996 WASHINGTON AVENUE

BRONX, NEW YORK

Remedial Action Work Plan

NYC VCP Number: 14CVCP206K
(if applicable) E-Designation Site Number: 13EHAZ472X

Prepared for:
South Bronx Overall Economic Corp.
555 Bergen Avenue 3rd Floor
Bronx, NY 10455

Prepared by:

EBC
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1808 Middle Country Road
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LIST OF ACRONYMS

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

CERTIFICATION

I, Ariel Czemerinski, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the Site located at 996 Washington Avenue, Bronx, NY, Site number 14CVCP206K.

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

_____

Name

_____

NYS PE License Number

_____

Signature

_____

Date

PE Stamp

EXECUTIVE SUMMARY

South Bronx Overall Economic Corp. has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 0.29 acre Site located at 996 Washington Avenue in the Bronx, 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 996 Washington Avenue in the Morrisania section of Bronx, New York, and is identified as Block 2369 and Lots 1, 2, 3, 4, 5, 53, 54 , 90 and 153 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 0.29 acres and is bounded by Block 2369 Lot 6, a vacant lot to the north, East 164th Street to the south, beyond which is Block 2368 Lot 7501, a multifamily residential building, Block 2369 Lot 48, a commercial to the east, and Washington Avenue and Block 2386 Lots 65 and 144, a residential building and church to the west. A map of the site boundary is shown in Figure 2. Currently, Lots 3, 4 and 5 are improved with three 2-story single-family homes with finished basements. The remaining lots are current unimproved.

Summary of Proposed Redevelopment Plan

The proposed development at the Site consists of the new construction of an L-shaped eight-story ninety-five (95) unit building to be tenanted by a mixed population of special needs and low income individuals and families. The building will cover 85% of the lot and the remainder of the lot will consist of outdoor recreational area which will be capped with two feet of clean fill and a thin concrete slab. The building will feature a 9,523.62 square foot cellar. The cellar will be utilized for the supers work shop, water meter room, pump room, compactor room, electrical room, telephone room, boiler room, tenant storage, OMH storage room and tenant bike storage room. The proposed foundation depth is 13 feet. As part of development, the referenced lots are expected to be merged into one lot. The current zoning designation is M1-1;

manufacturing and residential R7-2. The proposed use is consistent with existing zoning for the property.

Summary of the Remedy

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Unrestricted Use (Track1) Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding Unrestricted Use SCOs. Removal of two hotspot areas identified during remedial investigation. For development purposes, 85% of the property will be excavated to depth of 13 feet for new building's cellar footings and foundation. The 2,900 square feet rear yard will be excavated to a depth of 2 feet. Approximately 1,386 tons of soil will be removed;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal,

and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site;

9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs. One end point sample will be taken in the area of the rear yard to determine attainment of Track 1 SCOs;
10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
11. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
12. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations. Based on the proposed development, excavations will be conducted below water table, dewatering is required during excavation. Site-wide dewatering will be completed in accordance with a New York City Department of Environmental Protection (NYCDEP) permit;
13. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and, if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following Engineering and Institutional Controls will be implemented;

14. As part of development, installation of a vapor barrier/waterproofing system below the concrete slab underneath the building, as well as behind foundation walls of the proposed building. The vapor barrier/waterproofing system will consist of Preprufe 300R system as manufactured by Grace;
15. As part of development, construction and maintenance of an engineered composite cover consisting of 5 inch thick concrete building slab to prevent human exposure to residual soil/fill remaining under the Site. For the yard area a composite cover of 2 feet of clean soil covered by a thin concrete slab beneath open joint concrete pavers will be utilized.

In some areas, two feet of clean soil will be left exposed for plantings;

16. Submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency; and
17. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

COMMUNITY PROTECTION STATEMENT

The Office of Environmental Remediation created the New York City Voluntary Cleanup Program (NYC VCP) to provide governmental oversight for the cleanup of contaminated property in NYC. This Remedial Action Work Plan ("cleanup plan") describes the findings of prior environmental studies that show the location of contamination at the Site, and describes the plans to clean up the Site to protect public health and the environment.

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

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

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

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

addressed under this cleanup plan.

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

Site Safety Coordinator. This project has a designated Site Safety Coordinator to implement the Health and Safety Plan. The Site Safety Coordinator maintains an emergency contact sheet and protocol for management of emergencies. The Site Safety Coordinator is Mr. Kevin Waters of Environmental Business Consultants. Mr. Waters can be reached at (631) 504-6000.

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

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

Odor, Dust and Noise Control. This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the on-Site Project Manager, Chawinie Miller at (631) 504-6000 or NYC Office of Environmental Remediation Project Manager, Rebecca Bub (212) 341-2073.

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, Chawinie Miller (EBC) at (631) 504-6000, the NYC Office of Environmental Remediation Project Manager, Rebecca Bub at (212) 341-2073, 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 Morrisania Library.

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 (if Track 1 is not achieved) that calls for continued inspection of protective controls, such as Site covers. The Site Management Plan is evaluated and approved by the NYC OER. Requirements that the property owner must comply with are established through a city environmental designation. A certification of continued protectiveness of the cleanup will be required from time to time to show that the approved cleanup is still effective.

REMEDIAL ACTION WORK PLAN

1.0 SITE BACKGROUND

South Bronx Overall Economic Corp has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 996 Washington Avenue in the Morrisania section of the Bronx , New York (the Site). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

1.1 Site Location and Current Usage

The Site is located at 996 Washington Avenue in the Morrisania section of Bronx, New York, and is identified as Block 2369 and Lots 1, 2, 3, 4, 5, 53, 54 , 90 and 153 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 0.29 acres and is bounded by Block 2369 Lot 6, a vacant lot to the north, East 164th Street to the south, beyond which is Block 2368 Lot 7501, a multifamily residential building, Block 2369 Lot 48, a commercial to the east, and Washington Avenue and Block 2386 Lots 65 and 144, a residential building and church to the west. A map of the site boundary is shown in Figure 2. Currently, Lots 3, 4 and 5 are improved with three 2-story single-family homes with finished basements. The remaining lots are current unimproved.

1.2 Proposed Redevelopment Plan

The proposed development at the Site consists of the new construction of an L-shaped eight-story ninety-five (95) unit building to be tenanted by a mixed population of special needs and low income individuals and families. The building will cover 85% of the lot and the remainder of the lot will consist of outdoor recreational area which will be capped with two feet

of clean fill and a thin concrete slab. The building will feature a 9,523.62 square foot cellar. The cellar will be utilized for the supers work shop, water meter room, pump room, compactor room, electrical room, telephone room, boiler room, tenant storage, OMH storage room and tenant bike storage room. The proposed foundation depth is 13 feet. As part of development, the referenced lots are expected to be merged into one lot. The current zoning designation is M1-1; manufacturing and residential R7-2. 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 commerical properties. Figure 4 shows the surrounding land usage of the adjacent properties listed below as well as additional properties located up to 500 feet away from the Site. No hospitals, daycare facilities or schools are located within a 250 ft radius of the Site.

Surrounding Property Usage

Direction	Property Description
North – Adjacent property	Block 2369, Lot 6 (998 Washington Avenue) – Developed as parking lot.
South – Adjacent property	East 164th Street and Block 2368, Lot 7501 (488 East 164th Street) – developed with a multifamily residential building
East – Adjacent property	Block 2369, Lot 48 (501 East 164th Street) – Developed with a commercial building.
West – Adjacent property	Block 2386, Lots 56 and 144 (461 East 164th Street and Avenue) – Developed with a multi family residential building and church.

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, 996 Washington Avenue, Bronx, NY*", dated December 2013 (RIR).

Summary of Past Uses of Site and Areas of Concern

A prior Phase I E nvironmental Site Assessemnt dated June 5, 2013 indicates that the Site has been historically occupied by residnetial building and idenfiied the follwing areas of conern:

The subject property is identified as having Hazmat/ Noise "E" restrictions. The Site has been assigned an E-designation (E-118). An E designation on a property indicates that prior to obtaining building permits from the Department of Building, certain requirements from the NYC Office of Environmental Remediation (OER) and Section 11-15 of the Zoning Resolution Environmental Requirements must be satisfied by a testing and sampling protocol. An E designation also requires submittal of a construction related health and safety plan to the OER.

Review of available Sanborn maps revealed that in 1951, the adjacent property to the north was used for metal fabrication. The site was subsequently used as a private garage with a gasoline tank until approximately 2007. The presence of a gasoline tank is indicative of auto repair activities. The site is currently utilized as an auto repair shop. Based on the long-term use of hazardous materials and the likely generation of hazardous waste associated with auto repair activities and metal fabrication, as well as the lack of waste disposal regulations prior to the 1970s, there is a possibility that the Site has been impacted by the historical and current uses of the adjacent property to the north. The potential for exposures to contaminated media exists, if site redevelopment activities involving excavation take place at the Site.

The AOCs identified for this Site include:

1. Historic fill layer is present at the Site from grade to depths as great as 2 feet below grade.
2. The adjacent property to the north was used for metal fabrication.
3. The site is currently utilized as an auto repair shop.

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 seven soil borings across the entire project Site, and collected thirteen soil samples for chemical analysis from the soil borings to evaluate soil quality;

3. Installed four temporary groundwater monitoring wells and collected eight groundwater samples;
4. Installed four soil vapor probes around Site perimeter and collected four soil vapor samples for chemical analysis.

Summary of Environmental Findings

1. Elevation of the property ranges from 29 to 31 feet.
2. Depth to groundwater is ranges from 9 to 13 feet.
3. Groundwater flow is generally to the southeast 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 2 feet of historical fill underlain by brown sand and sandy clay.
6. Soil/fill samples collected during the RI showed that no PCBs were detected in any of the soil samples. Several VOCs were detected at trace levels except for acetone (max. of 120 µg/Kg), which was detected in one deep soil sample exceeding Unrestricted Use SCOs but below Restricted Residential SCOs. Six SVOCs, all Polycyclic Aromatic Hydrocarbons (PAHs), were detected within three shallow soil samples exceeding their respective Unrestricted Use SCOs as well as Restricted Residential SCOs. These SVOCs included benzo(a)anthracene (max. of 10,700 µg/Kg), benzo(a)pyrene (max. of 8,600 µg/Kg), benzo(b)fluoranthene (max. of 4,690 µg/Kg), benzo-(k)fluoranthene (max. of 6,800 µg/Kg), chrysene (max. of 9,090 µg/Kg) and indeno(1,2,3-cd)pyrene (max. of 3,990 µg/Kg). SVOCs were also detected in one deep soil sample which was below Unrestricted Use SCOs. Four pesticides; 4,4'-DDD (max. of 5.91 µg/Kg), 4,4'-DDE (max. of 10.7 µg/Kg), 4,4'-DDT (max. of 78.2 µg/Kg) and dieldrin (max. of 7.29µg/Kg) were detected above Unrestricted Use SCOs, but below their Restricted Residential SCOs in three shallow soil samples. Chlordane was also detected at maximum concentration of 78.5 µg/Kg in three shallow samples. Five metals including barium (max. of 1440 mg/Kg), copper (max. of 51.3 mg/Kg), lead (max. of 3,540 mg/Kg), mercury (max. of 1.04 mg/Kg) and zinc (max. of 699 mg/Kg) were detected at concentrations above Unrestricted Use SCOs in four shallow soil samples. Of these, barium, lead, and mercury also exceeded their respective Restricted Residential SCOs. Findings of the RI were

consistent with observations for historical fill sites in areas throughout NYC, with the exception of the two soil sampling locations, boring SB-03 and SB-TWP-02 for lead hot spot in shallow soils.

7. Groundwater samples collected during the Remedial Investigations showed no detectable concentrations of PCBs in any of the ground water samples. Three VOCs including acetone (max. of 6.2 ug/L), tetrachloroethylene (max. of 15 ug/l) and trichloroethene (max. of 7.1 ug/L) exceeded NYSDEC Part 703.5 Groundwater Quality Standards (GQS) in three of four monitoring wells. One SVOC; bis(2-ethylhexyl)phthalate (max. of 134 ug/L) exceeded GQS. Trace concentration of pesticides including 4,4'-DDT and Dieldrin were detected below their respective GQS. Dissolved metals including magnesium (max of 43 mg/L), manganese (max of 3.3 mg/L) and sodium (max of 103 mg/L) were identified above GQS.
8. Soil vapor samples collected during the RI showed low levels of petroleum related and chlorinated VOCs in all soil vapor samples. Total concentrations of petroleum-related VOCs (BTEX) ranged from 15.0 $\mu g/m^3$ to 102.7 $\mu g/m^3$. All compounds were detected at concentrations less than 50 $\mu g/m^3$, except for acetone (maximum of 1700 $\mu g/m^3$) and hexane (maximum of 270 $\mu g/m^3$). PCE, TCE, carbon tetrachloride and 1,1,1-trichloroethane were non detect in all soil vapor samples.

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

2.0 REMEDIAL ACTION OBJECTIVES

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

Groundwater

- Prevent direct exposure to contaminated groundwater.
- Prevent exposure to contaminants volatilizing from groundwater.
- Prevent off-Site migration of contaminated groundwater above applicable groundwater standards.

Soil

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

Soil Vapor

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

3.0 REMEDIAL ALTERNATIVES ANALYSIS

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

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

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

Alternative 1 (Track 1 Remedy):

- Establishment of NYSDEC Part 375 Track 1 Unrestricted Use Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs 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 minimum depth of approximately 2 feet to remove all historic fill. 85% of the property will be excavated to depth of 13 feet for new

building's footings and foundation. The rear yard will be excavated to a depth of 2 feet. Approximately 1,386 tons of soil will be removed. If soil/fill containing analytes at concentrations above Unrestricted Use SCOs is still present at the base of the excavation, or in the side paved areas after removal of all soil required for construction of the proposed development is complete, additional excavation will be performed to ensure complete removal of soil that does not meet Track 1 Unrestricted Use SCOs;

- No Engineering or Institutional Controls are required for a Track 1 cleanup, but a vapor barrier/waterproofing system would be installed beneath the basement foundation and behind foundation sidewalls of the new building as a part of development to prevent any potential future exposures from on and off-Site soil vapor.
- Placement of a final cover over the entire Site as part of new development. The composite cover will consist of a 5 inch thick concrete building slab and a composite cover of 2 feet of clean soil covered by a thin concrete slab beneath open joint concrete pavers will be utilized in the rear yard area. In some areas soil will be left exposed for plantings;

Alternative 2 involves

- Establishment of Track 4 Site-Specific SCOs;
- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-Specific SCOs have been achieved with post-excavation endpoint sampling. Excavation for construction of the new building's cellar level would take place to a depth of approximately 13 feet for 85% of the Site with the remaining portions being excavated to a depth of 2 feet for the rear yard. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs;
- Placement of a final cover (5' concrete building slab and 2' of clean fill/thin concrete cap in area of rear yard) over the entire Site to prevent exposure to remaining soil/fill;
- Installation of a soil vapor / waterproofing barrier system beneath the building slab and along foundation side walls to prevent any potential future exposures from on and off-Site soil vapor;

- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of sensitive Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and
- Continued registration as an E-designated property to memorialize the remedial action and the Engineering and Institutional Controls required by the RAWP.

3.1 Threshold Criteria

Protection of Public Health and the Environment

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

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

Alternative 2 would achieve comparable protections of human health and the environment by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCOs, as well as by placement of Institutional and Engineering controls, including a vapor barrier/waterproofing system and composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. Implementing Institutional Controls including a Site Management Plan and continued "E" designation of the property would ensure that the composite cover system remains intact and protective.

For both Alternatives, potential exposure to the contaminated soils or groundwater during

construction would be minimized by implementing a Construction Health and Safety Plan (CHASP), a Soil and Materials Management Plan, and Community Air Monitoring Plan (CAMP). Groundwater is expected to be encountered during development. Potential use of contact with contaminated groundwater for potable supply would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the new building would be prevented by installing a vapor barrier/waterproofing system below the new building's basement slab and continuing the vapor barrier around the foundation walls.

3.2. Balancing Criteria

Compliance with Standards, Criteria and Guidance (SCGs)

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

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

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

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

Short-term effectiveness and impacts

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

Both alternatives 1 and 2 have short term effectiveness, as each requires excavation of historic fill material/soil. Short term impacts are likely to be higher for the Alternative 1 due to excavation of greater amounts of historical fill material. Both Alternatives are considered to be effective in protecting human health and the environment in the short term. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Approximately 55, 25-ton capacity truck trips would be necessary to transport fill and soil excavated during Site development. Truck traffic would be routed on the most direct course using major thoroughfares where possible and flaggers will be used to protect pedestrians at Site entrances and exits.

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

Long-term effectiveness and permanence

This evaluation criterion addresses the results of a remedial action in terms of its permanence

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

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

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs, establishing Engineering Controls including a composite cover system (5" concrete slab and 2 feet clean soil in rear yard or concrete or asphalt cap in rear yard) across the Site; establishing Institutional Controls to ensure long-term management including use restrictions, a Site Management Plan and continued registration as E-designated property. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

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

Reduction of toxicity, mobility, or volume of contaminated material

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

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

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

Alternative 2 would likely remove all the fill/soil at the Site, and any remaining on-Site soil beneath the new building and the side yard area would meet Track 4 - Site-Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site.

Implementability

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

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

Cost effectiveness

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

The remedial plan creates an approach that combines the remedial action with the redevelopment of the Site, including the construction of the building foundation. The remedial plan is also cost effective in that it will take into consideration the selection of the closest and most appropriate

disposal facilities to reduce transportation and disposal costs during the excavation of historic fill and other soils during the redevelopment of the Site.

Costs associated with Alternative 1 could potentially be higher than Alternative 2 if soil with analytes above Unrestricted Use SCOs are encountered below the depth required for excavation. Additional costs would include installation of additional shoring/underpinning, disposal of additional soil, and import of clean soil for backfill. However, long-term costs for Alternative 2 are likely higher than Alternative 1 based on implementation of a Site Management Plan as part of Alternative 2.

Community Acceptance

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

Land use

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

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

Sustainability of the Remedial Action

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

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

4.0 REMEDIAL ACTION

4.1 Summary of Preferred Remedial Action

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Unrestricted Use (Track1) Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding Unrestricted Use SCOs. Removal of two hotspot areas identified during remedial investigation. For development purposes, 85% of the property will be excavated to depth of 13 feet for new building's cellar footings and foundation. The 2,900 square feet rear yard will be excavated to a depth of 2 feet. Approximately 1,386 tons of soil will be removed;
6. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations;
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal,

and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site;

9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs. One end point sample will be taken in the area of the rear yard to determine attainment of Track 1 SCOs;
10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
11. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
12. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations. Based on the proposed development, excavations will be conducted below water table, dewatering is required during excavation. Site-wide dewatering will be completed in accordance with a New York City Department of Environmental Protection (NYCDEP) permit;
13. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and, if Track 1 SCOs are not achieved, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.

If Track 1 Unrestricted Use SCOs are not achieved, the following Engineering and Institutional Controls will be implemented;

14. As part of development, installation of a vapor barrier/waterproofing system below the concrete slab underneath the building, as well as behind foundation walls of the proposed building. The vapor barrier/waterproofing system will consist of Preprufe 300R system as manufactured by Grace;
15. As part of development, construction and maintenance of an engineered composite cover consisting of 5 inch thick concrete building slab to prevent human exposure to residual soil/fill remaining under the Site. For the yard area a composite cover of 2 feet of clean soil covered by a thin concrete slab beneath open joint concrete pavers will be utilized.

In some areas, two feet of clean soil will be left exposed for plantings;

16. Submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency; and
17. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

4.2 Soil Cleanup Objectives and Soil/Fill Management

Track 1 Soil Cleanup Objectives (SCOs) are proposed for this project. The SCOs for this Site are listed in Table 1. If Track 1 is not achieved, the following Track 4 Site-Specific SCOs will be used:

Contaminant	Track 4 SCOs
Total SVOCs	250 ppm
Mercury	2.0 ppm
Barium	750 ppm
Lead	1000 ppm

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

Discrete contaminant sources (such as hotspots) identified during the remedial action will be identified by GPS or surveyed. This information will be provided in the Remedial Action Report. Two hotspot areas; boring SB-03 and SB-TWP-02 were identified in the RI for lead hot spots in

shallow soils.

Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is 1,386 tons. Disposal location(s) will be reported promptly to the OER Project Manager prior to the start of the remedial action.

End-Point Sampling

Removal actions under this plan will be performed in conjunction with remedial end-point sampling. The RI provided endpoint data that met Track 4 - Site Specific SCOs at the 12 to 16 feet interval. However, additional post-excavation end-point sampling and testing will be performed promptly following materials removal and completed prior to Site development activities. To evaluate attainment of Track 1 – Unrestricted Use SCOs, seven end point samples will be collected and analyzed for VOCs, SVOCs, pesticides and TAL Metals. The approximate collection location of the endpoint soil samples is shown on Figure 6.

If any additional hotspots are encountered, hotspot removal end-point sampling frequency will consist of the following:

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

should be taken immediately after contaminated soil removal. If the excavation is enlarged horizontally, additional soil samples will be taken pursuant to bullets 1-3 above.

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

New York State ELAP certified labs will be used for all end-point sample analyses. Labs for end-point sample analyses will be reported in the RAR. The RAR will provide a tabular and map summary of all end-point sample results and will include all data including non-detects and applicable standards and/or guidance values. End-point samples will be analyzed for trigger analytes (those for which SCO exceedence is identified) utilizing the following methodology:

Soil analytical methods will include:

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

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

Quality Assurance/Quality Control

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

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

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

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

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

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

Import and Reuse of Soils

Import of soils onto the property and reuse of soils already on-Site will be performed in conformance with the Soil/Materials Management Plan in Attachment D. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 347 tons. The estimated quantity of onsite soil/fill expected to be reused/relocated on Site is 0 tons.

4.3 Engineering Controls

The excavation required for the proposed Site development will achieve Track 1 Unrestricted Use SCOs. No engineering controls are required to address residual contamination at the Site. However, the following elements will be incorporated into the foundation design as part of the development: (1) composite cover system; and (2) vapor waterproofing barrier system. If Track 1 is not achieved, these two elements will constitute Engineering Controls that will be employed in the remedial action to address residual contamination remaining at the Site.

Composite Cover System

As part of new development, the entire property will be covered by an engineered permanent cover system. This cover system will be comprised of a 5 inch thick concrete-building slab beneath the area of the proposed building. The yard areas will be capped with 2 feet of clean soil, most of which will be covered by a thin concrete slab beneath open joint concrete pavers. In some areas, the clean soil will be left exposed for plantings.

If Track 1 SCO's are not achieved at the Site, the composite cover system will be a permanent engineering control to address residual soils. 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.

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

Vapor Barrier/ Waterproofing

As part of development, migration of potential soil vapor from offsite in the future will be achieved with a combination of building slab and vapor barrier waterproofing system. The vapor barrier will consist of Preprufe 300R system as manufactured by Grace, Preprufe 300 is a 1.2 mm (0.046in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. It is suitable for both under slab and vertical wall applications. The work will be inspected as necessary to meet the requirements of the product warranty.

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

4.4 Institutional Controls

Institutional Controls are not required on sites that achieve Track 1 remedial action. If Track 1 SCOs are not achieved Institutional Controls (IC) will be utilized in this remedial action to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR.

Institutional Controls for this remedial action are:

- The property will continue to be registered with an E-Designation at the NYC Buildings Department. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that

constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted annually and will comply with RCNY §43-1407(l)(3).

- Vegetable gardens and farming on the Site are prohibited;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for residential and commercial, 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 not required for Track 1 remedial actions. However, if Track 1 Unrestricted Use SCOs are not achieved, Site Management will be the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The Site Management Plan (SMP) describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in this RAWP and the Site Management Plan are implemented.

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

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

submission to OER by December 31 of the year following the reporting period.

4.6 Qualitative Human Health Exposure Assessment

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

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

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

Known and Potential Sources

Historic fill material is present at the Site from grade to approximately 2 feet below grade. Based on the results of the Remedial Investigation Report, the contaminants of concern found are:

<u>Soil</u>

- VOC; acetone exceeded Unresitrcted Use SCOs.
- SVOCs included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo-(k)fluoranthene, chrysene and indeno(1,2,3-cd)pyrene were identified but did not exceed Restricted Residential SCOs;
- Metals, including barium, lead and mercury exceeded Restricted Restricted Use SCOs;

- Pesticides, including 4,4'-DDD, 4,4-DDE, 4,4'-DDT and dieldrin were identified but did not exceed Restricted Residential SCOs.

Groundwater

- Three (3) VOCs; acetone, tetrachloroethylene and trichloroethene were detected above GQS;
- One SVOC, Bis(2-ethylhexyl)phthalate was detected above GQS;
- Metals including magnesium, sodium and manganese exceeded GQSs;

Soil vapor

- Acetone and ethanol at moderate levels;
- Petroleum VOCs detected at moderate concentrations including toluene, ethyl-benzene and xylenes; and
- Chlorinated VOCs at low levels, well below the NYSDOH monitoring thresholds..

Nature, Extent, Fate and Transport of Contaminants

VOCs, SVOCs, Metals and pesticides are present in the historic fill materials throughout the Site. Several SVOC found in soil were not detected in groundwater samples at a concentration above its respective GQSs. Pesticides were detected in shallow samples. Dissolved metals including magnesium, sodium and manganese were detected above GQS. Chlorinated VOCs in soil vapor were detected below monitoring thresholds established by New York State DOH.

Potential Routes of Exposure

The five elements of an exposure pathway are: (1) a contaminant source; (2) contaminant release and transport mechanisms; (3) a point of exposure; (4) a route of exposure; and (5) a receptor population. An exposure pathway is considered complete when all five elements of an exposure pathway are documented. A potential exposure pathway exists when any one or more of the five elements comprising an exposure pathway cannot be documented. An exposure pathway may be eliminated from further evaluation when any one of the five elements comprising an exposure pathway has not existed in the past, does not exist in the present, and will never exist in the future. Three potential primary routes exist by which chemicals can enter the body:

- Ingestion of water, fill, or soil;

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

Existence of Human Health Exposure

Current Conditions: The potential for exposure to surficial historic fill exists under current conditions but is limited due the 6 foot high chained and lock perimeter fence. Groundwater is marginally contaminated but is not exposed at the Site, and because the Site is served by the public water supply and groundwater use for potable supply is prohibited, groundwater is not used at the Site and there is no potential for exposure.

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

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

Receptor Populations

On-Site Receptors – The Site is currently developed with two residential buildings and uncapped areas. Access to Site is restricted by a 6 foot high, chained and locked, perimeter fence. Onsite receptors are limited to trespassers and site representatives and visitors granted access to the property. During redevelopment of the Site, the on-Site potential receptors will include

construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents, workers and visitors.

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

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

Overall Human Health Exposure Assessment

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

Based upon this analysis, complete on-Site exposure pathways appear to be present only during the current unremediated phase and the remedial action phase. Under current conditions, on-Site exposure pathways exist for those given access to the Site or trespassers. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. After the remedial action is complete, there will be no remaining exposure pathways to on-Site soil/fill, as all soil above Unrestricted Use SCOs will have been removed and a vapor barrier/ waterproofing system will have been installed as part of development.

5.0 REMEDIAL ACTION MANAGEMENT

5.1 Project Organization and Oversight

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

5.2 Site Security

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

5.3 Work Hours

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

5.4 Construction Health and Safety Plan

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

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

Personnel entering any exclusion zone will be trained in the provisions of the HASP and be required to sign an HASP acknowledgment. Site-specific training will be provided to field personnel. Additional safety training may be added depending on the tasks performed.

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

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

5.5 Community Air Monitoring Plan

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

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

VOC Monitoring, Response Levels, and Actions

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

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

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

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

Particulate Monitoring, Response Levels, and Actions

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

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

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

5.6 Agency Approvals

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

5.7 Site Preparation

Pre-Construction Meeting

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

Mobilization

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

Utility Marker Layouts, Easement Layouts

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

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

Dewatering

Based on the proposed development plan, dewatering is expected during excavation. Site-wide dewatering will be completed in accordance with a New York City Department of Environmental Protection (NYCDEP) permit. As part of the permit process, additional groundwater samples will be collected and analyzed for NYCDEP dewatering parameters. All dewatering will be conducted in accordance with NYCDEP regulations regarding discharge to the municipal sewer (including appropriate groundwater sampling and permitting) and NYSDEC regulations regarding groundwater discharge. A copy of the NYCDEP or NYSDEC sewer discharge permit will be shared with OER prior to commencement of dewatering activities and included in the PE-certified RAR submitted to OER. The need for pretreatment will be determined by DEP's requirements for the discharge permit. If pretreatment is required by the DEP, it will be performed in accordance with the requirements of the DEP.

Equipment and Material Staging

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

Stabilized Construction Entrance

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

Truck Inspection Station

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

Extreme Storm Preparedness and Response Contingency Plan

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

Storm Preparedness

Preparations in advance of an extreme storm event will include the following: containerized hazardous materials and fuels will be removed from the property; lose materials will be secured to prevent dislocation and blowing by wind or water; heavy equipment such as excavators and generators will be removed from holes, trenches and depressions on the property to high ground

or removed from the property; an inventory of the property with photographs will be performed to establish conditions for the site and equipment prior to the event; stockpile covers for soil and fill will be secured by adding weights such as sandbags for added security and worn or ripped stockpile covers will be replaced with competent covers; stockpiled hazardous wastes will be removed from the property; stormwater management systems will be inspected and fortified, including, as necessary: clean and reposition silt fences, haybales; clean storm sewer filters and traps; and secure and protect pumps and hosing.

Storm Response

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

professional will determine the nature and extent of the spill and report to NYS DEC's spill hotline at DEC 800-457-7362. If the source of the spill is ongoing and can be identified, it should be stopped it this can be done safely. Potential hazards will be addressed immediately, consistent with guidance issued by NYS DEC.

Storm Response Reporting

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

5.8 Traffic Control

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the Site is the following:

a) head southwest on Washington Ave toward E 164th Street

b)take the 2nd left on to East 163rd Street

c)turn right on the Rev James A Polite Ave

d)turn left on to 163rd St

e)continue onto Hunts Point Avenue

f)turn left on to Buckner Blvd

g)take I278 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.

EBC
Environmental Business Consultants
1808 Middle Country Road
Ridge, NY 11961
Ph: 631.504.6000
Fax: 631.928.2780

6.0 REMEDIAL ACTION REPORT

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

- Information required by this RAWP;
- As-built drawings for all constructed remedial elements, required certifications, manifests and other written and photographic documentation of remedial work performed under this remedy;
- Site Management Plan;
- Description of any changes in the remedial action from the elements provided in this RAWP and associated design documents;
- Tabular summary of all end point sampling results and all material characterization results, QA/QC results for end-point sampling, and other sampling and chemical analysis performed as part of the remedial action and DUSR;
- Test results or other evidence demonstrating that remedial systems are functioning properly;
- Account of the source area locations and characteristics of all contaminated material removed from the Site including a map showing source areas;
- Account of the disposal destination of all contaminated material removed from the Site. Documentation associated with disposal of all material will include transportation and disposal records, and letters approving receipt of the material.
- Account of the origin and required chemical quality testing for material imported onto the Site.
- Continue registration of the property with an E-Designation at the NYC Department of Buildings.
- Reports and supporting material will be submitted in digital form.

