235-237 KENT AVENUE

BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC VCP Number: 14CVCP231K

E-Designation Site Number: 14EHAZ314K

Prepared for:

112 Manhattan LLC

134 Broadway

Brooklyn, NY 11211

Prepared by:

EBC

Environmental Business Consultants

1808 Middle Country Road

Ridge, NY 11961

FEBRUARY 2014

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LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
COC	Certificate of Completion
CSOP	Contractors Site Operation Plan
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
VCA	Voluntary Cleanup Agreement
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
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
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	NYSDEC Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
OSHA	United States Occupational Health and Safety Administration
PE	Professional Engineer
PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

CERTIFICATION

I, Ariel Czemerinski, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the Redevelopment Project located at 235-237 Kent Avenue, Brooklyn, NY, Site number 14CVCP231K.

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.

Ariel Czemerinski

Name

076508

NYS PE License Number

Signature

3/24/2014

Date

EXECUTIVE SUMMARY

112 Manhattan LLC has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 4,856.6 ft^2 Site located at 235 and 237 Kent Avenue in Brooklyn, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

Site Location and Current Usage

The Site is located at 235-237 Kent Avenue in the Williamsburg section of Brooklyn, New York, and is identified as Block 2378 and Lots 1 and 2 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 4,856.6-square feet and is bounded by a new 4-story apartment building (Block 2378, Lot 3 - 233 Kent Avenue) to the north, a four story apartment building with 1st floor commercial space (Block 2378, Lot 44 - 245 Kent Avenue) to the south, Kent Avenue to the west, and a new 7-story apartment building (Block 2378 Lot 11 - 52 North 1st Street) and a three story multi-family walk up (Block 2378, Lot 38 - 45 Grand Street) to the east. A map of the site boundary is shown in Figure 2.

Lot 1 (237 Kent Avenue) is a slightly irregular shaped lot consisting of 25 feet of street frontage on Kent Avenue, a rear width of approximately 27.62 feet in the rear, and a length of approximately 101.5 feet on its longest side.

Lot 2 (235 Kent Avenue) is also slightly irregular, and consists of 25 feet of street frontage on Kent Avenue, a rear width of approximately 22.5 feet in the rear, and a length of approximately 95.5 feet.

Currently, the Site lots are developed with two one-story manufacturing buildings that were recently converted to and utilized as residential space.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 4-story mixed use building (Lot 1) with a full cellar and a concrete capped rear yard, and 4-story mixed use building with a penthouse level, a cellar, and a concrete capped rear yard.

The frame of the existing one-story manufacturing buildings will remain, but the rear 25 feet of each building will be removed to create at-grade rear court yards. Three additional levels (and penthouse) will be constructed above, and excavation below the building will be conducted to expand the existing small cellars in the front of the lots to the rear of the buildings.

Lot 1 (237 Kent Avenue) will have 954.57 ft^2 of retail space on the first floor, and an additional 694.55 ft^2 of retail storage space in the cellar. The cellar will also consist of the utility/meter room, and open cellar space which will be connected to a small apartment space on the first floor by a spiral stair case. Two window wells on the rear facade of the building will provide light to the cellar level residential space. The second, third and fourth floors will each consist of two one-bedroom apartments.

Lot 2 (235 Kent Avenue) will have 640.29 ft^2 of residential space and 951.04 ft^2 of retail space on the first floor, and an additional 694.55 ft^2 of retail storage space in the cellar. The cellar will also consist of the utility/meter room, and open cellar space which will be connected to a small apartment space on the first floor by a spiral stair case. Two window wells on the rear facade of the building will provide light to the cellar level residential space. The second, third and fourth floors will each consist of two one-bedroom apartments, and the penthouse will provide additional space to one of the 4th floor apartments.

The slab of the new cellars will be installed at a depth of approximately 9 feet below grade, with maximum excavations to approximately 10.5 feet for footings. Assuming an average excavation depth of approximately 9 ft across the front 75% of the Lot (2,750-ft^2, taking into account the existing cellars), a total of approximately 925 yd^3 (1,375 tons) of soil will require removal for the cellar expansions. Layout of the proposed site development is presented in Figure 3. The current zoning designation of Lot 1 is M1-2/R6B, and the current zoning designation of Lot 2 is M1-2/R6AM1-2/R6B. The proposed use is consistent with existing zoning for the property.

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1808 Middle Country Road
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FAX: 631.928.2780

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

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 standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Track 4 Site-Specific 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 Track 4 Site-Specific SCOs. For development purposes, 75% of the Site will be excavated to depth of approximately 9 feet for the buildings' cellars and foundations, as well as two hotspot areas identified in RI (Borings B2 and B6);
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) 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 on-Site;

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. Installation of a vapor barrier below the concrete slab of the buildings, as well as behind foundation walls of the proposed buildings. The vapor barrier will consist of Raven Industries VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from polyethylene and EVOH resins;
12. Installation and operation of an active Sub-Slab Depressurization System (SSDS);
13. Construction and maintenance of an engineered composite cover consisting of each building's 4 inch thick concrete slab and 4 inch thick concrete-capped rear yard to prevent human exposure to residual soil/fill remaining under the Site;
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
15. Implementation of storm-water pollution prevention measures 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, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
17. 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.
18. The property will continue to be registered with an E-Designation by the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1)

vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

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

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 all contaminant sources that have been identified during the study of this property.

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

Qualitative Human Health Exposure Assessment. An important part of the cleanup planning for the Site is 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 Construction Health and Safety Plan (CHASP) 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 (OSHA). 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 Site Safety Coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site Safety Coordinator is Mr. Kevin Waters of Environmental Business Consultants. Mr. Waters can be reached at (631) 504-6000.

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 only to workers performing specific tasks including removing hazardous material and installing cleanup systems in contaminated areas.

Community Air Monitoring Plan. Community air monitoring will be performed during this cleanup project to ensure that the community is properly protected from contaminants, dust and odors. Air samples will be tested in accordance with a detailed plan called the Community Air Monitoring Plan (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 includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the on-Site Project Manager, Mr. Kevin Waters at (631) 504-6000 or NYC Office of Environmental Remediation Project Manager, Ms. Shana Holberton (212) 788-3220.

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

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 construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation are 7:00AM to 6:00PM 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 Voluntary Cleanup Program, 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 facility Project Manager, Mr. Kevin Brussee (EBC) at (631) 504-6000, the NYC Office of Environmental Remediation Project Manager, Shana Holberton at (212) 788-3220, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

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

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

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

Stockpile Management. Soil stockpiles will be kept covered with tarps to prevent dust, 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 (called a Remedial Action Report) that will be available for you to review online at OER's website.

Long-Term Site Management. If long-term protection after the cleanup is needed, the property owner will be required to comply with an ongoing Site Management Plan (if Track 1 is not achieved) that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC OER. Requirements that the property owner must comply with are established through a city environmental designation. 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

112 Manhattan LLC has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 235-237 Kent Avenue in the Williamsburg section of Brooklyn, New York (the Site). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Current Usage

The Site is located at 235-237 Kent Avenue in the Williamsburg section of Brooklyn, New York, and is identified as Block 2378 and Lots 1 and 2 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 4,856.54-square feet and is bounded by a new 4-story apartment building (Block 2378, Lot 3 - 233 Kent Avenue) to the north, a four story apartment building with 1st floor commercial space (Block 2378, Lot 44 - 245 Kent Avenue) to the south, Kent Avenue to the west, and a new 7-story apartment building (Block 2378 Lot 11 - 52 North 1st Street) and a three story multi-family walk up (Block 2378, Lot 38 - 45 Grand Street) to the east. A map of the site boundary is shown in Figure 2.

Lot 1 (237 Kent Avenue) is a slightly irregular shaped lot consisting of 25 feet of street frontage on Kent Avenue, a rear width of approximately 27.62 feet in the rear, and a length of approximately 101.5 feet on its longest side.

Lot 2 (235 Kent Avenue) is also slightly irregular, and consists of 25 ft of street frontage on Kent Avenue, a rear width of approximately 22.5 ft in the rear, and a length of approximately 95.5 ft.

Currently, the Site lots are developed with two one-story manufacturing buildings that were recently converted to and utilized as residential space.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of a 4-story mixed use building (Lot 1) with a full cellar and a concrete capped rear yard, and 4-story mixed use building with a penthouse level, a cellar, and a concrete capped rear yard.

The frame of the existing one-story manufacturing buildings will remain, but the rear 25 feet of each building will be removed to create at-grade rear court yards. Three additional levels (and penthouse) will be constructed above, and excavation below the building will be conducted to expand the existing small cellars in the front of the lots to the rear of the buildings.

Lot 1 (237 Kent Avenue) will have 954.57 ft^2 of retail space on the first floor, and an additional 694.55 ft^2 of retail storage space in the cellar. The cellar will also consist of the utility/meter room, and open cellar space which will be connected to a small apartment space on the first floor by a spiral stair case. Two window wells on the rear facade of the building will provide light to the cellar level residential space. The second, third and fourth floors will each consist of two one-bedroom apartments.

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The slab of the new cellars will be installed at a depth of approximately 9 feet below grade, with maximum excavations to approximately 10.5 feet for footings.

Assuming an average excavation depth of approximately 9 feet across the front 75% of the Lot (2,750-square feet, taking into account the existing cellars), a total of approximately 925 cubic yards (1,375 tons) of soil will require removal for the cellar expansions. Layout of the proposed site development is presented in Figure 3. The current zoning designation of Lot 1 is M1-2/R6B, and the current zoning designation of Lot 2 is M1-2/R6AM1-2/R6B. The proposed use is consistent with existing zoning for the property.

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

1.3 Description of Surrounding Property

The area surrounding the Site consists of a mix of residential, commercial and manufacturing buildings. Figure 4 shows the surrounding land usage of the adjacent properties listed below as well as additional properties located up to 500 feet away from the Site. No hospitals, schools or daycare facilities are located within a 250 ft radius of the Site.

Surrounding Property Usage

Direction	Property Description
North – Adjacent Property	Block 2378, Lot 3 233 Kent Avenue – Developed with a new four story condo building.
South – Adjacent Property	Block 2378, Lot 44 245 Kent Avenue – Developed with a 4-story mixed use building (1st floor commercial space and apartments above).
East – Adjacent Properties	Block 2378, Lot 11 52 North 1st Street – Developed with a 7-story apartment building. Block 2378, Lot 38 45 Grand Street – Developed with a 3-story multi-family walk-up.
West – Opposite side of Kent Ave	Block 2377, Lot 12 234 Kent Avenue – Recently renovated 4-story industrial manufacturing building.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called "*Remedial Investigation Report, 235-237 Kent Avenue, Brooklyn, NY*", dated February 2014 (RIR).

Summary of Past Uses of Site and Areas of Concern

EBC reviewed Sanborn maps and City Directory Listings, and established a history for both Lot 1 and Lot 2 dating back to 1888. From 1888 to at least 1918, both lots were used as retail stores. 235 Kent Avenue (Lot 2) continued to be used as a retail store through 1935, but 237 Kent Avenue (Lot 1) was vacant on the Sanborn Map. By 1965, 235 Kent Avenue (Lot 2) operated as a waste company and printing press under the name "Jay Wool Waste Co." and 237 Kent Avenue (Lot 1) operated as a trucking company. The use of 235 Kent Avenue (Lot 2) changed by 1970 into a 55-gallon drum (plastic, steel, and fiber glass) recycling company and was listed in the City Directory as recently as 2012. 237 Kent Avenue (Lot 1) changed to an auto repair service company ("King Collision") by 1995 and continued until 2000. In the 2000's, the interior of both buildings were converted into use as apartments.

A Phase I was competed by Alpha-Hydro Environmental Services (AHES) in April 2013. AHES identified the following recognized environmental conditions:

- Historic site operation as a waste and printing press facility (235 Kent Avenue) and as an auto repair shop (237 Kent Avenue).

- The presence of NYSDEC VCP Site 150 feet northeast (230 Kent Avenue) of the Site. The NYSDEC VCP site was investigated and the results indicate that soil and groundwater contamination is present beneath the site and has migrated to adjoining properties.

The AOCs identified for this Site include:

1. Historic fill layer is present at the Site from grade to depths at least 10 feet below grade.

Summary of the Work Performed under the Remedial Investigation

EBC performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);

2. Installed six soil borings across the entire project Site, and collected ten soil samples and one duplicate soil sample for chemical analysis from the soil borings to evaluate soil quality;
3. Installed two groundwater monitoring wells and collected two groundwater samples and one duplicate sample to evaluate groundwater quality; and
4. Installed five soil vapor probes across the Site and collected five samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property is approximately 21 feet.
2. Depth to groundwater at the Site is approximately 20 feet.
3. Depth to bedrock is at the Site is greater than 100 feet.
4. The stratigraphy of the Site, from the surface down, consists of 8 to 10 feet of historic fill in front portion of property and 3 to 4 feet in rear portion of property, underlain by a native fine brown sand.
5. Analytical results were compared to NYSDEC 6NYCRR Part 375-6.8 Unrestricted Use Soil Cleanup Objectives (SCOs) and Restricted Residential Use SCOs. The RI showed no pesticides or PCBs at a detectable concentration. VOCs, including acetone (110 µg/Kg), naphthalene (400 µg/Kg), tetrachloroethylene (820 µg/Kg), and trichloroethylene (1,400 µg/Kg) were detected in one or more soil samples. Of these, acetone and trichloroethylene exceeded Unrestricted Use SCOs in one soil sample each. No VOCs exceeded Restricted Residential Use SCOs. Several SVOCs were detected in soil and nine SVOCs including benz(a)anthracene (maximum of 55,000 µg/Kg), benzo(a)pyrene (maximum of 49,000 µg/Kg), benzo(b)-fluoranthene (maximum of 63,000 µg/Kg), benzo(k)fluoranthene (maximum of 14,000 µg/Kg), chrysene (maximum of 53,000 µg/Kg), dibenz(a,h)-anthracene (maximum of 10,000 µg/Kg), fluoranthene (maximum of 140,000 µg/Kg), indeno(1,2,3-cd)pyrene (maximum of 27,000 µg/Kg), phenanthrene (maximum of 140,000 µg/Kg), and pyrene (maximum of 120,000 µg/Kg) were detected above Restricted Residential Use SCOs within the soil samples collected from the urban fill layer. Six metals, including arsenic (maximum of 21.5 mg/Kg), barium (maximum of 2,830 mg/Kg), cadmium (maximum 30 mg/Kg), copper (maximum of 514 mg/Kg), lead

(maximum of 4,430 mg/Kg, detected at 8 feet depths), and mercury (maximum of 1.99 mg/Kg) were detected above Restricted Residential Use SCOs within the soil samples collected from the urban fill layer. An additional two metals (chromium and zinc) were also detected above Unrestricted Use SCOs within soil samples collected from the urban fill layer. The maximum SVOC concentrations listed above were detected in the shallow soil samples collected at soil boring locations B3 and B6, and the highest lead concentration was identified in soil boring location B2, indicating hot-spot locations.

5. Groundwater samples were compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). Groundwater samples collected during the RI found no detectable concentrations of pesticides or PCBs. VOCs, including acetone (maximum of 2.8 µg/L), chloromethane (maximum of 1.2 µg/L), trichloroethylene (maximum of 0.76 µg/L), and tetrachloroethylene (maximum of 0.33 µg/L) were detected in both groundwater samples, well below their respective GQS. Two SVOCs were detected above GQS and include benzo(a)anthracene (maximum of 0.04 µg/L) and chrysene (0.02 µg/L). No other SVOCs were detected in the groundwater samples. Dissolved (filtered) metals present in groundwater at levels above GQS include iron and sodium.

6. Soil vapor samples collected during the RI indicated petroleum related compounds at low concentrations and chlorinated VOCs at relatively moderate concentrations. Most compounds were detected at concentrations less than 20 µg/m^3. Overall the highest reported concentrations were for ethanol (maximum of 86 µg/m^3). Petroleum-related VOCs (BTEX) were detected at a maximum concentration of 85 µg/m^3. Chlorinated VOCs, including trichloroethylene was detected at a concentration ranging from 5.96 to 213 µg/m^3, tetrachloroethylene ranged from 5.62 to 36.2 µg/m^3, carbon tetrachloride was detected at a maximum concentration of 1.36 µg/m^3, and 1,1,1-trichloethylene (TCA) was detected at a maximum concentration of 19.4 µg/m^3 in both sub-slab soil gas and two of the three soil vapor samples. The TCE concentrations were above the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion and recommend mitigation. The PCE, carbon tetrachloride and TCA concentrations were

below the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

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

2.0 REMEDIAL ACTION OBJECTIVES

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

Groundwater

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

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from 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 under is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedence of 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.

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

Alternative 1 involves:

- Establishment of Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would require excavation across the entire Site to a depth of 10 feet below grade for removal of historic fill Excavation for construction of the buildings' cellar levels would only take place to a depth of approximately 9 feet for the

first 75 feet of the Site. Therefore, additional excavation of fill in the rear yards and below the depth required for construction of the cellars would be required to remove all soil/fill containing analytes at concentrations above Unrestricted Use SCOs.

- No Engineering or Institutional Controls can be utilized in a Track 1 cleanup, but installation of a sub-slab depressurization system (SSDS) beneath the foundation and a vapor barrier beneath the basement foundation and behind foundation sidewalls of the new buildings would be installed as part of development to prevent exposures from off-Site soil vapor.
- Placement of a final cover over the entire Site as part of new development.

Alternative 2 involves

- Establishment of Track 4 Site-Specific SCOs.
- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-Specific SCOs have been achieved with post-excavation endpoint sampling. Excavation for construction of the buildings' cellar levels would take place to a depth of approximately 9 feet for the first 75 feet of the Site. Hot spot removal at boring B2 would need to occur to at least 10 feet bgs, as lead was encountered at a concentration of 4,430 ppb from the 8-10 foot depth interval at this location. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the buildings is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs. Additional excavation and endpoint sampling from the rear yard hotspot would also be performed to meet Track 4 Site-Specific SCOs.
- Placement of a final cover over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a soil vapor barrier system beneath the building's slab and along foundation side walls to prevent any potential future exposures from off-Site soil vapor;
- Installation of an active Sub-Slab Depressurization system (SSDS);
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of sensitive Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval;

- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and
- Continued registration as an E-designated property to memorialize the remedial action and the Engineering and Institutional Controls required by the RAWP.

3.1 Threshold Criteria

Protection of Public Health and the Environment

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

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

Alternative 2 would achieve comparable protections of human health and the environment by excavating the historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCOs, as well as by placement of Institutional and Engineering controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. The SSDS system, along with the vapor barrier would prevent any soil vapors from entering the buildings. Implementing Institutional Controls including a Site Management Plan would ensure that the composite cover system remains intact and protective. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a Construction Health and Safety Plan, an

approved Soil/Materials Management Plan and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the buildings would be prevented by installing an active sub-slab depressurization system and vapor barrier below the new buildings' basement slabs and continuing the vapor barrier around foundation walls.

3.2. Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

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

Alternative 1 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to achieve Track 1 Unrestricted Use SCOs and Groundwater Protection Standards. Compliance with SCGs for soil vapor would also be achieved by installing an active SSDS and a vapor barrier system below the new buildings' basement slabs and continuing the vapor barrier around foundation walls, as part of development.

Alternative 2 would achieve compliance with the remedial goals, chemical-specific SCGs and RAOs for soil through removal of soil to meet Track 4 Site-Specific SCOs. Compliance with SCGs for soil vapor would also be achieved by installing an active SSDS and a vapor barrier below the buildings' basement slabs and continuing the vapor barrier around foundation walls. A Site Management Plan would ensure that these controls remained protective for the long term.

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

Short-term effectiveness and impacts

This evaluation criterion assesses the effects of the alternative during the construction and implementation phase until remedial action objectives are met. Under this criterion, alternatives are evaluated with respect to their 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 alternatives 1 and 2 have similar short-term effectiveness during their respective implementations, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short term impacts would be higher for Alternative 1 due to a greater amount of historical fill material required to be excavated from the rear yards and below the buildings. 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.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Approximately 80, 25-ton capacity truck trips would be necessary to transport fill and soil excavated during Site development. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flaggers will be used to protect pedestrians at Site entrances and exits.

The effects of these potential adverse impacts to the community, workers and the environment will be minimized through implementation of corresponding control plans including a Construction Health and Safety Plan, a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of contaminants into the environment. Both alternatives provide short term effectiveness in protecting the surrounding community by decreasing the risk of contact with on-Site contaminants. Construction workers operating under appropriate management procedures and a Construction Health and Safety Plan (CHASP) would 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; a composite cover system across the Site, maintaining use restrictions, establishing an SMP to ensure long-term management of Institutional Controls (ICs), Engineering Controls (ECs), and maintaining continued registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy would provide continued high level of protection in perpetuity.

Both alternatives would result in removal of soil contamination exceeding the SCOs providing the highest level, most effective and permanent remedy over the long-term with respect to a remedy for contaminated soil, which would eliminate any migration to groundwater. Potential sources of soil vapor and groundwater contamination would also be eliminated as part of the 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.

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

Alternative 2 would remove most of the historic fill at the Site, and any remaining on-Site soil beneath the buildings will meet Track 4 - Site-Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site.

Implementability

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

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

Cost effectiveness

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

Costs associated with Alternative 1 would be significantly higher than Alternative 2 since historic fill with analytes above Unrestricted Use SCOs is present both below the excavation depth required for new development and in areas not required to be excavated for the new development. Additional costs would include installation of additional shoring/underpinning in the rear yard, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.

The remedial plan creates an approach that combines the remedial action with the redevelopment of the Site, including the construction of the building foundation and subgrade structures. The remedial plan is also cost effective in that it will take into consideration the selection of the closest and most appropriate disposal facilities to reduce transportation and disposal costs during the excavation of historic fill and other soils during the redevelopment of the Site.

Community Acceptance

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP. Based on the overall goals of the remedial program and initial permitting associated with the proposed site development, no adverse community opinion is anticipated for either alternative. This RAWP will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Attachment B.

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 redevelopment of the Site is compatible with its current zoning and is consistent with recent development patterns. Following remediation, the Site will meet either Track 1 Unrestricted Use or Track 4 Site-Specific SCOs, both of which are appropriate for its planned mixed use (residential and commercial). Improvements in the current environmental condition of the property achieved by both alternatives are also consistent with the City's goals for cleanup of contaminated land and bringing such properties into productive reuse. Both alternatives are equally protective of natural resources and cultural resources.

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.

The remedial plan would take into consideration the shortest trucking routes during off-Site disposal of historic fill and other soils, which would reduce greenhouse gas emissions and conserve energy used to fuel trucks. New York City Clean Soil Bank program may be utilized for backfill clean soils. To the extent practicable, energy efficient building materials, appliances, and equipment will be utilized to complete the development. While Alternative 2 would potentially result in lower energy usage based on reducing the volume of material transported off-Site, both remedial alternatives are comparable with respect to the opportunity to achieve sustainable remedial action. A complete list of green remedial activities considered as part of the NYC VCP is included in the Sustainability Statement, included as Appendix C.

4.0 REMEDIAL ACTION

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is the Track 4 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 remedial action objectives 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 for particulates and volatile organic carbon compounds;
3. Establishment of Track 4 Site-Specific 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 Track 4 Site-Specific SCOs. For development purposes, 75% of the Site will be excavated to depth of approximately 9 feet for the buildings' cellars and foundations as well as two hotspot areas identified during RI (Borings B2 and B6);
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) 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 on-Site;

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. Installation of a vapor barrier below the concrete slab of each building, as well as behind foundation walls of the proposed buildings. The vapor barrier will consist of Raven Industries VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from polyethylene and EVOH resins;
12. Installation and operation of an active Sub-Slab Depressurization System (SSDS);
13. Construction and maintenance of an engineered composite cover consisting of each building's 4 inch thick concrete slab and 4 inch thick concrete-capped rear yard to prevent human exposure to residual soil/fill remaining under the Site;
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
15. Implementation of storm-water pollution prevention measures 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, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
17. 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.
18. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it

safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/Fill Management

Track 4 - Site-Specific Soil Cleanup Objectives (SCOs) are proposed for this project. The following Track 4 - Site-Specific SCOs will be used:

Contaminant	Track 4 SCOs
Total SVOCs	250 ppm
Mercury	2.5 ppm
Lead	1,200 ppm
Barium	800 ppm

Soil and materials management on-Site and off-Site, including excavation, handling and disposal, will be conducted in accordance with the Soil/Materials Management Plan in Attachment D. The location of planned excavations is shown in Figure 5.

Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is 2,000 tons. Disposal location(s) will be reported promptly to the OER Project Manager prior to the start of the remedial action.

End-Point Sampling

Removal actions under this plan will be performed in conjunction with remedial end-point sampling. Post-excavation end-point sampling and testing will be performed promptly following materials removal and completed prior to Site development activities. To evaluate attainment of Track 4 - Site-Specific SCOs, seven endpoint soil samples will be collected and analyzed for VOCs, SVOCs and metals. The approximate collection location of the endpoint soil samples is shown on Figure 6.

In addition, if additional hotspots are encountered, hotspot removal end-point 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:
    - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
    - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation 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 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 trigger analytes (those for which SCO exceedence is identified) utilizing the following methodology:

Soil analytical methods will include:

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

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

Quality Assurance/Quality Control

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

One duplicate sample for every 20 samples collected will be submitted to the approved laboratory for analysis of the same parameters. One trip blank will be submitted to the laboratory with each shipment of soil samples.

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 $4^{o}C$.

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

- Gently tap or scrape to remove adhered soil
- Rinse with tap water

- Wash 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 every 20 samples.

Import and Reuse of Soils

Import of soils onto the property and reuse of soils already on-Site will be performed in conformance with the Soil/Materials Management Plan in Attachment D. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 0 tons. The estimated quantity of onsite soil/fill expected to be reused as backfill behind Site perimeter shoring is approximately 0 tons.

4.3 Engineering Controls

The excavation required for the proposed Site development will achieve Track 4 - Site-Specific SCOs. Engineering Controls will be employed in the remedial action to address residual contamination remaining at the Site. The Site has three elements will constitute primary Engineering Controls.

Composite Cover System

The entire property will be covered by an engineered permanent cover system. This cover system will be comprised of a 4 inch thick concrete-building slab beneath the area of the proposed buildings and a 4-inch concrete cap in the rear yard areas.

The composite cover system will be a permanent engineering control to address residual soils. Under Alternative 2, the composite cover system will serve as a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and

underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the RAR.

Vapor Barrier

Migration of potential soil vapor from off-Site in the future will be achieved with a combination of building slab, vapor barrier and active SSDS. The vapor barrier will consist of Raven Industries' VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins. The vapor barrier will be installed prior to pouring the building's concrete slab. The vapor barrier will extend throughout the area occupied by the footprint of the new buildings and up the foundation sidewalls in accordance with manufacturer specifications. The specifications for installation will be provided to the construction management company and the foundation contractor or installer of the liner. The specifications state that all vapor barrier seams, penetrations, and repairs will be sealed either by the tape method or weld method, according to the manufacturer's recommendations and instructions.

The project's Professional Engineer licensed by the State of New York will have primary direct responsibility for overseeing the implementation of the vapor barrier. The extent of the proposed vapor barrier membrane is provided in Figure 8. Installation details (penetrations, joints, etc.) with respect to the proposed buildings' foundations, footings, slab, and sidewalls are provided in Figure 8. Product specification sheets are provided in Attachment E. The Remedial Closure Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty**.**

Active Sub-Slab Depressurization System

An active sub-slab depressurization system will be installed beneath the footprint of the buildings' slabs to address residual soil vapors.

Migration of soil vapor beneath the buildings will be mitigated with the construction of an active sub-slab depressurization system. The SSDS will consist of two separate loops installed within porous granular material beneath the basements' foundations. The two SSDS loops will provide

the correct coverage in accordance with USEPA sub-slab depressurization design specifications which recommend a separate vent loop for every 4,000 ft^2 of slab area. Each loop will be outfitted with a riser that will extend to the roof of the building and finished with a blower/fan. The blower/fan exhaust will be placed at a minimum distance of 15ft from all air intakes. The layout plan for the SSDS system is provided as Figure 8. Details of the SSD system are provided in Figure 9.

4.4 Institutional Controls

Institutional Controls (IC) have been incorporated in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be established in a site-specific Site Management Plan (SMP) that will be included in the RAR.

Institutional Controls for this remedial action are:

- The property will continue to be registered with an E-Designation at the NYC Buildings Department. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a Site Management Plan in the RAR for approval by 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 OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted annually and will comply with RCNY §43-1407(l)(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 residential, commercial, and institutional use and will not be used for a higher level of use without prior approval by OER.

4.5 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in this RAWP and the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) 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 an periodic basis to be established in the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by March 31 of the year following the reporting period.

4.6 Qualitative Human Health Exposure Assessment

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

The objective of the qualitative exposure assessment is to identify potential receptors to the contaminants of concern (COC) that are present at, or migrating from, the Site. The identification of exposure pathways describes the route that the COC takes to travel from the source to the

receptor. An identified pathway indicates that the potential for exposure exists; it does not imply that exposures actually occur.

Investigations reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (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 EA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

Known and Potential Sources

Historic fill material is present at the Site from grade to approximately 8 feet below grade. Based on the results of the Remedial Investigation Report, the contaminants of concern found are:

Soil

- VOCs, including acetone and trichloroethylene were detected at concentrations exceeding Unrestricted Use SCOs;
- SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo-(ghi)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, pyrene, phenanthrene, and indeno(1,2,3-cd)pyrene, were detected at concentrations exceeding Restricted Residential SCOs; and
- Metals, including arsenic, barium, cadmium, copper, lead and mercury were detected at concentrations exceeding Restricted Residential SCOs;

Groundwater

- SVOCs, including benzo(a)anthracene, and chrysene were detected above GQS; and
- Metals, including iron, magnesium and sodium were detected above GQS;

Soil vapor

- The chlorinated VOC, TCE was detected above NYSDOH mitigation thresholds;
- Chlorinated VOCs detected at moderate concentrations including 1,1,1-trichloroethylene, and tetrachloroethylene; and
- Petroleum VOCs detected at low concentrations including benzene, toluene, ethyl-benzene and xylenes.

Nature, Extent, Fate and Transport of Contaminants

SVOCs and metals are present in the historic fill materials throughout the Site. Two of these SVOCs found in soil were also detected in groundwater samples at a concentration above its respective GQSs. Dissolved metals including iron, magnesium and sodium were detected above GQS. TCE was detected in soil vapor samples at a concentration above the mitigation threshold established by New York State DOHPCE. TCE was detected in three of the groundwater samples, and was also reported at trace concentrations within one of the soil samples.

Receptor Populations

On-Site Receptors – The Site is currently developed with two one-story industrial/manufacturing buildings. The Site is capped with the buildings' concrete slabs. Both buildings are vacant and locked, and On-Site receptors are limited to Site owner's and contractors. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents, workers and visitors.

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 (up to 0.25 mile) – existing and future
2. Residential Buildings (up to 0.25 mile) – existing and future
3. Building Construction/Renovation (up to 0.25 mile) – existing and future
4. Pedestrians, Trespassers, Cyclists (up to .25 mile) – existing and future
5. Schools (up to .25 mile) – existing and future

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: The potential for exposure to surficial historic fill is restricted by the foundation slab of the current building. Groundwater is marginally contaminated but is not exposed at the Site, and because the Site is served by the public water supply and groundwater use for potable supply is prohibited, groundwater is not used at the Site and there is no potential for exposure. As there is currently no structure on-Site, accumulation of soil vapor cannot pose an exposure threat.

Construction/ Remediation Activities: Once redevelopment activities begin, construction workers will come into direct contact with surface and subsurface soils, as a result of on-Site construction and excavation activities. On-Site construction workers potentially could ingest, inhale or have dermal contact with any exposed impacted soil and fill. Similarly, off-Site receptors could be exposed to dust and vapors from on-Site activities. During construction, on-Site and off-Site exposures to contaminated dust from on-Site will be addressed through the Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 4 SCOs will be removed. The Site will be fully capped, limiting potential direct exposure to soil

and groundwater remaining in place, and an active SSDS and 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.

Overall Human Health Exposure Assessment

There are no potential complete exposure pathways (i.e., source, route to exposure, receptor population) for the current condition and for the post-construction condition. There is a potential complete, exposure pathway that requires mitigation during implementation of the remedy. There is no complete exposure pathway under future conditions after the Site is developed. This assessment takes into consideration the reasonably anticipated use of the Site, which includes a residential structure, site-wide impervious surface cover cap, and a subsurface vapor barrier system and SSDS for the building. Potential post-construction use of groundwater is not considered an option because groundwater in this area of New York City is not used as a potable water source. There are no surface waters in close proximity to the Site that could be impacted or threatened.

Based upon this analysis, complete on-Site exposure pathways appear to be present only during the remedial action phase. Under current conditions, on-Site exposure pathways do not exist. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. After the remedial action is complete, there will be no remaining exposure pathways to on-Site soil/fill, as all soil above Track 4 Site Specific SCOs will have been removed and a vapor barrier system and SSDS will have been installed as part of development.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Kevin Brussee, Project Manager-EBC and Kevin Waters, Field Operations Officer-EBC. The Professional Engineer (PE) and Qualified Environmental Professionals (QEP) for this project are Ariel Czemerinski P.E., AMC Engineering and Charles Sosik P.G. EBC.

5.2 Site Security

Site access will be controlled by a chain link or wooden construction fence, which will surround the property.

5.3 Work Hours

The hours for operation of remedial construction will be from 7:00AM to 6:00PM. These hours conform to the New York City Department of Buildings construction code requirements.

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in Appendix 4. The Site Safety Coordinator will be Kevin Waters - EBC. Remedial work performed under this RAWP will be in full compliance with applicable health and safety laws and regulations, including Site and OSHA worker safety requirements and HAZWOPER requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards and will address potential risks. The parties performing the remedial construction work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. The HASP pertains to remedial and invasive work performed at the Site until the issuance of the Notice of Completion.

All field personnel involved in remedial activities will participate in training required under 29 CFR 1910.120, 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 an 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 volatile organic compounds (VOCs) and particulate levels at the perimeter of the exclusion zone or work area will be performed. Continuous monitoring will be performed for all ground intrusive activities and during the handling of contaminated or potentially contaminated media. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pit excavation or trenching, and the installation of soil borings or monitoring wells.

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

VOC Monitoring, Response Levels, and Actions

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

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

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

All 15-minute readings must be recorded and be available for OER personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/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 PM-10 particulate levels do not exceed 150 mcg/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 PM-10 particulate levels are greater than 150 mcg/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 PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

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

5.6 Agency Approvals

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

5.7 Site Preparation

Pre-Construction Meeting

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

Mobilization

Mobilization will be conducted as necessary for each phase of work at the Site. Mobilization includes field personnel orientation, equipment mobilization (including securing all sampling equipment needed for the field investigation), marking/staking sampling locations and utility mark-outs. Each field team member will attend an orientation meeting to become familiar with the general operation of the Site, health and safety requirements, and field procedures.

Utility Marker Layouts, Easement Layouts

The presence of utilities and easements on the Site will be fully investigated prior to the performance of invasive work such as excavation or drilling under this plan by using, at a minimum, the One-Call System (811). Underground utilities may pose an electrocution, explosion, or other hazard during excavation or drilling activities. All invasive activities will be performed incompliance 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

In the event that dewatering of groundwater during construction will be necessary, the water will be disposed into the New York City combined sanitary/storm sewer system. A permit to discharge will be obtained from the New York City Department of Environmental Protection (NYCDEP). As part of the permit to discharge, the location of discharge will be based on the Site-Specific requirements of the DEP. The need for pretreatment will be determined by DEP's requirements for the discharge permit. If pretreatment is required by the DEP, it will be performed in accordance with the requirements of the DEP.

Equipment and Material Staging

Equipment and materials will be stored and staged in a manner that complies with applicable laws and regulations. Staging locations will be reported to OER prior to the start of the remedial action.

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.

Extreme Storm Preparedness and Response Contingency Plan

Damage from flooding or storm surge can include dislocation of soil and stockpiled materials, dislocation of site structures and construction materials and equipment, and dislocation of support of excavation structures. Damage from wind during an extreme storm event can create unsafe or unstable structures, damage safety structures and cause downed power lines creating dangerous site conditions and loss of power. In the event of emergency conditions caused by an extreme storm event, the 112 Manhattan LLC will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

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

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

Storm Response

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

Storm Response Reporting

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

5.8 Traffic Control

Drivers of trucks leaving the 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 11.

5.9 Demobilization

Demobilization will include:

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

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

5.10 Reporting and Record Keeping

Daily Reports

Daily reports providing a general summary of activities for each day of *active remedial work* will be emailed to the OER Project Manager by the end of the following 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 OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

An alpha-numeric site map will be used to identify locations described in reports submitted to OER and is shown in Figure 10.

Record Keeping and Photo-Documentation

Job-site record keeping for all remedial work will be performed. These records will be

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

5.11 Complaint Management

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

5.12 Deviations from the Remedial Action Work Plan

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

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

6.0 REMEDIAL ACTION REPORT

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

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan;
- 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;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- 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.
- Continue registration of the property with an E-Designation by the NYC Department of Buildings.
- 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, _____, 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 Site name Site number.

I certify that the OER-approved Remedial Action Work Plan dated month day year 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	5
Demobilization	10	1
Submit Remedial Action Report	20	-

1808 MIDDLE COUNTRY ROAD
RIDGE, NY 11961
PH: 631.504.6000
FAX: 631.928.2780

TABLES

TABLE 1
Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water	Unrestricted Use
		Residential	Restricted-Residential	Commercial	Industrial			
METALS								
Arsenic	7440-38 -2	16f	16f	16f	16f	13f	16f	13 [c]
Barium	7440-39 -3	350f	400	400	10,000 d	433	820	350 [c]
Beryllium	7440-41 -7	14	72	590	2,700	10	47	7.2
Cadmium	7440-43 -9	2.5f	4.3	9.3	60	4	7.5	2.5 [c]
Chromium, hexavalent [h]	18540-29-9	22	110	400	800	1e	19	1 [b]
Chromium, trivalent[h]	16065-83-1	36	180	1,500	6,800	41	NS	30 [c]
Copper	7440-50 -8	270	270	270	10,000 d	50	1,720	50
Total Cyanide [h]		27	27	27	10,000 d	NS	40	27
Lead	7439-92 -1	400	400	1,000	3,900	63f	450	63 [c]
Manganese	7439-96 -5	2,000f	2,000f	10,000 d	10,000 d	1600f	2,000f	1600 [c]
Total Mercury		0.81j	0.81j	2.8j	5.7j	0.18f	0.73	0.18 [c]
Nickel	7440-02 -0	140	310	310	10,000 d	30	130	30
Selenium	7782-49 -2	36	180	1,500	6,800	3.9f	4f	3.9[c]
Silver	7440-22 -4	36	180	1,500	6,800	2	8.3	2
Zinc	7440-66 -6	2200	10,000 d	10,000 d	10,000 d	109f	2,480	109 [c]
PESTICIDES / PCBs								
2,4,5-TP Acid (Silvex)	93-72-1	58	100a	500b	1,000c	NS	3.8	3.8
4,4'-DDE	72-55-9	1.8	8.9	62	120	0.0033 e	17	0.0033 [b]
4,4'-DDT	50-29-3	1.7	7.9	47	94	0.0033 e	136	0.0033 [b]
4,4'-DDD	72-54-8	2.6	13	92	180	0.0033 e	14	0.0033 [b]
Aldrin	309-00-2	0.019	0.097	0.68	1.4	0.14	0.19	0.005 [c]
alpha-BHC	319-84-6	0.097	0.48	3.4	6.8	0.04g	0.02	0.02
beta-BHC	319-85-7	0.072	0.36	3	14	0.6	0.09	0.036
Chlordane (alpha)	5103-71 -9	0.91	4.2	24	47	1.3	2.9	0.094
delta-BHC	319-86-8	100a	100a	500b	1,000c	0.04g	0.25	0.04
Dibenzofuran	132-64-9	14	59	350	1,000c	NS	210	7
Dieldrin	60-57-1	0.039	0.2	1.4	2.8	0.006	0.1	0.005[c]
Endosulfan I	959-98-8	4.8i	24i	200i	920i	NS	102	2.4
Endosulfan II	33213-65-9	4.8i	24i	200i	920i	NS	102	2.4
Endosulfan sulfate	1031-07 -8	4.8i	24i	200i	920i	NS	1,000c	2.4
Endrin	72-20-8	2.2	11	89	410	0.014	0.06	0.014
Heptachlor	76-44-8	0.42	2.1	15	29	0.14	0.38	0.042
Lindane	58-89-9	0.28	1.3	9.2	23	6	0.1	0.1
Polychlorinated biphenyls	1336-36 -3	1	1	1	25	1	3.2	0.1
SEMI-VOLATILES								
Acenaphthene	83-32-9	100a	100a	500b	1,000c	20	98	20
Acenapthylene	208-96-8	100a	100a	500b	1,000c	NS	107	100 [a]
Anthracene	120-12-7	100a	100a	500b	1,000c	NS	1,000c	100 [a]
Benz(a)anthracene	56-55-3	1f	1f	5.6	11	NS	1f	1[c]
Benzo(a)pyrene	50-32-8	1f	1f	1f	1.1	2.6	22	1[c]
Benzo(b) fluoranthene	205-99-2	1f	1f	5.6	11	NS	1.7	1[c]
Benzo(g,h,i) perylene	191-24-2	100a	100a	500b	1,000c	NS	1,000c	100
Benzo(k) fluoranthene	207-08-9	1	3.9	56	110	NS	1.7	0.8 [c]
Chrysene	218-01-9	1f	3.9	56	110	NS	1f	1[c]
Dibenz(a,h) anthracene	53-70-3	0.33e	0.33e	0.56	1.1	NS	1,000c	0.33 [b]
Fluoranthene	206-44-0	100a	100a	500b	1,000c	NS	1,000c	100 [a]
Fluorene	86-73-7	100a	100a	500b	1,000c	30	386	30
Indeno(1,2,3-cd) pyrene	193-39-5	0.5f	0.5f	5.6	11	NS	8.2	0.5 [c]
m-Cresol	108-39-4	100a	100a	500b	1,000c	NS	0.33e	0.33 [b]
Naphthalene	91-20-3	100a	100a	500b	1,000c	NS	12	12
o-Cresol	95-48-7	100a	100a	500b	1,000c	NS	0.33e	0.33 [b]
p-Cresol	106-44-5	34	100a	500b	1,000c	NS	0.33e	0.33 [b]
Pentachlorophenol	87-86-5	2.4	6.7	6.7	55	0.8e	0.8e	0.8[b]
Phenanthrene	85-01-8	100a	100a	500b	1,000c	NS	1,000c	100
Phenol	108-95-2	100a	100a	500b	1,000c	30	0.33e	0.33[b]
Pyrene	129-00-0	100a	100a	500b	1,000c	NS	1,000c	100

TABLE 1
Soil Cleanup Objectives

Contaminant	CAS Number	Protection of Public Health				Protection of Ecological Resources	Protection of Ground-water	Unrestricted Use
		Residential	Restricted-Residential	Commercial	Industrial			
VOLATILES								
1,1,1-Trichloroethane	71-55-6	100a	100a	500b	1,000c	NS	0.68	0.68
1,1-Dichloroethane	75-34-3	19	26	240	480	NS	0.27	0.27
1,1-Dichloroethene	75-35-4	100a	100a	500b	1,000c	NS	0.33	0.33
1,2-Dichlorobenzene	95-50-1	100a	100a	500b	1,000c	NS	1.1	1.1
1,2-Dichloroethane	107-06-2	2.3	3.1	30	60	10	0.02f	0.02[c]
cis-1,2-Dichloroethene	156-59-2	59	100a	500b	1,000c	NS	0.25	0.25
trans-1,2-Dichloroethene	156-60-5	100a	100a	500b	1,000c	NS	0.19	0.19
1,3-Dichlorobenzene	541-73-1	17	49	280	560	NS	2.4	2.4
1,4-Dichlorobenzene	106-46-7	9.8	13	130	250	20	1.8	1.8
1,4-Dioxane	123-91-1	9.8	13	130	250	0.1e	0.1e	0.1[b]
Acetone	67-64-1	100a	100b	500b	1,000c	2.2	0.05	0.05
Benzene	71-43-2	2.9	4.8	44	89	70	0.06	0.06
Butylbenzene	104-51-8	100a	100a	500b	1,000c	NS	12	12
Carbon tetrachloride	56-23-5	1.4	2.4	22	44	NS	0.76	0.76
Chlorobenzene	108-90-7	100a	100a	500b	1,000c	40	1.1	1.1
Chloroform	67-66-3	10	49	350	700	12	0.37	0.37
Ethylbenzene	100-41-4	30	41	390	780	NS	1	1
Hexachlorobenzene	118-74-1	0.33e	1.2	6	12	NS	3.2	0.33[b]
Methyl ethyl ketone	78-93-3	100a	100a	500b	1,000c	100a	0.12	0.12
Methyl tert-butyl ether	1634-04 -4	62	100a	500b	1,000c	NS	0.93	0.93
Methylene chloride	75-09-2	51	100a	500b	1,000c	12	0.05	0.05
n-Propylbenzene	103-65-1	100a	100a	500b	1,000c	NS	3.9	3.9
sec-Butylbenzene	135-98-8	100a	100a	500b	1,000c	NS	11	11
tert-Butylbenzene	98-06-6	100a	100a	500b	1,000c	NS	5.9	5.9
Tetrachloroethene	127-18-4	5.5	19	150	300	2	1.3	1.3
Toluene	108-88-3	100a	100a	500b	1,000c	36	0.7	0.7
Trichloroethene	79-01-6	10	21	200	400	2	0.47	0.47
1,2,4-Trimethylbenzene	95-63-6	47	52	190	380	NS	3.6	3.6
1,3,5-Trimethylbenzene	108-67-8	47	52	190	380	NS	8.4	8.4
Vinyl chloride	75-01-4	0.21	0.9	13	27	NS	0.02	0.02
Xylene (mixed)	1330-20 -7	100a	100a	500b	1,000c	0.26	1.6	0.26

All soil cleanup objectives (SCOs) are in parts per million (ppm). NS=Not specified. See Technical Support Document (TSD). Footnotes

a The SCOs for residential, restricted-residential and ecological resources use were capped at a maximum value of 100 ppm. See TSD section 9.3.

