505 UNION AVENUE

BROOKLYN, NEW YORK

Remedial Action Work Plan

NYC VCP Number: 14CVCP246K
E-Designation Site Number: 14EHAZ316K

Prepared for:

Express Builders
144 Spenser Street
Brooklyn, NY 11205

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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 505 Union Avenue, Brooklyn, NY, VCP Site number 14CVCP246K and OER project number 14EHAZ316K.

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

_____

Name

_____

NYS PE License Number

_____

Signature

_____

Date

PE Stamp

EXECUTIVE SUMMARY

Express Builders has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 9,375-ft^2 Site located at 505 Union 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 505 Union Avenue in the Williamsburg section of Brooklyn, New York, and is identified as Block 2315 and Lot 21 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 9,375-square feet and is bounded by Block 2315 Lot 14, multi-story residential property, to the north, Block 2315 Lots 26 and 28, a multi-story mixed use property and parking lot, respectively, to the south, Union Avenue and green space (Mt Carmel Triangle) to the east, and Block 2315 Lots 31 and 33, a multi-story residential property and Church, respectively, to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is improved with a vacant 2-story commercial building which covers the entire Lot.

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will consist of the renovation of the existing structure to include three additional floors. The first floor of the renovated structure will remain in commercial use and will consist of a parking garage, mechanical and utility areas, a residential lobby, and retail space. Thirty four residential apartments will be created on floors 2 through 5. To support the additional floors, new foundation structures (steel pile with concrete pile cap) will be installed. Concrete pile caps will be driven into place, therefore there will be little to no excavation of soils onsite, with the exception of the elevator pit which will require excavation to a depth of approximately 6 feet below grade (ftbg). Excavation at this location will likely be into the groundwater table, as groundwater at the Site ranges from 5.02 feet to 7.39 feet. Layout of the proposed site development is presented in Figure 3. The current zoning designation is M1-2/R6 residential. The proposed use is consistent with existing zoning for the property.

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. Establish Track 4 Site Specific 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 Use SCOs. Hotspot excavation will be completed at three locations across the Site. Excavation of B1 and B5 will take place to a depth of 4 ftbg and a minimum of 6 ftbg at boring location B4. In addition, elevator pit will be excavated to depths of six feet below grade.
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. A vapor barrier will be installed beneath the residential lobby area. The vapor barrier would consist of Raven Industries' VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from polyethylene and EVOH resins.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. Construction and maintenance of an engineered composite cover consisting of the existing building concrete slab across the footprint of the renovated building. Composite cover system will manage residual soil contamination in place.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
16. 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
17. The property will continue to be registered with an E-Designation at the NYC Building Department. Establishment of Engineering Controls and Institutional Controls; 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, Kristen DiScenza at (631) 504-6000 or NYC OER Project Manager, 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 6:00 PM, Monday through Friday.

Signage. While the cleanup is in progress, a placard will be prominently posted at the main entrance of the property with a laminated project Fact Sheet that states that the project is in the NYC 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, Ms. Kristen DiScenza (EBC) at (631) 504-6000, the NYC OER 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 in the public document repositories located at the Brooklyn Library - Leonard Branch (81 Devoe Street, Brooklyn).

Long-Term Site Management. If long-term protection is required after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC 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

Express Builders has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 505 Union 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 505 Union Avenue in the Williamsburg section of Brooklyn, New York, and is identified as Block 2315 and Lot 21 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 9,375-square feet and is bounded by Block 2315 Lot 14, multi-story residential property, to the north, Block 2315 Lots 26 and 28, a multi-story mixed use property and parking lot, respectively, to the south, Union Avenue and green space (Mt Carmel Triangle) to the east, and Block 2315 Lots 31 and 33, a multi-story residential property and Church, respectively, to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is improved with a vacant 2-story commercial building which covers the entire Lot.

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will consist of the renovation of the existing structure to include three additional floors. The first floor of the renovated structure will remain in commercial use and will consist of a parking garage, mechanical and utility areas, a residential lobby, and retail space. Thirty four residential apartments will be created on floors 2 through 5. To support the additional floors, new foundation structures (steel pile with concrete pile cap) will be installed. Concrete pile caps will be driven into place, therefore there will be little to no

excavation of soils onsite, with the exception of the elevator pit which will require excavation to a depth of approximately 6 feet. below grade. Excavation at this location will likely be into the groundwater table, as groundwater at the Site ranges from 5.02 feet to 7.39 feet. Layout of the proposed site development is presented in Figure 3. The current zoning designation is M1-2/R6 residential. 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 and commercial properties. 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. Based upon review of the NYCOER SPEED database, no hospitals or schools are located within a 500 ft radius of the Site. One day care facility, The Williamsburg Neighborhood Nursery School, is located within a 250 ft radius of the Site, at 10 Withers Street.

Surrounding Property Usage

Direction	Property Description
North – Adjacent property	Block 2315, Lot 14 (525 Union Avenue) – Developed with a multi-story residential building.
South – Adjacent properties	Block 2315, Lots 26 and 28 (497 Union Avenue) – Developed with a multi-story mixed used building and parking lot, respectively.
East – Opposite side of Union Avenue	No Block and Lot Information Available - Mt Carmel Triangle, uncapped green space.
West – Adjacent property	Block 2315, Lots 31 and 33 (275-287 North 8th Street) – Developed with multi-story residential buildings and Our Lady of Mount Carmel Church.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called "*Remedial Investigation Report,505 Union Avenue, Brooklyn, NY*", dated April 2014 (RIR).

Summary of Past Uses of Site and Areas of Concern

EBC was able to establish a history for the Site dating back to 1887 based upon Sanborn maps. From at least 1905 to sometime before 1916, the Site was used as a junk yard and rag/paper warehouse. By 1951 the warehouse was demolished and the property was used as small storefront. The existing building was constructed in 1946 and was used by a lumber supply company. The property was used as a building materials warehouse from at least 1965 to 2011 when the building was vacated.

The AOCs identified for this Site include:

1. Historic fill layer is present at the Site from grade to depths at least 8 feet below grade;
2. Presence of an E designation for HazMat.

Summary of the Work Performed under the Remedial Investigation

Express Builders performed the following scope of work:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed seven soil borings across the entire project Site, and collected seven soil samples to evaluate soil quality;
3. Installed four groundwater monitoring wells throughout the Site and collected four groundwater samples for chemical analysis to evaluate groundwater quality; and
4. Installed five sub-slab soil vapor probes across the Site and collected five sub-slab samples and three ambient indoor air samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property is approximately 14 feet.
2. Depth to groundwater ranges from 5.02 to 7.39 feet at the Site.
3. Groundwater flow, based upon regional groundwater contour maps, is generally from east to west beneath the Site.
4. Depth to bedrock is at the Site is greater than 100 feet.
5. The stratigraphy of the Site, from the surface down, consists of approximately 8 feet of historic fill underlain by native silty sand.

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6. Results of Soil/fill samples collected during the RI were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs) as presented in 6NYCRR Part 375-6.8 and CP51. Soil/fill samples showed no PCBs detected above Track1 SCOs. Three VOCs, acetone (95 micrograms per kilogram (µg/kg) or ppb, m&p-Xylenes (890 ppb) and o-Xylenes (450 ppb) were detected in two of the seven samples at concentrations above Track 1 Unrestricted Use SCOs. Several SVOCs including benz(a)anthracene (maximum [max.] of 62,000 ppb), benzo(a)pyrene (max. of 49,000 ppb), benzo(b)fluoranthene (max. of 58,000 ppb), benzo(k)fluoranthene (max. of 18,000 ppb), chrysene (max. of 59,000 ppb), dibenz(a,h)anthracene (max. of 7,800 ppb), dibenzofuran (9,200 ppb), fluoranthene (160,000 ppb), fluorene (160,000 ppb), indeno(1,2,3-cd)pyrene (max. of 29,000 ppb), phenanthrene (160,000 ppb), and pyrene (150,000 ppb) were detected above their respective Track 2 Restricted Residential Use SCOs. Four pesticides including 4,4'-DDD (2,600 ppb), 4,4'-DDE (780 ppb), 4,4'-DDT (max. of 9,200 ppb) and dieldrin (290 ppb) were detected in three of the seven soil samples above their respective Track 1 Unrestricted Use SCOs. 4,4'-DDT and dieldrin were also detected about Track 2 Restricted Residential SCOs in one of the seven samples. Nine metals including arsenic (max. of 37.9 parts per million [ppm]), barium (max. of 2,220 ppm), cadmium (max. of 9.12 ppm), chromium (max. of 159 ppm), copper (max. of 13,900 ppm), lead (max. of 6,860 ppm), mercury (max. of 6.76 ppm), nickel (max. of 74.1 ppm) and zinc (max. of 12,800 ppm) exceeded Track 1 Unrestricted Use SCOs in all seven samples. Of these metals, arsenic, barium, cadmium, copper, lead, mercury, and zinc also exceeded Track 2 Restricted Residential Use SCOs. Elevated concentrations of SVOCs and metals in boring B4 are evident of coal debris (historic fill) as identified in the borings log for this location. The results indicate SVOCs and metals hotspot in three borings B1, B4 and B5. Boring B1 is also a hotspot for pesticides. Overall, the soil findings were consistent with observations for historical fill sites in areas throughout NYC.
7. Data collected during the RI was compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). Groundwater samples showed no VOCs, pesticides or PCBs detected above their respective GQS in any of the four groundwater samples. Five SVOCs including benzo(a)anthracene (max. of 2.4 ppb),

benzo(b)fluoranthene (max. of 3.3 ppb), benzo(k)fluoranthene (max. of 1.1 ppb), chrysene (max. of 2.6 ppb), and indeno(1,2,3-cd)pyrene (max. of 1.6 ppb) were detected above GQS in one or more samples. Several metals were identified in one or more of the groundwater samples, but only aluminum, iron, manganese, and sodium exceeded their respective GQS in dissolved samples..

8. Soil vapor samples collected during the RI show low levels of petroleum compounds and chlorinated VOCs. Concentrations of petroleum-related VOCs (BTEX) ranged from 23.93 $\mu g/m^3$ to 36.46 $\mu g/m^3$ for sub-slab samples and 25.74 $\mu g/m^3$ to 43.04 $\mu g/m^3$ for ambient indoor air samples. Overall, the highest reported concentration was for acetone (639 $\mu g/m^3$ in one indoor air sample). Chlorinated VOCs including Tetrachloroethene (PCE) (max of 146 $\mu g/m^3$) trichloroethene (TCE) (max. of 6.9 $\mu g/m^3$), 1,1,1-Trichloroethane (max. of 3.7 $\mu g/m^3$) and carbon tetrachloride (max. of $\mu g/m^3$) were detected in one or more of the five sub-slab soil vapor samples as well as in the ambient indoor air samples. PCE and TCE were detected in the monitoring level range established by NYSDOH guidance matrix.

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.

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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.

Soil

- Prevent direct contact with contaminated soil.
- Prevent exposure to contaminants volatilizing from contaminated soil.

Soil Vapor

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

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

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 approximately to 8 feet to removal all historic fill/contaminated soils. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the

base of the excavation, additional excavation will be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering or Institutional Controls are required in a Track 1 Unrestricted Use cleanup, but a vapor barrier would be installed beneath the foundation of the new building lobby and elevator area as a part of new development to prevent any potential future exposures from off-Site soil vapor.
- As part of new development, placement of a final cover over the entire Site.

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 SCOs have been achieved with post-excavation endpoint sampling. As no excavation is planned for renovation of the existing structure, with the exception of the elevator pit, hotspot excavation will be completed at three locations across the Site. Excavation of boring B1 and B5 will take place to a depth of 4 ftbg and boring location B4 will be excavated to a minimum depth of 6 ftbg. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the hotspot excavations after soil removal, additional excavation will 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 vapor barrier beneath the new building's lobby and elevator area.
- 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/soil 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, and vapor barrier beneath the residential lobby and elevator area. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. 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 new building would be prevented via the ventilated parking area located throughout the first floor. The ground floor indoor parking area will be built and ventilated per requirements of NYC Building

Department's codes.

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. Compliance with SCGs for soil vapor would also be achieved through the vapor barrier beneath the residential lobby and elevator area and by ventilated ground level indoor parking area per requirements of the NYC Building Department's codes.

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 through the vapor barrier beneath the new building's lobby and by the ventilated parking garage located on the ground floor, the parking garage will be built and ventilated per requirements of the NYC Building Department's codes. 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 would 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 could potentially be higher for Alternative 1 if excavation of greater amounts of historical fill material is encountered below the excavation depth of the proposed building. 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 4, 25-ton capacity truck trips would be necessary to transport fill and soil excavated during Site development. Track 1 cleanup would require approximately 165 truck trips. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flaggers would be used to protect pedestrians at Site entrances and exits.

The effects of these potential adverse impacts to the community, workers and the environmental would be minimized through implementation of corresponding control plans including a CHASP, a 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 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 will 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 new building 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 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.

Since historic fill at the Site was found during the RI to extend to depths of up to 8 feet below grade, and the building renovations required no excavation with the exception of the elevator pit, the costs associated with Alternative 1 would be much greater than Alternative 2.

There would be additional costs associated with Alternative 1 if soil with analytes above Unrestricted Use SCOs is encountered below the depth required for excavation. Additional costs would include installation of shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 may be 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/or 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 residential use. 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.

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 D.

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. Establish 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 Site Specific SCOs. Hotspot excavation will be completed at three locations across the Site. Excavation of B1 and B5 will take place to a depth of 4 ftbg and a minimum of 6 ftbg at boring location B4. In addition, elevator pit will be excavated to depths of six feet below grade.
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. A vapor barrier will be installed beneath the residential lobby area. The vapor barrier would consist of Raven Industries' VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from polyethylene and EVOH resins.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. Construction and maintenance of an engineered composite cover consisting of the existing building concrete slab across the footprint of the renovated building. Composite cover system will manage residual soil contamination in place.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
16. 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
17. The property will continue to be registered with an E-Designation at the NYC Building Department. Establishment of Engineering Controls and Institutional Controls; 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 SCOs for this site are included in the 6 NYCRR Part 703.5 Table 6.8 (b) as amended by for compounds below:

Contaminant	Track 4 SCOs
Total SVOCs	500 ppm
Barium	800 ppm
Lead	1200 ppm
Mercury	2.5 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 90 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, five post excavation endpoint samples will be collected from each of the three hotspot excavations and will be analyzed for VOCs, SVOCs, TAL Metals as listed in

Section 4.2, and pesticides. The approximate collection location of the endpoint soil samples is shown on Figure 6.

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:

- SVOCSs by EPA Method 8270;
- VOCs by EPA Method 8260;
- Target Analyte List metals; and
- Pesticides by EPA Method 8081.

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.

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 is approximately 70 tons. The estimated quantity of onsite soil/fill expected to be reused/relocated on Site is 0 tons.

4.3 Engineering Controls

The excavation required for the proposed Site development will achieve Track 4 Site Specific SCOs. Engineering Controls are required to address residual contamination at the Site. The following elements will be incorporated into the foundation design as part of the development: composite cover system and soil vapor barrier.

A vapor barrier will be installed beneath the residential lobby and elevator area. This element will also constitute an Engineering Control. A sub-slab depressurization system will not be required as the entire first floor of the renovated building will be utilized for indoor parking and as such will be ventilated in accordance with NYC Building Department code.

Composite Cover System

As part of renovation, the entire property will be covered by an engineered permanent cover system. This cover system will be comprised of the existing 4 inch thick concrete-building slab. The existing building slab will be removed at each hotspot location to facilitate soil removal. It is estimated that each hotspot location will require removal of a 10ft x 10ft portion of the concrete slab. Removal of existing slab will also take place in the proposed elevator pit area in order to enlarge the existing structure. It is estimated that the residential lobby and elevator pit will

require removal of a 10ft by 20ft portion of the existing concrete slab. Upon completion of excavation activities, all areas will be backfilled and 4 inch thick concrete replacement slab will be poured.

The composite cover system is a permanent engineering control for the Site. The cover 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

As part of development, migration of potential soil vapor from offsite in the future will be achieved with a combination of building slab and vapor barrier. A vapor barrier will be installed beneath the residential lobby and elevator area of the new building. 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 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 installation. The extent of the proposed vapor barrier membrane is provided in Figure 7. Product specification sheets are provided in Attachment F. 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**.** Vapor barrier specifications are included in **Attachment F**.

4.4 Institutional Controls

Institutional Controls (IC) will be utilized 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 implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR.

Institutional Controls for this remedial action are:

- Continued registration of the E-Designation for the property. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Site Management Plan approved 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 at a frequency to be determine by OER in the SMP 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;

4.5 Site Management Plan

Site Management will be performed for this Track 4 cleanup and will be 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 SMP describes appropriate methods

and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all site management responsibilities defined in the SMP are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Voluntary Cleanup Agreement with 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 July 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

- Three VOCs, acetone, m&p Xylenes and o-Xylenes exceeding Track 1 Unrestricted Use SCOs;
- SVOCs including, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene exeeding Track 2 Restricted Residential SCOs and dibenzofuran and napthalene exceeding Track 1 Unrestricted Use SCOs;
- Pesticides including 4,4'-DDD and 4,4'-DDE exceeding Track 1 Unrestricted Use SCOs and 4,4'-DDT and dieldrin exceeding Track 2 Restricted Residential SCOs; and
- Metals, including arsenic, barium, cadmium, copper, lead, mercury, and zinc exceeding Track 2 Restricted Residential SCOs and chromium and nickel exceeding Track 1 Unrestricted USe SCOs.

Groundwater

- SVOCs including benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene exceeding GQSs; and
- Metals including aluminum, iron, sodium and manganese exceeding GQSs;

Soil vapor

- Chlorinated VOCs detected above NYSDOH Guidance Values in one sampling location for PCE and TCE; 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. Xylenes were detected in one soil sample obtained from the 0 to 4 foot interval. SVOCs and metals found in soil were found in groundwater samples obtained at concentrations above their respective GQSs, indicating that this contamination is mobilizing into groundwater or migrating off-site.

CVOCs detected in one sub-slab soil gas sample were not detected in soil or groundwater samples collected from this area, indicating that soil vapor may be migrating on-site from an off-site source.

Receptor Populations

On-Site Receptors – The Site is currently improved with a vacant single story commercial building. On-site receptors consist of site visitors and trespassers. 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 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 commercial building. Groundwater is 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. Based upon data collected from the RI, soil vapor is accumulating beneath the current building slab.

Construction/ Remediation Activities: Once redevelopment activities begin, construction workers will come into direct contact with surface and subsurface soils and soil vapor, 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, fill, and soil vapor. 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 the ventilated indoor ground level parking area 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 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. This assessment takes into consideration the reasonably anticipated use of the site, which includes a residential structure and site-wide impervious surface cover cap. 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 current unremediated phase and the remedial action phase. Under current conditions, on-Site exposure pathways exist for site visitors and trespassers. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material and soil vapor 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, a site wide composite cover system and ventilated indoor ground level parking area will be in place.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

Principal personnel who will participate in the remedial action include Kristen DiScenza, 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 enrollee will undertake the following steps for site preparedness prior to the event and response after the event.

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; 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 the following:

a) Continue south on Union Avenue to I-278 (Brooklyn Queens Expressway) North or South

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.

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 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 2 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	2
Demobilization	10	1
Submit Remedial Action Report	20	-

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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.

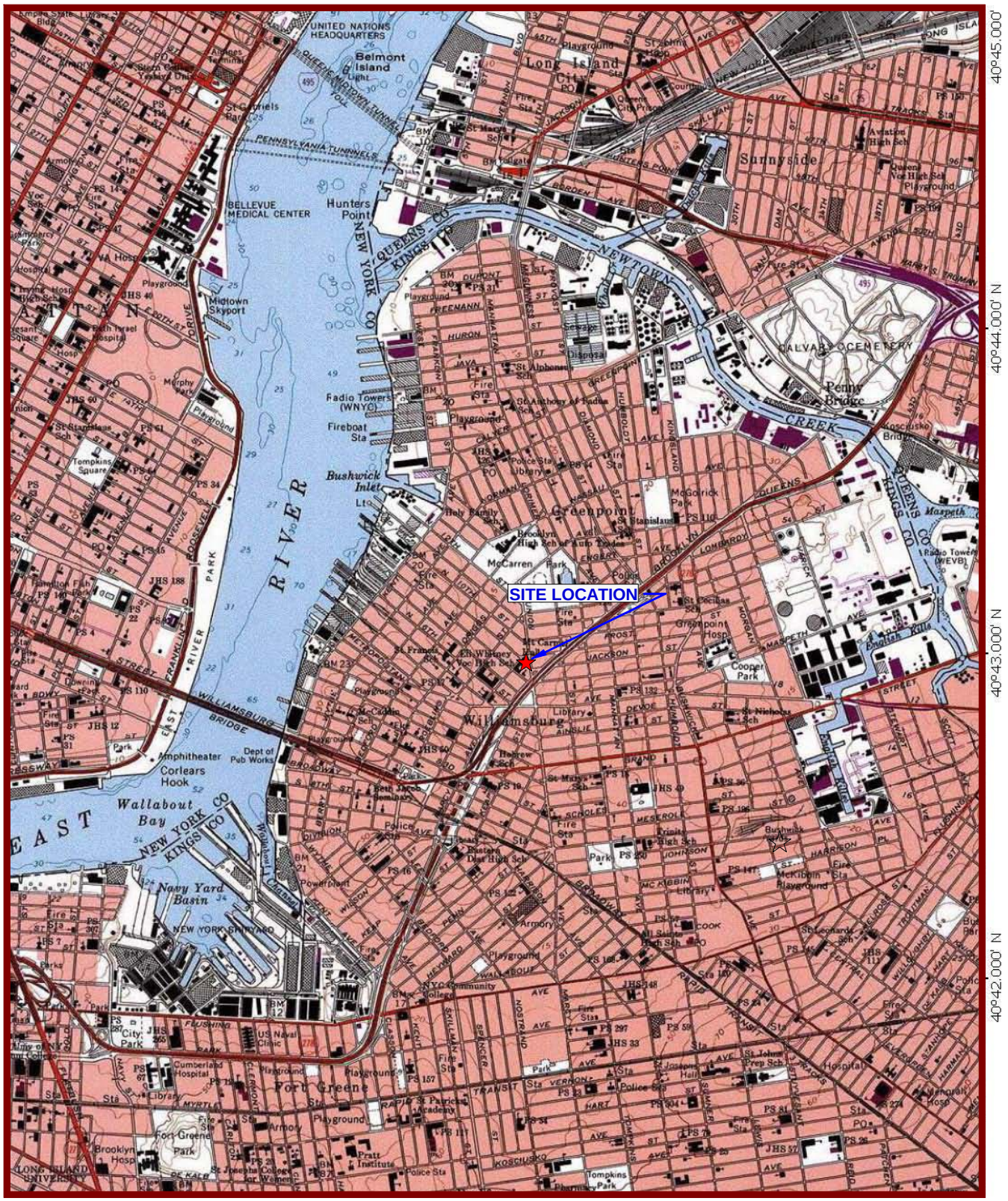
b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

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

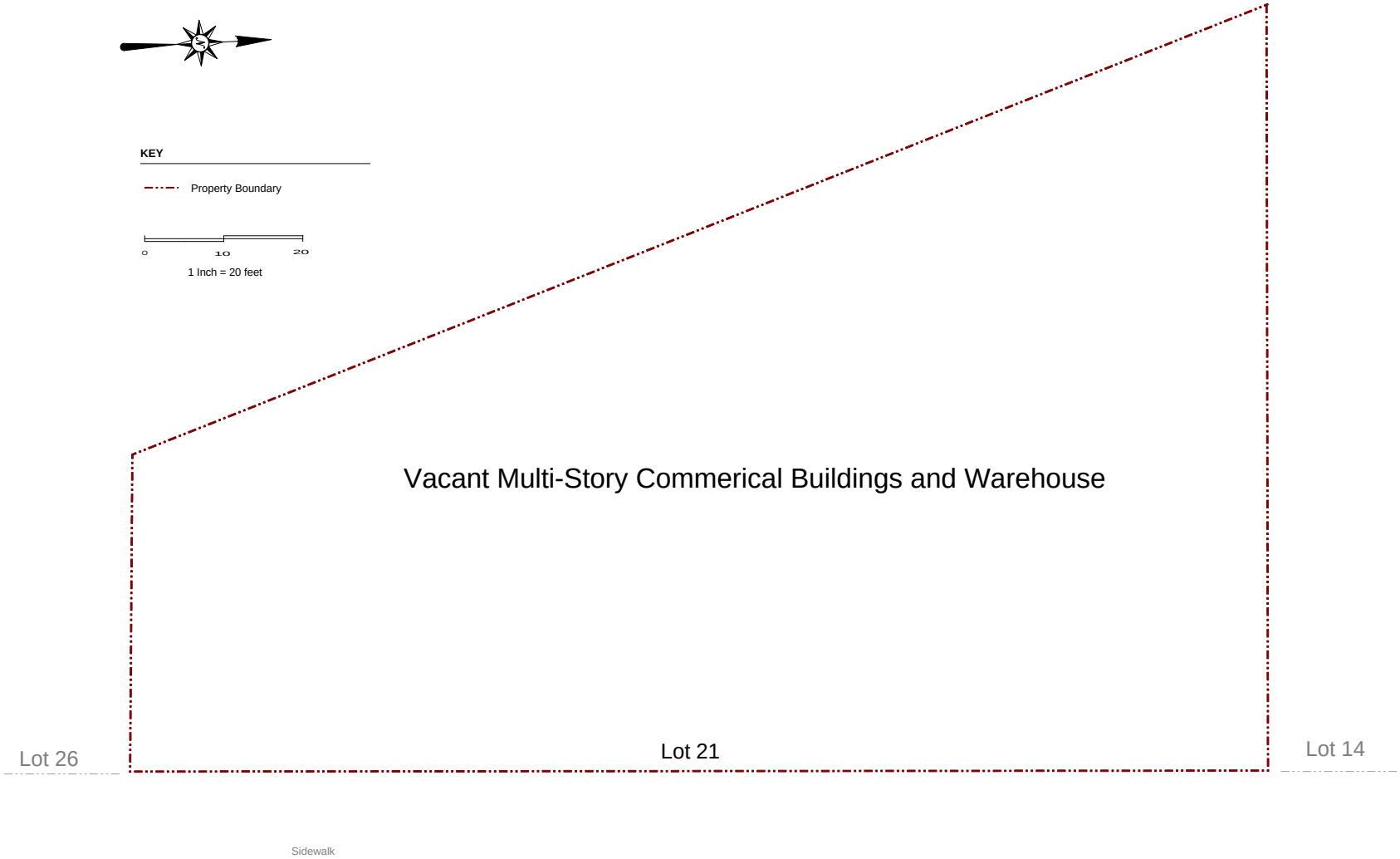


USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

EBC
Environmental Business Consultants
Phone 631.504.6000
Fax 631. 924 .2870

505 Union Avenue
Brooklyn, NY

FIGURE 1 Site Location Map



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505 Union Avenue, Brooklyn, NY
Block 2315 Lot 21

FIGURE 2 - Site Plan

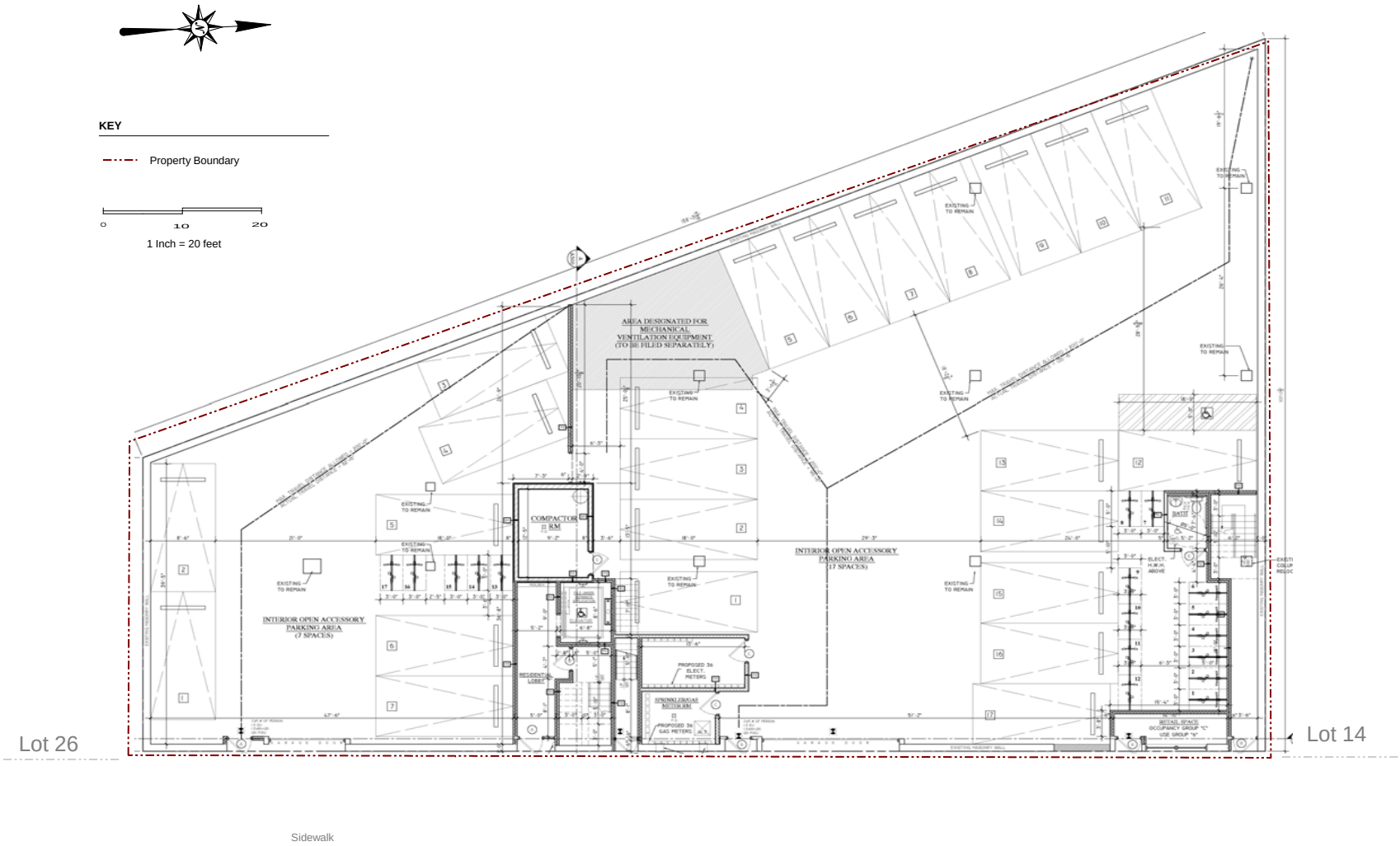

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FIGURE 3 - Redevelopment Plan

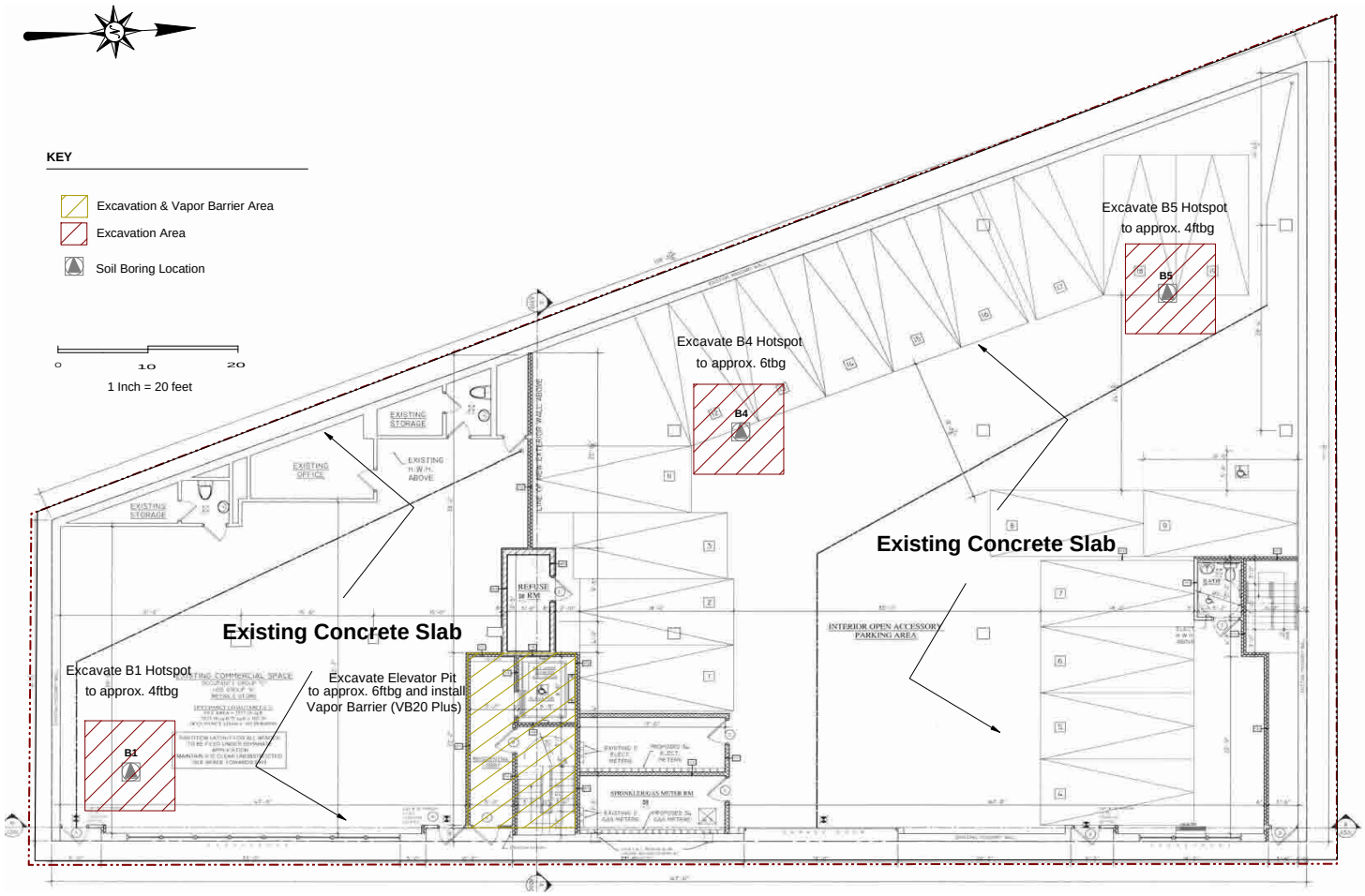
Source: http://www.oasisnyc.net/map.aspx

FIGURE 4
SURROUNDING LAND USE MAP

505 UNION AVENUE, BROOKLYN, NY

REMEDIAL INVESTIGATION REPORT

EBC
ENVIRONMENTAL BUSINESSS CONSULTANTS
1808 MIDDLE COUNTRY ROAD, RIDGE, NEW YORK 11961
PHONE: (631) 504-6000 FAX: (631) 924-2870



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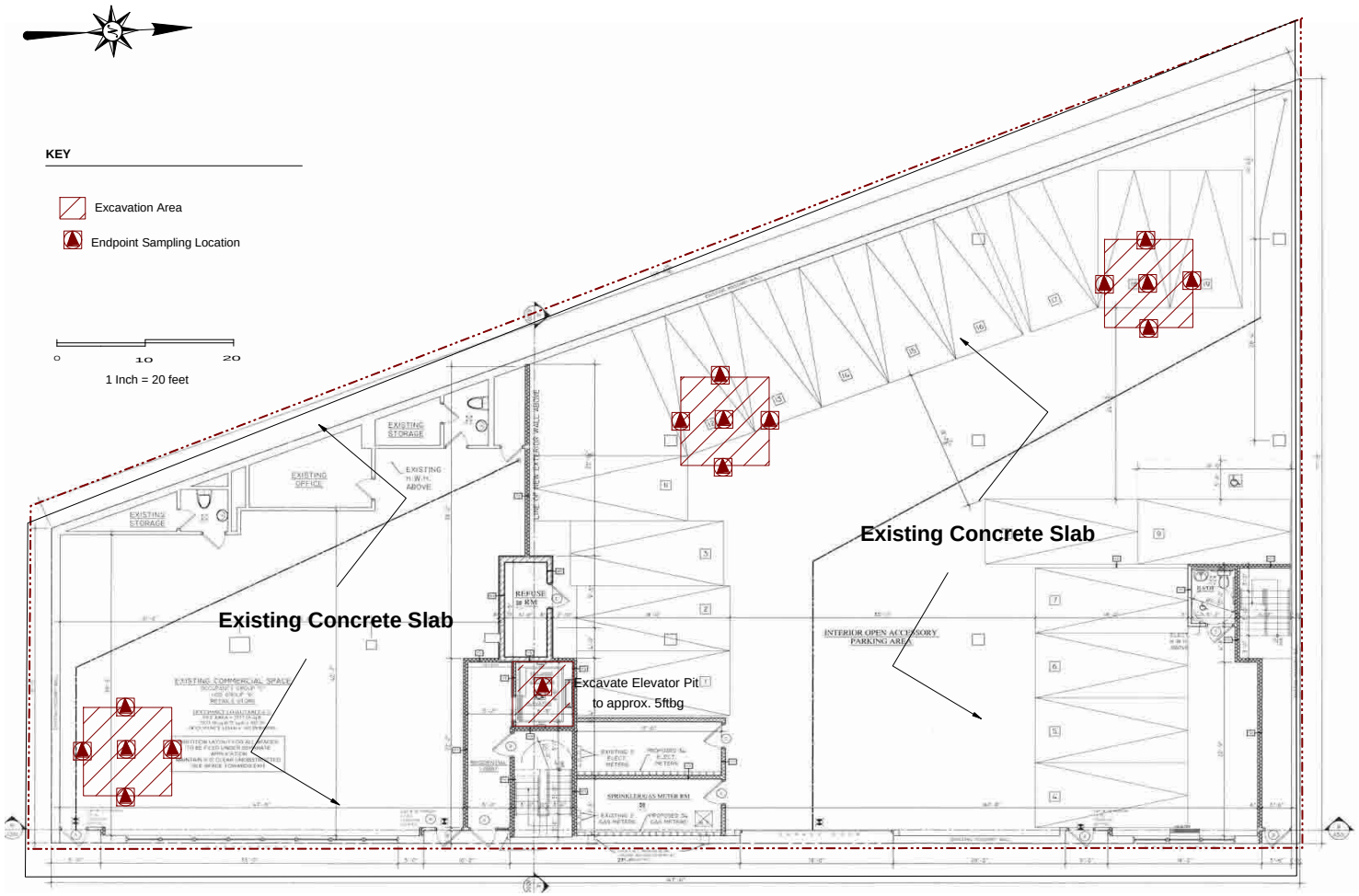
505 UNION AVENUE, BROOKLYN, NY
BLOCK 2315 LOT 21

FIGURE 5 - EXCAVATION AND CAPPING PLAN



Sidewalk

UNION AVENUE

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Block 2315 Lot 21

FIGURE 6 - Endpoint Sampling Locations

ATTACHMENT A
PROPOSED DEVELOPMENT PLANS

Proposed Alteration to Existing One (1) Story & Mezzanine Commercial Building to a Six (6) Story Mixed-Use Building

