

**REDEVELOPMENT PROJECT**  
**545-551 WEST 48TH STREET**  
**534-542 WEST 49TH STREET**  
**MANHATTAN, NEW YORK**

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**Remedial Action Work Plan**

**NYC VCP Number: 13VCP083M**

**Prepared for:**

FPG W. 48th Street, LLC  
45 Main Street, Suite 302  
Brooklyn, NY 11201

**Prepared by:**



***ENVIRONMENTAL BUSINESS CONSULTANTS***

1808 Middle Country Road  
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AUGUST 2012

# REMEDIAL ACTION WORK PLAN

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## LIST OF ACRONYMS

Acronym	Definition
AOC	Area of Concern
AS/SVE	Air Sparging/Soil Vapor Extraction
BOA	Brownfield Opportunity Area
CAMP	Community Air Monitoring Plan
C/D	Construction/Demolition
COC	Certificate of Completion
CQAP	Construction Quality Assurance Plan
CSOP	Contractors Site Operation Plan
DCR	Declaration of Covenants and Restrictions
ECs/ICs	Engineering and Institutional Controls
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
BCA	Brownfield Cleanup Agreement
MNA	Monitored Natural Attenuation
NOC	Notice of Completion
NYC VCP	New York City Voluntary Cleanup Program
NYC DEP	New York City Department of Environmental Protection
NYC DOHMH	New York State Department of Health and Mental Hygiene
NYCRR	New York Codes Rules and Regulations
NYC OER	New York City Office of Environmental Remediation
NYS DEC	New York State Department of Environmental Conservation
NYS DEC DER	New York State Department of Environmental Conservation Division of Environmental Remediation
NYS DOH	New York State Department of Health
NYS DOT	New York State Department of Transportation
ORC	Oxygen-Release Compound
OSHA	United States Occupational Health and Safety Administration
PE	Professional Engineer

PID	Photo Ionization Detector
QEP	Qualified Environmental Professional
QHHEA	Qualitative Human Health Exposure Assessment
RAOs	Remedial Action Objectives
RAR	Remedial Action Report
RAWP	Remedial Action Work Plan or Plan
RCA	Recycled Concrete Aggregate
RD	Remedial Design
RI	Remedial Investigation
RMZ	Residual Management Zone
SCOs	Soil Cleanup Objectives
SCG	Standards, Criteria and Guidance
SMP	Site Management Plan
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compound
USGS	United States Geological Survey
UST	Underground Storage Tank
VOC	Volatile Organic Compound

## CERTIFICATION

I, Ariel Czemerinski, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the Redevelopment Project at 545-551 West 48th Street, and 534-542 West 49th Street, Site number 13CVCP083M.

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

Ariel Czemerinski

Name

076508

NYS PE License Number

Signature

3/5/2013

Date



## EXECUTIVE SUMMARY

FPG W. 48th Street, LLC, has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 0.49-acre site located at 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section of Manhattan, 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 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section in Manhattan, New York, and is identified as Block 1077 and Lots 8, 9, 10, 55, and 56 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 21,237.71-square feet and is bounded by West 49th Street to the north, West 48th Street to the south, both a 5-story office building occupied by the American Red Cross (514 West 49th Street) and a 7-story office building occupied by the Salvation Army (535 West 48th Street) to the east, and both a 5-story brick residential building (544 West 49th Street) and a car dealership lot (666 11th Avenue) to the west. A map of the site boundary is shown in Figure 2.

Currently, Lot 55 of the Site is developed with a one-story parking garage building with a basement level and Lot 56 is developed with a one-story brick building used for auto repair. Lots 8, 9 and 10 are undeveloped and are used as an open-air parking lot.

Lots 8, 9 and 10 are adjacent rectangular lots that front West 48th Street. Lots 8 and 9 both have 25 feet of street frontage and a depth of approximately 100.42 feet, for a total of approximately 2,510 ft<sup>2</sup> for each lot. Lot 10 has 50 feet of street frontage and a depth of 100.42 ft for a total of 5,020 ft<sup>2</sup>.



Lots 55 and 56 are adjacent lots located north of Lots 8, 9 and 10 that have street frontage on West 49th Street. Lot 55 has 86.5 feet of street frontage and a depth of 100.42 feet for a total of 8,686 ft<sup>2</sup> and Lot 56 has 25 feet of street frontage and a depth of 100.42 feet for a total of 2,510 ft<sup>2</sup>.

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

The proposed future use of the Site will consist of residential use. Layout of the proposed site development is presented in Figure 3. Architectural Plans are provided in Attachment A. The current zoning designation is zoning designation and R8 with a C2-4 commercial overlay description. The proposed use is consistent with existing zoning for the property.

Redevelopment plans for the property includes the demolition of the 1-story parking garage on Lot 55 and the 1-story auto repair shop building on Lot 56. Two new 7-story buildings (Towers A and B) will be constructed on the Site. The buildings will front both W. 48<sup>th</sup> Street and W. 49<sup>th</sup> Street and will cover approximately 70 percent of the combined area of the 5 lots. Each building will have a full basement level which will be utilized for residential apartments, common and recreation areas and mechanical equipment rooms. The first floor of each building will consist of a lobby area, connection to the courtyard and residential apartments. Floors 2 through 7 will consist of residential apartments. The total gross building square footage for Tower A will be 55,023 ft<sup>2</sup> and 49,258 ft<sup>2</sup> for Tower B.

A cellar level open space (6,414 ft<sup>2</sup>) will be created between the two towers and will consist of private rear yard spaces, common terrace space, and a greenhouse enclosed in glass that connects the basement level of Tower A with the basement level of Tower B. The entire open space between the two buildings will be capped with a concrete slab.

Excavation for the basement of the two towers and the open space behind the buildings will result in excavation of the entire property to a depth of 14-16 feet below street level. This will require excavation of at least 4 to 7 feet into the bedrock over the majority of the Site. Since the depth to groundwater at the Site was measured to be approximately 9ft in the asphalt paved

parking area, both the basements of the Tower A and Tower B buildings and the open space between the two buildings will require the installation of a waterproofing membrane/system.

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

### **Summary of the Remedy**

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

1. Preparation of a Community Protection Statement and performance of all required NYC VCP citizen participation activities according to an approved Citizen Participation Plan (CPP);
2. Performance a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establish Track 1 - Unrestricted Use Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs to the bedrock surface. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
6. 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;
7. Sampling and analysis of excavated media as required by disposal facility(ies). Appropriate segregation of excavated media on-Site;

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;
9. Collection and analysis of end-point samples if any soil remains to determine the performance of the remedy with respect to attainment of Track 1 - Unrestricted Use SCOs;
10. As part of development, installation of a waterproofing membrane beneath the buildings' slabs and cellar level open space located between the two buildings;
11. As part of development, construction of an engineered composite cover across the entire Site;
12. Installation of bedrock groundwater wells prior to development;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
15. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
16. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes any Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP; and
17. If Track 1 is not achieved, establishment of a deed notice and institutional controls and 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.

## Community Protection Statement

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

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

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

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

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

for people to come in contact with this contamination. All identified public exposures will be addressed under this cleanup plan.

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

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

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

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

**Odor, Dust and Noise Control.** This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas,

please contact the on-Site project manager, Kevin Brussee at (631) 504-6000 or NYC Office of Environmental Remediation Project Manager, Breanna Gribble at (212) 442-7126.

**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 EBC facility Project Manager, Kevin Brussee at (631) 504-6000, the NYC Office of Environmental Remediation Project Manager, Breanna Gribble at (212) 442-7126, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

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

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

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

**Stockpile Management.** Soil stockpiles will be kept covered with tarps to prevent dust, odors and erosion. Stockpiles will be frequently inspected. Damaged tarp covers will be promptly replaced. Stockpiles will be protected with silt fences. Hay bales will be used, as needed to protect storm water catch basins and other discharge points.

**Trucks and Covers.** Loaded trucks leaving the Site will be covered in compliance with applicable laws and regulations to prevent dust and odor. Trucks will be properly recorded in logs and records and placarded in compliance with applicable City, State and Federal laws, including those of the New York State Department of Transportation. If loads contain wet material that can leak, truck liners will be used. All transport of materials will be performed by licensed truckers and in compliance with all laws and regulations.

**Imported Material.** All fill materials proposed to be brought onto the Site will comply with rules outlined in this cleanup plan and will be inspected and approved by a qualified worker located on-Site. Waste materials will not be brought onto the Site. Trucks entering the Site with imported clean materials will be covered in compliance with applicable laws and regulations.

**Equipment Decontamination.** All equipment used for cleanup work will be inspected and washed, if needed, before it leaves the Site. Trucks will be cleaned at a truck inspection station on the property before leaving the Site.

**Housekeeping.** Locations where trucks enter or leave the Site will be inspected every day and cleaned regularly to ensure that they are free of dirt and other materials from the Site.

**Truck Routing.** Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

**Final Report.** The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for you to review in the public document repositories located at the New York Public Library - Columbus Library (742 10th Avenue New York, NY).

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

## REMEDIAL ACTION WORK PLAN

### 1.0 SITE BACKGROUND

FPG W. 48th Street, LLC, has enrolled in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section of Manhattan, 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 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section of Manhattan, New York, and is identified as Block 1077 and Lots 8, 9, 10, 55, and 56 on the New York City Tax Map. Figure 1 shows the Site location. The Site is 21,237.71-square feet and is bounded by West 49th Street to the north, West 48th Street to the south, both a 5-story office building occupied by the American Red Cross (514 West 49th Street) and a 7-story office building occupied by the Salvation Army (535 West 48th Street) to the east, and both a 5-story brick residential building (544 West 49th Street) and a car dealership lot (666 11th Avenue) to the west. A map of the site boundary is shown in Figure 2.

Currently, the Lot 55 of the Site is developed with a one-story parking garage building with a basement level and Lot 56 is developed with a one-story brick building used for auto repair and contains. Lots 8, 9 and 10 are undeveloped and are used as an open-air parking lot.

Lots 8, 9 and 10 are adjacent rectangular lots that front West 48th Street. Lots 8 and 9 both have 25 feet of street frontage and a depth of approximately 100.42 feet, for a total of approximately

2,510 ft<sup>2</sup> for each lot. Lot 10 has 50 feet of street frontage and a depth of 100.42 ft for a total of 5,020 ft<sup>2</sup>.

Lots 55 and 56 are adjacent lots located north of Lots 8, 9 and 10 that have street frontage on West 49th Street. Lot 55 has 86.5 feet of street frontage and a depth of 100.42 feet for a total of 8,686 ft<sup>2</sup> and Lot 56 has 25 feet of street frontage and a depth of 100.42 feet for a total of 2,510 ft<sup>2</sup>.

## **1.2 Proposed Redevelopment Plan**

The proposed future use of the Site will consist of residential use. Layout of the proposed site development is presented in Figure 3. Architectural Plans are provided in Attachment A. The current zoning designation is zoning designation and R8 with a C2-4 commercial overlay description. The proposed use is consistent with existing zoning for the property.

Redevelopment plans for the property includes the demolition of the 1-story parking garage on Lot 55 and the 1-story auto repair shop building on Lot 56. Two new 7-story buildings (Towers A and B) will be constructed on the Site. The buildings will front both W. 48<sup>th</sup> Street and W. 49<sup>th</sup> Street and will cover approximately 70 percent of the combined area of the 5 lots. Each building will have a full basement level which will be utilized for residential apartments, common and recreation areas and mechanical equipment rooms. The first floor of each building will consist of a lobby area, connection to the courtyard and residential apartments. Floors 2 through 7 will consist of residential apartments. The total gross building square footage for Tower A will be 55,023 ft<sup>2</sup> and 49,258 ft<sup>2</sup> for Tower B.

A cellar level open space (6,414 ft<sup>2</sup>) will be created between the two towers and will consist of private rear yard spaces, common terrace space, and a greenhouse enclosed in glass that connects the basement level of Tower A with the basement level of Tower B. The entire open space between the two buildings will be capped with a concrete slab.

Excavation for the basement of the two towers and the open space behind the buildings will result in excavation of the entire property to a depth of 14-16 feet below street level. This is expected to require excavation of at least 4 to 7 feet into the bedrock over the majority of the

Site. Since the depth to groundwater at the Site was measured to be approximately 9ft in the asphalt paved parking area, both the basements of the Tower A and Tower B buildings and the open space between the two buildings will require the installation of a waterproofing membrane/system.

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 industrial 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 or daycare facilities are located within a 250 ft radius of the Site. Five small high schools are located at the former H.S. 535 Park West High School located at 737 10th Avenue (between West 50th Street and West 51st Street). These five small high schools include Manhattan Bridges High School, Food and Finance High School, High School of Hospitality Management, Urban Assembly School for Design and Construction, and Facing History High School.

#### Surrounding Property Usage

Direction	Property Description
<b>North</b> Opposite Side of W. 49 <sup>th</sup> Street	<p><u>Block 1078, Lot 8</u> (541 W. 49<sup>th</sup> Street) – A 75' by 100' lot. The lot is developed with a 6-story apartment building.</p> <p><u>Block 1078, Lot 111</u> (539 W. 49<sup>th</sup> Street) – A 25' by 100' lot. The lot is developed with a 5-story residential building. The building, built approximately 1901, has 20 residential units.</p> <p><u>Block 1078, Lot 12</u> (537 W. 49<sup>th</sup> Street) – A 25' by 100' lot. The lot is developed with a 5-story residential building. The building, built approximately 1901, has 20 residential units.</p> <p><u>Block 1078, Lot 13</u> (535 W. 49<sup>th</sup> Street) – A 25' by 100' lot. The lot is developed with a 5-story residential building. The building, built approximately 1901, has 20 residential units.</p>

<b>South</b> Opposite Side of W. 48 <sup>th</sup> Street	<p><u>Block 1076, Lot 51</u> (540 W. 48<sup>th</sup> Street) – A 100’ by 100’ lot under construction.</p> <p><u>Block 1076, Lot 55</u> (542 W. 48<sup>th</sup> Street) – A 20’ by 100’ lot developed with a 4-story commercial building, circa 1940.</p> <p><u>Block 1076, Lot 56</u> (544 W. 48<sup>th</sup> Street) – A 30’ by 100’ lot developed with a 3-story commercial building. The first floor of the building is utilized as parking.</p>
<b>East</b> Adjacent Property	<p><u>Block 1077 Lot 43</u> (514 W. 49<sup>th</sup> Street) – A 332’ by 100’ corner lot developed with a 4-story industrial building, circa 1920.</p> <p><u>Block 1077 Lot 12</u> (535 W. 48<sup>th</sup> Street) – A 75’ by 100’ lot developed with a 7-story commercial building. The building is utilized as a salvation army.</p>
<b>West</b> Adjacent Property	<p><u>Block 1077 Lot 1</u> (559-561 W. 48<sup>th</sup> Street) – A 175’ by 200’ corner lot. The lot is developed with a 2-story commercial building and was built approximately 1984.</p> <p><u>Block 1077 Lot 57</u> (544 W. 49<sup>th</sup> Street) – A 25’ by 100’ lot developed with a 5-story residential building, built approximately 1909.</p>

#### 1.4 Remedial Investigation

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, Redevelopment Project*”, dated August, 2012 (RIR).

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

##### *Lots 8 & 9 – 549-551 W. 48<sup>th</sup> Street*

Lots 8 and 9 were each developed prior to 1890 with residential buildings. The buildings were demolished between 1968 and 1979. According to the 1995 Sanborn map, the lots were combined with Lot 10 and used as a parking facility.

##### *Lot 10 – 545-547 W. 48<sup>th</sup> Street*

Lot 10 was originally two separate lots labeled as 545 and 547 W. 48<sup>th</sup> Street. Both lots were developed prior to 1890 with residential buildings. The buildings were demolished by 1968. The lot remained vacant until it was combined with Lots 8 and 9 sometime prior to 1995 and used as a parking facility.

*Lot 55 – 534-540 W. 49<sup>th</sup> Street*

Prior to 1890, Lot 55 consisted of three lots with street addresses 534-536, 538, and 540 which were each developed as residential properties with outbuildings. By 1911, 534-536 and 538 W. 49<sup>th</sup> Street were combined and redeveloped into a 2-story garage/repair shop. In 1911, 540 W. 49<sup>th</sup> Street was utilized as a wagon repair shop. Sometime between 1911 and 1919, 540 W. 49<sup>th</sup> Street was combined with 534-536 W. 49<sup>th</sup> Street and redeveloped into a 1-story automobile service station and repair shop. The tank in the sidewalk was no longer shown but a 275 gallon gasoline tank appears in the southwest corner of the building. In 1959 the property is redeveloped with a new 1-story garage building and appears to have been used as a parking garage, auto repair facility and for auto sales through the 1980's. It was then used as a parking garage to the present time. A 250 gallon underground gasoline tank is present beneath the sidewalk in the 1911 Sanborn map. A 275 gallon gasoline tank is shown in the southwest corner of the building in the 1919, 1930 and 1950 Sanborn maps.

*Lot 56 – 542 W. 49<sup>th</sup> Street*

Prior to 1890, Lot 56 was developed with a residential home and outbuildings. By 1911 the property was used labeled “dairyman”. According to NYC DOB records and the 1919 Sanborn map, the lot was redeveloped in 1919 into a 1-story auto repair shop in the front of the lot and an adjoining 2-story machine shop in the rear of the lot. By 1930, the property was used by a trucking company. The building reverted back to an auto repair facility by 1947 and has remained an auto repair facility since.

The AOCs identified for this Site include:

1. Historic fill is present at the Site to a depth of at least 4 feet below the basement level of the parking garage and to a depth of approximately 7 feet or to the bedrock surface in the asphalt paved parking lot located behind the automotive repair facility and parking garage building.

**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 ten soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed three sub-slab soil vapor probes within the parking garage building and collected three samples for chemical analysis;
4. Installed three soil vapor implants within the asphalt paved parking lot and collected three samples for chemical analysis; and
5. Several attempts were made to collect a groundwater sample, but groundwater was not encountered within the overburden soil above the bedrock located at approximately 7 feet below grade in the asphalt paved parking lot. However a pre-existing monitoring well was discovered in the central portion of Lot 8. Originally the well was believed to be a fill port, but upon further inspection it was a determined that it was a monitoring well installed for a geotechnical report. A groundwater sample was collected from the monitoring well for chemical analysis. Supplemental groundwater sampling will be performed after the redevelopment project begins and demolition of the existing buildings and excavation to the bedrock surface is completed.

### **Summary of Environmental Findings**

1. Elevation of the property ranges from approximately 25 to 27 feet.
2. Groundwater is not present within overburden soil at the Site.
3. Depth to bedrock at the Site ranges from 4 to at least 14 feet below grade.
4. The stratigraphy of the Site, from the surface down, consists a layer of historic fill to a depth of at least 4 feet below the basement level of the parking garage and a depth of approximately 7 feet below the asphalt paved parking lot located behind the automotive repair facility and parking garage building. Bedrock consisting of a mica schist is present below the fill.
5. Soil/fill samples collected during the RI showed no PCBs at detectable concentrations. No VOCs were present at detectable concentrations, with the exception of naphthalene which was detected at a low level in two of ten soil samples (8.7 ppb and 1,200 ppb) and 1,2,4-trimethylbenzene, which was detected at a low level (6.9 ppb) in one of the soil samples. The concentration of the VOC is below Unrestricted Use SCOs. Six SVOCs, were

detected in shallow soils at concentrations above Restricted Residential SCOs and included benzo(a)anthracene, benzo(a)pyrene, benzo(a)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(k)anthracene and indeno(1,2,3-cd)pyrene. These SVOCs were all PAH compounds and their concentrations and distributions indicate that they are associated with historic fill material observed in shallow samples. Five pesticides, including 4,4,4-DDD (max of 150 ppb), 4,4,4-DDE (max of 61 ppb), 444-DDT (max of 360 ppb), chlordane (max of 150 ppb) and dieldrin (max of 300 ppb) were detected above Unrestricted Use SCOs, and one pesticide (dieldrin) exceeded Restricted Residential SCOs (in one sample). Five metals, including barium, chromium, mercury, lead and zinc exceeded Unrestricted Use SCOs in the soil samples, and of these metals, barium (max of 2,530 ppm), mercury (max of 2.26 ppm), and lead (max of 1,160 ppm) also exceeded their respective Restricted Residential SCOs. Overall, the findings were consistent with observations for other historical fill sites in Manhattan.

6. Bedrock is present at the Site at a depth of approximately 7 feet below grade in the asphalt paved parking lot located behind the parking garage and automotive repair facility buildings and is assumed to be slightly more than 4 feet below grade beneath the basement of the parking garage building. Groundwater was not encountered within the soil borings performed within the overburden soil above bedrock. The collection of groundwater samples will require drilling into the bedrock. Due to current Site conditions (height restriction of basement, and an active/crowded parking lot), monitoring well installation and groundwater sampling was deferred until after the redevelopment project begins and demolition of the existing buildings and excavation to the bedrock surface is completed. However a pre-existing monitoring well was discovered in Lot 8 and was sampled for chemical analysis. The groundwater sample collected during the RI showed no PCBs at detectable concentrations. No VOCs were present at detectable concentrations. Five SVOCs were detected above NYS Groundwater Quality Standards (GQS). These SVOCs were all PAH compounds and their concentrations and distributions indicate that they are associated with historic fill material. Two pesticides (4,4,4-DDT and dieldrin) were detected, but only dieldrin was detected above its respective GQS. One dissolved metal, sodium, exceeded GQS in the groundwater sample

and is attributed to saline intrusion or road salting. Overall, the findings were consistent with observations for other historical fill sites in Manhattan.

7. Sub-slab and soil vapor samples collected during the RI showed petroleum and chlorinated VOCs at low to moderate concentrations. Total petroleum VOCs were identified from 50 to 522  $\mu\text{g}/\text{m}^3$ . Acetone was detected to a maximum concentrations of 342  $\mu\text{g}/\text{m}^3$ , toluene was detected at 101  $\mu\text{g}/\text{m}^3$ , and xylenes were at 70  $\mu\text{g}/\text{m}^3$ . PCE was identified in all samples at a maximum concentration of 121  $\mu\text{g}/\text{m}^3$  and TCE was detected within only one of the samples at a concentration of 30.4  $\mu\text{g}/\text{m}^3$ . These results for TCE and PCE are within the monitoring level ranges of the State DOH soil vapor guidance matrix. Neither PCE nor TCE were detected within any of the soil samples collected at the Site.

## 2.0 REMEDIAL ACTION OBJECTIVES

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

### Soil

- Prevent direct contact with contaminated soil.

### Soil Vapor

- Prevent exposure to contaminants in soil vapor.

### Groundwater

- Due to presence of parking garage and auto repair shop, only one groundwater sample was collected from a pre-existing monitoring well. A supplemental groundwater investigation will be performed after demolition of buildings.

### 3.0 REMEDIAL ALTERNATIVES ANALYSIS

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

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

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

Alternative 1 is a Track 1 alternative that involves removal of all soil impacted above Track 1 - Unrestricted Use SCOs and includes:

- Removal of all soil/ fill exceeding Track 1 - Unrestricted Use SCOs throughout the Site and confirmation that Track 1 - Unrestricted Use SCOs have been achieved by reaching into bedrock or with post-excavation endpoint sampling. Based on the results of the remedial investigation, it is expected that this alternative would require excavation of 7 feet to remove all historic fill at the Site. Since the planned excavation depth for the new

building and courtyard area is 14 to 16 feet below grade, and the depth to bedrock varies from 8 to 12 feet below existing grade, the majority of the Site will be excavated to and below the bedrock surface. If soil/fill containing analytes at a concentration above Track 1 -Unrestricted Use SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation will be performed to ensure complete removal of soil that does not meet Track 1 - Unrestricted Use SCOs.

- Although engineering or institutional controls are not required in a Track 1 cleanup, as part of development, a waterproofing/vapor barrier will be installed beneath the basement foundation and along the sidewalls of the both the Tower A and Tower B buildings, as well as beneath the concrete slab to be installed in the cellar level open space that will be created between the two towers .

Alternative 2 removes all impacted soil above Track 4 - Site-Specific SCOs and includes:

- 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 development purposes would take place to a depth of approximately 4 to 7 feet into bedrock. If soil/fill containing SVOCs or metals at concentrations above Track 4 - Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the new building is complete, additional excavation will be performed to ensure complete removal of soil that does not meet Track 4 - Site-Specific SCOs;
- Placement of a final cover over the entire Site to eliminate exposure to remaining soil/fill;
- Placement of a waterproofing/vapor barrier beneath the basement foundation and along the sidewalls of the both the Tower A and Tower B buildings, as well as beneath the concrete slab to be installed in the cellar level open space that will be created between the two towers;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site and prohibitions on sensitive Site uses, such as farming or vegetable gardening, to eliminate future exposure pathways;

- Establishment of an approved Site Management Plan to ensure long-term management of these engineering and institutional controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and
- Placement of a deed notice to memorialize the remedial action and the Engineering and Institutional Controls to ensure that future owners of the Site continue to maintain these controls as required.

### **3.1 THRESHOLD CRITERIA**

#### **Protection of Public Health and the Environment**

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

**Alternative 1** would result in removal of all soil/fill with contaminant concentrations above Track 1 - Unrestricted Use SCOs. As such, this alternative would be consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Eliminating historic fill from the Site;
- Preventing direct contact with contaminated on-Site soils;
- Eliminating the risk of ingestion exposures or other direct contact with contaminated on-Site soils;
- Minimizing potential exposure to contaminated soils during construction by implementing an approved Soil/Materials Management Plan and Community Air Monitoring Plan (CAMP);
- Eliminating the risk of contamination leaching into groundwater; and
- Preventing migration of soil vapors into occupied structures.

**Alternative 2** would achieve comparable protective of human health and the environment by excavating the historic fill at the Site and by meeting Track 4 - Site Specific SCOs as well as placement of institutional and engineering controls, including a composite cover system. As such, this alternative would be consistent with the RAOs and would provide overall protection of public health and the environment in consideration of current and potential future land use by:

- Preventing direct contact with contaminated on-Site soils by implementing an approved Soil/Materials Management Plan and CAMP during remediation;
- Minimizing the risk of contamination leaching into groundwater;
- Preventing direct contact with groundwater;
- Minimizing the potential for direct contact with contaminated on-Site soils by placement of a composite cover system over the entire Site and implementing Institutional Controls; and
- Preventing migration of soil vapors into occupied structures.

For both alternatives, worker exposure to soil and vapors will be minimized through implementation of a Health and Safety Plan. Exposures to area residents from dust and/or vapors will be minimized through the use of engineering controls and through implementation of a Community Air Monitoring Plan (CAMP).

### **3.2. Balancing Criteria**

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

Alternative 1 will achieve compliance with the remedial goals, SCGs and RAOs for soil through removal to Track 1 - Unrestricted Use SCOs. Compliance with SCGs for soil gas will be achieved under Alternative 1 without remedial action based on the laboratory results of the Remedial Investigation. All potential sources for groundwater contamination will be removed as part of the remedial action (by soil excavation to bedrock). Further compliance with SCGs for groundwater will be further evaluated after demolition of existing buildings

Alternative 2 will achieve compliance with the remedial goals, SCGs and RAOs for soil through removal of soil to meet Track 4 - Site Specific SCOs. Further compliance with SCGs for groundwater and soil gas will be achieved under Alternative 2 as stated above for Alternative 1.

### **Short-term effectiveness and impacts**

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

Both Alternative 1 and 2 would result in short-term impacts associated with excavation, handling, load out of materials, and truck traffic. However, focused attention to means and methods during the remedial action, including community air monitoring, dust control and appropriate truck routing, would minimize or negate the overall impact of these activities.

The Track 1 and Track 4 Alternatives would both employ appropriate measures to prevent short-term impacts, including a Community Air Monitoring Plan (CAMP) and a Soil/Materials Management Plan (SMMP), during all on-Site soil disturbance activities and would minimize the release of significant contaminants into the environment. Construction workers operating under appropriate management procedures and a Health and Safety Plan (HASP) will be protected from on-Site contaminants (personal protective equipment would be worn consistent with the documented risks within the respective work zones).

Other potential impacts to the community under Alternatives 1 or 2, such as construction-related noise, vibrations and traffic, will be controlled and regulated under the terms of the NYC Department of Buildings issued building permit which can place a Stop Work Order on the property for unsafe conditions, community impacts or violation of the terms and conditions of the permit. Decontamination procedures of equipment, including trucks transporting soil to off-Site disposal facilities will minimize the potential for impacted soil to be dispersed beyond the

Site boundary. A truck traffic plan would also be prepared to minimize disturbance to the local roads and community under these alternatives.

### **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 by permanently removing and/or eliminating the exposure to Site contaminants (urban fill).

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 - Site-Specific SCOs, establishing a composite cover system and a waterproofing membrane/system across the entire Site, establishing use restrictions, establishing a Site Management Plan to ensure long-term management of Institutional Controls (ICs) and Engineering Controls (ECs), and placing a deed restriction to memorialize these controls for the long term. Establishment of an SMP and a deed restriction will ensure that this protection remains effective for the long-term. The SMP will ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and use restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy will provide continued high level of protection in perpetuity.

Both Alternative 1 and Alternative 2 will continue to meet RAOs for soil, providing a permanent long-term solution for the Site.

### **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 meeting Track 1 - Unrestricted Use SCOs. Alternative 2 would permanently eliminate the toxicity, mobility, and volume of contaminants from on-Site soil to a depth of bedrock, and any remaining soil beneath the new buildings and courtyard area will meet Track 4 Site-Specific SCOs. An engineered concrete cap will eliminate any potential exposures to remaining soil beneath the buildings or courtyard areas that contain metals, or SVOCs at a concentration that exceeds Track 4 - Site Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site.

### **Implementability**

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

The techniques, materials and equipment to implement Alternatives 1 and 2 are readily available and have been proven effective in remediating the contaminants associated with the Site. Excavation for the remediation of soils is both a "low tech" and reliable method which has a long and proven track record on the remediation of hazardous waste and petroleum spill sites.

The waterproofing membrane/system to be installed as a part of building construction is a highly effective method of preventing vapor intrusion. The installation of the waterproofing membrane

system beneath the basement slab of the new buildings is easily implemented during building construction.

### **Cost effectiveness**

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

Costs associated with Alternative 1 are estimated at approximately \$365,000. This cost estimate includes the following elements and assumptions:

- Excavate to a depth of 14-16 ft for the foundation and basement level of buildings A & B (5,200 cy) with over excavation as needed to reach bedrock in all areas of the Site;
- Disposal of 5,200 yd<sup>3</sup> (7,800 tons) of excavated soil as non-hazardous;
- Backfilling ~150 yd<sup>3</sup> of certified, virgin or recycled materials within over excavated area to raise to construction grade;
- Installation of a waterproofing membrane beneath both buildings and below the concrete slab constructed in the cellar level open courtyard created between the two buildings.
- HASP and CAMP monitoring for the duration of the remedial activities.

Costs associated with Alternative 2 are estimated at approximately \$350,000. This cost estimate includes the following elements and assumptions:

- Excavate to a depth of 14-16 ft for the foundation and basement level of buildings A & B (5,052 cy) to achieve Track 4 - Site Specific SCOs;
- Disposal of 5,200 yd<sup>3</sup> (7,800 tons) of excavated soil as non-hazardous;
- Installation of a waterproofing membrane beneath both buildings and below the concrete slab constructed in the cellar level open courtyard created between the two buildings.
- Capping the Site with a 4-inch concrete basement slab (Towers A&B) and the cellar level open courtyard created between the two buildings;

- HASP and CAMP monitoring for the duration of the remedial activities.

### **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. No questions regarding the Site have been raised regarding remedial options to date. This RAWP will be subject to a 30-day public comment period to determine if the community has any comments on the presented remedial alternatives and selected remedy. If no comments are received regarding the selected remedy, it will be considered to be acceptable to the community. 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 Track 1 - Unrestricted Use or Track 4 - Site Specific SCOs, either of which are appropriate for its planned residential use.

### **Sustainability of the Remedial Action**

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

Sustainability considerations under Alternatives 1 and 2 would consist of disposal of affected soil at a facility which recycles it for use in asphalt or other construction materials following processing to remove or stabilize contaminants consistent with applicable laws, rules and regulations, where approved by OER. Alternatives 1 and 2 would also seek to utilize recycled materials such as recycled concrete aggregate (RCA) for backfilling where feasible and thus offer similar opportunities for sustainable remedial action. See sustainability statement in Attachment 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 (CPP);
2. Performance a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establish Track 1 - Unrestricted Use Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Excavation and removal of soil/fill exceeding SCOs to the bedrock surface. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID;
6. 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;
7. Sampling and analysis of excavated media as required by disposal facility(ies). Appropriate segregation of excavated media on-Site;

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;
9. Collection and analysis of end-point samples if any soil remains to determine the performance of the remedy with respect to attainment of Track 1 - Unrestricted Use SCOs;
10. As part of development, installation of a waterproofing membrane beneath the buildings' slabs and cellar level open space located between the two buildings;
11. As part of development, construction of an engineered composite cover across the entire Site;
12. Installation of bedrock groundwater wells prior to development;
13. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations;
14. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
15. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
16. Submission of a RAR that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, and describes any Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP; and
17. If Track 1 is not achieved, establishment of a deed notice and institutional controls and 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.

## 4.2 Soil Cleanup Objectives and Soil/Fill management

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

<u>Contaminant</u>	<u>Track 4 SCOs</u>
Total SVOCs	250 ppm
Barium	1,000 ppm
Lead	1,200 ppm

All other compounds will be Track 2 - Restricted Residential SCOs.

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.

### Estimated Soil/Fill Removal Quantities

The total quantity of soil/fill expected to be excavated and disposed off-Site is 5,200 cy (7,800) tons. Disposal facilities will be reported to OER when they are identified and prior to the start of remedial action.

### End-Point Sampling

The recommended Alternative removes all fill /soil at the Site to the bedrock surface. However if any soil were to remain, end-point sampling would be performed to confirm that the Soil meets the SCOs for the project. End point sampling requirements will be addressed in the Stipulation List for this project. If hotspots are found, the end-point sampling protocol is discussed below:

1. One sample from the excavation bottom for every 900 square feet of bottom area.
2. 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.

3. 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 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. To achieve Track 4 - Site Specific SCOs, 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:

- Semi-volatile organic compounds by EPA Method 8270 (PAHs);
- Target Analyte List metals; and
- Pesticides by EPA Method 8081.

Endpoint samples for confirmation of Track 1 will include the full suite of analysis. If either LNAPL and/or DNAPL are detected, appropriate samples will be collected for characterization and required regulatory reporting (i.e. spills hotline) will be performed.

### **Quality Assurance/Quality Control**

The fundamental QA objective with respect to accuracy, precision, and sensitivity of analysis for laboratory analytical data is to achieve the QC acceptance of the analytical protocol. The

accuracy, precision and completeness requirements will be addressed by the laboratory for all data generated.

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4°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 withalconox® detergent solution and scrub
- Rinse with tap water
- Rinse with distilled or deionized water

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

### **Import and Reuse of Soils**

Import of soils onto the property and reuse of soils already onsite will be performed in conformance with the Soil/Materials Management Plan in Attachment D. The estimated quantity

of soil to be imported into the Site for backfill and cover soil is 750cy. The estimated quantity of on-Site soil/fill expected to be reused/relocated on Site is 0 cy.