Remedial Action Report Certification

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

I, _____, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Site name Site number.

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

7.0 SCHEDULE

The table below presents a schedule for the proposed remedial action and reporting. If the schedule for remediation and development activities changes, it will be updated and submitted to OER. Currently, a 6 month remediation period is anticipated.

Schedule Milestone	Weeks from Remedial Action Start	Duration (weeks)
OER Approval of RAWP	0	-
Fact Sheet 2 announcing start of remedy	0	-
Mobilization	1	1
Remedial Excavation	2	6
Demobilization	10	1
Submit Remedial Action Report	20	-

TABLES

TABLE 1
SOIL CLEANUP OBJECTIVES
SOIL IMPORT CRITERIA

Contaminant	CAS Number	Unrestricted Use
Metals		
Arsenic	7440-38-2	13 [c]
Barium	7440-39-3	350 [c]
Beryllium	7440-41-7	7.2
Cadmium	7440-43-9	2.5 [c]
Chromium, hexavalent [e]	18540-29-9	1 [b]
Chromium, trivalent [e]	16065-83-1	30 [c]
Copper	7440-50-8	50
Total Cyanide [e, f]		27
Lead	7439-92-1	63 [c]
Manganese	7439-96-5	1600 [c]
Total Mercury		0.18 [c]
Nickel	7440-02-0	30
Selenium	7782-49-2	3.9[c]
Silver	7440-22-4	2
Zinc	7440-66-6	109 [c]
PCBs/Pesticides		
2,4,5-TP Acid (Silvex) [f]	93-72-1	3.8
4,4'-DDE	72-55-9	0.0033 [b]
4,4'-DDT	50-29-3	0.0033 [b]
4,4'-DDD	72-54-8	0.0033 [b]
Aldrin	309-00-2	0.005 [c]
alpha-BHC	319-84-6	0.02
beta-BHC	319-85-7	0.036
Chlordane (alpha)	5103-71-9	0.094

TABLE 1
SOIL CLEANUP OBJECTIVES

Contaminant	CAS Number	Unrestricted Use
delta-BHC [g]	319-86-8	0.04
Dibenzofuran [f]	132-64-9	7
Dieldrin	60-57-1	0.005 [c]
Endosulfan I [d, f]	959-98-8	2.4
Endosulfan II [d, f]	33213-65-9	2.4
Endosulfan sulfate [d, f]	1031-07-8	2.4
Endrin	72-20-8	0.014
Heptachlor	76-44-8	0.042
Lindane	58-89-9	0.1
Polychlorinated biphenyls	1336-36-3	0.1
Semivolatile organic compounds		
Acenaphthene	83-32-9	20
Acenapthylene [f]	208-96-8	100 [a]
Anthracene [f]	120-12-7	100 [a]
Benz(a)anthracene [f]	56-55-3	1 [c]
Benzo(a)pyrene	50-32-8	1 [c]
Benzo(b)fluoranthene [f]	205-99-2	1 [c]
Benzo(g,h,i)perylene [f]	191-24-2	100
Benzo(k)fluoranthene [f]	207-08-9	0.8 [c]
Chrysene [f]	218-01-9	1 [c]
Dibenz(a,h)anthracene [f]	53-70-3	0.33 [b]
Fluoranthene [f]	206-44-0	100 [a]
Fluorene	86-73-7	30
Indeno(1,2,3-cd)pyrene [f]	193-39-5	0.5 [c]
m-Cresol [f]	108-39-4	0.33 [b]
Naphthalene [f]	91-20-3	12
o-Cresol [f]	95-48-7	0.33 [b]

TABLE 1
SOIL CLEANUP OBJECTIVES

Contaminant	CAS Number	Unrestricted Use
p-Cresol [f]	106-44-5	0.33 [b]
Pentachlorophenol	87-86-5	0.8 [b]
Phenanthrene [f]	85-01-8	100
Phenol	108-95-2	0.33 [b]
Pyrene [f]	129-00-0	100
Volatile organic compounds		
1,1,1-Trichloroethane [f]	71-55-6	0.68
1,1-Dichloroethane [f]	75-34-3	0.27
1,1-Dichloroethene [f]	75-35-4	0.33
1,2-Dichlorobenzene [f]	95-50-1	1.1
1,2-Dichloroethane	107-06-2	0.02 [c]
cis -1,2-Dichloroethene [f]	156-59-2	0.25
trans-1,2-Dichloroethene [f]	156-60-5	0.19
1,3-Dichlorobenzene [f]	541-73-1	2.4
1,4-Dichlorobenzene	106-46-7	1.8
1,4-Dioxane	123-91-1	0.1 [b]
Acetone	67-64-1	0.05
Benzene	71-43-2	0.06
n-Butylbenzene [f]	104-51-8	12
Carbon tetrachloride [f]	56-23-5	0.76
Chlorobenzene	108-90-7	1.1
Chloroform	67-66-3	0.37
Ethylbenzene [f]	100-41-4	1
Hexachlorobenzene [f]	118-74-1	0.33[b]
Methyl ethyl ketone	78-93-3	0.12
Methyl tert-butyl ether [f]	1634-04-4	0.93
Methylene chloride	75-09-2	0.05

TABLE 1
SOIL CLEANUP OBJECTIVES

Contaminant	CAS Number	Unrestricted Use
n - Propylbenzene [f]	103-65-1	3.9
sec-Butylbenzene [f]	135-98-8	11
tert-Butylbenzene [f]	98-06-6	5.9
Tetrachloroethene	127-18-4	1.3
Toluene	108-88-3	0.7
Trichloroethene	79-01-6	0.47
1,2,4-Trimethylbenzene [f]	95-63-6	3.6
1,3,5-Trimethylbenzene[f]	108-67-8	8.4
Vinyl chloride[f]	75-01-4	0.02
Xylene (mixed)	1330-20-7	0.26

All soil cleanup objectives (SCOs) are in parts per million (ppm).

Footnotes

[a] The SCOs for unrestricted use were capped at a maximum value of 100 ppm. See Technical Support Document (TSD), section 9.3.

[b] For constituents where the calculated SCO was lower than the contract required quantitation limit (CRQL), the CRQL is used as the Track 1 SCO value.

[c] For constituents where the calculated SCO was lower than the rural soil background concentration, as determined by the Department and Department of Health rural soil survey, the rural soil background concentration is used as the Track 1 SCO value for this use of the site.

[d] SCO is the sum of endosulfan I, endosulfan II and endosulfan sulfate.

[e] The SCO for this specific compound (or family of compounds) is considered to be met if the analysis for the total species of this contaminant is below the specific SCO.

[f] Protection of ecological resources SCOs were not developed for contaminants identified in Table 375-6.8(b) with "NS". Where such contaminants appear in Table 375-6.8(a), the applicant may be required by the Department to calculate a protection of ecological resources SCO according to the TSD.

TABLE 1
996 Washington Avenue,
Bronx, New York
Soil Analytical Results
Volatile Organic Compounds

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	SB-01				SB-02		SB-03				SB-TWP-01				SB-TWP-02				SB-TWP-03		SB-TWP-04					
			(0-2') µg/Kg		(13-15') µg/Kg		(0-2') µg/Kg		(0-2') µg/Kg		(14') µg/Kg		(0-2') µg/Kg		(14') µg/Kg		(0-2') µg/Kg		(14-16') µg/Kg		(0-2') µg/Kg		(0-2') µg/Kg		(12') µg/Kg		(14-16') µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Acetone	50	100,000	ND	12	**6.5**	13	ND	12	**3.7**	11	**4.1**	11	ND	5.5	ND	4	ND	6.6	ND	4.5	ND	12	ND	11	**120**	360	**5.2**	12
Methylene chloride	50	100,000	**5.6**	12	**7.6**	13	**6.8**	12	**4.9**	11	**4.3**	11	ND	5.5	ND	4	ND	6.6	ND	4.5	ND	12	**14**	11	ND	360	**5.4**	12
Naphthalene	12,000	100,000	ND	12	ND	13	ND	12	**69**	11	**3.1**	11	ND	5.5	ND	4	ND	6.6	ND	4.5	ND	12	ND	11	ND	360	ND	12
p-Isopropyltoluene			ND	5.8	ND	6.3	ND	5.8	ND	5.5	ND	5.7	ND	2.7	ND	2	ND	3.3	ND	2.3	ND	5.8	ND	5.5	**100**	180	ND	6.2
Tetrachloroethene	1,300	19,000	ND	5.8	ND	6.3	ND	5.8	ND	5.5	ND	5.7	ND	2.7	ND	2	ND	3.3	**1.2**	2.3	ND	5.8	ND	5.5	ND	180	ND	6.2
Total VOCs Concentration			**5.6**		**14.1**		**6.8**		**77.6**		**11.5**		**0.0**		**0.0**		**0.0**		**1.2**		**0.0**		**14.0**		**220.0**		**10.6**	

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives
ND - Not-detected
RL - Reporting Limit
Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value
Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 2
996 Washington Avenue,
Bronx, New York
Soil Analytical Results
Semi-Volatile Organic Compounds

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	SB-01				SB-02		SB-03				SB-TWP-01				SB-TWP-02				SB-TWP-03		SB-TWP-04					
			(0-2') µg/Kg		(13-15') µg/Kg		(0-2') µg/Kg		(0-2') µg/Kg		(14') µg/Kg		(0-2') µg/Kg		(14') µg/Kg		(0-2') µg/Kg		(14-16') µg/Kg		(0-2') µg/Kg		(0-2') µg/Kg		(12') µg/Kg		(16') µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Anthracene	100,000	100,000	ND	966	ND	210	ND	192	**5,360**	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	**63.1**	195	ND	4620	ND	489	ND	206
Benz(a)anthracene	1,000	1,000	ND	966	ND	210	ND	192	**10,700**	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	**339**	195	**3970**	4620	ND	489	ND	206
Benzo(a)pyrene	1,000	1,000	ND	966	ND	210	ND	192	**8,600**	9240	ND	189	ND	186	ND	172	**1,380**	3810	ND	195	**276**	195	**4,900**	4620	ND	489	ND	206
Benzo(b)fluoranthene	1,000	1,000	ND	966	ND	210	ND	192	**4,690**	9240	ND	189	ND	186	ND	172	**2,230**	3810	ND	195	**202**	195	**3,210**	4620	ND	489	ND	206
Benzo(ghi)perylene	100,000	100,000	ND	966	ND	210	ND	192	ND	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	ND	195	**3530**	4620	ND	489	ND	206
Benzo(k)fluoranthene	800	3,900	ND	966	ND	210	ND	192	**6,800**	9240	ND	189	ND	186	ND	172	**2,330**	3810	ND	195	**246**	195	**4,450**	4620	ND	489	ND	206
Bis(2-ethylhexyl)phthalate			ND	966	ND	210	ND	192	ND	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	**130**	195	ND	4620	ND	489	ND	206
Chrysene	1,000	3,900	ND	966	ND	210	ND	192	**9,090**	9240	ND	189	ND	186	ND	172	**1,430**	3810	ND	195	**307**	195	**3,990**	4620	ND	489	ND	206
Fluoranthene	100,000	100,000	ND	966	ND	210	ND	192	**22,500**	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	**599**	195	**7220**	4620	ND	489	ND	206
Fluorene	30,000	100,000	ND	966	ND	210	ND	192	**2440**	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	ND	195	ND	4620	**2060**	489	ND	206
Indeno(1,2,3-cd)pyrene	500	500	ND	966	ND	210	ND	192	**3,990**	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	**73.2**	195	**3250**	4620	ND	489	ND	206
Phenanthrene	100,000	100,000	ND	966	ND	210	ND	192	**20,100**	9240	ND	189	ND	186	ND	172	ND	3810	ND	195	**284**	195	**2440**	4620	ND	489	ND	206
Pyrene	100,000	100,000	ND	966	ND	210	ND	192	**20,400**	9240	ND	189	ND	186	ND	172	**1,420**	3810	ND	195	**562**	195	**6,960**	4620	ND	489	ND	206

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Not-detected

RL - Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 3
996 Washington Avenue,
Bronx, New York
Soil Analytical Results
Pesticides PCBs

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	SB-01				SB-02		SB-03				SB-TWP-01				SB-TWP-02				SB-TWP-03		SB-TWP-04					
			(0-2') µg/Kg		(13-15') µg/Kg		(0-2') µg/Kg		(0-2') µg/Kg		(14') µg/Kg		(0-2') µg/Kg		(14') µg/Kg		(0-2') µg/Kg		(14-16') µg/Kg		(0-2') µg/Kg		(0-2') µg/Kg		(12') µg/Kg		(14-16') µg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
4,4' -DDD	3.3	13,000	ND	1.91	ND	2.08	ND	1.9	ND	1.83	ND	1.87	ND	1.84	ND	1.7	**4.39**	1.89	ND	1.93	ND	1.93	**5.91**	1.83	ND	1.94	ND	5
4,4' -DDE	3.3	8,900	ND	1.91	ND	2.08	ND	1.9	ND	1.83	ND	1.87	ND	1.84	ND	1.7	**10.7**	1.89	ND	1.93	ND	1.93	**9.44**	1.83	ND	1.94	ND	5
4,4' -DDT	3.3	7,900	**4.11**	1.91	ND	2.08	ND	1.9	ND	1.83	ND	1.87	ND	1.84	ND	1.7	**78.2**	1.89	ND	1.93	**2.77**	1.93	**76.7**	1.83	ND	1.94	ND	5
Chlordane			**18.4**	1.91	ND	2.08	ND	1.9	ND	1.83	ND	1.87	ND	1.84	ND	1.7	**65.8**	1.89	ND	1.93	ND	1.93	**78.5**	1.83	ND	1.94	ND	5
Dieldrin	5	200	ND	1.91	ND	2.08	ND	1.9	ND	1.83	ND	1.87	ND	1.84	ND	1.7	**2.99**	1.89	ND	1.93	ND	1.93	**7.29**	1.83	ND	1.94	ND	5
PCB-1016	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1
PCB-1221	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1
PCB-1232	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1
PCB-1242	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1
PCB-1248	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1
PCB-1254	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1
PCB-1260	100	100	ND	19.7	ND	21.4	ND	19.6	ND	18.9	ND	19.3	ND	19,0	ND	17.5	ND	19.4	ND	19.8	ND	19.9	ND	18.8	ND	20	ND	1

Notes:

* Due to matrix interference from non target compounds in the sample an elevated RL was reported.

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

ND - Non-Detect

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 4
996 Washington Avenue,
Bronx, New York
Soil Analytical Results
Metals

COMPOUND	NYSDEC Part 375.6 Unrestricted Use Soil Cleanup Objectives	NYDEC Part 375.6 Restricted Residential Soil Cleanup Objectives*	SB-01				SB-02		SB-03				SB-TWP-01				SB-TWP-02				SB-TWP-03		SB-TWP-04					
			(0-2') mg/Kg		(13-15') mg/Kg		(0-2') mg/Kg		(0-2') mg/Kg		(14') mg/Kg		(0-2') mg/Kg		(14') mg/Kg		(0-2') mg/Kg		(14-16') mg/Kg		(0-2') mg/Kg		(0-2') mg/Kg		(12') mg/Kg		(14-16') mg/Kg	
			Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Aluminum			14200	1.16	7680	1.26	10500	1.15	12200	1.11	3380	1.14	4910	1.12	4630	1.03	8560	1.14	2800	1.17	11900	1.17	9500	1.11	8180	1.17	10400	1.23
Antimony			ND	0.58	ND	0.63	ND	0.577	1.06	0.555	ND	0.568	ND	0.558	ND	0.515	ND	.5721.14	ND	0.584	0.71	0.584	ND	0.554	ND	0.587	ND	0.617
Arsenic	13	16	5.62	1.16	1.35	1.26	6.26	1.15	6.68	1.11	1.15	1.14	1.26	1.12	ND	1.03	5.92	1.14	ND	1.17	7.83	1.17	4.19	1.11	1.36	1.17	2.24	1.23
Barium	350	400	124	1.16	47.4	1.26	122	1.15	170	1.11	57.9	1.14	17.5	1.12	36	1.03	1440	0.114	16.2	1.17	238	1.17	673	1.11	55.3	1.17	87.6	1.23
Beryllium	7.2	72	ND	0.116	ND	0.126	ND	0.115	ND	0.111	ND	0.114	ND	0.112	ND	0.103	ND	0.343	ND	0.117	ND	0.117	ND	0.111	ND	0.117	ND	0.123
Cadmium	2.5	4.3	ND	0.348	ND	0.378	ND	0.346	ND	0.333	ND	0.341	ND	0.335	ND	0.309	1.52	0.572	ND	0.35	0.832	0.35	0.35	0.332	ND	0.352	ND	0.37
Calcium			1670	5.8	2720	6.3	3220	5.77	4080	5.55	1770	5.68	1040	0.558	984	0.515	39300	0.572	1730	0.584	3850	5.84	32700	5.54	4550	5.87	19200	6.17
Chromium	30	180	18.5	0.58	19.8	0.63	ND	0.577	17.4	0.555	8.83	0.568	10.4	0.558	11.5	0.515	18.8	0.572	7.45	0.584	21.1	0.584	19.9	0.554	21.2	0.587	24.4	0.617
Cobalt			7.44	0.58	9.03	0.63	6.37	0.577	9.15	0.555	5.41	0.568	4.86	0.558	4.41	0.515	6.96	0.572	4.44	0.584	7.83	0.584	7.96	0.554	8.61	0.587	10.4	0.617
Copper	50	270	20.5	0.58	19.1	0.63	27.5	0.577	32.8	0.555	14.3	0.568	12.5	0.558	10.1	0.515	23.5	0.572	18	0.584	51.3	0.584	29.1	0.554	19.1	0.587	24.9	0.617
Iron			19600	2.32	14700	2.52	14000	2.31	46500	2.22	8590	2.27	8220	2.23	7570	2.06	14900	2.29	9150	2.33	18600	2.34	18400	2.22	15200	2.35	19900	2.47
Lead	63	400	177	0.348	4.65	0.378	ND	0.346	3540	0.33	16	0.341	2.86	0.335	1.83	0.309	1550	0.343	3.74	0.35	561	0.35	267	0.332	3.74	0.352	5.56	0.37
Magnesium			2640	5.8	5870	6.3	2550	5.77	2810	5.55	2070	5.68	2800	5.58	2810	5.15	13200	5.72	2120	5.84	2590	5.84	5040	5.54	6330	5.87	11900	6.17
Manganese	1,600	2,000	348	0.58	299	0.63	312	0.577	449	0.555	1040	0.568	194	0.558	223	0.515	546	0.572	142	0.584	264	0.584	364	0.554	203	0.587	369	0.617
Mercury	0.18	0.81	0.102	0.0009	0.00315	0.001	1.4	0.0008	0.649	0.0009	0.0399	0.0009	0.0029	0.0009	0.0434	0.0008	1	0.0009	0.00409	0.0009	0.751	0.0009	0.191	0.0009	0.00411	0.0009	0.00556	0.001
Nickel	30	310	16.8	0.58	19	0.63	14.4	0.577	18.9	0.555	14.5	0.568	12.7	0.558	11.4	0.515	16.4	0.572	10	0.584	20.4	0.584	16	0.554	21	0.587	25.1	0.617
Potassium			650	5.8	2090	6.3	891	5.77	1260	5.55	823	5.68	668	5.58	557	5.15	1950	5.72	857	5.84	712	5.84	3480	5.54	2400	5.87	3260	6.17
Selenium	3.9	180	1.48	1.16	ND	1.26	1.34	1.15	1.63	1.11	ND	1.14	ND	1.12	ND	1.03	ND	1.14	ND	1.17	2.59	1.17	ND	1.11	ND	1.17	ND	1.23
Silver	2	180	ND	0.58	ND	0.63	ND	0.577	ND	0.555	ND	0.568	ND	0.558	ND	0.515	ND	0.572	ND	0.584	ND	0.584	ND	0.554	ND	0.587	ND	0.617
Sodium			295	11.6	353	12.6	292	11.5	291	11.1	300	11.4	367	11.2	318	10.3	510	11.4	321	11.7	301	11.7	1030	11.1	444	11.7	469	12.3
Thallium			ND	1.16	ND	1.26	ND	1.15	ND	1.11	ND	1.14	ND	1.12	ND	1.03	ND	1.14	ND	1.17	ND	1.17	ND	1.11	ND	1.17	ND	1.23
Vanadium			32.2	1.16	23.7	1.26	22.4	1.15	27.3	1.11	13.4	1.14	12.5	1.12	11.8	1.03	26.5	1.14	13.2	1.17	27.6	1.17	28.2	1.11	26.9	1.17	29.1	1.23
Zinc	109	10,000	119	1.16	40.2	1.26	109	1.15	129	1.11	23.2	1.14	17.9	1.12	20.8	1.03	699	1.14	17.4	1.17	612	1.17	323	1.11	41.9	1.17	48.8	1.23

Notes:

** - 6 NYCRR Part 375-6 Remedial Program Soil Cleanup Objectives

BRL - Below Reporting Limit

Bold/highlighted- Indicated exceedance of the NYSDEC UUSCO Guidance Value

Bold/highlighted- Indicated exceedance of the NYSDEC RRSCO Guidance Value

TABLE 5
996 Washington Avenue,
Bronx, New York
Groundwater Analytical Results
Volatile Organic Compounds

	NYSDEC Groundwater Quality Standards µg/L	SB-TWP-01				SB-TWP-02				SB-TWP-03				SB-TWP-04			
		9/17/2013 µg/L		9/20/2013 µg/L		9/17/2013 µg/L		9/20/2013 µg/L		9/17/2013 µg/L		9/20/2013 µg/L		9/17/2013 µg/L		9/20/2013 µg/L	
		Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL	Result	RL
Acetone	5	**4.7**	5.0	**3.5**	5.0	ND	5.0	ND	5.0	**4.8**	5.0	**3.9**	5.0	**5.4**	5.0	**6.2**	5.0
Chloroform	60	ND	5.0	ND	5.0	ND	5.0	ND	5.0	ND	5.0	ND	5.0	ND	5.0	**2.7**	5.0
cis-1,2-Dichloroethylene		ND	5.0	ND	5.0	ND	5.0	ND	5.0	ND	5.0	ND	5.0	ND	5.0	**2.9**	5.0
Tetrachloroethylene	5	ND	5.0	**19**	5.0	ND	5.0	**7.0**	5.0	ND	5.0	**3.9**	5.0	ND	5.0	**15**	5.0
Trichloroethene	5	ND	5.0	**6.8**	5.0	**2.7**	5.0	ND	5.0	ND	5.0	ND	5.0	**3.4**	5.0	**7.1**	5.0
Total VOCs Concentration		**4.7**		**29.3**		**2.7**		**7**		**4.8**		**7.8**		**8.8**		**33.9**	

Notes:
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 6
996 Washington Avenue,
Bronx, New York
Groundwater Analytical Result
Semi-Volatile Organic Compounds

Compound	NYSDEC Groundwater Quality Standards µg/L	SB-TWP-01 9/17/2013 µg/L		SB-TWP-02 9/16/2013 µg/L		SB-TWP-03 9/17/2013 µg/L		SB-TWP-04 9/17/2013 µg/L	
		Result	RL	Result	RL	Result	RL	Result	RL
Acenaphthene	50	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Acenaphthylene		ND	10.5	ND	10.5	ND	11.1	ND	10.5
Benzo(a)anthracene	0.002	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Benzo(a)pyrene		ND	10.5	ND	10.5	ND	11.1	ND	10.5
Benzo(b)fluoranthene	0.002	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Benzo(k)fluoranthene	0.002	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Bis(2-ethylhexyl)phthalate	5	**23**	10.5	ND	10.5	**134**	11.1	ND	10.5
Chrysene	0.002	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Dibenz(a,h)anthracene		ND	10.5	ND	10.5	ND	11.1	ND	10.5
Fluoranthene	50	ND	10.5	**2.69**	10.5	ND	11.1	ND	10.5
Indeno(1,2,3-cd)pyrene	0.002	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Phenanthrene	50	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Pyrene	50	ND	10.5	ND	10.5	ND	11.1	ND	10.5
Total SVOC		**23**		**2.69**		**134**		**0**	

Notes:
ND - Not detected
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 7
996 Washington Avenue,
Bronx, New York
Groundwater Analytical Results
Pesticides/PCBs

Compound	NYSDEC Groundwater Quality Standards µg/L	SB-TWP-01 9/17/2013		SB-TWP-02 9/16/2013		SB-TWP-03 9/17/2013		SB-TWP-04 9/17/2013	
		Result	RL	Result	RL	Result	RL	Result	RL
4,4'-DDE	**0.2**	ND	0.053	ND	0.053	ND	0.053	ND	0.053
4,4'-DDT	**0.11**	**0.00857**	0.053	ND	0.053	ND	0.053	ND	0.053
Dieldrin	**0.004**	**0.00211**	0.053	ND	0.053	ND	0.053	ND	0.053

Notes:

ND - Non-detect

ND* - Due to matrix interference from non target compounds in the sample an elevated RL was reported.

Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 8
996 Washington Avenue,
Bronx, New York
Groundwater Analytical Results
TAL Metals

Compound	NYSDEC Groundwater Quality Standards	SB-TWP-01		SB-TWP-02		SB-TWP-03		SB-TWP-04	
		9/17/2013		9/16/2013		9/17/2013		9/17/2013	
	mg/L	Result	RL	Result	RL	Result	RL	Result	RL
Silver	**0.05**	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Aluminum	**0.1**	**24.3**	0.01	**50.7**	0.01	**77**	0.01	**87**	0.01
Arsenic	**0.025**	**0.011**	0.004	**0.02**	0.004	**0.023**	0.004	**0.027**	0.004
Barium	**1**	**0.475**	0.01	**5.2**	0.01	**1.95**	0.01	**2.39**	0.01
Beryllium	**0.003**	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Calcium	**NS**	**138**	0.05	**333**	0.05	**281**	0.05	**395**	0.05
Cadmium	**0.005**	ND	0.003	**0.005**	0.003	**0.004**	0.003	**0.005**	0.003
Cobalt	**NS**	**0.092**	0.005	**0.285**	0.005	**0.384**	0.005	**0.239**	0.005
Chromium	**0.05**	**0.089**	0.005	**0.298**	0.005	**0.556**	0.005	**0.36**	0.005
Copper	**0.2**	**0.14**	0.003	**0.502**	0.003	**0.594**	0.003	**0.452**	0.003
Iron	**0.5**	**58.8**	0.02	**129**	0.02	**187**	0.02	**163**	0.02
Mercury	**0.0007**	ND	0.05	ND	0.05	ND	0.05	ND	0.05
Potassium	**NS**	**9.97**	0.05	**15.7**	0.005	**20.1**	0.05	**18.5**	0.05
Magnesium	**35**	**53.8**	0.05	**138**	0.05	**136**	0.05	**125**	0.05
Manganese	**0.3**	**4.61**	0.005	**9.47**	0.005	**23.5**	0.005	**14.6**	0.005
Sodium	**2**	**92.5**	0.1	**84**	0.1	**95**	0.1	**103**	0.1
Nickel	**0.1**	**0.116**	0.005	**0.319**	0.005	**0.563**	0.005	**0.753**	0.005
Lead	**0.025**	**0.094**	0.003	**7.95**	0.003	**0.572**	0.003	**0.977**	0.003
Antimony	**0.003**	ND	0.005	ND	0,.005	ND	0.005	ND	0.005
Selenium	**0.01**	ND	0.01	ND	0.01	ND	0.01	**0.014**	0.01
Thallium	**0.0005**	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Vanadium	**NS**	**0.089**	0.01	**0.157**	0.01	**0.242**	0.01	**0.305**	0.01
Zinc	**2**	**0.172**	0.01	**2.73**	0.01	**0.78**	0.01	**1.56**	0.01

Notes:
BRL - Below Reporting Limit
NS - No Standard
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

Table 9
996 Washington Avenue,
Bronx, New York
Groundwater Analytical Results
TAL Filtered Metals

Compound	NYSDEC Groundwater Quality Standards	SB-TWP-01		SB-TWP-02		SB-TWP-03		SB-TWP-04	
		9/17/2013		9/16/2013		9/17/2013		9/17/2013	
	mg/L	Result	RL	Result	RL	Result	RL	Result	RL
Aluminum	**0.1**	ND	0.01	ND	0.01	**0.016**	0.01	ND	0.01
Antimony	**0.003**	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Arsenic	**0.025**	ND	0.004	ND	0.004	ND	0.004	ND	0.004
Barium	**1**	**0.075**	0.01	**0.077**	0.01	**0.083**	0.01	**0.069**	0.01
Beryllium	**0.003**	ND	0.001	ND	0.001	ND	0.001	ND	0.001
Cadmium	**0.005**	ND	0.003	ND	0.003	ND	0.003	ND	0.003
Calcium	**NS**	**119**	0.05	**110**	0.05	**119**	0.05	**122**	0.05
Chromium	**0.05**	ND	0.005	ND	0.005	ND	0.005	**0.053**	0.005
Cobalt	**NS**	ND	0.005	**0.012**	0.005	**0.011**	0.005	ND	0.005
Copper	**0.2**	ND	0.003	ND	0.003	**0.003**	0.003	ND	0.003
Iron	**0.5**	ND	0.02	ND	0.02	**0.048**	0.02	**0.043**	0.02
Lead	**0.025**	ND	0.003	**0.007**	0.003	ND	0.003	ND	0.003
Magnesium	**35**	**42**	0.05	**40**	0.05	**38**	0.05	**43**	0.05
Manganese	**0.3**	**0.124**	0.005	**1.19**	0.005	**3.3**	0.005	**0.129**	0.005
Mercury	**0.0007**	ND	0.05	ND	0.05	ND	0.05	ND	0.05
Nickel	**0.1**	ND	0.005	0.008	0.005	**0.019**	0.005	**0.015**	0.005
Potassium	**NS**	**5.03**	0.05	**5.53**	0.05	**6.19**	0.05	**5.18**	0.05
Selenium	**0.01**	ND	0.01	ND	0.01	**0.01**	0.01	ND	0.01
Silver	**0.05**	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Sodium	**2**	**93**	0.1	**81**	0.1	**94.3**	0.1	**103**	0.1
Thallium	**0.0005**	ND	0.005	ND	0.005	ND	0.005	ND	0.005
Vanadium	**NS**	ND	0.01	ND	0.01	ND	0.01	ND	0.01
Zinc	**2**	ND	0.01	**0.014**	0.01	ND	0.01	ND	0.01