Located at 503 Union Avenue, Brooklyn, New York

ABBREVIATIONS

&	AND
∠	ANGLE
@	AT
℄	CENTERLINE
#	POUND OR NUMBER
ℙ	PROPERTY LINE
A/C	AIR CONDITIONING
ACC.	ACCESSORY
ACT.	ACOUSTICAL CEILING TILE
ADJ.	ADJUSTABLE
A.F.F.	ABOVE FINISHED FLOOR
ALUM.	ALUMINUM
ALLOW.	ALLOWABLE
APP'L.	APPLICATION
APPVD.	APPROVED
APPROX.	APPROXIMATE
ARCH.	ARCHITECTURAL
ASPH.	ASPHALT
B.	BOILER
B.C.	BOTTOM OF CURB
BD.	BOARD
BITUM.	BITUMINOUS
BLDG	BUILDING
BLK.	BLOCK
BLKG.	BLOCKING
BM.	BEAM
BOT.	BOTTOM
B.O.	BOTTOM OF
BRG.	BEARING
BTW'N.	BETWEEN
B.U.R.	BUILT-UP ROOFING
C/T	CERAMIC TILE
CAB.	CABINET
CANT.	CANTILEVER
C.B.	CATCH BASIN
CEIL'G	CEILING
CEM.	CEMENT
CER.	CERAMIC
C.F.	COLD FORMED
C.G.	CORNER GUARD
C.I.	CAST IRON
C.J.	CONTROL JOINT
CL.	CLOSET
CLK'G.	CAULKING
CLR.	CLEAR
CMU	CONCRETE MASONRY UNIT
CNTR.	COUNTER
C.O.	CASED OPENING
COL.	COLUMN
CONC.	CONCRETE
CONN.	CONNECTION
CONST.	CONSTRUCTION
CONT.	CONTINUOUS
CORR.	CORRIDOR
CTR.	CENTER
CTSK.	COUNTERSUNK
C.W.	COLD WATER
D.	DEPTH
DBL.	DOUBLE
DEPT.	DEPARTMENT
D.F.	DRINKING FOUNTAIN
DET.	DETAIL
DIA.	DIAMETER
DIM.	DIMENSION
DISP.	DISPENSER
DN.	DOWN
D.O.	DOOR OPENING
DR.	DOOR
DS.	DOWNSPOUT
DWG.	DRAWING
DWR.	DRAWER
DURO.	DURANODIC
E.	EAST
EA.	EACH
E.I.F.S.	EXT. INSUL. & FINISH SYSTEM
E.J.	EXPANSION JOINT
EL.	ELEVATION
ELEV.	ELEVATION
ELEC.	ELECTRIC
EMER.	EMERGENCY
ENCL.	ENCLOSURE
EQ.	EQUAL
EQPT.	EQUIPMENT
E.U.	EXIT UNIT(S)
E.W.	EACH WAY
E.W.C.	ELECTRIC WATER COOLER
EXH.	EXHAUST
EXP.	EXPANSION
EXPO.	EXPOSED
EXST.	EXISTING
EXT.	EXTERIOR
F.	FLUSH
FABR.	FABRICATOR / FABRICATED
F.C.	FURRING CHANNEL
F.D.	FLOOR DRAIN
FDN.	FOUNDATION
F.E.	FIRE ESCAPE
F/E	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
FIN.	FINISH
FIXT.	FIXTURE
FL.	FLOOR
FLASH.	FLASHING
FLUOR.	FLUORESCENT
F.O.(XX)	FACE OF (XX)
F.O.C.	FACE OF CONCRETE
F.O.F.	FACE OF FINISH
F.O.M.	FACE OF MASONRY
F.O.S.	FACE OF STUDS
F.P.S.C.	FIRE PROOF SELF CLOSING
FR.TR.	FIRE-RETARDANT TREATED
F.S.	FIBER STRENGTH
FT.	FOOT OF FEET
FTG.	FOOTING
FURR.	FURRING
GA.	GAUGE
GALV.	GALVANIZED
G.C.	GENERAL CONTRACTOR
GL.	GLASS
GR.	GRADE
G.W.B.	GYPSUM WALL BOARD
GYP.BD.	GYPSUM BOARD
H.B.	HOSE BIBB
H.C.	HOLLOW CORE
HD.	HOOD
H.D.	HEAVY DUTY
HDR.	HEADER
HDWD.	HARDWOOD
HDWE.	HARDWARE
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
H.P.	HIGH POINT
HR.	HOUR
H.S.S.	HOLLOW STEEL SECTION
HT.	HEIGHT
HVAC.	HEAT'G, VENTILAT'G & AIR COND.
H.W.	HOT WATER
H.W.H.	HOT WATER HEATER
I.D.	INSIDE DIMENSION
I.G.	INSULATING GLASS
INFO.	INFORMATION
INSUL.	INSULATION
INT.	INTERIOR
INV.	INVERT
JAN.	JANITOR
JT.	JOINT
KIT.	KITCHEN
KIT"TE	KITCHENETTE
L.	LENGTH
LAM.	LAMINATE
LAV.	LAVATORY
LNDRY.	LAUNDRY
L.P.	LOW POINT
LTG.	LIGHTING
M.	MEN
MAS.	MASONRY
MAT.	MATERIAL
MAX.	MAXIMUM
MECH.	MECHANICAL
MED.	MEDIUM
MEMB.	MEMBRANE
MET.	METAL
MFG.	MANUFACTURER
MIN.	MINIMUM
MISC.	MISCELLANEOUS
M.O.	MASONRY OPENING
M.R.	MOISTURE RESISTANT
M.S.	MARBLE SADDLE
MTD.	MOUNTED
MTG.	MOUNTING
MTL.	METAL
MTL. S.	METAL SADDLE
N.	NORTH
N. & FS.	NEAR AND FAR SIDE
N.I.C.	NOT IN CONTRACT
NO. or #	NUMBER
NOM.	NOMINAL
N.T.S.	NOT TO SCALE
O.A.	OVER ALL
OBS.	OBSCURE
O.C.	ON CENTER
OCC.	OCCUPANT(S)
O.D.	OUTSIDE DIMENSION
O.H.	OVER HANG
OPEN'G	OPENING
OPP.	OPPOSITE
PL.T.	PLATE
PARTN.	PARTITION
P.L.	PROPERTY LINE
PL. LAM.	PLASTIC LAMINATE
PLAS.	PLASTER
PLMB.	PLUMBING
PLYWD.	PLYWOOD
P.O.C.	POINT OF CONNECTION
P	4"x4" POST
PP	4"x6" POST
PR.	PAIR
PRCST.	PRE-CAST
PR.TR.	PRESSURE TREATED
P.S.F.	POUNDS/ SQ. FEET
P.S.I.	POUNDS/ SQ. INCHES
P/T	PRESSURE TREATED
PT.	POINT
PTD.	PAINTED
P.V.C.	POLYVINYL CHLORIDE
Q.T.	QUARRY TILE
QTR.	QUARTER
R.	RISER
RAD.	RADIUS
R.D.	ROOF DRAIN
RECEPT.	RECEPTACLE
REF.	REFERENCE
REFR.	REFRIGERATOR
REINF.	REINFORCED
REQ'D.	REQUIRED
RES.	RESILIENT
RET.	RETAINING
RM.	ROOM
RND.	ROUND
R.O.	ROUGH OPENING
R.T.U.	ROOF TOP HVAC UNITS
RWC.	RAINWATER CONDUCTOR
S.	SOUTH
S/C	SELF CLOSING
S.C.	SOLID CORE
SCHED.	SCHEDULE(D)
SECT.	SECTION
SF.	STOREFRONT
SHT.	SHEET
SIM.	SIMILAR
S.J.	SAWCUT JOINT
SPEC.	SPECIFICATION
SPECD.	SPECIFIED (SECTION)
S.ST.	STAINLESS STEEL
STD.	STANDARD
STL.	STEEL
STR'G	STORAGE
STRUCT.	STRUCTURAL
SUSP.	SUSPENDED
T & B	TOP AND BOTTOM
T.C.	TOP OF CURB
TEL.	TELEPHONE
T & G	TONGUE AND GROOVE
T.G.	TEMPERED GLASS
THK.	THICK
THR.	THRESHOLD
T.I.G.	TEMPERED INSULATING GLASS
T/O	TOP OF
T.O.S.	TOP OF SLAB
T.P.	TOP OF PAVEMENT
T.S.	TUBE STEEL
TV.	TELEVISION
T.W.	TOP OF WALL
TYP.	TYPICAL
UNF.	UNFINISHED
U.G.	UNDERGROUND
U.O.N.	UNLESS OTHERWISE NOTED
UR.	URINAL
VCT.	VINYL COMPOSITION TILE
VERT.	VERTICAL
VEST.	VESTIBULE
V.I.F.	VERIFY IN FIELD
V.T.R.	VENT THRU ROOF
VWC	VINYL WALL COVERING
W.	WEST
W/	WITH
W.C.	WATER CLOSET
WD.	WOOD
WD.S.	WOOD SADDLE
WDT.	WIDTH
W.I.C.	WALK IN CLOSET
W/O	WITHOUT
WOM.	WOMEN
WP.	WATERPROOF
WSCT.	WAINSCOT
WT.	WEIGHT
W.W.M.	WELDED WIRE MESH

SYMBOLS

- EQUIPMENT
- PLAN NOTE
- WALL TYPE
- DOOR TYPE
- ROOM No.
- WINDOW TYPE
- REVISIONS
- ELEVATIONS
- SECTION (DET. NO. / DWG. NO.)
- DETAIL (DET. NO. / DWG. NO.)
- ELEVATION HEIGHT
- APPROVED TYPE EXIT LIGHT AND SIGN
- APPROVED DIRECTIONAL TYPE EXIT LIGHT AND SIGN
- SD/CO — DENOTES U.L. LISTED HARD WIRED SMOKE & CARBON MONOXIDE DETECTOR
- DENOTES MARBLE SADDLE
- M.V. — DENOTES MIN 50cfm (2cfm /sq.ft. min. for Kitchette) EXHAUST FAN DUCTED TO OUT DOORS PROVIDE FUSIBLE-LINK FIRE DAMPER WHERE EXHAUST DUCTS PASS THRU RATED CONSTRUCTION
- F.D. — 2" DIA. FLOOR DRAIN
- A.D. — 3" DIA. AREA DRAIN
- SP — DENOTES APPROVED TYPE PENDANT TYPE SPRINKLER HEAD MEA NO. 354-01-E, CENTRAL SPRINKLER

- PLYWOOD
- ROUGH WOOD
- FINISH WOOD
- RIGID INSULATION
- BLANKET INSULATION
- ACOUSTICAL TILE
- GYPSUM BOARD
- EARTH
- FILL
- CONCRETE
- CONCRETE BLOCK
- FACE BRICK
- STEEL OR ALUM.
- MENS — MEN'S RESTROOM
- MEN — MEN'S RESTROOM /HANDICAPPED ACCESSIBLE
- WOMENS — WOMEN'S RESTROOM
- WOMEN — WOMEN'S RESTROOM /HANDICAPPED ACCESSIBLE
- TOILETS — UNISEX RESTROOM
- TOILETS — UNISEX RESTROOM /HANDICAPPED ACCESSIBLE
- W.C. — WATER COOLER

DRAWING LIST

A000 -COVER SHEET
Z001 -PLOT PLAN AND ZONING CALCS.
A002 -AREA BREAKDOWN
-ENERGY COMPLIANCE
A003 -AREA DEDUCTIONS
A004 -GENERAL NOTES
A005 -GENERAL NOTES

A101 -FIRST FLOOR PLAN
A102 -MEZZANINE FLOOR PLAN
A103 -SECOND FLOOR PLAN
A104 -THIRD and FOURTH FLOOR PLAN
A105 -FIFTH FLOOR PLAN
A106 -ROOF FLOOR PLAN

A200 -FRONT ELEVATION
A201 -REAR ELEVATION

A300 -BUILDING SECTION A-A
A301 -BUILDING SECTION B-B

A400 -WALL TYPES
A401 -STAIR DETAIL

A500 -PLUMBING RISER DIAG.
A501 -GAS RISER DIAG.
A502 -DOOR / WINDOW SCHEDULE
A503 -HC DETAILS
A504 -HC DETAILS.

LEGEND

SEE A401 FOR DETAILS

The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

REVISIONS:

NO.:	DATE:	DESCRIPTION:

THE ARCHITECT SHALL NOT HAVE CONTROL OR CHARGE OF AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, DEVIATIONS, TECHNIQUES, SEQUENCES, OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ALWAYS USE DIMENSIONS AS SHOWN. DRAWINGS ARE NOT TO BE SCALED

REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

139 FULTON STREET, SUITE 318
NEW YORK, N.Y. 10038
TEL. 212.393.9679

PROFESSIONAL SEAL:

Z:\My Stuff\NuAn Stationery\NuanDesign Logo-Address.jpg

PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

JOB APPLICATION #

COVER

SCALE: INDICATED	DRAWING #:
DRAWN BY:	A-103.00
DESIGED BY:	
DATE: 02/01/2011	
JOB NO.:	
CHECKED BY:	

ZONING COMPUTATIONS

ZONING CALCULATIONS

FAR = FLOOR AREA RATIO	DU = DWELLING UNIT	COM = COMMERCIAL	
LC = LOT COVERAGE	RES = RESIDENTIAL	FA = FLOOR AREA	
ITALICS = DOES NOT COUNT AS F.A.			

ZONE: M1-2 /R6 MX-8 Special Use District
MAP: 13b
BLOCK: 2315
LOT: 21

LOT AREA COMPUTATION — **PROJECT 10-120**

LOT AREA	=	**10,386.47 SF**

Note: See Architectural Dwgs for Area Breakdown

FLOOR AREA RATIO

MAX. FAR (ZR 23-145, 23-942 & 123-64) FOR RESIDENTIAL		=	**2.70 OF LOT AREA**
MAX FAR	= 2.70 x 10,386.47	=	28,043.47 SF
MAX. FAR (ZR 43-12 & 123-64) FOR MANUFACTURING /COMMERCIAL		=	**2.00 OF LOT AREA**
MAX FAR	= 2.00 x 10,386.47	=	20,772.94 SF

TOTAL ALLOWABLE FA = 28,043.47 SF

Note: See Architectural Dwgs for Area Breakdown

LOT COVERAGE RATIO

MAX. LC (ZR 23-145 & 123-63) FOR RESIDENTIAL		=	**65.00 %**
MAX LC:	= 10,386.47 x 0.65	=	6,751.21 SF
ACTUAL LC:	= 6,371.68	=	**6,371.68 SF**

Note: See Architectural Dwgs for Area Breakdown

MAX. LC (ZR 123-64) FOR MANUFACTURING /COMMERCIAL			**N/A %**
MAX LC:	=	=	N/A
ACTUAL LC:	= 10,386.47	=	**10,386.47 SF**

Note: See Architectural Dwgs for Area Breakdown

PROPOSED FLOOR AREA

EXISTING GROSS COMMERCIAL F.A.

	Existing		
1st	= 82.96	=	82.96 SF
	TOTAL ACTUAL GROSS COMMERCIAL F.A.	=	**82.96 SF**

EXISTING/PROPOSED GROSS RESIDENTIAL F.A.

	DU	Existing	+ Proposed		
1st	**0**	= 10,303.16	+ 0.00	=	10,303.16 SF
Mezzanine	**4**	= 2,857.46	+ 330.92	=	3,188.38 SF
2nd	**8**	= 0.00	+ 6,356.80	=	6,356.80 SF
3rd	**8**	= 0.00	+ 6,356.80	=	6,356.80 SF
4th	**8**	= 0.00	+ 6,356.80	=	6,356.80 SF
5th	**6**	= 0.00	+ 5,366.45	=	5,366.45 SF
Total DU:	**34**	13,160.62	+ 24,767.77	**TOTAL ACTUAL GROSS RESIDENTIAL F.A.** =	**38,011.35 SF**

Note: See Architectural Dwgs for Area Breakdown

ALLOWABLE DEDUCTION AREA

PIPE CHASE WALLS		**Proposed**		
1st	=	0.00	=	0.00 SF
Mezzanine	=	32.26	=	32.26 SF
2nd	=	66.90	=	66.90 SF
3rd	=	66.90	=	66.90 SF
4th	=	66.90	=	66.90 SF
5th	=	49.38	=	49.38 SF
			TOTAL PIPE CHASE WALLS =	**282.34 SF**

Note: See Architectural Dwgs for Area Breakdown

COMPACTOR ROOM		=	
COMPACTOR AT 1st FLOOR		=	140.88 SF
	TOTAL REFUSE ROOM	=	**140.88 SF**

Note: See Architectural Dwgs for Area Breakdown

INTERIOR ACCESSORY PARKING			
PARKING AT 1st FLOOR ONLY	= +	=	9,572.56 SF
	TOTAL PARKING AREA	=	**9,572.56 SF**

Note: See Architectural Dwgs for Area Breakdown

NET FLOOR AREA

TOTAL GROSS FLOOR AREA		=	**38,011.35 SF**
DEDUCTIONS			
PIPE CHASE WALLS		=	282.34 SF
COMPACTOR ROOM		=	140.88 SF
ACCESSORY PARKING		=	9,572.56 SF
	TOTAL DEDUCTIONS	=	**9,995.78 SF**
ACTUAL NET FA :	38,011.35 - 9,995.78	=	28,015.57 SF
MAX. ALLOWABLE FA:		=	28,043.47 SF
	28,015.57 2.70 F.A.R.	***IS LESS THAN***	**28,043.47 SF** 2.70 F.A.R.

Note: See Architectural Dwgs for Area Breakdown

DENSITY REGULATIONS

DENSITY (ZR 23-22 & 15-111)			
PER RESIDENTIAL DU			**680.00 SF**
	FA / DU		
	27,960.51 / 680.00	=	41.12 DU
	MAX. AMOUNT OF DU =	**41** >	**34 DU (Actual)**

YARD REGULATIONS

LOT AREA AND LOT WIDTH REGULATIONS

	Z.R. SECTION	REQUIRED	PROVIDED
LOT WIDTH	ZR 23-32	18'-0"	147'-0"
LOT AREA	ZR23-32	1,700.00 SF	10,386.47 SF

YARDS REQUIREMENTS

FRONT	ZR 23-45 & 123-651	NONE	0'-0"
SIDE	ZR 23-462c & 123-651	0'-0" OR MAX 8'-0"	0'-0"
REAR	ZR 23-47 & 23-52	30'-0", -1'-0" >70'-0" DEEP & 8'-0"	30'-0", -1'-0" >70'-0" DEEP & 8'-0"

HEIGHT & SETBACK REGULATIONS

HEIGHT	**Z.R. SECTION**	**REQUIRED**	**PROVIDED**
BASE HEIGHT	ZR 123-662 TABLE A	MIN 40'-0" MAX. 60'-0"	60'-0"
MAX. BUILDING HEIGHT		110'-0"	60'-0"
SETBACK	ZR 123-662	15'-0" Narrow St. & 10'-0" Wide St.	0'-0"

PARKING REGULATIONS

PARKING REQUIRMENTS	**Z.R. SECTION**	**REQUIRED**	**PROVIDED**
RESIDENTIAL PARKING	ZR 123-72 & 25-23	70% x 34.00 = 23.8 SPCs	25 SPCs
COMMERCIAL PARKING	ZR 123-71 & 44-21	1 PER 200.0 SF = 0 SPCs	See Parking Waiver
PARKING WAIVER			
COMMERCIAL	ZR 44-23	MAX. WAIVER = 15 SPCs	PARKING WAIVED

BICYCLE PARKING REQUIREMENTS (ZR 25-811 & 44-60)

	MIN. REQUIRED	PROPOSED
Residential PARKING	1 / 2 DU = 17 SPCs	18
Commercial PARKING	1 / 10,000.00 = 0 SPCs	0

LOADING BERTH	**Z.R. SECTION**	**REQUIRED**	**PROVIDED**
COMMERCIAL	ZR 44-52	None Required for First 8,000.0 sq.ft.	LOADING BERTH WAIVED

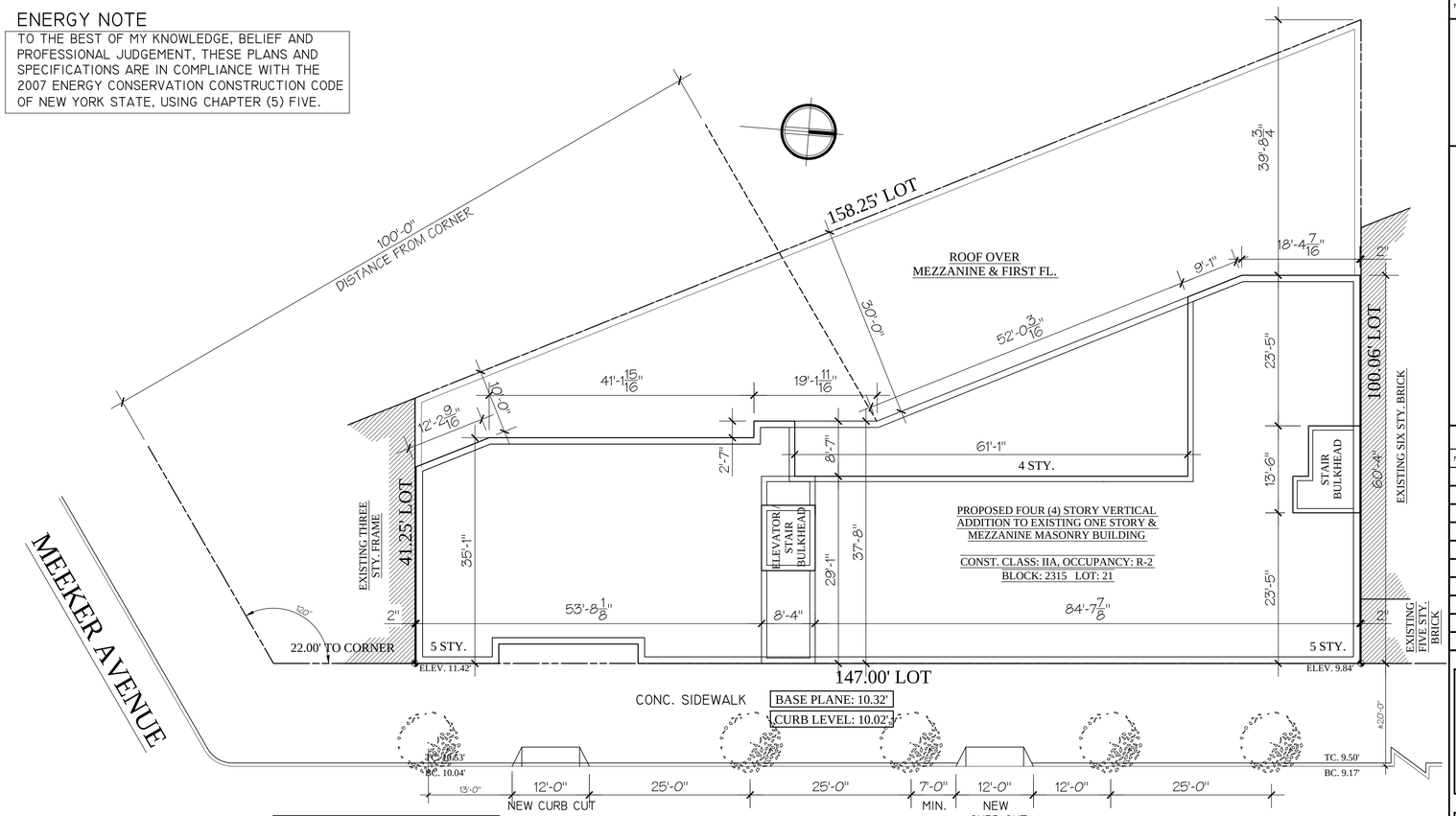
Revised 09-2-2011

PLOT PLAN

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

ENERGY NOTE

TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2007 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE, USING CHAPTER (5) FIVE.



SIX (6) STREET TREES REQUIRED AS PER Z.R. 26-41. FOUR (4) PROVIDED; ONE (1) TO BE TO BE PLANTED OFF-SITE. EXACT LOCATIONS DETERMINED BY DEPT. OF PARKS AND RECREATION.

NOTE:
As per ZR **123-32, Environmental Conditions**
Special Mixed Use Districts, all new dwelling units shall be provided with a minimum 35dB(A) of window wall attenuation to maintain an interior noise level of 45dB(A) or less, with windows closed, and shall provide an alternate means of ventilation.

NOTE:
NO TENANTS WILL BE PRESENT WHILE THE THE EXISTING BUILDING IS UNDER CONSTRUCTION.

SITE PLAN LEGEND

LIGHT POST · BUILDING ENTRANCE · UTILITY POLE · WATER VALVE · GAS VALVE · D.W.S. WATER · SEWER MANHOLE · CATCH BASIN · DATUM · FIRE HYDRANT · TREE · STREET SIGN · NORTH ARROW · EMERGENCY BOX · PEDESTRIAN CURB

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REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

139 FULTON STREET, SUITE 318
NEW YORK, N.Y. 10038
TEL. 212.393.9679

PROFESSIONAL SEAL:

Z:\MY STUFF\NUAN STATIONERY\NUAN DESIGN LOGOREV2.JPG

PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

JOB APPLICATION #

ZONING - PLOT PLAN

SCALE: INDICATED	DRAWING #:
DRAWN BY:	
DESIGED BY:	
DATE: 02/01/2011	Z-001.00
JOB NO.:	
CHECKED BY:	

ZONING MAP

\\NUANHPSERVER\NUAN DESIGN\10-PROJECTS\10-120 503 UNION AVENUE\10-120 DOCS\MAP13B.JPG

TABLE 3-4

TABLE 3-4

†TABLE 3-4 CONSTRUCTION CLASSIFICATIONS	CONSTRUCTION ELEMENT		CLASS I-A Rating in Hrs.	CLASS I-A Ext.[a,b] Open'g	CLASS I-B Rating in Hrs.	CLASS I-B Ext.[a,b] Open'g	CLASS I-C Rating in Hrs.	CLASS I-C Ext.[a,b] Open'g	CLASS I-D Rating in Hrs.	CLASS I-D Ext.[a,b] Open'g	CLASS I-E Rating in Hrs.	CLASS I-E Ext.[a,b] Open'g
CONSTRUCTION GROUP 1 NONCOMBUSTIBLE	Exterior Walls with an Exterior Separation of: 3'-0" or less	Bearing	4	N.P.	3	N.P.	2	N.P.	2	N.P.	2	N.P.
		Non-bearing[c]	2		2		2		2		2	
	More than 3'-0" but less than 15'-0"	Bearing	4	3 1/3 % protected	3	3 1/3 % protected	2	3 1/3 % protected	2	3 1/3 % protected	2	6 2/3 % protected
		Non-bearing[c]	2		2		2		2		2	
	15'-0" or more but less than 30'-0"	Bearing	4	3 1/3 %	3	3 1/3 %	2	3 1/3 %	1	3 1/3 %	0	N.L.
		Non-bearing[c]	1½		1½		1		1		0	
	30'-0" or more	Bearing	4	N.L.	3	N.L.	2	N.L.	1	N.L.	0	
		Non-bearing[c]	0		0		0		0		0	
Required fire-resistance ratings of construction elements in hours, based on the test procedures of reference standard RS 3-1.	Interior bearing walls and bearing partitions.		4		3		2		1		0[d,i]	
	Enclosure of vertical exits[e], exit passageways, hoistways and shafts.		2		2		2		2		2	
	Fire divisions and fire separations.		See Article 5									
	Columns[k], girders, trusses (other than roof trusses) and framing.	Supporting one floor	3		2		1½		1		0[d,i]	
		Supporting more than one floor[j]	4		3		2		1		0[d,i]	
	Structural members supporting a wall.		Same as required fire resistance of wall supported, but not less than rating required for member by the class of construction.									
	Floor construction including beams.		3		2		1½		1		0[d,i]	
	Roof construction, including beams, trusses and framing, including arches, domes, shells, cable supported roofs and roof decks[g].	15'-0" or less in ht. above floor to lowest member	2		1½		1[i]		1[i]		0[d,i]	
		15'-0" to 20'-0" in ht. above floor to lowest member	2[c,i] or 1[d,i]		1½[c,i] or 1[d,i]		1[i]		1[i]		0[d,i]	
		20'-0" or more in ht. above floor to lowest member	2[c,i] or 0[d,g,i]		1½[c,i] or 0[d,g,i]		1[c,i] or 0[d,g,i]		1[c,i] or 0[d,g,i]		0[d,i]	

Key:

N.P.—Not permited
N.L.—No limit

Noncombustible Materials

Notes:

[a] The area of openings permitted in exterior walls at any story shall be obtained by multiplying the percentage shown in the table by the exterior separation distance in feet, and then multiplying that product by the square-foot area of the façade of that story. Requirements for protected exterior openings shall not apply to churches. [.Protected openings within an exterior separation of 3 ft. 0 inch or less are permitted for buildings classified in Occupancy Groups *J-2* and *J-3* provided, however said openings do not exceed in total area 10% of the façade of the story in which they are located. The openings however, may not be credited towards meeting any of the mandatory natural light or ventilation requirements of Art. 12* Protection of openings with an exterior separation of 3 ft. to 30 ft. shall not be required for *J2* and *J3* occupancy groups]** or to buildings classified in occupancy groups *J-2* and *J-3*** See section 27-331 of article four of subchapter five of this chapter for additional requirements for exterior walls and exterior wall openings.

[b] Upon special application, the commissioner may permit exterior wall openings to be constructed in excess of the permitted area established by table 3-4 if such openings at the time of their construction are located at least sixty feet in a direct line from any neighboring building except as otherwise permitted by footnote f. Such additional openings may not, however, be credited toward meeting any of the mandatory natural light or ventilation requirements of subchapter twelve of chapter on of this title. If any neighboring building is later altered or constructed to come within the above distance limitation, the affected exterior openings shall immediately be closed with construction meeting the fire-resistance rating requirements for exterior wall construction of the building in which they are located.

**Now Subchapter 12.*

***Copy in brackets not enacted but probably intended.*

****Copy from closing brackets to these asterisks enacted but probably intended to be omitted.*

†Local Law 77-1988

NOTE:

TO BE FILED UNDER SEPARATE APPLICATION:

- SPRINKLER
- MECHANICAL
- BPP
- SHED
- ELEVATOR
- FIRE ALARM

SPECIAL INSPECTION ITEMS

AT LEAST TWENTY-FOUR (24) HOURS WRITTEN NOTICE SHALL BE GIVEN TO THE COMMISSIONER BEFORE THE COMMENCEMENT OF ANY WORK FOR WHICH A PERMIT HAS BEEN ISSUED. BEFORE ANY WORK IS COMMENCED ON AN ITEM OF CONSTRUCTION REQUIRING CONTROLLED INSPECTION, ALL PERSONS RESPONSIBLE FOR SUCH CONTROLLED INSPECTION SHALL BE NOTIFIED IN WRITING AT LEAST SEVENTY-TWO HOURS PRIOR TO SUCH COMMENCEMENT.

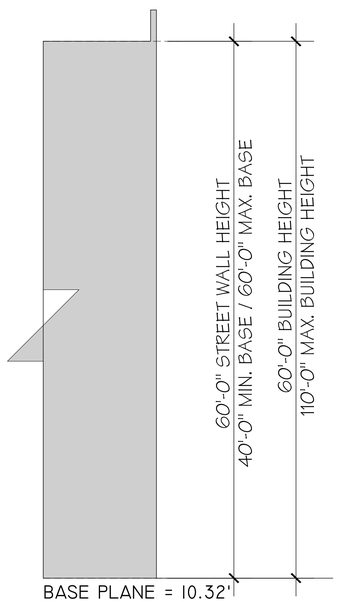
ALL MATERIALS DESIGNATED FOR CONTROLLED INSPECTION SHALL BE INSPECTED AND/OR TESTED TO VERIFY COMPLIANCE WITH CODE REQUIREMENTS, UNLESS OTHERWISE SPECIFICALLY PROVIDED BY CODE PROVISIONS. ALL REQUIRED INSPECTIONS AND TESTS OF MATERIAL SHALL BE MADE AND/OR WITNESSED BY OR UNDER THE DIRECT SUPERVISION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

• STRUCTURAL STEEL - ERECTION & BOLTING 1704.3.3		BC 1704.3.2, BC
• STRUCTURAL COLD-FORMED STEEL		BC 1704.3.4
• CONCRETE TEST CYLINDERS*	▌TR2	BC 1905.6
• CONCRETE DESIGN MIX*	▌TR3	BC 1905.3
• MASONRY		BC 1704.5
• SOILS - INVESTIGATIONS (BORINGS/TEST PITS)	▌TR4	BC 1704.7.4
• SOIL PERCOLATION TEST - DRYWELL	▌	BC 1704.20.1
• SEPTIC SYSTEM INSTALLATION		BC 1704.20
• SPRINKLER SYSTEMS		BC 1704.21
• FIRESTOP, DRAFTSTOP, AND FIREBLOCK SYSTEMS		BC 1704.25

PROGRESS INSPECTIONS ITEMS

• FOOTING AND FOUNDATION	BC 109.3.1
• FRAME INSPECTION	BC 109.3.3
• ENERGY CODE COMPLIANCE INSPECTIONS	BC 109.3.5
• FIRE-RESISTIVE RATED CONSTRUCTION	BC 109.3.1

SKY EXPOSURE PLANE



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JOB APPLICATION #

ZONING - PLOT PLAN

SCALE: INDICATED	DRAWING #:
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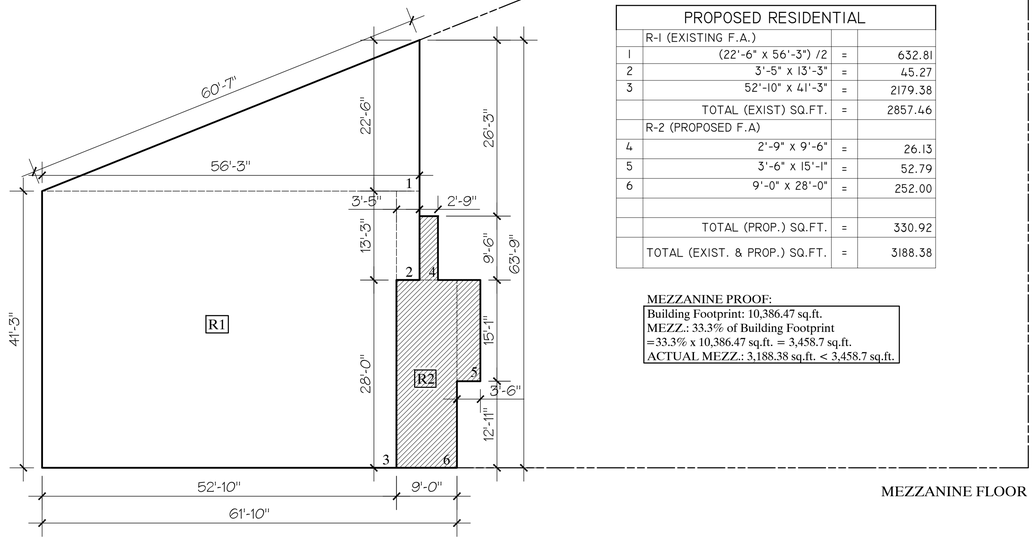
AREA CALCULATIONS

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



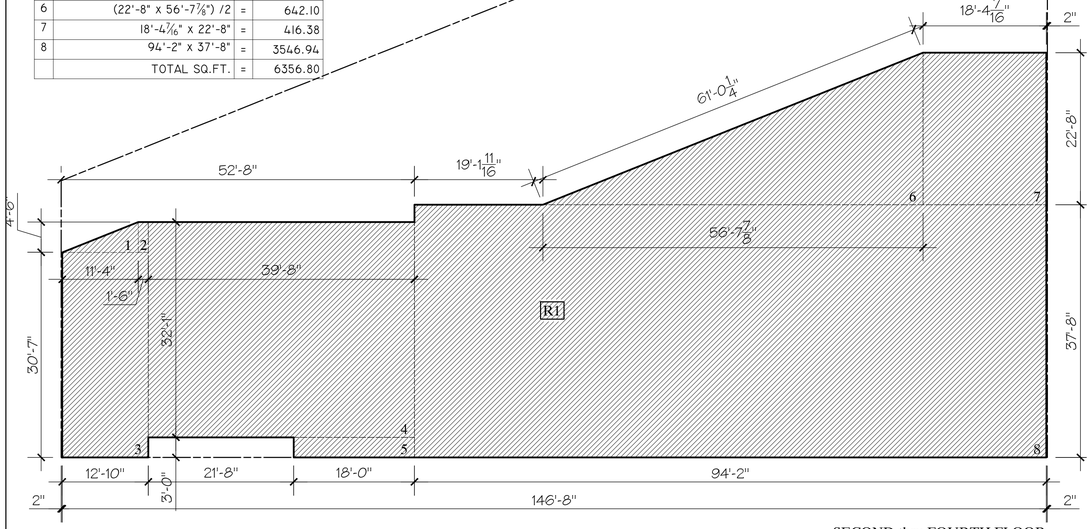
PROPOSED RESIDENTIAL			
	R-1 (EXISTING F.A.)		
1	(22'-6" x 56'-3") /2	=	632.81
2	3'-5" x 13'-3"	=	45.27
3	52'-10" x 41'-3"	=	2179.38
	TOTAL (EXIST) SQ.FT.	=	2857.46
	R-2 (PROPOSED F.A)		
4	2'-9" x 9'-6"	=	26.13
5	3'-6" x 15'-1"	=	52.79
6	9'-0" x 28'-0"	=	252.00
	TOTAL (PROP.) SQ.FT.	=	330.92
	TOTAL (EXIST. & PROP.) SQ.FT.	=	3188.38

MEZZANINE PROOF:
Building Footprint: 10,386.47 sq.ft.
MEZZ.: 33.3% of Building Footprint
=33.3% x 10,386.47 sq.ft. = 3,458.7 sq.ft.
ACTUAL MEZZ.: 3,188.38 sq.ft. < 3,458.7 sq.ft.

MEZZANINE FLOOR

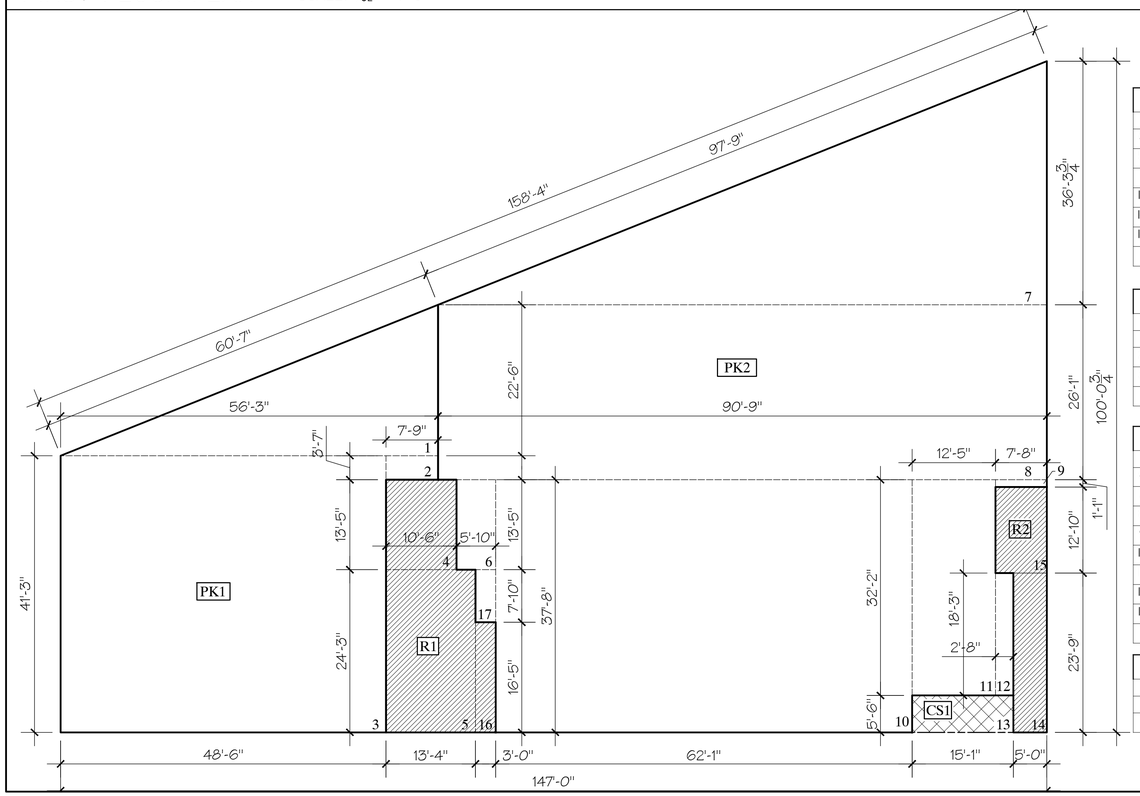
SECOND-FOURTH FLOOR PLAN SCALE: 3/32" = 1'-0"

PROPOSED RESIDENTIAL			
	R-1 (PROPOSED F.A.)		
1	(4'-6" x 11'-4") /2	=	25.5
2	4'-6" x 1'-6"	=	6.75
3	12'-10" x 30'-7"	=	392.49
4	39'-8" x 32'-1"		1272.64
5	18'-0" x 3'-0"	=	54.00
6	(22'-8" x 56'-7 7/8") /2	=	642.10
7	18'-4 7/16" x 22'-8"	=	416.38
8	94'-2" x 37'-8"	=	3546.94
	TOTAL SQ.FT.	=	6356.80



SECOND thru FOURTH FLOOR

FIRST FLOOR PLAN SCALE: 3/32" = 1'-0"



PROPOSED RESIDENTIAL			
	R-1		
4	10'-6" x 13'-5"	=	140.88
5	13'-4" x 24'-3"	=	323.33
	R-2		
15	7'-8" x 12'-10"	=	98.39
14	5'-0" x 23'-9"	=	118.75
16	3'-0" x 16'-5"	=	49.25
	TOTAL SQ.FT.	=	730.60

PROPOSED ACCESSORY PARKING			
	PK-1		
1	(56'-3" x 22'-6") /2	=	632.81
2	7'-9" x 3'-7"	=	27.77
3	48'-6" x 41'-3"	=	2000.63
	TOTAL SQ.FT.	=	2661.21

PROPOSED ACCESSORY PARKING			
	PK-2		
6	5'-10" x 13'-5"	=	78.26
7	(36'-3 3/4" x 90'-9") /2	=	1647.68
8	90'-9" x 26'-1"	=	2367.06
9	7'-8" x 1'-1"	=	8.31
10	62'-1" x 37'-8"	=	2338.47
11	12'-5" x 32'-2"	=	399.40
12	2'-8" x 18'-3"	=	48.67
17	3'-0" x 7'-10"	=	23.50
	TOTAL SQ.FT.	=	6911.35

EXISTING COMMERCIAL SPACE			
	CS-1		
1	15'-1" x 5'-6"	=	82.96
	TOTAL SQ.FT.	=	82.96

ENERGY ANALYSIS FOR ALTERATION (CLIMATE ZONE 10B KINGS COUNTY-COMMERCIAL BUILDING)

ITEM DESCRIPTION	PROPOSED DESIGN VALUE	CODE PRESCRIPTIVE VALUE
Roof insulation	R-40.99 Cavity insulation	Minimum R-19 cavity insulation Minimum R-17 continuous insulation (Table 802.2.1)
Wall Assembly R-Values	R-Values: Masonry Wall: 13.47 Insulated Exterior Wall: 16.21	Minimum R-11 cavity insulation Minimum R-11 continuous insulation (Table 802.2.1)
Replace, new Windows (fenestration 20% of wall area; PF = 0)	U = 0.28 SHGC = 0.28	Maximum U = any SHGC = any (Table 802.2.2)
Lighting in Common areas	1 watt / SF	Maximum 1.1 W / SF (Table 805.5.2)
Heater	RINNAI 10.500 BTU'S	Minimum 80% Et, tested by ANSI Z21.13 (Table 803.2.2(3) 3.2 - (0.026 CAP/1000) COP
Any piping required for boiler, 1" pipe diameter (hot water)	1" of .27 Btu/h x SF x deg F conductivity	Minimum 1" having conductivity of <= .27 Btu/inch/h x SF x deg F (table 803.3.7)

COMPONENT (ROOF)	R-VALUE STUDS	R-VALUE CAVITY	ASSEMBLY R-VALUE
FLAT RUBBER	0.91	0.91	
BUILT-UP ROOFING	0.90	0.90	
1/2" PLYWOOD	0.63	0.63	
5 1/2" FIBERGLASS BATT	38.00	38.00	
1 1/2" STUDS	6.88		
5/8" DRYWALL	0.56	0.56	
PERCENT FOR 16" O.C. + ADDITIONAL STUDS	15%	85%	
TOTAL WALL COMPONENT R-VALUES	**46.97**	**40.09**	
WALL COMPONENT U-VALUES	**0.021**	**0.025**	
TOTAL WALL ASSEMBLY R-VALUES			**40.99**
CALCULATING ASSEMBLY R-VALUE =			
1 / (ASSEMBLY U-VALUE) = 1 / (U-STUDS x % + U-CAVITY x %)			

COMPONENT (FRAME-STUCCO WALL)	R-VALUE STUDS	R-VALUE CAVITY	ASSEMBLY R-VALUE
POURED CONCRETE	0.2	0.2	
1/2" FIBERBOARD	1.32	1.32	
1/2" FIBERGLASS	1.32	1.32	
3 1/2" FIBERGLASS BATT		15.05	
3 1/2" STUDS	4.38		
1/2" DRYWALL	1.35	1.35	
PERCENT FOR 16" O.C. + ADDITIONAL STUDS	15%	85%	
TOTAL WALL COMPONENT R-VALUES	**8.57**	**19.24**	
WALL COMPONENT U-VALUES	**0.117**	**0.052**	
TOTAL WALL ASSEMBLY R-VALUES			**16.21**
CALCULATING ASSEMBLY R-VALUE =			
1 / (ASSEMBLY U-VALUE) = 1 / (U-STUDS x % + U-CAVITY x %)			

COMPONENT (MASONRY/STUCCO WALL)	R-VALUE STUDS	R-VALUE CAVITY	ASSEMBLY R-VALUE
POURED CONCRETE	0.2	0.2	
CONCRETE BLOCK 8"	1.11	1.11	
3 1/2" FIBERGLASS BATT		15.05	
3 1/2" STUDS	4.38		
5/8" DRYWALL	0.56	0.56	
PERCENT FOR 16" O.C. + ADDITIONAL STUDS	15%	85%	
TOTAL WALL COMPONENT R-VALUES	**6.25**	**16.92**	
WALL COMPONENT U-VALUES	**0.160**	**0.059**	
TOTAL WALL ASSEMBLY R-VALUES			**13.47**
CALCULATING ASSEMBLY R-VALUE =			
1 / (ASSEMBLY U-VALUE) = 1 / (U-STUDS x % + U-CAVITY x %)			