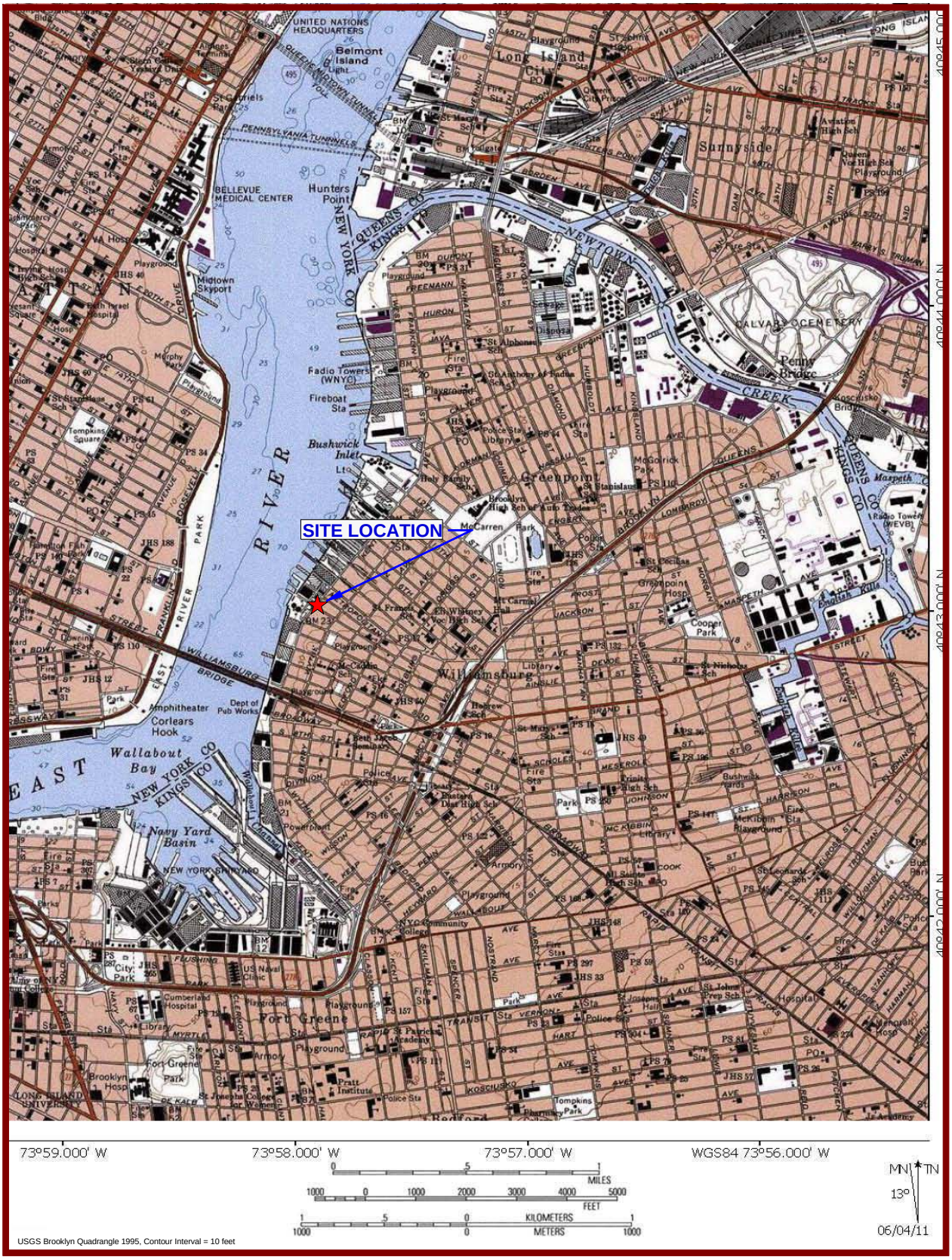
b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

c The SCOs for industrial use and the protection of groundwater were capped at a maximum value of 1000 ppm. See TSD section 9.3.

d The SCOs for metals were capped at a maximum value of 10,000 ppm. See TSD section 9.3.

e For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the SCO value.

FIGURES



USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

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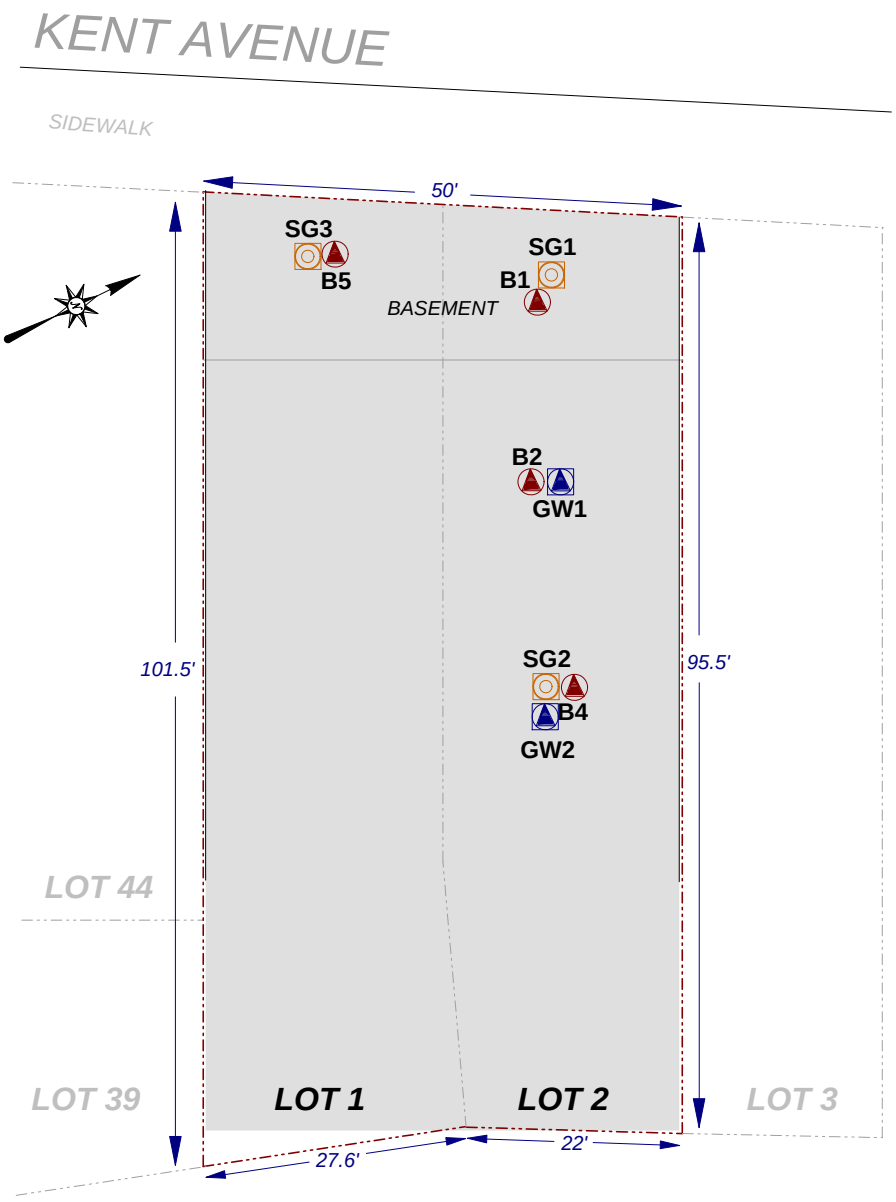
235-237 KENT AVENUE, BROOKLYN NY
BLOCK 2378 LOTS 1 & 2

FIGURE 1 SITE LOCATION MAP



KEY:

- Property Boundary
- Groundwater Sampling Location
- Soil Boring Location
- Soil Gas Sampling Location

SCALE:

0 10 20

1 Inch = 20 feet

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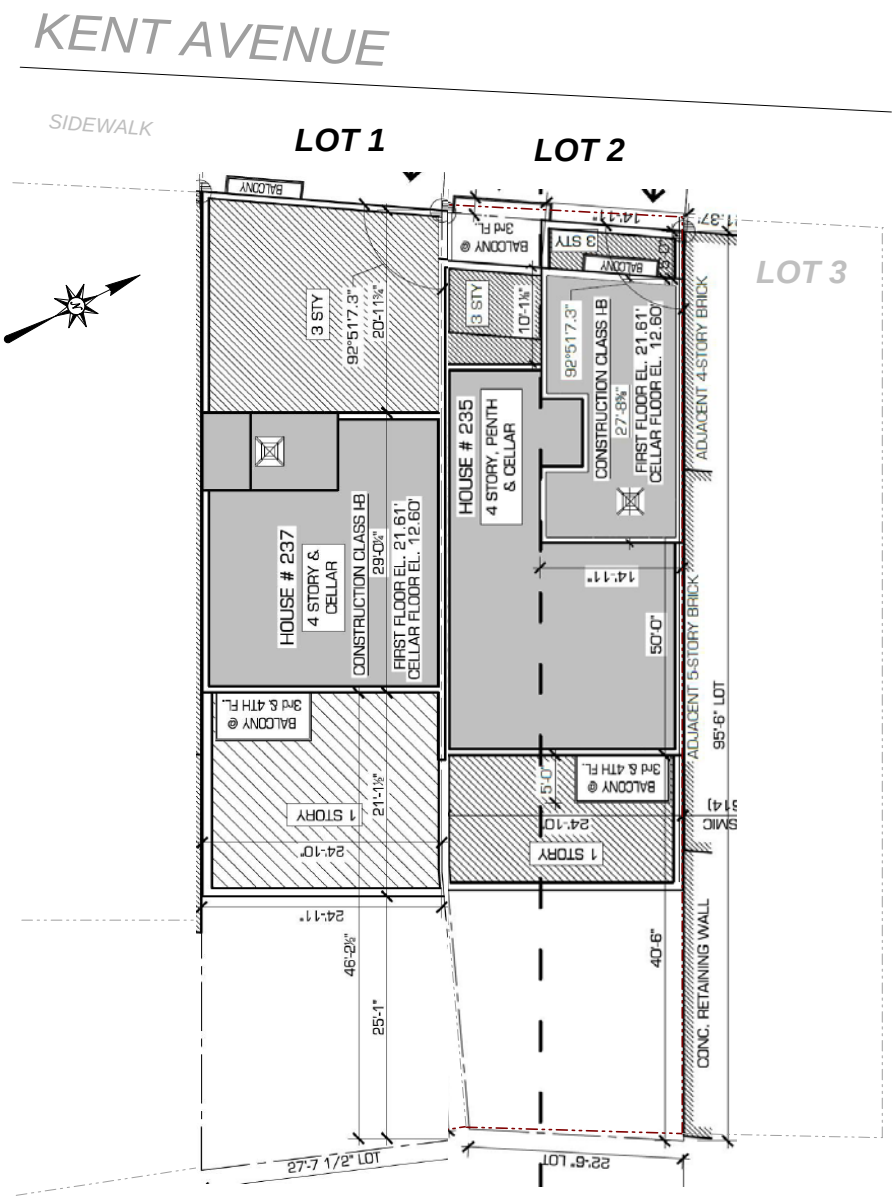
FIGURE 2 SITE BOUNDARY MAP



SCALE:

0 10 20

1 Inch = 20 feet

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FIGURE 3 REDEVELOPMENT PLAN

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

FIGURE 4
SURROUNDING LAND USE MAP

235-237 KENT AVENUE, BROOKLYN, NY

REMEDIAL INVESTIGATION REPORT

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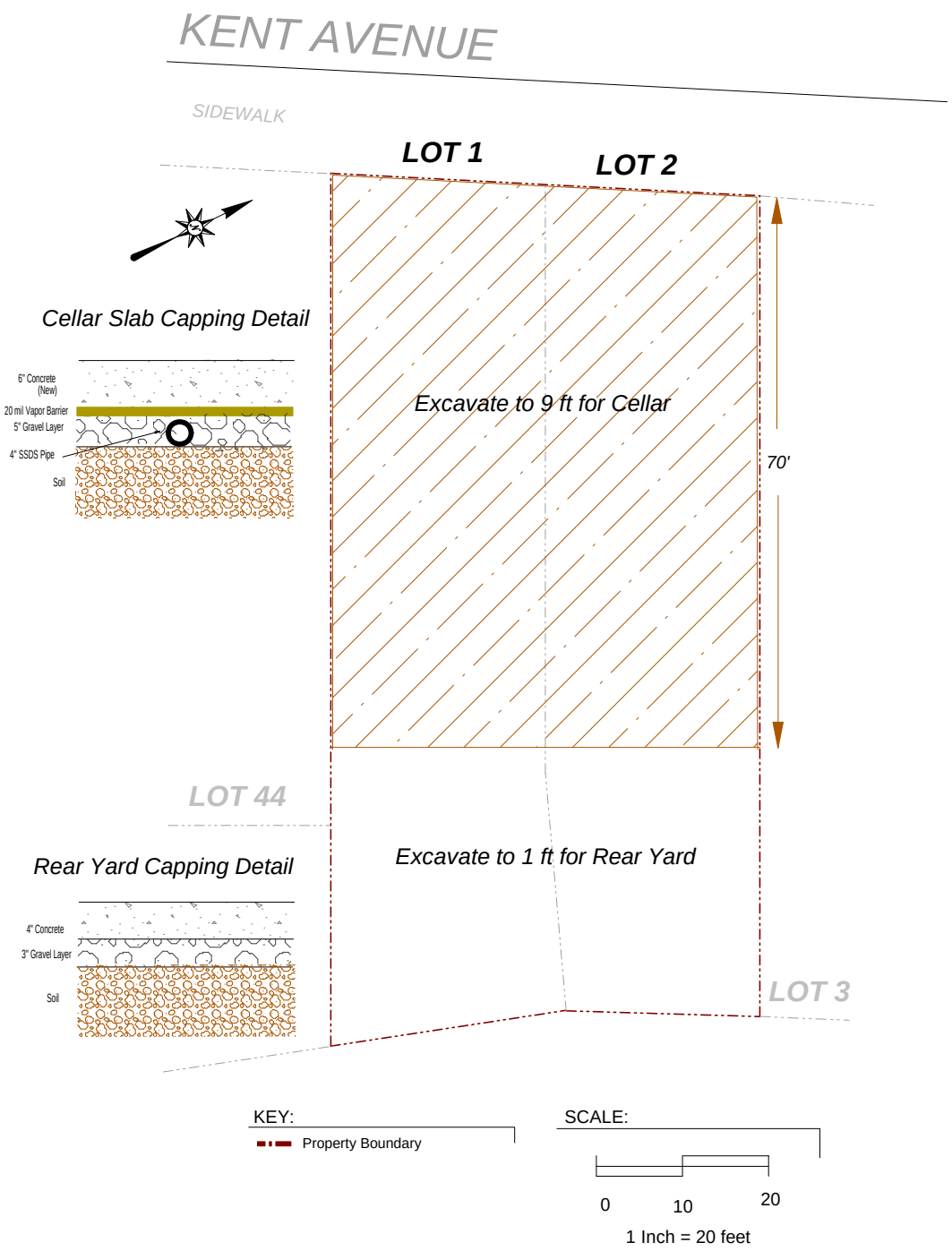

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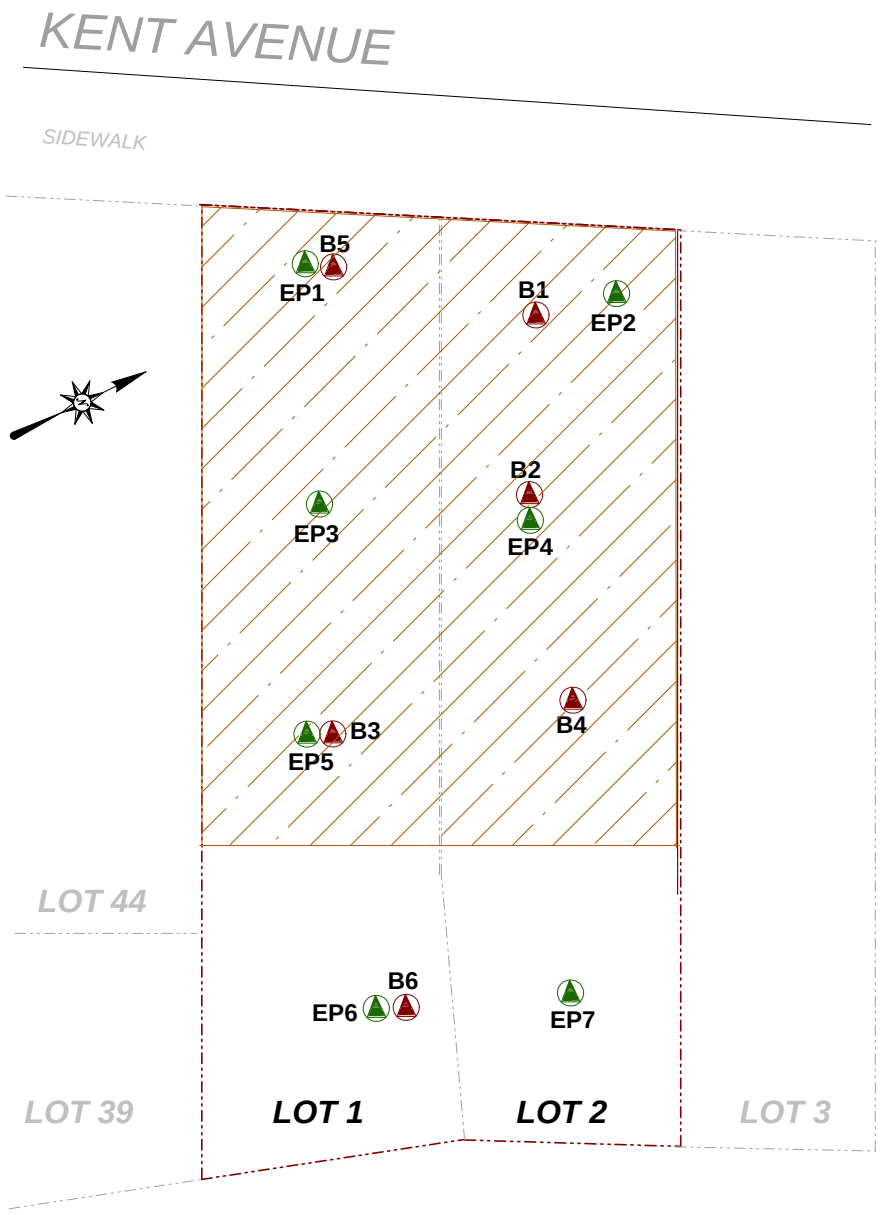
FIGURE 5 Excavation and Capping Plan



KEY:

- Property Boundary
- Endpoint Sample Location
- RI Soil Boring Location

SCALE:

0 10 20

1 Inch = 20 feet

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FIGURE 6 ENDPOINT SAMPLING PLAN

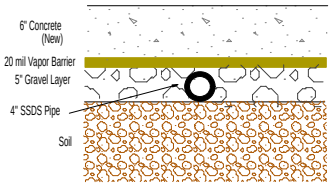
KENT AVENUE

SIDEWALK

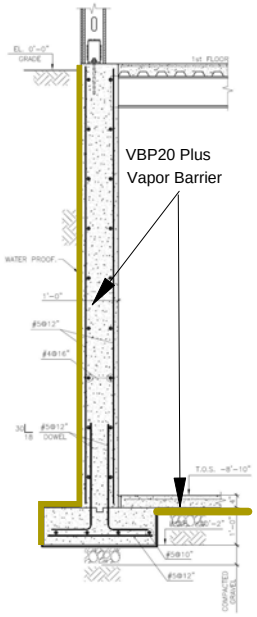
LOT 1

LOT 2

Cellar Slab Capping Detail



Foundation Wall Detail



RAVEN INDUSTRIES

VAPOR BLOCK VBP20 Plus

BELOW SLAB AND BEHIND

ALL FOUNDATION WALLS

TO GRADE

70'

LOT 3

KEY:

Property Boundary

Raven Industries VBP 20 Plus Vapor Barrier

SCALE:

0 10 20

1 Inch = 20 feet

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FIGURE 7 VAPOR BARRIER PLAN

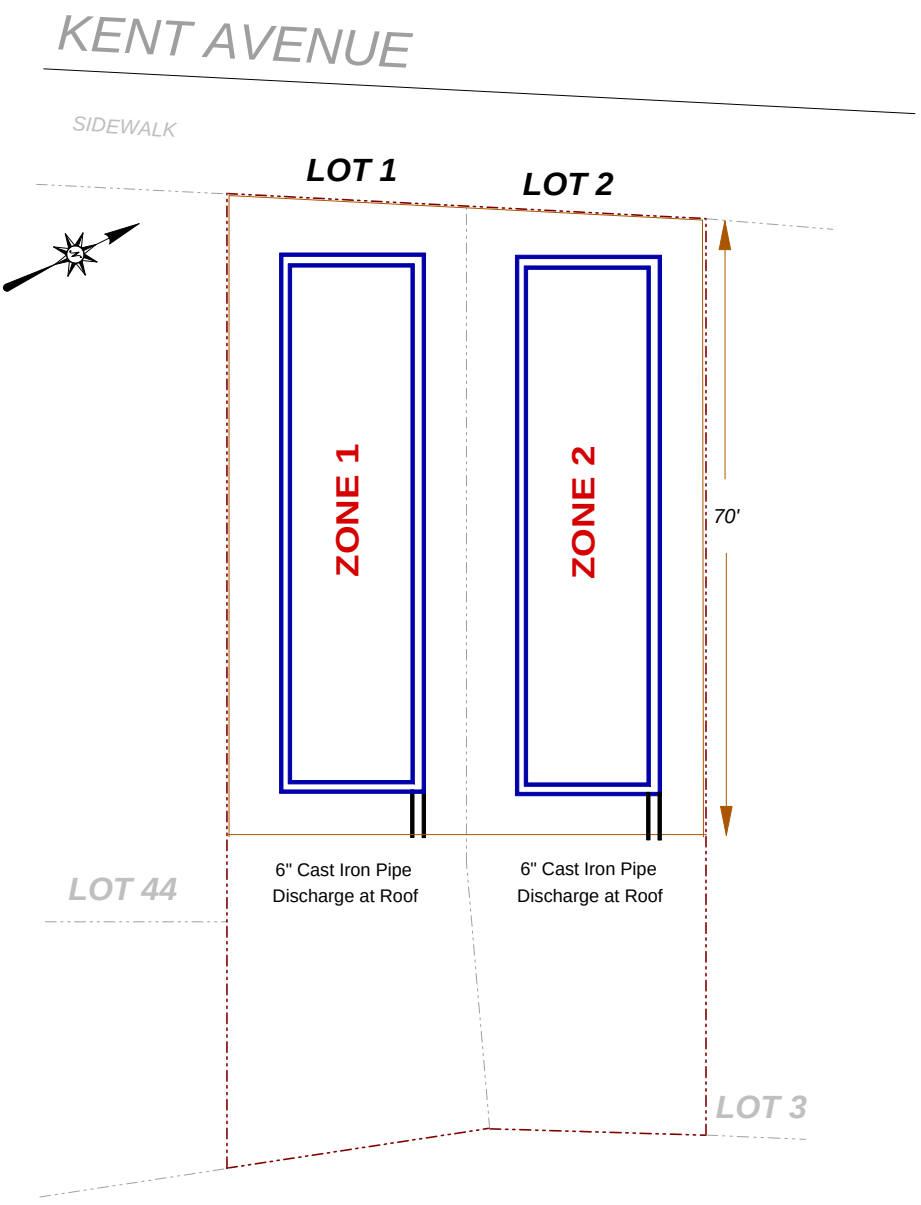

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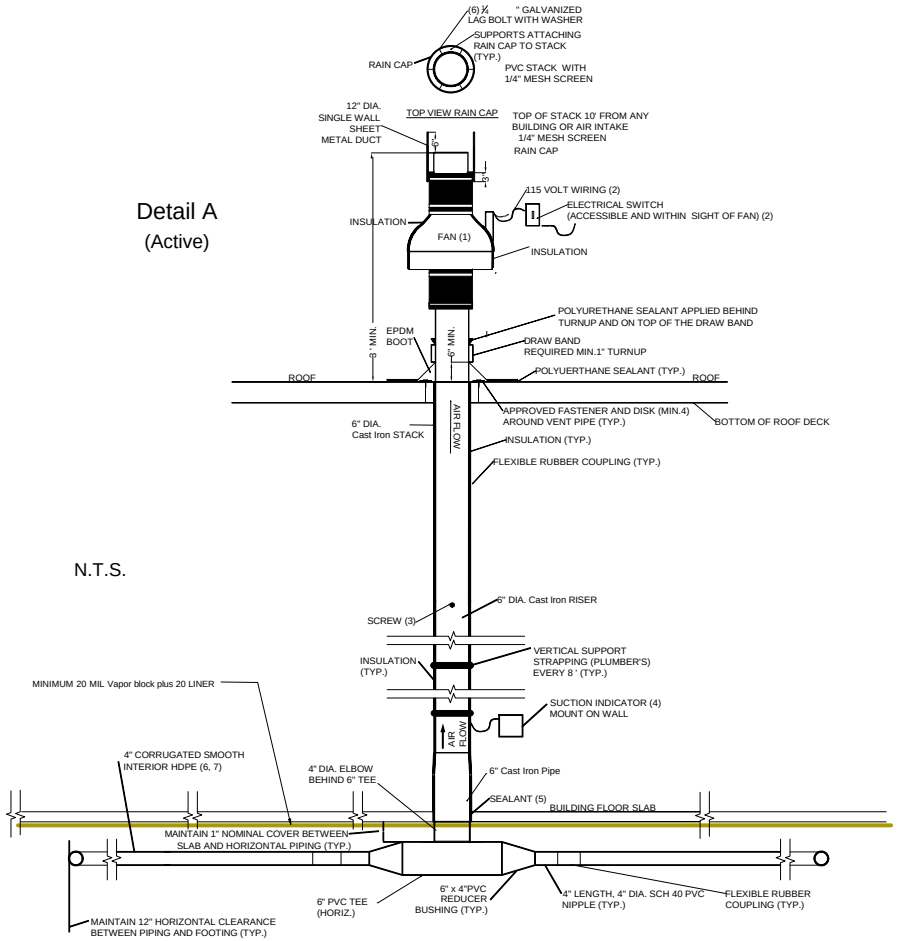
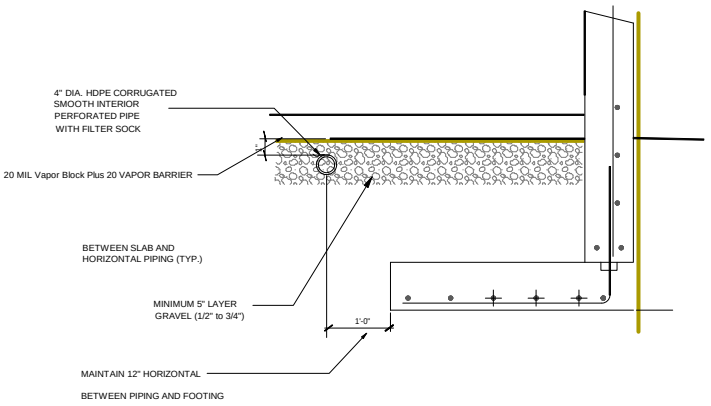
FIGURE 8 SSDS LAYOUT

Detail A
(Active)

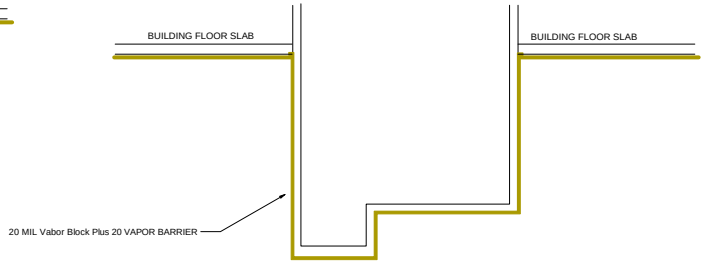


N.T.S.

Detail B



Detail C
Elevator Shaft



NOTES:

1. FAN TO BE RADONAWAY HIGH-FLOW IN-LINE FAN, MODEL RP 265, OR APPROVED EQUAL.
2. FAN AND ON/OFF SWITCH TO BE HARD-WIRED TOGETHER TO 115 VOLT CIRCUIT.
3. SECURE RUBBER COUPLING WITH SCREW TO PREVENT FAN ASSEMBLY FROM SLIPPING DOWN VERTICAL PIPE.
4. DWYER MAGNAHELIC DIAL TYPE VACUUM GAUGE MODEL 2002-M OR APPROVED EQUAL.
5. SEAL OPENING WITH ELASTOMERIC JOINT SEALANT AS DEFINED IN ASTM C920.
6. HIGH DENSITY POLYETHYLENE CORRUGATED PERFORATED PIPE ADS N-12 OR APPROVED EQUAL.
7. WRAP 4' HDPE PIPE WITH GEOTEXTILE FABRIC, GSE NW4 OR APPROVED EQUAL.
8. EBC MUST PRE-APPROVE ALL FILLMATERIAL BEFORE DELIVERY TO SITE.

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FIGURE NO. 9

235-237 KENT AVENUE, BROOKLYN, NEW YORK

SUBSLAB DEPRESSURIZATION SYSTEM DETAILS

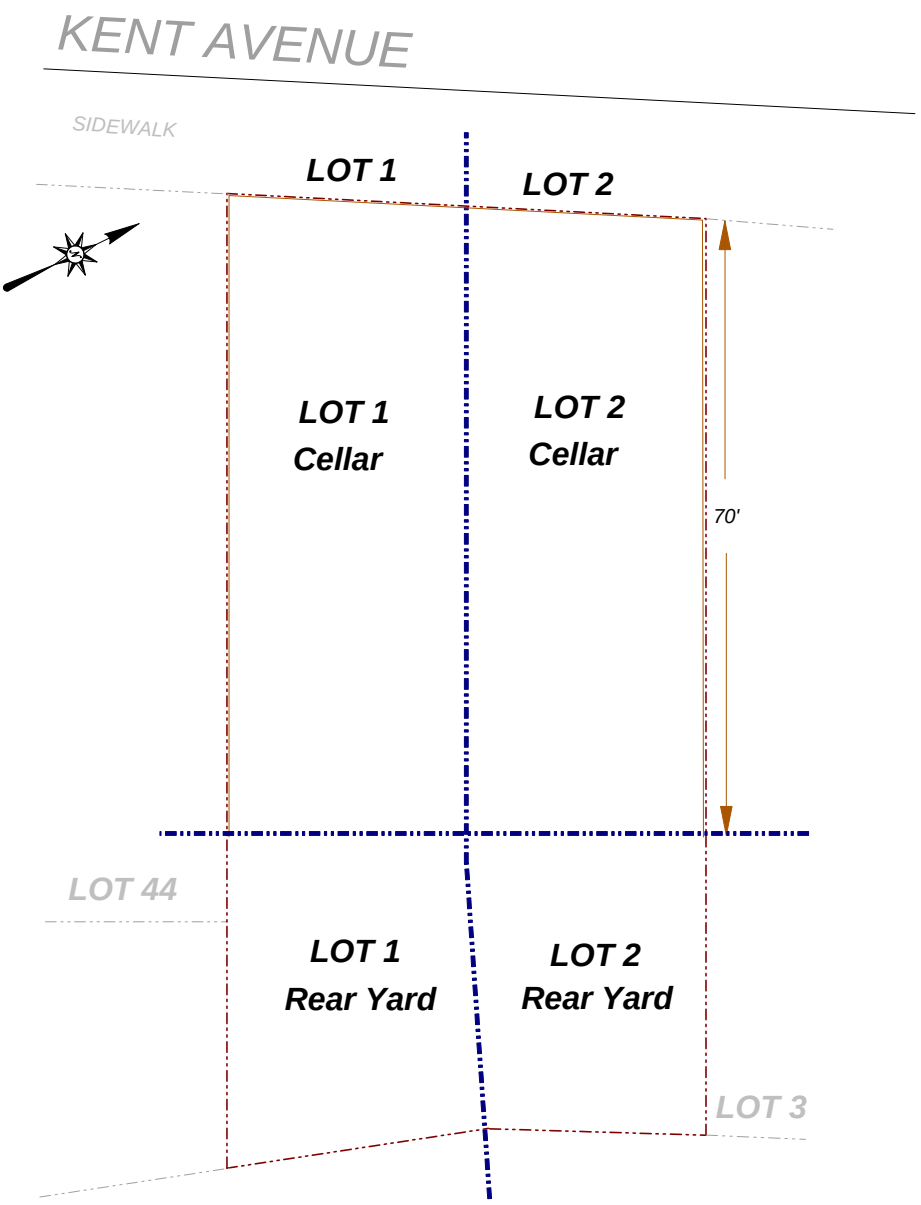

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FIGURE 10 GRID PATTERN MAP

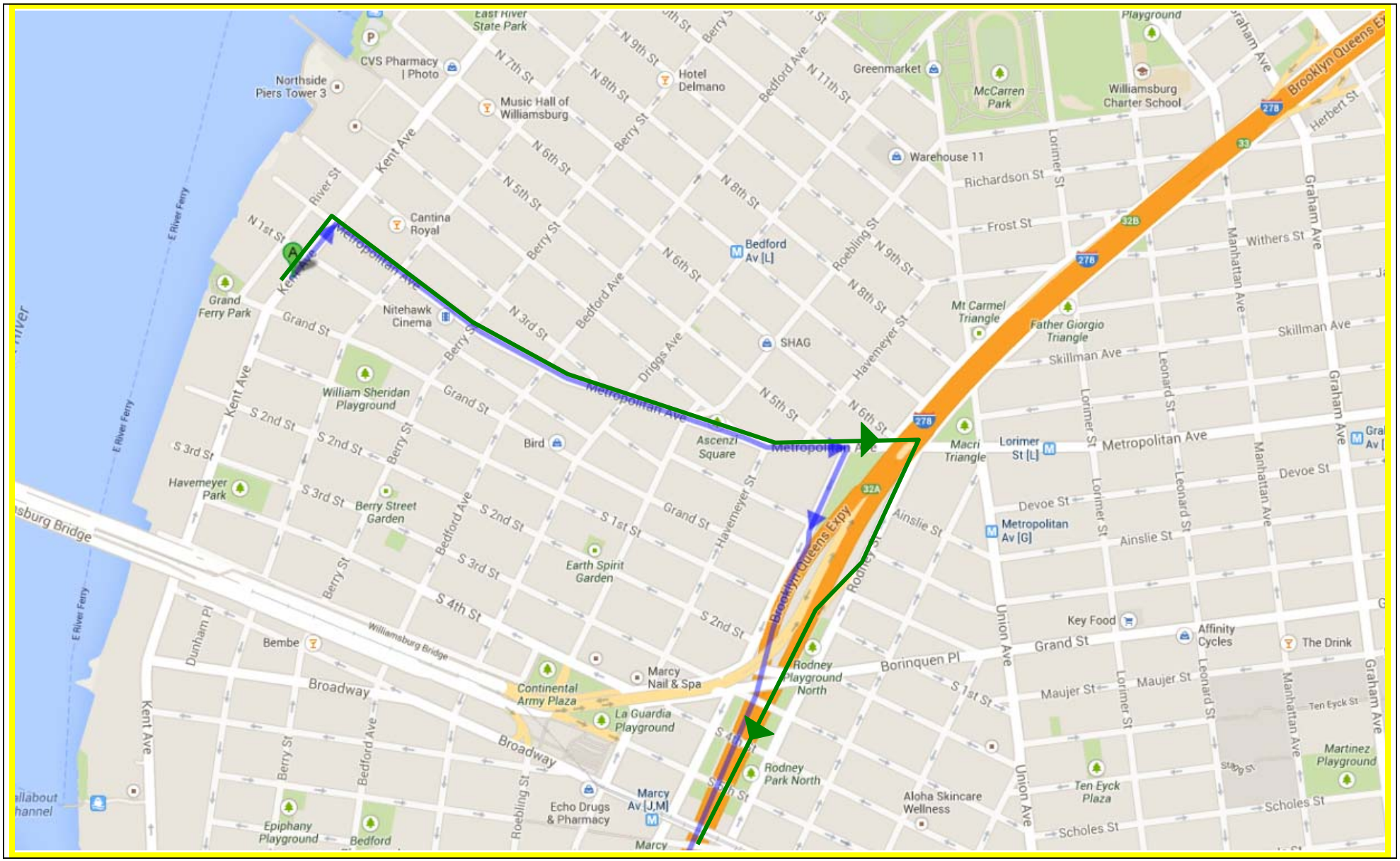

FIGURE 11 – TRUCK ROUTE

235-237 KENT AVENUE, BROOKLYN, NY
REMEDIAL ACTION WORK PLAN

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ATTACHMENT A
PROPOSED DEVELOPMENT PLANS

PROJECT DESCRIPTION

LOCATION: 235, KENT AVENUE
BROOKLYN, N.Y., 11249

SCOPE OF WORK : NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

ZONING ANALYSIS

ZONE: (M1-2/R6A IN MX-8) & (M1-2/R6B IN MX-8), INCLUSIONARY & QUALITY HOUSING (NARROW STREET)

MAP #:12c BLOCK #: 2378 LOT#: 2

ZONING USE GROUP : USE GROUP: 2 - MULTIFAMILY
USE GROUP: 6C - RETAIL

LOT AREA:	IRREGULAR (see Z-002 for calc.) = 2353.34 SQ. FT.	(1435.62 SQ. FT. FOR M1-2/R6A IN MX-8) (917.72 SQ. FT. FOR M1-2/R6B IN MX-8)
ZR 23-32	MIN. LOT AREA REQ'D:	1700 SQ.FT.
	ACTUAL LOT AREA:	2353.34 SQ. FT.
	MIN. LOT WIDTH REQ'D:	18'-0"
	ACTUAL LOT WIDTH:	25'-0"

LOT COVERAGE IN MIXED USE BUILDINGS:

ZR 123-64	NOT APPLICABLE

BULK REGULATIONS OF A LOT DIVIDED BY A DISTRICT BOUNDARY

ZR 77-20	THE BULK REGULATIONS AS SET FORTH IN SECTIONS 77-22 TO 77-29, INCLUSIVE, MAY APPLY TO ZONING LOTS EXISTING ON 12/15/1961 THAT ARE DIVIDED INTO TWO DISTRICTS WITH DEFFERENT REGULATIONS.