Notes:

BRL - Below Reporting Limit

NS - No Standard

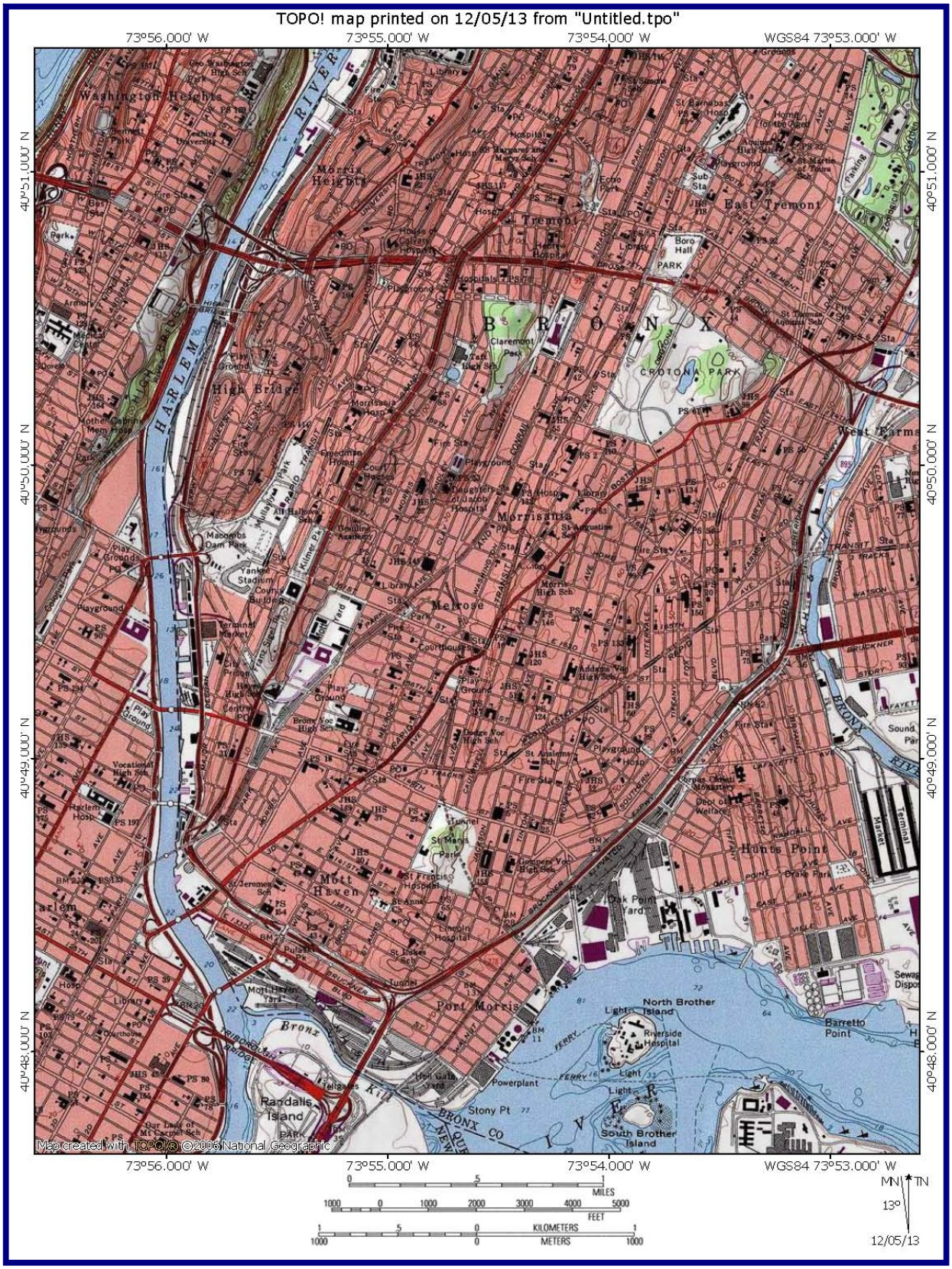
Bold/highlighted- Indicated exceedance of the NYSDEC Groundwater Standard

TABLE 6
996 Washington Avenue,
Bronx, New York
Soil Gas - Volatile Organic Compounds

COMPOUNDS	NYSDOH Maximum Sub-Slab Value (µg/m³) [a]	NYSDOH Soil Outdoor Background Levels (µg/m³) [b]	SV-01 (µg/m3)		SV-02 (µg/m3)		SV-03 (µg/m3)		SV-04 (µg/m3)	
			Result	RL	Result	RL	Result	RL	Result	RL
1,1,1-Trichloroethane	100	<2.0 - 2.8	ND	11	ND	11	ND	19	ND	9.3
1,1,2,2-Tetrachloroethane		<1.5	ND	13	ND	14	ND	23	ND	12
1,1,2-Trichloro-1,2,2-trifluoroethane			ND	15	ND	16	ND	26	ND	13
1,1,2-Trichloroethane		<1.0	ND	11	ND	11	ND	19	ND	9.3
1,1-Dichloroethane		<1.0	ND	7.8	ND	8.5	ND	14	ND	6.9
1,1-Dichloroethylene		<1.0	ND	1	ND	8.3	ND	14	ND	6.8
1,2,4-Trichlorobenzene		NA	ND	14	ND	16	ND	25	ND	13
1,2,4-Trimethylbenzene		<1.0	ND	9.5	**15**	10	ND	17	**8.4**	8.4
1,2-Dibromoethane		<1.5	ND	15	ND	16	ND	26	ND	13
1,2-Dichlorobenzene		<2.0	ND	12	ND	13	ND	21	ND	10
1,2-Dichloroethane		<1.0	ND	7.8	ND	8.5	ND	14	ND	6.9
1,2-Dichloropropane			ND	8.9	ND	9.7	ND	16	ND	7.9
1,2-Dichlorotetrafluoroethane			ND	14	ND	15	ND	24	ND	12
1,3,5-Trimethylbenzene		<1.0	ND	9.5	ND	10	ND	17	ND	8.4
1,3-Butadiene		NA	ND	8.4	ND	9.1	ND	15	ND	7.4
1,3-Dichlorobenzene		<2.0	ND	12	ND	13	ND	21	ND	10
1,4-Dichlorobenzene		NA	ND	12	ND	13	ND	21	ND	10
1,4-Dioxane			ND	7	ND	7.5	ND	12	ND	6.2
2-Butanone			**7.4**	5.7	**33**	6.2	**48**	10	**16**	5
2-Hexanone			ND	7.9	ND	8.6	ND	14	ND	7
4-Methyl-2-pentanone			ND	7.9	**14**	8.6	ND	14	ND	7
Acetone		NA	**230**	4.6	**1000**	5	**1700**	8.1	**770**	4.1
Benzene		<1.6 - 4.7	ND	6.2	**8.7**	6.7	ND	11	ND	5.5
Benzyl Chloride		NA	ND	10	ND	11	ND	18	ND	8.8
Bromodichloromethane		<5.0	ND	12	ND	13	ND	21	ND	11
Bromoform		<1.0	ND	20	ND	22	ND	35	ND	18
Bromomethane		<1.0	ND	7.5	ND	8.1	ND	13	ND	6.6
Carbon Disulfide		NA	ND	6	**21**	6.5	**15**	11	ND	5.3
Carbon Tetrachloride	5	<3.1	ND	6.1	ND	6.6	ND	11	ND	5.4
Chlorobenzene		<2.0	ND	8.9	ND	9.6	ND	16	ND	7.9
Chloroethane		NA	ND	5.1	ND	5.5	ND	9	ND	4.5
Chloroform		<2.4	ND	9.4	**11**	10	ND	17	ND	8.3
Chloromethane		<1.0 - 1.4	ND	4	ND	4.3	ND	7.1	ND	3.5
cis-1,2-Dichloroethene		<1.0	ND	4	ND	8.3	ND	14	ND	6.8
cis-1,3-Dichloropropene		NA	ND	7.7	ND	9.5	ND	16	ND	7.8
Cyclohexane		NA	ND	6.7	ND	7.2	ND	12	ND	5.9
Dibromochloromethane		<5.0	ND	16	ND	17	ND	27	ND	14
Dichlorodifluromethane		NA	ND	9.6	**12**	10	ND	17	ND	8.4
Ethyl Acetate		NA	ND	7	ND	7.5	ND	12	ND	6.2
Ethylbenzene		<4.3	ND	8.4	**13**	9.1	ND	15	ND	7.4
Hexachlorobutadiene		NA	ND	21	ND	22	ND	36	ND	18
Isopropanol			ND	4.8	ND	5.1	ND	8.4	ND	4.2
Methyl Methacrylate			**7.4**	7.9	ND	8.6	ND	14	ND	7
MTBE		NA	ND	7	ND	7.5	ND	12	ND	6.1
Methylene Chloride		<3.4	**7.4**	6.7	**8**	7.3	ND	12	**8.9**	5.9
Heptane		NA	ND	7.9	**13**	8.6	**45**	14	ND	7
Hexane		<1.5	**13**	6.8	**19**	7.4	**270**	12	**39**	6
Xylene (o)		<4.3	ND	8.4	**12**	9.1	ND	15	ND	7.4
Xylene (m&p)		<4.3	ND	17	**34**	18	ND	30	**17**	15
p-Ethyltoluene		NA	**1.08**	1	ND	51	ND	84	ND	42
Propylene		NA	ND	3.3	ND	3.6	ND	5.9	ND	2.9
Styrene		<1.0	ND	8.2	ND	8.9	ND	15	ND	7.3
Tetrachloroethene	100		ND	13	ND	14	ND	23	ND	12
Tetrahydrofuran		NA	ND	5.7	ND	6.2	ND	10	ND	5
Toluene		1.0 - 6.1	**9.5**	7.3	**35**	7.9	**15**	13	**19**	6.4
trans-1,2-Dichloroethene		NA	ND	7.7	ND	8.8	ND	14	ND	6.8
trans-1,3-Dichloropropene		NA	ND	7.8	ND	9.5	ND	16	ND	7.8
Trichloroethene	5	<1.7	ND	5.2	ND	5.6	ND	9.2	ND	4.6
Trichlorofluoromethane		NA	ND	11	**45**	12	ND	19	9.6	9.6
Vinyl Acetate			ND	6.8	ND	7.4	ND	12	ND	6
Vinyl Chloride		<1.0	ND	4.9	ND	5.3	ND	8.7	ND	4.4

Notes:
NA No guidance value or standard available
(a) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October 2006. New York State Department of Health.
(b) NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, February 2005, Summary of Background Levels for Selected Compounds (NYSDOH Database, Outdoor values)
Value detected above NYSDOH Air Guidance Value of 5 µg/m3, which according to Soil Vapor/Indoor Air Matrix 1 would require at a minimum, mitigation.
Value detected above NYSDOH Air Guidance Value of 100 µg/m3, which according to Soil Vapor/Indoor Air Matrix 2 would require at a minimum, mitigation.

FIGURES



USGS Bronx, NJ-NY Quadrangle 1995, Contour Interval = 10 feet

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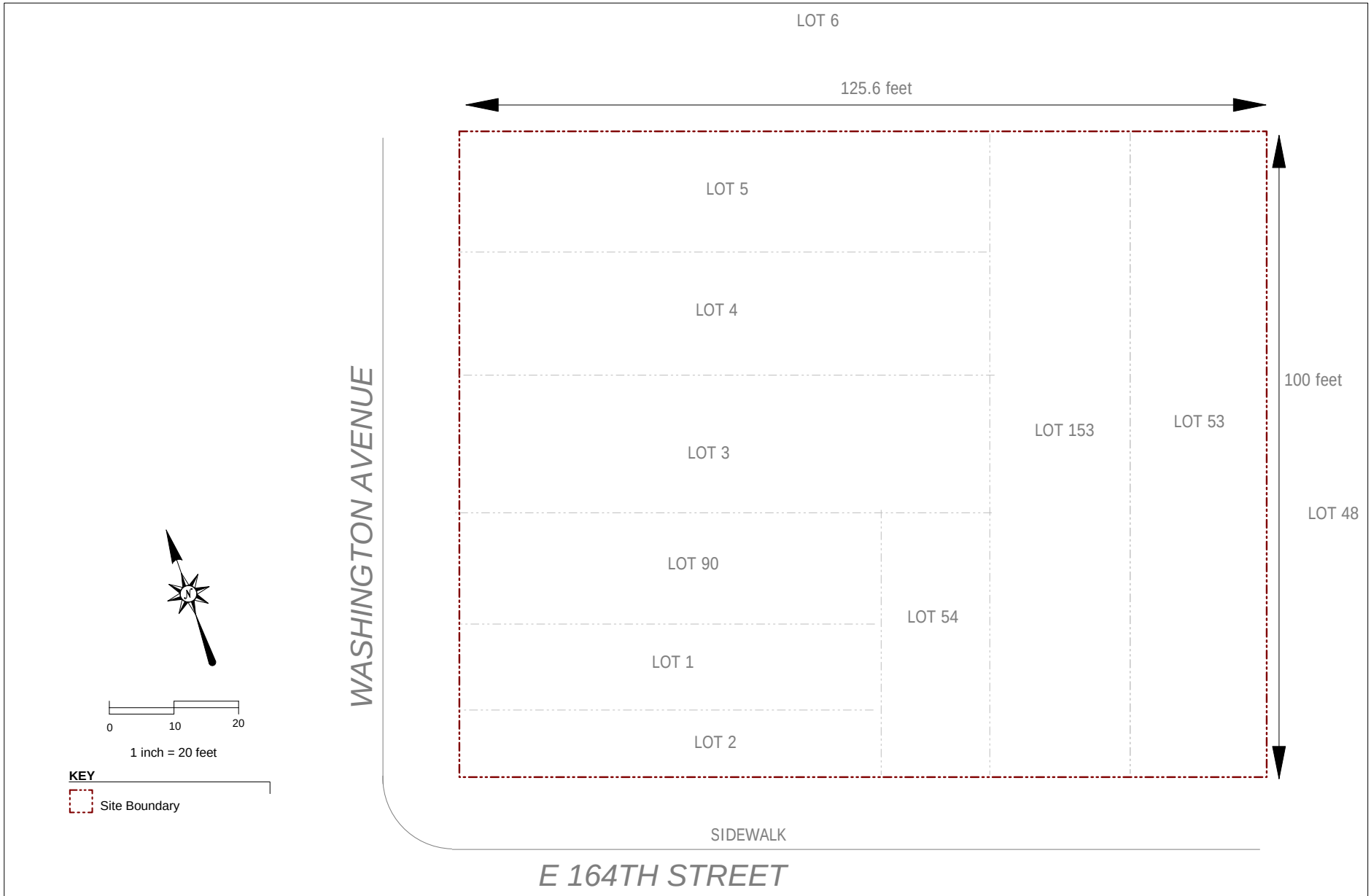
996 Washington Avenue, Bronx, NY

FIGURE 1 SITE LOCATION MAP



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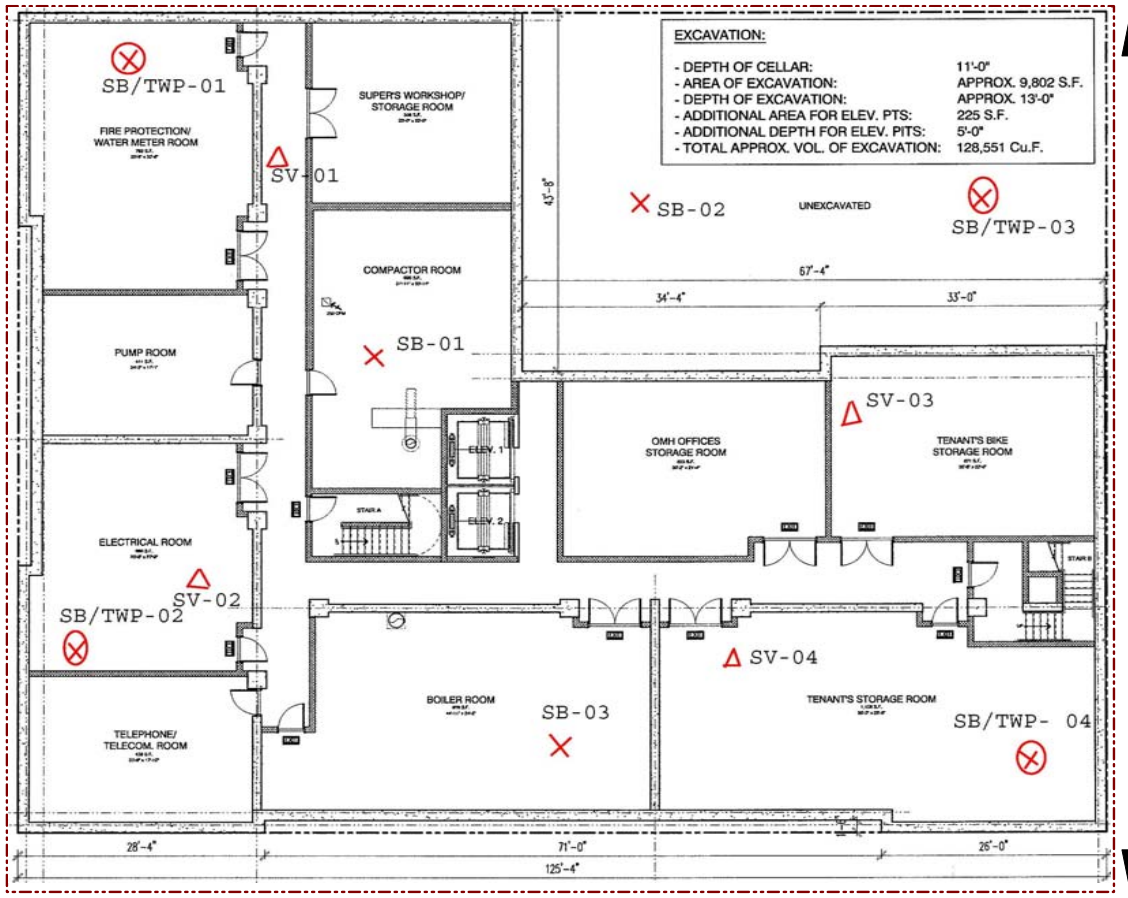
BRONX, NY 10456

FIGURE 2 SITE BOUNDARY

LOT 6

125.6 feet



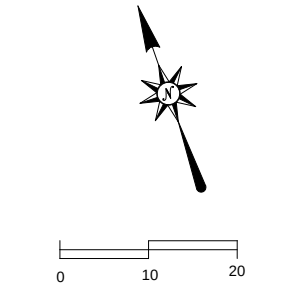
100 feet

LOT 48

WASHINGTON AVENUE

SIDEWALK

E 164TH STREET



1 inch = 20 feet

KEY

Site Boundary

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FIGURE 3 REDEVELOPMENT PLAN

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

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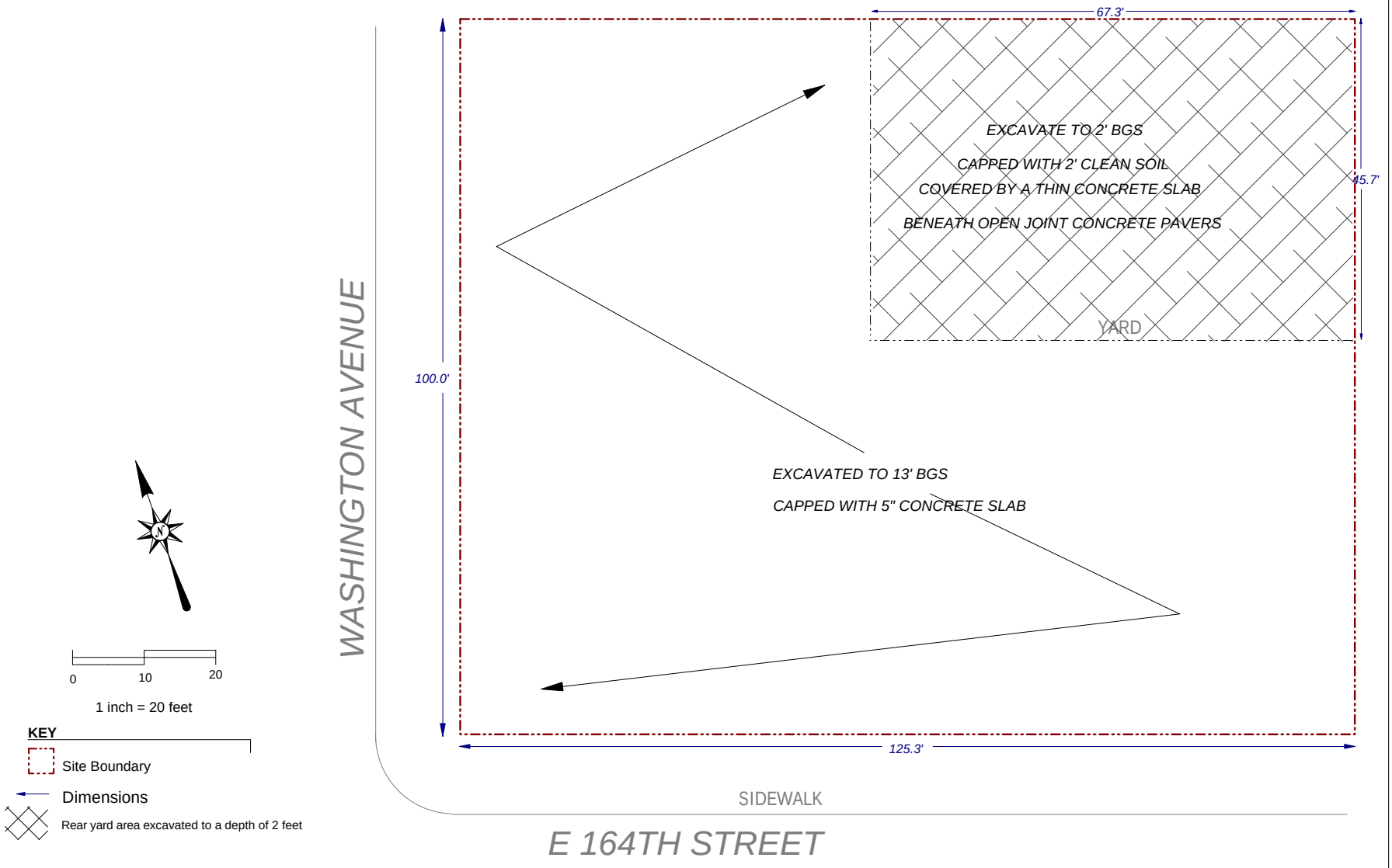

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BRONX, NY 10456

FIGURE 5 EXCAVATION PLAN

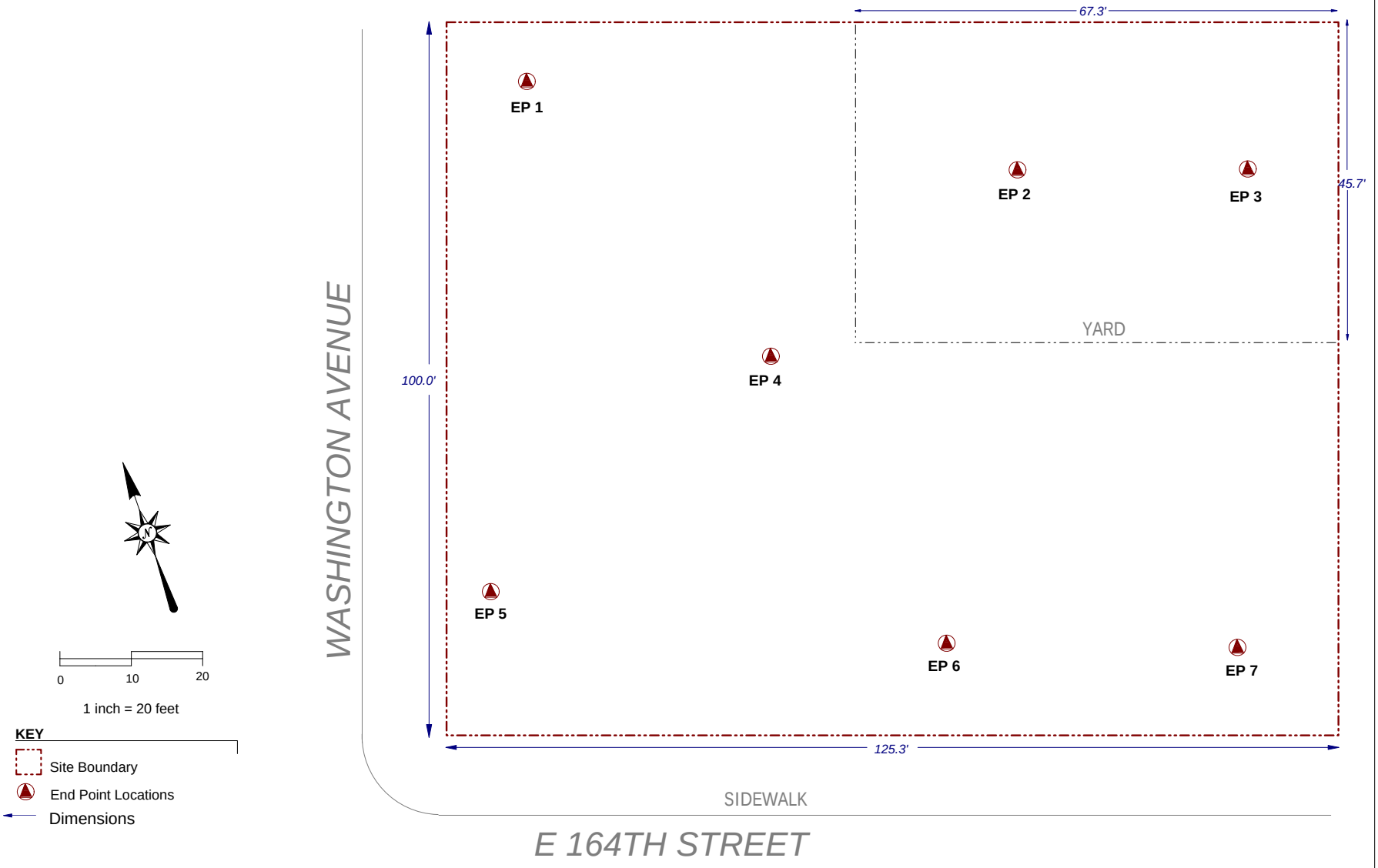

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FIGURE 6 END POINT SAMPLING PLAN

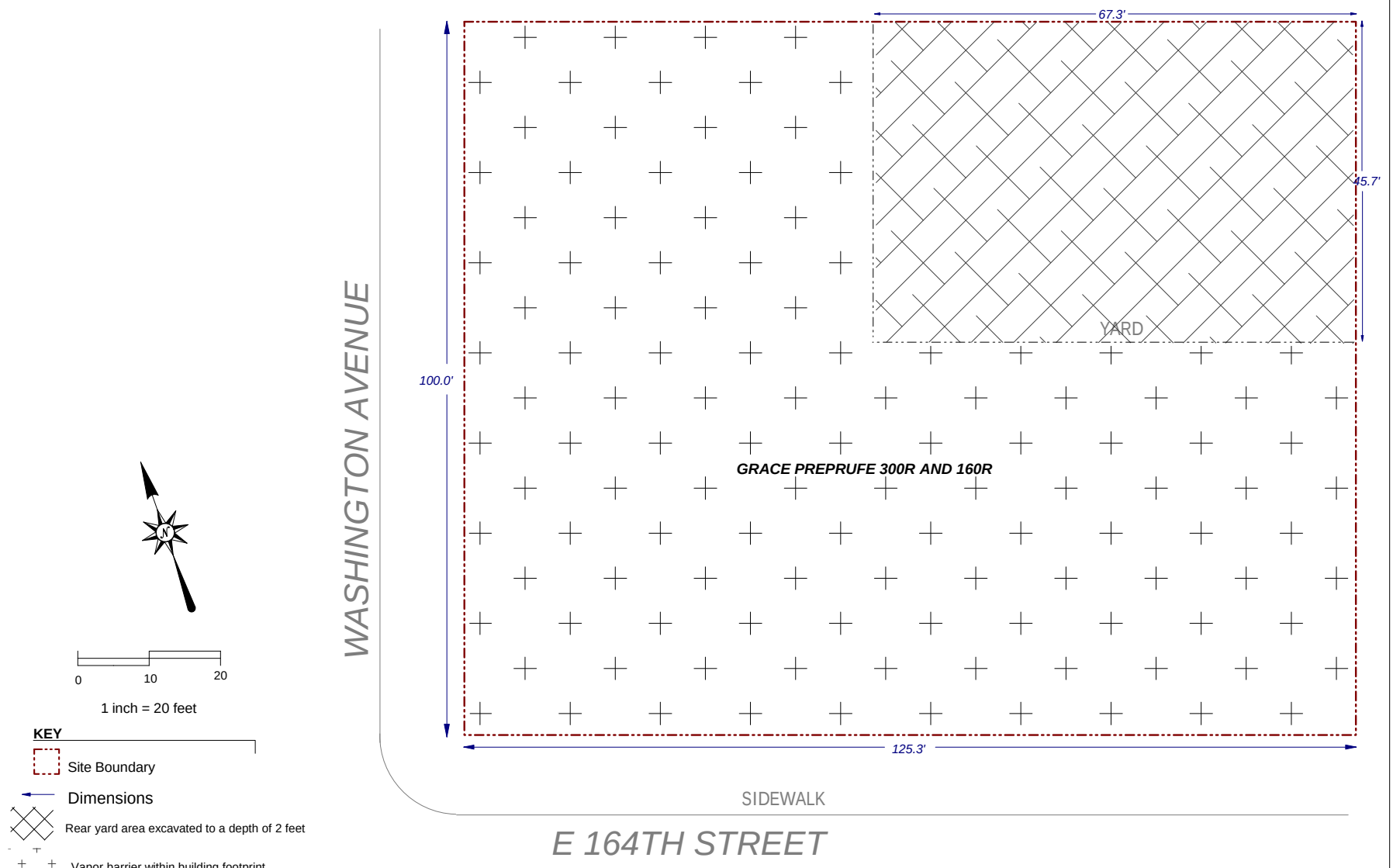

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FIGURE 7 VAPOR BARRIER

ATTACHMENT A
PROPOSED DEVELOPMENT PLANS

ZONING CALCULATIONS

APPLICABLE RESOLUTION:
ZONING RESOLUTION OF THE CITY OF NEW YORK
CITY PLANNING COMMISSION DEPARTMENT OF CITY PLANNING

ADDRESS: CORNER OF WASHINGTON AVENUE AND EAST 164TH STREET
BRONX, NEW YORK

ZONE: MX-7/M-1/R7-2
MAP: 6c
BLOCK: 2369
LOTS: 1, 2, 3, 4, 5, 53, 54, 90 AND 153.
LOT AREA: 12,543.25 S.F.

