

**REDEVELOPMENT PROJECT
821 BEDFORD AVENUE
BROOKLYN, NEW YORK**

Remedial Action Work Plan

NYC VCP Number: 12CVCP057K

Prepared for:

Sunshine Construction LLC
42 Skillman Street Unit BR
Brooklyn NY 11205

Prepared by:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

MAY 2012

REMEDIAL ACTION WORK PLAN

TABLE OF CONTENTS

| | |
|---|----|
| LIST OF ACRONYMS | i |
| CERTIFICATION | 1 |
| EXECUTIVE SUMMARY | 1 |
| COMMUNITY PROTECTION STATEMENT..... | 5 |
| REMEDIAL ACTION WORK PLAN | 10 |
| 1.0 SITE BACKGROUND..... | 10 |
| 1.1 Site Location and Current Usage | 10 |
| 1.2 Proposed Redevelopment Plan | 11 |
| 1.3 Description of Surrounding Property..... | 11 |
| 1.4 Remedial Investigation | 12 |
| 2.0 REMEDIAL ACTION OBJECTIVES | 15 |
| 3.0 REMEDIAL ALTERNATIVES ANALYSIS | 16 |
| 3.1 Threshold Criteria | 18 |
| 3.2. Balancing Criteria | 20 |
| 4.0 REMEDIAL ACTION..... | 26 |
| 4.1 Summary of Preferred Remedial Action..... | 26 |
| 4.2 Soil Cleanup Objectives and Soil/Fill Management..... | 28 |
| 4.3 Engineering Controls | 32 |
| 4.4 Institutional Controls | 34 |
| 4.5 Site Management Plan | 35 |
| 4.6 Qualitative Human Health Exposure Assessment | 35 |
| 5.0 REMEDIAL ACTION MANAGEMENT..... | 40 |
| 5.1 Project Organization and Oversight..... | 40 |
| 5.2 Site Security | 40 |
| 5.3 Work Hours..... | 40 |
| 5.4 Construction Health and Safety Plan | 40 |
| 5.5 Community Air Monitoring Plan..... | 41 |

| | |
|--|----|
| 5.6 Agency Approvals | 43 |
| 5.7 Site Preparation | 43 |
| 5.8 Traffic Control | 45 |
| 5.9 Demobilization..... | 45 |
| 5.10 Reporting and Record Keeping..... | 45 |
| 5.11 Complaint Management..... | 46 |
| 5.12 Deviations from the Remedial Action Work Plan | 47 |
| 5.13 Data Usability Summary Report..... | 47 |
| 6.0 REMEDIAL ACTION REPORT | 48 |
| 7.0 SCHEDULE..... | 50 |

TABLES

| | |
|---------|---|
| Table 1 | Imported Backfill and Clean Soil Limits |
|---------|---|

FIGURES

| | |
|----------|---|
| Figure 1 | Site Location Map |
| Figure 2 | Site Boundary Map |
| Figure 3 | Layout of Proposed Site Development |
| Figure 4 | Surrounding Land Usage |
| Figure 5 | Excavation and Capping Plan |
| Figure 6 | Layout of SSDS and Vapor Barrier (ENV-001-02) |
| Figure 7 | Layout of SSDS and Vapor Barrier (ENV-002.01) |
| Figure 8 | Endpoint Sampling Locations |

APPENDICES

| | |
|------------|---|
| Appendix A | Proposed Development Plans |
| Appendix B | Citizen Participation Plan |
| Appendix C | Sustainability Statement |
| Appendix D | Soil Materials Management Plan |
| Appendix E | Site-Specific Construction Health and Safety Plan (CHASP) |
| Appendix F | Community Air Monitoring Plan |
| Appendix G | Vapor Barrier Specifications |

LIST OF ACRONYMS

| Acronym | Definition |
|-------------|--|
| AOC | Area of Concern |
| AS/SVE | Air Sparging/Soil Vapor Extraction |
| BOA | Brownfield Opportunity Area |
| CAMP | Community Air Monitoring Plan |
| C/D | Construction/Demolition |
| COC | Certificate of Completion |
| CQAP | Construction Quality Assurance Plan |
| CSOP | Contractors Site Operation Plan |
| DCR | Declaration of Covenants and Restrictions |
| ECs/ICs | Engineering and Institutional Controls |
| HASP | Health and Safety Plan |
| IRM | Interim Remedial Measure |
| BCA | Brownfield Cleanup Agreement |
| MNA | Monitored Natural Attenuation |
| 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 | New York State Department of Environmental Conservation Division of Environmental Remediation |
| NYS DOH | New York State Department of Health |
| NYS DOT | New York State Department of Transportation |
| ORC | Oxygen-Release Compound |
| OSHA | United States Occupational Health and Safety Administration |
| 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 821 Bedford Avenue in Brooklyn, NY, Site Number 12CVCP057K.

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



EXECUTIVE SUMMARY

Sunshine Construction, LLC has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 2,500-square foot (ft²) site located at 821 Bedford 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 821 Bedford Avenue in the Bedford-Stuyvesant section in Brooklyn, New York and is identified as Block 1734 and Lot 60 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500 ft² and is bounded by 819 Bedford Avenue - Lot 61 (a two-story mixed use building) to the north, 823 Bedford Avenue - Lot 59 (a one-story brick commercial building) to the south, 100 Spencer Street - Lot 7506 (a new 6-story residential building) to the east, and Bedford Avenue to the west. A map of the Site boundary is shown in Figure 2. Currently, the Site is improved with a 2-story mixed use brick building. The second floor of the building is set up for residential use. The first floor is vacant and consists of an exposed concrete floor and walls. The east half of the first floor is split into two levels (ground floor and mezzanine). The mezzanine area appeared to be set up for use as office space, but is in a severe derelict condition. The Site lot consists of 25 ft of street frontage on Bedford Avenue and is 100 ft deep for a total of approximately 2,500 ft².

Summary of Proposed Redevelopment Plan

The proposed future use of the Site will include the construction of a new six-story building with a full height cellar level. The new building will cover 85% of the lot and include a basement level to 10 ft below grade (see Figure 3). The cellar level will be used for storage and mechanical rooms. The first floor will include one residential unit and parking for 4 cars. Floors 2 through 4 will each have one residential unit and floors 5 and 6 will be a single unit duplex. The building's



cellar footprint covers 2,250 ft² of the 2,500 ft² lot leaving a 10 ft by 25 ft (250 ft²) area that would not typically require excavation. An at grade rear patio will be constructed above the rear 5 feet of the cellar level and will extend to the rear of the lot. The patio area will be capped with a 4-inch concrete slab. There are no exposed soil, landscaped or green areas. The current zoning designation is M1-2/R6A. The proposed use is consistent with existing zoning for the property.

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

Summary of 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:

Site-Specific remedial elements

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-Specific SCOs.
4. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs.
5. Collection and analysis of end-point samples to determine whether Track 1 Unrestricted Use or Track 4 Site-Specific SCOs are achieved.
6. Construction and maintenance of an engineered composite cover across the entire Site, consisting of the new building's concrete slab and rear concrete patio, to prevent human exposure to residual soil/fill remaining under the Site.
7. Installation of a vapor barrier system beneath the foundation and sidewalls.

8. Installation and operation of a passive sub-slab depressurization system.
9. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
10. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
11. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of any contaminated media on-Site.
12. Removal of underground storage tanks and closure of petroleum spills (if encountered) in compliance with applicable local, State and Federal laws and regulations.
13. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
14. 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.
15. Demarcation of residual soil/fill.
16. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
17. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
18. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, and lists any changes from this RAWP.
19. If Track 1 Unrestricted Use SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual historic fill, including plans for inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
20. If Track 1 Unrestricted Use SCOs are not achieved, recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable

gardening and farming; (2) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (3) 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. This cleanup plan also includes many other elements that address common community concerns, such as community air monitoring, odor, dust and noise controls, hours of operation, good housekeeping and cleanliness, truck management and routing, and opportunities for community participation. The purpose of this Community Protection Statement is to explain these community protection measures in non-technical language to simplify community review.

Remedial Investigation and Cleanup Plan. Under the NYC VCP, a thorough cleanup study of this property (called a remedial investigation) has been performed to identify past property usage, to sample and test soils, groundwater and soil vapor, and identify contaminant sources present on the property. The cleanup plan has been designed to address 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 Health and Safety Plan that is designed to protect community residents and on-Site workers. The elements of this plan are in compliance with safety requirements of the United States Occupational Safety and Health Administration. This plan includes many protective elements including those discussed below.

Site Safety Coordinator. This project has a designated Site safety coordinator to implement the Health and Safety Plan. The safety coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site safety coordinator is 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 to workers performing specific tasks including removing contaminated material and installing cleanup systems in contaminated areas.

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

Odor, Dust and Noise Control. This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the on-Site Project Manager Kevin Brussee at 631-504-6000 or NYC Office of Environmental Remediation Project Manager Maurizio Bertini (212) 788-3922.

Quality Assurance. This cleanup plan requires that evidence be provided to illustrate that all cleanup work required under the plan has been completed properly. This evidence will be

summarized in the final report, called the Remedial Action Report. This report will be submitted to the NYC Office of Environmental Remediation and will be thoroughly reviewed.

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

Hours of Operation. The hours for operation of cleanup will comply with the NYC Department of Buildings construction code requirements or according to specific variances issued by that agency. For this cleanup project, the hours of operation are 7:00AM to 6:00PM Monday through Friday.

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

Complaint Management. The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager Mr. Kevin Brussee (EBC Project Manager) at (631) 504-6000, the NYC Office of Environmental Remediation Project Manager Maurizio Bertini at (212) 788-3922, 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 Marcy Library (617 Dekalb Avenue).

Long-Term Site Management. To provide long-term protection after the cleanup is complete, the property owner will be required to comply with an ongoing Site Management Plan that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC Office of Environmental Remediation. Requirements that the property owner must comply with are defined in the property's deed. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

Sunshine Construction, LLC, has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 821 Bedford Avenue in the Bedford-Stuyvesant section of Brooklyn, New York (the Site). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides a remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, 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 821 Bedford Avenue in the Bedford-Stuyvesant section in Brooklyn, New York and is identified as Block 1734 and Lot 60 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 2,500 ft² and is bounded by 819 Bedford Avenue - Lot 61 (a two-story mixed use building) to the north, 823 Bedford Avenue - Lot 59 (a one-story brick commercial building) to the south, 100 Spencer Street - Lot 7506 (a new 6-story residential building) to the east, and Bedford Avenue to the west. A map of the Site boundary is shown in Figure 2. Currently, the Site is improved with a 2-story mixed use brick building. The second floor of the building is set up for residential use. The first floor is vacant and consists of an exposed concrete floor and walls. The east half of the first floor is split into two levels (ground floor and mezzanine). The mezzanine area appeared to be set up for use as office space, but is in a severe derelict condition.

The Site lot consists of 25 ft of street frontage on Bedford Avenue and is 100 ft deep for a total of approximately 2,500 ft².

1.2 Proposed Redevelopment Plan

The proposed future use of the Site will include the construction of a new six-story building with a full height cellar level. The new building will cover 85% of the lot and include a basement level to 10 ft below grade (see Figure 3). The cellar level will be used for storage and mechanical rooms. The first floor will include one residential unit and parking for 4 cars. Floors 2 through 4 will each have one residential unit and floors 5 and 6 will be a single unit duplex. The building's cellar footprint covers 2,250 ft² of the 2,500 ft² lot leaving a 10 ft by 25 ft (250 ft²) area that would not typically require excavation. An at grade rear patio will be constructed above the rear 5 feet of the cellar level and will extend to the rear of the lot. The patio area will be capped with a 4-inch concrete slab. There are no exposed soil, landscaped or green areas. The current zoning designation is M1-2/R6A. 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. Each of the adjacent properties is described in detail in the table provided below:

| Direction | Property Description |
|--|---|
| North <i>Adjacent Properties</i> | <u>Block 1734, Lot 61</u> (819 Bedford Avenue) – Lot 61 is partially developed with a two-story residential building. The first floor is set up as warehouse/garage space. An empty yard is located behind the building. <u>Block 1734, Lot 62</u> (817 Bedford Avenue) – Lot 62 is developed with a small one-story auto repair facility (Putnam Auto Repair). |
| South <i>Adjacent Properties</i> | <u>Block 1734, Lot 59</u> (823 Bedford Avenue) – The entire lot (59) is developed with a one-story warehouse/garage building. The building was/is utilized by Adfreed Oil Co. Inc. <u>Block 1734, Lots 58 and 57</u> (825 and 827 Bedford Avenue) – Both lots are developed with four story multi-family homes. Both lots have rear yards located behind the houses. |
| East <i>Adjacent Properties</i> | <u>Block 1734, Lot 7506</u> (100 Spencer Street) – The large lot is developed with a 6-story multi-family apartment building completed in 2006. New apartment buildings are also constructed north and south of this lot on Spencer Street. |
| West <i>Opposite Side of Bedford Ave</i> | <u>Block 1900, Lot 50</u> (850 Bedford Avenue) – The lot is developed with a NYCFD station building. <u>Block 1900, Lots 47, 48, 49</u> (844, 846 and 848 Bedford Avenue) – Each of the thin lots are developed with 3-story multi-family homes. |

Two private schools are located within 500 feet of the Site. Figure 4 shows the surrounding land usage.

1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, Redevelopment Project - 821 Bedford Avenue, Brooklyn, NY*”, dated April, 2012 (RIR).

Summary of Past Uses of Site and Areas of Concern

A Comprehensive Environmental Site Assessment Report (CESAR) was prepared for 821 Bedford Avenue and an adjacent property (823 Bedford Avenue) by Hydro Tech Environmental Corp. (Hydro Tech) in January of 2011. The purpose of the assessment was to identify historical uses and/or specific conditions or areas of concern at the Site in order to conduct subsequent investigation/sampling of such areas.

The AOCs identified for this Site include:

1. Historic fill layer is present at the Site from grade to at least 12 feet below grade.
2. Presence of floor drains.

Summary of the Work Performed under the Remedial Investigation

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed two soil borings at the Site, and collected four soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed one groundwater monitoring well at the Site and collected one groundwater sample for chemical analysis to evaluate groundwater quality;
4. Installed two soil vapor probes at the Site and collected two samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property is approximately 32 feet.
2. Depth to groundwater ranges from 40 to 44 feet at the Site.
3. Regional groundwater flow 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 2 ft of historic fill followed by brown silty sand with some gravel to a depth of at least 16 feet below grade.
6. Soil/fill samples collected during the RI detected methylene chloride at low levels of 16 $\mu\text{g}/\text{kg}$. However, methylene chloride is a common laboratory contaminant and was detected within the laboratory blank. No other VOCs, pesticides or PCBs were detected. Several SVOCs were detected within one of the shallow soil samples, but the concentration of each of the SVOCs was below Track 1 Unrestricted Use SCOs. Several metals including barium, chromium, copper, lead, nickel and zinc were detected above Unrestricted Use SCOs. Of these barium and lead were also detected above Restricted Residential SCOs, both in just one shallow soil sample. The concentration of barium was 6,620 ppm and concentration of lead was 3,600 ppm, which greatly exceeded the Restricted Residential SCO of 400 ppm. All other metal concentration were well below Restricted Residential SCOs. Overall, except for one shallow soil sample, soil testing results were unremarkable and were consistent with observations for other historical fill sites in Brooklyn. The RI did not reveal any contaminant source areas on this property.
7. Groundwater samples collected during the RI indicated no detectable concentration of SVOCs, pesticides or PCBs within the Site groundwater. The dissolved concentration of each of the metals was below NYSDEC 6NYCRR Part 375 Groundwater Quality standards (GQS). Several chlorinated VOCs were detected within the groundwater sample. Chloroform (3.6 ppb) and cis-1,2-dichlorethylene (3.1 ppb) were detected below GQS. However, tetrachloroethylene (39 ppb) and trichloroethylene (250 ppb) were detected within the groundwater sample above their corresponding GQS. PCE and TCE were not detected in on-Site soils. The RI indicates that groundwater is contaminated with the PCE and TCE, likely from an off-Site source.
8. Soil vapor samples collected during the RI showed a wide range of petroleum and chlorinated volatile organic compounds at relatively low concentrations. PCE was detected in the range from 3.1 to 3.4 $\mu\text{g}/\text{m}^3$ and TCE ranged from 2.2 to 3.3 $\mu\text{g}/\text{m}^3$. These results were all well below the monitoring levels for PCE and TCE in the State DOH soil vapor guidance matrix. Total petroleum related compounds ranged from 81 to 94 $\mu\text{g}/\text{m}^3$

and total VOC ranged from 260 to 297 $\mu\text{g}/\text{m}^3$. Neither PCE nor TCE were detected within any of the soil collected at the Site, but both were detected within groundwater, which is present at a depth of approximately 40 to 44 feet below grade. This suggests the low concentrations of PCE and TCE in soil gas are related to a possible off-Site source.

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

2.0 REMEDIAL ACTION OBJECTIVES

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

Soil

- Prevent direct contact with contaminated soil.

Soil Vapor

- Prevent migration of soil vapor into dwelling and other occupied structures.

3.0 REMEDIAL ALTERNATIVES ANALYSIS

The goal of the remedy selection process under is to select a remedy that is protective of human health and the environment taking into consideration the current, intended and reasonably anticipated future use of the property. The remedy selection process begins by establishing RAOs for media in which chemical constituents were found in exceedence of applicable standards, criteria and guidance values (SCGs). A remedy is then developed based on the following nine 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; and
- Land use.

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 are evaluated as follows;

- Alternative 1 involves
 - Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 has been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would require excavation to a depth of at least 2 to remove all historic fill at the Site. Excavation for development purposes would take place to a depth of approximately 11 feet in the front 90 feet of the Site lot. No excavation is required for development purposes for the 10 feet in the rear. Therefore, soil/fill from the rear yard would require excavation to a depth at which historic fill was present. In addition, if soil/fill containing

analytes at concentrations above Track 1 Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation would be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs.

- No Engineering Controls (ECs) or Institutional Controls (ICs) can be utilized in a Track 1 cleanup, but installation of a vapor barrier and passive sub-slab depressurization system (SSDS) beneath the basement foundation of the new building would still take place as part of construction to prevent exposures from off-Site soil vapor.
- Alternative 2 involves
 - Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-Specific SCOs has been achieved with post-excavation endpoint sampling. Excavation for development purposes would take place to a depth of approximately 11 feet in the front 90 feet of the Site lot. No excavation is required for development purposes for the 10 feet in the rear. Therefore, soil/fill from the rear yard requires excavation to ensure complete removal of soil from the rear yard that does not meet Track 4 Site-Specific SCOs. If soil/fill containing metals at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation would be performed to ensure complete removal of soil that does not meet Track 4 Site-Specific SCOs.
 - Placement of a final cover over the entire Site to eliminate exposure to remaining soil/fill;
 - Placement of a soil vapor barrier beneath the building slab and along foundation side walls and a passive SSDS beneath the foundation due to the presence of off-Site impacts to soil vapor;
 - Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive Site uses, such as farming or vegetable gardening, to eliminate future exposure pathways.
 - Establishment of an approved Site Management Plan to ensure long-term management of these Engineering Controls (ECs) and Institutional Controls (ICs) including the

performance of periodic inspections and certification that the controls are performing as they were intended; and

- Placement of a deed notice to memorialize the remedial action and the ECs/ICs to ensure that future owners of the Site continue to maintain these controls as required.

3.1 Threshold Criteria

Protection of Public Health and the Environment

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

Alternative 1 will be protective of human health and the environment by eliminating the historic fill at the Site which contains elevated levels of metals. The potential for human and environmental exposure to these constituents on-Site will be eliminated by excavation of all soils with metals in excess of Track 1 Unrestricted Use SCOs, disposing of excavated materials off-Site and backfilling as needed with certified clean fill/topsoil, virgin mined materials, or certified recycled materials.

The Alternative 1 will result in excavation of all soil with contaminant concentration above Track 1 Unrestricted Use SCOs and would:

- Eliminate the risk of ingestion exposures or other direct contact with contaminated on-Site soils consistent with remedial action objectives;
- Eliminate the risk of leaching into groundwater and ingestion exposures or direct contact with groundwater with contamination derived from the Site consistent with remedial action objectives; and
- Eliminate potential sources for on-Site production of soil vapors, and prevent migration of on-Site derived vapors into occupied structures and eliminate associated inhalation exposures consistent with remedial action objectives.

Potential post-remediation exposures to on-Site residents from soil vapors remain a concern since the volatile contaminants in groundwater originate from an off-Site source. This will be addressed by the installation of a vapor barrier and passive SSDS beneath the foundation of the new buildings' basement. However, in order to prevent the migration of soil vapor from off-Site sources into the proposed building and to prevent associated inhalation exposures, ECs/ICs are needed.

Alternative 2 will be protective of human health and the environment by excavating the front 90 feet of the Site lot down to the depth of approximately 11 feet for construction of the new building and excavation to a depth of approximately 2 feet below grade in the remaining 10 feet in the rear of the lot to ensure complete removal of soil from the rear yard that does not meet Track 4 Site-Specific SCOs. This would effectively remove all soil at the Site that exceeds Track 4 Site-Specific SCOs. The potential for human and environmental exposure to the elevated levels of metals present in the historic fill on-Site will be eliminated by excavation of all soils with parameters in excess of Track 4 Site-Specific SCOs, disposing of excavated materials off-Site and backfilling as needed with certified clean fill/topsoil. Potential post-remediation exposures to on-Site residents from soil vapors remain a concern since the volatile contaminants in groundwater originate from an off-Site source. This will be addressed by the installation of a vapor barrier and SSDS beneath the new building's basement foundation.

The Alternative 2 would achieve comparable protections of human health and the environment to Alternative 1 by removing soil/fill with contaminant concentrations above Track 4 Site-Specific SCOs as well as placement of ECs/ICs, including a composite cover system, vapor barrier, and passive SSDS. As such, this alternative would be consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Minimizing the potential for direct contact with contaminated on-Site soils by implementing an approved Soil and Materials Management Plan and CAMP during remediation;
- Minimizing the risk of contamination leaching into groundwater;
- Preventing direct contact with groundwater;

- Minimizing the potential for direct contact with contaminated on-Site soils once construction is complete by establishing a composite cover system over the entire Site and implementing ICs; and
- Preventing migration of soil vapors into occupied structures and associated inhalation exposures by installing a vapor barrier and passive SSDS, in conjunction with the composite cover system.

3.2. Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

Alternative 1 would address the chemical-specific SCGs for soil by establishment of Track 1 Unrestricted Use SCOs and attainment of these standards for on-Site soil. Alternative 2 would address the chemical-specific SCGs for soil through removal to Track 4 Site-Specific SCOs. Compliance with groundwater SCGs will not be affected by the remedial action, as the VOCs that were identified are not believed to be associated with an on-Site source. All potential sources for groundwater contamination will be removed as part of the remedial action. Compliance with SCGs for soil gas will be achieved under either Alternative without remedial action based on the laboratory results of the Remedial Investigation. However, Alternative 2 would address future soil vapor SCGs by mitigation against soil vapor intrusion through the use of ECs/ICs.

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 Alternative 1 and 2 would result in short-term impacts associated with excavation, handling, load out of materials, and truck traffic. The volume of soil to be removed is high in both alternatives but may be higher for the Track 1 alternative (Alternative 1) if deeper excavation was required in the rear yard to meet Track 1 Unrestricted Use SCOs. However, focused attention to means and methods during the remedial action during the removal action,

including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities.

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 ECs.

Alternative 1 would achieve long-term effectiveness and permanence related to on-Site contamination by permanently removing all impacted soils. However, without ECs/ICs, Alternative 1 would not prevent exposure to off-Site soil vapor contamination.

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs, establishing a composite cover system across the Site with a vapor barrier and passive SSDS, establishing use restrictions, establishing a SMP to ensure long-term management of ECs/ICs, and placing a deed restriction to memorialize these controls for the long term. Establishment of an SMP and a deed restriction will ensure that this protection remains effective for the long-term. The SMP will ensure long-term effectiveness of all ECs/ICs by requiring periodic inspection and certification that these controls and use 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.

Reduction of toxicity, mobility, or volume of contaminated material

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

and/or treatment, containment, elimination of exposure and treatment of source at the point of exposure. It is preferred to use treatment or removal to eliminate contaminants at a Site, reduce the total mass of toxic contaminants, cause irreversible reduction in contaminants mobility, or reduce of total volume of contaminated media.

Alternative 1 will permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil by meeting Track 1 Unrestricted Use SCOs. Alternative 2 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil to a maximum depth of approximately 11 feet bgs for the front 90 feet of the lot, and any remaining soil/fill remaining beneath the new building or below the composite cover system in the rear yard would meet Track 4 Site-Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site, if additional soil excavation was required in the rear yard.

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. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

The use of a vapor barrier is a common, highly effective method of preventing vapor intrusion when combined with a depressurization, venting or positive pressure system. The installation of a vapor barrier and SSDS beneath the entire basement slab of the new building is easily implemented during building construction.

Cost effectiveness

This evaluation criterion addresses the cost of alternatives, including capital costs (such as

construction costs, equipment costs, and disposal costs, engineering expenses) and Site management costs (costs incurred after remedial construction is complete) necessary to ensure the continued effectiveness of a remedial action.

Costs associated with Alternative 1 are estimated at approximately \$150,000. This cost estimate includes the following elements and assumptions:

- Excavate to a depth of 11 ft within a 2,250 ft² area for the new building and excavation to a depth of 2 feet (estimated) with a 250 ft² area for the rear yard;
- Install additional shoring beyond that required for building construction;
- Disposal of 950 cy (1,300 tons) of excavated soil as nonhazardous;
- Backfilling with certified or virgin materials;
- Installation of a vapor barrier and SSDS beneath the building's basement slab foundation.
- HASP and CAMP monitoring for the duration of the remedial activities.

Costs associated with Alternative 2 are estimated at approximately \$100,000. This cost estimate includes the following elements and assumptions:

- Excavate to a depth of 11 ft within a 2,250 ft² area and within a 250 ft² area to a depth at which soil meets Track 4-Site Specific SCOs;
- Disposal of 950 cy (1,300 tons) of excavated soil as nonhazardous;
- Backfilling with certified or virgin materials;
- Installation of a vapor barrier and SSDS beneath the building's basement slab foundation.
- HASP and CAMP monitoring for the duration of the remedial activities.

The costs associated with the Alternative 1 would be marginally higher than Alternative 2 if a higher volume of soil/fill is required to be excavated for off-Site disposal to achieve a Track 1 status over the entire Site. Alternative 2 would have higher long term Site management costs due to the requirement for periodic inspections.

Community Acceptance

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

This RAWP will be subject to a 30-day public comment period to determine if the community has any comments on the presented remedial alternatives and selected remedy. Public comments are will be considered by OER during the plan approval process. Both remedial approaches involve substantial elimination of contaminated media and are expected to be acceptable to the community.

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 ICs applicable to the Site.

The proposed redevelopment of the Site is compatible with its current M1-2/R6A zoning. Following remediation, the Site will meet either Track 1 Unrestricted Use SCOs or Track 4 Site-Specific SCOs which is appropriate for its planned residential use. However, the Track 1 alternative does not allow ECs or ICs that would provide protection against off-Site vapor migration which would be needed for residential use.

Sustainability of the Remedial Action

This criterion evaluates the overall sustainability of the remedial action alternatives and the degree to which sustainable means are employed to implement the remedial action including those that take into consideration NYC's sustainability goals defined in *PlaNYC: A Greener, Greater New York*. Sustainability goals may include: maximizing the recycling and reuse of non-virgin materials; reducing the consumption of virgin and non-renewable resources; minimizing

energy consumption and greenhouse gas emissions; improving energy efficiency; and promotion of the use of native vegetation and enhancing biodiversity during landscaping associated with Site development.

Sustainability considerations under Alternatives 1 and 2 would consist of disposal of affected soil at a facility which recycles it for use in asphalt or other construction materials following processing to remove or stabilize contaminants. Alternatives 1 and 2 would also seek to utilize recycled materials such as recycled concrete aggregate (RCA) for backfilling where feasible.

4.0 REMEDIAL ACTION

4.1 Summary of Preferred Remedial Action

The preferred remedial action alternative is Alternative 2, 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:

Site-Specific remedial elements

1. Preparation of a Community Protection Statement and implementation of a Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track 4 Site-Specific SCOs.
4. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs.
5. Collection and analysis of end-point samples to determine whether Track 1 Unrestricted Use or Track 4 Site-Specific SCOs are achieved.
6. Construction and maintenance of an engineered composite cover across the entire Site, consisting of the new building's concrete slab and rear concrete patio, to prevent human exposure to residual soil/fill remaining under the Site.
7. Installation of a vapor barrier system beneath the foundation and sidewalls.
8. Installation and operation of a passive sub-slab depressurization system.
9. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
10. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.

11. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of any contaminated media on-Site.
12. Removal of underground storage tanks and closure of petroleum spills (if encountered) in compliance with applicable local, State and Federal laws and regulations.
13. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
14. 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.
15. Demarcation of residual soil/fill.
16. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
17. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
18. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, and lists any changes from this RAWP.
19. If Track 1 Unrestricted Use SCOs are not achieved, submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual historic fill, including plans for inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
20. If Track 1 Unrestricted Use SCOs are not achieved, recording of a Declaration of Covenants and Restrictions that includes a listing of Engineering Controls and a requirement that management of these controls must be in compliance with an approved SMP; and Institutional Controls including prohibition of the following: (1) vegetable gardening and farming; (2) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (3) 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 Track 4 Site-Specific SCOs are:

| <u>Contaminant</u> | <u>Track 4 SCOs</u> |
|--------------------|---------------------|
| Total SVOCs | 250 ppm |
| Lead | 1200 ppm |
| Barium | 750 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 **Appendix D**. The front 90 feet of the lot will be excavated to a depth of approximately 11 feet for construction of the new building. The remaining 10 feet in the rear yard will be excavated to a depth required to obtain Track 4 Site-Specific SCOs or Track 1 Unrestricted Use SCOs. 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 1,300 tons.

The proposed disposal locations for Site-derived impacted materials are listed below. Additional disposal locations established at a later date will be reported promptly to the OER Project Manager.

| Disposal Facility | Waste Type | Estimated Quantities |
|--|-----------------------------|----------------------|
| Clean Earth of Carteret, Carteret, NJ | Historic fill | 0 to 1,300 tons |
| Clean Earth of North Jersey, Kerny NJ | Historic Fill | 0 to 1,300 tons |
| Soil Safe Inc. Logan, NJ | Historic Fill | 0 to 1,300 tons |
| 110 Landfill Bethpage, NY | Historic Fill Clean Soil | 0 to 1,300 tons |

End-Point Sampling

Remedial actions under this plan will be performed in conjunction with remedial performance end-point sampling. 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, samples will be collected and analyzed for SVOCs and TAL Metals (Lead and Barium only). For areas where Track 1 Unrestricted Use SCOs are pursued, endpoint samples will be analyzed for the full list of VOCs, SVOCs, PCBs, Pesticides, and Metals.

The laboratory results of the two deep soil samples collected during the RI indicate soil at the final excavation depth for the proposed building meets Track 4 Site-Specific SCOs. Therefore, the two soil samples collected from within the proposed building's footprint are suitable for use as endpoint soil samples. However, the 25 foot wide by 10 foot long rear yard will only be excavated to a depth necessary to obtain either Track 4 Site-Specific SCOs or Track 1 Unrestricted Use SCOs, and end point sampling will be necessary to determine if either the Track 4 Site-Specific SCOs or Track 1 Unrestricted Use SCOs have been met. If Track 1 Unrestricted Use SCOs are pursued for the entire Site, three endpoint soil samples will be collected from the locations shown on Figure 8.

Additional endpoint sampling will also be performed if a hotspot is identified during remedial action or construction. If hotspots are identified during the remedial action or construction, hotspot removal actions under this plan will be performed in conjunction with remedial end-point sampling. End-point sampling for any hot spots identified during the remedial action or construction will consist of the following frequency:

1. For excavations less than 20 feet in total perimeter, at least one bottom sample and one sidewall sample biased in the direction of surface runoff.
2. For excavations 20 to 300 feet in perimeter:
 - For surface removals, one sample from the top of each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of bottom area.
 - For subsurface removals, one sample from each sidewall for every 30 linear feet of sidewall and one sample from the excavation bottom for every 900 square feet of

- bottom area.
3. For sampling of volatile organics, bottom samples should be taken within 24 hours of excavation, and should be taken from the zero to six-inch interval at the excavation floor. Samples taken after 24 hours should be taken at six to twelve inches.
 4. For contaminated soil removal, post remediation soil samples for laboratory analysis should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

Post-remediation 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 for hot-spot endpoint samples may include any of the following groups of compounds depending on the type of hot-spot identified:

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

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

Quality Assurance/Quality Control

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

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°C.

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

- Gently tap or scrape to remove adhered soil
- Rinse with tap water
- Wash withalconox® 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 onsite will be performed in conformance with the Soil/Materials Management Plan in **Appendix D**. The estimated quantity

of soil to be imported into the Site for backfill and cover soil is 0 tons. The estimated quantity of onsite soil/fill expected to be reused/relocated on Site is 0 tons.

4.3 Engineering Controls

Engineering Controls (ECs) will be employed in the remedial action to address residual contamination remaining at the Site. The Site has 3 primary Engineering Control Systems. These are:

- composite cover system
- waterproofing membrane / vapor barrier
- sub-slab depressurization system

Composite Cover System

Exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system is comprised of:

- the 4" thick concrete building slab and a 4" thick concrete rear patio.

Figure 5 shows the typical design and location for each remedial cover type used on this Site.

The composite cover system is a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the SMP. A Soil Management Plan will be included in the Site Management Plan and will outline the procedures to be followed in the event that the composite cover system and underlying residual soil/fill is disturbed after the remedial action is complete. Maintenance of this composite cover system will be described in the Site Management Plan in the RAR.

Vapor Barrier

Migration of soil vapor will be mitigated with a combination of the building slab, SSDS and vapor barrier.

A high density polyethylene vapor barrier liner (HPDE) will be installed over the SSDS prior to pouring the building's concrete slab. The vapor barrier will consist of a 20 mil HDPE geomembrane liner manufactured by GSE Lining Technologies of North America, or equivalent.

The vapor barrier will extend throughout the area occupied by the footprint of the new building which is to be constructed at the Site. 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. Sidewalls of the building's basement level foundation will be sealed using either 60 mil (minimum thickness) Procor 75 sealant as manufactured by Grace, and/or 20 mil HDPE geomembrane liner manufactured by GSE Lining Technologies of North America, or equivalent.

The extent of the proposed vapor barrier membrane is provided in Figure 7 (ENV-002.01). Installation details (penetrations, joints, etc.) with respect to the proposed building foundation, footings, slab, and sidewalls are provided in Figure 6 (ENV-001-02). Product specification sheets are provided in Appendix G. The Remedial Action 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.

Sub-Slab Depressurization

Migration of soil vapor will be mitigated with the construction of a passive sub-slab depressurization system.

An SSDS beneath the basement slab (2,125 ft²) will consist of a single venting zone in accordance with USEPA sub-slab depressurization design specifications which recommend a separate vent loop for every 4,000 ft² of slab area. A layout of the SSDS is provided as **Figure 6** (ENV-002-01). Design details of the SSDS are provided as **Figure 7** (ENV-002.01).

The horizontal vent line is constructed of a continuous loop of perforated 4-inch HDPE smooth interior pipe fitted with a filter sock. Fill material around the horizontal vent piping will be RCA or virgin-mined, ½ inch to ¾ inch gravel. The horizontal pipe will extend to an adjacent utility chase-way where it will be piped to the roof via a 6-inch schedule 40 PVC line.

The passive sub-slab depressurization system is designed to ventilate vapors to the building exterior and prevent vapor accumulation beneath the slab. The Remedial Action Report will

include photographs of the installation of SSDS piping as well as if any deviations which may have occurred due to construction scope changes.

4.4 Institutional Controls

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

ICs for this remedial action are:

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the Site Management Plan, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;
- Submittal of a Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted annually and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;

- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for residential use and will not be used for a higher level of use without prior approval by OER.

4.5 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by the DCR and 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 DCR and the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the Brownfield Cleanup Agreement with OER. This includes a plan for: (1) implementation of EC's and ICs; (2) implementation of monitoring programs; (3) operation and maintenance of EC's; (4) inspection and certification of EC's; and (5) reporting.

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

4.6 Qualitative Human Health Exposure Assessment

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 BCP 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 was 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 is present at the Site to a depth of approximately 2 feet below grade. The laboratory results of soil samples collected of the fill material noted the metals barium and lead at a concentration above Restricted Residential SCOs within one of the shallow (0 to 2 feet) soil samples collected at the Site. Five additional metals were detected within the same shallow soil sample at a concentration above Unrestricted Use SCOs. One of the two deep (10 to 12 feet) soil samples contained nickel and copper at a concentration above Unrestricted Use SCOs, but below Restricted Residential SCOs.

The chlorinated VOCs tetrachloroethene (PCE) and trichloroethene (TCE) were detected within the groundwater sample collected at the Site at a concentration above GQS. No other VOCs were detected at a concentration above GQS. PCE and TCE were not detected in any of the four soil samples collected at the Site. Therefore, the two compounds likely originate from an off-Site source. Although both PCE and TCE were detected within both soil gas samples collected at a depth of approximately 12 feet, the concentrations were below NYSDOH minimum detection levels. The results of soil gas samples indicated low concentrations of VOCs typically associated with background levels in an urban setting.

Nature, Extent, Fate and Transport of Contaminants

Historic fill is present throughout the Site from surface grade to a depth of at least 12 feet below the surface. Most of this material will be removed and managed under the proposed remediation and redevelopment of the Site.

Potential Routes of Exposure

Potential On-Site Exposures: An exposure route is the mechanism by which a receptor comes into contact with a chemical. Three potential primary routes exist by which chemicals can enter the body:

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

Construction workers engaged in excavation of soils at the Site for the installation of basement level foundation of the new building may be exposed through ingestion and dermal contact from handling of soil/fill containing metals and low concentrations of SVOCs.

Land Use of the Site and Neighboring Properties - Current and Future

Currently, the 2,500 ft² Site, is utilized for mixed-use (commercial/residential). The immediate area surrounding the Site is mixed commercial/residential, and is anticipated to remain as such. The proposed future use of the Site consists of a new 6-story residential building with a basement level that will be used for storage and mechanical rooms.

On-Site Receptors - The current on-Site potential sensitive receptors include adult and child visitors, construction workers, pedestrians, and trespassers. The proposed redevelopment of the Site includes the construction of a six-story residential building with a basement. During redevelopment of the Site, the on-Site potential receptors will include construction workers and adult visitors. Once the Site is redeveloped, the on-Site potential receptors will include: building residents including adults, children 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

Existence of Human Health Exposure

Based upon this analysis, there are two future potential exposure pathways: 1) direct exposure to on-Site soils and dust from on-Site soils; and 2) exposure to soil vapors. Potential on-Site receptors include adult and child visitors, construction workers, trespassers and commercial workers. The potential off-site receptors are adult and child pedestrians and residents. The primary route of exposure would be inhalation and dermal contact on-site and inhalation off-site. During remedial construction, on-site and off-site exposures to contaminated dust from historic fill will be addressed through dust controls, and through the implementation of the community air monitoring program and a construction health and safety plan.

After the remedial action is complete, there will be no remaining exposure pathways. The composite cover and long-term site management will interrupt any remaining exposure pathways. The vapor barrier and sub-slab depressurization system will prevent the accumulation of vapors beneath the new building's basement slab and prevent the migration of vapors into the new building. Continued protection after the remedial action will be achieved by the implementation of site management including periodic inspection and certification of the performance of remedial controls.

Overall Human Health Exposure Assessment

Based upon this analysis, there is currently limited potential for exposure pathways due to the cover on majority of the Site.

During remedial construction, on-Site and off-Site exposures to contaminated dust from contaminated fill will be addressed through dust controls, and through the implementation of the community air-monitoring program and a construction health and safety plan.