FLOOR AREA IN MIXED USE BUILDINGS:

ZR 123-64 a)4) ZR 77-22	MAX. ALLOWABLE F.A.R. FOR ENTIRE BUILDING PORTION OF M1-2/R6A IN MX-8 =	2.7 x 1435.62 SQ. FT. = 3876.17 SQ.FT.
	MAX. ALLOWABLE F.A.R. FOR ENTIRE BUILDING PORTION OF M1-2/R6B IN MX-8 =	2.0 x 917.72 SQ. FT. = 1835.44 SQ.FT.
	ADJUSTED MAX. ALLOWABLE F.A.R. = 3876.17 + 1835.44 SQ. FT. = 5711.61 SQ.FT.	= 2.43 FAR
	LOCATION OF THE ADJUSTED F.A.R = ANYWHERE ON THE LOT HOWEVER IT SHALL NOT EXCEED THE MAXIMUM AREA PRESCRIBED BY THE SPECIFIC DISTICT IN WHICH A PORTION OF A ZONING LOT IS LOCATED, OR THE ADJUSTED MAXIMUM FAR OF THE ENTIRE LOT, WHIVCHEVER IS GREATER.	
ZR 123-64 a)1) ZR 43.12	MAX. ALLOWABLE F.A.R. FOR COMMERCIAL PORTION ONLY =	2.0 x 1435.62 SQ. FT. = 2871.24 SQ.FT.
		2.0 x 917.72 SQ. FT. = 1835.44 SQ.FT.
		TOTAL = 4706.68 SQ.FT.

FLOOR AREA CALCULATIONS

FLOOR LEVEL	USE	GROSS F.A. (SQ.FT.)	DEDUCTIONS (see Z-003 for calc.)	NET F.A. (SQ.FT.)
CELLAR:	2&6C	1741.15 SQ.FT.	N/A	N/A
1st FLOOR:	6C	1101.24 SQ.FT.	N/A	= 1101.24 SQ.FT.
	2	640.29 SQ.FT.	N/A	= 640.29 SQ.FT.
2nd FLOOR:	2	1265.98 SQ.FT.	(-) 46.54 SQ.FT	= 1219.44 SQ.FT.
3rd FLOOR:	2	1345.82 SQ.FT.	(-) 46.54 SQ.FT	= 1299.28 SQ.FT.
4th FLOOR:	2	1091.87 SQ.FT.	(-) 30.57 SQ.FT	= 1061.30 SQ.FT.
PENTHOUSE:	2	363.34 SQ.FT.	N/A	= 363.34 SQ.FT.
TOTAL AREA		7549.69 SQ.FT.	(-) 123.65 SQ.FT	5684.89 S.F. < 5711.61 S.F. = OK.

DENSITY REGULATIONS:

ZR 23-22 ZR 77.25	MAXIMUM ALLOWABLE # OF D.U. RESIDENTIAL F.A.R. / 680 (5711.61 - 1101.24) / 680 = 6.78 TOTAL PROPOSED D.U.'S = 7 OK.

YARD REQUIREMENTS

ZR 123-652	REQ'D. FRONT YARD FOR A MIXED USE BUILDING :	0'-0"
	PROPOSED FRONT YARDS:	0'-0" and 5'-0"
ZR 123-652	REQ'D. SIDE YARDS FOR A MIXED USE BUILDING:	0'-0" or 8'-0"
	PROPOSED SIDE YARDS:	0'-0"
MDL 277.7 C)	REQ'D. REAR YARD FOR A RES. PORTION OF THE BUILDING @ 1ST FL.:	20'-0"
	PROP. RESIDENTIAL REAR YARD :	25'-1"
ZR 23-47	REQ'D. REAR YARD FOR A RES. PORTION OF THE BUILDING @ 2ND FL.:	30'-0"
	PROP. RESIDENTIAL REAR YARD :	40'-2 3/4"
ZR 43-26	REQ'D. REAR YARD FOR A COMMERCIAL PORTION OF THE BUILDING:	20'-0"
	PROP. COMMERCIAL REAR YARD :	25'-1"

HEIGHT:

ZR 123-662 b)	FOR PORTION OF M1-2/R6A IN MX-8:		FOR PORTION OF M1-2/R6B IN MX-8:	
	MINIMUM BASE HEIGHT:	40'-0"	MINIMUM BASE HEIGHT:	30'-0"
	MAXIMUM BASE HEIGHT:	60'-0"	PROP. MIN. BASE HEIGHT:	31'-1"
	PROPOSED BASE HEIGHT:	42'-4"	MAXIMUM BASE HEIGHT:	40'-0"
	MAXIMUM BUILDING HEIGHT:	70'-0"	PROP. MAX. BASE HEIGHT:	38'-10"
	PROPOSED BUILDING HEIGHT:	59'-11"	MAXIMUM BUILDING HEIGHT:	50'-0"
	F. STEBACK ABOVE MAX B.HT:	15'-0"	PROPOSED BUILDING HEIGHT:	50'-0"
	PROPOSED F. STEBACK:	N/A	F. STEBACK ABOVE MAX B.HT:	15'-0"
			PROPOSED F. STEBACK:	15'-0"

PLANTING REQUIREMENTS:

ZR 23.892 b)	FRONT PLANTING AREA REQUIRED EXCEPT AT EXITS, ENTRANCES AND DRIVEWAYS OR FOR COMMERCIAL USES FRONTING THE STREET PROPOSED PLANTING = NONE

TREE REQUIREMENTS

ZR 23-03 ZR 26-41	NEW DEVELOPMENT PROVIDE 1 TREE FOR EVERY 25 FEET OF STREET FRONTAGE OF THE ZONING LOT. SUCH TREES SHALL BE OF AT LEAST 3" CALIPER AT TIME OF PLANTING AND BE PLACED AS INDICATED ON THE SITE PLAN. ALL STREET TREES SHALL BE PLANTED, MAINTAINED AND REPLACED WHEN NECESSARY WITH THE APPROVAL OF, AND IN ACCORDANCE WITH THE STANDARDS OF, THE DEPARTMENT OF PARKS AND RECREATION AND THE DEPARTMENT OF TRANSPORTATION. 1 TREE 3" CALIPER / 25 FT OF STREET LOT LINE STREET LOT LINE = 25.00 25 / 25 = 1 TREE REQUIRED 1 TREES PROVIDED * EXACT LOCATIONS TO BE DETERMINED BY THE DPT. OF PARKS AND RECREATION.*

RESIDENTIAL PARKING REQUIREMENTS

ZR 25-23	NUMBER OF SPACES WHERE GROUP PARKING FACILITIES ARE PROVIDED 50% OF D.U. FOR QUALITY HOUSING PROPOSED 7 DWELLING UNITS MIN. SPACES REQUIRED = 4
ZR 25-261	WAIVER FOR NEW DEVELOPMENTS MAX. 5 SPACES 4 - 5 = -1 THEREFORE 0 PARKING SPACES ARE REQUIRED 0 PARKING SPACES PROVIDED

COMMERCIAL PARKING REQUIREMENTS

ZR 12-10	CELLAR SPACE USED FOR RETAILING SHALL BE INCLUDED FOR THE PURPOSE OF CALCULATING REQUIREMENTS FOR ACCESSORY OFF-STREET PARKING SPACES, LOADING BERTHS AND BICYCLE PARKING AS PER ZR 12-10 "FLOOR AREA", OTHERWISE, CELLAR SHALL BE EXCLUDED. FOR THE PURPOSES OF CALCULATING THE NUMBER OF REQUIRED PARKING SPACES, ANY FRACTION OF A SPACE 50 PERCENT OR GREATER SHALL BE COUNTED AS AN ADDITIONAL SPACE.
ZR 44-21	ACCESSORY OFF-STREET PARKING USE GROUP: 6C - RETAIL PARKING CATEGORY: (B) PARKING REQUIREMENT: 1 / 300 SQ.FT. ACTUAL USE AREA: 1101.24 SQ.FT. REQUIRED PARKING: 1101.24 / 300 = 4 SPACES REQUIRED
ZR 44-23	WAIVER FOR ALL SPACES BELOW THE MIN. NUMBER NUMBER OF SPACES TO BE WAIVED = 15 SPACES 4 - 15 = (-)11 = NONE THEREFORE 0 PARKING SPACES ARE REQUIRED 0 PARKING SPACES PROVIDED
ZR 44-52	LOADING BERTHS USE GROUP: 6C - RETAIL LOADING BERTHS REQUIREMENT: NONE BELOW 8000 SF ACTUAL USE AREA: 1101.24 SQ.FT. REQUIRED PARKING: 1101.24 < 8000 = 0 SPACES REQUIRED 0 LOADING BERTHS PROVIDED
ZR 44-60	BICYCLE PARKING REQUIREMENT: NONE

QUALITY HOUSING REQUIREMENTS

ZR 28-21	MIN. AREA OF DWELLING UNIT IS 400 SQ.FT.FOR FLOORS 2ND THROUGH PENTHOUSE
ZR 28-22	WINDOWS SHALL BE DOUBLE GLAZED
ZR 28-23	REFUSE STORAGE & DISPOSAL REQUIRED FOR 9 D.U.'s AND MORE
ZR 28-31	RECREATIONAL AREAS REQUIRED FOR 9 D.U.'s AND MORE

ENVIRONMENTAL CONDITIONS OF AN MX-8 DISTRICT

ZR 123-32	IN SPECIAL MIXED USE DISTRICTS, ALL NEW DWELLING UNITS SHALL BE PROVIDED WITH A MINIMUM 35 DB (A) OF WINDOW WALL ATTENUATION TO MAINTAIN AN INTERIOR NOISE LEVEL OF 45 DB (A) OR LESS, WITH WINDOWS CLOSED, AND SHALL PROVIDE AN ALTERNATE MEANS OF VENTILATION.

CODE ANALYSIS

CONSTRUCTION CLASS: I-B

OCCUPANCY CLASS: R-2 - RESIDENTIAL
M - MERCANTILE

HANDICAP ACCESSIBILITY REGULATIONS:

S.1107.7.1	MINIMUM REQUIRED # OF ADAPTABLE D.U.: WHERE NO ELEVATOR IS PROVIDED, ONLY THE LOWEST STORY CONTAINING DWELLING UNITS OR SLEEPING UNITS SHALL BE PROVIDED WITH AN ACCESSIBLE ENTRANCE FROM THE EXTERIOR OF THE BUILDING AND ALL UNITS INTENDED TO BE OCCUPIED AS A RESIDENCE ON THAT STORY SHALL BE TYPE "B" UNITS. - NO ELEVATOR IS PROVIDED IN THIS BUILDING - 2 DU'S ON THE LOWEST STORY, THEREFORE 2 ADAPTABLE DU'S PROVIDED.

TABLE 503—continued
ALLOWABLE HEIGHT AND BUILDING AREAS*
Height limitations shown as stories and feet above grade plane.
Area limitations as determined by the definition of "Area, building," per floor.

GROUP	Hgt (feet) Hgt(S)	TYPE OF CONSTRUCTION TYPE I A	TYPE I B	TYPE II A	TYPE II B	TYPE III A	TYPE III B	TYPE IV HT
		UL	160e	65	55	65	55	65
R-1	S	UL	UL	6	NP	6	NP	6
	A	UL	UL	UL	NP	24,000	NP	20,500
R-2	S	UL	UL	6	NP	6	3	6
	A	UL	UL	UL	NP	24,000	5,600	20,500

TABLE 601
FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (hours)

BUILDING ELEMENT	TYPE I A	TYPE I B	TYPE II A[d]	TYPE II B	TYPE III A[d]	TYPE III B	TYPE IV HT
Structural frame[a] Including columns, girders, trusses	3[b]	2[b]	1	0	1	0	HT
Bearing walls Exterior[d, g]	3	2	1	0	2	2	2
Interior	3[b]	2[b]	1	0	1	0	1/HT
Nonbearing walls and partitions Exterior	See Table 602						
Nonbearing walls and partitions Interior[e]	0	0	0	0	0	0	See Section 602.4.6
Floor construction[h] Including supporting beams and joists	2	2	1	0	1	0	HT
Roof construction Including supporting beams and joists	1 1/2[c]	1[c]	1[c]	0[c]	1[c]	0	HT

TABLE 706.3.7
FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING (hours)
H-1, H-2	4
F-1, H-3, S-1	3
A, B, E, F-2, H-4, H-5, I, M, R, S-2	2
U	1

TABLE 1014.1
SPACES WITH ONE MEANS OF EGRESS

OCCUPANCY	MAXIMUM OCCUPANT LOAD
A, B, E, M, U	74
F	50
H-1, H-2, H-3	3
H-4, H-5, I-1, I-3, I-4	10
I-2	See Section 1013.2.2
R	20
S	30

MINIMUM STAIRWAY WIDTH:

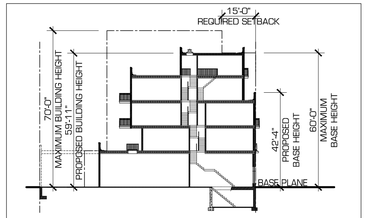
S.1009.1	THE WIDTH OF STAIR SHALL BE DETERMINED AS PER TABLE 1005.1 DEPENDING ON THE NUMBER OF OCCUPANTS OF THE FLOOR, HOWEVER, FOR OCCUPANCY R-2, MAXIMUM BUILDING HEIGHT OF 125'-0" AND MAXIMUM 30 OCCUPANTS PER FLOOR, IT SHALL NOT BE LESS THAN 36". PROPOSED OCCUPANCY PER FLOOR: R-2, (2 APARTMENTS < 30 OCCUPANTS) PROPOSED STAIR WIDTH : 36"

MINIMUM CORRIDOR WIDTH:

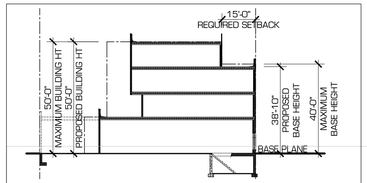
S.1016.2	THE WIDTH OF CORRIDOR SHALL BE DETERMINED AS PER TABLE 1005.1 DEPENDING ON THE NUMBER OF OCCUPANTS OF THE FLOOR, HOWEVER, FOR OCCUPANCY CAPACITY OF 50 OR LESS, IT SHALL NOT BE LESS THAN 36". PROPOSED OCCUPANCY PER FLOOR: R-2, (2 APARTMENTS < 30 OCCUPANTS) PROPOSED CORRIDOR WIDTH : 36"

MAXIMUM DEAD END CORRIDOR:

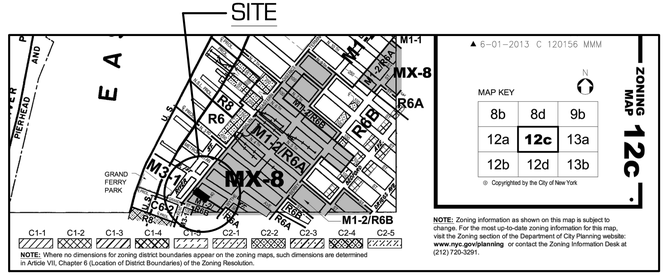
S.1016.3	IN OCCUPANCY R-2, THE DEAD END IN A CORRIDOR SHALL NOT EXCEED 40'-0". HOWEVER WHERE THE CORRIDORS ARE COMPLETELY ENCLOSED IN CONSTRUCTION HAVING A 2 HRS FIRE-RESISTANCE RATING WITH ALL DOORS OPENING INTO THE CORRIDOR BEING SELF-CLOSING AND HAVING A FIRE-RESISTANCE RATING OF 1 ½ HOURS, THE LENGTH OF A DEAD END CORRIDOR SHALL NOT EXCEED 80'-0"



SETBACK DIAGRAM
(portion M1-2/R6A)
SCALE 1/32" =1'-0"



SETBACK DIAGRAM
(portion M1-2/R6B)
SCALE 1/32" =1'-0"

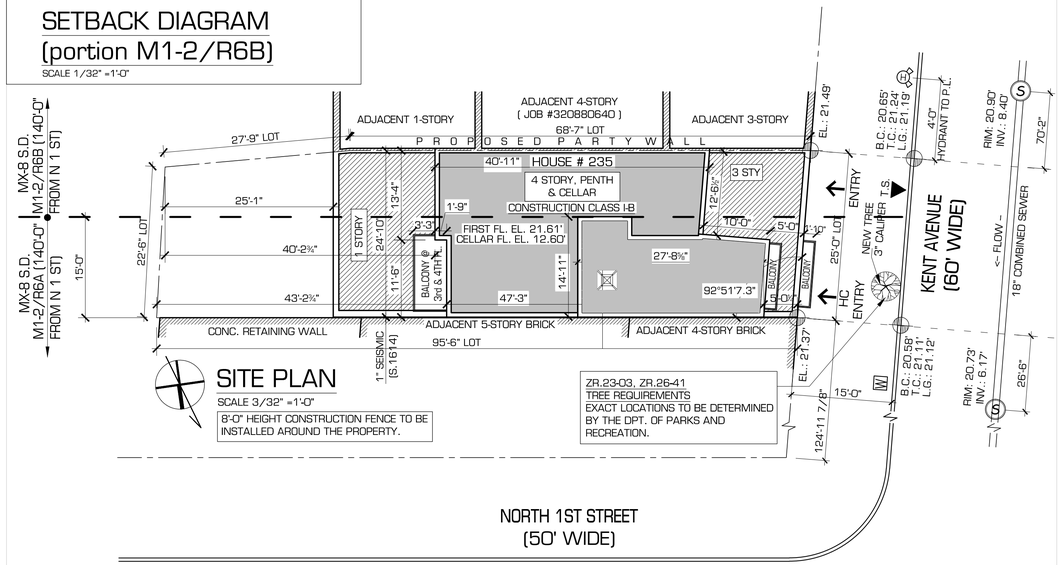


ZONING MAP 12c
NOT TO SCALE

ZONE M1-2/R6A & B IN MX-8

ENERGY CODE COMPLIANCE NOTE:

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE, USING CHAPTER 5



SITE PLAN
SCALE 3/32" =1'-0"

8'-0" HEIGHT CONSTRUCTION FENCE TO BE INSTALLED AROUND THE PROPERTY.

ZR 23-03, ZR 26-41
TREE REQUIREMENTS
EXACT LOCATIONS TO BE DETERMINED BY THE DPT. OF PARKS AND RECREATION.

TABLE 1015.1
EXIT ACCESS TRAVEL DISTANCE*

OCCUPANCY	WITHOUT SPRINKLER SYSTEM (feet)	WITH SPRINKLER SYSTEM (feet)
A	See Section 1024.7	
E, F-1, I-1, M, R-1, S-1	150	200[b]
B	200	300[c]

TABLE 1005.1
EGRESS WIDTH PER OCCUPANT SERVED

OCCUPANCY	STAIRWAYS (inches per occupant)	OTHER COMPONENTS (inches per occupant)
Occupancies other than those listed below	0.3	0.2
Hazardous: H-1, H-2, H-3 and H-4	0.7	0.4

TABLE 1016.1.2
PUBLIC CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY	REQUIRED FIRE-RESISTANCE RATING (hours)
H-1, H-2, H-3	2
H-4, H-5	1
A, E, F, M, S, U	1
B	1[a]
R (Noncombustible)	1
R (Combustible)	2[b]
I-1, I-2, I-3, I-4	1

LIST OF DRAWINGS

Z-001	ZONING / CODE ANALYSIS AND SITE PLAN
Z-002	LOT AREA AND FLOOR AREA DIAGRAMS
Z-003	FLOOR AREA, COURT AND DEDUCTIONS DIAGRAMS
A-001	PROPOSED CELLAR FLOOR PLAN & LEGENDS
A-002	PROPOSED FIRST AND SENOND FLOOR PLANS
A-003	PROPOSED THIRD AND FOURTH FLOOR PLANS
A-004	PROPOSED PENTHOUSE / ROOF AND TOP OF PENTHOUSE PLANS
A-005	FRONT & REAR ELEVATION
A-006	SECTION B-B
A-007	SECTION A-A AND WINDOW SCHEDULE
DT-001	DETAILS
N-001	GENERAL CONSTRUCTION NOTES
N-002	HANDICAP ADAPTABILITY PROVISIONS
EN-001	ENERGY CONSERVATION COMPLIANCE CERTIFICATES

WORK TYPES TO BE FILED SEPARATELY

WORK TYPE	SEPARATE APPLICATION	SUBSEQUENT FILING
DEMOLITION	✓	
BPP	✓	
SIDEWALK SHED & FENCE	✓	
SPRINKLERS	✓	
FIRE ALARM	✓	
MECHANICAL	✓	
PLUMBING	✓	
SD1&2	✓	
SUPPORT OF EXCAVATION	✓	
FOUNDATIONS	✓	
STRUCTURAL	✓	

CONTROLLED INSPECTIONS

ALL MATERIALS DESIGNATED FOR "CONTROLLED INSPECTION" SHALL BE INSPECTED AND / OR TESTED TO VERIFY COMPLIANCE WITH CODE REQUIREMENTS, UNLESS OTHERWISE SPECIFICALLY PROVIDED BY CODE PROVISIONS. ALL REQUIRED INSPECTIONS AND TESTS OF MATERIAL SHALL BE MADE AND / OR WITNESSED BY OR UNDER THE DIRECT SUPERVISION OF AN ARCHITECT OR ENGINEER RETAINED BY OR ON BEHALF OF THE OWNER OR LESSEE.

REQUIRED SPECIAL INSPECTIONS

STRUCTURAL STEEL-WELDING	BC 1704.3.1
STRUCTURAL STEEL-ERECTION & BOLTING	BC 1704.3.2, BC 1704.3.3
STRUCTURAL COLD-FORMED STEEL	BC 1704.3.4
CONCRETE - CAST - IN - PLACE	BC 1704.4
MASONRY	BC 1704.5
SOILS - SITE PREPARATION	BC 1704.7.1
SOILS - INVESTIGATION (Borings / Test Pits)	BC 1704.7.4
EXTERIOR INSULATION FINISH SYSTEMS (EIFS)	BC 1704.12
MECHANICAL SYSTEMS	BC 1704.15
STRUCTURAL SAFETY - STRUCTURAL STABILITY	BC. 1704.19
EXCAVATION - SHEETING, SHORING, AND BRACING	BC. 1704.19, BC 3304.4.1
SITE STORM DRAINAGE DISP.& DETEN. SYS. INSTALLATION	BC 1704.20
SPRINKLER SYSTEMS	BC 1704.21
HEATING SYSTEMS	BC 1704.23
FIRESTOP, DRAFTSTOP, AND FIREBLOCK SYSTEMS	BC 1740.25
SEISMIC ISOLATION SYSTEMS	BC 1707.8
CONCRETE TEST CYLINDERS, TR-2	BC 1905.6
CONCRETE DESIGN MIX, TR-3	BC 1905.3
REQUIRED PROGRESS INSPECTIONS	
FOOTING AND FOUNDATION	BC 109.3.1
ENERGY CODE COMPLIANCE INSPECTIONS	BC. 109.3.5
FIRE-RESISTANCE RATED CONSTRUCTION	BC.109.3.4

GREEN LINE ARCHITECTURE

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DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

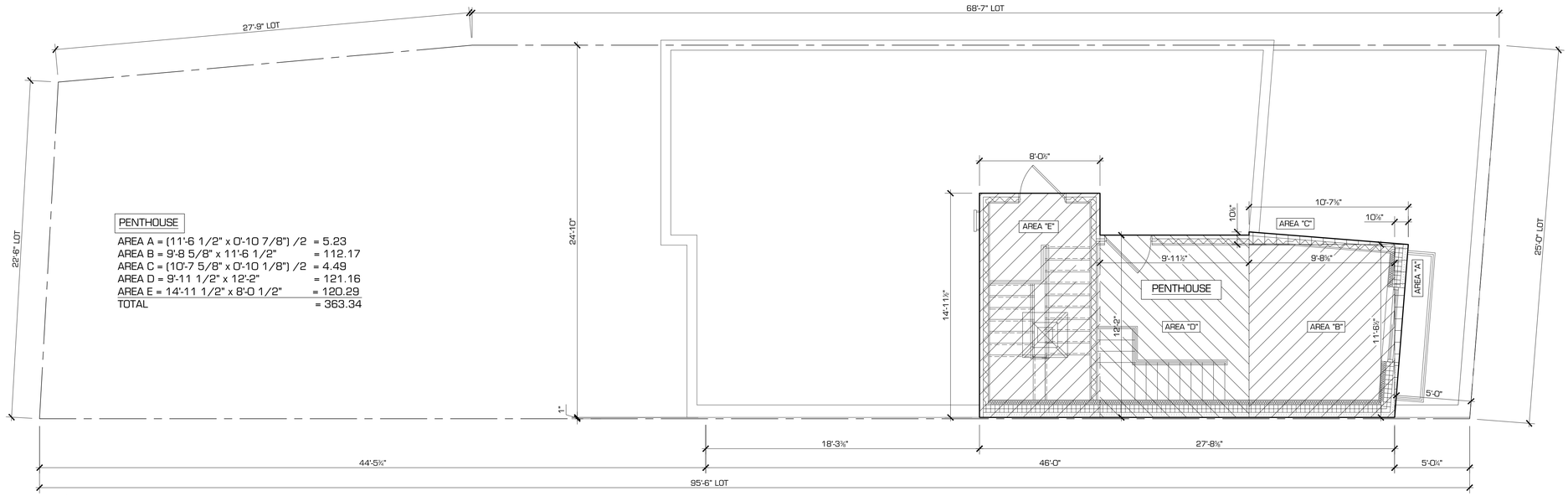
OWNER:
MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
BROOKLYN, NEW YORK 11249

DRAWING TITLE:
ZONING / CODE ANALYSIS AND SITE PLAN

SEAL & SIGNATURE:

DATE: 08-30-13
DRAWING BY: E.D.
CHK BY: S.STILES
DWG No: Z-001.00
Page: 1 of ....

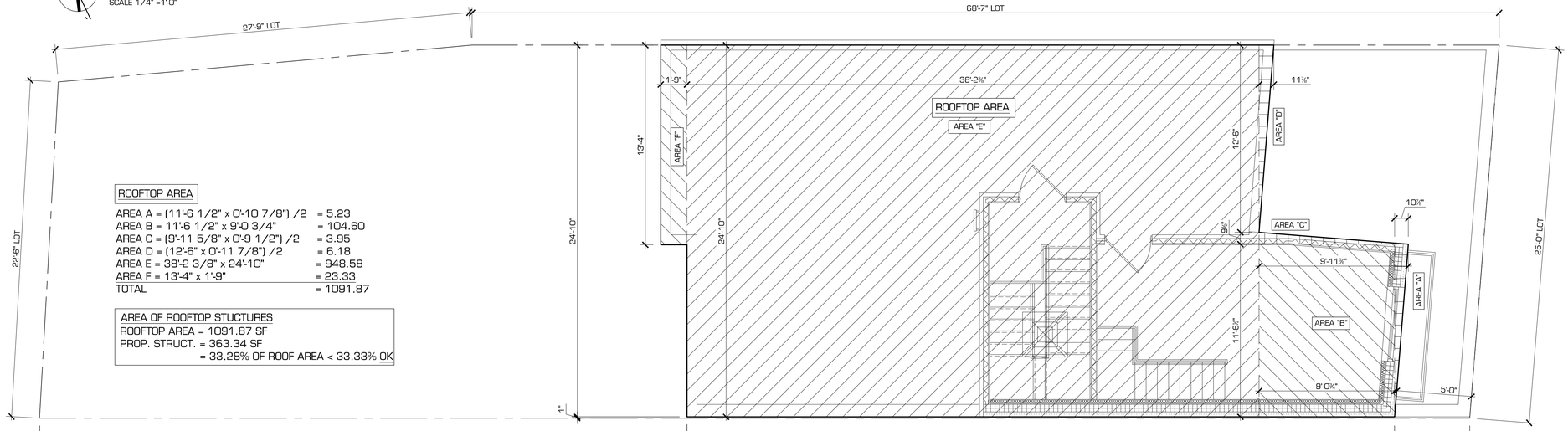


PENTHOUSE

AREA A = (11'-6 1/2" x 0'-10 7/8") /2	= 5.23
AREA B = 9'-8 5/8" x 11'-6 1/2"	= 112.17
AREA C = (10'-7 5/8" x 0'-10 1/8") /2	= 4.49
AREA D = 9'-11 1/2" x 12'-2"	= 121.16
AREA E = 14'-11 1/2" x 8'-0 1/2"	= 120.29
TOTAL	= 363.34

PENTHOUSE AREA DIAGRAM

SCALE 1/4" =1'-0"



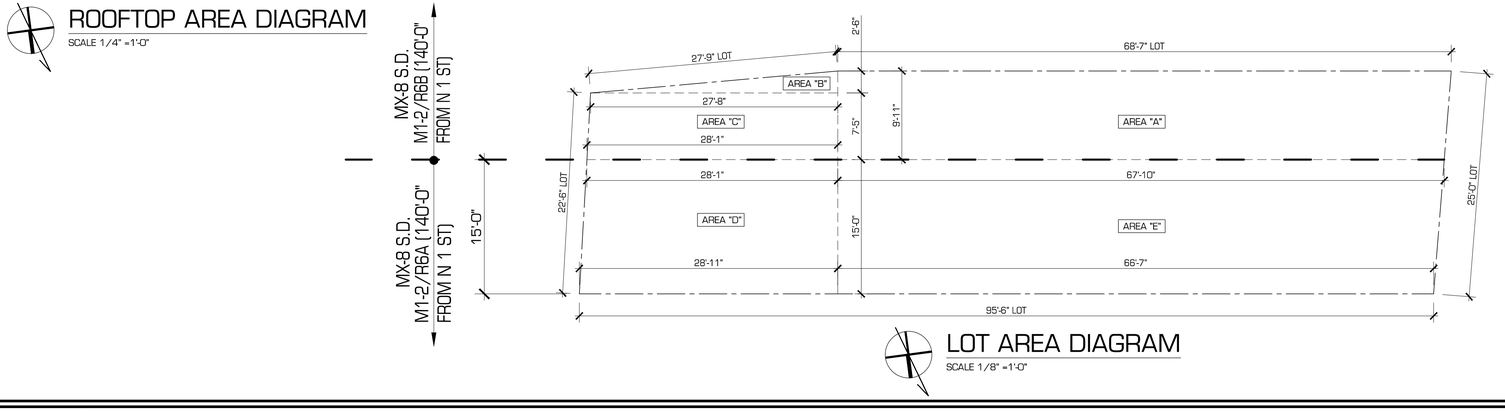
ROOFTOP AREA

AREA A = (11'-6 1/2" x 0'-10 7/8") /2	= 5.23
AREA B = 11'-6 1/2" x 9'-0 3/4"	= 104.60
AREA C = (9'-11 5/8" x 0'-9 1/2") /2	= 3.95
AREA D = (12'-6" x 0'-11 7/8") /2	= 6.18
AREA E = 38'-2 3/8" x 24'-10"	= 948.58
AREA F = 13'-4" x 1'-9"	= 23.33
TOTAL	= 1091.87

AREA OF ROOFTOP STUCTURES
ROOFTOP AREA = 1091.87 SF
PROP. STRUCT. = 363.34 SF
= 33.28% OF ROOF AREA < 33.33% OK

ROOFTOP AREA DIAGRAM

SCALE 1/4" =1'-0"



PORTION WITH (M1-2/R6B IN MX-8):

AREA A = [(68'-7" + 67'- 10") X 9'-11"] /2	= 676.40
AREA B = (27'-8" x 2'-6") / 2	= 34.58
AREA C = [(27'-8" + 28'- 1") X 7'-5"] /2	= 206.74
TOTAL	= 917.72 SQ. FT.

PORTION WITH (M1-2/R6A IN MX-8):

AREA D = [28'-1" + 28'- 11") X 15'-0"] /2	= 427.50
AREA E = [(67'-10" + 66'- 7") X 15'-0"] /2	= 1008.12
TOTAL	= 1435.62 SQ. FT.

AREA OF ENTIRE LOT
917.72 + 1435.62 = 2353.34 SQ. FT.

LOT AREA DIAGRAM

SCALE 1/8" =1'-0"

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LOT AREA AND FLOOR AREA DIAGRAMS

SEAL & SIGNATURE:

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CHK BY:	S.STILES
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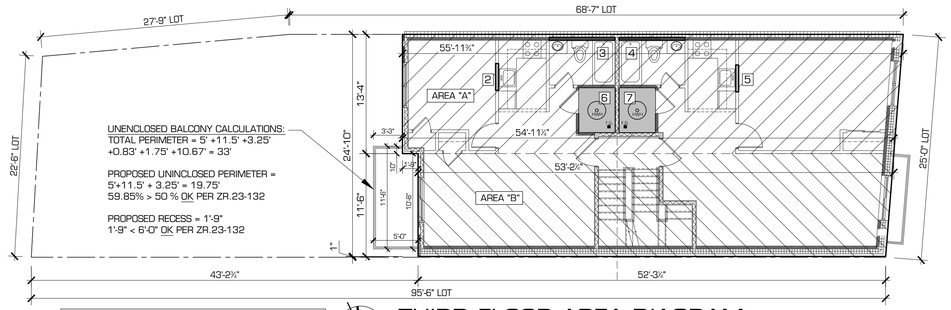
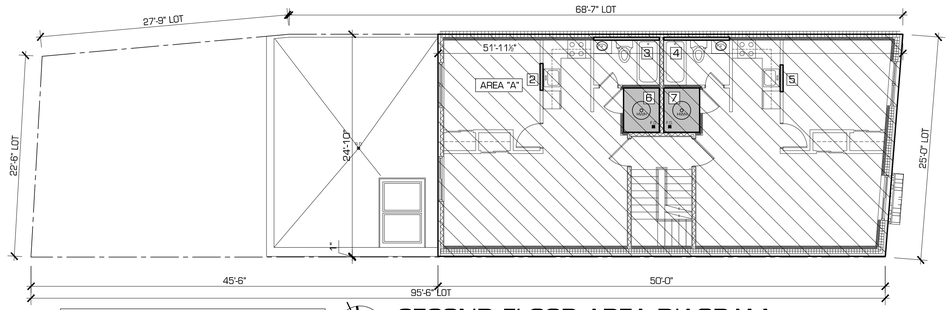


3RD FL. F.A. DEDUCTION AREA (SQ.FT)		
PLUMBING CHASE WALL	2 5 — 3'-0"	2.00
	3 4 — 7'-4"	4.88
MECH.	6 7 — 4'-11½" × 4'-0"	39.66
TOTAL:		46.54

THIRD FLOOR AREA DIAGRAM

SCALE 1/8" =1'-0"

AREA A = [(55'-11 3/4" + 54'- 11 1/4") X 13'-4"] /2 = 739.44
AREA B = [(53'-2 1/4" + 52'-3 1/4") X 11'-6"] /2 = 606.38
TOTAL = 1345.82 SQ. FT.

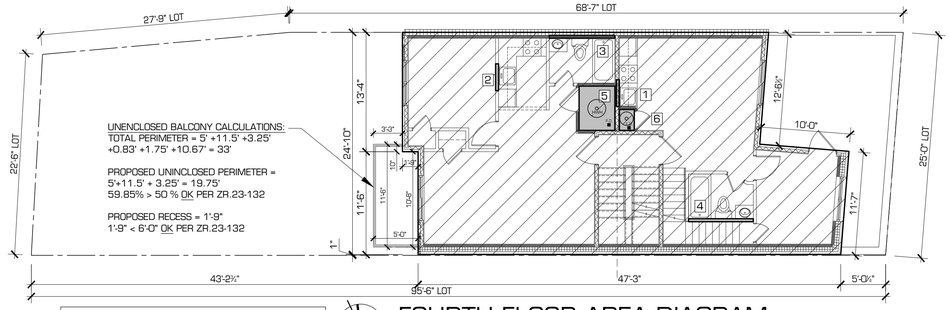


2ND FL. F.A. DEDUCTION AREA (SQ.FT)		
PLUMBING CHASE WALL	2 5 — 3'-0"	2.00
	3 4 — 7'-4"	4.88
MECH.	6 7 — 4'-11½" × 4'-0"	39.66
TOTAL:		46.54

SECOND FLOOR AREA DIAGRAM

SCALE 1/8" =1'-0"

AREA A = [(51'-11 1/2" + 50'-0") X 24'-10"] /2 = 1265.98 SQ. FT.

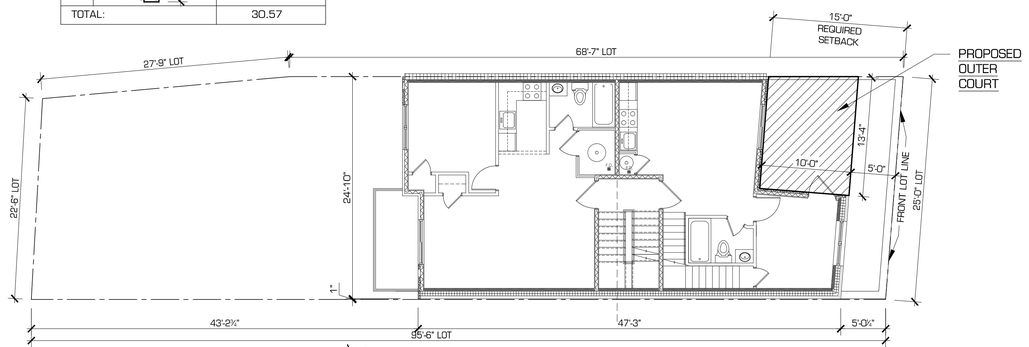


4TH FL. F.A. DEDUCTION AREA (SQ.FT)		
PLUMBING CHASE WALL	2 5 — 3'-0"	2.00
	3 — 7'-4"	2.44
	4 — 7'-2½"	2.41
MECHANICAL	5 — 4'-11½" × 4'-0"	19.83
	6 — 2'-6" × 2'-4"	3.89
TOTAL:		30.57

FOURTH FLOOR AREA DIAGRAM

SCALE 1/8" =1'-0"

SEE ROOFTOP AREA CALCULATIONS
TOTAL = 1091.87 SQ. FT

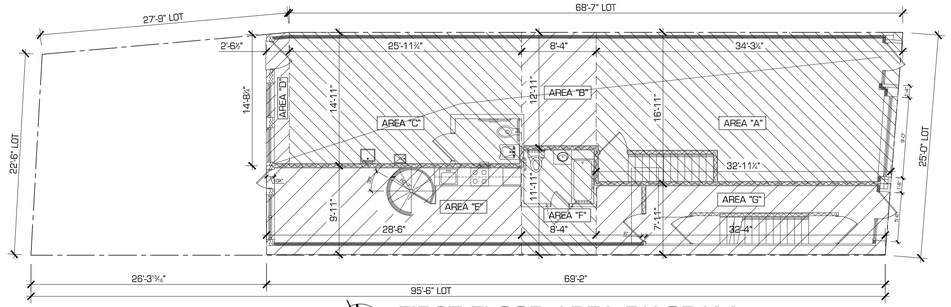


FOURTH FLOOR COURT CALCULATIONS

SCALE 1/8" =1'-0"

ZR.23-841 NARROW OUTER COURT
THE WIDTH OF A NARROW OUTER COURT SHALL BE AT LEAST ONE AND ONE-THIRD THE DEPTH OF SUCH OUTER COURT.

PROPOSED DEPTH = 10'-0"
MINIMUM REQUIRED WIDTH = 1.33 X 10'-0" = 13'-4"
PROPOSED WIDTH = 13'-4" OK

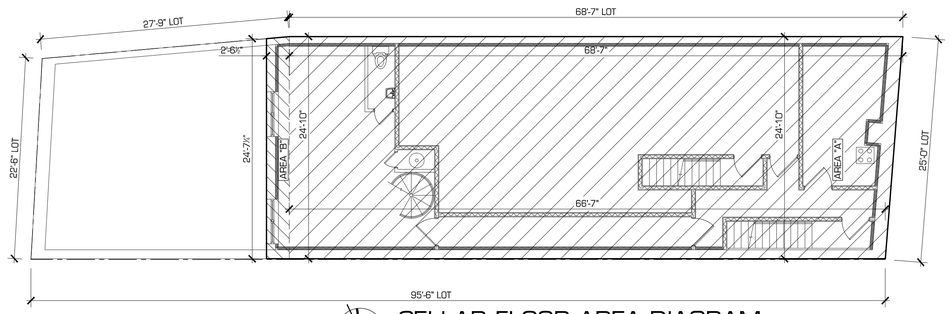


FIRST FLOOR AREA DIAGRAM

SCALE 1/8" =1'-0"

COMMERCIAL:
AREA A = [(34'-3 1/4" + 32'- 11 1/4") X 16'-11"] /2 = 568.47
AREA B = 12'-11" x 8'-4" = 107.63
AREA C = 25'-11 3/4" x 14'-11" = 387.52
AREA D = [14'-8 1/4" + 14'-11") X 2'-6 1/2"] /2 = 37.62
TOTAL = 1101.24 SQ. FT.

RESIDENTIAL:
AREA E = 28'-6" x 9'-11" = 282.62
AREA F = 11'-11" x 8'-4" = 99.31
AREA G = [(32'-11 1/4" + 32'-4") X 7'-11"] /2 = 258.36
TOTAL = 640.29 SQ. FT.



