and mailed by Kenry Corp. Public comment is solicited in public notices for all work plans developed under the NYC VCP. Final

review of all work plans by NYC 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. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued. 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 NYC OER upon request.

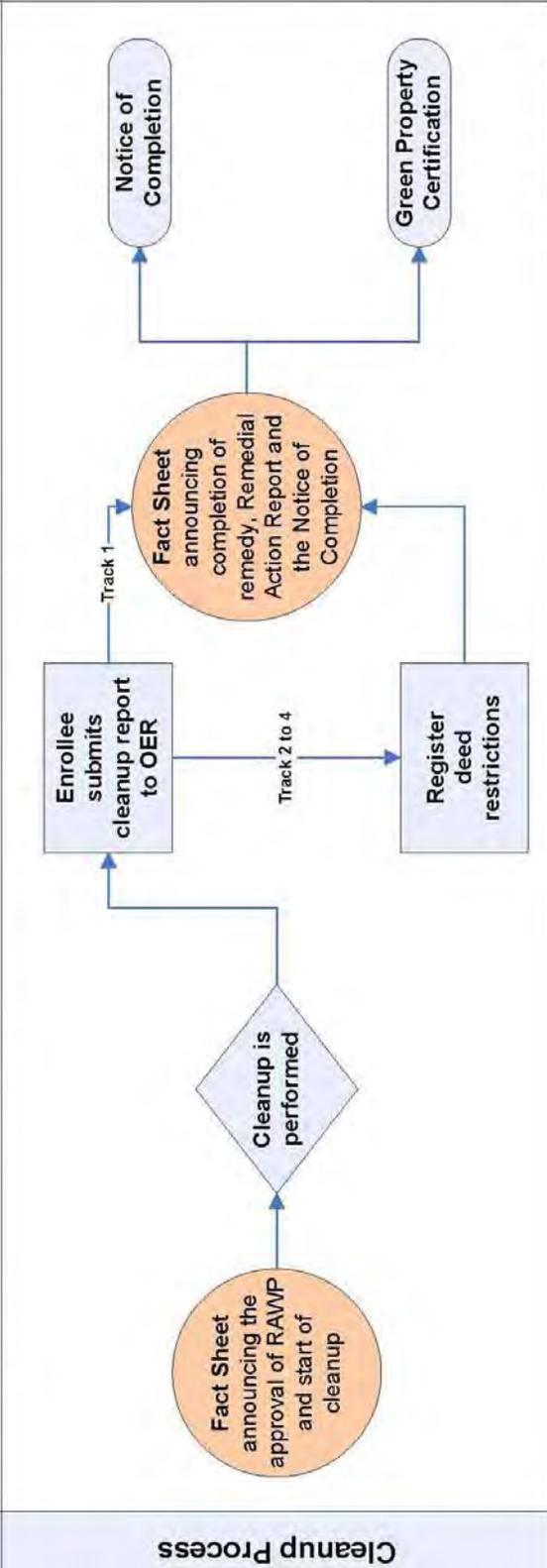
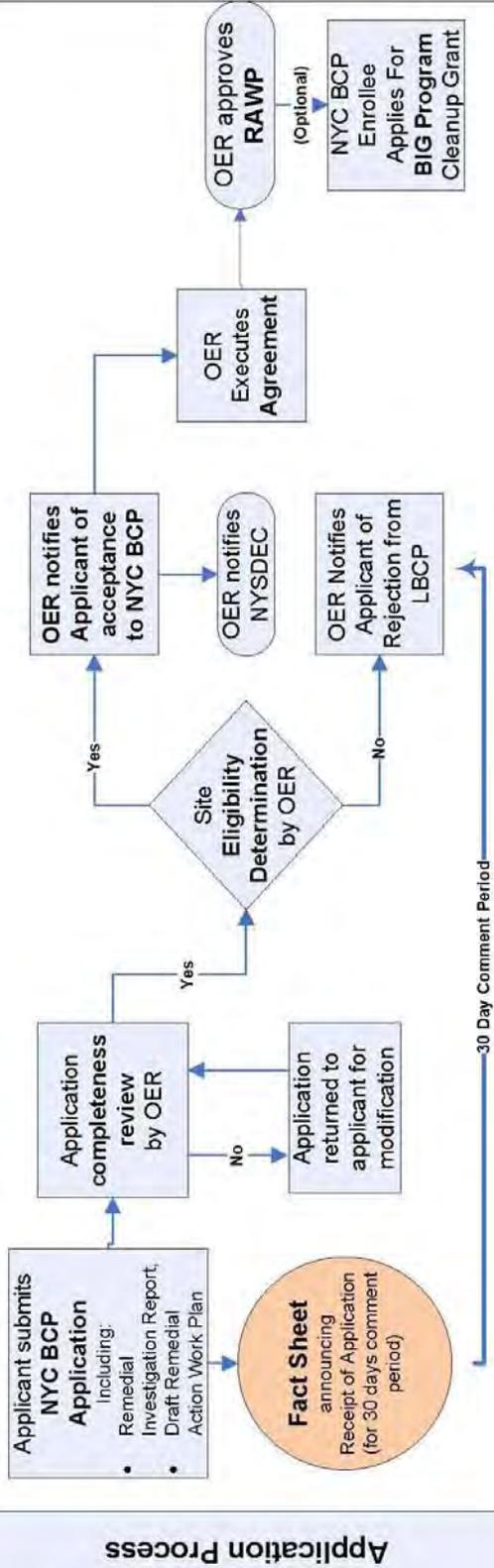
- **Public Notice announcing the approval of the RAWP and the start of remediation**