USE REGULATIONS: RESIDENCE AND COMMERCIAL DISTRICTS

ZR 22-10 USES PERMITTED AS OF RIGHT
ZR 22-12 USE GROUP 2 IN R7 - RESIDENTIAL
ZR 22-14 USE GROUP 3 IN R7 - COMMUNITY FACILITIES

(A) Philanthropic or non-profit institutions with sleeping accommodations. (4) The number of persons employed in central office functions shall not exceed 50, and the amount of *floor area* used for such purposes shall not exceed 25 percent of the total *floor area*, or, in R8, R9 or R10 Districts, 25,000 square feet, whichever is greater.

BULK REGULATIONS FOR MIXED BLDGS. IN RESIDENTIAL DISTRICT (R7-2)

ZR 23-145 Maximum Lot Coverage and Floor Area Ratio for residential buildings developed under the Quality Housing Program.

CORNER LOT CALCULATIONS

Max. Lot Coverage (80%):
100'-0" x 100'-00"= 10,000 S.F.
10,000 S.F. x .80 = Permitted Coverage **8,000 S.F.**

PROPOSED TOTAL CORNER LOT COVERAGE AREA= 7,997.61 S.F.

INTERIOR AND THROUGH LOT CALCULATIONS

Max. Lot Coverage (65%):
Interior and Through lot Area = 25.66' x 100.00'= 2,566 S.F.
2,566 S.F. x .65 = Permitted Coverage **1,667,90 S.F.**

PROPOSED TOTAL INTERIOR LOT COVERAGE AREA= 1,503 S.F.

PROPOSED COMBINED LOT COVERAGE AREA = 9,500,61 S.F.
(COMPLIES)

MAXIMUM FLOOR AREA RATIO FOR MIXED BUILDINGS

ZR 24-161 In the districts indicated, for zoning lots containing community facility and residential uses, the maximum floor area ratio permitted for a community facility use shall be set forth in Section 24-11, inclusive, and the maximum floor area ratio permitted for a residential use shall be a set forth in Article II, Chapter 3, provided the total of all such floor area ratios does not exceed the greatest floor area ratio permitted for any such use on the zoning lot.

ZR 24-11 COMMUNITY FACILITY PORTION FAR
MAX. FLOOR AREA ALLOWED
6.50 x 12,543.25 S.F. =81,531.10 S.F.

COMMUNITY FACILITY AREA PROPOSED	=	24,285 S.F.
PROPOSED FAR: 23,627 S.F. / 12,543.25 S.F.	=	1.936

(COMPLIES)

ZR 23-145 RESIDENTIAL PORTION FAR
MAX. FLOOR AREA ALLOWED
3.44 x 12,543.25 S.F. = 43,148.78 S.F.

RESIDENTIAL AREA PROPOSED	=	42,097.27 S.F.
PROPOSED FAR: 41,489 S.F. / 12,543.25 S.F.	=	3,356

(COMPLIES)

RESIDENTIAL	=	3,356
PROPOSED COMMUNITY FACILITY FAR	=	1,936
TOTAL FAR PROPOSED	=	5,292
MAX. FAR ALLOWED	=	6.5

(COMPLIES)

PERMITTED NUMBER OF DWELLING UNITS

ZR 24-20 In all districts, the maximum number of dwelling units or rooming units on a zoning lot containing both community facility and residential uses shall equal the maximum residential floor area permitted on such zoning lot determined in accordance with the provisions set forth in Section 24-16 (Special Provisions for Zoning Lots Containing Both Community Facility and Residential Uses) divided by the applicable factor in Section 23-20 (DENSITY REGULATIONS)

ZR 23-22 PERMITTED DWELLING UNIT FACTOR = 680 SF

$$\frac{\text{MAX. FAR}}{\text{D.U. FACTOR}} = \frac{66{,}382.27 \text{ S.F.}}{680} = 97.62 = 98 \text{ Allowable Dwelling Units}$$

	1st Flr	2nd Flr	3rd Flr	4th Flr	5th Flr	6th Flr	7th Flr	8th Flr	TOTAL
0 Bedroom Unit	4	10	8	8	8	8	7	4	57
1 Bedroom Unit	1	2	3	3	3	3	2	2	19
2 Bedroom Unit	2	3	3	3	3	3	2	0	19
Total	7	15	14	14	14	14	11	6	95

PROPOSED # OF DWELLING UNITS = 95

ACCESSORY OFF STREET PARKING

ZR 25-25 Parking required for 25% of total amount of dwelling units, (Based on Government Assisted Housing Program)
Required Parking = 38 x 25% = 9.50 = 10 Parking spaces

ZR 25-261 In R5D, R6, R7, R8 R9 and R10 Districts, the maximum number of *accessory* off-street parking spaces for which requirements are waived: 15 spaces in R7-2 districts.

PROPOSED # OF RESIDENTIAL PARKING SPACES = 0

ZR 25-31 Required off-street parking spaces for non-residential uses for Community Facilities; Philanthropic or non-profit institutions with sleeping accommodations.
Use Group 3 : Non required.

PROPOSED # OF COMM. FAC. PARKING SPACES = 0

BICYCLE PARKING REQUIRENMENTS

ZR 25-811 Required bicycle parking spaces for residential,community facility or commercial uses.
Use group 2 1 per 2 dwelling units, 15 SF per bicycle.
38/2=19 bicycle spaces required

Use group 3 1 per 10,000 S.F. of *floor area*
24,285 S.F. S.F./10,000= 3 bicycle spaces required

PROPOSED # OF BICYCLE SPACES = 30

ZR 25-83 **Covered bicycle parking- 15 S.F. per bike = 30x15 = 450 sf required**

PROPOSED BICYCLE STORAGE ROOM 576 sf net

REQUIRED SIDE YARDS

ZR 24-35 **MINIMUM REQUIRED SIDE YARDS:**
NONE REQUIRED; MIN. 8'-0" IF PROVIDED

PROPOSED SIDE YARD = NONE

REQUIRED REAR YARDS

ZR 24-361 **MINIMUM REQUIRED REAR YARDS :**
A rear yard with a depth of not less than 30 feet shall be provided at every rear lot line on any zoning lot.

PROPOSED REAR YARD AT INT. LOT = 40'-8"

MAXIMUM HEIGHT & REQUIRED SETBACKS

ZR 24-522 **MAXIMUM HEIGHT OF WALLS AND REQUIRED SETBACKS**

MAX. HEIGHT OF FRONT WALL	=	60'-0" OR 6 STORIES	
INITIAL SETBACK- NARROW STREET	=	20'-0"	
INITIAL SETBACK- WIDE STREET	=	15'-0"	
HEIGHT ABOVE STREET LINE	=	60'-0"	
SKY EXPOSURE PLANE- NARROW STREET	=	2.7 TO 1	
SKY EXPOSURE PLANE- WIDE STREET	=	5.6 TO 1	
ZR 23-633 MAX. BUILDING HEIGHT	=	80'-0"	
PROPOSED HEIGHT OF FRONT WALL	=	58'-0"	(COMPLIES)
PROPOSED SETBACK- NARROW STREET	=	26'-6"	(COMPLIES)
PROPOSED SETBACK- WIDE STREET	=	26'-6"	(COMPLIES)
PROPOSED HEIGHT ABOVE STREET LINE	=	58'-0"	(COMPLIES)
PROPOSED BUILDING HEIGHT	=	77'-0"	(COMPLIES)

ZR 23-62 **PERMITTED OBSTRUCTIONS**
(c) Chimneys or flues, with a total width not exceeding 10 percent of the *aggregate width of street walls* of a *building* at any level;
(d) Dormers having an *aggregate width of street walls* equal to not more than 50 percent of the width of the *street wall* of a *detached* or *semi-detached single-* or *two-family residence*;
(e) Elevators or stair bulkhead, roof water tanks or cooling towers (including enclosures), each having an *aggregate width of street walls* equal to not more than 50 feet. However, the product, in square feet, of the *aggregate width of street walls* of such obstructions facing each street frontage, times their average height, in feet, shall not exceed a figure equal to four times the width, in feet, of the *street wall* of the *building* facing such frontage;
(h) Parapet walls, not more than four feet high;

ZR 23-621(c) **DORMER PERMITTED OBSTRUCTION**
East 164th Street Aggregate Street Wall Length = 125'-4"
Proposed Height Exceeds Permitted Height by = 7'-4"
Maximum Aggregate Length of Dormer =
125'-4" x (.60 -.073 = .527) = 66'-0 2/3"
Proposed Dormer Length = **66'-0"**
Washington Ave. Aggregate Street Wall Length = 100'-0"
Proposed Height Exceeds Permitted Height by = 7'-4"
Maximum Aggregate Length of Dormer =
100'-0" x (.60 -.073 = .527) = 52'-8"
Proposed Dormer Length = **51'-8"**

QUALITY HOUSING PROGRAM

ZR 28-12 STREET TREE PLANTING
One (1) tree per 25' of street frontage of zoning lot.
125.66' (East 164th Street) / 25 = 5.02 (5) trees required
100.00' (Washington Avenue) / 25 = 4 (4) trees required

Total: 5+4= 9 trees required

PROPOSED: 9 trees provided on site as per NYC parks & recreation regulations and requirements.

ZR 28-21 SIZE OF DWELLING UNITS
Minimum required f.a./d.u.: 400 S.F.

MIN. PROPOSED DWELLING UNIT = 652 S.F.

ZR 28-22 WINDOWS DOUBLE GLAZING REQUIRED

PROVIDED

ZR 28-23 REFUSE STORAGE AND DISPOSAL
2.9 cu. ft./ D.U. of refuse storage space required

1st Floor- 2.9 X 7 D.U. = 20.3 CU.FT. required
2nd Floor- 2.9 X 15 D.U. = 43.5 CU.FT. required
3rd-6th Floor- 2.9 x 14 D.U.= 40.6 CU.FT. required / floor
7th Floor- 2.9 x 11 D.U.= 31.9 CU.FT. required
8th Floor- 2.9 X 6 D.U. = 17.4 CU.FT. required

PROVIDED: 59 S.F. x 8' h = 472 cu.ft/ floor

12 S.F./ floor of disposable space required

PROVIDED: 12 S.F. per floor

ZR 28-24 LAUNDRY FACILITIES
(a) at least one washing machine per 20 dwelling units or and at least one dryer per 40 dwelling units;

95 D.U. / 20 = 5 washing machines required
95 D.U. / 40 = 2 dryers required

PROVIDED: 10 washers, 5 dryers.

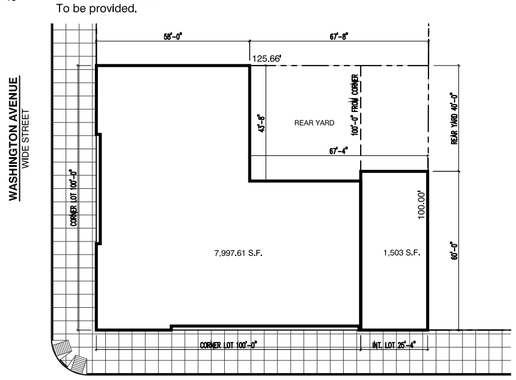
ZR 28-25 DAYLIGHT IN CORRIDORS
Fifty percent of the square footage of a corridor may be excluded from the definition of floor area if a window with a clear, non-tinted, glazed area of at least 20 square feet is provided in such corridor, provided that such window:
(a) shall be directly visible from 50 percent of the corridor or from the vertical circulation core. This standard shall be achieved when a visually unobstructed straight line can be drawn between such corridor, elevator or stairwell, and the window; and

ZR 28-25 (b) is located at least 20 feet from a wall or a side or rear lot line measured in a horizontal plane and perpendicular to the rough window opening.

ZR 28-31 RECREATION SPACE
Minimum required: 3.3% of residential floor area:
42,155,28 S.F. x .033 = 1,423,65 S.F.

PROPOSED: Rec. Room (742 S.F.)+Outdoor Terrace (2,864 S.F.+1,788 S.F.)
=Total Rec. Area = 5,394 S.F.

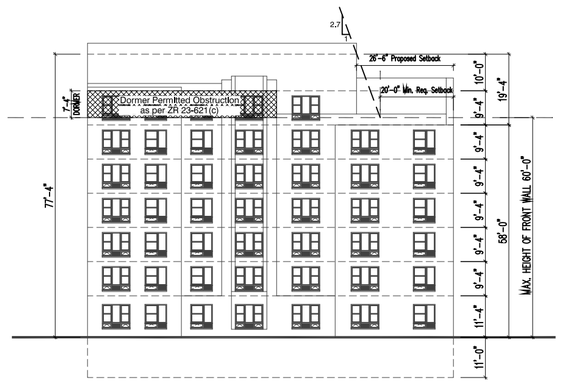
ZR 28-40 SAFETY AND SECURITY
To be provided.



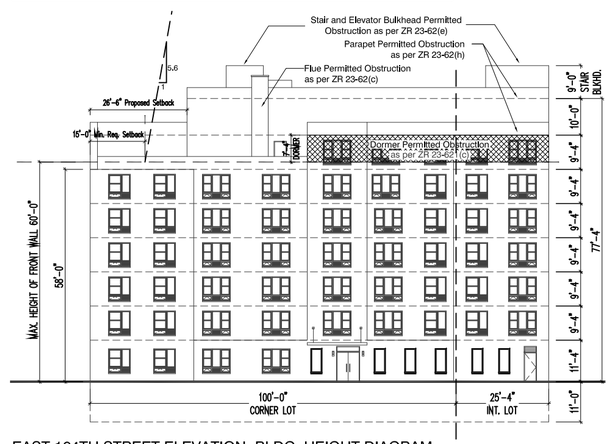
LOT COVERAGE DIAGRAM
SCALE: N.T.S.

GROSS FLOOR AREAS PER OCCUPANCY

FLOOR	SPACE	OCCUPANCY: MECHANICAL RMS.	COMM. FACILITY: APARTMENTS	COMM. FACILITY: OTHER	RESIDENTIAL: APARTMENTS	RESIDENTIAL: CIRCULATION	RESIDENTIAL: OTHER	
Cellar	F.P./Water M./Pump Rm.	472 S.F.						
	El.M./Tel./Telecom Rm.	458 S.F.						
	Boiler Room	1,115 S.F.						
	Compactor Room	754 S.F.						
	Gas Meter Room	425 S.F.						
	Super's Workshop	582 S.F.						
	Tenant's Storage Room						771 S.F.	
	Tenant's Storage Room						1,443 S.F.	
	Tenant's Storage Room						1,252 S.F.	
	Tenant's Bike Room						505 S.F.	
	Circ.(Stairs, Elevs, Corr.)						1,723.61 S.F.	
	Zoning deductions							
	Sub-total per Floor	* 3,806 S.F.					* 5,694.61 S.F.	* 9,500.61 S.F.
1st FL	Laundry Room						459 S.F.	
	Recreation Room			742 S.F.				
	Excercise Room			481 S.F.				
	OMH Offices			1,034 S.F.				
	Refuse room						114 S.F.	
	Storage Room						54 S.F.	
	Toilet						54 S.F.	
	Mail Room						136 S.F.	
	Security Office						110 S.F.	
	Apartments		1,670 S.F.		2,547 S.F.			
	Circ.(L.,Strs, Elevs.,Corr.)					2,099.61 S.F.		
	Zoning deductions					- 495 S.F.		
	Sub-total per Floor		1,670 S.F.	2,257 S.F.	2,547 S.F.	2,099.61 S.F.	927 S.F.	9,500.61 S.F.
2nd FL	Apartments		3,799 S.F.		4,067 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor		3,799 S.F.		4,067 S.F.	1,360.61 S.F.	114 S.F.	9,340.61 S.F.
3rd FL	Apartments		3,111 S.F.		4,762 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor		3,111 S.F.		4,762 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
4th FL	Apartments		3,111 S.F.		4,762 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor		3,111 S.F.		4,762 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
5th FL	Apartments		3,111 S.F.		4,762 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor		3,111 S.F.		4,762 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
6th FL	Apartments		3,111 S.F.		4,762 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor		3,111 S.F.		4,762 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
7th FL	Apartments		2,677 S.F.		3,239 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,358.78 S.F.		
	Zoning deductions					- 514 S.F.		
	Sub-total per Floor		2,677 S.F.		3,239 S.F.	1,358.78 S.F.	114 S.F.	7,388.78 S.F.
8th FL	Apartments		1,438 S.F.		1,347 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,513.83 S.F.		
	Zoning deductions					- 554 S.F.		
	Sub-total per Floor		1,438 S.F.		1,347 S.F.	1,513.83 S.F.	114 S.F.	4,412.83 S.F.
Sub-Total per occupancy		3,806 S.F.	22,028 S.F.	2,257 S.F.	30,248 S.F.	11,747.27 S.F.	7,419.61 S.F.	
FLOOR AREA (Inc. Cellar)		3,806 S.F.	24,285 S.F.		49,414.88 S.F.			**77,505.88 S.F.**
TOTAL ZONING FLOOR AREA (Incl. deductions)			24,285 S.F.		42,097.27 S.F.			**66,382.27 S.F.**



WASHINGTON AVENUE ELEVATION- BLDG. HEIGHT DIAGRAM



EAST 164TH STREET ELEVATION- BLDG. HEIGHT DIAGRAM

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

DANOIS
ARCHITECTS, PC
22 Cortlandt St.,16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
4		
5		
6		
7		
8		

Drawing Title

SCHEMATIC DESIGN

ZONING ANALYSIS

Dwg. No.

Z-001.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	01 of 13

Code Reference

ITEM	REQUIREMENT	STATUTE
USE & OCUPANCY CLASSIFICA-TION	Group — Class/Use R-2 — RESIDENTIAL	BC 302
	B — BUSINESS	BC 304
GENERAL HEIGHT & AREA LIMITATIONS	THE HEIGHT AND AREA FOR BUILDINGS OF DIFFERENT CONSTRUCTION TYPES SHALL BE GOVERNED BY THE INTENDED USE AND OCCUPANCY OF THE BUILDING AND SHALL NOT EXCEED THE LIMITS IN TABLE 503 EXCEPT AS MODIFIED HEREAFTER.	BC 503.1
	ALLOWABLE HEIGHT & BLDG. AREAS	TABLE 503
UNLIMITED AREA BUILDINGS	***GROUP B BUILDINGS.*** NOTWITHSTANDING THE PROVISIONS OF SECTIONS 507.2 AND 507.3, THE AREAOF A GROUP B BUILDING OF TYPE IIA, IIIA OR IV CONSTRUCTION SHALL NOT BE LIMITED WHERE THE BUILDING IS PROTECTED THROUGHOUT WITH AN APPROVED AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.3.1.1.	BC 507.10
	GROUP R BUILDINGS. THE AREA OF GROUP R-1 AND R-2 BUILDINGS OF TYPE IIA, IIIA, OR IV CONSTRUCTION SHALL NOT BE LIMITED WHERE THE BUILDING IS PROTECTED THROUGHOUT WITH AN APPROVED AUTOMATIC SPRINKLER SYSTEM IN ACCORDANCE WITH SECTION 903.3.1.1 OR 903.3.1.2, AS APPLICABLE.	BC 507.13
INCIDENTAL USE AREAS AND MIXED OCCUPANCIES	***OCCUPANCY CLASSIFICATION.*** A SPACE THAT ARE LISTED IN TABLE 508.2 AND IS INCIDENTAL TO A MAIN OCCUPANCY SHALL BE CONSIDERED INCIDENTAL USE AREA. AN INCIDENTAL USE AREA SHALL BE CLASSIFIED IN ACCORDANCE WITH THE MAIN OCCUPANCY TO WHICH THE USE IS INCIDENTAL; OR SUCH AREA SHALL BE CLASSIFIED IN ACCORDANCE WITH ITS ACTUAL OCCUPANCY AND SHALL COMPLY WITH SECTION 508.3 FOR MIXED OCCUPANCIES.	BC 508.2.1
	SEPARATION. INCIDENTAL USE AREAS SHALL BE SEPARATED OR PROTECTED, OR BOTH, FROM ALL OTHER OCCUPANCIES IN ACCORDANCE WITH TABLE 508.2.	BC 508.2.2
	ROOM OR AREA — SEPARATION(a)	TABLE 508.2
	MIXED OCCUPANCIES. WHERE A BUILDING CONTAINS MORE THAN ONE OCCUPANCY GROUP, THE BUILDING OR PORTION THEREOF SHALL COMPLY WITH SECTION 508.3.1, 508.3.2, 508.3.3 OR A COMBINATION OF THESE SECTIONS.	BC 508.3
	REQ. SEPARATION OF OCCUPANCIES (HRS)	TABLE 508.3.3
CONST. CLASSIFICA-TION	***GENERAL.*** THE BUILDING ELEMENTS SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THAT SPECIFIED IN TABLE 601 AND EXTERIOR WALLS SHALL HAVE A FIRE-RESISTANCE RATING NOT LESS THAN THAT SPECIFIED IN TABLE 602.	BC 602
	FIRE-RESISTANCE RATING REQ. FOR BLDG. ELEMENTS (HRS	TABLE 601

ALLOWABLE HEIGHT & BLDG. AREAS

GROUP	Hgt(feet) Hgt (S)	TYPE I A	TYPE I B
		UL	160e
B	S	UL	UL
	A	UL	UL
R-2	S	UL	UL
	A	UL	UL

e: *Except for Occupancy Groups F-1, H-1 through H-5, I-2, I-3, S-1 and U, buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 shall be unlimited in height.*

ROOM OR AREA — SEPARATION(a)

ROOM OR AREA	SEPARATION(a)
Furnace room where any piece of equipment is 400,000 Btu per hour input or less, except in R-3 occupancy	1 hour or provide automatic sprinkler system
Rooms with any boiler 15 psi or less and 10 HP 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
Storage rooms over 100 SF, except in R-3 occupancy	1 hour or provide automatic fire-extinguishing system
Laundry rooms over 100 SF, except within dwelling units	1 hour or provide automatic fire-extinguishing system

REQ. SEPARATION OF OCCUPANCIES (HRS)

USE	Bb	R-2
Bb	-	2
R-2	-	-

FIRE-RESISTANCE RATING REQ. FOR BLDG. ELEMENTS (HRS

BLDG. ELEMENT	TYPE I B
Structural Frame Including columns, girders, trusses	2b
Bearing Walls Exterior	2
Interior	2b
Nonbearing Walls and Partitions Exterior	See Table 602
Nonbearing Walls and Partitions Interior	0
Floor construction Including supporting beams & joists	2
Roof Construction Including supporting beams & joists	1c

ITEM	REQUIREMENT	STATUTE
CONST. CLASSIFICA-TION (Continued)	FIRE-RESISTANCE RATING REQ. FOR EXT. WALLS BASED ON FIRE SEPARATION DISTANCE	TABLE 602
EXTERIOR WALLS	***PROJECTIONS.*** CORNICES, EAVE OVERHANGS, EXT. BALCONIES AND SIMILAR ARCHITECTURAL APPENDAGES,...., WHICH EXTEND BEYOND THE FLOOR AREA SHALL CONFORM TO THE REQ. OF THIS SECTION AND SECTION 1406, PROVIDED, IF REMOVED OR DESTROYED, WILL NOT REDCE THE REQ. FIRE-RESISTANCE RATINF OF THE ENCLOSURE.	BC 704.2
	FIRE-RESISTANCE RATINGS. EXT. WALLS SHALL BE FIRE-RESISTANCE RATED IN ACCORDANCE WITH TABLES 601, 602 AND APPENDIX D WHERE APPLICABLE.	BC 704.5
	ALLOWABLE AREA OF OPENINGS. THE MAX. AREA OF UNPROTECTED OR PROTECTED OPENINGS PERMITTED IN AN EXTERIOR WALL IN ANY STORY SHALL NOT EXCEED THE VALUES SET FORTH IN TABLE 704.8.	BC 704.8
	MAX. AREA OF EXT. WALL OPENINGS	TABLE 704.8
FIRE WALLS	***FIRE-RESISTANCE RATINGS.*** FIRE WALLS SHALL HAVE A FIRE-RESISTANCE RATING OF NOT LESS THAN THAT REQ. BY TABLE 705.4.	BC 705.4
	FIRE-RESISTANCE RATINGS	TABLE 705.4
FIRE BARRIERS	***FIRE-RESISTANCE RATINGS.*** FIRE WALLS SHALL HAVE A FIRE-RESISTANCE RATING OF NOT LESS THAN THAT REQ. BY TABLE 705.4.	BC 705.4
	FIRE-RESISTANCE RATINGS	TABLE 705.4
SHAFT ENCLOSURES	***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 HR WHERE PENETRATING FEWER THAN THREE STORIES. THE NUMBER OF STORIES CONNECTED BY THE SHAFT ENCLOSURE SHALL INCLUDE ANY BASEMENTS OR CELLARS, BUT NOT ANY MEZZANINES. SHAFT ENCLOSURES SHALL BE CONSTRUCTED AS FIRE BARRIERS IN ACCORDANCE WITH SECTION 706. SHAFT ENCLOSURES SHALL HAVE A FIRE- RESISTANCE RATING NOT LESS THAN THE FLOOR ASSEMBLY PENETRATED, BUT NEED NOT EXCEED 2 HRS.	707.4
	EXTERIOR WALLS. WHERE EXT. WALLS SERVE AS PART OF A REQ. ENCLOSURE, SUCH WALLS SHALL COMPLY WITH THE REQ. OF SECTION 704 FOR EXT. WALLS AND THE FIRE-RESISTANCE-RATED ENCLOSURE REQUIREMENTS SHALL NOT APPLY.	707.6
	DUCTS AND AIR TRANSFER OPENINGS. PENETRATIONS OF A SHAFT ENCLOSURE BY DUCTS AND AIR TRANSFER OPENINGS SHALL COMPLY WITH SECTIONS 712 AND 716.	707.10
	REFUSE & LAUNDRY CHUTES. SHALL MEET REQ. OF SECTIONS 707.13.1 THROUGH 707.13.6.	707.13
	ELEVATOR & DUMBWAITER SHAFTS. eNCLOSURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION 707.4 AND CHAPTER 30.	707.14
FIRE PARTITIONS	***FIRE-RESISTANCE RATING.*** THE FIRE-RESISTANCE RATING OF THE WALLS SHALL BE 1 HOUR. EXCEPTION: INTERIOR CORRIDOR WALLS AS PERMITTED BY TABLE 1016.1	708.3
SMOKE BARRIERS	***FIRE-RESISTANCE RATING.*** A 1-HOUR FIRE-RESISTANCE RATING IS REQUIRED FOR SMOKE BARRIERS.	709.3
SMOKE PARTITIONS	***FIRE-RESISTANCE RATING.*** UNLESS REQUIRED ELSEWHERE IN THE CODE, SMOKE PARTITIONS ARE NOT REQUIRED TO HAVE A FIRE-RESISTANCE RATING.	710.3
HORIZONTAL ASSEMBLIES	***FIRE-RESISTANCE RATING.*** FLOOR ASSEMBLIES SEPARATING DWELLING UNITS IN GROUP I-1 OR R OCCUPANCIES SHALL BE A MIN. OF 1-HOUR FIRE-RESISTANCE-RATED CONSTRUCTION.	711.3
PENETRATIONS	***FIRE-RESISTANCE RATED WALLS.*** PENETRATIONS INTO OR THROUGH FIRE WALLS, FIRE BARRIERS, SMOKE BARRIER WALLS, AND FIRE PARTITIONS SHALL COMPLY WITH THIS SECTION.	712.3
FIRE SISTANCE RATING OF STRUCTURAL MEMBERS	***PROTECTION OF STRUCTURAL MEMBERS.*** PROTECTION OF COLUMNS, GIRDERS, TRUSSES, BEAMS, LINTELS OR OTHER STRUCTURAL MEMBERS THAT ARE REQUIRED TO HAVE A FIRE-RESISTANCE RATING SHALL COMPLY WITH THIS SECTION.	714
OPENING PROTECTIVES	***FIRE DOOR & SHUTTER ASSEMBLIES***. APPROVED FIRE DOOR AND FIRE SHUTTER ASSEMBLIES SHALL BE CONSTRUCTED OF ANY MATERIAL OR ASSEMBLY OF COMPONENT MATERIALS THAT CONFORMS TO THE TEST REQUIREMENTS OF SECTION 715.3.1, 715.3.2 OR 715.3.3 & THE FIRE PROTECTION RATING INDICATED IN TABLE 715.3. FIRE DOOR ASSEMBLIES & SHUTTERS SHALL BE INSTALLED IN ACCORDANCE WITH THE PROVISIONS OF THIS SECTION & NFPA 80.	715.3

FIRE-RESISTANCE RATING REQ. FOR EXT. WALLS BASED ON FIRE SEPARATION DISTANCE

FIRE SEPARATION DISTANCE (FEET)	TYPE OF CONSTRUCTION	OCCUP. GROUP A, B, E, F-2, I, Rb, S-2, U
< 5c	ALL	1
≥ 5 TO <10	IA	1
	OTHERS	1
≥ 10 TO <30	IA, IB	1
	IIB, VB	0
	OTHERS	1
≥ 30	ALL	0

MAX. AREA OF EXT. WALL OPENINGS

CLASSIF. OF OPENING	0 to 3 & <5	>3 &<10	>5 &<15	>10 &<20	>15 &<25	>20 &<30	>25 &>30	>30
Unprotected	N.P.	N.P.(b,g,k)	10%	15%	25%	45%	70%	N.L.
Protected	N.P.	15%(k)	15%	25%(k)	45%(k)	75%(k)	N.L.(k)	N.L.(k)

(k) In Groups R-2 and R-3 occupancies with an exterior separation distance greater than 3 feet, openings shall be in accordance with percentages indicated as "Protected Classification of Opening" in Table 704.8. However, such openings shall not be required to be protected.