### **4.3 Engineering Controls**

Since the selected Alternative will achieve a Track 1 cleanup, there will be no residual contamination remaining at the Site requiring the use of engineering controls. However, if a Track 1 cleanup can not be achieved the following Engineering Control Systems will be used:

- A composite cover system consisting of the concrete slabs of the two buildings, and the concrete slab covering the cellar level courtyard located between the 2 buildings.
- A waterproofing membrane system to be installed below the slab of the 2 buildings and around the sidewalls of each building.

#### **Composite Cover System**

If the Track 1 Cleanup objective is not achieved then exposure to residual soil/fill will be prevented by an engineered, composite cover system to be built on the Site. This composite cover system is comprised of:

- A composite cover system consisting of the concrete slabs of the two buildings, and the concrete slab covering the cellar level courtyard located between the two buildings.

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

### **Waterproofing Membrane**

Although not considered an engineering control for this project, a waterproofing membrane will be installed as part of development of the building foundation, since the basement level slab will be installed below the water table surface.

The waterproofing membrane will be the Preprufe 300R system as manufactured by Grace or an approved equivalent system. Preprufe 300 is a 1.2 mm (0.046 in) thick HDPE film with a pressure sensitive adhesive that bonds to 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.

Product specification sheets are provided in Attachment E. The Remedial Action Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty.

### **4.4 Institutional Controls**

Institutional Controls (IC) will not be required under the selected remedial alternative. In the event that a Track 1 cleanup is not achieved as planned, Institutional Controls (IC) have been incorporated in this remedial action as a contingency to manage residual soil/fill and other media and render the Site protective of public health and the environment. Institutional Controls are listed below. Long-term employment of EC/ICs will be established in a Declaration of Covenant and Restrictions (DCR) assigned to the property by the title holder and will be implemented under a site-specific Site Management Plan (SMP) that will be included in the RAR.

Institutional Controls as a contingency for this remedial action are:

- Recording of an OER-approved Declaration of Covenant and Restrictions (DCR) with the City Register or county clerk, as appropriate. The DCR will include a description of all ECs and ICs, will summarize the requirements of the Site Management Plan, and will note that the property owner and property owner's successors and assigns must comply with the DCR and the approved SMP. The recorded DCR will be submitted in the

Remedial Action Report. The DCR will be recorded prior to OER issuance of the Notice of Completion;

- Submittal of a Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, monitoring, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted when requested and will comply with RCNY §43-1407(1)(3).
- 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 community / residential use and will not be used for a higher level of use without prior approval by OER.

#### **4.5 Site Management plan**

The preparation of a Site Management Plan (SMP) will not be required under the selected Track 1 remedial alternative for this Site. Discussion of the SMP is provided in this section as a contingency in the event that the Track 1 cleanup is not achieved. Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The SMP describes appropriate methods and procedures to ensure implementation of all ECs and ICs that are required by the DCR and this RAWP. The Site Management Plan is submitted as part of the RAR but will be written in a manner that allows its use as an independent document. Site Management continues until terminated in writing by OER. The property owner is responsible to ensure that all Site Management responsibilities defined in the DCR and the Site Management Plan are implemented.

The SMP will provide a detailed description of the procedures required to manage residual soil/fill left in place following completion of the remedial action in accordance with the 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 a periodic basis to be established in the SMP and will be subject to review and modification by OER. The Site Management Plan will be based on a calendar year and certification reports will be due for submission to OER by March 31 of the year following the reporting period.

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

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

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

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

## **Known and Potential Sources**

Historic fill is present in the top 4 to 14 feet of soil at the Site. The laboratory results of soil samples collected of the fill material noted metals, SVOC above Unrestricted Use SCOs and several metals and SVOCs above Restricted Residential SCOs. VOCs including chlorinated solvents were detected at slightly elevated concentrations in soil gas in the northwestern corner of the property. The results of soil and groundwater samples at the Site do not report the presence of chlorinated solvents, or indicate an on-Site source.

Based on the results of the RIR, the contaminants of concern found are:

### Soil

- Metals, including barium, chromium, lead, mercury and zinc, exceeding Track 2 - Restricted Residential SCOs;
- SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)flouranthene, benzo(k)flouranthene, chrysene, dibenzo(a,h)anthracene, and indeno (1,2,3-cd)pyrene above Track 2 - Restricted Residential SCOs; and
- Dieldrin exceeding Track 2 - Restricted Residential SCOs.

### Groundwater

- Will be investigated after buildings demolition.

### Soil vapor

- Petroleum and Chlorinated VOCs (acetone and toluene) detected at low concentrations. PCE and TCE were detected at levels that warrant monitoring as per NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*, October 2006.

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

SVOCs, pesticides and metals are present in the historic fill material present above the bedrock at the Site. This material will be removed to the bedrock surface under the proposed remediation and redevelopment of the Site.

## **Potential Routes of Exposure**

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

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

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

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

Currently, the Site is a 21,000 square feet in size and was historically utilized for commercial (auto repair, parking garage / lot) purposes. The immediate area surrounding the Site is mixed commercial/residential, and is anticipated to remain so in the foreseeable future. The proposed future use of the Site consists of two new 7-story residential buildings.

On-Site Receptors - The property is currently used for parking and on-Site potential receptors include visitors and workers.

During redevelopment of the Site, the on-Site potential receptors will include construction workers, trespassers and visitors. The proposed future use of the Site consists of two new 7-story residential buildings. Once the Site is redeveloped, the on-Site potential receptors will include building residents and retail workers in the commercial portion of building A.

Off-Site Receptors - Potential off-Site receptors would include: adult and child residents, and commercial and construction workers, pedestrians, trespassers, and cyclists, based on the following:

1. Commercial Businesses
2. Residential Buildings

3. Building Construction/Renovation
4. Pedestrians, Trespassers, Cyclists
5. Schools

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

#### *Existing*

The Site is used for parking and commercial purposes. The Site is paved, limiting exposure to subsurface fill/soil.

#### *Future*

Once redevelopment activities begin, there will be a potential exposure pathway from contaminated subsurface fill to construction workers 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 fill. Similarly, off-Site receptors could be exposed to dust and petroleum vapors from on-Site activities. During construction, on-Site and off-Site exposures to contaminated dust and VOCs from on-Site will be addressed through dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan.

Once the remedial actions and redevelopment of the Site has been completed, there will be no potential on-Site or off-Site exposure pathways to adult and child residents, community residents, and construction workers. Contaminated soils will be fully removed, the Site will be completely covered and will include a waterproofing membrane/system to prevent migration of off-Site soil vapors.

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

Based upon this analysis, there are currently limited potential exposure pathways. During remedial construction, on-Site and off-Site exposures to contaminated dust and VOCs from historic fill material will be addressed through dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan. After the remedial action is complete, there will be no remaining exposure pathways.

## **5.0 REMEDIAL ACTION MANAGEMENT**

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

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

### **5.2 Site Security**

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

### **5.3 Work Hours**

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

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

The Health and Safety Plan is included in Attachment F. 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 24 and 40-hour hazardous waste operator training and annual 8-hour refresher training. The 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 ( $\text{mcg}/\text{m}^3$ ) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed  $150 \text{ mcg}/\text{m}^3$  above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than  $150 \text{ mcg}/\text{m}^3$  above the upwind level, work will be stopped and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within  $150 \text{ mcg}/\text{m}^3$  of the upwind level and in preventing visible dust migration.

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

### **5.6 Agency Approvals**

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

## **5.7 Site Preparation**

### **Pre-Construction Meeting**

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

### **Mobilization**

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

### **Utility Marker Layouts, Easement Layouts**

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

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

## **Dewatering**

Based on the planned excavation depth, Site dewatering may be necessary. Water removed from the base of the excavation will be discharged into the New York City sewer system. FPG W. 48th Street, LLC, will obtain prior approval from the 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.

## **Equipment and Material Staging**

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

## **Stabilized Construction Entrance**

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

## **Truck Inspection Station**

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

## 5.8 Traffic Control

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the site is to proceed west on W. 49<sup>th</sup> Street (1-way) 1-block to 11<sup>th</sup> Avenue, turn left onto 11<sup>th</sup> Avenue (2-way) heading south to W.40<sup>th</sup> Street. Turn left heading east on W.40<sup>th</sup> 1 block to the Lincoln tunnel entrance. Turn right onto the Lincoln tunnel entrance and proceed to the tunnel exit at Rt 495. Continue on Rt 495 to Rt 1 or Interstate 95.

## 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 significant 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 substantial deviations from the RAWP will include a request for approval for the change from OER noting the following:

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

## 6.0 REMEDIAL ACTION REPORT

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

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

## **Remedial Action Report Certification**

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

*I, \_\_\_\_\_, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Redevelopment Project at 545-551 West 48th Street, and 534-542 West 49th Street, Site number 13CVCP083M.*

*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	12
Demobilization	13	1
Submit Remedial Action Report	36	1

# **TABLES**

**TABLE 1**  
**Soil Cleanup Objectives**

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

**TABLE 1**  
**Soil Cleanup Objectives**

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

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

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

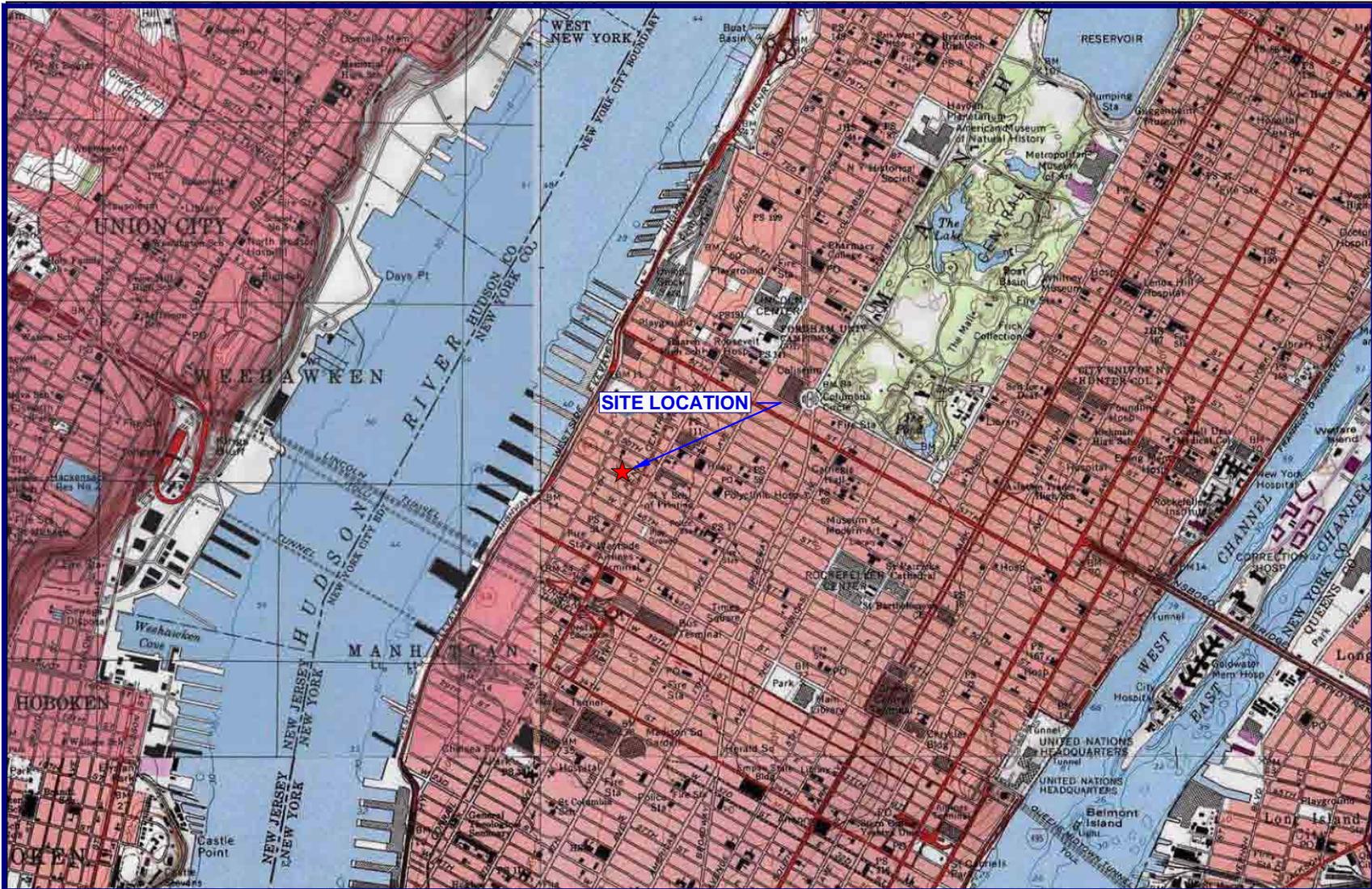
b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

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

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

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

# **FIGURES**



40°47.000' N

40°46.000' N

40°45.000' N

74°02.000' W

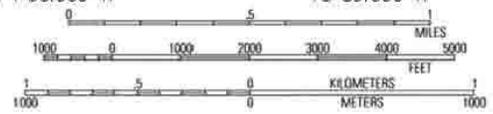
74°01.000' W

74°00.000' W

73°59.000' W

73°58.000' W

WGS84 73°57.000' W



USGS Central Park Quadrangle 1995, Contour Interval = 10 feet



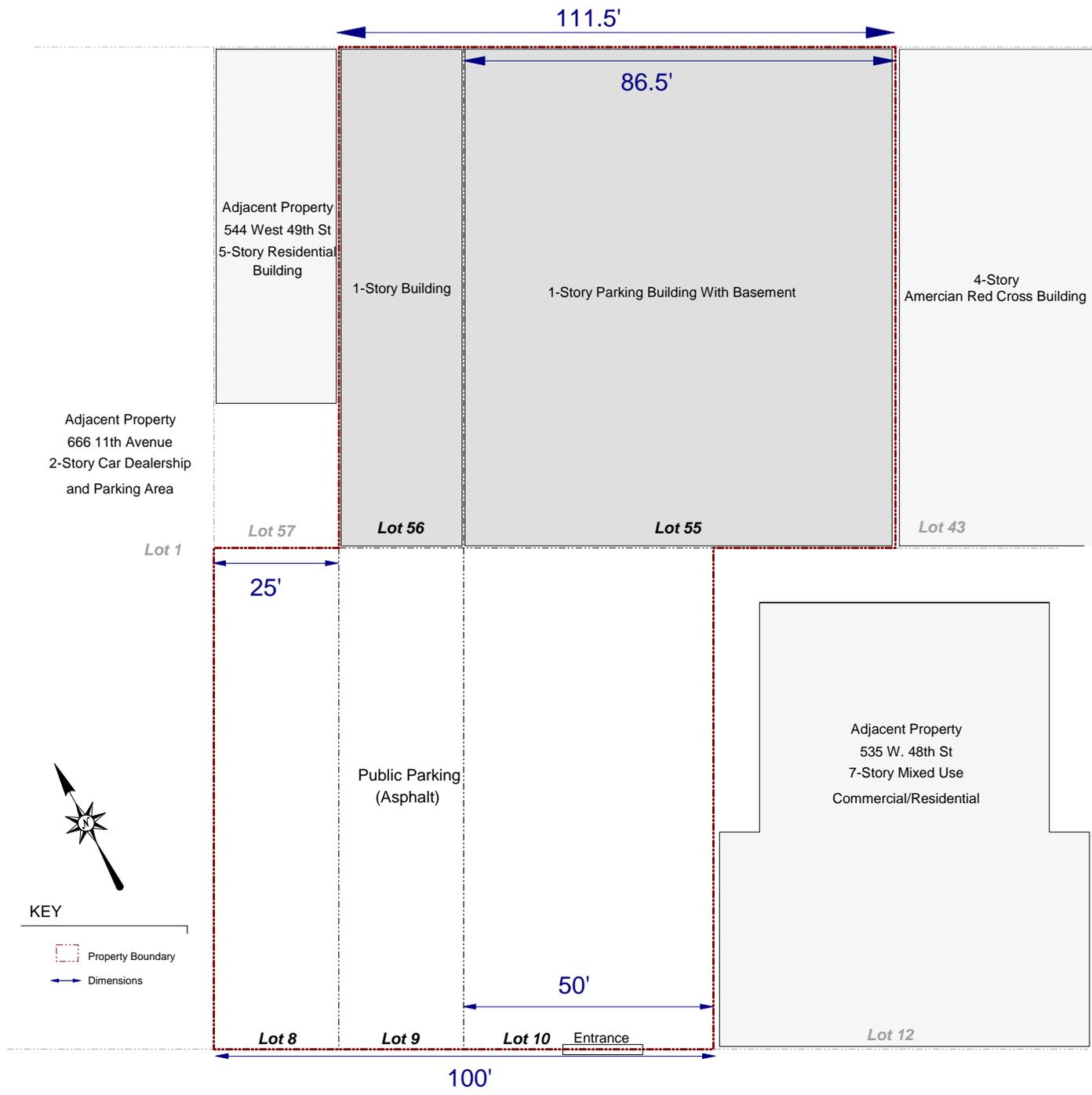
**ENVIRONMENTAL BUSINESS CONSULTANTS**  
1808 MIDDLE COUNTRY ROAD, RIDGE, NY 11961

Phone 631.504.6000  
Fax 631.924.2780

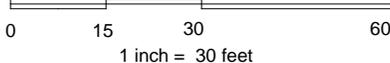
545-551 W. 48TH STREET AND 534-542 W. 49TH STREET  
NEW YORK, NY 10036

**FIGURE 1** SITE LOCATION MAP

W. 49th Street



W. 48th Street



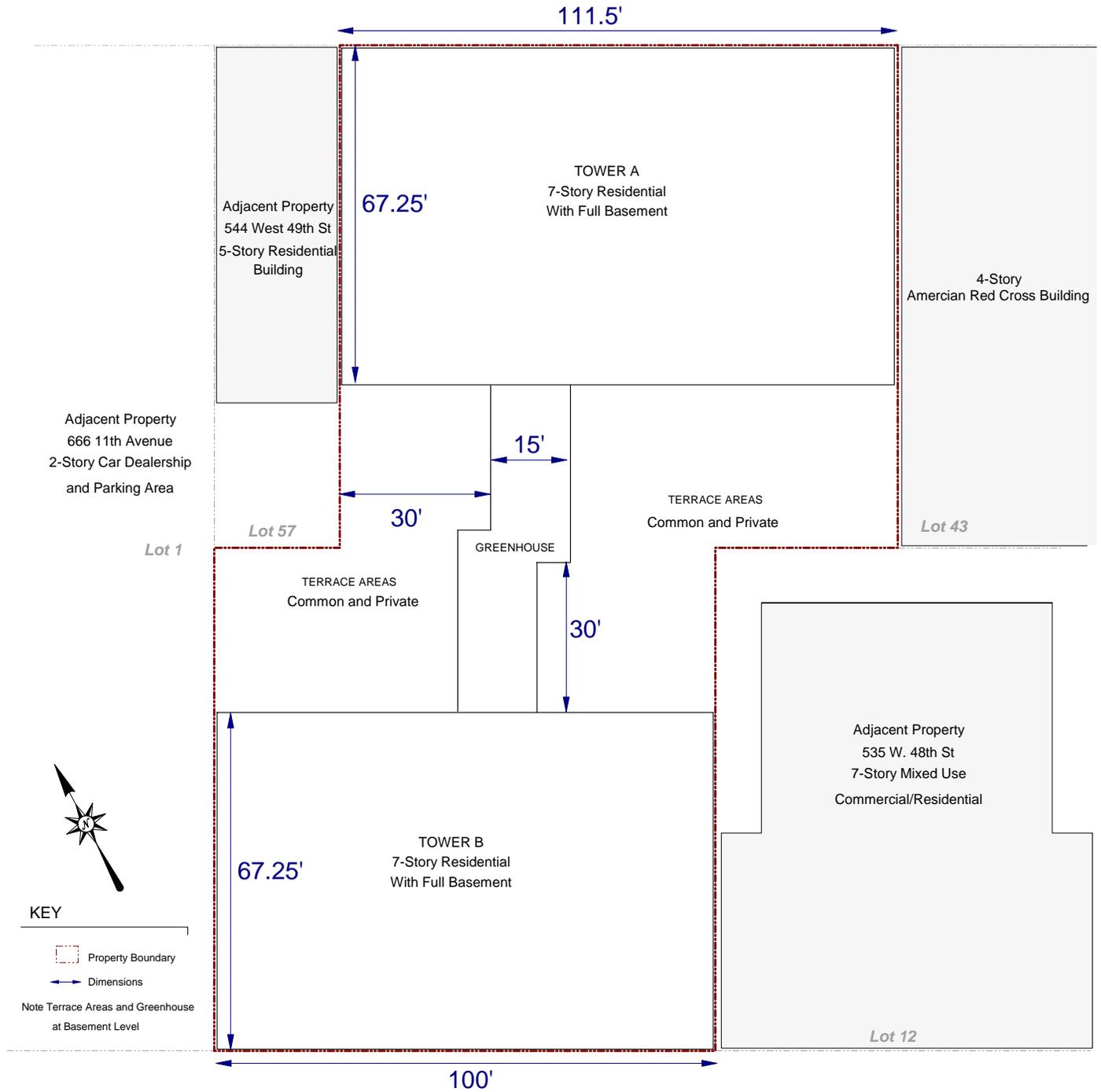
**ENVIRONMENTAL BUSINESS CONSULTANTS**  
 1808 Middle Country Road, Ridge, NY 11961

Phone 631.504.6000  
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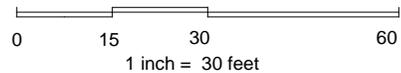
545-551 W. 48TH STREET AND 534-542  
 W. 49TH STREET, NEW YORK, NY 10036

**FIGURE 2 SITE BOUNDARY**

W. 49th Street



W. 48th Street



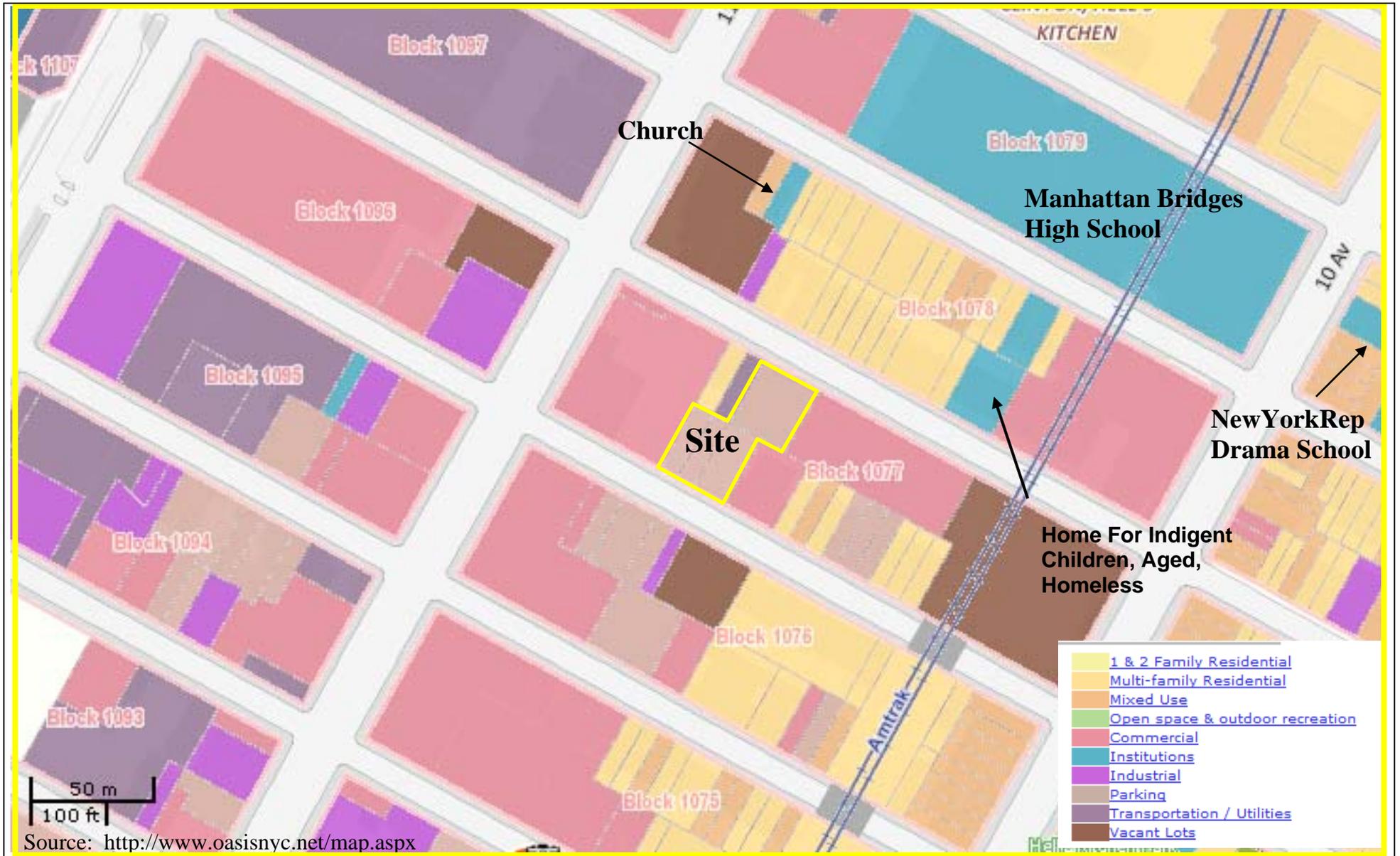
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Fax 631.924.2780

545-551 W. 48TH STREET AND 534-542  
W. 49TH STREET, NEW YORK, NY 10036

**FIGURE 3 REDEVELOPMENT PLAN**



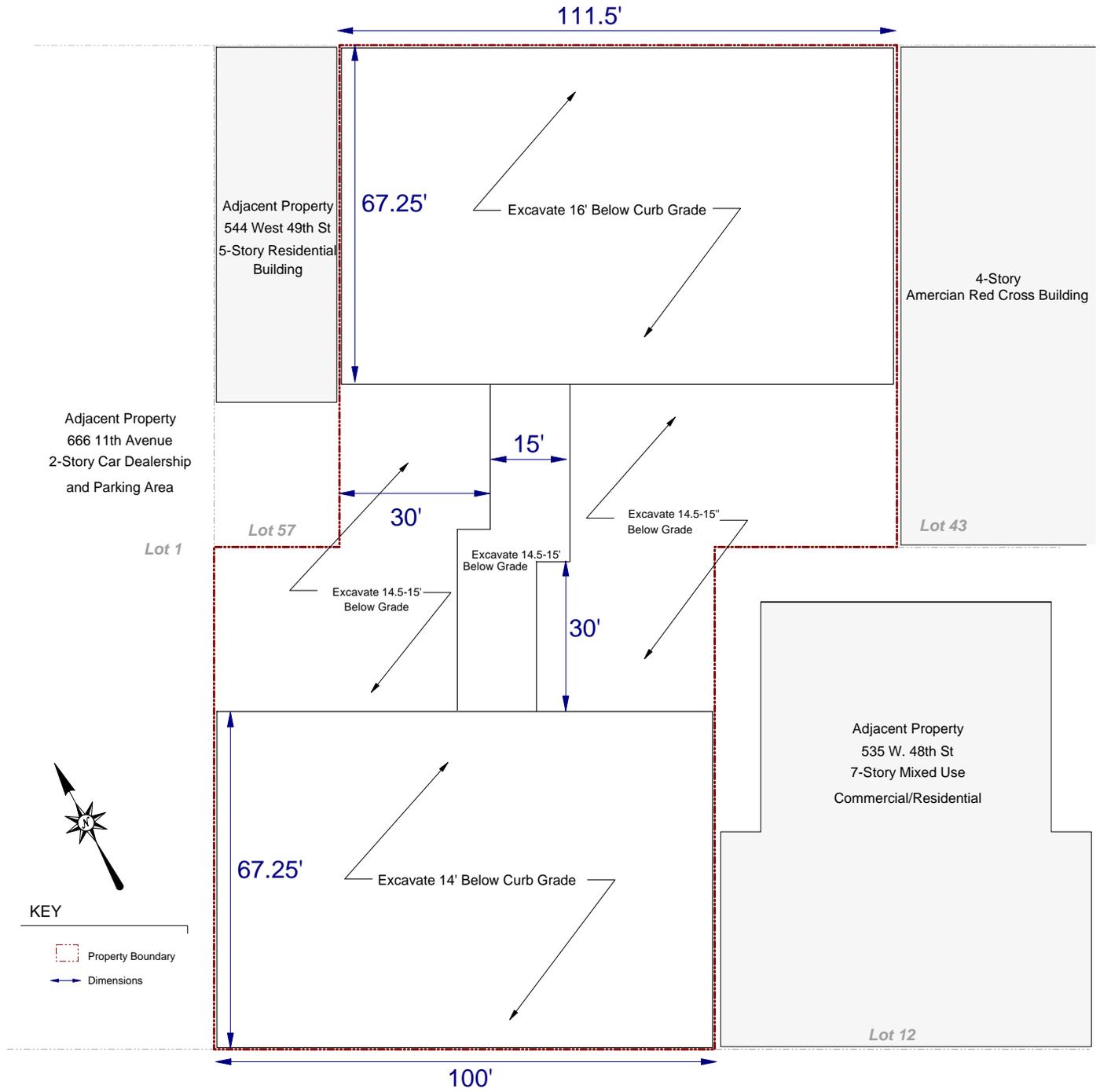
**FIGURE 4**  
**SURROUNDING LAND USE MAP**



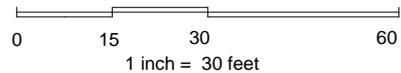
545-551 W. 48<sup>TH</sup> ST & 534-542 W. 49<sup>TH</sup> ST, NEW YORK, NY

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

W. 49th Street



W. 48th Street



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Fax 631.924.2780

545-551 W. 48TH STREET AND 534-542  
W. 49TH STREET, NEW YORK, NY 10036

**FIGURE 5 EXCAVATION PLAN**

**ATTACHMENT A**  
**PROPOSED DEVELOPMENT PLANS**

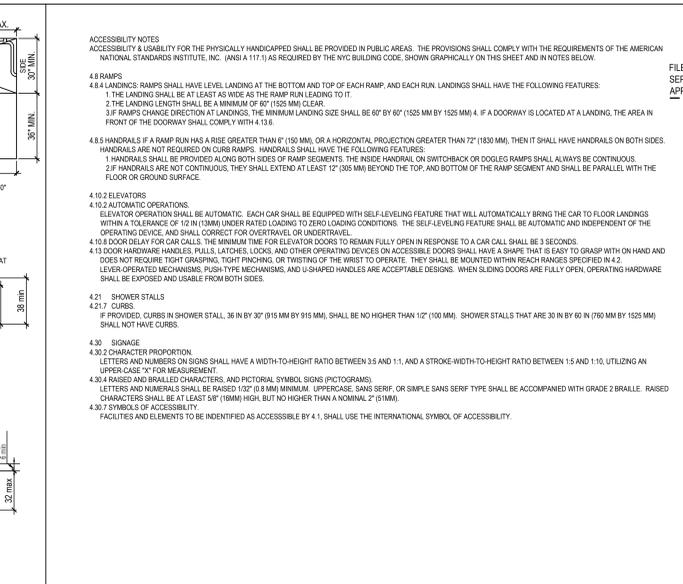
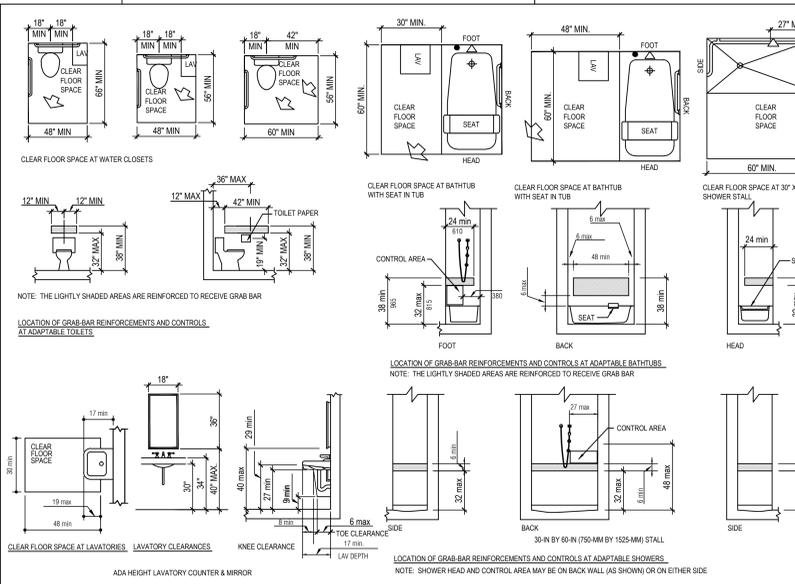
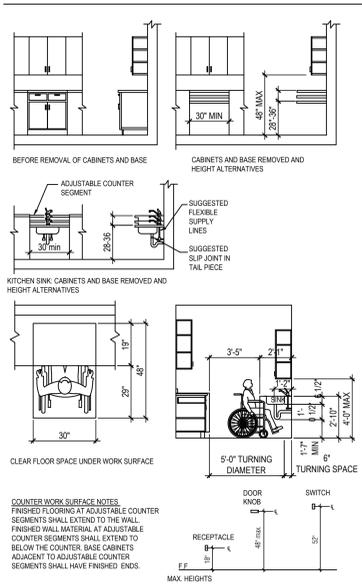
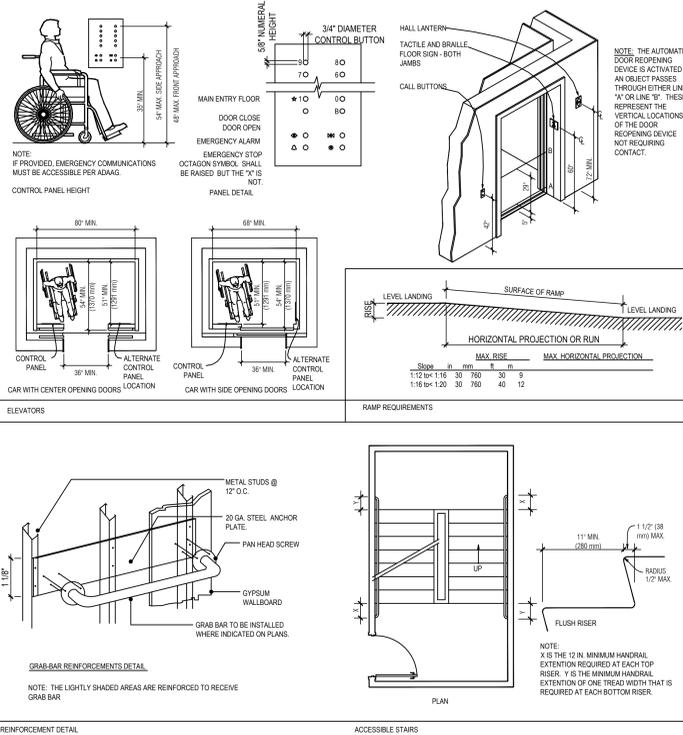
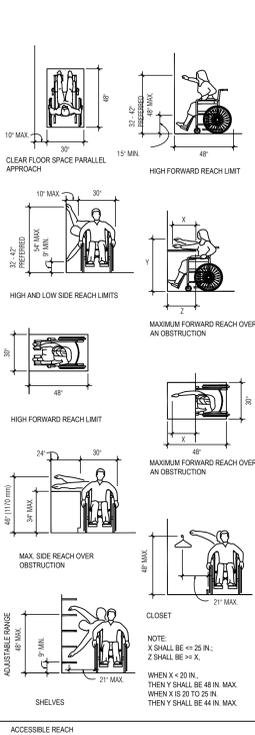
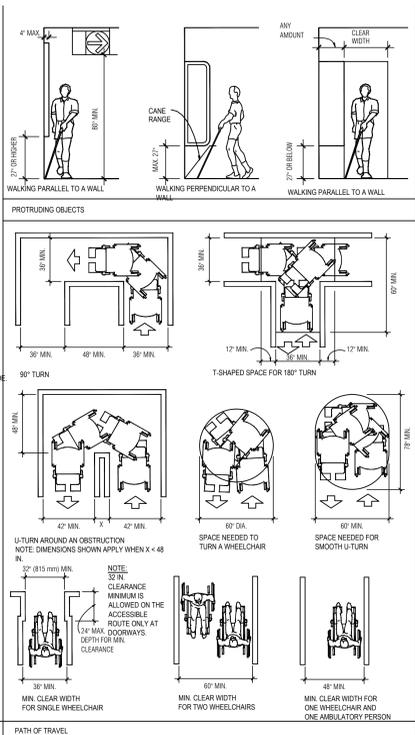
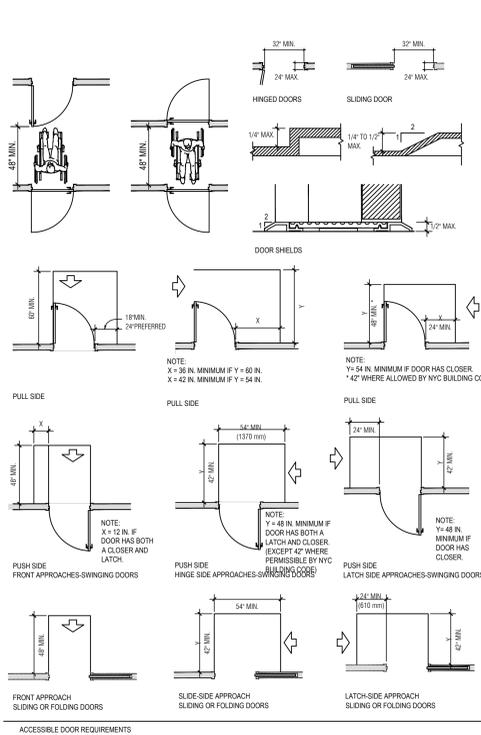


# 540 WEST 49TH STREET

540 West 49th Street, NY, New York. 10019

DOB SUBMISSION 2012.07.24





**BUILDING CODE ANALYSIS**

**Table 503 - ALLOWABLE HEIGHT & BUILDING AREA**

**Table 504 - INCIDENTAL USE AREAS**

**Table 505 - REQUIRED SEPARATION OF OCCUPANCIES**

**Table 506 - FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS**

**Table 507 - FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS**

**Table 508 - MAX. AREA OF EXTERIOR WALL OPENING**

**Table 509 - EGRESS WIDTH PER OCCUPANT SERVED**

**Table 510 - E-EGRESS WIDTH PER OCCUPANT SERVED**

**Table 511 - E-EGRESS WIDTH PER OCCUPANT SERVED**

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**Table 600 - E-EGRESS WIDTH PER OCCUPANT SERVED**

**HOUSING MAINTENANCE CODE**

1. OWNER SHALL FILE REGISTRATION STATEMENT AS PER 208-4.10 AND 208-4.10 HMC.

2. OWNER SHALL PROVIDE A SIGN IDENTIFYING OWNER, MANAGEMENT AND SUPERINTENDING PERSON. 208-4.15.

3. FLOOR SIGNS SHALL BE PLACED AND MAINTAINED ON EACH FLOOR LEVEL AS PER 208-21.1 HMC.

4. ALL APARTMENT ENTRANCE DOORS SHALL BE A MINIMUM 34 HOUR RATED, SELF-CLOSING WITH PEELPOLES AS PER 208-20.1 HMC AND LOCKS AS PER 208-20.2 HMC.