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TEL. 212.393.9679

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PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

JOB APPLICATION #

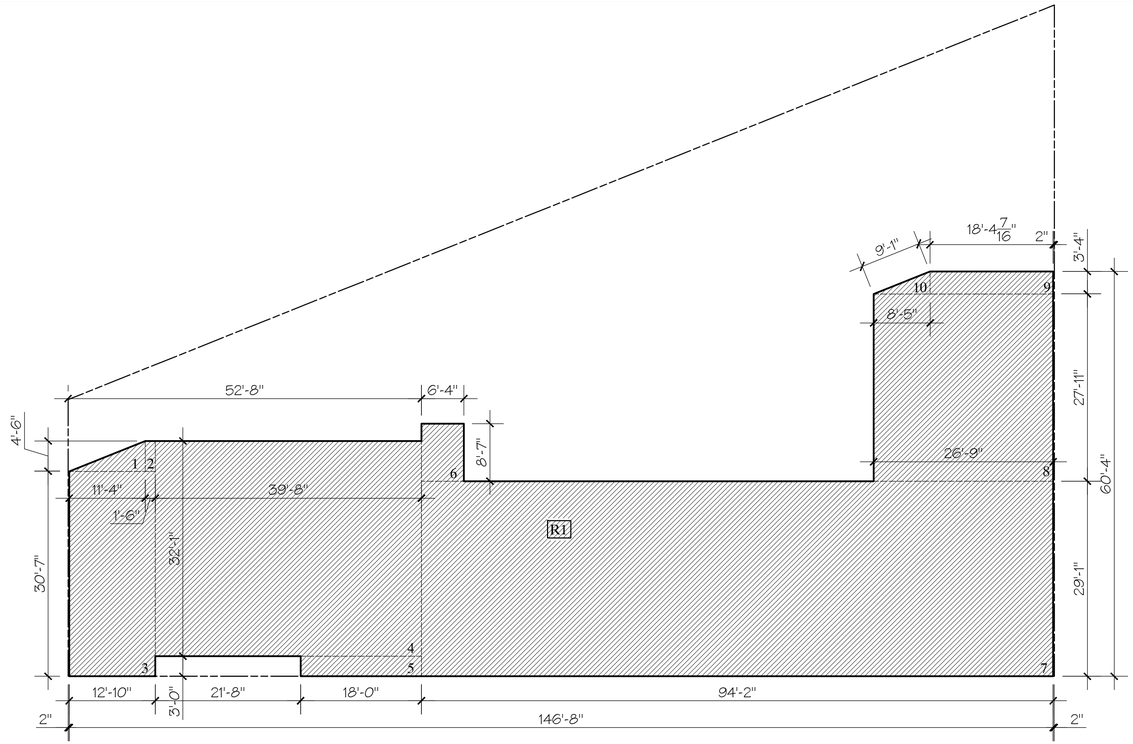
AREA BREAKDOWNS - ENERGY COMPLIANCE

SCALE: INDICATED	DRAWING #:
DRAWN BY:	
DESIGED BY:	
DATE: 02/01/2011	A-002.00
JOB NO.:	
CHECKED BY:	

FIFTH FLOOR PLAN

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

PROPOSED RESIDENTIAL			
	R-1 (PROPOSED F.A.)		
1	(4'-6" x 11'-4") /2	=	25.5
2	4'-6" x 1'-6"	=	6.75
3	12'-10" x 30'-7"	=	392.49
4	39'-8" x 32'-1"	=	1272.64
5	18'-0" x 3'-0"	=	54.00
6	6'-4" x 8'-7"	=	54.36
7	94'-2" x 29'-1"	=	2738.68
8	26'-9" x 27'-11"	=	746.77
9	3'-4" x 18'-4 7/16"	=	61.23
10	(8'-5" x 3'-4") /2	=	14.03
	TOTAL SQ.FT.	=	5366.45

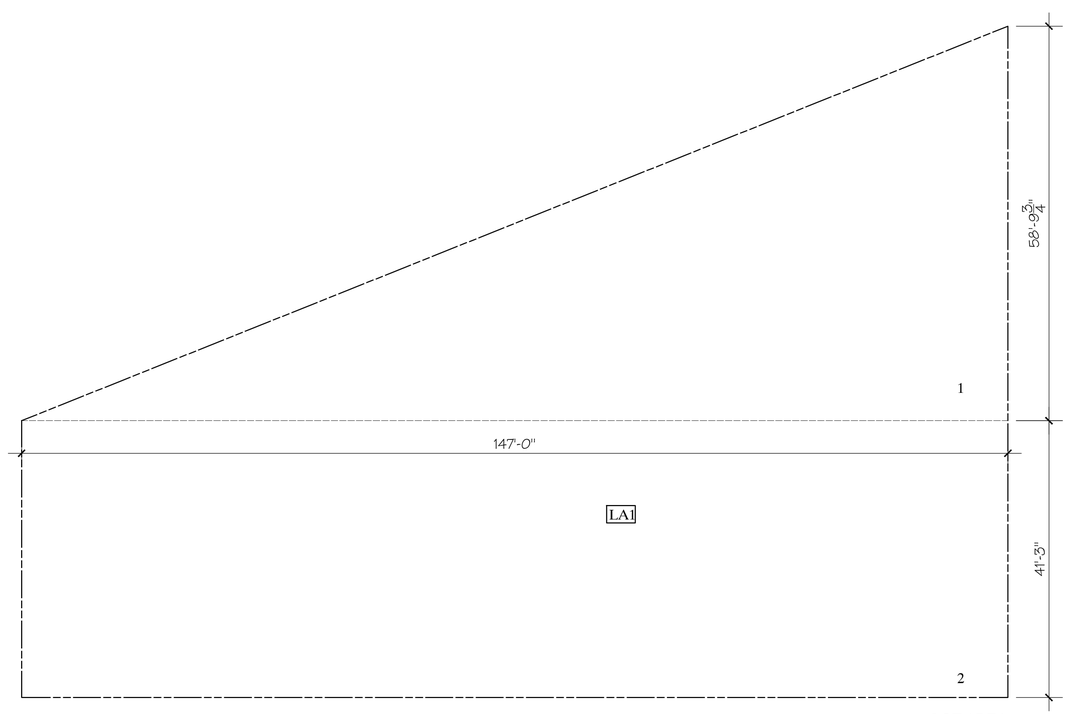


FIFTH FLOOR

LOT AREA PLAN

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

LOT AREA			
	LA		
1	(147'-0" x 58'-9 3/4") /2	=	4322.72
2	147'-0" x 41'-3"	=	6063.75
	TOTAL SQ.FT.	=	10386.47



LOT AREA

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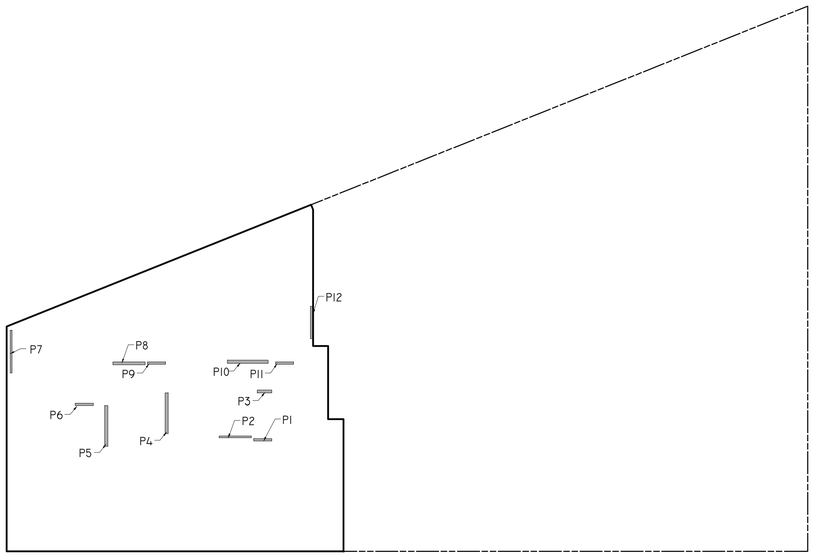
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

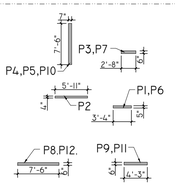
AREA DEDUCTIONS

MEZZANINE FLOOR

SCALE: N.T.S



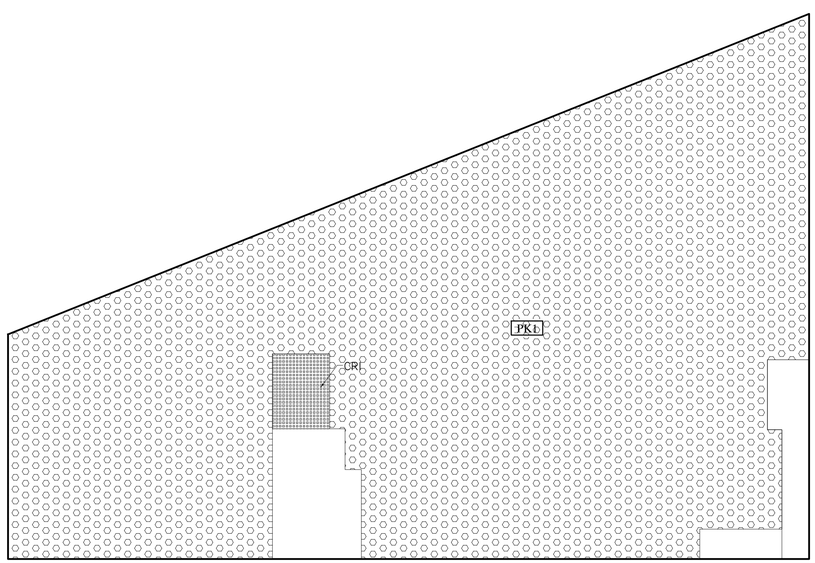
MEZZANINE FLOOR



PLUMBING		
P-1	=	1.38
P-2	=	1.97
P-3	=	1.33
P-4	=	4.37
P-5	=	4.37
P-6	=	1.38
P-7	=	1.33
P-8	=	3.75
P-9	=	2.13
P-10	=	4.37
P-11	=	2.13
P-12	=	3.75
		32.26

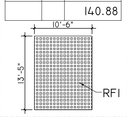
FIRST FLOOR PLAN

SCALE: N.T.S



FIRST FLOOR

COMPACTOR RM		
CR-1	=	140.88
		140.88

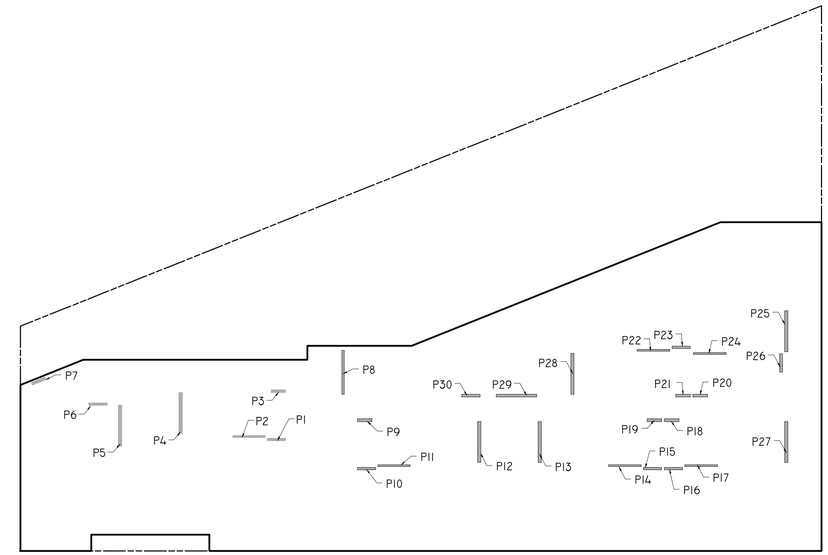


PARKING		
PK-1	=	9572.56
		9572.56

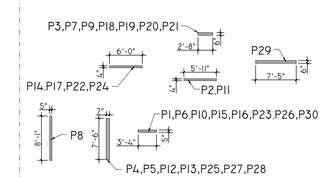
SEE SHEET A002 FOR PARKING AREA COMP.

SECOND-FOURTHTH FLOOR PLAN

SCALE: N.T.S



SECOND thru FOURTH FLOOR



PLUMBING		
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P-2	=	1.97
P-3	=	1.33
P-4	=	4.37
P-5	=	4.37
P-6	=	1.38
P-7	=	1.33
P-8	=	3.36
P-9	=	1.33
P-10	=	1.38
P-11	=	1.97
P-12	=	4.37
P-13	=	1.33
P-14	=	2.00
P-15	=	1.38
P-16	=	1.38
P-17	=	2.00
P-18	=	1.33
P-19	=	1.33
P-20	=	1.33
P-21	=	1.33
P-22	=	2.00
P-23	=	1.38
P-24	=	2.00
P-25	=	4.37
P-26	=	1.38
P-27	=	4.37
P-28	=	4.37
P-29	=	3.70
P-30	=	1.38
		66.90

The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

REVISIONS:

NO.:	DATE:	DESCRIPTION:

THE ARCHITECT SHALL NOT HAVE CONTROL OR CHARGE OF AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, DEVIATIONS, TECHNIQUES, SEQUENCES, OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ALWAYS USE DIMENSIONS AS SHOWN. DRAWINGS ARE NOT TO BE SCALED

REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

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NEW YORK, N.Y. 10038
TEL. 212.393.9679

PROFESSIONAL SEAL:

Z:\MY STUFF\NUAN STATIONERY\NUANDESIGN LOGO-ADDRESS.JPG

PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

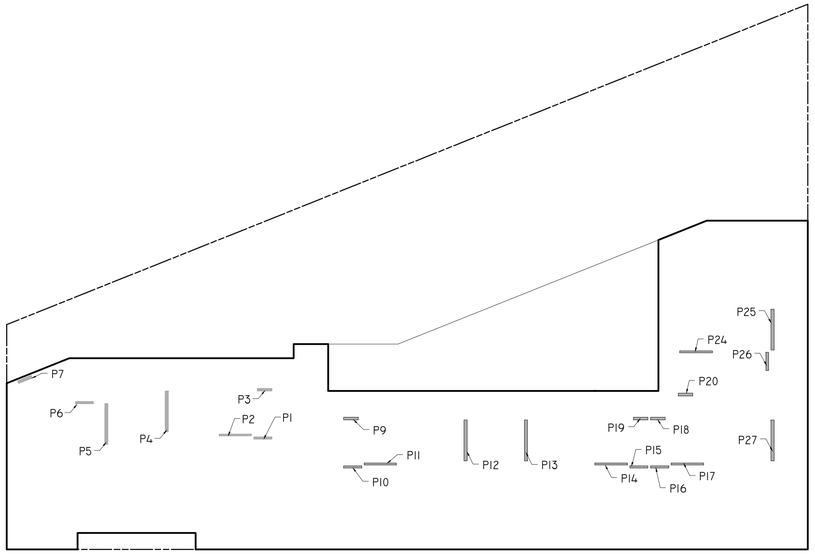
JOB APPLICATION #

AREA DEDUCTIONS

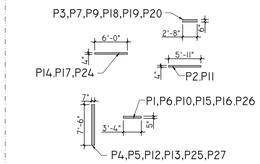
SCALE: INDICATED	DRAWING #:
DRAWN BY:	A-005.00
DESIGED BY:	
DATE: 02/01/2011	
JOB NO.:	
CHECKED BY:	

AREA DEDUCTIONS

FIFTH FLOOR PLAN SCALE: N.T.S



FIFTH FLOOR



PLUMBING		
P-1	=	1.38
P-2	=	1.97
P-3	=	1.33
P-4	=	4.37
P-5	=	4.37
P-6	=	1.38
P-7	=	1.33
P-9	=	1.33
P-10	=	1.38
P-11	=	1.97
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P-15	=	1.38
P-16	=	1.38
P-17	=	2.00
P-18	=	1.33
P-19	=	1.33
P-20	=	1.33
P-24	=	2.00
P-25	=	4.37
P-26	=	1.38
P-27	=	4.37
		49.38

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SCALE: INDICATED		DRAWING #:
DRAWN BY:		A-006.00
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

MULTIPLE DWELLING LAW NOTES

ARTICLE 4. FIREPROOF MULTIPLE DWELLINGS

SEC.100. APPLICATION OF ARTICLE FOUR.
THE PROVISIONS OF THIS ARTICLE SHALL APPLY TO FIREPROOF MULTIPLE DWELLINGS ERECTED AFTER APRIL EIGHTEENTH, NINETEEN HUNDRED TWENTYNINE, AND TO SUCH DWELLINGS ONLY. THEY SHALL APPLY TO ALL SUCH FIREPROOF DWELLINGS UNLESS THEIR APPLICATION IS EXPRESSLY LIMITED TO AND NOT IN SUBSTITUTION FOR, THE PROVISIONS OF ARTICLE THREE.

TITLE 1 FIRE PROTECTION
1. EVERY SUCH DWELLING EXCEEDING SIX STORIES OR SEVENTY-FIVE FEET IN HEIGHT SHALL BE FIREPROOF AS PER SECTION.101.1 M.D.L.
2. EXCEPT AS OTHERWISE SPECIFICALLY PROVIDED IN SUBDIVISIONS THREE AND FOUR AND IN PARAGRAPHS B TO J INCLUSIVE OF SUBDIVISION SIX, EVERY MULTIPLE DWELLING WHICH EXCEEDS TWO STORIES IN HEIGHT FROM THE ENTRANCE STORY TO THE ROOF AND BE EQUIPPED WITH FIREPROOF SELF-CLOSING DOORS GLAZED WITH WIRE GLASS AND WITHOUT TRANSOMS AS PER SECTION 102.1 M.D.L.
3. EXCEPT AS PROVIDED IN PARAGRPH B OF THIS SUBDIVISION, THERE SHALL BE AT LEAST ONE MEANS OF EGRESS FROM EACH APARTMENT ON EACH AND EVERY STORY OF SUCH APARTMENT, AND A SECOND MEANS OF EGRESS IF THE FIRST MEANS IS NOT WITHIN FIFTY FEET OF EVERY LIVING ROOM IN SUCH APARTMENT ON SUCH STORY. WHEN TWO MEANS OF EGRESS ARE REQUIRED, THEY SHALL OPEN FROM DIFFERENT ROOMS AS PER SECTION 103.1.A. M.D.L.
4. EVERY STAIR, FIRE-STAIR AND FIRE-TOWER REQUIRED BY THIS CHAPTER TO EXTEND TO THE LEVEL OF THE ROOF OR TO ANY TERRACE FORMED BY A SETBACK SHALL EXTEND TO THE THROUGH A FIREPROOF BULKHEAD OR OTHER FIREPROOF ENCLOSURE IN SUCH ROOF OR TERRACE APPROVED BY THE DEPARTMENT AS PER SECTION 104.1 M.D.L.
5. IN A DWELLING IN WHICH ONE OR MORE PASSENGER ELEVAORS ARE MAINTAINED AND OPERATED OPENING UPON A PUBLIC HALL AT EVERY STORY, ALL STAIRSM FIRE-STAIRS AND FIRE-TOWERS SHALL BE COMPLETELY SEPERATED FROM ONE ANOTHER AND FROM EVERY ELEVATOR SHAFT BY FIREPROOF WALLS AS PER SECTION 105.1 M.D.L.
6. A CELLAR OR BASEMENT STAIR MAY BE LOCATED INSIDE THE DWELLING, BUT SHALL NOT BE LOCATED UNDERNEATH STAIR LEADING TO THE UPPER STORIES UNLESS IT IS A BASEMENT STAIR LEADING UPWARD FROM A BASEMENT WHICH IS THE MAIN ENTRANCE STORY OF THE DWELLING, OR UNLESS IT IS A STAIR LEADING DOWNWARD FROM THE ENTRANCE STORY WHICH IS SEPERATED BY A FIREPROOF ARCH FROM THE STAIR LEADING UPWARD FROM THE ENTRANCE STORY AS PER SECTION 106 M.D.L.
7. EVERY PUBLIC VESTIBULE OR OTHER PUBLIC HALL SHALL COMPLY EITHER WITH THE PROVISIONS OF SECTION ONE HUNDRED FORTY-NINE FOR NON-FIREPROOF MULTIPLE DWELLINGS, SO FAR AS APPLICABLE, OR WITH THE PROVISIONS OF SUBDIVISION TWO OF THIS SECTION, EXCEPT THAT THE PROVISIONS AS TO VEENTILATION SHALL NOT APPLY TO ANY PART OF AN ENTRANCE HALL WITHIN SIXTY FEET IN A STRAIGHT LINE FROM AN ENTRANCE DOOR AS PER SECTION 107.1 M.D.L.
8. ALL PARTITIONS HSALL REST DIRECTLY UPON THE FIREPROOF FLOOR CONSTRUCTION AND NEVER UPON ANY WOOD FLOORING, AND SHALL EXTEND TO THE FIREPROOF CONSTRUCTION OF THE FLOOR OR ROOF ABOVE AS PER SECTION 108 M.D.L.

MULTIPLE DWELLING LAW NOTES ARTICLE 3 HEAE

1. PROVIDE EXTERIOR LIGHTS AS PER SEC. 26 & 35 M.D.L.
2. ALL BUILDING ENTRANCE DOORS TO BE SELF CLOSING, SELF LOCKING DEVICES AS PER SEC 50(a) M.D.L.
3. WATER SUPPLY TO BE AS PER SEC. 75 M.D.L.
4. CENTRAL HEATING AND HOT WATER SUPPLY TO BE AS PER 70 M.D.L.
5. NIGHT LIGHT IN PUBLIC HALL AND STAIR HALL TO BE AS PER SEC. 37, 217 M.D.L.
6. MAIL SERVICE TO BE AS PER SEC. 57 M.D.L.
7. PROVIDE FLOOR SIGNS AND HOUSE NUMBER.
8. FIRE RETARD WITHIN ONE FOOT OF COOKING APPARATUS AND MAINTAIN TWO FOOT CLEARANCE ABOVE WITH 3/16" ASBESTOS AND 26 GA. METAL OVER AS PER SEC. 33.3(b) M.D.L.
9. REGISTER BUILDING AS PER SEC. 325 M.D.L.
10. ALL APARTMENT DOORS TO BE SELF CLOSING.
11. PROVIDE FOR APARTMENT DOORS HEAVY DUTY LATCHSET WITH HEAVY DUTY DEAD BOLT AND DOOR CHAIN GUARD.

HOUSE MAINTENANCE CODE

1. OWNERS OBLIGATION AS PER SECTION 27-2005 H.M.C.
2. TENANTS DUTIES AS PER SECTION 27-2006 H.M.C.
3. CLEANING OR ROOF, YARDS, COURTS AND OTHER OPEN SPACES SHALL COMPLY WITH SECTION 27-2010 H.M.C.
4. CLEANING OF INTERIOR SPACES TO COMPLY WITH SECTION 27-011 H.M.C.
5. CLEANING OF INTERIOR OF DWELLING SHALL COMPLY WITH SECTION27-2012 H.M.C.
6. PAINTING OF PUBLIC PARTS AND WITHIN DWELLING SHALL COMPLY WITH SECTION 27-2013 H.M.C.
7. PAINTING OF WINDOW FRAMES SHALL COMPLY WITH SECTION 27-2014 H.M.C.
8. WATER SUPPLY TO BUILDING TO COMPLY WITH SECTION 27-2024 H.M.C.
9. WATER SUPPLY TO UNITS TO COMPLY WITH SECTION 27-2025 H.M.C.
10. DRAINAGE OF ROOF, COURTS AND YARDS TO COMPLY WITH SECTION 27-2027 H.M.C.
11. BUILDING MINIMUM TEMPERATURE TO BE MAINTAINED AS PER SECTION 27-2029 H.M.C.
12. SUPPLY OF HOT WATER TO COMPLY WITH SECTION 27-2031 H.M.C.
13. ELECTRIC LIGHTING EQUIPMENT IN ALL DWELLING UNITS TO COMPLY WITH SECTION 27-2037 H.M.C.
14. STREET NUMBERS SHALL BE POSTED AND MAINTAINED AS PER SECTION 27-2047 H.M.C.
15. RECEPTACLES FOR WASTE MATTER COLLECTION OF WASTE MATTER AS PER SECTION 27-2023 H.M.C.
16. TO BE PROVIDED AS PER SECTION 27-2021 H.M.C.
17. OWNER OR OCCUPANT SHALL CONTROL AND KEEP THE BUILDING FREE OF RODENTS AS PER SECTION 27-2018 H.M.C.
18. MAXIMUM PERMITTED OCCUPANCY TO COMPLY WITH SECTION 27-2075 H.M.C.
19. MAINTENANCE OF SEWER CONNECTIONS AND PLUMBING FIXTURES TO COMPLY WITH SECTION 27-2026 H.M.C.
20. ENTRANCE DOOR OF EACH DWELLING UNIT TO BE PROVIDED WITH B.S.A. APPROVED TYPE PEEPHOLES. THE DISTANCE ABOVE THE INSIDE FINISH FLOOR TO THE CENTER OF THE PEEPHOLE SHALL BE APPROXIMATELY 5'-0", AS PER SECTION 27-2041 H.M.C.
21. LIGHTING, GAS METERS, GAS APPLIANCE SHALL COMPLY WITH SECTION 64 M.D.L. AND ARTICLE 18 H.M.C.
22. ELECTRICAL LIGHTING FIXTURES SHALL BE INSTALLED IN PUBLIC HALLS AS PER SECTION 27-2038 H.M.C.
23. ALL DOORS TO PUBLIC HALL TO BE SELF-CLOSING.
24. NIGHT LIGHT IN PUBLIC HALL AND STAIR HALL TO BE PROVIDED AS PER SECTION 27-2039.
25. PROVIDE EXTERIOR LIGHTS AS PER SECTION 26 AND 35 M.D.L.
26. ALL BUILDING EXTRANCE DOORS TO BE SELF-CLOSING AND AUTOMATIC SELF-LOCKING DOORS AS PER SECTION 50 M.D.L.
27. MAIL SERVICE TO BE PROVIDED AS PER SECTION 27-2047 H.M.C.
28. EXISTING CENTRAL HEAT TO BE AS PER SECTION 27-2048 H.M.C.
29. LIGHTS NEAR ENTRANCE WAYS AND IN YARDS AND COURTS TO BE MAINTAINED AS PER SECTION 27-2040 H.M.C.
30. DUTIES OF OWNER AND OCCUPANCY WITH RESPECT TO THE INSTALLATION AND MAINTENANCE OF SMOKE DETECTING SERVICE TO BE AS PER SECTION 27-2045 H.M.C.
31. FLOOR SIGHS SHALL BE POSTED AND MAINTAINED AS PER SECTION 27-2048 H.M.C.
32. STREET NUMBERS SHALL BE POSTED AND MAINTAINED AS PER SECTION 27-2049 H.M.C.
33. RESIDENCE OR PERSONS PERFORMING JANITORIAL SERVICES, FOR A MULTIPLE DWELLING OF NINE OR MORE UNITS SHALL COMPLY WITH SECTION 27-2054 H.M.C.
34. CERTIFICATION OF COMPETENCY OF JANITOR FOR MULTIPLE DWELLING ON INE OR MORE UNITS SHALL COMPLY WITH SECTION 27-2055 H.M.C.
35. REGISTRATION STATEMENT SHALL BE FILED AS PER SECTION 27-2097 H.M.C.
36. POSTING OF IDENTIFICATION SIGN AND SERIAL NUMBER TO BE AS PER SECTION 27-2204 H.M.C.
37. INSTALLATIONOF WINDOW GUARDS ON THE WINDOWS, IF ANY, IN PUBLIC HALL OF A MULTIPLE DWELLING IN WHICH SUCH CHILDREN RESIDE SHALL COMPLY WITH MULTIPLE DWELLING RULES, DATED OCTOBER 10, 1986.
38. PROVIDE FOR APARTMENT ENTRY DOORS, HEAVY DUTY LATCH SET WITH HEAVY DUTY DEADBOLT AND CHAIN DOOR GUARD.

ENERGY CONSTRUCTION NOTES
E302 THERMAL DESIGN PARAMETERS
E302.1 EXTERIOR DESIGN CONDITIONS. THE FOLLOWING DESIGN PARAMETERS IN TABLE E302.1 SHALL BE USED FOR CALCULATIONS REQUIRED UNDER THIS CODE.

TABLE E302.1 EXTERIOR DESIGN CONDITIONS NEW YORK STATE

COUNTY	WINTER DESIGN DRY-BULB TEMP.	SUMMER DESIGN DRY-BULB TEMP.	WET-BULB TEMP.	HEATING DEGREE DAYS	COINCIDENT ZONE
KINGS	13	89	73	4910	10B

E501.1 GENERAL. RESIDENTIAL BUILDINGS OR PORTIONS THEREOF THAT ENCLOSE CONDITIONED SPACE SHALL BE CONSTRUCTED TO MEET THE REQUIREMENTS OF THIS CHAPTER.
E502.1 GENERAL REQUIREMENTS. THE BUILDING ENVELOPE SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF E502.1.1 THROUGH E502.1.5 REGARDLESS OF THE MEANS OF DEMONSTRATING ENVELOPE COMPLIANCE AS SET FORTH IN E502.2.
E502.1.1 MOISTURE CONTROL. THE DESIGN SHALL NOT CREATE CONDITIONS OF ACCELERATED DETERIORATION FROM MOISTURE CONDENSATION. FRAME WALLS, FLOORS AND CEILINGS NOT VENTILATED TO ALLOW MOISTURE TO ESCAPE SHALL BE PROVIDED WITH AN APPROVED VAPOR RETARDER HAVING A MAXIMUM PERMEANCE RATING OF 1.0 PERM (5.72 X 10-8 G/PA S M2) WHEN TESTED IN ACCORDANCE WITH PROCEDURE A OF ASTM E 96. THE VAPOR RETARDER SHALL BE INSTALLED ON THE WARM-IN-WINTER SIDE OF THE THERMAL INSULATION.
EXCEPTIONS:
1. IN CONSTRUCTION WHERE MOISTURE OR ITS FREEZING WILL NOT DAMAGE THE MATERIALS.
2. WHERE OTHER APPROVED MEANS TO AVOID CONDENSATION IN UNVENTILATED FRAMED WALL, FLOOR, ROOF AND CEILING CAVITIES ARE PROVIDED.
E502.1.2 MASONRY VENEER. WHEN INSULATION IS PLACED ON THE EXTERIOR OF A FOUNDATION SUPPORTING A MASONRY VENEER EXTERIOR, THE HORIZONTAL FOUNDATION SURFACE SUPPORTING THE VENEER IS NOT REQUIRED TO BE INSULATED TO SATISFY ANY FOUNDATION INSULATION REQUIREMENT.
E502.1.3 RECESSED LIGHTING FIXTURES. WHEN INSTALLED IN THE BUILDING ENVELOPE, RECESSED LIGHTING FIXTURES SHALL MEET ONE OF THE FOLLOWING REQUIREMENTS:
1. TYPE IC RATED, MANUFACTURED WITH NO PENETRATIONS BETWEEN THE INSIDE OF THE RECESSED FIXTURE AND CEILING CAVITY AND SEALED OR GASKETED TO PREVENT AIR LEAKAGE INTO THE UNCONDITIONED SPACE.
2. TYPE IC OR NON-IC RATED, INSTALLED INSIDE A SEALED BOX CONSTRUCTED FROM A MINIMUM 0.5-INCH-THICK (12.7 MM) GYPSUM WALLBOARD OR CONSTRUCTED FROM A PREFORMED POLYMERIC VAPOR BARRIER, OR OTHER AIR-TIGHT ASSEMBLY MANUFACTURED FOR THIS PURPOSE, WHILE MAINTAINING REQUIRED CLEARANCES OF NOT LESS THAN 0.5 INCH (12.7 MM) FROM COMBUSTIBLE MATERIAL AND NOT LESS THAN 3 INCHES (76 MM) FROM INSULATION MATERIAL.
3. TYPE IC RATED, IN ACCORDANCE WITH ASTM E 283 NO MORE THAN 2.0 CUBIC FEET PER MINUTE (CFM) (0.944 L/S) AIR MOVEMENT FROM THE CONDITIONED SPACE TO THE CEILING CAVITY. THE LIGHTING FIXTURE SHALL BE TESTED AT 1.57 PSI (75 PA) PRESSURE DIFFERENCE AND SHALL BE LABELED.
E502.1.4 AIR LEAKAGE. PROVISIONS FOR AIR LEAKAGE SHALL BE IN ACCORDANCE WITH E502.1.4.1 AND E502.1.4.2.
E502.1.4.1 WINDOW AND DOOR ASSEMBLIES. WINDOW AND DOOR ASSEMBLIES INSTALLED IN THE BUILDING ENVELOPE SHALL COMPLY WITH THE MAXIMUM ALLOWABLE INFILTRATION RATES IN TABLE E502.1.4.1.
EXCEPTION: SITE-CONSTRUCTED WINDOWS AND DOORS SEALED IN ACCORDANCE WITH E502.1.4.2.

TABLE E502.1.4.1
ALLOWABLE AIR INFILTRATION RATESA

WINDOWS (CFM PER SQUARE FOOT OF WINDOW AREA)	DOORS (CFM PER SQUARE FOOT OF DOOR AREA) SLIDERS	SWINGING
0.3B,C	0.3	0.5D

A. WHEN TESTED IN ACCORDANCE WITH ASTM E 283.
B. SEE AAMA/WDMA 101/I.S.2.
C. SEE ASTM D 4099.
D. REQUIREMENT BASED ON ASSEMBLY AREA.

E502.1.4.2 CAULKING AND SEALANTS. EXTERIOR JOINTS, SEAMS OR PENETRATIONS IN THE BUILDING ENVELOPE, THAT ARE SOURCES OF AIR LEAKAGE, SHALL BE SEALED WITH DURABLE CAULKING MATERIALS, CLOSED WITH GASKET SYSTEMS, TAPED OR COVERED WITH MOISTURE VAPOR-PERMEABLE HOUSE-WRAP. SEALING MATERIALS SPANNING JOINTS BETWEEN DISSIMILAR CONSTRUCTION MATERIALS SHALL ALLOW FOR DIFFERENTIAL EXPANSION AND CONTRACTION OF THE CONSTRUCTION MATERIALS. THIS INCLUDES SEALING AROUND TUBS AND SHOWERS, AT THE ATTIC AND CRAWL SPACE PANELS, AT RECESSED LIGHTS AND AROUND ALL PLUMBING AND ELECTRICAL PENETRATIONS. THESE ARE OPENINGS LOCATED IN THE BUILDING ENVELOPE BETWEEN CONDITIONED SPACE AND UNCONDITIONED SPACE OR BETWEEN THE CONDITIONED SPACE AND THE OUTSIDE.
E502.1.5 FENESTRATION SOLAR HEAT GAIN COEFFICIENT. IN LOCATIONS WITH HEATING DEGREE DAYS (HDD) LESS THAN 3,500, THE COMBINED SOLAR HEAT GAIN COEFFICIENT (THE AREA-WEIGHTED AVERAGE) OF ALL GLAZED FENESTRATION PRODUCTS (INCLUDING THE EFFECTS OF ANY PERMANENT EXTERIOR SOLAR SHADING DEVICES) IN THE BUILDING SHALL NOT EXCEED 0.4.
E502.2.1.4 SLAB-ON-GRADE FLOORS. THE THERMAL RESISTANCE OF THE INSULATION AROUND THE PERIMETER OF THE FLOOR SHALL NOT BE LESS THAN THE VALUE GIVEN IN TABLE E502.2.
INSULATION SHALL BE OF AN APPROVED TYPE, AND PLACED ON THE OUTSIDE OF THE FOUNDATION OR ON THE INSIDE OF A FOUNDATION WALL. IN CLIMATES BELOW 6,000 ANNUAL FAHRENHEIT HDD, THE INSULATION SHALL EXTEND DOWNWARD FROM THE ELEVATION OF THE TOP OF THE SLAB FOR A MINIMUM DISTANCE OF 24 INCHES (610 MM) OR DOWNWARD TO AT LEAST THE BOTTOM OF THE SLAB AND THEN HORIZONTALLY TO THE INTERIOR OR EXTERIOR FOR A MINIMUM TOTAL DISTANCE OF 24 INCHES (610 MM). IN ALL CLIMATES EQUAL TO OR GREATER THAN 6,000 HDD, THE INSULATION SHALL EXTEND DOWNWARD FROM THE ELEVATION OF THE TOP OF THE SLAB FOR A MINIMUM OF 48 INCHES (1219 MM) OR DOWNWARD TO AT LEAST THE BOTTOM OF THE SLAB AND THEN HORIZONTALLY TO THE INTERIOR OR EXTERIOR FOR A MINIMUM TOTAL DISTANCE OF 48 INCHES (1219 MM). IN ALL CLIMATES, HORIZONTAL INSULATION EXTENDING OUTSIDE OF THE FOUNDATION SHALL BE COVERED BY PAVEMENT OR BY SOIL A MINIMUM OF 10 INCHES (254 MM) THICK. THE TOP EDGE OF THE INSULATION INSTALLED BETWEEN THE EXTERIOR WALL AND THE EDGE OF THE INTERIOR SLAB SHALL BE PERMITTED TO BE CUT AT A 45-DEGREE ANGLE AWAY FROM THE EXTERIOR WALL.
E502.2.1.5 CRAWL SPACE WALLS. IF THE FLOOR ABOVE A CRAWL SPACE DOES NOT MEET THE REQUIREMENTS OF E502.2.1.3 AND THE CRAWL SPACE DOES NOT HAVE VENTILATION OPENINGS WHICH COMMUNICATE DIRECTLY WITH OUTSIDE AIR, THEN THE EXTERIOR WALLS OF THE CRAWL SPACE SHALL HAVE A THERMAL TRANSMITTANCE VALUE NOT EXCEEDING THE VALUE GIVEN IN TABLE E502.2. CRAWL SPACE WALL INSULATION SHALL EXTEND VERTICALLY OR VERTICALLY AND HORIZONTALLY A MINIMUM TOTAL DISTANCE OF 24 INCHES (610 MM) LINEARLY FROM THE OUTSIDE FINISH GROUND LEVEL [SEE DETAIL E502.2.1.5(1), DETAIL E502.2.1.5(2) AND DETAIL E502.2.1.5(3) AND THE DOE FOUNDATION DESIGN HANDBOOK.]
E502.2.1.6 BASEMENT WALLS. THE EXTERIOR WALLS OF CONDITIONED BASEMENTS SHALL HAVE A TRANSMITTANCE VALUE NOT EXCEEDING THE VALUE GIVEN IN TABLE E502.2 FROM THE TOP OF THE BASEMENT WALL TO A DEPTH AS SPECIFIED IN TABLE E502.2.1.6 BELOW THE OUTSIDE FINISH GROUND LEVEL, OR TO THE LEVEL OF THE BASEMENT FLOOR, WHICHEVER IS LESS.

TABLE E502.2.1.6
FOUNDATION INSULATION DEPTH

HEATING DEGREE DAYS LESS THAN OR EQUAL TO	DEPTH BELOW GRADE
5000	24"

TABLE E502.2.4(7)
PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS, TYPE R-2, R-4 OR TOWNHOUSE
RESIDENTIAL BUILDINGS WINDOW AREA 20 PERCENT OF GROSS EXTERIOR WALL AREA

HEATING DEGREE DAYS	MAXIMUM U-FACTOR	MINIMUM R-VALUE EXTERIOR WALL	R-VALUE CEILING	R-VALUE SLAB FLOOR	R-VALUE CRAWL WALL	BASEMENT PERIMETER SPACE R-VALUE
4,500-4,999	0.50	R-26	R-11	R-13	R-6	R-0 R-7

TABLE E502.2.4(8)
PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS, TYPE R-2, R-4 OR TOWNHOUSE
RESIDENTIAL BUILDINGS WINDOW AREA 25 PERCENT OF GROSS EXTERIOR WALL AREA

HEATING DEGREE DAYS	MAXIMUM U-FACTOR	MINIMUM R-VALUE EXTERIOR WALL	R-VALUE CEILING	R-VALUE SLAB FLOOR	R-VALUE CRAWL WALL	BASEMENT PERIMETER SPACE R-VALUE
4,500-4,999	0.53	R-30	R-13	R-11	R-5	R-0 R-6

TABLE E502.2.4(9)
PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS, TYPE R-2, R-4 OR TOWNHOUSE
RESIDENTIAL BUILDINGS WINDOW AREA 30 PERCENT OF GROSS EXTERIOR WALL AREA

HEATING DEGREE DAYS	MAXIMUM U-FACTOR	MINIMUM R-VALUE EXTERIOR WALL	R-VALUE CEILING	R-VALUE SLAB FLOOR	R-VALUE CRAWL WALL	BASEMENT PERIMETER SPACE R-VALUE
4,500-4,999	0.45	R-38	R-13	R-19	R-9	R-6,2 FT R-15

TABLE E502.2.4(10)
ENVELOPE INSULATION R-VALUES AND GLAZING U-FACTOR
REQUIREMENTS FOR RESIDENCES USING ELECTRIC RESISTANCE HEATING

BUILDING ELEMENT	SINGLE AND MULTI-FAMILY HOUSES
ROOF/CEILING	R-49
WALL (ABOVE GRADE)B	R-26
GLAZING U-FACTORA	0.31
FLOOR OVER UNHEATED SPACE OR CRAWL SPACE WALL	R-30
BASEMENT WALL	R-19, 7 FT. OR TO TOP OF SLAB
SLAB EDGE	R-15, 4 FT.