FIRE-RESISTANCE RATINGS

GROUP	FIRE-RESISTANCE RATING (HRS)
A,B,E,H-4,I,R-1,R-2,U	3a
F-2, S-2, R-3, R-4	2

ITEM	REQUIREMENT	STATUTE
OPENING PROTECTIVES (Continued)	FIRE DOOR & SHUTTER FIRE PROTECTION RATINGS	TABLE 715.3
	FIRE WINDOW ASSEMBLY FIRE PROTECTION RATINGS	TABLE 715.4
FIRE DAMPERS	FIRE DAMPERS SHALL HAVE THE MINIMUM FIRE PROTECTION RATING SPECIFIED IN TABLE 716.3.1 FOR THE TYPE OF PENETRATION.	716.3.1
	TYPE OF PENETRATION — MIN. DAMPER RATING (HR)	TABLE 716.3.1
THERMAL- AND SOUND-INSULATING MATERIALS	***CONCEALED INSTALLATION.*** INSULATING MATERIALS, WHERE CONCEALED AS INSTALLED IN BUILDINGS OF ANY TYPE OF CONSTR., SHALL COMPLY WITH SECTIONS 719.1, 719.1.1 & 719.1.2. CONCEALED INSULATION SHALL BE SEPARATED FROM THE BUILDING INTERIOR BY A THERMAL BARRIER CONSISTING OF AT LEAST 1/2" THICK GYP. WALLBOARD OR APPROVED EQUIVALENT.	719.2
INTERIOR WALL AND CEILING FINISH REQ.	BY OCCUPANCY(k)- SPRINKLERED	TABLE 803.5
FIRE PROTECTION SYSTEMS	***GROUP R.*** AN AUTOMATIC SPRINKLER SYSTEM SHALL BE INSTALLED IN GROUP R FIRE AREAS AND THROUGHOUT BUILDINGS WITH A MAIN USE OR DOMINANT OCCUPANCY OF GROUP R.	BC 903.2.7
MEANS OF EGRESS	***HEADROOM.*** PROTRUDING OBJECTS ARE PERMITTED TO EXTEND BELOW THE MIN. CEILING HEIGHT REQUIRED BY SECTION 1003.2 PROVIDED A MIN. HEADROOM OF 84" SHALL BE PROVIDED FOR ANY WALKING SURFACE, INCLUDING WALKS, CORRIDORS, AISLES AND PASSAGEWAYS. NOT MORE THAN 50% OF THE CEILING AREA OF A MEANS OF EGRESS SHALL BE REDUCED IN HEIGHT BY PROTRUDING OBJECTS.	1003.3.1
	CEILING HEIGHT. THE MEANS OF EGRESS SHALL HAVE A CEILING HEIGHT OF NOT LESS THAN 7'-6".	1003.3.2
OCCUPANT LOAD	***OUTDOOR AREAS***. YARDS, PATIOS COURTS AND SIMILAR OUTDOOR AREAS ACCESSIBLE TO AND USABLE BY THE BUILDING OCCUPANTS SHALL BE PROVIDED WITH MEANS OF EGRESS AS REQUIRED BY THIS CHAPTER. THE OCCUPANT LOAD OF SUCH OUTDOOR AREAS SHALL BE DETERMINED BY THE DESIGN PROFESSIONAL SUBJECT TO THE APPROVAL OF THE COMMISSIONER. WHERE OUTDOOR AREAS ARE TO BE USED BY PERSONS IN ADDITION TO THE OCCUPANTS OF THE BUILDING, AND THE PATH OF EGRESS TRAVEL FROM THE OUTDOOR AREAS PASSES THROUGH THE BUILDING, MEANS OF EGRESS REQUIREMENTS FOR THE BUILDING SHALL BE BASED ON THE SUM OF THE OCCUPANT LOADS OF THE BUILDINGS PLUS OUTDOOR AREAS.	1004.8
EGRESS	EGRESS WIDTH	TABLE 1005.1
ACC. MEANS OF EGRESS	ACCESSIBLE MEANS OF EGRESS SHALL COMPLY WITH THIS SECTION.	1007.1
MEANS OF EGRESS DOORS	MEANS OF EGRESS DOORS SHALL MEET THE REQUIREMENTS OF THIS SECTION. DOORS SERVING A MEANS OF EGRESS SYSTEM SHALL MEET THE REQUIREMENTS OF THIS SECTION AND SECTION 1017.2.	1008.1
	DOOR WIDTH- 32 inches DOOR HEIGHT- 80 inches	1008.1.1.1 1008.1.1.3
STAIRWAYS	THE WIDTH OF STAIRWAYS SHALL BE DETERMINED AS SPECIFIED IN SECTION 1005.1, BUT SUCH WIDTH SHALL NOT <44". SEE SECTION 1007.3 FOR ACCESSIBLE MEANS OF EGRESS STAIRWAYS.	1009.1
	HEADROOM STAIRWAYS SHALL HAVE A MIN. HEADROOM CLEARANCE OF 84" MEASURED VERTICALLY FROM A LINE CONNECTING THE EDGE OF THE NOSINGS. (1) IN R-2 & R-3 STAIRWAYS SHALL HAVE A MIN. HEADROOM CLEARANCE OF 80".	1009.2
	STAIR TREADS AND RISERS STAIR RISER HEIGHTS SHALL BE MAX. 7" & AND MIN. 4". STAIR TREAD DEPTHS SHALL BE MIN. 11". (5) IN R-2: THE MAX. RISER HEIGHT SHALL BE 7.75" & THE MIN. TREAD DEPTH SHALL BE 9.5" PLUS NOSING. TREADS MAY BE UNDERCUT A DISTANCE EQUAL TO THE NOSING. A NOSING <0.75" BUT NOT >1.25" SHALL BE PROVIDED ON STAIRWAYS WITH SOLID RISERS WHERE THE TREAD DEPTH IS LESS THAN 11".	1009.3
	HANDRAILS STAIRWAYS SHALL HAVE HANDRAILS ON EACH SIDE. HANDRAILS SHALL BE ADEQUATE IN STRENGTH & ATTACHMENT IN ACCORDANCE WITH SECTION 1607.7. HANDRAILS FOR RAMPS, WHERE REQ. BY SECTION 1010.8, SHALL COMPLY WITH THIS SECTION.	1009.11

FIRE DOOR & SHUTTER FIRE PROTECTION RATINGS

TYPE OF ASSEMBLY	REQ. ASSEMBLY RATING (HRS)	MIN. REQ. FIRE DOOR & FIRE SHUTTER ASSEMBLY RATING (HRS)
Fire Walls & Fire Barriers	3	3 a
w/ Fire-resistance rating >1hr	2	1 1/2
Fire Walls w/ Fire-resistance rating =1hr		
Shaft, exit encl. & exit passageway walls	1	1
Other fire barriers	1	3/4
Fire Partitions		
Corridor walls	1	1
Other partitions	1	1
Exterior Walls	3	1 1/2
	2	1 1/2

FIRE WINDOW ASSEMBLY FIRE PROTECTION RATINGS

Interior walls		
Fire walls	All	NP a
Fire barriers & fire partitions	>1	NP a
	1	3/4
Smoke barriers	1	3/4
Exterior walls	>1	1 1/2
	1	1 1/2
Party walls	All	NP a

BY OCCUPANCY(k)- SPRINKLERED

Group	Vertical exits & exit passageways (a,b)	Exit access corridors & other exitways	Rooms & enclosed spaces(c)
B	B	B	B
R-2	B	B	C

EGRESS WIDTH

OCCUPANCY	Stairways (inches per occupant)	Other components (inches per occupant)
R-2, B	0.3	0.2

TYPE OF PENETRATION — MIN. DAMPER RATING (HR)

TYPE OF PENETRATION	MIN. DAMPER RATING (HR)
< 3-hr fire-resitance-rated assemblies	1.5

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

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555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

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ARCHITECTS, PC
22 Cortlandt St.,16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

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Drawing Title

SCHEMATIC DESIGN

CODE COMPLIANCE ANALYSIS

Dwg. No.

G-001.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
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Code Reference (Continued)

ITEM	REQUIREMENT	STATUTE
STAIRWAYS	THE WIDTH OF STAIRWAYS SHALL BE DETERMINED AS SPECIFIED IN SECTION 1005.1, BUT SUCH WIDTH SHALL NOT <44". SEE SECTION 1007.3 FOR ACCESSIBLE MEANS OF EGRESS STAIRWAYS. HEADROOM STAIRWAYS SHALL HAVE A MIN. HEADROOM CLEARANCE OF 84" MEASURED VERTICALLY FROM A LINE CONNECTING THE EDGE OF THE NOSINGS. (1) IN R-2 & R-3 STAIRWAYS SHALL HAVE A MIN. HEADROOM CLEARANCE OF 80". STAIR TREADS AND RISERS STAIR RISER HEIGHTS SHALL BE MAX. 7" & AND MIN. 4". STAIR TREAD DEPTHS SHALL BE MIN. 11". (5) IN R-2: THE MAX. RISER HEIGHT SHALL BE 7.75" & THE MIN. TREAD DEPTH SHALL BE 9.5" PLUS NOSING. TREADS MAY BE UNDERCUT A DISTANCE EQUAL TO THE NOSING. A NOSING <0.75" BUT NOT >1.25" SHALL BE PROVIDED ON STAIRWAYS WITH SOLID RISERS WHERE THE TREAD DEPTH IS LESS THAN 11". HANDRAILS STAIRWAYS SHALL HAVE HANDRAILS ON EACH SIDE. HANDRAILS SHALL BE ADEQUATE IN STRENGTH & ATTACHMENT IN ACCORDANCE WITH SECTION 1607.7. HANDRAILS FOR RAMPS, WHERE REQ. BY SECTION 1010.8, SHALL COMPLY WITH THIS SECTION.	1009.1 1009.2 1009.3 1009.11
GUARDS	GUARDS SHALL BE LOCATED ALONG OPEN-SIDED WALKING SURFACES, MEZZANINES, INDUSTRIAL EQUIPMENT PLATFORMS, STAIRWAYS, RAMPS AND LANDINGS WHICH ARE LOCATED MORE THAN 30 INCHES ABOVE THE FLOOR OR GRADE BELOW. GUARDS SHALL BE ADEQUATE IN STRENGTH AND ATTACHMENT IN ACCORDANCE WITH SECTION 1607.7.	1012.1
EXIT AND EXIT ACCESS DOORWAYS	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 2. THE COMMON PATH OF EGRESS TRAVEL EXCEEDS THE LIMITATIONS OF SECTION 1013.3 3. WHERE REQUIRED BY SECTIONS 1014.3, 1014.4 AND 1014.5. SPACES WITH ONE MEANS OF EGRESS OCCUPANCY: A,B,E,M,U — MAX. OCCUPANT LOAD: 74; R — 20	1014.1 TABLE 1014.1
EXIT ACCESS TRAVEL DISTANCE	EXIT ACCESS TRAVEL DISTANCE OCCUPANCY: E,F-1, I-1, M, R, S-1 — WITH SPRINKLER SYSTEM (feet): 200b; B — 300c *b: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2 are permitted.* *c: Buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.*	TABLE 1015.1
NUMBER OF EXITS AND CONTINUITY	MINIMUM UMBER OF EXITS PER OCCUPANT LOAD 1-500 — 2; 500-1,000 — 3; More than 1,000 — 4	TABLE 1018.1
VERTICAL EXIT ENCLOSURES	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 HRS WHERE CONNECTING FOUR STORIES OR MORE. 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. (10) IN GROUP R-1 AND R-2 OCCUPANCIES, WHERE EXIT ENCLOSURES ARE REQUIRED TO HAVE A FIRE-RESISTANCE RATING OF 2 HRS, SUCH ENCLOSURES SHALL BE CONSTRUCTED OF MASONRY OR MASONRY EQUIVALENT, IN ACCORDANCE WITH DEPARTMENT RULES.	1019.1
EXIT PASSAGEWAYS	EXIT PASSAGEWAY ENCLOSURES SHALL HAVE WALLS, FLOORS AND CEILINGS OF NOT LESS THAN 1-HOUR FIRE-RESISTANCE RATING, AND NOT LESS THAN THAT REQUIRED FOR ANY CONNECTING EXIT ENCLOSURE. EXIT PASSAGEWAYS SHALL BE CONSTRUCTED AS FIRE BARRIERS IN ACCORDANCE WITH SECTION 706.	1020.3
HORIZONTAL EXIT	A HORIZONTAL EXIT SHALL NOT SERVE AS THE ONLY EXIT FROM A PORTION OF A BUILDING, AND WHERE TWO OR MORE EXITS ARE REQUIRED, NOT MORE THAN ONE-HALF OF THE TOTAL NUMBER OF EXITS OR TOTAL EXIT WIDTH SHALL BE HORIZONTAL EXITS. THE SEPARATION BETWEEN BUILDINGS OR AREAS OF REFUGE CONNECTED BY A HORIZONTAL EXIT SHALL BE PROVIDED BY A FIRE WALL COMPLYING WITH SECTION 705 OR A FIRE BARRIER COMPLYING WITH SECTION 706 AND HAVING A FIRE-RESISTANCE RATING OF NOT LESS THAN 2 HOURS.	1021.1 1021.2
EXTERIOR EXIT RAMPS & STAIRWAYS	EXTERIOR EXIT RAMPS AND STAIRWAYS SERVING AS AN ELEMENT OF A REQUIRED MEANS OF EGRESS SHALL COMPLY WITH THIS SECTION.	1022.1
EXIT DISCHARGE	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.	1023.1
SIGNAGE	SIGNAGE SHALL BE PROVIDED IN ACCORDANCE WITH THIS SECTION. EXITS SIGNS SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 1011.	1026.1 1026.2
ACCESIBILITY	BUILDINGS AND FACILITIES SHALL BE DESIGNED AND CONSTRUCTED TO BE ACCESSIBLE IN ACCORDANCE WITH THIS CODE AND ICC A117.1	1101.2

Code Analysis

Building Code Requirements

APPLICABLE CODE: 2008 THE CITY OF NEW YORK BUILDING CODE JULY, 2008

BUILDING USE: MIXED USE BUILDING

OCCUPANCY GROUP: RESIDENTIAL R-2 (BC 310.1.2)
BUSINESS B (BC 304.1)

CONSTRUCTION CLASS: TYPE IB (BC 602.3 AND TABLE 601)

ELEMENT:	HOURS REQ'D:	PROVIDED/HOURS:
EXTERIOR BEARING WALLS	2 HOUR	2 HOUR
STRUCTURAL FRAME INCLUDING COLUMNS, GIRDERS AND TRUSSES	2 HOUR	2 HOUR
INTERIOR BEARING WALLS	2 HOUR	2 HOUR
ENCLOSURE OF VERTICAL EXITS (1019.1) AND SHAFTS (707.4)	2 HOURS	2 HOURS (BSA 1020 65 SM)
FLOOR CONSTRUCTION	2 HOUR	2 HOURS (BS&A CAL # 1164-64-SM)
ROOF CONSTRUCTION INCLUDING SUPPORTING BEAMS AND JOISTS	1 HOUR	2 HOURS (BS&A CAL # 1164-64-SM)

EXIT AND ACCESS REQUIREMENTS: SPRINKLERED BUILDING- I B CONSTRUCTION CLASS:

MAX. TRAVEL DISTANCE (TABLE 1015.1): R-2: 200'-0" B: 300'-0"

TRAVEL DISTANCE PROPOSED: COMPLIANT AS PER TABLE 1015.1

EGRESS WIDTH REQUIRED (TABLE 1005.1): STAIRWAY - 0.3" / OCCUPANT
OTHER - 0.2" / OCCUPANT

EGRESS WIDTH PROVIDED: SEE OCCUPANCY LOAD / EXIT ANALYSIS

MIN. NUMBER OF EXITS (TABLE 1018.1): REQUIRED: 2 PROPOSED: 2

FIRE DISTRICT: THE PROPERTY IS LOCATED WITHIN A FIRE DISTRICT (D101.2)

AREA AND HEIGHT LIMITATIONS: SPRINKLERED BUILDING
I B CONSTRUCTION CLASS:
B OCCUPANCY GROUP (SEE TABLE 503)
R-2 OCCUPANCY GROUP (SEE TABLE 503)

MAXIMUM AREA/ FLOOR: NO LIMIT (TABLE-503)

GROSS FLOOR AREA PROPOSED: SEE ZONING ANALYSIS

MAXIMUM BLDG HEIGHT: NO LIMIT (TABLE-503)

AREA/ FLOOR PROPOSED: NO LIMIT (TABLE-503)

SOUND TRANSMISSION RATINGS (BC1207):

ITEM	REQUIRED	PROVIDED
BETWEEN APT. & APT.	STC 50	STC 55
BETWEEN APT. & PUBLIC HALL (WALLS)	STC 50	STC 55
DWELLING UNIT ENTRANCE DOOR	STC 35	STC 37
ELEVATOR SHAFTS, TRASH CHUTE SHAFTS, ETC...	STC 50	STC 55

GENERAL: THIS BUILDING CONTAINS A FIRE STANDPIPE SYSTEM, A SPRINKLER SYSTEM, AN SMOKE DETECTORS WITH CARBON MONOXIDE DETECTION IN ALL APTS. AND WHERE REQUIRED BY NYCBC THERE IS AN ANNUNCIATOR PANEL IN THE LOBBY CONNECTED TO THE FIRE ALARM AND SPRINKLER SYSTEMS.

Occupancy Load

OCCUPANCY GROUP (BC 302)	DESIGNATION	OCC. LOAD (TABLE 1004.1.2)	MAX. OCC. LOAD W/ 1 DOOR (TABLE 1014.1)
RESIDENTIAL (APTS.)	R-2	200 SF/PER. (gross within D.U.)	20
ACCESSORY STORAGE AREAS, MECH. & ELECT. RMS	S-1, S-2	300 SF/PER. (gross)	30
LAUNDRY ROOM	S-2	50 SF/PER. (net)	30
OFFICES - COMM. FACILITY	B	100 SF/PER. (gross)	74
RECREATION ROOM	A-3	15 SF/PER.(net)	74
OUTDOOR TERRACE	A-3	AS INDICATED ON PLAN	74
EXERCISE ROOM	A-3	50 SF/ PER. (gross)	74

Fire Divisions / Separations

OCCUPANCY GROUP (BC 302)	DESIGNATION	INCIDENTAL USE AREA SEPARATION (HR) TABLE BC 508.2	RATING PROVIDED
RESIDENTIAL (APT,REC & LOBBY)	R -2	-	1 HR
COMPACTOR ROOM	S -1	1	3 HR
MECHANICAL & ELECTRICAL ROOMS	S -2	1	2 HR
BUSINESS	B	1	2 HR
STORAGE ROOM	S-1	1	2 HR
BOILER ROOM	S -2	1	2 HR
LAUNDRY ROOM	S -2	1	2 HR
TRASH CHUTE ROOM	S -2	1	2 HR
PARKING GARAGE	S -2	1	2 HR

OCCUPANCY LOAD /EXIT ANALYSIS

(AS PER TABLE 1004.1.2)

			EGRESS WIDTH PER OCCUPANT STAIRS : 0.3" PER OCCUPANT OTHER COMP.: 0.2" PER OCCUPANT (TABLE 1005.1)			EXIT CAPACITY PROVIDED		
CELLAR		# OF PERSONS*	DOORS	STAIRS	CORRIDORS	DOORS	STAIRS	CORRIDORS
BIKE STORAGE ROOM (S-2)	505 S.F.	2	0.4"	0.6"	0.4"	72"	88"	64"
TENANT STRG. ROOM (S-1)	771 S.F.	3	0.6"	0.9"	0.6"	72"	88"	64"
COMPACTOR ROOM (S-1)	754 S.F.	3	0.6"	0.9"	0.6"	36"	88"	64"
ELECT./TEL./TELECOM. RM. (S-2)	458 S.F.	2	0.4"	0.6"	0.4"	36"	88"	64"
F.P./WATER M./PUMP RM. (S-2)	472 S.F.	2	0.4"	0.6"	0.4"	36"	88"	64"
GAS METER ROOM (S-2)	425 S.F.	1	0.2"	0.3"	0.2"	36"	88"	64"
SUPER'S W.S./ STRG. (S-1)	582 S.F.	2	0.4"	0.6"	0.4"	72"	88"	64"
BOILER ROOM (S-1)	1,115 S.F.	4	0.8"	1.2"	0.8"	108"	88"	64"
TENANT STRG. ROOM (S-1)	1,252 S.F.	4	0.8"	1.2"	0.8"	108"	88"	64"
TENANT STRG. ROOM (S-1)	1,443 S.F.	5	0.8"	1.2"	0.8"	108"	88"	64"
SUB-TOTAL		28 PERSONS	4.6"	6.9"	4.6"			
FIRST FLOOR		# OF PERSONS*	DOORS	STAIRS	CORRIDORS	DOORS	STAIRS	CORRIDORS
STORAGE ROOM (S-1)	54 S.F.	1	0.2"	-	0.2"	36"	-	60"
REFUSE ROOM (S-1)	114 S.F.	1	0.2"	-	0.2"	36"	-	60"
LAUNDRY ROOM (S-2)	383 S.F.	8	1.6"	-	1.6"	36"	-	60"
RECREATION ROOM (A-3)	657 S.F.	44	8.8"	-	8.8"	72"	-	60"
EXERCISE ROOM (A-3)	481 S.F.	10	2"	-	2"	36"	-	60"
OMH OF.- COMM. FAC. (B)	1,034 S.F.	45	9"	-	9"	72"	-	60"
OUTDOOR TERRACE (A-3)	2,841 S.F.	74	14.8"	-	14.8"	36"	-	60"
RESIDENTIAL (Apts. - R-2)	See Apts. Net Areas	19	3.8"	-	3.8"	108"	-	60"
SUB-TOTAL		202 PERSONS	40.8"		40.8"			
SECOND THRU SIXTH FLOOR		# OF PERSONS*	DOORS	STAIRS	CORRIDORS	DOORS	STAIRS	CORRIDORS
TOTAL - 2nd Fl. (Apts. - R-2)	See Apts. Net Areas	37	7.4"	11.1"	7.4"	72"	88"	60"
TOTAL - 3rd Fl. (Apts. - R-2)	See Apts. Net Areas	36	7.2"	10.8"	7.2"	72"	88"	60"
TOTAL - 4th Fl. (Apts. - R-2)	See Apts. Net Areas	36	7.2"	10.8"	7.2"	72"	88"	60"
TOTAL - 5th Fl. (Apts. - R-2)	See Apts. Net Areas	36	7.2"	10.8"	7.2"	72"	88"	60"
TOTAL - 6th Fl. (Apts. - R-2)	See Apts. Net Areas	36	7.2"	10.8"	7.2"	72"	88"	60"
REFUSE ROOM (S-1) (1 per floor)	102 S.F.	5	1"	0.3"	1"	36"	88"	60"
SUB-TOTAL		186 PERSONS	37.2"	55.8"	37.2"			
SEVENTH FLOOR		# OF PERSONS*	DOORS	STAIRS	CORRIDORS	DOORS	STAIRS	CORRIDORS
RESIDENTIAL (Apts. - R-2)	See Apts. Net Areas	27	5.4"	8.1"	5.4"	72"	88"	60"
OUTDOOR TERRACE (A-3)	1,788 S.F.	74	14.8"	22.2"	14.8"	36"	88"	60"
REFUSE ROOM (S-1)	102 S.F.	1	0.2"	0.3"	0.2"	36"	88"	60"
SUB-TOTAL		102 PERSONS	20.4"	30.6"	20.4"			
EIGHTH FLOOR		# OF PERSONS*	DOORS	STAIRS	CORRIDORS	DOORS	STAIRS	CORRIDORS
RESIDENTIAL (Apts. - R-2)	See Apts. Net Areas	13	2.6"	3.9"	2.6"	72"	88"	60"
REFUSE ROOM (S-1)	102 S.F.	1	0.2"	0.3"	0.2"	36"	88"	60"
SUB-TOTAL		14 PERSONS	2.8"	4.2"	2.8"			
BLDG. TOTAL		532 PERSONS						

*THE NUMBER OF PERSONS IS CALCULATED BY DIVIDING THE OCCUPANCY AREA BY THE OCCUPANCY LOAD.

WASHINGTON AVENUE APARTMENTS

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Drawing Title

SCHEMATIC DESIGN

CODE COMPLIANCE ANALYSIS

Dwg. No.

G-002.00

Job No:	08.02
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Dwg. by:	M.A-L.
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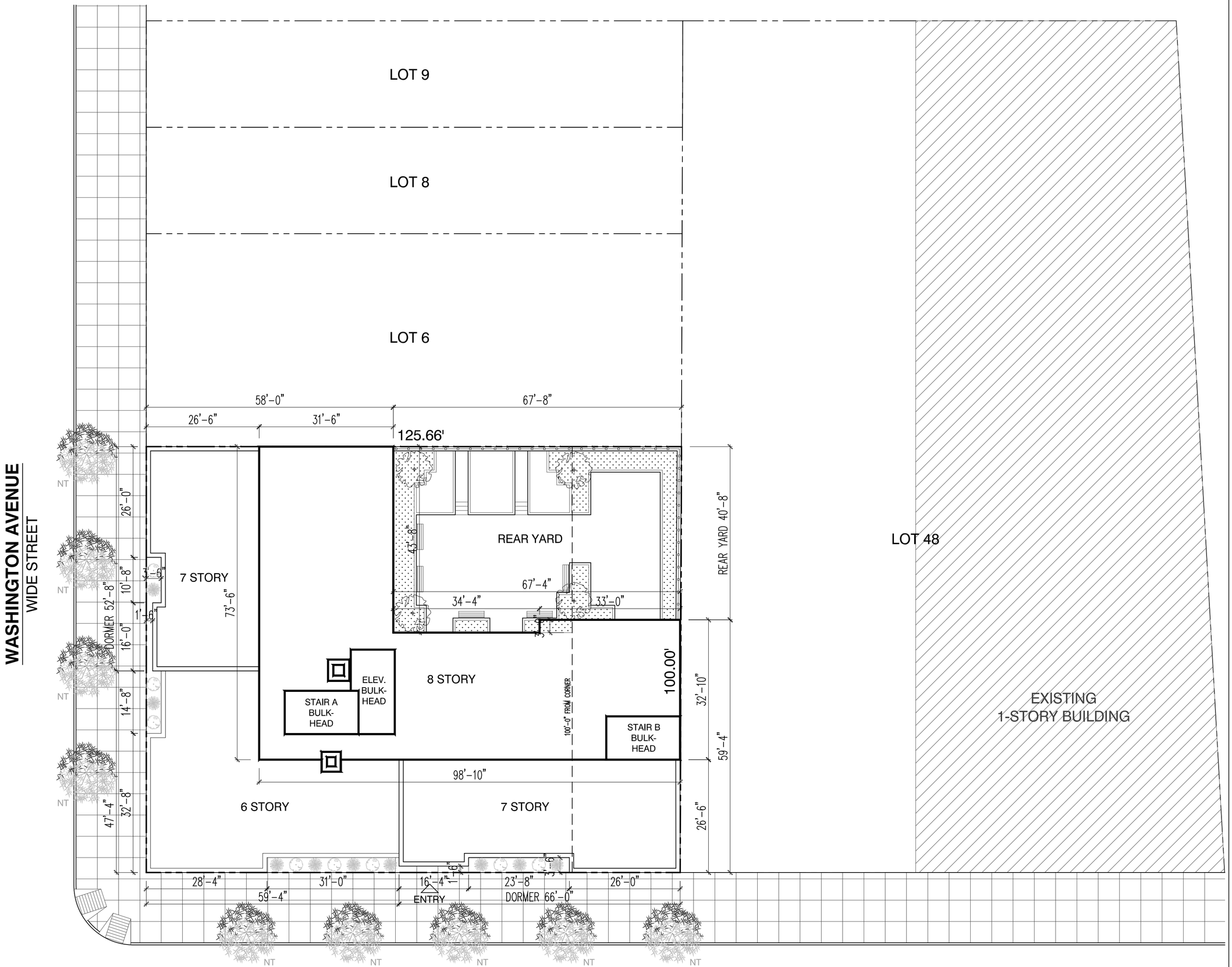
DANOIS
Architects P.C
22 Cortlandt Street, 16th Floor
New York, New York 10007

Washington Avenue Apartments

DHCR APPLICATION- SUMMARY OF FLOOR AREAS

FLOOR	SPACE	MECHANICAL RMS.	OMH AREA	SHARED TENANT COMM. SPACE	RESIDENTIAL			
					APARTMENTS	CIRCULATION	OTHER	
Cellar	F.P./Water M./Pump Rm.	472 S.F.						
	El.M./Tel./Telecom Rm.	458 S.F.						
	Boiler Room	1,115 S.F.						
	Compactor Room	754 S.F.						
	Gas Meter Room	425 S.F.						
	Super's Workshop	582 S.F.						
	Tenant's Storage Room						771 S.F.	
	Tenant's Storage Room						1,443 S.F.	
	Tenant's Storage Room						1,252 S.F.	
	Tenant's Bike Room						505 S.F.	
	Circ.(Stairs, Elevs, Corr.)						1,723.61 S.F.	
	Zoning deductions							
	Sub-total per Floor	* 3,806 S.F.					* 5,694.61 S.F.	* 9,500.61 S.F.
1st FL	Laundry Room			459 S.F.				
	Recreation Room			742 S.F.				
	Excercise Room			481 S.F.				
	OMH Offices		1,034 S.F.					
	Refuse room						114 S.F.	
	Storage Room						54 S.F.	
	Toilet			54 S.F.				
	Mail Room			136 S.F.				
	Security Office			110 S.F.				
	Lobby & Vestibule			363 S.F.				
	Apartments				4,217 S.F.			
	Circ.(Strs, Elevs.,Corr.)					1,736.61 S.F.		
	Zoning deductions					- 495 S.F.		
	Sub-total per Floor		1,034 S.F.	2,345 S.F.	4,217 S.F.	1,736.61 S.F.	168 S.F.	9,500.61 S.F.
2nd FL	Apartments				7,866 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor				7,866 S.F.	1,360.61 S.F.	114 S.F.	9,340.61 S.F.
3rd FL	Apartments				7,873 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor				7,873 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
4th FL	Apartments				7,873 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor				7,873 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
5th FL	Apartments				7,873 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor				7,873 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
6th FL	Apartments				7,873 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,353.61 S.F.		
	Zoning deductions					- 12 S.F.		
	Sub-total per Floor				7,873 S.F.	1,353.61 S.F.	114 S.F.	9,340.61 S.F.
7th FL	Apartments				5,916 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,358.78 S.F.		
	Zoning deductions					- 514 S.F.		
	Sub-total per Floor				5,916 S.F.	1,358.78 S.F.	114 S.F.	7,388.78 S.F.
8th FL	Apartments				2,785 S.F.			
	Refuse room						114 S.F.	
	Circ. (Stairs,Elev.,Corr.)					1,513.83 S.F.		
	Zoning deductions					- 554 S.F.		
	Sub-total per Floor				2,785 S.F.	1,513.83 S.F.	114 S.F.	4,412.83 S.F.
Sub-Total per occupancy		3,806 S.F.	1,034 S.F.	2,345 S.F.	52,276 S.F.	11,384.27 S.F.	6,660.61 S.F.	
FLOOR AREA (Inc. Cellar)		3,806 S.F.	1,034 S.F.	2,345 S.F.	70,320.88 S.F.			**77,505.88 S.F.**



SITE PLAN

SCALE 1/32"= 1'

BLOCK: 2369
LOTS: 1, 2, 3, 4, 5, 53, 54, 90 and 153.

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Drawing Title

SCHEMATIC DESIGN

SITE PLAN

Dwg. No.