5. MIRRORS IN ELEVATORS SHALL BE AS PER 208-20.3 HMC.

6. THE BUILDING'S HEATING AND HOT WATER SUPPLY SHALL COMPLY WITH 208-17.01, 17.03, 17.05 AND 17.07 HMC.

7. LIGHTING SHALL BE PROVIDED AS PER 208-19.03, 208-19.05, AND 208-19.07 HMC, AND C26-656AC, C26-120AC AND SECTION 26-35 MDL.

8. GARBAGE COLLECTION AND STORAGE IN RECEPTACLES SHALL COMPLY WITH 208-14.03 AND 208-14.05 HMC.

9. U.S. MAIL SERVICE SHALL BE PROVIDED AS PER 208-21.01 HMC.

10. THE BUILDING STREET NUMBER SHALL BE DISPLAYED AS PER 208-21.05.

11. JANITORIAL SERVICES SHALL BE PROVIDED AS PER 208-22.03 HMC.

12. OWNER SHALL PAINT ALL PUBLIC PARTS OF A MULTIPLE DWELLING AS PER 208-12.01 HMC.

13. INTERIOR OF DWELLING UNITS SHALL BE CLEANED AS PER 011.05 HMC.

14. DUTES OF OWNER SHALL BE AS PER 208-10.01 HMC AND 10.05 HMC.

15. DUTES OF TENANTS SHALL BE AS PER 208-10.03 AND 10.05 HMC.

16. OWNERS RIGHT OF ACCESS SHALL BE AS PER 208-31.01, 31.03, 31.06, 31.11 AND 31.11 HMC.

17. EXTENSION AND ROOFING EROSION SHALL BE AS PER 208-13.03 AND 13.05 HMC.

18. WATER SHALL BE SUPPLIED AS PER 208-10.11 AND 10.15 HMC.

19. THE PLUMBING AND DRAINAGE SYSTEM SHALL BE MAINTAINED AS PER 208-16.04 HMC.

20. DRAINAGE OF ROOFS AND COURTYARDS SHALL BE AS PER 208-16.03 HMC.

21. NATURAL LIGHT AND VENTILATION SHALL BE PROVIDED AS PER 208-30.01 AND 30.03 HMC FOR MULTIPLE DWELLINGS.

22. SANITARY FACILITIES IN MULTIPLE DWELLINGS AND COMMON AREAS SHALL BE PROVIDED AS PER 208-31.01, 31.03, 31.06, 31.11 AND 31.11 HMC.

23. KITCHENS AND KITCHENETTES SHALL BE PROVIDED WITH PROPER FACILITIES, EQUIPMENT, LIGHTING, VENTILATION AND FIRE PROTECTION AS PER 208-31.01, 31.03, 31.06, 31.11 AND 31.11 HMC.

24. MINIMUM ROOM SIZES SHALL BE AS PER 208-32.01 AND MAXIMUM OCCUPANCY SHALL BE AS PER 208-32.03.

**MULTIPLE DWELLING LAW GENERAL PROVISIONS**

1. LIGHTING AND VENTILATION OF ROOMS SHALL BE AS PER SECTION 30. MDL.

2. SIZE OF ROOMS SHALL BE AS PER SECTION 31. MDL.

3. ALCOVES SHALL BE AS PER SECTION 32. MDL.

4. COOKING SPACES (KITCHENS & KITCHENETTES) SHALL BE AS PER SECTION 33. MDL.

5. BUILDING ENTRANCE DOORS AND LIGHTS SHALL BE AS PER SECTION 34. MDL.

6. WINDOWS AND SKYLIGHTS FOR PUBLIC HALLS AND STAIRS SHALL BE AS PER SECTION 35. MDL.

7. ARTIFICIAL HALL LIGHTING SHALL BE AS PER SECTION 37. MDL.

8. ENTRANCE HALLS TO BE AS PER SECTION 40. MDL.

9. BUILDING ENTRANCES, DOORS, LOCKS AND INTERCOMMUNAL SYSTEMS SHALL BE AS PER SECTION 41. MDL.

10. ALL SHAFTS, ELEVATORS AND DUMPHOLDERS SHALL BE AS PER SECTION 51. MDL.

11. APARTMENT PEELPOLES SHALL BE AS PER SECTION 51.4. MDL.

12. MIRRORS IN SELF-SERVICE ELEVATORS SHALL BE AS PER SECTION 51.8. MDL.

13. STAIRS SHALL BE AS PER SECTION 52. MDL.

14. WANDCLOSET SHALL BE AS PER SECTION 55. MDL.

15. ENTRANCE BOLTS AND MAIL RECEPTACLES SHALL BE AS PER SECTION 57. MDL.

16. ALL INCOMBUSTIBLE MATERIALS SHALL BE AS PER SECTION 62. MDL.

17. PARAPETS AND GUARD RAILINGS SHALL BE AS PER SECTION 62. MDL.

18. SUB-CURBS SHALL BE AS PER SECTION 63. MDL.

19. LIGHTING, GAS METERS, GAS AND OIL APPLIANCES SHALL BE AS PER SECTION 64. MDL.

20. BOILER ROOMS SHALL BE AS PER SECTION 65. MDL.

21. WATER SUPPLY SHALL BE AS PER SECTION 75. MDL.

22. WATER CLOSET AND BATH ACCOMMODATIONS SHALL BE AS PER SECTION 76. MDL.

23. PLUMBING AND DRAINAGE SHALL BE AS PER SECTION 77. MDL.

24. REPAIRS SHALL BE MADE AS PER SECTION 78. MDL.

25. HEAT SHALL BE PROVIDED AS PER SECTION 79. MDL.

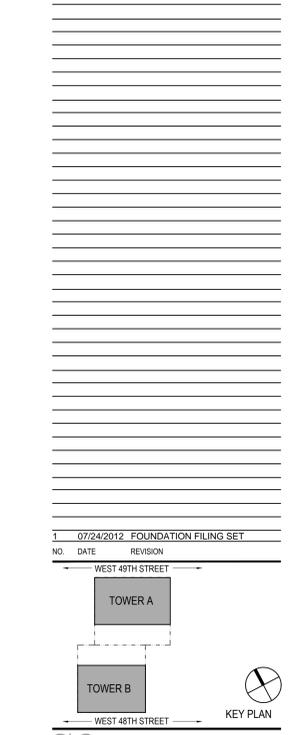
26. CLEANLINESS SHALL BE AS PER SECTION 80. MDL.

27. RECEPTACLES FOR WASTE MATTER SHALL BE AS PER SECTION 81. MDL.

28. PRIVACY SHALL BE AS PER SECTION 82. MDL.

29. JANITORIAL SERVICES SHALL BE AS PER SECTION 83. MDL.

30. CONSTRUCTION STANDARDS FOR THE CONTROL OF NOISE SHALL BE AS PER SECTION 84. MDL.



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**Owner:**  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

**Construction Manager:**  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL.  
NEW YORK, NY, TEL # 212-465-9455

**Architect:**  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

**Structural:**  
WSP CANTOR SEINIK  
228 EAST 45TH ST, 3RD FL.  
NEW YORK, NY, TEL # 212-687-8988

**MEP:**  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

**Geotechnical:**  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

**PROJECT TITLE:**  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324030

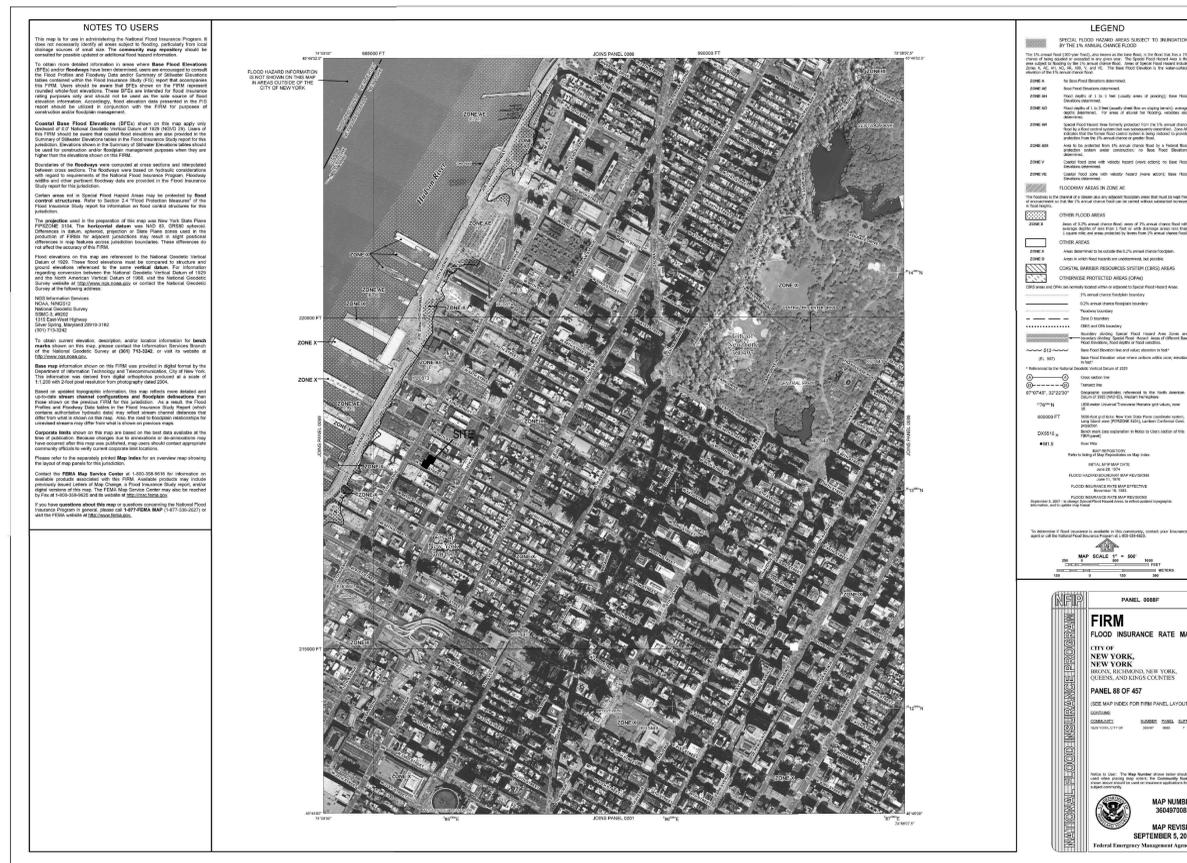
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**BUILDING CODE COMPLIANCE ADA DIAGRAMS**

SCALE: AS NOTED PAGE 02 OF 18

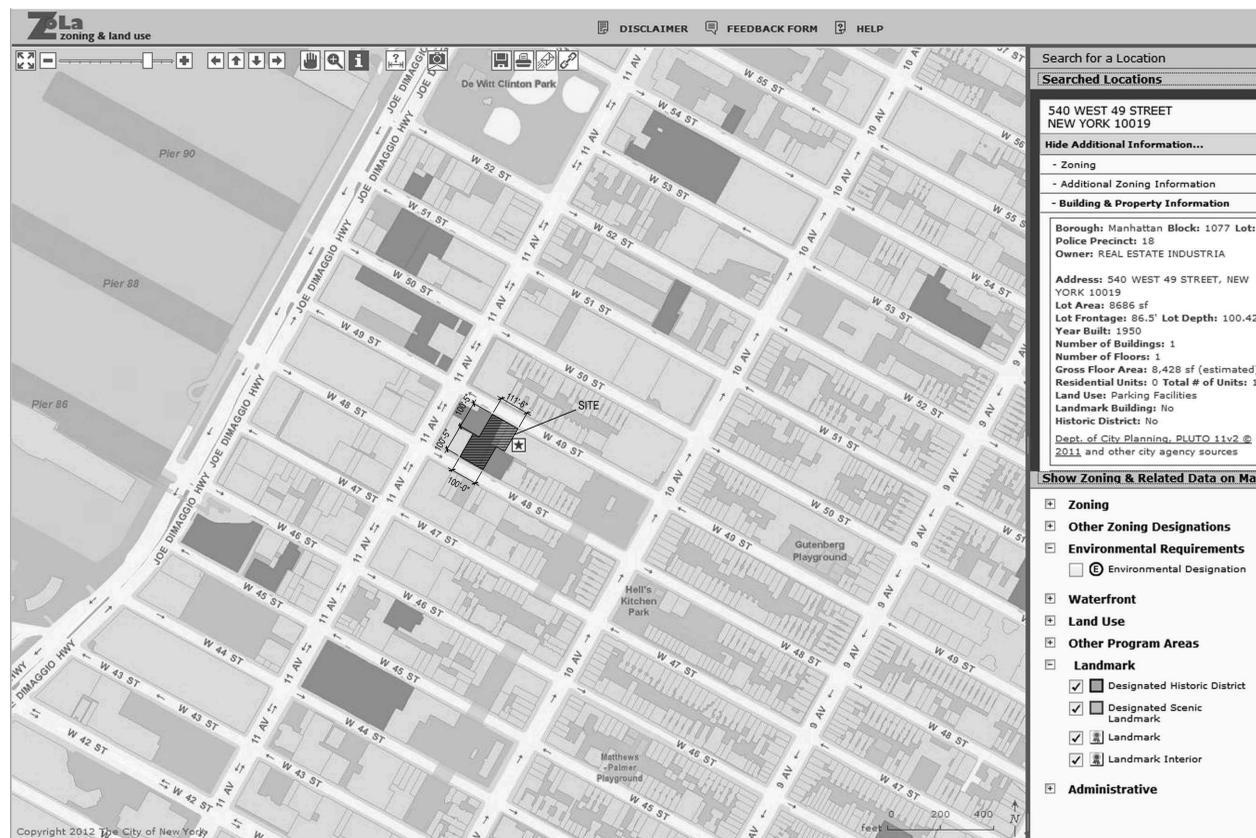
**A-002A**

DOB BSCAN STICKER

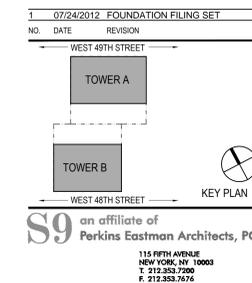
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2 FEMA FLOOD MAP - (FROM FEMA WEBSITE)  
A-003 SCALE: N.T.S.



1 LANDMARK BUILDINGS AND DISTRICTS MAP - (FROM NY CITY MAP AT NYC.GOV)  
A-003 SCALE: 1/4" = 1'-0"



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FORTIS PROPERTY GROUP WEST 48TH ST LLC  
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BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
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228 EAST 45TH ST, 3RD FL  
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PROJECT TITLE:  
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540 WEST 49TH ST  
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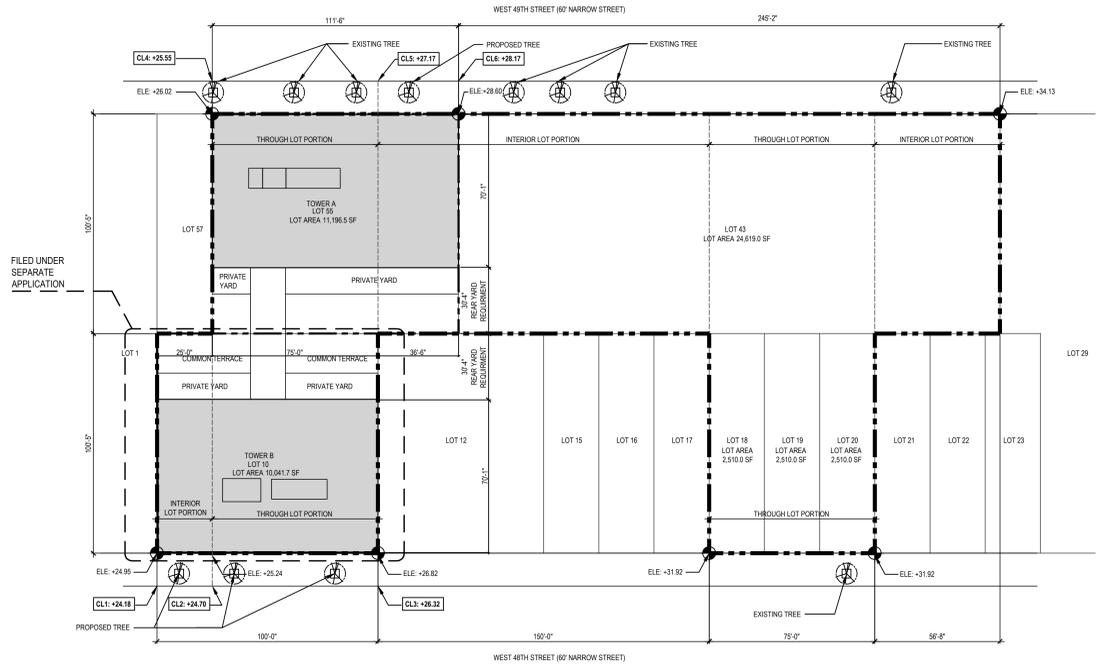
DRAWING TITLE:  
**LANDMARK MAP  
AND FLOOD AREAS**

SCALE: AS NOTED PAGE: 03 OF 18

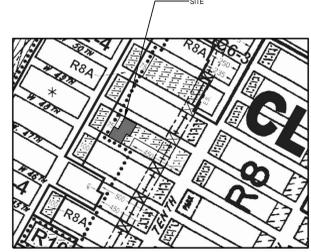
**A-003A**



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**\*NOTE:**  
(LOT AREAS FOR LOT 18, 19, 20 AND 43, ARE ESTIMATED)



**ZONING ANALYSIS**

1. GENERAL  
ADDRESS: TOWER A, 540 WEST 49TH STREET, MANHATTAN, NY  
TOWER B, 545 WEST 48TH STREET, MANHATTAN, NY  
ZONING DISTRICTS: R8 / C2-5, SPECIAL CLINTON DISTRICT  
ZONING MAP: BC  
E-DESIGNATION: E-203 (AIR QUALITY, EXHAUST STACK LIMITATIONS, AND WINDOW WALL ATTENUATION)

2. USE REGULATIONS (Z.R.22-00, Z.R.30-00)  
PERMITTED USE GROUP: 1-9 & 14  
PROPOSED USE GROUP: GROUP 2 RESIDENTIAL (NOT PURSUANT QUALITY HOUSING Z.R.23-01)

3. FLOOR AREA REGULATIONS (Z.R.36-31, Z.R.36-101)  
TRANSFER ZONING FLOOR AREA FROM LOT 43 TO LOT 43: 14,131 SF, CONFIRMED BY THE OWNERSHIP ON JUNE 22, 2012  
MAXIMUM RESIDENTIAL OR COMMUNITY FACILITY FAR: 4.2  
MAXIMUM COMMERCIAL FAR: 2.0

**FILED UNDER SEPARATE APPLICATION**

4. LOT COVERAGE REGULATIONS (Z.R.36-31, Z.R.36-102)  
TOWER A, MAXIMUM LOT COVERAGE = 70% OF LOT AREA = 70% X 11,196.5 SF = 7,837 SF (SEE DIAGRAM 4)  
PROPOSED LOT COVERAGE = 111'-0" X 70'-1" = 7,814 SF < 7,837 SF  
TOWER B, MAXIMUM LOT COVERAGE = MAXIMUM 70% OF LOT AREA = 70% X 10,041.7 SF = 7,029 SF  
PROPOSED LOT COVERAGE = 100'-0" X 70'-1" = 7,008 SF < 7,029 SF

**FILED UNDER SEPARATE APPLICATION**

RESIDENTIAL USE DEVELOPMENT: MINIMUM 20% LOT AREA AS USABLE LANDSCAPE FOR OCCUPANTS (SEE DIAGRAM 5)  
MINIMUM OPEN LANDSCAPE AREA ZONING = 20% OF LOT AREA = 20% X 53,387.2 = 10,677 SF  
TOWER A, PROPOSED OPEN LANDSCAPE AREA = 2,301 (LOCATED IN COURTYARD) + 3,581 (LOCATED ON ROOF) = 5,882 SF  
TOWER B, PROPOSED OPEN LANDSCAPE AREA = 2,562 (LOCATED IN COURTYARD) + 3,914 (LOCATED ON ROOF) = 6,476 SF  
TOTAL PROPOSED OPEN LANDSCAPE AREA = TOWER A + TOWER B = 6,362 + 5,918 = 12,178 SF > 10,677 SF (OK)

**FILED UNDER SEPARATE APPLICATION**

5. DENSITY REGULATIONS (Z.R.23-02)  
DWELLING UNIT FACTOR: 740  
MAXIMUM PERMITTED DWELLING UNIT: 103,331 / 740 = 140 UNITS  
TOWER A, 60 UNITS  
TOWER B, 54 UNITS  
PROPOSED DWELLING UNIT TOWER A + TOWER B: 114 UNITS < 140 UNITS (OK)

**FILED UNDER SEPARATE APPLICATION**

6. YARD REGULATIONS (Z.R.23-02a)  
FRONT YARDS: NONE REQUIRED  
SIDE YARDS: NONE REQUIRED, 8'-0" MINIMUM WIDTH IF PROVIDED  
REAR YARDS (THROUGH LOT): 60'-0" MINIMUM REAR YARD EQUIVALENT  
REAR YARD EQUIVALENT = 30'-4" X 30'-4" = 60'-8" X 60'-0"

**FILED UNDER SEPARATE APPLICATION**

7. HEIGHT & SETBACK REGULATIONS (Z.R.36-31, Z.R.36-104)  
MAXIMUM BUILDING HEIGHT: 7 STORY OR 66'-0" (SEE DIAGRAM 6)

**ZONING LOT AREA CALCULATIONS**

LOT 8 = 10,041.7 SF  
LOT 18 = 2,510.0 SF  
LOT 19 = 2,510.0 SF  
LOT 20 = 2,510.0 SF  
LOT 43 = 24,619.0 SF  
LOT 55 = 11,196.5 SF  
TOTAL = 53,387.2 SF  
(LOT AREAS FOR LOT 18, 19, 20 AND 43, ARE ESTIMATED)

**STREET TREES CALCULATIONS**

1. TOWER A WEST 49TH STREET = 111'-0" X 243'-2" = 14 TREES  
EXISTING TREES = 7 TREES  
PROPOSED TREES = 1 TREES  
REMAINING TREES = 14-7+1 = 8 TREES (LOCATIONS TO BE DETERMINED BY DPR)

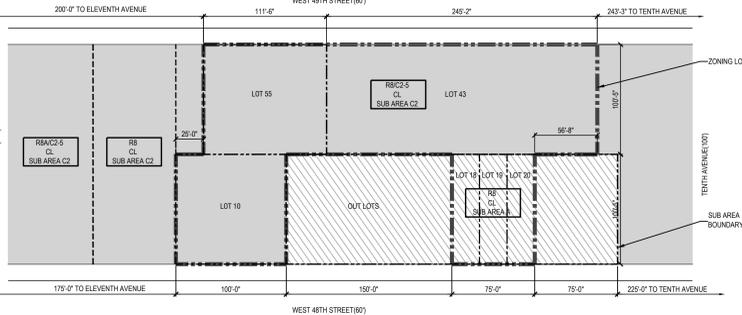
2. TOWER B WEST 48TH STREET = 100'-0" X 243'-2" = 7 TREES  
EXISTING TREES = 1 TREES  
PROPOSED NEW TREES = 3 TREES  
REMAINING TREES 7-1+3+4 = 13 TREES (LOCATIONS TO BE DETERMINED BY DPR)

**PROPOSED CURB LEVEL CALCULATIONS**

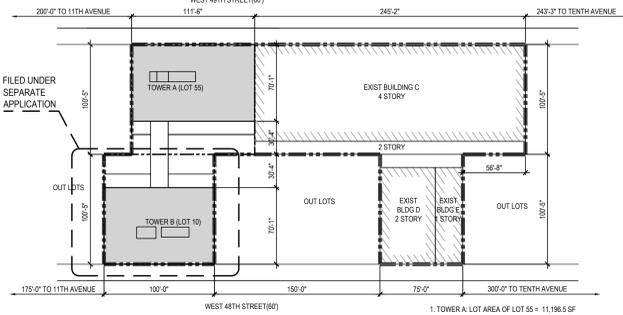
1. TOWER A WEST 49TH STREET  
INTERIOR LOT PORTION =  $CL_2 + CL_1 - \frac{27.17' + 28.17'}{2} = 27.67'$   
TROUGH LOT PORTION =  $CL_2 + CL_1 - \frac{25.52' + 27.17'}{2} = 26.34'$   
PROPOSED CURB LEVEL OF 49TH STREET WILL BE TROUGH LOT PORTION 26.36' (LOWER ELEVATION)

2. TOWER B WEST 48TH STREET  
INTERIOR LOT PORTION =  $CL_1 + CL_2 - \frac{24.18' + 24.70'}{2} = 24.44'$   
TROUGH LOT PORTION =  $CL_2 + CL_1 - \frac{24.70' + 25.32'}{2} = 25.51'$   
PROPOSED CURB LEVEL OF 48TH STREET WILL BE INTERIOR LOT PORTION 24.44' (LOWER ELEVATION)

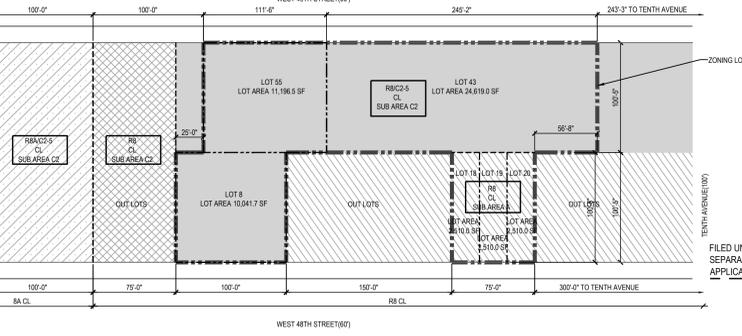
**1 SITE PLAN**  
Z-001 SCALE: 1/32" = 1'-0"



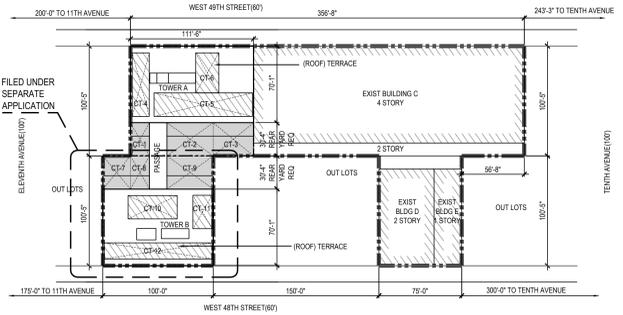
**2 SUB AREAS DIAGRAM**  
Z-001 SCALE: 1/64" = 1'-0"



**4 LOT COVERAGE DIAGRAM**  
Z-001 SCALE: 1/64" = 1'-0"



**3 ZONING DISTRICT DIAGRAM**  
Z-001 SCALE: 1/64" = 1'-0"



**1. TOWER A: 540 WEST 49TH STREET**

LANDSCAPED OPEN AREA: COURTYARD

CT-1: 30'-1" x 17'-3" = 523 SF  
CT-2: 30'-1" x 17'-3" = 523 SF  
CT-3: 30'-1" x 41'-11" = 1,271 SF  
CT-4: 55'-3" x 61'-3" = 900.3 SF  
CT-5: 55'-3" x 61'-3" = 915.3 SF  
CT-6: 55'-3" x 61'-3" = 755.2 SF

LANDSCAPED OPEN AREA: ROOF

CT-7: 30'-1" x 17'-3" = 523 SF  
CT-8: 30'-1" x 17'-3" = 523 SF  
CT-9: 30'-1" x 41'-11" = 1,271 SF  
CT-10: 55'-3" x 61'-3" = 948.4 SF  
CT-11: 55'-3" x 61'-3" = 931.6 SF  
CT-12: 55'-3" x 61'-3" = 1,433.7 SF

TOWER A TOTAL LANDSCAPED OPEN AREAS = CT-1+CT-2+CT-3+CT-4 + CT-5 + CT-6 = 6,482 SF

**2. TOWER B: 545 WEST 48TH STREET**

LANDSCAPED OPEN AREA: COURTYARD

CT-1: 30'-1" x 17'-3" = 523 SF  
CT-2: 30'-1" x 17'-3" = 523 SF  
CT-3: 30'-1" x 41'-11" = 1,271 SF  
CT-4: 55'-3" x 61'-3" = 948.4 SF  
CT-5: 55'-3" x 61'-3" = 931.6 SF  
CT-6: 55'-3" x 61'-3" = 1,433.7 SF

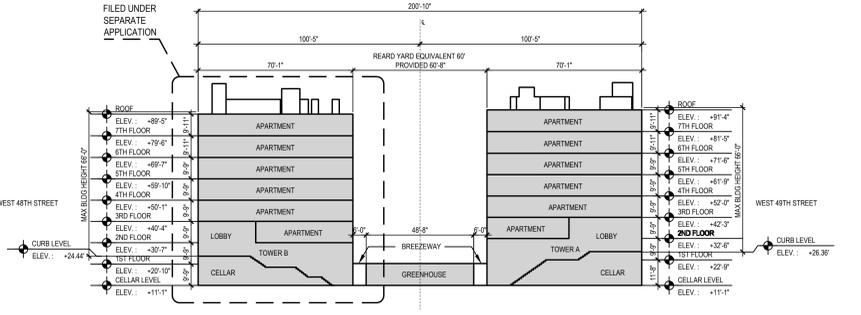
LANDSCAPED OPEN AREA: ROOF

CT-7: 30'-1" x 17'-3" = 523 SF  
CT-8: 30'-1" x 17'-3" = 523 SF  
CT-9: 30'-1" x 41'-11" = 1,271 SF  
CT-10: 55'-3" x 61'-3" = 948.4 SF  
CT-11: 55'-3" x 61'-3" = 931.6 SF  
CT-12: 55'-3" x 61'-3" = 1,433.7 SF

TOWER B TOTAL LANDSCAPED OPEN AREAS = CT-5+CT-6+CT-7+CT-8 + CT-9 + CT-10 + CT-11 = 5,465.7

TOTAL LOT AREAS = CT-1+CT-2+CT-3+CT-4+CT-5+CT-6+CT-7+CT-8+CT-9+CT-10+CT-11+CT-12 = 11,948  
TOTAL ZONING LOT = 53,387.2  
0.22 > 20%

**5 LANDSCAPED OPEN AREAS CALCULATIONS**  
Z-001 SCALE: 1/64" = 1'-0"



**6 BUILDING SECTION**  
Z-001 SCALE: 1/32" = 1'-0"

**TOWER A BULKHEAD CALCULATIONS 540 WEST 49TH STREET**

WIDTH OF STREET WALL	= 111'-0"
PERMITTED PRODUCT OF AGGREGATE WIDTH OF STREET WALL (23-62) (9/3/0)	111'-0" x 8' = 892 SF
PROPOSED PRODUCT OF AGGREGATE WIDTH OF STREET WALL	A + B + C + D + E + F + G + H + I = 40 SF + 17 SF + 173 SF + 39 SF + 162 SF + 23 SF + 210 SF + 65 SF + 143 SF = 878 SF > 892 SF (COMPLIES)
TOTAL BULKHEAD AREA	878 SF