After the remedial action is complete, there will be no remaining exposure pathways. The composite cover and long-term site management will interrupt any remaining exposure pathways. The vapor barrier and sub-slab depressurization system will prevent the accumulation of vapors beneath the new building's basement slab and prevent the migration of vapors into the new building. Continued protection after the remedial action will be achieved by the

implementation of site management including periodic inspection and certification of the performance of remedial controls.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

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

5.2 Site Security

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

5.3 Work Hours

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

5.4 Construction Health and Safety Plan

The Health and Safety Plan is included in **Appendix E**. 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 ($\mu\text{g}/\text{m}^3$) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \mu\text{g}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \mu\text{g}/\text{m}^3$ above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \mu\text{g}/\text{m}^3$ 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 in compliance with applicable laws and regulations to assure safety. Utility companies and other responsible authorities will be contacted to locate and mark the locations, and a copy of the Markout Ticket will be retained by the contractor prior to the start of drilling, excavation or other invasive subsurface operations. Overhead utilities may also be present within the anticipated work zones. Electrical hazards associated with drilling in the vicinity of overhead utilities will be prevented by maintaining a safe distance between overhead power lines and drill rig masts.

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

Equipment and Material Staging

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

Stabilized Construction Entrance

Steps will be taken to ensure that trucks departing the site will not track soil, fill or debris off-Site. Such actions may include use of cleaned asphalt or concrete roads or use of stone or other aggregate-based egress paths between the truck inspection station and the property exit. Measures will be taken to ensure that adjacent roadways will be kept clean of project related soils, fill and debris.

Truck Inspection Station

An outbound-truck inspection station will be set up close to the Site exit. Before exiting the

NYC VCP Site, trucks will be required to stop at the truck inspection station and will be examined for evidence of contaminated soil on the undercarriage, body, and wheels. Soil and debris will be removed. Brooms, shovels and potable water will be utilized for the removal of soil from vehicles and equipment, as necessary.

5.8 Traffic Control

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is the following; continue north on Bedford Avenue. Make the second left to head west on Flushing Avenue. Follow the signs for the Brooklyn-Queens Expressway (I-278) east or west.

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.

5.13 Data Usability Summary report

The primary objective of a Data Usability Summary Report (DUSR) is to determine whether or not data meets the site specific criteria for data quality and data use. The DUSR provides an evaluation of analytical data without third party data validation. The DUSR for post-remedial samples collected during implementation of this RAWP will be included in the Remedial Action Report (RAR).

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.
- Recorded Declaration of Covenants and Restrictions.
- 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 1 month remediation period is anticipated.

| Schedule Milestone | Weeks from Remedial Action Start | Duration (weeks) |
|--|---|-------------------------|
| OER Approval of RAWP | 0 | - |
| Mobilization | 1 | |
| Remedial Excavation | 1 | 2 |
| Demobilization | 3 | 1 |
| Record Declaration of Covenants and Restrictions | 16 | |
| Submit Remedial Action Report | 16 | |

TABLES

TABLE 1

TABLE 1 - Imported Backfill and Clean Soil Limits

All values are listed in parts per million (ppm)

| Contaminant | Unrestricted | Residential | Restricted - Residential | Restricted - Commercial or Industrial |
|---------------------------|--------------|-------------|--------------------------|---------------------------------------|
| Metals | | | | |
| Arsenic | 13 | 16 | 16 | 16 |
| Barium | 350 | 350 | 400 | 400 |
| Beryllium | 7.2 | 14 | 47 | 47 |
| Cadmium | 2.5 | 2.5 | 4.3 | 7.5 |
| Chromium, Hexavalent | 1 | 19 | 19 | 19 |
| Chromium, Trivalent | 30 | 36 | 180 | 1500 |
| Copper | 50 | 270 | 270 | 270 |
| Cyanide | 27 | 27 | 27 | 27 |
| Lead | 63 | 400 | 400 | 450 |
| Manganese | 1600 | 2000 | 2000 | 2000 |
| Mercury (total) | 0.18 | 0.73 | 0.73 | 0.73 |
| Nickel | 30 | 130 | 130 | 130 |
| Selenium | 3.9 | 4 | 4 | 4 |
| Silver | 2 | 8.3 | 8.3 | 8.3 |
| Zinc | 109 | 2200 | 2480 | 2480 |
| PCBs/Pesticides | | | | |
| 2,4,5-TP Acid (Silvex) | 3.8 | 3.8 | 3.8 | 3.8 |
| 4,4'-DDE | 0.0033 | 1.8 | 8.9 | 17 |
| 4,4'-DDT | 0.0033 | 1.7 | 7.9 | 47 |
| 4,4'-DDD | 0.0033 | 2.6 | 13 | 14 |
| Aldrin | 0.005 | 0.019 | 0.097 | 0.19 |
| Alpha-BHC | 0.02 | 0.02 | 0.02 | 0.02 |
| Beta-BHC | 0.036 | 0.072 | 0.09 | 0.09 |
| Chlordane (alpha) | 0.094 | 0.91 | 2.9 | 2.9 |
| Delta-BHC | 0.04 | 0.25 | 0.25 | 0.25 |
| Dibenzofuran | 7 | 14 | 59 | 210 |
| Dieldrin | 0.005 | 0.039 | 0.1 | 0.1 |
| Endosulfan I | 2.4 | 4.8 | 24 | 102 |
| Endosulfan II | 2.4 | 4.8 | 24 | 102 |
| Endosulfan sulfate | 2.4 | 4.8 | 24 | 200 |
| Endrin | 0.014 | 0.06 | 0.06 | 0.06 |
| Heptachlor | 0.042 | 0.38 | 0.38 | 0.38 |
| Lindane | 0.1 | 0.1 | 0.1 | 0.1 |
| Polychlorinated biphenyls | 0.1 | 1 | 1 | 1 |

TABLE 1 - Imported Backfill and Clean Soil Limits (cont')

All values are listed in parts per million (ppm)

| Contaminant | Unrestricted | Residential | Restricted - Residential | Restricted - Commercial or Industrial |
|---------------------------------------|--------------|-------------|--------------------------|---------------------------------------|
| Semivolatile Organic Compounds | | | | |
| Acenaphthene | 20 | 98 | 98 | 98 |
| Acenaphthylene | 100 | 100 | 100 | 107 |
| Anthracene | 100 | 100 | 100 | 500 |
| Benzo(a)anthracene | 1 | 1 | 1 | 1 |
| Benzo(a)pyrene | 1 | 1 | 1 | 1 |
| Benzo(b)fluoranthene | 1 | 1 | 1 | 1.7 |
| Benzo(g,h,i)perylene | 100 | 100 | 100 | 500 |
| Benzo(k)fluoranthene | 0.8 | 1 | 1.7 | 1.7 |
| Chrysene | 1 | 1 | 1 | 1 |
| Dibenz(a,h)anthracene | 0.33 | 0.33 | 0.33 | 0.56 |
| Fluoranthene | 100 | 100 | 100 | 500 |
| Fluorene | 30 | 100 | 100 | 386 |
| Indeno(1,2,3-cd)pyrene | 0.5 | 0.5 | 0.5 | 5.6 |
| m-Cresol(s) | 0.33 | 0.33 | 0.33 | 0.33 |
| Naphthalene | 12 | 12 | 12 | 12 |
| o-Cresol(s) | 0.33 | 0.33 | 0.33 | 0.33 |
| p-Cresol(s) | 0.33 | 0.33 | 0.33 | 0.33 |
| Pentachlorophenol | 0.8 | 0.8 | 0.8 | 0.8 |
| Phenanthrene | 100 | 100 | 100 | 500 |
| Phenol | 0.33 | 0.33 | 0.33 | 0.33 |
| Pyrene | 100 | 100 | 100 | 500 |
| Volatile Organic Compounds | | | | |
| 1,1,1-Trichloroethane | 0.68 | 0.68 | 0.68 | 0.68 |
| 1,1-Dichloroethane | 0.27 | 0.27 | 0.27 | 0.27 |
| 1,1-Dichloroethene | 0.33 | 0.33 | 0.33 | 0.33 |
| 1,2-Dichlorobenzene | 1.1 | 1.1 | 1.1 | 1.1 |
| 1,2-Dichloroethane | 0.02 | 0.02 | 0.02 | 0.02 |
| 1,2-Dichloroethene(cis) | 0.25 | 0.25 | 0.25 | 0.25 |
| 1,2-Dichloroethene(trans) | 0.19 | 0.19 | 0.19 | 0.19 |
| 1,3-Dichlorobenzene | 2.4 | 2.4 | 2.4 | 2.4 |
| 1,4-Dichlorobenzene | 1.8 | 1.8 | 1.8 | 1.8 |
| 1,4-Dioxane | 0.1 | 0.1 | 0.1 | 0.1 |
| Acetone | 0.05 | 0.05 | 0.05 | 0.05 |
| Benzene | 0.06 | 0.06 | 0.06 | 0.06 |
| Butylbenzene | 12 | 12 | 12 | 12 |
| Carbon tetrachloride | 0.76 | 0.76 | 0.76 | 0.76 |
| Chlorobenzene | 1.1 | 1.1 | 1.1 | 1.1 |
| Chloroform | 0.37 | 0.37 | 0.37 | 0.37 |

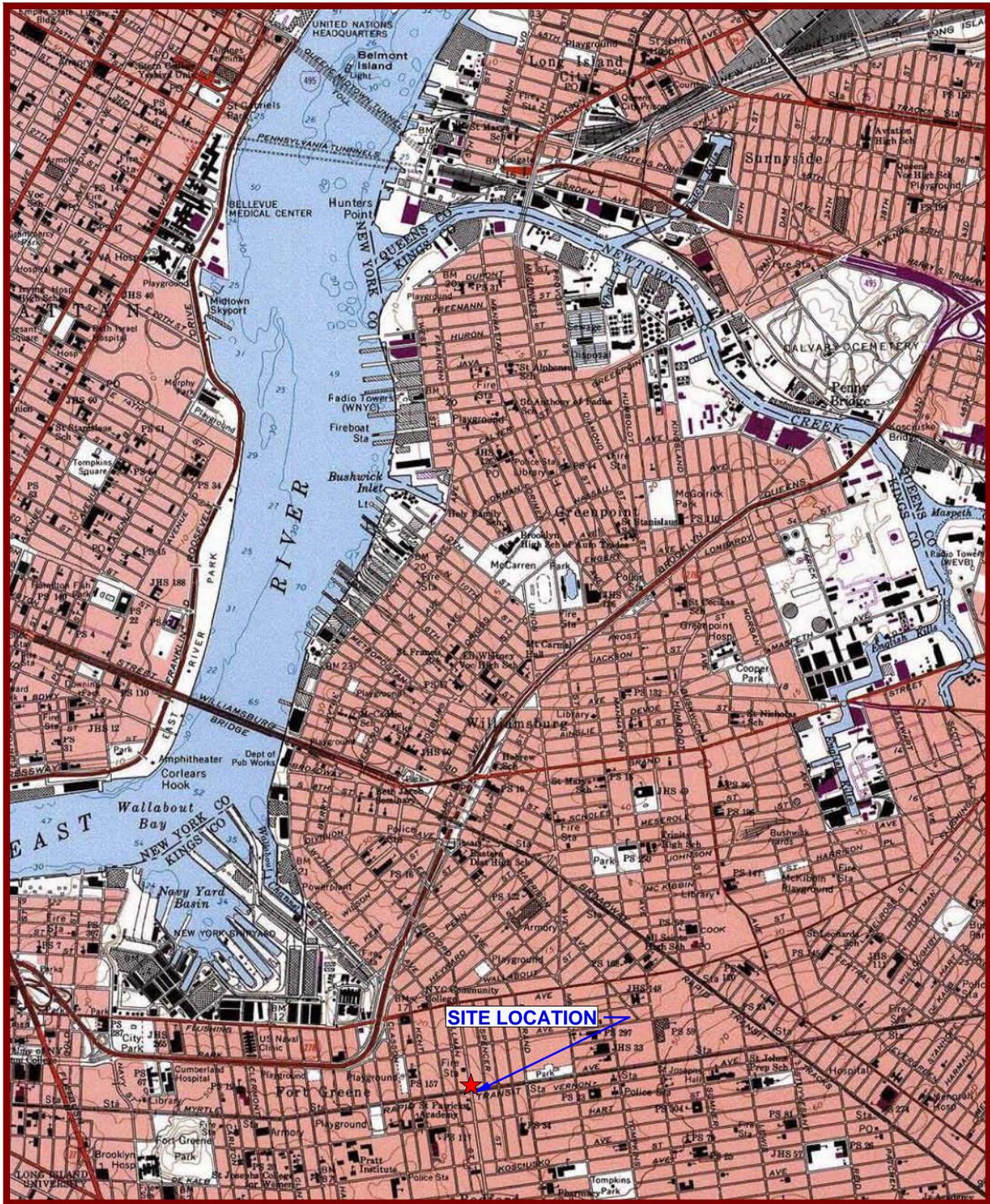
TABLE 1 - Imported Backfill and Clean Soil Limits (cont')
 All values are listed in parts per million (ppm)

| Contaminant | Unrestricted | Residential | Restricted - Residential | Restricted - Commercial or Industrial |
|---|--------------|-------------|--------------------------|---------------------------------------|
| Volatile Organic Compounds (cont') | | | | |
| Ethylbenzene | 1 | 1 | 1 | 1 |
| Hexachlorobenzene | 0.33 | 0.33 | 1.2 | 3.2 |
| Methyl ethyl ketone | 0.12 | 0.12 | 0.12 | 0.12 |
| Methyl tert-butyl ether | 0.93 | 0.93 | 0.93 | 0.93 |
| Methylene chloride | 0.05 | 0.05 | 0.05 | 0.05 |
| Propylbenzene-n | 3.9 | 3.9 | 3.9 | 3.9 |
| Sec-Butylbenzene | 11 | 11 | 11 | 11 |
| Tert-Butylbenzene | 5.9 | 5.9 | 5.9 | 5.9 |
| Tetrachloroethene | 1.3 | 1.3 | 1.3 | 1.3 |
| Toluene | 0.7 | 0.7 | 0.7 | 0.7 |
| Trichloroethene | 0.47 | 0.47 | 0.47 | 0.47 |
| Trimethylbenzene-1,2,4 | 3.6 | 3.6 | 3.6 | 3.6 |
| Trimethylbenzene-1,3,5 | 8.4 | 8.4 | 8.4 | 8.4 |
| Vinyl chloride | 0.02 | 0.02 | 0.02 | 0.02 |
| Xylene (mixed) | 0.26 | 1.6 | 1.6 | 1.6 |

NOTES:

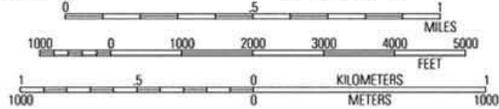
- 1) Allowable values for imported soils are derived from 6NYCRR Part 375 Table 6.8(b) Soil Cleanup Objectives and is determined by comparing the use-based Protection of Public Health value (based on the site's achieved cleanup track) with the Protection of Groundwater value and selecting the lower of the two (for sites with no ecological resources).
- 2) The SCO for Hexavalent or Trivalent Chromium is considered to be met if the analysis for the total species of this contaminant is below the specific SCO for Hexavalent Chromium.
- 3) The following material may be imported, without chemical testing, to be used as backfill beneath pavement or the final soil cover (i.e. the uppermost 1 or 2 feet, depending on the site's use restriction): a) - Rock or stone, consisting of virgin material from a permitted mine or quarry; b) - Recycled concrete, brick or asphalt from a NYSDEC-registered C&D processing facility which conforms to Section 304 of the New York State Department of Transportation Standard Specifications Construction and Materials Volume 1 (2002). This material must contain less than 10% (by weight) material which would pass through a size 200 sieve.

FIGURES



40°45.000' N
40°44.000' N
40°43.000' N
40°42.000' N

73°59.000' W 73°58.000' W 73°57.000' W WGS84 73°56.000' W



13°
06/04/11

USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

EBC
ENVIRONMENTAL BUSINESS CONSULTANTS

Phone 631.504.6000
Fax 631.924.2870

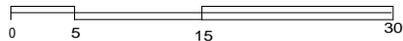
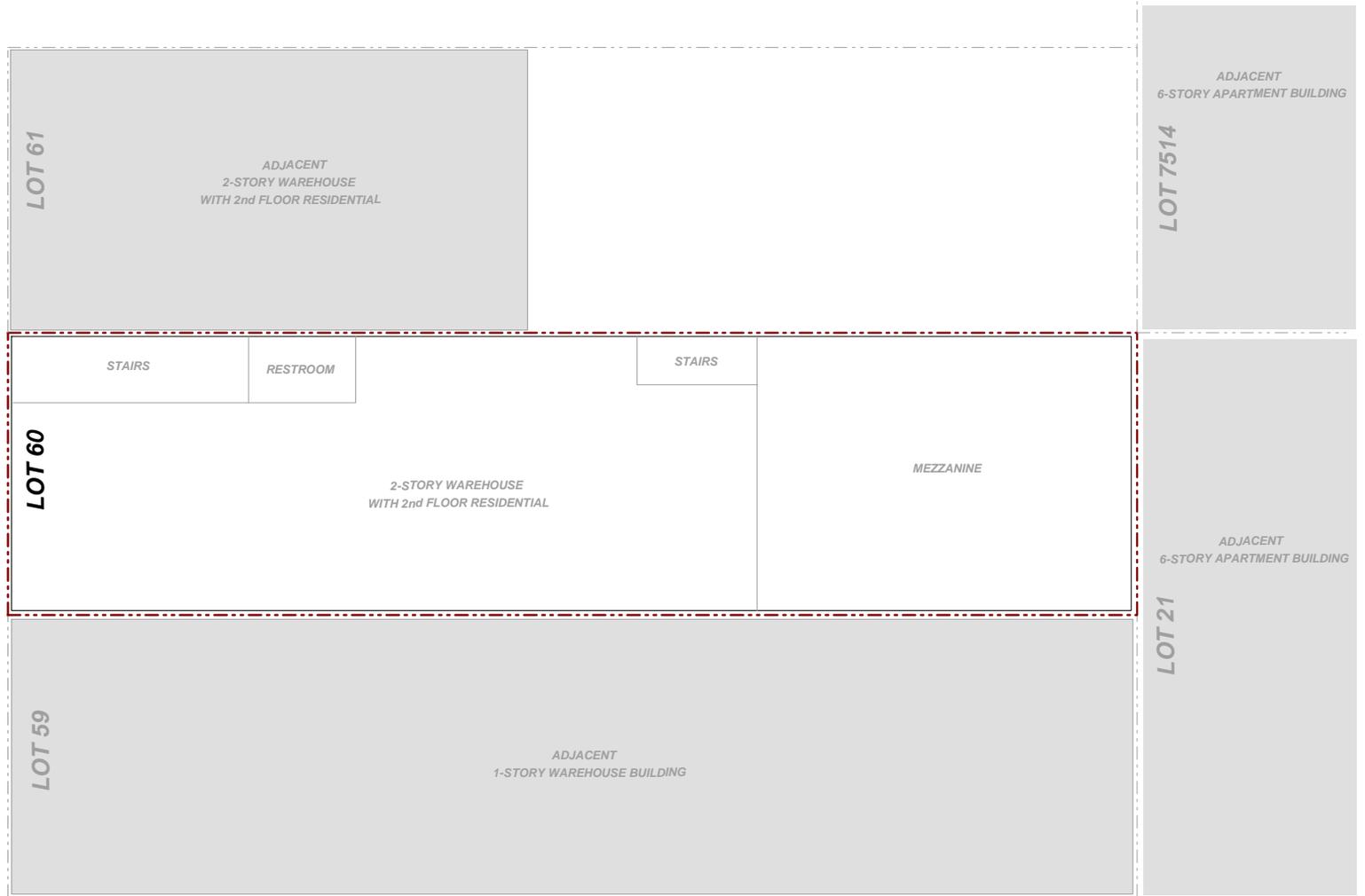
821 BEDFORD AVENUE, BROOKLYN, NY
BLOCK 1734 LOT 60

FIGURE 1 **SITE LOCATION MAP**

BEDFORD AVENUE



SIDEWALK



1 inch = 15 feet

--- Site Boundary



ENVIRONMENTAL BUSINESS CONSULTANTS

1808 MIDDLE COUNTRY ROAD, RIDGE, NY 11961

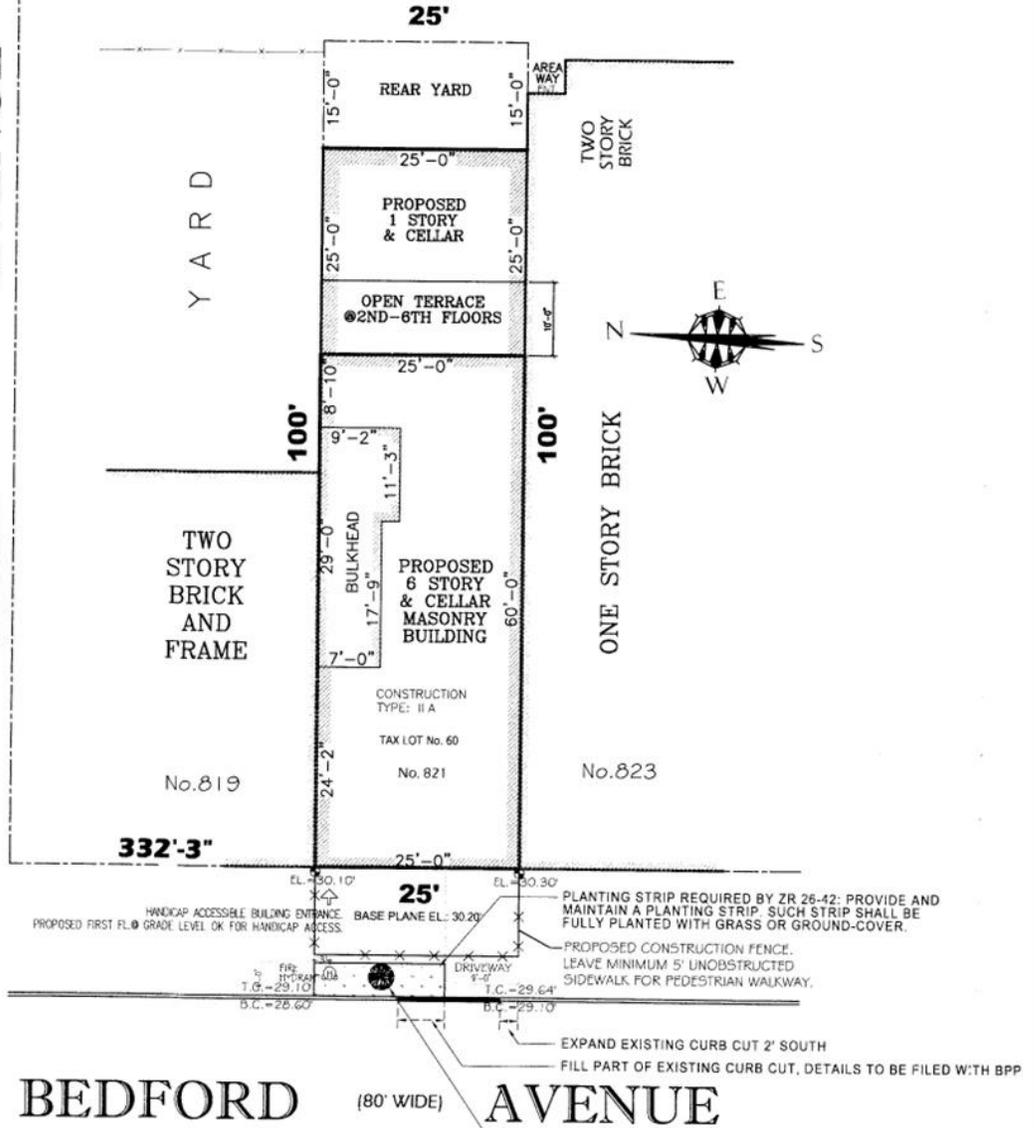
Phone 631.504.6000

Fax 631.924.2780

821 BEDFORD AVENUE
BROOKLYN, NY

FIGURE 2 - SITE BOUNDARY

PARK AVENUE
(70' WIDE)



BEDFORD AVENUE
(80' WIDE)

NOTE:
(ZR 26-41) 1 STREET TREE SHALL BE PROVIDED FOR EVERY 25' OF STREET FRONTAGE OF THE ZONING LOT. LOT FRONTAGE: 25'-0", THEREFORE 1 TREE REQUIRED. PROPOSED: 1 TREE. EXACT LOCATION TO BE DETERMINED BY THE DEPARTMENT OF PARKS AND RECREATION. FOR TREE PLANTING DETAIL SEE SHEET. A-400

PROPOSED PLOT PLAN

IBC
ENVIRONMENTAL BUSINESS CONSULTANTS
1808 MIDDLE COUNTRY ROAD, RIDGE, NY 11961

Phone 631.504.6000
Fax 631.924.2780

821 BEDFORD AVENUE
BROOKLYN, NY

FIGURE 3 REDEVELOPMENT PLAN



FIGURE 4
SURROUNDING LAND USE MAP

821 BEDFORD AVENUE, BROOKLYN, NY
 HAZARDOUS MATERIALS REMEDIAL INVESTIGATION REPORT



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

BEDFORD AVENUE



SIDEWALK

LOT 61

LOT 21

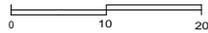
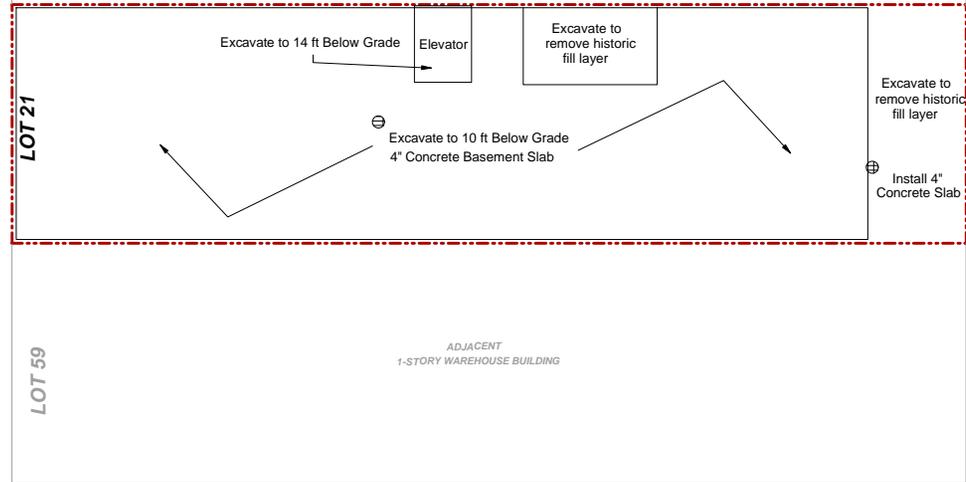
LOT 59

ADJACENT
2-STORY WAREHOUSE
WITH 2nd FLOOR RESIDENTIAL

LOT 7514

LOT 7506

ADJACENT
1-STORY WAREHOUSE BUILDING



1 inch = 20 feet

⊕ Existing Floor Drain



ENVIRONMENTAL BUSINESS CONSULTANTS

1808 MIDDLE COUNTRY ROAD, RIDGE, NY 11961

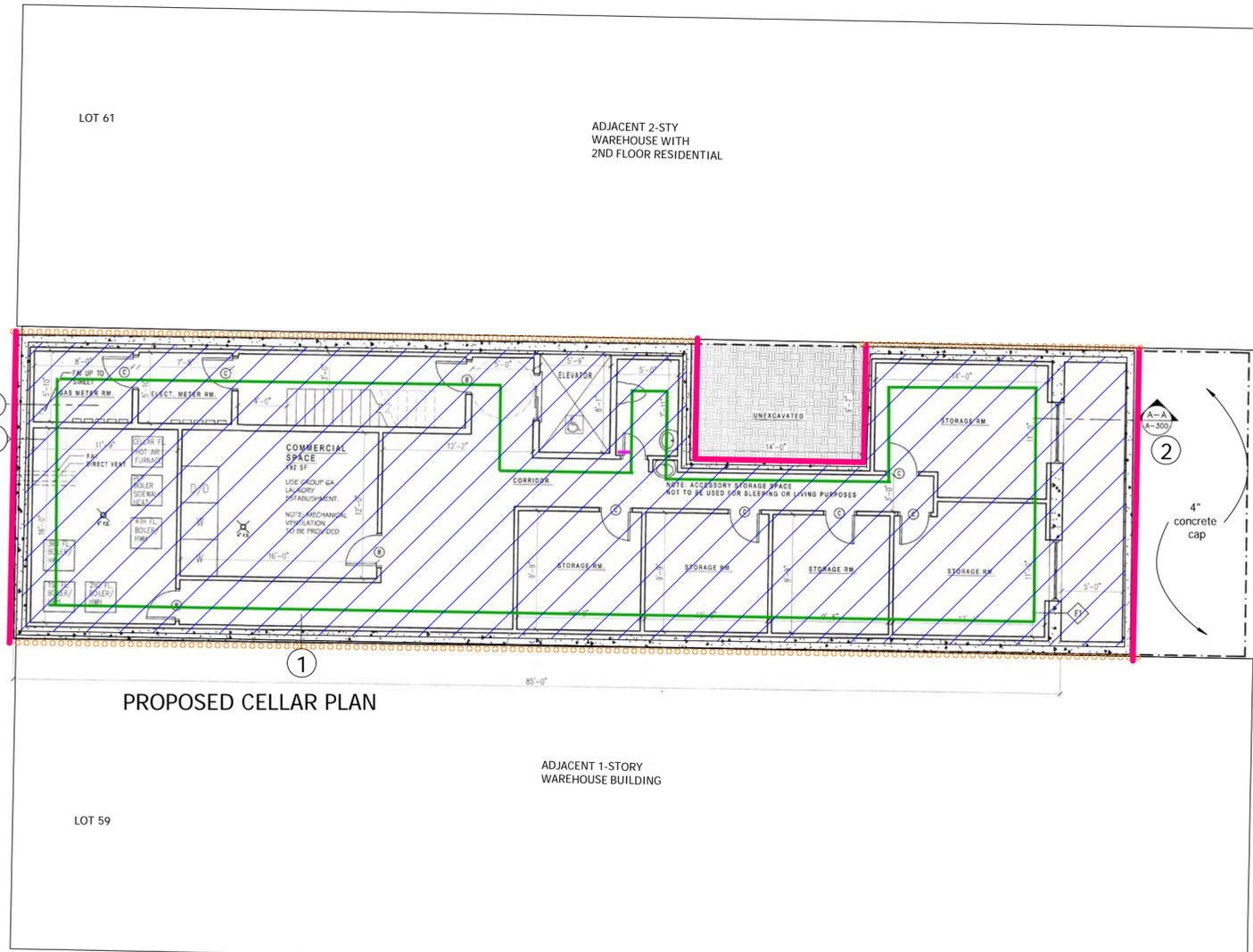
Phone 631.504.6000

Fax 631.924.2780

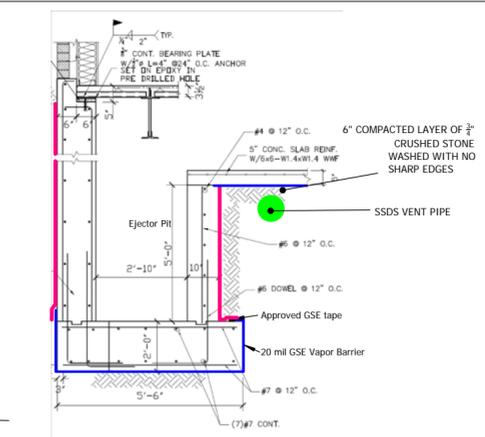
821 BEDFORD AVENUE, BROOKLYN, NY

FIGURE 5 EXCAVATION & CAPPLING PLAN

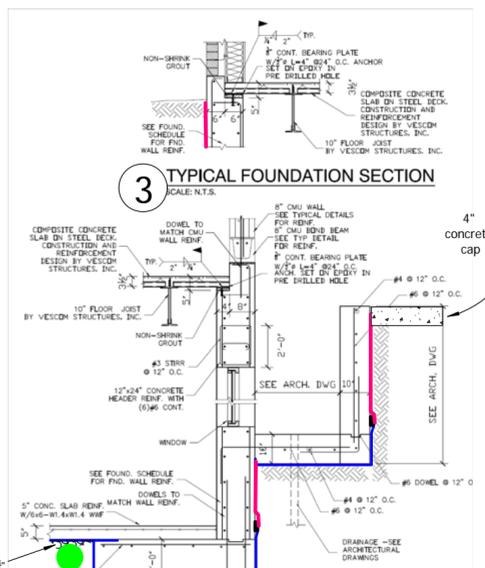
BEDFORD AVENUE



PROPOSED CELLAR PLAN



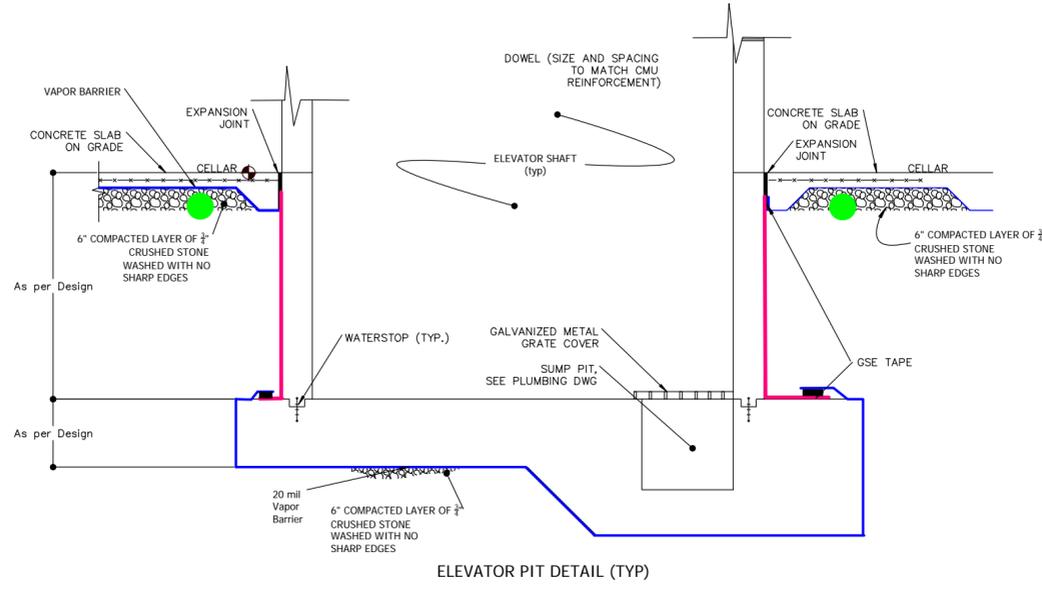
4 TYPICAL FOUNDATION SECTION
SCALE: N.T.S.



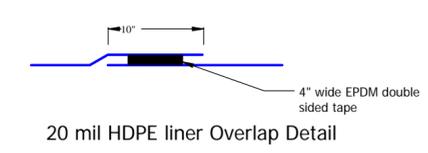
3 TYPICAL FOUNDATION SECTION
SCALE: N.T.S.



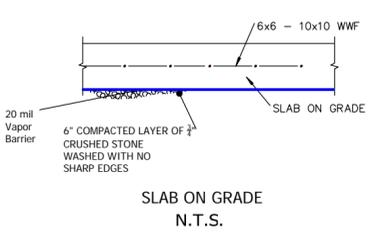
2 TYPICAL FOUNDATION SECTION
SCALE: N.T.S.



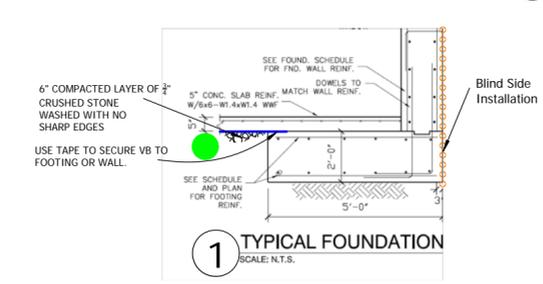
ELEVATOR PIT DETAIL (TYP)



20 mil HDPE liner Overlap Detail



SLAB ON GRADE
N.T.S.



1 TYPICAL FOUNDATION
SCALE: N.T.S.

- 4" HDPE CORRUGATED PIPE SMOOTH INTERIOR
- 6" PVC SCH 80 RISER PIPE
- 20 MIL HSPE GSE VAPOR BARRIER OR APPROVED EQUAL
- SPRAY ON/TROWEL 60 MIL MIN PROCOR 75 (GRACE) OR APPR'D EQUAL
- 20 GSE HDPE VAPOR BARRIER BLIND SIDE INSTALLATION

BASED ON JEFFREY KAMEN
PLAN DATED 11/22/11

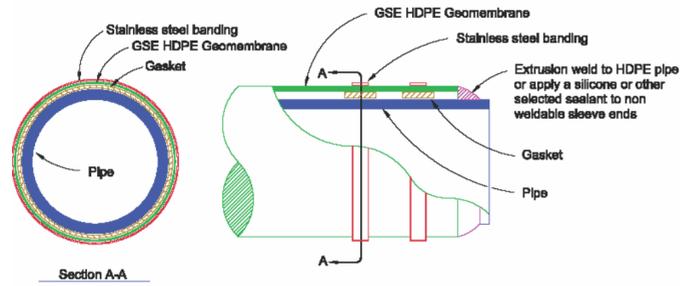
AMC ENGINEERING PLLC
99 Jericho Turnpike
Jericho, NY 11753
516 417-8588

PROJECT
**821 BEDFORD AVENUE
BROOKLYN, NY**

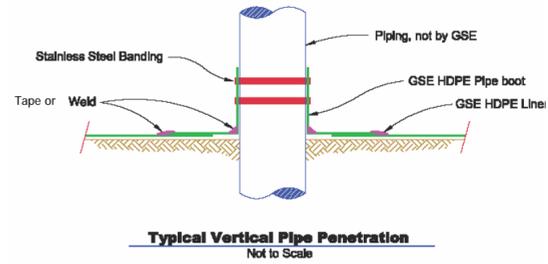
TITLE:
SSDS AND VAPOR BARRIER



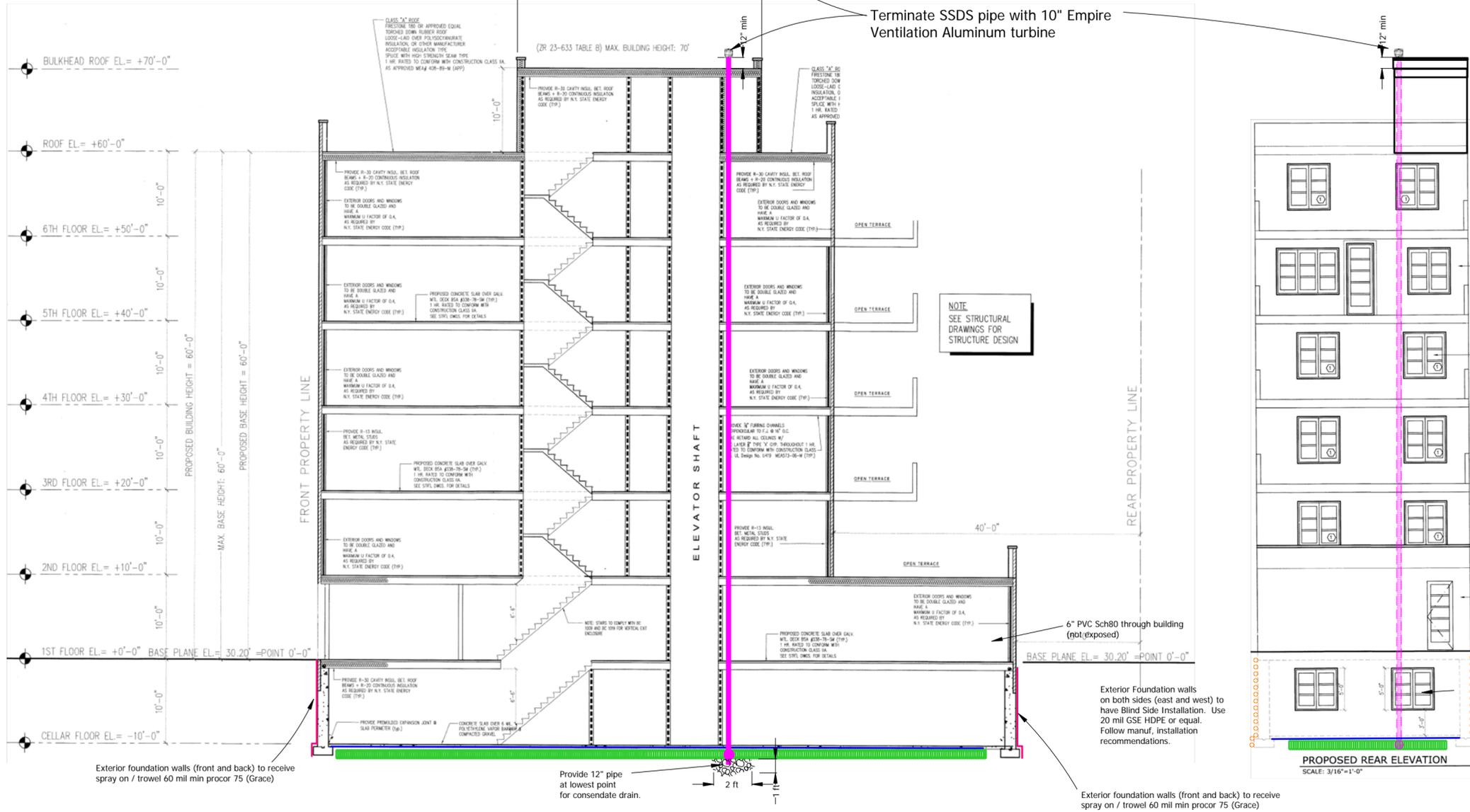
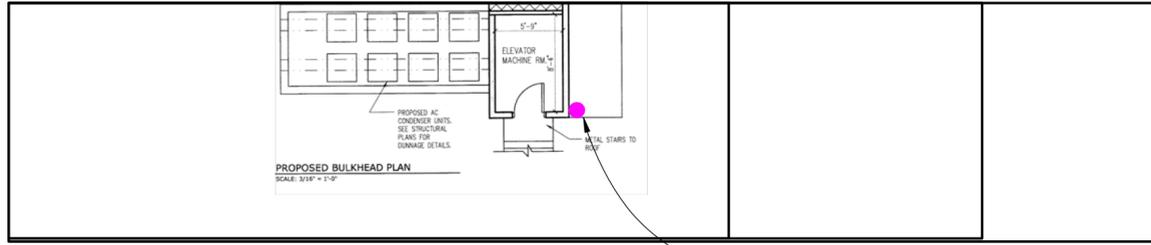
DATE: 1/6/12
PROJECT No:
DRAWING BY: AC
CHK BY:
DWG No:
ENV-001-01
CADD FILE No: 1 of 2



Pipe Penetration Seal
(Vertical or horizontal)
Not to scale



Typical Vertical Pipe Penetration
Not to Scale



- Notes:
- Controlled inspections by PE or Architect of record
 - Approval of gravel or subgrade material prior to installation
 - Approval of vapor barrier prior to installation
 - Inspection of subgrade installed
 - Inspection of vapor barrier after installation including all overlaps and seals around penetrations
 - Inspection of riser prior to covering.