A. MAXIMUM ALLOWABLE GLAZING: 15% OF THE WALL AREA.
B. OPAQUE DOORS SHALL HAVE A MAXIMUM U-FACTOR OF 0.35.

E503.1 GENERAL. THIS SECTION COVERS MECHANICAL SYSTEMS AND EQUIPMENT USED TO PROVIDE HEATING, VENTILATING AND AIR-CONDITIONING FUNCTIONS. THIS SECTION ASSUMES THAT RESIDENTIAL BUILDINGS AND DWELLING UNITS THEREIN WILL BE DESIGNED WITH INDIVIDUAL HVAC SYSTEMS. WHERE EQUIPMENT NOT SHOWN IN TABLE E503.2 IS SPECIFIED, IT SHALL MEET THE PROVISIONS OF E803.2.2 AND E803.3.2.
E503.2 MECHANICAL EQUIPMENT EFFICIENCY. EQUIPMENT SHOWN IN TABLE E503.2 SHALL MEET THE SPECIFIED MINIMUM PERFORMANCE. DATA FURNISHED BY THE EQUIPMENT SUPPLIER, OR CERTIFIED UNDER A NATIONALLY RECOGNIZED CERTIFICATION PROCEDURE, SHALL BE USED TO SATISFY THESE REQUIREMENTS. ALL SUCH EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

TABLE E503.2
MINIMUM EQUIPMENT PERFORMANCE

EQUIPMENT CATEGORY	SUB-CATEGORYE	MINIMUM REFERENCED STANDARD	PERFORMANCE
AIR-COOLED HEAT PUMPS HEATING MODE < 65,000 BTU/H	SPLIT SYSTEMS	ARI 210/240	6.8 HSPFA,B
COOLING CAPACITY < 225,000 BTU/H	SINGLE PACKAGE	DOE 10 CFR PART 430, SUBPART B, APPENDIX N	6.6 HSPFA,B
GAS-FIRED OR OIL-FIRED FURNACE	-	DOE 10 CFR PART 430, SUBPART B, APPENDIX N	AFUE 78%B ET 80%C
GAS-FIRED OR OIL-FIRED STEAM AND HOT-WATER BOILERS < 300,000 BTU/H	-	DOE 10 CFR PART 430, SUBPART B, APPENDIX N	AFUE 80%B,D
AIR-COOLED AIR CONDITIONERS AND HEAT PUMPS COOLING MODE < 65,000 BTU/H	SPLIT SYSTEMS	ARI 210/240	10.0 SEERB
COOLING CAPACITY	SINGLE PACKAGE		9.7 SEERB

A. FOR MULTICAPACITY EQUIPMENT, THE MINIMUM PERFORMANCE SHALL APPLY TO EACH CAPACITY STEP PROVIDED. MULTICAPACITY REFERS TO MANUFACTURER-PUBLISHED RATINGS FOR MORE THAN ONE CAPACITY MODE ALLOWED BY THE PRODUCT'S CONTROLS.
B. THIS IS USED TO BE CONSISTENT WITH THE NATIONAL APPLIANCE ENERGY CONSERVATION ACT (NAECA) OF 1987 (PUBLIC LAW 100-12).
C. THESE REQUIREMENTS APPLY TO COMBINATION UNITS NOT COVERED BY NAECA (THREE-PHASE POWER OR COOLING CAPACITY 65,000 BTU/H).
D. EXCEPT FOR GAS-FIRED STEAM BOILERS FOR WHICH MINIMUM AFUE IS PERCENT.
E. SEASONAL RATING.

TABLE E503.3.3.1
MINIMUM PIPE INSULATION
(THICKNESS IN INCHES)

PIPE SIZESA	FLUID TEMPERATURE RANGE, °F	RUNOUTS UP TO 2"B	1 AND LESS	1.25" TO 2"	2.5" TO 4"	5" TO 8" AND LARGER
HEATING SYSTEMS						
STEAM AND HOT WATER:						
HIGH PRESSURE/TEMPERATURE	306-450	1-1/2	2-1/2	2-1/2	3	3-1/2 3-1/2
MEDIUM PRESSURE/TEMPERATURE	251-305	1-1/2	2	2-1/2	2-1/2	3 3
LOW PRESSURE/TEMPERATURE	201-250	1	1	1-1/2	2	2 2
LOW TEMPERATURE	120-200	1/2	1	1	1-1/2	1-1/2 1-1/2
STEAM CONDENSATE (FOR FEED WATER)	ANY	1	1	1-1/2	2	2 2
COOLING SYSTEMS						
CHILLED WATER, REFRIGERANT AND BRINE:	40-55	1/2	1/2	3/4	1	1 1
	BELOW 40	1	1	1-1/2	1-1/2	1-1/2 1-½

A. FOR PIPING EXPOSED TO OUTDOOR AIR, INCREASE INSULATION THICKNESS BY 0.5 INCH.
B. RUNOUTS NOT EXCEEDING 12 FEET IN LENGTH TO INDIVIDUAL TERMINAL UNITS.

CALCULATION FOR PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS
EXTERIOR WALL AREA ABOVE GRADE:
PERIMETER WALLS = 2(102.50' + 55.00') = 315 LIN. FT.
315 LIN. FT. x 27.00' HEIGHT = 8,505 SQ. FT.
TOTAL = 8,505 SQ. FT. OF EXTERIOR WALL ABOVE GRADE
EXTERIOR GLAZED AREA ABOVE GRADE:
REAR WALL + FRONT WALL + SIDE WALLS
675 SQ.FT. + 495 SQ.FT. + 71 SQ. FT. = 1,241 SQ. FT.
GLAZED AREA ABOVE GRADE IN PERCENT OF EXTERIOR WALL AREA ABOVE GRADE:
(1,241 SQ. FT. / 8,505 SQ. FT.) X 100 = 15%
USE REQUIREMENTS OF TABLE E502.2.4(7)
PRESCRIPTIVE BUILDING ENVELOPE REQUIREMENTS, TYPE R-2, R-4 OR TOWNHOUSE
RESIDENTIAL BUILDINGS WINDOW AREA 20 PERCENT OF GROSS EXTERIOR WALL AREA

The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

REVISIONS:

NO.:	DATE:	DESCRIPTION:

THE ARCHITECT SHALL NOT HAVE CONTROL OR CHARGE OF AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, DEVIATIONS, TECHNIQUES, SEQUENCES, OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ALWAYS USE DIMENSIONS AS SHOWN. DRAWINGS ARE NOT TO BE SCALED

REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

139 FULTON STREET, SUITE 318
NEW YORK, N.Y. 10038
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PROFESSIONAL SEAL:

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PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

JOB APPLICATION #

GENERAL NOTES

SCALE: INDICATED
DRAWN BY:
DESIGED BY:
DATE: 02/01/2011
JOB NO.:
CHECKED BY:

DRAWING #:
A-005.00

GENERAL NOTES
1. ARCHITECTS HAVE NOT BEEN RETAINED TO SUPERVISE ANY CONSTRUCTION OR INSTALLATION OF ANY EQUIPMENT.
2. BUILDING LINE. LOT LINES, TO BE LOCATED BY A DULY LICENSED CITY SURVEYOR. BUILDING TO BE LOCATED ON SITE BY A DULY LICENSED CITY SURVEYOR ALL PRIOR TO START OF ANY WORK.
3. PRIOR TO THE START OF ANY CONSTRUCTION, CONTRACTOR IS REQUIRED TO CHECK AND VERIFY ALL CONDITIONS AND DIMENSIONS AT JOB SITE AND DIMENSIONS ON PLANS. CONTRACTOR TO REPORT AND DISCREPANCIES TO THE ARCHITECTS IMMEDIATELY. NO PLANS SHALL BE SCALED. DIMENSIONS SHALL BE USED.
4. AT LEAST 24 HOURS WRITTEN NOTICE SHALL BE GIVEN TO THE COMMISSIONER PRIOR TO COMMENCEMENT OF ANY WORK, AS PER SEC. C26-118.5.
5. PROVIDE ADEQUATE FENCING AT ALL EXCAVATIONS AS PER SEC. C26-710.0.
6. PROVIDE GUARDRAILS AT EXCAVATION AS PER SEC. C26-1903.2 (b).
7. FIVE DAYS PRIOR WRITTEN NOTICE OF PERMIT APPLICATION SHALL BE GIVEN TO OWNERS OF ALL ADJOINING LOTS, BUILDINGS AND SERVICE FACILITIES WHICH MAY BE AFFECTED BY THE EARTH WORK OPERATIONS AS PER SEC. 26-112.3.
8. ALL EXCAVATIONS SHALL BE KEPT SUBSTANTIALLY FREE OF WATER DURING FOUNDATION WORK (CONSTRUCTION) AS PER SEC. C26-110.5.
9. MORTAR TO COMPLY WITH A.S.T.M. C270.1964 AND WITH TABLE R.S. 10-12.
10. BONDING TO COMPLY WITH R.S. 10, SEC. 7.
11. CARRY ALL FOOTINGS AT LEAST 4'-0" MINIMUM BELOW ADJACENT EXTERIOR GROUND OPERATION.
12. NO BACKFILLING OPERATIONS ARE TO TAKE PLACE AGAINST FOUNDATION WALLS UNTIL THE FIRST FLOOR HAS BEEN SET IN PLACE.
13. NO BACKFILLING SHALL BE DONE UNTIL THE WATERPROOFING (WHERE NOTED ON PLANS) HAS BEEN PLACED, INSPECTED AND APPROVED BY THE DEPARTMENT OF BUILDINGS INSPECTOR.
14. THE SIZE AND NUMBER OF NAILS FOR CONSTRUCTION SHALL BE IN ACCORDANCE WITH TABLE 10.4.
15. WOOD CONSTRUCTION AND DESIGN METHOD TO COMPLY WITH SEC. 1006.0 AND APPLICABLE REFERENCE STANDARDS.
16. NOTCHES IN THE ENDS OF WOOD JOISTS, WOOD BEAMS SHALL COMPLY WITH SEC. 1006.0 ADMIN. CODE.
17. ALL HEATING OR AIR CONDITIONING TO COMPLY WITH ARTICLES 12-16 OF NEW YORK CITY ELECTRICAL CODE.
18. MASONRY JOISTS SHALL COMPLY WITH SUB-ARTICLE 1003.0 AND APPLICABLE REFERENCE STANDARDS.
19. A FINAL SURVEY SHALL BE FILED TO COMPLY WITH SEC. C26-121.7 BUILDING CODE.
20. INTERIOR FINISHES SHALL COMPLY WITH SEC. C26-504.10AND R.S. 5.5.
21. ALL ELECTRICAL WIRING TO COMPLY WITH THE MINIMUM REQUIREMENTS OF THE NEW YORK CITY ELECTRICAL CODE.
22. CONTRACTOR SHALL OBTAIN A CERTIFICATE OF OCCUPANCY UPON COMPLETION OF ALL WORK.
23. ALL STRUCTURAL STEEL (A-36) DESIGNED FOR A UNIT STRESS OF 22,000 P.S.I. STEEL FABRICATOR TO FILE AN AFFIDAVIT OF PRODUCER OF STEEL CERTIFYING THAT IT MEETS ALL PROVISIONS. ALL AS PER SUB-ARTICLE C26-1005.0 AND R.S. 10.5.
24. ALL LUMBER TO BE GRADE MARKED PRIOR TO DELIVERY TO SITE. LUMBER TO BE TYPE AS NOTED ON PLANS. PLYWOOD SHALL BEAR IDENTIFICATIONS AS TO GRADE, TYPE, SPECIES OR IDENTIFICATION INDEX C26-1006.2.
25. PROVIDE 4" MIN. SOLID MASONRY UNDER, ABOVE AND AROUND ALL WOOD JOISTS RESTING ON MASONRY.
26. CONTROLLED INSPECTION ITEMS:
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 MATERIALS 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.
a) BORINGS AS PER SEC. C26-1112.2.
b) SUBGRADE AS PER SEC. C26-1112.5.
c) CONCRETE OPERATIONS:
d) CONSTRUCTION AFFECTING SUPPORT OF ADJACENT PROPERTIES WHERE EXCAVATION IS MORE THAN 10'-0" BELOW LEGAL GRADE AS PER SEC. C26-112.6 IF REQUIRED.
e) FIRESTOPS AS PER SEC. C26-504.7 (g).
f) HEATING AS PER SEC. C26-117.3.
g) VENTILATING AS PER C26-1301.2.
27. MAINTENANCE OF SITE AND ADJACENT AREAS TO COMPLY WITH SEC. C26-1901.0.
28. CONCRETE WORK SHALL COMPLY WITH SUB-ARTICLE 1004.0 AND APPLICABLE REFERENCE STANDARDS.
29. ALL PLUMBING STACKS, EXHAUST FAN ASSEMBLIES, ETC. THAT PIERCE THE ROOF TO BE PROPERLY FLASHED.
30. EACH INTERIOR BATHROOM TO BEVENTILATION OF SUFFICIENT CAPACITY TO EXHAUST 40 C.F.M. PER COMPARTMENT.
31. PROVIDE SLEEVES IN FOUNDATION WALL FOR UTILITIES AS REQUIRED.
32. PROVIDE ANCHORS FOR BEAMS BEARING ON CONCRETE AND GOVERNMENT ANCHORS FOR BEAMS RESTING ON MASONRY.
33. CONTRACTOR TO COMPLY WITH ALL RULES AND REGULATIONS OF ALL CITY AND STATE DEPARTMENTS HAVING JURISDICTION.
34. COMPLETE PLUMBING AND DRAINAGE SYSTEM INSTALLATION SHALL COMPLY WITH ARTICLE 16 AND R.S. 16.1.
35. SECURITY REQUIREMENTS SHALL COMPLY WITH PROVISIONS OF SEC. C26-604.4 (j). BUILDING ENTRANCE DOOR SHALL BE EQUIPPED WITH HEAVY DUTY LOCK SETS WITH AUXILIARY LATCH BOLTS TO PREVENT THE LATCH FROM BEING MANIPULATED BY MEANS OTHER THAN A KEY. LATCH SETS SHALL HAVE STOPWORK IN THE INSIDE CYLINDERS CONTROLLED BY A MASTER KEY. ONLY OUTSIDE CYLINDERS OF MAIN ENTRANCE DOOR LOCK SHALL BE OPERATED BY THE TENANT'S KEY WHICH SHALL NOT BE KEYED TO ALSO OPEN THE TENANT'S APARTMENT ENTRANCE DOOR. A LIGHT OR LIGHTS SHALL BE PROVIDED AT OR NEAR THE OUTSIDE OF THE FRONT ENTRANCE WAY OF THE BUILDING PROVIDING NOT LESS THAN 5' CANDLES INTENSITY MEASURED OFF THE FLOOR LEVEL FOR THE FULL WIDTH OF THE ENTRANCEWAY.

36. DOORS TO DWELLING UNITS SHALL BE EQUIPPED WITH A HEAVY DUTY LOCK SET EQUIPPED WITH STOPWORK FOR CONTROL OF THE KNOBS AND AN ADDITIONAL DEAD BOLT OR AUXILIARY LATCH BOLT TO PREVENT MANIPULATION BY MEANS OTHER THAN A KEY. DOORS SHALL ALSO BE EQUIPPED WITH A CHAIN DOOR GUARD SO AS TO PERMIT PARTIAL OPENING OF THE DOOR. DWELLING UNIT ENTRANCE DOOR SHALL BE EQUIPPED WITH A VIEWING DEVICE (APPROVED TYPE) LOCATED AS TO ENABLE A PERSON ON THE INSIDE OF THE ENTRANCE DOOR TO VIEW A PERSON IMMEDIATELY OUTSIDE.
37. ALL WINDOWS (OPENABLE) SHALL BE EQUIPPED WITH SASH LOCKS (APPROVED TYPE) DESIGNED TO BE OPENABLE FROM THE INSIDE ONLY.
38. WATER SUPPLY TO BUILDING TO COMPLY WITH SEC. D26-15.01 H.M.C.
39. WATER SUPPLY TO INDIVIDUAL UNITS AND FIXTURES SHALL COMPLY WITH SEC. D26-15.03 H.M.C.
40. SUPPLY OF HOT WATER TO COMPLY WITH SEC. D26-17.07 H.M.C.
41. LIGHTS NEAR ENTRANCE WAYS AND IN YARDS AND COURTS TO BE PROVIDED AS PER D26-19.07 H.M.C.
42. U.S. APPROVED TYPE MAILBOXES SHALL BE INSTALLED AS PER SEC. D26-21.01 H.M.C.
43. STREET NUMBER SHALL BE POSTED AND MAINTAINED AS PER SEC. D26-21.05 H.M.C.
44. ALL STREET BEAMS TO HAVE A MINIMUM OF 6" BEARING ON MASONRY.
45. SAFETY OF PUBLIC AND PROPERTY DURING CONSTRUCTION OPERATIONS TO COMPLY WITH ARTICLE 19.
46. REMOVAL AND STORAGE OF MATERIALS TO COMPLY WITH SEC. 26-1901.3.
47. PROVIDE ADEQUATE FENCING AT ALL EXCAVATIONS AS PER SEC. C26-710.
48. PROVIDE GUARDRAILS AT EXCAVATIONS AS PER SEC. C26-1903.2 (b).
49. MASONRY EXTERIOR WALLS OF ALL FLOORS TO BE FURRED WITH WOOD FURRING STRIPS BEFORE RECEIVING SHEETROCK. IN WALLS WHERE WOODEN FURRING IS USED, EVERY COURSE OF MASONRY FROM UNDERSIDE TO TOP OF FLOOR BEAMS, TO PROJECT A DISTANCE OF 2" BEYOND FACE OF WALL OR RIGID FIRESTOPPING AS PER SEC. C26-504.7 (a). INTERIOR MASONRY WALLS, PARTITIONS TO BE FINISHED WITH ½" WALLBOARD LAMINATED DIRECTLY TO MASONRY UNLESS NOTED OTHERWISE.
50. ARCHITECTS HAVE NOT BEEN RETAINED TO SUPERVISE CONSTRUCTION OF ANY WORK OR INSTALLATION OF ANY MECHANICAL EQUIPMENT.
51. PROVIDE AND SET WOOD SHELVES AND A 1½" DIAGONAL HORIZONTAL WOOD POLE IN EACH CLOSET. LINEN CLOSETS SHALL HAVE FIVE SHELVES.
52. APPROVED TYPE IRON JOIST HANGERS TO BE USED WHEREVER WOOD MEMBERS FRAME INTO ONE ANOTHER WHICH ARE TO BE FLUSHED TOP. TECO CONNECTORS B.S.&A. CAL. 3325-60SM, (A.I.A.) FILE 196 OR 14J MAY BE USED INSTEAD OF APPROVED TYPE BRIDLE IRONS.
53. GAS APPLIANCES SHALL COMPLY WITH BOARD OF STANDARDS AND APPEALS.
54. BATHROOM AREAS TO HAVE CERAMIC TILE FLOORS AND MIN. 6" TILE BASE. TUB ENCLOSURE WALL TO HAVE 6'-0" HIGH TILE WAINSCOT. BATHROOMS TO COMPLY WITH SEC. D26-31.03 H.M.C. ALL PARTITIONS ABOVE TILE BASE AND/OR TILE WAINSCOT ENCLOSING BATHROOMS SHALL BE PROVIDED WITH APPROVED TYPE MOISTURE RESISTIVE WALLBOARD AS PER B.S.A. APPROVAL. PARTITIONS REQUIRED TO HAVE A FIRE RESISTIVE RATING SHALL BE PROVIDED WITH APPROVED TYPE MOISTURE-RESISTIVE WALLBOARD FIRE-RESISTIVE RATED AND CONSTRUCTED AS PER B.S.A. APPROVAL.
55. REQUIRED SOURCES OF NATURAL LIGHT SHALL HAVE AN AGGREGATE TRANSMITTING AREA OF AT LEAST 10% OF THE FLOOR AREA OF THE ROOM OR SPACE SERVED, AND ONLY THAT AREA OF LIGHT SOURCE ABOVE 30" FROM THE FINISHED FLOOR MAY BE CONSIDERED AS PROVIDING THE NATURAL LIGHT REQUIRED IN ANY SPACE AS PER SEC. C26-1202.3.
56. BOILERS TO BE B.S.A. APPROVED TYPE AND INSTALLED AS PER APPROVAL.
57. ALL MATERIALS, ASSEMBLIES, FORMS AND METHOD OF CONSTRUCTION AND SERVICE EQUIPMENT SHALL MEET THE FOLLOWING REQUIREMENTS:
a) IT SHALL HAVE BEEN ACCEPTABLE PRIOR TO THE EFFECTIVE DATE OF THE CODE BY THE BOARD OF STANDARDS AND APPEALS OR
b) SHALL HAVE BEEN ACCEPTED FOR USE UNDER TOE PRESCRIBED CODE TEST METHODS BY THE COMMISSIONER OR
c) APPROVED BY THE BOARD OF STANDARDS AND APPEALS.
58. HEATING SYSTEM SHALL BE CAPABLE OF MAINTAINING A MINIMUM OF 70 TEMPERATURE AS PER SEC. C26-1204.1. HEATING BOILERS SHALL BE B.S.A. APPROVED TYPE AND INSTALLED AS PER THE APPROVAL. HEATING BOILERS TO MAXIMUM: 350,000 BTU AND PRESSURE GAUGE TO BE SET AT LESS THAN 15#D".
59. THESE GENERAL NOTES ARE PART OF THE PLANS AND ARE TO BE COMPLETED WITH IN ALL RESPECTS. MORE RESTRICTIVE NOTES MENTIONED ELSEWHERE ARE TO TAKE PRECEDENCE OVER SAME.
60. IF REQUIRED VENTILATION OF INTERIOR BATHROOMS AND TOILETS: PROVIDE 4"x 6" G.I. VENT DUCTS FOR EACH BATHROOM AND TOILET. EACH DUCT SHALL BE EQUIPPED WITH A MECHANICAL EXHAUST FAN HAVING THE CAPACITY TO EXHAUST MIN. 50 C.F.M. REFER TO ENCLOSURE DETAIL S#.
61. ENTIRE CELLAR, FIRST FLOOR AND SECOND FLOOR CEILINGS TO BE FIRE-RETARDED WITH ½" SHEETROCK FIRE CODE "C" AS PER CAL. #217-65 SM.
62. CHIMNEY TO BE ENCLOSED WITH ONE HOUR CONSTRUCTION-REFER TO DETAIL SH#.
63. ALL WOOD HEADERS TO BE SIZED AS NOTED AND 1400 FS.
64. SPACE BETWEEN VENTILATING/HEATING DUCTS AND FLOOR CONSTRUCTION SHALL BE SOLIDLY FILLED WITH INERT NON-COMBUSTIBLE MATERIALS (MINERAL WOOL) FOR THE DEPTH OF THE FLOOR CONSTRUCTION.
65. PROVIDE DOUBLE HEADERS AND TRIMMERS AROUND STAIRWELLS OPG, UNLESS OTHER WISE NOTED OR SHOWN ON PLANS.
66. KITCHENETTES SHALL BE VENTILATED BY MECHANICAL MEANS EXHAUSTING AT LEAST 2 C.F.M. OF AIR PER SQUARE FOOT OF FLOOR AREA.

CONCRETE NOTES:
1. CONCRETE IS TO BE PROVIDED ON THE BASIS OF A PREQUALIFIED OR PREVIOUSLY ACCEPTED MIX.
2. CONCRETE MIX IS TO EXHIBIT STRENGTH AT LEAST 25% HIGHER THAN THE SPECIFIED VALUE. MINIMUM CEMENT FACTOR TO COMPLY WITH TABLE 10.3.
3. PRELIMINARY TESTS AS A BASIS FOR A PREQUALIFIED MIX TO COMPLY WITH C26-1004.3. A3.
4. QUALITY CONTROL OF CONCRETE IS TO BE PROVIDED AT BATCH PLANT. THE RESULTS OF QUALITY CONTROL AND INSPECTION ARE TO APPEAR ON THE TICKET ACCOMPANYING EACH LOAD OF CONCRETE C26-1004.3 a5.
5. COMPRESSIVE STRENGTH OF CONCRETE IS TO BE 2,500 P.S.I. AT 28 DAYS.
6. THREE CYLINDERS SHALL BE TESTED PER 50 CUBIC YARDS OR FRACTION THEREOF OF POURED IN ANY ONE DAY.
7. CONCRETE MATERIALS FOR SHORT SPAN FLOOR CONSTRUCTION TO COMPLY WITH C26-1004.8.
8. CONCRETE THAT IS TO BE SUBJECT TO FREEZING TEMP. WHILE WET SHALL HAVE A WATER CEMENT RATION NOT TO EXCEED 6 GAL. PER BAG AND IT SHALL CONTAIN ENTRAINED AIR. SEC. 501 © A.C.I. 318-63.

PLAIN CONCRETE NOTES:
A. PLAIN CONCRETE FOR FOOTINGS AND WALLS SHALL BE PROPORTIONED ON THE BASIS OF CALCULATED STRESSES LESS THAN 70% OF BASIC ALLOWABLE VALUES. LESS THAN 50 CUBIC YARDS OF CONCRETE TO BE POURED-TABLE 10-1. INSPECTION OF MATERIALS AND ASSEMBLIES: TABLE 10-2. INSPECTION OF METHODS OR CONSTRUCTION, BUILDING CODE: TABLE 1002 (a) ALLOWABLE STRESSES IN CONCRETE. ACI STANDARD BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE- (ACI 318-63). STRESSES IN CONCRETE ARE COMPUTED ON THE BASIS OF WORKING STRESS DESIGN.
B. CONCRETE MATERIALS, DESIGN AND CONSTRUCTION, SHALL MEET THE REQUIREMENTS OF REFERENCE STANDARD RS 10-3, "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE (ACI 318-63)", AS MODIFIED BY NEW BUILDING CODE.
C. CONCRETE IS TO BE PROVIDED ON THE BASIS OF A PREQUALIFIED OR PREVIOUSLY ACCEPTED MIX. THE CONCRETE MIX IS TO BE EXHIBITING STRENGTH AT LEAST 25% HIGHER THAN THE SPECIFIED VALUE. MINIMUM CEMENT FACTOR TO COMPLY WITH TABLE 10-3 PRELIMINARY TESTS AS A BASIS FOR A PREQUALIFIED TO COMPLY WITH C26-1004.3 a3. QUALITY CONTROL OF CONCRETE IS TO BE PROVIDED AT THE BATCH PLANT. THE RESULTS OF QUALITY CONTROL AND INSPECTION ARE TO APPEAR ON THE TICKET ACCOMPANYING EACH LOAD OF CONCRETE C26-1004.3 a5.
D. MAXIMUM TENSION IN FOOTING OF PLAIN CONCRETE IS TO BE 70% OF 1.6 fc-SEC. 2307 (ACI 318-63).
E. SHEAR IN FOOTINGS NOT TO EXCEED 70% OF 2fc OR 70% OF 1.1 fc WHICHEVER IS LOWER AS SPECIFIED IN SEC. 1207-1201 (ACI 318-63).
F. THE RATIO OF UNSUPPORTED HEIGHT TO THICKNESS OR THE RATIO OF UNSUPPORTED LENGTH TO THICKNESS (WHICHEVER IS GREATER) FOR PLAIN CONCRETE WALLS SHALL NOT EXCEED 20. PLAIN CONCRETE WALLS SHALL BE SO PROPORTIONED THAT THE TENSILE STRESS DOES NOT EXCEED 70% 1.6 fc AND THE ALLOWABLE STRESS IN COMPRESSION SHALL BE 70% OF 0.25 fc FOR WALLS HAVING A RATIO HEIGHT TO THICKNESS OF 10 OR LESS AND SHALL BE REDUCED PROPORTIONATELY TO 70% OF 0.15 fc FOR WALLS HAVING A RATIO OF HEIGHT TO THICKNESS OF 20. SEC. 2204 (ACI 318-63 AS ADDED BY NEW BUILDING CODE).
G. CONCRETE MATERIALS FOR SHORT SPAN FLOOR CONSTRUCTION TO COMPLY WITH C26-1004.8.

SIGN REQUIREMENTS FOR CONSTRUCTION SITES
ALL NEW BUILDING PERMIT APPLICATIONS -SECTION 27-1009C REQUIRES THAT A SIGN INDICATING THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE OWNER AND GENERAL CONTRACTOR BE POSTED.
ENERGY CONSTRUCTION NOTES
§E802.1 GENERAL. WALLS, ROOF ASSEMBLIES, FLOORS, GLAZING, AND SLABS ON GRADE WHICH ARE PART OF THE BUILDING ENVELOPE FOR BUILDINGS WHERE THE WINDOW AND GLAZED DOOR AREA IS NOT GREATER THAN 30 PERCENT OF THE GROSS AREA OF ABOVE-GRADE WALLS SHALL MEET THE REQUIREMENTS OF §E802.2.1 THROUGH §E802.2.8, AS APPLICABLE. BUILDINGS WITH MORE GLAZING SHALL MEET THE APPLICABLE PROVISIONS OF ASHRAE/IESNA 90.1.
§E802.1.1 CLASSIFICATION OF WALLS. WALLS ASSOCIATED WITH THE BUILDING ENVELOPE SHALL BE CLASSIFIED IN ACCORDANCE WITH §E802.1.1.1, §E802.1.1.2 OR §E802.1.1.3.
§E802.1.1.1 ABOVE-GRADE WALLS. ABOVE-GRADE WALLS ARE THOSE WALLS COVERED BY §E802.2.1 ON THE EXTERIOR OF THE BUILDING AND COMPLETELY ABOVE GRADE OR THE ABOVE-GRADE PORTION OF A BASEMENT OR FIRST-STORY WALL THAT IS MORE THAN 15 PERCENT ABOVE GRADE.
§E802.1.1.2 BELOW-GRADE WALLS. BELOW-GRADE WALLS COVERED BY §E802.2.8 ARE BASEMENT OR FIRST-STORY WALLS ASSOCIATED WITH THE EXTERIOR OF THE BUILDING THAT ARE AT LEAST 85 PERCENT BELOW GRADE.
§E802.1.1.3 INTERIOR WALLS. INTERIOR WALLS COVERED BY §E802.2.9 ARE THOSE WALLS NOT ON THE EXTERIOR OF THE BUILDING AND THAT SEPARATE CONDITIONED AND UNCONDITIONED SPACE.
§E802.1.2 MOISTURE CONTROL. ALL FRAMED WALLS, FLOORS, AND CEILINGS NOT VENTILATED TO ALLOW MOISTURE TO ESCAPE SHALL BE PROVIDED WITH AN APPROVED VAPOR RETARDER HAVING A MAXIMUM PERMEANCE RATING OF 1.0 PERM (5.72X10-8 G/PASM2), WHEN TESTED IN ACCORDANCE WITH PROCEDURE A OF ASTM E 96, ON THE WARM-IN-WINTER SIDE OF THE INSULATION.
EXCEPTIONS:
1. BUILDINGS LOCATED IN CLIMATE ZONES 1 THROUGH 7 AS INDICATED IN TABLE E302.1.
2. IN CONSTRUCTION WHERE MOISTURE OR ITS FREEZING WILL NOT DAMAGE THE MATERIALS.
3. WHERE OTHER APPROVED MEANS TO AVOID CONDENSATION IN UNVENTILATED FRAMED WALL, FLOOR, ROOF AND CEILING CAVITIES ARE PROVIDED.
§E802.2 CRITERIA. THE BUILDING ENVELOPE COMPONENTS SHALL MEET EACH OF THE APPLICABLE REQUIREMENTS IN TABLE E802.2(1) THROUGH TABLE E802.2(7) [BEGINNING ON PAGE 78], BASED ON THE PERCENTAGE OF WALL THAT IS GLAZED. AND ON CLIMATE ZONE. THE PERCENTAGE OF WALL THAT IS GLAZED SHALL BE DETERMINED BY DIVIDING THE AGGREGATE AREA OF ROUGH OPENINGS FOR GLAZING (WINDOWS AND GLAZED DOORS) IN ALL THE ABOVE-GRADE WALLS ASSOCIATED WITH THE BUILDING ENVELOPE BY THE TOTAL GROSS AREA OF ALL ABOVE-GRADE EXTERIOR WALLS THAT ARE A PART OF THE BUILDING ENVELOPE. IN BUILDINGS WITH MULTIPLE TYPES OF BUILDING ENVELOPE CONSTRUCTION, EACH BUILDING ENVELOPE CONSTRUCTION TYPE SHALL BE EVALUATED SEPARATELY. WHERE TABLE E802.2(1) THROUGH TABLE E802.2(7) DOES NOT LIST A PARTICULAR CONSTRUCTION TYPE, THE APPLICABLE PROVISIONS OF ASHRAE/IESNA 90.1 SHALL BE USED IN LIEU OF §E802.
§E802.2.1 ABOVE-GRADE WALLS. THE MINIMUM THERMAL RESISTANCE (*R*-VALUE) OF THE INSULATING MATERIAL(S) INSTALLED IN THE WALL CAVITY BETWEEN THE FRAMING MEMBERS AND CONTINUOUSLY ON THE WALLS SHALL BE AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7) BASED ON FRAMING TYPE AND CONSTRUCTION MATERIALS USED IN THE WALL ASSEMBLY. WHERE BOTH CAVITY AND CONTINUOUS INSULATION VALUES ARE PROVIDED IN TABLE E802.2(1) THROUGH TABLE E802.2(7) BOTH REQUIREMENTS SHALL BE MET. CONCRETE MASONRY UNITS (CMU) AT LEAST 8-INCH (203 MM) NOMINAL THICKNESS WITH ESSENTIALLY EQUAL AMOUNTS OF MASS ON EITHER SIDE OF THE INSULATION LAYER ARE CONSIDERED AS HAVING INTEGRAL INSULATION, HOWEVER, THE THERMAL RESISTANCE OF THAT INSULATION SHALL NOT BE CONSIDERED WHEN DETERMINING COMPLIANCE WITH TABLE E802.2(1) THROUGH TABLE E802.2(7) "OTHER MASONRY WALLS" SHALL INCLUDE WALLS WEIGHING AT LEAST 35 LB/FT2 (170 KG/M2) OF WALL SURFACE AREA AND DO NOT INCLUDE CMUS LESS THAN 8 INCHES (203 MM) NOMINAL THICKNESS.
§E802.2.2 NONGLAZED DOORS. NONGLAZED DOORS SHALL MEET THE APPLICABLE REQUIREMENTS FOR WINDOWS AND GLAZED DOORS AND BE CONSIDERED AS PART OF THE GROSS AREA OF ABOVE-GRADE WALLS THAT ARE PART OF THE BUILDING ENVELOPE.
§E802.2.3 WINDOWS AND GLASS DOORS. THE MAXIMUM SOLAR HEAT GAIN COEFFICIENT (SHGC) AND THERMAL TRANSMITTANCE (*U*-FACTOR) OF WINDOW ASSEMBLIES AND GLASS DOORS LOCATED IN THE BUILDING ENVELOPE SHALL BE AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7) BASED ON THE WINDOW PROJECTION FACTOR.
THE WINDOW PROJECTION FACTOR SHALL BE DETERMINED IN ACCORDANCE WITH EQUATION E8-1.

EQUATION E8-1
$PF = A/B$
WHERE: PF = PROJECTION FACTOR (DECIMAL).

A = DISTANCE MEASURED HORIZONTALLY FROM THE FURTHEST CONTINUOUS EXTREMITY OF ANY OVERHANG, EAVE, OR PERMANENTLY ATTACHED SHADING DEVICE TO THE VERTICAL SURFACE OF THE GLAZING.

B = DISTANCE MEASURED VERTICALLY FROM THE BOTTOM OF THE GLAZING TO THE UNDERSIDE OF THE OVERHANG, EAVE, OR PERMANENTLY ATTACHED SHADING DEVICE.

WHERE DIFFERENT WINDOWS OR GLASS DOORS HAVE DIFFERENT *PF* VALUES, THEY SHALL EACH BE EVALUATED SEPARATELY, OR AN AREA-WEIGHTED *PF* VALUE SHALL BE CALCULATED AND USED FOR ALL WINDOWS AND GLASS DOORS.
§E802.2.4 ROOF ASSEMBLY. THE MINIMUM THERMAL RESISTANCE (*R*-VALUE) OF THE INSULATING MATERIAL INSTALLED EITHER BETWEEN THE ROOF FRAMING OR CONTINUOUSLY ON THE ROOF ASSEMBLY SHALL BE AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7) BASED ON CONSTRUCTION MATERIALS USED IN THE ROOF ASSEMBLY.
§E802.2.5 SKYLIGHTS. SKYLIGHTS LOCATED IN THE BUILDING ENVELOPE SHALL BE LIMITED TO 3 PERCENT OF THE GROSS ROOF ASSEMBLY AREA AND SHALL HAVE A MAXIMUM THERMAL TRANSMITTANCE (*U*-FACTOR) OF THE SKYLIGHT ASSEMBLY AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7).

§E802.2.6 FLOORS OVER OUTDOOR AIR OR UNCONDITIONED SPACE. THE MINIMUM THERMAL RESISTANCE (*R*-VALUE) OF THE INSULATING MATERIAL INSTALLED EITHER BETWEEN THE FLOOR FRAMING OR CONTINUOUSLY ON THE FLOOR ASSEMBLY SHALL BE AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7) BASED ON CONSTRUCTION MATERIALS USED IN THE FLOOR ASSEMBLY.
§E802.2.7 SLABS ON GRADE. THE MINIMUM THERMAL RESISTANCE (*R*-VALUE) OF THE INSULATION AROUND THE PERIMETER OF THE SLAB FLOOR SHALL BE AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7). THE INSULATION SHALL BE PLACED IN THE OUTSIDE OF THE FOUNDATION OR ON THE INSIDE OF A FOUNDATION WALL. THE INSULATION SHALL EXTEND DOWNWARD FROM THE TOP OF THE SLAB FOR A MINIMUM OF 48 INCHES (1219 MM) OR DOWNWARD TO AT LEAST THE BOTTOM OF THE SLAB AND THEN HORIZONTALLY TO THE INTERIOR OR EXTERIOR FOR A MINIMUM TOTAL DISTANCE OF 48 INCHES (1219 MM).
§E802.2.8 BELOW-GRADE WALLS. THE MINIMUM THERMAL RESISTANCE (*R*-VALUE) OF THE INSULATING MATERIAL INSTALLED IN, OR CONTINUOUSLY ON, THE BELOW-GRADE WALLS SHALL BE AS SPECIFIED IN TABLE E802.2(1) THROUGH TABLE E802.2(7) AND SHALL EXTEND TO A DEPTH OF 10 FEET (3048 MM) BELOW THE OUTSIDE FINISH GROUND LEVEL, OR TO THE LEVEL OF THE FLOOR, WHICHEVER IS LESS.
§E802.3 INTERIOR WALLS. THE MINIMUM THERMAL RESISTANCE (*R*-VALUE) OF THE INSULATING MATERIAL INSTALLED IN THE WALL CAVITY OR CONTINUOUSLY ON THE INTERIOR WALLS SHALL BE AS SPECIFIED IN TABLE E802.2(1) FOR ABOVE-GRADE WALLS, REGARDLESS OF GLAZING AREA, BASED ON FRAMING TYPE AND CONSTRUCTION MATERIALS USED IN THE WALL ASSEMBLY.
§E802.3 AIR LEAKAGE. THE REQUIREMENTS FOR AIR LEAKAGE SHALL BE AS SPECIFIED IN §E802.3.1 AND §E802.3.6.
§E802.3.1 WINDOW, DOOR, AND CURTAIN WALL ASSEMBLIES. WINDOW, SLIDING OR SWINGING DOORS AND CURTAIN WALL ASSEMBLIES THAT ARE PART OF THE BUILDING ENVELOPE SHALL BE TESTED AND LISTED AS MEETING AAMA/WDMA 101/I.S.2.
EXCEPTION: SITE-CONSTRUCTED WINDOWS AND DOORS THAT ARE WEATHERSTRIPPED OR SEALED IN ACCORDANCE WITH §E802.3.2.
COMMERCIAL ENTRANCE DOORS SHALL HAVE A MAXIMUM AIR INFILTRATION RATE OF 1.75 CUBIC FEET PER MINUTE (CFM)/FT2 (32.0 M3/HM2) OF DOOR AREA WHEN TESTED IN ACCORDANCE WITH ASTM E 283.
§E802.3.2 SEALING OF THE BUILDING ENVELOPE. OPENINGS AND PENETRATIONS IN THE BUILDING ENVELOPE SHALL BE SEALED WITH CAULKING MATERIALS OR CLOSED WITH GASKETING SYSTEMS COMPATIBLE WITH THE CONSTRUCTION MATERIALS AND LOCATION. JOINTS AND SEAMS SHALL BE SEALED IN THE SAME MANNER OR TAPED OR COVERED WITH A MOISTURE VAPOR-PERMEABLE WRAPPING MATERIAL. SEALING MATERIALS SPANNING JOINTS BETWEEN CONSTRUCTION MATERIALS SHALL ALLOW FOR EXPANSION AND CONTRACTION OF THE CONSTRUCTION MATERIALS.
§E802.3.3 DAMPERS INTEGRAL TO THE BUILDING ENVELOPE. STAIR, ELEVATOR SHAFT VENTS AND OTHER DAMPERS INTEGRAL TO THE BUILDING ENVELOPE SHALL BE EQUIPPED WITH MOTORIZED DAMPERS WITH A MAXIMUM LEAKAGE RATE OF 3 CFM/FT2 AT 1.0 IN W.G. (250 PA) WHEN TESTED IN ACCORDANCE WITH AMCA 500. SUCH DAMPERS SHALL BE CLOSED DURING NORMAL BUILDING OPERATION AND SHALL OPEN AS REQUIRED BY FIRE AND SMOKE DETECTION SYSTEMS.
EXCEPTION: GRAVITY (NON-MOTORIZED) DAMPERS ARE PERMITTED TO BE USED IN BUILDINGS LESS THAN THREE STORIES IN HEIGHT ABOVE GRADE.
§E802.3.4 LOADING DOCK WEATHER SEALS. CARGO DOORS AND LOADING DOCK DOORS SHALL BE EQUIPPED WITH WEATHER SEALS TO RESTRICT INFILTRATION WHEN VEHICLES ARE PARKED IN THE DOORWAY.
§E802.3.5 VESTIBULES. A DOOR THAT SEPARATES CONDITIONED SPACE FROM THE EXTERIOR SHALL BE PROTECTED WITH AN ENCLOSED VESTIBULE, WITH ALL DOORS OPENING INTO AND OUT OF THE VESTIBULE EQUIPPED WITH SELF-CLOSING DEVICES. VESTIBULES SHALL BE DESIGNED SO THAT IN PASSING THROUGH THE VESTIBULE IT IS NOT NECESSARY FOR THE INTERIOR AND EXTERIOR DOORS TO OPEN AT THE SAME TIME.