CELLAR FLOOR AREA DIAGRAM

SCALE 1/8" =1'-0"

AREA A = [(68'-7" + 66'-7") X 24'-10"] /2 = 1678.32
AREA B = [24'-7 1/4" + 24'-10") X 2'-6 1/2"] /2 = 62.83

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BROOKLYN, NEW YORK
11249

DRAWING TITLE:
FLOOR AREA, COURT AND DEDUCTIONS DIAGRAMS

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DWG No:	Z-003.00
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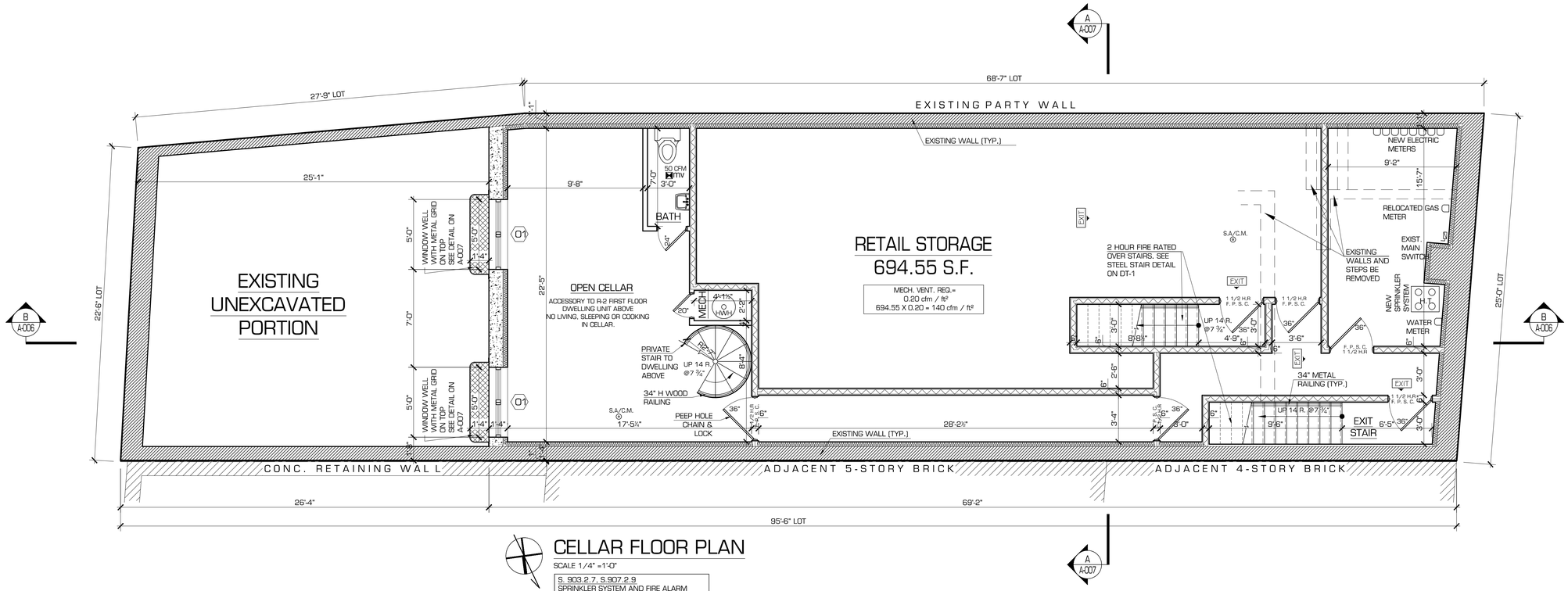

CELLAR FLOOR PLAN

SCALE 1/4" =1'-0"

S. 903.2.7, S.907.2.9
SPRINKLER SYSTEM AND FIRE ALARM SHALL BE INSTALLED THROUGHOUT THIS BUILDING.

SYMBOL AND MATERIAL LEGEND

A.D.	AREA DRAIN
F.D.	FLOOR DRAIN
R.D.	ROOF DRAIN
	SPRINKLER HEAD
S.A/C.M.	DENOTES HARD-WIRED SMOKE ALARM / CARBON MONOXIDE DETECTOR
S.A	DENOTES HARD-WIRED SMOKE ALARM
mv	MECHANICAL VENTILATION
	HANDICAP ACCESSIBLE
	BRICK VENEER
	CONC. BLOCK
	POURED CONCRETE
	BATT INSULATION
	LEVEL CHANGE
XX	WINDOW TAG
EXIT	DIRECTIONAL EXIT SIGN
EXIT	NON-DIRECTIONAL EXIT SIGN
HWH	WATER HEATER (PLUMBING AND MECHANICAL EQUIPMENT TO BE FILED SEPARATELY)
H.T.	HOUSE TRAP
	METER
ELE. PN	ELECTRIC PANNEL
C. UNIT 1	CONDENSING UNIT #1 (OUTDOOR UNIT) (SEE MECHANICAL PLANS FOR DETAILS)

ABREVIATION LEGEND

LAV	LAVATORY
W.C.	WATER CLOSET
LN	LINEN CLOSET
W	WASHER
D	DRYER
HC	HANDICAP
TYP.	TYPICAL
DN	STAIR DOWN
UP	STAIR UP
R.	RISER
REF	REFRIGERATOR
RGE	RANGE
TUB	BATH TUB
SHWR	SHOWER
SF	SQUARE FEET
CL	CLOSET
DOB	DEPARTMENT OF BUILDINGS
DW	DISHWASHER
DIA	DIAMETER
DU	DWELLING UNIT
EL	ELEVATION
F.A.I.	FRESH AIR INTAKE
O.C.	ON CENTER

PARTITION LEGEND

(SEE STRUCTURAL PLANS FOR WALL WIDTHS, DETAILS & SPECIFICATIONS.)

FOUNDATION WALL (3 HOUR RATED)
UL DESIGN No. U924
STC RATING > 50, AS PER ASTM E 90.
12" POURED CONCRETE WALL WITH 3 1/2" METAL STUDS @ 16" O.C. - R-11 BATT INSULATION & 5/8" TYPE "X" GYPSUM BOARD

EXISTING MASONRY WALL (3 HOUR RATED)
UL DESIGN No. U902
STC RATING > 55, AS PER ASTM E 90.
EXISTING MASONRY WALL WITH 3 1/2" METAL STUDS @ 16" O.C. - R-11 BATT INSULATION & 5/8" TYPE "X" GYPSUM BOARD

EXTERIOR WALL (4 HOUR RATED)
UL DESIGN No. U902
STC RATING > 55, AS PER ASTM E 90.
4" NOMINAL BRICK BONDED TO CONCRETE BLOCK, 16" O.C. WITH 9 GA GALVANIZED TRUSS REINFORCEMENT, 3 ½" METAL STUDS @ 16" O.C. WITH R-11 BATT INSULATION IN BETWEEN - 5/8" TYPE "X" GYPSUM BOARD ON INTERIOR FACE

SHAFT WALLS, (2 HOUR RATED)
UL DESIGN No. U415 SYSTEM C
STC RATING = 50, AS PER ASTM E 90.
1" SHEETROCK BRAND GYPSUM LINER PANELS SET BETWEEN 3" USG C-H STUDS 20 GA MIN. @24" O.C., 2" SPF (R-12) INSULATION BETWEEN STUDS, 2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON THE EXTERIOR OF THE SHAFT

INTERIOR PARTITION (1 HOUR RATED)
UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
1 LAYER OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 3 ⅝" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.

EXTERIOR WALL (3 HOUR RATED)
UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2" STUCCO, 3 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 5 ⅛" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.

EXTERIOR WALL (2 HOUR RATED)
UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2" STUCCO, 2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 3 ⅝" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.
IN STAIRCASE, INSTALL 24" GA. 36" X 48" SHEET SECURED BETWEEN PANELS 18" ABOVE FLOOR LINE.

INTERIOR PARTITION (2 HOUR RATED)
UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 3 ⅝" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.
IN STAIRCASE, INSTALL 24" GA. 36" X 48" SHEET SECURED BETWEEN PANELS 18" ABOVE FLOOR LINE.

INTERIOR PARTITION (2 HOUR RATED)
UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 1 ½" 20 GAUGE STL STUDS @16" O.C. WITH 1" CELLULOSE FIBER IN WALL CAVITY FOR INSULATION.
IN STAIRCASE, INSTALL 24" GA. 36" X 48" SHEET SECURED BETWEEN PANELS 18" ABOVE FLOOR LINE.

INTERIOR WALL (NON RATED)
NON-RATED, NONBEARING
1 LAYER OF ⅝" GYPSUM BOARD EACH SIDE, 3 ⅝" 20 GAUGE STL STUDS @16" O.C.
USE WATER-RESISTANT GYPSUM BOARD AT WALL SURFACES FACING BATHROOM AREAS.
USE TYPE X GYPSUM BOARD AT WALL SURFACES FACING BATHROOM KITCHENS AREAS.

SMOKE ALARMS
S. 907.2.10. 1
SMOKE ALARMS SHALL BE INSTALLED AND MAINTAINED IN GROUPS R-2, R-3 REGARDLESS OF OCCUPANT LOAD AT ALL OF THE FOLLOWING LOCATIONS WITHIN A DWELLING UNIT:
1. ON THE CEILING OR WALL OUTSIDE OF EACH ROOM USED FOR SLEEPING PURPOSES WITHIN 15 FEET (4572 MM) FROM THE DOOR TO SUCH ROOM.
2. IN EACH ROOM USED FOR SLEEPING PURPOSES.
3. IN EACH STORY WITHIN A DWELLING UNIT, INCLUDING BELOW-GRADE STORIES AND PENTHOUSES OF ANY AREA, BUT NOT INCLUDING CRAWL SPACES AND UNINHABITABLE ATTICS. IN DWELLINGS OR DWELLING UNITS WITH SPLIT LEVELS AND WITHOUT AN INTERVENING DOOR BETWEEN THE ADJACENT LEVELS, A SMOKE ALARM INSTALLED ON THE UPPER LEVEL SHALL SUFFICE FOR THE ADJACENT LOWER LEVEL PROVIDED THAT THE LOWER LEVEL IS LESS THAN ONE FULL STORY BELOW THE UPPER LEVEL.

NOTE:
THERE IS NO GAS EQUIPMENT PROPOSED IN THIS BUILING

CARBON MONOXIDE DETECTORS
908.7.1.1
AFFECTED DWELLING UNITS. CARBON MONOXIDE ALARMS OR DETECTORS SHALL BE REQUIRED WITHIN THE FOLLOWING DWELLING UNITS:
1. UNITS ON THE SAME STORY WHERE CARBON MONOXIDEPRODUCING EQUIPMENT OR ENCLOSED PARKING IS LOCATED.
2. UNITS ON THE STORIES ABOVE AND BELOW THE FLOOR WHERE CARBON MONOXIDE-PRODUCING EQUIPMENT OR ENCLOSED PARKING IS LOCATED.
3. UNITS IN A BUILDING CONTAINING A CARBON MONOXIDEPRODUCING FURNACE, BOILER, OR WATER HEATER AS PART OF A CENTRAL SYSTEM.
4. UNITS IN A BUILDING SERVED BY A CARBON MONOXIDEPRODUCING FURNACE, BOILER, OR WATER HEATER AS PART OF A CENTRAL SYSTEM THAT IS LOCATED IN AN ADJOINING OR ATTACHED BUILDING.

908.7.1.1.1
REQUIRED LOCATIONS WITHIN DWELLING UNITS. CARBON MONOXIDE ALARMS OR DETECTORS SHALL BE LOCATED WITHIN DWELLING UNITS AS FOLLOWS:
1. OUTSIDE OF ANY ROOM USED FOR SLEEPING PURPOSES, WITHIN 15 FEET (4572 MM) OF THE ENTRANCE TO SUCH ROOM.
2. IN ANY ROOM USED FOR SLEEPING PURPOSES.
3. ON ANY STORY WITHIN A DWELLING UNIT, INCLUDING BELOW-GRADE STORIES AND PENTHOUSES OF ANY AREA, BUT NOT INCLUDING CRAWL SPACES AND UNINHABITABLE ATTICS.

GREEN LINE ARCHITECTURE

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TEL: 908.268.6283 FAX: 800.782.6981

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DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

OWNER:
MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
BROOKLYN, NEW YORK
11249

DRAWING TITLE:
EXISTING CELLAR FLOOR PLAN & LEGENDS

SEAL & SIGNATURE:

DATE:	08-30-13
DRAWING BY:	E.D.
CHK BY:	S.STILES
DWG No:	A-001.00
Page:	4 of ....

MECHANICAL EQUIPMENT NOTE:
EXACT LOCATION, SIZE AND TYPE OF MECHANICAL EQUIPMENT IS TO BE FILED ON A SEPARATE APPLICATION.

REQUIRED OUTDOOR VENTIALTION AIR
TABLE 403.3 (NYC MECHANICAL CODE)

BUILDINGS SHALL BE PROVIDED WITH A NATURAL VENTILATION IN ACCORDANCE WITH SECTION 1203.4, AND/OR MECHANICAL VENTILATION IN ACCORDANCE WITH THE NEW YORK CITY MECHANICAL CODE.

EVERY OCCUPIED SPACE SHALL BE VENTILATED BY NATURAL MEANS IN ACCORDANCE WITH S.402 OR BY MECHANICAL MEANS IN ACCORDANCE WITH S.403 OF THE NEW YORK CITY MECHANICAL CODE.

MECHANICAL VENTILATING SHALL BE PROVIDED BY A METHOD OF SUPPLY AIR AND RETURN OR EXHAUST AIR, THE AMOUNT OF SUPPLY AIR SHALL BE APPROXIMATELY EQUAL TO THE AMOUNT OF RETURN AND EXHAUST AIR.

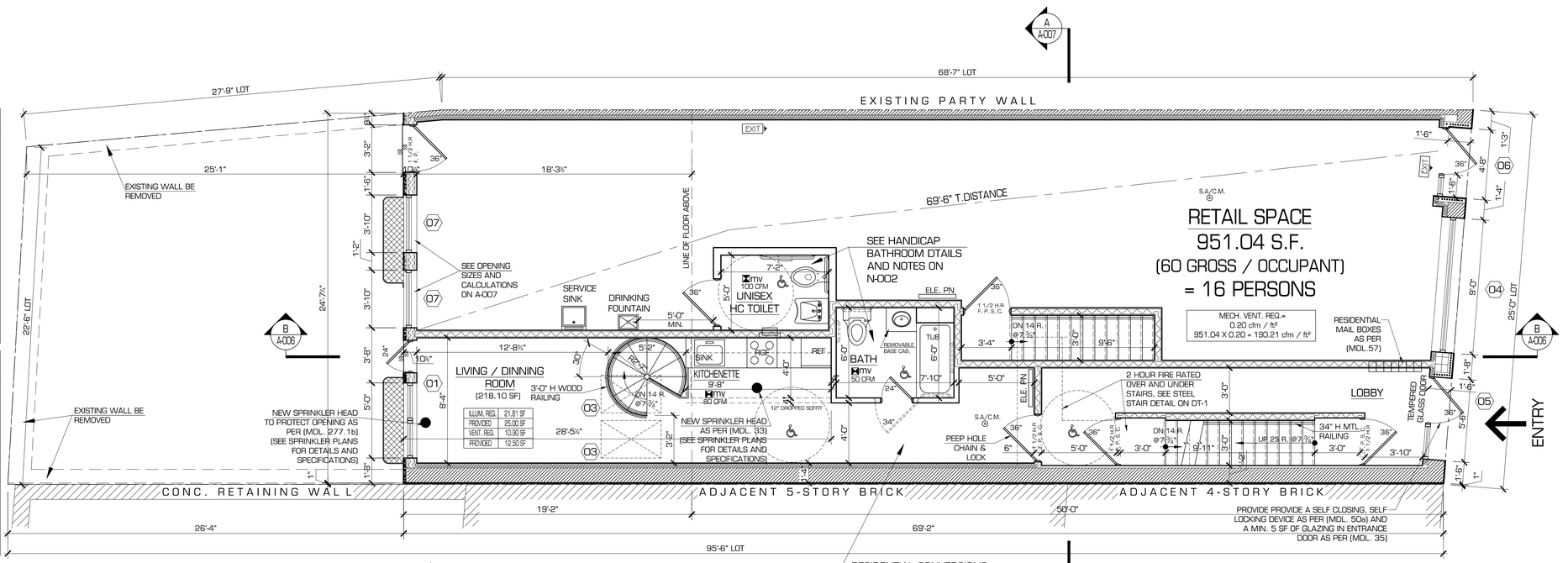
THE MINIMUM VENTILATION RATE OF A REQUIRED OUTDOOR AIR SHALL BE DETERMINED IN ACCORDANCE WITH S.403.3 OF THE NEW YORK CITY MECHANICAL CODE. THE AIR REQUIRED BY THIS SECTION SHALL NOT BE RECIRCULATED.

RETAIL FLOORS = 0.20 cfm / ft²

MINIMUM NUMBER OF PLUMBING FIXTURES
REQUIRED TABLE 403.1 (NYC BUILDING CODE)

STORE :

- W.C. (BOTH SEXES)
  (1 PER 500)
  ACTUAL NUMBER OF OCCUPANTS = 16
  16 / 500 = 1 REQUIRED.
- LAVATORIES (BOTH SEXES)
  (1 PER 750)
  ACTUAL NUMBER OF OCCUPANTS = 16
  16 / 750 = 1 REQUIRED.
- DRINKING FOUNTAINS:
  (1 FOR 1000 PERSONS)
  ACTUAL NUMBER OF OCCUPANTS = 16
  16 < 1000 = 1 REQUIRED.
- SERVICE SINK:
  (1 REQUIRED)



FIRST FLOOR PLAN

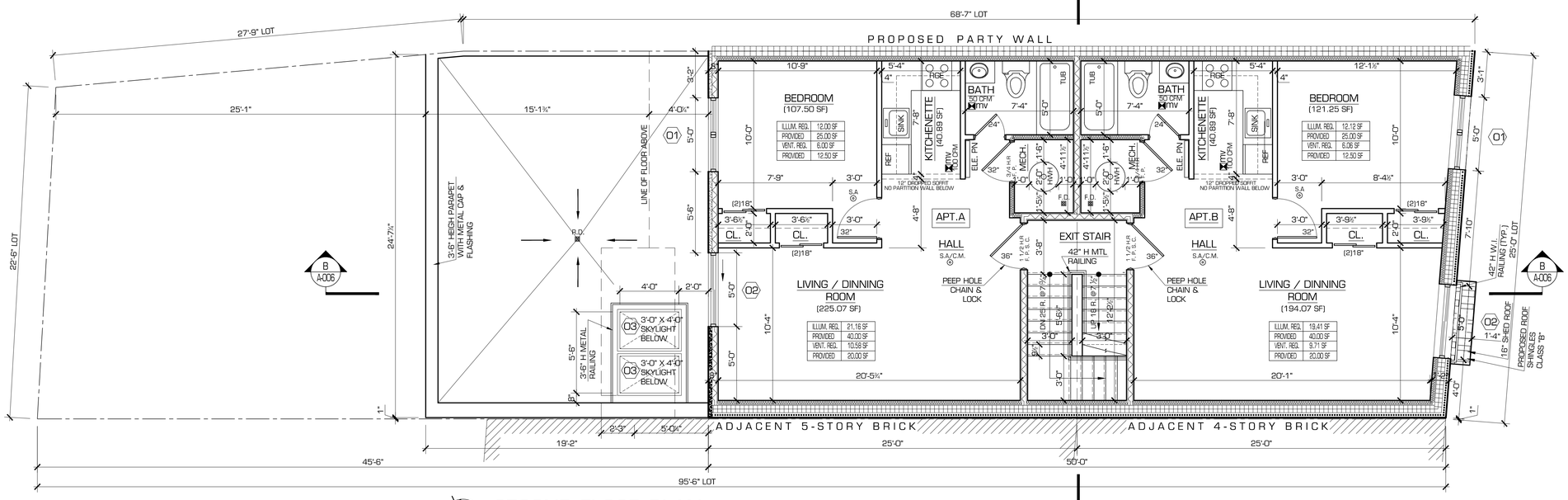
SCALE 1/4" =1'-0"

S. 903.2.7, S.907.2.9
SPRINKLER SYSTEM AND FIRE ALARM SHALL BE INSTALLED THROUGHOUT THIS BUILDING.

S. 1614
BUILDING TO CONFORM WITH EARTHQUAKE RESISTANCE DESIGN PRESCRIBED BY THE 2008 NYC BUILDING CODE. SEE STRUCTURAL PLANS FOR CONSTRUCTION DETAILS.

S.1107, HANDICAP ACCESSIBILITY
FOR RESIDENTIAL PORTION OF THE BUILDING, FACILITIES FOR PEOPLE HAVING PHYSICAL DISABILITIES SHALL COMPLY WITH APPENDIX "P" OF THE 2008 NYC BUILDING CODE AND A117.1-2003 MODIFIED BY LL58/87 (SEE N-002 FOR DETAILS AND SPECIFICATIONS)

RESIDENTIAL CONVERSIONS WITHIN EXISTING BUILDINGS PERMITTED AS PER ZR.15-11



SECOND FLOOR PLAN

SCALE 1/4" =1'-0"

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PROJECT:
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OWNER:
MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
BROOKLYN, NEW YORK
11249

DRAWING TITLE:
PROPOSED FIRST AND SENOND FLOOR PLANS

SEAL & SIGNATURE:

DATE:	08-30-13
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CHK BY:	S.STILES
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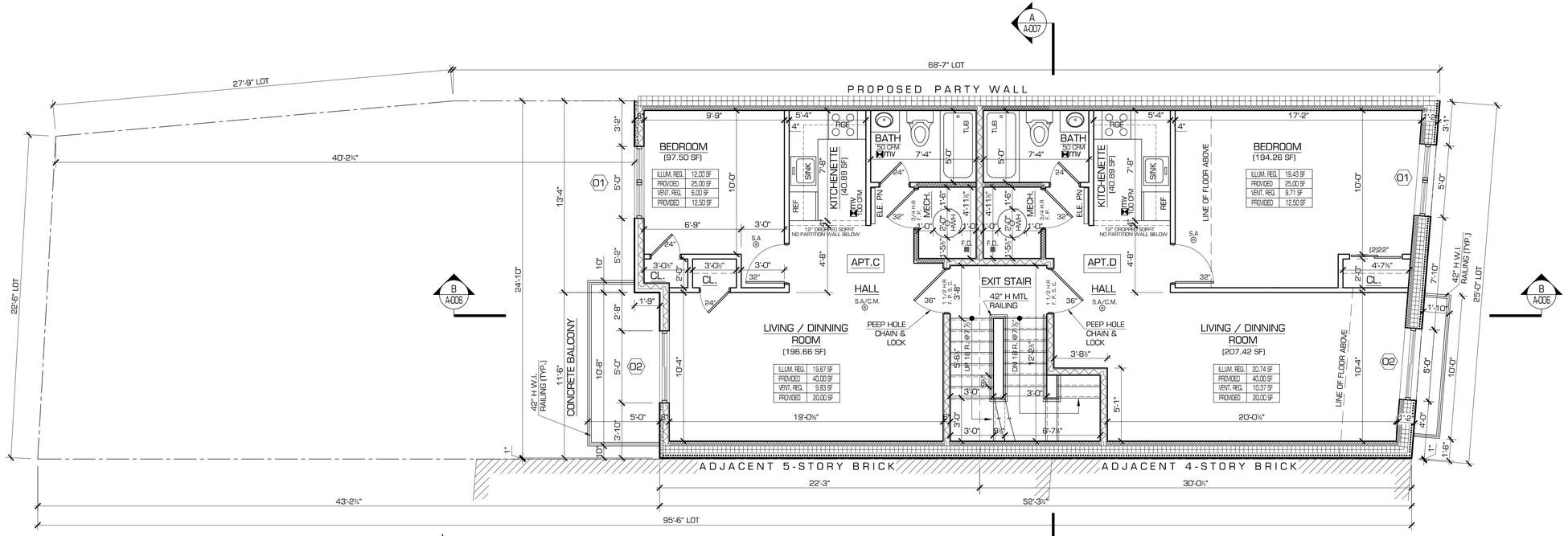
Page:	5 of ....

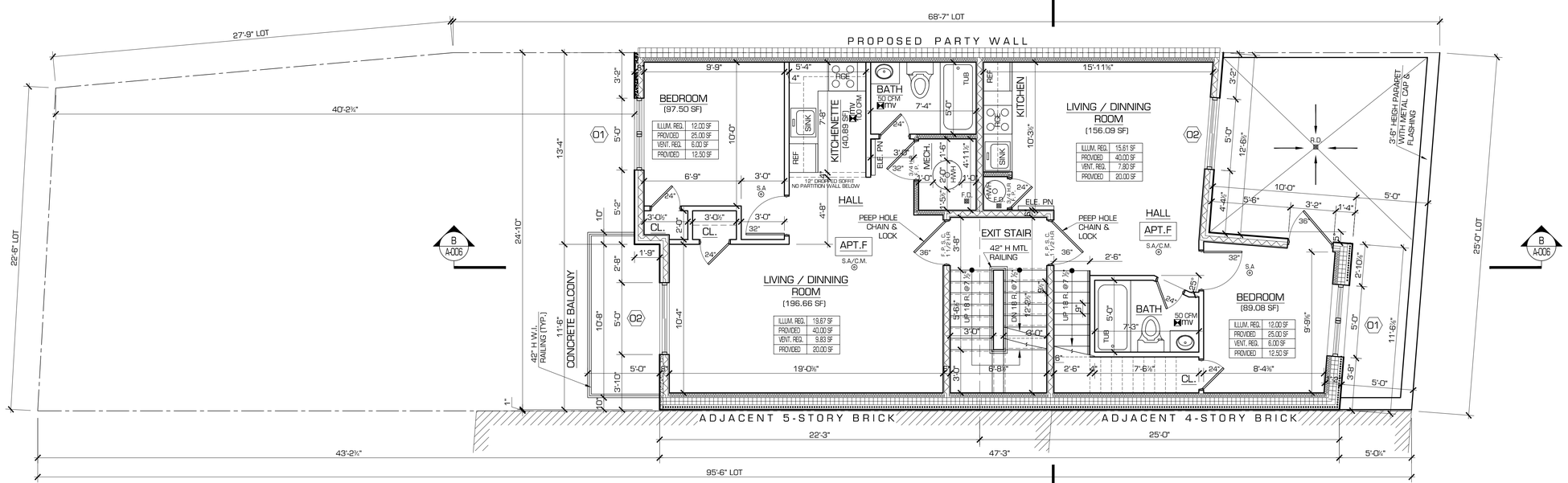


THIRD FLOOR PLAN

SCALE 1/4" =1'-0"

S. 903.2.7, S.907.2.9
SPRINKLER SYSTEM AND FIRE ALARM SHALL BE INSTALLED THROUGHOUT THIS BUILDING.

S. 1614
BUILDING TO CONFORM WITH EARTHQUAKE RESISTANCE DESIGN PRESCRIBED BY THE 2008 NYC BUILDING CODE. SEE STRUCTURAL PLANS FOR CONSTRUCTION DETAILS.



FOURTH FLOOR PLAN

SCALE 1/4" =1'-0"

GREEN LINE ARCHITECTURE

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MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
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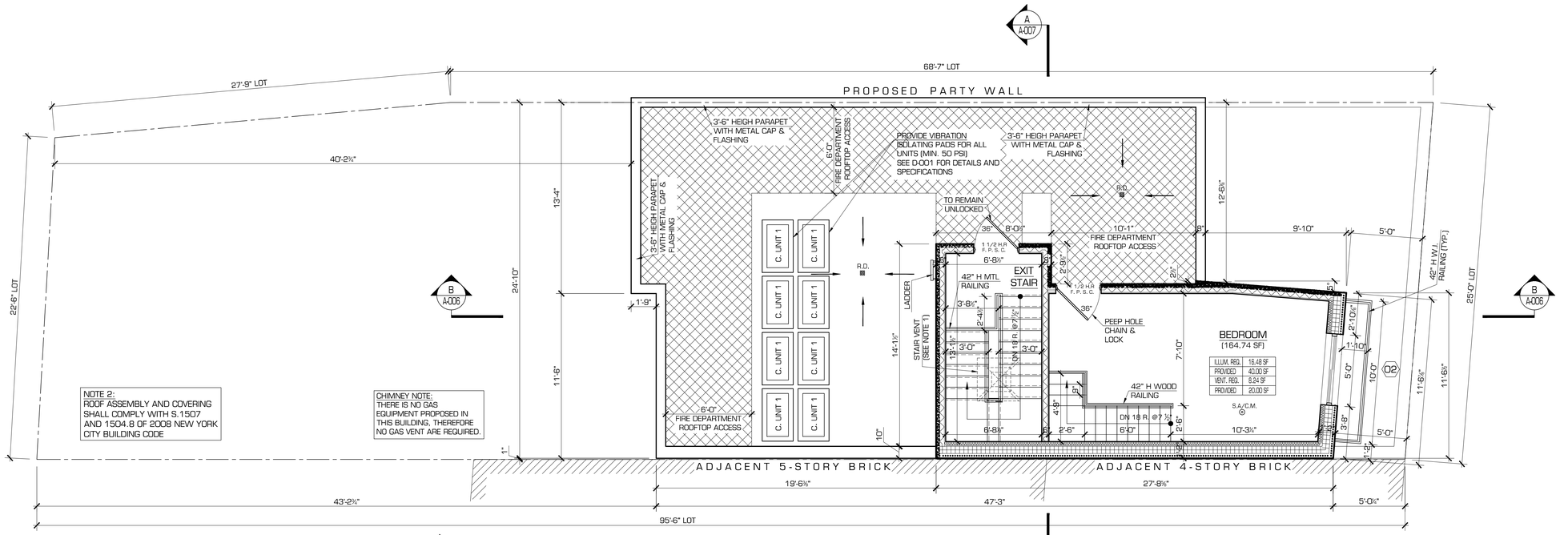
11249

DRAWING TITLE:
PROPOSED THIRD AND FOURTH FLOOR PLANS

SEAL & SIGNATURE:

DATE: 08-30-13
DRAWING BY: E.D.
CHK BY: S.STILES
DWG No: A-003.00
Page: 6 of ....

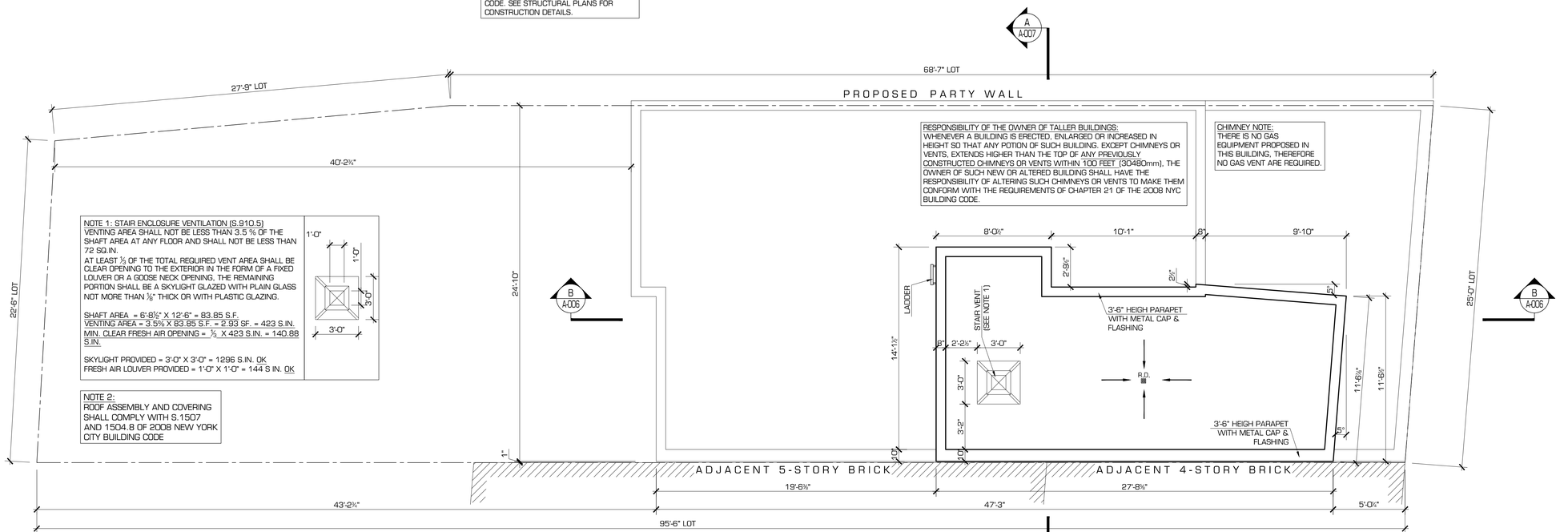


PENTHOUSE / ROOF FLOOR PLAN

SCALE 1/4" =1'-0"

S. 903.2.7, S.907.2.9
SPRINKLER SYSTEM AND FIRE ALARM SHALL BE INSTALLED THROUGHOUT THIS BUILDING.

S. 1614
BUILDING TO CONFORM WITH EARTHQUAKE RESISTANCE DESIGN PRESCRIBED BY THE 2008 NYC BUILDING CODE. SEE STRUCTURAL PLANS FOR CONSTRUCTION DETAILS.



TOP OF PENTHOUSE PLAN

SCALE 1/4" =1'-0"

GREEN LINE ARCHITECTURE

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DRAWING TITLE:
PROPOSED PENTHOUSE / ROOF AND TOP OF PENTHOUSE PLANS

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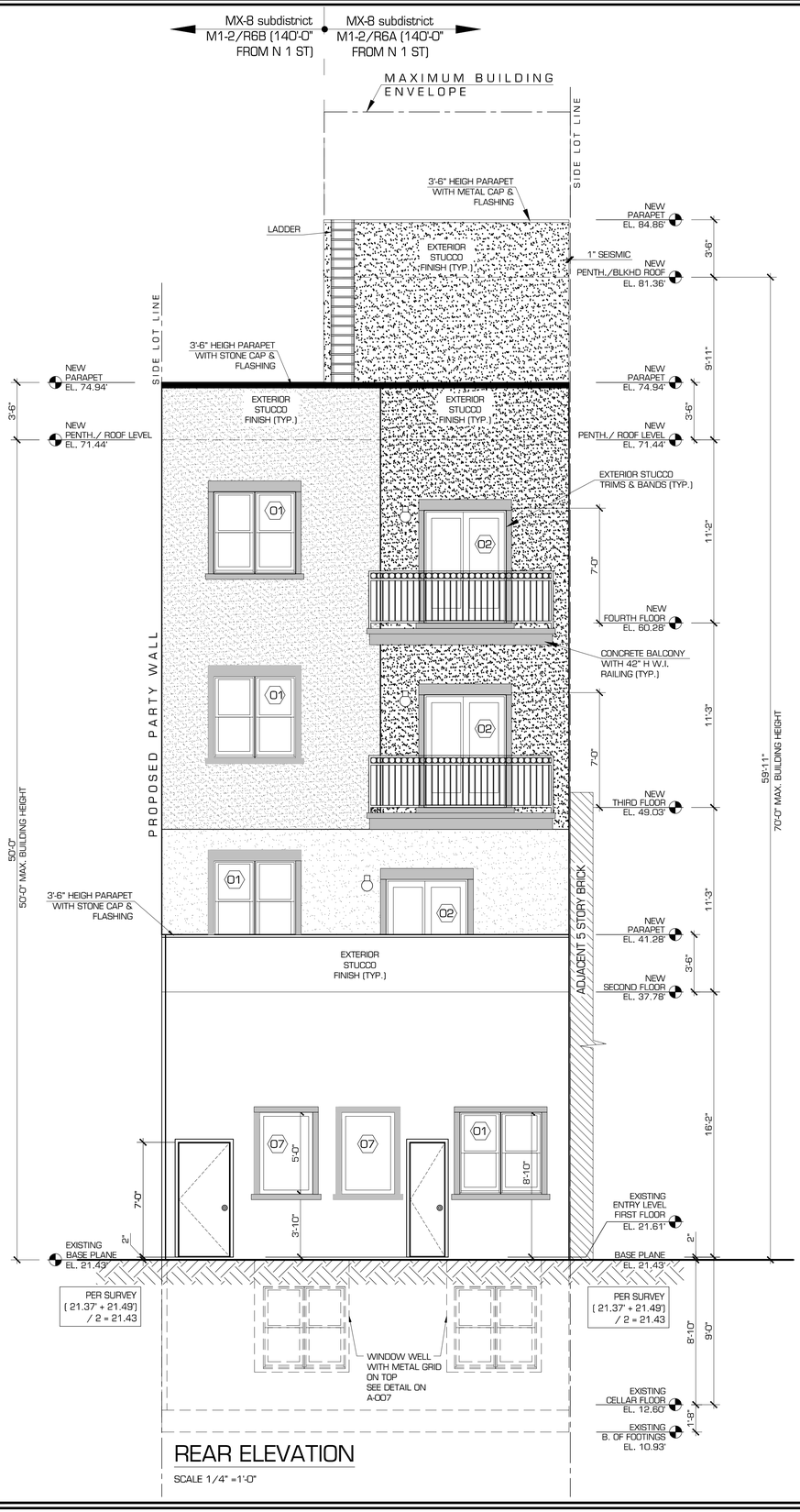
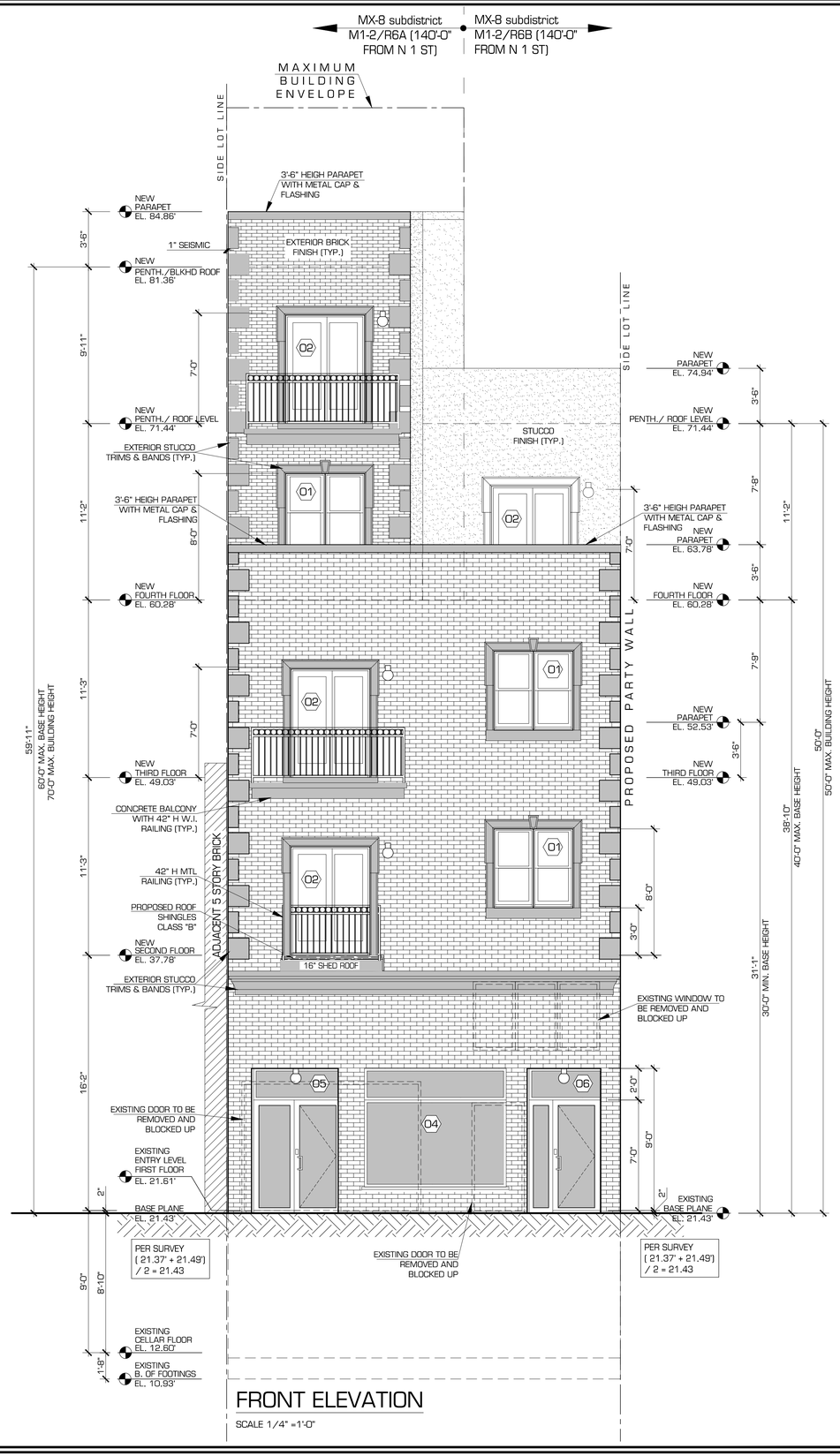


REAR ELEVATION

SCALE 1/4" =1'-0"



FRONT ELEVATION

SCALE 1/4" =1'-0"

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MENDEL GOLD

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BROOKLYN, NEW YORK 11249

DRAWING TITLE:
FRONT & REAR ELEVATIONS

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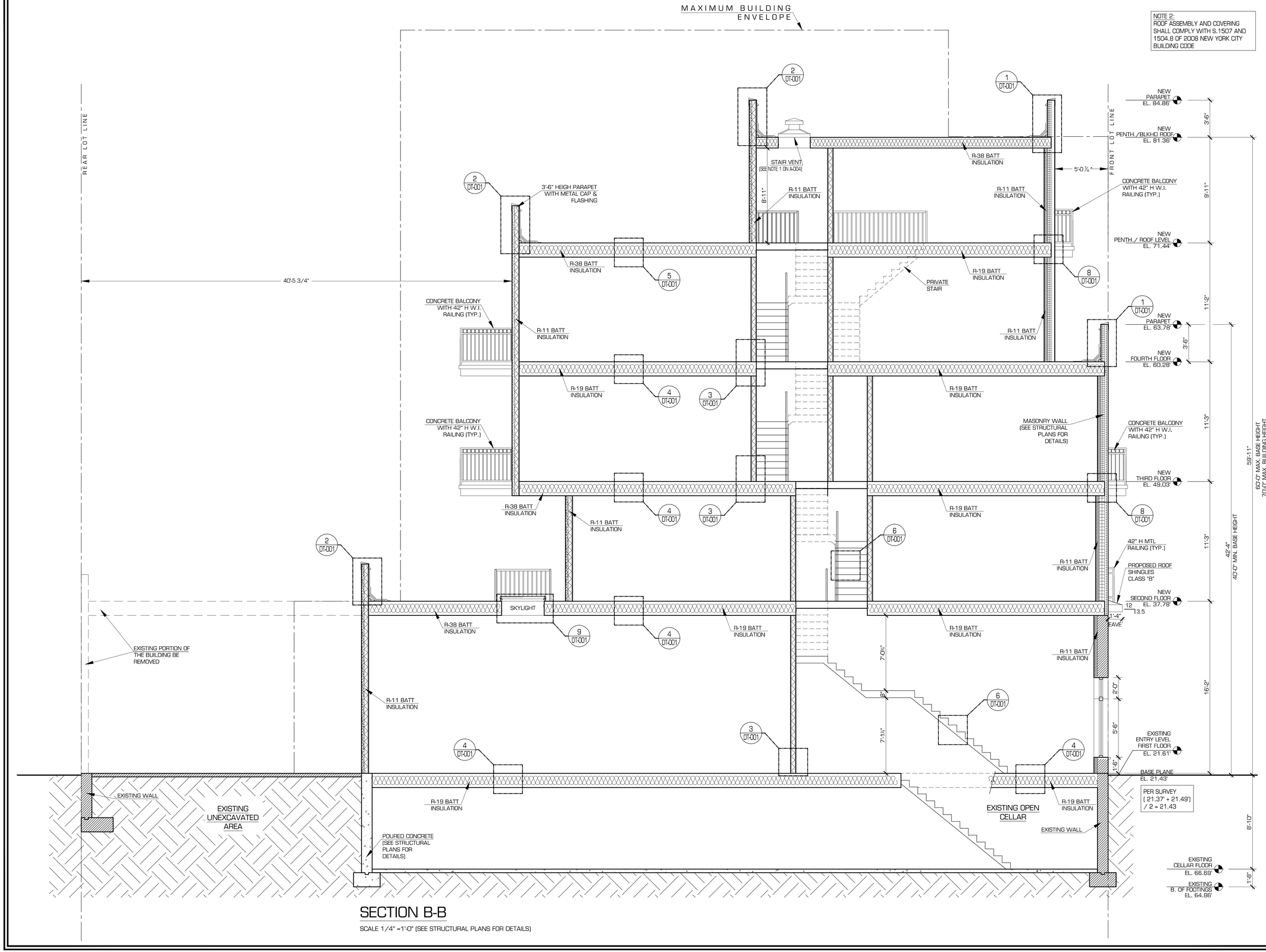

SECTION B-B

SCALE 1/4" =1'-0" (SEE STRUCTURAL PLANS FOR DETAILS)

GREEN LINE ARCHITECTURE

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SECTION B-B

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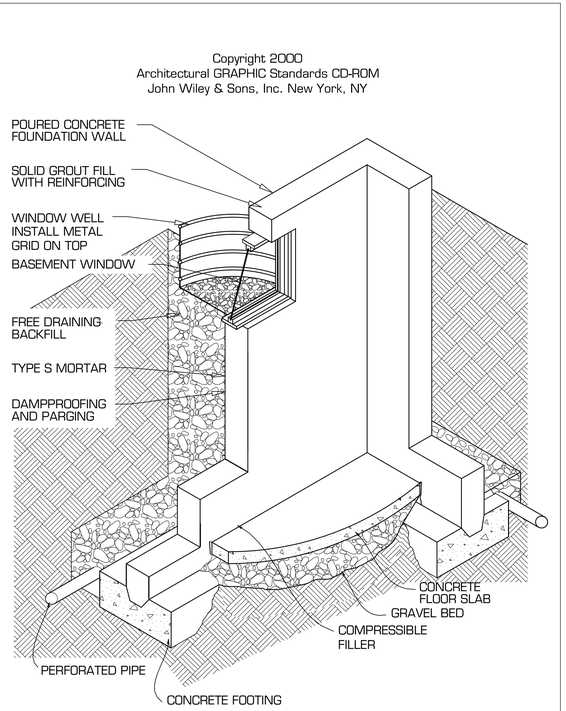
Page:	9 of ....