2. INSTALLATION NOTES
- SEAL OPENING WITH ELASTOMERIC JOINT SEALANT AS DEFINED IN ASTM C920.
 - HIGH DENSITY POLYETHYLENE CORRUGATED PERFORATED PIPE WITH SMOOTH INTERIOR WATERWAY. ADS N-12 OR APPROVED EQUAL.
 - WRAP 4" HDPE PIPE WITH GEOTEXTILE FABRIC, GSE NW4 OR APPROVED EQUAL
 - EBC/AMC MUST PRE-APPROVE ALL FILLMATERIAL BEFORE DELIVERY TO SITE.

- 4" HDPE CORRUGATED PIPE SMOOTH INTERIOR
- 6" PVC SCH 80 RISER PIPE
- 20 MIL HSPE GSE VAPOR BARRIER OR APPROVED EQUAL
- SPRAY ON/TROWEL 60 MIL MIN PROCOR 75 (GRACE) OR APPR'D EQUAL
- 20 GSE HDPE VAPOR BARRIER BLIND SIDE INSTALLATION



AMC ENGINEERING PLLC
99 Jericho Turnpike
Jericho, NY 11753
516 417-8588

PROJECT

**821 BEDFORD AVENUE
BROOKLYN, NY**

TITLE:

SSDS AND VAPOR BARRIER



DATE: 1/6/12
PROJECT No:
DRAWING BY: AC
CHK BY:
DWG No:
ENV-002.01
CADO FILE No:

1 of 2

APPENDIX A
PROPOSED DEVELOPMENT PLANS

GENERAL NOTES:

1. THESE NOTES ARE PART OF THE PLANS AND SPECIFICATIONS AND ARE TO BE COMPLIED WITH IN ALL RESPECTS. MORE RESTRICTIVE NOTES MENTIONED ELSEWHERE ARE TO TAKE PRECEDENCE OVER THE FOLLOWING.
2. THE CONTRACTOR SHALL DIRECT AND SUPERVISE THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, PROCEDURES, AND SHALL COORDINATE THE WORK.
3. THE CONTRACTOR SHALL BE HELD TO HAVE VISITED THE SITE SO THAT HE MAY DETERMINE THE DIFFICULTIES HE MAY ENCOUNTER DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS IN THE FIELD PRIOR TO COMMENCING WORK, AND SHALL IMMEDIATELY REPORT ANY DISCREPANCIES BETWEEN DRAWINGS AND FIELD CONDITIONS TO THE ARCHITECT.
5. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FILE ALL REQUIRED CERTIFICATES OF INSURANCE WITH THE DEPARTMENT OF BUILDINGS, OBTAIN ALL REQUIRED PERMITS AND PAY ALL FEES REQUIRED BY GOVERNING NEW YORK CITY AGENCIES.
6. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NEW YORK CITY BUILDING CODE, FIRE DEPARTMENT REGULATIONS, DEPARTMENT OF HIGHWAYS, UTILITY COMPANY AND THE BEST TRADE PRACTICES.
7. MINOR DETAILS NOT USUALLY SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER CONSTRUCTION OF ANY PART OF THE WORK SHALL BE INCLUDED AS THEY WERE INDICATED IN THE DRAWINGS.
8. THE CONTRACTOR SHALL COORDINATE ALL WORK PROCEDURES WITH REQUIREMENTS OF LOCAL AUTHORITIES AND BUILDING MANAGEMENT.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL CONDITIONS AND MATERIALS WITHIN THE PROPOSED CONSTRUCTION AREA. THE CONTRACTOR SHALL DESIGN AND INSTALL ADEQUATE SHORING AND BRACING FOR ALL STRUCTURAL OR REMOVAL TRADES. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR ANY DAMAGE OR INJURIES CAUSED BY OR DURING THE EXECUTION OF THE WORK.
10. THE CONTRACTOR SHALL LAY OUT HIS OWN WORK, AND SHALL PROVIDE ALL DIMENSIONS REQUIRED FOR OTHER TRADES (PLUMBING, ELECTRICAL, ETC.).
11. PLUMBING AND ELECTRICAL WORK SHALL BE PERFORMED BY PERSONS LICENSED IN THEIR TRADES, WHO SHALL ARRANGE FOR AND OBTAIN INSPECTIONS AND REQUIRED SIGN-OFFS.
12. THE CONTRACTOR SHALL DO ALL CUTTING, PATCHING, REPAIRING AS REQUIRED TO PERFORM ALL OF THE WORK INDICATED ON THE DRAWINGS, AND ALL OTHER WORK THAT MAY BE REQUIRED TO COMPLETE THE JOB.
13. ALL PIPING AND WIRING SHALL BE REMOVED TO A POINT OF CONNECTION AND SHALL BE PROPERLY CAPPED OR PLUGGED.
14. THE CONTRACTOR, UPON COMPLETION OF THE WORK, SHALL ARRANGE FOR DEPARTMENT OF BUILDINGS INSPECTIONS AND SIGN-OFFS REQUIRED TO COMPLETE THE JOB AND PROVIDE ALL CONTROLLED INSPECTIONS AS REQUIRED BY THE BUILDING DEPARTMENT FOR THIS PROJECT.
15. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING LAYOUT, PROFILES, METHODS OF JOINING AND ANCHORAGE DETAILS, INCLUDING MAJOR FINISHING AND TRIM UNITS. PROVIDE LAYOUTS AT 1/4" SCALE AND DETAILS AT 3" SCALE.
16. DIMENSIONS GOVERN - DRAWINGS ARE NOT TO BE SCALED.

GENERAL SAFETY PLAN NOTES:

1. CONTRACTOR TO KEEP NOISE FACTOR TO A MINIMUM.
2. CONTRACTOR NOT TO BLOCK OR SEAL ANY MEANS OF EGRESS FROM OR TO BUILDING.
3. CONTRACTOR TO MAINTAIN SAFETY FACTOR FOR FLOOR LOADS & NOT TO OVERLOAD.
4. CONTRACTOR TO MAINTAIN ALL FACILITIES FOR UTILITIES.
5. CONTRACTORS TO MAINTAIN PROPER WORKING HOURS PER OWNER.
6. NO WORK TO BE DONE EXCEPT AS NOTED ON THIS APPLICATION.

N Y STATE ENERGY CODE NOTES:

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

ALL PERTINENT DATA & DESIGN CRITERIA REGARDING THE FOLLOWING SHALL CONFORM WITH THE NYC BUILDING CODE WHICHEVER IS MORE RESTRICTIVE:

1. "U" VALUE OF ENVELOPE SUB-SYSTEM.
2. DESIGN INSIDE AIR TEMPERATURE OF EACH ROOM THAT IS TO BE HEATED / AND OR COOLED.
3. DESIGN OUTDOOR AIR TEMPERATURE
4. DESIGN HEAT / LOSS GAIN THROUGH EACH EXTERIOR FACADE BTU / HR
5. "R" VALUE OF INSULATING MATERIALS.
6. SIZE AND TYPE OF APPARATUS/ EQUIPMENT SYSTEM, CONTROLS, & OTHER PERTINENT DATA TO INDICATE CONFORMANCE TO CODE.
7. ELECTRICAL LIGHTING & POWER DESIGN DATA.
8. FIRE PROTECTION CONSTRUCTION REQUIREMENTS, INCLUDING BUILDING CODE LIMITATIONS REGARDING USE AND INSULATION OF EQUIPMENT, AND WHAT THE CONTRACTOR OR AUTHORIZED REPRESENTATIVE WILL OBTAIN ALL NECESSARY APPROVALS FOR ELECTRICAL WORK FROM BUREAU OF GAS AND ELECTRICITY.
9. DESIGN OF INSIDE AIR TEMPERATURE OF EACH ROOM THAT IS HEATED OR COOLED: HEATED 70 DEGREES F. NYC (70DEG NYS)
COOLED 78 DEGREES F. NYS
10. DESIGN OF OUTSIDE AIR TEMPERATURE (BASED ON 5,000 DEGREE DAYS):
NYC WINTER 0 DEG F.
NYC SUMMER 69 DEG F.

SECTION NOTES:

1. FIRE RETARD ALL WOOD JOIST CEILINGS WITH 5/8" SHEETROCK FIRE-CODE "X" ONE HOUR RATED).
2. ALL FOOTINGS TO BE CARRIED DOWN A MINIMUM OF 4'-0" BELOW ADJACENT GRADE AND BEAR ON UNDISTURBED SOIL, HAVING A MINIMUM BEARING CAPACITY OF TWO (2) TONS PER SQUARE FOOT.
3. PROVIDE DOUBLE WOOD JOISTS UNDER PARTITIONS RUNNING PARALLEL TO FLOOR BEAMS.
4. PROVIDE TRIPLE-HEADERS AND TRIMMERS AROUND STAIRWELL OPENING UNLESS OTHERWISE NEEDED.
5. INSTALLATION OF INSULATION AND CONSTRUCTION OF WINDOWS AND EXTERIOR DOORS TO COMPLY WITH NEW YORK STATE ENERGY CODE.
(A) ROOF INSULATION: MINIMUM 6" ROCKWOOL INSULATION.
(B) EXTERIOR WALLS: MINIMUM 4" ROCKWOOL INSULATION.
(C) CHIMNEY TO BE ENCLOSED WITH ONE (1) HOUR RATED CONSTRUCTION.
(D) ALL WOOD HEADERS AND TRIMMERS TO BE SIZED AS NOTED ON PLANS.
(E) WATERPROOF NEW FOUNDATION AND FOOTINGS WITH 1/4" THICK TROWELLED ON MASTIC WATERPROOFING.
(F) NEW WOOD STAIRS:
(A) CONTRACTORS SHALL CHECK AND VERIFY STORY HEIGHTS PRIOR TO FABRICATION AND INSTALLATION OF STAIRS.
(B) MAXIMUM RISER 7 3/4" MINIMUM TREAD: 9 1/2" + 1 1/4" NOSING. THE SUM OF TWO RISERS PLUS ONE TREAD SHALL NOT BE LESS THAN 24" NOR MORE THAN 25 1/2".
(C) UPPER SURFACE OF EVERY BALUSTRADE OR RAILING SHALL BE AT LEAST 2'-6" AND MAXIMUM OF 2'-8" ABOVE THE FRONT EDGE OF THE STAIR TREADS AND 2'-8" MINIMUM, 3'-0" MAXIMUM ABOVE LEVEL OF LANDING.
(D) SOFFIT OF STAIR TO BE COVERED WITH 5/8" SHEETROCK TYPE "X".
(E) EXTERIOR METAL RAILINGS:
(A) EXTERIOR METAL RAILINGS SHALL BE A TYPE THAT WILL PREVENT CHILDREN FROM CRAWLING THROUGH OR OVER THEM.
(B) STRUCTURAL DESIGN OF RAILING TO COMPLY WITH SECTION 27-558 (b).
(C) ALL CONCRETE FOOTING TO BE CARRIED DOWN BELOW THE LEVEL OF THE HOUSE SEWER WHERE HOUSE SEWER PASSES THROUGH FOUNDATION WALL.
(D) ALL CONCRETE TO BE REINFORCED UNLESS OTHERWISE NOTED.
(E) REFER TO DETAIL FOR REINFORCING OF CONCRETE FOUNDATION WALLS AND FOOTINGS.

MULTIPLE DWELLING LAW NOTES:

M.D.L. CLASSIFICATION HFCA, NYS MDL ARTICLE 3 AND 6

1. 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 PARAGRAPH 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 103.1A. 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 ELEVATORS ARE MAINTAINED AND OPERATED UPON A PUBLIC HALL AT EVERY STORY, ALL STAIRS 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 VENTILATION 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 MON OF THE FLOOR OR ROOF ABOVE AS PER SECTION 108 M.D.L.
8. ALL PARTITIONS SHALL REST DIRECTLY UPON THE FIREPROOF FLOOR CONSTRUCTION AND NEVER UPON ANY WOOD FLOORING, AND SHALL EXTEND TO THE FIREPROOF CONSTRUCTION M.D.L.
9. PROVIDE EXTERIOR LIGHTS AS PER SEC 26 & 35 M.D.L.
10. ALL BUILDING ENTRANCE DOORS TO BE SELF-CLOSING, SELF-LOCKING DEVICES AS PER SEC 50(a) M.D.L.
11. WATER SUPPLY TO BE AS PER SEC 75 M.D.L.
12. CENTRAL HEATING AND HOT WATER SUPPLY TO BE AS PER 79 M.D.L.
13. NIGHT LIGHT IN PUBLIC HALL AND STAIR HALL TO BE AS PER SEC 37, 217 M.D.L.
14. MAINTENANCE TO BE AS PER SEC 57 M.D.L.
15. PROVIDE FLOOR SIGNS AND HOUSE NUMBER.
16. FIRE RATED 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.
17. REGISTER BUILDING AS PER SEC 325 M.D.L.
18. ALL APARTMENT DOORS TO BE SELF-CLOSING.
19. PROVIDE FOR APARTMENT DOORS HEAVY DUTY LATCHSET AND HEAVY DUTY DEAD BOLT AND DOOR CHAIN GUARD.

AIR RESOURCES NOTES:

1. THE APPLICANT IS AWARE OF DISCREPANCIES BETWEEN THE RULES AND REGULATIONS OF THE DEPARTMENT OF AIR RESOURCES AND THE BUILDING CODE AND REFERENCE STANDARDS.
2. INSTALLATIONS APPROVED BY THIS DEPARTMENT OR EQUIPMENT APPROVAL BY THE BOARD OF STANDARDS AND APPEALS OR ACCEPTED BY THE M.E.A. DIVISION MAY NOT BE IN CONFORMANCE WITH SAID RULES OR REGULATIONS.
3. APPROVAL BY THE DEPT. OF BLDGS. SHALL NOT BE PRESUMED TO BE AN INDICATION OF COMPLIANCE WITH THE ABOVE MENTIONED RULES AND REGULATIONS.
4. THE OWNER HAS BEEN MADE AWARE OF THESE DIFFERING REQUIREMENTS AND OF THE NEED TO OBTAIN NECESSARY APPROVALS AND PERMITS FROM THE DEPT. OF AIR RESOURCES.
5. IT IS UNDERSTOOD THAT ISSUANCE OF PERMITS BY THIS DEPARTMENT IS NOT TO BE CONSTRUED AS EVIDENCE OF COMPLIANCE WITH DEPARTMENT OF AIR RESOURCES RULES AND REGULATIONS AND WILL NOT PREVENT THE DEPT. OF AIR RESOURCES FROM ISSUING VIOLATIONS OR FROM PREVENTING THE USE OF NON-COMPLYING, FUEL BURNING EQUIPMENT - SEE B.D. MEMO DATED

BOILER ROOM NOTES:

1. ANY CHANGE OF HEATING APPARATUS TO BE FILED PRIOR TO INSTALLATION.
2. GAS VENT TO BE AMERIVENT FLUE M.E.A. #294-565M.
3. PROVIDE MASONRY FOUNDATION UNDER AMERIVENT FLUE.
4. PROVIDE MINIMUM 18" CLEARANCE BETWEEN BOILERS & ENCLOSING WALL PARTITIONS. PROVIDE 3'-0" CLEARANCE IN FRONT OF BOILER/ FURNACE FOR MAINTENANCE.
5. PROVIDE 4" CONCRETE SLAB, ELECTRIC LIGHT & FLOOR DRAIN IN BOILER ROOM.
6. REFER TO LEGEND FOR BOILER ROOM ENCLOSURE PARTITIONS.
7. NO METERS, INTERIOR STAIR OR REQUIRED
8. BOILER ROOM DOOR TO BE ONE (1) 1/2 HOUR TEST FIREPROOF SELF-CLOSING, BOARD OF STANDARDS & APPEALS APPROVED TYPE.
9. NO STORAGE PERMITTED WITHIN BOILER ROOM.
10. PROVIDE 12"x12" FIXED REGISTER WITH B.S.A. APPROVED TYPE FIRE DAMPER WITH FUSIBLE LINK
11. INSTALLATION OF EQUIPMENT SHALL COMPLY WITH B.S.A./ M.E.A. APPROVAL, BUILDING CODE REQUIREMENTS, DEPARTMENT OF BUILDINGS RULES & REGULATIONS, AND MANUFACTURER'S SPECIFICATIONS (LATEST EDITION).

HOUSING MAINTENANCE CODE:

1. D26-11 MAINTAIN IN CLEAN CONDITION ROOF, YARDS, COURTS, OPEN SPACES AND INTERIOR PUBLIC SPACES.
2. D26-12 REPAINT OR RECOVER WALLS AND CEILINGS WITH WALLPAPER EVERY THREE YEARS (FOR MDs) AND KEEP RECORDS OF SUCH. ALSO REPAINT WINDOW FRAMES AND SASHES EVERY FIVE YEARS.
3. D26-13 KEEP PREMISES FREE FROM RODENTS AND INSECT INFESTATION.
4. D26-14 MAINTAIN METAL CANS (2 MINIMUM) SUFFICIENT TO CONTAIN WASTE FOR 72 HOURS AND PLACE NOTICE OF HOURS AND METHODS OF COLLECTION.
5. D26-15 PROVIDE AND MAINTAIN SUPPLY OF WATER TO KEEP PLUMBING FIXTURES ADEQUATELY SUPPLIED.
6. D26-16 PROPERLY MAINTAIN AND KEEP IN GOOD REPAIR PLUMBING AND DRAINAGE SYSTEM. ALSO MAINTAIN UNOBSTRUCTED DRAINAGE OF OPEN SPACES, ROOFS, TERRACES, ETC.
7. D26-17 MAINTAIN CENTRAL HEATING BETWEEN 10/1 TO 5/31 AT 68°F BETWEEN 6 a.m. AND 10 p.m. WHEN OUTSIDE TEMPERATURE FALLS BELOW 55°F; AT 55°F BETWEEN 10 p.m. AND 6 a.m. WHEN OUTSIDE TEMPERATURE FALLS BELOW 40°F.
8. D26-19 EQUIP EACH DWELLING FOR ELECTRIC LIGHTING IN PUBLIC SPACES (10 WATTS PER 25 S.F. AT 60 WATTS PER FIXTURE), AT ENTRANCES (100 WATTS), IN COURTS AND YARDS (40 WATTS). LIGHTS SHALL BE TURNED ON IN PUBLIC HALLS AND STAIRS FROM SUNSET AND CONTINUOUSLY IN FIRESTAIRS OR IN WINDOWLESS HALLS AND STAIRS.
9. D26-20 PROVIDE PEEPHOLES IN DOORS; MIRRORS IN ELEVATORS (TO ENABLE VIEWING OF INTERIOR PRIOR TO ENTERING) AND A KEY LOCK IN EACH DOOR. FOR OLTS UP TO BASEMENT AND THREE STORIES IN HEIGHT, DOORS TO PUBLIC AREAS ARE TO BE SELF CLOSING AND CEILING OF LOWEST STORY IS TO BE FIRE-RETARDED.
10. D26-21 MAINTAIN MAIL RECEPTACLES AND DIRECTORIES, FLOOR SIGNS AND HOUSE NUMBERS VISIBLE FROM THE SIDEWALK
11. D26-22 PROVIDE JANITORIAL SERVICES. 12. D26-32 PROVIDE EVERY KITCHEN OR KITCHENETTE WITH GAS OR ELECTRICITY FOR
12. D26-32 PROVIDE EVERY KITCHEN OR KITCHENETTE WITH GAS OR ELECTRICITY FOR COOKING AND A SINK WITH RUNNING WATER, EQUIPPED WITH A WASTE AND TRAP AT LEAST TWO INCHES IN DIAMETER.
13. D26-40 FOR MULTIPLE DWELLING, FILE REGISTRATION STATEMENT.

GENERAL STRUCTURAL NOTES:

1. ALL STRUCTURAL WORK, INCLUDING MATERIALS, FIRE RATING AND METHODS OF CONSTRUCTION SHALL CONFORM TO THE BUILDING CODE OF THE CITY OF NEW YORK, LATEST EDITION.
2. THE CONTRACTOR SHALL PROPERLY SHORE, BRACE AND MAKE SAFE ALL FLOORS, RAILS, WALL AND ADJACENT PROPERTY AS JOB CONDITIONS
3. THE CONTRACTOR SHALL COORDINATE ALL STRUCTURAL WORK WITH REQUIRE. THE ARCHITECTURAL AND MECHANICAL DRAWINGS AND SPECIFICATIONS.
4. ALL DIMENSIONS INDICATED ON THE DRAWINGS ARE APPROXIMATE. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING OR FABRICATING MATERIAL.

SMOKE DETECTOR / CARBON MONOXIDE NOTES:

1. EACH DWELLING UNIT SHALL BE EQUIPPED WITH AN APPROVED TYPE CARBON MONOXIDE & SMOKE DETECTOR DEVICE RECEIVING PRIMARY POWER FROM THE BUILDING WIRING WITH NO SWITCH IN THE CIRCUIT OTHER THAN THE OVER-CURRENT DEVICE PROTECTING THE BRANCH CIRCUIT AS PER SEC. C26-1705.4.
2. SUCH SMOKE DETECTORS MUST BE EITHER THE IONIZATION CHAMBER TYPE OR PHOTOELECTRIC DETECTOR TYPE AS PER SEC. C26-1705.4.
3. ALL SMOKE/ CARBON MONOXIDE DETECTORS MUST BE INSTALL WITHIN 15'-0" OF THE ENTRANCE TO ANY SLEEPING ROOMS, WALL OR CEILING MOUNTED, AND INDICATED ON PLAN AS PER NFPA # 78/80.
4. A CERTIFICATE OF SATISFACTORY INSTALLATION MUST BE FILED WITH THE DIVISION OF CODE ENFORCEMENT H.P.D. TEN DAYS AFTER THE INSTALLATION OF SMOKE DETECTORS.
5. CARBON MONOXIDE INSTALLATION TO COMPLY WITH LOCAL LAW 7 OF 2004.

TENANT SAFETY NOTES:

1. CONSTRUCTION WORK SHALL BE DEFINED TO THE APARTMENT INTERIOR, AND WILL NOT CREATE DUST, DIRT, OR OTHER INCONVENIENCES TO OTHER APARTMENT UNITS WITHIN THE BUILDING.
2. CONSTRUCTION OPERATION SHALL NOT BLOCK HALLWAYS OR MEANS OF EGRESS FOR TENANTS OF THE BUILDING.
3. CONSTRUCTION OPERATIONS SHALL NOT INVOLVE INTERRUPTION OF HEATING, WATER OR ELECTRICAL SERVICES TO OTHER TENANTS OF THE BUILDING.
4. CONSTRUCTION OPERATIONS SHALL BE CONFINED TO NORMAL WORKING HOURS: 8 A.M. TO 5 P.M. MONDAYS THROUGH FRIDAYS, EXCEPT ON LEGAL HOLIDAYS.
5. THERE SHALL BE NO ONE OCCUPYING THE APARTMENT TO BE RENOVATED DURING THE COURSE OF CONSTRUCTION WORK.

ELEVATOR NOTE

A. ARCHITECT IS NOT RESPONSIBLE FOR SIZE, TYPE OR DESIGN OF ELEVATORS OR ELEVATOR PIT SIZE OR DEPTH.
B. THE OWNER AND CONTRACTOR ARE TO HIRE A LICENSED ELEVATOR CONTRACTOR TO FILE, OBTAIN APPROVAL, OBTAIN AN ELEVATOR PERMIT, AND OBTAIN SIGNOFF BY THE ELEVATOR DIVISION OF THE BUILDING DEPARTMENT.
C. NO BUILDING EXCAVATION OR FABRICATION OF STRUCTURAL MEMBERS IS TO PROCEED WITHOUT AN APPROVAL OF ELEVATOR DRAWINGS BY THE ELEVATOR DIVISION OF THE BUILDING DEPARTMENT.

JEFFREY KAMEN ARCHITECT

33 BOND STREET
New York, NY 10013
212.979.9286

REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
|-----|------|-------------|

DATE ISSUED TO NO.

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |
| | | |
| | | |
| | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

821 BEDFORD AVENUE
BROOKLYN, NY

DRAWING:

GENERAL NOTES

DOB JOB No.

DRAWING #:

A-500.00

DATE: 10/09/11 DRAWING BY: JF

SCALE: NOTED CHK BY: DL

COMM. NO. DWG. 10 OF 12

DRAWINGS: GENERAL NOTES, MDL NOTES

The following are primary sections that subject application is subject to but not limited to the following under the provisions of the 2008 New York City Building Code

CHAPTER 3 USE AND OCCUPANCY CLASSIFICATION
BC 302 CLASSIFICATION

302.1 R-2
BC 310 RESIDENTIAL GROUP R
310.1.2 Group R-2 This occupancy shall include buildings or portions thereof containing sleeping units or more than two dwelling units that are occupied, as a rule, for shelter and sleeping accommodation on a long-term basis for a month or more at a time.

CHAPTER 5 GENERAL BUILDING HEIGHTS AND AREAS, SEPARATION OF OCCUPANCIES

501.2 Premises identification should be provided in accordance with BC 501.2
501.3 Fire Department access.
501.3.1 Frontage Total Frontage proposed adjoining the street: 25'
501.3.2 Building access.
501.3.2.1 Above grade. Above grade access is provided via windows at front facade
501.3.2.2 Below grade. Below grade access provided via stairs
BC 503 GENERAL HEIGHT AND AREA LIMITATIONS

TABLE 503 ALLOWABLE HEIGHT AND BUILDING AREAS CONSTRUCTION TYPE IIA

| | |
|------------------|----|
| Hgt (feet) | 65 |
| GROUP R-2 Hgt(S) | 6 |

BC 508 INCIDENTAL USE AREAS AND MIXED OCCUPANCIES

508.2 Incidental use areas. The following spaces are to be identified as incidental use areas and are to be provided with the required separation per Table 508.2
508.2.1 Occupancy classification. All incidental use areas are to be classified under the occupancy which they are incidental to R-2
508.2.1.1 Fire protection requirements. Fire protection requirements in Chapter 9 for an incidental use area shall be based upon the occupancy classification of the area's main occupancy
508.2.1.2 Allowable area and height. The actual floor area of an incidental use area shall be treated as being in the same occupancy group as its main occupancy for the purposes of calculating allowable height and area in accordance with Section 503.1.
508.2.2 Separation. Incidental use areas shall be separated or protected, or both, from all other occupancies in accordance with Table 508.2.
TABLE 508.2 INCIDENTAL USE AREAS ROOM OR AREA SEPARATION
Furnace room where any piece of equipment is 400,000 1 hour or provide automatic sprinkler system
Blu per hour input or less, except in R-3 occupancy
Rooms with any boiler 15 psi or less and 10 horsepower or less, except in R-3 occupancy 1 hour or provide automatic sprinkler system
Mechanical and/or electrical equipment room, except in R-3 occupancy 1 hour or provide automatic sprinkler system
Laundry rooms over 100 square feet, except within dwelling units 1 hour or provide automatic sprinkler system
Storage rooms over 100 square feet, except in R-3 occupancy 1 hour or provide automatic sprinkler system
509.9 Separation of different tenancies. Spaces or dwelling units occupied by different tenants shall be separated by fire barriers having at least 1-hour fire-resistance ratings.

CHAPTER 6 TYPES OF CONSTRUCTION

602.2 Types I and II. Type I and II construction are those types of construction in which the building elements listed in Table 601 are of noncombustible materials. Table 601
BUILDING ELEMENT TYPE IIA
Structural frame Including columns, girders, trusses 1 hr.
Bearing walls Exterior 1 hr.
Bearing walls Interior 1 hr.
Nonbearing walls and partitions Exterior See Table 602
Nonbearing walls and partitions Interior 0 hr.
Floor construction Including supporting beams and joists 1 hr.
Roof construction Including supporting beams and joists 1 hr.
Table 602: fire-resistance rating requirements for exterior walls based on fire separation distance FIRE SEPARATION OCCUPANCY

GROUP R-2

| | |
|------------|-------|
| 5 | 1 hr. |
| 5 to 10' | 1 hr. |
| 10' to 30' | 1 hr. |
| 30 | 0 hr. |

SECTION BC 603 COMBUSTIBLE MATERIAL IN TYPE I AND II CONSTRUCTION

603.1 Allowable materials. Combustible materials shall only be used in accordance with BC 603.1

CHAPTER 7 FIRE-RESISTANCE-RATED CONSTRUCTION

BC 703 FIRE-RESISTANCE RATINGS AND FIRE TESTS
703.2 Fire-resistance ratings. All fire-resistance rating of building elements are determined in accordance with the test procedures set forth in ASTM E 119 in accordance with Section 703.3.
BC 704 EXTERIOR WALLS
704.1 General. All required rated Exterior walls under table 601 & 602 are to be fire-resistance rated and have opening protection as required by this section. Exterior wall construction shall comply with the provisions of Chapter 14 and Appendix D of the 2008 BC where applicable.
704.1.1 Parapets. Parapets shall be provided on exterior walls of buildings.
704.1.1.1 Parapet construction. Parapets shall have the same fire-resistance rating as that required for the supporting wall, and on any side adjacent to a roof surface, shall have noncombustible faces for the uppermost 18 inches (457 mm), including counter flashing and coping materials. The height of the parapet shall not be less than 30 inches BC 706 FIRE BARRIERS
706.3 Fire-resistance rating The fire-resistance rating and assembly required of the walls and floor assemblies required for fire barriers shall fully comply with required ratings and assembly as described in BC 706 and all applicable provisions.
BC 707 SHAFT ENCLOSURES
707.1 General. The provisions of section BC 707 in its entirety shall apply to all vertical shafts where such shafts are required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies
707.2 Shaft enclosure required. Openings through a floor/ceiling assembly shall be protected by a shaft enclosure complying with this section.
707.4 Fire-resistance rating. Shaft enclosures shall have a fire-resistance rating of not less than 2 hours where penetrating three stories or more and not less than 1 hour where penetrating fewer than three stories.
BC 708 FIRE PARTITIONS
708.1 General. The fire-resistance rating and assembly required of the walls and floor assemblies required for fire partition shall fully comply with required ratings and assembly as described in BC 708 and all applicable provisions.
708.3 Fire-resistance rating. The fire-resistance rating of the walls shall be 1 hour.
SECTION BC 709 SMOKE BARRIERS
709.1 General. The fire-resistance rating and assembly required of the walls and floor assemblies required for Smoke Barriers shall fully comply with required ratings and assembly as described in BC 709 and all applicable provisions.
709.3 Fire-resistance rating. A1-hour fire-resistance rating is required for smoke barriers.
BC 710 SMOKE PARTITIONS
710.1 General. The fire-resistance rating and assembly required of the walls and floor assemblies required for Smoke Partitions shall fully comply with required ratings and assembly as described in BC 710 and all applicable provisions.
710.3 Fire-resistance rating. Unless required elsewhere in the code, smoke partitions are not required to have a fire-resistance rating.
BC 711 HORIZONTAL ASSEMBLIES
711.1 General. Floor and roof assemblies required to have a fire-resistance rating shall comply with this BC 711 and all applicable provisions.
711.2 Materials. The floor and roof assemblies shall be of materials permitted by the building type of construction and Horizontal floor or roof assemblies shall be of noncombustible materials when such assemblies serve as a horizontal offset to a fire wall or fire barrier that is required to be noncombustible.
711.3 Fire-resistance rating. The fire-resistance rating of floor and roof assemblies shall not be less than that required by the building type of construction and any other applicable provision.

CHAPTER 9 FIRE PROTECTION SYSTEMS

BC 903 AUTOMATIC SPRINKLER SYSTEMS
903.2.7 Group R. An automatic sprinkler system shall be installed in Group R fire areas. An automatic sprinkler system shall be installed throughout buildings with a main use or dominant occupancy of Group R2
SECTION BC 907 FIRE ALARM AND DETECTION SYSTEMS
907.2.6.2.3 Smoke detectors. An approved automatic smoke detection system shall be installed throughout resident housing areas, including sleeping areas and contiguous day rooms, group activity spaces and other common spaces normally accessible to residents. Exoptions: 1. Other approved smoke detection arrangements providing equivalent protection including, but not limited to, placing detectors in exhaust ducts from cells or behind protective guards listed for the purpose are allowed when necessary to prevent damage or tampering. 2. Sleeping units in Use Conditions 2 and 3. 3. Smoke detectors are not required in sleeping units with four or fewer occupants in smoke compartments that are equipped throughout with an approved automatic sprinkler system.
907.2.9 Group R-2. An automatic fire alarm system without alarm notification appliances shall be provided in accordance with this section in Group R-2 occupancies, other than student apartments, where such occupancy satisfies any one of the following conditions: 1. Any dwelling unit is located three or more stories above the lowest level of exit discharge, including dwelling units in penthouses of any area; 2. Any dwelling unit is located more than one story below the highest level of exit discharge of exits serving the dwelling unit; or 3. The building contains more than 16 dwelling units. Actuation of smoke detectors shall not initiate a signal to alarm notification appliances. The activation of any detector required by this section shall initiate a signal at a central station or a constantly attended location. Smoke detectors shall be located as follows: 1. In each mechanical equipment, electrical, transformer, telephone equipment or similar room, greater than 75 square feet (6.96 m2) in area. 2. In air distribution systems in accordance with Section 606 of the New York City Mechanical Code. 3. In elevator machine rooms and in elevator lobbies.

SECTION BC 908 EMERGENCY ALARM SYSTEMS

908.7 Carbon monoxide alarms and detectors. Carbon monoxide alarms and detectors shall be provided and installed in accordance with Sections 908.7.1 through 908.7.3.
908.7 Carbon monoxide alarms and detectors. Carbon monoxide alarms and detectors shall be provided and installed in accordance with Sections 908.7.1 through 908.7.3.
908.7.1 Group R occupancies. Listed carbon monoxide alarms or detectors shall be installed as follows: 2. Groups R-1, 2. Carbon monoxide alarms shall be installed in affected dwelling units as per Section 908.7.1.1. of the 2008 NYC BC
908.7.1.1 Affected dwelling units. Carbon monoxide alarms or detectors shall be required within the following dwelling units: 1. Units on the same story where carbon monoxide-producing equipment or enclosed parking is located. 2. Units on the stories above and below the floor where carbon monoxide-producing equipment or enclosed parking is located. 3. Units in a building containing a carbon monoxide-producing furnace, boiler, or water heater as part of a central system. 4. Units in a building served by a carbon monoxide-producing furnace, boiler, or water heater as part of a central system that is located in an adjoining or attached building.
908.7.1.1.1 Required locations within dwelling units. Carbon monoxide alarms or detectors shall be located within dwelling units as follows: 1. Outside of any room used for sleeping purposes, within 15 feet (4572 mm) of the entrance to such room. 2. In any room used for sleeping purposes. 3. On any story within a dwelling unit, including below-grade stores and penthouses of any area, but not including crawl spaces and uninhabitable attics.
908.7.1.1.2 Installation requirements. Carbon monoxide alarms or detectors shall comply with the power source, interconnection, and acceptance testing requirements as required for smoke alarms in accordance with Sections 907.2.10.2 through 907.2.10.4, of the 2008 NYC BC

CHAPTER 10 MEANS OF EGRESS

SECTION BC 1004 OCCUPANT LOAD

1004.1 Design occupant load. In determining means of egress requirements, the number of occupants for whom means of egress facilities shall be provided shall be established by the largest number computed in accordance with Sections 1004.1.1 through 1004.1.3.
1004.1.2 Number by Table 1004.1.2. The number of occupants computed at the rate of one occupant per unit of area as prescribed in Table 1004.1.2. TABLE 1004.1.2 - MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT
Residential 200 gross within dwelling units

SECTION BC 1005 EGRESS WIDTH

1005.1 Minimum required egress width. The means of egress width shall not be less than that required by this section. The total width of means of egress in inches (mm) shall not be less than the total occupant load served by the means of egress multiplied by the factors in Table 1005.1 and not less than specified elsewhere in this code. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity. The maximum capacity required from any story of a building shall be maintained to the termination of the means of egress.
TABLE 1005.1 - EGRESS WIDTH PER OCCUPANT SERVED
OCCUPANCY STAIRWAYS (inches per occupant) OTHER COMPONENTS (inches per occupant) R 0.3 0.2
SECTION BC 1008 DOORS, GATES AND TURNSTILES
1008.1.1.1 Door width. The minimum width of each door opening shall be sufficient for the occupant load thereof and shall provide a clear width of not less than 32 inches (813 mm).

SECTION BC 1009 STAIRWAYS AND HANDRAILS

1009.1 Stairway width. The width of stairways shall be determined as specified in Section 1005.1, but such width shall not be less than 44 inches (1118 mm). See Section 1007.3 for accessible means of egress stairways. Exoptions: 1. A width of not less than 36 inches (914 mm) shall be permitted in: 1.1. A stairway that serves an occupant load of 50 or less cumulative for all stories; or 1.2. A stairway that provides egress to the exit discharge solely for the use of Group R-2 occupancies, provided the building it serves is 125 feet (38 100 mm) or less in height, and provided such a stairway serves not more than 30 occupants per floor.
1013.2 Egress through intervening spaces Egress from a room or space shall not pass through adjoining or intervening rooms or areas, except where such adjoining rooms or areas are accessory to the area served, are not a high-hazard occupancy and provide a discernible path of egress travel to an exit. Egress shall not pass through kitchens, storage rooms, closets or spaces used for similar purposes. An exit access shall not pass through a room that can be locked to prevent egress. Means of egress from dwelling units or sleeping areas shall not lead through other sleeping areas, toilet rooms or bathrooms.
1013.3 Common path of egress travel. In occupancies other than Groups H-1, H-2 and H-3, the common path of egress travel shall not exceed 75 feet (22 860mm). In occupancies in Groups H-1, H-2, and H-3, the common path of egress travel shall not exceed 25 feet (7620mm).
1013.6 Exit access in R-2 occupancies. In buildings in occupancy Group R-2 exceeding three stories or more in height or occupied by more than two dwelling units on any story, a door from a dwelling unit shall open into an intervening public hall. Such public hall shall be constructed as a public corridor in accordance with Section 1016. Where two or more exits are required, such public hall shall provide access to at least two exits.