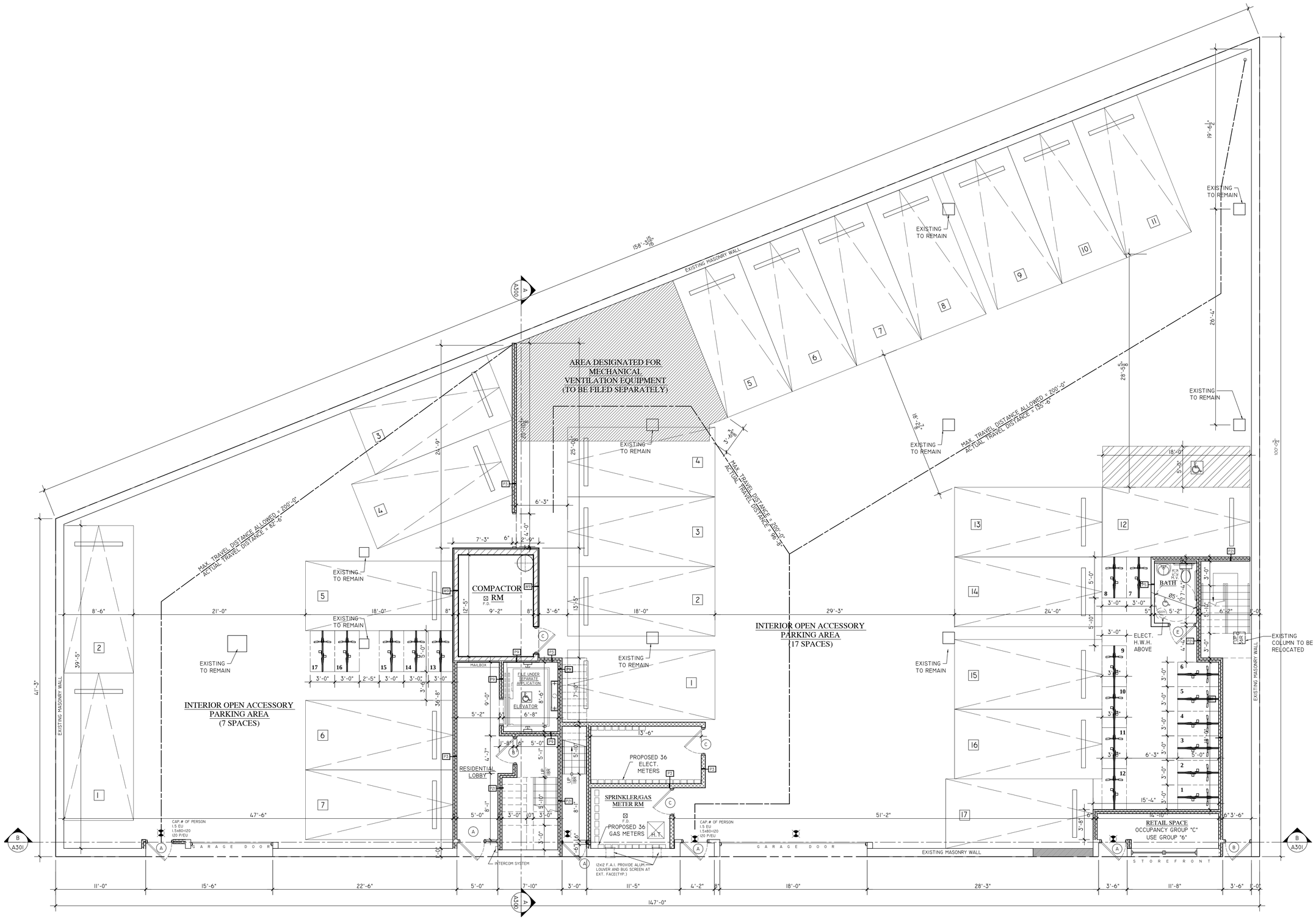
EXCEPTIONS:

1. DOORS NOT INTENDED TO BE USED AS A BUILDING ENTRANCE DOOR, SUCH AS DOORS TO MECHANICAL OR ELECTRICAL EQUIPMENT ROOMS.
2. DOORS OPENING DIRECTLY FROM A GUEST ROOM OR DWELLING UNIT.
3. DOORS THAT OPEN DIRECTLY FROM A SPACE LESS THAN 3,000 FT2 (298 M2) IN AREA.
4. REVOLVING DOORS.
5. DOORS USED PRIMARILY TO FACILITATE VEHICULAR MOVEMENT OR MATERIAL HANDLING AND ADJACENT PERSONNEL DOORS.

§E802.3.6 RECESSED LIGHTING FIXTURES. WHEN INSTALLED IN THE BUILDING ENVELOPE, RECESSED LIGHTING FIXTURES SHALL MEET ONE OF THE FOLLOWING REQUIREMENTS:

1. TYPE IC RATED, MANUFACTURED WITH NO PENETRATIONS BETWEEN THE INSIDE OF THE RECESSED FIXTURE AND CEILING CAVITY AND SEALED OR GASKETED TO PREVENT AIR LEAKAGE INTO THE UNCONDITIONED SPACE.
2. TYPE

FIRST FLOOR PLAN SCALE: 3/16"= 1'-0"



The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

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PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE, BROOKLYN N.Y.

JOB APPLICATION #

FIRST FLOOR PLAN

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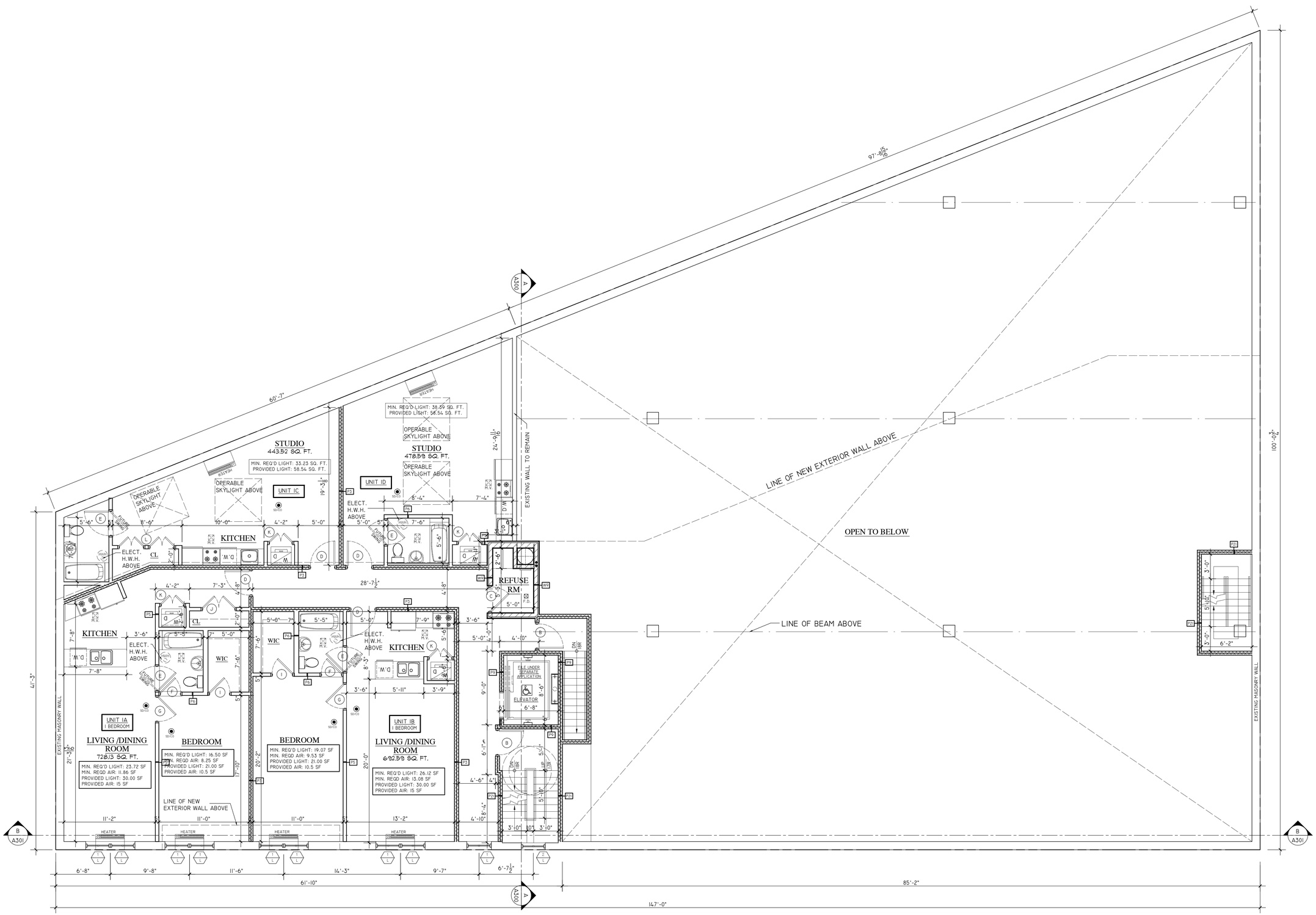
MEZZANINE FLOOR PLAN

SCALE: 3/16"= 1'-0"



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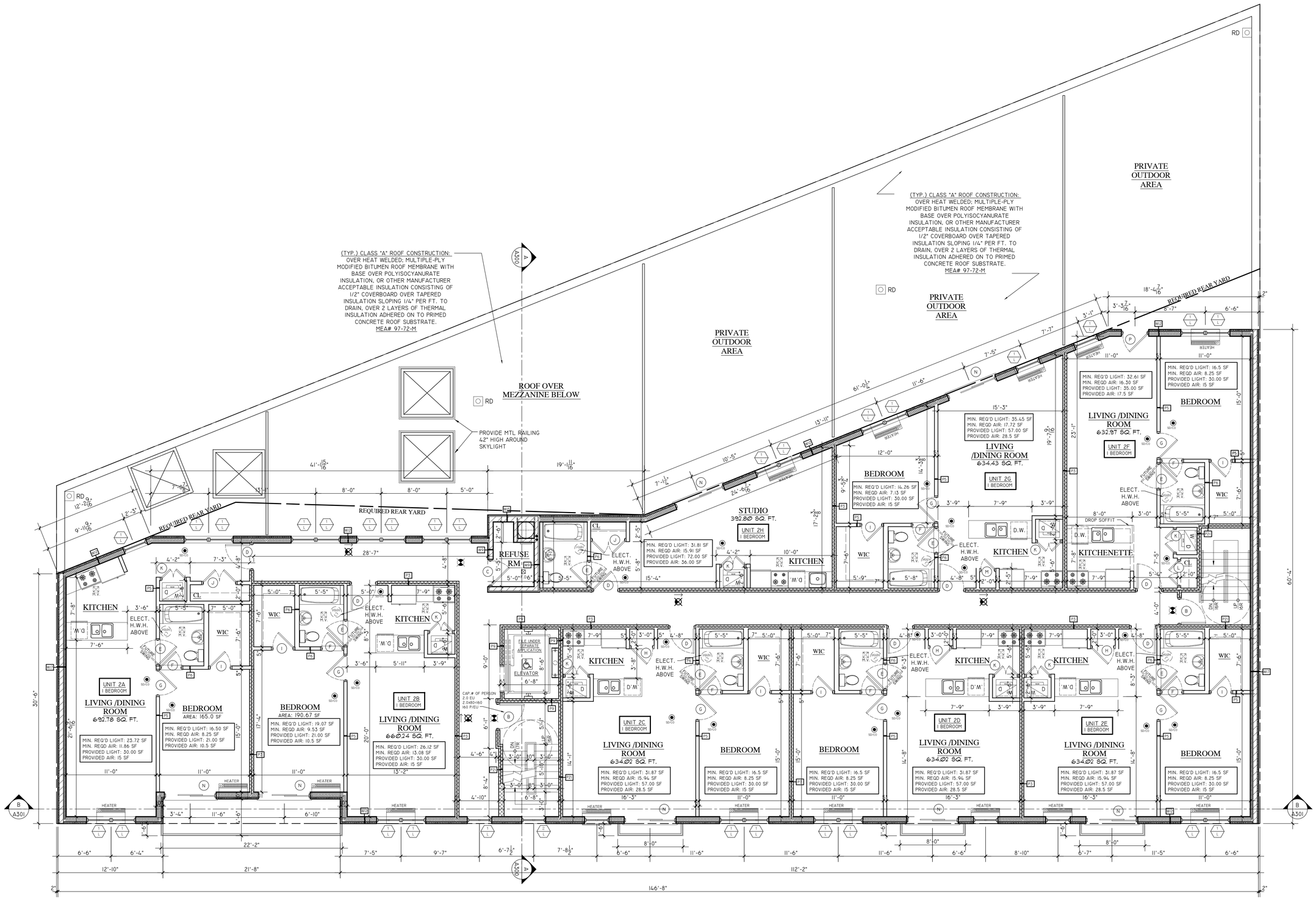
SECOND FLOOR PLAN

SCALE: 3/16"= 1'-0"



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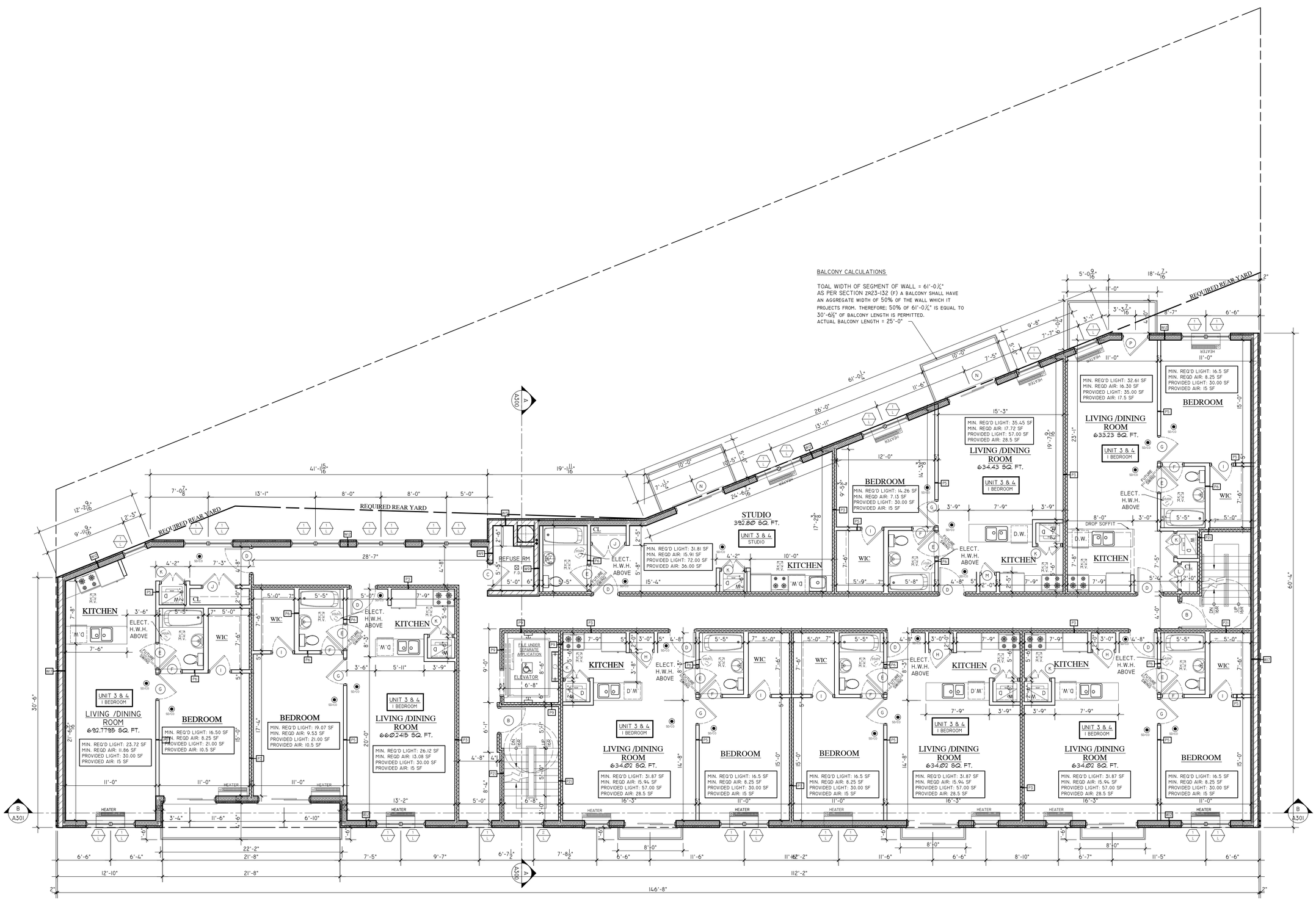
THIRD AND FOURTH FLOOR PLAN

SCALE: 3/16"= 1'-0"



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FIFTH FLOOR PLAN

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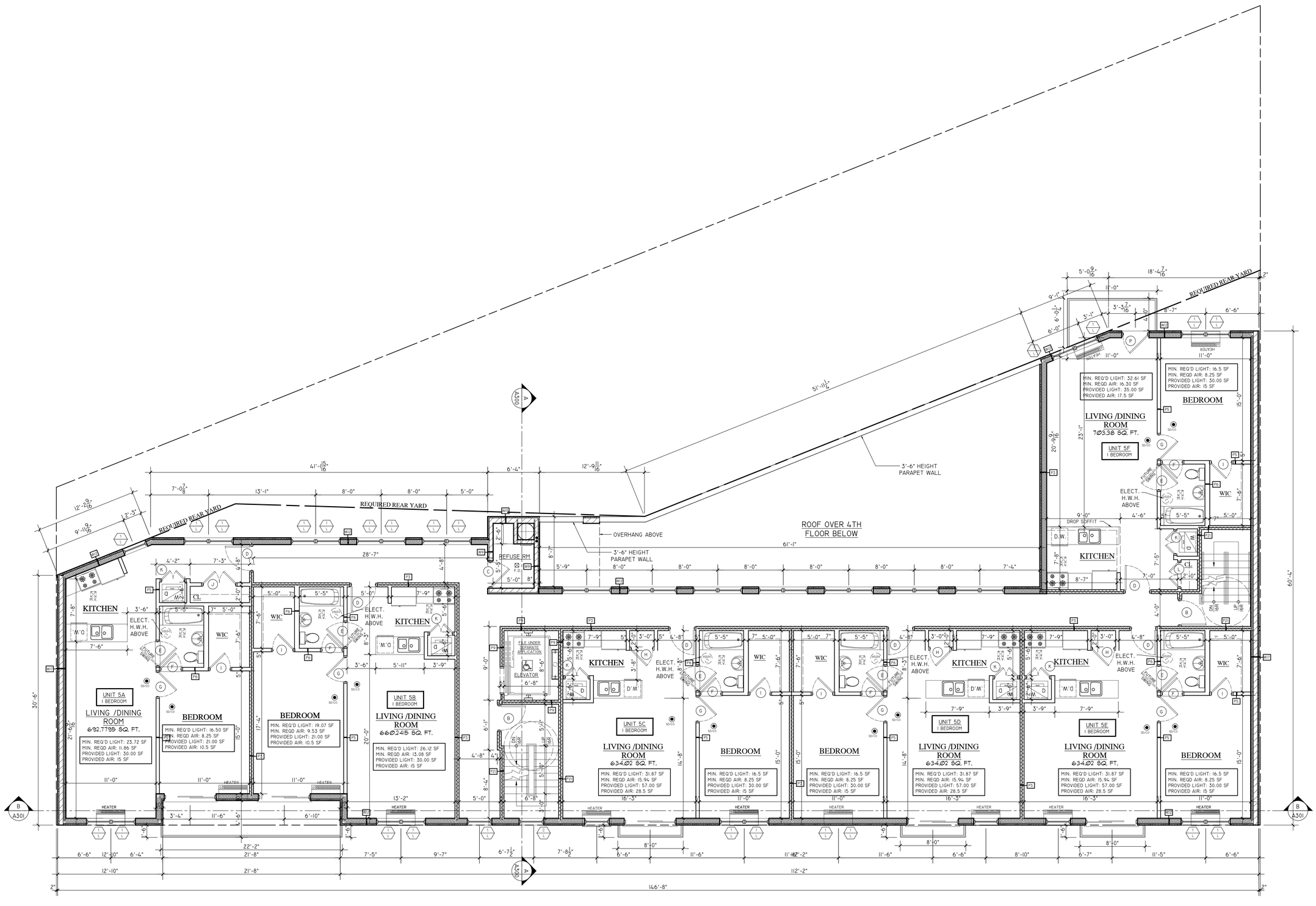

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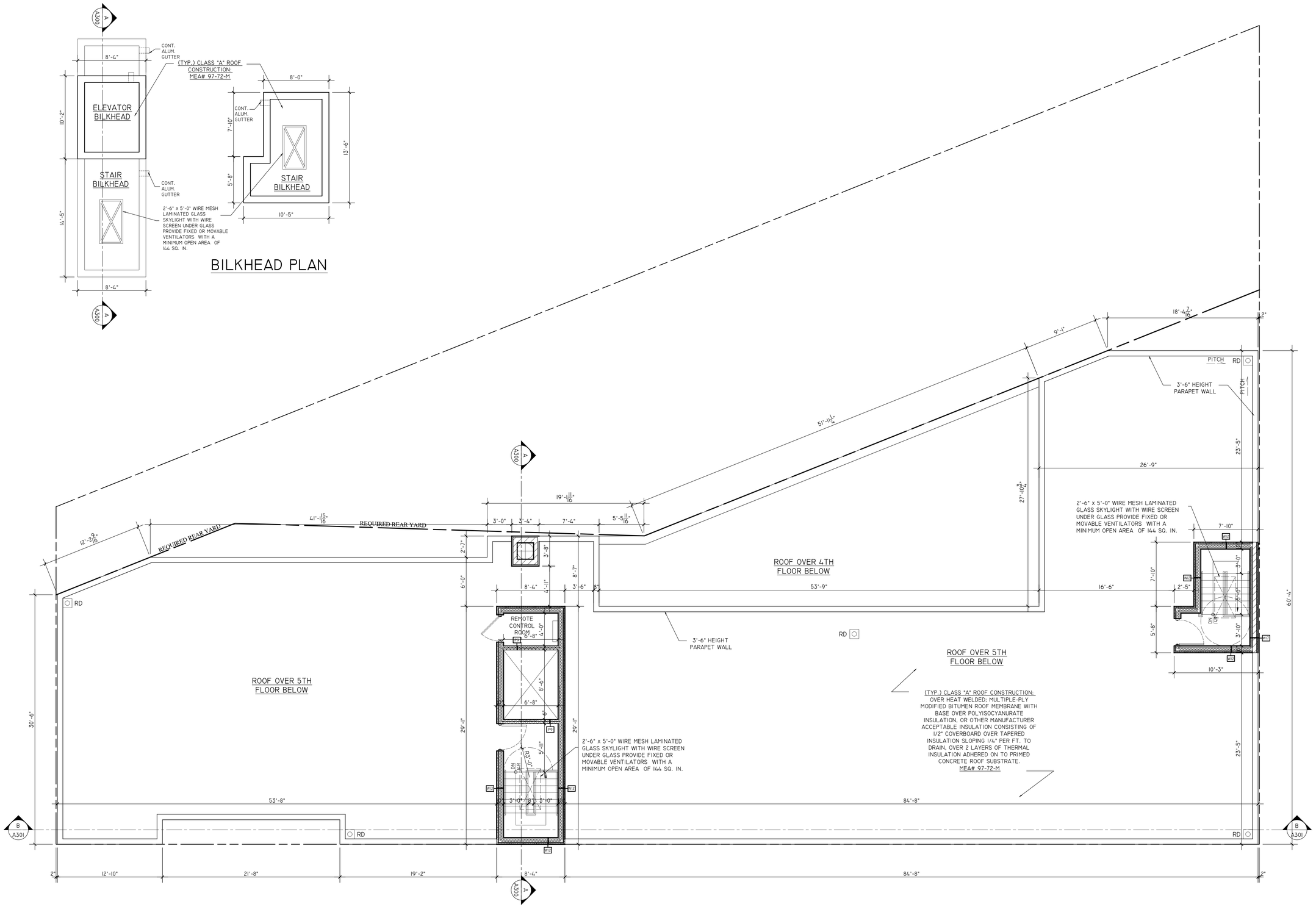
ROOF PLAN

SCALE: 3/16"= 1'-0"



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ROOF PLAN

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JOB NO.:		
CHECKED BY:		

FRONT ELEVATION

SCALE: 3/16"= 1'-0"

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REVISIONS:

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NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

139 FULTON STREET, SUITE 318
NEW YORK, N.Y. 10038
TEL. 212.393.9679

PROFESSIONAL SEAL:

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PROJECT TITLE:

ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

JOB APPLICATION #

FRONT ELEVATION

SCALE: INDICATED		DRAWING #:
DRAWN BY:		A-200.00
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

REAR ELEVATION

SCALE: 3/16"= 1'-0"

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PROJECT TITLE:

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503 UNION AVENUE,
BROOKLYN N.Y.

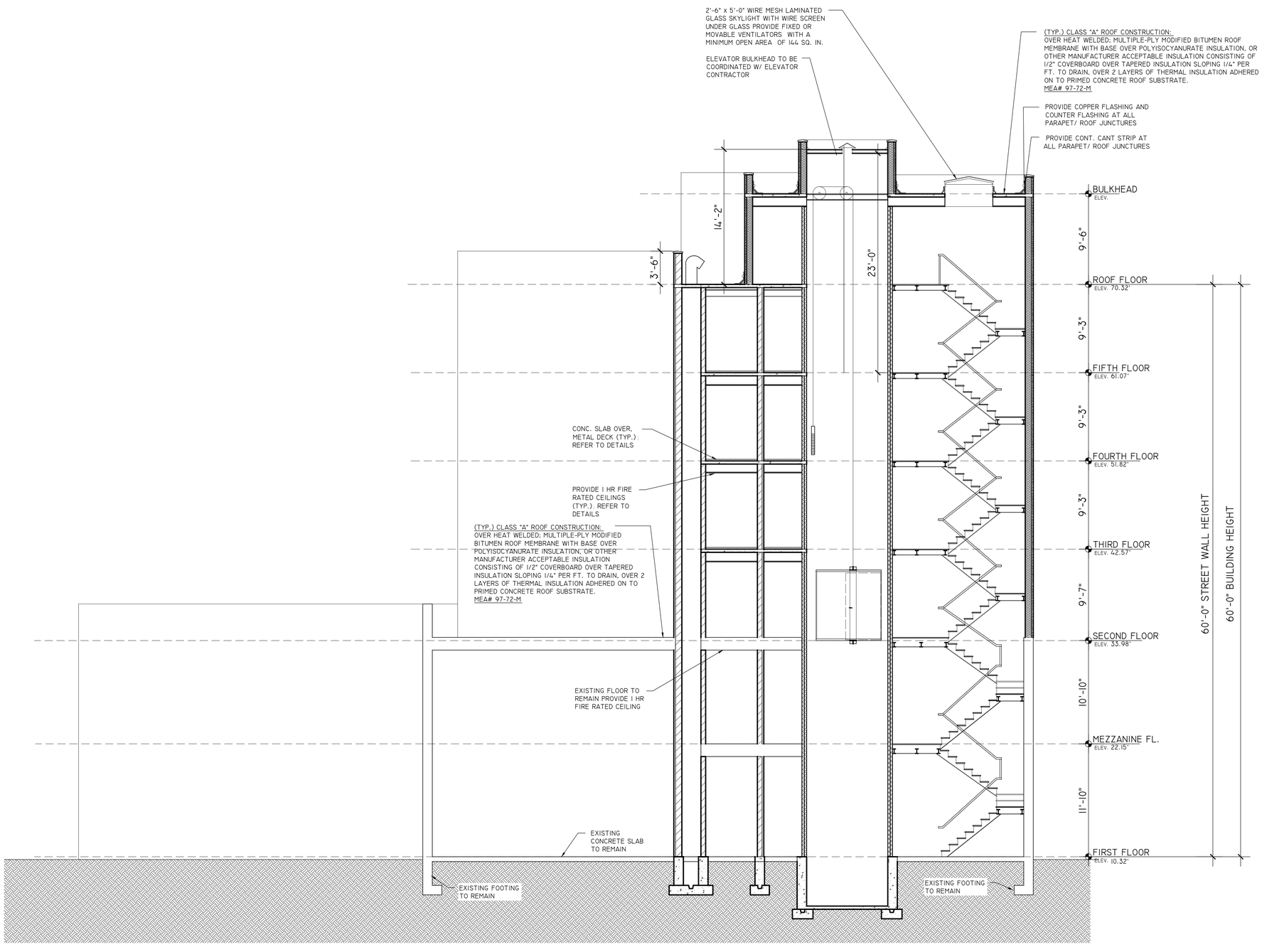
JOB APPLICATION #

REAR ELEVATION

SCALE: INDICATED		DRAWING #:
DRAWN BY:		
DESIGED BY:		
DATE: 02/01/2011		A-201.00
JOB NO.:		
CHECKED BY:		

BUILDING SECTION A-A

SCALE: 3/16"= 1'-0"



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PROJECT TITLE:
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BROOKLYN N.Y.

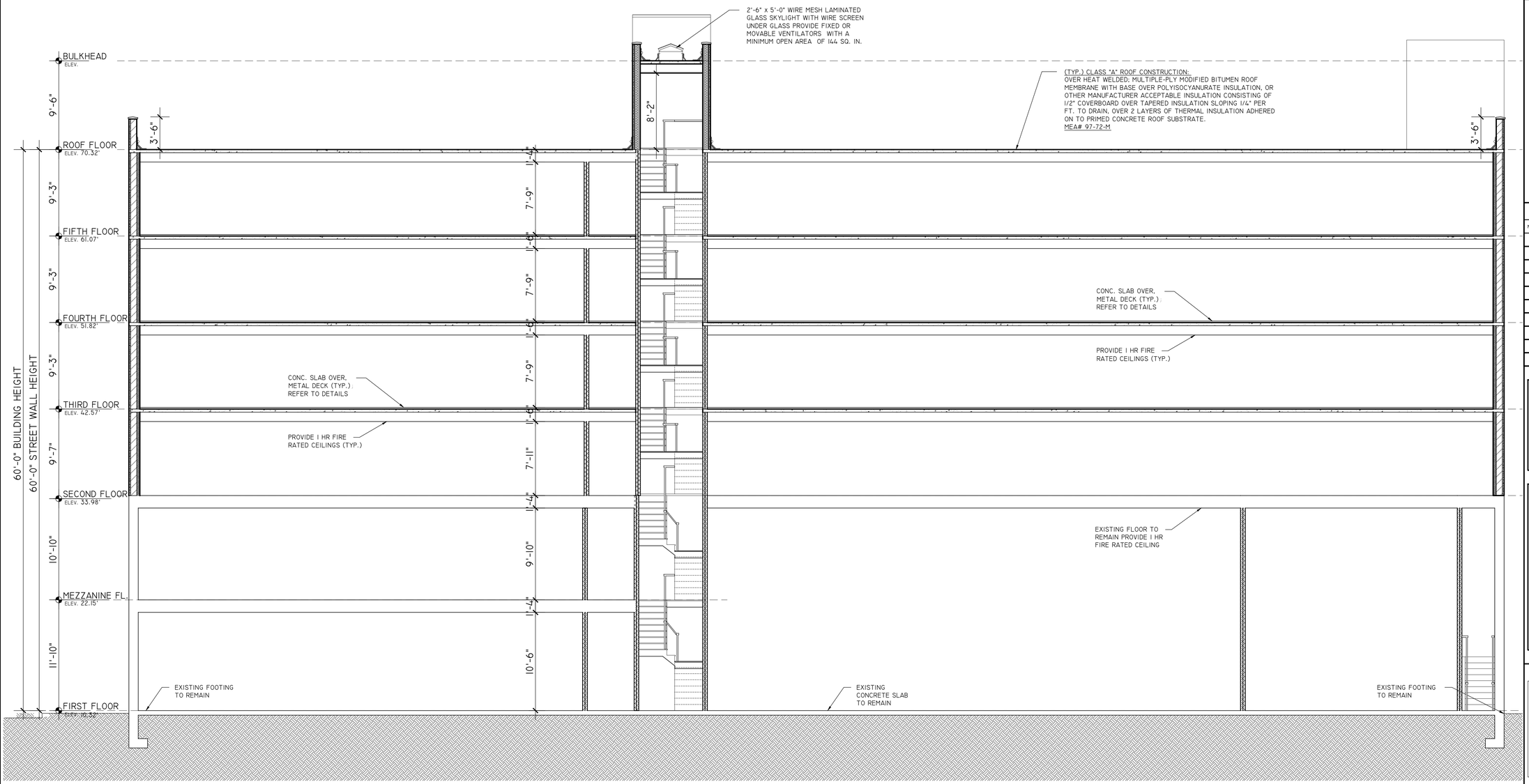
JOB APPLICATION #

BUILDING SECTION A-A

SCALE: INDICATED		DRAWING #:
DRAWN BY:		A-300.00
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

BUILDING SECTION B-B

SCALE: 3/16"= 1'-0"



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BROOKLYN N.Y.

JOB APPLICATION #

BUILDING SECTION B-B

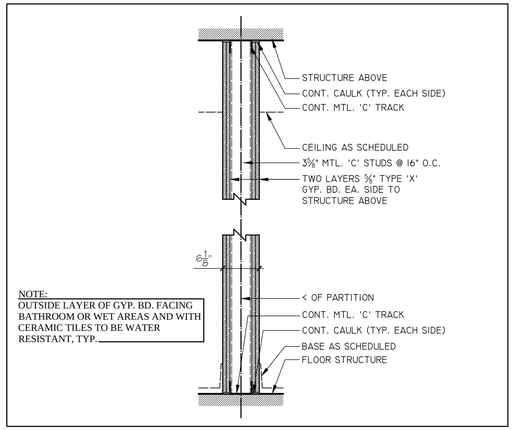
SCALE: INDICATED		DRAWING #:
DRAWN BY:		A-301.00
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

P3

2 HR. FIRE RATED DRYWALL ASSEMBLY

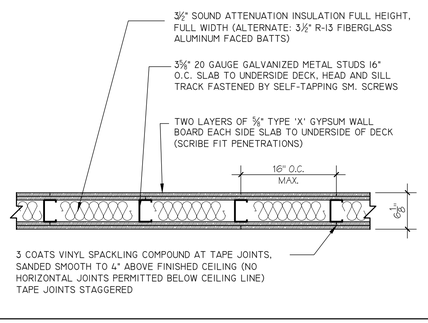
DESIGN WP 1711 (GYPSUM ASSOCIATION)
MEA # 81-98-M • 48 STC

SCALE: 1"=1'-0"



NOTE:
OUTSIDE LAYER OF GYP. BD. FACING BATHROOM OR WET AREAS AND WITH CERAMIC TILES TO BE WATER RESISTANT, TYP.

VERTICAL WALL SECTION



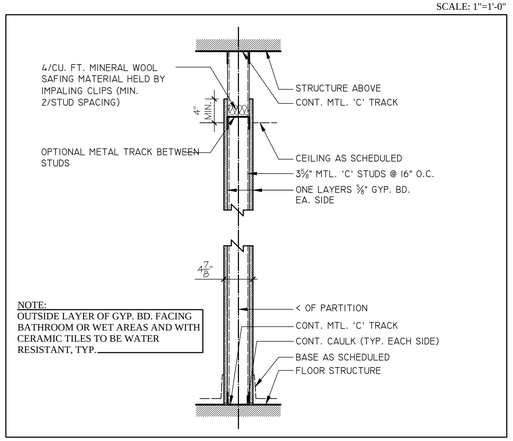
HORIZONTAL WALL SECTION

P5

UNRATED DRYWALL ASSEMBLY

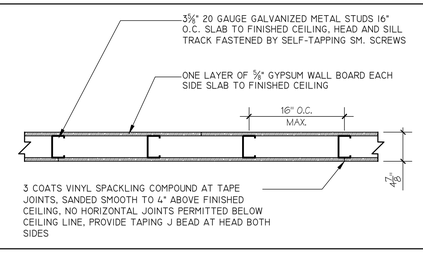
DESIGN WP 1200 (GYPSUM ASSOCIATION)
MEA # 81-98-M • 39 STC

SCALE: 1"=1'-0"



NOTE:
OUTSIDE LAYER OF GYP. BD. FACING BATHROOM OR WET AREAS AND WITH CERAMIC TILES TO BE WATER RESISTANT, TYP.

VERTICAL WALL SECTION



HORIZONTAL WALL SECTION

P6

DRYWALL ASSEMBLY

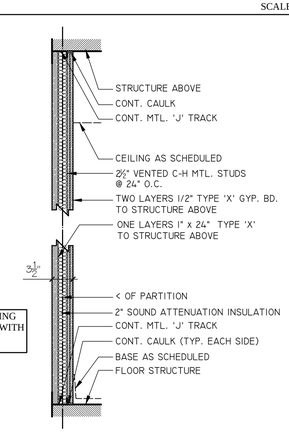
SIMILAR TO P5 EXCEPT ON ONE SIDE SUBSTITUTE ⅝" WATER RESISTANT GYPSUM WALL BOARD SHEATHING

P9

2 HR. FIRE RATED SHAFT DRYWALL ASSEMBLY

DESIGN WP 7096 (GYPSUM ASSOCIATION)
MEA # 542-68-SM • 50 STC

SCALE: 1"=1'-0"



NOTE:
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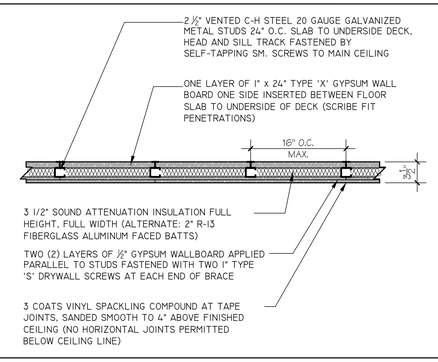
VERTICAL WALL SECTION



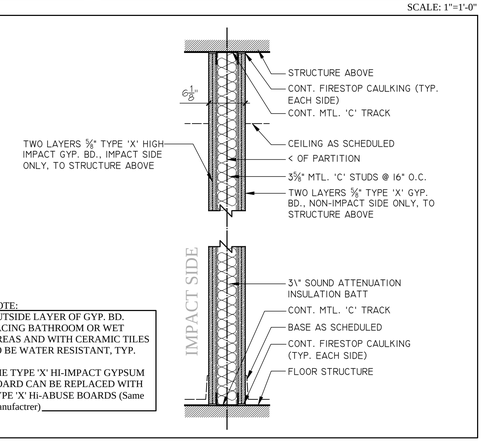
HORIZONTAL WALL SECTION

P21

2 HR. FIRE RATED SOUNDPROOF DRYWALL ASSEMBLY (MASONRY EQUIVALENT)

MEA 234-08-M • 60 STC

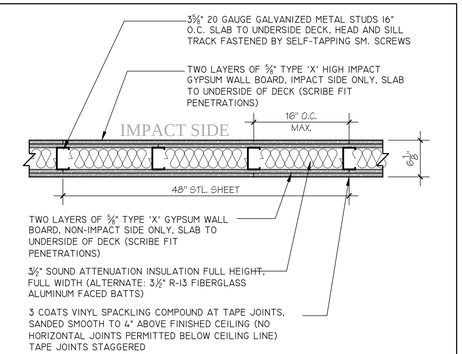
SCALE: 1"=1'-0"



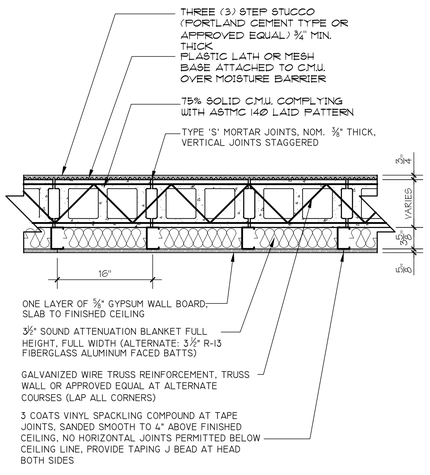
NOTE:
OUTSIDE LAYER OF GYP. BD. FACING BATHROOM OR WET AREAS AND WITH CERAMIC TILES TO BE WATER RESISTANT, TYP.