WINDOW SCHEDULE

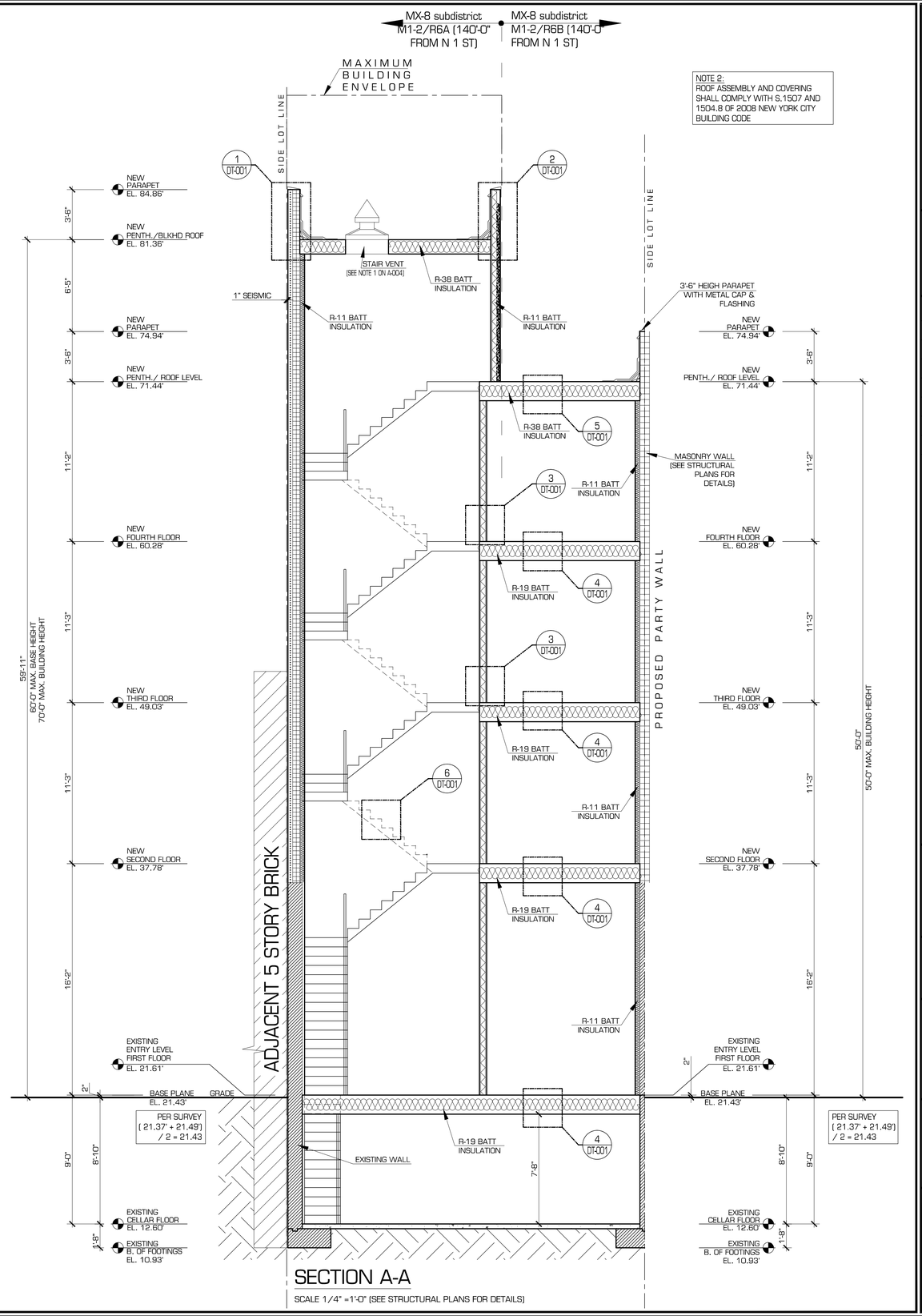
WINDOW #	WINDOW SIZE (W x H)	TYPE	COMMENTS	SHGC VALUE	U-FACTOR	STC
1	5'-0" x 5'-0"	ARCHITECT SERIES WOOD WITH HURRICANESHIELD IMPACT RESISTANT DOUBLE HUNG BY PELLA. (2) DOUBLE HUNG, CLEAR GLAZING	DUAL GLAZED, LOW E WITH ARGON INT GLASS THICKNESS = 3mm, EXT GLASS THICKNESS = 7.6mm PVB	0.34	0.28	36
2	5'-0" x 6'-10"	ARCHITECT SERIES CLAD DOOR BY PELLA. SLIDING PATIO DOOR, CLEAR GLAZING	DUAL GLAZED, LOW E WITH ARGON INT GLASS THICKNESS = 3mm, EXT GLASS THICKNESS = 7.6mm PVB	0.34	0.28	
	5'-0" x 6'-10"	SLIDING GLASS PATIO DOOR BY SOUNDPROOF WINDOWS INSTALLED EXTERIORLY 4" OF PELLA UNIT.				50
3	3'-0" x 4'-0"	ELECTRIC FRESH AIR SKYLIGHT BY VELUX. CLEAR GLAZING	GLAZING: TEMPERED OVER LAMINATED HS (0.030" INTERLAYER)	0.24	0.53	
	3'-0" x 4'-0"	½" GLASS PANEL BY SOUNDPROOF WINDOWS INSTALLED INTERIORLY 4" OF VELUX SKYLIGHT.				49
4	9'-0" x 5'-6" & 9'-0" x 2'-0"	RECTANGULAR CLAD FIXED PICTURE WINDOW BY PELLA WITH FIXED TRANSOM ON TOP. CLEAR GLAZING	DUAL GLAZED, LOW E WITH ARGON INT GLASS THICKNESS = 5mm, EXT GLASS THICKNESS = 13.6mm SGP	0.34	0.28	37
5	5'-6" x 2'-0"	RECTANGULAR CLAD FIXED TRANSOM WINDOW BY PELLA. CLEAR GLAZING	DUAL GLAZED, LOW E WITH ARGON INT GLASS THICKNESS = 5mm, EXT GLASS THICKNESS = 13.6mm SGP	0.34	0.28	37
6	4'-8" x 2'-0"	RECTANGULAR CLAD FIXED TRANSOM WINDOW BY PELLA. CLEAR GLAZING	DUAL GLAZED, LOW E WITH ARGON INT GLASS THICKNESS = 5mm, EXT GLASS THICKNESS = 13.6mm SGP	0.34	0.28	37
7*	3'-10" x 5'-0"	RECTANGULAR CLAD FIXED PICTURE WINDOW BY PELLA. CLEAR GLAZING	DUAL GLAZED, LOW E WITH ARGON INT GLASS THICKNESS = 5mm, EXT GLASS THICKNESS = 13.6mm SGP	0.34	0.28	37

* UNPROTECTED OPPENINGS PERMITTED AS PER TABLE 704.8:
FOR A SEPARATION DISTANCE GREATED THAN 25'-0" AND NOT MORE THAN 30'-0", 70% IS ALLOWED
AREA OF THE WALL = 24'-7 1/4" x 16'-2" = 397.77 SQ. FT.
AREA OF ALL UNPROTECTED OPNENINGS = (2) 3'-10" x 5'-0" = 38.33 SQ. FT. = 9.64% OK

ENVIRONMENTAL CONDITIONS OF AN MX-8 DISTRICT	
ZR 123-32	IN SPECIAL MIXED USE DISTRICTS, ALL NEW DWELLING UNITS SHALL BE PROVIDED WITH A MINIMUM 35 DB (A) OF WINDOW WALL ATTENUATION TO MAINTAIN AN INTERIOR NOISE LEVEL OF 45 DB (A) OR LESS, WITH WINDOWS CLOSED, AND SHALL PROVIDE AN ALTERNATE MEANS OF VENTILATION.



1 / A-001 WINDOW WELL DETAIL
N.T.S.



SECTION A-A
SCALE 1/4" =1'-0" (SEE STRUCTURAL PLANS FOR DETAILS)

GREEN LINE ARCHITECTURE

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DRAWING TITLE:
SECTION A-A AND WINDOW SCHEDULE

SEAL & SIGNATURE:

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CHK BY:	S.STILES
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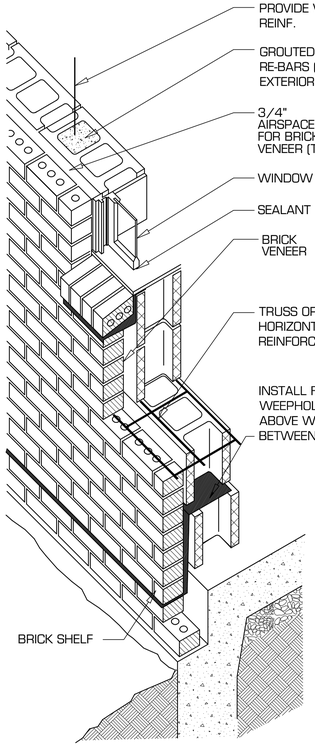
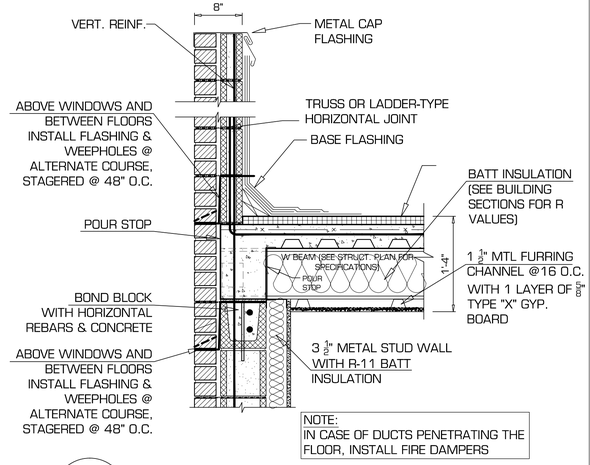
Page:	10 of ..

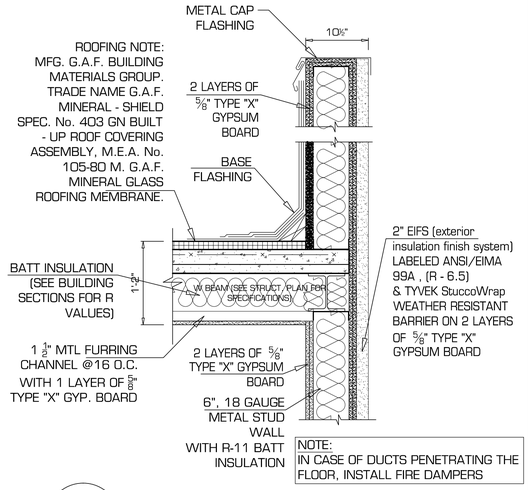


BRICK VENEER WITH FLASHING & WEEP HOLES JOINT TO CONCRETE MASONRY UNIT WALL

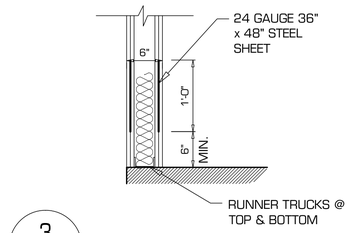
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS



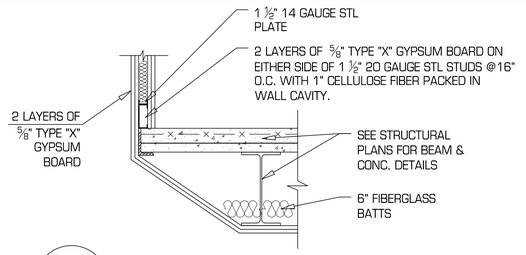
1 / A-006 — W BEAM-MASONRY WALL CONNECTION AT PARAPET LEVEL WITH FIRESTOPPING, FIREPROOFING & FLASHING-WEEP HOLES.
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS



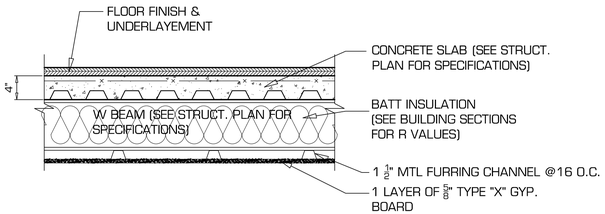
2 / A-006 — W BEAM-STUD WALL CONNECTION AT PARAPET LEVEL WITH FIRESTOPPING, FIREPROOFING & FLASHING-WEEP HOLES.
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS



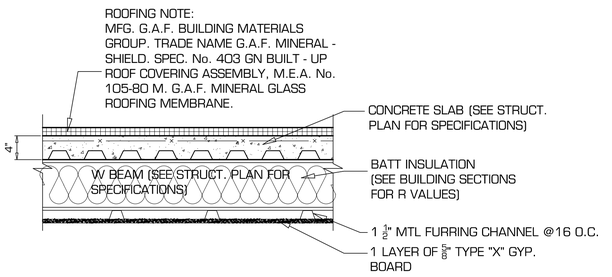
3 / A-006 — STAIRCASE MASONRY WALL EQUIVALENT
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS



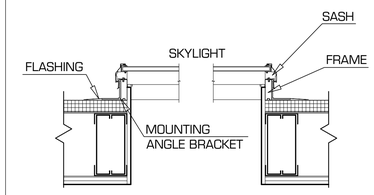
10 / A-006 — STAIRCASE MASONRY WALL EQUIVALENT
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS



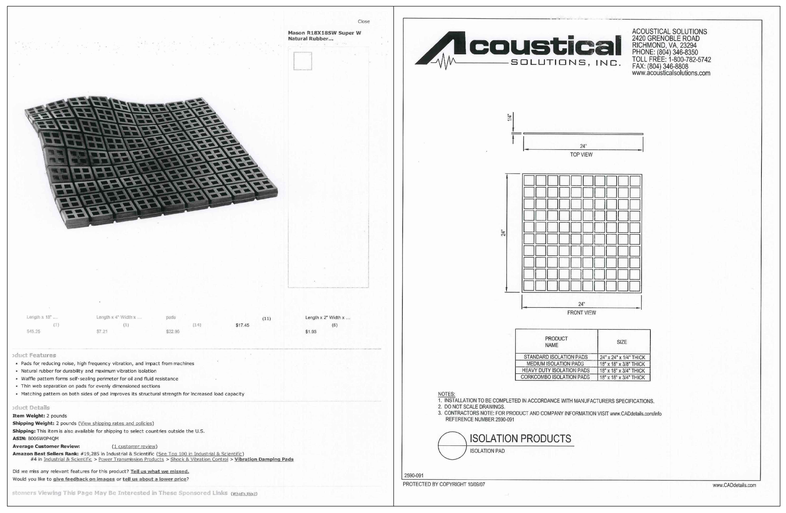
4 / A-006 — 2 HR FIRE SEPARATION FOR FLOOR & CEILING UL #D502
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS

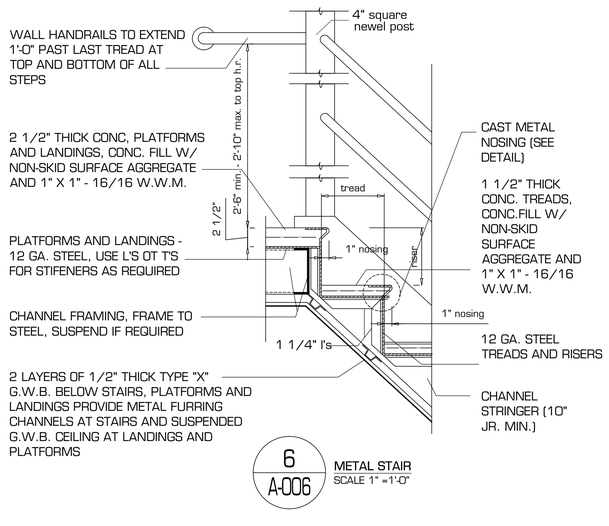


5 / A-006 — 2 HR FIRE SEPARATION FOR FLOOR & CEILING UL #D502
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS

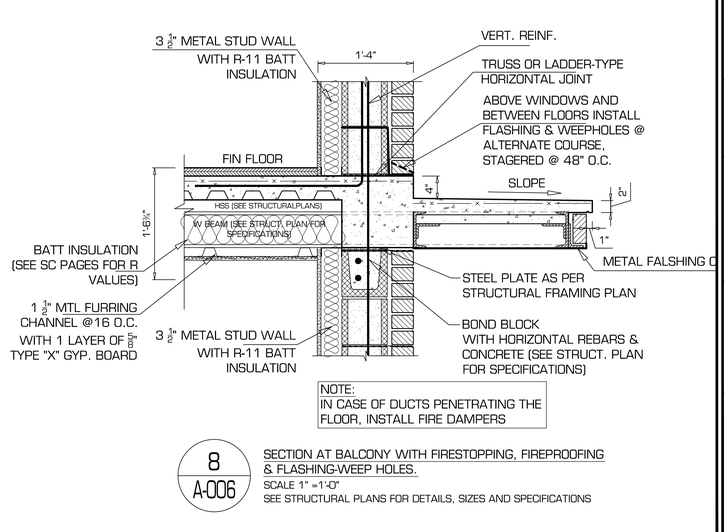


9 / A-006 — SKYLIGHT SECTION
SCALE 3/8" =1'-0"





6 / A-006 — METAL STAIR
SCALE 1" =1'-0"



8 / A-006 — SECTION AT BALCONY WITH FIRESTOPPING, FIREPROOFING & FLASHING-WEEP HOLES.
SCALE 1" =1'-0"
SEE STRUCTURAL PLANS FOR DETAILS, SIZES AND SPECIFICATIONS

GREEN LINE ARCHITECTURE

S & S ARCHITECTURAL DESIGN LLC
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REVISIONS

No	DATE	ISSUE
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DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

OWNER:
MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
BROOKLYN, NEW YORK 11249

DRAWING TITLE:
PROPOSED CELLAR FLOOR PLAN & LEGENDS

SEAL & SIGNATURE:

DATE:	08-30-13
DRAWING BY:	E.D.
CHK BY:	S.STILES
DWG No:	DT-001.00
Page:	11 of ..

GENERAL NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO FAMILIARIZE HIMSELF THOROUGHLY WITH ALL DRAWINGS, SPECIFICATIONS, FIELD CONDITIONS AND OTHER REQUIREMENTS OF THIS PROJECT AND SHALL REPORT ANY DISCREPANCIES TO THE ARCHITECT.

2. THE DRAWINGS REFLECT CONDITIONS REASONABLY INTERPRETED FROM THE EXISTING V1SIBLE CONDITIONS OR FROM DRAWINGS OR INFORMAT1ON FURNISHED BY THE OWNER BUT CANNOT BE GUARANTEED BY THE ARCHITECT.

3. ALL CONSTRUCTION SHALL COMPLY WITH STATE AND OTHER LOCAL BUILDING CODES AND REGULATIONS AND THE BEST TRADE PRACTICES.

4. THE CONTRACTOR SHALL PROVIDE SUCH LABOR, MATERIALS AND EQUIPMENT AS REQUIRED FOR THE TIMELY COMPLETION OF HIS WORK, AND TO COMPLETE THE PROJECT AS SHOWN.

5. MINOR DETAILS NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER CONSTRUCTION, INSTALLATION OR OPERATION OR ANY PART OF THE WORK AS DETERMINED BY THE ARCHITECT SHALL BE INCLUDED IN THE WORK AS IF IT WERE SPECIFIED OR INDICATED IN THE DRAWINGS.

6. ALL MATERIALS SHALL BE INSTALLED PROPERLY, FOR THE USE INTENDED, IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS AND TO THE HIGHEST STANDARDS OF THE TRADE.

7. THE CONTRACTOR SHALL FILE fOR ALL PERMITS CONTROLLED INSPECTIONS, INSPECTIONS AND SIGN-OFFS, PAY ALL RELATED FEES AND PRESENT COPIES OF APPROVALS FOR FINAL ACCEPTANCE BY THE OWNER INCLUDING FINAL CERTIFICATE OF OCCUPANCY.

8. THE DRAWINGS ARE NOT TO BE SCALED, ONLY DIMENSIONS ARE TO BE USED. ALL DIMENSIONAL DISCREPANCIES SHALL BE CALLED TO THE ARCHITECT'S ATTENTION. All DIMENSIONS SHALL BE VERIFIED BEFORE STARTING WORK BY THE RESPECTIVE SUBCONTRACTOR, WHO SHALL BE HELD RESPONSIBLE FOR HIS PHASE OF THE WORK. VERIFIED EXISTING FRAMING, REVIEW WITH ARCHITECT ALL EXPOSED CONDITIONS WHERE NEW CONSTRUCTION IS SUPPORTED BY EXISTING CONSTRUCTION.

9. ALL CONSTRUCTION, DIMENSIONS AND DETAILS SHALL CONCUR WITH AND BE DETERMINED FROM THESE DRAWINGS AND REVISED DRAWINGS OR SKETCHES ISSUED BY THE ARCHITECT ONLY.

10. DIMENSIONS ON PLAN SHOWN AS PLUS OR MINUS (+-) ARE TO BE CLARIFIED IN THE FIELD AND DISCREPANCIES OF GREATER THAN 2" ARE TO REPORTED TO THE ARCHITECT.

11. ALL MATERIALS, ASSEMBLIES, FORMS AND METHODS OF CONSTRUCTION AND SERVICE EQUIPMENT SHALL MEET WITH THE FOLLOWING REQUIREMENTS:
   A. SHALL BE ACCEPTABLE PRIOR TO THE EFFECTIVE DATE OR THE N.Y.C. BUILDING CODE OR.
   B. SHALL BE ACCEPTED FOR USE UNDER THE PRESCRIBED CODE TEST METHOD BY COMMISSIONER OR.
   C. HAVE BOARD OF STANDARDS AND APPEALS APPROVAL.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY SERVICES AND UTILITIES DURING THE CONSTRUCTION PERIOD, AND SHALL PAY ALL COST INVOLVED.

13. THE CONTRACTOR SHALL CARRY BUILDER'S RISK INSURANCE WITH BROAD FORM EXTENDED COVERAGE COVERING THE VALUE OF HIS COMPLETED WORK.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TEMPORARY PROTECTION, SECURITY AND SAFETY OF THE SITE DURING CONSTRUCTION.

15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE BREAKAGE, COLLAPSE, DISTORTION AND MISALIGNMENT ACCORDING TO APPLICABLE CODE STANDARDS AND GOOD PRACTICE.

16. THE CONTRACTOR SHALL PROVIDE A REFUSE CONTAINER AT THE SITE AND SHALL CLEAN UP HIS DEBRIS AT THE TIME OF COMPLETION OF EACH WORK DAY.

17. ALL CONSTRUCTION SHALL BE AS PER PLANS AND SPECIFICATIONS UNLESS OTHERWISE AGREED IN WRITING BY THE OWNER.

18. NO CHANGES ARE TO BE MADE WITHOUT THE CONSULTATION AND APPROVAL BY THE ARCHITECT.

19. ARCHITECT HAS NOT BEEN RETAINED TO SUPERVISE ANY CONSTRUCTION OR INSTALLATION OF ANY EQUIPMENT AT BUILDING SITE.

20. CONTRACTOR SHALL BE RESPONSIBLE TO THE OWNER FOR ALL ACTS AND OMISSIONS OF HIS EMPLOYEES, AND ALL SUB-CONTRACTORS, THEIR AGENTS AND EMPLOYEES AND ALL OTHER PERSONS PERFORMING ANY OF THE WORK TO BE DONE.

21. IT IS THE INTENTION OF THIS CONTRACT TO COMPLETELY FINISH AND READY FOR OCCUPANCY THIS BUILDING IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ALL REQUIREMENTS OF LAWS. . ALTHOUGH NECESSARY WORK MAY NOT BE ITEMIZED IN THE DRAWINGS THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND INCLUDE ALL WORK SPECIFIED OF IMPLIED FOR THE COMPLETE REPAIR OF THIS BUILDING.

CONSTRUCTION NOTES

1. PROVIDE FLASHING AT HEADS AND SILLS OF ALL WINDOWS AND EXTERIOR DOOR OPENINGS.

2. STEEL LINTELS OVER 4'-0" SUPPORTING MASONRY SHALL BE FIREPROOFED WITH WIRE LATH AND 1" VERMICULITE PLASTER OR CEMENT PLASTER.

3. PLUMBING FIXTURES: WATER CLOSET - VITREOUS CHINA WITH MAX. 1 3/5 GAL. FLUSH, WITH AN APPROVED VACUUM BREAKER. ALL FIXTURES TO MEET WATER SAVING PERFORMANCE STANDARDS. (L.L. 29-89) FIXTURES TO BE AS SELECTED BY THE OWNER AND/OR CONTRACTOR.

4. ELECTRICAL: ALL WIRING TO COMPLY WITH THE MINIMUM REQUIREMENTS OF THE NEW YORK CITY ELECTRICAL CODE. LOCATION OF ALL OUTLETS, SWITCHES, RECEPTACLES, CEILING LIGHTS, BELL SYSTEM, AS DIRECTED BY THE OWNER AND/OR CONTRACTOR.

5. HEATING SYSTEM TO BE CAPABLE OF MAINTAINING A MINIMUM TEMPERATURES PER CHAPTER 13 OF 2008 NYC B.CODE AND SHALL ALSO MEET THE REQUIREMENTS OF THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE, THE MORE STRINGENT SHALL APPLY.

6. MECHANICAL VENTILATION: BATHROOMS WHICH ARE TO BE MECHANICALLY VENTILATED SHALL BE PROVIDED WITH AT LEAST 50 C.F.M. EXHAUST. VENT SHAFT TO GO 3'-0" ABOVE ROOF.

7. STAIRS TO HAVE A MAXIMUM RISER HEIGHT OF 7.5", TREAD TO BE A MINIMUM OF 9 1/5" PLUS NOSING. THE SUM OF TWO RISERS PLUS TREAD (EXCLUSIVE OF NOSING) SHALL BE NOT LESS THAN 24" NOR MORE THAN 25-1/2". INTERIOR STAIRS SHALL COMPLY WITH CHAPTER 10 OF 2008 NYC B. CODE.

8. A FINAL SURVEY WILL BE FILED TO COMPLY WITH 2008 NYC B. CODE

9. LOT GRADING TO BE REGULATED AS FOLLOWS: WHEN PITCH OF LOT DOES NOT EXCEED 5% ALL UNPAVED AREAS TO BE SEEDED. WHEN PITCH OF LOT EXCEEDS 5%, ALL UNPAVED AREAS TO BE SODDED. THIS GRADING WILL BE DESIGNED SO AS NOT TO RESULT IN PONDING OR UNSTABLE GRADES IN THE SURROUNDING AREA.

10. INTERIOR FINISHES SHALL CONFORM TO CHAPTER 8 OF 2008 NYC BUILDING CODE.

11. SMOKE DETECTORS TO BE PROVIDED WHERE INDICATED ON PLANS.

HOUSING MAINTENANCE CODE & MULTIPLE DWELLING NOTES

A. PAINTING - (SEC. 29 M.D.L. AND ART. 12 H.M.C)
   1. PAINTING OF PUBLIC PARTS AND WITHIN DWELLINGS SHALL COMPLY WITH SEC. D26-12.01 H.M.C.
   2. PAINTING OF WINDOW FRAMES SHALL COMPLY WITH SEC. D26-12.03 H.M.C.
   3. WALLS OF COURTS AND SHAFTS SHALL BE OF A LIGHT COLORED SURFACE.

B. EXTERMINATION AND RAT PROOFING - (SEC 80 M.D.L. AND ART. 13 H.M.C.)
   1. DWELLINGS SHALL BE SO CONSTRUCTED AS TO BE RAT-PROOF.
   2. PREMISES SHALL BE MAINTAINED AND KEPT FREE OF RODENT AND INSECT INFESTATION.

C. RECEPTACLES FOR AND COLLECTION OF WASTE MATTER - (SEC. 81 M.D.L. AND ART 14 H.M.C.)
   1. PROPER AND SUITABLE CONVENIENCES OR RECEPTACLES SHALL BE PROVIDED FOR COLLECTION OF WASTE MATTER.

D. PLUMBING AND DRAINAGE - (SEC. 77 M.D.L. AND ART 16 H.M.C.)
   1. ENTIRE PLUMBING AND DRAINAGE SYSTEM INCLUDING ALL PLUMBING FIXTURES SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD REPAIR AT ALL TIMES.
   2. ALL ROOFS, TERRACES, SHAFTS, COURTS, AREAS AND YARDS SHALL BY PROPERLY GRADED AND DRAINED (SEE SITE PLAN)

E. HEAT AND HOT WATER - (SEC. 79 M.D.L. AND ART. 17 H.M.C.)
   1. YEARLY INSPECTIONS OF CENTRAL HEATING PLANTS SHALL BE MADE BY A QUALIFIED PERSON.
   2. MINIMUM TEMPERATURES FOR HEATING AND HOT WATER SHALL BE MAINTAINED.

F. GAS METERS AND GAS APPLIANCES - (SEC. 64 M.D.L. AND ART. 18 H.M.C.)
   1. GAS METERS SHALL COMPLY WITH SEC. 64 M.D.L.
   2. GAS APPLIANCES SHALL, IN ADDITION TO THESE SECTIONS, COMPLY WITH THE BOARD OF STANDARDS AND APPEALS.
   3. YEARLY INSPECTION OF GAS APPLIANCES BY QUALIFIED PERSON SHALL BE MADE IN "OLD LAW TENEMENTS" OR "ROOMING UNITS".

G. ARTIFICIAL LIGHTING AND ENTRANCE DOORS - (SEC. 26 & 35 M.D.L. AND ART.19 H.M.C.)
   1. PROPER ELECTRIC LIGHTING AND EQUIPMENT SHALL BE PROVIDED AND MAINTAINED WITHIN ALL DWELLINGS.
   2. PROPER ELECTRIC LIGHTS SHALL BE INSTALLED AND MAINTAINED AT OR NEAR THE OUTSIDE OF FRONT ENTRANCE WAY AND MIN. OR 50 WATTS INCANDESCENT ILLUMINATION OR EQUIVALENT
      AND MIN. OR 40 WATTS IN YARDS AND COURTS AND SHALL BE KEPT BURNING FROM SUNSET EACH
      DAY TO SUNRISE ON THE DAY FOLLOWING.
   3. MAIN ENTRANCE AND VESTIBULE DOORS SHALL HAVE NOT LESS THAN FIVE (5)SQ.FT. OF GLAZED SURFACE.

H. ENTRANCE DOORS - (SEC. 50-A.M.D.L. AND ART. 20 H.M.C.)
   1. BLDG. ENTRANCES AND ALL OTHER EXTERIOR ENTRANCES SHALL BE EQUIPPED WITH APPROVED TYPE AUTOMATIC SELF-CLOSING AND SELF-LOCKING DOORS.
   2. ENTRANCE DOORS TO EACH DWELLING UNIT SHALL HAVE KEY LOCK WITH AT LEAST ONE KEY TO BE PROVIDED BY OWNER, HEAVY DUTY LATCH SET WITH DEAD BOLT, THUMB TURN INSIDE AND DOOR CHAIN GUARD, STC 35.

J. PEEP HOLES - (SEC. 51-A.M.D.L. AND ART. 20 H.M.C.)
   1. PEEPHOLES SHALL BE PROVIDED IN ENTRANCE DOORS OR EACH DWELLING UNIT, LOCATED AS PRESCRIBED BY THE DEPARTMENT.

K. BELLS AND MAIL SERVICE - (SEC. 57 M.D.L. AND ART. 21 H.M.C.)
   1. BELL OR BUZZER SYSTEM SHALL BE APPROVED TYPE AND SHALL BE KEPT IN ORDER.
   2. PROVIDE AND MAINTAIN APPROVED TYPE MAIL RECEPTACLES AND DIRECTORIES OF PERSONS LIVING
      IN THE DWELLING AS PROVIDED BY FEDERAL LAW AND AS PER REGULATIONS OF THE POST OFFICE DEPARTMENT.

L. LIGHTING AND VENTILATION - (SEC. 30 M.D.L. AND ART. 30 H.M.C.)
   1. WINDOWS IN ALL ROOMS, EXCEPT BATHROOM AND KITCHENETTES, SHALL BE AT LEAST ONE-TENTH THE AREA OF THE ROOM AND BE AT LEAST 12 SQ.FT. IN AREA

M. WATER CLOSET AND BATH ACCOMMODATIONS - (SEC. 76 M.D.L. AND ART.31 H.M.C.)
   1. FLOORS SHALL BE CERAMIC TILE WITH 6" BASE.
   2. WALLS AND FLOORS IN WATER CLOSET COMPARTMENT, BATHROOMS AND LAVATORIES SHALL COMPLY WITH REQUIREMENTS OF THESE SECTIONS.
   3. EVERY WATER CLOSET COMPARTMENT, BATHROOM AND LAVATORY SHALL HAVE A WINDOW OF AT LEAST 3 SQ.FT. IN AREA AND ONE HALF THE AREA SHALL OPEN.
   4. IN LIEU OF A WINDOW, MECHANICAL VENTILATION MAY BE INSTALLED WHICH WILL PROVIDE AT LEAST FOUR CHANGES OF AIR PER HR. OR A MIN. OF 50 CFM OF EXHAUST FOR EACH SUCH WATER CLOSET COMPARTMENT, BATHROOM OR LAVATORY AND SHALL BE PROVIDED WITH APPROVED TYPE REGISTER WITH FUSIBLE LINK DAMPER B.S.& A. CAL. # 678.41-SM.

O. KITCHENS AND KITCHENETTES - (SEC. 33 M.D.L. AND ART. 32 H.M.C.)
   1. EVERY KITCHEN AND KITCHENETTE SHALL BE PROVIDED WITH FACILITIES FOR COOKING AND SHALL BE EQUIPPED FOR ARTIFICIAL LIGHTING.
   2. EVERY KITCHEN AND KITCHENETTE SHALL BE PROVIDED WITH A SINK HAVING A MIN. 2" WASTE AND TRAP.
   3. LIGHTING AND VENTILATION OF KITCHENS SHALL BE AS PROVIDED UNDER SEC.30 M.D.L. AND ART. 30 H.M.C.
   4. CEILING AND WALLS, EXCLUSIVE OF DOORS, OF ALL KITCHENETTES SHALL BE FIRE RETARDED WITH MATERIALS HAVING A ONE HR. FIRE RATING OR IN LIEU THEREOF SHALL BE EQUIPPED WITH A SPRINKLER.
   5. KITCHENETTES SHALL BE PROVIDED WITH A WINDOW AT LEAST ONE FT. WIDE 3 SQ. FT.. IN AREA AND BE AT LEAST 10% OF THE FL. AREA IN LIEU OF WINDOW MECHANICAL VENTILATION MAY BE INSTALLED WHICH WILL PROVIDE. AT LEAST 6 CHANGES OF AIR PER HOUR.
   6. ALL COMBUSTIBLE MATERIALS IMMEDIATELY UNDERNEATH AND WITHIN ONE FOOT OF COOKING APPARATUS SHALL BE PROPERLY FIRE RETARDED. A MINIMUM OF TWO FEET CLEARANCE SHALL BE
      MAINTAINED ABOVE EXPOSED COOKING SURFACES. COMBUSTIBLE MATERIALS BETWEEN 2 AND 3 FEET ABOVE EXPOSED COOKING SURFACE SHALL BE FIRE RETARDED.

P. BOILER ROOMS - (SEC. 65 M.D.L.)
   1. BOILER ROOMS SHALL COMPLY WITH REQUIREMENTS OF THIS SECTION.

R. SECURITY REQUIREMENTS (BC04.4)
   1. BLDG. ENTRANCE DOORS AND OTHER EXTERIOR DOORS SHALL BE PROVIDED WITH HEAVY DUTY LOCK SETS WITH AUXILIARY LATCH BOLTS TO PREVENT THE LATCH FROM BEING MANIPULATED BY OTHER THAN A KEY.
   2. DOORS TO DWELLING UNITS SHALL BE EQUIPPED WITH A HEAVY DUTY LOCKSET; A DEAD BOLT WITH INTERIOR THUMB TURN AND A CHAIN DOOR GUARD.
   3. ALL OPENABLE WINDOWS SHALL BE EQUIPPED WITH SASH LOCKS DESIGNED TO BE OPENABLE FROM THE INSIDE ONLY.
   4. BLDGS. CLASSIFIED IN OCCUPANCY GROUP J-2 CONTAINING 8 OR MORE DWELLING UNITS SHALL BE PROVIDED WITH AN INTERCOMMUNICATION SYSTEM LOCATED AT THE DOOR GIVING ACCESS TO THE MAIN ENTRANCE HALL OR LOBBY.

S. MISCELLANEOUS NOTES:
   1. RADIATORS SHALL NOT OBSTRUCT STAIRS OR PUBLIC HALLS.
   2. ALL F.P.S.C. DOORS AND TRIM SHALL HAVE FIRE RATING AS SPECIFIED ON PLAN OR DOOR SCHEDULE.
   3. CARPENTER SHALL PROVIDE RECESS FOR MEDICINE CABINETS IN BATHROOMS AND LAVATORIES.
   4. ALL BATHTUBS, RECESSED OR OTHERWISE, SHALL BE PROVIDED WITH SUFFICIENT SHOWER CURTAIN RODS.
   5. PROVIDE AND SET WOOD SHELVES AND A 1-1/2" DIAMETER HORIZONTAL WOOD OR METAL POLE IN EACH CLOSET. LINEN CLOSETS SHALL HAVE FIVE SHELVES.

EARTHQUAKE LOADS

1614.1 SCOPE. EVERY STRUCTURE, AND PORTION THEREOF, SHALL AT A MINIMUM, BE DESIGNED AND CONSTRUCTED TO RESIST THE EFFECTS OF EARTHQUAKE MOTIONS AND ASSIGNED A SEISMIC DESIGN CATEGORY AS SET FORTH IN SECTION 1616.3.

EXCEPTIONS:

1. STRUCTURES DESIGNED IN ACCORDANCE WITH THE PROVISIONS OF SECTIONS 9.1 THROUGH 9.6, 9.13 AND 9.14 OF ASCE 7 SHALL BE PERMITTED.
2. ONE- AND TWO-FAMILY DWELLINGS NOT MORE THAN THREE STORIES IN HEIGHT ARE EXEMPT FROM THE REQUIREMENTS OF SECTIONS 1613 THROUGH 1622.
3. THE SEISMIC-FORCE-RESISTING SYSTEM OF WOOD FRAME BUILDINGS THAT CONFORM TO THE PROVISIONS OF SECTION 2308 ARE NOT REQUIRED TO BE ANALYZED AS SPECIFIED IN SECTION 1616.1.
4. AGRICULTURAL STORAGE STRUCTURES INTENDED ONLY FOR INCIDENTAL HUMAN OCCUPANCY ARE EXEMPT FROM THE REQUIREMENTS OF SECTIONS 1613 THROUGH 1623.

1614.4 QUALITY ASSURANCE. A QUALITY ASSURANCE PLAN SHALL BE PROVIDED WHERE REQUIRED BY CHAPTER 17.

1614.5 SEISMIC AND WIND. WHEN THE CODE-PRESCRIBED WIND DESIGN PRODUCES GREATER EFFECTS, THE WIND DESIGN SHALL GOVERN, BUT DETAILING REQUIREMENTS AND LIMITATIONS PRESCRIBED IN THIS AND REFERENCED SECTIONS SHALL BE FOLLOWED.