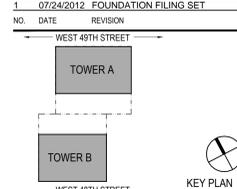
A	4'-4" X 9'-4"	40 SF
B	1'-0" X 9'-4"	17 SF
C	10'-0" X 16'-11"	173 SF
D	4'-2" X 9'-4"	39 SF
E	17'-4" X 9'-4"	162 SF
F	3'-1" X 9'-4"	29 SF
G	22'-6" X 9'-4"	210 SF
H	7'-0" X 9'-4"	65 SF
I	14'-4" X 10'-0"	143 SF
TOTAL BULKHEAD AREA	878 SF	

**TOWER B BULKHEAD CALCULATIONS 545 WEST 48TH STREET**

WIDTH OF STREET WALL	= 100'-0"
PERMITTED PRODUCT OF AGGREGATE WIDTH OF STREET WALL (23-62) (9/3/0)	100'-0" x 8' = 800 SF
PROPOSED PRODUCT OF AGGREGATE WIDTH OF STREET WALL	A + B + C + D + E + F + G = 40 SF + 40 SF + 64 SF + 173 SF + 45 SF + 153 SF + 214 SF = 799 SF > 800 SF (COMPLIES)
TOTAL BULKHEAD AREA	799 SF

A	4'-4" X 9'-4"	40 SF
B	4'-4" X 9'-4"	40 SF
C	6'-8" X 9'-4"	64 SF
D	10'-0" X 16'-11"	173 SF
E	4'-0" X 9'-4"	45 SF
F	16'-8" X 9'-4"	153 SF
G	22'-11" X 9'-4"	214 SF
TOTAL BULKHEAD AREA	799 SF	

**7 BULKHEAD**  
Z-001 SCALE: 1/32" = 1'-0"



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**PROJECT TITLE:**  
**540 W49TH ST**

540 WEST 49TH ST  
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PROJECT No: 47440.00  
DOB No: 121324030  
DRAWING TITLE:  
**SITE PLAN & ZONING ANALYSIS**

SCALE: AS NOTED PAGE 04 OF 18

**Z-001**

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M1	2.8 SF		
M2	4.0 SF		
M3	4.0 SF		
M4	2.8 SF		
M5	4.0 SF		
M6	5.7 SF		
M7	0.9 SF		
M8	5.6 SF		
M9	0.6 SF		
M10	5.6 SF		
M11	0.6 SF		
M12	0.9 SF		
M13	4.6 SF		

1 TOWER A CELLAR LEVEL TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

M1	4.0 SF		
M2	4.0 SF		
M3	4.0 SF		
M4	4.0 SF		
M5	5.2 SF		
M6	1.1 SF		
M7	0.6 SF		
M8	1.2 SF		
M9	5.6 SF		
M10	0.6 SF		
M11	1.8 SF		
M12	0.6 SF		
M13	5.6 SF		

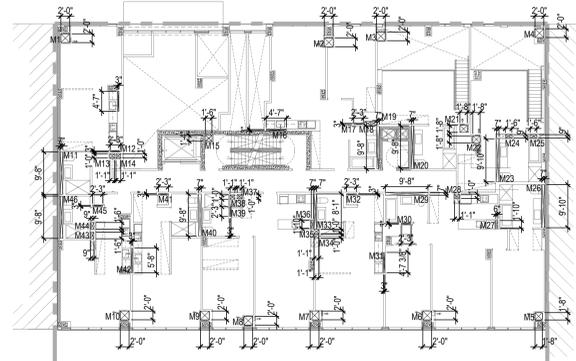
2 TOWER B CELLAR LEVEL TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

M1	4.0 SF	M29	0.6 SF
M2	4.0 SF	M30	0.6 SF
M3	2.8 SF	M31	5.6 SF
M4	4.0 SF	M32	1.1 SF
M5	4.0 SF	M33	0.6 SF
M6	4.0 SF	M34	0.6 SF
M7	4.0 SF	M35	0.9 SF
M8	2.0 SF	M36	5.6 SF
M9	0.6 SF		
M10	1.1 SF		
M11	5.6 SF		
M12	1.1 SF		
M13	1.1 SF		
M14	0.6 SF		
M15	0.6 SF		
M16	5.5 SF		
M17	5.7 SF		
M18	0.9 SF		
M19	0.6 SF		
M20	5.6 SF		
M21	0.6 SF		
M22	1.1 SF		
M23	0.6 SF		
M24	0.6 SF		
M25	0.9 SF		
M26	0.6 SF		
M27	0.6 SF		
M28	0.6 SF		

3 TOWER A 1ST FLOOR TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

M1	4.0 SF	M29	0.6 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	0.6 SF
M4	4.0 SF	M32	5.2 SF
M5	4.0 SF	M33	1.2 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	0.5 SF
M8	0.6 SF		
M9	5.0 SF		
M10	0.6 SF		
M11	0.6 SF		
M12	1.3 SF		
M13	0.6 SF		
M14	0.6 SF		
M15	0.6 SF		
M16	5.6 SF		
M17	1.1 SF		
M18	0.6 SF		
M19	0.6 SF		
M20	0.6 SF		
M21	1.1 SF		
M22	5.6 SF		
M23	2.0 SF		
M24	5.7 SF		
M25	0.6 SF		
M26	0.6 SF		
M27	0.6 SF		
M28	5.2 SF		

4 TOWER B 1ST FLOOR TABULATION  
Z-002 SCALE: 1/16" = 1'-0"



M1	4.0 SF	M29	5.6 SF
M2	4.0 SF	M30	0.6 SF
M3	4.0 SF	M31	1.2 SF
M4	4.0 SF	M32	0.6 SF
M5	2.8 SF	M33	4.7 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	1.1 SF
M8	4.0 SF	M36	0.9 SF
M9	4.0 SF	M37	1.1 SF
M10	4.0 SF	M38	1.1 SF
M11	5.6 SF	M39	0.6 SF
M12	0.6 SF	M40	5.6 SF
M13	1.1 SF	M41	0.6 SF
M14	1.1 SF	M42	1.4 SF
M15	2.0 SF	M43	1.1 SF
M16	1.1 SF	M44	1.1 SF
M17	0.6 SF	M45	0.6 SF
M18	1.3 SF	M46	5.6 SF
M19	1.3 SF		
M20	5.7 SF		
M21	2.8 SF		
M22	2.8 SF		
M23	5.7 SF		
M24	1.1 SF		
M25	1.1 SF		
M26	5.7 SF		
M27	0.9 SF		
M28	1.1 SF		

5 TOWER A 2ND FLOOR TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

M1	2.8 SF	M29	1.1 SF
M2	4.0 SF	M30	0.6 SF
M3	4.0 SF	M31	0.6 SF
M4	4.0 SF	M32	1.1 SF
M5	4.0 SF	M33	5.3 SF
M6	4.0 SF	M34	2.8 SF
M7	4.0 SF	M35	2.8 SF
M8	5.7 SF	M36	4.7 SF
M9	0.9 SF	M37	5.7 SF
M10	0.6 SF	M38	2.0 SF
M11	1.1 SF	M39	1.1 SF
M12	1.1 SF	M40	5.3 SF
M13	4.3 SF		
M14	1.1 SF		
M15	0.6 SF		
M16	4.6 SF		
M17	1.1 SF		
M18	0.6 SF		
M19	0.9 SF		
M20	1.1 SF		
M21	5.7 SF		
M22	1.1 SF		
M23	2.8 SF		
M24	0.6 SF		
M25	5.7 SF		
M26	1.1 SF		
M27	5.6 SF		
M28	1.1 SF		

6 TOWER B 2ND FLOOR TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

M1	4.0 SF	M29	2.0 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	0.9 SF
M4	2.8 SF	M32	0.6 SF
M5	4.0 SF	M33	2.0 SF
M6	4.0 SF	M34	1.1 SF
M7	2.8 SF	M35	5.6 SF
M8	4.0 SF	M36	5.7 SF
M9	4.0 SF	M37	2.0 SF
M10	4.0 SF	M38	5.6 SF
M11	4.0 SF	M39	0.6 SF
M12	4.0 SF	M40	0.6 SF
M13	5.6 SF	M41	0.6 SF
M14	0.6 SF	M42	4.7 SF
M15	0.6 SF	M43	4.7 SF
M16	1.1 SF	M44	2.0 SF
M17	2.0 SF	M45	2.0 SF
M18	1.2 SF	M46	1.1 SF
M19	5.6 SF	M47	0.6 SF
M20	5.6 SF	M48	5.6 SF
M21	0.6 SF	M49	0.6 SF
M22	0.6 SF	M50	1.9 SF
M23	0.6 SF	M51	1.9 SF
M24	0.6 SF	M52	1.9 SF
M25	1.1 SF	M53	1.1 SF
M26	5.6 SF	M54	2.0 SF
M27	4.4 SF	M55	5.6 SF
M28	2.0 SF		

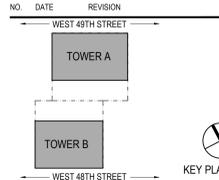
7 TOWER A 3RD-6TH FLOOR TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

M1	2.8 SF	M29	5.6 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	2.0 SF
M4	4.0 SF	M32	0.6 SF
M5	4.0 SF	M33	0.6 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	5.6 SF
M8	4.0 SF	M36	1.1 SF
M9	4.0 SF	M37	0.9 SF
M10	2.8 SF	M38	0.6 SF
M11	5.7 SF	M39	5.9 SF
M12	2.0 SF	M40	1.1 SF
M13	0.9 SF	M41	5.6 SF
M14	0.6 SF	M42	0.6 SF
M15	1.1 SF	M43	0.9 SF
M16	1.1 SF	M44	1.9 SF
M17	4.3 SF	M45	0.5 SF
M18	0.6 SF	M46	5.3 SF
M19	1.1 SF		
M20	0.6 SF		
M21	0.9 SF		
M22	1.1 SF		
M23	5.7 SF		
M24	1.1 SF		
M25	2.0 SF		
M26	0.6 SF		
M27	5.7 SF		
M28	1.1 SF		

8 TOWER B 3RD-6TH FLOOR TABULATION  
Z-002 SCALE: 1/16" = 1'-0"

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07/24/2012 FOUNDATION FILING SET



S9 an affiliate of Perkins Eastman Architects, PC  
115 FIFTH AVENUE  
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Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY TEL # 718-967-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY TEL # 212-466-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY TEL # 212-352-8636

Structural:  
WSP CANTOR SEINUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY TEL # 212-687-8888

MEP:  
MOTTOLARI ENGINEERS P.C.  
36 WEST 20TH ST  
NEW YORK, NY TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ TEL # 201-374-1794

PROJECT TITLE:  
540 W49TH ST

540 WEST 49TH ST  
NEW YORK, NY

PROJECT No: 47440.00

DOB No: 121324030

DRAWING TITLE:  
MECHANICAL DEDUCTION  
CALCULATION

SCALE: AS NOTED PAGE 05 OF 18

Z-002A

DOB BSCAN STICKER



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PROPOSED ZONING FLOOR AREA TABULATION

TOWER A	TOTAL GSF	SALEABLE FA	MECH DED	BIKE ROOM DEDUCTIONS	ZONING FA
CELLAR	6,833 SQ. FT.	2,298 SQ. FT.	42 SQ. FT.		2,257 SQ. FT.
1ST	7,616 SQ. FT.	4,334 SQ. FT.	81 SQ. FT.	503 SQ. FT.	7,035 SQ. FT.
2ND	6,421 SQ. FT.	5,628 SQ. FT.	121 SQ. FT.		6,309 SQ. FT.
3RD	7,773 SQ. FT.	7,005 SQ. FT.	143 SQ. FT.		7,630 SQ. FT.
4TH	7,773 SQ. FT.	7,005 SQ. FT.	143 SQ. FT.		7,630 SQ. FT.
5TH	7,773 SQ. FT.	7,005 SQ. FT.	143 SQ. FT.		7,630 SQ. FT.
6TH	7,773 SQ. FT.	7,005 SQ. FT.	143 SQ. FT.		7,630 SQ. FT.
7TH	7,790 SQ. FT.	7,135 SQ. FT.	123 SQ. FT.		7,667 SQ. FT.
ROOF	760 SQ. FT.	0 SQ. FT.	0 SQ. FT.		85 SQ. FT.
SUBTOTAL	60,514 SQ. FT.	47,416 SQ. FT.	939 SQ. FT.		53,866 SQ. FT.

TOWER B	TOTAL GSF	SALEABLE FA	MECH DED	BIKE ROOM DEDUCTIONS	ZONING FA
CELLAR	6,676 SQ. FT.	2,466 SQ. FT.	38 SQ. FT.		2,428 SQ. FT.
1ST	6,847 SQ. FT.	4,499 SQ. FT.	77 SQ. FT.	443 SQ. FT.	6,327 SQ. FT.
2ND	5,963 SQ. FT.	5,278 SQ. FT.	107 SQ. FT.		5,866 SQ. FT.
3RD	6,997 SQ. FT.	6,339 SQ. FT.	116 SQ. FT.		6,881 SQ. FT.
4TH	6,997 SQ. FT.	6,339 SQ. FT.	116 SQ. FT.		6,881 SQ. FT.
5TH	6,997 SQ. FT.	6,339 SQ. FT.	116 SQ. FT.		6,881 SQ. FT.
6TH	6,997 SQ. FT.	6,339 SQ. FT.	116 SQ. FT.		6,881 SQ. FT.
7TH	6,997 SQ. FT.	6,373 SQ. FT.	115 SQ. FT.		6,882 SQ. FT.
ROOF	749 SQ. FT.	0 SQ. FT.	0 SQ. FT.		88 SQ. FT.
SUBTOTAL	55,119 SQ. FT.	43,931 SQ. FT.	801 SQ. FT.		49,104 SQ. FT.

GREENHOUSE	TOTAL GSF	SALEABLE FA	MECH DED	BIKE ROOM DEDUCTIONS	ZONING FA
	819 SQ. FT.	0 SQ. FT.	0 SQ. FT.		0 SQ. FT.

TOTAL	TOTAL GSF	SALEABLE FA	MECH DED	BIKE ROOM DEDUCTIONS	ZONING FA
	116,433 SQ. FT.	91,347 SQ. FT.	1,950 SQ. FT.		102,970 SQ. FT.

LOT SIZE	21,238 SQ. FT.
FLOOR AREA RATIO	4.20
ZONING FLOOR AREA	89,200 SQ. FT.
TRANSFER ZONING AREA	14,132 SQ. FT.
PERMITTED ZONING AREA	103,332 SQ. FT. >
SURPLUS ZONING AREA	* 362 SQ. FT.

UNIT TABULATION

TOWER A	STUDIO	1 BR	1BR DUPLEX	2BR	SUBTOTAL
CELLAR	0	0	2	2	2
1ST	2	1	2	1	6
2ND	4	2		1	7
3RD	5	3		2	10
4TH	5	3		2	10
5TH	5	3		2	10
6TH	5	3		2	10
7TH	0	0		5	5
SUBTOTAL	28	15	2	17	62

TOWER B	STUDIO	1 BR	2BR	SUBTOTAL
CELLAR	2	2	0	4
1ST	3	2	2	7
2ND	2	3		5
3RD	2	4		6
4TH	2	4		6
5TH	2	4		6
6TH	2	4		6
7TH	0	0		5
SUBTOTAL	15	23	2	44

TOTAL	STUDIO	1 BR	2BR	SUBTOTAL
	41	38	4	114
PROPOSED %	36%	33%	4%	27%
TARGET %	24%	40%	-	35%
PROPOSED SALEABLE				91,347 SQ. FT.
TARGET SALEABLE				93,000 SQ. FT.

M1	2.0 SF	M29	0.9 SF
M2	4.0 SF	M30	5.7 SF
M3	4.0 SF	M31	2.0 SF
M4	4.0 SF	M32	1.1 SF
M5	4.0 SF	M33	1.1 SF
M6	4.0 SF	M34	5.7 SF
M7	4.0 SF	M35	5.5 SF
M8	4.0 SF	M36	5.5 SF
M9	4.0 SF	M37	1.1 SF
M10	4.0 SF	M38	2.0 SF
M11	2.0 SF	M39	1.1 SF
M12	2.0 SF	M40	2.0 SF
M13	2.0 SF	M41	5.7 SF
M14	2.0 SF	M42	0.9 SF
M15	5.7 SF		
M16	3.7 SF		
M17	0.6 SF		
M18	5.5 SF		
M19	0.6 SF		
M20	5.7 SF		
M21	1.1 SF		
M22	1.1 SF		
M23	2.0 SF		
M24	5.6 SF		
M25	1.1 SF		
M26	1.1 SF		
M27	5.7 SF		
M28	0.6 SF		

1 TOWER A 7TH FLOOR TABULATION  
SCALE: 1/16" = 1'-0"

M1	2.8 SF	M29	2.0 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	5.7 SF
M4	4.0 SF	M32	0.9 SF
M5	4.0 SF	M33	5.2 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	0.6 SF
M8	4.0 SF	M36	5.5 SF
M9	4.0 SF	M37	5.5 SF
M10	2.8 SF	M38	1.1 SF
M11	4.9 SF	M39	1.1 SF
M12	2.0 SF	M40	0.9 SF
M13	1.1 SF	M41	4.8 SF
M14	1.1 SF		
M15	2.0 SF		
M16	0.9 SF		
M17	0.6 SF		
M18	1.1 SF		
M19	1.9 SF		
M20	1.1 SF		
M21	4.1 SF		
M22	5.7 SF		
M23	0.6 SF		
M24	5.1 SF		
M25	2.0 SF		
M26	1.1 SF		
M27	0.6 SF		
M28	2.0 SF		

2 TOWER B 7TH FLOOR TABULATION  
SCALE: 1/16" = 1'-0"

ZONING FLOOR AREA SUMMARY

ZONING SUMMARY	S40WEST 49TH STREET, NEW YORK				R8/ C2-3/ CL	
	PERMITTED FLOOR AREA	PERMITTED		EXISTING ZONING FLOOR AREA	PERMITTED NEW ZONING FLOOR AREA	
USE	FAR	LOT AREA	ZFA	ZFA	ZFA	COMMENT
SUB AREA C2	COMMERCIAL	2.00	45,857.2 SF	91,714.4 SF	89,268.0 SF	2,446.4 SF ZR (96-31) (96-101)
	RESIDENTIAL	4.20	45,857.2 SF	192,600.2 SF	0	ZR (96-31) (96-101)
	TOTAL	4.20	45,857.2 SF	192,600.2 SF	89,268.0 SF	103,332.2 SF ZR (96-31) (96-101)
SUB AREA A	RESIDENTIAL	4.20	7,530.0 SF	31,626.0 SF	0	ZR (96-101)
COMMERCIAL TOTAL SITE	COMMERCIAL	2.00	45,857.2 SF	91,714.4 SF	89,268.0 SF	2,446.4 SF ZR (96-31) (96-101)
	RESIDENTIAL TOTAL SITE	4.20	53,387.2 SF	224,226.2 SF	31,626.0 SF	192,600.2 SF ZR (96-31) (96-101)
	ALL USERS TOTAL SITE	4.20	53,387.2 SF	224,226.2 SF	120,894.0 SF	103,332.2 SF ZR (96-31) (96-101)

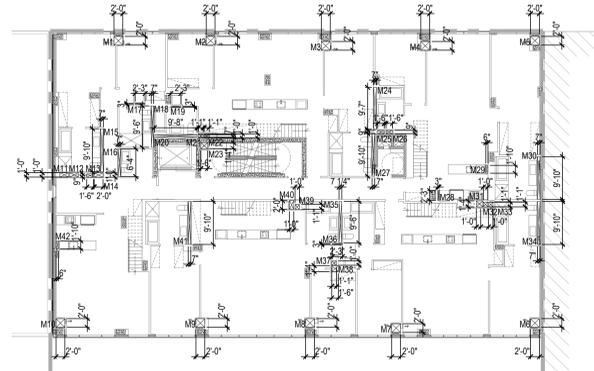
  

PROPOSED ZONING FLOOR AREA						
USE	EXIST	NEW	TOTAL	PERMITTED	OVER/UNDER	COMMENT
SUB AREA C2	COMMERCIAL	89,268.0 SF	0	89,268.0 SF	91,714.4 SF	2,446.4 SF
	RESIDENTIAL	0	102,970.0 SF	102,970.0 SF	192,600.2 SF	89,630.2 SF
	TOTAL	89,268.0 SF	102,970.0 SF	192,238.0 SF	192,600.2 SF	362.2 SF
SUB AREA A	RESIDENTIAL	31,626.0 SF	0	31,626.0 SF	31,626.0 SF	0
COMMERCIAL TOTAL SITE	COMMERCIAL	89,268.0 SF	0	89,268.0 SF	91,714.4 SF	2,446.4 SF
	RESIDENTIAL TOTAL SITE	31,626.0 SF	102,970.0 SF	134,596.0 SF	224,226.2 SF	89,630.2 SF
	ALL USERS TOTAL SITE	120,894.0 SF	102,970.0 SF	223,864.0 SF	224,226.2 SF	362.2 SF

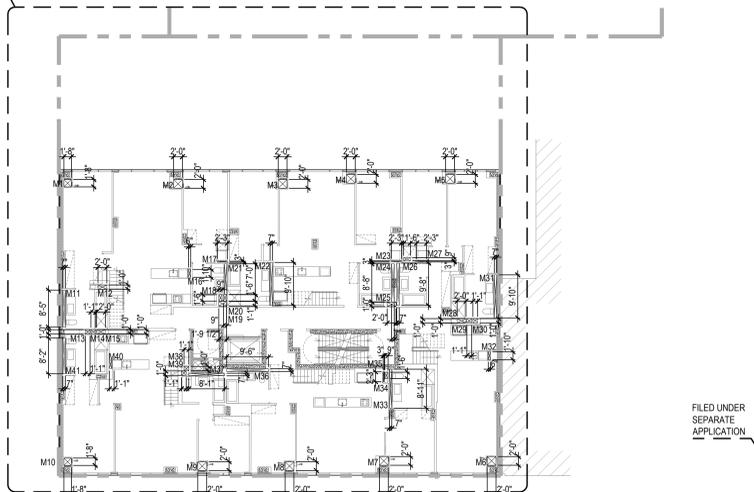
ESTIMATED ZONING FLOOR AREA OF EXISTING BUILDINGS

LOT NUMBER	FLOOR	RESIDENTIAL	COMMERCIAL
LOT 18-19	1	5020.0 SF X 4.2 = 21084.0 SF	0 SF
	1	2810.0 SF X 4.2 = 11802.0 SF	0 SF
LOT 20	1	0 SF	21,833.0 SF
	M	0 SF	792 SF
LOT 43	2	0 SF	21,779.0 SF
	3	0 SF	21,797.0 SF
	4	0 SF	21,775.0 SF
	R	0 SF	223.0 SF
	SUBTOTAL	0 SF	88,199
TOTAL		31626.0 SF	89,268.0 SF

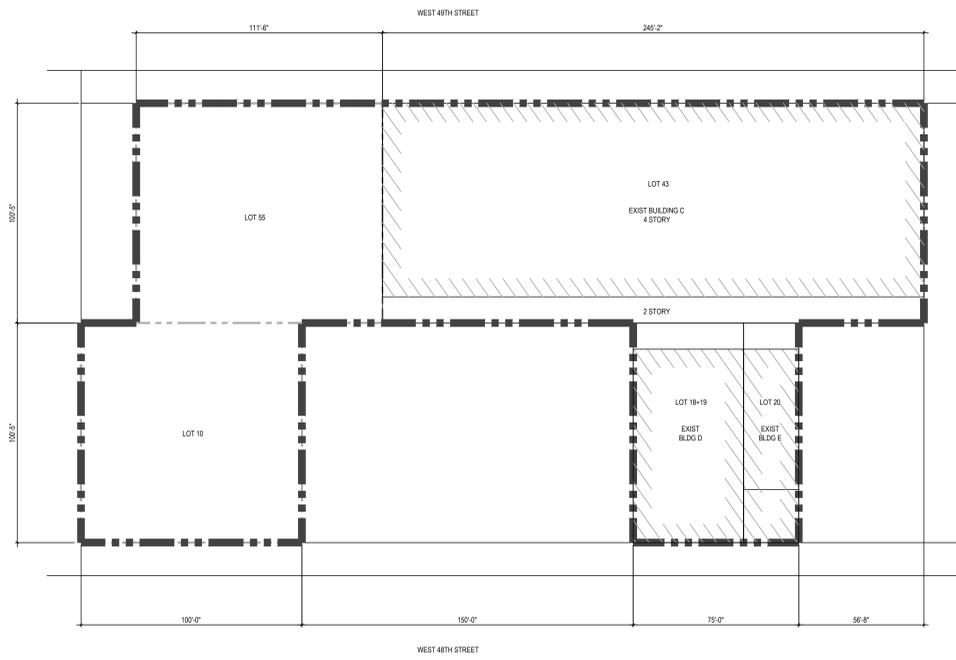
- LOT AREA OF LOT 43 = 24619.0 SF
- PERMITTED RESIDENTIAL ZONING FLOOR AREA OF LOT 43 = 24619.0 SF X 4.2 = 103,399.8 SF  
REMAINING AVAILABLE ZONING FLOOR AREA OF LOT 43 = 103,420.0 SF - 89,268.0 SF = 14,152.0 SF
- FLOOR AREAS OF LOT 18 + 19 ARE ESTIMATED TO BE 100% RESIDENTIAL USE
- FLOOR AREAS OF LOT 20 ARE ESTIMATED TO BE 100% RESIDENTIAL USE



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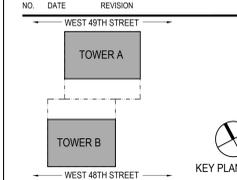


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5 EXISTING BUILDING DIAGRAM  
SCALE: 1/32" = 1'-0"

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Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, N.J, TEL # 201-374-1794

PROJECT TITLE:  
540 W49TH ST

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324030

DRAWING TITLE:  
MECHANICAL DEDUCTION  
AND FLOOR AREA  
CALCULATION

SCALE: AS NOTED PAGE:06 OF 18

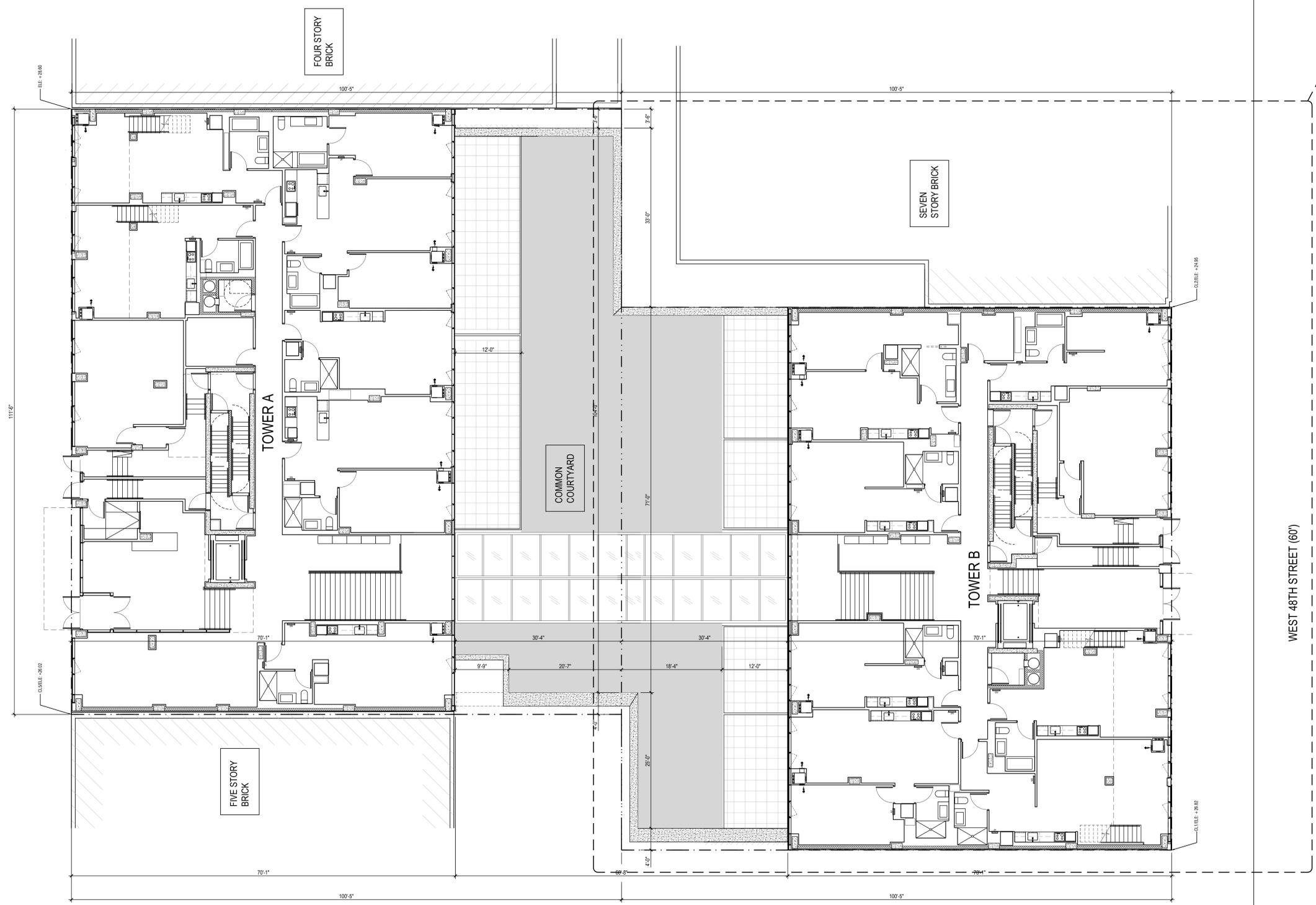
Z-003A

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WEST 49TH STREET (60')



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 NO. DATE REVISION

WEST 49TH STREET  
 TOWER A  
 TOWER B  
 WEST 48TH STREET

KEY PLAN

**S9** an affiliate of Perkins Eastman Architects, PC  
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Owner:  
 FORTIS PROPERTY GROUP WEST 48TH ST LLC  
 45 MAIN STREET, SUITE 800  
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 RA CONSULTANTS LLC  
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PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
 NEW YORK, NY  
 PROJECT No: 47440.00  
 DOB No: 121324030  
 DRAWING TITLE:  
**SITE PLAN**

SCALE: AS NOTED PAGE 07 OF 18

**A-020A**

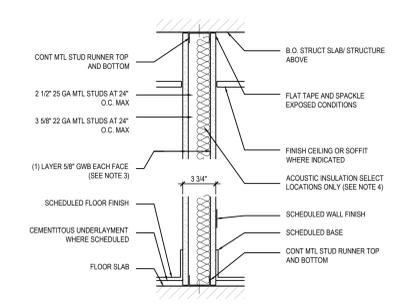


DOB BSCAN STICKER



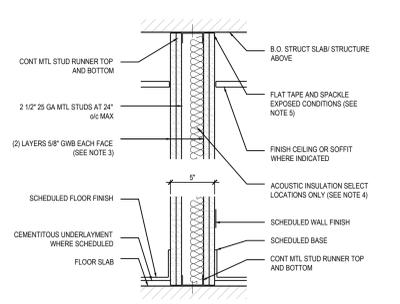
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 XX/XX/2012



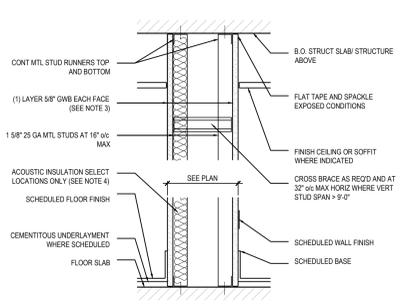
TYPE A: UNRATED  
 TYPE A1: ONE HOUR FIRE RATING - CGS 111-83, BSA # 301-603M  
 TYPE A2: UNRATED WITH 3/8" MTL STUD @ 24" O.C. TO UNDERSIDE OF CONC. PLANK  
 STC RATING: 47 WITH INSULATION

**A A1 A2** **GWB PARTITION**



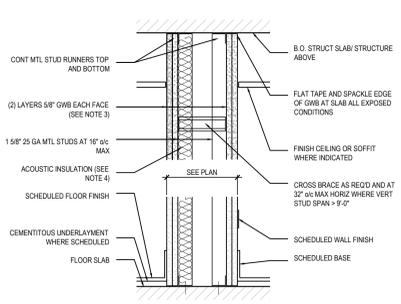
TYPE B: UNRATED  
 TYPE B1: ONE HOUR FIRE RATING - 3M UL L415, BSA # 301-603M  
 TYPE B2: TWO HOUR FIRE RATING - UL L415, BSA # 301-603M  
 STC RATING: 48 WITHOUT INSULATION / 56 WITH INSULATION

**B B1 B2** **GWB PARTITION**



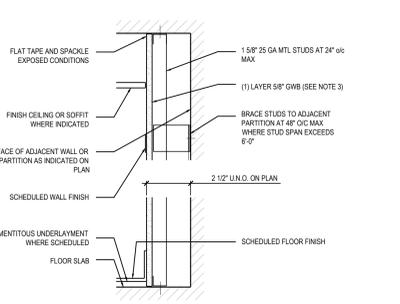
TYPE C: UNRATED  
 TYPE C1: ONE HOUR FIRE RATING - UL U420, BSA # 301-603M  
 STC RATING: 52 WITH INSULATION

**C C1** **GWB CHASE**  
 1 1/2" = 1'-0"



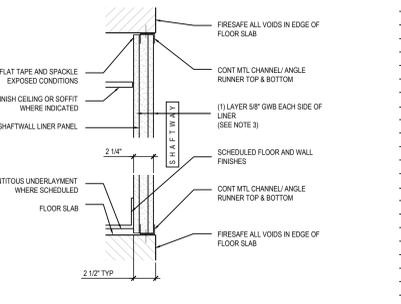
TYPE D: UNRATED  
 TYPE D1: ONE HOUR FIRE RATING - 3M UL L415, MEA #  
 TYPE D2: TWO HOUR FIRE RATING - UL L415, MEA #  
 STC RATING: 48 WITHOUT INSULATION / 56 WITH INSULATION

**D D1 D2** **GWB PARTITION**



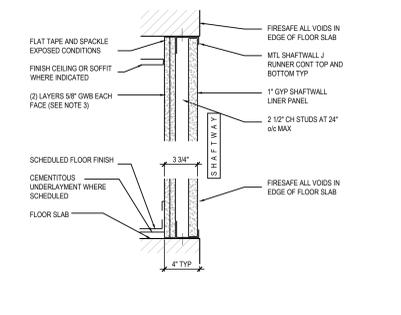
TYPE E: UNRATED  
 STC RATING: NA

**E** **FURRED GYP FINISH**  
 1 1/2" = 1'-0"



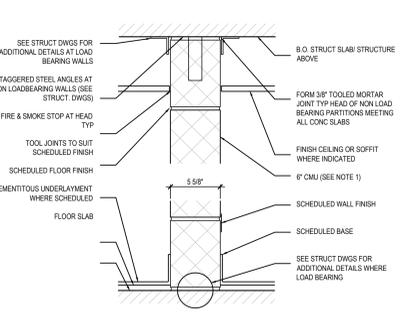
TYPE F: TWO HOUR FIRE RATED - UL U529, BSA # 898-473M  
 STC RATING: NA