A-001.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/16"=1'
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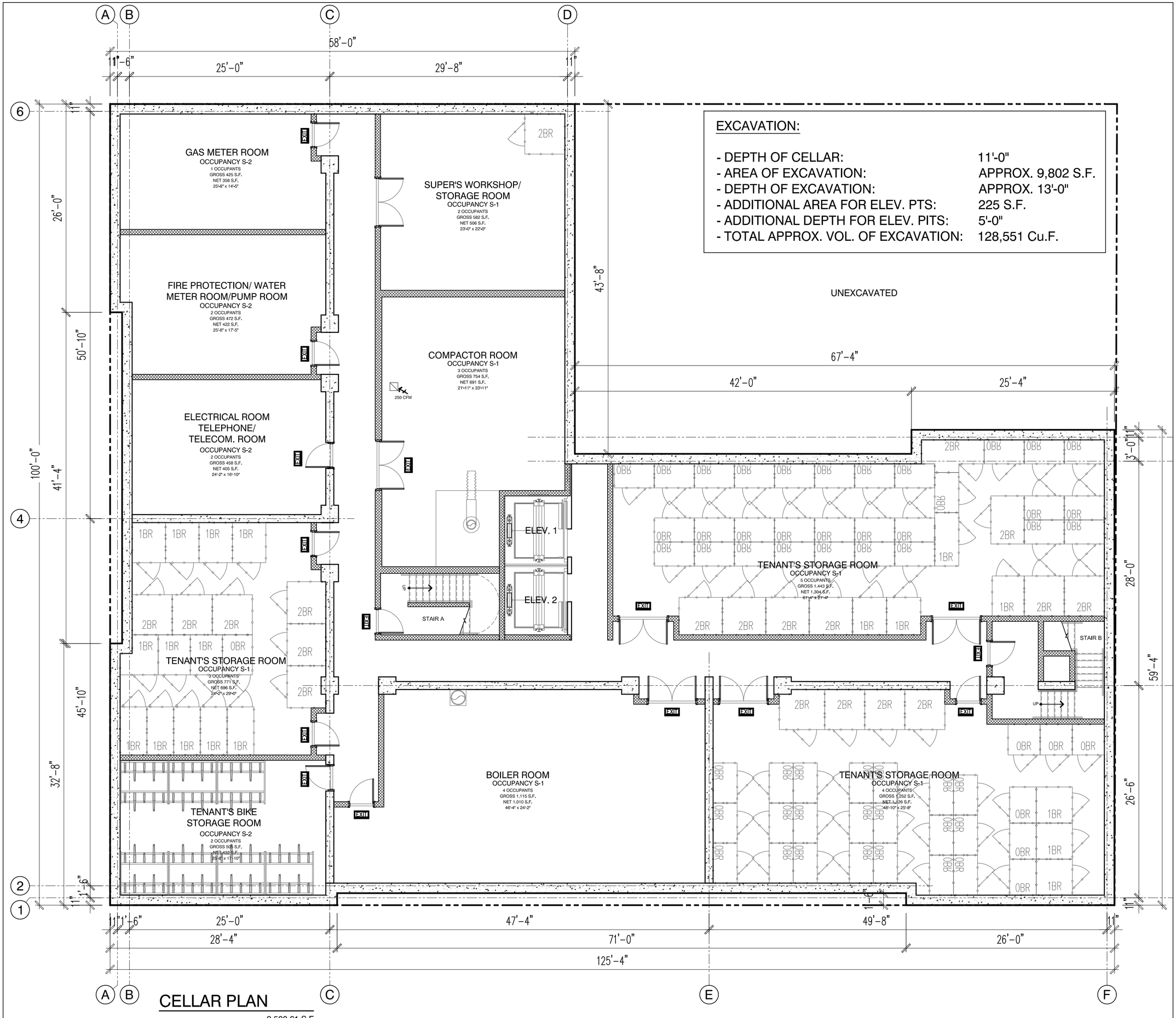

CELLAR PLAN

9,500.61 S.F.

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

DANOIS
ARCHITECTS, PC
22 Cortlandt St., 16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

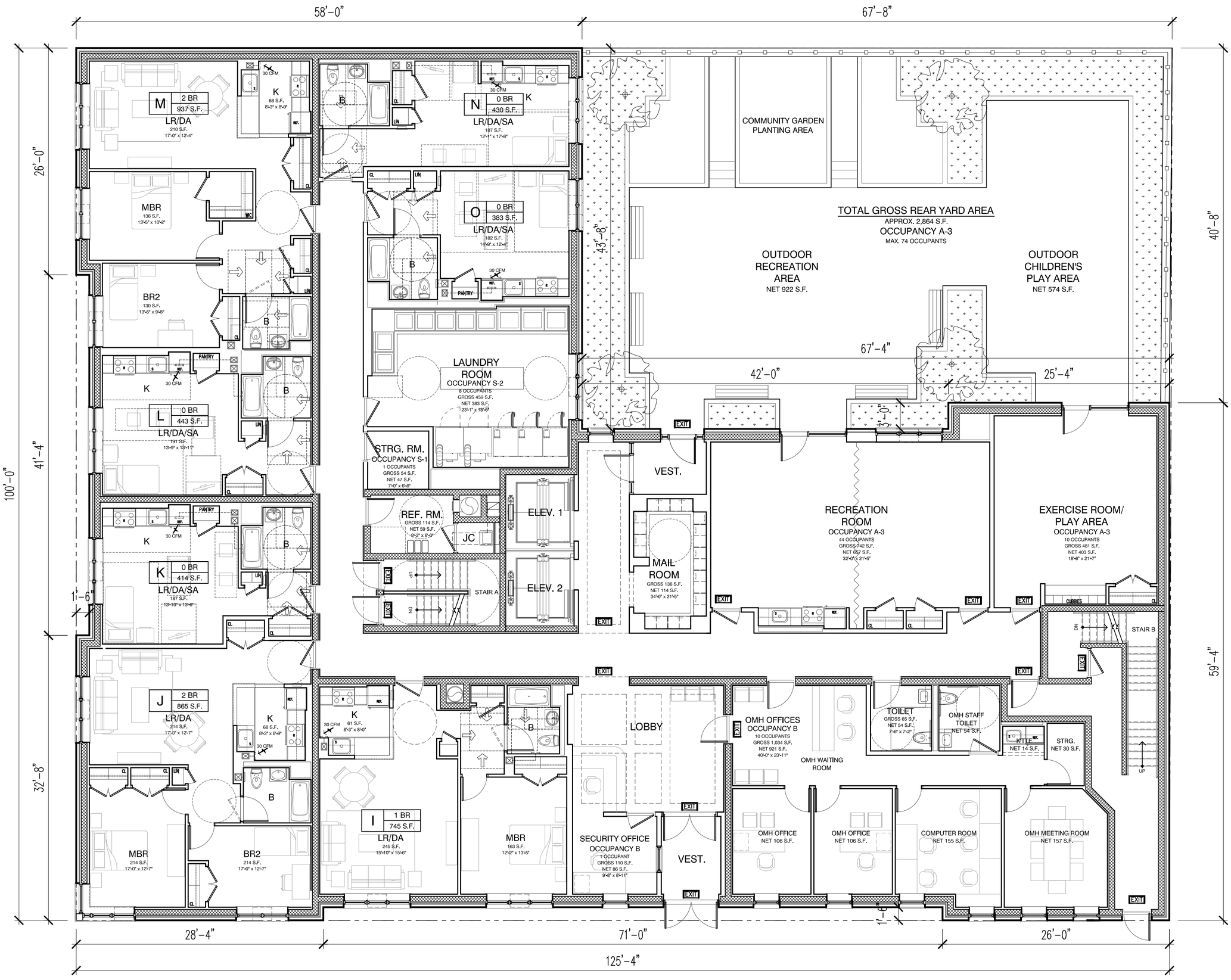
SCHEMATIC DESIGN

CELLAR FLOOR PLAN

Dwg. No.

A-100.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	05 of 13



FIRST FLOOR PLAN

9,500.61 S.F.

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

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Bronx, NY 10455

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ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

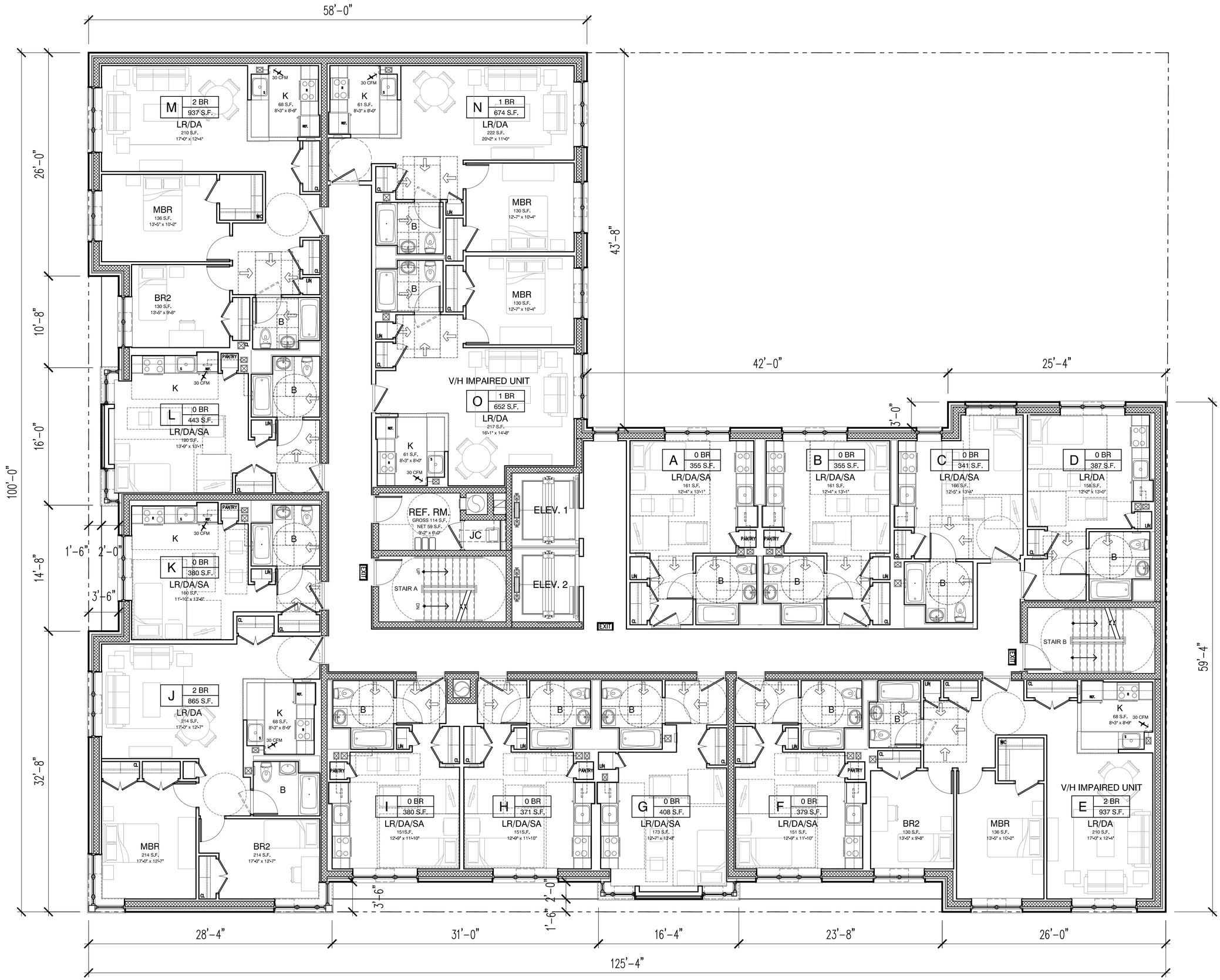
SCHEMATIC DESIGN

FIRST FLOOR PLAN

Dwg. No.

A-101.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	06 of 13



SECOND FLOOR PLAN

9,340.61 S.F.

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

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ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

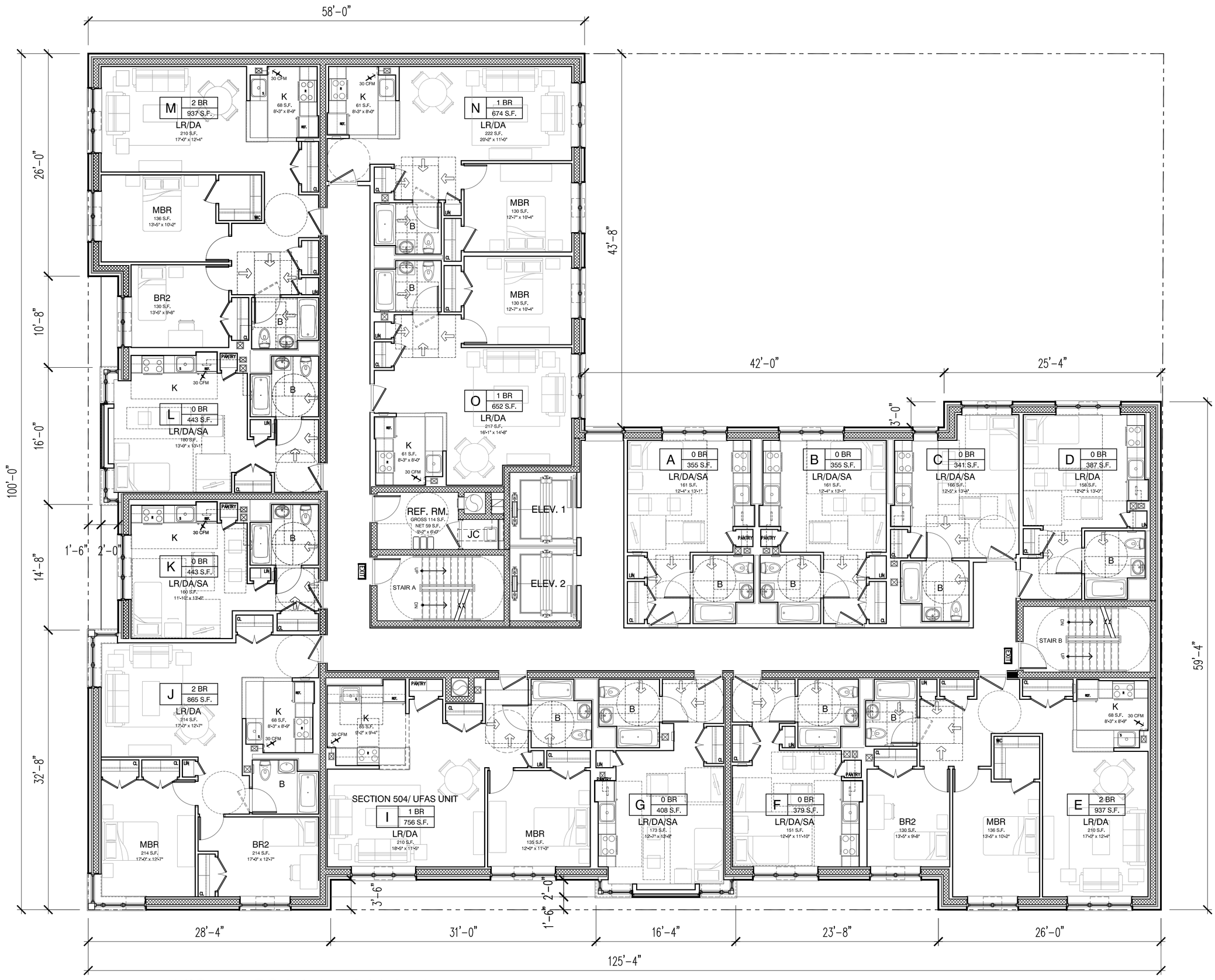
SCHEMATIC DESIGN

SECOND FLOOR PLAN

Dwg. No.

A-102.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	07 of 13



TYPICAL FLOOR PLAN (3RD-6TH)

9,340.61 S.F.

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

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New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

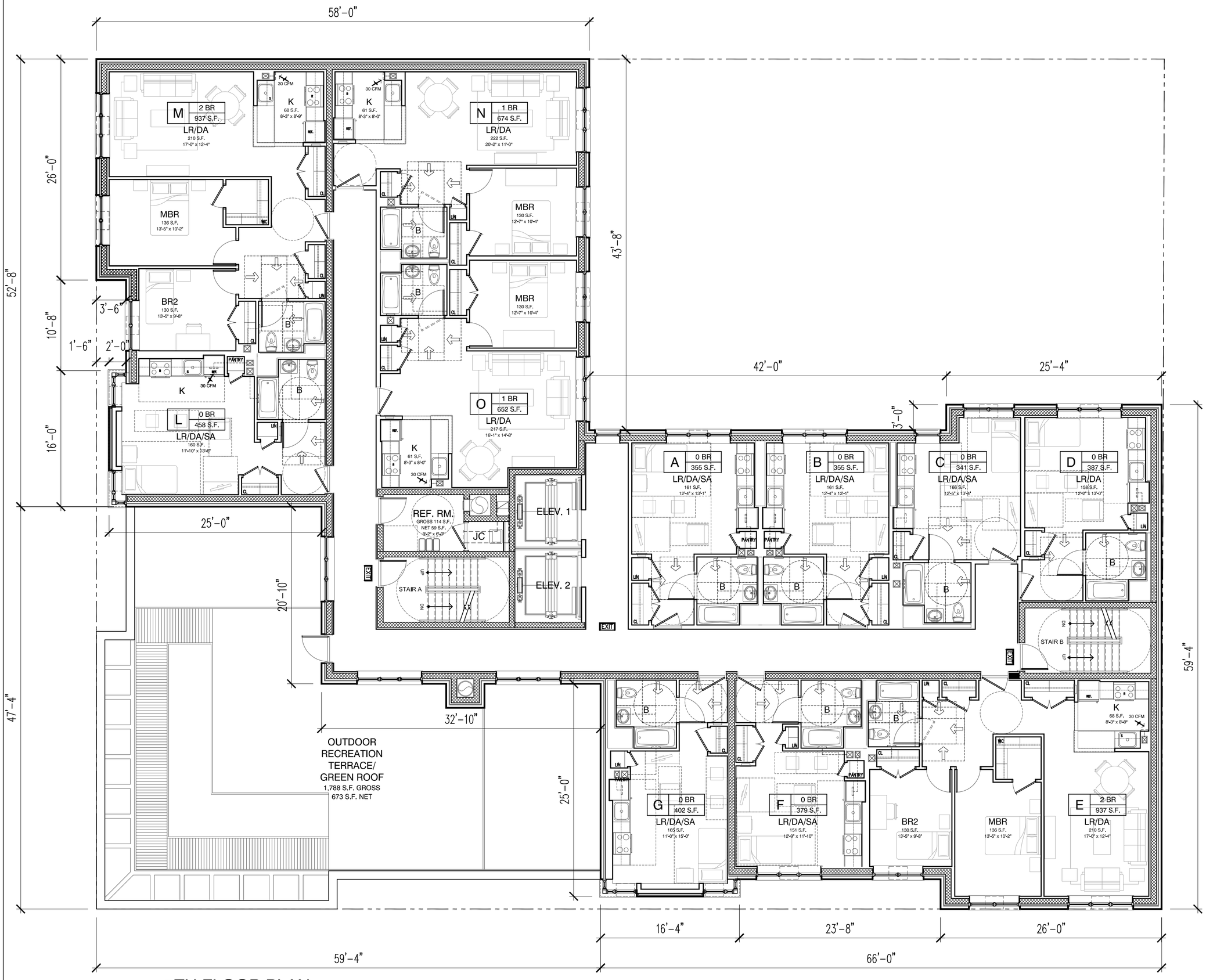
SCHEMATIC DESIGN

TYPICAL FLOOR PLAN (3rd-6th Floor)

Dwg. No.

A-103.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	08 of 13



7TH FLOOR PLAN

7,388.78 S.F.

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

DANOIS
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22 Cortlandt St., 16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

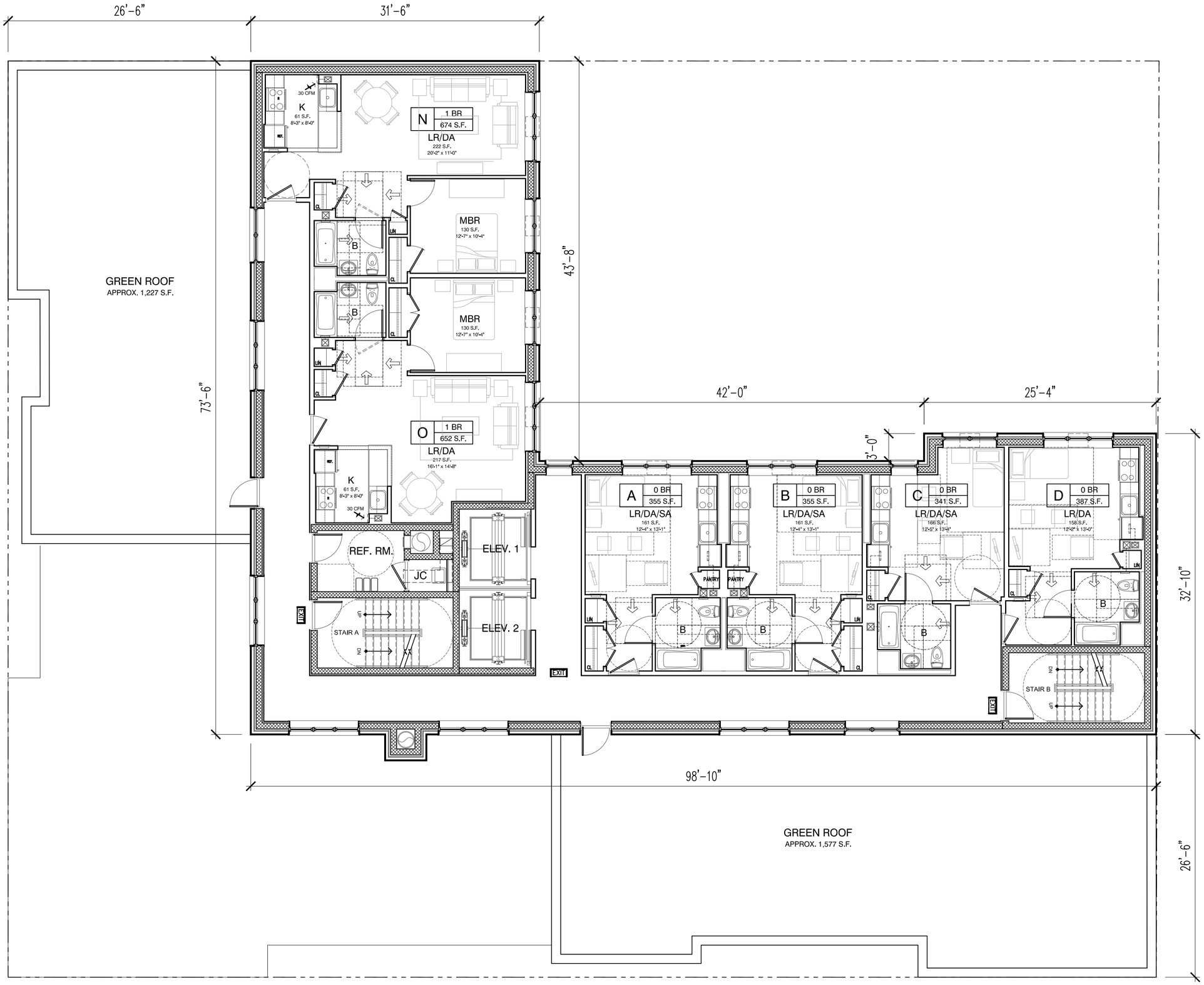
SCHEMATIC DESIGN

SEVENTH FLOOR PLAN

Dwg. No.

A-104.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	09 of 13



8TH FLOOR PLAN

4,412.83 S.F.

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

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New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

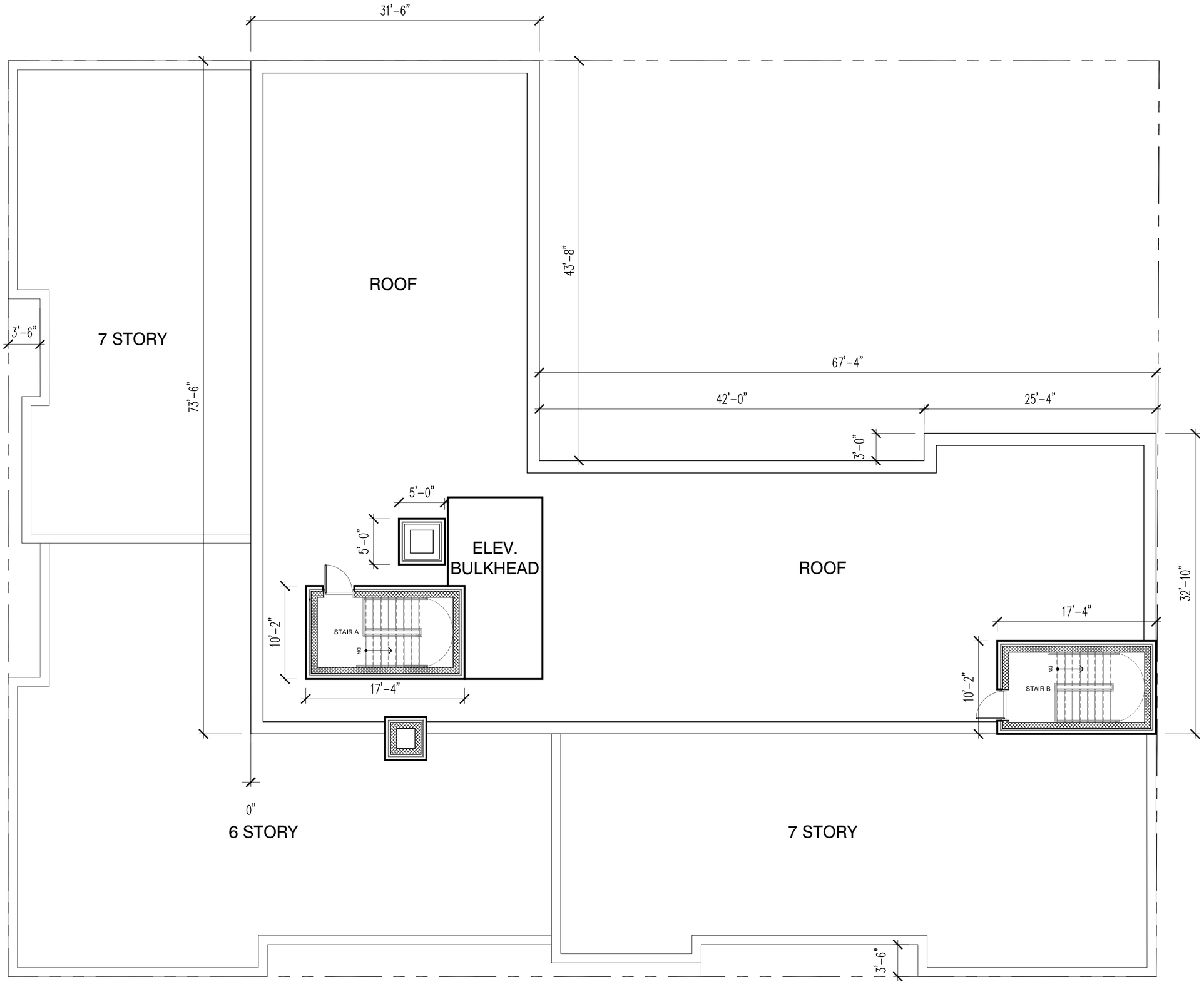
SCHEMATIC DESIGN

EIGHTH FLOOR PLAN

Dwg. No.

A-105.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	10 of 13



ROOF PLAN

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

DANOIS
ARCHITECTS, PC
22 Cortlandt St., 16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

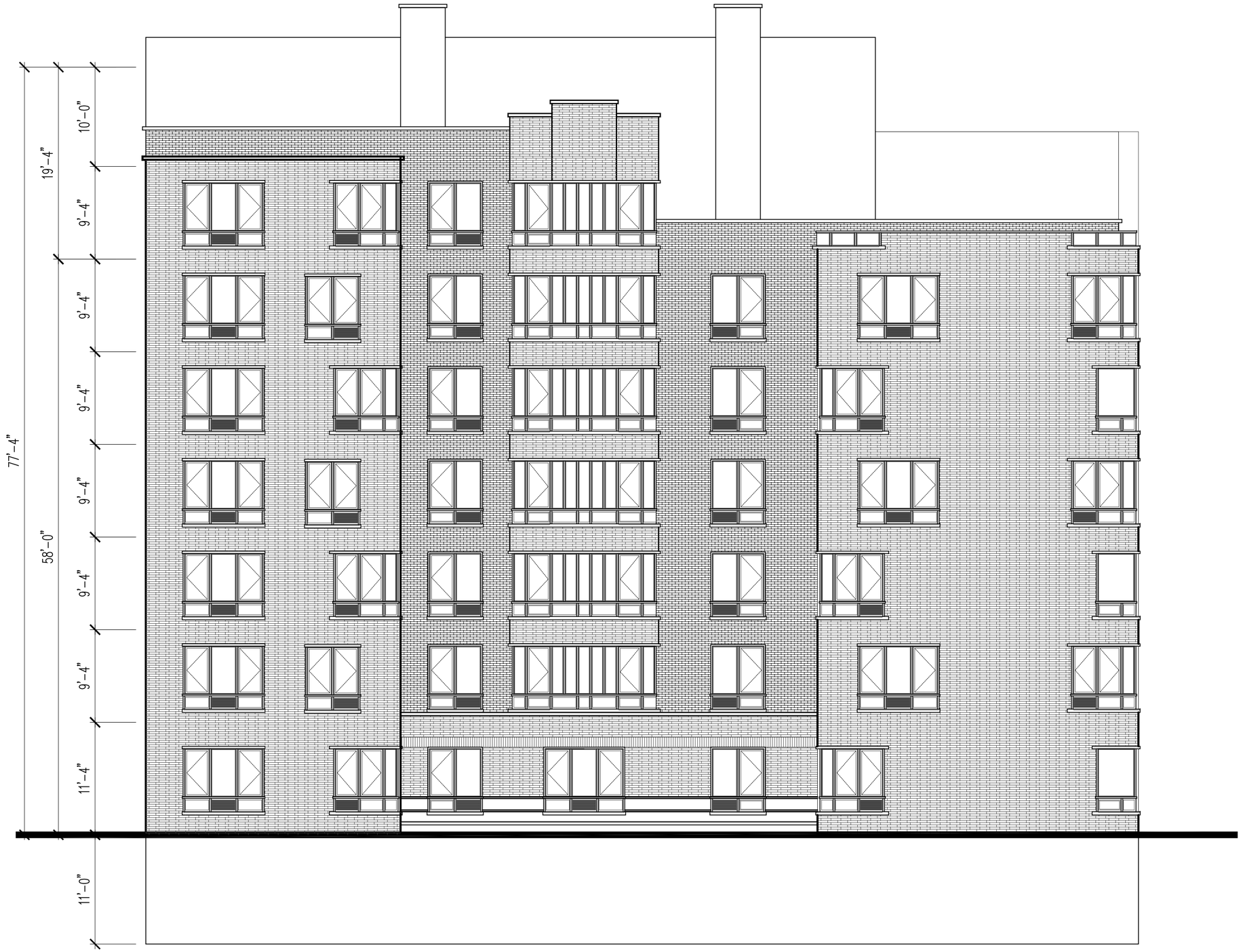
SCHEMATIC DESIGN

ROOF
PLAN

Dwg. No.