1" BUILDING SEPARATION IS REQUIRED FOR EACH 50'-0" OF BUILDING HEIGHT AS PER TPPN 2/96

ENERGY CONSERVATION NOTES:

BUILDING TO COMPLY WITH 2007 NEW YORK ENERGY CONSERVATION CONSTRUCTION CODE, ARCHITECTURAL PLANS & COMPLIANCE-REPORT CERTIFICATE FROM COMcheck software Version 3.5.1 or 3.7.0.
ALL DISCREPANCIES SHALL BE REPORTED IN WRITING TO THE ARCHITECT IN CHARGE.

BUILDING ENVELOPE REQUIREMENTS:

1. ALL JOINTS AND PENETRATIONS IN THE BUILDING ENVELOPE THAT ARE POTENTIAL SOURCES OF AIR LEAKAGE MUST BE CAULKED, GASKETED, OR COVERED WITH A MOISTURE VAPOR-PERMEABLE WRAPPING MATERIAL.

2. RECESSED LIGHTING FIXTURES MUST BE GASKETED AND IC RATED; I.E., RATED FOR DIRECT CONTACT WITH INSULATION.

3. THE FOLLOWING AREAS MUST BE SEALED:
   - EXTERIOR JOINTS AROUND WINDOW AND DOOR FRAMES
   - BETWEEN WALL SOLE PLATES, FLOORS, AND EXTERIOR-WALL PANELS
   - OPENINGS FOR PLUMBING, ELECTRICITY, AND REFRIGERANT AND GAS LINES IN EXTERIOR WALLS, FLOORS, AND ROOFS
   - OPENINGS IN ATTIC FLOORS (SUCH AS WHERE CEILING PANELS MEET INTERIOR AND EXTERIOR WALLS AND MASONRY FIREPLACES)
   - SERVICE AND ACCESS DOORS OR HATCHES
   - ALL OTHER SIMILAR OPENINGS IN THE BUILDING ENVELOPE.

4. FALLOW ARCHITECTURAL PLANS FOR INSULATION R-VALUES AND GLAZING SHGC & U-FACTORS.

5. EXCEPT AS NOTED BELOW, VAPOR RETARDERS MUST BE INSTALLED IN ALL NONVENTED FRAMED AREAS IN CEILINGS, WALLS, AND FLOORS. THE VAPOR RETARDER MUST HAVE A PERM RATING OF 1.0 OR LESS AND MUST BE INSTALLED ON THE WARM-IN-WINTER SIDE OF THE INSULATION (BETWEEN THE INSULATION AND CONDITIONED SPACE).

   EXCEPTION : VAPOR RETARDERS ARE NOT REQUIRED WHERE MOISTURE OR ITS FREEZING WILL NOT DAMAGE MATERIALS.

6. FIELD CERTIFICATION OF INSTALLED COMPONENTS IS REQUIRED AND CAN BE PROVIDED THROUGH PRODUCT LABELS PRINTED ON DIFFERENT MATERIALS.

BUILDING MECHANICAL REQUIREMENTS:

1. ALL EQUIPMENT AND SYSTEMS MUST BE SIZED TO BE NO GREATER THAN PROPOSED ON MECHANICAL PLANS.

2. EACH HEATING OR COOLING SYSTEM SERVING A SINGLE ZONE MUST HAVE ITS OWN TEMPERATURE CONTROL DEVICE.

3. THERMOSTATS CONTROLLING BOTH HEATING AND COOLING MUST BE CAPABLE OF HAVING A 5 DEG. F DEADBAND. OR RANGE OF TEMPERATURE WHERE NO HEATING OR COOLING IS AVAILABLE.

4. THE SYSTEM MUST SUPPLY OUTSIDE VENTILATION AIR AS REQUIRED BY CHAPTER 4 OF THE INTERNATIONAL MECHANICAL CODE. IF THE VENTILATION SYSTEM IS DESIGNED TO SUPPLY OUTDOOR AIR QUANTITIES EXCEEDING MINIMUM REQUIRED LEVELS, THE SYSTEM MUST BE CAPABLE OF REDUCING OUTDOOR-AIR FLOW THE THE MINIMUM REQUIRED LEVELS. SEE MECHANICAL PLANS.

5. OUTDOOR-AIR SUPPLY SYSTEMS WITH DESIGN AIR FLOW RATES GREATER THAN 3000 CU FT PER MINUTE OF OUTDOOR AIR AND ALL EXHAUST SYSTEMS MUST HAVE DAMPERS THAT AUTOMATICALLY CLOSE WHILE THE EQUIPMENT IS NOT OPERATING.

6. SUPPLY AND RETURN AIR DUCTS FOR CONDITIONED AIR, LOCATED IN UNCONDITIONED SPACE MUST BE INSULATED WITH A MINIMUM OF R-5.

7. SUPPLY AND RETURN AIR DUCTS AND PLENUMS MUST BE INSULATED TO A MIN. OF R-8 WHEN LOCATED OUTSIDE THE BUILDING ENVELOPE.

8. ALL JOINTS, LONGITUDINAL AND TRANSVERSE SEAMS AND CONNECTIONS IN DUCTWORK MUST BE SECURELY SEALED USING WELDMENTS, MECHANICAL FASTENERS WITH SEALS OR GASKETS OR MASTICS, MESH AND MASTIC SEALING SYSTEMS OR TAPES. TAPES AND MASTICS MUST BE LISTED AND LABELED IN ACCORDANCE WITH UL 181A OR UL 181B.

9. DUCTS MUST BE CONNECTED TO FANS AND OTHER AIR DISTRIBUTION EQUIPMENT, INCLUDING MULTI-ZONE TERMINAL UNITS, USING MECHANICAL FASTENERS WITH SEALS, MASTICS OR GASKETS.

10. EACH SUPPLY AIR OUTLET OR DIFFUSER AND EACH ZONE TERMINAL DEVICE (SUCH AS VAV OR MIXING BOXES) MUST HAVE ITS OWN BALANCING DEVICE. ACCEPTABLE BALANCING DEVICES INCLUDE ADJUSTABLE DAMPERS LOCATED WITHIN THE DUCTWORK, TERMINAL DEVICES OR SUPPLY AIR DIFFUSER.

11. ALL PIPES SERVING SPACE CONDITIONING SYSTEMS MUST BE INSULATED TO THE FOLLOWING LEVELS:

FLUID	PIPE DIAMETER	
	<= 1.5"	> 1.5"
HOT WATER	1.0"	2.0"
STEAM	1.5"	3.0"
CHILED WATER, BRINE, REFRIGERANT	1.0"	1.5"

12. UPON PURCHASE OF MECHANICAL EQUIPMENT, THE OWNER SHALL BE PROVIDED WITH OPERATION AND MAINTENANCE DOCUMENTATION THAT PROVIDES THE FOLLOWING INFORMATION:

   - EQUIPMENT INPUT AND OUTPUT CAPACITY AND REQUIRED MAINTENANCE ACTIONS.
   - EQUIPMENT OPERATION AN MAINTENANCE MANUALS.
   - HVAC SYSTEM CONTROL MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS, AND CONTROL SEQUENCE DESCRIPTIONS. DESIRED OR FIELD DETERMINED SET POINTS MUST BE PERMANENTLY RECORDED ON CONTROL DRAWINGS,
   AT CONTROL DEVICES, OR, FOR DIGITAL CONTROL SYSTEMS, IN PROGRAMMING COMMENTS.
   - A NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE.

GREEN LINE ARCHITECTURE

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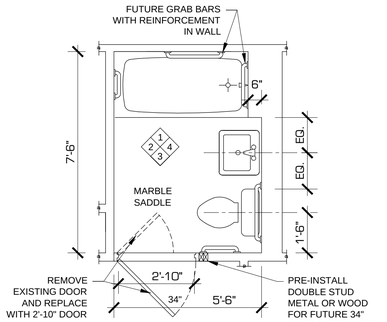
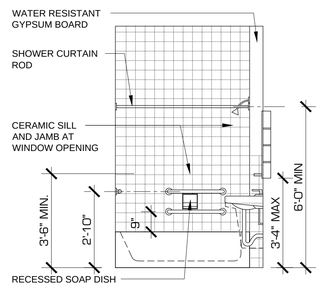
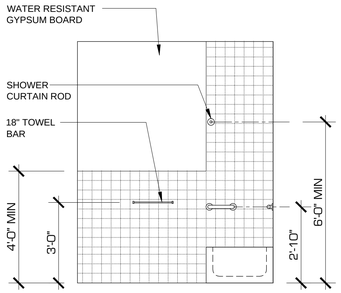
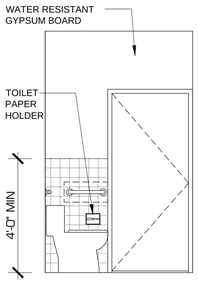
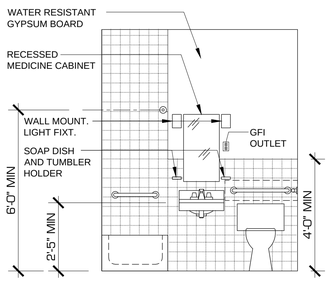


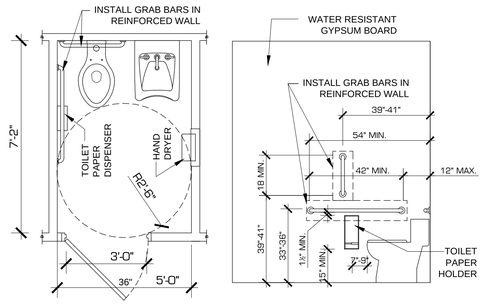




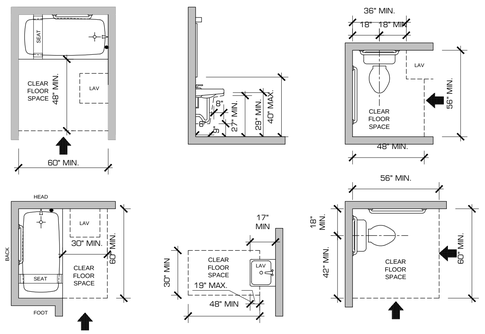




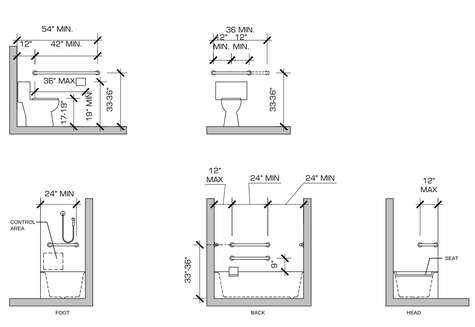
1 TYPE "B" BATHROOM PLANS (ADAPTABLE FOR FUTURE ACCESS)
Scale: 3/8"=1'-0"



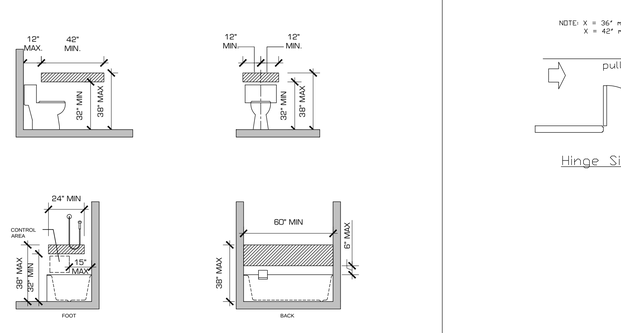
2 COMMERCIAL HC ACCESSIBLE BATHROOM
Scale: 3/8"=1'-0"



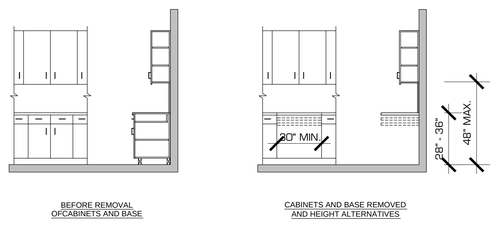
3 BATHROOM CLEAR FLOOR SPACE
NOT TO SCALE

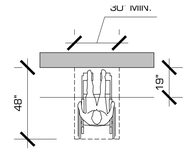


4 GRAB BAR CLEARANCE (ADAPTABLE FOR FUTURE ACCESS)
NOT TO SCALE



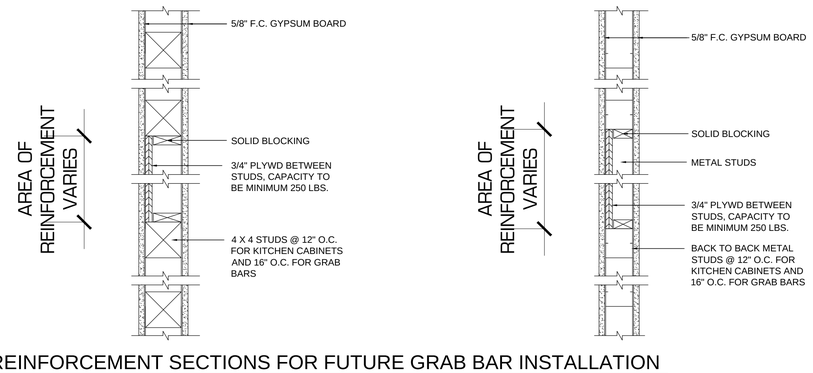
5 REINFORCEMENT ELEVATIONS FOR FUTURE GRAB BAR INSTALLATION
NOT TO SCALE



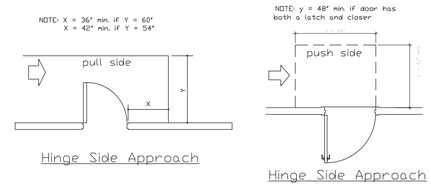


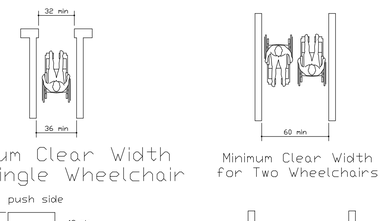
NOTE: THE HATCHED AREAS ARE REINFORCED TO RECEIVE GRAB BARS

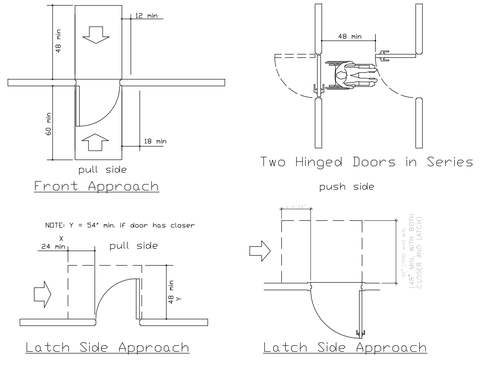
6 KITCHEN ADAPTABLE CABINETS (ADAPTABLE FOR FUTURE ACCESS)
NOT TO SCALE



7 REINFORCEMENT SECTIONS FOR FUTURE GRAB BAR INSTALLATION
Scale: 1-1/2"=1'-0"







DOOR CLEARANCES IN HC ADAPTABLE AND/OR ACCESSIBLE UNIT

FACILITIES FOR PEOPLE HAVING PHYSICAL DISABILITIES SHAL COMPLY WITH APPENFIX "P" OF THE 2008 NYC BUILDING CODE AND A117.1-2003 MODIFIED BY LL58/87

ADAPTABLE DWELLING UNITS: RESIDENTIAL UNITS CONSTRUCTED ON AN ACCESSIBLE ROUTE AND EQUIPPED TO ALLOW CONVERSION, WITH A MINIMUM OF CHANGE, FOR USE BY PEOPLE WITH PHYSICAL DISABILITIES.

A. ADAPTABLE BATHROOMS, KITCHENS AND KITCHENETTES, ADAPTABLE BATHROOMS, KITCHENS AND KITCHENETTES WITHIN ADAPTABLE DWELLING UNITS SHALL BE CONSTRUCTED AND EQUIPPED IN ACCORDANCE WITH REQUIREMENTS SET FORTH IN APPENDIX "P" FOR TYPE "B" APARTMENTS OF THE 2008 NYC BUILDING CODE WITH RESPECT TO THE FOLLOWING:
- ACCESS DOORWAY OR OPENING
- CLEAR FLOOR SPACE
- FLOOR SURFACE
- BATHROOMS, KITCHEN AND KITCHENETTE FACILITIES AND CONTROLS CAPABLE OF BEING MADE USABLE.
- SPACE AND UTILITIES FOR USABLE RANGE, (OR COOK TOP OF OVEN) REFRIGERATOR/FREEZER, (DISHWASHER IF

B. SUCH ITEMS SHALL INCLUDE WATER CLOSET AND TOILET PAPER DISPENSER, LAVATORY AND REMOVABLE BASE CABINET, MIRRORS, MEDICINE CABINET, BATHTUB AND CONTROLS, BATHTUB AND SHOWER ENCLOSURE, REINFORCED AREAS FOR GRAB BARS, CLEARANCE BETWEEN OPPOSING BASE CABINETS, COUNTER TOPS, APPLIANCES AND WALLS, ADJUSTABLE OR REPLACEABLE SINK AND REMOVABLE BASE CABINET, AS WELL AS STORAGE CABINETS, DRAWERS AND SHELVES.

C. WASHING MACHINES AND CLOTHES DRYERS WITHIN ADAPTABLE DWELLING UNITS, WHERE WASHING MACHINES AND CLOTHES DRYERS ARE LOCATED WITHIN ADAPTABLE DWELLING UNITS, SHALL COMPLY WITH OR BE CAPABLE OF BEING CONVERTED TO THE REQUIREMENTS SET FORTH IN APPENDIX "P" OF THE 2008 NYC BUILDING CODE.

D. WINDOWS WITHIN TYPE B DWELLING UNITS SHALL HAVE OPERABLE PARTS COPLYING WITH SETION 309 OF ICC A117.1.

GREEN LINE ARCHITECTURE

S & S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD, WASHINGTON, NY 07882
TEL: 908.268.6283 FAX: 800.782.6981

REVISIONS

No	DATE	ISSUE
1		
2		
3		

DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

OWNER:
MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
BROOKLYN, NEW YORK 11249

DRAWING TITLE:
HANDICAP ADAPTABILITY PROVISIONS

SEAL & SIGNATURE:

DATE:	08-30-13
DRAWING BY:	E.D.
CHK BY:	S.STILES
DWG No:	N-002.00
Page:	13 of ..

COM*check* Software Version 3.9.2

Envelope Compliance Certificate

2009 IECC

Section 1: Project Information

Project Type: **Addition**
Project Title : NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

Construction Site:
235 KENT AVENUE
BROOKLYN, NY 11249

Owner/Agent:
MENDEL GOLD

Designer/Contractor:
SHAWN STILES
S&S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD
WASHINGTON, NY 07882
908-268-6283
SSTILES_12000@YAHOO.COM

Section 2: General Information

Building Location (for weather data):	**New York, New York**
Climate Zone:	**4a**
Building Space Conditioning Type(s):	**Nonresidential, Residential**
Vertical Glazing / Wall Area Pct.:	**6%**
Skylight Glazing / Roof Area Pct.:	**1%**

Activity Type(s)	Floor Area
GROSS (Multifamily)	5060
GROSS (Retail)	1196

Section 3: Requirements Checklist

Envelope PASSES: Design 5% better than code.

Climate-Specific Requirements:

Component Name/Description	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor(a)
Roof 1: Attic Roof with Steel Joists, Nonresidential	476	38.0	0.0	0.035	0.027
Skylight 1: Metal Frame:Double Pane with Low-E, Clear, SHGC 0.34, Nonresidential	24	---	---	0.280	0.600
Roof 2: Attic Roof with Steel Joists, Residential	47	38.0	0.0	0.035	0.027
Roof 3: Attic Roof with Steel Joists, Residential	100	38.0	0.0	0.035	0.027
Roof 4: Attic Roof with Steel Joists, Residential	775	38.0	0.0	0.035	0.027
Roof 5: Attic Roof with Steel Joists, Residential	270	38.0	0.0	0.035	0.027
Exterior Wall 1: Concrete Block:12", Partially Grouted, Cells Empty,Normal Density , Furring: Metal, Nonresidential	1522	0.0	11.0	0.070	0.104
Windows 1: Metal Frame:Double Pane with Low-E, Clear, SHGC 0.34, Nonresidential	166	---	---	0.280	0.550
Exterior Wall 2: Concrete Block:8", Solid Grouted,Normal Density , Furring: Metal, Nonresidential	1109	0.0	11.0	0.072	0.104
Exterior Wall 3: Steel-Framed, 16" o.c., Nonresidential	398	11.0	8.0	0.064	0.064
Windows 3: Metal Frame:Double Pane with Low-E, Clear, SHGC 0.34, Nonresidential	38	---	---	0.280	0.550
Door 2: Insulated Metal, Swinging, Nonresidential	21	---	---	0.180	0.700
Exterior Wall 5: Concrete Block:10", Partially Grouted, Cells Empty,Normal Density , Furring: Metal, Residential	2830	0.0	11.0	0.070	0.090
Window 5: Wood Frame:Double Pane with Low-E, Clear, SHGC 0.34, Residential	162	---	---	0.280	0.400
Exterior Wall 6: Concrete Block:8", Partially Grouted, Cells Empty,Normal Density , Furring: Metal, Residential	1629	0.0	11.0	0.071	0.090
Exterior Wall 7: Steel-Framed, 16" o.c., Residential	1812	11.0	8.0	0.064	0.064
Window 4: Wood Frame:Double Pane with Low-E, Clear, SHGC 0.34, Residential	227	---	---	0.280	0.400

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.

Air Leakage, Component Certification, and Vapor Retarder Requirements:

1. ☑ All joints and penetrations are caulked, gasketed or covered with a moisture vapor-permeable wrapping material installed in accordance with the manufacturer's installation instructions.
2. ☑ Windows, doors, and skylights certified as meeting leakage requirements.
3. ☑ Component R-values & U-factors labeled as certified.
4. ☑ No roof insulation is installed on a suspended ceiling with removable ceiling panels.
5. ☐ 'Other' components have supporting documentation for proposed U-Factors.
6. ☑ Insulation installed according to manufacturer's instructions, in substantial contact with the surface being insulated, and in a manner that achieves the rated R-value without compressing the insulation.
7. ☑ Stair, elevator shaft vents, and other outdoor air intake and exhaust openings in the building envelope are equipped with motorized dampers.
8. ☐ Cargo doors and loading dock doors are weather sealed.
9. ☑ Recessed lighting fixtures installed in the building envelope are Type IC rated as meeting ASTM E283, are sealed with gasket or caulk.
10. ☑ Building entrance doors have a vestibule equipped with self-closing devices.
    Exceptions:
    - ☐ Building entrances with revolving doors.
    - ☐ Doors not intended to be used as a building entrance.
    - ☐ Doors that open directly from a space less than 3000 sq. ft. in area.
    - ☐ Doors used primarily to facilitate vehicular movement or materials handling and adjacent personnel doors.
    - ☑ Doors opening directly from a sleeping/dwelling unit.

Section 4: Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed envelope system has been designed to meet the 2009 IECC requirements in COM*check* Version 3.9.2 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title | Signature | Date

COM*check* Software Version 3.9.2

Interior Lighting Compliance Certificate

2009 IECC

Section 1: Project Information

Project Type: **Addition**
Project Title : NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

Construction Site:
235 KENT AVENUE
BROOKLYN, NY 11249

Owner/Agent:
MENDEL GOLD

Designer/Contractor:
SHAWN STILES
S&S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD
WASHINGTON, NY 07882
908-268-6283
SSTILES_12000@YAHOO.COM

Section 2: Interior Lighting and Power Calculation

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts (B x C)
GROSS (Multifamily)	5060	0.7	3542
GROSS (Retail)	1196	1.5	1794
		Total Allowed Watts =	5336

Section 3: Interior Lighting Fixture Schedule

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
GROSS (Multifamily 5060 sq.ft.)				
Compact Fluorescent 1: Twin Tube 40W: Magnetic:	2	20	80	1600
Incandescent 1: Incandescent 40W:	1	20	40	800
GROSS (Retail 1196 sq.ft.)				
Linear Fluorescent 1: 24" T12U 40W: Magnetic:	2	15	80	1200
Incandescent 2: Incandescent 40W:	1	12	40	480
			Total Proposed Watts =	4080

Section 4: Requirements Checklist

Interior Lighting PASSES: Design 24% better than code.

Lighting Wattage:

1. ☑ Total proposed watts must be less than or equal to total allowed watts.

Allowed Watts	Proposed Watts	Complies
5336	4080	YES

Controls, Switching, and Wiring:

2. ☑ Daylight zones under skylights more than 15 feet from the perimeter have lighting controls separate from daylight zones adjacent to vertical fenestration.
3. ☑ Daylight zones have individual lighting controls independent from that of the general area lighting.

Exceptions:
- ☑ Contiguous daylight zones spanning no more than two orientations are allowed to be controlled by a single controlling device.
- ☑ Daylight spaces enclosed by walls or ceiling height partitions and containing two or fewer light fixtures are not required to have a separate switch for general area lighting.

4. ☑ Independent controls for each space (switch/occupancy sensor).
   Exceptions:
   - ☑ Areas designated as security or emergency areas that must be continuously illuminated.
   - ☑ Lighting in stairways or corridors that are elements of the means of egress.
5. ☐ Master switch at entry to hotel/motel guest room.
6. ☑ Individual dwelling units separately metered.
7. ☐ Medical task lighting or art/history display lighting claimed to be exempt from compliance has a control device independent of the control of the nonexempt lighting.
8. ☑ Each space required to have a manual control also allows for reducing the connected lighting load by at least 50 percent by either controlling all luminaires, dual switching of alternate rows of luminaires, alternate luminaires, or alternate lamps, switching the middle lamp luminaires independently of other lamps, or switching each luminaire or each lamp.
   Exceptions:
   - ☑ Only one luminaire in space.
   - ☑ An occupant-sensing device controls the area.
   - ☑ The area is a corridor, storeroom, restroom, public lobby or sleeping unit.
   - ☑ Areas that use less than 0.6 Watts/sq.ft.
9. ☑ Automatic lighting shutoff control in buildings larger than 5,000 sq.ft.
   Exceptions:
   - ☑ Sleeping units, patient care areas; and spaces where automatic shutoff would endanger safety or security.
10. ☑ Photocell/astronomical time switch on exterior lights.
    Exceptions:
    - ☑ Lighting intended for 24 hour use.
11. ☑ Tandem wired one-lamp and three-lamp ballasted luminaires (No single-lamp ballasts).
    Exceptions:
    - ☑ Electronic high-frequency ballasts; Luminaires on emergency circuits or with no available pair.

Section 5: Compliance Statement

Compliance Statement: The proposed lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2009 IECC requirements in COM*check* Version 3.9.2 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title | Signature | Date

COM*check* Software Version 3.9.2

Exterior Lighting Compliance Certificate

2009 IECC

Section 1: Project Information

Project Type: **Addition**
Project Title : NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING
Exterior Lighting Zone: **2 (Residential mixed use area)**

Construction Site:
235 KENT AVENUE
BROOKLYN, NY 11249

Owner/Agent:
MENDEL GOLD

Designer/Contractor:
SHAWN STILES
S&S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD
WASHINGTON, NY 07882
908-268-6283
SSTILES_12000@YAHOO.COM

Section 2: Exterior Lighting Area/Surface Power Calculation

A Exterior Area/Surface	B Quantity	C Allowed Watts / Unit	D Tradable Wattage	E Allowed Watts (B x C)	F Proposed Watts
Main entry	4 ft of door width	20	Yes	80	80
			Total Tradable Watts* =	80	80
			Total Allowed Watts =	80	
			Total Allowed Supplemental Watts** =	600	

* Wattage tradeoffs are only allowed between tradable areas/surfaces.
** A supplemental allowance equal to 600 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Section 3: Exterior Lighting Fixture Schedule

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixtures	D Fixture Watt.	E (C X D)
Main entry (4 ft of door width): Tradable Wattage				
Incandescent 1: Incandescent 20W:	1	4	20	80
			Total Tradable Proposed Watts =	80

Section 4: Requirements Checklist

Lighting Wattage:

1. ☑ Within each non-tradable area/surface, total proposed watts must be less than or equal to total allowed watts. Across all tradable areas/surfaces, total proposed watts must be less than or equal to total allowed watts.
   Compliance: Passes.

Controls, Switching, and Wiring:

2. ☑ All exemption claims are associated with fixtures that have a control device independent of the control of the nonexempt lighting.
3. ☑ Lighting not designated for dusk-to-dawn operation is controlled by either a a photosensor (with time switch), or an astronomical time switch.
4. ☑ Lighting designated for dusk-to-dawn operation is controlled by an astronomical time switch or photosensor.

5. ☑ All time switches are capable of retaining programming and the time setting during loss of power for a period of at least 10 hours.

Exterior Lighting Efficacy:

6. ☑ All exterior building grounds luminaires that operate at greater than 100W have minimum efficacy of 60 lumen/watt.
   Exceptions:
   - ☑ Lighting that has been claimed as exempt and is identified as such in Section 3 table above.
   - ☐ Lighting that is specifically designated as required by a health or life safety statue, ordinance, or regulation.
   - ☑ Emergency lighting that is automatically off during normal building operation.
   - ☑ Lighting that is controlled by motion sensor.

Section 5: Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2009 IECC requirements in COM*check* Version 3.9.2 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title | Signature | Date

GREEN LINE ARCHITECTURE

S & S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD, WASHINGTON, NY 07882
TEL: 908.268.6283 FAX: 800.782.6981

REVISIONS

No	DATE	ISSUE
1		
2		
3		

DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY & PENTHOUSE RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

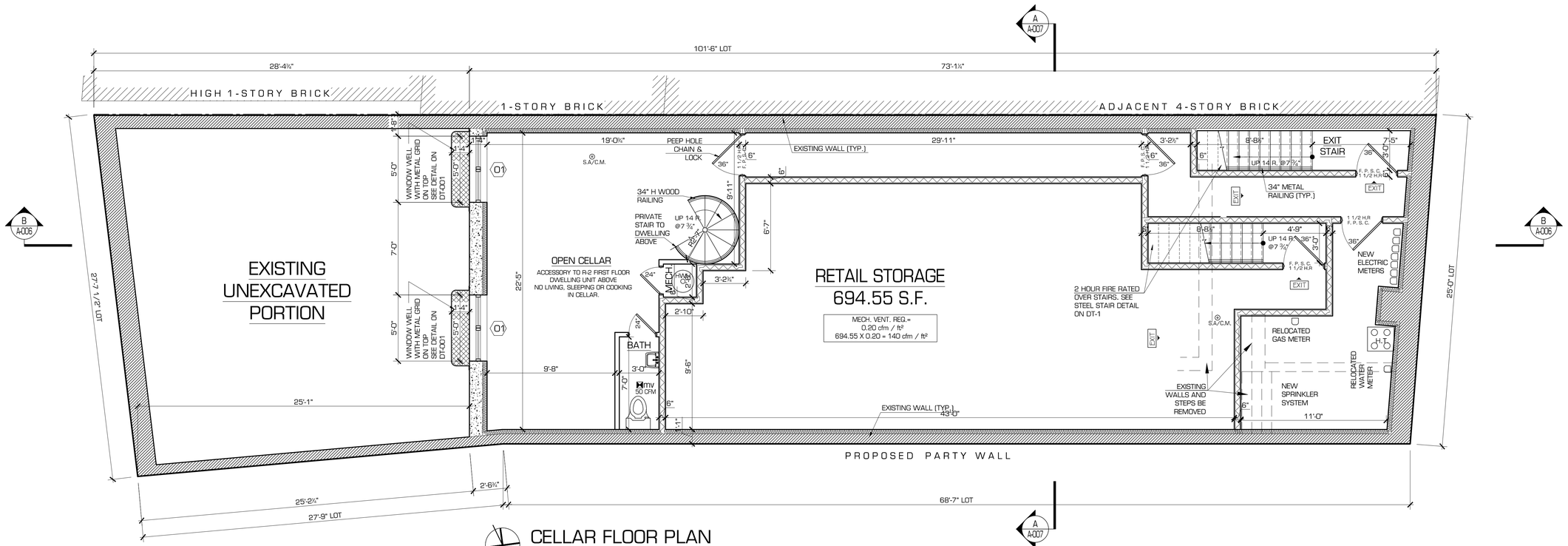
OWNER:
MENDEL GOLD

PROJECT ADRESS:
235 KENT AVENUE
BROOKLYN, NEW YORK 11249

DRAWING TITLE:
ENERGY CONSERVATION COMPLIANCE CERTIFICATES

SEAL & SIGNATURE:

DATE: 08-30-13
DRAWING BY: E.D.
CHK BY: S.STILES
DWG No:
EN-001.00
Page: 14 of ..



CELLAR FLOOR PLAN

SCALE 1/4" =1'-0"

S. 903.2.7, S.907.2.9
SPRINKLER SYSTEM AND FIRE ALARM SHALL BE INSTALLED THROUGHOUT THIS BUILDING.

SYMBOL AND MATERIAL LEGEND

A.D.	AREA DRAIN
F.D.	FLOOR DRAIN
R.D.	ROOF DRAIN
	SPRINKLER HEAD
S.A/C.M.	DENOTES HARD-WIRED SMOKE ALARM / CARBON MONOXIDE DETECTOR
S.A	DENOTES HARD-WIRED SMOKE ALARM
mv	MECHANICAL VENTILATION
	HANDICAP ACCESSIBLE
	BRICK VENEER
	CONC. BLOCK
	POURED CONCRETE
	BATT INSULATION
	LEVEL CHANGE
XX	WINDOW TAG
EXIT	DIRECTIONAL EXIT SIGN
EXIT	NON-DIRECTIONAL EXIT SIGN
HWH	WATER HEATER (PLUMBING AND MECHANICAL EQUIPMENT TO BE FILED SEPARATELY)
H.T.	HOUSE TRAP
	METER
ELE. PN	ELECTRIC PANNEL

ABREVIATION LEGEND

LAV	LAVATORY
W.C.	WATER CLOSET
LN	LINEN CLOSET
W	WASHER
D	DRYER
HC	HANDICAP
TYP.	TYPICAL
DN	STAIR DOWN
UP	STAIR UP
R.	RISER
REF	REFRIGERATOR
RGE	RANGE
TUB	BATH TUB
SHWR	SHOWER
SF	SQUARE FEET
CL	CLOSET
DOB	DEPARTMENT OF BUILDINGS
DW	DISHWASHER
DIA	DIAMETER
DU	DWELLING UNIT
EL	ELEVATION
F.A.I.	FRESH AIR INTAKE
O.C.	ON CENTER

PARTITION LEGEND

(SEE STRUCTURAL PLANS FOR WALL WIDTHS, DETAILS & SPECIFICATIONS.)

EXTERIOR WALL (4 HOUR RATED)

UL DESIGN No. U902
STC RATING > 55, AS PER ASTM E 90.
4" NOMINAL BRICK BONDED TO CONCRETE BLOCK, 16" O.C. WITH 9 GA GALVANIZED TRUSS REINFORCEMENT, 3 ½" METAL STUDS @ 16" O.C. WITH R-11 BATT INSULATION IN BETWEEN - 5/8" TYPE "X" GYPSUM BOARD ON INTERIOR FACE

EXISTING MASONRY WALL (3 HOUR RATED)

UL DESIGN No. U902
STC RATING > 55, AS PER ASTM E 90.
EXISTING MASONRY WALL WITH 3 1/2" METAL STUDS @ 16" O.C. - R-11 BATT INSULATION & 5/8" TYPE "X" GYPSUM BOARD

FOUNDATION WALL (3 HOUR RATED)

UL DESIGN No. U924
STC RATING > 50, AS PER ASTM E 90.
12" POURED CONCRETE WALL WITH 3 1/2" METAL STUDS @ 16" O.C. - R-11 BATT INSULATION & 5/8" TYPE "X" GYPSUM BOARD

EXTERIOR WALL (4 HOUR RATED)

UL DESIGN No. U902
STC RATING > 55, AS PER ASTM E 90.
4" NOMINAL BRICK BONDED TO CONCRETE BLOCK, 16" O.C. WITH 9 GA GALVANIZED TRUSS REINFORCEMENT, 3 ½" METAL STUDS @ 16" O.C. WITH R-11 BATT INSULATION IN BETWEEN - 5/8" TYPE "X" GYPSUM BOARD ON INTERIOR FACE

SHAFT WALLS, (2 HOUR RATED)

UL DESIGN No. U415 SYSTEM C
STC RATING = 50, AS PER ASTM E 90.
1" SHEETROCK BRAND GYPSUM LINER PANELS SET BETWEEN 3" USG C-H STUDS 20 GA MIN. @24" O.C., 2" SPF (R-12) INSULATION BETWEEN STUDS, 2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD ON THE EXTERIOR OF THE SHAFT

EXTERIOR WALL (3 HOUR RATED)

UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2" STUCCO, 3 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 6 ½" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.

EXTERIOR WALL (2 HOUR RATED)

UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2" STUCCO, 2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 3 ½" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.
IN STAIRCASE, INSTALL 24" GA. 36" X 48" SHEET SECURED BETWEEN PANELS 18" ABOVE FLOOR LINE.

INTERIOR PARTITION (2 HOUR RATED)

UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
2 LAYERS OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 3 ½" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.
IN STAIRCASE, INSTALL 24" GA. 36" X 48" SHEET SECURED BETWEEN PANELS 18" ABOVE FLOOR LINE.

INTERIOR WALL (NON RATED)

NON-RATED, NONBEARING
1 LAYER OF ⅝" GYPSUM BOARD EACH SIDE, 3 ½" 20 GAUGE STL STUDS @16" O.C.
USE WATER-RESISTANT GYPSUM BOARD AT WALL SURFACES FACING BATHROOM AREAS.
USE TYPE X GYPSUM BOARD AT WALL SURFACES FACING BATHROOM KITCHENS AREAS.

INTERIOR PARTITION (1 HOUR RATED)

UL DESIGN No. U419
STC RATING > 50, AS PER ASTM E 90.
1 LAYER OF ⅝" TYPE "X" GYPSUM BOARD EACH SIDE, 3 ½" 20 GAUGE STL STUDS @16" O.C. WITH R-11 BATT INSULATION PACKED IN WALL CAVITY.

SMOKE ALARMS
S. 907.2.10. 1
SMOKE ALARMS SHALL BE INSTALLED AND MAINTAINED IN GROUPS R-2, R-3 REGARDLESS OF OCCUPANT LOAD AT ALL OF THE FOLLOWING LOCATIONS WITHIN A DWELLING UNIT:
1. ON THE CEILING OR WALL OUTSIDE OF EACH ROOM USED FOR SLEEPING PURPOSES WITHIN 15 FEET (4572 MM) FROM THE DOOR TO SUCH ROOM.
2. IN EACH ROOM USED FOR SLEEPING PURPOSES.
3. IN EACH STORY WITHIN A DWELLING UNIT, INCLUDING BELOW-GRADE STORIES AND PENTHOUSES OF ANY AREA, BUT NOT INCLUDING CRAWL SPACES AND UNINHABITABLE ATTICS. IN DWELLINGS OR DWELLING UNITS WITH SPLIT LEVELS AND WITHOUT AN INTERVENING DOOR BETWEEN THE ADJACENT LEVELS, A SMOKE ALARM INSTALLED ON THE UPPER LEVEL SHALL SUFFICE FOR THE ADJACENT LOWER LEVEL PROVIDED THAT THE LOWER LEVEL IS LESS THAN ONE FULL STORY BELOW THE UPPER LEVEL.

NOTE:
THERE IS NO GAS EQUIPMENT PROPOSED IN THIS BUILING

GREEN LINE ARCHITECTURE

S & S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD, WASHINGTON, NY 07882
TEL: 908.268.6283 FAX: 800.782.6981

REVISIONS

No	DATE	ISSUE
1		
2		
3		

DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

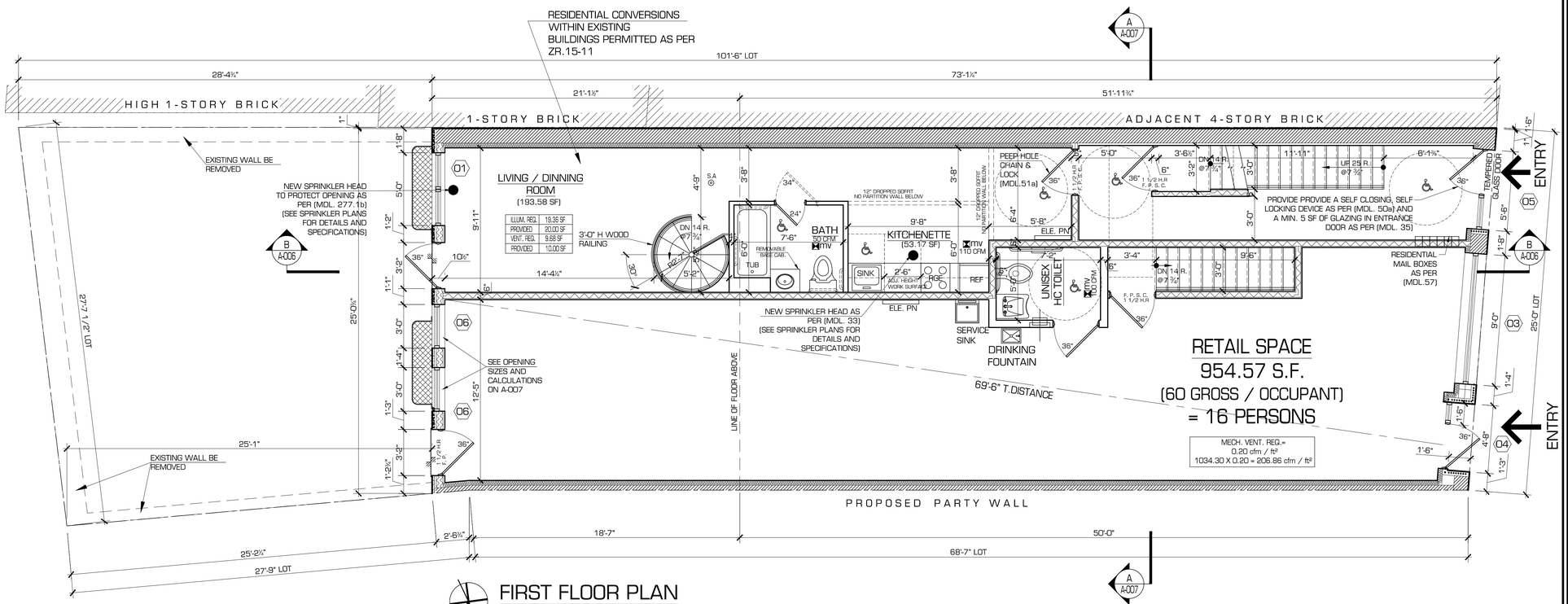
OWNER:
MENDEL GOLD

PROJECT ADRESS:
237 KENT AVENUE
BROOKLYN, NEW YORK 11249

DRAWING TITLE:
EXISTING CELLAR FLOOR PLAN & LEGENDS

SEAL & SIGNATURE:

DATE:	08-30-13
DRAWING BY:	E.D.
CHK BY:	S.STILES
DWG No:	A-001.00
Page:	4 of ....