SECTION BC 1014 EXIT AND EXIT ACCESS DOORWAYS

1014.1 Exit or exit access doorways required. Two exits or exit access doorways from any space shall be provided where one of the following conditions exists: 1. The occupant load of the space exceeds the values in Table 1014.1.
TABLE 1014.1 SPACES WITH ONE MEANS OF EGRESS
OCCUPANCY MAXIMUM OCCUPANT LOAD
R2 20

SECTION BC 1015 EXIT ACCESS TRAVEL DISTANCE

1015.1 Travel distance limitations. Exits shall be so located on each story such that the maximum length of exit access travel, measured from the most remote point within a story to the entrance to an exit along the natural and unobstructed path of egress travel, shall not exceed the distances given in Table 1015.1.
TABLE 1015.1 EXIT ACCESS TRAVEL DISTANCE
OCCUPANCY WITH SPRINKLER SYSTEM (feet)
R2 200b

1016.1.2 Public corridors. Public corridors shall be fire-resistance rated in accordance with Table 1016.1.2.

TABLE 1016.1.2 PUBLIC CORRIDOR FIRE-RESISTANCE RATING

OCCUPANCY REQUIRED FIRE-RESISTANCE RATING (hours)

R2 (Noncombustible)
1016.2 Corridor width. The minimum corridor width shall be as determined in Section 1005.1, but not less than 44 inches (1118 mm). Exoptions: 1. Twenty-four inches (610 mm)—For access to and utilization of electrical, mechanical or plumbing systems or equipment. 2. Thirty-six inches (914 mm)—With a required occupant capacity of 50 or less, except as otherwise required by Chapter 11. 4. Thirty inches (762 mm)—Within a dwelling unit in Occupancy Groups R-2 and R-3, except as otherwise required by Section 1107.
1016.3 Dead ends. Where more than one exit or exit access doorway is required, the exit access shall be arranged such that there are no dead ends in corridors more than 20 feet (6096 mm) in length. 4. In occupancies in Group R-2, the dead end in a corridor shall not exceed 40 feet (12 192 mm). However, where the corridors are completely enclosed in construction having a 2-hour fire-resistance rating with all doors opening into the corridor being self-closing and having a fire-resistance rating of 11/2 hours, the length of dead-end corridor shall not exceed 80 feet (24 384 mm).

SECTION BC 1018 NUMBER OF EXITS AND CONTINUITY

1018.1 Minimum number of exits. All rooms and spaces within each story shall be provided with and have access to the minimum number of approved independent exits as required by Table 1018.1 based on the occupant load of such story, except as modified in Section 1018.2. For the purposes of this chapter, occupied roofs shall be provided with exits as required for stories. The required number of exits from any story, basement or individual space shall be maintained until arrival at grade or the public way.
1018.2 Buildings with one exit. Only one exit shall be required in buildings as described below: 5. Buildings of Group R-2 occupancy of construction Type I or II not exceeding six stories and not exceeding 2,000 square feet (186 m2) per story.
SECTION BC 1019 VERTICAL EXIT ENCLOSURES
1019.1 Enclosures required. Interior exit stairways and interior exit ramps shall be enclosed with fire barriers. Exit enclosures shall have a fire-resistance rating of not less than 2 hours where connecting four stories or more and not less than 1 hour where connecting less than four stories. The number of stories connected by the shaft enclosure shall include any basements but not any mezzanines. An exit enclosure shall not be used for any purpose other than means of egress. Enclosures shall be constructed as fire barriers in accordance with Section 706. Exoptions: 10. In Group R-1 and R-2 occupancies, where exit enclosures are required to have a fire-resistance rating of 2 hours, such enclosures shall be constructed of masonry or masonry equivalent. Wall assemblies constituting masonry equivalent shall be constructed in accordance with department rules.

SECTION BC 1023 EXIT DISCHARGE

1023.1 General. Exits shall discharge directly to the exterior of the building. The exit discharge shall be at grade or shall provide direct access to grade. The exit discharge shall not reenter a building

CHAPTER 11 ACCESSIBILITY

BC 1105 ACCESSIBLE ENTRANCES
1105.1 Public entrances. In addition to accessible entrances required by Sections 1105.1.1 through 1105.1.6, all public entrances shall be accessible.
1105.1.6 Tenant spaces. All entrances to tenant spaces that are required to be accessible shall be accessible entrances.
1105.1.6.1 Dwelling units and sleeping units. Doors and doorways at entrance(s) to Accessible units, including hardware, shall comply with Section 404 (Doors and doorways) of ICC A117.1. Doors and doorways, including hardware, at entrance(s) to Type B units shall comply with Section 1003.5 (Doors and doorways) of ICC A117.1. Exoptions: 1. An accessible entrance is not required to dwelling units and sleeping units that are not required to be Accessible units or Type B units. 2. Entrances to multistory dwelling or sleeping units in R-2 occupancy as provided in Section 1107.2.5 that are not on the primary entry story to the unit and are not part of the accessible route required in Exception 1 of Section 1107.2.5 shall not be required to be accessible.

SECTION BC 1107 DWELLING UNITS AND SLEEPING UNITS

1107.1 General. In addition to the other requirements of this chapter, occupancies having dwelling units or sleeping units shall be provided with accessible features in accordance with this section.
1107.2 Design. Dwelling units and sleeping units which are required to be Accessible units or Type B units shall comply with this code including Appendix P where applicable, and the applicable provisions in Chapter 10 of ICC A117.1. In addition, Type B units in R-2 occupancies shall comply with Sections 1107.2.1 through 1107.2.8. Units required to be Type B units are permitted to be designed and constructed as Accessible units.
1107.2.5 Type B multistory units in R-2 occupancy. Multistory dwelling or sleeping units shall comply with the following: 1. One of the stories with an accessible entrance shall be designated as the primary entry story to the unit; 2. All rooms, spaces and doors on the primary entry story shall comply with Section 1107.2, and 3. Rooms, spaces or doors located on other than the primary entry story, and interior routes thereto, need not comply with Section 1107.2 where the primary entry story contains equivalent functional facilities.

CHAPTER 12 INTERIOR ENVIRONMENT

BC 1203 VENTILATION

1203.4 Natural ventilation. Natural ventilation of occupy-able and habitable space shall be through openings to the outdoors. The openings shall be of a type permitted under Sections 1203.4.1.1, 1203.4.1.2, 1203.4.1.3 and 1203.4.1.4. The operating mechanism for such openings shall be provided with ready access so that the openings are readily controllable by the building occupants.
1203.4.1 Ventilation area required. Ventilation areas shall be as set forth in Sections 1203.4.1.1 through 1203.4.1.4.
1203.4.1.1 Occupy-able spaces. Where occupy-able spaces are not required to be provided with mechanical ventilation in accordance with the New York City Mechanical Code, natural ventilation shall be provided in accordance with Section 1203.4.1.1. Openings providing required natural ventilation to occupy-able spaces shall be windows, doors, louvers, skylights or other similar ventilating openings. Exoptions: 1. Bathrooms and toilet rooms in R or I-1 occupancies shall comply with Section 1203.4.1.3. 2. Kitchensettes in R or I-1 occupancies shall comply with Section 1203.4.1.4.
1203.4.1.2 Habitable spaces. All habitable spaces shall be provided with natural ventilation in accordance with Section 1203.4.1.2. Openings providing required natural ventilation to habitable spaces shall be windows and/or glazed doors.
1203.4.1.2.1 Minimum opening. The minimum open-able area to the outdoors shall be 5 percent of the floor area of the habitable space being ventilated. Every opening providing required natural ventilation shall be at least 12 square feet (1.1 m2) of glazed area, providing a minimum of 6 square feet (0.56 m2) of open-able area.
1203.4.1.2.4 Maximum depth of room. No part of any room shall be more than 30 feet (914 mm) from a window opening onto a street or yard unless such room also opens onto a court complying with Section 1206. Exoption: In dwelling units containing more than three habitable rooms in Group R-1 or R-2 occupancies in buildings of Type I or II construction, rooms may be greater than 30 feet (914 mm) in depth provided that all other requirements of Section 1203.4.1.2 are met and that the required windows are so located as to properly light all portions of the room in accordance with Section 1205.
1203.4.1.3 Bathrooms and toilet rooms in R and I-1 occupancies. Bathrooms or toilet rooms in R or I-1 occupancies shall be provided with natural ventilation in accordance with Section 1203.4.1.3, unless provided with exhaust ventilation in accordance with the New York City Mechanical Code. Openings providing required natural ventilation shall be windows.
1203.4.1.4. Kitchensettes in R and I-1 occupancies. Kitchensettes in R or I-1 occupancies shall be provided with natural ventilation in accordance with Section 1203.4.1.4, unless provided with exhaust ventilation in accordance with the New York City Mechanical Code. Openings providing required natural ventilation shall be windows.

SECTION BC 1205 LIGHTING

1205.1 General. Every room and space in every building shall be provided with artificial light in accordance with Section 1205.3. Every habitable room and space shall also be provided with natural light by means of exterior glazed openings in accordance with Section 1205.2 Natural light. Every opening providing required natural light shall be so located so as to properly light all portions of the room. Openings providing required natural light shall be windows and/or glazed doors.
1205.2.1 Minimum opening. The minimum net glazed area shall not be less than 10 percent of the floor area of the room served. Every opening providing required natural light shall be at least 12 square feet (1.1m2) of glazed area.
1205.2.4 Maximum depth of room. No part of any room shall be more than 30 feet (914 mm) from a window opening on a street or yard unless such room also opens onto a legal court. Exception: In dwelling units containing more than three habitable rooms in R-1 or R-2 occupancies in buildings of Type I or II construction, rooms may be greater than 30 feet (914 mm) in depth provided that all other requirements of Section 1205.2 are met and that the required windows are located so as to properly light all portions of the room.
SECTION BC 1207 SOUND TRANSMISSION
1207.1 Scope. This section shall apply to common interior walls, partitions and floor/ceiling assemblies between adjacent dwelling units, between dwelling units and adjacent mechanical equipment spaces, or between dwelling units and adjacent public areas such as halls, corridors, stairs or service areas
1207.2 Air-borne sound. Walls, partitions and floor/ceiling assemblies separating dwelling units from each other, from public or service areas, from stairs or from mechanical equipment spaces, including boiler rooms, or elevator or other shafts shall have a sound transmission class (STC) for air-borne noise of not less than 50 based upon laboratory measurements made in accordance with ASTM E 90, or not less than 45 if field tested in accordance with ASTM E 336. Dwelling unit: entrance doors shall be installed as assemblies having an STC of not less than 35 based upon laboratory measurements made in accordance with ASTM E 1408. Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, bathtubs, soffits, or heating, ventilating or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings.
1207.2.1 Machine and equipment rooms. Elevator machine rooms and machinery spaces containing equipment totaling more than 75 rated h.p. shall not be located vertically or horizontally adjacent to dwelling units unless the total sound power level output of all the equipment in the machine room or space is certified not to exceed the maximum sound power levels of Table 1207.2.1 in any octave band.
1207.3 Structure-borne sound. Floor/ceiling assemblies between dwelling units or between a dwelling unit and a public or service area stair, exterior mechanical equipment, or other mechanical equipment space, including boiler rooms, shall be constructed of assemblies having an impact insulation class (IIC) rating of not less than 50 based upon laboratory measurements made in accordance with ASTM E 492, or not less than 45 if field tested in accordance with ASTM E 1007 in completed construction. See Chapter 30 for additional sound control requirements for elevator machinery.
1207.3.1 Refuse chutes. Metal refuse chutes, metal chute supports, and/or metal chute bracing shall be free of direct contact with the shaft enclosure and the openings provided in the floor construction. Metal chutes shall be resiliently supported at each structural support location. Isolators shall provide a minimum static deflection of 0.3 inches (7.62 mm). All chutes shall be plumb.

BC 1208 INTERIOR SPACE DIMENSIONS

1208.1 Minimum room widths. Habitable spaces, other than a kitchen, shall not be less than 8 feet (2438 mm) in any plan dimension. Kitchens and kitchensettes shall have a clear passageway of not less than 3 feet (914 mm) between counter fronts and appliances or counter fronts and walls. Exoptions: 1. A room that complies with the requirements for natural light and natural ventilation and in addition has an unobstructed opening of not less than 60 square feet (5.6m2) into an immediately adjoining room shall not be less than 7 feet (2134 mm) in any plan dimension. 2. A habitable dining space that complies with the requirements for natural light and natural ventilation may be less than 8 feet (2438 mm) in any plan dimension. 3. One-half the number of bedrooms in a dwelling unit containing three or more bedrooms shall not be less than 7 feet (2134 mm) in any plan dimension. 4. A room in a Group R-1 dwelling or sleeping unit shall not be less than 6 feet (1829 mm) in any plan dimension.
1208.2 Minimum ceiling heights. Habitable rooms and spaces shall have a ceiling height of not less than 8 feet (2438 mm). Occupy-able spaces and corridors shall have a ceiling height of not less than 7 feet 6 inches (2286 mm). Bathrooms, toilet rooms, kitchens in other than I-1 and R occupancies, kitchensettes in I-1 or R occupancies, storage rooms and laundry rooms shall be permitted to have a ceiling height of not less than 7 feet (2134 mm). All measurements shall be taken from the finished floor to the finished underside of the ceiling or ceiling beams.
1208.3 Room area. Minimum net floor areas of rooms shall be in accordance with Sections 1208.3.1 and 1208.3.2.
1208.3.1 Habitable rooms and spaces. Every habitable room or space shall have not less than 80 square feet (7.4m2) in net floor area.
1208.3.2 Dwelling units. In a dwelling unit, at least one habitable room shall have not less than 150 square feet (13.9 m2) of net floor area.

SECTION BC 1210 SURROUNDING MATERIALS

1210.1 Floors. Toilet and bathing room floors shall have a smooth, hard, nonabsorbent surface that extends upward onto the walls at least 6 inches (152 mm).
1210.2 Walls. Walls within 2 feet (610 mm) of urinals and water closets shall have a smooth, hard, nonabsorbent surface, to a height of 4 feet (1219 mm) above the floor, and except for structural elements, the materials used in such walls shall be of a type that is not adversely affected by moisture. Exoptions: 1. Dwelling units. 2. Toilet rooms that are not accessible to the public and which have not more than one water closet. Accessories such as grab bars, towel bars, paper dispensers and soap dishes, provided on or within walls, shall be installed and sealed to protect structural elements from moisture.
1210.3 Showers. Shower compartments and walls above bathtubs with installed shower heads shall be finished with a smooth, nonabsorbent surface to a height not less than 70 inches (1778 mm) above the drain inlet.
1210.4 Waterproof joints. Built-in tubs with showers shall have waterproof joints between the tub and adjacent wall.
1210.5 Toilet rooms. Toilet rooms shall not open directly into a room used for the preparation of food for service to the public. In multiple dwellings no toilet room or bathroom shall open onto any kitchen or kitchensette

SECTION BC 1211 KITCHENS AND KITCHENETTES

1211.1 Sleeping. No kitchen or kitchensette shall be occupied for sleeping purposes.
1211.2 Kitchensettes in multiple dwellings. Except at entrances thereto, every kitchensette in a multiple dwelling shall be surrounded by partitions extending from floor to ceiling, and/or by a soffit dropped 1 foot (305 mm) from the ceiling

SECTION BC 1213 REFUSE AND RECYCLABLE STORAGE

1213.1 General. Multiple dwellings shall comply with Section 81 of the New York State Multiple Dwelling Law and Section 27-2021 of the New York City Housing Maintenance Code. Where a room is provided for the storage of refuse and recyclables in a building, such room shall be completely enclosed by construction that has a fire-resistance rating of not less than 2 hours, with self-closing opening protective having a fire protection rating of not less than 11/2 hours. The location of such refuse storage room shall be identified on the construction documents.

CHAPTER 13 ENERGY EFFICIENCY

1301.1.1 Criteria. Buildings shall be designed and constructed in accordance with the Energy Conservation Construction Code of New York State.

CHAPTER 17 STRUCTURAL TESTS AND SPECIAL INSPECTIONS

SECTION BC 1704 SPECIAL INSPECTIONS

1704.1 General. Where application is made for construction as described in this section, one or more special inspectors shall be employed by the owner to provide inspections during construction on the types of work listed under Section 1704 and elsewhere in this code. The special inspector shall be acceptable to the registered design professional of record. The following special inspectors shall be required under section 80 applicable

JEFFREY KAMEN ARCHITECT

**33 BOND STREET
New York, NY 10013
212.979.9286**

REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
|-----|------|-------------|

DATE ISSUED TO NO.

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

**821 BEDFORD AVENUE
BROOKLYN, NY**

DRAWING:

BC NOTES

DOB JOB NO.

DRAWING #:

A-501.00

DATE: 10/09/11 DRAWING BY: JF

SCALE: NOTED CHK BY: DL

COMM. NO. DWG. 11 OF 12

DRAWING: 2008 BUILDING CODE NOTES

JEFFREY KAMEN ARCHITECT

33 BOND STREET New York, NY 10013 212.979.9286

REVISIONS

Table with columns: NO., DATE, DESCRIPTION

DATE ISSUED TO NO.

Table for tracking issued dates and numbers

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

821 BEDFORD AVENUE BROOKLYN, NY

DRAWING:

ENERGY CODE

DOB JOB No.

DRAWING #:

EN-000.00

DATE: 10/09/11 DRAWING BY: JF

SCALE: NOTED CHK BY: DL

COMM. NO. 12 OF 12



2010 New York Energy Conservation Construction Code

Section 1: Project Information

Project Type: New Construction
Project Title: 821 Bedford Ave.
Construction Site:
Owner/Agent:
Designer/Contractor:

Section 2: General Information

Building Location (for weather data): Kings, New York
Climate Zone: 4a
Building Type for Envelope Requirements: Residential
Vertical Glazing / Wall Area Pct: 18%
Activity Type(s): Residential (Multi-Family)
Floor Area: 9625

Section 3: Requirements Checklist

Envelope PASSES: Design 4% better than code

Climate-Specific Requirements:

Table with columns: Component Name/Description, Gross Area or Perimeter, Cavity R-Value, Cont. R-Value, Proposed U-Factor, Budget U-Factor

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

Air Leakage, Component Certification, and Vapor Retarder Requirements:

- 1. All joints and penetrations are caulked, gasketed, weather-stripped, or otherwise sealed.
2. Windows, doors, and skylights certified as meeting leakage requirements.
3. Component R-values & U-factors labeled as certified.

Section 4: Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed envelope system has been designed to meet the 2010 New York Energy Conservation Construction Code requirements in COMcheck Version 3.8.2 and to comply with the mandatory requirements in the Requirements Checklist.

When a Registered Design Professional has stamped and signed this page, they are attesting that to the best of his/her knowledge, belief, and professional judgment, such plans or specifications are in compliance with this Code.

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 1 of 8

Name - Title Signature Date

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 2 of 8



2010 New York Energy Conservation Construction Code

Section 1: Project Information

Project Type: New Construction
Project Title: 821 Bedford Ave.
Construction Site:
Owner/Agent:
Designer/Contractor:

Section 2: Interior Lighting and Power Calculation

Table with columns: Area Category, Floor Area (sq ft), Allowed Watts / ft2, # of Fixtures, Allowed Watts (B x C), Total Allowed Watts

Section 3: Interior Lighting Fixture Schedule

Table with columns: Fixture ID, Description / Lamp / Wattage Per Lamp / Ballast, Lamp / Fixture, # of Fixtures, Watt, (C x D)

Section 4: Requirements Checklist

Lighting Wattage:

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

Allowed Watts: 6738
Proposed Watts: 320
Complies: YES

Exterior Lighting:

- 2. Comply with Sections 401.3.1 and 401.3.1.1 of 90.1-1989 Code and attach documentation.

Controls, Switching, and Wiring:

- 3. Master switch at entry to hotel/motel guest room.
4. Minimum of one manual control for each space with no task activity (i.e. storage). Multiple manual controls, occupancy sensor, automatic timer, or dimmer in other spaces.

Exceptions:

- Lighting for emergency or exit egress or intended for continuous operation.
5. Photoelectric/astrometrical time switch on exterior lights.

Exceptions:

- Lighting intended for 24 hour use.
6. Tandem wired one-lamp and three-lamp ballasted luminaires (No single-lamp ballast).

Exceptions:

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 3 of 8



2010 New York Energy Conservation Construction Code

Section 1: Project Information

Project Type: New Construction
Project Title: 821 Bedford Ave.
Exterior Lighting Zone: 2 (Residentially zoned area)
Construction Site:
Owner/Agent:
Designer/Contractor:

Section 2: Exterior Lighting Area/Surface Power Calculation

Table with columns: Exterior Area/Surface, Quantity, Allowed Watts / Unit, Tradable Watts (B x C), Allowed Proposed Watts, Total Allowed Watts, Total Tradable Watts, Total Allowed Supplemental Watts

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

Section 3: Exterior Lighting Fixture Schedule

Table with columns: Fixture ID, Description / Lamp / Wattage Per Lamp / Ballast, Lamp / Fixture, # of Fixtures, Watt, (C x D)

Section 4: Requirements Checklist

Lighting Wattage:

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

Compliance: Passes

Controls, Switching, and Wiring:

- 2. All exemption claims are associated with fixtures that have a control device independent of the control of the nonexempt lighting.
3. All lighting fixtures are controlled by a photosensor or astronomical time switch that is capable of automatically turning off the fixture when sufficient daylight is available or the lighting is not required.

Exceptions:

- Covered vehicle entrance/exit areas requiring lighting for safety, security and eye adaptation.

Exterior Lighting Efficacy:

- 4. All exterior building grounds luminaires that operate at greater than 100W have minimum efficacy of 90 lumen/watt.

Exceptions:

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 5 of 8

- Lighting that has been claimed as exempt and is identified as such in Section 3 table above.
Lighting that is specifically designated as required by a health or life safety statute, ordinance, or regulation.
Emergency lighting that is automatically off during normal building operation.
Lighting that is controlled by motion sensor.

Section 5: Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2010 New York Energy Conservation Construction Code requirements in COMcheck Version 3.8.2 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title Signature Date

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 6 of 8



2010 New York Energy Conservation Construction Code

Section 1: Project Information

Project Type: New Construction
Project Title: 821 Bedford Ave.
Construction Site:
Owner/Agent:
Designer/Contractor:

Section 2: General Information

Building Location (for weather data): Kings, New York
Climate Zone: 4a

Section 3: Mechanical Systems List

- 4 HVAC Systems (Single Zone)
Heating: 4 each - Duct Furnace, Gas, Capacity = 80 kBtu/h, Efficiency = 85.0% DOE
Cooling: 4 each - Split System, Capacity = 80 kBtu/h, Efficiency = 15.00 EER, Air-Cooled Condenser, Air Economizer
4 Water Heaters: Gas Storage Water Heater, Capacity: 75 gallons, Input Rating: 75 Gbh, Efficiency: 82.00 EF

Section 4: Requirements Checklist

Requirements Specific To: HVAC Systems:

- 1. Equipment minimum efficiency: Duct Furnace (Btu): 80.0% DOE
2. Equipment minimum efficiency: Split System: 15.0 EER
3. Cooling system provides a means to relieve excess outdoor air during economizer operation.
4. Integrated air economizer required.
5. Hot gas bypass limited to 50% of total cooling capacity.

Requirements Specific To: Water Heaters:

- 1. Gas Storage Water Heater efficiency: 0.5 EF
2. First 5 ft of outlet piping is insulated.
3. Hot water storage temperature adjustable down to 120°F or lower.
4. Heat traps provided on inlet and outlet of storage tanks.

Generic Requirements: Must be met by all systems to which the requirement is applicable:

- 1. Plant equipment and system capacity no greater than needed to meet loads.
Exception: Standby equipment automatically off when primary system is operating.
Exception: Multiple units controlled to sequence operation as a function of load.
2. Minimum one temperature control device per system.
3. Minimum one humidity control device per installed humidification/dehumidification system.
4. Load calculations per ASHRAE/ACCA Standards 185.
5. Automatic Controls: Setback to 55°F (heat) and 65°F (cool), 7-day clock, 2-hour occupant override, 10-hour backup.
Exception: Continuously operating zones.
Exception: 2 kW demand or less, submit calculations.
6. Outside-air source for ventilation, system capable of reducing OSA to required minimum.
7. R-5 supply and return air duct insulation in unconditioned spaces.

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 7 of 8

- Luminaires with three lamp ballasts (or electronic high-frequency single-lamp ballasts).

Interior Lighting PASSES: Design 95% better than code

Section 5: Compliance Statement

Compliance Statement: The proposed lighting design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed lighting system has been designed to meet the 2010 New York Energy Conservation Construction Code requirements in COMcheck Version 3.8.2 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title Signature Date

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 4 of 8

R-8 supply and return air duct insulation outside the building

R-8 insulation between ducts and the building exterior when ducts are part of a building assembly

Exception: Ducts located within equipment.

- 8. Mechanical fanless and fans used to connect ducts and air distribution equipment.
9. Ducts sealed - longitudinal seams on rigid ducts, transverse seams on all ducts, UL 181A or 181B tapes and mastics.

10 Hot water pipe insulation: 1.5 in. for pipes <= 1.5 in. and 2 in. for pipes > 1.5 in.

Chilled water/ refrigerant pipe insulation: 1.5 in. for pipes <= 1.5 in. and 2 in. for pipes > 1.5 in.

Steam pipe insulation: 1.5 in. for pipes <= 1.5 in. and 3 in. for pipes > 1.5 in.

Exception: Piping within HVAC equipment.

Exception: Fluid temperatures between 55 and 105°F.

Exception: Fluid not heated or cooled with renewable energy.

Exception: Piping within room fan-coil (with AHR340 rating) and unit ventilators (with AHR340 rating).

Exception: Runouts < 4.8 in. length.

11. Operation and maintenance manual provided to building owner.

12 Piping, insulated to 1/2 in. if nominal diameter of pipe is < 1.5 in.;

Larger pipe insulated to 1 in. thickness.

13. Lavatory faucet outlet temperatures in public restrooms limited to 110°F (43°C).

14. Thermostatic controls have 5°F deadband.

Exception: Thermostats requiring manual changeover between heating and cooling.

Exception: Special occupancy or special applications where wide temperature ranges are not acceptable and are approved by the authority having jurisdiction.

15. Balancing devices provided in accordance with IMC (2006) 603.1.7.

16. Demand control ventilation (DCV) present for high design occupancy areas (>40 person/1000 sq ft) and served by systems with any one of 1) an air-side economizer, 2) automatic modulating control of the outdoor air damper, or 3) a design outdoor airflow greater than 3000 cfm.

Exception: Systems with heat recovery.

Exception: Multiple-zone systems without DDC of individual zones communicating with a central control panel.

Exception: Systems with a design outdoor airflow less than 1200 cfm.

Exception: Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1200 cfm.

17. Motorized, automatic shutoff dampers required on exhaust and outdoor air supply openings.

Exception: Gravity dampers acceptable in buildings < 2 stories.

Exception: Gravity dampers acceptable in systems with outside or exhaust air flow rates less than 300 cfm where dampers are interlocked with fan.

18. Automatic controls for freeze protection on systems present.

19. Exhaust air heat recovery included for systems 5,000 cfm or greater with more than 70% outside air fraction or specifically exempted.

Exception: Hazardous exhaust systems, commercial kitchen and clothes dryer exhaust systems that the International Mechanical Code prohibits the use of energy recovery systems.

Exception: Systems serving spaces that are heated and not cooled to less than 60°F.

Exception: Where more than 60 percent of the outdoor heating energy is provided from site-recovered or site solar energy.

Exception: Heating systems in climates with a 1 percent cooling design wet-bulb temperature less than 64°F.

Exception: Systems requiring dehumidification that employ energy recovery in series with the cooling coil.

Exception: Laboratory fume hood exhaust systems that have either a variable air volume system capable of reducing exhaust and makeup air volume to 50 percent or less of design values or, a separate make-up air supply meeting the following makeup air requirements: a) at least 75 percent of exhaust flow rate; b) heated to no more than 2°F below room setpoint temperature; c) cooled to no lower than 3°F above room setpoint temperature; d) no humidification added; e) no simultaneous heating and cooling.

Section 5: Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2010 New York Energy Conservation Construction Code requirements in COMcheck Version 3.8.2 and to comply with the mandatory requirements in the Requirements Checklist.

Name - Title Signature Date

Project Title: 821 Bedford Ave.
Data filename: C:\Users\Joseph\Documents\My Dropbox\Projects\821 Bedford Ave\Com Check\821 Bedford Ave. cck
Report date: 10/09/11
Page 8 of 8

JEFFREY KAMEN ARCHITECT

33 BOND STREET
New York, NY 10013
212.979.9286

| REVISIONS | | |
|-----------|------|-------------|
| NO. | DATE | DESCRIPTION |
| | | |
| | | |
| | | |
| | | |

DATE ISSUED TO NO.

| | | |
|--|--|--|
| | | |
| | | |
| | | |
| | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

821 BEDFORD AVENUE
BROOKLYN, NY

DRAWING:

FLOOR PLANS

DOB JOB No.

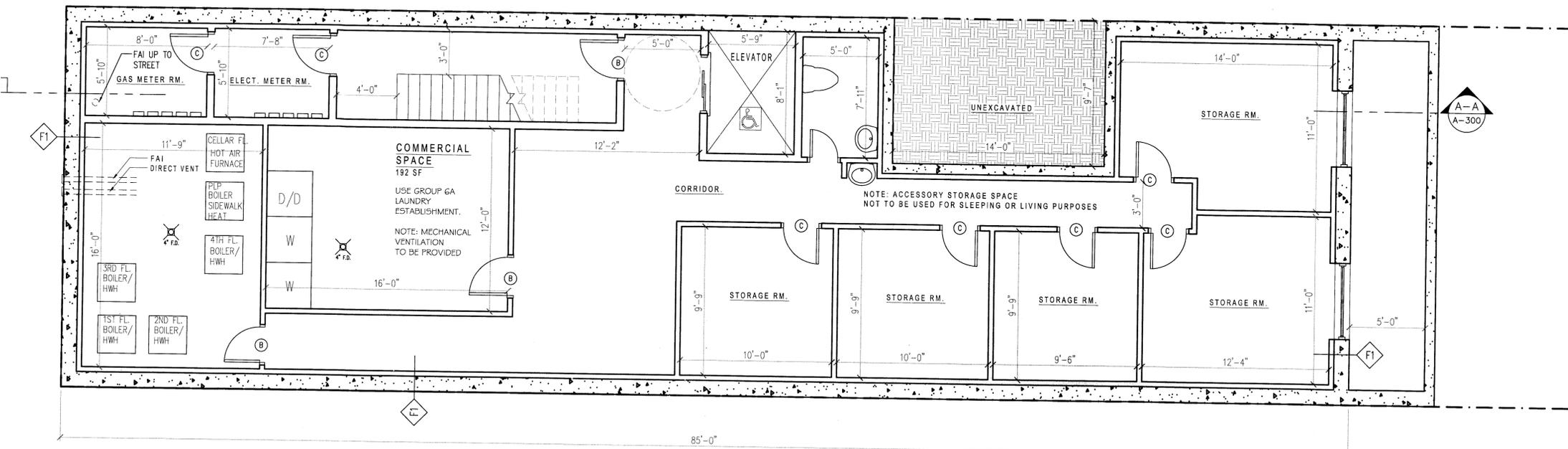
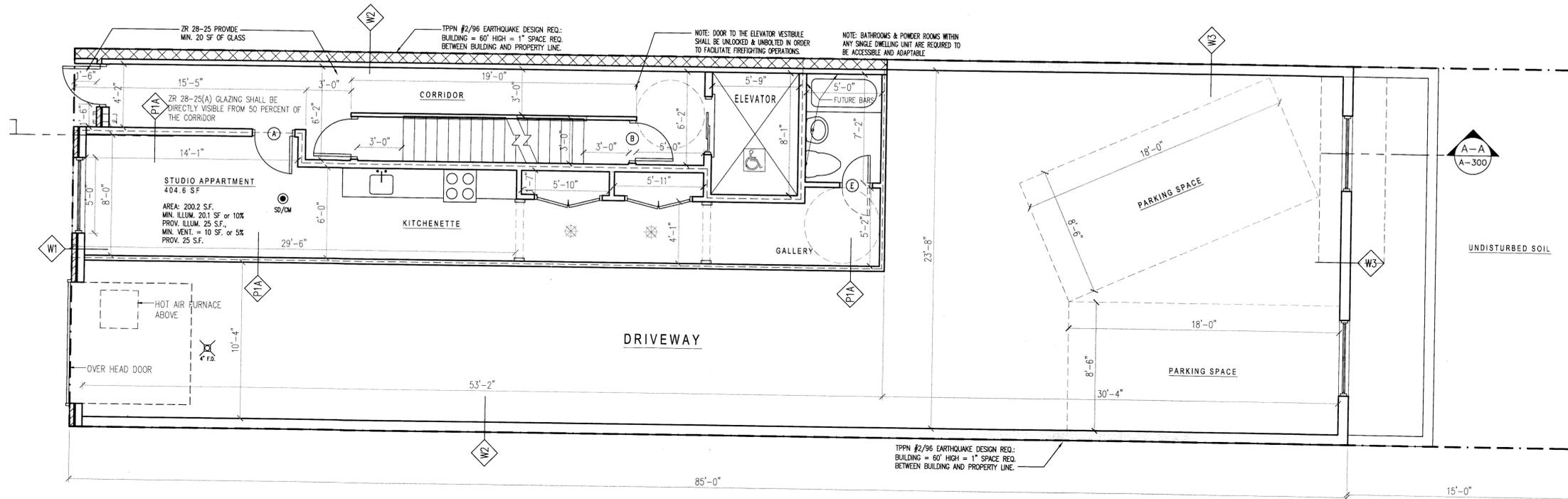
DRAWING #:

A-100.00

DATE: 11/22/11 DRAWING BY: JF

SCALE: NOTED CHK BY: DL

COMM. NO. DWG. 3 OF 12



DRAWINGS: FLOOR PLANS

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

**JEFFREY KAMEN
ARCHITECT**

**33 BOND STREET
New York, NY 10013
212.979.9286**

| REVISIONS | | |
|-----------|------|-------------|
| NO. | DATE | DESCRIPTION |
| | | |
| | | |
| | | |

DATE ISSUED TO NO.

| | | |
|--|--|--|
| | | |
| | | |
| | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

**821 BEDFORD AVENUE
BROOKLYN, NY**

DRAWING:

FLOOR PLANS

DOB JOB No.

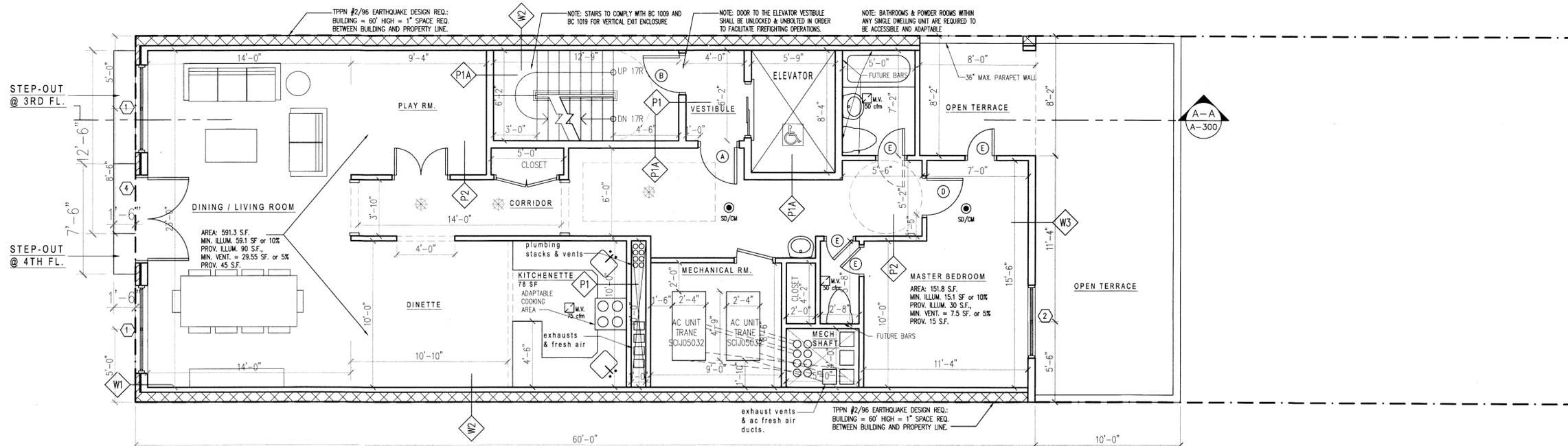
DRAWING #:

A-101.00

DATE: 11/22/11 DRAWING BY: JF

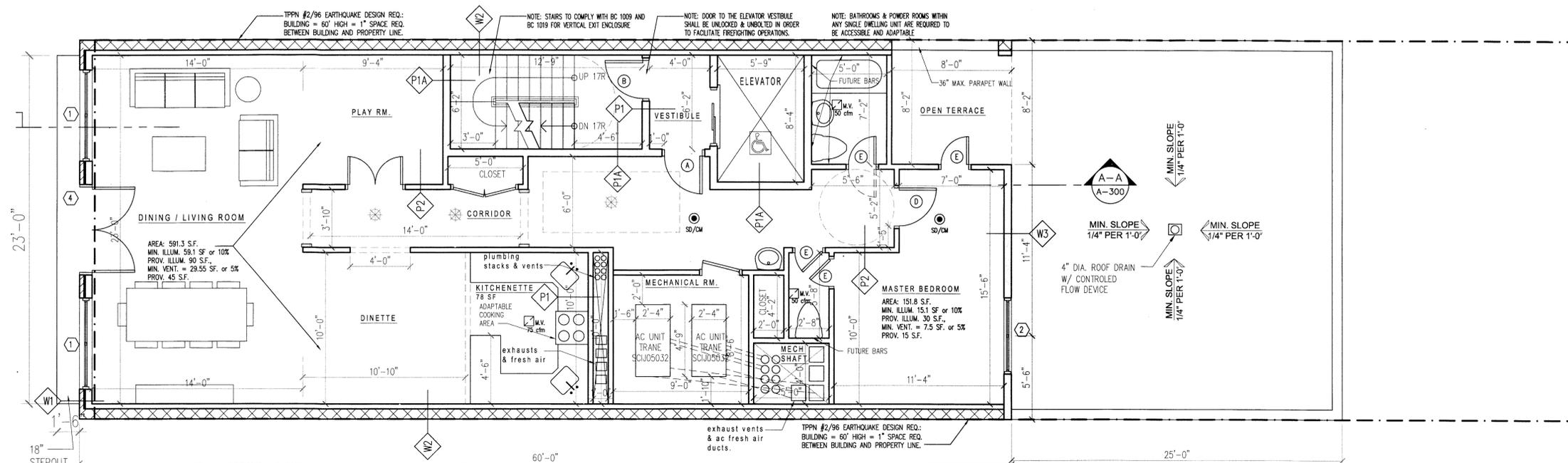
SCALE: NOTED CHK BY: DL

COMM. NO. DWG. 4 OF 12



PROPOSED 3RD & 4TH FLOOR PLAN

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



PROPOSED SECOND FLOOR PLAN

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

DRAWINGS: FLOOR PLANS

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

**JEFFREY KAMEN
ARCHITECT**

33 BOND STREET
New York, NY 10013
212.979.9286

| REVISIONS | | |
|-----------|------|-------------|
| NO. | DATE | DESCRIPTION |
| | | |
| | | |
| | | |

DATE ISSUED TO NO.

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

**821 BEDFORD AVENUE
BROOKLYN, NY**

DRAWING:

FLOOR PLANS

DOB JOB No.