A-106.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	11 of 13



WASHINGTON AVENUE ELEVATION

SCALE 1/8" = 1'

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

DANOIS
ARCHITECTS, PC
22 Cortlandt St., 16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

SCHEMATIC DESIGN

WASHINGTON AVE. ELEVATION

Dwg. No.

A-200.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	12 of 13

EAST 164TH STREET ELEVATION

SCALE 1/8" = 1'

WASHINGTON AVENUE APARTMENTS

Washington Avenue & East 164th Street Bronx, New York

OWNER

SOBRO
555 Bergen Avenue, Third Fl.
Bronx, NY 10455

ARCHITECT

DANOIS
ARCHITECTS, PC
22 Cortlandt St., 16th Floor
New York, NY 10007-3107

ENERGY CONSULTANT

1	11/04/13	DAE Submission-Progress
2	11/08/13	DAE Submission
3	11/21/13	DHCR Submission
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Drawing Title

SCHEMATIC DESIGN

EAST 164TH ST. ELEVATION

Dwg. No.

A-201.00

Job No:	08.02
Chk. by:	D.D.
Dwg. by:	M.A-L.
Scale:	1/8"=1'
Date:	05/ 31/ 13
Sheet:	13 of 13

ATTACHMENT B
CITIZEN PARTICIPATION PLAN

ATTACHMENT B

CITIZEN PARTICIPATION PLAN

The NYC Office of Environmental Remediation and South Bronx Overall Economic Corp. 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, South Bronx Overall Economic Corp. will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Ms. Rebecca Bub, 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. South Bronx Overall Economic Corp. will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Morrisania Library

610 East 169th Street Bronx NY

(718) 589-9268

Mon	10:00 AM - 6:00 PM
Tue	11:00 PM - 7:00 PM
Wed	10:00 AM - 6:00 PM
Thu	2:00 PM - 7:00 PM
Fri	10:00 AM - 5:00 PM
Sat	10:00 AM - 5:00 PM
Sun	Closed

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

Identify Issues of Public Concern. The major issues of concern to the public will be potential impacts of nuisance odors and dust during the disturbance of historic fill soils at the Site. This work will be performed in accordance with procedures which will be specified under a detailed Remedial Program which considers and takes preventive measures for exposures to future residents of the property and those on adjacent properties during construction. Detailed plans to monitor the potential for exposure including a Construction Health and Safety Plan and a Community Air Monitoring Plan are required components of the remedial program.

Implementation of these plans will be under the direct oversight of the New York City Department of Environmental Remediation (NYCOER).

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

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

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

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

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

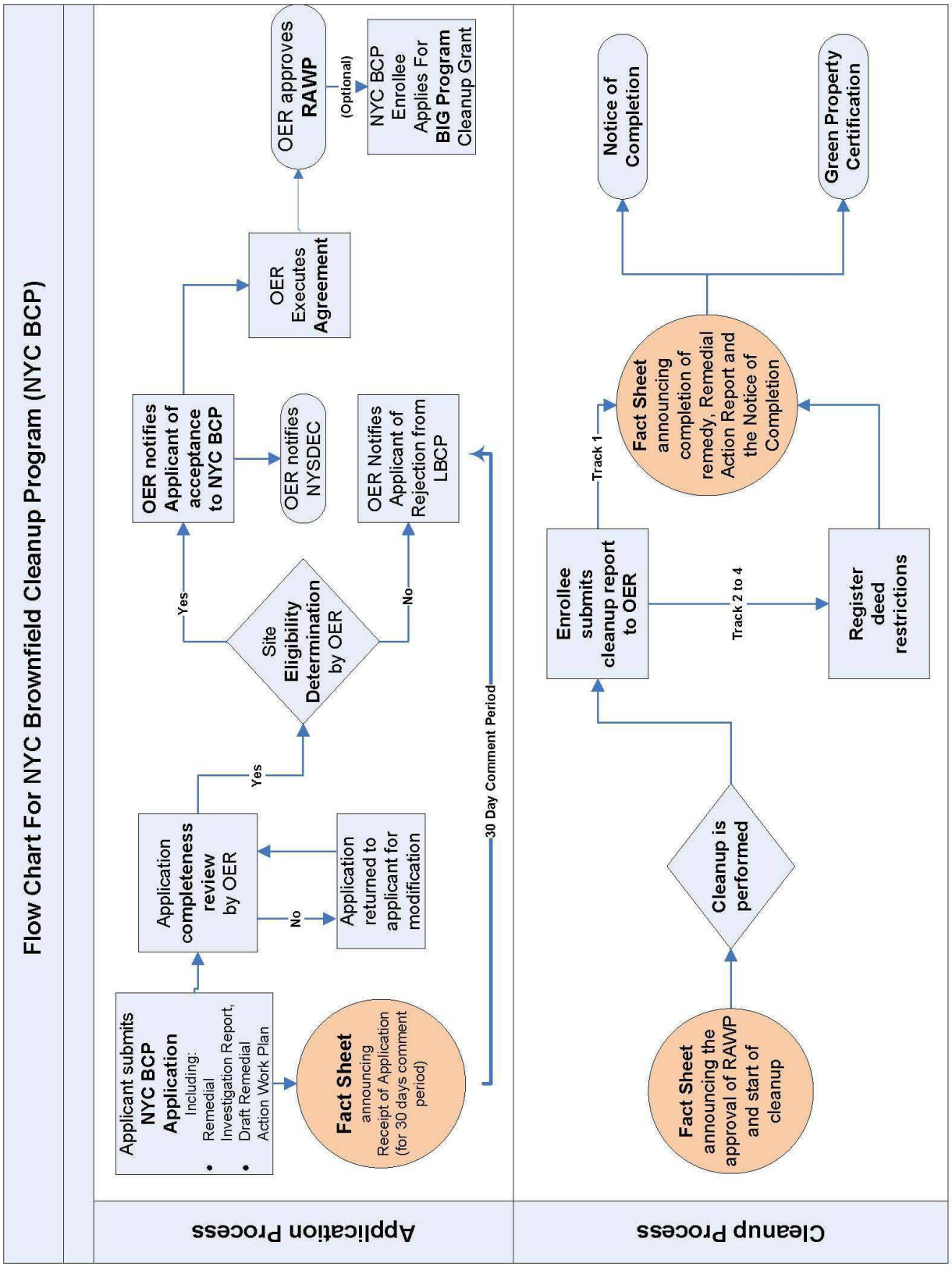
- **Public Notice of the availability of the Remedial Investigation Report and Remedial Action Work Plan and a 30-day public comment period on the Remedial Action Work Plan.**

  Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial

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

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

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


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

ATTACHMENT C
SUSTAINABILITY STATEMENT

ATTACHMENT C
SUSTAINABILITY STATEMENT

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

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

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

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

The project will reduce the consumption of virgin materials by substituting recycled concrete aggregate for mined gravel and/or sand backfill whenever possible. An estimate of the quantity (in tons) of virgin and non-renewable resources, the use of which will be avoided under this plan, will be quantified and reported in the RAR.

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

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

Paperless Voluntary Cleanup Program. South Bronx Overall Economic Corp. is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

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

ATTACHMENT D
SOIL/MATERIALS MANAGEMENT PLAN

ATTACHMENT D
SOIL/MATERIALS MANAGEMENT PLAN

1.1 SOIL SCREENING METHODS

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

1.2 STOCKPILE METHODS

Excavated soil from suspected areas of contamination (e.g., hot spots, USTs, drains, etc.) will be stockpiled separately and will be segregated from clean soil and construction materials. Stockpiles will be used only when necessary and will be removed as soon as practicable. While stockpiles are in place, they will be inspected daily, and before and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. Excavated soils will be stockpiled on, at minimum, double layers of 8-mil minimum sheeting, will be kept covered at all times with appropriately anchored plastic tarps, and will be routinely inspected. Broken or ripped tarps will be promptly replaced.

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

1.3 CHARACTERIZATION OF EXCAVATED MATERIALS

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

1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE

The PE/QEP overseeing the remedial action will:

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

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

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

1.5 OFF-SITE MATERIALS TRANSPORT

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

Outbound truck transport routes are:

a) head southwest on Washington Ave toward E 164th Street

b)take the 2nd left on to East 163rd Street

c)turn right on the Rev James A Polite Ave

d)turn left on to 163rd St

e)continue onto Hunts Point Avenue

f)turn left on to Buckner Blvd

g)take I278 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 Enrollee to each disposal facility describing the material to be disposed and requesting written acceptance of the material. This letter will state that material to be disposed is regulated material generated at an environmental remediation Site in Bronx, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

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

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

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

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

1.7 MATERIALS REUSE ON-SITE

Soil and fill that is derived from the property that meets the soil cleanup objectives established in this plan may be reused on-Site. The soil cleanup objectives for on-Site reuse are listed in Table 1. ‘Reuse on-Site’ means material that is excavated during the remedy or development, does not leave the property, and is relocated within the same property and on comparable soil/fill material, and addressed pursuant to the NYC VCP agreement subject to Engineering and Institutional Controls. The PE/QEP will ensure that reused materials are segregated from other materials to be exported from the Site and that procedures defined for material reuse in this RAWP are followed. The reuse of material is not anticipated on site.

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.

ATTACHMENT E
SITE SPECIFIC CONSTRUCTION HEALTH AND SAFETY PLAN

996 Washington Avenue

BRONX, NEW YORK

Block 2369, Lots 1, 2, 3, 4, 5, 53, 54, 90 & 153

CONSTRUCTION HEALTH AND SAFETY PLAN

December 2013

Prepared By:

EBC

ENVIRONMENTAL BUSINESS

1808 Middle Country Road
Ridge, NY 11961

HEALTH AND SAFETY PLAN

Site: **Redevelopment Project**

Location: **996 Washington Avenue, Bronx, NY**

Prepared By: **ENVIRONMENTAL BUSINESS CONSULTANTS**

Date Prepared: **December- 2013**

Version: **1**

Revision: **0**

Project Description:

Waste types: Solid

Characteristics: Volatile Organic Compounds, Semi-Volatile Organic Compounds, Pesticides and metals in historic fill (From grade to depths as great as 2 feet)

Overall Hazard: Low

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

CONSTRUCTION HEALTH AND SAFETY PLAN
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STATEMENT OF COMMITMENT

This Construction Health and Safety Plan (CHASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Activities planned for 996 Washington Avenue, Bronx, New York.

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

1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of a Remedial Action Plan at the Redevelopment Project located at 996 Washington Avenue and exposure to hazardous materials or wastes during the removal of underground storage tanks and the excavation and loading of contaminated soil. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available. The CHASP may be revised by EBC at the request of the Owner or the New York City Office of Environmental Remediation (NYCOER) upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC's Project Manager, site safety officer and/or the EBC Health and Safety Consultant.

1.1 Scope

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

1) Site mobilization of General Contractor (GC) and Subcontractors to install the buildings' foundations.
    a) Excavate historic fill to a depth of approximately 13 feet below grade from the area within the foot print of the building and excavate 2 feet in the e yard areas.

1.2 Application

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

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

1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

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

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

1.4 Key Personnel - Roles and Responsibilities

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

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

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

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

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

2. Coordinating site safety decisions with the project manager.

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

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

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

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

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

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2.0 SITE BACKGROUND AND SCOPE OF WORK

The Site is located at 996 Washington Avenue in the Morrisania section of Bronx, New York, and is identified as Block 2369 and Lots 1, 2, 3, 4, 5, 53, 54 , 90 and 153 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 0.29 acres and is bounded by Block 2369 Lot 6, a vacant lot to the north, East 164th Street to the south, beyond which is Block 2368 Lot 7501, a multifamily residential building, Block 2369 Lot 48, a commercial to the east, and Washington Avenue and Block 2386 Lots 65 and 144, a residential building and church to the west. Currently, Lots 3, 4 and 5 are improved with three 2-story single-family homes with finished basements. The remaining lots are current unimproved.

The proposed development at the Site consists of the new construction of an L-shaped eight-story ninety-five (95) unit building to be tenanted by a mixed population of special needs and low income individuals and families. The building will cover 85% of the lot. The building will feature a 9,523.62 square foot cellar, as well as an outdoor recreational area on the ground floor. The cellar will be utilized for supers work shop, water meter room, pump room, compactor room, electrical room, telephone room, boiler room, tenant storage, OMH storage room and tenant bike storage room. The proposed foundation depth is 13 feet. As part of development, the referenced lots are expected to be merged into one lot. The current zoning designation is M1-1; manufacturing and residential R7-2. The proposed use is consistent with existing zoning for the property.

Excavation of the foundation on specific areas of the site will be approximately 13 feet for the foot print of the building and approximately 2 feet for the yard.

2.1 Prior Investigations

2.1.1 Remedial Investigation Report

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

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed seven soil borings across the entire project Site, and collected thirteen soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed four temporary groundwater monitoring wells and collected eight groundwater samples;
4. Installed four soil vapor probes around Site perimeter and collected four soil vapor samples for chemical analysis.

Soil Sampling Results

Soil/fill samples collected during the RI showed that no PCBs were detected in any of the soil samples. Several VOCs were detected at trace levels except for acetone (max. of 120 µg/Kg), which was detected in one deep soil sample exceeding Unrestricted Use SCOs but below Restricted Residential SCOs. Six SVOCs, all Polycyclic Aromatic Hydrocarbons (PAHs), were detected within three shallow soil samples exceeding their respective Unrestricted Use SCOs as well as Restricted Residential SCOs. These SVOCs included benzo(a)anthracene (max. of 10,700 µg/Kg), benzo(a)pyrene (max. of 8,600 µg/Kg), benzo(b)fluoranthene (max. of 4,690 µg/Kg), benzo-(k)fluoranthene (max. of 6,800 µg/Kg), chrysene (max. of 9,090 µg/Kg) and

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indeno(1,2,3-cd)pyrene (max. of 3,990 µg/Kg). SVOCs were also detected in one deep soil sample which was below Unrestricted Use SCOs. Four pesticides; 4,4'-DDD (max. of 5.91 µg/Kg), 4,4'-DDE (max. of 10.7 µg/Kg), 4,4'-DDT (max. of 78.2 µg/Kg) and dieldrin (max. of 7.29µg/Kg) were detected above Unrestricted Use SCOs, but below their Restricted Residential SCOs in three shallow soil samples. Chlordane was also detected at maximum concentration of 78.5 µg/Kg in three shallow samples. Five metals including barium (max. of 1440 mg/Kg), copper (max. of 51.3 mg/Kg), lead (max. of 3,540 mg/Kg), mercury (max. of 1.04 mg/Kg) and zinc (max. of 699 mg/Kg) were detected at concentrations above Unrestricted Use SCOs in four shallow soil samples. Of these, barium, lead, and mercury also exceeded their respective Restricted Residential SCOs. Findings of the RI were consistent with observations for historical fill sites in areas throughout NYC, with the exception of the two soil sampling locations, boring SB-03 and SB-TWP-02 for lead hot spot in shallow soils.

Groundwater Sampling Results

Groundwater samples collected during the Remedial Investigations showed no detectable concentrations indicate of PCBs in any of the ground water samples. Three VOCs including acetone (max. of 6.2 ug/L), tetrachloroethylene (max. of 15 ug/l) and trichloroethene (max. of 7.1 ug/L) exceeded NYSDEC Part 703.5 Groundwater Quality Standards (GQS) in three of four monitoring wells. One SVOC; bis(2-ethylhexyl)phthalate (max. of 134 ug/L) exceeded GQS. Trace concentration of pesticides including 4,4'-DDT and Dieldrin were detected below their respective GQS. Dissolved metals including magnesium (max of 43 mg/L), manganese (max of 3.3 mg/L) and sodium (max of 103 mg/L) were identified above GQS.

Soil Vapor Sampling Results

Soil vapor samples collected during the RI showed low levels of petroleum related and no of chlorinated VOCs in all soil vapor samples. Total concentrations of petroleum-related VOCs (BTEX) ranged from 15.0 µg/m^3 to 102.7 µg/m^3. All compounds were detected at concentrations less than 50 µg/m^3, except for acetone (maximum of 1700 µg/m^3) and hexane (maximum of 270 µg/m^3) . Chlorinated VOCs were non detect in all soil vapor samples and below the monitoring level ranges established within the State DOH soil vapor guidance matrix (October 2006).

2.2 Description of Remedial Action Plan

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan.
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds.
3. Establishment of Track1 Soil Cleanup Objectives (SCOs).
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas.
5. Excavation and removal of soil/fill exceeding Unrestricted Use SCOs. For development purposes, 85% of the property will be excavated to depth of 13 feet for new building's footings and foundation. The rear yard will be excavated to a depth of 2 feet. Approximately 1,386 tons of soil will be removed;
6. Screening of excavated soil/fill during intrusive work for indications of contamination

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by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site.

7. Removal of underground storage tanks (if encountered) and closure of petroleum spills (if evidence of a spill/leak is encountered during Site excavation) in compliance with applicable local, State and Federal laws and regulations.
8. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site.
9. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs.
10. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
11. As part of development, installation of a vapor barrier/waterproofing system below the concrete slab underneath the building, as well as behind foundation walls of the proposed building. The vapor / waterproofing barrier will consist of Preprufe 300R system as manufactured by Grace.
12. Construction and maintenance of an engineered composite cover consisting of 5 inch thick concrete building slab to prevent human exposure to residual soil/fill remaining under the Site. For the yard area a composite cover of 2 feet of clean soil covered by a thin concrete slab beneath open joint concrete pavers will be utilized. In some areas soil will be left exposed for plantings;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
14. Based on the proposed development, excavations will be conducted below water table, dewatering is required during excavation. Site-wide dewatering will be completed in accordance with a New York City Department of Environmental Protection (NYCDEP) permit. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations.
15. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
16. 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 contamination, including plans for operation, maintenance, monitoring, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
17. If Track 1 Unrestricted Use SCOs are not achieved; the property will continue to be registered with an E-Designation by the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

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3.0 HAZARD ASSESSMENT

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

3.1 Physical Hazards

3.1.1 Tripping Hazards

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

3.1.2 Climbing Hazards

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

3.1.3 Cuts and Lacerations

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

3.1.4 Lifting Hazards

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

3.1.5 Utility Hazards

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

3.1.6 Traffic Hazards

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

3.2 Work in Extreme Temperatures

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

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3.2.1 Heat Stress

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

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

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

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

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

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3.2.2 Cold Exposure

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

3.3 Chemical Hazards

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

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

Acetone

Semi-Volatile organic compounds reported to be present at elevated concentrations in historic fill materials at the Site include the following:

Benz(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene
Indeno(1,2,3-cd)pyrene	Chrysene		

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

Barium	Copper	Lead	Zinc	Mercury

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

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

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

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

3.3.1 Respirable Dust

Dust may be generated from vehicular traffic and/or excavation activities. If visible observation detects elevated levels of dust, a program of wetting will be employed by the site safety officer. If elevated dust levels persist, the site safety office will employ dust monitoring using a

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particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 5,000 µg/m3 over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

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

3.3.2 Dust Control and Monitoring During Earthwork

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 5,000 µg/m^3 over site-specific background in the breathing zone as measured by a dust monitor unless the site safety officer directs workers to wear APRs. The site safety officer will use visible dust as an indicator to implement the dust control plan.

3.3.3 Organic Vapors

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

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4.0 PERSONAL PROTECTIVE EQUIPMENT

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

4.1 Level D

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

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

4.2 Level C

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

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

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

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

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4.3 Activity-Specific Levels of Personal Protection

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

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5.0 AIR MONITORING AND ACTION LEVELS

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

5.1 Air Monitoring Requirements

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

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

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

5.2 Work Stoppage Responses

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

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

5.3 Action Levels During Excavation Activities

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

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

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

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

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

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

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6.0 SITE CONTROL

6.1 Work Zones

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

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

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

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

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7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

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

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

7.1 Emergency Equipment On-site

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

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

7.2 Emergency Telephone Numbers

General Emergencies	911
Bronx County Police	911
NYC Fire Department	911
Bronx Lebanon Hospital	(718) 590-1800
NYSDEC Spills Hotline	1-800-457-7362
NYCDEP Project Manager	(212) 442-7126
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

7.3 Personnel Responsibilities During an Emergency

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

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

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

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

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

- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager — Ms. Chawinie Miller (631) 504-6000
- Site Safety Officer — Mr. Kevin Waters (631) 504-6000

7.4 Medical Emergencies

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

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

7.5 Fire or Explosion

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

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

7.6 Evacuation Routes

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

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

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

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- The site safety officer will conduct a head count to ensure that all personnel have been evacuated safely. The head count will be correlated to the site and/or exclusion zone entry/exit log.
- If emergency site evacuation is necessary, all personnel are to escape the emergency situation and decontaminate to the maximum extent practical.

7.7 Spill Control Procedures

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

7.8 Vapor Release Plan

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

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

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

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APPENDIX A

SITE SAFETY ACKNOWLEDGEMENT FORM

DAILY BREIFING SIGN-IN SHEET

Date:_____ Person Conducting Briefing:_____

Project Name and Location:_____

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

_____

_____

_____

_____

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

_____

_____

_____

3. ATTENDEES (Print Name):

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

10.	20.

APPENDIX B

SITE SAFETY PLAN AMENDMENTS

SITE SAFETY PLAN AMENDMENT FORM

Site Safety Plan Amendment #:_____

Site Name: _____

Reason for Amendment:_____

_____

_____

_____

Alternative Procedures:_____

_____

_____

_____

Required Changes in PPE:_____

_____

_____

_____

_____ _____

Project Superintendent (signature) Date

_____ _____

Health and Safety Consultant (signature) Date

_____ _____

Site Safety Officer (signature) Date

APPENDIX C

CHEMICAL HAZARDS

CHEMICAL HAZARDS

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

International Chemical Safety Cards

ACETONE

ICSC: 0087

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ACETONE

ICSC: 0087

IMPORTANT DATA

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

PHYSICAL DANGERS:
The vapour is heavier than air and may travel along the ground; distant ignition possible.

CHEMICAL DANGERS:
The substance can form explosive peroxides on contact with strong oxidants such as acetic acid, nitric acid, hydrogen peroxide. Reacts with chloroform and bromoform under basic conditions, causing fire and explosion hazard. Attacks plastic.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 500 ppm as TWA, 750 ppm as STEL; A4 (not classifiable as a human carcinogen); BEI issued; (ACGIH 2004).
MAK: 500 ppm 1200 mg/m³
Peak limitation category: I(2); Pregnancy risk group: D; (DFG 2006).
OSHA PEL†: TWA 1000 ppm (2400 mg/m^3)
NIOSH REL: TWA 250 ppm (590 mg/m^3)
NIOSH IDLH: 2500 ppm 10%LEL See: 67641

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

INHALATION RISK:
A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C; on spraying or dispersing, however, much faster.

EFFECTS OF SHORT-TERM EXPOSURE:
The vapour irritates the eyes and the respiratory tract. The substance may cause effects on the central nervous system , liver , kidneys and gastrointestinal tract .

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the blood and bone marrow .

PHYSICAL PROPERTIES

Boiling point: 56°C
Melting point: -95°C
Relative density (water = 1): 0.8
Solubility in water:
miscible
Vapour pressure, kPa at 20°C: 24

Relative vapour density (air = 1): 2.0
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2
Flash point: -18°C c.c.
Auto-ignition temperature: 465°C
Explosive limits, vol% in air: 2.2-13
Octanol/water partition coefficient as log Pow: -0.24

ENVIRONMENTAL DATA

N O T E S

Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1090

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

ADDITIONAL INFORMATION

International Chemical Safety Cards

BENZ(a)ANTHRACENE

ICSC: 0385

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0385

International Chemical Safety Cards

BENZ(a)ANTHRACENE

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

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

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

CHEMICAL DANGERS:

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

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

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

EFFECTS OF SHORT-TERM EXPOSURE:

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

PHYSICAL PROPERTIES

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

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

ENVIRONMENTAL DATA

Bioaccumulation of this chemical may occur in seafood.

N O T E S

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

ADDITIONAL INFORMATION

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

BENZO(a)PYRENE

ICSC: 0104

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0104

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

BENZO(a)PYRENE

ICSC: 0104

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

PHYSICAL STATE; APPEARANCE:
PALE-YELLOW CRYSTALS

PHYSICAL DANGERS:

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

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

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

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

EFFECTS OF SHORT-TERM EXPOSURE:

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

PHYSICAL PROPERTIES

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

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

ENVIRONMENTAL DATA

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

N O T E S

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

ADDITIONAL INFORMATION

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0720

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

International Chemical Safety Cards

BENZO(b)FLUORANTHENE

ICSC: 0720

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

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

N O T E S

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

ADDITIONAL INFORMATION

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

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0721

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

International Chemical Safety Cards

BENZO(k)FLUORANTHENE

ICSC: 0721

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

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

N O T E S

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

ADDITIONAL INFORMATION

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

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

International Chemical Safety Cards

INDENO(1,2,3-cd)PYRENE

ICSC: 0730

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

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

N O T E S

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

ADDITIONAL INFORMATION

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

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0827

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

International Chemical Safety Cards

BARIUM SULFATE

ICSC: 0827

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

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

International Chemical Safety Cards

COPPER

ICSC: 0240

Cu
(powder)

ICSC # 0240
CAS # 7440-50-8
RTECS # GL5325000
September 24, 1993 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Combustible.	NO open flames.	Special powder, dry sand, NO other agents.
EXPLOSION			
EXPOSURE		PREVENT DISPERSION OF DUST!	
•INHALATION	Cough. Headache. Shortness of breath. Sore throat.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
•SKIN	Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
•EYES	Redness. Pain.	Safety goggles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Sweep spilled substance into containers. Carefully collect remainder. Then remove to safe place. (Extra personal protection: P2 filter respirator for harmful particles).	Separated from - See Chemical Dangers.	R: S:

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0240

International Chemical Safety Cards

COPPER

ICSC: 0240

I

M

P

PHYSICAL STATE; APPEARANCE:
RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.

PHYSICAL DANGERS:

CHEMICAL DANGERS:

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

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

O **R** **T** **A** **N** **T** **D** **A** **T** **A**	Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard. **OCCUPATIONAL EXPOSURE LIMITS:** TLV: 0.2 mg/m³ fume (ACGIH 1992-1993). TLV (as Cu, dusts & mists): 1 mg/m³ (ACGIH 1992-1993). Intended change 0.1 mg/m³ Inhal., A4 (not classifiable as a human carcinogen); MAK: 0.1 mg/m³ (Inhalable fraction) Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005). OSHA PEL*: TWA 1 mg/m^3 *Note: The PEL also applies to other copper compounds (as Cu) except copper fume. NIOSH REL*: TWA 1 mg/m^3 *Note: The REL also applies to other copper compounds (as Cu) except Copper fume. NIOSH IDLH: 100 mg/m^3 (as Cu) See: 7440508	**EFFECTS OF SHORT-TERM EXPOSURE:** Inhalation of fumes may cause metal fume fever. See Notes. **EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:** Repeated or prolonged contact may cause skin sensitization.
PHYSICAL PROPERTIES	Boiling point: 2595°C Melting point: 1083°C Relative density (water = 1): 8.9	Solubility in water: none
ENVIRONMENTAL DATA		

N O T E S

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

ADDITIONAL INFORMATION

ICSC: 0240 **COPPER**

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

International Chemical Safety Cards

LEAD

ICSC: 0052

Lead metal
Plumbum
Pb
Atomic mass: 207.2
(powder)

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

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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0052

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

International Chemical Safety Cards

LEAD

ICSC: 0052

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

PHYSICAL STATE; APPEARANCE:
BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.

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

CHEMICAL DANGERS:
On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.05 mg/m³ A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2004).
MAK:
Carcinogen category: 3B; Germ cell mutagen group: 3A; (DFG 2004).
EU OEL: as TWA 0.15 mg/m³ (EU 2002).
OSHA PEL*: 1910.1025 TWA 0.050 mg/m^3 See Appendix C *Note: The PEL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH REL*: TWA 0.050 mg/m^3 See Appendix C
*Note: The REL also applies to other lead compounds (as Pb) -- see Appendix C.
NIOSH IDLH: 100 mg/m^3 (as Pb) See: 7439921

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

INHALATION RISK:
A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.

EFFECTS OF SHORT-TERM EXPOSURE:

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.

PHYSICAL PROPERTIES		
	Boiling point: 1740°C	Density: 11.34 g/cm3
	Melting point: 327.5°C	Solubility in water: none

ENVIRONMENTAL DATA	
	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment. 

N O T E S

Depending on the degree of exposure, periodic medical examination is suggested. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-51S1872

ADDITIONAL INFORMATION

ICSC: 0052 **LEAD**

International Chemical Safety Cards

MERCURY

ICSC: 0056

Quicksilver
Liquid silver
Hg
Atomic mass: 200.6

ICSC # 0056
CAS # 7439-97-6
RTECS # OV4550000
UN # 2809
EC # 080-001-00-0
April 22, 2004 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
EXPLOSION	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
•INHALATION	Abdominal pain. Cough. Diarrhoea. Shortness of breath. Vomiting. Fever or elevated body temperature.	Local exhaust or breathing protection.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
•EYES		Face shield, or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in case of a large spill! Consult an expert! Ventilation. Collect leaking and spilled liquid in sealable non-metallic containers as far as possible. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs Well closed.	Special material. Do not transport with food and feedstuffs. T symbol N symbol R: 23-33-50/53 S: 1/2-7-45-60-61 UN Hazard Class: 8 UN Packing Group: III

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

MERCURY

ICSC: 0056

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.

PHYSICAL DANGERS:

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. Reacts violently with ammonia and halogens causing fire and explosion hazard. Attacks aluminium and many other metals forming amalgams.

OCCUPATIONAL EXPOSURE LIMITS:
TLV: 0.025 mg/m³ as TWA (skin) A4 BEI issued (ACGIH 2004).
MAK: 0.1 mg/m³ Sh
Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003).
OSHA PEL†: C 0.1 mg/m^3
NIOSH REL: Hg Vapor: TWA 0.05 mg/m^3 skin
Other: C 0.1 mg/m^3 skin
NIOSH IDLH: 10 mg/m^3 (as Hg) See: 7439976

ROUTES OF EXPOSURE:
The substance can be absorbed into the body by inhalation of its vapour and through the skin , also as a vapour!