FIRST FLOOR PLAN

SCALE 1/4" =1'-0"

S. 903.2.7, S.907.2.9
SPRINKLER SYSTEM AND FIRE ALARM SHALL BE INSTALLED THROUGHOUT THIS BUILDING.

S. 1614
BUILDING TO CONFORM WITH EARTHQUAKE RESISTANCE DESIGN PRESCRIBED BY THE 2008 NYC BUILDING CODE. SEE STRUCTURAL PLANS FOR CONSTRUCTION DETAILS.

S.1107, HANDICAP ACCESSIBILITY
FOR RESIDENTIAL PORTION OF THE BUILDING, FACILITIES FOR PEOPLE HAVING PHYSICAL DISABILITIES SHALL COMPLY WITH APPENDIX "P" OF THE 2008 NYC BUILDING CODE AND A117.1-2003 MODIFIED BY LL58/87 (SEE N-002 FOR DETAILS AND SPECIFICATIONS)

S & S ARCHITECTURAL DESIGN LLC
11 MILLPOND ROAD, WASHINGTON, NY 07882
TEL: 908.268.6283 FAX: 800.782.6981

REVISIONS

No	DATE	ISSUE
1		
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DOB EXAMINER SIGNATURE:

DOB BSCAN sticker:

PROJECT:
NEW 3 STORY RESIDENTIAL ADDITION TO AN EXISTING ONE STORY COMMERCIAL BUILDING

OWNER:
MENDEL GOLD

PROJECT ADRESS:
237 KENT AVENUE
BROOKLYN, NEW YORK
11249

DRAWING TITLE:
PROPOSED FIRST FLOOR PLAN

SEAL & SIGNATURE:

DATE:	08-30-13
DRAWING BY:	E.D.
CHK BY:	S.STILES
DWG No:	A-002.00
Page:	5 of ....

ATTACHMENT B
CITIZEN PARTICIPATION PLAN

ATTACHMENT B

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and 112 Manhattan LLC have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, 112 Manhattan LLC will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Ms. Shana Holberton, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-3220.

Project Contact List. OER has established a Site Contact List for this project to provide public notices in the form of fact sheets to interested members of the Community. Communications will include updates on important information relating to the progress of the cleanup program at the Site as well as to request public comments on the cleanup plan. The Project Contact List includes owners and occupants of adjacent buildings and homes, principal administrators of nearby schools, hospitals and day care centers, the public water supplier that serves the area, established document repositories, the representative Community Board, City Council members, other elected representatives and any local Brownfield Opportunity Area (BOA) grantee organizations. Any member of the public or organization will be added to the Site Contact List on request. A copy of the Site Contact List is maintained by OER's project manager. If you would like to be added to the Project Contact List, contact NYC OER at (212) 788-8841 or by email at

brownfields@cityhall.nyc.gov.

Repositories. A document repository is maintained 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. 112 Manhattan LLC will inspect the repositories to ensure that they are fully populated with project information.

The repository for this project is:
Repository Name: Brooklyn Library - Leonard Branch
Repository Address: 81 Devoe Street, Brooklyn, NY 11215
Repository Telephone Number: 718-486-3365
Repository Hours of Operation:

Mon	10:00 AM - 6:00 PM
Tue	1:00 PM - 8:00 PM
Wed	10:00 AM - 6:00 PM
Thu	10:00 AM - 6:00 PM
Fri	10:00 AM - 6:00 PM
Sat	10:00 AM - 5:00 PM
Sun	Closed

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.

Identify Issues of Public Concern. The major issues of concern to the public will be potential impacts of nuisance odors and dust during the disturbance of historic fill soils at the Site. This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future

residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Construction Health and Safety Plan and a Community Air Monitoring Plan are required components of the remedial program. Implementation of these plans will be under the direct oversight of the New York City Department of Environmental Remediation (NYCOER).

These plans will specify the following worker and community health and safety activities during remedial activity at the Site:

- On-Site air monitoring for worker protection,
- Perimeter air monitoring for community protection.

The Health and Safety Plan and the Community Air Monitoring Plan prepared as part of the Remedial Action Work Plan will be available for public review at the document repository.

Public Notice and Public Comment. Public notice to all members of the Project Contact List is required at three major steps during the performance of the cleanup program (listed below) and at other points that may be required by OER. Notices will include Fact Sheets with descriptive project summaries, updates on recent and upcoming project activities, repository information, and important phone and email contact information. All notices will be prepared by 112 Manhattan LLC, reviewed and approved by OER prior to distribution and mailed by 112 Manhattan LLC. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

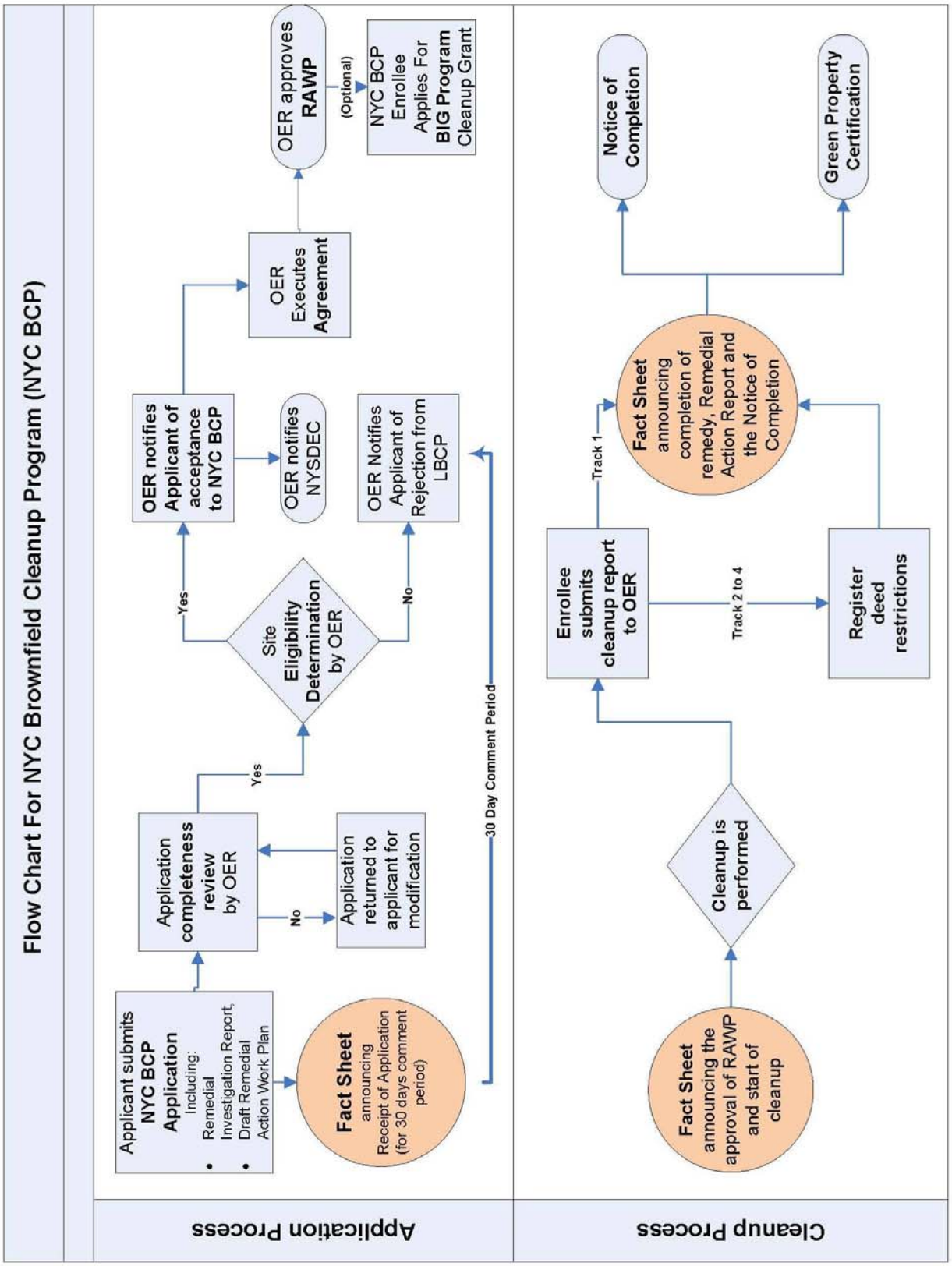
Citizen Participation Milestones. Public notice and public comment activities occur at several steps during a typical NYC VCP project. See flow chart on the following page, which identifies when during the NYC VCP public notices are issued: These steps include:

- **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 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)
Application Process
Cleanup Process
Applicant submits NYC BCP Application
Including:
Remedial Investigation Report,
Draft Remedial Action Work Plan
Fact Sheet
announcing
Receipt of Application
(for 30 days comment period)
Application completeness review by OER
Application returned to applicant for modification
No
Yes
Site Eligibility Determination by OER
Yes
No
OER notifies Applicant of acceptance to NYC BCP
OER notifies NYSDEC
OER Notifies Applicant of Rejection from LBCP
OER Executes Agreement
OER approves RAWP
(Optional)
NYC BCP Enrollee Applies For BIG Program Cleanup Grant
30 Day Comment Period
Fact Sheet announcing the approval of RAWP and start of cleanup
Cleanup is performed
Enrollee submits cleanup report to OER
Track 1
Track 2 to 4
Register deed restrictions
Fact Sheet announcing completion of remedy, Remedial Action Report and the Notice of Completion
Notice of Completion
Green Property Certification

ATTACHMENT C
SUSTAINABILITY STATEMENT

ATTACHMENT C
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.

This project intends to use recycled concrete aggregate wherever possible in grading and backfilling the Site. An estimate of the quantity (in tons) of clean, non-virgin materials (reported by type of material) reused under this plan will be quantified and reported in the RAR.

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.

The project will reduce the consumption of virgin materials by substituting recycled concrete aggregate for mined gravel and/or sand backfill whenever possible. 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.

Recycled concrete materials and other backfill materials will be locally sourced reducing the energy consumption associated with transporting these materials to the Site. Best efforts will be made to quantify energy efficiencies achieved during the remediation and will be reported in the Remedial Action Report (RAR). Where energy savings cannot be easily quantified, a gross indicator of the amount of energy saved or the means by which energy savings was achieved will be reported.

Paperless Voluntary Cleanup Program. 112 Manhattan LLC 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. 112 Manhattan LLC is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

ATTACHMENT D
SOIL/MATERIALS MANAGEMENT PLAN

ATTACHMENT D
SOIL/MATERIALS MANAGEMENT PLAN

1.1 SOIL SCREENING METHODS

Visual, olfactory and PID soil screening and assessment will be performed under the supervision of a Qualified Environmental Professional and will be reported in the 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, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

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

1.3 CHARACTERIZATION OF EXCAVATED MATERIALS

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

1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE

The PE/QEP overseeing the remedial action will:

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

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

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

1.5 OFF-SITE MATERIALS TRANSPORT

Loaded vehicles leaving the Site will comply with all applicable materials transportation requirements (including appropriate covering, manifests, and placards) in accordance with applicable laws and regulations, including use of licensed haulers in accordance with 6 NYCRR Part 364. If loads contain wet material capable of causing leakage from trucks, truck liners will be used. Queuing of trucks will be performed on-Site, when possible in order to minimize off Site disturbance. Off-Site queuing will be minimized.

The planned route on local roads for trucks leaving the Site is shown on Figure 11.

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 112 Manhattan LLC 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 Brooklyn, 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 112 Manhattan LLC. 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 Remedial Action Report will include an itemized account of the destination of all material removed from the Site during this remedial action. Documentation associated with disposal of all material will include records and approvals for receipt of the material. This information will be presented in the 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.

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

1.7 MATERIALS REUSE ON-SITE

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives 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 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 OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Table 1.

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.

Recycled concrete aggregate (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 SPDES permit issued by New York State Department of Environmental Conservation.

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 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 OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found

during on-Site remedial excavation or development-related excavation, sampling will be performed on contaminated source material and surrounding soils and reported to OER. Chemical analytical testing will be performed for TAL metals, TCL volatiles and semi-volatiles, TCL pesticides and PCBs, as appropriate.

1.13 ODOR, DUST AND NUISANCE CONTROL

Odor Control

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

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

Dust Control

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

- Use of a dedicated water spray methodology for roads, excavation areas and stockpiles.
- Use of properly anchored tarps to cover stockpiles.
- Exercise extra care during dry and high-wind periods.
- Use of gravel or recycled concrete aggregate on egress and other roadways to provide a clean and dust-free road surface.

This dust control plan is capable of controlling emissions of dust. If nuisance dust emissions are identified, work will be halted and the source of dusts will be identified and corrected. Work will not resume until all nuisance dust emissions have been abated. OER will be notified of all dust complaint events. Implementation of all dust controls, including halt of work, will be the

responsibility of the PE/QEP's responsible for certifying 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.

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ATTACHMENT E
SITE SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN

235-237 KENT AVENUE

BROOKLYN, NEW YORK

Block 2378, Lots 1 and 2

CONSTRUCTION HEALTH AND SAFETY PLAN

JANUARY 2014

Prepared By:

EBC

ENVIRONMENTAL BUSINESS

1808 Middle Country Road

Ridge, NY 11961

HEALTH AND SAFETY PLAN

Site:	**Redevelopment Project**
Location:	**235-237 Kent Avenue, Brooklyn, NY**
Prepared By:	**ENVIRONMENTAL BUSINESS CONSULTANTS**
Date Prepared:	**January - 2014**
Version:	**1**
Revision:	**0**

Project Description:

Waste types:	Solid
Characteristics:	SVOCs and Metals in historic fill (Grade to 8 ftbg)
Overall Hazard:	Low

ENVIRONMENTAL BUSINESS CONSULTANTS (EBC) AND EBC'S SUBCONTRACTORS DO NOT GUARANTEE THE HEALTH OR SAFETY OF ANY PERSON ENTERING THIS SITE. DUE TO THE NATURE OF THIS SITE AND THE ACTIVITY OCCURRING THEREON, IT IS NOT POSSIBLE TO DISCOVER, EVALUATE, AND PROVIDE PROTECTION FOR ALL POSSIBLE HAZARDS WHICH MAY BE ENCOUNTERED. STRICT ADHERENCE TO THE HEALTH AND SAFETY GUIDELINES SET FORTH HEREIN WILL REDUCE, BUT NOT ELIMINATE, THE POTENTIAL FOR INJURY AT THIS SITE. THE HEALTH AND SAFETY GUIDELINES IN THIS PLAN WERE PREPARED SPECIFICALLY FOR THIS SITE AND SHOULD NOT BE USED ON ANY OTHER SITE WITHOUT PRIOR RESEARCH AND EVALUATION.

CONSTRUCTION HEALTH AND SAFETY PLAN
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STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Activities planned for 235-237 Kent Avenue, Brooklyn, New York.

This HASP, which applies to persons present at the site actually or potentially exposed to hazardous materials, describes emergency response procedures for actual and potential chemical hazards. This HASP is also intended to inform and guide personnel entering the work area or exclusion zone. Persons are to acknowledge that they understand the potential hazards and the contents of this Health and Safety policy by signing off on receipt of their individual copy of the document. The General Contractor and their subcontractors and suppliers are retained as independent contractors and are responsible for ensuring the health and safety of their own employees. The General contractor has the option of adopting this HASP or providing its own for the planned scope of work under the Remedial Action Plan.

1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of a Remedial Action Plan at Redevelopment Project located at 235-237 Kent Avenue, Brooklyn, NY, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during the removal of underground storage tanks and the excavation and loading of contaminated soil. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available. The CHASP may be revised by EBC at the request of property owner, developer and/or the New York State Department of Environmental Conservation (NYSDEC) or New York City Office of Environmental Remediation (NYCOER) upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's Project Manager, site safety officer and/or the EBC Health and Safety Consultant.

1.1 Scope

This CHASP addresses the potential hazards related to the site Remedial Action Plan (RAP). The RAP activities are as described below:

1) Site mobilization of General Contractor (GC) and Subcontractors to install the building foundation.
   a) Excavate 75% of the property for cellar level
   b) Excavate to 2ftbg in rear yard of Lot 1 (B6 location).
   c) Excavate as needed for rear yard concrete cap.

1.2 Application

The HASP applies to all personnel involved in the above tasks who wish to gain access to active work areas, including but not limited to:

- General Contractor
- EBC employees and subcontractors;
- Client representatives; and
- Federal, state or local representatives.

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

The project superintendent and the site safety officer are responsible for informing personnel (EBC employees and/or owner or owners representatives) entering the work area of the contents of this plan and ensuring that each person signs the safety plan acknowledging the on-site hazards and procedures required to minimize exposure to adverse effects of these hazards. A copy of the Acknowledgement Form is included in **Appendix A**.

Site conditions may warrant an amendment to the HASP. Amendments to the HASP are acknowledged by completing forms included in **Appendix B**.

1.4 Key Personnel - Roles and Responsibilities

Personnel responsible for implementing this Construction Health and Safety Plan are:

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Name	Title	Address	Contact Numbers
Mr. Kevin Brussee	EBC Project Manager	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (631) 338-1749
Mr. Kevin Waters	EBC Site Safety Officer	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000

The project manager is responsible for overall project administration and, with guidance from the site safety officer, for supervising the implementation of this CHASP. The site safety officer will conduct daily (tail gate or tool box) safety meetings at the project site and oversee daily safety issues. Each subcontractor and supplier (defined as an OSHA employer) is also responsible for the health and safety of its employees. If there is any dispute about health and safety or project activities, on-site personnel will attempt to resolve the issue. If the issue cannot be resolved at the site, then the project manager will be consulted.

The site safety officer is also responsible for coordinating health and safety activities related to hazardous material exposure on-site. The site safety officer is responsible for the following:

1. Educating personnel about information in this CHASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.

2. Coordinating site safety decisions with the project manager.

3. Designating exclusion, decontamination and support zones on a daily basis.

4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.

5. Maintaining the work zone entry/exit log and site entry/exit log.

6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

The person who observes safety concerns and potential hazards that have not been addressed in the daily safety meetings should immediately report their observations/concerns to the site safety officer or appropriate key personnel.

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2.0 SITE BACKGROUND AND SCOPE OF WORK

The Site is located at 235-237 Kent Avenue in the Williamsburg section of Brooklyn, New York, and is identified as Block 2378 and Lots 1 and 2 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 5,856.5-square feet and is bounded by a new 4-story apartment building (Block 2378, Lot 3 - 233 Kent Avenue) to the north, a four story apartment building with 1st floor commercial space (Block 2378, Lot 44 - 245 Kent Avenue) to the south, Kent Avenue to the east, and a new 7-story apartment building (Block 2378 Lot 11 - 52 North 1st Street) and a three story multi-family walk up (Block 2378, Lot 38 - 45 Grand Street) to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is developed with two one-story manufacturing buildings that were recently converted to and utilized as residential space

2.1 Prior Investigations

2.1.1 Phase I Assessment - Alpha-Hydro Environmental Services (AHES) - 2013
A Phase I was competed by Alpha-Hydro Environmental Services (AHES) in April 2013. AHES identified the following recognized environmental conditions:

- Historic site operation as a waste and printing press facility (235 Kent Avenue) and as an auto repair shop (237 Kent Avenue).
- The presence of NYSDEC VCP Site 150 feet northeast (230 Kent Avenue) of the Site. The NYSDEC VCP site was investigated and the results indicate that soil and groundwater contamination is present beneath the site and has migrated to adjoining properties.

2.1.2 Remedial Investigation - EBC - 2014
EBC performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed six soil borings across the entire project Site, and collected ten soil samples and one duplicate soil sample for chemical analysis from the soil borings to evaluate soil quality; and
3. Installed two groundwater monitoring wells and collected two groundwater samples and one duplicate sample to establish groundwater flow and to evaluate groundwater quality; and
4. Installed five soil vapor probes across the Site and collected five samples for chemical analysis.

<u>Soil Sampling Results</u>
Soil/fill samples collected during the RI showed no pesticides or PCBs at a detectable concentration. No VOCs were detected above Restricted Residential SCOs, but the chlorinated VOC trichloroethylene (1,400 ppb) was detected above Unrestricted Use SCOs within a soil sample collected from immediately below the basement slab of Lot 1. The chlorinated VOC tetrachloroethylene (820 ppb) was detected within the same soil sample, but at a concentration below Unrestricted Use SCOs. Trichloroethylene was also detected within the other soil sample collected from below the basement floor of Lot 2 (9.6 ppb) and within a deep soil sample collected towards the front of Lot 1 (7.8 ppb), but both concentrations were well below Unrestricted Use SCOs. Acetone (110 ppb) was present in one soil sample at a concentration

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above Unrestricted Use SCOs and Naphthalene was present in four soil samples at a concentration below Unrestricted Use SCOs. Nine SVOCs including benz(a)anthracene (maximum of 55,000 µg/Kg), benzo(a)pyrene (maximum of 49,000 µg/Kg), benzo(b)-fluoranthene (63,000 µg/Kg), benzo(k)fluoranthene (maximum of 14,000 µg/Kg), chrysene (maximum of 53,000 µg/Kg), dibenz(a,h)anthracene (maximum of 10,000 µg/Kg), fluoranthene (maximum of 140,000 µg/Kg), indeno(1,2,3-cd)pyrene (maximum of 27,000), phenanthrene (maximum of 140,000 µg/Kg), and pyrene (maximum of 120,000 µg/Kg) were detected above Restricted Residential SCOs within the soil samples collected from the urban fill layer. In addition, six metals, including arsenic (maximum of 21.5 mg/Kg), barium (maximum of 2,830 mg/Kg), cadmium (30 mg/Kg), copper (514 mg/Kg), lead (maximum of 4,430 mg/Kg), and mercury (maximum of 1.99 mg/Kg) were detected above Restricted Residential SCOs within the soil samples collected from the urban fill layer. An addition two metals (chromium and zinc) were also detected above Unrestricted Use SCOs within soil samples collected from the urban fill layer. Overall, the findings were consistent with observations for historical fill sites in areas throughout NYC.

Groundwater Sampling Results

Groundwater samples collected during the no detectable concentrations of pesticides or PCBs were found within the two groundwater samples retrieved and analyzed. No VOCs were detected above GQS, but the chlorinated VOCs trichloroethylene (0.76 µg/L) and tetrachloroethylene (0.33 µg/L) were detected within the groundwater sample collected towards the front of Lot 2. SVOCs detected above GQS include benzo(a)anthracene (maximum of 0.04 µg/L) and chrysene (0.02 µg/L). Dissolved (filtered) metals present in groundwater at levels above GQS include iron and sodium. The presence of some of these metals in groundwater, specifically those that are common salinity indicators, can be attributed to intrusion or road salting.

Soil Gas Sampling Results

Soil vapor samples collected during the RI indicated petroleum related VOCs were present at relatively low concentrations. However, the chlorinated VOC trichloroethylene (TCE) was detected in both sub-slab soil gas and all the three soil vapor samples at a concentration ranging from 5.96 to 213 µg/m^3. The New York State Department of Health (NYSDOH) Final Guidance on Soil Vapor Intrusion (October 2006) notes mitigation is the recommended action for a TCE concentrations above 250 µg/m^3 in soil gas. Tetrachloroethylene (PCE) was detected in both sub-slab soil gas and all the three soil vapor samples, but concentrations ranged only from 5.62 to 36.2 µg/m^3. Carbon tetrachloride was detected in both sub-slab soil gas and two of the three soil vapor samples at a maximum concentration of 1.36 µg/m^3, and 1,1,1-trichloethylene (TCA) was detected in both sub-slab soil gas and two of the three soil vapor samples at a maximum concentration of 19.4 µg/m^3. The PCE, carbon tetrachloride and TCA concentrations were below the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

2.2 Redevelopment Plans

The proposed future use of the Site will consist of redeveloping the lots with a 4-story (Lot 1) mixed use building and 4-story with penthouse mixed use building (Lot 2) each with a full cellar and rear capped yard. The new structures will require removal of approximately 25 feet of the existing buildings (rear) and adding the required additional floors, the footprint of the new structures will occupy approximately 75% of each Lot. Currently, each building has a small cellar (approximately 375 square feet), the cellar level for each new structure will be expanded to

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cover the entire footprint of the new structure to a depth of approximately 9 feet below grade. Assuming an average excavation depth of approximately 9 feet across 75% of the Lot (3,700-square feet, taking into account the existing cellars) lot, a total of approximately 1,250 cubic yards (1,850 tons) of soil will require removal for the new building. Layout of the proposed site development is presented in Figure 3. The current zoning designation is M1-2/R6A. The proposed use is consistent with existing zoning for the property.

2.3 Description of Remedial Action Plan

Site activities included within the Remedial Action Plan that are included within the scope of this HASP include the following:

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Track 4 Restricted Residential Use 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 Track 4 Site Specific SCOs. For development purposes, 75% of the Site will be excavated to depth of approximately 9 feet for the new building's footings and foundation as well as hotspot soil removal to 2ftbg at boring location B6;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) 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 on-Site;
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. Installation of a vapor barrier below the concrete slab of the building, as well as behind foundation walls of the proposed building. The vapor barrier will consist of Raven Industries VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from polyethylene and EVOH resins;
12. Installation and operation of an active Sub-Slab Depressurization System (SSDS);
13. Construction and maintenance of an engineered composite cover consisting of an 4 inch thick concrete building slab and 4 inch thick rear capped yard to prevent human exposure to residual soil/fill remaining under the Site;
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations. Based on the proposed development, excavation will not be conducted below

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water table, therefore, dewatering should not be required during excavation. However, if dewatering activities are needed, dewatering will be completed in accordance with a New York City Department of Environmental Protection (NYCDEP) permit;

15. Implementation of storm-water pollution prevention measures 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, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
17. 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.
18. The property will continue to be registered with an E-Designation by the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

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3.0 HAZARD ASSESSMENT

This section identifies the hazards associated with the proposed scope of work, general physical hazards that can be expected at most sites; and presents a summary of documented or potential chemical hazards at the site. Every effort must be made to reduce or eliminate these hazards. Those that cannot be eliminated must be guarded against using engineering controls and/or personal protective equipment.

3.1 Physical Hazards

3.1.1 Tripping Hazards

An area of risk associated with on-site activities are presented by uneven ground, concrete, curbstones or equipment which may be present at the site thereby creating a potential tripping hazard. During intrusive work, care should be taken to mark or remove any obstacles within the exclusion zone.

3.1.2 Climbing Hazards

During site activities, workers may have to work on excavating equipment by climbing. The excavating contractor will conform with any applicable NIOSH and OSHA requirements or climbing activities.

3.1.3 Cuts and Lacerations

Field activities that involve excavating activities usually involve contact with various types of machinery. A first aid kit approved by the American Red Cross will be available during all intrusive activities.

3.1.4 Lifting Hazards

Improper lifting by workers is one of the leading causes of industrial injuries. Field workers in the excavation program may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

3.1.5 Utility Hazards

Before conducting any excavation, the excavation contractor will be responsible for locating and verifying all existing utilities at each excavation.

3.1.6 Traffic Hazards

All traffic, vehicular and pedestrian, shall be maintained and protected at all times consistent with local, state and federal agency regulations regarding such traffic and in accordance with NYCDOT guidelines. The excavation contractor shall carry on his operations without undue interference or delays to traffic. The excavation contractor shall furnish all labor, materials, guards, barricades, signs, lights, and anything else necessary to maintain traffic and to protect his work and the public, during operations.

3.2 Work in Extreme Temperatures

Work under extremely hot or cold weather conditions requires special protocols to minimize the chance that employees will be affected by heat or cold stress.

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3.2.1 Heat Stress

The combination of high ambient temperature, high humidity, physical exertion, and personal protective apparel, which limits the dissipation of body heat and moisture, can cause heat stress.

The following prevention, recognition and treatment strategies will be implemented to protect personnel from heat stress. Personnel will be trained to recognize the symptoms of heat stress and to apply the appropriate treatment.

1. Prevention
    a. Provide plenty of fluids. Available in the support zone will be a 50% solution of fruit punch and water or plain water.
    b. Work in Pairs. Individuals should avoid undertaking any activity alone.
    c. Provide cooling devices. A spray hose and a source of water will be provided to reduce body temperature, cool protective clothing and/or act as a quick-drench shower in case of an exposure incident.
    d. Adjustment of the work schedule. As is practical, the most labor-intensive tasks should be carried out during the coolest part of the day.

2. Recognition and Treatment
    a Heat Rash (or prickly heat):
        Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.
        Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.
        Treatment: Remove source or irritation and cool skin with water or wet cloths.

    b. Heat Cramps (or heat prostration)
        Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.
        Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.
        Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.
    c. Heat Stroke
        Cause: Same as heat exhaustion. This is also an extremely serious condition.
        Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.
        Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

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3.2.2 Cold Exposure

Exposure to cold weather, wet conditions and extreme wind-chill factors may result in excessive loss of body heat (hypothermia) and /or frostbite. To guard against cold exposure and to prevent cold injuries, appropriate warm clothing should be worn, warm shelter must be readily available, rest periods should be adjusted as needed, and the physical conditions of on-site field personnel should be closely monitored. Personnel and supervisors working on-site will be made aware of the signs and symptoms of frost bite and hypothermia such as shivering, reduced blood pressure, reduced coordination, drowsiness, impaired judgment, fatigue, pupils dilated but reactive to light and numbing of the toes and fingers.

3.3 Chemical Hazards

Soil collected from the site as part of several subsurface investigations performed at the site have revealed elevated levels of SVOCs, metals and pesticides in historic fill at the Site.

VOCs reported to be present at elevated concentrations in historic fill materials at the Site include the following:

Acetone	TCE

SVOCs reported to be present at elevated concentrations in historic fill materials at the Site include the following:

Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(ghi)perylene
Benzo(k)fluoranthene	Chrysene	Dibenz(ah)anthracene	Fluoranthene
Indeno(1,2,3-cd)pyrene	Pyrene		

Metals reported to be present at elevated concentrations in historic fill materials at the Site include the following:

Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel
Zinc							

The primary routes of exposure to identified contaminants in soil to on-site construction workers are through inhalation, ingestion and absorption.

Appendix C includes information sheets for all detected chemicals that may be encountered at the site.

Soil vapor collected from the site as part of the subsurface investigation performed at the site have revealed elevated levels of CVOCs in soil gas at the Site.

CVOCs reported to be present at elevated concentrations in soil vapor at the Site include the following:

TCE

The primary routes of exposure to identified contaminants in soil vapor to on-site construction workers is through inhalation.
Appendix C includes information sheets for all detected chemicals that may be encountered at the site.

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3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

Absorption pathways for dust and direct contact with soils or groundwater will be mitigated with the implementation of latex gloves, hand washing and decontamination exercises when necessary.

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 $\mu g/m^3$ over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

Although no VOCs were detected within any of the soil samples collected at the Site, the site safety officer will periodically monitor organic vapors with a Photo-ionization Detector (PID) during excavation activities to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

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4.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) shall be selected in accordance with the site air monitoring program, OSHA 29 CFR 1910.120(c), (g), and 1910.132. Protective equipment shall be NIOSH approved and respiratory protection shall conform to OSHA 29 CFR Part 1910.133 and 1910.134 specifications; head protection shall conform to 1910.135; eye and face protection shall conform to 1910.133; and foot protection shall conform to 1910.136. The only true difference among the levels of protection from D thru B is the addition of the type of respiratory protection. **It is anticipated that work will be performed in Level D PPE.**

4.1 Level D

Level D PPE shall be donned when the atmosphere contains no known hazards and work functions preclude splashes, immersion, or the potential for inhalation of, or contact with, hazardous concentrations of harmful chemicals. Level D PPE consists of:

- standard work clothes, coveralls, or tyvek, as needed;
- steel toe and steel shank work boots;
- hard hat;
- gloves, as needed;
- safety glasses;
- hearing protection;
- equipment replacements are available as needed.

4.2 Level C

Level C PPE shall be donned when sustained concentrations of measured total organic vapors in the breathing zone exceed background concentrations (using a portable OVA, or equivalent), by more than 5 ppm. The specifications on the APR filters used must be appropriate for contaminants identified or expected to be encountered. Level C PPE shall be donned when the identified contaminants have adequate warning properties and criteria for using APR have been met. Level C PPE consists of:

- chemical resistant or coated tyvek coveralls;
- steel-toe and steel-shank workboots;
- chemical resistant overboots or disposable boot covers;
- disposable inner gloves (surgical gloves);
- disposable outer gloves;
- full face APR fitted with organic vapor/dust and mist filters or filters appropriate for the identified or expected contaminants;
- hard hat;
- splash shield, as needed; and,
- ankles/wrists taped with duct tape.

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes.

The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

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4.3 Activity-Specific Levels of Personal Protection

The required level of PPE is activity-specific and is based on air monitoring results (Section 4.0) and properties of identified or expected contaminants. **It is expected that site work will be performed in Level D.** If air monitoring results indicate the necessity to upgrade the level of protection, engineering controls (i.e. Facing equipment away from the wind and placing site personnel upwind of excavations, active venting, etc.) will be implemented before requiring the use of respiratory protection.

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5.0 AIR MONITORING AND ACTION LEVELS

29 CFR 1910.120(h) specifies that monitoring shall be performed where there may be a question of employee exposure to hazardous concentrations of hazardous substances in order to assure proper selection of engineering controls, work practices and personal protective equipment so that employees are not exposed to levels which exceed permissible exposure limits, or published exposure levels if there are no permissible exposure limits, for hazardous substances.

5.1 Air Monitoring Requirements

If excavation work is performed, air will be monitored for VOCs with a portable ION Science 3000EX photoionization detector, or the equivalent. If necessary, Lower Explosive Limit (LEL) and oxygen will be monitored with a Combustible Gas Indicator (CGI). If appropriate, fugitive dust will be monitored using a MiniRam Model PDM-3 aerosol monitor. Air will be monitored when any of the following conditions apply:

- initial site entry;
- during any work where a potential IDLH condition or flammable atmosphere could develop;
- excavation work begins on another portion of the site;
- contaminants, other than those previously identified, have been discovered;
- each time a different task or activity is initiated;
- during trenching and/or excavation work.

The designated site safety officer will record air monitoring data and ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. Instruments will be zeroed daily and checked for accuracy. Monitoring results will be recorded in a field notebook and will be transferred to instrument reading logs.

5.2 Work Stoppage Responses

The following responses will be initiated whenever one or more of the action levels necessitating a work stoppage are exceeded:

1 The SSO will be consulted immediately
2 All personnel (except as necessary for continued monitoring and contaminant migration, if applicable) will be cleared from the work area (eg from the exclusion zone).
3 Monitoring will be continued until intrusive work resumes.

5.3 Action Levels During Excavation Activities

Instrument readings will be taken in the breathing zone above the excavation pit unless otherwise noted. Each action level is independent of all other action levels in determining responses.

Organic Vapors (PID)	LEL %	Responses
0-1 ppm above background	0%	• Continue excavating • Level D protection • Continue monitoring every 10 minutes
1-5 ppm Above Background, Sustained Reading	1-10%	• Continue excavating • Go to Level C protection or employ engineering controls

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Fax 631.924.2870

		• Continue monitoring every 10 minutes
5-25 ppm Above Background, Sustained Reading	10-20%	• Discontinue excavating, unless PID is only action level exceeded. • Level C protection or employ engineering controls • Continue monitoring for organic vapors 200 ft downwind • Continuous monitoring for LEL at excavation pit
>25 ppm Above Background, Sustained Reading	>20%	• Discontinue excavating • Withdraw from area, shut off all engine ignition sources. • Allow pit to vent • Continuous monitoring for organic vapors 200 ft downwind.

Notes: Air monitoring will occur in the breathing zone 30 inches above the excavation pit. Readings may also be taken in the excavation pit but will not be used for action levels.

If action levels for any one of the monitoring parameters are exceeded, the appropriate responses listed in the right hand column should be taken. If instrument readings do not return to acceptable levels after the excavation pit has been vented for a period of greater than one-half hour, a decision will then be made whether or not to seal the pit with suppressant foam.

If, during excavation activities, downwind monitoring PID readings are greater than 5 ppm above background for more than one-half hour, excavation will stop until sustained levels are less then 5 ppm (see Community Air Monitoring Plan).

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6.0 SITE CONTROL

6.1 Work Zones

The primary purpose of site controls is to establish the perimeter of a hazardous area, to reduce the migration of contaminants into clean areas, and to prevent access or exposure to hazardous materials by unauthorized persons. When operations are to take place involving hazardous materials, the site safety officer will establish an exclusion zone, a decontamination zone, and a support zone. These zones "float" (move around the site) depending on the tasks being performed on any given day. The site safety officer will outline these locations before work begins and when zones change. The site safety officer records this information in the site log book.

Due to the dimensions of the Site and the work area, it is expected that an exclusion zone will include the entire fenced area with the exception of the construction entrance area, which will serve as the decontamination zone. A support zone if needed will be located outside of the fenced area. All onsite workers during excavation of historic fill materials must provide evidence of OSHA 24 or 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer, if provided.

Protective equipment is removed in the decontamination zone. Disposable protective equipment is stored in receptacles staged in the decontamination zone, and non-disposable equipment is decontaminated. All personnel and equipment exit the exclusion zone through the decontamination zone. If a decontamination trailer is provided the first aid equipment, an eye wash unit, and drinking water are kept in the decontamination trailer.

The support zone is used for vehicle parking, daily safety meetings, and supply storage. Eating, drinking, and smoking are permitted only in the support zone. When a decontamination trailer is not provided, the eye wash unit, first aid equipment, and drinking water are kept at a central location designated by the site safety officer.

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7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

Site personnel must be prepared in the event of an emergency. Emergencies can take many forms: illnesses, injuries, chemical exposure, fires, explosions, spills, leaks, releases of harmful contaminants, or sudden changes in the weather.

Emergency telephone numbers and a map to the hospital will be posted in the command post. Site personnel should be familiar with the emergency procedures, and the locations of site safety, first aid, and communication equipment.

7.1 Emergency Equipment On-site

Private telephones:	Site personnel.
Two-way radios:	Site personnel where necessary.
Emergency Alarms:	On-site vehicle horns*.
First aid kits:	On-site, in vehicles or office.
Fire extinguisher:	On-site, in office or on equipment.

* Horns: Air horns will be supplied to personnel at the discretion of the project superintendent or site safety officer.

7.2 Emergency Telephone Numbers

General Emergencies	911
Kings County Police	911
NYC Fire Department	911
Woodhul Medical Center	(718) 963-8000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 349-8500
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

7.3 Personnel Responsibilities During an Emergency

The project manager is primarily responsible for responding to and correcting any emergency situations. However, in the absence of the project manager, the site safety officer shall act as the project manager's on-site designee and perform the following tasks:

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;

- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;

- Ensure appropriate decontamination, treatment, or testing for exposed or injured

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personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager Mr. Kevin Brussee (631) 504-6000
- Site Safety Officer Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

A person who becomes ill or injured in the exclusion zone will be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination will be completed and first aid administered prior to transport. First aid will be administered while waiting for an ambulance or paramedics. A Field Accident Report (**Appendix D**) must be filled out for any injury.

A person transporting an injured/exposed person to a clinic or hospital for treatment will take the directions to the hospital (**Appendix D**).and information on the chemical(s) to which they may have been exposed (**Appendix C**).

7.5 Fire or Explosion

In the event of a fire or explosion, the local fire department will be summoned immediately. The site safety officer or his designated alternate will advise the fire commander of the location, nature and identification of the hazardous materials on-site. If it is safe to do so, site personnel may:

- use fire fighting equipment available on site; or,
- remove or isolate flammable or other hazardous materials that may contribute to the fire.

7.6 Evacuation Routes

Evacuation routes established by work area locations for each site will be reviewed prior to commencing site operations. As the work areas change, the evacuation routes will be altered accordingly, and the new route will be reviewed.

Under extreme emergency conditions, evacuation is to be immediate without regard for equipment. The evacuation signal will be a continuous blast of a vehicle horn, if possible, and/or by verbal/radio communication. When evacuating the site, personnel will follow these instructions:

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.
- The site safety officer will conduct a head count to ensure that all personnel have been

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evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.

- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

Spills associated with site activities may be attributed to project equipment and include gasoline, diesel and hydraulic oil. In the event of a leak or a release, site personnel will inform their supervisor immediately, locate the source of spillage and stop the flow if it can be done safely. A spill containment kit including absorbent pads, booms and/or granulated speedy dry absorbent material will be available to site personnel to facilitate the immediate recovery of the spilled material. Daily inspections of site equipment components including hydraulic lines, fuel tanks, etc. will be performed by their respective operators as a preventative measure for equipment leaks and to ensure equipment soundness. In the event of a spill, site personnel will immediately notify the NYSDEC (1-800-457-7362), and a spill number will be generated.

7.8 Vapor Release Plan

If work zone organic vapor (excluding methane) exceeds 5 ppm, then a downwind reading will be made either 200 feet from the work zone or at the property line, whichever is closer. If readings at this location exceed 5 ppm over background, the work will be stopped.

If 5 ppm of VOCs are recorded over background on a PID at the property line, then an off-site reading will be taken within 20 feet of the nearest residential or commercial property, whichever is closer. If efforts to mitigate the emission source are unsuccessful for 30 minutes, then the designated site safety officer will:

- contact the local police;
- continue to monitor air every 30 minutes, 20 feet from the closest off-site property. If two successive readings are below 5 ppm (non-methane), off-site air monitoring will be halted.
- All property line and off site air monitoring locations and results associated with vapor releases will be recorded in the site safety log book.