THE TYPE 'X' HI-IMPACT GYPSUM BOARD CAN BE REPLACED WITH TYPE 'X' Hi-ABUSE BOARDS (Same Manufactrer)

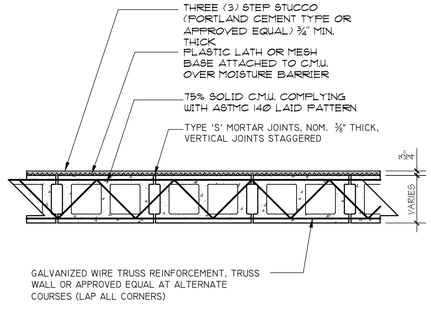
VERTICAL WALL SECTION



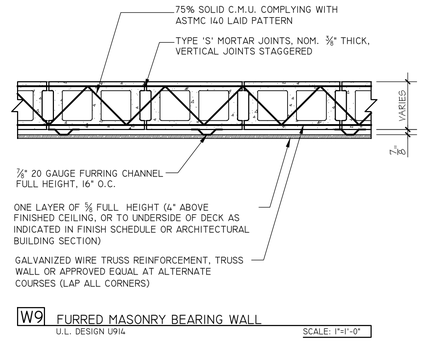
HORIZONTAL WALL SECTION



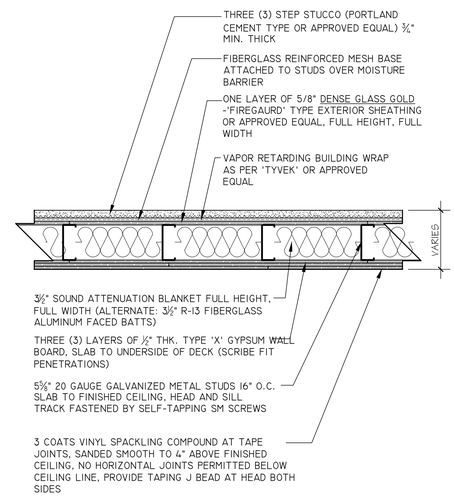
WI7 STUCCO OVER INSULATED MASONRY BEARING WALL
U.L. DESIGN U905
SCALE: 1"=1'-0"



WI5 STUCCO OVER MASONRY BEARING WALL
U.L. DESIGN U905
SCALE: 1"=1'-0"



W9 FURRED MASONRY BEARING WALL
U.L. DESIGN U914
SCALE: 1"=1'-0"



WI2 INSULATED EXTERIOR BEARING WALL -2HR. F.R.
U.L. DESIGN U418
SCALE: 1"=1'-0"

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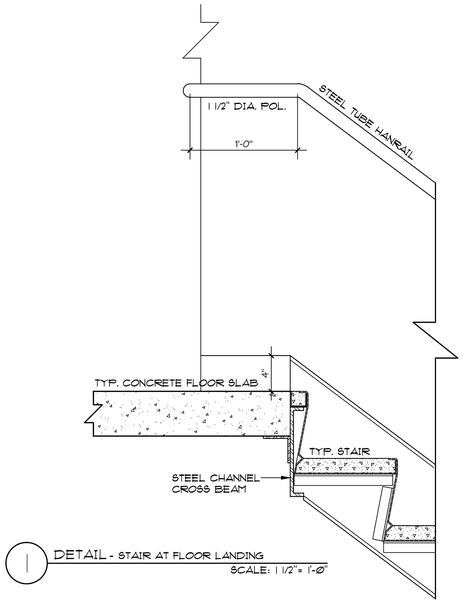
PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

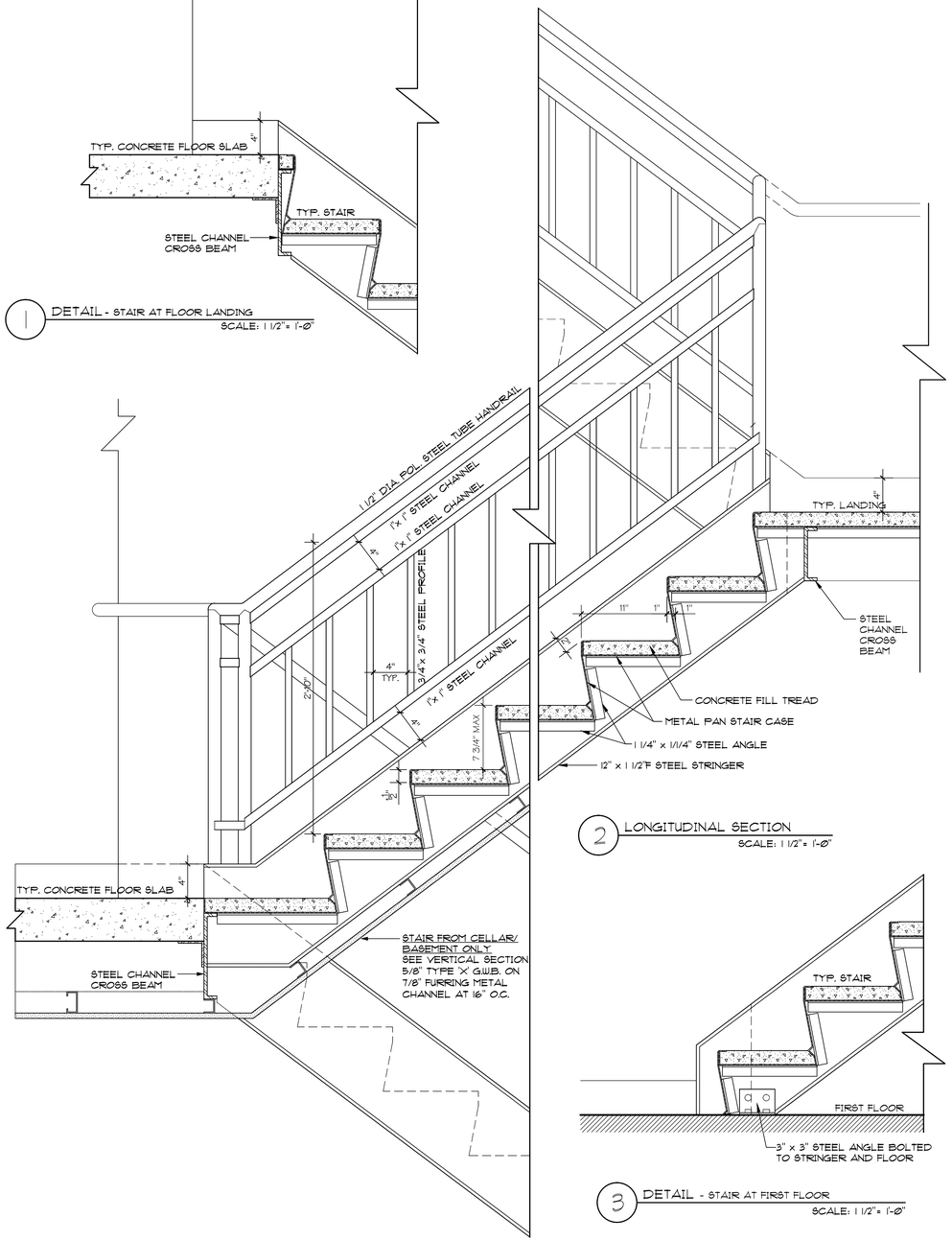
JOB APPLICATION #

WALL TYPES

SCALE: INDICATED		DRAWING #:
DRAWN BY:		
DESIGED BY:		A-400.00
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

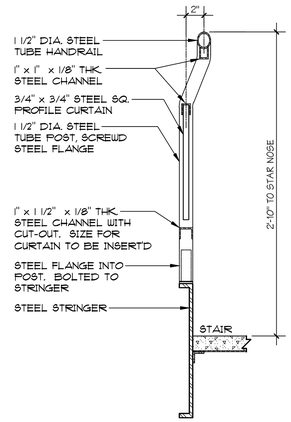


1 DETAIL - STAIR AT FLOOR LANDING
SCALE: 1 1/2"= 1'-0"

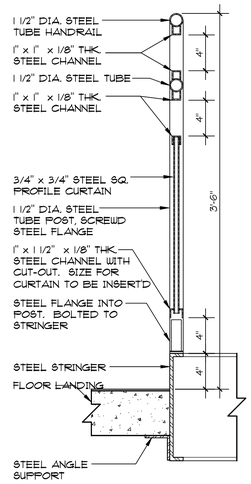


2 LONGITUDINAL SECTION
SCALE: 1 1/2"= 1'-0"

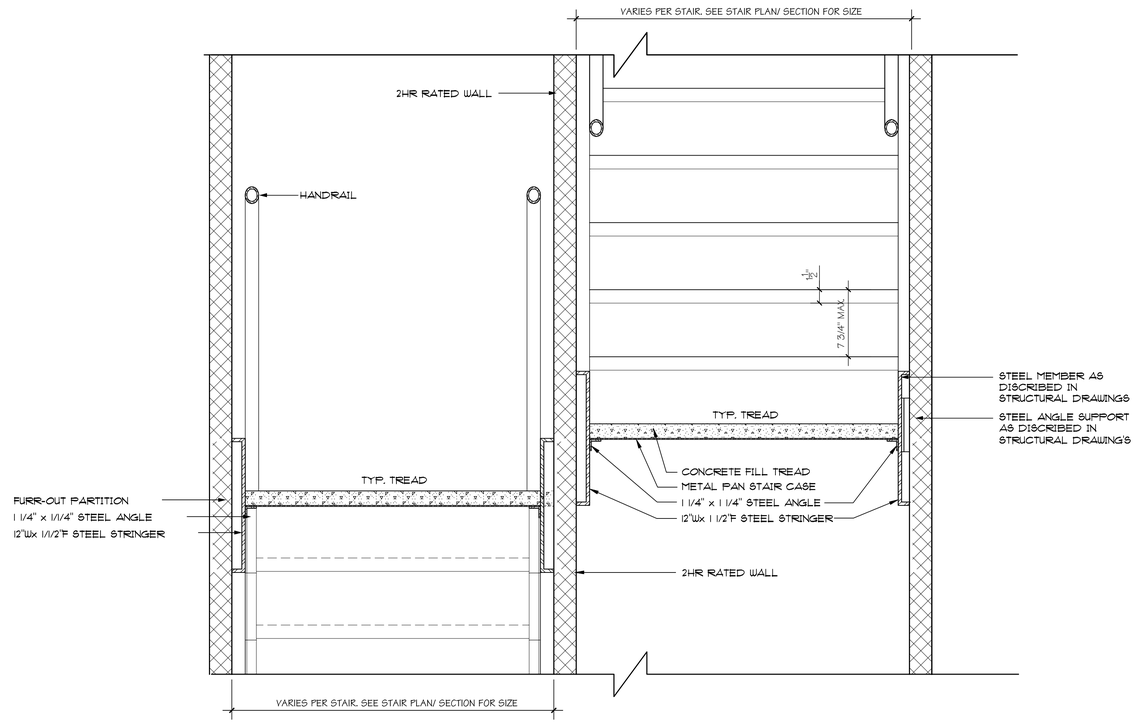
3 DETAIL - STAIR AT FIRST FLOOR
SCALE: 1 1/2"= 1'-0"



4 SECTION TYP. STAIR HANDRAIL
SCALE: 1 1/2"= 1'-0"



5 SECTION - GUARDRAIL AT ROOF FL.
SCALE: 1 1/2"= 1'-0"



6 TRANSVERSAL SECTION
SCALE: 1 1/2"= 1'-0"

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JOB APPLICATION #

STAIR DETAIL

SCALE: INDICATED		DRAWING #:
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DESIGED BY:		
DATE: 02/01/2011		A-401.00
JOB NO.:		
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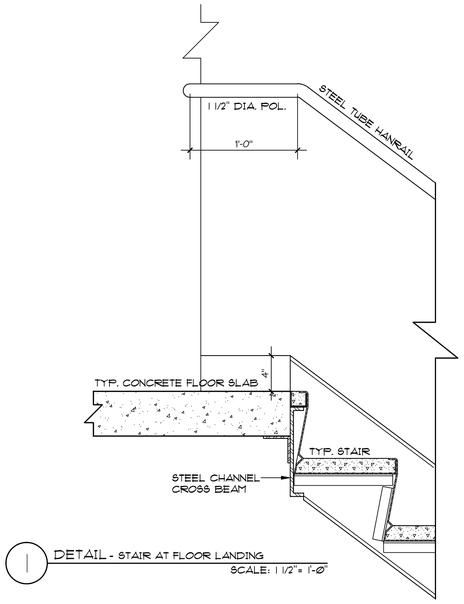
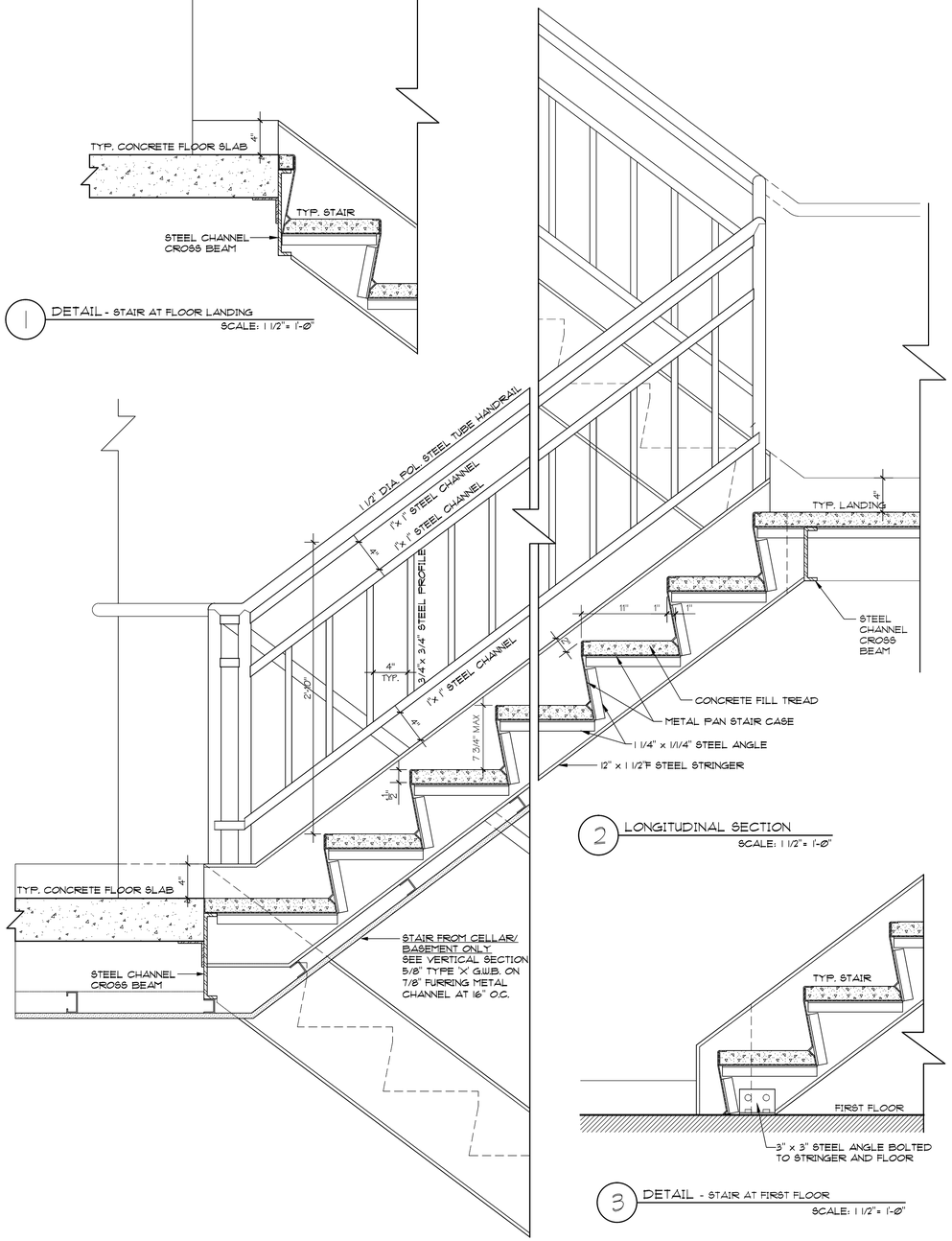
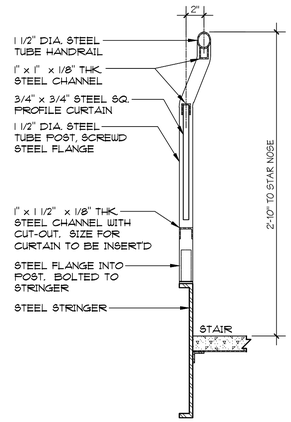


1 DETAIL - STAIR AT FLOOR LANDING
SCALE: 1 1/2"= 1'-0"

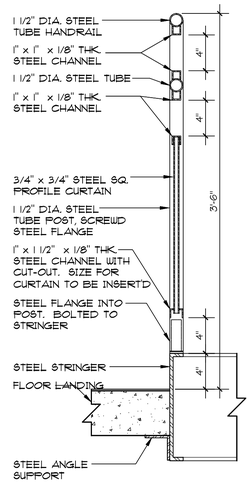


2 LONGITUDINAL SECTION
SCALE: 1 1/2"= 1'-0"

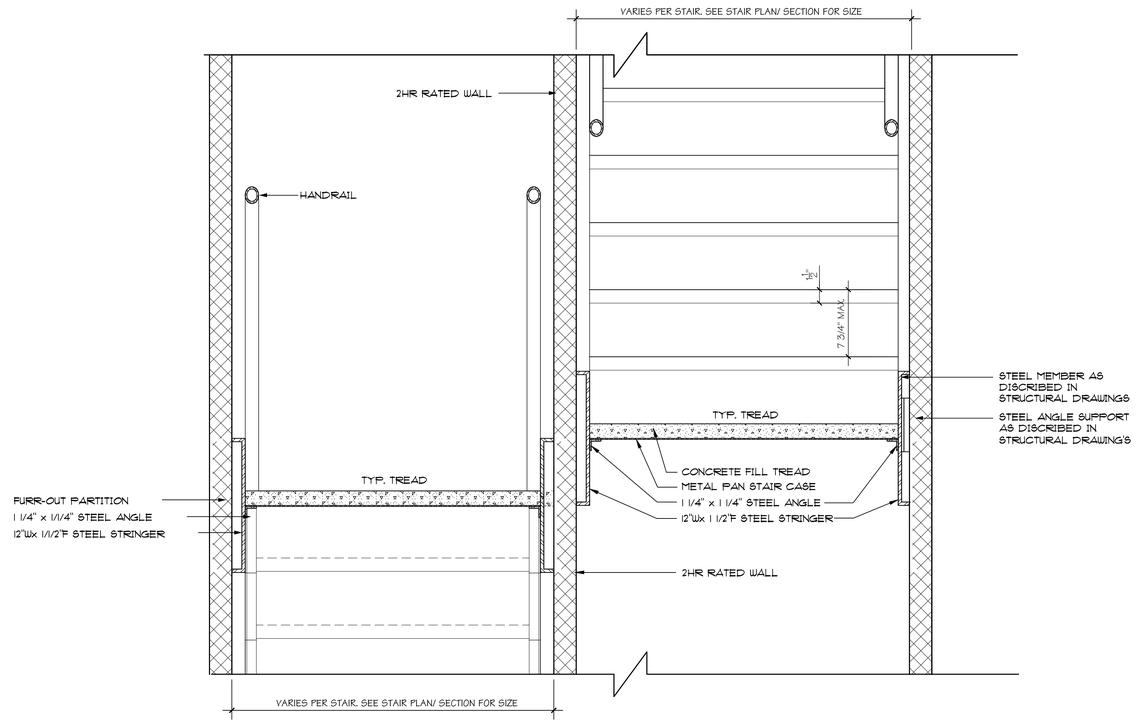
3 DETAIL - STAIR AT FIRST FLOOR
SCALE: 1 1/2"= 1'-0"



4 SECTION TYP. STAIR HANDRAIL
SCALE: 1 1/2"= 1'-0"



5 SECTION - GUARDRAIL AT ROOF FL.
SCALE: 1 1/2"= 1'-0"



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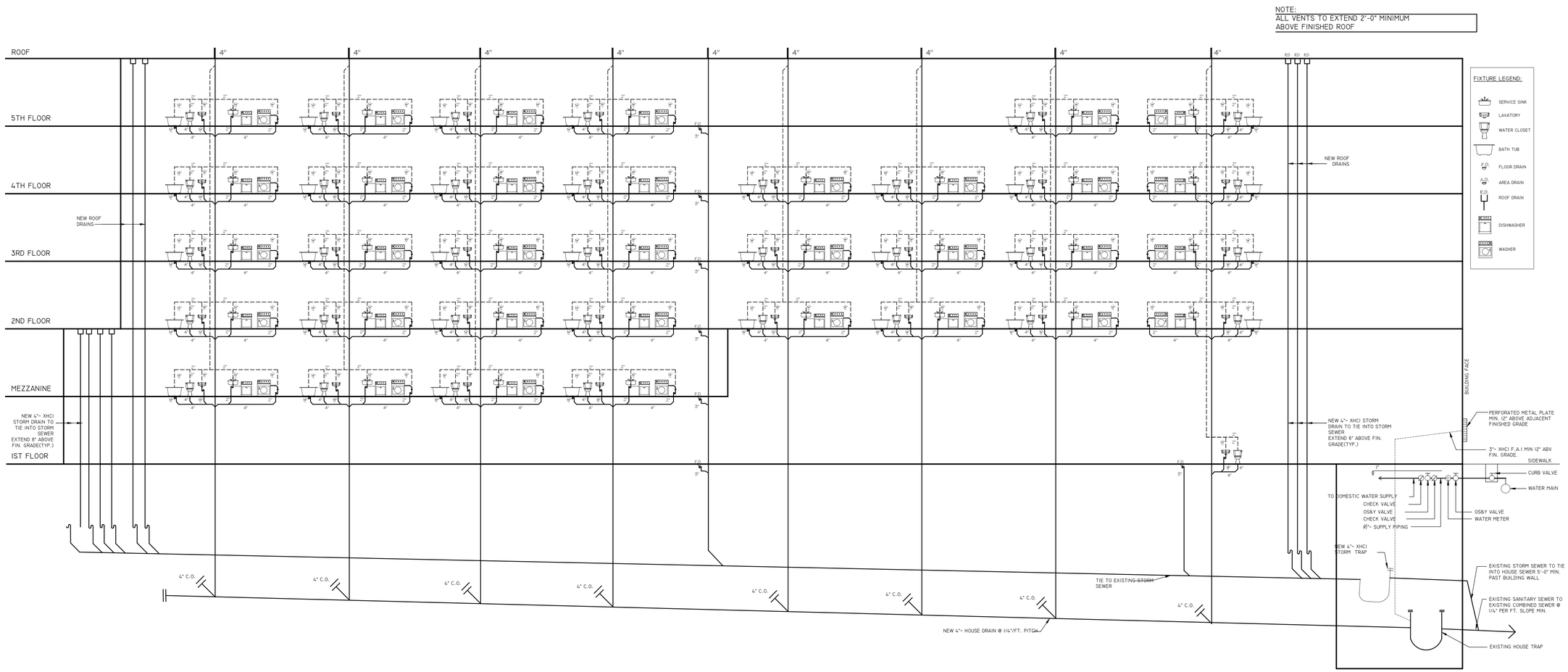
STAIR DETAIL

SCALE: INDICATED		DRAWING #:
DRAWN BY:		
DESIGED BY:		
DATE: 02/01/2011		A-401.00
JOB NO.:		
CHECKED BY:		

PLUMBING RISER DIAGRAM

SCALE: N.T.S



PLUMBING NOTES: (NEW RESIDENCE)

1. COMPLETE PLUMBING SYSTEM AND DRAINAGE SYSTEM INSTALLATION SHALL COMPLY WITH SUB-CHAPTER 16 & RS 16-1.
2. PROVIDE CLEANOUTS AT BASE OF ALL STACKS.
3. PROVIDE SHUT OFF VALVES ON ALL WATER SUPPLY LINES AT FIXTURES.
4. PURGE ALL WATER AND GAS LINES BEFORE FINAL CONNECTIONS.
5. PROVIDE AIR CHAMBERS AT TOP OF WATER RISERS MINIMUM 18" HIGH; 12" DIA.
6. STANDARD WEIGHT BLACK STEEL PIPE FOR GAS SYSTEM WITH GALVANIZED STEEL FITTINGS.
7. FLOOR DRAINS SHALL BE PROVIDED WITH REMOVABLE STRAINER AS PER RS 16.
8. TRAPS FOR FLOOR DRAINS SHALL BE DEEP SEAL TYPE.
9. APPROVED TYPE WATER METER TO BE INSTALLED TO CONFORM WITH LEGISLATION SIGNED INTO LAW ON JULY 31, 1985.
10. ALL PIPING INSTALLED TO SERVICE BUILDING AND WITHIN BUILDING SHALL BE THERMALLY INSULATED AS PER NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE.
11. WATER METERS LOCATED OUTSIDE OF THE BUILDING AND WITHIN THE PROPERTY LINE, SHALL BE INSTALLED IN AN ACCESSIBLE, WATERTIGHT AND FROST PROOF PIT OR METER BOX AS PER SEC. P107.3 (B).
12. PLUMBING VENT LINE TO EXTEND 2'-0" MINIMUM ABOVE FINISHED ROOF.
13. INSTALLATION OF WATER SUPPLY SERVICE LINES SHALL COMPLY WITH SEC. P107.2.
14. SEPARATION OF WATER SUPPLY SERVICE AND BUILDING SEWER SHALL COMPLY WITH SEC. P107.2 (B) (6).
15. PROTECTIVE COVER FOR SERVICE PIPE SHALL COMPLY WITH SEC. P107.2 (B) (6).
16. WATER METER LOCATION SHALL BE SUBJECT TO APPROVAL BY THE DEPARTMENT OF WATER SUPPLY, GAS AND ELECTRICITY, AND SHALL COMPLY WITH SEC. P107.3 (B).
17. PRIOR TO THE INSTALLATION OF HOUSE DRAIN, PLUMBING CONTRACTOR SHALL CHECK AND VERIFY DEPTH OF SEWER/SEWERS IN STREET, TO ASCERTAIN THE COMPLIANCE OF PROVIDING THE MINIMUM REQUIRED PITCH OF HOUSE SEWER, AS PER BUILDING CODE REQUIREMENTS. ANY DISCREPANCIES SHALL BE REPORTED TO ARCHITECT IMMEDIATELY PRIOR TO START OF ANY WORK.
18. ROOF GUTTERS SHALL BE AS PER RS 16-19.
19. PLUMBING CONTRACTOR SHALL VERIFY ALL INVERTS AND EXISTING CONDITIONS PRIOR TO THE INSTALLATION OF NEW WORK.
20. ALL HOT AND COLD WATER LINES TO BE INSULATED WITH FIBERGLASS-FOIL BACKED INSULATION JACKETS.
21. WASHING MACHINES TO BE PROVIDED WITH VACUUM BREAKERS. ALL WASHING MACHINES SHALL BE M.E.A. APPROVED TYPE, VACUUM BREAKER BY SINGER CORP., M.E.A. 398-87E.
22. LAUNDRY ROOM / BOILER ROOM FLOOR DRAINS, TRAPS FOR FLOOR DRAINS, SHALL BE DEEP SEAL TYPE AND SHALL HAVE A WATER SUPPLY AVAILABLE FROM A PLUMBING FIXTURE LOCATED IN THE SAME ROOM OR FROM A FAUCET OR VALVED OUTLET LOCATED NOT MORE THAN 3'-0" ABOVE THE FLOOR DRAIN. AUTOMATIC PRIMING DEVICES WILL BE PERMITTED ONLY WHEN AN AIR GAP IS PROVIDED BETWEEN THE PORTABLE WATER SUPPLY AND THE WATER SUPPLY FOR THE DRAIN AS PER SEC. P104.17.
23. PLUMBING FIXTURES TO COMPLY WITH NATIONAL STANDARD OF REFERENCE STANDARDS RS-16.
24. ALL NEW WATER CLOSETS AND ASSOCIATED FLUSH VALVES INSTALLED MUST MEET WATER SAVING PERFORMANCE STANDARDS AS WELL AS PROPER LABELING AS SET FORTH IN LOCAL LAW 29/89. WATER CLOSETS AND ASSOCIATED FLUSH VALVES SHALL BE ON THE APPROVED LIST OF WATER SAVING DEVICES COMPILED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION.

The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

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Z:\MY STUFF\NUAN STATIONERY\NUANDESIGN LOGO-ADDRESS.JPG

PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

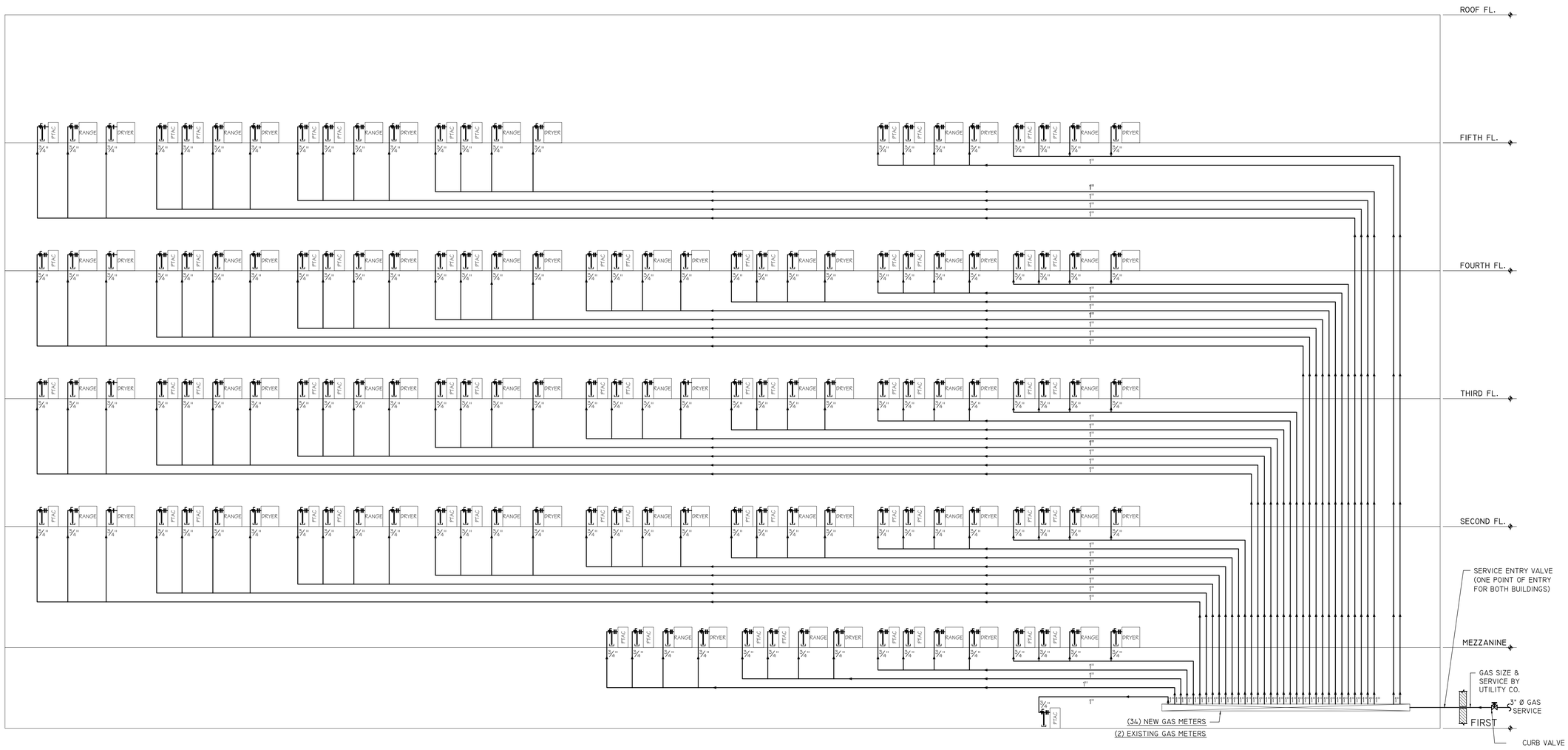
JOB APPLICATION #

PLUMBING RISER DIAGRAM

SCALE: INDICATED		DRAWING #:
DRAWN BY:		A-500.00
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

GAS RISER DIAGRAM

SCALE: N.T.S



GAS PIPING ISTALLATIONG

1. ALL PIPING SHELL BE SCHEDULE 40 BLACK STEEL WITH 125 LB. CAST IRON SCREWED FITTINGS
2. PROVIDE SHUTOFF GAS COCKS IN GAS SERVICE PIPING AT CONNECTIONS TO EXISTING MAIN.
3. ALL GAS PIPING SHALL BE SUPPORTED FROM BUILDING STRUCTURE IN AN APPROVED MANNER.
4. PROVIDE GAS COCK CONNECTION TO GAS TRAIN FOR EACH GAS-FIRED EQUIPMENT ITEM AND ON RISERS AND BRANCHES WHERE INDICATED.
5. LOCATE GAS COCKS WHERE EASILY ACCESSIBLE, AND WHERE THEY WILL BE PROTECTED FROM POSSIBLE DAMAGE.
6. CONNECT GAS PIPING TO EACH GAS-FIRED EQUIPMENT ITEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2. ANY CHANGE OF HEATING APPARATUS TO BE FILED PRIOR TO INSTALLATION.
3. GAS VENT TO BE AMERIVENT FLUE M.E.A. 294-56SM.
4. PROVIDE MASONRY FOUNDATION UNDER AMERIVENT FLUE.
5. PROVIDE FLOOR DRAIN IN BOILER ROOM.
6. PROVIDE MINIMUM 18" CLEARANCE BETWEEN BOILERS AND ENCLOSING WALL PARTITIONS. PROVIDE 3'-0" CLEARANCE IN FRONT OF BOILER/FURNACE FOR MAINTENANCE.
7. PROVIDE 4" CONCRETE SLAB IN BOILER ROOM.
8. PROVIDE ELECTRIC LIGHT IN BOILER ROOM.
9. BOILER ROOM CEILING: TWO (2) LAYERS 5/8" SHEETROCK, TYPE "X".
10. REFER TO LEGEND FOR BOILER ROOM ENCLOSURE PARTITIONS.
11. NO METERS, DUMBWAITER SHAFTS ELEVATOR SHAFTS, INTERIOR STAIR OR REQUIRED OUTSIDE CELLAR ENTRANCE TO BE LOCATED WITHIN BOILER ROOM.
12. BOILER ROOM DOOR TO BE ONE (1) HOUR TEST FIREPROOFS SELF-CLOSING. BOARD OF STANDARDS AND APPEALS APPROVED TYPE.
13. NO STORAGE PERMITTED WITHIN BOILER ROOM.
14. "A" DENOTES 12" X 12" FIXED REGISTER WITH B.S.A. APPROVED TYPE FIRE DAMPER WITH FUSIBLE LINK, LOCATED AT TOP OF PARTITION.
15. "A1" DENOTES 12" X 12" FIXED REGISTER WITH B.S.A. APPROVED TYPE FIRE DAMPER WITH FUSIBLE LINK, LOCATED AT BOTTOM OF PARTITION.
16. INSTALLATION OF EQUIPMENT SHALL COMPLY WITH B.S.A./M.E.A. APPROVAL, BUILDING CODE REQUIREMENTS, DEPARTMENT OF BUILDINGS RULES AND REGULATIONS, AND MANUFACTURER SPECIFICATIONS (LATEST EDITION).

NOTES:

	HEATER (WINDOW UNITS)	HOT WATER UNIT (ELECTRIC)
TRADE NAME:	RINNAI	A.O. SMITH
MODEL NUMBER:	RHFE-1004FA	FSG-40
INPUT:	10,500 BTU/HR	40 GAL./40,000 BTU/H
MEA NUMBER:	309-99-E	51-01-E

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GAS RISER DIAGRAM

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DOOR & HARDWARE SCHEDULE

DOOR	ROOM/AREA			DOOR TYPES				FRAME TYPE				HARDWARE TYPE										REMARKS
DOOR #		TYPE	SWING	SIZE(WXHXTHK)	MATERIAL	FINISH	UNDER CUT	TYPE	JAMB / HEAD	MATERIAL	FINISH	HINGE / BUTTS	LOCK	CLOSER	STOP	FLUSH BOLT	THRESHOLD	SILENCERS	PEEP HOLE	ASTRAGAL	LABEL	
A	MAIN ENTRY		P.P.	3'-0" X 7'-0" X 3/4"	GL	-	3/4"	A	-	-	-	A	D	A	-	-	A	A	-	-	-	FRAMELESS TEMPERED GLASS DOOR W/ TRANSOM
B	STAIR & EGRESS		P.P.	3'-0" X 6'-8" X 1-3/4"	HM	PT.	3/4"	B	HM	HM	PT.	A	D	A	-	-	A	A	-	A	-	1 1/2 HRS F.P.S.C. STAIR & EGRESS DOOR
C	UTILITY		P.P.	3'-0" X 6'-8" X 1-3/4"	HM	PT.	3/4"	B	HM	HM	PT.	A	D	A	-	-	A	A	-	A	-	1 1/2 HRS F.P.S.C. UTILITY DOOR W/ LOUVER
D	APARTMENT ENT.		P.P.	3'-0" X 6'-8" X 1-3/4"	HM	PT.	3/4"	C	HM	HM	PT.	A	D	A	-	-	A	A	A	A	-	APT. ENTRANCE DOOR, T.B.D.
E	INT. APT.		P.P.	2'-10" X 6'-8" X 1-3/4"	WD.	ST.	1/2"	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	STANDARD INT. WOOD DR., STYLE & MANF. T.B.D. 1/2 UNDERCUT
F	INT. APT.		P.P.	2'-6" X 6'-8" X 1-3/4"	WD.	ST.	1/2"	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	STANDARD INT. WOOD DR., STYLE & MANF. T.B.D. 1/2 UNDERCUT
G	INT. APT.		P.P.	3'-0" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	STANDARD INT. WOOD DR., STYLE & MANF. T.B.D.
H	INT. APT.		P.P.	2'-8" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	STANDARD INT. WOOD DR., STYLE & MANF. T.B.D.
I	INT. APT.		P.P.	2'-6" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	STANDARD INT. WOOD DR., STYLE & MANF. T.B.D.
J	INT. APT. DBL. DR.		P.P.	4'-0" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	PAIR OF DOUBLE INT. WOOD DR., STYLE & MANF. T.B.D.
K	INT. APT. DBL. DR.		P.P.	2'-10" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	PAIR OF DOUBLE INT. WOOD DR., STYLE & MANF. T.B.D.
L	INT. APT. DBL. DR.		P.P.	3'-0" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	PAIR OF DOUBLE INT. WOOD DR., STYLE & MANF. T.B.D.
M	INT. APT.		P.P.	1'-8" X 6'-8" X 1-3/4"	WD.	ST.	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	STANDARD INT. WOOD DR., STYLE & MANF. T.B.D.
N	BALCONY-TER.	N	P.P.	6'-0" X 7'-0" X 1-3/4"	GL	-	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	SLIDING WOOD DR., STYLE & MANF. T.B.D.
O	RECREATION AREA	N	P.P.	6'-0" X 7'-0" X 1-3/4"	GL	-	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	SLIDING WOOD DR., STYLE & MANF. T.B.D.
O	BALCONY	O	P.P.	3'-0" X 7'-0" X 1-3/4"	GL	-	-	E	WD.	WD.	WD.	A	C	-	A	-	A	A	-	-	-	HINGED PATIO WOOD DR., STYLE & MANF. T.B.D.

NOTE: ALL LOCKSETS TO BE GRAND MASTERED TO BUILDING MASTER

HARDWARE SCHEDULE

LOCK SET

A. OFFICE PASSAGE LATCH SET
MFR.: OMNIA
ITEM #: 012
FINISH: US32D (STAINLESS STEEL)

B. DOUBLE- DUMMY TRIM
MFR.: OMNIA
ITEM #: 012
FINISH: US32D (STAINLESS STEEL)

C. SINGLE DUMMY TRIM
MFR.: OMNIA
ITEM #: 012
FINISH: US32D (STAINLESS STEEL)

D. ENTRANCE LOCKSET
MFR.: OMNIA
ITEM #: 012
FINISH: US32D (STAINLESS STEEL)

HINGES

A. BUTT HINGES
MFR.: HAGER
ITEM #: BB 1191
2 PAIR EA LEAF
FINISH: US26D (SATIN CHROME)

CLOSER

A. SURFACE MOUNTED CLOSER
MFR.: NORTON
ITEM #: 8500IBF W/MS REG
FINISH: US26D (SATIN CHROME)
(MUST BE 1-1/2 HR RATED FPSC "SUBMIT CUT SHEET")

DOOR STOP

A. FLOOR MOUNTED STOP
MFR.: IVES
ITEM #: 438-B260
FINISH: US26D (SATIN CHROME)

SILENCERS

A. SILENCERS
MFR.: GLYNN-JOHNSON
ITEM #: GJ64 HM6 GJ65WD
FINISH: GRAY

FLUSHBOLT

A. MFR.: GLYNN JOHNSON
ITEM #: FB6W
FINISH: US26D (SATIN CHROME)

ASTRAGAL

A. OVERLAPPING METAL ASTRAGAL PROVIDED BY DOOR MANUFACTURER TO BE PAINTED, SAME COLOR OF DOOR SEE FINISH NOTE #11.

MAGNETIC CATCH

A. MFR.: IVES
ITEM #: 327A92
FINISH: US26D (SATIN CHROME)

THRESHOLD

A. UTILITY SADDLE
MFR.: ZERO (OR APPROVED EQUAL)
ITEM #: 655A
FINISH: ALUMINUM

B. VINYL REDUCING STRIP TO MATCH VCT TILE SEE DETAIL #7, SHEET A-11.

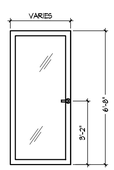
NOTES

1. CONTRACTOR TO COORDINATE WITH CLIENT AND BUILDING MANAGEMENT FOR SECURITY SYSTEM AS REQUIRED BY TENANT FOR MAIN DOOR AND PROVIDE ALL HARDWARE AND ELECTRICAL CONNECTION PROVIDE SEPARATE PRICING.
2. ALL HARDWARE METAL FINISH TO BE STAINLESS STEEL, TYPICAL U.O.N.
3. NEW DOORS BEING INSTALLED AT EXISTING FRAME TO BE VERIFIED IN FIELD FOR SIZE AND LOCATIONS OF HINGES AND LOCKSETS
4. ALL SURFACE MOUNTED DOOR CLOSERS TO BE MOUNTED AT ROOM SIDE (CLOSER AT MAIN DOOR MOUNTED AT SUITE SIDE).
5. HARDWARE/ GC TO COORDINATE WITH BUILDING MANAGEMENT FOR MASTER KEYING OF KEYED LOCK AS REQUIRED.
6. ALL DOORS TO HAVE 3/4" UNDERCUTS AS REQUIRED, EXCEPT AS NOTED.
7. ALL DOORS OVER 7'-0" IN HEIGHT ARE TO HAVE (2) - SETS OF BUTT HINGES (TOTAL OF (4)- FOUR HINGES PER DOOR.)
8. CONTRACTOR TO VERIFY ALL DESIRED CEILING HEIGHTS IN FEILD, PRIOR TO ORDERING DOORS.

OVERHEAD ROLLUP FIRE DOOR (3/4 TO 4 HR FIRE RESISTANT RATING) FOR GARAGES CORNELL IRONWORKS MEA#476-84-M SEE 1ST FLOOR PLAN (A-105) AND BUILDING SECTION A302 / D FOR DIMENSIONS.

DOOR & FRAME TYPE

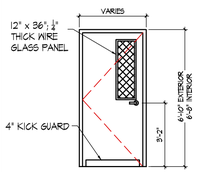
A | P



BUILDING ENTRANCE DOOR
3/4" THICK, FRAMELSS GLASS (SAFETY GL.) DOOR (3'-0" X 7'-0" V.I.F.) W/ CLOSER AND WEATHER STRIPPING
NOTE: COORDINATE WITH ELECTROMAGNETIC DOOR LOCK.

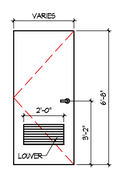
P. HINGED PATIO DOOR

B



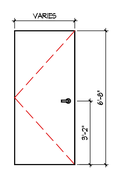
STAIR EXIT/EGRESS DOOR
1-3/4" THICK, 1-1/2 HR RATED ("B" LABEL) H.M. DOOR W/ WELDED FRAME & CLOSER (3'-0" X 6'-8")

C



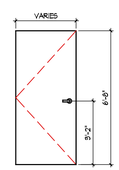
UTILITY DOOR
1-3/4" THICK, 1-1/2 HR RATED ("B" LABEL) H.M. DOOR (3'-0" X 7'-0") W/ WELDED FRAME & CLOSER & BSA APPROVED PEEP HOLES

D



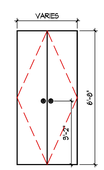
APARTMENT ENTRANCE
1-3/4" THICK, 1-1/2 HR RATED ("B" LABEL) H.M. DOOR (3'-0" X 6'-8") W/ WELDED FRAME & CLOSER & BSA APPROVED PEEP HOLES

E F G I M



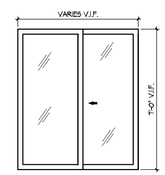
INTERIOR WOOD DOOR T.B.D.
1-3/4" THICK, WOOD DOOR (1'-6" X 6'-8") W/ WD. FRAME. MANF. & HARDWARE T.B.D.

J K L



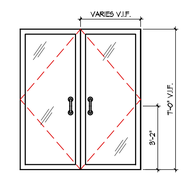
H. INTERIOR WOOD DOUBLE DOOR
1-3/8" THICK, WOOD DOOR (SEE SCHEDULE FOR SIZE) W/ WD. FRAME. MANF. & HARDWARE T.B.D.

N



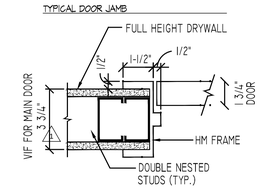
BALCONY DOOR
1-3/4" THICK, H.M. & GLASS (SAFETY GL.) GLIDING DOOR, WELDED FRAME, CLOSER AND WEATHER STRIPPING
NOTE: COORDINATE WITH ELECTROMAGNETIC DOOR LOCK.

O

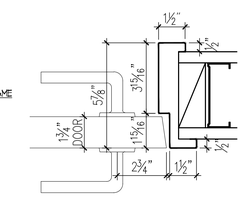


RECREATION ENTRANCE DOOR
3/4" THICK, FRAMELSS GLASS (SAFETY GL.) DOOR (6'-0" X 7'-0" V.I.F.) W/ CLOSER AND WEATHER STRIPPING
NOTE: COORDINATE WITH ELECTROMAGNETIC DOOR LOCK.