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

EFFECTS OF SHORT-TERM EXPOSURE:
The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous systemandkidneys. The effects may be delayed. Medical observation is indicated.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance may have effects on the central nervous system kidneys , resulting in irritability, emotional instability, tremor, mental and memory disturbances, speech disorders. Danger of cumulative effects. Animal tests show that this substance possibly causes toxic effects upon human reproduction.

PHYSICAL PROPERTIES

Boiling point: 357°C
Melting point: -39°C
Relative density (water = 1): 13.5
Solubility in water:
none

Vapour pressure, Pa at 20°C: 0.26
Relative vapour density (air = 1): 6.93
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.009

ENVIRONMENTAL DATA

The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.

N O T E S

Depending on the degree of exposure, periodic medical examination is indicated. No odour warning if toxic concentrations are present. Do NOT take working clothes home.

Transport Emergency Card: TEC (R)-80GC9-II+III

ADDITIONAL INFORMATION

ICSC: 0056 **MERCURY**

International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

Blue powder
Merrillite
Zn
Atomic mass: 65.4
(powder)

ICSC # 1205
CAS # 7440-66-6
RTECS # ZG8600000
UN # 1436 (zinc powder or dust)
EC # 030-001-00-1
October 24, 1994 Peer reviewed

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames, NO sparks, and NO smoking. NO contact with acid(s), base (s) and incompatible substances (see Chemical Dangers).	Special powder, dry sand, NO other agents. NO water.
EXPLOSION	Risk of fire and explosion on contact with acid(s), base(s), water and incompatible substances.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Prevent deposition of dust.	In case of fire: cool drums, etc., by spraying with water but avoid contact of the substance with water.
EXPOSURE		PREVENT DISPERSION OF DUST! STRICT HYGIENE!	
•**INHALATION**	Metallic taste and metal fume fever. Symptoms may be delayed (see Notes).	Local exhaust.	Fresh air, rest. Refer for medical attention.
•**SKIN**	Dry skin.	Protective gloves.	Rinse and then wash skin with water and soap.
•**EYES**		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•**INGESTION**	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Extinguish or remove all ignition sources. Do NOT wash away into sewer. Sweep spilled substance into containers. then remove to safe place. Personal protection: self-contained breathing apparatus.	Fireproof. Separated from acids, bases oxidants Dry.	Airtight. F symbol N symbol R: 15-17-50/53 S: 2-7/8-43-46-60-61 UN Hazard Class: 4.3 UN Subsidiary Risks: 4.2

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

ZINC POWDER

ICSC: 1205

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

PHYSICAL STATE; APPEARANCE:
ODOURLESS GREY TO BLUE POWDER.

PHYSICAL DANGERS:
Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.

CHEMICAL DANGERS:
Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.

OCCUPATIONAL EXPOSURE LIMITS:
TLV not established.

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

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

EFFECTS OF SHORT-TERM EXPOSURE:
Inhalation of fumes may cause metal fume fever. The effects may be delayed.

EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
Repeated or prolonged contact with skin may cause dermatitis.

PHYSICAL PROPERTIES

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

ENVIRONMENTAL DATA

N O T E S

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 **ZINC POWDER**

IMPORTANT LEGAL NOTICE:

Material Safety Data Sheet

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

1. PRODUCT AND COMPANY IDENTIFICATION

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

2. HAZARDS IDENTIFICATION

Emergency Overview

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

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)

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

Precautionary statement(s)

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

HMIS Classification

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

NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

Potential Health Effects

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

3. COMPOSITION/INFORMATION ON INGREDIENTS

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

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

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

4. FIRST AID MEASURES

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

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

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

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

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

5. FIRE-FIGHTING MEASURES

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

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

6. ACCIDENTAL RELEASE MEASURES

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

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

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

7. HANDLING AND STORAGE

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

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

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

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

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

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

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

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid

Safety data

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

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

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

11. TOXICOLOGICAL INFORMATION

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

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

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

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

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

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

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

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

Limited evidence of carcinogenicity in animal studies

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

Reproductive toxicity

no data available

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

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

Aspiration hazard
no data available

Potential health effects

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

Eyes May cause eye irritation.

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

Additional Information
RTECS: KI0700000

12. ECOLOGICAL INFORMATION

Toxicity

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

Persistence and degradability
no data available

Bioaccumulative potential
Indication of bioaccumulation.

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

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

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

13. DISPOSAL CONSIDERATIONS

Product
Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

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

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

15. REGULATORY INFORMATION

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

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

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

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

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

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

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

Pennsylvania Right To Know Components

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

New Jersey Right To Know Components

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

California Prop. 65 Components

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

16. OTHER INFORMATION

Further information

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

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

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

Suppliers:

Not Available

Buyers:

Not Available

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

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

Hazard Symbols: XN
Risk Phrases: 22 33

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

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

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

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

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

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

General Information:

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

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

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

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

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

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

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

Personal Protective Equipment

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

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

Physical State: Crystals
Color: white
Odor: None reported.
pH: Not available.
Vapor Pressure: 6.5106 mm Hg @ 20 C
Viscosity: Not available.
Boiling Point: 336 deg C
Freezing/Melting Point: 88.00 - 90.00 deg C
Autoignition Temperature: Not available.
Flash Point: Not available.
Explosion Limits, lower: Not available.
Explosion Limits, upper: Not available.
Decomposition Temperature:
Solubility in water: 0.010 ppm
Specific Gravity/Density:
Molecular Formula: C14H8Cl4
Molecular Weight: 318.02

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

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

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

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

Other:
See actual entry in RTECS for complete information.

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

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

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

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

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

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

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

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

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

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

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

4-Cyano-4-Phenylpiperidine Hydrochloride, 99% (TLC)	51304-58-6
Methanesulfonamide	3144-09-0
gamma-Octanoic lactone, 98%	104-50-7
Cis,cis,cis,cis-1,2,3,4-cyclopentane- tetracarboxylic dianhydride,	4802-47-5
Tetrachloroethylene Carbonate, 98+%	22432-68-4
Oxamic Acid, 98%	471-47-6
10,11-Dihydro-5H-Dibenzo(A,D)-Cycloheptene, 98%	833-48-7
Thallium (I) Sulfate, 99.9+%	7446-18-6
N-(2,6-Dimethylphenylcarbamoyl-Methyl)-Iminodiacetic Acid, 99%	59160-29-1
P-(Dimethylamino)cinnamic Acid, 99%	1552-96-1
Biebrich Scarlet, 99% (UV-VIS)	4196-99-0
4-Chlorobenzenediazonium hexafluoro- phosphate	1582-27-0
Ammonium hexachloroiridate(IV), 99.99%	16940-92-4
Methylamine-d2 deuteriochloride, 98+ atom % D	593-51-1
2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%	72-55-9
Nitro red	56431-61-9
Methyl 2,3-dichlorobenzoate, 98+%	2905-54-6
Isopropyl Bromoacetate, 98% (GC)	29921-57-1
1-Iodo-4-Nitrobenzene, 99%	636-98-6
4-Ethylcyclohexanol, 99% cis/trans mixture	4534-74-1
Fluorescamine	38183-12-9
Tris(2,2,6,6-Tetramethyl-3,5-Heptanedionato)Dysprosium(III), 99+%	15522-69-7
3-Amino-2,2,5,5-Tetramethyl-1-Pyrrolidinyloxy, 99% (Titr.)	34272-83-8
3,4-Dihydroxyphenylacetic Acid,98%	102-32-9

International Chemical Safety Cards

DDT

ICSC: 0034

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

DDT

ICSC: 0034

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

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

PHYSICAL DANGERS:

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

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

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

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

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

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

PHYSICAL PROPERTIES

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

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

ENVIRONMENTAL DATA

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

N O T E S

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

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

ADDITIONAL INFORMATION

ICSC: 0034 **DDT**

International Chemical Safety Cards

DIELDRIN

ICSC: 0787

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

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

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

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

SEE IMPORTANT INFORMATION ON BACK

International Chemical Safety Cards

DIELDRIN

ICSC: 0787

IMPORTANT DATA

PHYSICAL STATE; APPEARANCE:
COLOURLESS CRYSTALS

PHYSICAL DANGERS:

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

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

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

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

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

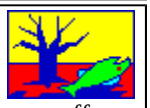
EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
The substance accumulates in the human body. Cumulative effects are possible: see Acute Hazards/Symptoms.

PHYSICAL PROPERTIES

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

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

ENVIRONMENTAL DATA



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

NOTES

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

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

ADDITIONAL INFORMATION

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.)

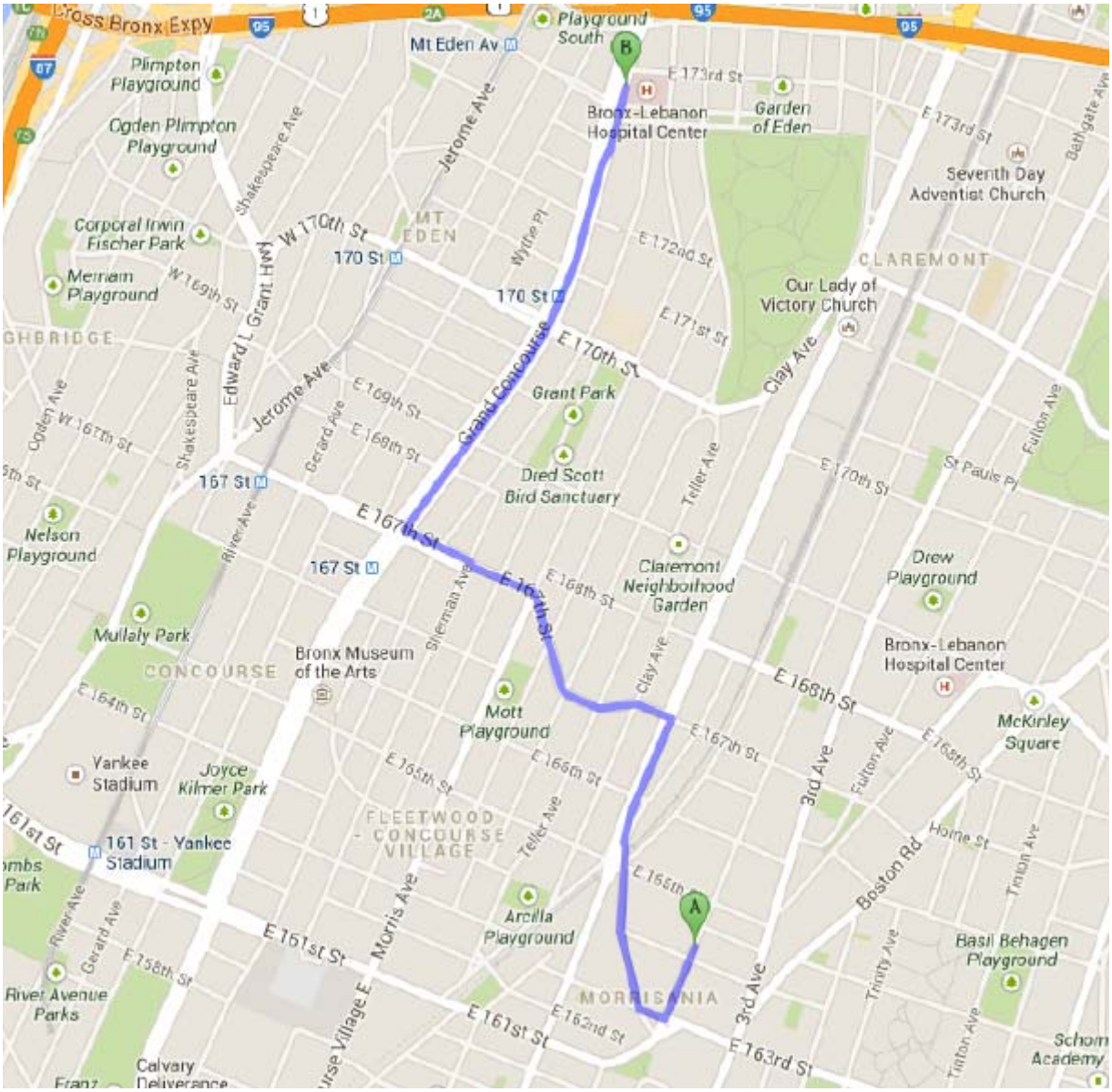
INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

Bronx Lebanon Hospital

1650 Grand Concourse, Bronx, NY
(718) 590-1800
1.8 Miles – About 6 Minutes



996 Washington Ave, Bronx, NY 10456

	1. Head **southwest** on **Washington Ave** toward **E 164th St**	**go 0.1 mi** total 0.1 mi
	2. Turn right at the 2nd cross street onto **E 163rd St**	go 203 ft total 0.1 mi
	3. Take the 1st right onto **Brook Ave** About 55 secs	**go 0.2 mi** total 0.4 mi
	4. Continue onto **Webster Ave**	go 0.2 mi total 0.6 mi
	5. Turn left onto **E 167th St** About 2 mins	**go 0.4 mi** total 1.0 mi
	6. Turn right to stay on **E 167th St**	go 0.1 mi total 1.1 mi
	7. Take the 3rd right onto **Grand Concourse** About 2 mins	**go 0.6 mi** total 1.7 mi
	8. Slight right toward **Grand Concourse** (signs for **Mt Eden Ave E**)	go 125 ft total 1.7 mi
	9. **Continue straight onto Grand Concourse** Destination will be on the right	**go 479 ft** total 1.8 mi

Bronx-Lebanon Hospital Center
1650 Grand Concourse, New York, NY 10457

ATTACHMENT F
VAPOR BARRIER SPECIFICATIONS

GRACE

PREPRUFE® 300R & 160R

Pre-applied waterproofing membranes that bond integrally to poured concrete for use below slabs or behind basement walls on confined sites

Description

Preprufe® 300R & 160R membranes are unique composite sheets comprising a thick HDPE film, an aggressive pressure sensitive adhesive and a weather resistant protective coating.

Unlike conventional non-adhering membranes, which are vulnerable to water ingress tracking between the unbonded membrane and structure, the unique Preprufe bond to concrete prevents ingress or migration of water around the structure.

The Preprufe R System includes:

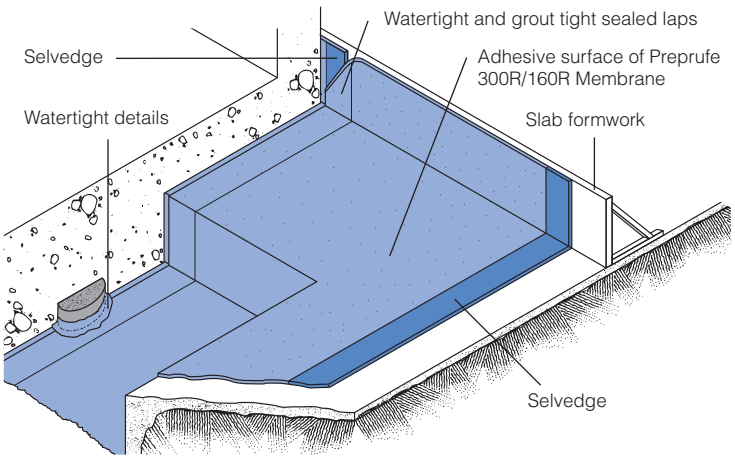
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe Tape LT**—for covering cut edges, roll ends, penetrations and detailing (temperatures between 25°F (-4°C) and 86°F (+30°C)).
- **Preprufe Tape HC**—as above for use in Hot Climates (minimum 50°F (10°C)).
- **Bituthene® Liquid Membrane**—for sealing around penetrations, etc.
- **Adcor™ ES**—waterstop for joints in concrete walls and floors
- **Preprufe Tieback Covers**—preformed cover for soil retention wall tieback heads
- **Preprufe Preformed Corners**—preformed inside and outside corners

Preprufe 300R & 160R membranes are applied either horizontally to smooth prepared concrete, carton forms or well rolled and compacted earth or crushed stone substrate; or vertically to permanent formwork or adjoining structures. Concrete is then cast directly against the adhesive side of the membranes. The specially developed Preprufe adhesive layers work together to form a continuous and integral seal to the structure.

Preprufe can be returned up the inside face of slab formwork but is not recommended for conventional twin-sided formwork on walls, etc. Use Bituthene self-adhesive membrane or Procor® fluid applied membrane to walls after removal of formwork for a fully bonded system to all structural surfaces.

Advantages

- **Forms a unique continuous adhesive bond to concrete poured against it**—prevents water migration and makes it unaffected by ground settlement beneath slabs
- **Fully-adhered watertight laps** and detailing
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **BBA Certified** for basement Grades 2, 3, & 4 to BS 8102:1990
- **Zero permeance** to moisture
- **Solar reflective**—reduced temperature gain
- **Simple and quick to install**—requiring no priming or fillets
- **Can be applied to permanent formwork**—allows maximum use of confined sites
- **Self protecting**—can be trafficked immediately after application and ready for immediate placing of reinforcement
- **Unaffected by wet conditions**—cannot activate prematurely
- **Inherently waterproof, non-reactive system:**
  - not reliant on confining pressures or hydration
  - unaffected by freeze/thaw, wet/dry cycling
- **Chemical resistant**—effective in most types of soils and waters, protects structure from salt or sulphate attack



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

BBA BRITISH BOARD OF AGREMENT CERTIFICATE No. 97/3325

Installation

The most current application instructions, detail drawings and technical letters can be viewed at graceconstruction.com. For other technical information contact your local Grace representative.

Preprufe 300R & 160R membranes are supplied in rolls 4 ft (1.2 m) wide, with a selvedge on one side to provide self-adhered laps for continuity between rolls. The rolls of Preprufe Membrane and Preprufe Tape are interwound with a disposable plastic release liner which must be removed before placing reinforcement and concrete.

Substrate Preparation

All surfaces—It is essential to create a sound and solid substrate to eliminate movement during the concrete pour. Substrates must be regular and smooth with no gaps or voids greater than 0.5 in. (12 mm). Grout around all penetrations such as utility conduits, etc. for stability (see Figure 1).

Horizontal—The substrate must be free of loose aggregate and sharp protrusions. Avoid curved or rounded substrates. When installing over earth or crushed stone, ensure substrate is well compacted to avoid displacement of substrate due to traffic or concrete pour. The surface does not need to be dry, but standing water must be removed.

Vertical—Use concrete, plywood, insulation or other approved facing to sheet piling to provide support to the membrane. Board systems such as timber lagging must be close butted to provide support and not more than 0.5 in. (12 mm) out of alignment.

Membrane Installation

Preprufe can be applied at temperatures of 25°F (-4°C) or above. When installing Preprufe in cold or marginal weather conditions 55°F (<13°C) the use of Preprufe Tape LT is recommended at all laps and detailing. Preprufe Tape LT should be applied to clean, dry surfaces and the release liner must be removed immediately after application. Alternatively, Preprufe Low Temperature (LT) is available for low temperature condition applications. Refer to Preprufe LT data sheet for more information.

Horizontal substrates—Place the membrane HDPE film side to the substrate with the clear plastic release liner facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave plastic release liner in position until overlap procedure is completed (see Figure 2).

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back the plastic release liner from between the overlaps as the two layers are bonded together. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

Refer to Grace Tech Letter 15 for information on suitable rebar chairs for Preprufe.

Vertical substrates—Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Immediately remove the plastic release liner.

Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Roll firmly to ensure a watertight seal.

Roll ends and cut edges—Overlap all roll ends and cut edges by a minimum 3 in. (75 mm) and ensure the area is clean and free from contamination, wiping with a damp cloth if necessary. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly (see Figure 3). Immediately remove printed plastic release liner from the tape.

Details

Refer to Preprufe Field Application Manual, Section V Application Instructions or visit graceconstruction.com. This manual gives comprehensive guidance and standard details.

Membrane Repair

Inspect the membrane before installation of reinforcement steel, formwork and final placement of concrete. The membrane can be easily cleaned by power washing if required. Repair damage by wiping the area with a damp cloth to ensure the area is clean and free from dust, and allow to dry. Repair small punctures (0.5 in. (12 mm) or less) and slices by applying Preprufe Tape centered over the damaged area and roll firmly. Remove the release liner from the tape. Repair holes and large punctures by applying a patch of Preprufe membrane, which extends 6 in. (150 mm) beyond the damaged area. Seal all edges of the patch with Preprufe Tape, remove the release liner from the tape and roll firmly. Any areas of damaged adhesive should be covered with Preprufe Tape. Remove printed plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe membrane and tape.

It is recommended that concrete be poured within 56 days (42 days in hot climates) of application of the membrane. Following proper ACI guidelines, concrete must be placed carefully and consolidated properly to avoid damage to the membrane. Never use a sharp object to consolidate the concrete.

Removal of Formwork

Preprufe membranes can be applied to removable formwork, such as slab perimeters, elevator and lift pits, etc. Once the concrete is poured the formwork must remain in place until the concrete has gained sufficient compressive strength to develop the surface bond. Preprufe membranes are not recommended for conventional twin-sided wall forming systems.

A minimum concrete compressive strength of 1500 psi (10 N/mm^2) is recommended prior to stripping formwork supporting Preprufe membranes. Premature stripping may result in displacement of the membrane and/or spalling of the concrete.

Refer to Grace Tech Letter 17 for information on removal of formwork for Preprufe.

Figure 1

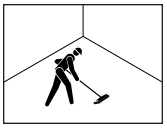


Figure 2

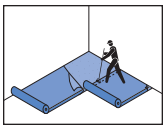
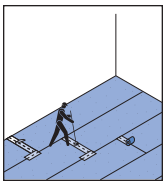
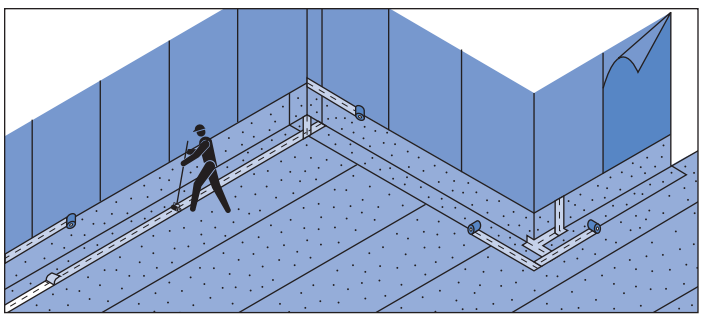


Figure 3

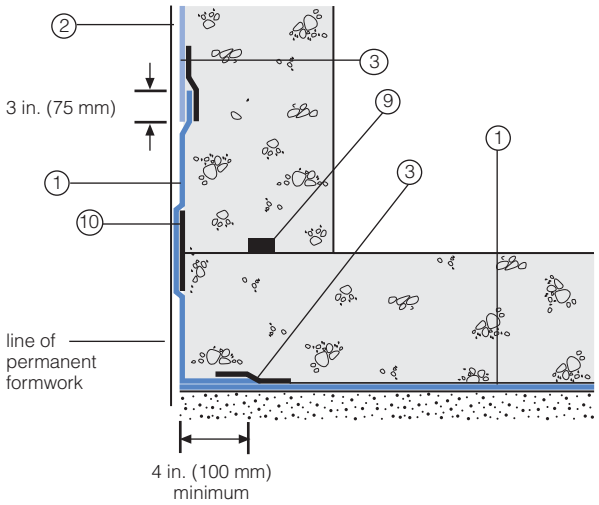




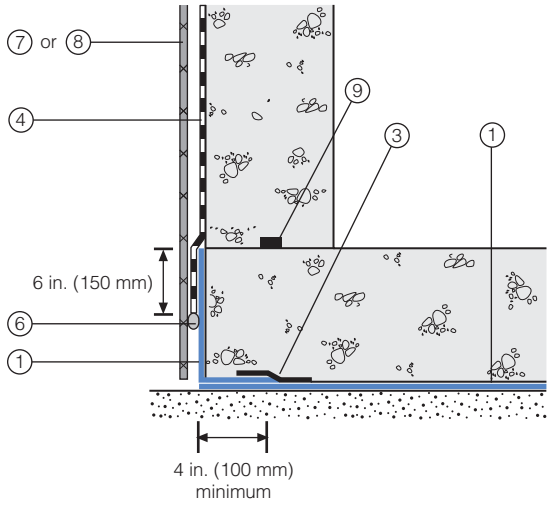
Detail Drawings

Details shown are typical illustrations and not working details. For a list of the most current details, visit us at graceconstruction.com. For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

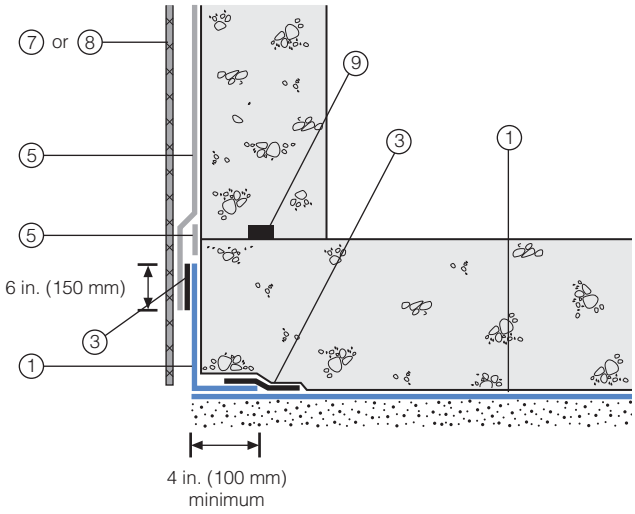
Wall base detail against permanent shutter



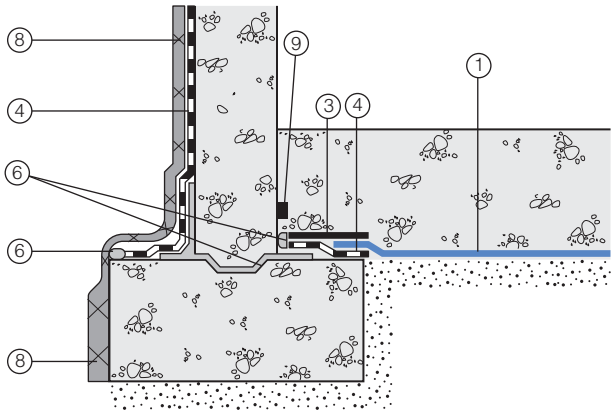
Bituthene wall base detail (Option 1)



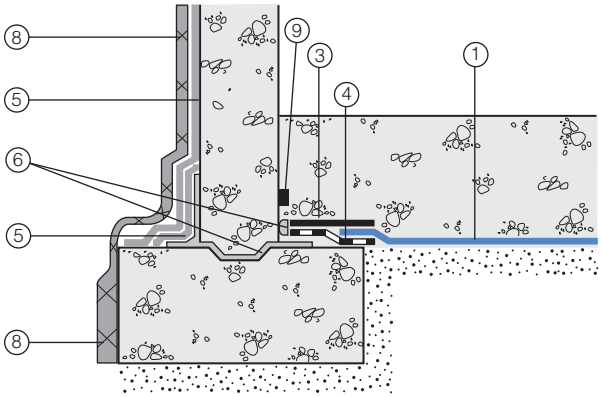
Procor wall base detail (Option 1)



Bituthene wall base detail (Option 2)



Procor wall base detail (Option 2)



1 Preprufe 300R
2 Preprufe 160R
3 Preprufe Tape
4 Bituthene
5 Procor
6 Bituthene Liquid Membrane
7 Protection
8 Hydroduct®
9 Adcor ES
10 Preprufe CJ Tape

Supply

Dimensions (Nominal)	Preprufe 300R Membrane	Preprufe 160R Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	4 ft x 98 ft (1.2 m x 30 m)	4 ft x 115 ft (1.2 m x 35 m)	4 in. x 49 ft (100 mm x 15 m)
Roll area	392 ft² (36 m²)	460 ft² (42 m²)	
Roll weight	108 lbs (50 kg)	92 lbs (42 kg)	4.3 lbs (2 kg)
Minimum side/end laps	3 in. (75 mm)	3 in. (75 mm)	3 in. (75 mm)
* LT denotes Low Temperature (between 25°F (-4°C) and 86°F (+30°C)) HC denotes Hot Climate (50°F (>+10°C))			
Ancillary Products			
Bituthene Liquid Membrane—1.5 US gal (5.7 liter) or 4 US gal (15.1 liter)			

Physical Properties

Property	Typical Value 300R	Typical Value 160R	Test Method
Color	white	white	
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	ASTM D3767
Lateral Water Migration Resistance	Pass at 231 ft (71 m) of hydrostatic head pressure	Pass at 231 ft (71 m) of hydrostatic head pressure	ASTM D5385, modified[1]
Low temperature flexibility	Unaffected at -20°F (-29°C)	Unaffected at -20°F (-29°C)	ASTM D1970
Resistance to hydrostatic head	231 ft (71 m)	231 ft (71 m)	ASTM D5385, modified[2]
Elongation	500%	500%	ASTM D412, modified[3]
Tensile strength, film	4000 psi (27.6 MPa)	4000 psi (27.6 MPa)	ASTM D412
Crack cycling at -9.4°F (-23°C), 100 cycles	Unaffected, Pass	Unaffected, Pass	ASTM C836
Puncture resistance	221 lbs (990 N)	100 lbs (445 N)	ASTM E154
Peel adhesion to concrete	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D903, modified[4]
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified[5]
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m²))	0.01 perms (0.6 ng/(Pa x s x m²))	ASTM E96, method B
Water absorption	0.5%	0.5%	ASTM D570

Footnotes:

1. Lateral water migration resistance is tested by casting concrete against membrane with a hole and subjecting the membrane to hydrostatic head pressure with water. The test measures the resistance of lateral water migration between the concrete and the membrane.
2. Hydrostatic head tests of Preprufe Membranes are performed by casting concrete against the membrane with a lap. Before the concrete cures, a 0.125 in. (3 mm) spacer is inserted perpendicular to the membrane to create a gap. The cured block is placed in a chamber where water is introduced to the membrane surface up to the head indicated.
3. Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
4. Concrete is cast against the protective coating surface of the membrane and allowed to properly dry (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 2 in. (50 mm) per minute at room temperature.
5. The test is conducted 15 minutes after the lap is formed (per Grace published recommendations) and run at a rate of 2 in. (50 mm) per minute.

Specification Clauses

Preprufe 300R or 160R shall be applied with its adhesive face presented to receive fresh concrete to which it will integrally bond. Only Grace Construction Products approved membranes shall be bonded to Preprufe 300R/160R. All Preprufe 300R/160R system materials shall be supplied by Grace Construction Products, and applied strictly in accordance with their instructions. Specimen performance and formatted clauses are also available.

NOTE: Use Preprufe Tape to tie-in Procor with Preprufe.

Health and Safety

Refer to relevant Material Safety data sheet. Complete rolls should be handled by a minimum of two persons.

www.graceconstruction.com

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

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