**F** **GYP SHAFTWALL**  
 1 1/2" = 1'-0"



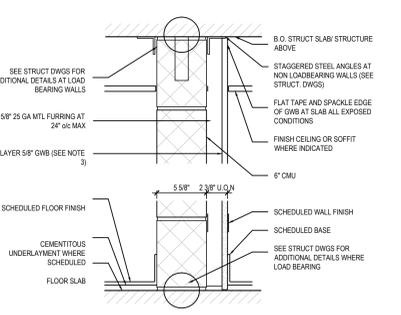
TYPE G: TWO HOUR FIRE RATED - UL U415, BSA # 354-76 5M  
 STC RATING: 39 WITHOUT INSULATION / 47 WITH INSULATION

**G** **GYP SHAFTWALL**  
 1 1/2" = 1'-0"



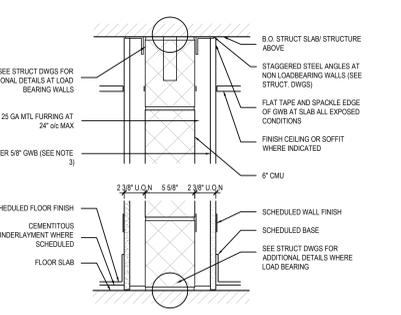
TYPE H: UNRATED  
 TYPE H1: ONE HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE H2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE H3: TYPE H3: THREE HOUR FIRE RATING - 3M UL U906 USING BLOCK CLASS C-3, MEA # 1-74 M  
 STC RATING: NA

**H H2 H3** **CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



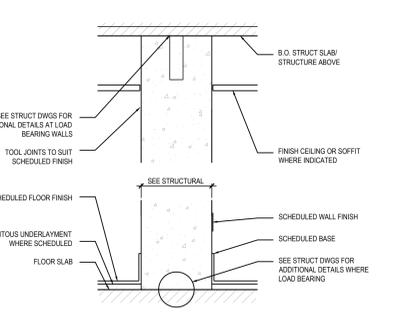
TYPE J1: UNRATED  
 TYPE J2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2, MEA # 1-74 M  
 STC RATING: NA

**J1 J2** **FURRED CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



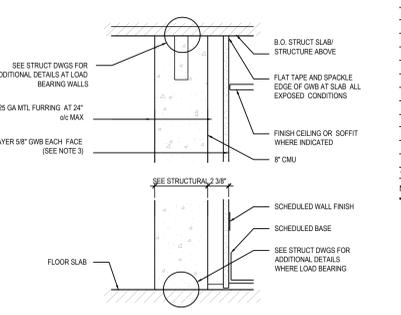
TYPE K1: UNRATED  
 TYPE K2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2, MEA # 1-74 M  
 STC RATING: NA

**K1 K2** **FURRED CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



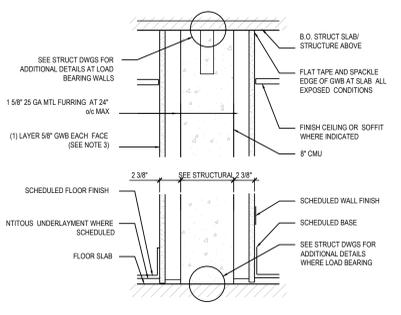
TYPE L1: ONE HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE L2: TWO HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE L3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3, MEA # 1-74 M  
 STC RATING: NA

**L1 L2 L3** **CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



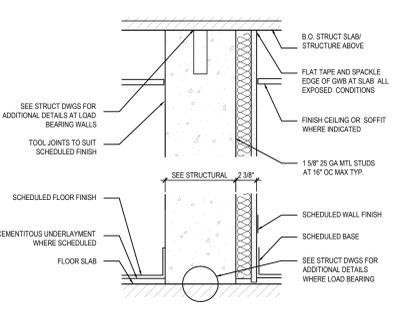
TYPE M1: ONE HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE M2: TWO HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE M3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3, MEA # 1-74 M  
 STC RATING: NA

**M1 M2 M3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



TYPE N1: ONE HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE N2: TWO HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE N3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3, MEA # 1-74 M  
 STC RATING: NA

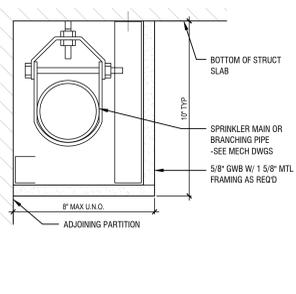
**N1 N2 N3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



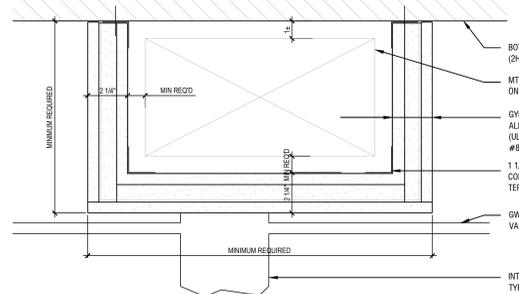
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 TYPE P2: TWO HOUR FIRE RATING - UL U905 USING BLOCK CLASS D-2, MEA # 1-74 M  
 TYPE P3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3, MEA # 1-74 M  
 STC RATING: NA

**P1 P2 P3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"

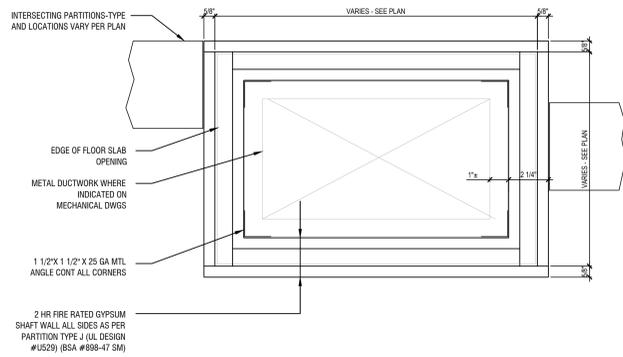
- PARTITION NOTES**
- SEE SECTION 0420 "UNIT MASONRY" FOR ADDITIONAL UNIT MASONRY REQUIREMENTS, INCLUDING REQUIRED JOINT REINFORCEMENT. WALLS AND PARTITIONS INDICATED ON THE STRUCT DWGS ARE LOAD BEARING AND STRUCTURAL. FOLLOW ADDITIONAL DETAILS AND NOTES AS MAY BE INDICATED ON STRUCT DWGS FOR SUCH LOAD BEARING WALLS AND PARTITIONS.
  - SEE SPECIFICATION SECTION 0920 "GYPSUM BOARD ASSEMBLIES" FOR ADDITIONAL REQUIREMENTS REGARDING GYPSUM PARTITION AND SHAFTWALL CONSTRUCTION.
  - PROVIDE 5/8" GLASS MAT GYPSUM WALL BOARD EN LIEU MOISTURE RESISTANT GYPSUM WALL BOARD ON THE FACE LAYER OF ALL PARTITIONS AND SOFFITS WITHIN BATHROOMS, INCLUDING PARTITIONS AND SOFFITS OF BATHUB AND SHOWER SURROUNDS.
  - PROVIDE ACOUSTIC INSULATION PER SPECIFICATION SECTION 0920 "GYPSUM BOARD ASSEMBLIES" WITHIN PARTITIONS SEPARATING APARTMENT UNITS AND WITHIN PARTITIONS SEPARATING APARTMENT UNITS FROM CORRIDORS, AMENITY SPACE, AND OTHER COMMON SPACES.
  - PROVIDE 3/4" PTD FIRE RETARDANT PLYWOOD AT ALL ELECTRIC PANELS AND DATA/TELEPHONE CLOSET LOCATIONS.



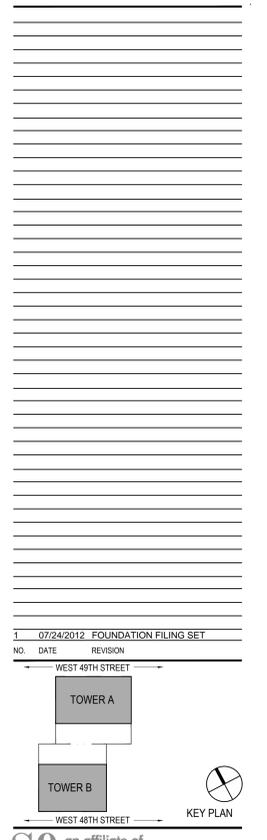
**1** **TYP. SPRINKLER PIPE ENCLOSURE**  
 3" = 1'-0"



**2** **HORIZONTAL SHAFT ENCLOSURE**  
 3" = 1'-0"



**3** **VERTICAL SHAFT ENCLOSURE**  
 3" = 1'-0"



07/24/2012 FOUNDATION FILING SET  
 NO. DATE REVISION  
 WEST 49TH STREET  
 TOWER A  
 TOWER B  
 WEST 48TH STREET  
 KEY PLAN

**S9** an affiliate of  
**Perkins Eastman Architects, PC**  
 115 FIFTH AVENUE  
 NEW YORK, NY 10003  
 T. 212.353.7000  
 F. 212.353.7676

Owner:  
 FORTIS PROPERTY GROUP WEST 48TH ST LLC  
 45 MAIN STREET, SUITE 800  
 BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
 WONDER WORKS CONSTRUCTION CORPORATION  
 18 WEST 21ST STREET, 4TH FL  
 NEW YORK, NY, TEL # 212-465-9455

Chil / Site:  
 SULLIVAN GROUP DESIGN LLC  
 109 WEST 27TH ST  
 NEW YORK, NY, TEL # 212-352-8636

Structural:  
 WSP CANTOR SENIUK  
 228 EAST 45TH ST, 3RD FL  
 NEW YORK, NY, TEL # 212-687-8988

MEP:  
 MOTTOLA RINI ENGINEERS P.C.  
 36 WEST 25TH ST  
 NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
 RA CONSULTANTS LLC  
 47 WILKENS DRIVE  
 DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
 NEW YORK, NY  
 PROJECT No: 474400  
 DRAWING No: 121324030  
 DOB No: 121324030

DRAWING TITLE:  
**PARTITION SCHEDULE**

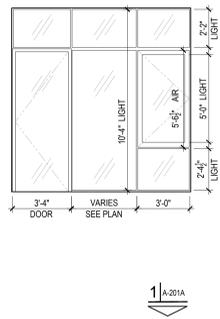
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**A-030A**

DOB BSCAN STICKER



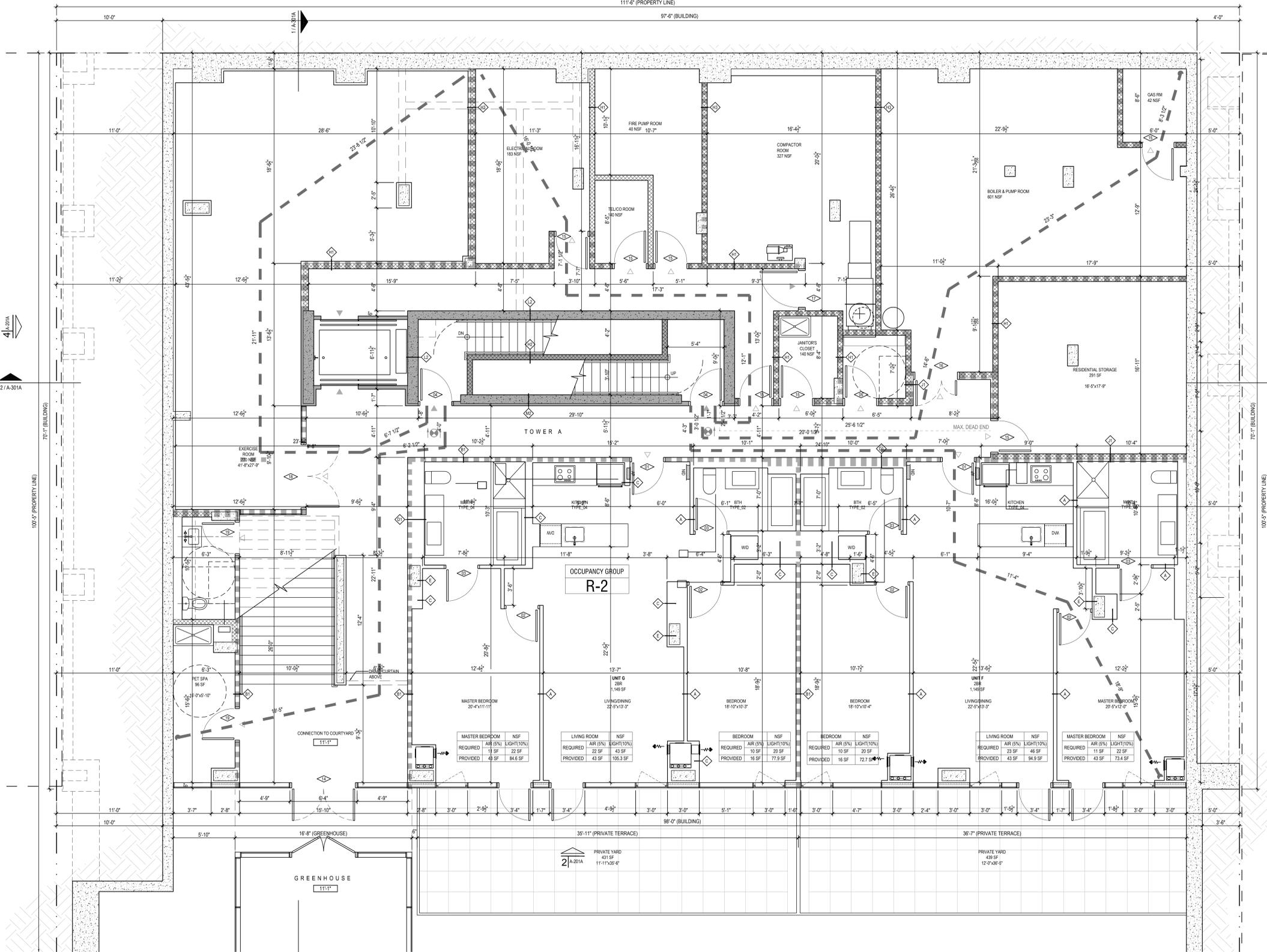
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OCCUPANCY LOAD & EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQ. FEET) WITHIN DIV	GROSS FLOOR AREA PER OCCUPANT (SQ. FT.)	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WIDTH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX TRAVEL DISTANCE PERMITTED (FT)	MAX TRAVEL DISTANCE PROVIDED (FT)	MAX DEAD END DISTANCE PERMITTED (FT)	MAX DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL (GROSS AREA)	R-2	2,310 SQ. FT.	200	12	3.5							
EXERCISE ROOM	R-2	808 SQ. FT.	50	16	4.8							
INCIDENTAL TO R-2:						40' * 2 = 80		36' * 2 = 72	200	69'-9"	40	27'-11"
ELECTRICAL ROOM	INCIDENTAL TO R-2	193 SQ. FT.	-	0	-							
FIRE PUMP ROOM	INCIDENTAL TO R-2	140 SQ. FT.	-	0	-							
COMPACTOR ROOM	INCIDENTAL TO R-2	327 SQ. FT.	-	0	-							
BOILER & PUMP ROOM	INCIDENTAL TO R-2	691 SQ. FT.	-	0	-							
GAS ROOM	INCIDENTAL TO R-2	42 SQ. FT.	-	0	-							
TELECO ROOM	INCIDENTAL TO R-2	40 SQ. FT.	-	0	-							
JANITOR'S CLOSET	INCIDENTAL TO R-2	43 SQ. FT.	-	0	-							
RESIDENTIAL STORAGE	INCIDENTAL TO R-2	291 SQ. FT.	-	0	-							
PET SPA	INCIDENTAL TO R-2	96 SQ. FT.	-	0	-							
BATHROOM	INCIDENTAL TO R-2	64 SQ. FT.	-	0	-							
<b>TOTAL</b>				<b>28</b>	<b>8</b>			<b>6</b>				

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS 'A' FIRE DOOR (3/4 HR); 1 1/2 EXIT UNITS(EU), UNO
  - CLASS 'B' FIRE DOOR (1-1/2 HR); 1 1/2 EXIT UNITS(EU), UNO
  - FIRE STAND PIPE W/VALVE EXIT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



07/24/2012 FOUNDATION FILING SET  
NO. DATE REVISION

WEST 49TH STREET

TOWER A

TOWER B

WEST 48TH STREET

KEY PLAN

**S9** an affiliate of Perkins Eastman Architects, PC

115 FIFTH AVENUE  
NEW YORK, NY 10003  
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F 212.353.7476

Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
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BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY

PROJECT No: 474400

DOB No: 121324030

DRAWING TITLE:  
**TOWER A  
CELLAR LEVEL  
(GARDEN LEVEL)**

SCALE: AS NOTED PAGE.09 OF 18

**A-100A.00**

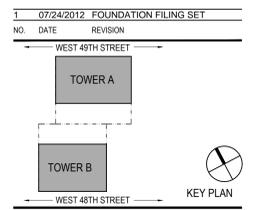
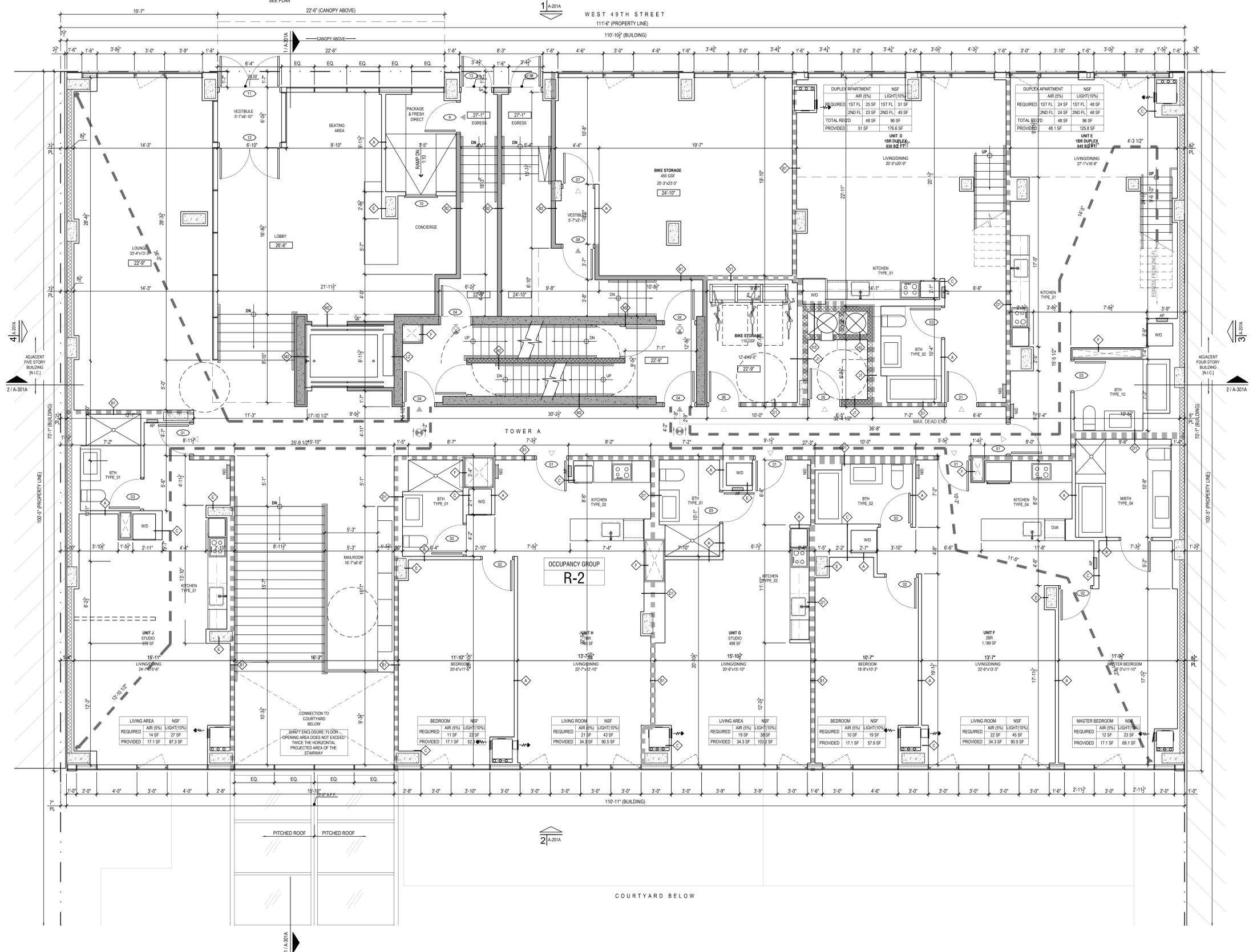
DOB BSCAN STICKER



EGRESS CONVERGENCE					
LEVEL	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)
CELLAR	28	8.4	80	5.6	72
GROUND FLOOR	57	17.1		11.4	
TOTAL	85	25.5		17.0	

OCCUPANCY LOAD & EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005												
ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQ. FT.) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (SQ. FT.)	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX TRAVEL DISTANCE PERMITTED (FT)	MAX TRAVEL DISTANCE PROVIDED (FT)	MAX DEAD END DISTANCE PERMITTED (FT)	MAX DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL (GROSS AREA)	R-2	4,333 SQ. FT.	200	22	6.5	40' * 2 = 80	4.3	36' * 2 = 72	200	73'-2"		
INCIDENTAL TO R-2												
LOUNGE	INCIDENTAL TO R-2	502 SQ. FT.	15	33	10.0		6.7					
LOBBY & PACKAGE ROOM	INCIDENTAL TO R-2	547 SQ. FT.	-	1	0.3		0.2					
BIKE STORAGE	INCIDENTAL TO R-2	597 SQ. FT.	-	0	-		-					
MAIL ROOM	INCIDENTAL TO R-2	114 SQ. FT.	-	0	-		-					
TOTAL				57	16.8		11.2			116'-10"	40	34'-2"

- SYMBOLS LEGEND**
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS 'A' FIRE DOOR (3/4 HR); 1 1/2 EXIT UNITS(EU), UNO
  - CLASS 'B' FIRE DOOR (1-1/2 HR); 1 1/2 EXIT UNITS(EU), UNO
  - FIRE STAND PIPE W/VALVE EXIT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



an affiliate of  
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**Owner:**  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

**Construction Manager:**  
WONDER WORKS CONSTRUCTION CORPORATION  
109 WEST 27TH ST, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

**Civil / Site:**  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

**Structural:**  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

**MEP:**  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

**Geotechnical:**  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

**PROJECT TITLE:**  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY

**PROJECT NO:** 47440.00

**DOB No:** 121324030

**DRAWING TITLE:**  
**TOWER A  
1ST FLOOR PLAN  
(LOBBY LEVEL)**

SCALE: AS NOTED PAGE 10 OF 18

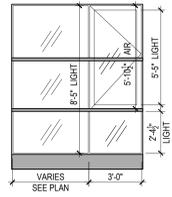
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DOB BSCAN STICKER



**GROUND LEVEL PLAN**  
SCALE: 1/4" = 1'-0"

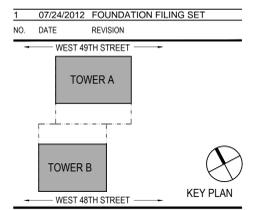
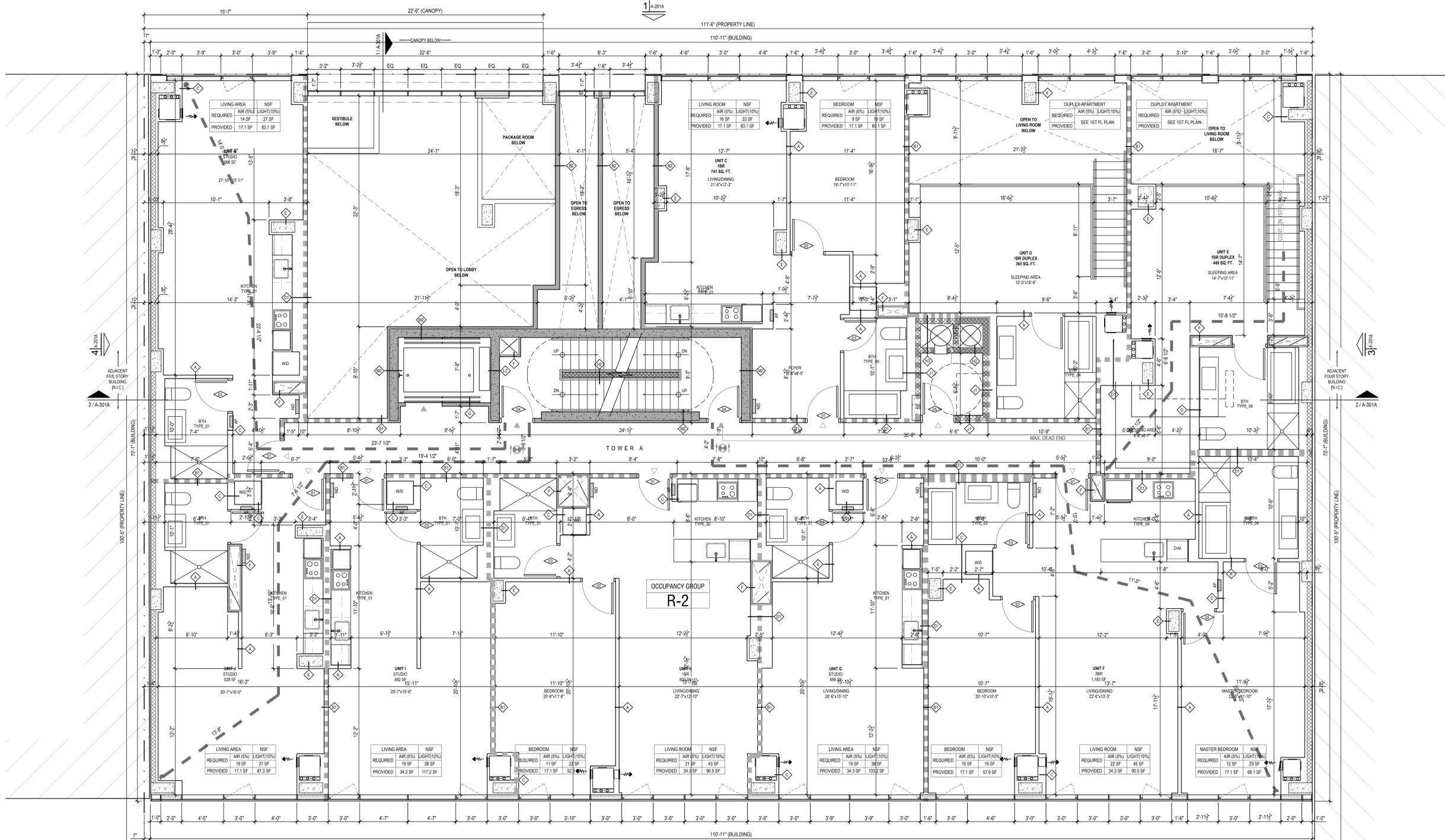
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OCCUPANCY LOAD & EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQ. FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (SQ. FT.)	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX TRAVEL DISTANCE PERMITTED (FT)	MAX TRAVEL DISTANCE PROVIDED (FT)	MAX DEAD END DISTANCE PERMITTED (FT)	MAX DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL (GROSS AREA)	R-2	5,630 SQ. FT.	200	28	8.4	40 * 2 = 80	5.6	36 * 2 = 72	200	79'-6"	40	37'-5"

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS 'A' FIRE DOOR (3/4 HR); 1 1/2 EXIT UNITS(EU), UNO
  - CLASS 'B' FIRE DOOR (1-1/2 HR); 1 1/2 EXIT UNITS(EU), UNO
  - FIRE STAND PIPE W/VALVE EXIT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



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FORTIS PROPERTY GROUP WEST 49TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL# 718-907-7700
- Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL# 212-465-9455
- Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL# 212-352-8636
- Structural:  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL# 212-687-8988
- MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL# 212-627-7299
- Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL# 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY

PROJECT No: 47440.00

DOB No: 121324030

DRAWING TITLE:  
**TOWER A  
2ND FLOOR PLAN**

SCALE: AS NOTED PAGE.11 OF 18

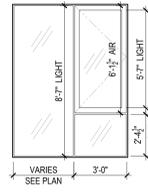
**A-102A.00**

DOB BSCAN STICKER



1 2ND FLOOR PLAN  
A-102A SCALE: 1/4" = 1'-0"

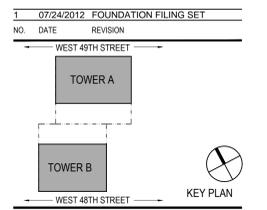
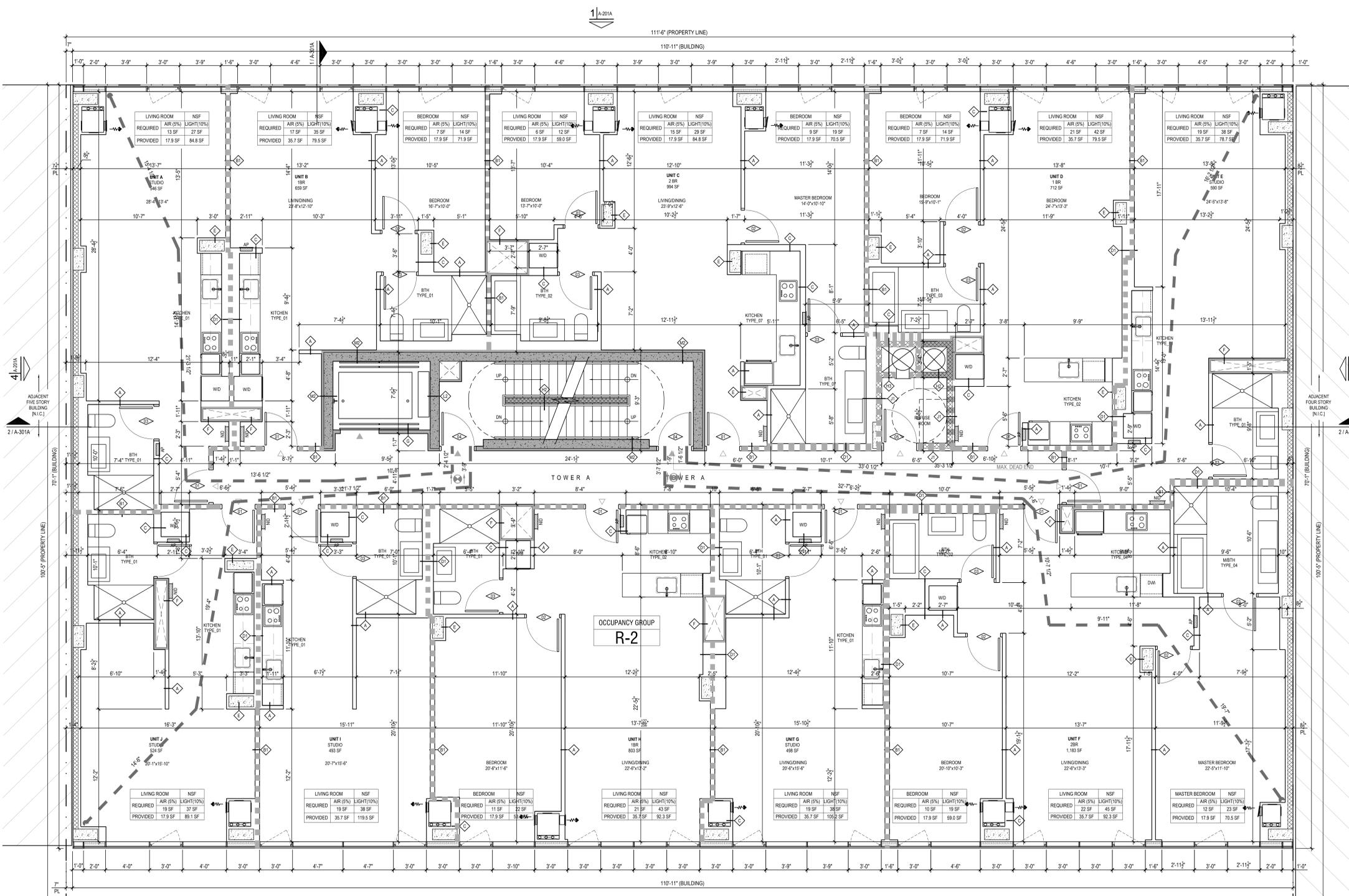
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OCCUPANCY LOAD & EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQ. FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (SQ. FT.)	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX TRAVEL DISTANCE PERMITTED (FT)	MAX TRAVEL DISTANCE PROVIDED (FT)	MAX DEAD END DISTANCE PERMITTED (FT)	MAX DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL (GROSS AREA)	R-2	7,002 SQ. FT.	200	35	10.5	40 * 2 = 80	7.0	36 * 2 = 72	200	80'-4"	40	37'-1"

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS 'A' FIRE DOOR (3/4 HR); 1 1/2 EXIT UNITS(EU), UNO
  - CLASS 'B' FIRE DOOR (1-1/2 HR); 1 1/2 EXIT UNITS(EU), UNO
  - FIRE STAND PIPE W/VALVE EXIT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



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Construction Manager:  
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NEW YORK, NY, TEL# 212-465-9455

Architect / Site:  
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NEW YORK, NY, TEL# 212-352-8636

Structural:  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL# 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
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Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL# 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY

PROJECT No: 47440.00

DOB No: 121324030

DRAWING TITLE:  
**TOWER A  
TYPICAL FLOOR PLANS  
3RD-6TH**

SCALE: AS NOTED PAGE 12 OF 18

**A-103A.00**

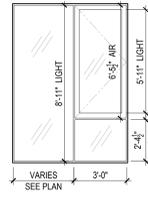
DOB SCAN STICKER



SEAL

1 TYPICAL FLOOR PLAN  
A-103A SCALE: 1/4" = 1'-0"

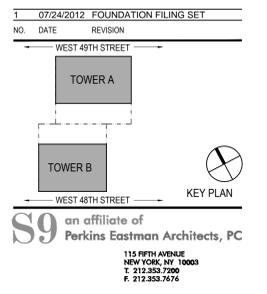
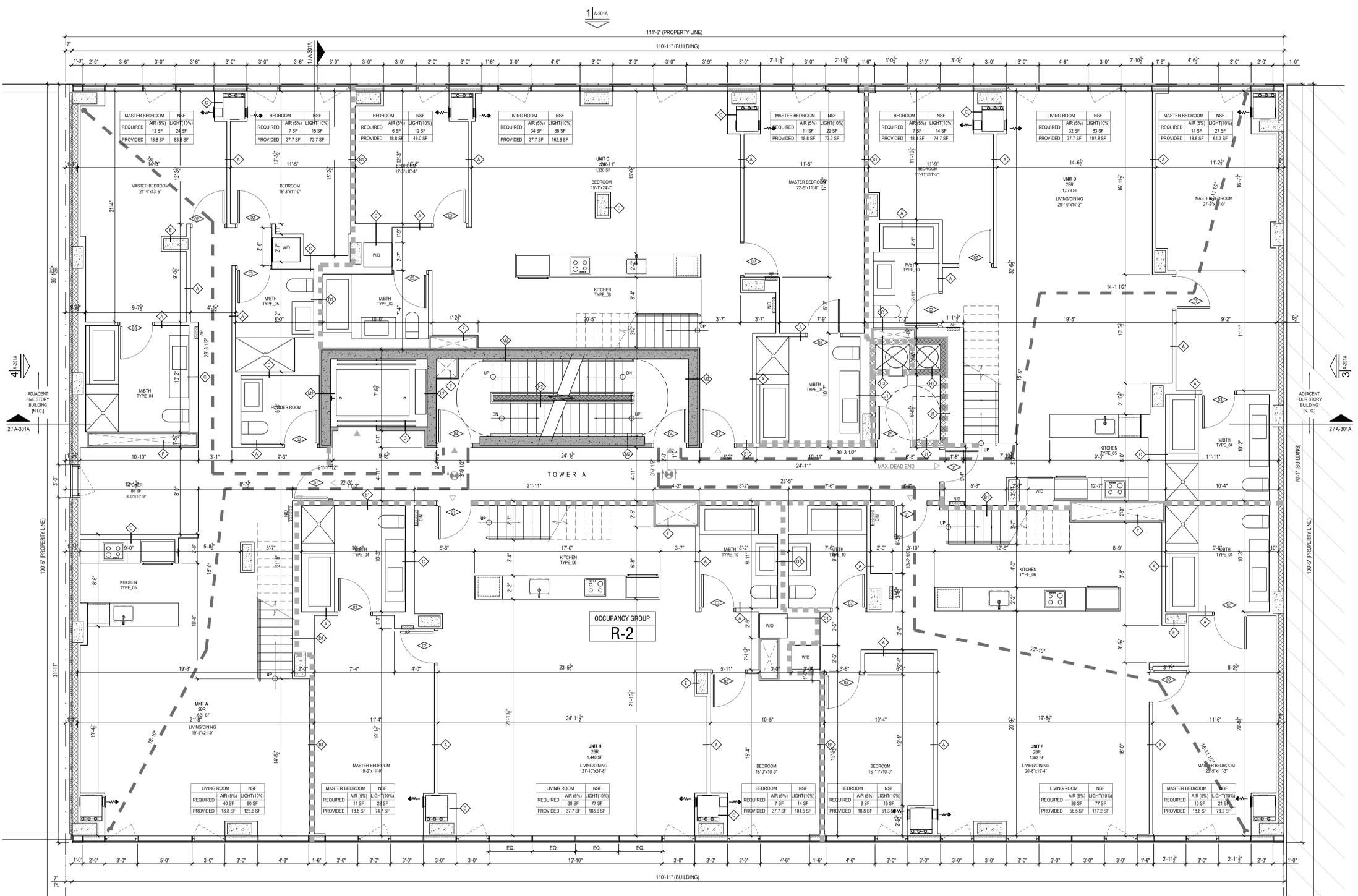
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OCCUPANCY LOAD & EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQ. FT.) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (SQ. FT.)	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX TRAVEL DISTANCE PERMITTED (FT)	MAX TRAVEL DISTANCE PROVIDED (FT)	MAX DEAD END DISTANCE PERMITTED (FT)	MAX DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL (GROSS AREA)	R-2	7,134 SQ. FT.	200	36	10.7	40 * 2 = 80	7.1	36 * 2 = 72	200	79'-1"	40	26'-11"

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS 'A' FIRE DOOR (3/4 HR); 1 1/2 EXIT UNITS(EU), UNO
  - CLASS 'B' FIRE DOOR (1-1/2 HR); 1 1/2 EXIT UNITS(EU), UNO
  - FIRE STAND PIPE W/VALVE EXIT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
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BROOKLYN, NY, TEL# 718-907-7700

Construction Manager:  
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Structural:  
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MEP:  
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NEW YORK, NY, TEL# 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL# 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324030

DRAWING TITLE:  
**TOWER A  
7TH FLOOR PLAN  
(PENTHOUSE LEVEL)**

SCALE: AS NOTED PAGE.13 OF 18

**A-104A.00**

DOB SCAN STICKER

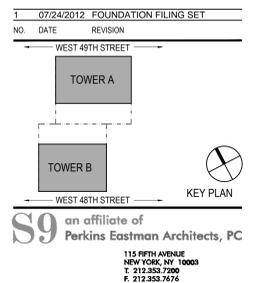
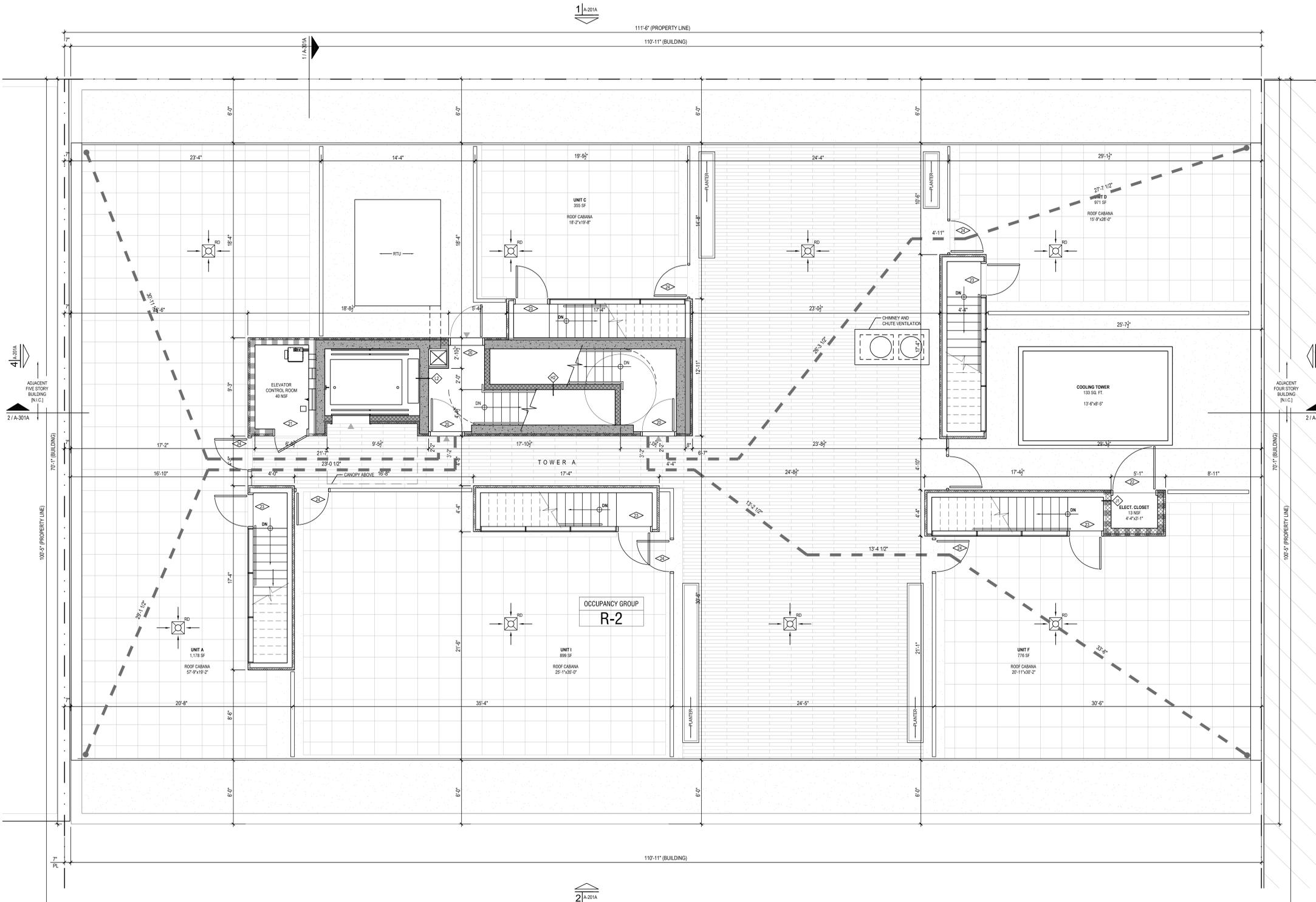


1 PENTHOUSE LEVEL PLAN  
A-104A SCALE: 1/4" = 1'-0"

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ISSUED FOR PRICING ONLY  
XX/XX/2012

OCCUPANCY LOAD & EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005												
ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQ. FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (SQ. FT.)	NO. OF OCCUPANTS	REQUIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REQUIRED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX TRAVEL DISTANCE PERMITTED (FT)	MAX TRAVEL DISTANCE PROVIDED (FT)	MAX DEAD END DISTANCE PERMITTED (FT)	MAX DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL (GROSS AREA)	R-2	4,963 SQ. FT.	30	165	49.6	40 * 2 = 80	33.1	36 * 2 = 72	200	67'-7"	N/A	N/A

- SYMBOLS LEGEND**
- ▬ 1 HR RATED INTERIOR SEPARATION/DIVISION
  - ▬ 2 HR RATED INTERIOR SEPARATION/DIVISION
  - ▬ 3 HR RATED INTERIOR SEPARATION/DIVISION
  - △ CLASS 'A' FIRE DOOR (3/4 HR); 1 1/2 EXIT UNITS(EU), UNO
  - ▲ CLASS 'B' FIRE DOOR (1-1/2 HR); 1 1/2 EXIT UNITS(EU), UNO
  - FIRE STAND PIPE W/VALVE EXIT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - ⊞ MECHANICAL VENTILATION
  - ⊞ SMOKE/CO2 DETECTOR (HARD-WIRED)



**Owner:**  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

**Construction Manager:**  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

**Civil / Site:**  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

**Structural:**  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

**MEP:**  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

**Geotechnical:**  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

**PROJECT TITLE:**  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324030  
DRAWING TITLE:  
**TOWER A  
ROOF PLAN**

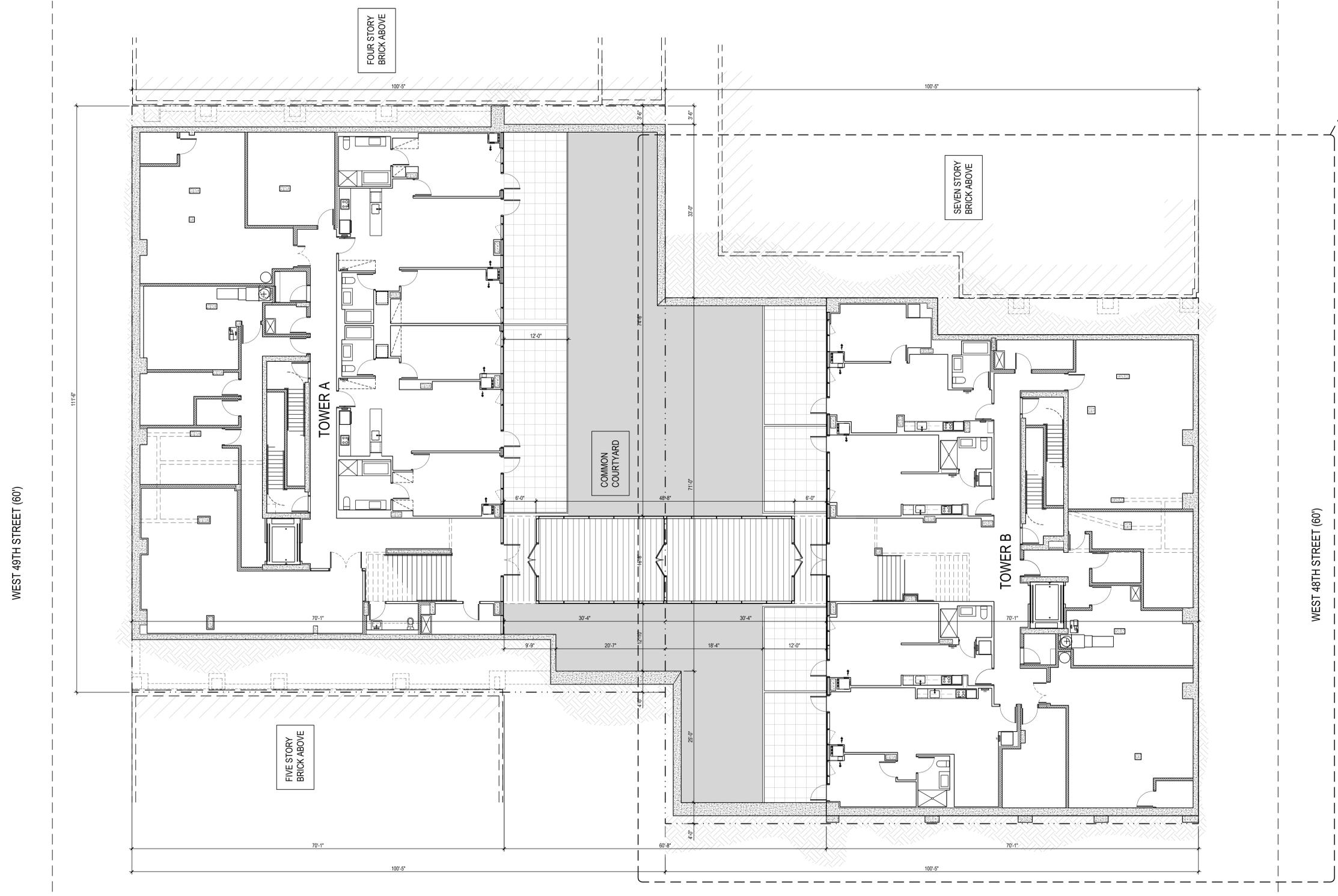
SCALE: AS NOTED PAGE.14 OF 18  
**A-105A.00**

DOB SCAN STICKER



**1 ROOF PLAN**  
A-105A SCALE: 1/4" = 1'-0"

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XX/XX/2012



WEST 49TH STREET (60')

WEST 48TH STREET (60')

FILED UNDER SEPARATE APPLICATION

07/24/2012 FOUNDATION FILING SET

NO.	DATE	REVISION
1		WEST 49TH STREET
2		TOWER A
3		TOWER B

KEY PLAN

**S9** an affiliate of Perkins Eastman Architects, PC

115 FIFTH AVENUE  
NEW YORK, NY 10003  
T. 212.353.7000  
F. 212.353.7676

**Owner:**  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
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NEW YORK, NY, TEL# 212-352-8636

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NEW YORK, NY, TEL# 212-687-8988

**MEP:**  
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36 WEST 25TH ST  
NEW YORK, NY, TEL# 212-627-7299

**Geotechnical:**  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, N.J, TEL# 201-374-1794

**PROJECT TITLE:**  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324030

**DRAWING TITLE:**  
**COURTYARD PLAN**

SCALE: AS NOTED PAGE: 15 OF 18

**A-106A**

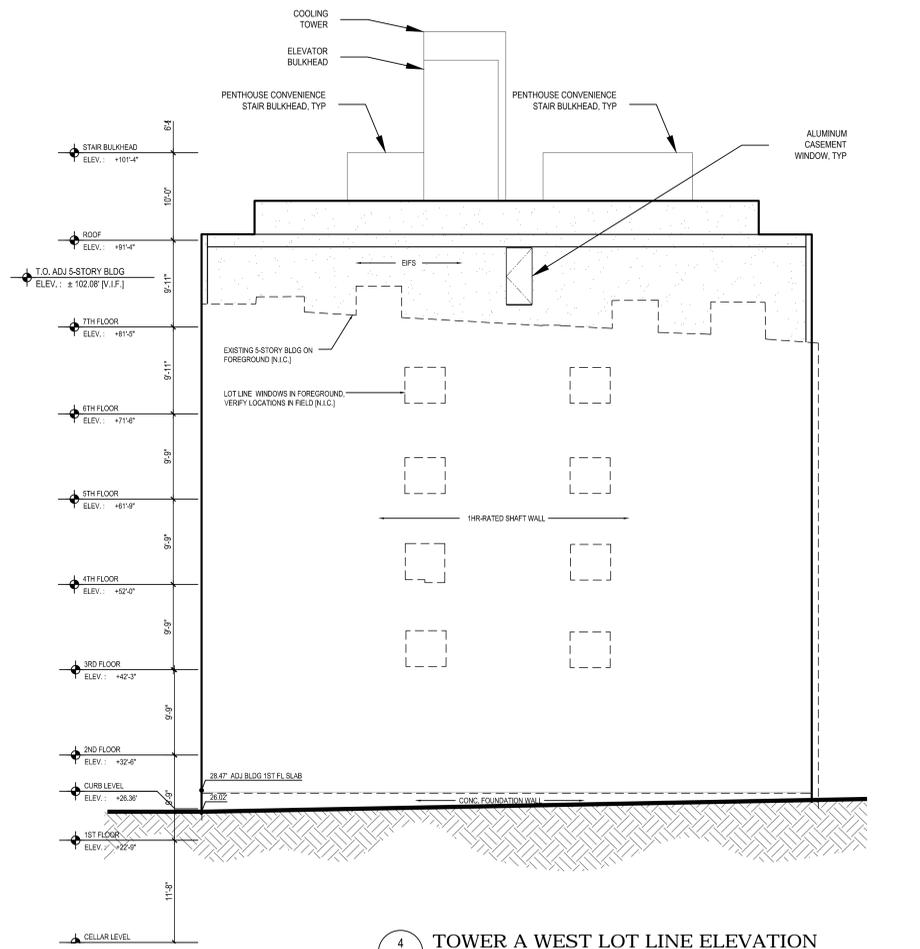


DOB BSCAN STICKER

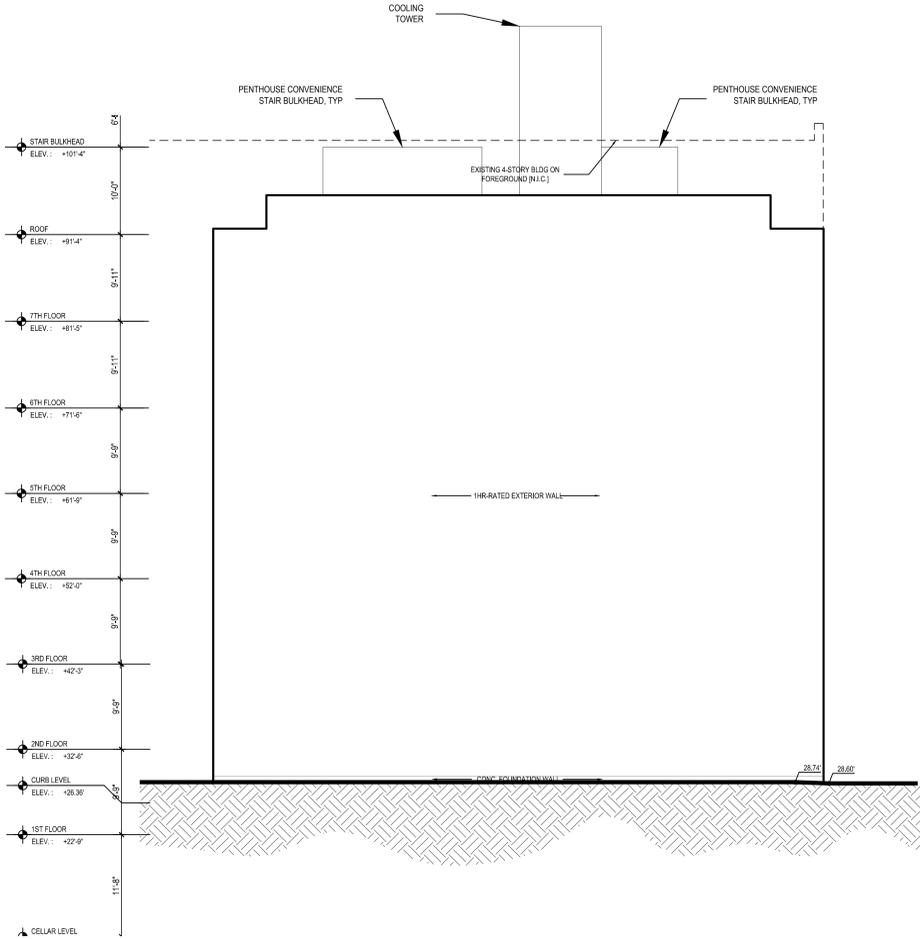


SEAL

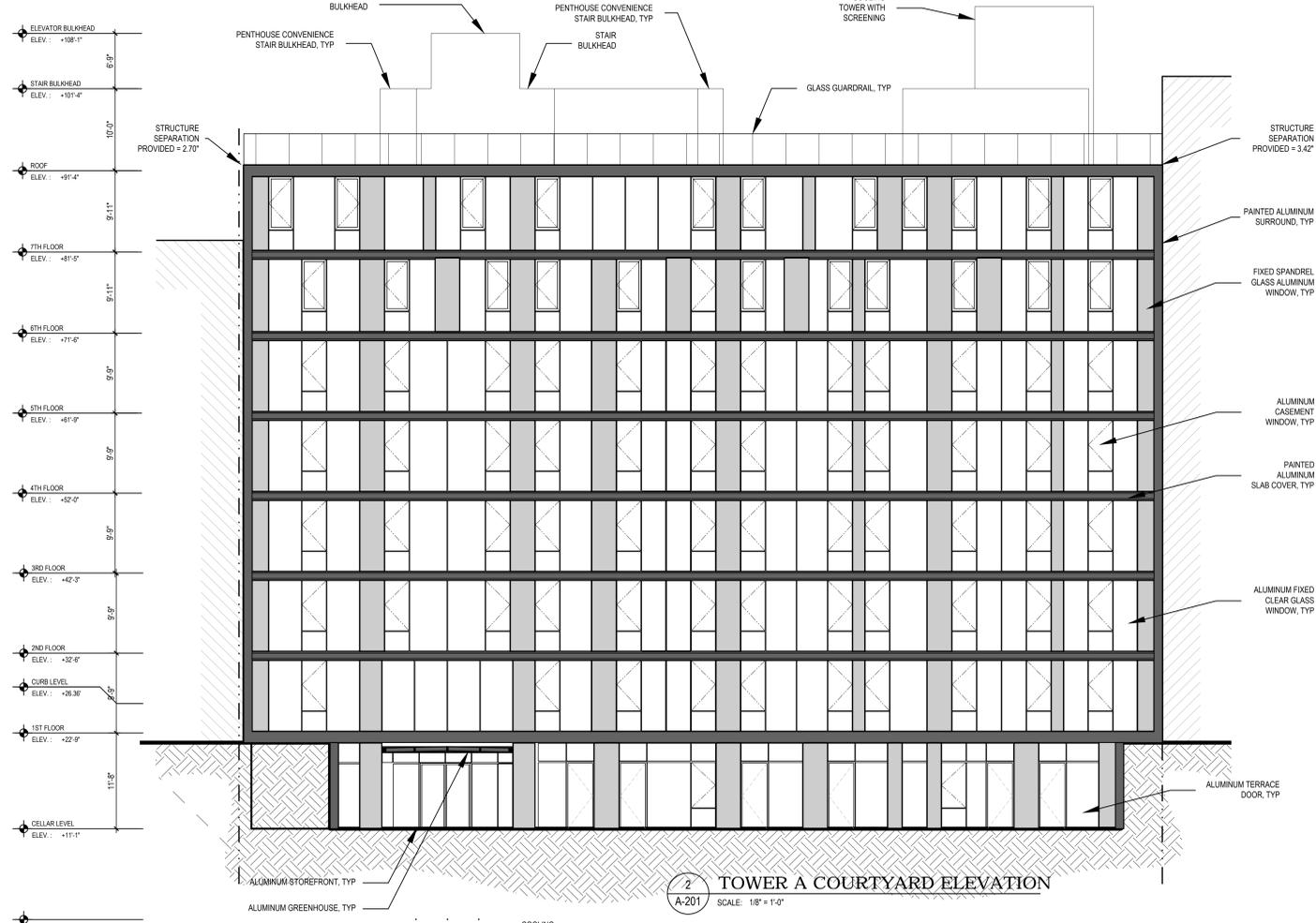
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XX/XX/2012



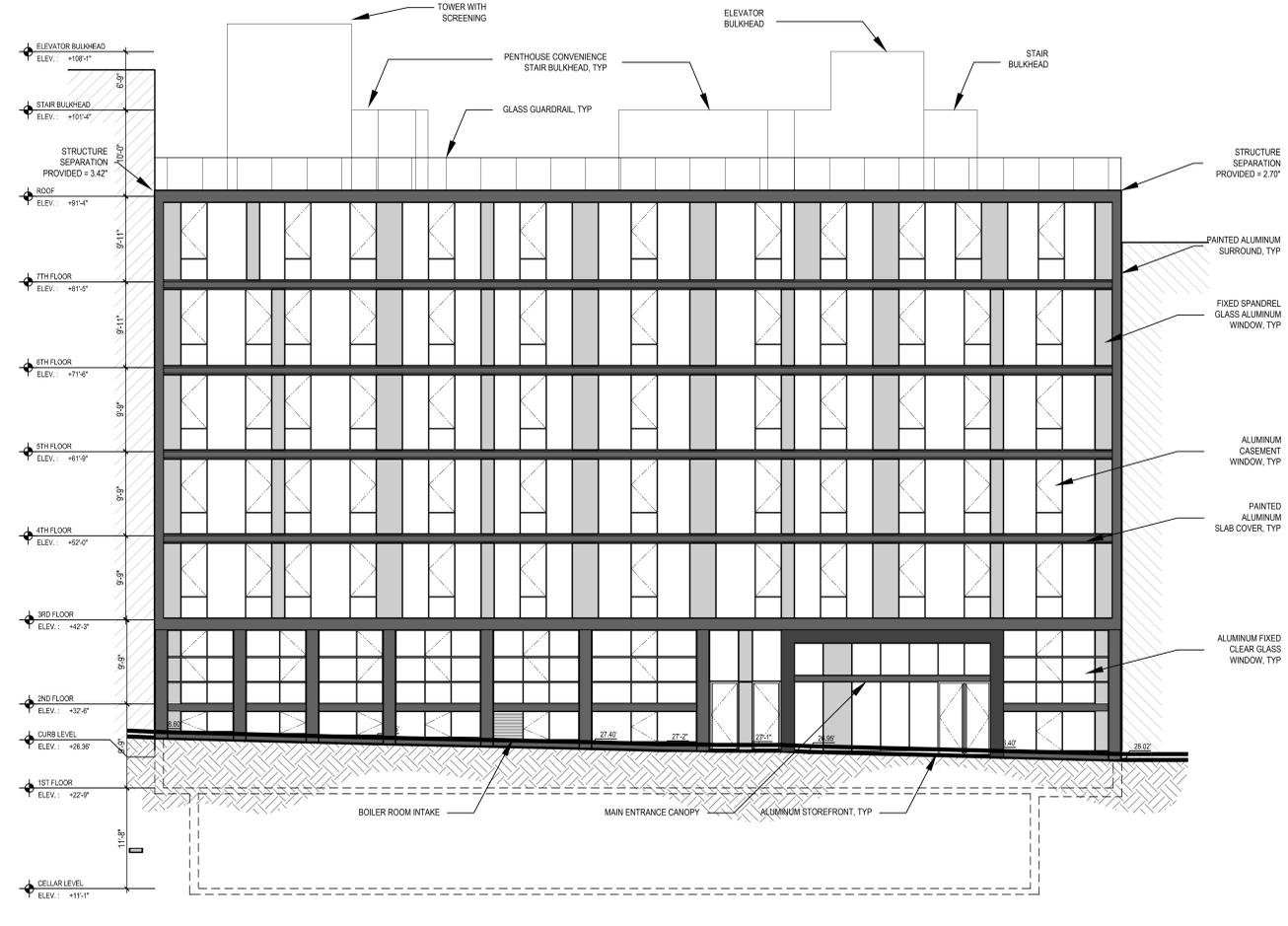
4 TOWER A WEST LOT LINE ELEVATION  
A-201A SCALE: 1/8" = 1'-0"



3 TOWER A EAST LOT LINE ELEVATION  
A-201A SCALE: 1/8" = 1'-0"



2 TOWER A COURTYARD ELEVATION  
A-201 SCALE: 1/8" = 1'-0"



1 TOWER A STREET ELEVATION  
A-201 SCALE: 1/8" = 1'-0"

07/24/2012 FOUNDATION FILING SET  
NO. DATE REVISION

WEST 49TH STREET

TOWER A

TOWER B

WEST 48TH STREET

KEY PLAN

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115 FIFTH AVENUE  
NEW YORK, NY 10003  
T 212.353.7000  
F 212.353.7476

Owner:  
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BROOKLYN, NY, TEL # 718-907-7700

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WONDER WORKS CONSTRUCTION CORPORATION  
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NEW YORK, NY, TEL # 212-465-9455

Arch / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
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Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, N.J, TEL # 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY

PROJECT No: 47440.00

DOB No: 121324030

DRAWING TITLE:  
**TOWER A ELEVATIONS**

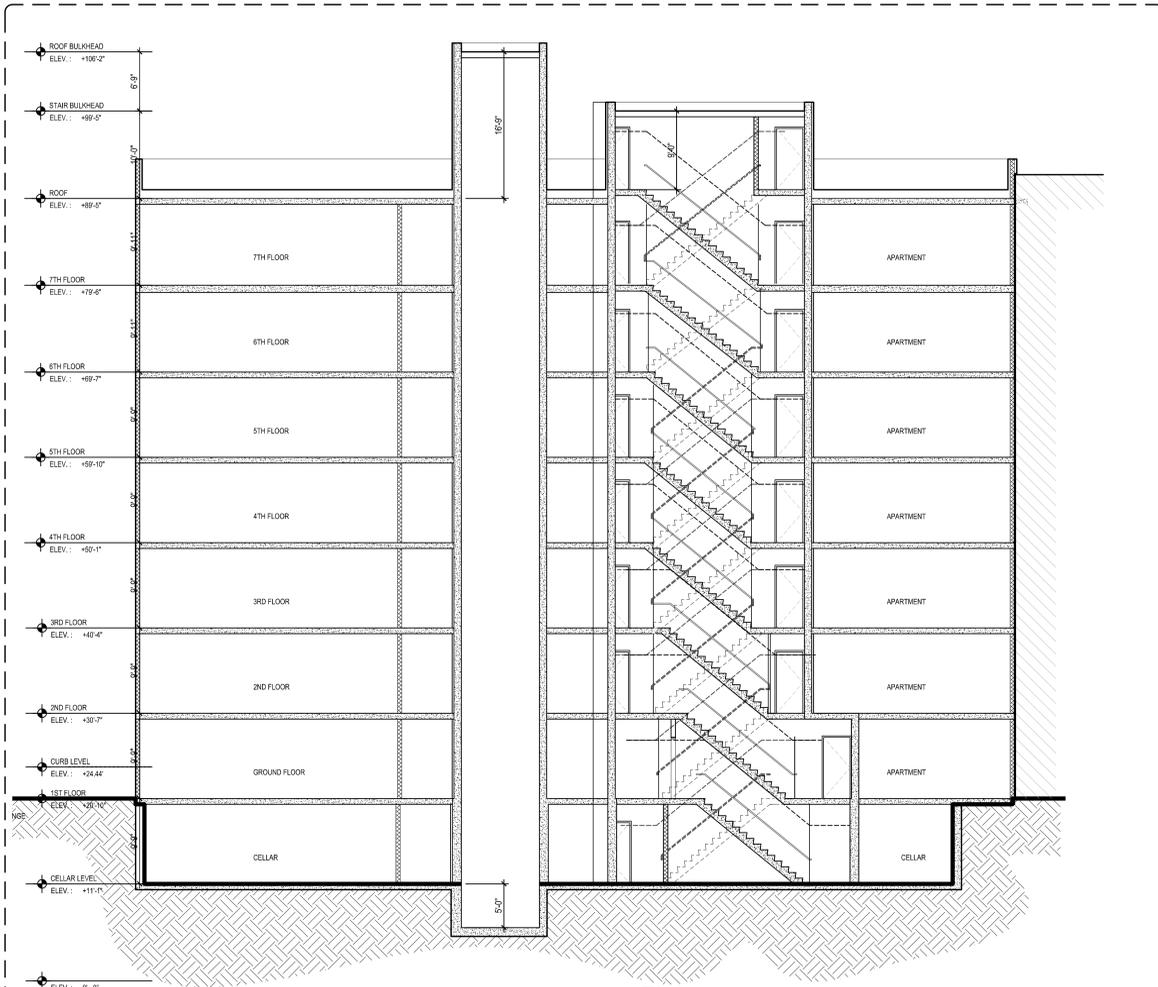
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**A-201A**