TYPICAL DOOR JAMB

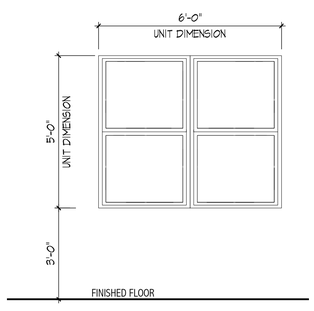


A. KNOCKDOWN TYP. HM HEADER & SIDE FRAME
B. WELDED TYP. HM HEADER & SIDE FRAME
TYPICAL TO FRAME TYPE-A, EXCEPT WELDED FOR FIRERATED DOOR



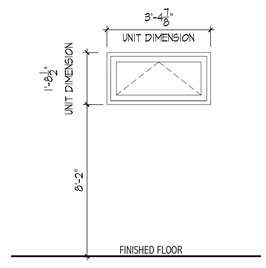
NUMBER 1

ELEVATIONS



TYPE	DOUBLE HUNG COMPOSITES
MODEL #	WDH210410
OPERATION	HINGED
EXTERIOR COLOR	T.B.D.
LOCATION	REFER TO PLAN

2



TYPE	AWNING
MODEL #	AN351
OPERATION	HINGED
EXTERIOR COLOR	T.B.D.
LOCATION	REFER TO PLAN

WINDOW NOTES :

1. WINDOW MANUFACTURER TO VERIFY ALL WINDOW DIMENSIONS, ROUGH & MASONRY OPENING SIZES W/G/C/, QUANTITIES AS WELL AS ALL FINISHED PARTITION THICKNESS FOR FRAME WIDTH SIZING PRIOR TO FABRICATION.

2. ALL WINDOWS TO HAVE WEATHER-STRIPPING AT JAMB, HEAD AND SILL.

3. SHOP DRAWINGS FOR FIXED GLASS @ ELEVATOR SHAFT LOCATION TO BE SUBMITTED TO ARCHITECT AND APPROVED PRIOR TO INSTALLATION.

4. PROVIDE ALLOWANCE FOR BUILDER'S HARDWARE.

5. MODEL NUMBERS REFERED FROM "PELLA" PRODUCT

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PROJECT TITLE:
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BROOKLYN N.Y.

JOB APPLICATION #

DOOR - WINDOW SCHEDULE

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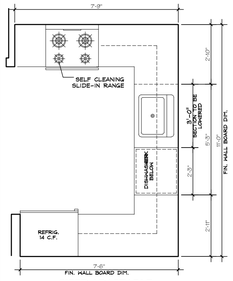
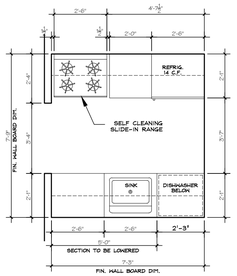
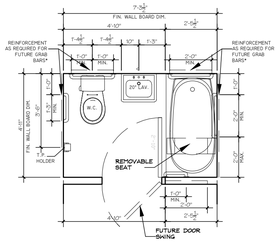
JOB NO.:		
CHECKED BY:		



SIZED ADAPTABLE KITCHEN

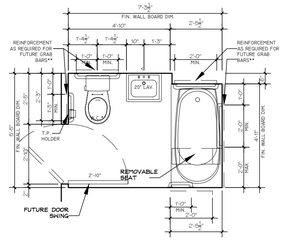


MINIMUM SIZED ADAPTABLE KITCHEN "K2A"



BATHROOM PLAN W/ 20" LAVATORY

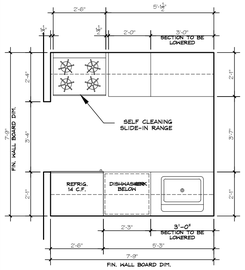
*GRAB BAR REINFORCMENT WILL CONSIST OF 20 GA. MTL. PLATES SECURED TO STUDS.



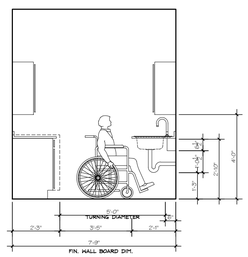
BATHROOM PLAN W/ 20" LAVATORY

* CHOOSE WATER CLOSET THAT WILL NOT EXTEND INTO THE SPACE REQUIRED FROM THE DOOR OPENING

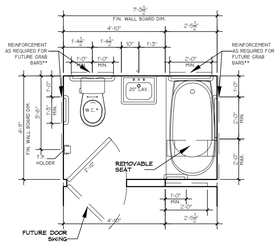
** GRAB BAR REINFORCMENT WILL CONSIST OF 20 GA. MTL. PLATES SECURED TO STUDS.



MINIMUM SIZED ADAPTABLE KITCHEN (GALLEY TYPE)



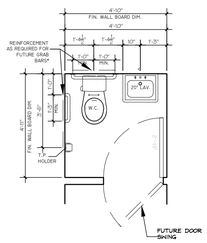
KITCHEN CLEARANCE DIMENSIONS



BATHROOM PLAN W/ 20" LAVATORY

* CHOOSE WATER CLOSET THAT WILL NOT EXTEND INTO THE SPACE REQUIRED FROM THE DOOR OPENING

** GRAB BAR REINFORCMENT WILL CONSIST OF 20 GA. MTL. PLATES SECURED TO STUDS.



POWDER ROOM W/ 20" LAVATORY

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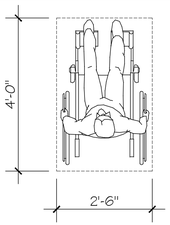
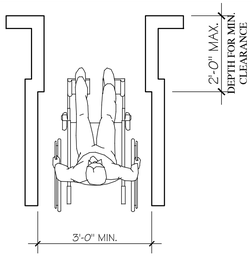
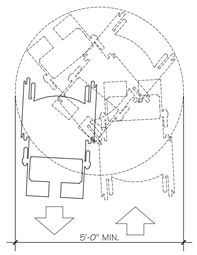


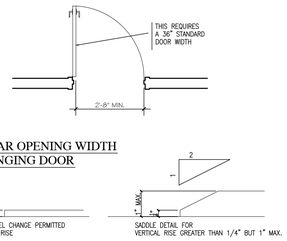
CLEAR FLOOR SPACE FOR SINGLE WHEELCHAIR



MIN. CLEAR WIDTH FOR SINGLE WHEELCHAIR

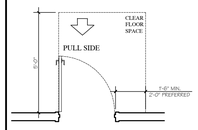


SPACE NEEDED TO TURN A WHEELCHAIR

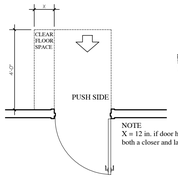


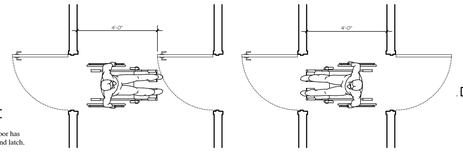
CLEAR OPENING WIDTH SWINGING DOOR

FLOOR SADDLES OR HEIGHT CHANGES

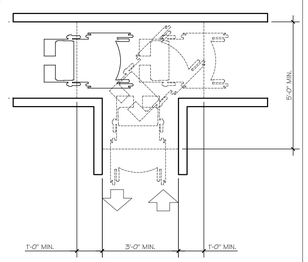


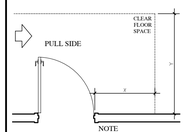
FRONT APPROACHES SWINGING DOOR



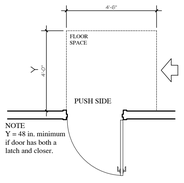


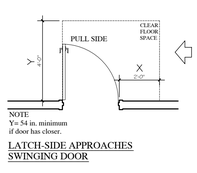
TWO HINGED DOORS IN SERIES



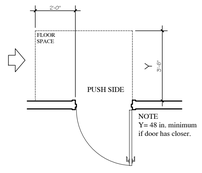


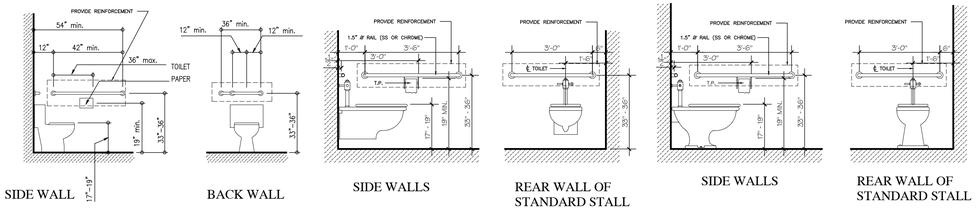
HINGE-SIDE APPROACHES SWINGING DOOR





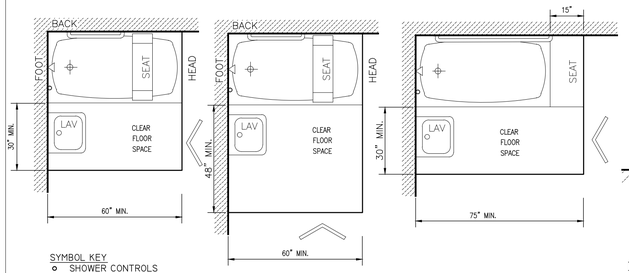
LATCH-SIDE APPROACHES SWINGING DOOR



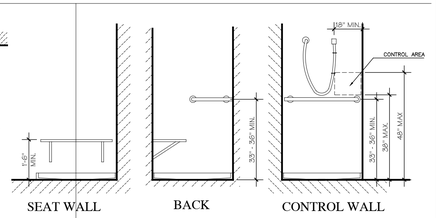


SIDE WALL — BACK WALL — SIDE WALLS — REAR WALL OF STANDARD STALL — SIDE WALLS — REAR WALL OF STANDARD STALL

HANDICAPPED PUBLIC TOILETS



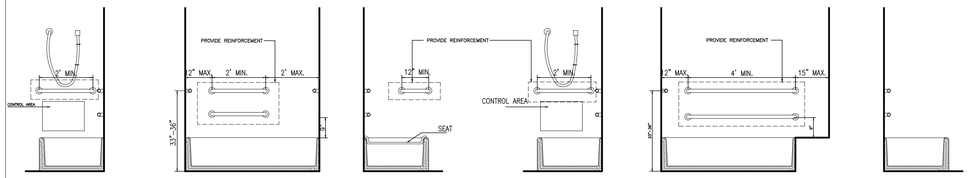
SYMBOL KEY
SHOWER CONTROLS
SHOWER HEAD
DRAIN



SEAT WALL — BACK — CONTROL WALL

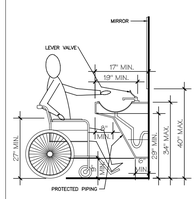
36" x 36" HANDICAPPED SHOWER STALLS

NOTE: SHOWERHEAD AND CONTROL AREA MAY BE ON BACK (LONG) WASS (AS SHOWN) OR ON EITHER SIDE WALL

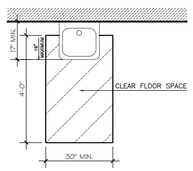


FOOT — BACK — HEAD — FOOT — BACK — HEAD

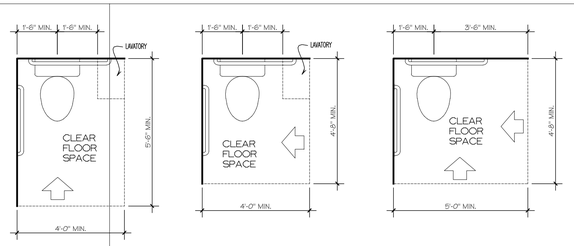
BATH WITH SEAT IN TUB



SIDE VIEW



TOP VIEW



LAVATORY CLEARANCES

CLEAR FLOOR SPACE AT WATER CLOSETS

ACCESSIBLE ROUTE:
A CONTINUOUS UNOBSTRUCTED PATH CONNECTING ALL ACCESSIBLE SPACES AND ROOMS IN A BUILDING THAT CAN BE NEGOTIATED BY ALL CATEGORIES OF PEOPLE HAVING PHYSICAL DISABILITIES.

PORTIONS OF ACCESSIBLE ROUTES WITH SLOPES OF MORE THAN 1:20 ARE RAMPS AND SHALL COMPLY WITH REQUIREMENTS FOR RAMPS.

AN INTERIOR ACCESSIBLE ROUTE SHALL BE PROVIDED FROM THE ENTRANCE OF THE BUILDING TO ALL DWELLING UNITS IN THE BUILDING. ALL DWELLING UNITS ARE TO BE ADAPTABLE.

ADAPTABLE DWELLING UNITS:
DWELLING UNITS WHICH ARE CONSTRUCTED ON AN ACCESSIBLE ROUTE AND EQUIPPED AS SET FORTH IN REFERENCE STANDARD RS 4-6 OF THE NYC BUILDING CODE SO THAT THEY CAN BE CONVERTED TO BE USED, WITH A MINIMUM OF STRUCTURAL CHANGE, BY ALL CATEGORIES OF PERSONS HAVING PHYSICAL DISABILITIES.

ADAPTABLE DWELLING UNITS SHALL BE EQUIPPED WITH DOOR WIDTHS AND CLEAR FLOOR SPACES FOR POSSIBLE OCCUPANTS WITH PHYSICAL DISABILITIES. ADAPTABLE SPACES WITHIN DWELLING UNITS SHALL INCLUDE KITCHENS AND BATHROOMS AND THEIR RESPECTIVE DOORWAYS.

THE INFORMATION SHOWN ON THIS DRAWING IS FOR GUIDANCE PURPOSES ONLY AND OUTLINE THE MOST COMMON ACCESSIBILITY CRITERIA APPLICABLE TO THIS JOB. THEY DO NOT CONSTITUTE A COMPREHENSIVE DESCRIPTION OF ALL POSSIBLE CRITERIA WHICH ARE GIVEN IN RS 4-6 OF THE NYC BLDG. CODE AND ANSI A1117.1 - 1986 AS MODIFIED BY RS 4-6. THE GENERAL CONTRACTOR MUST DO ALL WORK IN ACCORDANCE WITH THESE REGULATIONS.

The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

REVISIONS:

NO.:	DATE:	DESCRIPTION:

THE ARCHITECT SHALL NOT HAVE CONTROL OR CHARGE OF AND SHALL NOT BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, DEVIATIONS, TECHNIQUES, SEQUENCES, OR PROCEDURES, OR FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUBCONTRACTORS OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. ALWAYS USE DIMENSIONS AS SHOWN. DRAWINGS ARE NOT TO BE SCALED

REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

139 FULTON STREET, SUITE 318
NEW YORK, N.Y. 10038
TEL. 212.393.9679

PROFESSIONAL SEAL:

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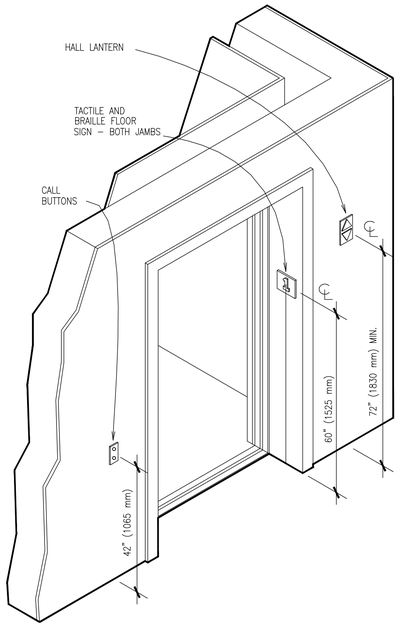
PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE, BROOKLYN N.Y.

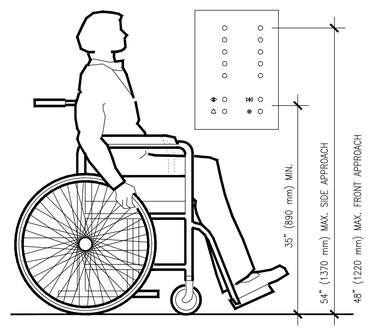
JOB APPLICATION #

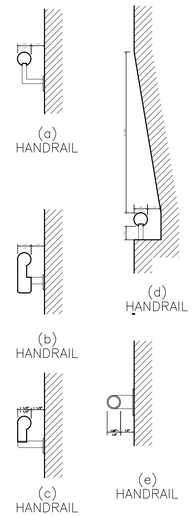
HC DETAILS

SCALE: INDICATED		DRAWING #:
DRAWN BY:		A-503.00
DESIGED BY:		
DATE: 02/01/2011		
JOB NO.:		
CHECKED BY:		

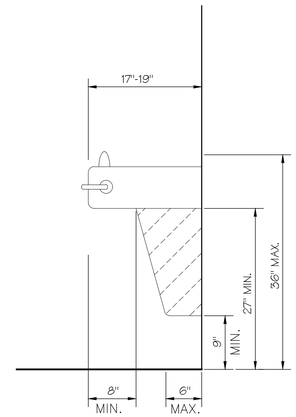


ELEVATOR REQUIREMENTS



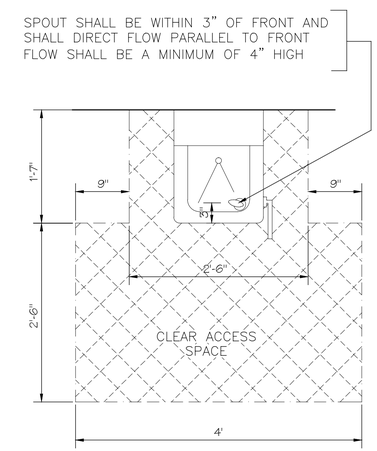


SIZE AND SPACING OF HANDRAILS AND GRAB BARS



SECTION THRU DRINKING FOUNTAIN

EQUIPMENT PERMITTED IN SHADED AREA



PLAN AT DRINKING FOUNTAIN

WATER FOUNTAINS

CABO/ANSI AI 17.1-1992 NOTES:

4.9.5 Outdoor Conditions. Outdoor stairs and approaches to them shall be designed so that mater will not accumulate on walking surfaces.

4.10 Elevators

4.10.1 New Elevators

4.1 0.1.1 General. Accessible Passenger elevators shall comply with 4. 1 0 and' ASME/ANSI AI 7. 1. Freight elevators shall not be considered as meeting the requirements of this section unless the only elevators provided are used as combination passenger and freight elevators.

4.10.1.2 Automatic Operations. Elevator operation shall be automatic. Each car shall be equipped with a self–leveling feature that will automatically bring the car to floor landings within a tolerance of 1/2 in (13 mm) under rated loading to zero loading conditions. This self–leveling feature shall be automatic and independent of the operable part and shall correct for overtravel or undertravel.

4.10–1.3 Call Buttons. Call buttons in elevator lobbies and halls shall be centered at 42 in (1065 mm) above the floor. See Fig. B4.10.1. Such call buttons shall have visual signals to indicate when each call is registered and when each call is answered. Call buttons shall be 3/4 in (1 9 mm) minimum in the smallest dimension. The button that designates the up direction shall be located above the button that designates the 1 down direction. Objects located beneath hall call buttons shall protrude into the elevator lobby 4 in (100 mm) maximum.

4.10.1.4 Hall Signals. A visible and audible signal shall be provided et each hoistway entrance to indicate which car is answering a call and the direction of travel, except that–in–car signals located– in cars, visible from the floor area adjacent to the hall call buttons, and conforming to the requirements of this subsection, shall be acceptable, Audible signals shall sound once for the up direction and twice for the down direction, or shall have verbal annunciators that state the word "up" or "down. Visible signals shall have the following features:

– Hall signal fixtures shall be centered at@72 in (1830 mm) minimum above the lobby floor. See Fig. B4.10.1.

– The visible signal elements shall@ be 2 1/2 in (63 mm) minimum in the. smallest dimension.

– Signals shall be visible from the floor area adjacent to the hall call button.

4.10.1.5* Tactile Signage on Hoistway Entrances. Raised character and Braille floor designations shall be provided on both jambs of elevator hoistway entrances and shall be centered et 60 in (1.525 mm) above the floor. See Fig. B4.1 0. 1. Such characters shall be 2 in (51 mm) high nominal and shall comply with 4.28.6.

4.10.1.6* Door Protective and Reopening Device. Elevator doors shall open and close automatically. Elevator doors shall be provided with a reopening device that shall stop and reopen a car door and –hoistway door automatically if the door becomes obstructed by an object or person. The device shall be activated by sensing an obstruction passing through the door opening at 5 in and al 29 in'(1 25 mm and 73e mm) above the floor. The device shall not require physical contact to be activated, although contact may occur before the door reverses. Door reopening devices shall remain effective for 20 seconds minimum.

4.10.1.7* Door and Signal Timing for Hall Calls. The minimum acceptable time from notification that a car is answering a call until the doors of that car start to close shall be calculated from one of the following equations:

$$T = \frac{D}{1.5\ ft/S}$$

or

$$T = \frac{D}{455\ mm/s} \quad 5\ seconds\ minimum$$

where T= total time in seconds and 0 = distance (in feet or millmeters) from the point in the lobby or corridor 60 in (1 525 mm) directly in front of the farthest call button controlling that car to the centerline of its hoistway door.

For cars with in–car signals, T be ,gins when the Signal is visible, from the point 60 in (1 525 mm) directly in front of the farthest hall call button and the audible signal is sounded.

4.1 0. 1.8 Door Delay for Car Calls. Elevator doors shall remain fully open in response to a car call for 3 seconds minimum.

4.10.1.9* Inside Dimensions of Elevator Cars. The inside dimensions of elevator cars shall provide space for wheelchair users to enter the car, maneuver within reach of controls, and exit from the car. The clearance between the car platform sill and the edge of any hoistway landing shall be 1 1/4 in (32 mm) maximum.

4.10.1.10Floor Surfaces. Floor surfaces in elevator cars shall comply with 4.5.,.

4.10.1.11 Illumination Levels .The level of illumination at the,car controls, platfrom, and car threshold and landing sill shall be 5 footcandles,(53.8 lux) minimum.

4.10.1.12* Car Controls. Elevator control panels Shall have the following features,

4.10.1.12.1. Control buttons shall be 3/4 in (1 9 mm) minimum in their smallest dimension. Control buttons shall be raised, flush, or recessed. control buttons shall be arranged with numbers in ascending order. When two or more Columns of buttons are provided they shall read from left to right. SeeFig. B4.10.1.12(a).

4.10.1,12.2 Designations for control: buttons shall comply with 4.28.2, 4.28.5,and–4;.28, The call button for the main entry floor shall be ,designated by star. Raised and Braille designated for control buttons shall be placed Immediately to the left of the button to which the, designations apply. See. Fig. 84.10.1.12(b). Floor buttons shall be provid6d with visible indicators to show that a call has been registered. The visible indication shall cease when the call has been answered.

4.10.1.12.3 Floor buttons shall be located 54 in (1370 mm) maximum above the floor for parallel approach and 48 in –(1 220 mm) maximum for front approach. Emergency controls, including the emergency alarm, shall be grouped ,at the bottom of the panel. Emergency control buttons shall have their centelines 35 in (890 mm minimum above the floor. See Fig B410.1.12(C).

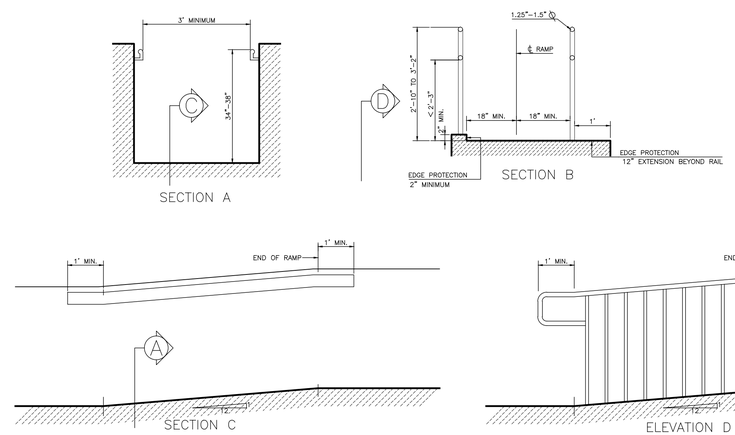
4.10.1.12.4 Control Is shall be located, on a front wait if cars have center opening doors, and at the side wall or at the front wall next to the door if cars have side opening doors.

4.10.1.13* Car Position indicators. In elevator cars, both audible and visible car floor location indicators shall be provided.

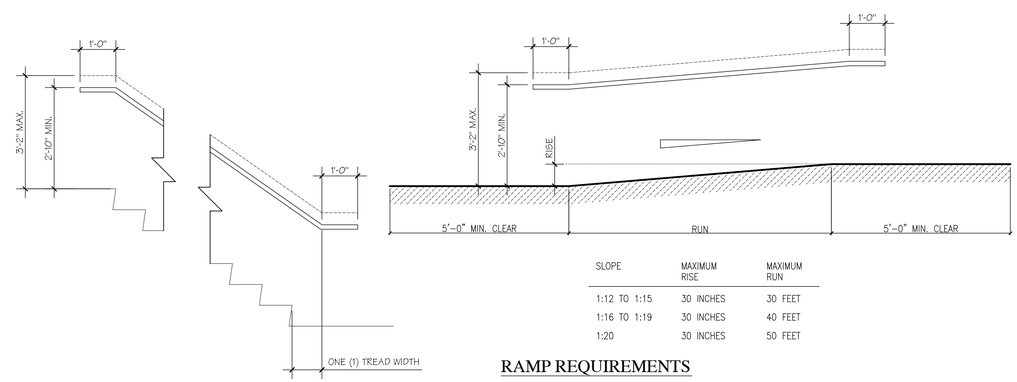
4.10.1.13.1 Visible. Indicator located above the car control–panel or above the door. Numerals shall be 1/2 in (13mm) minimum. As the car passes or stops at a floor served–by; the elevator, the corresponding character shall illuminate.

4.10.1.1,3.2 Audible. Indicator shall be 20 decibels minimum with a frequency of 1500 Hz maximum above ambient. Indicator shall be either–an audible signal which sounds when the car passes a floor
and when a car stops at a floor served by the elevator, or. an automatic verbal, announcement Which announces the floor at which the car has stopped.

4.10.1.14* Emergency Communications. If provided, car emergency signaling devices between the elevator and a point outside the hoistway shall comply With ASME/ANSI A17.1. The highest operable part of a two–way communication system shall be 54 in (1 370, mm) maximum above the floor for parallel approach and 48 in (1220 mm) maximum above the floor for front approach. If the device is located in a closed compartment, the compartment door hardware shall comply with 4.25. The device shall be identified by raised symbols and lettering complying with 4.28 and located adjacent to the device. If the system uses a handset, the cord from the panel to the handset shall be 29 in (735 mm) long minimum. The car emergency signaling device shall not be limited to voice communication. If instructions for use are provided essential information shall be presented in both tactile and visual form.



ACCESSIBLE RAMP AND RAILING REQUIREMENTS



SLOPE	MAXIMUM RISE	MAXIMUM RUN
1:12 TO 1:15	30 INCHES	30 FEET
1:16 TO 1:19	30 INCHES	40 FEET
1:20	30 INCHES	50 FEET

RAMP REQUIREMENTS

HANDRAIL REQUIREMENTS FOR STAIRS

The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

REVISIONS:

NO.:	DATE:	DESCRIPTION:

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REVISIONS:

NO.:	DATE:	DESCRIPTION:

PROFESSIONAL INFO.:

LEONID KRUPNIK, PE

139 FULTON STREET, SUITE 318
NEW YORK, N.Y. 10038
TEL. 212.393.9679

PROFESSIONAL SEAL:

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PROJECT TITLE:
ALTERATION AND CHANGE OF USE TO EXISTING MASONRY BUILDING

503 UNION AVENUE,
BROOKLYN N.Y.

JOB APPLICATION #

HC DETAILS

SCALE: INDICATED	DRAWING #:
DRAWN BY:	A-504.00
DESIGED BY:	
DATE: 02/01/2011	
JOB NO.:	
CHECKED BY:	

FIRST FLOOR DEMOLITION PLAN

SCALE: 3/16"= 1'-0"

DEMOLITION / REMOVAL NOTES:

1. BEFORE PROCEEDING WITH THE WORK, EACH CONTRACTOR AND SUBCONTRACTOR SHALL THOROUGHLY EXAMINE EXISTING CONDITIONS AT THE PROJECT SITE TO ASSURE THAT THE SCOPE OF WORK CAN PROCEED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. CONDITIONS FOUND WHICH WILL ADVERSELY AFFECT THE WORD SHALL BE REPORTED TO THE ARCHITECT PRIOR TO PROCEEDING WITH THE WORK SET FORTH IN THE CONTRACT DOCUMENTS.

2. PRIOR TO THE START OF REMOVAL/ DEMOLITION, PROVIDE TEMPORARY DUST PROTECTION BETWEEN AREAS DESIGNATED FOR REMOVAL AND EXISTING TO REMAIN. PROVIDE TEMPORARY DUST PROTECTION ON CONTINUOUS BASIS FOR THE DURATION OF DEMOLITION OPERATIONS. MINIMUM 6 MIL POLYETHYLENE SHEET SEALED WITH DUCT TAPE AS REQUIRED.

3. ALL FLAWS IN THE APPEARANCE OF WORK TO BE PROTECTED SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO THE PLACEMENT OF PROTECTION.

4. PLUMBING AND ELECTRICAL REMOVALS -PRIOR TO THE REMOVAL OF ANY PORTION OF EXISTING PLUMBING OR ELECTRICAL SYSTEM COMPONENTS, THE CONTRACTOR SHALL ARRANGE FOR THOSE PORTIONS OF SYSTEMS INDICATED FOR REMOVAL TO BE DISCONNECTED AND WHERE REQUIRED RE-ROUTED AS INDICATED ON DRAWINGS.

   A. EXISTING GAS, ELECTRIC, WATER METERS TO REMAIN

5. ITEMS INDICATED FOR REMOVAL ON DEMOLITION DRAWINGS INDICATE TYPICAL WORK ITEMS. THE SCOPE OF THE WORK IS NOT LIMITED TO AS INDICATED ON THE DRAWINGS, BUT INCLUDES WORK ON ALL AREAS REQUIRED TO COMPLETE THE SCOPE OF THE WORK OF THIS PROJECT WHETHER OR NOT INDICATED.

6. ALL EXISTING BUILDING PARTS INDICATED FOR REMOVAL SHALL BE REMOVED IN THEIR ENIRETY. ALL EXISTING BUILDING ELEMENTS NOT INDICATED FOR REMOVAL SHALL BE RETAINED AND SHALL BE SAFEGUARDED AND PROTECTED FROM DAMAGE OF ANY KIND.

7. ALL REFUSE AND DEBRIS CREATED BY THE WORK OF THIS PROJECT SHALL BE REMOVED FROM THE PREMISES AND LEGALLY DISPOSED OF AT AN OFFSIDE LOCATION DAILY.

8. ALL DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED IN STRICT CONFORMANCE WITH LOCAL BUILDING AND ELECTRIC CODES, O.S.H.A. SAFETY REGULATIONS AND ALL OTHER REGULATIONS HAVING JURISDICTION.

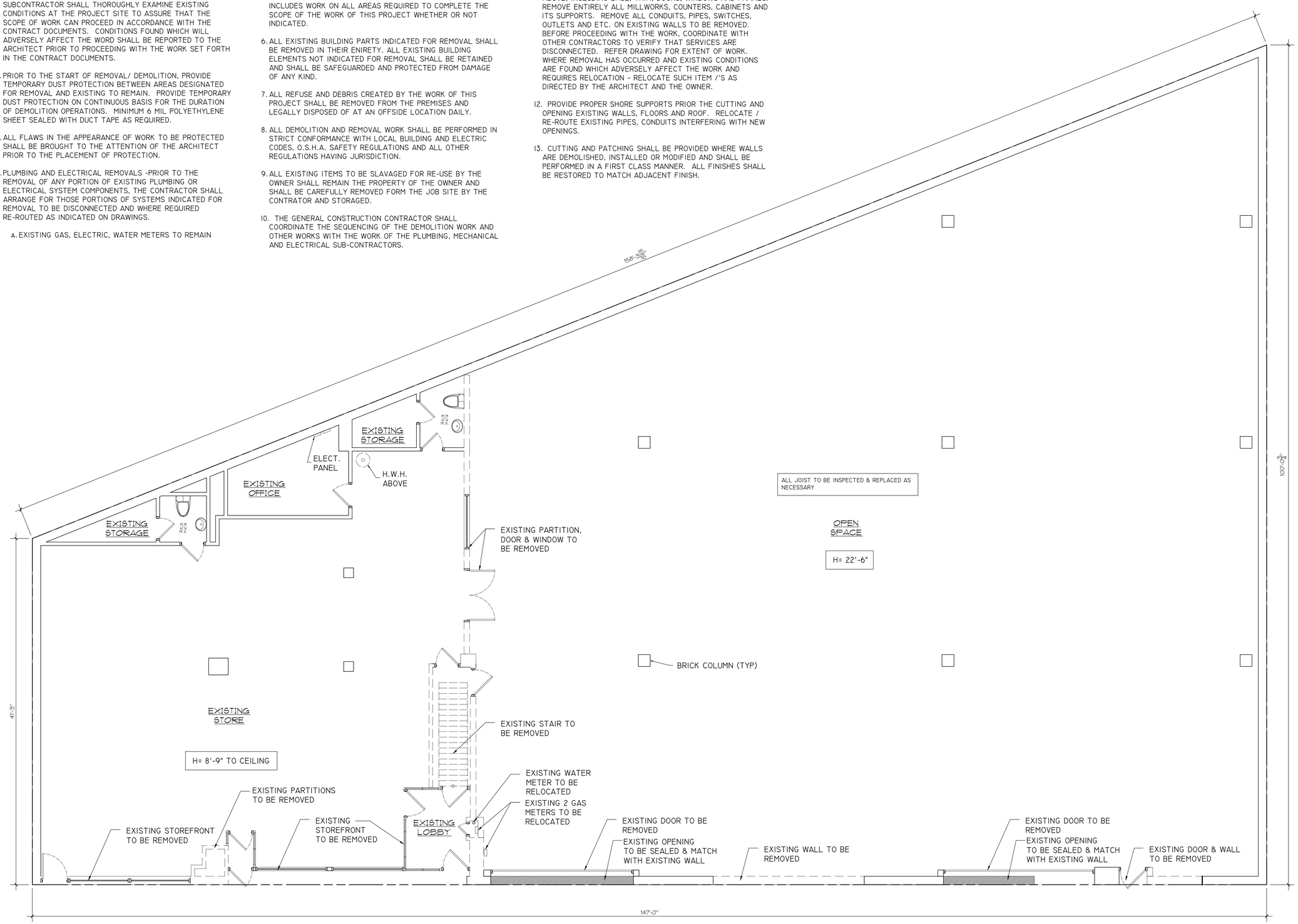
9. ALL EXISTING ITEMS TO BE SLAVAGED FOR RE-USE BY THE OWNER SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE CAREFULLY REMOVED FORM THE JOB SITE BY THE CONTRATOR AND STORAGED.

10. THE GENERAL CONSTRUCTION CONTRACTOR SHALL COORDINATE THE SEQUENCING OF THE DEMOLITION WORK AND OTHER WORKS WITH THE WORK OF THE PLUMBING, MECHANICAL AND ELECTRICAL SUB-CONTRACTORS.

11. ENTIRELY REMOVING EXISTING WALLS (SHOWN DOTTED IN DRAWINGS) FROM FLOOR STRUCTURE TO FLOOR STRUCTURE ABOVE, INCLUDING BASE, TRIM, DOORS, WINDOWS AND FRAMES. REMOVE ENTIRELY ALL MILLWORKS, COUNTERS, CABINETS AND ITS SUPPORTS. REMOVE ALL CONDUITS, PIPES, SWITCHES, OUTLETS AND ETC. ON EXISTING WALLS TO BE REMOVED. BEFORE PROCEEDING WITH THE WORK, COORDINATE WITH OTHER CONTRACTORS TO VERIFY THAT SERVICES ARE DISCONNECTED. REFER DRAWING FOR EXTENT OF WORK. WHERE REMOVAL HAS OCCURRED AND EXISTING CONDITIONS ARE FOUND WHICH ADVERSELY AFFECT THE WORK AND REQUIRES RELOCATION - RELOCATE SUCH ITEM /'S AS DIRECTED BY THE ARCHITECT AND THE OWNER.

12. PROVIDE PROPER SHORE SUPPORTS PRIOR THE CUTTING AND OPENING EXISTING WALLS, FLOORS AND ROOF. RELOCATE / RE-ROUTE EXISTING PIPES, CONDUITS INTERFERING WITH NEW OPENINGS.

13. CUTTING AND PATCHING SHALL BE PROVIDED WHERE WALLS ARE DEMOLISHED, INSTALLED OR MODIFIED AND SHALL BE PERFORMED IN A FIRST CLASS MANNER. ALL FINISHES SHALL BE RESTORED TO MATCH ADJACENT FINISH.



The general contractor shall check and verify all dimensions and report all errors and omissions to the Architects. Do not scale the drawing. This drawing shall not be used for construction purposes until signed by the consultants.

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PROFESSIONAL SEAL:

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PROJECT TITLE:

1265 38 STREET,
BROOKLYN N.Y.

JOB APPLICATION #

FIRST DEMO FLOOR PLAN

SCALE: INDICATED	DRAWING #:
DRAWN BY: A.A	DM-100.00
DESIGED BY:	
DATE: 12/08/2009	
JOB NO.: 09-107	
CHECKED BY:	

FIRST FLOOR DEMOLITION PLAN

SCALE: 3/16"= 1'-0"

DEMOLITION / REMOVAL NOTES:

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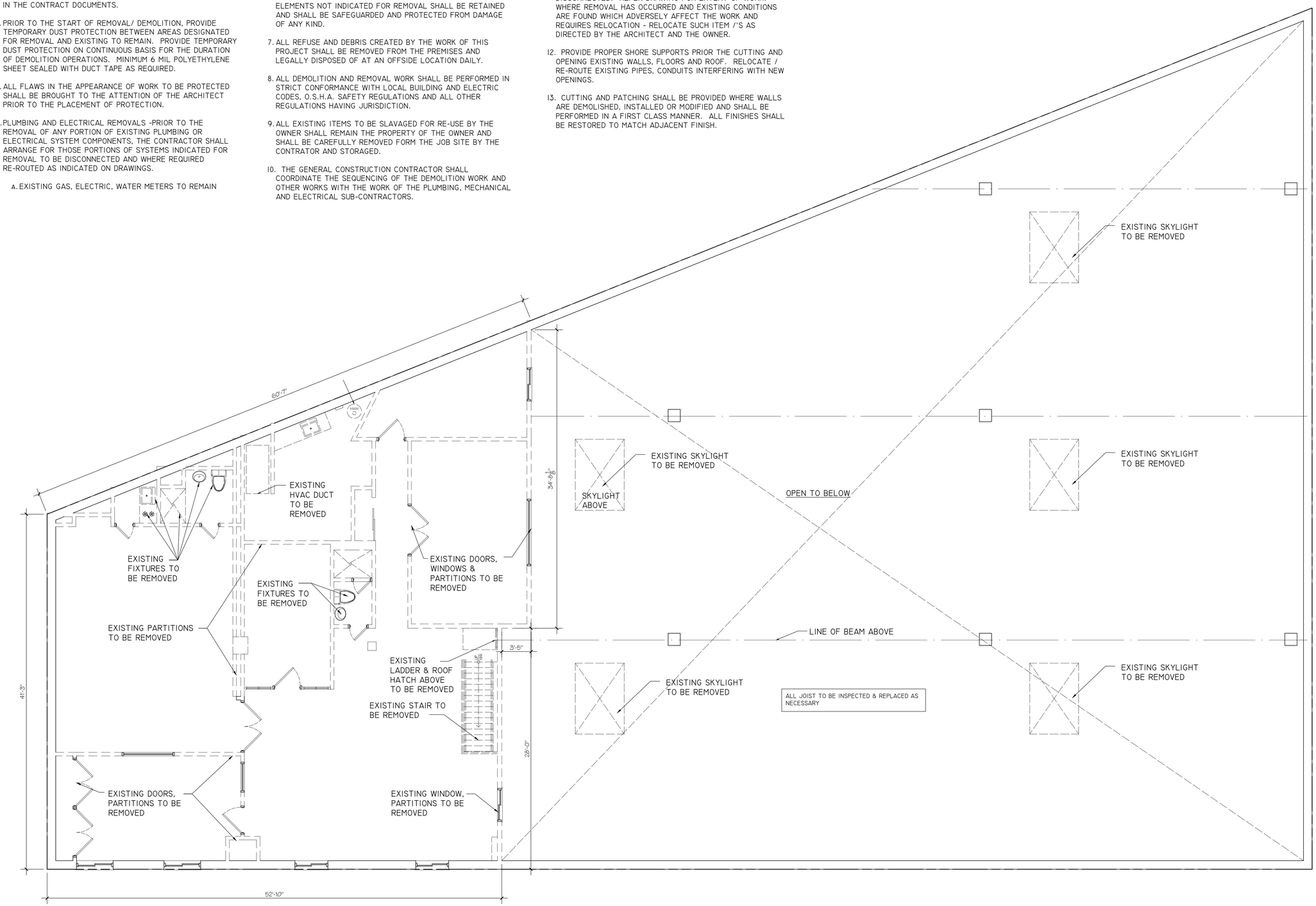

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PROJECT TITLE:

1265 38 STREET,
BROOKLYN N.Y.

JOB APPLICATION #

MEZZANINE DEMO FLOOR PLAN

SCALE: INDICATED	DRAWING #:
DRAWN BY: A.A	DM-101.00
DESIGED BY:	
DATE: 12/08/2009	
JOB NO.: 09-107	
CHECKED BY:	

ATTACHMENT B
CITIZEN PARTICIPATION PLAN

ATTACHMENT B

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Express Builders 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, Express Builders 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, Shana Holberton, who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 788-8841

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

brownfields@cityhall.nyc.gov.