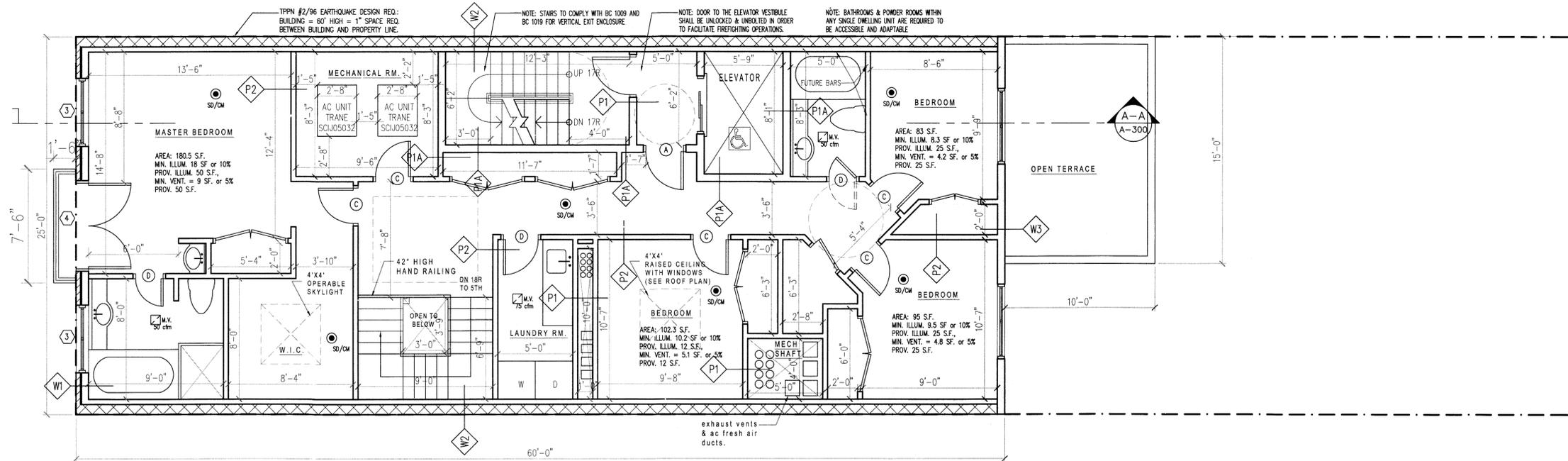
DRAWING #:

A-102.00

DATE: 12/09/11 DRAWING BY: JF

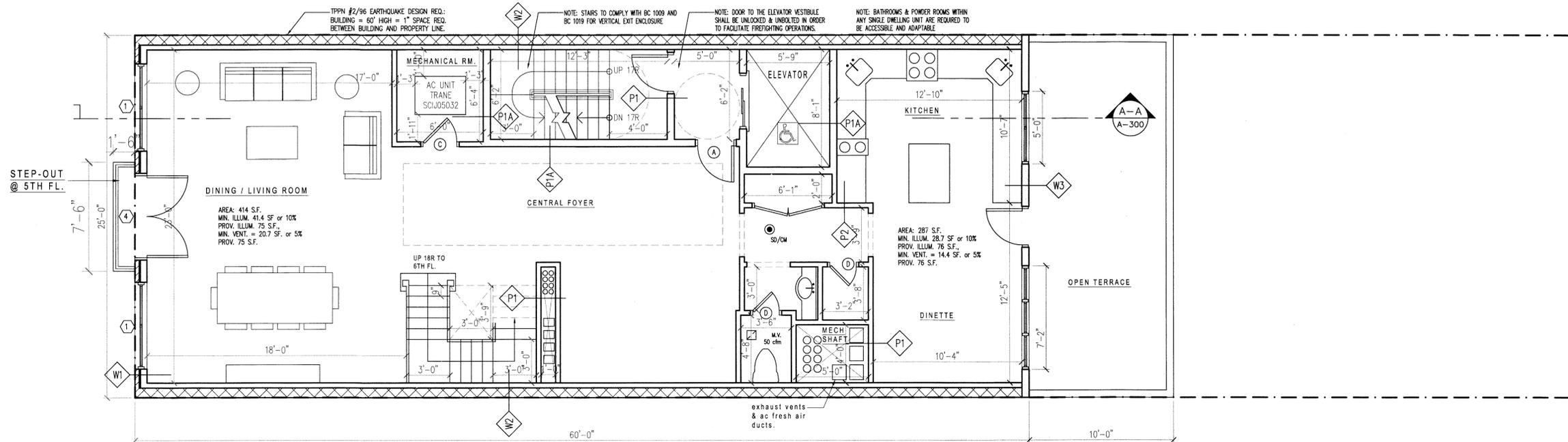
SCALE: NOTED CHK BY: DL

COMM. NO. DWG. 5 OF 12



PROPOSED 6TH FLOOR PLAN

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



PROPOSED 5TH FLOOR PLAN

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

DRAWINGS: FLOOR PLANS

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

JEFFREY KAMEN ARCHITECT

33 BOND STREET
New York, NY 10013
212.979.9286

| REVISIONS | | |
|-----------|------|-------------|
| NO. | DATE | DESCRIPTION |
| | | |
| | | |
| | | |

DATE ISSUED TO NO.

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

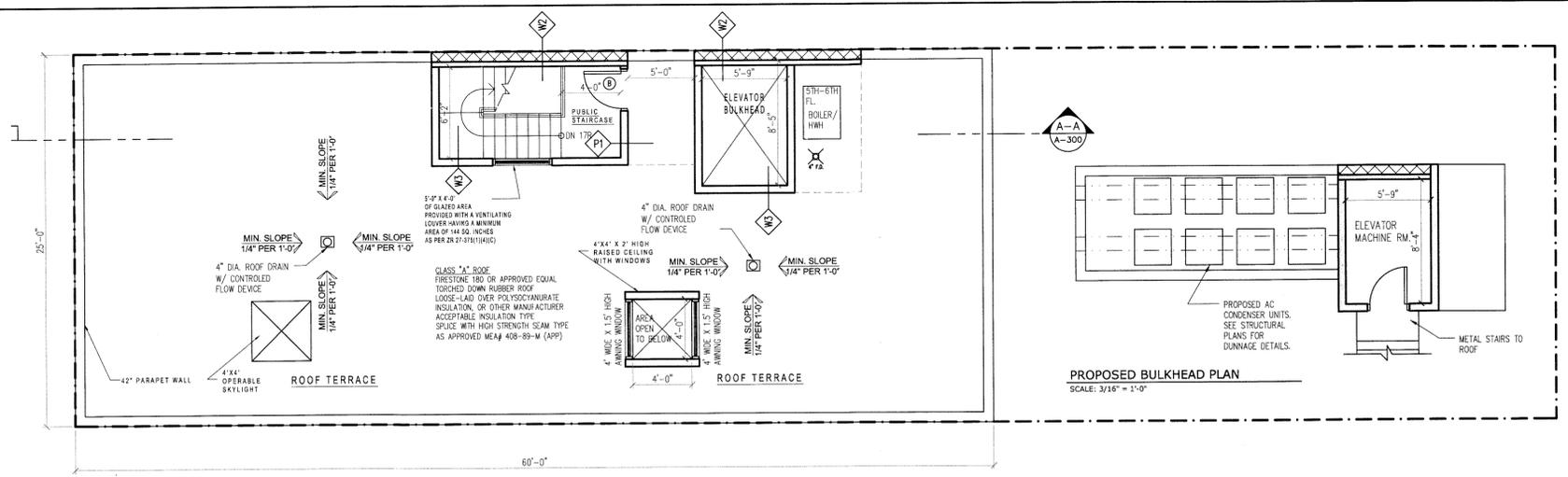
PROJECT:
821 BEDFORD AVENUE
BROOKLYN, NY

DRAWING:
BUILDING ELEVATIONS

DOB JOB No.
DRAWING #:

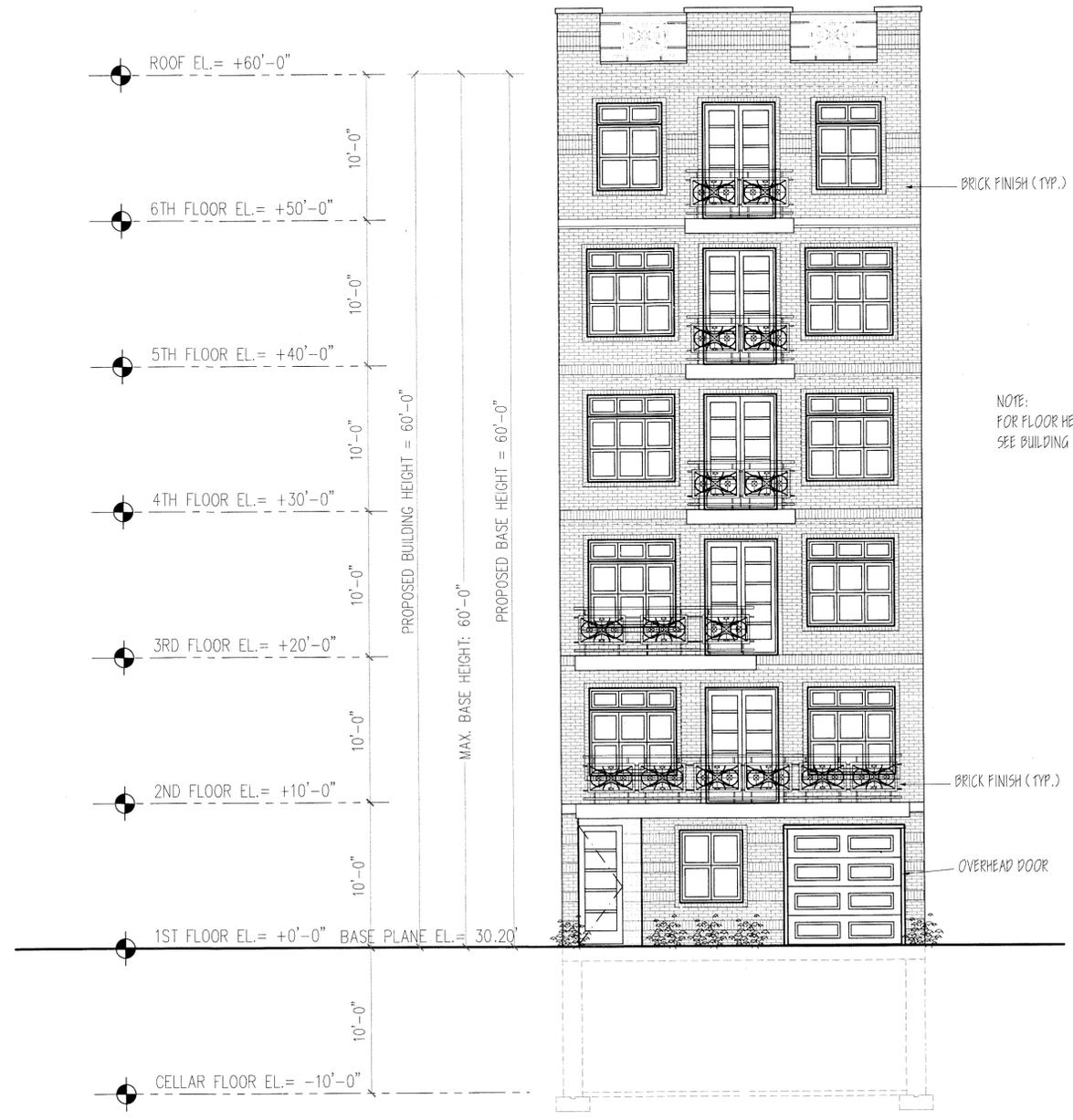
A-200.00

| | | | |
|-----------|----------|-------------|----|
| DATE: | 12/09/11 | DRAWING BY: | JF |
| SCALE: | NOTED | CHK BY: | DL |
| COMM. NO. | | DWG. OF | 12 |

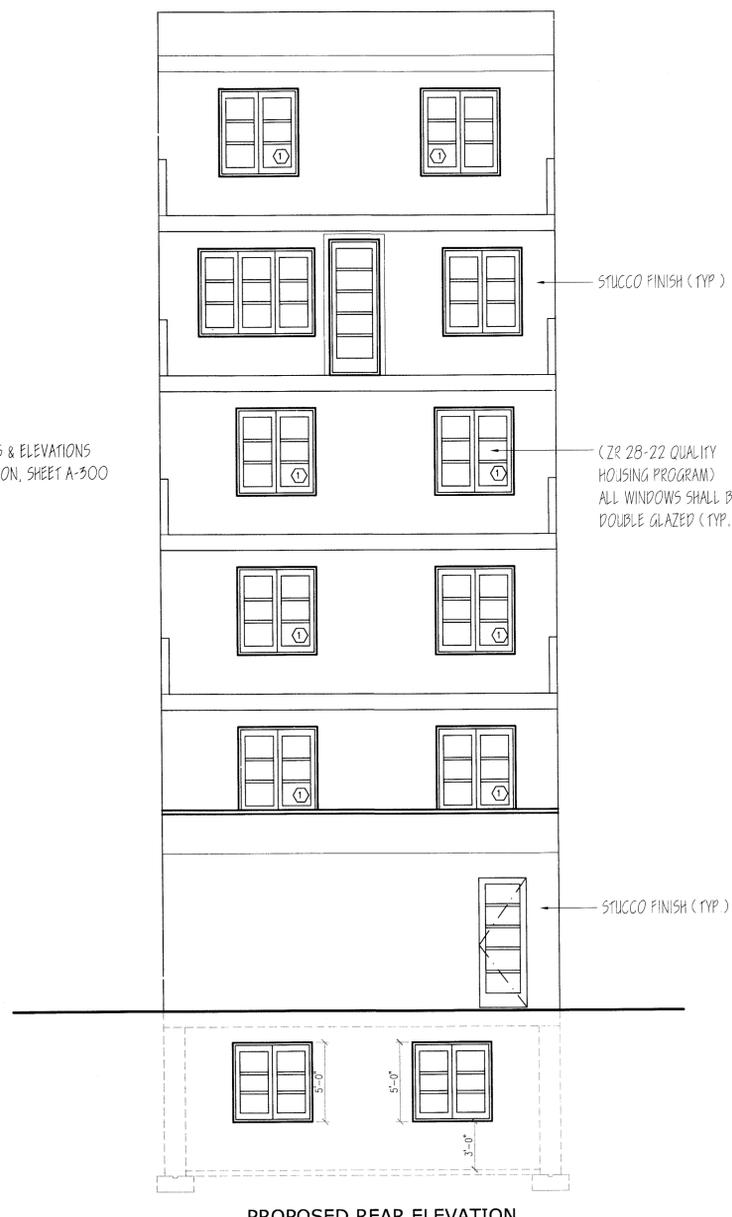


PROPOSED BULKHEAD PLAN
SCALE: 3/16" = 1'-0"

PROPOSED ROOF PLAN
SCALE: 3/16" = 1'-0"



PROPOSED FRONT ELEVATION
SCALE: 3/16" = 1'-0"



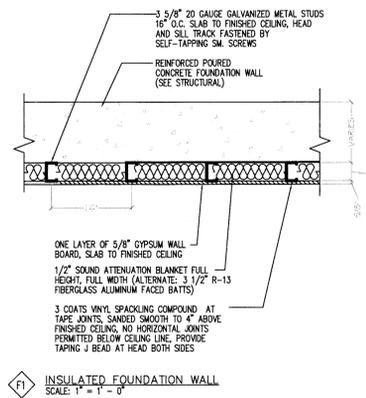
PROPOSED REAR ELEVATION
SCALE: 3/16" = 1'-0"

NOTE:
FOR FLOOR HEIGHTS & ELEVATIONS
SEE BUILDING SECTION, SHEET A-300

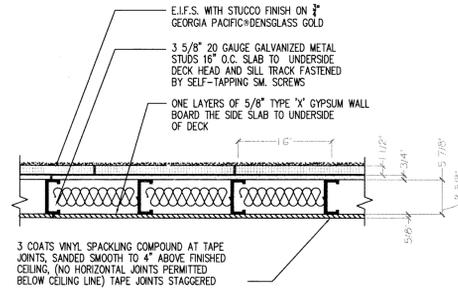
DRAWINGS: BUILDING ELEVATIONS

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

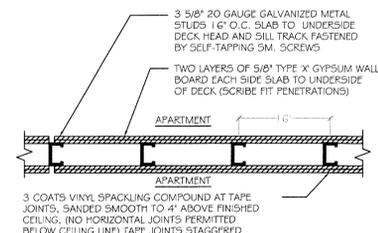
PROPOSED WALL TYPE DETAILS



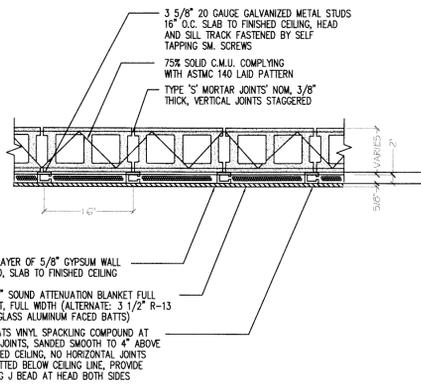
W1 INSULATED FOUNDATION WALL
SCALE: 1" = 1'-0"



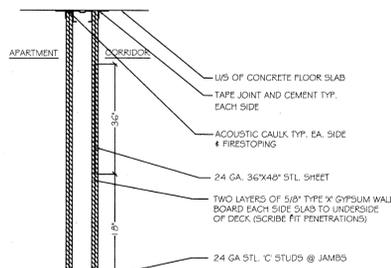
W3 2HR FIRE RATED LT. GAUGE BEARING WALL
DESIGN WP 1711 (GYPSUM ASSOCIATION)
MEA# 81-98-M (UL DESIGN #J419)
SCALE: 1" = 1'-0"



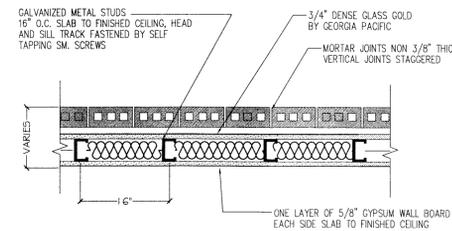
P1 2HR FIRE RATED DRYWALL ASSEMBLY
DESIGN WP 1711 (GYPSUM ASSOCIATION)
MEA# 81-98-M (UL DESIGN #J419)
SCALE: 1" = 1'-0"



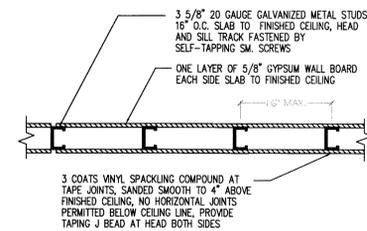
W2 3HR FIRE RATED FINISHED MASONRY BEARING WALL
U.L. DESIGN U905
SCALE: 1" = 1'-0"



P1A 2HR FIRE RATED DRYWALL ASSEMBLY
DESIGN WP 1711 (GYPSUM ASSOCIATION)
MEA# 84-98-5M
SCALE: 1" = 1'-0"

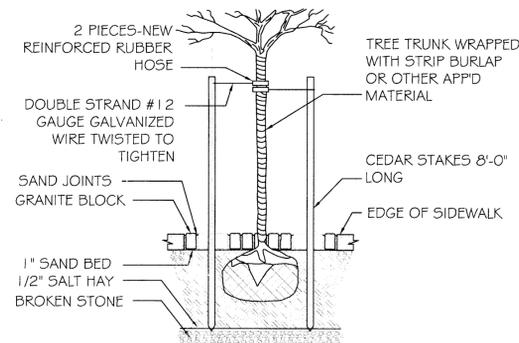


W1 2HR FIRE RATED INSULATED EXTERIOR BEARING WALL
U.L. DESIGN 0902
SCALE: 1" = 1'-0"

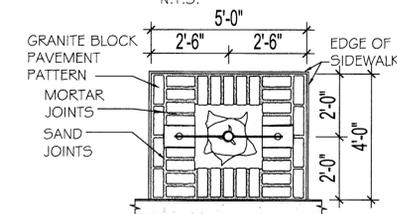


P2 UNRATED DRYWALL ASSEMBLY
SCALE: 1" = 1'-0"

P3 DRYWALL ASSEMBLY
SIMILAR TO P2 EXCEPT ON ONE SIDE SUBSTITUTE 5/8\"/>



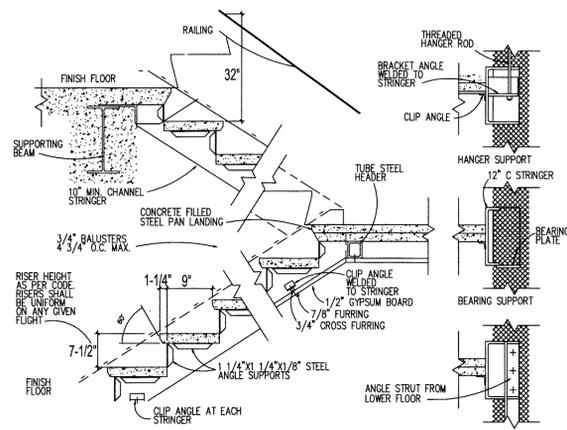
TREE SECTION DETAIL
N.T.S.



TREE PLAN DETAIL
N.T.S.

NOTES:

1. ALL MATERIALS AND CONSTRUCTION METHODS USED ARE TO CONFORM TO SECTION # 4.16 OF THE BUREAU OF HIGHWAY OPERATIONS SPECIFICATIONS, LATEST EDITION.
2. PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL OBTAIN THE NECESSARY PERMIT FROM THE DEPT. OF PARKS AND RECREATION FOR THE REMOVAL AND PLANTING OF TREES.
3. TREE PITS SHOULD BE LOCATED TWO (2) FEET MINIMUM FROM GAS, OIL OR WATER BOXES.
4. TREE STAKES ARE TO BE REMOVED BY THE TREE SUBCONTRACTOR NOT LESS THAN ONE YEAR AFTER PLANTING OF SAID TREES AND PRIOR TO THE FINAL ACCEPTANCE OF THE WORK.
5. USE OF SIDEWALK PAVEMENT MATERIALS OTHER THAN GRANITE BLOCK MUST BE SPECIFICALLY APPROVED, IN WRITING, BY THE BUREAU OF HIGHWAY OPERATIONS.
6. GRANITE BLOCK IN TREE PIT SHALL BE PAID FOR UNDER ITEM NO. 6.0G.



BUILDING METAL STAIR DETAIL
SCALE: NOT TO SCALE

INTERIOR DOOR SCHEDULE

| SYMBOL | DOOR SIZE | MATERIAL | SADDLE | REMARKS |
|--------|--------------|----------|--------|--|
| (A) | 3'-0"x6'-8" | MTL | ALUM. | 1 1/2 hr F.P.S.C. W/ PEEPHOLE & DOOR CHAIN |
| (B) | 2'-10"x6'-8" | MTL | ALUM. | 1 1/2 hr F.P.S.C. |
| (C) | 2'-10"x6'-8" | WOOD | N/A | |
| (D) | 2'-8"x6'-8" | WOOD | N/A | |

EXTERIOR WINDOW SCHEDULE:

| SYMBOL | ROUGH OPENING SIZE | | WINDOW TYPE | GRILLE PATTERN | EXTERIOR COLOR | ELEVATION OF WINDOW ABOVE FIN. FLOOR |
|-------------------------|--------------------|--------|---------------------------------------|----------------|----------------|--------------------------------------|
| | WIDTH | HEIGHT | | | | |
| EXTERIOR WINDOWS | | | | | | |
| 1 | 6'-0" | 6'-0" | 3 DOUBLE HUNG UNITS W/ TRANSOMS ABOVE | STANDARD | TAN | 24" |
| 2 | 6'-0" | 5'-0" | 2 DOUBLE HUNG UNITS | STANDARD | TAN | 36" |
| 3 | 4'-6" | 6'-0" | 2 DOUBLE HUNG UNITS W/ TRANSOMS ABOVE | STANDARD | TAN | 24" |
| 4 | 6'-0" | 8'-0" | 2 HINGED DOORS | STANDARD | TAN | N/A |

- All windows specified as shown per manufacturers specifications
 - Refer to manual for exact unit dimensions
 - All windows to be double insulated glass

DRAWING: WALL TYPES, DETAILS, DOOR & WINDOW SCHEDULES

JEFFREY KAMEN ARCHITECT

33 BOND STREET
New York, NY 10013
212.979.9286

| REVISIONS | | |
|-----------|------|-------------|
| NO. | DATE | DESCRIPTION |
| | | |

DATE ISSUED TO NO.

| | | | | |
|--|--|--|--|--|
| | | | | |
| | | | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:
821 BEDFORD AVENUE
BROOKLYN, NY

DRAWING:
DETAILS

DOB JOB NO.

DRAWING #:

A-400.00

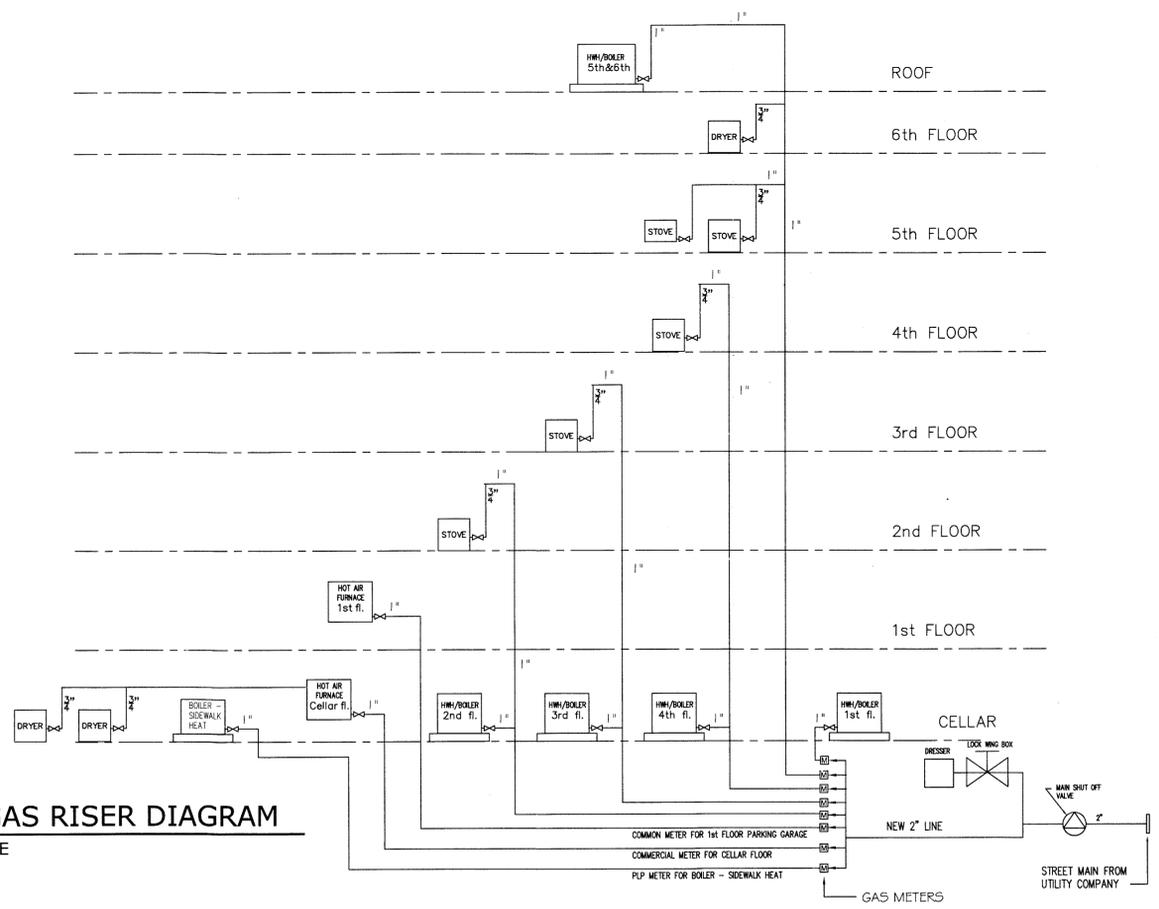
DATE: 11/22/11 **DRAWING BY:** JF

SCALE: NOTED **CHK BY:** DL

COMM. NO. **DWG. 8 OF 12**

JEFFREY KAMEN ARCHITECT
 33 BOND STREET
 New York, NY 10013
 212.979.9286

| REVISIONS | | |
|-----------|------|-------------|
| NO. | DATE | DESCRIPTION |
| | | |



PROPOSED GAS RISER DIAGRAM
 SCALE: NOT TO SCALE

PLUMBING NOTES

1. COMPLETE PLUMBING SYSTEM & DRAINAGE SYSTEM INSTALLATION SHALL COMPLY WITH ARTICLE 16 & RS16-1.
2. PROVIDE CLEANOUT AT BASE OF ALL STACKS.
3. PROVIDE AIR CHAMBERS AT TOP OF WATER RISERS MIN 18" TO 1" DIAMETER.
4. STANDARD WEIGHT BLACK STEEL PIPE FOR GAS SYSTEM WITH GALVANIZED STEEL FITTINGS.
5. FLOOR DRAINS SHALL BE PROVIDED WITH REMOVABLE STRAINER AS PER RS 16.
6. TRAPS FOR FLOOR DRAINS SHALL BE DEEP SEAL TYPE.
7. ROOF GUTTERS SHALL BE AS PER RS 16-19.
8. PLUMBING CONTRACTOR SHALL VERIFY ALL INVERT AND EXISTING CONDITIONS PRIOR TO THE INSTALLATION OF NEW WORK.
9. ALL HOT AND COLD WATER LINES TO BE INSULATED WITH 1" FIBERGLASS FOIL BACKED.
10. PROVIDE SHUT OFF VALVES ON ALL WATER SUPPLIES IN FIXTURE.
11. PURGE ALL WATER AND GAS LINES BEFORE FINAL CONNECTIONS.

PLUMBING FIXTURE SCHEDULE

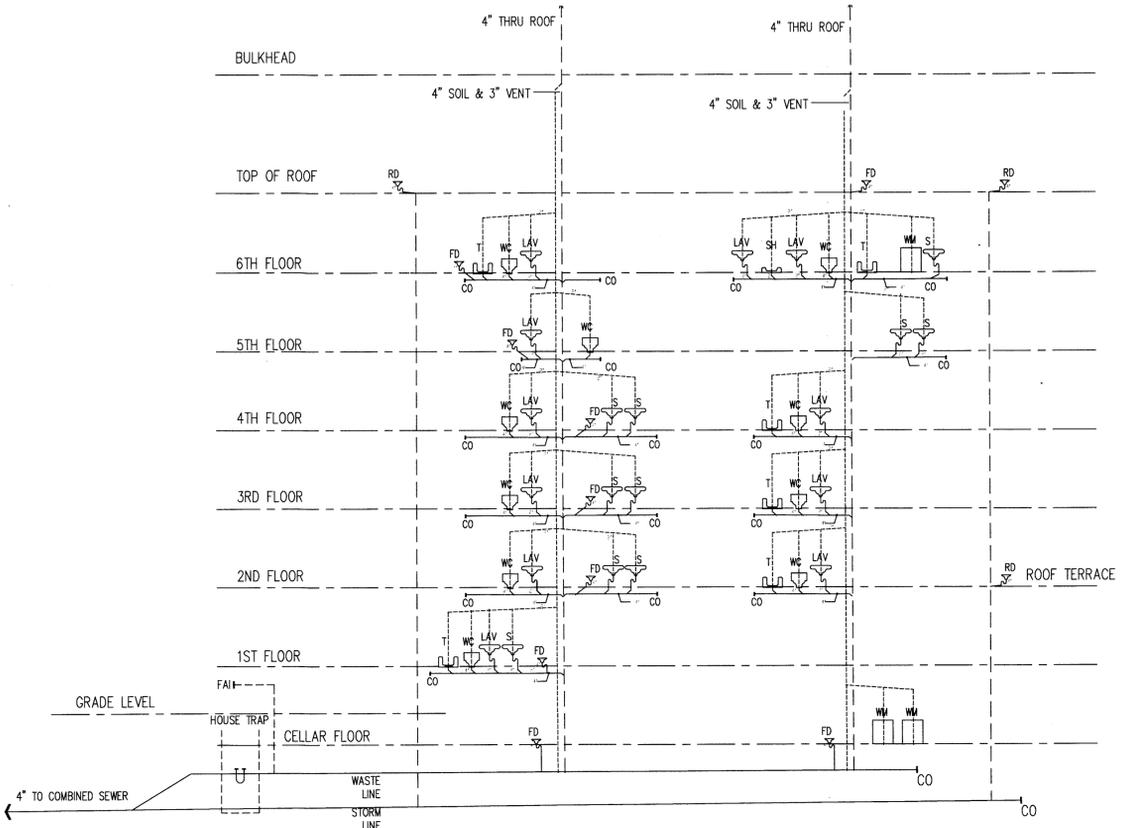
| FIXTURE | SYMBOL | SOIL | VENT | HOT WATER | COLD WATER |
|---|--------|------|--------|-----------|------------|
| WATER CLOSET | WC | 3" | 2" | | 2" |
| 1/2" FL MTD W/LOW SET TANK SILENT FLUSH | | | | | |
| LAVATORY | L | 2" | 1 1/2" | 1/2" | 1/2" |
| SINK | S | 2" | 1 1/2" | 1/2" | 1/2" |
| BATHTUB-C.I. | T | 2" | 1 1/2" | 1/2" | 1/2" |
| FD | | | | | |
| WASHING MACHINE | WM | 2" | 1 1/2" | 1/2" | 1/2" |

WASHING MACHINE WITH AMERICAN STANDARD OR EQUAL VACUUM BREAKER MEA# 40-70M AS PER MEMO 12 / 2/ 86.

NOTE:
 ALL EQUIPMENT MUST BE MEA/ BSA/ REF. STANDARD APPROVED

GAS PIPING NOTES

1. INSTALL GAS PIPING IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE NYC BUILDING CODE.
2. INSTALL ALL REQUIRED GAS VENTS IN ACCORDANCE WITH ALL APPLICABLE CODE REQUIREMENTS AND REFERENCE STANDARDS RS15, RS15-1, AND RS15-2.
3. ALL GAS PIPE MATERIAL AND PIPING, JOINTS OPERATING AT 1/2" PSIG, SHALL BE IN ACCORDANCE WITH DEPARTMENT OF BUILDINGS REQUIREMENTS AND ANSI Z 223-1-74 NATIONAL GAS CODE.
4. ALL GAS PIPING BRANCHES SHALL BE TAKEN OFF RISERS WITH NO LESS THAN 2 ELBOW SWINGS.
5. GAS PIPING SYSTEM SHALL NOT BE USED FOR ELECTRICAL GROUND.



PROPOSED PLUMBING RISER DIAGRAM
 SCALE: NOT TO SCALE

DATE ISSUED TO NO.

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
|--|--|--|--|--|--|

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:
 821 BEDFORD AVENUE
 BROOKLYN, NY

DRAWING:
 RISERS

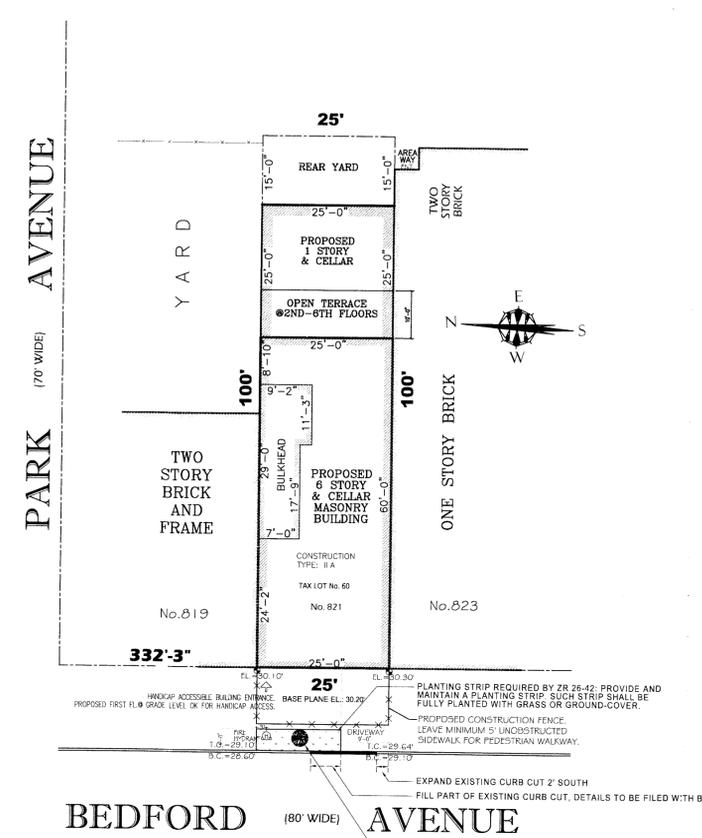
DOB JOB No.
DRAWING #:
 A-400.00

| | | | |
|-----------|----------|-------------|---------|
| DATE: | 10/09/11 | DRAWING BY: | JF |
| SCALE: | NOTED | CHK BY: | DL |
| COMM. NO. | | DWG. | 9 OF 12 |

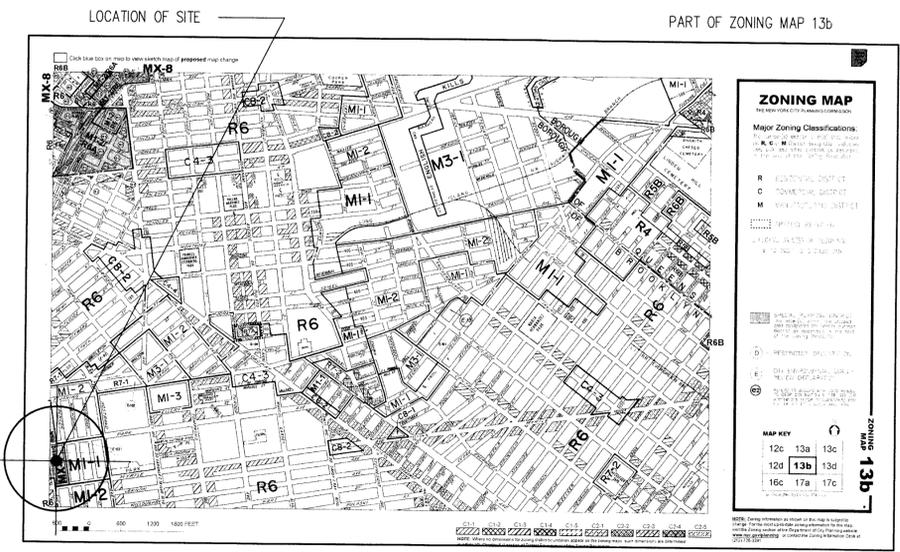
DRAWING: GAS & PLUMBING RISERS

PROPOSED NEW 6 STORY & CELLAR, MASONRY, MIXED USE BUILDING

821 BEDFORD AVENUE, BROOKLYN, N.Y.



PROPOSED PLOT PLAN
SCALE: 1/16" = 1'-0"



DRAWING LEGEND

- | | | | |
|--------|---|------|---------------------------------------|
| AD | AREA DRAIN | WD | WOOD |
| AL | ALUMINUM | EX | EXISTING |
| F.A.I. | FRESH AIR INTAKE | (X) | DETAIL OR REFERENCE |
| FD | FLOOR DRAIN | (XX) | SHEET NO. |
| FPSC | FIRE PROOF SELF-CLOSING | ZD | ZIP DRAIN |
| GL | GLASS | (X) | EXIT SIGN (ILLUM.) |
| HM | HOLLOW METAL | (X) | EXIT SIGN TO SHOW DIRECTION OF EGRESS |
| MC | MEDICINE CABINET | | |
| MIN. | MINIMUM | | |
| MTL. | METAL | | |
| MV | MECHANICAL VENTILATION, MIN. 50 CFM IN TOILETS, BATHS MIN. 75 CFM @ LAUNDRY AREA | | |
| P.K. | PASSOVER KITCHEN | | |
| PROV. | PROVIDED | | |
| RD | ROOF DRAIN | | |
| TP. | TYPICAL | | |
| SD/CM | SMOKE DETECTOR/ CARBON MONOXIDE DETECTOR HARDWIRED | | |
| EXIT | EXIT SIGN TO SHOW DIRECTION OF EGRESS | | |

ZONING COMPLIANCE

PROPERTY DATA
ADDRESS: 821 BEDFORD AVENUE
TAX BLOCK: 1734
TAX LOT: 60
ZONING MAP NO.: 12a
ZONE: M1-2 / R6A / MX-4 DISTRICT

SCOPE OF WORK
PROPOSED NEW 6 STORY
AND CELLAR - MASONRY, MIXED USE BUILDING.
PROPOSED COMMERCIAL LAUNDRY ON CELLAR
FL. PROPOSED 1ST - 6TH FLOORS: 5 RESIDENTIAL
DWELLING UNITS.
CONSTRUCTION TYPE: IIA

USE REGULATION
ZR 123-00 / 123-20
22-12 PROPOSED USE GROUP 2A + 2B
OCCUPATION CLASS: R-2 (RESIDENTIAL).
42-10, 42-11, 42-12 / 32-15 PROPOSED USE
GROUP GA LAUNDRY ESTABLISHMENT.