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.

## Flow Chart For NYC Brownfield Cleanup Program (NYC BCP)



**APPENDIX D**  
Sustainability Statement

## **APPENDIX D**

### **SUSTAINABILITY STATEMENT**

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

**Reuse of Clean, Recyclable Materials.** 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 Remedial Action Report (RAR).

**Reduce Consumption of Virgin and Non-Renewable Resources.** Reduced consumption of virgin and non-renewable resources lowers the overall environmental impact of the project on the region by conserving these resources.

An estimate of the quantity (in tons) of virgin and non-renewable resources, the use of which will be avoided 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 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.

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.

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

An estimate of the enhanced storm-water 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 Brownfield Cleanup Program.** Kenry Corp. 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.** Kenry Corp. is participating in NYC 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 E**  
Soils/Materials Management Plan

# **APPENDIX E**

## **SOIL/MATERIALS MANAGEMENT PLAN**

### **1.1 SOIL SCREENING METHODS**

Visual, olfactory and photoionization detector (PID) soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional (QEP) and will be reported in the Remedial Action Report (RAR). Soil screening will be performed during invasive work performed during the remedy and development phases prior to issuance of the Notice of Completion.

### **1.2 STOCKPILE METHODS**

Excavated soil from suspected areas of contamination (e.g., hot spots, 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 the New York City Office of Environmental Remediation (NYC OER). Excavated soils will be stockpiled on, at minimum, double layers of 8-mil 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 professional engineer (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 Remedial Action Work Plan (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 NYC 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 shown in Figure 4. 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 Kenry Corp. (the 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 Manhattan, New York 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 RAR.

The RAR 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 RAR.

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 RAR. A manifest system for off-Site transportation of exported materials will be employed. Manifest information will be reported in the RAR. Hazardous wastes derived from on-Site will be stored, transported, and disposed of in compliance with applicable laws and regulations.

## **1.7 MATERIALS REUSE ON-SITE**

Soil and fill that is derived from the property that meets the soil cleanup objectives (SCO) established in this plan may be reused on Site. The SCOs for on-Site reuse are listed in Table 1. '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 comparable soil/fill material, and addressed pursuant to the New York City Voluntary Cleanup Program (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 RAWP are followed.

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 NYC OER-approved backfill and cover soil quality objectives for this Site.

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 RAWP. The RAR 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.

### **Source Screening and 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.

RCA will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. 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 State Pollutant Discharge Elimination System (SPDES) permit issued by New York State Department of Environmental Conservation (NYSDEC).

#### **1.11 STORM-WATER POLLUTION PREVENTION**

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (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 NYC 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**

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 NYC OER's Project Manager. Petroleum spills will be reported to the NYSDEC 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 NYC OER. Chemical analytical testing will be performed for Target Analyte List (TAL) metals, Target Compound List (TCL) volatiles and semi-volatiles, TCL pesticides and polychlorinated biphenyls (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. NYC 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 the RAR.

### **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. NYC 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 the Remedial Action Report.

### **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.