Repositories. A document repository is maintained 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. Express Builders 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 11211

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 Express Builders, reviewed and approved by OER prior to distribution and mailed by Express Builders. 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.**

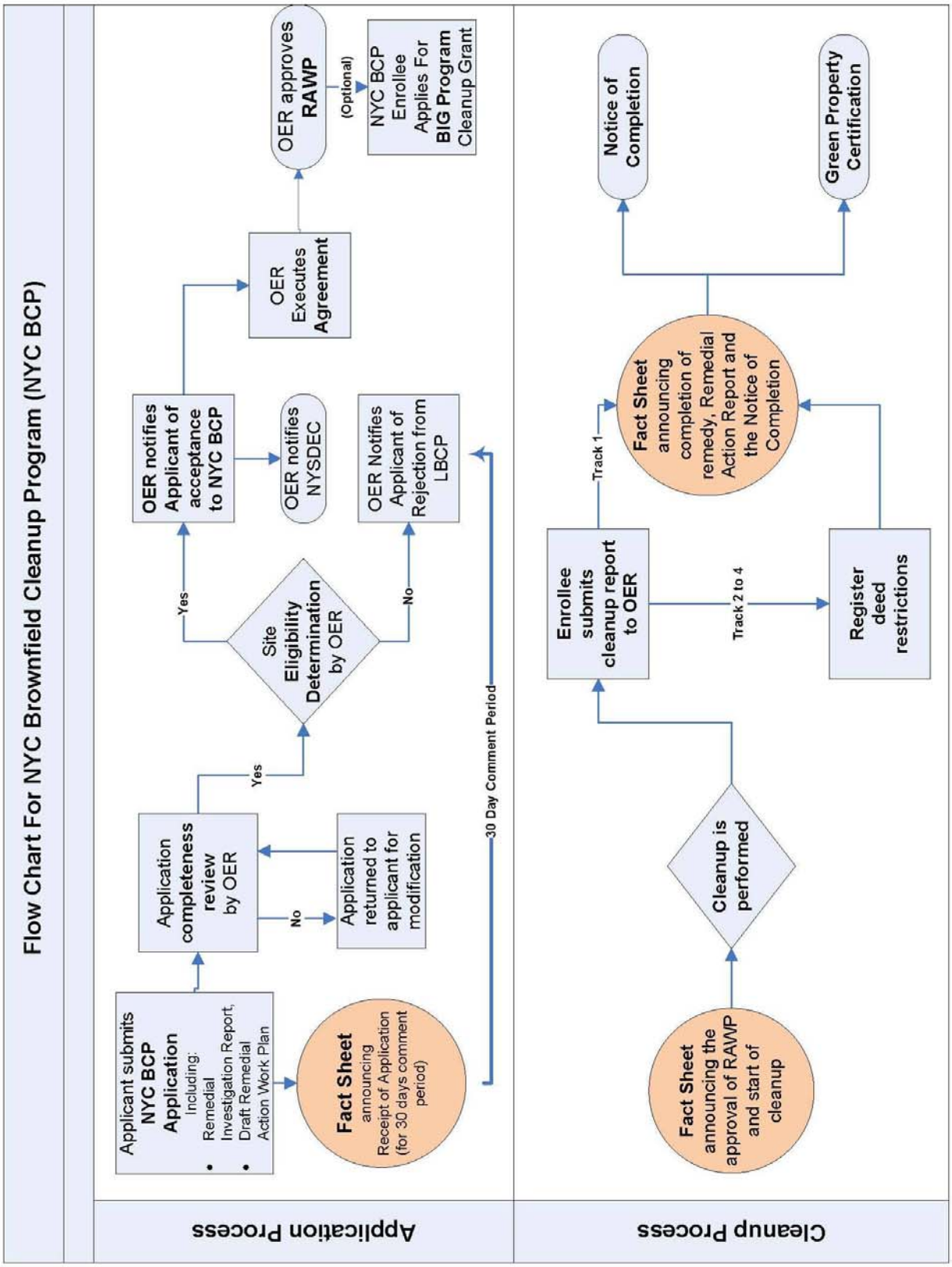
  Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact

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

1808 Middle Country Road
Ridge, NY 11961
Ph: 631.504.6000
Fax: 631.928.2780


Flow Chart For NYC Brownfield Cleanup Program (NYC BCP)
Application 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
No
Application returned to applicant for modification
Yes
Site Eligibility Determination by OER
Yes
OER notifies Applicant of acceptance to NYC BCP
OER notifies NYSDEC
No
OER Notifies Applicant of Rejection from LBCP
30 Day Comment Period
OER Executes Agreement
OER approves RAWP
(Optional)
NYC BCP Enrollee Applies For BIG Program Cleanup Grant
Cleanup Process
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
Fact Sheet announcing completion of remedy, Remedial Action Report and the Notice of Completion
Register deed restrictions
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. Express Builders 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. Express Builders 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.

1808 Middle Country Road
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Ph: 631.504.6000
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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.

Outbound truck transport routes are the following:

a) Continue south on Union Avenue to I-278 (Brooklyn Queens Expressway) North or South

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

1.6 MATERIALS DISPOSAL OFF-SITE

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

The 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

HEALTH AND SAFETY PLAN

Site:	**Renovation Project**
Location:	**505 Union Avenue, Brooklyn, NY**
Prepared By:	**ENVIRONMENTAL BUSINESS CONSULTANTS**
Date Prepared:	**May- 2014**
Version:	**1**
Revision:	**0**

Project Description:

Waste types:	Solid
Characteristics:	Semi-Volatile Organic Compounds, pesticides and metals in historic fill (From grade to depths as great as 8 feet)
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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APPENDIX D HOSPITAL INFORMATION, MAP AND FIELD ACCIDENT REPORT

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STATEMENT OF COMMITMENT

This Construction Health and Safety Plan (CHASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Activities planned for 505 Union Avenue, Brooklyn, New York.

This CHASP, 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 CHASP 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 CHASP 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 505 Union Avenue 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 the Owner or the 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 buildings' elevator pit for renovations.
    a) Excavate historic fill and soil to a depth of approximately 4 feet for Hotspot locations B1 and B5, 6 feet for Hotspot location B4 and 5 feet for construction of the elevator pit.

1.2 Application

The CHASP 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 CHASP. Amendments to the CHASP 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
Ms. Kristen DiScenza	EBC Project Manager	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (516) 652-8338
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 505 Union Avenue in the Williamsburg section of Brooklyn, New York, and is identified as Block 2315 and Lot 21 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 9,375-square feet and is bounded by Block 2315 Lot 14, multi-story residential property, to the north, Block 2315 Lots 26 and 28, a multi-story mixed use property and parking lot, respectively, to the south, Union Avenue and green space (Mt Carmel Triangle) to the east, and Block 2315 Lots 31 and 33, a multi-story residential property and Church, respectively, to the west. A map of the site boundary is shown in Figure 2. Currently, the Site is improved with a vacant 2-story commercial building which covers the entire Lot.

The proposed future use of the Site will consist of the renovation of the existing structure to include three additional floors. The first floor of the renovated structure will remain in commercial use with a parking garage. Thirty four residential apartments will be created on floors 2 through 5. To support the additional floors, new foundation structures (steel pile with concrete pile cap) will be installed. Concrete pile caps will be driven into place, therefore there will be little to no excavation of soils onsite, with the exception of the elevator pit which will require excavation to a depth of approximately 6 feet. below grade. Excavation at this location will likely be into the groundwater table, as groundwater at the Site ranges from 5.02 feet to 7.39 feet. Layout of the proposed site development is presented in Figure 3. The current zoning designation is M1-2/R6 residential. The proposed use is consistent with existing zoning for the property.

2.1 Prior Investigations

2.1.1 Remedial Investigation Report

EBC performed a subsurface investigation at the Site consisting of the following;

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed seven soil borings across the entire project Site, and collected seven soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed four groundwater monitoring wells throughout the Site to collected four groundwater samples for chemical analysis to evaluate groundwater quality; and
4. Installed five sub-slab soil vapor probes around Site and collected five sub-slab samples and three ambient air samples for chemical analysis.

Soil Sampling Results

Results of Soil/fill samples collected during the RI were compared to NYSDEC Unrestricted Use Soil Cleanup Objectives (UUSCOs) and Restricted Residential Soil Cleanup Objectives (RRSCOs) as presented in 6NYCRR Part 375-6.8 and CP51. Soil/fill samples showed no PCBs detected above Track1 SCOs. Three VOCs, acetone (95 micrograms per kilogram (µg/kg) or ppb, m&p-Xylenes (890 ppb) and o-Xylenes (450 ppb) were detected in two of the seven samples at concentrations above Track 1 Unrestricted Use SCOs. Several SVOCs including benz(a)anthracene (maximum [max.] of 62,000 ppb), benzo(a)pyrene (max. of 49,000 ppb), benzo(b)fluoranthene (max. of 58,000 ppb), benzo(k)fluoranthene (max. of 18,000 ppb), chrysene (max. of 59,000 ppb), dibenz(a,h)anthracene (max. of 7,800 ppb), dibenzofuran (9,200 ppb), fluoranthene (160,000 ppb), fluorene (160,000 ppb), indeno(1,2,3-cd)pyrene (max. of

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29,000 ppb), phenanthrene (160,000 ppb), and pyrene (150,000 ppb) were detected above their respective Track Track 2 Restricted Residential Use SCOs. Four pesticides including 4,4'-DDD (2,600 ppb), 4,4'-DDE (780 ppb), 4,4'-DDT (max. of 9,200 ppb) and dieldrin (290 ppb) were detected in three of the seven soil samples above their respective Track 1 Unrestricted Use SCOs. 4,4'-DDT and dieldrin were also detected about Track 2 Restricted Residential SCOs in one of the seven samples. Nine metals including arsenic (max. of 37.9 parts per million [ppm]), barium (max. of 2,220 ppm), cadmium (max. of 9.12 ppm), chromium (max. of 159 ppm), copper (max. of 13,900 ppm), lead (max. of 6,860 ppm), mercury (max. of 6.76 ppm), nickel (max. of 74.1 ppm) and zinc (max. of 12,800 ppm) exceeded Track 1 Unrestricted Use SCOs in all seven samples. Of these metals, arsenic, barium, cadmium, copper, lead, mercury, and zinc also exceeded Track 2 Restricted Residential Use SCOs. Elevated concentrations of SVOCs and metals in boring B4 are evident of coal debris (historic fill) as identified in the borings log for this location attached in Appendix B. The results indicate SVOCs and metals hotspot in three borings B1, B4 and B5. Boring B1 is also a hotspot for pesticides. Overall, the soil findings were consistent with observations for historical fill sites in areas throughout NYC.

Groundwater Sampling Results

Data collected during the RI was compared to the New York State 6NYCRR Part 703.5 Class GA Groundwater Quality Standards (GQS). Groundwater samples showed no VOCs, pesticides or PCBs detected above their respective GQS in any of the four groundwater samples. Five SVOCs including benzo(a)anthracene (max. of 2.4 ppb), benzo(b)fluoranthene (max. of 3.3 ppb), benzo(k)fluoranthene (max. of 1.1 ppb), chrysene (max. of 2.6 ppb), and indeno(1,2,3-cd)pyrene (max. of 1.6 ppb) were detected above GQS in one or more samples. Several metals were identified in one or more of the groundwater samples, but only aluminum, iron, manganese, and sodium exceeded their respective GQS in dissolved samples.

Soil Vapor Sampling Results

Soil vapor samples collected during the RI show low levels of petroleum compounds and chlorinated VOCs. Concentrations of petroleum-related VOCs (BTEX) ranged from 23.93 $\mu g/m^3$ to 36.46 $\mu g/m^3$ for sub-slab samples and 25.74 $\mu g/m^3$ to 43.04 $\mu g/m^3$ for ambient indoor air samples. Overall, the highest reported concentration was for acetone (639 $\mu g/m^3$ in one indoor air sample). Chlorinated VOCs including Tetrachloroethene (PCE) (max of 146 $\mu g/m^3$) trichloroethene (TCE) (max. of 6.9 $\mu g/m^3$), 1,1,1-Trichloroethane (max. of 3.7 $\mu g/m^3$) and carbon tetrachloride (max. of $\mu g/m^3$) were detected in one or more of the five sub-slab soil vapor samples as well as in the ambient indoor air samples. PCE and TCE were detected in the monitoring level range established by NYSDOH guidance matrix.

2.2 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. Establish Track 4 Restricted Residential Use Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs

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and marking & staking excavation areas.

5. Excavation and removal of soil/fill exceeding Track 4 Restricted Residential Use SCOs. No excavation is planned for renovation activities, with the exception of the elevator pit. Hotspot excavation will be completed at three locations across the Site. Excavation of B1 and B5 will take place to a depth of 4ftbg and a minimum of 6ftbg at boring location B4.
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. Installation of one sub-slab vapor implant following excavation of hotspot B1 followed by soil gas sampling to determine if TCE/PCE concentrations in soil gas require mitigation. If results of soil gas sampling indicate CVOC contaminants detected above NYSDOH Air Guidance Values, a vapor barrier will be installed beneath the southern portion of the property. The vapor barrier would consist of Raven Industries' VaporBlock 20 Plus, which is a seven layer co-extruded barrier made from polyethylene and EVOH resins.
11. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
12. As part of development, construction and maintenance of an engineered composite cover consisting of the existing building concrete slab across the footprint of the renovated building.
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
15. 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
16. The property will continue to be registered with an E-Designation at the NYC Building Department. Establishment of Engineering Controls and Institutional Controls; 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.

Volatile organic compounds reported to be present at elevated concentrations in groundwater, soil and/or soil gas at the Site include the following:

Acetone	m&p-Xylenes	o-Xylenes	Tetrachloroethene	Trichloroethene

Semi-Volatile organic compounds reported to be present at elevated concentrations in groundwater, soil and/or soil gas at the Site include the following:

Benzo(a)anthracene	Benzo(b)fluoranthene	Benzo(a)pyrene	Dibenzo(a,h)anthracene
Benzo(k)fluoranthene	Indeno(1,2,3-cd)pyrene	Chrysene	Fluoranthene
Fluorene	Napthalene	Phenanthrene	Pyrene

Metals reported to be present at elevated concentrations in groundwater, soil, and/or soil gas at the Site include the following:

Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury
Zinc						

Pesticides and PCBs reported to be present at elevated concentrations in groundwater, soil and/or soil gas at the Site include the following:

4,4'-DDD	4,4'-DDE	4,4'-DDT	Dieldrin

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.

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 5,000 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

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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 5,000 $\mu g/m^3$ 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 VOCs were detected within only one 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

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		engineering controls • 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 engaged in the excavation of hazardous or contaminated 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
NYCDEP Project Manager	(212) 442-7126
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;

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- Ensure appropriate decontamination, treatment, or testing for exposed or injured 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 Ms. Kristen DiScenza (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.

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- The site safety officer will conduct a head count to ensure that all personnel have been 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

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

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

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

International Chemical Safety Cards

TRICHLOROETHYLENE

ICSC: 0081

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

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.

N O T E S

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**

(C) IPCS, CEC, 1994

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

TETRACHLOROETHYLENE

ICSC: 0076

1,1,2,2-Tetrachloroethylene
Perchloroethylene
Tetrachloroethene
C_2Cl_4 / $Cl_2C{=}CCl_2$
Molecular mass: 165.8

ICSC # 0076
CAS # 127-18-4
RTECS # KX3850000
UN # 1897
EC # 602-028-00-4
April 13, 2000 Validated

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		STRICT HYGIENE! PREVENT GENERATION OF MISTS!	
•INHALATION	Dizziness. Drowsiness. Headache. Nausea. Weakness. 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. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles , face shield .	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 plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. 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. Personal protection: filter respirator for organic gases and vapours.	Separated from metals ,(see Chemical Dangers), food and feedstuffs . Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0076

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

TETRACHLOROETHYLENE

ICSC: 0076

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

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

PHYSICAL DANGERS:
The vapour is heavier than air.

CHEMICAL DANGERS:
On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004).
MAK: skin absorption (H);
Carcinogen category: 3B;
(DFG 2004).
OSHA PEL†: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours)
NIOSH REL: Ca Minimize workplace exposure concentrations. See Appendix A
NIOSH IDLH: Ca 150 ppm See: 127184

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

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

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 121°C
Melting point: -22°C
Relative density (water = 1): 1.6
Solubility in water, g/100 ml at 20°C: 0.015

Vapour pressure, kPa at 20°C: 1.9
Relative vapour density (air = 1): 5.8
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09
Octanol/water partition coefficient as log Pow: 2.9

ENVIRONMENTAL DATA

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

N O T E S

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. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

ADDITIONAL INFORMATION

ICSC: 0076 **TETRACHLOROETHYLENE**

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:

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	modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

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

ICSC: 0087

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

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

NOTES

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

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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

IMPORTANT DATA		
	PHYSICAL STATE; APPEARANCE: COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.	**ROUTES OF EXPOSURE:** The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
	PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.	**INHALATION RISK:** Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.
	CHEMICAL DANGERS:	**EFFECTS OF SHORT-TERM EXPOSURE:**
	OCCUPATIONAL EXPOSURE LIMITS: TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2 (as pyrolysis product of organic materials) (DFG 2005).	**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**

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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

(C) IPCS, CEC, 1994

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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

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.

BENZO(a)PYRENE

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

(C) IPCS, CEC, 1994

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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

I M P O

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**

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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

(C) IPCS, CEC, 1994

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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

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

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**

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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

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

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

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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
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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.

Material Safety Data Sheet

Version 3.1
Revision Date 10/15/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Fluorene
Product Number	:	46880
Brand	:	Aldrich
Product Use	:	For laboratory research purposes.

Supplier	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA	Manufacturer	:	Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 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
No known OSHA hazards

GHS Classification
Acute aquatic toxicity (Category 1)
Chronic aquatic toxicity (Category 1)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
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
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 May be harmful if absorbed through skin. May cause skin irritation.

Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{13}H_{10}$
Molecular Weight : 166.22 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Fluorene			
86-73-7	201-695-5	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

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
Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation.

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
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
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. 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
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., 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	crystalline
Colour	white

Safety data

pH	no data available
Melting/freezing point	Melting point/range: 113 - 115 °C (235 - 239 °F)
	Melting point/range: 111 - 114 °C (232 - 237 °F) - lit.
Boiling point	298 °C (568 °F) - lit.
Flash point	151.0 °C (303.8 °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

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
LD50 Intraperitoneal - mouse - > 2.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

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 (Fluorene)
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:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
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

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	May be harmful if swallowed.
Skin	May be 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: LL5670000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Fish - 0.82 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates.	Remarks: no data available
Toxicity to algae	EC50 - Algae - 3.4 mg/l - 96 h

Persistence and degradability

Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 24 h Bioconcentration factor (BCF): 512

Mobility in soil
Adsorbs on soil.

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.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Fluorene)
Marine pollutant: Marine pollutant

IATA
UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Fluorene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards
No known OSHA hazards

DSL Status
All components of this product are on the Canadian DSL list.

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
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Fluorene	86-73-7	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Further information
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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

NAPHTHALENE

ICSC: 0667

Naphthene
$C_{10}H_8$
Molecular mass: 128.18

ICSC # 0667
CAS # 91-20-3
RTECS # QJ0525000
UN # 1334 (solid); 2304 (molten)
EC # 601-052-00-2
April 21, 2005 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION	Above 80°C explosive vapour/air mixtures may be formed. 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!	
•INHALATION	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	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	Abdominal pain. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. Sweep spilled substance into covered containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place.	Separated from strong oxidants, food and feedstuffs Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 22-40-50/53 S: 2-36/37-46-60-61 UN Hazard Class: 4.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0667

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

NAPHTHALENE

ICSC: 0667

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

PHYSICAL STATE; APPEARANCE:
WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.

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

CHEMICAL DANGERS:
On combustion, forms irritating and toxic gases. Reacts with strong oxidants

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 10 ppm as TWA 15 ppm as STEL (skin) A4 (not classifiable as a human carcinogen); (ACGIH 2005).
MAK: skin absorption (H);
Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004).
OSHA PEL†: TWA 10 ppm (50 mg/m^3)
NIOSH REL: TWA 10 ppm (50 mg/m^3) ST 15 ppm (75 mg/m^3)
NIOSH IDLH: 250 ppm See: 91203

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

INHALATION RISK:
A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 218°C
Sublimation slowly at room temperature
Melting point: 80°C
Density: 1.16
g/cm3
Solubility in water, g/100 ml at 25°C:
none

Vapour pressure, Pa at 25°C: 11
Relative vapour density (air = 1): 4.42
Flash point:
80°C c.c.
Auto-ignition temperature: 540°C
Explosive limits, vol% in air: 0.9-5.9
Octanol/water partition coefficient as log Pow: 3.3

ENVIRONMENTAL DATA

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

N O T E S

Some individuals may be more sensitive to the effect of naphthalene on blood cells.

Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)
NFPA Code: H2; F2; R0;

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

IMPORTANT LEGAL NOTICE:
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Material Safety Data Sheet

Version 4.0
Revision Date 07/24/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Phenanthrene
Product Number	:	695114
Brand	:	Aldrich
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Harmful by ingestion., Irritant

Other hazards which do not result in classification
Photosensitizer.

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P273	Avoid release to the environment.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

HMIS Classification

Health hazard:	2
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.

Eyes	Causes eye irritation.
Ingestion	Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : $C_{14}H_{10}$
Molecular Weight : 178.23 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Phenanthrene			
85-01-8	201-581-5	-	-

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
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation.

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. 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.

Handle and store under inert gas.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Value	Control	Update	Basis

			parameters		
Phenanthrene	85-01-8	TWA	0.2 mg/m3	1993-06-30	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	1989-03-01	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Safety glasses with side-shields conforming to EN166

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

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

Safety data

pH	no data available
Melting point	98 - 100 °C (208 - 212 °F)
Boiling point	340 °C (644 °F)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Density	1.063 g/mL at 25 °C (77 °F)
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 4.57

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Oxidizing agents

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

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - mouse - 700.0 mg/kg

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity

no data available

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:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Phenanthrene)
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:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
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

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

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

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

Additional Information

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 3.2 mg/l - 96.0 h
	LC100 - other fish - 1.5 mg/l - 1.0 h
Toxicity to daphnia	EC50 - Daphnia magna (Water flea) - 0.86 mg/l - 24 h

and other aquatic invertebrates.

EC50 - Daphnia magna (Water flea) - 0.38 mg/l - 48 h

Toxicity to algae EC50 - Chlorella vulgaris (Fresh water algae) - 1.20 mg/l - 3 h

Persistence and degradability

Biodegradability Result: 55 - 95 % - Partially biodegradable.

Bioaccumulative potential

Bioaccumulation Pimephales promelas (fathead minnow) - 28 d
Bioconcentration factor (BCF): 5,100

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 organisms.

13. DISPOSAL CONSIDERATIONS

Product

Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

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. (Phenanthrene)
Reportable Quantity (RQ): 5000 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG

UN-Number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Phenanthrene)
Marine pollutant: No

IATA

UN-Number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Phenanthrene)

Further information

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

OSHA Hazards

Harmful by ingestion., Irritant

DSL Status

All components of this product are on the Canadian DSL list.

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

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Phenanthrene	85-01-8	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Phenanthrene	85-01-8	1990-01-01

16. OTHER INFORMATION

Further information
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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

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

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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

ICSC: 0013

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

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/cm³

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.

NOTES

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

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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

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

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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

IMPORTANT DATA

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

NOTES

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

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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

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

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**

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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

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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
Melting point: 327.5°C
Density: 11.34 g/cm3
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

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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

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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

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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

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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

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Material Safety Data Sheet

Version 4.0
Revision Date 03/12/2010
Print Date 12/09/2011

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	4,4'-DDD PESTANAL,250 MG (2,2-BIS(4-CHL&
Product Number	:	35486
Brand	:	Fluka
Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052
Emergency Phone #	:	(314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Toxic by ingestion, Harmful by skin absorption., Possible carcinogen.

GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)

H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary statement(s)

P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

NFPA Rating

Health hazard:	2
Fire:	0
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	Toxic if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 1,1-Dichloro-2,2-bis(4-chlorophenyl)ethane
4,4′-DDD
TDE

Formula : $C_{14}H_{10}Cl_4$
Molecular Weight : 320.04 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane			
72-54-8	200-783-0	-	-

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
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing dust. Ensure adequate ventilation. Evacuate personnel to safe areas.

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. 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
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

pH	no data available
Melting point	94.0 - 96.0 °C (201.2 - 204.8 °F)
Boiling point	193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg)
Flash point	no data available
Ignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	< 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F)
Density	1.38 g/cm3
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 6.02

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.

11. TOXICOLOGICAL INFORMATION

Acute toxicity
LD50 Oral - Hamster - > 5,000 mg/kg

TDLo Oral - Human - 428.5 mg/kg
Remarks: Endocrine:Adrenal cortex hypoplasia.

TDLo Oral - rat - 6,000 mg/kg
Remarks: Cardiac:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Changes in both tubules and glomeruli.

TDLo Oral - rat - 14 mg/kg
Remarks: Liver:Changes in liver weight. Endocrine:Estrogenic. Musculoskeletal:Other changes.

TDLo Oral - rat - 2,100 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex).

LD50 Dermal - rabbit - 1,200 mg/kg
Remarks: Behavioral:Excitement. Behavioral:Convulsions or effect on seizure threshold. Skin irritation

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
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:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
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

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Toxic 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.

Additional Information
RTECS: KI0700000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish	LC50 - other fish - 1.18 - 9 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.04 - 0.05 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.06 - 0.09 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 3.47 - 5.58 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates.	EC50 - Daphnia pulex (Water flea) - 0.01 mg/l - 48 h

Persistence and degradability
no data available

Bioaccumulative potential
Indication of bioaccumulation.

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 organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. 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: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Marine pollutant: No

IATA
UN-Number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

15. REGULATORY INFORMATION

OSHA Hazards
Toxic by ingestion, Harmful by skin absorption., Possible carcinogen.

DSL Status
This product contains the following components that are not on the Canadian DSL nor NDSL lists.

	CAS-No.
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8

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
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	

New Jersey Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. 2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	

16. OTHER INFORMATION

Further information
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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.

ChemCAS

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Search
72-55-9 msds
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MSDS 250,000+

MSDS : 2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%
CAS : 72-55-9
SYNONYMS : p,p'-DDE ; ethylene,1,1-dichloro-2,2-bis-(p-chlorophenyl)- ; DDT dehydrochloride ; DDE; 1-1'-(Dichloroethenylidene)bis(4-chlorobenzene)

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AdChoices

Catalog of Chemical Suppliers, Buyers, Custom Synthesis Companies And Equipment Manufacturers
[2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99% 72-55-9]

Suppliers:

Not Available

Buyers:

Not Available

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AdChoices

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
72-55-9	2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene	99	200-784-6

Hazard Symbols: XN
Risk Phrases: 22 33

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW
Harmful if swallowed. Danger of cumulative effects.Cancer suspect agent.Possible risks of irreversible effects.

Potential Health Effects
Eye:
May cause eye irritation.
Skin:
May cause skin irritation.
Ingestion:
May cause irritation of the digestive tract. May be harmful if swallowed. Ingestion of large amounts may cause liver and/or kidney damage.
Inhalation:
May cause respiratory tract irritation.
Chronic:
May cause cancer according to animal studies. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:
Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin:
Get medical aid. Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse.
Ingestion:
If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.
Inhalation:
Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.
Notes to Physician:
Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Will burn if involved in a fire.
Extinguishing Media:
For large fires, use water spray, fog or regular foam. For small fires, use dry chemical, carbon dioxide, water spray or regular foam. Cool containers with flooding quantities of water until well after fire is out.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:
Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Sweep up, then place into a suitable container for disposal. Avoid generating dusty conditions. Provide ventilation.

**** SECTION 7 - HANDLING and STORAGE ****

Handling:
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Minimize dust generation and accumulation. Avoid contact with eyes, skin, and clothing. Do not ingest or inhale. Use with adequate ventilation.
Storage:
Keep container closed when not in use. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate ventilation to keep airborne concentrations low.
Exposure Limits
CAS# 72-55-9:

Personal Protective Equipment

Eyes:
Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin:
Wear appropriate protective gloves to prevent skin exposure.
Clothing:
Wear appropriate protective clothing to prevent skin exposure.
Respirators:
A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State: Crystals
Color: white
Odor: None reported.
pH: Not available.
Vapor Pressure: 6.5106 mm Hg @ 20 C
Viscosity: Not available.
Boiling Point: 336 deg C
Freezing/Melting Point: 88.00 - 90.00 deg C
Autoignition Temperature: Not available.
Flash Point: Not available.
Explosion Limits, lower: Not available.
Explosion Limits, upper: Not available.
Decomposition Temperature:
Solubility in water: 0.010 ppm
Specific Gravity/Density:
Molecular Formula: $C_{14}H_8Cl_4$
Molecular Weight: 318.02

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:
Stable under normal temperatures and pressures.
Conditions to Avoid:
Incompatible materials, dust generation, strong oxidants.
Incompatibilities with Other Materials:
Strong oxidizing agents - strong bases.
Hazardous Decomposition Products:
Hydrogen chloride, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****

RTECS#:
CAS# 72-55-9: KV9450000
LD50/LC50:
CAS# 72-55-9: Oral, mouse: LD50 = 700 mg/kg; Oral, rat: LD50 = 880 mg/kg.
Carcinogenicity:
2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene -
California: carcinogen, initial date 1/1/89

Other:
See actual entry in RTECS for complete information.

**** SECTION 12 - ECOLOGICAL INFORMATION ****

Ecotoxicity:
Estimated BCF value = 8,300 based on water solubility. Estimated Koc value = 8,300. There was no movement of DDE reported in soil column mobility experiments.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****

Dispose of in a manner consistent with federal, state, and local regulations.

**** SECTION 14 - TRANSPORT INFORMATION ****

IATA
Not regulated as a hazardous material.
IMO
Not regulated as a hazardous material.
RID/ADR
Not regulated as a hazardous material.
USA RQ: CAS# 72-55-9: 1 lb final RQ; 0.454 kg final RQ

**** SECTION 15 - REGULATORY INFORMATION ****

European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN
Risk Phrases:
R 22 Harmful if swallowed.
R 33 Danger of cumulative effects.
Safety Phrases:
S 24/25 Avoid contact with skin and eyes.
WGK (Water Danger/Protection)
CAS# 72-55-9: 3
Canada
None of the chemicals in this product are listed on the DSL/NDSL list.
CAS# 72-55-9 is listed on Canada's Ingredient Disclosure List.
US FEDERAL
TSCA
CAS# 72-55-9 is not listed on the TSCA inventory.
It is for research and development use only.

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 9/28/1998 Revision #3 Date: 3/18/2003

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall the company be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if the company has been advised of the possibility of such damages.

Search More 72-55-9 msds GO

ALL MSDS PAGES IN THIS GROUP

NAME	CAS
M-Benzyloxybenzyl Alcohol , 97%	1700-30-7
Octaphenylcyclotetrasiloxane, 98%	546-56-5
Cetylpyridinium chloride	123-03-5
3,4-Difluorophenol, 99%	2713-33-9
1-Benzyl-4-Hydroxypiperidine, 97%	4727-72-4
4-tert-Butylbenzoyl chloride	1710-98-1
Borane-morpholine complex, 97%	4856-95-5
Benzyl Ether, 99%	103-50-4
5-Amino-1-Naphtol (Pract)	83-55-6
Pyridinium-P-Toluenesulfonate 98%	24057-28-1
Pyrogallol Red, 98% (Titr.)	32638-88-3
Amberlite ira 416	9002-26-0
3-Methoxybenzonitrile, 98%	1527-89-5
1-Adamantanemethanol, 99%	770-71-8
Inosine, 99%	58-63-9
Pentafluoropropionic Acid	422-64-0
Pyruvic Acid	127-17-3
Potassium hydrogen fluoride, 99+%	7789-29-9
Aluminum Nitride, 98% Particle Size <10 Micron	24304-00-5
Nickel(II) hydroxide, c.p., 60-61% Ni	12054-48-7
1-Adamantanamine sulfate, 99%	31377-23-8
S-(Thiobenzoyl)-Thioglycolic Acid, 97%	942-91-6
N,N-Dimethyl-P-Nitroaniline	100-23-2
Benzofuroxan	480-96-6
cis-2-Aminomethyl-1-cyclohexanol hydrochloride, 99%	24947-68-0
Silver Phosphate, 98% (Titr.)	7784-09-0

4-Cyano-4-Phenylpiperidine Hydrochloride, 99% (TLC)	51304-58-6
Methanesulfonamide	3144-09-0
gamma-Octanoic lactone, 98%	104-50-7
Cis,cis,cis,cis-1,2,3,4-cyclopentane- tetracarboxylic dianhydride,	4802-47-5
Tetrachloroethylene Carbonate, 98+%	22432-68-4
Oxamic Acid, 98%	471-47-6
1O,11-Dihydro-5H-Dibenzo(A,D)-Cycloheptene, 98%	833-48-7
Thallium (I) Sulfate, 99.9+%	7446-18-6
N-(2,6-Dimethylphenylcarbamoyl-Methyl)-Iminodiacetic Acid, 99%	59160-29-1
P-(Dimethylamino)cinnamic Acid, 99%	1552-96-1
Biebrich Scarlet, 99% (UV-VIS)	4196-99-0
4-Chlorobenzenediazonium hexafluoro- phosphate	1582-27-0
Ammonium hexachloroiridate(IV), 99.99%	16940-92-4
Methylamine-d2 deuteriochloride, 98+ atom % D	593-51-1
2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%	72-55-9
Nitro red	56431-61-9
Methyl 2,3-dichlorobenzoate, 98+%	2905-54-6
Isopropyl Bromoacetate, 98% (GC)	29921-57-1
1-Iodo-4-Nitrobenzene, 99%	636-98-6
4-Ethylcyclohexanol, 99% cis/trans mixture	4534-74-1
Fluorescamine	38183-12-9
Tris(2,2,6,6-Tetramethyl-3,5-Heptanedionato)Dysprosium(III), 99+%	15522-69-7
3-Amino-2,2,5,5-Tetramethyl-1-Pyrrolidinyloxy, 99% (Titr.)	34272-83-8
3,4-Dihydroxyphenylacetic Acid,98%	102-32-9

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International Chemical Safety Cards

DDT

ICSC: 0034

Dichlorodiphenyltrichloroethane
1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane
2,2-bis(p-Chlorophenyl)-1,1,1-trichloroethane
1,1'-(2,2,2-Trichloroethylidene)bis(4-chlorobenzene)
p,p'-DDT
$C_{14}H_9Cl_5$
Molecular mass: 354.5

ICSC # 0034
CAS # 50-29-3
RTECS # KJ3325000
UN # 2761
EC # 602-045-00-7
April 20, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Powder, water spray, foam, carbon dioxide.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
•INHALATION	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
•SKIN		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness.	Safety goggles, 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	Tremors. Diarrhoea. Dizziness. Headache. Vomiting. Numbness. Paresthesias. Hyperexcitability. Convulsions.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT let this chemical enter the environment. Sweep spilled substance into sealable non-metallic containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Personal protection: P3 filter respirator for toxic particles.	Provision to contain effluent from fire extinguishing. Separated from iron, aluminum and its salts, food and feedstuffs See Chemical Dangers.	Do not transport with food and feedstuffs. Severe marine pollutant. T symbol N symbol R: 25-40-48/25-50/53 S: 1/2-22-36/37-45-60-61 UN Hazard Class: 6.1 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

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

DDT

ICSC: 0034

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

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALS WHITE POWDER.
TECHNICAL PRODUCT IS WAXY SOLID.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
On combustion, forms toxic and corrosive fumesincludinghydrogen chloride. Reacts with aluminium and iron.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 1 mg/m³ as TWA A3 (ACGIH 2004).
MAK: 1 mg/m³ H
Peak limitation category: II(8)
(DFG 2003).
OSHA PEL: TWA 1 mg/m^3 skin
NIOSH REL: Ca TWA 0.5 mg/m^3 See Appendix A
NIOSH IDLH: Ca 500 mg/m^3 See: 50293

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

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

EFFECTS OF SHORT-TERM EXPOSURE:
May cause mechanical irritation. The substance may cause effects on the central nervous system , resulting in convulsions and respiratory depression Exposure at high levels may result in death. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the central nervous system and liver. This substance is possibly carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.

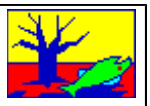
PHYSICAL PROPERTIES

Boiling point: 260°C
Melting point: 109°C
Density: 1.6
g/cm3

Solubility in water: poor
Octanol/water partition coefficient as log Pow: 6.36

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to birds. Bioaccumulation of this chemical may occur along the food chain, for example in milk and aquatic organisms. This substance does enter the environment under normal use. Great care, however, should be given to avoid any additional release, e.g. through inappropriate disposal.



N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Consult national legislation. Agritan, Azotox, Anofex, Ixodex, Gesapon, Gesarex, Gesarol, Guesapon, Clofenotane, Zeidane, Dicophane, Neocid are trade names.

Transport Emergency Card: TEC (R)-61GT7-III

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

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

DIELDRIN

ICSC: 0787

1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-endo-1,4-exo- 5,8-dimethanonaphthalene
3,4,5,6,9,9-Hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2ß,2aalpha,3ß,6ß,6aalpha,7ß,7aalpha)-2,73,6-dimethanonaphth(2,3-b)oxirene
HEOD
$C_{12}H_8Cl_6O$
Molecular mass: 380.9

ICSC # 0787
CAS # 60-57-1
RTECS # IO1750000
UN # 2761
EC # 602-049-00-9
March 26, 1998 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: all extinguishing agents allowed.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	
•INHALATION	(See Ingestion).	Ventilation (not if powder).	Fresh air, rest. Refer for medical attention.
•SKIN	MAY BE ABSORBED! See Ingestion.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Safety goggles, or face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Convulsions. Dizziness. Headache. Nausea. Vomiting. Muscle twitching.	Do not eat, drink, or smoke during work. Wash hands before eating.	Give a slurry of activated charcoal in water to drink. Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Do NOT wash away into sewer. Sweep spilled substance into sealable containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. (Extra personal protection: chemical protection suit including self-contained breathing apparatus).	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs and incompatible materials: See Chemical Dangers. Well closed. Keep in a well-ventilated room. Store in an area without drain or sewer access.	Do not transport with food and feedstuffs. Severe marine pollutant. T+ symbol N symbol R: 25-27-40-48/25-50/53 S: 1/2-22-36/37-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II

SEE IMPORTANT INFORMATION ON BACK

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.

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IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALS

PHYSICAL DANGERS:

CHEMICAL DANGERS:
The substance decomposes on heating producing toxic fumes including hydrogen chloride. Reacts with oxidants and acids. Attacks metal due to the slow formation of hydrogen chloride in storage.

OCCUPATIONAL EXPOSURE LIMITS:
TLV (as TWA): 0.25 mg/m³, A4 (skin) (ACGIH 1997).
MAK: (Inhalable fraction) 0.25 mg/m³ :
Peak limitation category: II(8)
skin absorption (H); (DFG 2007).
OSHA PEL: TWA 0.25 mg/m^3 skin
NIOSH REL: Ca TWA 0.25 mg/m^3 skin See Appendix A
NIOSH IDLH: Ca 50 mg/m^3 See: 60571

ROUTES OF EXPOSURE:
The substance can be absorbed into the body 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 on spraying.

EFFECTS OF SHORT-TERM EXPOSURE:
The substance may cause effects on the central nervous system , resulting in convulsions. Medical observation is indicated.

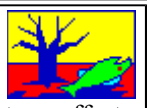
EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance accumulates in the human body. Cumulative effects are possible: see Acute Hazards/Symptoms.

PHYSICAL PROPERTIES

Melting point: 175-176°C
Density: 1.7 g/cm³
Solubility in water: none

Vapour pressure, Pa at 20°C: 0.0004
Octanol/water partition coefficient as log Pow: 6.2

ENVIRONMENTAL DATA



The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to honey bees, birds. In the food chain important to humans, bioaccumulation takes place, specifically in aquatic organisms. It is strongly advised not to let the chemical enter into the environment because it persists in the environment. The substance may cause long-term effects in the aquatic environment. Avoid release to the environment in circumstances different to normal use.

NOTES

Depending on the degree of exposure, periodic medical examination is indicated. If the substance is formulated with solvent(s) also consult the card(s) (ICSC) of the solvent(s). Carrier solvents used in commercial formulations may change physical and toxicological properties. Do NOT take working clothes home. Alvit, Dieldrex, Dieldrite, Illoxol, Octalox, Panoram, and Quintox are trade names. Also consult ICSC #0774, Aldrin.

Transport Emergency Card: TEC (R)-61G41b.
Card has been partially updated in August 2007: see Storage, Occupational Exposure Limits.

ADDITIONAL INFORMATION

(C) IPCS, CEC, 1994

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.)? _____

_____

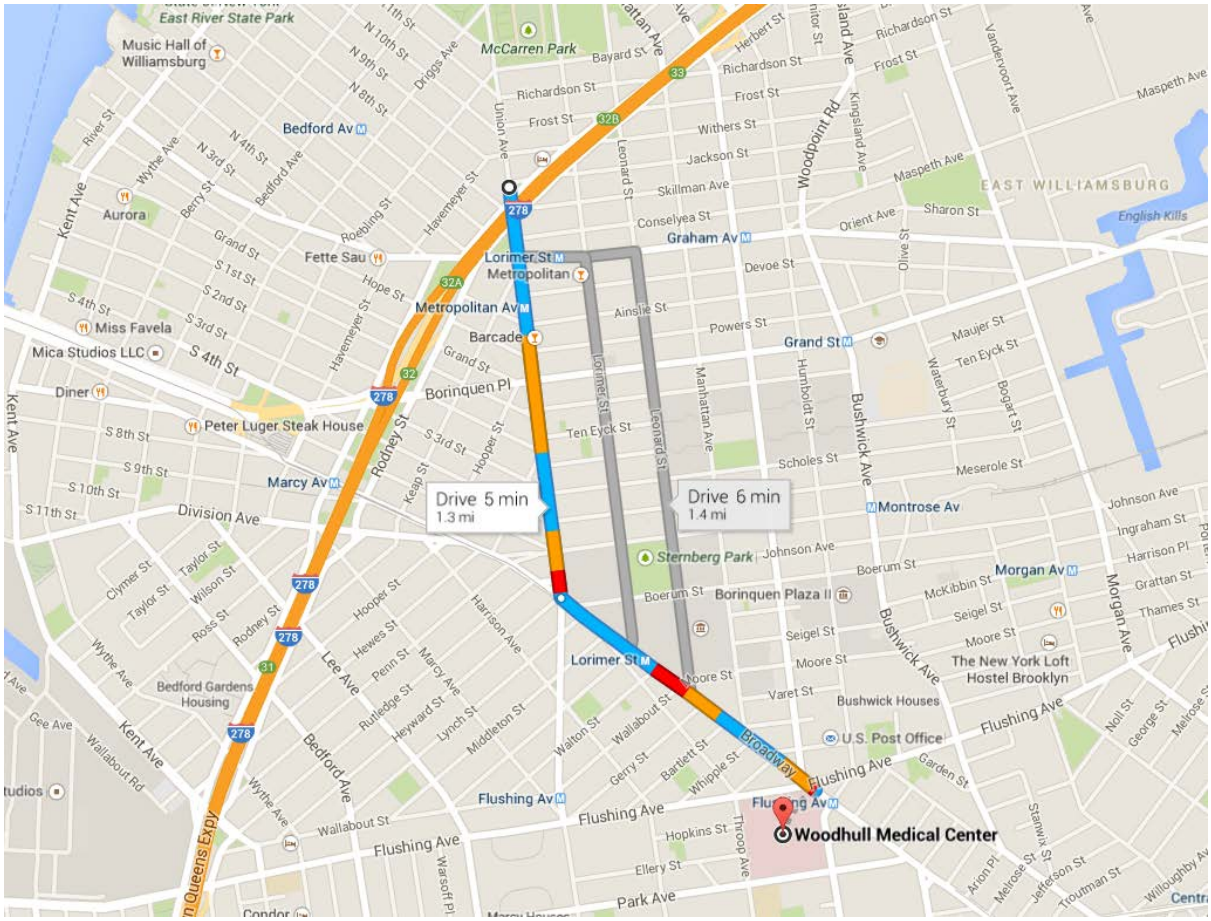
(If not, it is the EMPLOYEE'S sole responsibility to process his/her claim through his/her Health and Welfare Fund.)

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
1.3 Miles – About 5 Minutes



505 Union Ave, Brooklyn, NY 11211

1. Head **south** on **Union Ave** toward **Meeker Ave**

0.7 mi

2. Slight **left** onto **Broadway**

Destination will be on the right

0.6 mi

Woodhull Medical Center
760 Broadway, Brooklyn, NY 11206