F.A.R.
LOT AREA: 25'-0" x 100'-0" = 2,500 S.F.
ZR 123-64(a)(1), ZR 43-12 MAX. F.A.R. M1-2: 2.00
PROPOSED COMMERCIAL AREA:
CELLAR FL. 16'-0" x 12'-0" = 192 S.F.
ZR 123-64(a)(3), ZR 123-63, ZR 23-145: MAX.
RESIDENTIAL F.A.R.: 3.0
3.0 x 2,500 = 7,500 SF MAX. PERMITTED F.A.

PROPOSED RESIDENTIAL GROSS F.A.:
FIRST FL. 25'-0" x 65'-0" = 1,625 S.F.
SECOND FL. 25'-0" x 60'-0" = 1,500 S.F.
THIRD FL. 25'-0" x 60'-0" = 1,500 S.F.
FOURTH FL. 25'-0" x 60'-0" = 1,500 S.F.
FIFTH FL. 25'-0" x 60'-0" = 1,500 S.F.
SIXTH FL. 25'-0" x 60'-0" = 1,500 S.F.
TOTAL GROSS F.A. = 9,625 SF
-2,195.3 SF F.A. DEDUCTIONS (SEE DIAGRAM ON
SHEET Z-001)
TOTAL NET F.A. = 7,429.7 SF < 7,500 (OK)
7,429.7 SF / 2,500 SF (LOT AREA) = 2.97 F.A.R.

LOT COVERAGE
ZR 123-64(b) IN MIXED USE BUILDING, LOT
COVERAGE SHALL NOT APPLY.

DENSITY
ZR 23-22) DENSITY FACTOR: 7.500 SF / 660
= 11 D.U. PERMITTED
PROPOSED: 5 D.U. < 11 = OK

YARDS
ZR 123-652) FRONT YARD: NONE REQUIRED
PROPOSED = 0'-0" = O.K.
ZR 123-652) SIDE YARDS: 0'-0" OR 8'-0"
PROPOSED = 0'-0" = O.K.
ZR 123-652), (ZR 23-47) REQD REAR YARD FOR
RESIDENTIAL: 30'
PROPOSED = 30'-0" OK.
ZR 23-44) PERMITTED OBSTRUCTION IN REQUIRED
REAR YARDS FOR OFF-STREET PARKING, NOT TO
EXCEED 14' ABOVE CURB OR BASE PLANE LEVEL.
PROPOSED 1ST FL.: ENCLOSED PARKING AREA IN
REAR YARD, TOP OF ROOF @ 10' ABOVE BASE PLANE
LEVEL (OK).

BUILDING HEIGHTS
BASE PLANE CALCULATION
BASE PLANE EL.: 30.10' + 30.30' / 2 = 30.20'
ZR 123-662 TABLE B) MIN. BASE HEIGHT: 40'
MAX. BASE HEIGHT: 60'-0"
MAX. BLDG HEIGHT: 70'-0"
ZR 123-662 (b)(1)) ABOVE MAX. B.H. MIN. FRONT
SETBACK ON WIDE ST. REQ: 10'-0"
PROPOSED BASE & BUILDING HEIGHT = 60'-0" (OK)

PARKING
ZR 25-23) ACCESSORY OFF STREET PARKING: 50%
OF NUMBER OF DWELLING UNITS.
PROPOSED: 5 D.U. x 50% = 2.5 PARKING SPACES.
ZR 25-26(1) PARKING WAIVED IF LESS THEN 5
SPACES IS REQ. PROPOSED: NONE

BICYCLE PARKING
ZR 25-81(1) U.G. 2: 1 SPACE PER 2 DWELLING
UNITS.
HOWEVER, THE BICYCLE PARKING REQUIREMENTS
SHALL BE WAIVED FOR BICYCLE PARKING SPACES
THAT ARE ACCESSORY TO:
(A) BUILDINGS CONTAINING 10 DWELLING UNITS OR
LESS;
PROPOSED: 5 DWELLING UNITS THEREFORE NONE
REQUIRED.

ENVIRONMENTAL CONDITIONS
ZR 123-32) IN 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.

DRAWING SCHEDULE

- Z-000 PLOT PLAN & ZONING INFORMATION
- Z-001 FLOOR AREA DEDUCTIONS
- A-100 CELLAR & 1ST FLOOR PLANS
- A-101 2ND, 3RD & 4TH FLOOR PLANS
- A-102 5TH & 6TH FLOOR PLANS
- A-200 BUILDING ELEVATIONS & ROOF PLAN
- A-300 BUILDING SECTION A-A
- A-400 WALL TYPES, DETAILS & SCHEDULES
- A-401 GAS & PLUMBING RISER DIAGRAMS
- A-500 GENERAL NOTES
- A-501 BUILDING CODE NOTES
- EN-600 NYS ENERGY COMPLIANCE

QUALITY HOUSING REGULATIONS

(ZR28-12) REQD ONE TREE FOR EVERY 25'-0" OF STREET
FRONTAGE OF THE ZONING LOT. SUCH TREES SHALL BE
OF AT LEAST 3" CALIPER AT TIME OF PLANTING AND BE
PLACED AT APPROXIMATELY EQUAL INTERVALS.
PROPOSED: 1 TREE AS INDICATED ON PLOT PLAN.
(ZR28-21) MIN. UNIT SIZE REQUIRED = 400 S.F. PER D.U.
PROPOSED MIN. UNIT SIZE: 410 SF
(ZR28-22) ALL WINDOWS SHALL BE DOUBLE GLAZED.
(ZR28-25) 50% OF CORRIDORS MAY BE DEDUCTED
FROM F.A. AND ANOTHER 50% WHEN NATURAL ILLUM. IS
PROVIDED.
(SEE DEDUCTION DIAGRAM ON SHEET Z-001).
(ZR28-33) REQUIRED PLANTING ON ZONING LOT
BETWEEN STREET LINE AND STREET WALL.

SPECIAL 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
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.
- STRUCTURAL STEEL - WELDING BC 1704.3.1
 - STRUCTURAL STEEL - ERECTION & BOLTING BC 1704.3.2, BC 1704.3.3
 - STRUCTURAL COLD-FORMED STEEL BC 1704.3.4
 - CONCRETE CAST IN PLACE BC 1704.4
 - CONCRETE TEST CYLINDERS BC 1905.6
 - CONCRETE DESIGN MIX BC 1905.3
 - MASONRY BC 1704.5
 - SOILS - SITE PREPARATION BC 1704.7.1
 - SOILS - INVESTIGATIONS (BORINGS/TEST PITS) BC 1704.7.4
 - UNDERPINNING BC 1704.9.1
 - MECHANICAL SYSTEMS BC 1704.15
 - EXCAVATION - SHEETING, SHORING, AND BRACING BC 1704.19, BC 3304.4.1
 - SITE STORM DRAINAGE DISPOSAL AND DETENTION BC 1704.20
 - FIRESTOP, DRAFTSTOP, AND FIREBLOCK SYSTEMS BC 1704.25
 - FOOTING AND FOUNDATION BC 109.3.1
 - FRAME INSPECTION BC 109.3.3
 - ENERGY CODE COMPLIANCE INSPECTION BC 109.3.5
 - FIRE-RESISTANCE RATED CONSTRUCTION BC 109.3.4

FIRE STOPPING NOTES:

BATHROOM OR KITCHEN PARTITIONS, CHASE SPACES CONTAINING PIPES OR DUCTS TO
FILLED WITH MINERAL WOOL OR NON COMBUSTIBLE MATERIAL (ROCKWOOL) FULL HEIGHTS
AND ALL VOIDS BETWEEN FLOORS.

ENERGY CODE PROGRESS INSPECTIONS:

- PROTECTION OF FOUNDATION INSULATION (A1), (IA1)
- INSULATION PLACEMENT AND R-VALUES (IA2), (IA3)
- PENETRATION THERMAL VALUES AND RATING (A3), (IA3)

TO BE FILED SEPARATELY:

- STRUCTURAL PLAN
- FOUNDATION/EXCAVATION
- SPRINKLER PLAN
- BUILDERS PAVEMENT PLAN
- CURB CUT FILING
- ELEVATOR
- SD-1, 2
- AN AUTOMATIC FIRE ALARM SYSTEM WITHOUT ALARM NOTIFICATION
APPLIANCES SHALL BE PROVIDED THROUGHOUT THE BUILDING AND SHALL BE
FILED UNDER A SEPARATE APPLICATION.

**JEFFREY KAMEN
ARCHITECT**
33 BOND STREET
New York, NY 10013
212.979.9286

REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |
| | | |
| | | |
| | | |

DATE ISSUED TO NO.

| NO. | DATE |
|-----|------|
| | |
| | |
| | |
| | |



**CADD files, sealed drawings and specifications are instruments of
service whose ownership belongs to Jeffrey Kamen Architect.
Unauthorized use, changes or publication are prohibited unless
expressly approved by Jeffrey Kamen Architect. Infringements
will be prosecuted. Contractor shall verify all field conditions and
dimensions and be responsible for field fit and quantity of work.
No allowances shall be made in behalf of the contractor for any
error or neglect on his part. In a conflict between sealed drawings
and electronic files, the sealed drawings will govern.**

PROJECT:
821 BEDFORD AVENUE
BROOKLYN, NY

DRAWING:
**ZONING ANALYSIS,
PLOT PLAN**

DOB JOB No.

DRAWING #:
Z-000.00

| | |
|-----------------------|-----------------------|
| DATE: 11/22/11 | DRAWING BY: JF |
| SCALE: NOTED | CHK BY: DL |
| COMM. NO. | DWG. 1 OF 12 |

**JEFFREY KAMEN
ARCHITECT**

33 BOND STREET
New York, NY 10013
212.979.9286

REVISIONS

| NO. | DATE | DESCRIPTION |
|-----|------|-------------|
| | | |
| | | |
| | | |
| | | |

DATE ISSUED TO NO.

| | | | | |
|--|--|--|--|--|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

SEAL



CADD files, sealed drawings and specifications are instruments of service whose ownership belongs to Jeffrey Kamen Architect. Unauthorized use, changes or publication are prohibited unless expressly approved by Jeffrey Kamen Architect. Infringements will be prosecuted. Contractor shall verify all field conditions and dimensions and be responsible for field fit and quantity of work. No allowances shall be made in behalf of the contractor for any error or neglect on his part. In a conflict between sealed drawings and electronic files, the sealed drawings will govern.

PROJECT:

821 BEDFORD AVENUE
BROOKLYN, NY

DRAWING:

F. A. DEDUCTIONS

DOB JOB No.

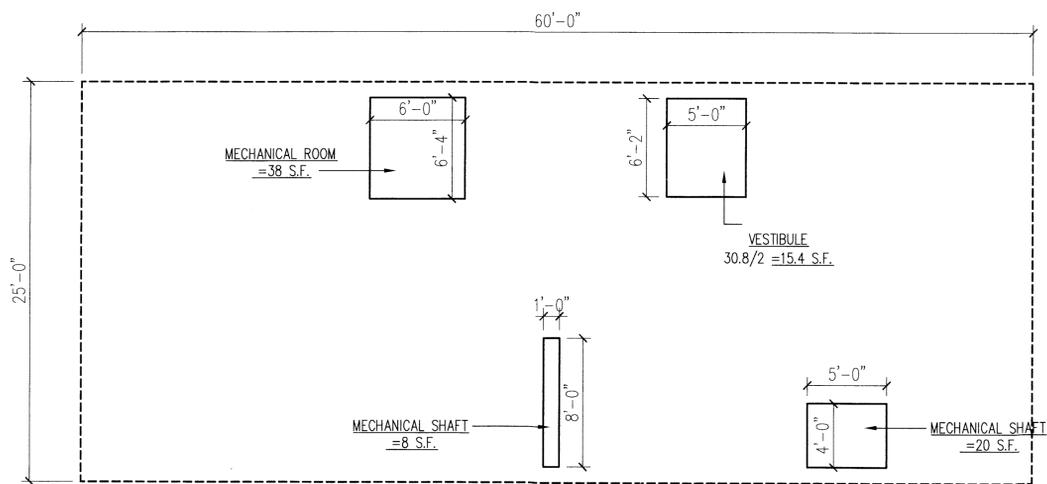
DRAWING #:

Z-001.00

DATE: 11/22/11 DRAWING BY: JF

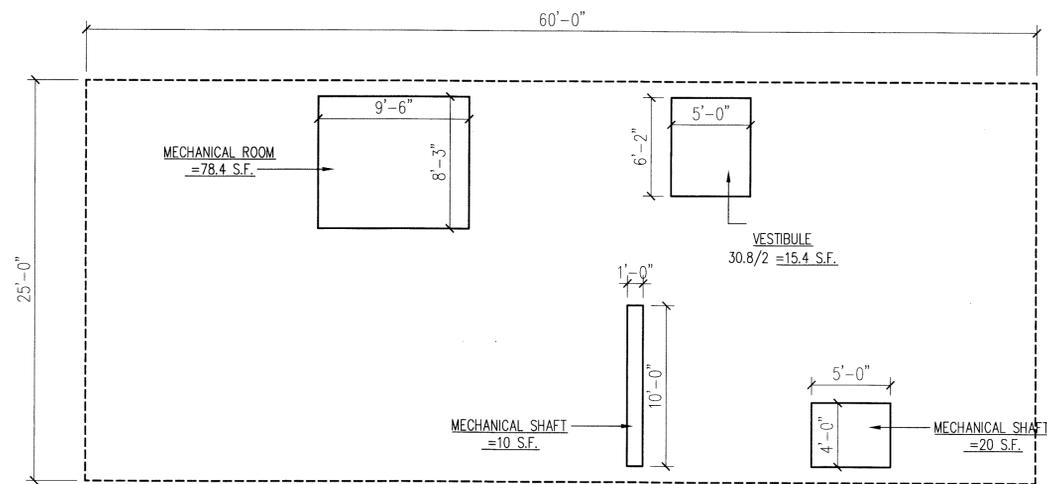
SCALE: NOTED CHK BY: DL

COMM. NO. DWG. 2 OF 12



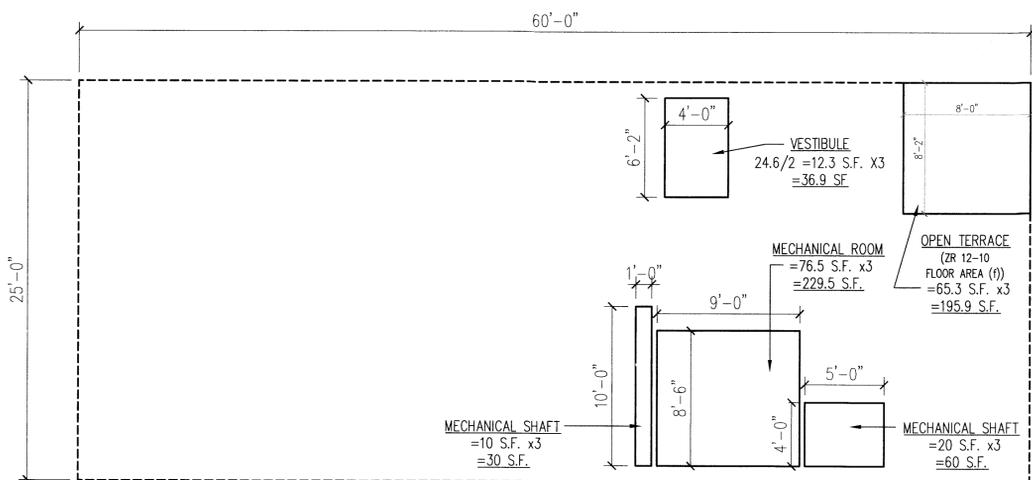
5TH FL. DEDUCTIONS

TOTAL DEDUCTIONS =81.4 SF



6TH FL. DEDUCTIONS

TOTAL DEDUCTIONS =123.8 SF

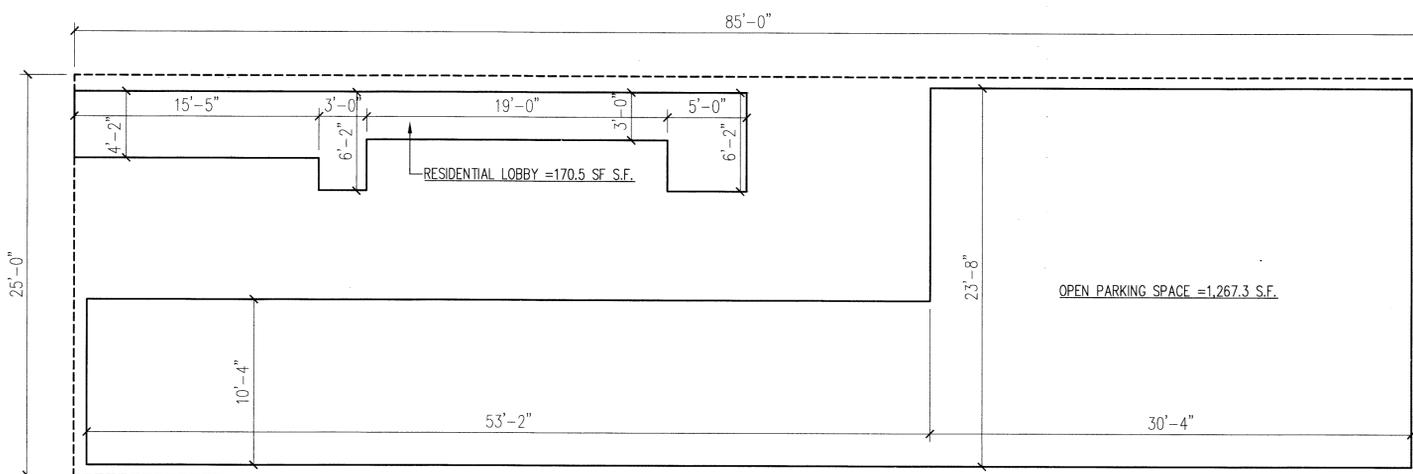


2ND, 3RD & 4TH FL. DEDUCTIONS

TOTAL DEDUCTIONS =552.3 SF

TOTAL FLOOR AREA DEDUCTIONS:

=2,195.3 SF



1ST FLOOR F.A. DEDUCTIONS

TOTAL DEDUCTIONS =1,437.8 SF

APPENDIX B

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and Sunshine Construction, LLC have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, Sunshine Construction, LLC will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Maurizio Bertini, 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. Sunshine Construction, LLC will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Repository Name: Marcy Library

Repository Address: 617 Dekalb Avenue, Brooklyn, NY 11216

Repository Telephone Number: 718-935-0032

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 | closed |
| 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 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 Sunshine Construction, LLC, reviewed and approved by OER prior to distribution and mailed by Sunshine Construction, LLC. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

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

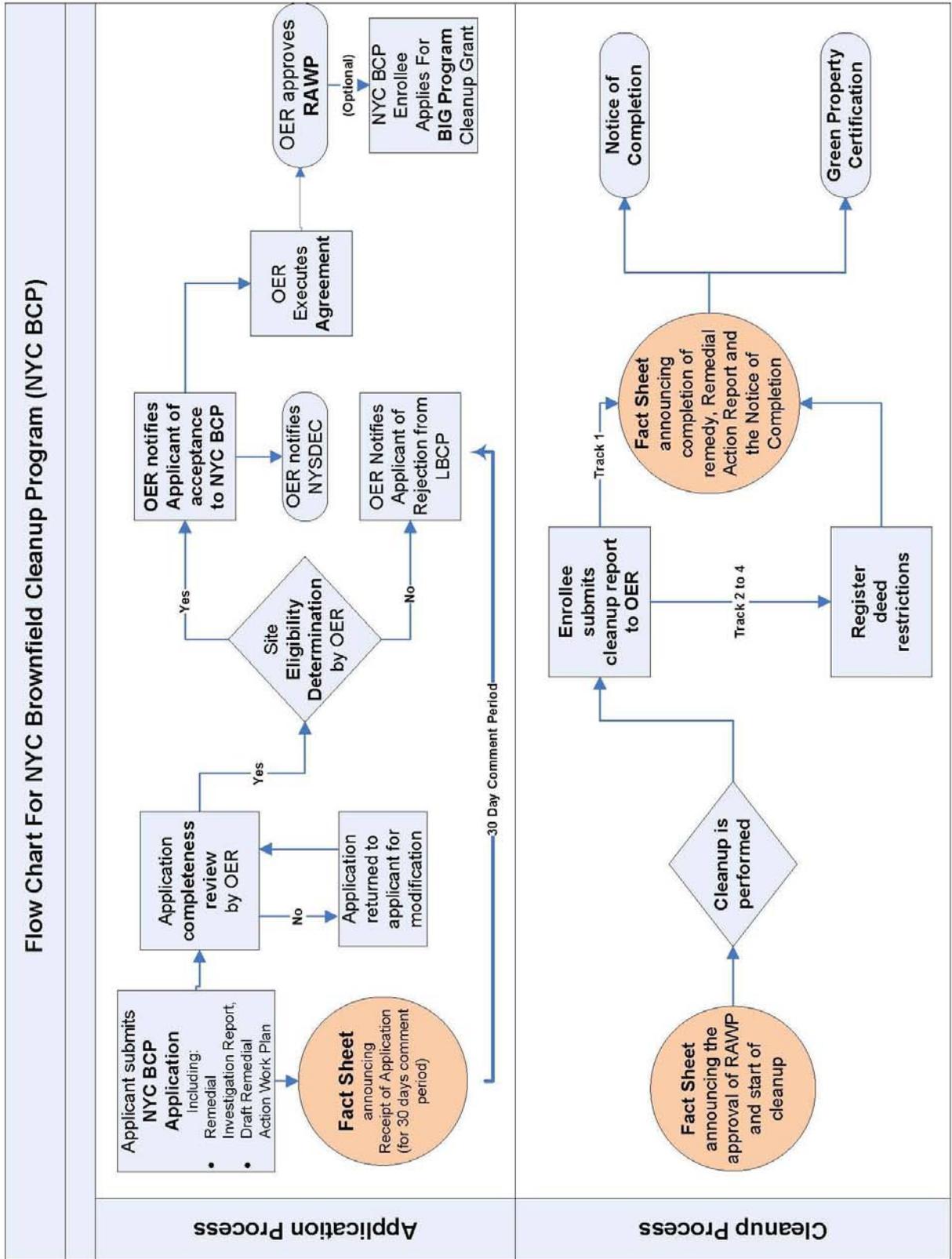
- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan.**

Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial

Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes the findings of the RIR and provides details of the RAWP. The public comment period will be extended an additional 15 days upon public request. A public meeting or informational session will be conducted by OER upon request.

- **Public Notice announcing the approval of the RAWP and the start of remediation.**
Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the approval of the RAWP and the start of remediation.

- **Public Notice announcing the completion of remediation, designation of Institutional and Engineering Controls and issuance of the Notice of Completion.**
Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the completion of remediation, providing a list of all Institutional and Engineering Controls implemented for to the Site and announcing the issuance of the Notice of Completion.



APPENDIX 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 Brownfield Cleanup Program. Sunshine Construction, LLC is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

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

APPENDIX 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;
- 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 is the following; continue north on Bedford Avenue. Make the second left to head west on Flushing Avenue. Follow the signs for the Brooklyn-Queens Expressway (I-278) east or west. 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 Sunshine Construction, LLC to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in Brooklyn, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Sunshine Construction, LLC. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

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

All impacted soil/fill or other waste excavated and removed from the Site will be managed as regulated material and will be disposed in accordance with applicable laws and regulations. Historic fill and contaminated soils taken off-Site will be handled as solid waste and will not be disposed at a Part 360-16 Registration Facility (also known as a Soil Recycling Facility).

Waste characterization will be performed for off-Site disposal in a manner required by the receiving facility and in conformance with its applicable permits. Waste characterization

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

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

1.7 MATERIALS REUSE ON-SITE

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in **Table 1**. ‘Reuse on-Site’ means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to the NYC VCP agreement subject to Engineering Controls (ECs) and Institutional Controls (ICs). 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.

It is common to reuse clean soil at the Site for use as backfill around footings and other foundation structures. If on-Site material is to be reused for these purposes at the Site, soil piles no greater than 500 cubic yards are to be staged on and under 5-mil polyethylene sheeting while awaiting sampling. Each soil pile will undergo a testing program to confirm the soil meets Track 1 Unrestricted Use Soil Cleanup Objectives prior to reuse on-site. Confirmation testing of clean soils will be as follows:

| Analysis | Frequency | Sample Type |
|-----------------|---------------------------|---------------------------|
| SVOCs (PAHs) | 1 per 500 yd ³ | Composite of 5-point grab |
| TAL Metals | 1 per 500 yd ³ | Composite of 5-point grab |

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.

APPENDIX E
CONSTRUCTION HEALTH AND SAFETY PLAN

RESIDENTIAL DEVELOPMENT PROJECT

821 Bedford Avenue, Brooklyn, NY
Block 1734, Lot 60

CONSTRUCTION HEALTH AND SAFETY PLAN

Prepared For:

Sunshine Construction LLC
42 Skillman Street Unit BR
Brooklyn NY 11205

Prepared By:

EBC

ENVIRONMENTAL BUSINESS CONSULTANTS

1808 Middle Country Road
Ridge, NY 11961

OCTOBER 2011

CONSTRUCTION HEALTH AND SAFETY PLAN

Table of Contents

| | |
|--|------|
| STATEMENT OF COMMITMENT | SC-1 |
| 1.0 INTRODUCTION AND SITE ENTRY REQUIREMENTS | 1 |
| 1.1 Scope | 1 |
| 1.2 Application | 1 |
| 1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments | 1 |
| 1.4 Key Personnel - Roles and Responsibilities | 2 |
| 2.0 SITE BACKGROUND AND SCOPE OF WORK | 3 |
| 3.0 HAZARD ASSESSMENT | 5 |
| 3.1 Physical Hazards | 5 |
| 3.1.1 Tripping Hazards | 5 |
| 3.1.2 Climbing Hazards | 5 |
| 3.1.3 Cuts and Lacerations | 5 |
| 3.1.4 Lifting Hazards | 5 |
| 3.1.5 Utility Hazards | 5 |
| 3.1.6 Traffic Hazards | 5 |
| 3.2 Work in Extreme Temperatures | 5 |
| 3.2.1 Heat Stress | 6 |
| 3.2.2 Cold Exposure | 7 |
| 3.3 Chemical Hazards | 7 |
| 3.3.1 Respirable Dust | 7 |
| 3.3.2 Dust Control and Monitoring during Earthwork | 7 |
| 3.3.3 Organic Vapors | 8 |
| 4.0 PERSONAL PROTECTIVE EQUIPMENT | 9 |
| 4.1 Level D | 9 |
| 4.2 Level C | 9 |
| 4.3 Activity-Specific Levels of Personal Protection | 10 |
| 5.0 AIR MONITORING AND ACTION LEVELS | 11 |
| 5.1 Air Monitoring Requirements | 11 |
| 5.2 Work Stoppage Responses | 11 |
| 5.3 Action Levels During Excavation Activities | 11 |
| 6.0 SITE CONTROL | 13 |
| 6.1 Work Zones | 13 |
| 7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN | 14 |
| 7.1 Emergency Equipment On-site | 14 |
| 7.2 Emergency Telephone Numbers | 14 |
| 7.3 Personnel Responsibilities During an Emergency | 14 |
| 7.4 Medical Emergencies | 15 |
| 7.5 Fire or Explosion | 15 |
| 7.6 Evacuation Routes | 15 |
| 7.7 Spill Control Procedures | 16 |
| 7.8 Vapor Release Plan | 16 |

Table of Contents (Continued)

FIGURES

Figure 1 Route to Hospital (Appendix D)

APPENDICES

| | |
|------------|---|
| APPENDIX A | SITE SAFETY ACKNOWLEDGMENT FORM |
| APPENDIX B | SITE SAFETY PLAN AMENDMENTS |
| APPENDIX C | CHEMICAL HAZARDS |
| APPENDIX D | HOSPITAL INFORMATION, MAP AND FIELD ACCIDENT REPORT |

STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Activities planned for 821 Bedford Avenue, Brooklyn Long Island City, New York.

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



1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of a Remedial Action Plan at a residential development project located at 821 Bedford Avenue, Brooklyn, NY, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials during the excavation and loading of impacted topsoil at the site. 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 HASP may be revised by EBC at the request of Sunshine Construction LLC, (“the owner”) and/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 demolition contractor to demolish the existing building prepare the site for construction.
- 2) Site mobilization of foundation/excavation contractor to begin excavation and shoring for the new building’s foundation.
 - a) Excavate and properly dispose of historic fill materials and soil at the site which will be excavated from a 25 ft x 85 ft area to a depth of 10 feet below surface grade.

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:

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

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

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

Site conditions may warrant an amendment to the HASP. Amendments to the 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:

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

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

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

1. Educating personnel about information in this CHASP and other safety requirements to be observed during site operations, including, but not limited to, decontamination procedures, designation of work zones and levels of protection, air monitoring, fit testing, and emergency procedures dealing with fire and first aid.
2. Coordinating site safety decisions with the project manager.
3. Designating exclusion, decontamination and support zones on a daily basis.
4. Monitoring the condition and status of known on-site hazards and maintaining and implementing the air quality monitoring program specified in this CHASP.
5. Maintaining the work zone entry/exit log and site entry/exit log.
6. Maintaining records of safety problems, corrective measures and documentation of chemical exposures or physical injuries (the site safety officer will document these conditions in a bound notebook and maintain a copy of the notebook on-site).

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

2.0 SITE BACKGROUND AND SCOPE OF WORK

The Site is located in the Bushwick section of Brooklyn (see **Figure 1**) and is identified as Block 1734 and Lot 60 on the New York City Tax Map. The Site is 0.060-acres (2,500-sq.ft.) and is bounded by mixed use commercial-residential properties to the north, south (unidentified) and west and by multi-family residential buildings the east.. An E-Designation for Hazardous Materials (E-102) was placed on the Site by the New York City Department of City Planning (DCP) as part of the June 2001 West Bushwick Rezoning action (CEQR number 00DCP015K).

Currently, the Site is improved with a 2-story mixed use brick building. The second floor of the building is set up for residential use. The first floor is vacant and consists of an exposed concrete floor and walls. The east half of the first floor is split into two levels (ground floor and mezzanine). The mezzanine area appeared to be set up for use as office space, but is in a severe derelict condition.

Historically the area has a mix of mixed-use commercial/residential buildings, multi-family residential buildings and commercial properties.

The Phase I report indicated that historical information reviewed for the subject property identified the past use of the site as a single family residence (existing structure) dating back at least to 1898. Some mixture of historic fill was identified on the property to a depth of approximately 12 below grade. This fill was found to contain elevated levels of metals particularly lead and barium though elevated levels of copper, chromium, nickel and zinc were also reported. Groundwater at the site was encountered at a depth of approximately 40 to 44 feet below grade and contained concentrations of the chlorinated volatile organic compounds (CVOCs) tetrachloroethylene and trichloroethylene above their corresponding NYSDEC Groundwater Quality Standards. No CVOCs were detected within the soil samples collected at the site, indicating the compounds detected in groundwater are likely from an off-site source. Soil gas samples collected at the site did not report elevated levels of CVOCs.

2.1 Redevelopment Plans

The proposed development at the Site includes the construction of a new mixed-use six-story Redevelopment plans for the subject property include the construction of a new 6-story residential building with a full height cellar level. The new building will cover the 85% of the lot and include a basement level to 10 feet below grade. The cellar level will be used for storage and mechanical rooms. The first floor will include one residential unit and parking for 2 cars. Floors 2 through 4 will each have one residential unit and floors 5 and 6 will have 2 residential units. The building footprint covers 2,125 square feet of the 2,500 square foot leaving a 15 ft by 25 ft (375 sf) patio area at the rear of the building. The patio area will be capped with a 4-inch concrete slab. There are no exposed soil, landscaped or green areas.

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 remedy achieves protection of public health and the environment for the intended use of the property. The proposed remedial action alternative achieves all of the remedial action goals established for the project. The proposed remedial action is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The proposed remedial action is cost effective, implementable and uses standard methods that are well established in the industry.

1. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
2. Performance of Community Air Monitoring Program for particulates and volatile organic compounds during soil disturbance activity.
3. Implementation of storm-water pollution prevention measures.
4. Performance of all activities associated with the remedial action, including permitting requirements and pretreatment requirements, will be addressed in accordance with all applicable Federal, State and City laws and regulations.
5. Establish site-specific Soil Cleanup Objectives (SCOs) for Contaminants of Concern.
6. Excavation and removal of soil as needed to accommodate any structural components of the new building's basement foundation.
7. Transportation and off-Site disposal and/or recycling of all fill materials at permitted facilities in accordance with all Federal, State and City laws and regulations for handling, transport and disposal.
8. Sampling and analysis of excavated media as required by regulated disposal facilities.
9. Appropriate segregation of excavated media.
10. Screening for indications of contamination (by visual means, odor, and monitoring with a photo ionization detector (PID) of excavated soil.
11. Import and placement of off-site materials to be used for sub-surface backfill and clean soil/fill cover in compliance with OER approved plan and in accordance with all Federal, State and City laws and regulations and placement of any on-site backfill material in excavated areas.
12. Capping of the site with the concrete basement slab and concrete rear patio area.
13. Submission of a PE certified Interim and/or Final Remedial Closure Reports that include a full listing of engineering and mitigation controls that prevent future exposure to any residual contamination remaining at the Site (if any).

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.

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.

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 several metals within the historic fill present beneath the Site.

Metals reported to be present at elevated concentrations in the topsoil within the front and / or rear yards at the Site include the following:

| | | | |
|--------|----------|--------|------|
| Barium | Chromium | Copper | Lead |
| Nickel | Zinc | | |

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

Appendix C includes information sheets for all detected chemicals that may be encountered in topsoil and native soil at the site.

3.3.1 Respirable Dust

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

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

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 µg/m³ 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*

Volatile organic compounds were reported in groundwater beneath the site but were not reported in soil or soil gas. The depth to groundwater is approximately 45 feet below grade and will not be encountered during excavation or remedial activity. However, as a precaution the site safety officer will periodically monitor organic vapors with a Photoionization Detector (PID) during excavation of impacted topsoil to determine whether organic vapor concentrations exceed action levels shown in Section 5 and/or the Community Air Monitoring Plan.

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.

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.

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

During the excavation and loading of the topsoil from the front and rear yard areas, 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 work area 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% | <ul style="list-style-type: none"> • Continue excavating • Level D protection • Continue monitoring every 10 minutes |
| 1-5 ppm Above Background, | 1-10% | <ul style="list-style-type: none"> • Continue excavating |

| | | |
|--|--------|---|
| Sustained Reading | | <ul style="list-style-type: none"> • Go to Level C protection or employ engineering controls • Continue monitoring every 10 minutes |
| 5-25 ppm Above Background, Sustained Reading | 10-20% | <ul style="list-style-type: none"> • 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% | <ul style="list-style-type: none"> • 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 work area. 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 area has been vented for a period of greater than one-half hour, a decision will then be made whether or not to area 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 than 5 ppm (see Community Air Monitoring Plan).

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, and the nature of the contaminants it is expected that an exclusion zone and decontamination zone will not be necessary.

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 |
| Suffolk County Police | 911 |
| NYC Fire Department | 911 |
| Jamaica Hospital Medical Center | (718) 206-6000 |
| NYSDEC Spills Hotline | 1-800-457-7362 |
| NYSDEC Project Manager | (718) 482-4010 |
| NYC Department of Health | (212) 676-2400 |
| National Response Center | 1-800-424-8802 |
| Poison Control | 1-800-222-1222 |
| Project Manager | 1-631-504-6000 |
| Site Safety Officer | 1-631-504-6000 |

7.3 Personnel Responsibilities During an Emergency

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

- Take appropriate measures to protect personnel including: withdrawal from the exclusion zone, evacuate and secure the site, or upgrade/downgrade the level of protective clothing and respiratory protection;
- Ensure that appropriate federal, state, and local agencies are informed and emergency response plans are coordinated. In the event of fire or explosion, the local fire department should be summoned immediately. If toxic materials are released to the air, the local authorities should be informed in order to assess the need for evacuation;
- Ensure appropriate decontamination, treatment, or testing for exposed or injured

personnel;

- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

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

7.4 Medical Emergencies

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

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

7.5 Fire or Explosion

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

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

7.6 Evacuation Routes

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

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

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.

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

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

BARIUM SULFATE

ICSC: 0827



Barium sulphate
Blanc fixe
Artificial barite
BaSO₄

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

| | | |
|---|--|--|
| <p>I M P O R T A N T D A T A</p> | <p>PHYSICAL STATE; APPEARANCE: ODOURLESS TASTELESS, WHITE OR YELLOWISH CRYSTALS OR POWDER.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: Reacts violently with aluminium powder.</p> <p>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/m³ (total) TWA 5 mg/m³ (resp) NIOSH REL: TWA 10 mg/m³ (total) TWA 5 mg/m³ (resp) NIOSH IDLH: N.D. See: IDLH INDEX</p> | <p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of its aerosol.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a nuisance-causing concentration of airborne particles can, however, be reached quickly.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>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).</p> |
|---|--|--|

| | | |
|----------------------------|---|---------------------------|
| PHYSICAL PROPERTIES | <p>Melting point (decomposes): 1600°C Density: 4.5 g/cm³</p> | Solubility in water: none |
|----------------------------|---|---------------------------|

| | |
|---------------------------|--|
| ENVIRONMENTAL DATA | |
|---------------------------|--|

NOTES

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

| | |
|--|--|
| | |
|--|--|

| | |
|---------------------|-----------------------|
| ICSC: 0827 | BARIUM SULFATE |
| (C) IPCS, CEC, 1994 | |

| | |
|---------------------------------------|--|
| <p>IMPORTANT LEGAL NOTICE:</p> | <p>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.</p> |
|---------------------------------------|--|

International Chemical Safety Cards

CHROMIUM

ICSC: 0029



Chrome
Cr
Atomic mass: 52.0
(powder)

ICSC # 0029
CAS # 7440-47-3
RTECS # [GB4200000](#)
October 27, 2004 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---------------------------|--|--|---|
| FIRE | Combustible under specific conditions. | No open flames if in powder form. | In case of fire in the surroundings: use appropriate extinguishing media. |
| EXPLOSION | | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| EXPOSURE | | PREVENT DISPERSION OF DUST! | |
| • INHALATION | Cough. | Local exhaust or breathing protection. | Fresh air, rest. |
| • SKIN | | Protective gloves. | Remove contaminated clothes. Rinse skin with plenty of water or shower. |
| • EYES | Redness. | Safety goggles. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| • INGESTION | | Do not eat, drink, or smoke during work. | Rinse mouth. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---------|-----------------------|
| Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Personal protection: P2 filter respirator for harmful particles. | | R: S: |

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0029

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

CHROMIUM

ICSC: 0029

| | | |
|----------|--|---|
| I | PHYSICAL STATE; APPEARANCE: GREY POWDER | ROUTES OF EXPOSURE: |
| M | PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air. | INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed. |
| P | | |

O
R
T
A
N
T
D
A
T
A

CHEMICAL DANGERS:

Chromium is a catalytic substance and may cause reaction in contact with many organic and inorganic substances , causing fire and explosion hazard.

EFFECTS OF SHORT-TERM EXPOSURE:

May cause mechanical irritation to the eyes and the respiratory tract.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m³ as TWA A4 (ACGIH 2004).
MAK not established.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

OSHA PEL*: TWA 1 mg/m³ [See Appendix C](#) *Note: The PEL also applies to insoluble chromium salts.