DOB BSCAN STICKER

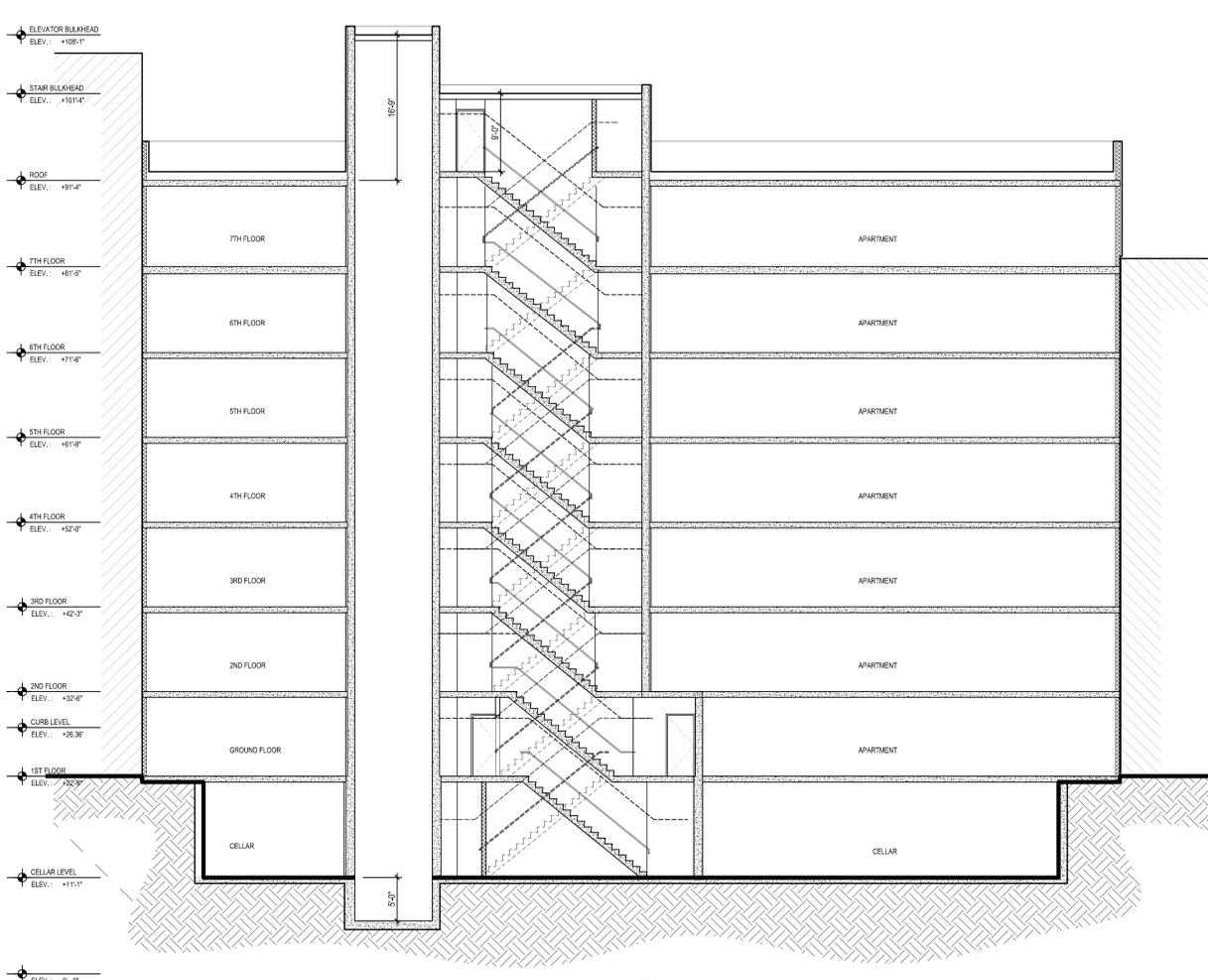


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XX/XX/2012



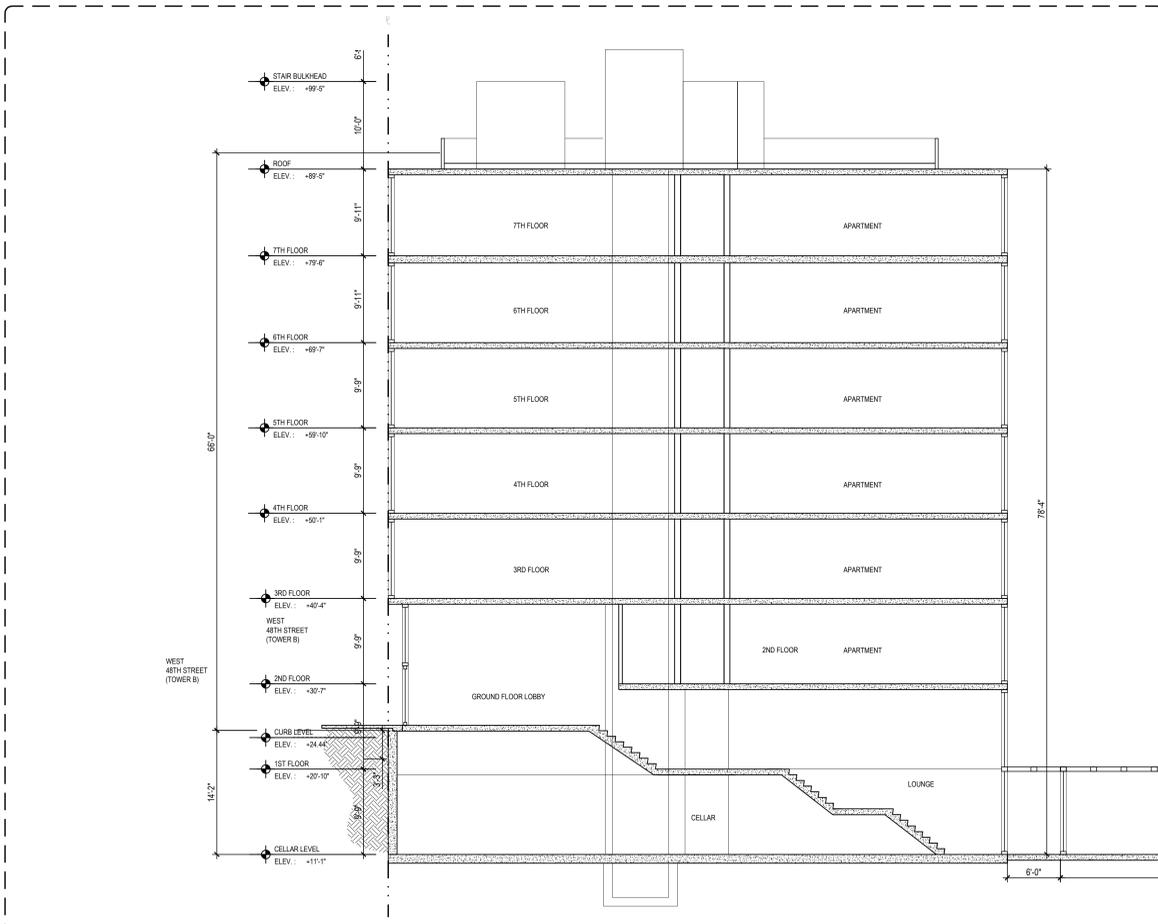
3 48TH ST BUILDING SECTION  
SCALE: 1/8" = 1'-0"

FILED UNDER SEPARATE APPLICATION

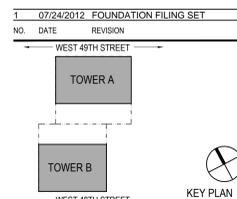
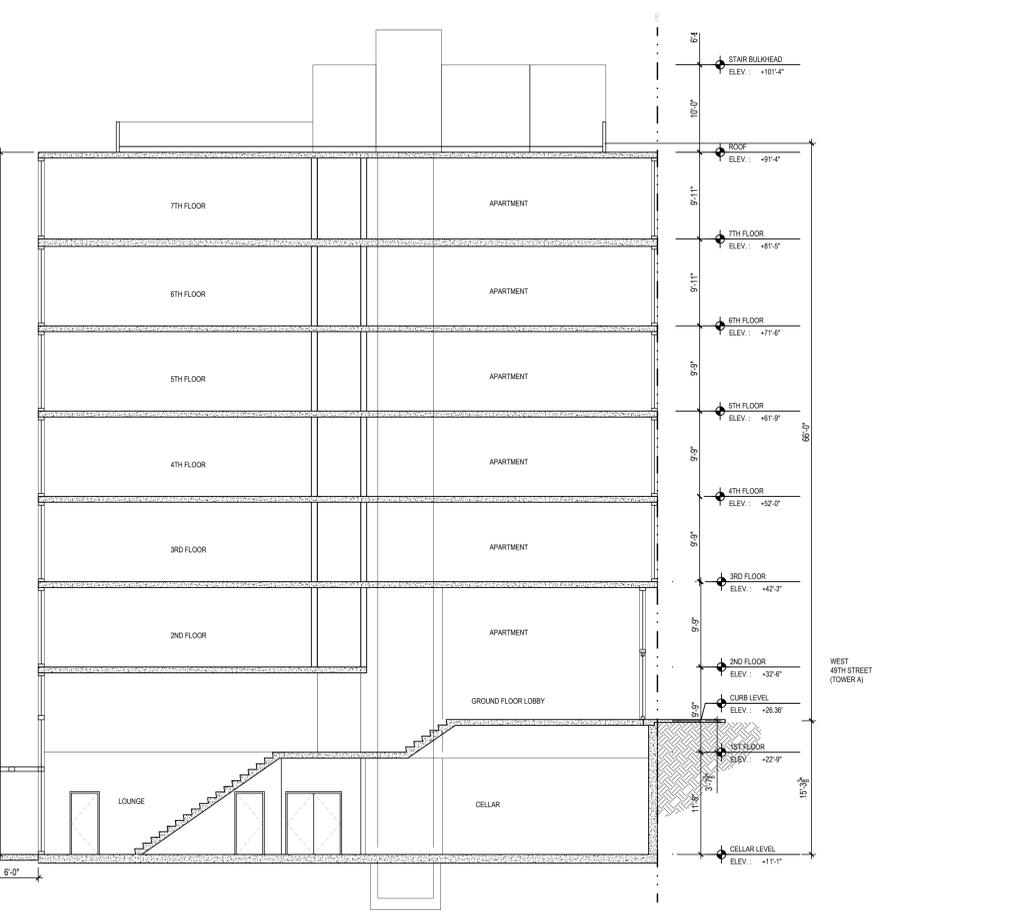


2 49TH ST BUILDING SECTION  
SCALE: 1/8" = 1'-0"

FILED UNDER SEPARATE APPLICATION



1 LONGITUDINAL BUILDING SECTION  
SCALE: 1/8" = 1'-0"



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Construction Manager:  
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NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
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NEW YORK, NY, TEL# 212-352-8636

Structural:  
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228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL# 212-687-8988

MEP:  
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36 WEST 25TH ST  
NEW YORK, NY, TEL# 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, N.J, TEL# 201-374-1794

PROJECT TITLE:  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324030

DRAWING TITLE:  
**OVERALL BUILDING SECTIONS**

SCALE: AS NOTED PAGE 17 OF 18

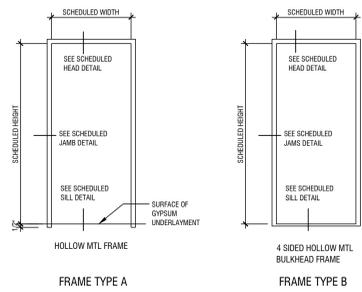
**A-301A**

DOB BSCAN STICKER

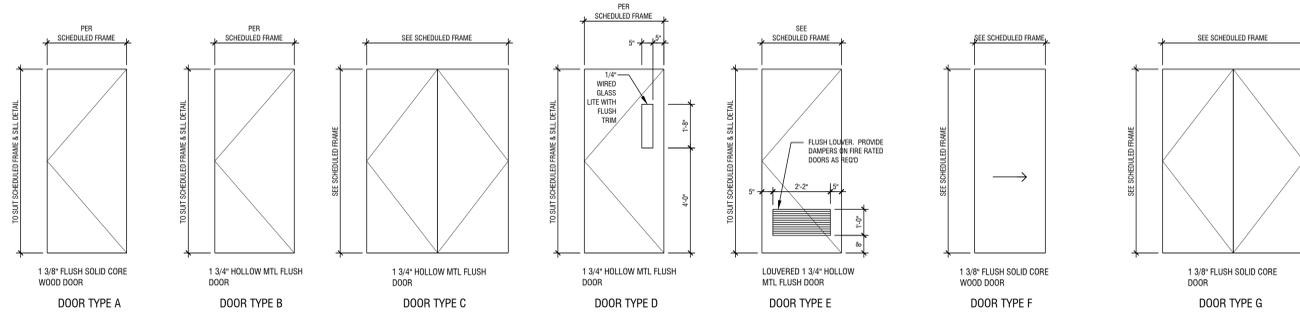


SEAL

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**1 FRAME TYPES**  
3/8" = 1'-0"



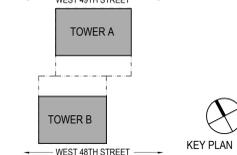
**2 DOOR TYPE**  
3/8" = 1'-0"

**DOOR SCHEDULE**

DOOR TAG	ROOM/SPACE	NOMINAL WIDTH	NOMINAL HEIGHT	DOOR TYPE	FRAME TYPE	JAMB DETAIL	HEAD DETAIL	SILL DETAIL	HARDWARE SET	FIRE RATING	NOTES
01	APARTMENT ENTRY	3'-0"	8'-0"	B	A	J2	H2	S2	-	3/4 HR	
02	BEDROOM	3'-0"	8'-0"	A	A	J1	H1	S1	-	UNRATED	
03	BATHROOM	3'-0"	8'-0"	A	A	J1	H1	S1	-	UNRATED	
04	EXIT STAIR (INTERIOR)	3'-0"	8'-0"	D	A	J2/S	H2/H5	S4	-	1 1/2 HR	
05	HIBLING ROOM	3'-0"	8'-0"	B	A	J1	H1	S1	-	3/4 HR	
06	BIKE ROOM (ADA)	3'-0"	8'-0"	B	A	J1	H1	S1	-	3/4 HR	
07	BIKE ROOM (VESTRIBULE)	3'-0"	8'-0"	D	A	J1	H1	S1	-	UNRATED	
08	BIKE ROOM (TO PASSAGEWAY)	3'-0"	8'-0"	D	A	J2	H2	S1	-	1 1/2 HR	
09	PACKAGE ROOM	3'-0"	8'-0"	D	A	J2	H2	S4	-	1 1/2 HR	
10	PACKAGE & BATHROOM (POCKET)	3'-0"	8'-0"	F	A	-	-	S6	-	UNRATED	
11	LOBBY (ENTRANCE/EXIT ROOM)	(2) 3'-0"	10'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
12	LOBBY ENTRANCE (INTERIOR)	(2) 3'-0"	10'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
13	EXIT PASSAGEWAY	3'-0"	8'-0"	B	A	J2	H2	S1	-	1 1/2 HR	
14	COURTYARD ENTRANCE	(2) 3'-0"	10'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
15	UTILITY/STORAGE/SEER. CORRIDOR	3'-0"	7'-0"	E	A	J3/H4	H3/H4	S4	-	3/4 HR	
16	BOILER ROOM (PREPARED)	4'-0"	7'-0"	C	A	J4	H4	S4	-	3/4 HR	
17	CONTRACTOR ROOM	3'-0"	7'-0"	B	A	J2	H2	S1	-	1 1/2 HR	
18	EXERCISE ROOM	(2) 3'-0"	7'-0"	N/A	N/A	J1	H1	S5	-	3/4 HR	
19	TOILET/PET SPA	3'-0"	7'-0"	B	A	J1	H1	S5	-	3/4 HR	
20	STAR BULKHEAD	3'-0"	7'-0"	D	B	J2	H2	S1	-	1 1/2 HR	
21	ELEVATOR CONTROL ROOM	3'-0"	7'-0"	B	B	J1	H1	S1	-	3/4 HR	
22	ELECTRICAL CLOSET	4'-0"	7'-0"	B	B	J1	H1	S1	-	UNRATED	
23	PENTHOUSE STAIR BULKHEAD	3'-0"	7'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
24	ROOF CABANA	3'-0"	N/A	N/A	N/A	N/A	N/A	-	-	UNRATED	

1 07/24/2012 FOUNDATION FILING SET

NO. DATE REVISION



**S9** an affiliate of Perkins Eastman Architects, P.C.  
115 FIFTH AVENUE  
NEW YORK, NY 10003  
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**Owner:**  
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45 MAIN STREET, SUITE 800  
BROOKLYN, NY. TEL # 718-907-7700

**Construction Manager:**  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL.  
NEW YORK, NY. TEL # 212-465-9455

**CM / Site:**  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY. TEL # 212-352-8636

**Structural:**  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
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**MEP:**  
MOTTOLA RINI ENGINEERS P.C.  
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**Geotechnical:**  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, N.J. TEL # 201-374-1794

**PROJECT TITLE:**  
**540 W49TH ST**

540 WEST 49TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
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**DRAWING TITLE:**  
**DOOR SCHEDULE**

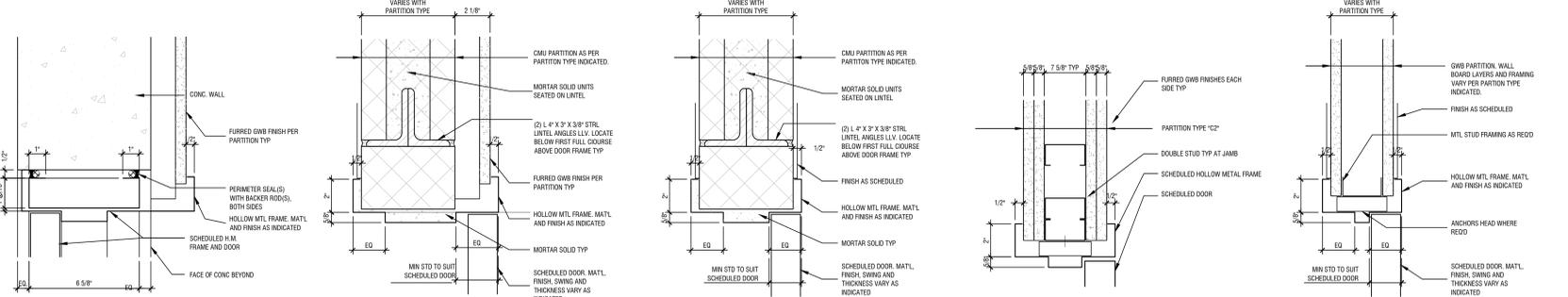
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**A-600A**

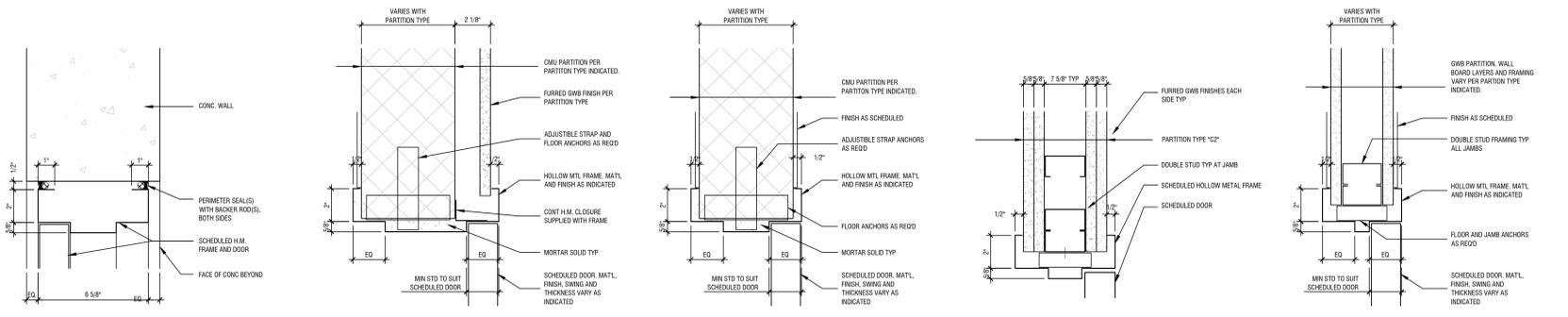
DOB BSCAN STICKER



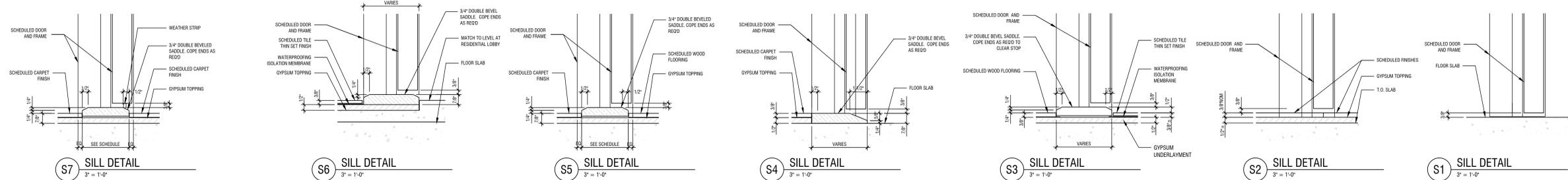
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XX/XX/2012



**H5 HEAD DETAIL** 3" = 1'-0"  
**H4 DOOR HEAD DETAIL** 3" = 1'-0"  
**H3 DOOR HEAD DETAIL** 3" = 1'-0"  
**H2 DOOR HEAD DETAIL** 3" = 1'-0"  
**H1 DOOR HEAD DETAIL** 3" = 1'-0"



**J5 JAMB DETAIL** 3" = 1'-0"  
**J4 DOOR JAMB DETAIL** 3" = 1'-0"  
**J3 DOOR JAMB DETAIL** 3" = 1'-0"  
**J2 DOOR JAMB DETAIL** 3" = 1'-0"  
**J1 DOOR JAMB DETAIL** 3" = 1'-0"



**S7 SILL DETAIL** 3" = 1'-0"  
**S6 SILL DETAIL** 3" = 1'-0"  
**S5 SILL DETAIL** 3" = 1'-0"  
**S4 SILL DETAIL** 3" = 1'-0"  
**S3 SILL DETAIL** 3" = 1'-0"  
**S2 SILL DETAIL** 3" = 1'-0"  
**S1 SILL DETAIL** 3" = 1'-0"

SEAL

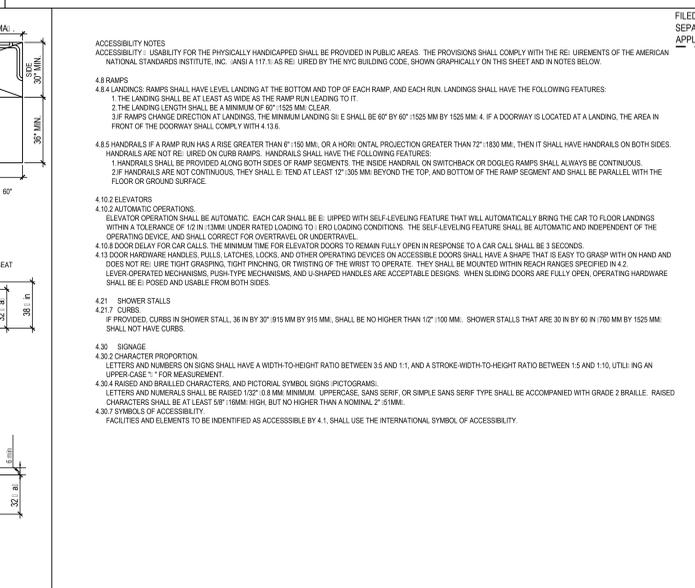
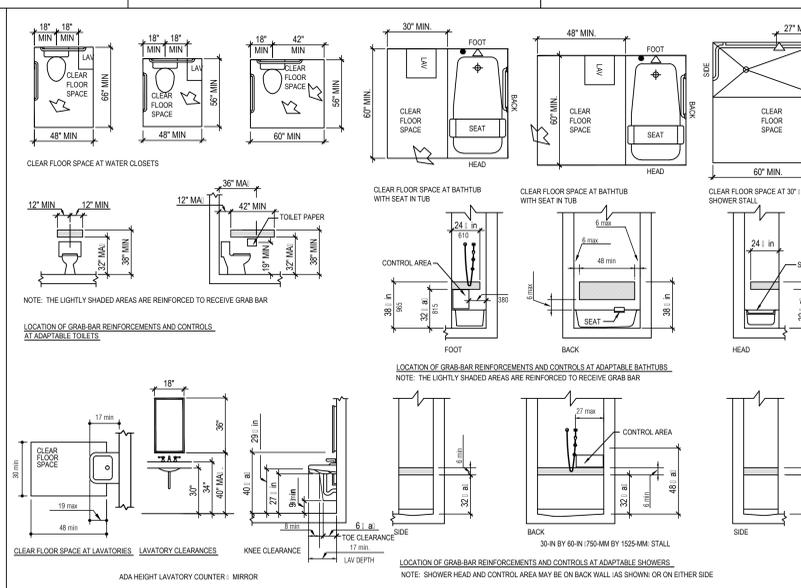
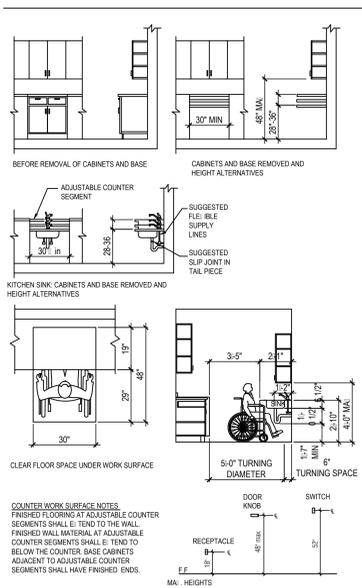
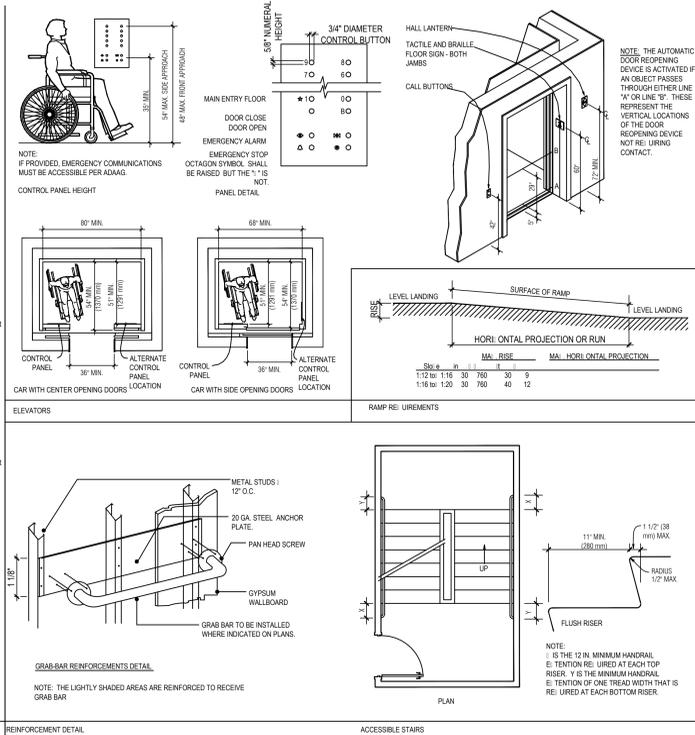
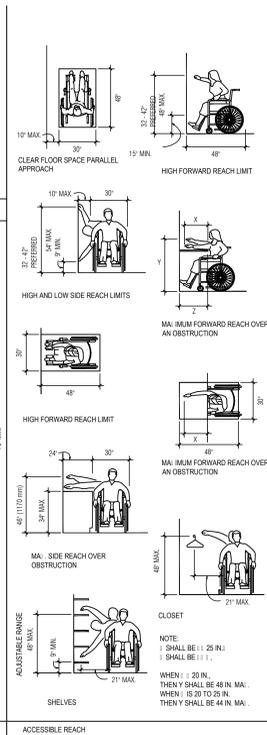
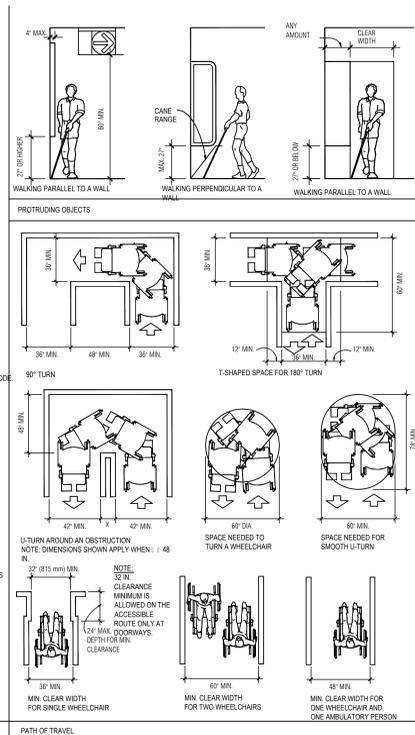
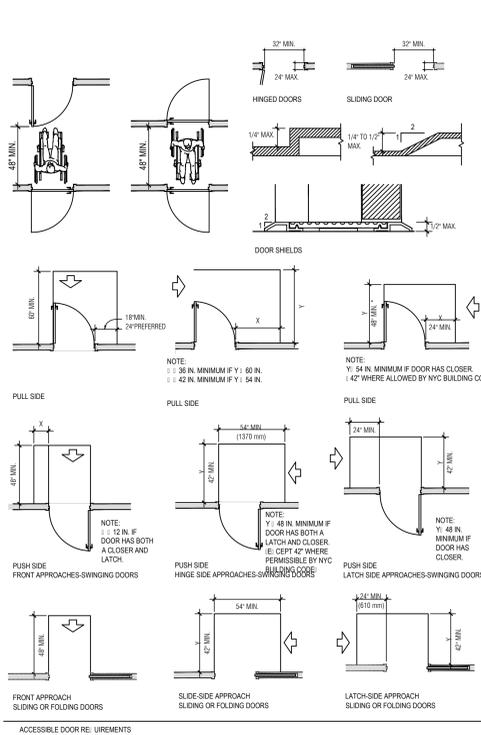


# 545 WEST 48TH STREET

545 West 48th Street, NY, New York. 10019

DOB SUBMISSION 2012.07.24





**BUILDING CODE ANALYSIS**

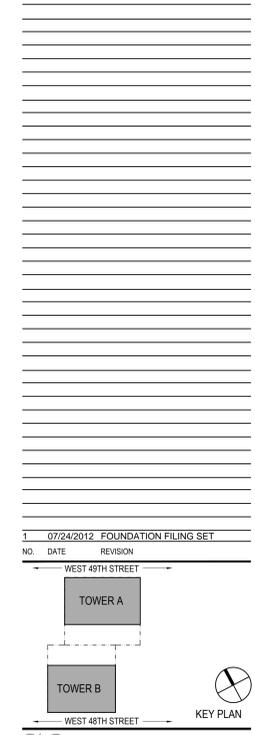
SECTION	DESCRIPTION	COMPLIANCE
24-103	ALLOWABLE HEIGHT - BUILDING AREA	COMPLIANT
24-104	MECHANICAL SYSTEMS	COMPLIANT
24-105	MECHANICAL SYSTEMS	COMPLIANT
24-106	MECHANICAL SYSTEMS	COMPLIANT
24-107	MECHANICAL SYSTEMS	COMPLIANT
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24-165	MECHANICAL SYSTEMS	COMPLIANT
24-166	MECHANICAL SYSTEMS	COMPLIANT
24-167	MECHANICAL SYSTEMS	COMPLIANT
24-168	MECHANICAL SYSTEMS	COMPLIANT
24-169	MECHANICAL SYSTEMS	COMPLIANT
24-170	MECHANICAL SYSTEMS	COMPLIANT
24-171	MECHANICAL SYSTEMS	COMPLIANT
24-172	MECHANICAL SYSTEMS	COMPLIANT
24-173	MECHANICAL SYSTEMS	COMPLIANT
24-174	MECHANICAL SYSTEMS	COMPLIANT
24-175	MECHANICAL SYSTEMS	COMPLIANT
24-176	MECHANICAL SYSTEMS	COMPLIANT
24-177	MECHANICAL SYSTEMS	COMPLIANT
24-178	MECHANICAL SYSTEMS	COMPLIANT
24-179	MECHANICAL SYSTEMS	COMPLIANT
24-180	MECHANICAL SYSTEMS	COMPLIANT
24-181	MECHANICAL SYSTEMS	COMPLIANT
24-182	MECHANICAL SYSTEMS	COMPLIANT
24-183	MECHANICAL SYSTEMS	COMPLIANT
24-184	MECHANICAL SYSTEMS	COMPLIANT
24-185	MECHANICAL SYSTEMS	COMPLIANT
24-186	MECHANICAL SYSTEMS	COMPLIANT
24-187	MECHANICAL SYSTEMS	COMPLIANT
24-188	MECHANICAL SYSTEMS	COMPLIANT
24-189	MECHANICAL SYSTEMS	COMPLIANT
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24-191	MECHANICAL SYSTEMS	COMPLIANT
24-192	MECHANICAL SYSTEMS	COMPLIANT
24-193	MECHANICAL SYSTEMS	COMPLIANT
24-194	MECHANICAL SYSTEMS	COMPLIANT
24-195	MECHANICAL SYSTEMS	COMPLIANT
24-196	MECHANICAL SYSTEMS	COMPLIANT
24-197	MECHANICAL SYSTEMS	COMPLIANT
24-198	MECHANICAL SYSTEMS	COMPLIANT
24-199	MECHANICAL SYSTEMS	COMPLIANT
24-200	MECHANICAL SYSTEMS	COMPLIANT

**HOUSING MAINTENANCE CODE**

- OWNER SHALL FILE REGISTRATION STATEMENT AS PER 208-4.01 AND 208-4.03 HMC
- OWNER SHALL PROVIDE A SIGN IDENTIFYING OWNER, MANAGEMENT AND SUPERINTENDING PERSONNEL
- FLOOR SIGNS SHALL BE PLACED AND MAINTAINED ON EACH FLOOR LEVEL AS PER 208-21.01 HMC
- APARTMENT ENTRANCE DOORS SHALL BE A MINIMUM 34 HOUR RATED, SELF-CLOSING WITH PEELPOLES AS PER 208-20.01 HMC AND LOCKS AS PER 208-20.02 HMC
- MIRRORS IN ELEVATORS SHALL BE AS PER 208-20.03 HMC
- THE BUILDING HEATING AND HOT WATER SUPPLY SHALL COMPLY WITH 208-17.01, 17.03, 17.05 AND 17.07 HMC
- LIGHTING SHALL BE PROVIDED AS PER 208-19.03, 208-19.05, AND 208-19.07 HMC AND C26-650AC, C26-1020AC AND SECTION 26-35 MDL
- GARBAGE COLLECTION AND STORAGE IN RECEPTACLES SHALL COMPLY WITH 208-14.03 AND 208-14.05 HMC
- U.S. MAIL SERVICE SHALL BE PROVIDED AS PER 208-21.01 HMC
- THE BUILDING STREET NUMBER SHALL BE DISPLAYED AS PER 208-21.05
- ANTENNAS SHALL BE PROVIDED AS PER 208-22.03 HMC
- OWNER SHALL PAINT ALL PUBLIC PARTS OF A MULTIPLE DWELLING AS PER 208-12.01 HMC
- INTERIOR OF DWELLING UNITS SHALL BE CLEANED AS PER 011.05 HMC
- OUTLETS OF OWNER SHALL BE AS PER 208-10.01 HMC AND 10.05 HMC
- OUTLETS OF TENANTS SHALL BE AS PER 208-10.03 AND 10.05 HMC
- OWNERS RIGHT OF ACCESS SHALL BE AS PER 208-10.01, 31.03 AND 31.05 HMC
- TERMINATION AND ROOFER ERADICATION SHALL BE AS PER 208-13.03 AND 13.05 HMC
- WATER SHALL BE SUPPLIED AS PER 208-10.11, 15.03 HMC
- THE PLUMBING AND DRAINAGE SYSTEM SHALL BE MAINTAINED AS PER 208-16.04 HMC
- DRAINAGE OF ROOFS AND COURT YARDS SHALL BE AS PER 208-16.03 HMC
- NATURAL LIGHT AND VENTILATION SHALL BE PROVIDED AS PER 208-30.01 AND 30.03 HMC FOR MULTIPLE DWELLINGS
- SANITARY FACILITIES IN MULTIPLE DWELLINGS AND COMMON AREAS SHALL BE PROVIDED AS PER 208-31.01, 31.03, 31.05, 31.11 AND 31.13 HMC
- KITCHENS AND KITCHENETTES SHALL BE PROVIDED WITH PROPER FACILITIES, E. UPMENT, LIGHTING, VENTILATION AND FIRE PROTECTION AS PER 208-32.01, 32.03 AND 32.05 HMC
- MINIMUM ROOM SIZES SHALL BE AS PER 208-33.01 AND MAX. MINIMUM OCCUPANCY SHALL BE AS PER 208-33.03

**MULTIPLE DWELLING LAW GENERAL PROVISIONS**

- LIGHTING AND VENTILATION OF ROOMS SHALL BE AS PER SECTION 30. MDL
- SI E OF ROOMS SHALL BE AS PER SECTION 31. MDL
- ALCOHOLS SHALL BE AS PER SECTION 32. MDL
- COOKING SPACES (KITCHENS / KITCHENETTES) SHALL BE AS PER SECTION 33. MDL
- BUILDING ENTRANCE DOORS AND LIGHTS SHALL BE AS PER SECTION 34. MDL
- WINDOWS AND SKYLIGHTS FOR PUBLIC HALLS AND STAIRS SHALL BE AS PER SECTION 35. MDL
- ARTIFICIAL HALL LIGHTING SHALL BE AS PER SECTION 37. MDL
- ENTRANCE HALLS TO BE AS PER SECTION 40. MDL
- BUILDING ENTRANCES, DOORS, LOCKS AND INTERCOMMUNAL SYSTEMS SHALL BE AS PER SECTION 41. MDL
- EVERY STRUCTURE SHALL BE CONSTRUCTED IN ACCORDANCE WITH PROVISIONS OF THE 2008 NYC BUILDING CODE APPENDIX F ROOFING AS PER SECTION 51. MDL
- APARTMENT PEELPOLES SHALL BE AS PER SECTION 51.4. MDL
- MIRRORS IN SELF-SERVICE ELEVATORS SHALL BE AS PER SECTION 61.8. MDL
- STAIRS SHALL BE AS PER SECTION 62. MDL
- WANDCOTING SHALL BE AS PER SECTION 65. MDL
- ENTRANCE BOLTS AND MAIL RECEPTACLES SHALL BE AS PER SECTION 67. MDL
- ALL NONCOMBUSTIBLE MATERIALS SHALL BE AS PER SECTION 62. MDL
- SUB-CURBS SHALL BE AS PER SECTION 63. MDL
- LIGHTING, GAS METERS, GAS AND OIL APPLIANCES SHALL BE AS PER SECTION 64. MDL
- BOILER ROOMS SHALL BE AS PER SECTION 65. MDL
- WATER SUPPLY SHALL BE AS PER SECTION 75. MDL
- WATER CLOSET AND BATH ACCOMMODATIONS SHALL BE AS PER SECTION 76. MDL
- PLUMBING AND DRAINAGE SHALL BE AS PER SECTION 77. MDL
- REPAIRS SHALL BE MADE AS PER SECTION 78. MDL
- HEAT SHALL BE PROVIDED AS PER SECTION 79. MDL
- CLEANLINESS SHALL BE AS PER SECTION 80. MDL
- RECEPTACLES FOR WASTE MATTER SHALL BE AS PER SECTION 81. MDL
- PRIVACY SHALL BE AS PER SECTION 82. MDL
- ANTENNAS SHALL BE AS PER SECTION 83. MDL
- CONSTRUCTION STANDARDS FOR THE CONTROL OF NOISE SHALL BE AS PER SECTION 84. MDL