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APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

1. AWARENESS (topics discussed, special safety concerns, recent incidents, etc…):

_____

_____

_____

_____

2. OTHER ISSUES (HASP changes, attendee comments, etc…):

_____

_____

_____

3. ATTENDEES (Print Name):

1.	11.
2.	12.
3.	13.
4.	14.
5.	15.
6.	16.
7.	17.
8.	18.
9.	19.
10.	20.

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #: _____

Site Name: _____

Reason for Amendment: _____

_____

_____

_____

Alternative Procedures: _____

_____

_____

_____

Required Changes in PPE: _____

_____

_____

_____

_____ _____

Project Superintendent (signature) **Date**

_____ _____

Health and Safety Consultant (signature) **Date**

_____ _____

Site Safety Officer (signature) **Date**

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

The attached International Chemical Safety Cards are provided for contaminants of concern that have been identified in soils and/or groundwater at the site.

International Chemical Safety Cards

ACETONE

ICSC: 0087

2-Propanone
Dimethyl ketone
Methyl ketone
C_3H_6O / CH_3COCH_3
Molecular mass: 58.1

ICSC # 0087
CAS # 67-64-1
RTECS # AL3150000
UN # 1090
EC # 606-001-00-8
April 22, 1994 Validated
Fi, review at IHE: 10/09/89

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, alcohol-resistant foam, water in large amounts, carbon dioxide.
EXPLOSION	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
•INHALATION	Sore throat. Cough. Confusion. Headache. Dizziness. Drowsiness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness. Pain. Blurred vision. Possible corneal damage.	Safety spectacles or face shield . Contact lenses should not be worn.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Nausea. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: self-contained breathing apparatus. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Then wash away with plenty of water.	Fireproof. Separated from strong oxidants. Store in an area without drain or sewer access.	F symbol Xi symbol R: 11-36-66-67 S: 2-9-16-26 UN Hazard Class: 3 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ACETONE

ICSC: 0087

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR. **PHYSICAL DANGERS:** The vapour is heavier than air and may travel along the ground; distant ignition possible. **CHEMICAL DANGERS:** The substance can form explosive peroxides on contact with strong oxidants such as acetic acid, nitric acid, hydrogen peroxide. Reacts with chloroform and bromoform under basic conditions, causing fire and explosion hazard. Attacks plastic. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 500 ppm as TWA, 750 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued; (ACGIH 2004). MAK: 500 ppm 1200 mg/m³ Peak limitation category: I(2); Pregnancy risk group: D; (DFG 2006). OSHA PEL†: TWA 1000 ppm (2400 mg/m^3) NIOSH REL: TWA 250 ppm (590 mg/m^3) NIOSH IDLH: 2500 ppm 10%LEL See: 67641 **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation and through the skin. **INHALATION RISK:** A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster. **EFFECTS OF SHORT-TERM EXPOSURE:** The vapour irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system , liver , kidneys and gastrointestinal tract . **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the blood and bone marrow .
PHYSICAL PROPERTIES	Boiling point: 56°C Melting point: -95°C Relative density (water = 1): 0.8 Solubility in water: miscible Vapour pressure, kPa at 20°C: 24 Relative vapour density (air = 1): 2.0 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: -18°C c.c. Auto-ignition temperature: 465°C Explosive limits, vol% in air: 2.2-13 Octanol/water partition coefficient as log Pow: -0.24
ENVIRONMENTAL DATA	

N O T E S

Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1090

NFPA Code: H 1; F 3; R 0;
Card has been partially updated in July 2007: see Occupational Exposure Limits.
Card has been partially updated in January 2008: see Storage.

ADDITIONAL INFORMATION

ICSC: 0087 **ACETONE**

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

1,1,2-Trichloroethylene
Trichloroethene
Ethylene trichloride
Acetylene trichloride
C_2HCl_3 / $ClCH=CCl_2$
Molecular mass: 131.4

ICSC # 0081
CAS # 79-01-6
RTECS # KX4550000
UN # 1710
EC # 602-027-00-9
April 10, 2000 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions. See Notes.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION		Prevent build-up of electrostatic charges (e.g., by grounding).	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		PREVENT GENERATION OF MISTS! STRICT HYGIENE!	
•INHALATION	Dizziness. Drowsiness. Headache. Weakness. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Personal protection: filter respirator for organic gases and vapours adapted to the airborne concentration of the substance. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment.	Separated from metals (see Chemical Dangers), strong bases, food and feedstuffs . Dry. Keep in the dark. Ventilation along the floor. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. T symbol R: 45-36/38-52/53-67 S: 53-45-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0081 OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.

PHYSICAL DANGERS:
The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (phosgene , hydrogen chloride). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004).
MAK:
Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours)
NIOSH REL: Ca See Appendix A See Appendix C
NIOSH IDLH: Ca 1000 ppm See: 79016

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 87°C
Melting point: -73°C
Relative density (water = 1): 1.5
Solubility in water, g/100 ml at 20°C: 0.1
Vapour pressure, kPa at 20°C: 7.8
Relative vapour density (air = 1): 4.5
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3
Auto-ignition temperature: 410°C
Explosive limits, vol% in air: 8-10.5
Octanol/water partition coefficient as log Pow: 2.42
Electrical conductivity: 800pS/m

ENVIRONMENTAL DATA

The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.

NOTES

Combustible vapour/air mixtures difficult to ignite, may be developed under certain conditions. Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert.

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;
Card has been partially updated in October 2004: see Occupational Exposure Limits, EU Classification, Emergency Response.
Card has been partially updated in April 2010: see Occupational Exposure Limits, Ingestion First Aid, Storage.

ADDITIONAL INFORMATION

ICSC: 0081 **TRICHLOROETHYLENE**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

1,2-Benzoanthracene
Benzo(a)anthracene
2,3-Benzphenanthrene
Naphthanthracene
$C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 0385
CAS # 56-55-3
RTECS # CV9275000
EC # 601-033-00-9
October 23, 1995 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: complete protective clothing including self-contained breathing apparatus.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

ICSC: 0385

BENZ(a)ANTHRACENE

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A2 (suspected human carcinogen); (ACGIH 2004).
MAK:
Carcinogen category: 2 (as pyrolysis product of organic materials)
(DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Sublimation point: 435°C
Melting point: 162°C
Relative density (water = 1): 1.274
Solubility in water:
none

Vapour pressure, Pa at 20°C: 292
Octanol/water partition coefficient as log Pow: 5.61

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.

N O T E S

This substance is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. Tetraphene is a common name. Card has been partly updated in October 2005 and August 2006: see sections Occupational Exposure Limits, EU classification.

ADDITIONAL INFORMATION

ICSC: 0385 **BENZ(a)ANTHRACENE**

International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

Benz(a)pyrene
3,4-Benzopyrene
Benzo(d,e,f)chrysene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0104
CAS # 50-32-8
RTECS # DJ3675000
EC # 601-032-00-3
October 17, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
EXPLOSION			
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: complete protective clothing including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants.	T symbol N symbol R: 45-46-60-61-43-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

International Chemical Safety Cards

BENZO(a)PYRENE

ICSC: 0104

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
PALE-YELLOW CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Reacts with strong oxidants causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: Exposure by all routes should be carefully controlled to levels as low as possible A2 (suspected human carcinogen); (ACGIH 2005).
MAK:
Carcinogen category: 2; Germ cell mutagen group: 2; (DFG 2005).

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is carcinogenic to humans. May cause heritable genetic damage to human germ cells. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES

Boiling point: 496°C
Melting point: 178.1°C
Density: 1.4
g/cm³

Solubility in water: none (<0.1 g/100 ml)
Vapour pressure :
negligible
Octanol/water partition coefficient as log Pow: 6.04

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish, in plants and in molluscs. The substance may cause long-term effects in the aquatic environment.

NOTES

Do NOT take working clothes home. Benzo(a)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAHs) in the environment, usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.

ADDITIONAL INFORMATION

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

Benz(e)acephenanthrylene
2,3-Benzofluoroanthene
Benzo(e)fluoranthene
3,4-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0720
CAS # 205-99-2
RTECS # CU1400000
EC # 601-034-00-4
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

I	**PHYSICAL STATE; APPEARANCE:** COLOURLESS CRYSTALS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation

IMPORTANT DATA	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2; (DFG 2004). of its aerosol and through the skin. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans. May cause genetic damage in humans.
PHYSICAL PROPERTIES	Boiling point: 481°C Melting point: 168°C Solubility in water: none Octanol/water partition coefficient as log Pow: 6.12
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. 

N O T E S

Benzo(b)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(b)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0720 **BENZO(b)FLUORANTHENE**

International Chemical Safety Cards

BENZO(g,h,i)FLUORANTHENE

ICSC: 0527

2,13-Benzofluoranthene
Benzo(mno)fluoranthene
$C_{18}H_{10}$
Molecular mass: 226.3

ICSC # 0527
CAS # 203-12-3
RTECS # DF6140000
March 25, 1998 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	
•SKIN	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention. Wear protective gloves when administering first aid.
•EYES		Safety goggles, face shield, or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0527

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(g,h,i)FLUORANTHENE

ICSC: 0527

I **M** **P**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS **PHYSICAL DANGERS:**	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

O **R** **T** **A** **N** **T** **D** **A** **T** **A**	**CHEMICAL DANGERS:** The substance decomposes on heating producing toxic fumes. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established.	**INHALATION RISK:** **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** See Notes.
PHYSICAL PROPERTIES	Melting point: 149°C Solubility in water: none Vapour pressure, Pa at 20°C: <10	Relative vapour density (air = 1): 7.8 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.0 Octanol/water partition coefficient as log Pow: 7.23
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats. 	

N O T E S

Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Also consult ICSC #0720 and 0721.

ADDITIONAL INFORMATION

ICSC: 0527 **BENZO(g,h,i)FLUORANTHENE**

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

Dibenzo(b,jk)fluorene
8,9-Benzofluoranthene
11,12-Benzofluoranthene
$C_{20}H_{12}$
Molecular mass: 252.3

ICSC # 0721
CAS # 207-08-9
RTECS # DF6350000
EC # 601-036-00-5
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0721

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

I **M**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin.

P O R T A N T D A T A	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK: Carcinogen category: 2; (DFG 2004). **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 480°C Melting point: 217°C Solubility in water: none Octanol/water partition coefficient as log Pow: 6.84
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish. 

N O T E S

Benzo(k)fluoranthene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing benzo(k)fluoranthene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0721 **BENZO(k)FLUORANTHENE**

International Chemical Safety Cards

CHRYSENE

ICSC: 1672

Benzoaphenanthrene
1,2-Benzophenanthrene
1,2,5,6-Dibenzonaphthalene
$C_{18}H_{12}$
Molecular mass: 228.3

ICSC # 1672
CAS # 218-01-9
RTECS # GC0700000
UN # 3077
EC # 601-048-00-0
October 12, 2006 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray. Dry powder. Foam. Carbon dioxide.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety goggles	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: P3 filter respirator for toxic particles. Do NOT let this chemical enter the environment. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, Provision to contain effluent from fire extinguishing. Store in an area without drain or sewer access.	T symbol N symbol R: 45-68-50/53 S: 53-45-60-61 UN Hazard Class: 9 UN Packing Group: III Signal: Warning Aqua-Cancer Suspected of causing cancer Very toxic to aquatic life with long lasting effects Very toxic to aquatic life

SEE IMPORTANT INFORMATION ON BACK

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European

International Chemical Safety Cards

CHRYSENE

ICSC: 1672

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS TO BEIGE CRYSTALS OR POWDER

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants

OCCUPATIONAL EXPOSURE LIMITS:
TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006).
MAK not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 448°C
Melting point: 254 - 256°C
Density: 1.3 g/cm³

Solubility in water:
very poor
Octanol/water partition coefficient as log Pow: 5.9

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.

NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. This substance does not usually occur as a pure substance but as a component of polyaromatic hydrocarbon (PAH) mixtures. Human population studies have associated PAH's exposure with cancer and cardiovascular diseases.

Transport Emergency Card: TEC (R)-90GM7-III

ADDITIONAL INFORMATION

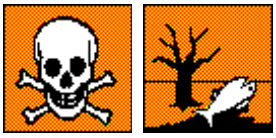
International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

1,25,6-Dibenzanthracene
$C_{22}H_{14}$
Molecular mass: 278.4

ICSC # 0431
CAS # 53-70-3
RTECS # HN2625000
EC # 601-041-00-2
October 23, 1995 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Water spray, powder.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN	Redness. Swelling. Itching.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Well closed.	T symbol N symbol R: 45-50/53 S: 53-45-60-61

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0431

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

DIBENZO(a,h)ANTHRACENE

ICSC: 0431

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PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALLINE POWDER.

PHYSICAL DANGERS:

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration

R T A N T D A T A	**CHEMICAL DANGERS:** **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established.	of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the skin , resulting in photosensitization. This substance is probably carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 524°C Melting point: 267°C Relative density (water = 1): 1.28	Solubility in water: none Octanol/water partition coefficient as log Pow: 6.5
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in seafood.	

N O T E S

This is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, it may be encountered as a laboratory chemical in its pure form. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken. Do NOT take working clothes home. DBA is a commonly used name. This substance is one of many polycyclic aromatic hydrocarbons (PAH).

ADDITIONAL INFORMATION

ICSC: 0431 **DIBENZO(a,h)ANTHRACENE**

Material Safety Data Sheet

Version 4.2
Revision Date 05/19/2011
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Fluoranthene
Product Number	:	423947
Brand	:	Aldrich
Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone # (For both supplier and manufacturer)	:	(314) 776-6555
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Carcinogen

GHS Classification
Acute toxicity, Oral (Category 4)
Acute toxicity, Dermal (Category 5)
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)

H302	Harmful if swallowed.
H313	May be harmful in contact with skin.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P273	Avoid release to the environment.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	1
Physical hazards:	0

NFPA Rating

Health hazard:	1
Fire:	1
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : Benzo[*j*,*k*]fluorene

Formula : $C_{16}H_{10}$

Molecular Weight : 202.25 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Fluoranthene			
206-44-0	205-912-4	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 105 - 110 °C (221 - 230 °F) - lit.
Boiling point	384 °C (723 °F) - lit.
Flash point	198.0 °C (388.4 °F) - closed cup
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available

Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 2,000 mg/kg

Inhalation LC50
no data available

Dermal LD50
LD50 Dermal - rabbit - 3,180 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Fluoranthene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be human carcinogens. (Fluoranthene)
	Reasonably anticipated to be a human carcinogen (Fluoranthene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Signs and Symptoms of Exposure
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Synergistic effects
no data available

Additional Information
RTECS: LL4025000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.0077 mg/l - 96 h
	NOEC - Cyprinodon variegatus (sheepshead minnow) - 560 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 - < 0.01 mg/l - 3 d
	Immobilization EC50 - Daphnia magna (Water flea) - 0.78 mg/l - 20 h
	NOEC - Daphnia magna (Water flea) - 0.085 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Fluoranthene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

OSHA Hazards
Harmful by ingestion., Carcinogen

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluoranthene	206-44-0	2007-03-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Fluoranthene	206-44-0	1990-01-01

16. OTHER INFORMATION

Further information

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

o-Phenylenepyrene
2,3-Phenylenepyrene
$C_{22}H_{12}$
Molecular mass: 276.3

ICSC # 0730
CAS # 193-39-5
RTECS # NK9300000
March 25, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE			In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		AVOID ALL CONTACT!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment.	Provision to contain effluent from fire extinguishing. Well closed.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

I **M** **P**	**PHYSICAL STATE; APPEARANCE:** YELLOW CRYSTALS **PHYSICAL DANGERS:**	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and through the skin. **INHALATION RISK:**

O R T A N T D A T A	**CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK: Carcinogen category: 2; (DFG 2004).	Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 536°C Melting point: 164°C Solubility in water: none	Octanol/water partition coefficient as log Pow: 6.58
ENVIRONMENTAL DATA	This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in fish.	

N O T E S

Indeno(1,2,3-cd)pyrene is present as a component of polycyclic aromatic hydrocarbons (PAH) content in the environment usually resulting from the incomplete combustion or pyrolysis of organic matters, especially fossil fuels and tobacco.ACGIH recommends environment containing Indeno(1,2,3-c,d)pyrene should be evaluated in terms of the TLV-TWA for coal tar pitch volatile, as benzene soluble 0.2 mg/m^3. Insufficient data are available on the effect of this substance on human health, therefore utmost care must be taken.

ADDITIONAL INFORMATION

ICSC: 0730 **INDENO(1,2,3-cd)PYRENE**

International Chemical Safety Cards

PYRENE

ICSC: 1474

Benzo (d,e,f) phenanthrene
beta-Pyrene
$C_{16}H_{10}$
Molecular mass: 202.26

ICSC # 1474
CAS # 129-00-0
RTECS # UR2450000
November 27, 2003 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking.	Water spray, carbon dioxide, dry powder, alcohol-resistant foam, foam.
EXPLOSION			
EXPOSURE			
•INHALATION		Avoid inhalation of dust	Fresh air, rest.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Do NOT induce vomiting. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder Do NOT let this chemical enter the environment. (Extra personal protection: P2 filter respirator for harmful particles.)	Separated from strong oxidants. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 1474

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

PYRENE

ICSC: 1474

I **M**	**PHYSICAL STATE; APPEARANCE:** YELLOW COLOURLESS SOLID IN VARIOUS FORMS	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation through the skin and by ingestion

P O R T A N T D A T A	**PHYSICAL DANGERS:** **CHEMICAL DANGERS:** The substance decomposes on heating producing irritating fumes **OCCUPATIONAL EXPOSURE LIMITS:** TLV not established. MAK not established. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** Exposure to sun may provoke an irritating effect of pyrene on skin and lead to chronic skin discoloration. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

PHYSICAL PROPERTIES	Boiling point: 404°C Melting point: 151°C Density: 1.27 g/cm3	Solubility in water: 0.135 mg/l at 25°C Vapour pressure, Pa at °C: 0.08 Octanol/water partition coefficient as log Pow: 4.88
ENVIRONMENTAL DATA	Bioaccumulation of this chemical may occur in crustacea,in fish,in milk,in algae andin molluscs. It is strongly advised that this substance does not enter the environment. 	

N O T E S

Pyrene is one of many polycyclic aromatic hydrocarbons - standards are usually established for them as mixtures, e.g., coal tar pitch volatiles. However, pyrene may be encountered as a laboratory chemical in its pure form. Health effects of exposure to the substance have not been investigated adequately. See ICSC 1415 Coal-tar pitch.

ADDITIONAL INFORMATION

ICSC: 1474 **PYRENE**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

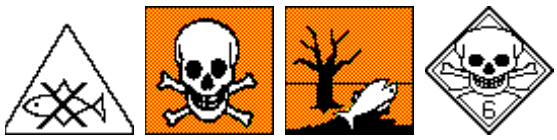
International Chemical Safety Cards

ARSENIC

ICSC: 0013

Grey arsenic
As
Atomic mass: 74.9

ICSC # 0013
CAS # 7440-38-2
RTECS # CG0525000
UN # 1558
EC # 033-001-00-X
October 18, 1999 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames. NO contact with strong oxidizers. NO contact with hot surfaces.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Risk of fire and explosion is slight when exposed to hot surfaces or flames in the form of fine powder or dust.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! AVOID EXPOSURE OF (PREGNANT) WOMEN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Sore throat. Shortness of breath. Weakness. See Ingestion.	Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
•SKIN	Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness.	Face shield or eye protection in combination with breathing protection if powder.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Nausea. Vomiting. Burning sensation in the throat and chest. Shock or collapse. Unconsciousness.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Sweep spilled substance into sealable containers. Carefully collect remainder, then remove to safe place. Chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment.	Separated from strong oxidants, acids, halogens, food and feedstuffs. Well closed.	Do not transport with food and feedstuffs. Marine pollutant. T symbol N symbol R: 23/25-50/53 S: 1/2-20/21-28-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ARSENIC

ICSC: 0013

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.01 mg/m³ as TWA A1 (confirmed human carcinogen); BEI issued (ACGIH 2004). MAK: Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004). OSHA PEL: 1910.1018 TWA 0.010 mg/m^3 NIOSH REL: Ca C 0.002 mg/m^3 15-minute See Appendix A NIOSH IDLH: Ca 5 mg/m^3 (as As) See: 7440382	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol and by ingestion. **INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly, when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the eyes the skin and the respiratory tract. The substance may cause effects on the gastrointestinal tract cardiovascular system central nervous system kidneys , resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders shock convulsions and kidney impairment Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the mucous membranes, skin, peripheral nervous system liver bone marrow , resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment anaemia This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.
PHYSICAL PROPERTIES	Sublimation point: 613°C Density: 5.7 g/cm^3	Solubility in water: none
ENVIRONMENTAL DATA	The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.	

N O T E S

The substance is combustible but no flash point is available in literature. Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home. Refer also to cards for specific arsenic compounds, e.g., Arsenic pentoxide (ICSC 0377), Arsenic trichloride (ICSC 0221), Arsenic trioxide (ICSC 0378), Arsine (ICSC 0222).

Transport Emergency Card: TEC (R)-61GT5-II

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

Barium sulphate
Blanc fixe
Artificial barite
$BaSO_4$
Molecular mass: 233.43

ICSC # 0827
CAS # 7727-43-7
RTECS # CR0600000
October 20, 1999 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P1 filter respirator for inert particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0827

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

IMPORTANT DATA	**PHYSICAL STATE; APPEARANCE:** ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Reacts violently with aluminium powder. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 10 mg/m³ as TWA; (ACGIH 2004). MAK: (Inhalable fraction) 4 mg/m³; (Respirable fraction) 1.5 mg/m³; (DFG 2004). OSHA PEL†: TWA 15 mg/m^3 (total) TWA 5 mg/m^3 (resp) NIOSH REL: TWA 10 mg/m^3 (total) TWA 5 mg/m^3 (resp) NIOSH IDLH: N.D. See: IDLH INDEX **ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation of its aerosol. **INHALATION RISK:** Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly. **EFFECTS OF SHORT-TERM EXPOSURE:** **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Lungs may be affected by repeated or prolonged exposure to dust particles , resulting in baritosis (a form of benign pneumoconiosis).
PHYSICAL PROPERTIES	Melting point (decomposes): 1600°C Density: 4.5 g/cm³ Solubility in water: none
ENVIRONMENTAL DATA	

N O T E S

Occurs in nature as the mineral barite; also as barytes, heavy spar. Card has been partly updated in October 2005. See section Occupational Exposure Limits.

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CADMIUM

ICSC: 0020

Cd
Atomic mass: 112.4

ICSC # 0020
CAS # 7440-43-9
RTECS # EU9800000
UN # 2570
EC # 048-002-00-0
April 22, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable in powder form and spontaneously combustible in pyrophoric form. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with heat or acid(s).	Dry sand. Special powder. NO other agents.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Cough. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Diarrhoea. Headache. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Remove all ignition sources. Sweep spilled substance into containers. Carefully collect remainder, then remove to safe place.	Fireproof. Dry. Keep under inert gas. Separated from igntion sources, oxidants acids, food and feedstuffs	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Note: E T+ symbol N symbol R: 45-26-48/23/25-62-63-68-50/53 S: 53-45-60-61 UN Hazard Class: 6.1

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0020

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

CADMIUM

ICSC: 0020

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
SOFT BLUE-WHITE METAL LUMPS OR GREY POWDER. MALLEABLE. TURNS BRITTLE ON EXPOSURE TO 80°C AND TARNISHES ON EXPOSURE TO MOIST AIR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
Reacts with acids forming flammable/explosive gas (hydrogen - see ICSC0001.) Dust reacts with oxidants, hydrogen azide, zinc, selenium or tellurium , causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: (Total dust) 0.01 mg/m³
(Respirable fraction)
0.002 mg/m³ as TWA A2 (suspected human carcinogen); BEI issued (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).
OSHA PEL*: 1910.1027 TWA 0.005 mg/m^3 *Note: The PEL applies to all Cadmium compounds (as Cd).
NIOSH REL*: Ca See Appendix A *Note: The REL applies to all Cadmium compounds (as Cd).
NIOSH IDLH: Ca 9 mg/m^3 (as Cd) See: IDLH INDEX

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

EFFECTS OF SHORT-TERM EXPOSURE:
The fume is irritating to the respiratory tract Inhalation of fume may cause lung oedema (see Notes). Inhalation of fumes may cause metal fume fever. The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Lungs may be affected by repeated or prolonged exposure to dust particles. The substance may have effects on the kidneys , resulting in kidney impairment This substance is carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 765°C
Melting point: 321°C
Density: 8.6
g/cm3

Solubility in water: none
Auto-ignition temperature: (cadmium metal dust) 250°C

ENVIRONMENTAL DATA

N O T E S

Reacts violently with fire extinguishing agents such as water,foam,carbon dioxideand halons. Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Do NOT take working clothes home. Cadmium also exists in a pyrophoric form (EC No. 048-011-00-X), which bears the additional EU labelling symbol F, R phrase 17, and S phrases 7/8 and 43. UN numbers and packing group will vary according to the physical form of the substance.

ADDITIONAL INFORMATION

IMPORTANT LEGAL NOTICE:

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

Chrome
Cr
Atomic mass: 52.0
(powder)

ICSC # 0029
CAS # 7440-47-3
RTECS # GB4200000
October 27, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible under specific conditions.	No open flames if in powder form.	In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION		Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
•EYES	Redness.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P2 filter respirator for harmful particles.		R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

International Chemical Safety Cards

CHROMIUM

ICSC: 0029

I

M

P

PHYSICAL STATE; APPEARANCE:
GREY POWDER

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

ROUTES OF EXPOSURE:

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed.

O R T A N T D A T A	**CHEMICAL DANGERS:** Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances , causing fire and explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m³ as TWA A4 (ACGIH 2004). MAK not established. OSHA PEL*: TWA 1 mg/m^3 See Appendix C *Note: The PEL also applies to insoluble chromium salts. NIOSH REL: TWA 0.5 mg/m^3 See Appendix C NIOSH IDLH: 250 mg/m^3 (as Cr) See: 7440473 **EFFECTS OF SHORT-TERM EXPOSURE:** May cause mechanical irritation tothe eyesandthe respiratory tract. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**
PHYSICAL PROPERTIES	Boiling point: 2642°C Melting point: 1900°C Density: 7.15 g/cm³ Solubility in water: none
ENVIRONMENTAL DATA	

N O T E S

The surface of the chromium particles is oxidized to chromium(III)oxide in air. See ICSC 1531 Chromium(III) oxide.

ADDITIONAL INFORMATION

ICSC: 0029 **CHROMIUM**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

COPPER

ICSC: 0240

Cu
(powder)

ICSC # 0240
CAS # 7440-50-8
RTECS # GL5325000
September 24, 1993 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from - See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0240

International Chemical Safety Cards

COPPER

ICSC: 0240

I

M

P

PHYSICAL STATE; APPEARANCE:
RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

O R T A N T D A T A	Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.2 mg/m³ fume (ACGIH 1992-1993). TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993). Intended change 0.1 mg/m³ Inhal., A4 (not classifiable as a human carcinogen); MAK: 0.1 mg/m³ (Inhalable fraction) Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005). OSHA PEL*: TWA 1 mg/m^3 *Note: The PEL also applies to other copper compounds (as Cu) except copper fume. NIOSH REL*: TWA 1 mg/m^3 *Note: The REL also applies to other copper compounds (as Cu) except Copper fume. NIOSH IDLH: 100 mg/m^3 (as Cu) See: 7440508	**EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of fumes may cause metal fume fever. See Notes. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization.
PHYSICAL PROPERTIES	Boiling point: 2595°C Melting point: 1083°C Relative density (water = 1): 8.9	Solubility in water: none
ENVIRONMENTAL DATA		

N O T E S

The symptoms of metal fume fever do not become manifest until several hours.

ADDITIONAL INFORMATION

ICSC: 0240 **COPPER**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

LEAD

ICSC: 0052

Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # OF7525000
October 08, 2002 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION		Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles.	Separated from food and feedstuffs incompatible materials See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

LEAD

ICSC: 0052

I M P O R T A N T D A T A

PHYSICAL STATE; APPEARANCE:
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air.

CHEMICAL DANGERS:
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m³ (EU 2002).
OSHA PEL*: 1910.1025 TWA 0.050 mg/m^3 See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH REL*: TWA 0.050 mg/m^3 See Appendix C
*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH IDLH: 100 mg/m^3 (as Pb) See: 7439921

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES		
	Boiling point: 1740°C	Density: 11.34 g/cm3
	Melting point: 327.5°C	Solubility in water: none

ENVIRONMENTAL DATA	
	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment. 

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

ICSC: 0052 **LEAD**

International Chemical Safety Cards

MERCURY

ICSC: 0056

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # OV4550000
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0056

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

International Chemical Safety Cards

MERCURY

ICSC: 0056

I M P O R T A N T D A T A	**PHYSICAL STATE; APPEARANCE:** ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL. **PHYSICAL DANGERS:** **CHEMICAL DANGERS:** Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m³ Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003). OSHA PEL†: C 0.1 mg/m^3 NIOSH REL: Hg Vapor: TWA 0.05 mg/m^3 skin Other: C 0.1 mg/m^3 skin NIOSH IDLH: 10 mg/m^3 (as Hg) See: 7439976
	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its vapour and through the skin , also as a vapour! **INHALATION RISK:** A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C. **EFFECTS OF SHORT-TERM EXPOSURE:** The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous systemandkidneys. The effects may be delayed. Medical observation is indicated. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** The substance may have effects on the central nervous system kidneys , resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.
PHYSICAL PROPERTIES	Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none Vapour pressure, Pa at 20°C: 0.26 Relative vapour density (air = 1): 6.93 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009
ENVIRONMENTAL DATA	The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish. 

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

ICSC: 0056 **MERCURY**

International Chemical Safety Cards

NICKEL

ICSC: 0062

Ni
Atomic mass: 58.7
(powder)

ICSC # 0062
CAS # 7440-02-0
RTECS # QR5950000
EC # 028-002-00-7
October 17, 2001 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. NO water.
EXPLOSION	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
EXPOSURE		PREVENT DISPERSION OF DUST! AVOID ALL CONTACT!	
•INHALATION	Cough. Shortness of breath.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES		Safety spectacles, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	Rinse mouth.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles.	Separated from strong acids.	Xn symbol R: 40-43 S: 2-22-36

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

International Chemical Safety Cards

NICKEL

ICSC: 0062

I	**PHYSICAL STATE; APPEARANCE:** SILVERY METALLIC SOLID IN VARIOUS FORMS. **PHYSICAL DANGERS:**

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of the dust.

International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

Blue powder
Merrillite
Zn
Atomic mass: 65.4
(powder)



ICSC # 1205
CAS # 7440-66-6
RTECS # ZG8600000
UN # 1436 (zinc powder or dust)
EC # 030-001-00-1
October 24, 1994 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with acid(s), base (s) and incompatible substances (see Chemical Dangers).	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Risk of fire and explosion on contact with acid(s), base(s), water and incompatible substances.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Prevent deposition of dust.	In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•INHALATION	Metallic taste and metal fume fever. Symptoms may be delayed (see Notes).	Local exhaust.	Fresh air, rest. Refer for medical attention.
•SKIN	Dry skin.	Protective gloves.	Rinse and then wash skin with water and soap.
•EYES		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Extinguish or remove all ignition sources. Do NOT wash away into sewer. Sweep spilled substance into containers. then remove to safe place. Personal protection: self-contained breathing apparatus.	Fireproof. Separated from acids, bases oxidants Dry.	Airtight. F symbol N symbol R: 15-17-50/53 S: 2-7/8-43-46-60-61 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
ODOURLESS GREY TO BLUE POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation and by ingestion.

INHALATION RISK:
Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. The effects may be delayed.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis.

PHYSICAL PROPERTIES

Boiling point: 907°C
Melting point: 419°C
Relative density (water = 1): 7.14
Solubility in water: reaction
Vapour pressure, kPa at 487°C: 0.1
Auto-ignition temperature: 460°C

ENVIRONMENTAL DATA

NOTES

Zinc may contain trace amounts of arsenic, when forming hydrogen, may also form toxic gas arsine (see ICSC 0001 and ICSC 0222). Reacts violently with fire extinguishing agents such as water, halons, foam and carbon dioxide. The symptoms of metal fume fever do not become manifest until several hours later. Rinse contaminated clothes (fire hazard) with plenty of water.

Transport Emergency Card: TEC (R)-43GWS-II+III
NFPA Code: H0; F1; R1;

ADDITIONAL INFORMATION

IMPORTANT DATA	Dust explosion possible if in powder or granular form, mixed with air. **CHEMICAL DANGERS:** Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: (Inhalable fraction) 1.5 mg/m³ as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004). MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah); Carcinogen category: 1; (DFG 2004). OSHA PEL*†: TWA 1 mg/m^3 *Note: The PEL does not apply to Nickel carbonyl. NIOSH REL*: Ca TWA 0.015 mg/m^3 See Appendix A *Note: The REL does not apply to Nickel carbonyl. NIOSH IDLH: Ca 10 mg/m^3 (as Ni) See: 7440020	**INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed. **EFFECTS OF SHORT-TERM EXPOSURE:** May cause mechanical irritation. Inhalation of fumes may cause pneumonitis. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.
PHYSICAL PROPERTIES	Boiling point: 2730°C Melting point: 1455°C Density: 8.9 g/cm3	Solubility in water: none
ENVIRONMENTAL DATA		

N O T E S

At high temperatures, nickel oxide fumes will be formed. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062 **NICKEL**

IMPORTANT LEGAL NOTICE:	Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

APPENDIX D

HOSPITAL INFORMATION AND MAP

FIELD ACCIDENT REPORT

FIELD ACCIDENT REPORT

This report is to be filled out by the designated Site Safety Officer after EVERY accident.

PROJECT NAME _____ PROJECT. NO._____

Date of Accident _____ Time _____ Report By _____

Type of Accident (Check One):

( ) Vehicular ( ) Personal ( ) Property

Name of Injured _____ DOB or Age _____

How Long Employed _____

Names of Witnesses _____

_____

Description of Accident _____

_____

_____

Action Taken _____

_____

_____

Did the Injured Lose Any Time? _____ How Much (Days/Hrs.)? _____

Was Safety Equipment in Use at the Time of the Accident (Hard Hat, Safety Glasses, Gloves, Safety Shoes, etc.)? _____

_____

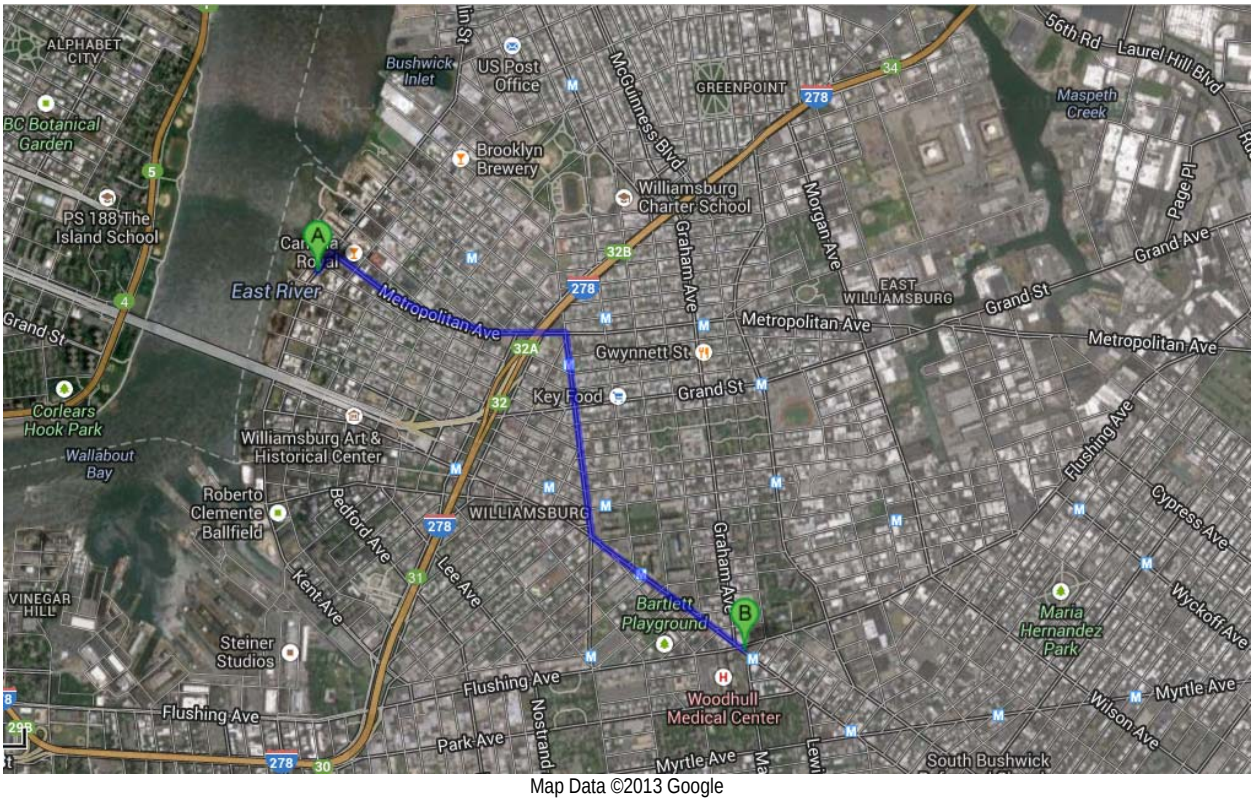
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

WOODHUL MEDICAL CENTER
760 Broadway, Brooklyn, New York 11206
718-963-8000
2.0 Miles – About 7-13 Minutes



Map Data ©2013 Google

A	235 Kent Ave, Brooklyn, NY 11249	
	1. Head **northeast** on **Kent Ave** toward **N 1st St**	go 390 ft total 390 ft
	2. Turn right onto **Metropolitan Ave** About 3 mins	go 0.7 mi total 0.8 mi
	3. Turn right onto **Union Ave** About 2 mins	go 0.6 mi total 1.4 mi
	4. Slight left onto **Broadway** Destination will be on the right About 2 mins	go 0.6 mi total 2.0 mi
B	**Woodhull Medical Center** 760 Broadway, Brooklyn, NY 11206	

ATTACHMENT F
VAPOR BARRIER SPECIFICATIONS

VAPORBLOCK® PLUS™ VBP20

Under-Slab Vapor / Gas Barrier

RAVEN INDUSTRIES

Product Description

VaporBlock® Plus™ 20 is a seven-layer co-extruded barrier made from state-of-the-art polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission. VaporBlock® Plus™ 20 is a highly resilient underslab / vertical wall barrier designed to restrict naturally occurring gases such as radon and/or methane from migrating through the ground and concrete slab. VaporBlock® Plus™ 20 is more than 100 times less permeable than typical high-performance polyethylene vapor retarders against Methane, Radon and other harmful VOCs.

VaporBlock® Plus™ 20 is one of the most effective underslab gas barriers in the building industry today far exceeding ASTM E-1745 (Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs) Class A, B and C requirements. Available in a 20 (Class A) mil thicknesses designed to meet the most stringent requirements. VaporBlock® Plus™ 20 is produced within the strict guidelines of our ISO 9001:2008 Certified Management System.

Product Use

VaporBlock® Plus™ 20 resists gas and moisture migration into the building envelop when properly installed to provide protection from toxic/harmful chemicals. It can be installed as part of a passive or active control system extending across the entire building including floors, walls and crawl spaces. When installed as a passive system it is recommended to also include a ventilated system with sump(s) that could be converted to an active control system with properly designed ventilation fans.

VaporBlock® Plus™ 20 works to protect your flooring and other moisture-sensitive furnishings in the building's interior from moisture and water vapor migration, greatly reducing condensation, mold and degradation.

Size & Packaging

VaporBlock® Plus™ 20 is available in 10' x 150' rolls to maximize coverage. All rolls are folded on heavy-duty cores for ease in handling and installation. Other custom sizes with factory welded seams are available based on minimum volume requirements. Installation instructions and ASTM E-1745 classifications accompany each roll.

Under-Slab Vapor/Gas Retarder

Product	Part #
VaporBlock Plus 20	VBP 20

APPLICATIONS

- Radon Barrier
- Methane Barrier
- VOC Barrier
- Under-Slab Vapor Retarder
- Foundation Wall Vapor Retarder

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VAPORBLOCK® PLUS™ VBP20

ISO 9001:2008 CERTIFIED MANAGEMENT SYSTEM

Under-Slab Vapor / Gas Barrier

		VAPORBLOCK PLUS 20	
PROPERTIES	**TEST METHOD**	**IMPERIAL**	**METRIC**
Appearance		White/Gold	
Thickness, Nominal		20 mil	0.51 mm
Weight		102 lbs/MSF	498 g/m²
Classification	ASTM E 1745	CLASS A, B & C	
Tensile Strength lbf/in (N/cm) average MD & TD (new material)	ASTM E 154 Section 9 (D-882)	58 lbf	102 N
Impact Resistance	ASTM D 1709	2600 g	
Maximum Use Temperature		180° F	82° C
Minimum Use Temperature		-70° F	-57° C
Permeance (new material)	ASTM E 154 Section 7 ASTM E 96 Procedure B	0.0051 Perms grains/(ft²·hr·in·Hg)	0.0034 Perms g/(24hr·m²·mm Hg)
Radon Diffusion Coeffiecient	K124/02/95	$< 1.1 \times 10^{-13}$ m²/s	
Methane Permeance	ASTM D 1434	$< 1.7 \times 10^{-10}$ m²/d• atm 0.32 GTR (Gas Transmission Rate) ml/m²•D•ATM	

VaporBlock® Plus™ Placement

All instructions on architectural or structural drawings should be reviewed and followed.
Detailed installation instructions accompany each roll of VaporBlock® Plus™ and can also be located on our website.
ASTM E-1643 also provides general installation information for vapor retarders.

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER

VaporBlock® Plus™ is a seven-layer co-extruded barrier made using high quality virgin-grade polyethylene and EVOH resins to provide unmatched impact strength as well as superior resistance to gas and moisture transmission.

RAVEN INDUSTRIES
Engineered Films Division
P.O. Box 5107
Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333

Toll Free: **800-635-3456**
Email: **efdsales@ravenind.com**
www.ravenefd.com

Limited Warranty available at www.RavenEFD.com