NIOSH REL: TWA 0.5 mg/m³ [See Appendix C](#)

NIOSH IDLH: 250 mg/m³ (as Cr) See: [7440473](#)

PHYSICAL PROPERTIES

Boiling point: 2642°C
Melting point: 1900°C
Density: 7.15 g/cm³

Solubility in water:
none

ENVIRONMENTAL DATA

NOTES

The surface of the chromium particles is oxidized to chromium(III)oxide in air. See ICSC 1531 Chromium(III) oxide.

ADDITIONAL INFORMATION

ICSC: 0029

CHROMIUM

(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

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

| | | |
|---|---|--|
| <p>I</p> <p>M</p> <p>P</p> | <p>PHYSICAL STATE; APPEARANCE: RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS:</p> | <p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> |
|---|---|--|

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.

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. See Notes.

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/m³ *Note: The PEL also applies to other copper compounds (as Cu) except copper fume.
NIOSH REL*: TWA 1 mg/m³ *Note: The REL also applies to other copper compounds (as Cu) except Copper fume.
NIOSH IDLH: 100 mg/m³ (as Cu) See: [7440508](#)

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

NOTES

The symptoms of metal fume fever do not become manifest until several hours.

ADDITIONAL INFORMATION

ICSC: 0240

COPPER

(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

LEAD

ICSC: 0052



Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

ICSC # 0052
CAS # 7439-92-1
RTECS # [OF7525000](#)
October 08, 2002 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---------------------------|--|--|---|
| FIRE | Not combustible. Gives off irritating or toxic fumes (or gases) in a fire. | | In case of fire in the surroundings: use appropriate extinguishing media. |
| EXPLOSION | Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| EXPOSURE | See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE. | PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN! | |
| •INHALATION | | Local exhaust or breathing protection. | Fresh air, rest. |
| •SKIN | | Protective gloves. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| •EYES | | Safety spectacles. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| •INGESTION | Abdominal pain. Nausea. Vomiting. | Do not eat, drink, or smoke during work. Wash hands before eating. | Rinse mouth. Give plenty of water to drink. Refer for medical attention. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|---|-----------------------|
| Sweep spilled substance into containers; if appropriate, moisten first to prevent dusting. Carefully collect remainder, then remove to safe place. Do NOT let this chemical enter the environment. Personal protection: P3 filter respirator for toxic particles. | Separated from food and feedstuffs incompatible materials See Chemical Dangers. | R: S: |

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

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

International Chemical Safety Cards

| | | |
|---|--|---|
| <p>I M P O R T A N T T A D A</p> | <p>PHYSICAL STATE; APPEARANCE: BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.</p> <p>PHYSICAL DANGERS: Dust explosion possible if in powder or granular form, mixed with air.</p> <p>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.</p> <p>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/m³ See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH REL*: TWA 0.050 mg/m³ See Appendix C *Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C. NIOSH IDLH: 100 mg/m³ (as Pb) See: 7439921</p> | <p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE:</p> <p>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.</p> |
|---|--|---|

| | | |
|----------------------------|---|---|
| PHYSICAL PROPERTIES | Boiling point: 1740°C Melting point: 327.5°C | Density: 11.34 g/cm ³ 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. |  |
|---------------------------|---|---|

NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.
 Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

| | |
|--|--|
| | |
|--|--|

| | |
|---------------------|-------------|
| ICSC: 0052 | LEAD |
| (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

NICKEL

ICSC: 0062



Ni
Atomic mass: 58.7
(powder)

ICSC # 0062
CAS # 7440-02-0
RTECS # [QR5950000](#)
EC # 028-002-00-7
October 17, 2001 Peer reviewed

| TYPES OF HAZARD/ EXPOSURE | ACUTE HAZARDS/ SYMPTOMS | PREVENTION | FIRST AID/ FIRE FIGHTING |
|---------------------------|--|--|---|
| FIRE | Flammable as dust. Toxic fumes may be released in a fire. | | Dry sand. NO carbon dioxide. NO water. |
| EXPLOSION | Finely dispersed particles form explosive mixtures in air. | Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting. | |
| EXPOSURE | | PREVENT DISPERSION OF DUST! AVOID ALL CONTACT! | |
| • INHALATION | Cough. Shortness of breath. | Local exhaust or breathing protection. | Fresh air, rest. |
| • SKIN | | Protective gloves. Protective clothing. | Remove contaminated clothes. Rinse and then wash skin with water and soap. |
| • EYES | | Safety spectacles, or eye protection in combination with breathing protection. | First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor. |
| • INGESTION | | Do not eat, drink, or smoke during work. | Rinse mouth. |

| SPILLAGE DISPOSAL | STORAGE | PACKAGING & LABELLING |
|---|------------------------------|-------------------------------------|
| Vacuum spilled material. Carefully collect remainder, then remove to safe place. Personal protection: P2 filter respirator for harmful particles. | Separated from strong acids. | Xn symbol R: 40-43 S: 2-22-36 |

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0062

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

NICKEL

ICSC: 0062

| | | |
|----------|--|--|
| I | <p>PHYSICAL STATE; APPEARANCE: SILVERY METALLIC SOLID IN VARIOUS FORMS.</p> <p>PHYSICAL DANGERS:</p> | <p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation of the dust.</p> |
|----------|--|--|

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

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

CHEMICAL DANGERS:

Reacts violently, in powder form, with titanium powder and potassium perchlorate, and oxidants such as ammonium nitrate, causing fire and explosion hazard. Reacts slowly with non-oxidizing acids and more rapidly with oxidizing acids. Toxic gases and vapours (such as nickel carbonyl) may be released in a fire involving nickel.

OCCUPATIONAL EXPOSURE LIMITS:

TLV: (Inhalable fraction) 1.5 mg/m³ as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004). MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah); Carcinogen category: 1; (DFG 2004). OSHA PEL*†: TWA 1 mg/m³ *Note: The PEL does not apply to Nickel carbonyl. NIOSH REL*: Ca TWA 0.015 mg/m³ [See Appendix A](#) *Note: The REL does not apply to Nickel carbonyl. NIOSH IDLH: Ca 10 mg/m³ (as Ni) See: [7440020](#)

INHALATION RISK:

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

EFFECTS OF SHORT-TERM EXPOSURE:

May cause mechanical irritation. Inhalation of fumes may cause pneumonitis.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:

Repeated or prolonged contact may cause skin sensitization. Repeated or prolonged inhalation exposure may cause asthma. Lungs may be affected by repeated or prolonged exposure. This substance is possibly carcinogenic to humans.

PHYSICAL PROPERTIES

Boiling point: 2730°C
Melting point: 1455°C
Density: 8.9 g/cm³

Solubility in water: none

ENVIRONMENTAL DATA

NOTES

At high temperatures, nickel oxide fumes will be formed. Depending on the degree of exposure, periodic medical examination is suggested. The symptoms of asthma often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Anyone who has shown symptoms of asthma due to this substance should avoid all further contact with this substance.

ADDITIONAL INFORMATION

ICSC: 0062

NICKEL

(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

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

ICSC: 1205

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

ZINC POWDER

ICSC: 1205

| | | |
|---|---|---|
| <p>I M P O R T A N T D A T A</p> | <p>PHYSICAL STATE; APPEARANCE: ODOURLESS GREY TO BLUE POWDER.</p> <p>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.</p> <p>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.</p> <p>OCCUPATIONAL EXPOSURE LIMITS: TLV not established.</p> | <p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation and by ingestion.</p> <p>INHALATION RISK: Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: Inhalation of fumes may cause metal fume fever. The effects may be delayed.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE: Repeated or prolonged contact with skin may cause dermatitis.</p> |
|---|---|---|

| | | |
|-----------------------------------|---|--|
| <p>PHYSICAL PROPERTIES</p> | <p>Boiling point: 907°C Melting point: 419°C Relative density (water = 1): 7.14</p> | <p>Solubility in water: reaction Vapour pressure, kPa at 487°C: 0.1 Auto-ignition temperature: 460°C</p> |
|-----------------------------------|---|--|

| | |
|----------------------------------|--|
| <p>ENVIRONMENTAL DATA</p> | |
|----------------------------------|--|

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

| | |
|--|--|
| | |
|--|--|

| | | |
|-------------------|---------------------|--------------------|
| ICSC: 1205 | (C) IPCS, CEC, 1994 | ZINC POWDER |
|-------------------|---------------------|--------------------|

| | |
|---------------------------------------|--|
| <p>IMPORTANT LEGAL NOTICE:</p> | <p>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.</p> |
|---------------------------------------|--|

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

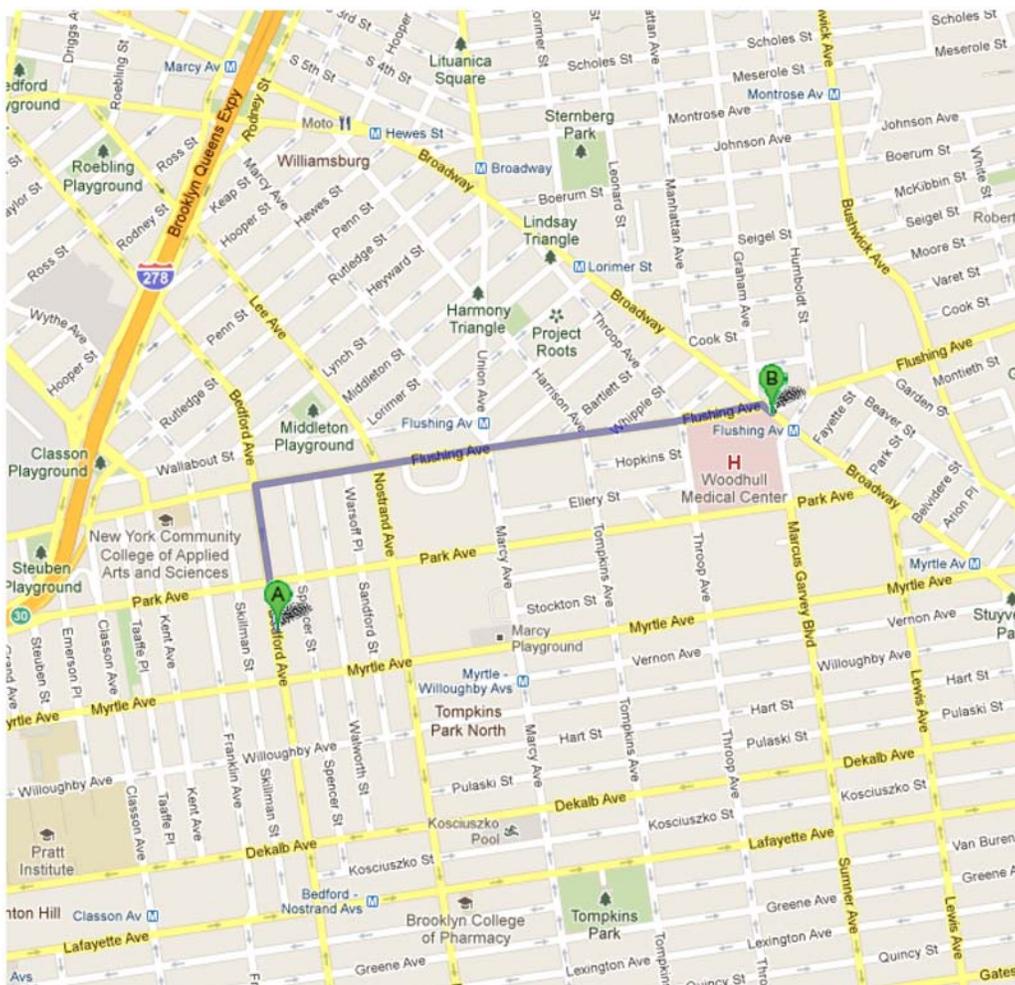
The hospital nearest the site is:

WOODHULL MEDICAL CENTER

760 Broadway Brooklyn, New York 11206

718-963-8000

1 Mile – About 3 Minutes



A 821 Bedford Ave, Brooklyn, NY 11205

1. Head **north** on **Bedford Ave** toward **Park Ave**
About 1 min

go 0.2 mi
total 0.2 mi

↗ 2. Take the 2nd right onto **Flushing Ave**
About 2 mins

go 0.8 mi
total 1.0 mi

↘ 3. Turn right onto **Broadway**
Destination will be on the right

go 112 ft
total 1.0 mi

B 760 Broadway, Brooklyn, NY 11206

APPENDIX F

COMMUNITY AIR MONITORING PLAN

COMMUNITY AIR MONITORING PLAN

**RESIDENTIAL DEVELOPMENT PROJECT
821 BEDFORD AVENUE
BROOKLYN, NY**

OCTOBER - 2011

**COMMUNITY AIR MONITORING PLAN
TABLE OF CONTENTS**

| | | |
|------------|--|---|
| 1.0 | INTRODUCTION | 1 |
| 1.1 | Regulatory Requirements | 1 |
| 2.0 | AIR MONITORING | 2 |
| 2.1 | Meteorological Data | 2 |
| 2.2 | Community Air Monitoring Requirements | 2 |
| 3.0 | VOC MONITORING, RESPONSE LEVELS, AND ACTIONS | 3 |
| 3.1 | Potential Corrective Measures and VOC Suppression Techniques | 3 |
| 4.0 | PARTICULATE MONITORING | 4 |
| 4.1 | Potential Particulate Suppression Techniques..... | 4 |
| 5.0 | DATA QUALITY ASSURANCE | 6 |
| 5.1 | Calibration | 6 |
| 5.2 | Operations | 6 |
| 5.3 | Data Review | 6 |
| 6.0 | RECORDS AND REPORTING | 7 |

APPENDICES

Appendix A Action Limit Report

1.0 INTRODUCTION

This Community Air Monitoring Plan (CAMP) has been prepared for soil disturbance activities associated with construction and remedial activities to be performed under a Hazmat Remedial Action Plan (RAP) at 821 Bedford Avenue in Brooklyn, NY. The CAMP provides measures for protection for the downwind community (i.e., off-site receptors including residences, businesses, and on-site workers not directly involved in the remedial work) from potential airborne contaminant releases resulting from remedial activities at the site.

Compliance with this CAMP is required during all activities associated with excavation and loading of impacted soils that have the potential to generate airborne particulate matter and volatile organic compounds (VOCs). This CAMP has been prepared to ensure that remediation activities do not adversely affect passersby, residents, or workers in the area immediately surrounding the Site and to preclude or minimize airborne migration of construction-related contaminants to offsite areas.

1.1 Regulatory Requirements

This CAMP was established in accordance with the following requirements:

- New York State Department of Health's (NYSDOH) Generic Community Air Monitoring Plan as presented in DER-10 Technical Guidance for Site Investigation and Remediation (NYSDEC May 3, 2010). This guidance specifies that a community air-monitoring program shall be implemented to protect the surrounding community and to confirm that the work does not spread contamination off-site through the air;
- New York State Department of Environmental Conservation (NYSDEC) Technical and Guidance Memorandum (TAGM) #4031 - Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites: This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2.0 AIR MONITORING

Metals are the constituents of concern in historic fill present at the Site. The appropriate method to monitor air for these constituents during remediation activities is through real-time air particulate (dust) monitoring.

2.1 Meteorological Data

At a minimum, wind direction will be evaluated at the start of each workday, noon of each workday, and the end of each workday. These readings will be utilized to position the monitoring equipment in appropriate upwind and downwind locations.

2.2 Community Air Monitoring Requirements

To establish ambient air background concentrations, air will be monitored at several locations around the site perimeter before construction activities begin. These points will be monitored periodically in series during the site work. When the excavation area is within 20 feet of potentially exposed populations or occupied structures, the perimeter monitoring points will be located to represent the nearest potentially exposed individuals at the downwind location.

Fugitive respirable dust will be monitored using a MiniRam Model PDM-3 aerosol monitor (or equivalent). Air will be monitored for VOCs with a portable Ionscience 3000 photoionization detector (PID), or equivalent. All air monitoring data will be documented in a site log book by the designated site safety officer. The site safety officer or delegate must ensure that air monitoring instruments are calibrated and maintained in accordance with manufacturer's specifications. All instruments will be zeroed daily and checked for accuracy. A daily log will be kept. If additional monitoring is required, the protocols will be developed and appended to this plan

3.0 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 or as otherwise specified during remedial activity. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present.

The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should 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 must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with 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 must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can 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 must be shutdown. All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

All readings will be recorded and made available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report, as shown in Appendix A, will be completed.

3.1 Potential Corrective Measures and VOC Suppression Techniques

If the 15-minute integrated VOC level at the downwind location persists at a concentration that exceeds the upwind level by more than 5 ppm but less than 25 ppm during remediation activities, then vapor suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive organic vapors:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- covering soil stockpiles with 6-mil plastic sheeting;
- hauling waste materials in properly tarped containers; and/or
- applying vapor suppressant foam.

4.0 PARTICULATE MONITORING

Air monitoring for particulates (i.e., dust) will be performed continuously during remediation activities using both air monitoring equipment and visual observation at upwind and downwind locations. Monitoring equipment capable of measuring particulate matter smaller than 10 microns (PM₁₀) and capable of integrating (averaging) over periods of 15 minutes or less will be set up at upwind (i.e., background) and downwind locations, at heights approximately four to five feet above land surface (i.e., the breathing zone). Monitoring equipment will be MIE Data Ram monitors, or equivalent. The audible alarm on the particulate monitoring device will be set at 90 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). This setting will allow proactive evaluation of worksite conditions prior to reaching the action level of 100 $\mu\text{g}/\text{m}^3$ above background. The monitors will be calibrated at least once per day prior to work activities and recalibrated as needed thereafter. In addition, fugitive dust migration will be visually assessed during all intrusive work activities.

The following summarizes particulate action levels and the appropriate responses:

- If the downwind PM-10 particulate level is 100 $\mu\text{g}/\text{m}^3$ greater than background (upwind perimeter) for the 15-minute period, or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 $\mu\text{g}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 $\mu\text{g}/\text{m}^3$ above the upwind level, work must be stopped and an evaluation of activities initiated. Work can resume provided that dust suppression measures (as described in Section 2.3.1 below) and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 $\mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

All readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. If an exceedance of the Action Limits occurs, an Action Limit Report as shown in **Appendix A** will be completed.

4.1 Potential Particulate Suppression Techniques

If the integrated particulate level at the downwind location exceeds the upwind level by more than 100 $\mu\text{g}/\text{m}^3$ at any time during remediation activities, then dust suppression techniques will be employed. The following techniques, or others, may be employed to mitigate the generation and migration of fugitive dusts:

- limiting the excavation size;
- backfilling the excavation;
- spraying water onto the excavation faces and equipment;
- covering soil stockpiles with 8-mil plastic sheeting;
- hauling waste materials in properly tarped containers; and/or
- limiting vehicle speeds onsite.

Work may continue with dust suppression techniques provided that downwind PM₁₀ levels are not more than 150 µg/m³ greater than the upwind levels.

There may also be situations where the dust is generated by remediation activities and migrates to downwind locations, but is not detected by the monitoring equipment at or above the action level. Therefore, if dust is observed leaving the working area, dust suppression techniques such as those listed above will be employed.

If dust suppression techniques do not lower particulates to below 150 µg/m³, or visible dust persists, work will be suspended until appropriate corrective measures are identified and implemented to remedy the situation.

All air monitoring readings will be recorded in the field logbook and will be available for the NYSDEC and NYSDOH personnel to review.

5.0 DATA QUALITY ASSURANCE

5.1 Calibration

Instrument calibration shall be documented on instrument calibration and maintenance sheets or in the designated field logbook. All instruments shall be calibrated as required by the manufacturer. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument response.

5.2 Operations

All instruments shall be operated in accordance with the manufacturer's specifications. Manufacturers' literature, including an operations manual for each piece of monitoring equipment will be maintained on-site by the SSO for reference.

5.3 Data Review

The SSO will interpret all monitoring data based the established criteria and his/her professional judgment. The SSO shall review the data with the PM to evaluate the potential for worker exposure, upgrades/downgrades in level of protection, comparison to direct reading instrumentation and changes in the integrated monitoring strategy.

Monitoring and sampling data, along with all sample documentation will be periodically reviewed by the PM.

6.0 RECORDS AND REPORTING

All air readings must be recorded on daily air monitoring log sheets and made available for review by personnel from NYCOER.

APPENDIX G

VAPOR BARRIER SPECIFICATIONS

Vapor Barrier Design and Installation

A vapor barrier is being recommended for this project as a preventative measure. This section includes the specifications and guidelines for installing a below concrete slab sheet vapor barrier. The vapor barrier will extend throughout the area to be occupied by the new multi-use building to be constructed on the site. 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.

A vapor retarder or barrier, by definition, is a material or assembly of materials that resists vapor diffusion through it. For this project the sheet material will consist of a black high-density polyethylene (HDPE) film, 20 mil thick.

ASTM references for vapor barriers include the following:

1. ASTM E 1745-97 "Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs."
2. ASTM E 1643-98 "Standard Practice for Vapor Barriers."

Materials

The minimum values for the HDPE film will meet the following:

| Property | Test Method | Minimum Values |
|--------------------------------------|---------------------|----------------|
| Thickness, mil (mm) | ASTM D 5199 | 20 |
| Density, g/cm ³ | ASTM D 1505 | 0.94 |
| Carbon Black Content, % | ASTM D 1603, mod. | 2.0 |
| Tensile Properties (each direction) | ASTM D 6693 | |
| Strength at Yield, lb/in. (kN/m) | | 22 |
| Strength at Break, lb/in. (kN/m) | | 44 |
| Elongation at Yield, % | (1.3" gauge length) | 10 |
| Elongation at Break, % | (2.0" gauge length) | 500 |
| Tear Resistance, lb (N) | ASTM D 1004 | 5 |
| Puncture Resistance, lb (N) | ASTM D 4833 | 26 |
| Notched Constant Tensile Load, hours | ASTM D 5397, app. | 400 |
| Oxidative Induction Time, min. | ASTM D 3895 | 100 |

The manufacturer of the specified liner is: GSE LINING TECHNOLOGY, INC.

1. All joints in the HDPE sheeting will be sealed with either a tape seal or a weld seal. The tape seal consists of a butyl mastic self-adhering tape, 2 inch (50 mm) wide, compatible with the sheet material.
2. The weld seal consists of an extrudate rod or bead, compatible with sheet material.

Preparation for the installation of the vapor barrier membrane is as follows:

3. Do not install vapor retarder/barrier until items penetrating it are in place.
4. Rake, trim, and tamp surfaces over which membrane is to be installed.
5. Substrates must be regular and smooth with no gaps or voids greater than 0.5 inches (12 mm).
6. The substrate must be free of loose aggregate and sharp protrusions.
7. The substrate does not need to be dry, but standing water must be removed.

Membrane Installation

Place the membrane HDPE film side to the substrate with printed coating side up facing towards the concrete pour. Lay membrane with seams perpendicular to and lapped in direction of concrete pour.

End laps should be staggered to avoid a build-up of layers. Accurately position succeeding sheets to overlap the previous sheet 3 inches (75 mm). Ensure that the underside of the succeeding sheet is clean, dry, and free from contamination before attempting to overlap.

If manufacturer recommends sealing overlaps with tape, proceed with the following steps:

8. Secure overlaps to the bottom sheet with tape.
9. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. During cold or damp conditions, the tape adhesive can be gently warmed using a hot air gun or similar to remove moisture or condensation and improve initial adhesion.
10. If manufacturer recommends sealing overlaps by welding, weld overlap seams according to manufacturer's instructions.
11. Penetrations through the membrane such as utility conduits, can be sealed either using the tape and liquid membrane method or the extrusion weld method.

Procedures for sealing penetrations using the tape and seal method include the following:

12. Scribe membrane tight to the penetration.
13. If the membrane is not within 0.5 inches (12 mm) of the penetration, apply tape to cover the gap.
14. Wrap the penetration with tape by positioning the tape 0.5 inches (12 mm) above the membrane.
15. Mix and apply Liquid Membrane around the penetrations using a fillet to provide a watertight seal between the membrane and tape.

Procedures for sealing penetrations using the extrusion weld method include the following:

Scribe membrane tight to the penetration.

16. Perform extrusion weld techniques according to manufacturer's instructions.

Protection

Protect membrane from damage until permanent covering is in place.

Membrane Repair

The membrane can be repaired using either the tape method or the weld method.

The procedure to repair the membrane using the tape method is as follows:

- Repair punctures and tears in membrane using patches of the material and overlapping the puncture or tear a minimum of 12 inches.
- Seal with tape.

The procedure to repair the membrane using the weld method is as follows:

- Repair punctures and tears in membrane using patches of the material and overlapping the puncture or tear a minimum of 6 inches. Seal with extrusion weld.

Inspection

Upon completion of the installation of the membrane, the Contractor shall coordinate an inspection with the Engineer or its designated representative. The membrane shall not be covered until the Contractor receives written approval from the Engineer.

Pouring of Concrete

It is recommended that concrete be poured within 56 days of application of the membrane. Concrete must be placed and compacted carefully to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.



Permeability For GSE Geomembranes

Due to its chemical structure, polyethylene is an (essentially) impermeable substance. The material is made up of very long molecules. There does exist, however, molecular voids (sometimes referred to as "free space") among the individual polyethylene chains. The existence of these spaces is recognized when we say polyethylene is essentially impermeable. Permeation may exist when, for instance, the pressure behind the permeant is very high or the permeant's molecular size is very small. However, the degree of permeation exhibited is difficult to determine using currently available test procedures. As a result, test results frequently reflect the inaccuracy of the procedure rather than the permeation of the material. Testing of GSE HDPE performed by an independent laboratory produced the following results.

A sometimes overlooked factor when reviewing permeation data is that most permeameters apply pressure to encourage permeation. In geotechnical and environmental applications, geomembranes are not subjected to the high pressures of potential permeants as they are in a permeation laboratory test. The lack of a driving force greatly diminishes actual permeation since the gaseous molecules find an easier path to follow than through the polyethylene liner. Also, because of the high pressures required to force permeants through polyethylene, failure of the permeameter is common. This is commonly in the form of a test apparatus leak. Such leaks can result in erroneous results.

| Test | ASTM Method | Results |
|--------------------------|-------------|--|
| Methane Permeability | D 1434 | 2.0 x 10 ⁻⁶ mL/cm ² ·s |
| Water Vapor Permeability | E 96 | 1.7 x 10 ⁻⁹ mL/cm ² ·s |

It must be emphasized that different chemicals will permeate at different rates due to differences in molecular shape, polarity and phase (gas or liquid). For example, the relatively small water molecule (atomic weight 18) will more easily permeate the polyethylene matrix as compared to a large molecule such as cyclohexanol (atomic weight 94).

The molecules' polarity must also be considered (recall the adage "like dissolves like"). Polyethylene is a non-polar molecule, therefore other non-polar molecules will permeate the matrix better. Examples of these molecules are hydrocarbons - especially those such as octane, pentane and hexene. The permeation of these are therefore greater than for polar molecules such as water.

TN006 PermeabilityGeomem R03/17/06

This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information. Please check with GSE for current, standard minimum quality assurance procedures and specifications.

GSE and other trademarks in this document are registered trademarks of GSE Lining Technology, Inc. in the United States and certain foreign countries.

| | | | | | |
|----------------------------|---------------------------------------|--------------------------------|--------------|----------------|---------------------|
| North America | GSE Lining Technology, Inc. | Houston, Texas | 800 435 2008 | 281 443 8564 | Fax: 281 230 8650 |
| South America | GSE Lining Technology Chile S.A. | Santiago, Chile | | 56 2 595 4200 | Fax: 56 2 595 4290 |
| Asia Pacific | GSE Lining Technology Company Limited | Bangkok, Thailand | | 66 2 937 0091 | Fax: 66 2 937 0097 |
| Europe & Africa | GSE Lining Technology GmbH | Hamburg, Germany | | 49 40 767420 | Fax: 49 40 7674234 |
| Middle East | GSE Lining Technology-Egypt | The 6th of October City, Egypt | | 202 2 828 8888 | Fax: 202 2 828 8889 |



Chemical Resistance For GSE Geomembranes

GSE geomembranes are made of high quality, virgin polyethylene which demonstrates excellent chemical resistance. GSE polyethylene geomembranes are resistant to a great number and combinations of chemicals. It is this property of (HDPE) high density polyethylene geomembranes that makes it the lining material of choice.

In order to gauge the durability of a material in contact with a chemical mixture, testing is required in which the material is exposed to the chemical environment in question. Chemical resistance testing is a very large and complex topic because of two factors. First, the number of specific media is virtually endless and second, there are many criteria such as tensile strength, hardness, etc. that may be used to assess a material's resistance to degradation.

The chemical resistance of polyethylene has been investigated by many people over the past few decades. We are able to draw from that work when making statements about the chemical resistance of today's polyethylene geomembranes. In addition to that, many tests have been performed that specifically use geomembranes and certain chemical mixtures. Naturally, however, every mixture of chemicals cannot be tested for. As a result of these factors, GSE published a chemical resistance chart, demonstrating general guidelines.

Polyethylene is, for practical purposes, considered impermeable. Be aware, however, that all materials are permeable to some extent. Permeability varies with concentration, temperature, pressure and type of permeant. The rates of permeation are usually so low, however, that they are insignificant. As a point of reference, polyethylene is commonly used for packaging of several types of materials. These include gasoline, motor oil, household cleaners (i.e. bleach), muratic acid, pesticides, insecticides, fungi-

cides, and other highly concentrated chemicals. Also, you should be aware that there are some chemicals which may be absorbed by the material but only when present at very high concentrations. These include halogenated and/or aromatic hydrocarbons at greater than 50%; their absorption results in swelling and slight changes in physical properties such as increased tensile elongations. This includes many types of fuels and oils. Recognize that this action, however, does not affect the liner's ability to act as a barrier for the material it is containing.

Since polyethylene is a petroleum product, it can absorb other petroleum products. Like a sponge, the material becomes slightly thicker and more flexible but does not produce a hole or void. However, unlike a sponge, this absorption is not immediate. It takes a much longer time for a polyethylene liner to swell than it does for a sponge. The exact time it takes for swelling to occur depends on the particular constituents and concentrations of the contained media. However, a hole would not be produced. Also, this absorption is reversible and the material will essentially return to it's original state when the chemical is no longer in contact with the liner.

With regard to typical municipal landfills in the United States, legally allowable levels of chemicals have been demonstrated to have no adverse affect on polyethylene geomembrane performance. The very low levels of salts, metals and organic compounds do not damage polyethylene. A double-lined containment with a leachate (leak detection) removal system effectively prevents any significant, continuous exposure of the secondary membrane to these materials and for practical purposes makes the total liner system even more impermeable.

TN005 ChemicalResistance R03/17/06

This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information. Please check with GSE for current, standard minimum quality assurance procedures and specifications.

GSE and other trademarks in this document are registered trademarks of GSE Lining Technology, Inc. in the United States and certain foreign countries.

| | | | | | |
|----------------------------|---------------------------------------|--------------------------------|--------------|----------------|---------------------|
| North America | GSE Lining Technology, Inc. | Houston, Texas | 800 435 2008 | 281 443 8564 | Fax: 281 230 8650 |
| South America | GSE Lining Technology Chile S.A. | Santiago, Chile | | 56 2 595 4200 | Fax: 56 2 595 4290 |
| Asia Pacific | GSE Lining Technology Company Limited | Bangkok, Thailand | | 66 2 937 0091 | Fax: 66 2 937 0097 |
| Europe & Africa | GSE Lining Technology GmbH | Hamburg, Germany | | 49 40 767420 | Fax: 49 40 7674234 |
| Middle East | GSE Lining Technology-Egypt | The 6th of October City, Egypt | | 202 2 828 8888 | Fax: 202 2 828 8889 |



Chemical Resistance Chart

GSE is the world's leading supplier of high quality, polyethylene geomembranes. GSE polyethylene geomembranes are resistant to a great number and combinations of chemicals. Note that the effect of chemicals on any material is influenced by a number of variable factors such as temperature, concentration, exposed area and duration. Many tests have been performed that use geomembranes and certain specific chemical mixtures. Naturally, however, every mixture of chemicals cannot be tested for, and various criteria may be used to judge performance. Reported performance ratings may not apply to all applications of a given material in the same chemical. Therefore, these ratings are offered as a guide only. This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information.

| Medium | Concentration | Resistance at: | |
|-----------------------------|----------------------|------------------|-------------------|
| | | 20 °C (68 °F) | 60 °C (140 °F) |
| A | | | |
| Acetic acid | 100% | S | L |
| Acetic acid | 10% | S | S |
| Acetic acid anhydride | 100% | S | L |
| Acetone | 100% | L | L |
| Adipic acid | sat. sol. | S | S |
| Allyl alcohol | 96% | S | S |
| Aluminum chloride | sat. sol. | S | S |
| Aluminum fluoride | sat. sol. | S | S |
| Aluminum sulfate | sat. sol. | S | S |
| Alum | sol. | S | S |
| Ammonia, aqueous | dil. sol. | S | S |
| Ammonia, gaseous dry | 100% | S | S |
| Ammonia, liquid | 100% | S | S |
| Ammonium chloride | sat. sol. | S | S |
| Ammonium fluoride | sol. | S | S |
| Ammonium nitrate | sat. sol. | S | S |
| Ammonium sulfate | sat. sol. | S | S |
| Ammonium sulfide | sol. | S | S |
| Amyl acetate | 100% | S | L |
| Amyl alcohol | 100% | S | L |
| Aniline | 100% | S | L |
| Antimony trichloride | 90% | S | S |
| Arsenic acid | sat. sol. | S | S |
| Aqua regia | HCl-HNO ₃ | U | U |
| B | | | |
| Barium carbonate | sat. sol. | S | S |
| Barium chloride | sat. sol. | S | S |
| Barium hydroxide | sat. sol. | S | S |
| Barium sulfate | sat. sol. | S | S |
| Barium sulfide | sol. | S | S |
| Benzaldehyde | 100% | S | L |
| Benzene | — | L | L |
| Benzoic acid | sat. sol. | S | S |
| Beer | — | S | S |
| Borax (sodium tetraborate) | sat. sol. | S | S |
| Boric acid | sat. sol. | S | S |
| Bromine, gaseous dry | 100% | U | U |
| Bromine, liquid | 100% | U | U |
| Butane, gaseous | 100% | S | S |
| 1-Butanol | 100% | S | S |
| Butyric acid | 100% | S | L |
| C | | | |
| Calcium carbonate | sat. sol. | S | S |
| Calcium chlorate | sat. sol. | S | S |
| Calcium chloride | sat. sol. | S | S |
| Calcium nitrate | sat. sol. | S | S |
| Calcium sulfate | sat. sol. | S | S |
| Calcium sulfide | dil. sol. | L | L |
| Carbon dioxide, gaseous dry | 100% | S | S |
| Carbon disulfide | 100% | L | U |
| Carbon monoxide | 100% | S | S |
| Chloroacetic acid | sol. | S | S |
| Carbon tetrachloride | 100% | L | U |
| Chlorine, aqueous solution | sat. sol. | L | U |
| Chlorine, gaseous dry | 100% | L | U |
| Chloroform | 100% | U | U |
| Chromic acid | 20% | S | L |
| Chromic acid | 50% | S | L |
| Citric acid | sat. sol. | S | S |

| Medium | Concentration | Resistance at: | |
|---------------------------|---------------|------------------|-------------------|
| | | 20 °C (68 °F) | 60 °C (140 °F) |
| Copper chloride | sat. sol. | S | S |
| Copper nitrate | sat. sol. | S | S |
| Copper sulfate | sat. sol. | S | S |
| Cresylic acid | sat. sol. | L | — |
| Cyclohexanol | 100% | S | S |
| Cyclohexanone | 100% | S | L |
| D | | | |
| Decahydronaphthalene | 100% | S | L |
| Dextrine | sol. | S | S |
| Diethyl ether | 100% | L | — |
| Diethylphthalate | 100% | S | L |
| Dioxane | 100% | S | S |
| E | | | |
| Ethandiol | 100% | S | S |
| Ethanol | 40% | S | L |
| Ethyl acetate | 100% | S | U |
| Ethylene trichloride | 100% | U | U |
| F | | | |
| Ferric chloride | sat. sol. | S | S |
| Ferric nitrate | sol. | S | S |
| Ferric sulfate | sat. sol. | S | S |
| Ferrous chloride | sat. sol. | S | S |
| Ferrous sulfate | sat. sol. | S | S |
| Fluorine, gaseous | 100% | U | U |
| Fluorosilicic acid | 40% | S | S |
| Formaldehyde | 40% | S | S |
| Formic acid | 50% | S | S |
| Formic acid | 98-100% | S | S |
| Furfuryl alcohol | 100% | S | L |
| G | | | |
| Gasoline | — | S | L |
| Glacial acetic acid | 96% | S | L |
| Glucose | sat. sol. | S | S |
| Glycerine | 100% | S | S |
| Glycol | sol. | S | S |
| H | | | |
| Heptane | 100% | S | U |
| Hydrobromic acid | 50% | S | S |
| Hydrobromic acid | 100% | S | S |
| Hydrochloric acid | 10% | S | S |
| Hydrochloric acid | 35% | S | S |
| Hydrocyanic acid | 10% | S | S |
| Hydrofluoric acid | 4% | S | S |
| Hydrofluoric acid | 60% | S | L |
| Hydrogen | 100% | S | S |
| Hydrogen peroxide | 30% | S | L |
| Hydrogen peroxide | 90% | S | U |
| Hydrogen sulfide, gaseous | 100% | S | S |
| L | | | |
| Lactic acid | 100% | S | S |
| Lead acetate | sat. sol. | S | — |
| M | | | |
| Magnesium carbonate | sat. sol. | S | S |
| Magnesium chloride | sat. sol. | S | S |
| Magnesium hydroxide | sat. sol. | S | S |
| Magnesium nitrate | sat. sol. | S | S |
| Maleic acid | sat. sol. | S | S |
| Mercuric chloride | sat. sol. | S | S |

| Medium | Concentration | Resistance at: | |
|--------------------------|---------------|------------------|-------------------|
| | | 20 °C (68 °F) | 60 °C (140 °F) |
| Mercuric cyanide | sat. sol. | S | S |
| Mercuric nitrate | sol. | S | S |
| Mercury | 100% | S | S |
| Methanol | 100% | S | S |
| Methylene chloride | 100% | L | — |
| Milk | — | S | S |
| Molasses | — | S | S |
| N | | | |
| Nickel chloride | sat. sol. | S | S |
| Nickel nitrate | sat. sol. | S | S |
| Nickel sulfate | sat. sol. | S | S |
| Nicotinic acid | dil. sol. | S | — |
| Nitric acid | 25% | S | S |
| Nitric acid | 50% | S | U |
| Nitric acid | 75% | U | U |
| Nitric acid | 100% | U | U |
| O | | | |
| Oils and Grease | — | S | L |
| Oleic acid | 100% | S | L |
| Orthophosphoric acid | 50% | S | S |
| Orthophosphoric acid | 95% | S | L |
| Oxalic acid | sat. sol. | S | S |
| Oxygen | 100% | S | L |
| Ozone | 100% | L | U |
| P | | | |
| Petroleum (kerosene) | — | S | L |
| Phenol | sol. | S | S |
| Phosphorus trichloride | 100% | S | L |
| Photographic developer | cust. conc. | S | S |
| Picric acid | sat. sol. | S | — |
| Potassium bicarbonate | sat. sol. | S | S |
| Potassium bisulfide | sol. | S | S |
| Potassium bromate | sat. sol. | S | S |
| Potassium bromide | sat. sol. | S | S |
| Potassium carbonate | sat. sol. | S | S |
| Potassium chlorate | sat. sol. | S | S |
| Potassium chloride | sat. sol. | S | S |
| Potassium chromate | sat. sol. | S | S |
| Potassium cyanide | sol. | S | S |
| Potassium dichromate | sat. sol. | S | S |
| Potassium ferricyanide | sat. sol. | S | S |
| Potassium ferrocyanide | sat. sol. | S | S |
| Potassium fluoride | sat. sol. | S | S |
| Potassium hydroxide | 10% | S | S |
| Potassium hydroxide | sol. | S | S |
| Potassium hypochlorite | sol. | S | L |
| Potassium nitrate | sat. sol. | S | S |
| Potassium orthophosphate | sat. sol. | S | S |
| Potassium perchlorate | sat. sol. | S | S |
| Potassium permanganate | 20% | S | S |
| Potassium persulfate | sat. sol. | S | S |
| Potassium sulfate | sat. sol. | S | S |
| Potassium sulfite | sol. | S | S |
| Propionic acid | 50% | S | S |
| Propionic acid | 100% | S | L |
| Pyridine | 100% | S | L |
| Q | | | |
| Quinol (Hydroquinone) | sat. sol. | S | S |
| S | | | |
| Salicylic acid | sat. sol. | S | S |

| Medium | Concentration | Resistance at: | |
|-----------------------|---------------------|------------------|-------------------|
| | | 20 °C (68 °F) | 60 °C (140 °F) |
| Silver acetate | sat. sol. | S | S |
| Silver cyanide | sat. sol. | S | S |
| Silver nitrate | sat. sol. | S | S |
| Sodium benzoate | sat. sol. | S | S |
| Sodium bicarbonate | sat. sol. | S | S |
| Sodium biphosphate | sat. sol. | S | S |
| Sodium bisulfite | sol. | S | S |
| Sodium bromide | sat. sol. | S | S |
| Sodium carbonate | sat. sol. | S | S |
| Sodium chlorate | sat. sol. | S | S |
| Sodium chloride | sat. sol. | S | S |
| Sodium cyanide | sat. sol. | S | S |
| Sodium ferricyanide | sat. sol. | S | S |
| Sodium ferrocyanide | sat. sol. | S | S |
| Sodium fluoride | sat. sol. | S | S |
| Sodium hydroxide | 40% | S | S |
| Sodium hydroxide | sat. sol. | S | S |
| Sodium hypochlorite | 15% active chlorine | S | S |
| Sodium nitrate | sat. sol. | S | S |
| Sodium nitrite | sat. sol. | S | S |
| Sodium orthophosphate | sat. sol. | S | S |
| Sodium sulfate | sat. sol. | S | S |
| Sodium sulfide | sat. sol. | S | S |
| Sulfur dioxide, dry | 100% | S | S |
| Sulfur trioxide | 100% | U | U |
| Sulfuric acid | 10% | S | S |
| Sulfuric acid | 50% | S | S |
| Sulfuric acid | 98% | S | U |
| Sulfuric acid | fuming | U | U |
| Sulfurous acid | 30% | S | S |
| T | | | |
| Tannic acid | sol. | S | S |
| Tartaric acid | sol. | S | S |
| Thionyl chloride | 100% | L | U |
| Toluene | 100% | L | U |
| Triethylamine | sol. | S | L |
| U | | | |
| Urea | sol. | S | S |
| Urine | — | S | S |
| W | | | |
| Water | — | S | S |
| Wine vinegar | — | S | S |
| Wines and liquors | — | S | S |
| X | | | |
| Xylenes | 100% | L | U |
| Y | | | |
| Yeast | sol. | S | S |
| Z | | | |
| Zinc carbonate | sat. sol. | S | S |
| Zinc chloride | sat. sol. | S | S |
| Zinc (II) chloride | sat. sol. | S | S |
| Zinc (IV) chloride | sat. sol. | S | S |
| Zinc oxide | sat. sol. | S | S |
| Zinc sulfate | sat. sol. | S | S |

Specific immersion testing should be undertaken to ascertain the suitability of chemicals not listed above with reference to special requirements.

NOTES:

(S) **Satisfactory:** Liner material is resistant to the given reagent at the given concentration and temperature. No mechanical or chemical degradation is observed.

(L) **Limited Application Possible:** Liner material may reflect some attack. Factors such as concentration, pressure and temperature directly affect liner performance against the given media. Application, however, is possible under less severe conditions, e.g. lower concentration, secondary containment, additional liner protections, etc.

(U) **Unsatisfactory:** Liner material is not resistant to the given reagent at the given concentration and temperature. Mechanical and/or chemical degradation is observed.

(-) **Not tested**

sat. sol. = Saturated aqueous solution, prepared at 20°C (68°F)

sol. = aqueous solution with concentration above 10% but below saturation level

dil. sol. = diluted aqueous solution with concentration below 10%

cust. conc. = customary service concentration

TN032 ResistChart R03/17/06

This information is provided for reference purposes only and is not intended as a warranty or guarantee. GSE assumes no liability in connection with the use of this information. Please check with GSE for current, standard minimum quality assurance procedures and specifications.

GSE and other trademarks in this document are registered trademarks of GSE Lining Technology, Inc. in the United States and certain foreign countries.

| | | | | | |
|----------------------------|---------------------------------------|--------------------------------|--------------|----------------|---------------------|
| North America | GSE Lining Technology, Inc. | Houston, Texas | 800 435 2008 | 281 443 8564 | Fax: 281 230 8650 |
| South America | GSE Lining Technology Chile S.A. | Santiago, Chile | | 56 2 595 4200 | Fax: 56 2 595 4290 |
| Asia Pacific | GSE Lining Technology Company Limited | Bangkok, Thailand | | 66 2 937 0091 | Fax: 66 2 937 0097 |
| Europe & Africa | GSE Lining Technology GmbH | Hamburg, Germany | | 49 40 767420 | Fax: 49 40 7674234 |
| Middle East | GSE Lining Technology-Egypt | The 6th of October City, Egypt | | 202 2 828 8888 | Fax: 202 2 828 8889 |

PROCOR®

Fluid applied waterproofing for below grade structures

Description

Procor® is a two component, synthetic rubber, cold vulcanized, fluid applied waterproofing membrane. It cures to form a resilient, monolithic, fully bonded elastomeric sheet.

Procor will protect below ground structures against water and water vapor ingress.

The Volatile Organic Compound (VOC) content of Procor waterproofing membranes is less than 75 g/L. Architectural and Industrial Maintenance Regulations limit the VOC content in products classified as Architectural Coatings. Refer to Technical Letters at www.graceconstruction.com for most current list of allowable limits.

Advantages

- **Fully bonded**—water cannot track beneath the membrane
- **Waterproof**—resists a hydrostatic head in excess of 65 ft (20 m)
- **Elastomeric**—accommodates minor structural movements and will bridge concrete shrinkage cracks
- **Asphalt free formulation**—does not become brittle with age and remains flexible to -23°F (-30°C)
- **Chemical cure**—100% solids; wet thickness equals dry thickness
- **Seamless**—continuous waterproofing integrity with easy detailing
- **Primerless**—applied directly to the substrate with minimal surface preparation
- **Damp surface tolerant**—can be applied to damp-to-touch surfaces
- **Cold applied**—eliminates fire hazards during application
- **Quick and easy application**—by airless spray or trowel
- **Wide application window**—can be sprayed down to 20°F (-7°C)
- **Versatile**—easy to use at drains, pipe penetrations, internal and external corners, etc.
- **ASTM C836**—meets or exceeds all physical performance criteria

Principal Applications

New and remedial waterproofing applications:

- Concrete and masonry basements
- Retaining walls
- Elevator pits
- Service ducts
- Split slab applications
- Floors
- Wet rooms

System Components

- **Procor 75 Spray Grade**—for horizontal and vertical applications
- **Procor 10 Pourable Grade**—for horizontal applications
- **Procor 20 Trowel Grade**—for vertical applications and details
- **Hydroduct® Drainage Composites**—high compressive strength, high flow geocomposite drainage sheets
- **Bituthene® Liquid Membrane**—for detailing at pipe entries, etc.
- **Preprufe® Tape**—for tie-ins of Procor, Bituthene or Preprufe waterproofing sheet membranes

Installation

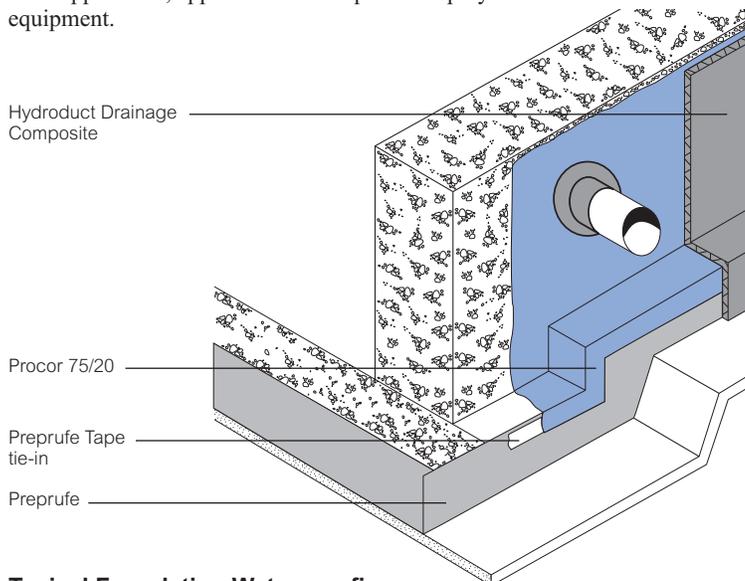
Safety

Refer to product label and Material Safety Data Sheet before use. All users should acquaint themselves with this information prior to working with the material. Carefully read detailed precaution statements on the product labels and MSDS before use. MSDSs can be obtained from our web site at www.graceconstruction.com or by contacting us toll free at 866-333-3SBM (3726).

Application

Procor fluid applied waterproofing membranes are typically applied at a minimum thickness of 60 mil (1.5 mm).

Procor can be installed by hand or using airless spray application. Grace has a network of Procor Specialist Spray Applicators who are trained and experienced in spray application. Contact Grace for further details of local applicators, application techniques and spray equipment.



Typical Foundation Waterproofing

Drawings are for illustration purposes only. Please refer to www.graceconstruction.com for specific application details.

Surface Preparation

Concrete

Cementitious surfaces must be smooth, monolithic and free of frost, voids, spalled areas, loose substrate and sharp protrusions, dirt, oil, grease and debris and must contain no other contaminants or any visible coarse aggregate. Repair defects such as spalled or poorly consolidated areas.

Tie-holes and “bugholes” larger than ¼ in. (6 mm) in diameter or deeper than ⅛ in. (3 mm) or both, should be either pretreated with Procor or repaired with a lean concrete mix or grout. See ASTM D5295, *Preparation of Concrete Surfaces for Adhered Membrane Waterproofing Systems*, for further details on substrate preparation.

Cracked, pitted, honeycombed or heavily bugholed surfaces can be filled by spraying from close in (10 in. to 12 in.) but high material usage will result. Under these circumstances it may be more efficient to fill the surfaces with a parge coat of lean mortar mix before application of the Procor. It is also acceptable to fill in gaps with a compatible sealant or caulk.

Remove windrows, sharp protrusions and form match lines. Also remove high spots greater than .03 in. (0.8 mm) in height. On highly porous and rough surfaces, it may be necessary to apply Procor Concrete Sealer or a scratch coat of Procor to provide a smooth surface, before applying the liquid membrane.

All substrates must be wirebrushed, swept with a stiff broom or blown off with low pressure air to remove dirt, dust and loose stones. Poor quality surfaces with excessive laitance may require shotblasting or pressure washing to provide a dense smooth surface free from contaminants.

Please refer to Technical Letter 2 for more information on *Inspection and Repair of Concrete*.

Masonry

Waterproofing concrete block is critical since most concrete block is porous and therefore susceptible to moisture and water infiltration. Refer to Technical Letter *Waterproofing Concrete Block Walls* for surface preparation. Apply a scratch coat of Procor to provide a smooth surface before applying the liquid membrane.

Wood/Plywood

Apply Procor membrane over securely fastened sound surface. All joints and fasteners shall be flush to create a smooth surface.

Contact Grace Construction Products if in doubt about the suitability of the substrate.

Application to Green Concrete or Damp Surfaces

Procor may be applied to green (minimum 3 days cure time) concrete or over surfaces which are damp to the touch. Remove any visible water prior to application. In green concrete or damp substrate applications, direct sunlight may cause the surface temperature to rise rapidly, drawing moisture from the substrate and resulting in blisters and pinholes in the membrane. Under these conditions it may be necessary to apply Procor Concrete Sealer or a scratch coat of Procor before applying the full thickness Procor membrane.

Do not apply Procor waterproofing membranes in wet weather. Once applied, the membranes will not be affected by light rain showers.

Application Temperature

Hand Application—Apply Procor 10 and 20 membranes at ambient and substrate temperatures above 40°F (4°C). Do not apply the material if the ambient temperature is likely to fall below 32°F (0°C) within one hour of application completion.

Spray Application—In spray applications using Procor 75, it is possible to work at temperatures below 40°F (4°C) provided there is no frost or condensation on the substrate. The minimum temperature for spray application is 20°F (-7°C). Refer to Technical Letter *Spraying Procor 75 at Low Temperatures*, or contact your Grace Construction Products representative for details of cold weather spraying.

Detailing

Detailing should be completed prior to applying the full coverage of Procor membrane. The continuous field application should completely cover the detail areas to provide double thickness coverage. For a complete description and instructions on Procor details, consult the separate detail sheets.

Inside and Outside Corners

- Apply a 60 mil (1.5 mm) coating of Procor membrane starting in the corner and extending 6 in. (150 mm) from each side of the corner. For added protection over rough surfaces on inside corners install a 1 in. (25 mm) fillet of Procor 20 or Bituthene Liquid Membrane by hand to reinforce the corner.

Non-moving Joints and Hairline Cracks

- Apply a 60 mil (1.5 mm) coating of Procor membrane over non-moving joints or hairline cracks and extend the material 6 in. (150 mm) from each side of the opening.
- Non-moving joints are defined in ASTM C898, *Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Separate Wearing Course*, as cold joints, construction joints, isolation joints and control joints held together with steel reinforcing bars or wire fabric. These joints are generally considered by the designer of the structural system as non-moving or static joints. Hairline cracks are defined as cracks less than 60 mil (1.5 mm) in width.

Drains and Penetrations

- In drain applications, apply a 60 mil (1.5 mm) coating of Procor membrane over the drain flange and extend it 6 in. (150 mm) beyond the flange.
- Penetration openings must be sealed and stabilized prior to the application of Procor membrane.
- Once sealed and stabilized, install a 1 in. (25 mm) fillet of Procor 20 or Bituthene Liquid Membrane around the protrusion. Extend the Procor membrane 6 in. (150 mm) onto the structural substrate and at least 2 in. (50 mm) onto the penetration. For plastic pipes and other low adhesion substrates, a tie-in using Preprufe Tape will be needed.

Hand Application on Horizontal Surfaces

On horizontal applications, use the “pour and spread” method. Pour the mixed material directly from the container and spread using a steel trowel, flexible spreader, float or screed. A metal squeegee with thickness guides at the ends is acceptable and flexible bladed rubber squeegees may also be used. Care must be taken to ensure that any thin areas are brought to the recommended thickness. A notched squeegee is not recommended since it will leave thin spots in the waterproofing. Plan the application sequence so that there is no need to walk on the freshly applied material. The membrane can typically accept foot traffic after 24 to 48 hours. However, in temperatures above 70°F (20°C), the membrane can accept foot traffic in less than 24 hours.

In horizontal applications where a minimum slope of 0.13 in./ft (11 mm/m) cannot be achieved, apply 2 coats of Procor membrane to achieve total thickness.

Hand Application on Vertical Surfaces

On vertical applications, scoop the Procor directly from the pail or apply using the “pour and trowel” method. Pour the mixed material directly from the container onto the vertical surface and follow directly behind it with a 12–18 in. (300–450 mm) straight edge steel trowel. Spread the material uniformly across the surface with only one or two passes, starting at the bottom of the wall and pulling the material up the wall. Additional passes with the trowel over the material will cause the material to become “stringy” and difficult to trowel.

Spray Application

Procor 75 Membrane may be spray applied to horizontal and vertical surfaces. Contact Grace Construction Products for qualified spray equipment.

Thickness Control

Application thickness is controlled in both horizontal and vertical applications by marking the area and spot checking the thickness with a wet film thickness gauge. Swipe and trowel marks on the Procor membrane are acceptable as long as the minimum thickness is maintained.

Mixing and Pot Life (Hand Application)

If Procor waterproofing membranes are stored in cold temperatures, allow the material to stand for several hours at room temperature to facilitate mixing and application.

Open the Part A container and stir or mix for about 15 seconds. Add the entire contents of the Part B container to the Part A container and mix either mechanically or by hand. For mechanical mixing, use a slow speed (300–450 RPM), heavy duty drill with a spiral mixing paddle (such as Goldblatt® Paint/Mud Mixer by Stanley Tools) and mix for about 1 minute. For hand mixing, use a flat board or paddle and mix for about 2 to 3 minutes using a slow folding motion.

The mixed product should have a uniform color, free from any white streaks. Take care to scrape material from the side and bottom of the container to assure thorough mixing. Once mixed use immediately. Do not overmix as overmixing will result in premature thickening of the material in the container and decrease the pot life. Once properly mixed, the pot life is typically 30 to 60 minutes depending on ambient temperature. The pot life may be reduced to about 15 minutes in temperatures above 86°F (30°C).

CAUTION:

Always install the entire contents of the container as soon as possible. The reaction that occurs between Part A and Part B is exothermic (gives off heat) and mixed material left in the pail will reach temperatures higher than 212°F (100°C).

Do not cover the material after it is mixed.

Do not add water or any other material to thin the product.

For Procor 75, use qualified spray equipment systems. Mixing occurs within the spray gun assembly. Pre-mix Part A prior to pumping to bring any settled material back into solution.

Coverage Rates

Procor fluid applied waterproofing membranes are typically applied at a minimum thickness of 60 mil (1.5 mm). The theoretical coverage rate (not including waste) at a 60 mil (1.5 mm) thickness is about 25 ft²/gal (0.6 m²/L). Coverage rates will be reduced over rough and uneven substrates.

Drainage, Protection or Insulation

Protect Procor membranes to avoid damage from other trades, construction materials and backfill. Protection products may be installed on the same day as the Procor membrane. Bonding of the protection products to the Procor membrane is achieved if the protection products are installed when the Procor membrane is tacky, generally 1 to 2 hours after the Procor membrane is installed. To achieve non-bonded protection, wait until the Procor membrane surface is no longer tacky, or spread cement dust or lime to remove the tack prior to applying the protection. Take care not to displace the Procor membrane.

On horizontal applications, use Hydroduct 660 Drainage Composite. Alternate methods of protection are 1/8 in. (3 mm) or 1/4 in. (6 mm) asphalt hardboard. Extruded polystyrene insulation boards may also be used and are compatible with Procor membranes.

On vertical applications, use Hydroduct 220 Drainage Composite. Alternate methods of protection are 1/4 in. (6 mm) asphalt impregnated board or 1 in. (25 mm) extruded polystyrene. Such alternatives do not provide positive drainage to the system.

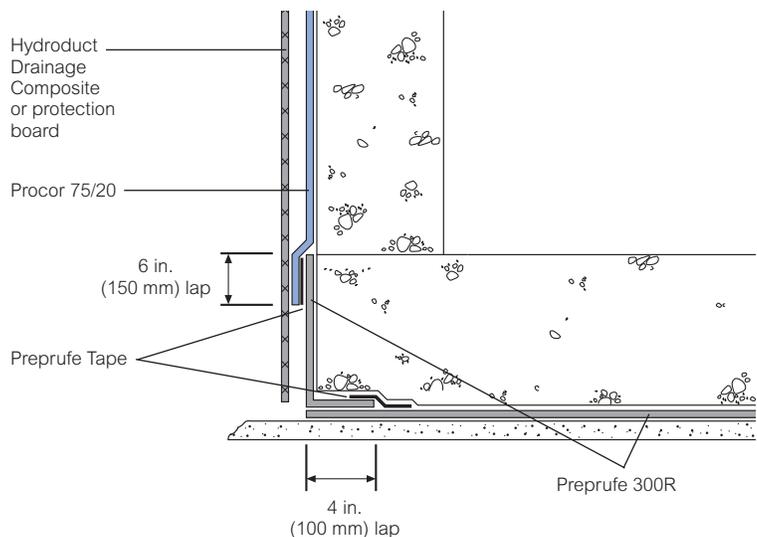
Backfill and Flood Tests

Allow Procor waterproofing membrane to cure at least 24 hours prior to backfill to avoid displacement of the membrane. Use care during the backfill operation to avoid damage to the waterproofing system. Follow generally accepted practices for backfilling and compaction. Backfill should be added and compacted in 6 in. (150 mm) to 12 in. (300 mm) lifts to avoid stresses on the waterproofing system. Settlement stresses may compromise the integrity of the waterproofing system.

Flood test all horizontal applications with a maximum 2 in. (50 mm) head of water for at least 24 hours. Mark any leaks and repair when the membrane is dry. Before flood testing, be sure the structure will withstand the dead load of the water. For well-sloped decks, segment the flood test to avoid deep water near drains. Start flood test 48 hours after completing the application of Procor fluid applied waterproofing. Low voltage electronic leak detection techniques are also suitable.

Cleaning

Tools and equipment are most effectively cleaned by allowing the material to cure and simply peeling it off the next day. Procor Flushing Oil is available to clean spray equipment.



Typical Foundation Waterproofing

Supply

| Product | Unit of Sale | Approx. Coverage at 60 mil (1.5 mm) | Weight | Palletization |
|----------------------|----------------------------|-------------------------------------|--|--|
| Procor 75 | 75 gallon kit | 1875 ft ² /kit | 748 lbs/kit, net (573 lbs Part A + 175 lbs Part B) | 1 or 2 kits/pallet, for orders of 1 or 2 kits only |
| Procor 10 | 5.3 gallon kit | 132 ft ² /kit | 53.4 lbs/kit, net (41.3 lbs Part A + 12.1 lbs Part B) | 16 kits/pallet (16 pails Part A + 16 pails Part B = 32 pails total) |
| Procor 20 | 1.9 gallon kit | 47 ft ² /kit | 18.4 lbs/kit, net (14.0 lbs Part A + 4.4 lbs Part B) | 40 kits/pallet (40 pails Part A + 40 pails Part B = 80 pails total) |
| Hydroduct 660 | 1 roll (4 ft x 50 ft roll) | 200 ft ² /roll | 54 lbs/roll | 6 rolls/pallet |
| Hydroduct 220 | 1 roll (4 ft x 50 ft roll) | 200 ft ² /roll | 42 lbs/roll | 6 rolls/pallet |

Footnote:

1. Nominal coverage based on 25 sf/gal for smooth concrete. Coverage will vary with substrate condition.

Physical Properties

| Property | Typical Value | Test Method |
|--|--|---------------------------------|
| Resistance to hydrostatic head over 1/8 in. (3.2 mm) post formed crack | 65 ft (20 m) | ASTM D5385 |
| Water vapor permeance | 0.08 perms (4.6 ng/Pa.s.m ²) | ASTM E96—method B |
| Peel adhesion to concrete | 5 lbs/in. (880 N/m) | ASTM D903 modified ² |
| Elongation | 500% | ASTM D412 |
| Pliability, 180° bend over 1 in. (25 mm) mandrel at -23°F (-30°C) | Unaffected | ASTM D1970 |
| Low temperature flexibility and crack bridging 1/8 in. (3.2 mm) crack cycling at -15°F (-26°C) | Pass | ASTM C836 |
| Extensibility over 1/4 in. (6.4 mm) crack after heat aging | Pass | ASTM C836 |
| Solids content | 100% | ASTM D1644 |

Footnote:

2. Procor waterproofing membrane is applied to concrete and allowed to cure. Peel adhesion of the membrane is measured at a rate of 2 in. (50 mm) per minute with a peel angle of 90° at room temperature.

Storage and Handling Information

Procor waterproofing membranes (Part A and Part B) should be stored under cover in original sealed containers above 40°F (4°C) and below 100°F (38°C). Keep Part B from freezing during storage. The shelf life is 9 months in unopened containers.

Limitations

Procor membranes should not be used in areas where they will be permanently exposed to sunlight, weather or traffic. Maximum exposure period is 30 days.

Procor membranes should not be used in negative side waterproofing applications in hydrostatic condition.

Apply Procor membranes directly to structural surfaces. Do not apply Procor membranes over lightweight insulating concrete. Insulation, if used, must be installed over the membrane.

Procor membranes are not recommended for use as a tank or containment structure liner unless in split slab construction.

Procor is not compatible with petroleum solvents, fuels and oils, materials containing creosote, pentachlorophenol or linseed oil.

Do not use part mixes.

Specification Clauses

Below grade areas shall be waterproofed with Procor Fluid Applied Waterproofing.

All Procor materials shall be supplied or approved by Grace Construction Products. All detailing, application and protection shall be installed strictly in accordance with Grace instructions. Sample performance and formatted clauses are also available.

www.graceconstruction.com

For technical assistance call toll free at 866-333-3SBM (3726)

Procor is a U.S. registered trademark of W. R. Grace & Co.—Conn., and is used in Canada under license from PROCOR LIMITED. Hydroduct, Bituthene and Preprufe are registered trademarks of W. R. Grace & Co.—Conn.

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations or suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.—Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, Grace Canada, Inc., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

This product may be covered by patents or patents pending.
PRO-085G Printed in U.S.A. 4/07

Copyright 2007. W. R. Grace & Co.—Conn.
FA/LI/1M

GRACE

GRACE

Construction Products

1. Product Name

Procor® Fluid-Applied Waterproofing Systems

2. Manufacturer

Grace Construction Products
 62 Whittemore Avenue
 Cambridge, MA 02140
 (866) 333-3SBM (3726)
 Fax: (800) 784-8569
 www.graceconstruction.com

3. Product Description

BASIC USE

Procor® fluid-applied waterproofing membranes are ideal for waterproofing concrete, masonry and plywood surfaces below grade and in split slab construction. Typical below-grade applications include foundation walls, tunnels and earth sheltered structures. Typical split slab applications include plaza decks, balconies, pedestrian walkways and parking decks.

Procor membranes are ideally suited for interior use conditions where the membrane will be covered such as floors in mechanical rooms, laboratories, kitchens, wet rooms and bathrooms. They also can be used in planters. Procor fluid-applied waterproofing membranes are especially suited for jobs where the use of solvents is restricted. They can be used in new construction and retrofit applications. Procor is available for both hand and spray applications.

Procor 10 waterproofing membrane is intended primarily for horizontal hand applications. Procor 20 waterproofing membrane is intended primarily for vertical hand applications. Procor 75 waterproofing membrane is intended for all spray applications.

COMPOSITION & MATERIALS

Procor 10, Procor 20 and Procor 75 fluid-applied waterproofing membranes are 2-part, self-curing rubber-based materials. The volatile organic compound (VOC) content of Procor waterproofing membranes as applied is 75 g/L.

COMPATIBILITY

Procor is not compatible with petroleum solvents, fuels and oils, materials containing

creosote, pentachlorophenol or linseed oil. Procor membranes are not compatible with certain types of prefabricated drainage systems that damage waterproofing membranes when exposed to soil pressures.

LIMITATIONS

Do not specify Procor membranes in areas where they will be permanently exposed to sunlight, weather or traffic. If an exposure period of greater than 30 days is anticipated, some form of temporary protection should be used. Do not specify Procor for exposed interior use.

Apply Procor membranes directly to structural surfaces. Do not apply Procor membranes over lightweight insulating concrete. Insulation, if used, must be installed over the membrane.

Procor membranes are not recommended for use as a tank or containment structure liner unless in split slab construction.

In horizontal applications where a minimum slope of 0.125 in/ft (10.6 mm/m) cannot be achieved, a 2-coat application of Procor membrane is recommended to achieve a total thickness of 120 mil (3 mm).

4. Technical Data

APPLICABLE STANDARDS

ASTM International

- ASTM C836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
- ASTM C898 Standard Guide for Use of High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Separate Wearing Course
- ASTM D412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension
- ASTM D903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
- ASTM D1644 Standard Test Methods for Nonvolatile Content of Varnishes
- ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection
- ASTM D3767 Standard Practice for Rubber-Measurement of Dimensions
- ASTM D5295 Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems

PHYSICAL PROPERTIES

Procor 10, Procor 20 and Procor 75 fluid-applied waterproofing membranes meet or exceed the performance requirements of ASTM C836. See Table 1.

5. Installation

SAFETY, STORAGE & HANDLING

Procor waterproofing membranes, Parts A and B, should be stored under cover in original sealed containers between 40 - 90 degrees F (4 - 32 degrees C). Part A reacts with water releasing heat. Do not allow Part A to come in contact with water. Prevent Part B from freezing during storage. In cool temperatures, store the material for several hours at room temperature to facilitate mixing and application. The shelf life is 9 months in unopened containers. Shelf life will be reduced if stored in temperatures above 90 degrees F (32 degrees C).

Refer to product label and Material Safety Data Sheet (MSDS) before use. All users should acquaint themselves with this information prior to working with the material. Carefully read detailed precaution statements on the product labels and MSDS before use, or contact Grace Construction Products.

PREPARATORY WORK

Concrete

All concrete and masonry surfaces must be smooth, monolithic and free of frost, voids, spalled areas, loose substrate and sharp protrusions, dirt, oil, grease and debris and must contain no other contaminants or any visible coarse aggregate. Repair defects such as spalled or poorly consolidated areas.

Tie-holes, bugholes, voids and surface irregularities larger than 1/2" (13 mm) in diameter or deeper than 1/8" (3 mm), or both, should be either pretreated with Procor or repaired with a lean concrete mix of grout. See ASTM D5295, Preparation of Concrete Surfaces for Adhered Membrane Waterproofing Systems, for further details concerning substrate preparation.

Cracked, pitted, honeycombed or heavily bugholed surfaces can be filled by spraying from close in, 10" - 12", but high material usage will result. Under these circumstances, it may be more efficient to fill the surface with a parge coat of lean mortar mix before application of the Procor. It is also acceptable to fill in gaps with a compatible sealant or caulk.

Remove windows, sharp protrusions and form match lines. Also remove high spots greater than 1/32" (0.8 mm) in height. On highly porous and rough surfaces, it may be necessary to apply Procor Concrete Sealer or a scratch coat of Procor to provide a smooth surface before applying the liquid membrane.

All substrates must be wire-brushed, swept with a stiff broom or blown off with low pressure air to remove dirt, dust and loose stones. Poor quality surfaces with excessive laitance may require shotblasting or pressure washing to provide a dense, smooth surface free from contaminants.

Please refer to Tech Letter #2, "Inspection and Repair of Concrete," for more information.

Masonry

Apply a scratch coat of Procor to provide a smooth surface before applying the liquid membrane.

Wood/Plywood

Apply Procor membrane over a securely fastened sound surface. To create a smooth surface, ensure that all joints and fasteners are flush.

Contact Grace Construction Products if the suitability of the substrate is in question.

Temperature

Hand Application - Apply Procor 10 and 20 membranes at ambient and substrate temperatures above 40 degrees F (4 degrees C). Do not apply the material if the ambient temperature is likely to fall below 32 degrees F (0 degrees C) within one hour of application completion.

Spray Application - In spray applications using Procor 75, it is possible to work at temperatures below 40 degrees F (4 degrees C) provided there is no frost or condensation on the substrate. The minimum temperature for spray application is 20 degrees F (-7 degrees C). Refer to Technical Bulletin 13, "Spraying Procor 75 at Low Temperatures," or contact a Grace Construction Products representative for cold weather spraying guidelines.

Application to "Green" Concrete or Damp Surfaces

Procor may be applied to "green" (minimum 3 days) concrete or over surfaces that are damp to the touch. Remove any visible water prior to application. In "green" concrete or damp substrate applications, direct sunlight may cause the surface temperature to rise rapidly, drawing moisture from the substrate and resulting in blisters and pinholes in the membrane. Under these conditions, it may be

necessary to apply Procor Concrete Sealer or a scratch coat of Procor before applying the liquid membrane.

Do not apply Procor waterproofing membranes in wet weather. Once applied, the membranes will not be affected by light rain showers.

MIXING

If Procor waterproofing membranes are stored in cold temperatures, allow the material to stand at room temperature for several hours to facilitate mixing and application.

Handmixing (Procor 10 and 20 only): Open the Part A container and stir or mix for about 15 seconds. Add the entire contents of the Part B container to the Part A container and mix either mechanically or by hand. For mechanical mixing, use a slow speed (300 - 450 rpm), heavy duty drill with a spiral mixing paddle (such as the Goldblatt® Paint/Mud Mixer by Stanley Tools) and mix for about 1 minute. Use a flat board or paddle and mix for about 2 - 3 minutes using a slow folding motion.

Spray applications (Procor 75 only): Parts A and B are pumped separately through hoses and mixed within the spray gun assembly. Premix Part A prior to pumping to bring any settled material back into solution. Contact a Grace representative for qualified plural component spray equipment systems.

The mixed product should have a uniform color, free of any white streaks. Take care to scrape material from the side and bottom of the container to ensure thorough mixing. Do not over-mix, as over-mixing will result in premature thickening of the material in the container and decrease the pot life.

Once properly mixed, the pot life is typically 30 - 60 minutes depending on ambient tem-

perature. The pot life may be reduced to about 15 minutes in temperatures above 86 degrees F (30 degrees C). Do not use water or any other material to thin the product.

DETAILING

Detailing should be completed prior to applying the full coverage of Procor membrane. The continuous field application should completely cover the detail areas to provide double thickness coverage. For a complete description and instructions on Procor details, consult the separate Detail Sheets.

Inside and Outside Corners

- Apply a 0.060" (1.5 mm) coating of Procor membrane starting in the corner and extending 6" (152 mm) from each side of the corner. For added protection over rough surfaces on inside corners, install a 1" (25.4 mm) fillet of Procor 20 or Bituthene® Liquid Membrane by hand to reinforce the corner

Non-Moving Joints and Hairline Cracks

- Apply a 0.060" (1.5 mm) coating of Procor membrane over non-moving joints or hairline cracks and extend the material 6" (152 mm) from each side of the opening
- Non-moving joints are defined in ASTM C898 as cold joints, construction joints, isolation joints and control joints held together with steel reinforcing bars or wire fabric. These joints are generally considered by the designer of the structural system as non-moving or static joints. Hairline cracks are defined as cracks less than 0.060" (1.5 mm) in width

Drains and Penetrations

- In drain applications, apply a 0.060" (1.5 mm) coating of Procor membrane over the drain

TABLE 1 PHYSICAL PROPERTIES OF PROCOR WATERPROOFING MEMBRANES

| Property & test method | Typical value |
|---|-----------------------------------|
| ASTM C836 | Meets or exceeds all requirements |
| Color, mixed | Terra cotta |
| Dry film thickness, ASTM D3767 (Method A) | 0.060" (1.5 mm) nominal |
| Solids content, ASTM D1644 | 100% |
| Flexibility, 180° bend over 1" (25.4 mm) mandrel at -25°F (-32°C), ASTM D1970 | Unaffected |
| Elongation, ASTM D412 | 500% |
| Peel adhesion to concrete, ASTM D903 (Modified) ¹ | 5 lb/in (880 N/m) |

¹ Procor waterproofing membrane is applied to concrete and allowed to cure. Peel adhesion of the membrane is measured at a rate of 2" (51 mm) per minute with a peel angle of 90° at room temperature.



flange and extend it 6" (152 mm) beyond the flange

- Penetration openings must be sealed and stabilized prior to the application of Procor membrane
- Once sealed and stabilized, install a 1" (25.4 mm) fillet of Procor 20 or Bituthene Liquid Membrane around the protrusion. Extend the Procor membrane 6" (152 mm) onto the structural substrate and at least 2" (51 mm) onto the penetration. For plastic pipes and other low adhesion substrates, a tie-in using Preprufe® Tape will be needed

APPLICATION

After detailing is complete, apply a uniform coating of Procor waterproofing membrane at a minimum thickness of 0.060" (1.5 mm) over the entire area to be waterproofed.

Horizontal Applications

On horizontal applications, use the pour-and-spread method. Pour the mixed material directly from the container and spread using a rounded-edge steel trowel, float or screed. A rubber squeegee or notched trowel is not recommended since it will leave thin spots in the waterproofing. A metal squeegee with thickness guides at the ends is acceptable.

Care must be taken to ensure that any thin areas in the material from the thickness guides are brought to the recommended thickness. Plan the application sequence so that there is no need to walk on the freshly applied material. The membrane can typically accept foot traffic after 24 - 48 hours.

In a horizontal application where a minimum slope of 0.125 in/ft (10.6 mm/m) cannot be achieved, apply 2 coats of floor membrane to achieve total thickness of 120 mil (3 mm).

Vertical Applications

On vertical applications, apply Procor fluid-applied waterproofing using the pour-and-trowel method. Pour the mixed material directly from the container onto the vertical surface and follow directly behind it with a 12" - 18" (305 - 457 mm) straight-edge steel trowel. Spread the material uniformly across the surface with only 1 or 2 passes, starting at the bottom of the wall and pulling the material up the wall. Additional passes with the trowel over the material will cause material to become stringy and difficult to trowel.

Thickness Control

Swipe and trowel marks are acceptable as long as the minimum thickness is maintained.

Check the thickness using a wet film thickness gauge.

Spray Application

Procor 75 membrane may be spray applied to horizontal or vertical surfaces. Contact Grace Construction Products for recommended plural component spray equipment.

Coverage

Procor fluid-applied waterproofing membranes are typically applied at a minimum thickness of 0.060" (1.5 mm). The coverage rate, not including waste, at a 0.060" (1.5 mm) thickness is about 25 ft²/gal (0.6 m²/L). The coverage will be lower on rough surfaces.

Application of Drainage, Protection or Insulation

Protect Procor membranes to avoid damage from other trades, construction materials and backfill. Protection products can be installed on the same day as the Procor membrane. Bonding of the protection products to the Procor membrane is achieved if the protection products are installed when the Procor membrane is tacky; this is generally 1 - 2 hours after the Procor membrane is installed. To achieve nonbonded protection, wait until the Procor membrane surface is no longer tacky or spread cement dust or lime to remove the tack prior to applying the protection layer. Be careful not to displace the Procor membrane.

On horizontal applications, use Hydroduct® 660 Drainage Composite. Alternate methods of protection are 1/8" or 1/4" (3 or 6.4 mm) asphaltic hardboard.

On vertical applications, use Hydroduct 220 Drainage Composite. Alternate methods of protection are 1" (25.4 mm) expanded polystyrene or 1/4" (6.4 mm) extruded polystyrene with a minimum 10 psi (69 kN/m²) compressive strength. Such alternatives do not provide positive drainage to the system. If 1/4" (6.4 mm) extruded polystyrene protection board is used, backfill should not contain sharp rock or aggregate over 2" (51 mm) in diameter.

Extruded polystyrene insulation boards also can be used and are compatible with Procor membranes.

CURING, BACKFILL & FLOOD TESTS

Allow Procor waterproofing membrane to cure at least 24 hours prior to backfill to avoid displacement of the membrane and at least 48 hours prior to flood testing. Use care during the overburden placement operation to avoid damage to the waterproofing system.

Flood test all horizontal applications with a minimum 2" (51 mm) head of water for at least 24 hours. Mark any leaks and repair when the membrane is dry. Before flood testing, ensure that the structure will withstand the dead load of the water. For well-sloped decks, segment the flood test to avoid deep water near drains. Begin the flood test 48 hours after completing the application of Procor fluid-applied waterproofing. Low voltage electronic leak detection techniques may also be suitable.

6. Availability & Cost

AVAILABILITY

A network of distributors carries Procor waterproofing membrane products for prompt delivery to project sites.

COST

Procor waterproofing membrane products are competitively priced. For specific pricing information, contact a local distributor or call Grace Construction Products for the nearest distributor.

7. Warranty

A 5 year material warranty is available upon request.

8. Maintenance

Procor membranes will not require maintenance when installed in accordance with Grace's recommendations.

9. Technical Services

Support is provided by full-time, technically trained Grace field sales representatives and technical service personnel, backed by a central research and development staff.

10. Filing Systems

- Reed First Source®
- Additional product information is available from the manufacturer.



W. R. Grace & Co.-Conn. hopes the information here will be helpful. It is based upon data and knowledge considered to be true and accurate and is offered for the users' consideration, investigation and verification, but we do not warrant the results to be obtained. Please read all statements, recommendations and suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation or suggestion is intended for any use which would infringe any patent or copyright. W. R. Grace & Co.-Conn., 62 Whittemore Avenue, Cambridge, MA 02140. In Canada, W.R. Grace & Co. Canada, Ltd., 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

Bituthene, Preprufe and Hydroduct are registered trademarks of W. R. Grace & Co.-Conn.

Procor is a U.S. registered trademark of W.R. Grace & Co.-Conn., and is used in Canada under license from Procor Limited.

This product may be covered by patents or patents pending. Copyright 2005 W. R. Grace & Co.-Conn.
PRO-014I Printed in U.S.A. 09/07 AFS/LI/5M