**S9 an affiliate of Perkins Eastman Architects, P.C.**

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 NEW YORK, NY 10003  
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**Owner:**  
 FORTIS PROPERTY GROUP WEST 48TH ST LLC  
 45 MAIN STREET, SUITE 800  
 BROOKLYN, NY, TEL # 718-907-7700

**Construction Manager:**  
 WONDER WORKS CONSTRUCTION CORPORATION  
 18 WEST 21ST STREET, 4TH FL  
 NEW YORK, NY, TEL # 212-465-9455

**Architect:**  
 SULLIVAN GROUP DESIGN LLC  
 109 WEST 27TH ST  
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**Structural:**  
 WSP CANTOR SENIK  
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**MEP:**  
 MOTTOLARI ENGINEERS P.C.  
 36 WEST 25TH ST  
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**Geotechnical:**  
 RA CONSULTANTS LLC  
 47 WILKENS DRIVE  
 DUMONT, NJ, TEL # 201-374-1794

**PROJECT TITLE:**  
**545 W48TH ST**

545 WEST 48TH ST  
 NEW YORK, NY

PROJECT NO: 47440.00

DOB No: 121324049

**DRAWING TITLE:**  
**BUILDING CODE COMPLIANCE ADA DIAGRAMS**

SCALE: AS NOTED PAGE: 02 OF 18

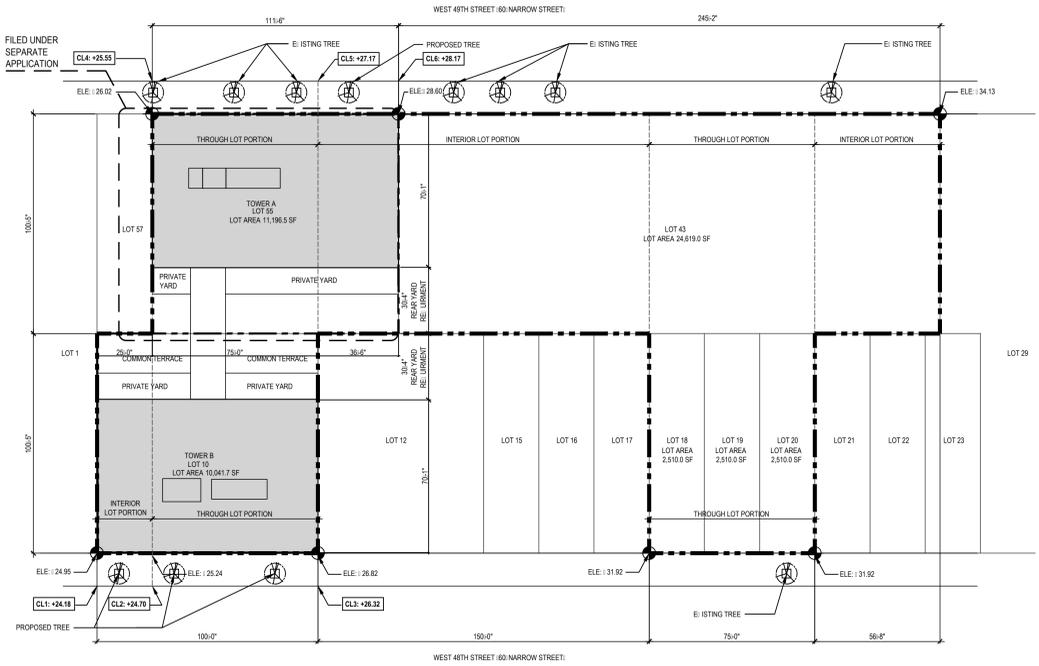
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DOB BSCAN STICKER

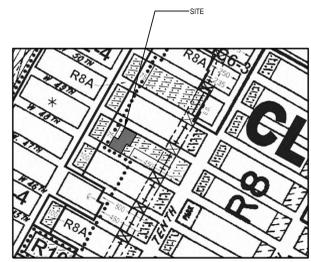
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 XXX/XX/2012







[NOTE:  
LOT AREAS FOR LOT 18, 19,  
20 AND 43, ARE ESTIMATED]

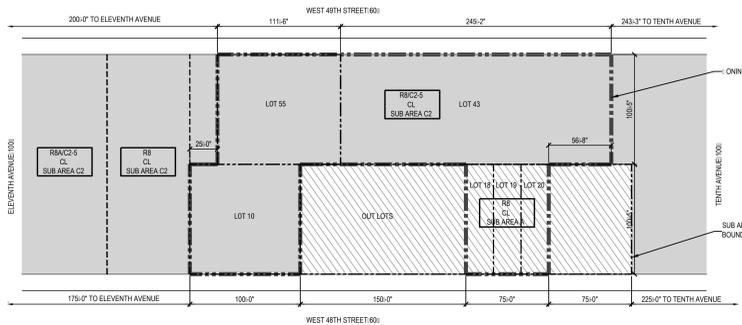


- FILED UNDER SEPARATE APPLICATION: 4 LOT COVERAGE REGULATIONS: R-96-31, R-96-102
- TOWER A: MA. MIN. LOT COVERAGE: 70'; LOT AREA: 70'; 11,196.5 SF; 7,837 SF (SEE DIAGRAM 4)
- PROPOSED LOT COVERAGE: 1114'-0"; 784 SF; 7,837 SF
- TOWER B: MA. MIN. LOT COVERAGE: MA. MIN. LOT COVERAGE: 70'; LOT AREA: 70'; 10,041.7 SF; 7,029 SF
- PROPOSED LOT COVERAGE: 1000'-0"; 70'-1"; 7,008 SF; 7,029 SF
- FILED UNDER SEPARATE APPLICATION: RESIDENTIAL USE DEVELOPMENT MINIMUM 20' LOT AREA AS USEABLE LANDSCAPE FOR OCCUPANTS (SEE DIAGRAM 5)
- MINIMUM OPEN LANDSCAPE AREA: 20'; OF LOT AREA: 20'; 53,387.2'; 10,677 SF
- TOWER A: PROPOSED OPEN LANDSCAPE AREA: 2,801' LOCATED IN COURTYARD; 3,581' LOCATED ON ROOF; 6,482 SF
- TOWER B: PROPOSED OPEN LANDSCAPE AREA: 2,562' LOCATED IN COURTYARD; 3,914' LOCATED ON ROOF; 6,466 SF
- TOTAL PROPOSED OPEN LANDSCAPE AREA: TOWER A: TOWER B: 6,262'; 5,916'; 12,178 SF; 10,677 SF (OK)
- FILED UNDER SEPARATE APPLICATION: 5. DENSITY REGULATIONS: R-23-322
- DWELLING UNIT FACTOR: 740
- MAXIMUM PERMITTED DWELLING UNIT: 103.33 / 740 = 140 UNITS
- TOWER A: 60 UNITS
- TOWER B: 34 UNITS
- PROPOSED DWELLING UNIT TOWER A: TOWER B: 114 UNITS; 140 UNITS (OK)
- FILED UNDER SEPARATE APPLICATION: 6. YARD REGULATIONS: R-23-322a
- FRONT YARDS: NONE REQUIRED
- SIDE YARDS: NONE REQUIRED; 6'-0" MINIMUM WIDTH IF PROVIDED
- REAR YARDS: THROUGH LOT: 60'-0" MINIMUM REAR YARD E: UNVALENT
- REAR YARD E: UNVALENT: 30'-4"; 30'-4"; 60'-0"
- FILED UNDER SEPARATE APPLICATION: 7. HEIGHT: SETBACK REGULATIONS: R-96-31, R-96-104
- MAXIMUM BUILDING HEIGHT: 7 STORY OR 66'-0" (SEE DIAGRAM 6)
- FILED UNDER SEPARATE APPLICATION: 8. PARKING: URMENT REGULATIONS
- MANHATTAN CORE COMMUNITY DISTRICT 4: NOT REQUIRED; SPECIAL PERMIT REQUIRED IF PROVIDED
- FILED UNDER SEPARATE APPLICATION: 9. BIKE PARKING: URMENT REGULATIONS: R-25-80
- INTERIOR SPACE PER 2 UNITS: 15 SF PER BIKE PARKING SPACE
- TOWER A: RE. UREED BIKE SPACES: 60 / 2 = 30 SPACES; 15 = 450 SF
- PROPOSED BIKE SPACES: 455 SF; 450 SF
- TOWER B: RE. UREED BIKE SPACES: 54 / 2 = 27 SPACES; 15 = 405 SF
- PROPOSED BIKE SPACES: 443 SF; 405 SF

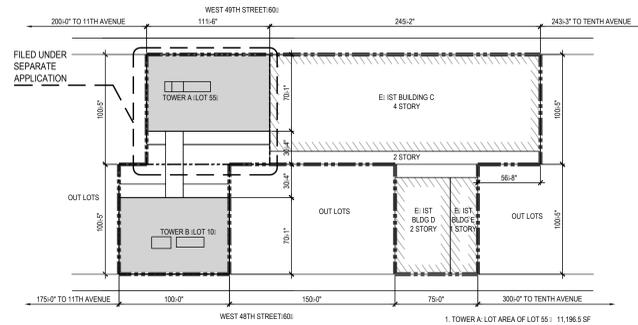
- FILED UNDER SEPARATE APPLICATION: 1. GENERAL
- ADDRESS: TOWER A, 540 WEST 49TH STREET, MANHATTAN, NY
- TOWER B, 545 WEST 48TH STREET, MANHATTAN, NY
- ONING DISTRICTS: R8 / C2-S, SPECIAL CLINTON DISTRICT
- ONING MAP: BC
- E-DESIGNATION: E-203 (AIR QUALITY, E: HAUST STACK LIMITATIONS, AND WINDOW WALL ATTENUATION)
- 2. USE REGULATIONS: R-22-00, R-32-00
- PERMITTED USE GROUP: 1-9; 1-4
- PROPOSED USE GROUP: GROUP 2 RESIDENTIAL (NOT PURSUANT TO QUALITY HOUSING); R-23-011
- 3. FLOOR AREA REGULATIONS: R-96-31, R-96-101
- TRANSFER: ONING FLOOR AREA FROM LOT 43: 14,131 SF, CONFIRMED BY THE OWNERSHIP ON JUNE 22, 2012
- MA. MIN. RESIDENTIAL OR COMMUNITY FACILITY FAR: 4.2
- MA. MIN. COMMERCIAL FAR: 2.0
- FILED UNDER SEPARATE APPLICATION: TOWER A: 540 WEST 49TH STREET AREA OF LOT 55: 11,196.5 SF
- PERMITTED RESIDENTIAL FLOOR AREA FROM LOT 55: 11,196.5 SF; 47,025.3 SF
- PERMITTED ONING FLOOR AREA FROM LOT 43: LOT 10: 47,025.3 SF; 14,131.8 SF; 61,157.1 SF
- PROPOSED ONING FLOOR AREA: 53,866 SF; 61,157.1 SF
- REMAINING AVAILABLE TRANSFER: ONING FLOOR FROM LOT 43: 61,157.1 SF; 53,866 SF; 7,291.1 SF
- TOWER B: 545 WEST 48TH STREET AREA OF LOT 10: 10,041.7 SF
- PERMITTED RESIDENTIAL FLOOR AREA FROM LOT 10: 10,041.7 SF; 42,175.1 SF
- PERMITTED ONING FLOOR AREA FROM LOT 43: LOT 10: 42,175.1 SF; 7,291.1 SF; 49,466.2 SF
- PROPOSED ONING FLOOR AREA: 49,466.2 SF
- REMAINING AVAILABLE TRANSFER: ONING FLOOR FROM LOT 43: 49,466.2 SF; 40,104 SF; 302.2 SF

- ONING LOT AREA CALCULATIONS
- LOT 8: 10,041.7 SF
- LOT 10: 2,510.0 SF
- LOT 19: 2,510.0 SF
- LOT 20: 2,510.0 SF
- LOT 43: 24,619.0 SF
- LOT 55: 11,196.5 SF
- TOTAL: 53,867.2 SF
- LOT AREAS FOR LOT 18, 19, 20 AND 43, ARE ESTIMATED
- FILED UNDER SEPARATE APPLICATION
- STREET TREES CALCULATIONS
- 1. TOWER A WEST 49TH STREET: 1114'-0", 245'-2", 14 TREES
- EXISTING TREES: 7 TREES
- PROPOSED TREES: 1 TREES
- REMAINING TREES: 14-7=7 TREES (LOCATIONS TO BE DETERMINED BY DPR)
- 2. TOWER B WEST 48TH STREET: 1000'-0", 75'-0", 7 TREES
- EXISTING TREES: 1 TREES
- PROPOSED NEW TREES: 3 TREES
- REMAINING TREES: 7-1=6 TREES (LOCATIONS TO BE DETERMINED BY DPR)
- PROPOSED CURB LEVEL CALCULATIONS
- 1. TOWER A WEST 49TH STREET
- INTERIOR LOT PORTION: CL1, CL2, 27.17', 28.17' = 27.67'
- TROUGH LOT PORTION: CL4, CL5, 25.56', 27.17' = 26.36'
- PROPOSED CURB LEVEL OF 48TH STREET WILL BE THROUGH LOT PORTION 26.36' (LOWER ELEVATION)
- 2. TOWER B WEST 48TH STREET
- INTERIOR LOT PORTION: CL1, CL2, 24.18', 24.70' = 24.44'
- TROUGH LOT PORTION: CL2, CL3, 24.70', 25.32' = 25.51'
- PROPOSED CURB LEVEL OF 48TH STREET WILL BE INTERIOR LOT PORTION 24.44' (LOWER ELEVATION)

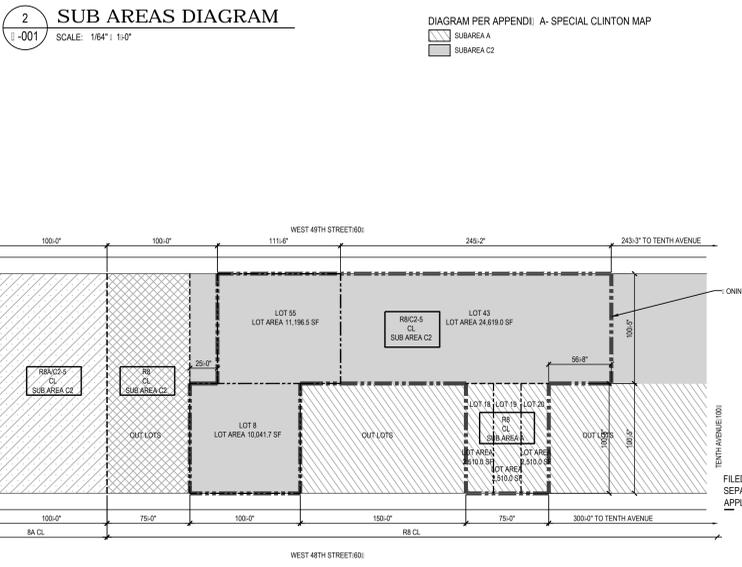
1 SITE PLAN  
SCALE: 1/32" = 1'-0"



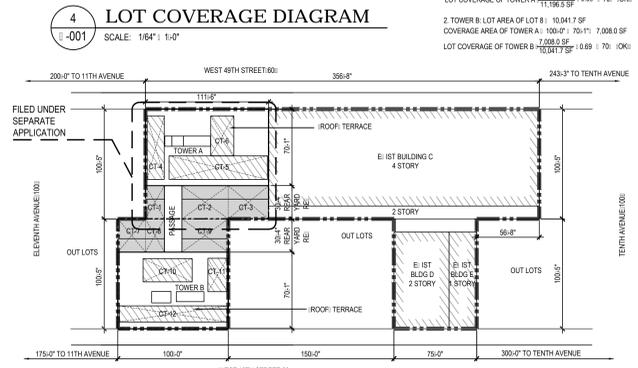
2 SUB AREAS DIAGRAM  
SCALE: 1/64" = 1'-0"



4 LOT COVERAGE DIAGRAM  
SCALE: 1/64" = 1'-0"

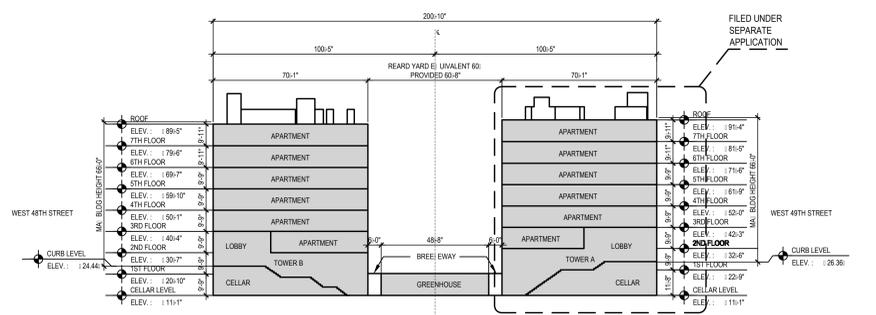


3 ZONING DISTRICT DIAGRAM  
SCALE: 1/64" = 1'-0"



- 1. TOWER A: 540 WEST 49TH STREET
- LANDSCAPED OPEN AREA: COURTYARD
- CT-1: 30'-1" x 17'-3" = 523 SF
- CT-2: 30'-1" x 17'-3" = 523 SF
- CT-3: 30'-1" x 17'-3" = 523 SF
- CT-4: 30'-1" x 17'-3" = 523 SF
- CT-5: 55'-3" x 61'-3" = 903 SF
- CT-6: 55'-3" x 61'-3" = 903 SF
- LANDSCAPED OPEN AREA: ROOF
- CT-7: 30'-1" x 17'-3" = 523 SF
- CT-8: 30'-1" x 17'-3" = 523 SF
- CT-9: 30'-1" x 17'-3" = 523 SF
- CT-10: 55'-3" x 61'-3" = 903 SF
- CT-11: 55'-3" x 61'-3" = 903 SF
- CT-12: 55'-3" x 61'-3" = 903 SF
- TOWER A: TOTAL LANDSCAPED OPEN AREAS = CT-1+CT-2+CT-3+CT-4 + CT-5 + CT-6 = 6,482 SF
- 2. TOWER B: 545 WEST 48TH STREET
- LANDSCAPED OPEN AREA: COURTYARD
- CT-7: 30'-1" x 25'-0" = 758 SF
- CT-8: 30'-1" x 17'-3" = 523 SF
- CT-9: 30'-1" x 17'-3" = 523 SF
- CT-10: 55'-3" x 61'-3" = 903 SF
- CT-11: 55'-3" x 61'-3" = 903 SF
- CT-12: 55'-3" x 61'-3" = 903 SF
- LANDSCAPED OPEN AREA: ROOF
- CT-7: 30'-1" x 25'-0" = 758 SF
- CT-8: 30'-1" x 17'-3" = 523 SF
- CT-9: 30'-1" x 17'-3" = 523 SF
- CT-10: 55'-3" x 61'-3" = 903 SF
- CT-11: 55'-3" x 61'-3" = 903 SF
- CT-12: 55'-3" x 61'-3" = 903 SF
- TOWER B: TOTAL LANDSCAPED OPEN AREAS = CT-5+CT-6+CT-7+CT-8 + CT-9 + CT-10 + CT-11 = 5,465.7
- TOTAL LOT AREAS: CT-1+CT-2+CT-3+CT-4+CT-5+CT-6+CT-7+CT-8 = 11,948
- TOTAL ZONING LOT: 53,387.2
- COMMON: PRIVATE ROOFTOP
- COMMON: PRIVATE COURTYARD

5 LANDSCAPED OPEN AREAS CALCULATIONS  
SCALE: 1/64" = 1'-0"



6 BUILDING SECTION  
SCALE: 1/32" = 1'-0"

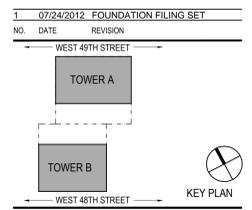
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TOWER A		BULKHEAD CALCULATIONS 540 WEST 49TH STREET	
WIDTH OF STREET WALL	1114'-0"	A	4'-4" x 9'-4" = 40 SF
PERMITTED PRODUCT OF AGGREGATE	1114'-0" x 8' = 892 SF	B	1'-0" x 9'-4" = 9 SF
WIDTH OF STREET WALL	23'-62" (g:3:11)	C	10'-0" x 16'-1" = 162 SF
PROPOSED PRODUCT OF AGGREGATE	7' A   8' C   D   E   F   G   H   I   14' 40 SF   19 SF   173 SF   30 SF   162 SF   29 SF	D	4'-2" x 9'-4" = 39 SF
WIDTH OF STREET WALL	1212 SF   88 SF   143 SF	E	17'-4" x 9'-4" = 162 SF
	878 SF COMPLES	F	3'-1" x 9'-4" = 29 SF
		G	22'-0" x 9'-4" = 210 SF
		H	7'-0" x 9'-4" = 65 SF
		I	14'-4" x 10'-0" = 143 SF
		TOTAL BULKHEAD AREA	878 SF

FILED UNDER SEPARATE APPLICATION

TOWER B		BULKHEAD CALCULATIONS 545 WEST 48TH STREET	
WIDTH OF STREET WALL	1000'-0"	A	4'-4" x 9'-4" = 40 SF
PERMITTED PRODUCT OF AGGREGATE	1000' x 8' = 800 SF	B	4'-4" x 9'-4" = 40 SF
WIDTH OF STREET WALL	33'-42"	C	10'-0" x 16'-1" = 162 SF
PROPOSED PRODUCT OF AGGREGATE	1' A   8' C   D   E   F   G   14' 40 SF   40 SF   64 SF   173 SF   45 SF   153 SF	D	10'-0" x 16'-1" = 162 SF
WIDTH OF STREET WALL	798 SF COMPLES	E	4'-0" x 9'-4" = 38 SF
		F	16'-8" x 9'-4" = 153 SF
		G	22'-11" x 9'-4" = 214 SF
		TOTAL BULKHEAD AREA	789 SF

7 BULKHEAD  
SCALE: 1/32" = 1'-0"



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T: 212.563.7000  
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Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
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WSP CANTOR SENIUK  
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NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049

DRAWING TITLE:  
**SITE PLAN & ZONING ANALYSIS**

SCALE: AS NOTED PAGE 04 OF 18

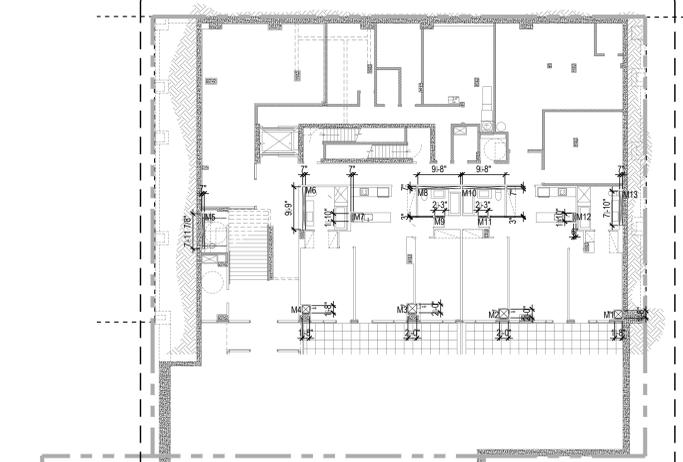
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DOB BSCAN STICKER



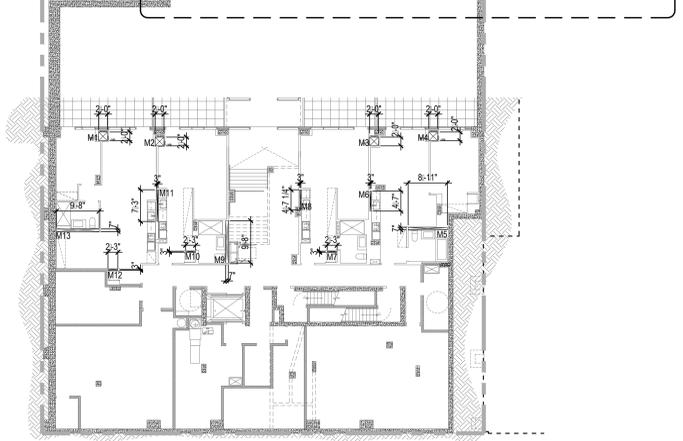
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XXXX/2012

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M1	2.8 SF		
M2	4.0 SF		
M3	4.0 SF		
M4	2.8 SF		
M5	4.0 SF		
M6	5.7 SF		
M7	0.9 SF		
M8	5.6 SF		
M9	0.6 SF		
M10	5.6 SF		
M11	0.6 SF		
M12	0.9 SF		
M13	4.6 SF		

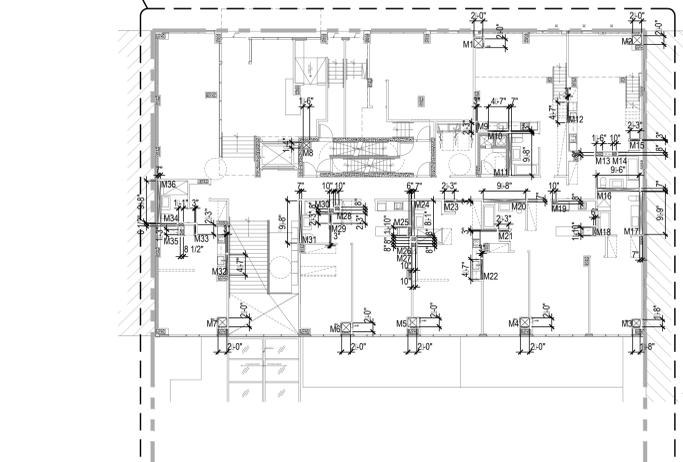
1 TOWER A CELLAR LEVEL TABULATION  
SCALE: 1/16" = 1'-0"



M1	4.0 SF		
M2	4.0 SF		
M3	4.0 SF		
M4	4.0 SF		
M5	5.2 SF		
M6	1.1 SF		
M7	0.6 SF		
M8	1.2 SF		
M9	5.6 SF		
M10	0.6 SF		
M11	1.8 SF		
M12	0.6 SF		
M13	5.6 SF		

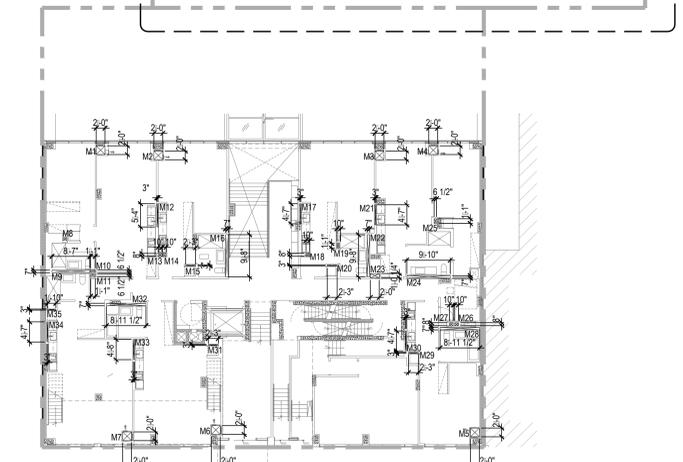
2 TOWER B CELLAR LEVEL TABULATION  
SCALE: 1/16" = 1'-0"

FILED UNDER SEPARATE APPLICATION



M1	4.0 SF	M29	0.6 SF
M2	4.0 SF	M30	0.6 SF
M3	2.8 SF	M31	5.6 SF
M4	4.0 SF	M32	1.1 SF
M5	4.0 SF	M33	0.6 SF
M6	4.0 SF	M34	0.6 SF
M7	4.0 SF	M35	0.9 SF
M8	2.0 SF	M36	5.6 SF
M9	0.6 SF		
M10	1.1 SF		
M11	5.6 SF		
M12	1.1 SF		
M13	1.1 SF		
M14	0.6 SF		
M15	0.6 SF		
M16	5.5 SF		
M17	5.7 SF		
M18	0.9 SF		
M19	0.6 SF		
M20	5.6 SF		
M21	0.6 SF		
M22	1.1 SF		
M23	0.6 SF		
M24	0.6 SF		
M25	0.9 SF		
M26	0.6 SF		
M27	0.6 SF		
M28	0.6 SF		

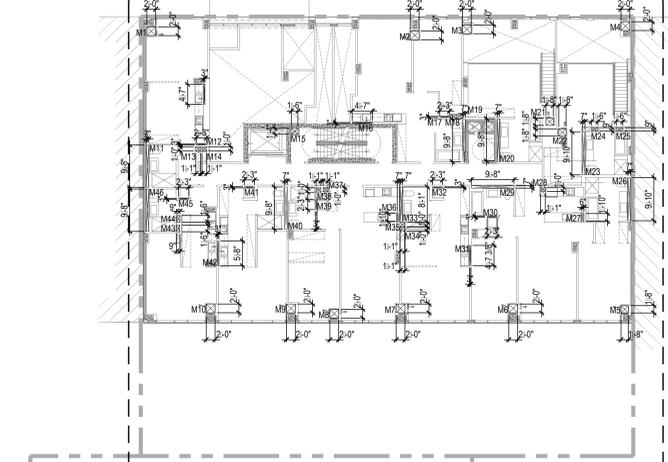
3 TOWER A 1ST FLOOR TABULATION  
SCALE: 1/16" = 1'-0"



M1	4.0 SF	M29	0.6 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	0.6 SF
M4	4.0 SF	M32	5.2 SF
M5	4.0 SF	M33	1.2 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	0.5 SF
M8	0.6 SF		
M9	5.0 SF		
M10	0.6 SF		
M11	0.6 SF		
M12	1.3 SF		
M13	0.6 SF		
M14	0.6 SF		
M15	0.6 SF		
M16	5.6 SF		
M17	1.1 SF		
M18	0.6 SF		
M19	0.6 SF		
M20	0.6 SF		
M21	1.1 SF		
M22	5.6 SF		
M23	2.0 SF		
M24	5.7 SF		
M25	0.6 SF		
M26	0.6 SF		
M27	0.6 SF		
M28	5.2 SF		

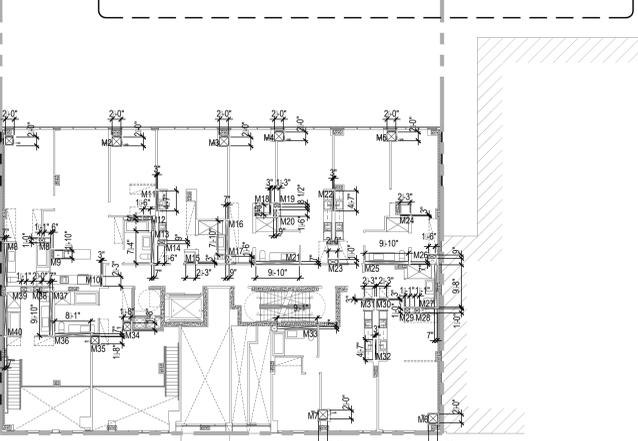
4 TOWER B 1ST FLOOR TABULATION  
SCALE: 1/16" = 1'-0"

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M1	4.0 SF	M29	5.6 SF
M2	4.0 SF	M30	0.6 SF
M3	4.0 SF	M31	1.2 SF
M4	4.0 SF	M32	0.6 SF
M5	2.8 SF	M33	4.7 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	1.1 SF
M8	4.0 SF	M36	0.9 SF
M9	4.0 SF	M37	1.1 SF
M10	4.0 SF	M38	1.1 SF
M11	5.6 SF	M39	0.6 SF
M12	0.6 SF	M40	5.6 SF
M13	1.1 SF	M41	0.6 SF
M14	1.1 SF	M42	1.4 SF
M15	2.0 SF	M43	1.1 SF
M16	1.1 SF	M44	1.1 SF
M17	0.6 SF	M45	0.6 SF
M18	1.3 SF	M46	5.6 SF
M19	1.3 SF		
M20	5.7 SF		
M21	2.8 SF		
M22	2.8 SF		
M23	5.7 SF		
M24	1.1 SF		
M25	1.1 SF		
M26	5.7 SF		
M27	0.9 SF		
M28	1.1 SF		

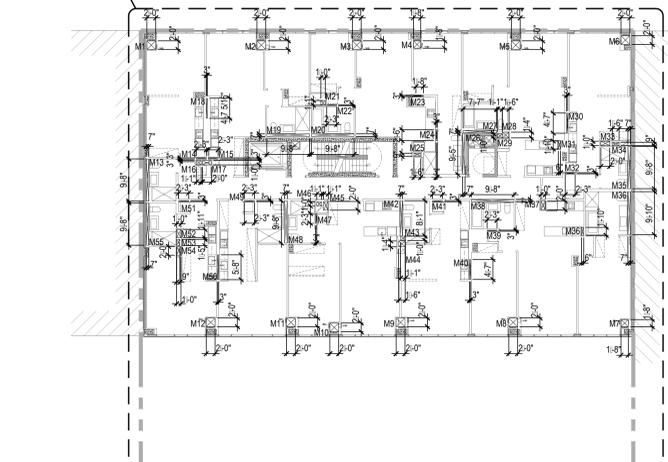
5 TOWER A 2ND FLOOR TABULATION  
SCALE: 1/16" = 1'-0"



M1	2.8 SF	M29	1.1 SF
M2	4.0 SF	M30	0.6 SF
M3	4.0 SF	M31	0.6 SF
M4	4.0 SF	M32	1.1 SF
M5	4.0 SF	M33	5.3 SF
M6	4.0 SF	M34	2.8 SF
M7	4.0 SF	M35	2.8 SF
M8	5.7 SF	M36	4.7 SF
M9	0.9 SF	M37	5.7 SF
M10	0.6 SF	M38	2.0 SF
M11	1.1 SF	M39	1.1 SF
M12	1.1 SF	M40	5.3 SF
M13	4.3 SF		
M14	1.1 SF		
M15	0.6 SF		
M16	4.6 SF		
M17	1.1 SF		
M18	0.6 SF		
M19	0.9 SF		
M20	1.1 SF		
M21	5.7 SF		
M22	1.1 SF		
M23	2.8 SF		
M24	0.6 SF		
M25	5.7 SF		
M26	1.1 SF		
M27	5.6 SF		
M28	1.1 SF		

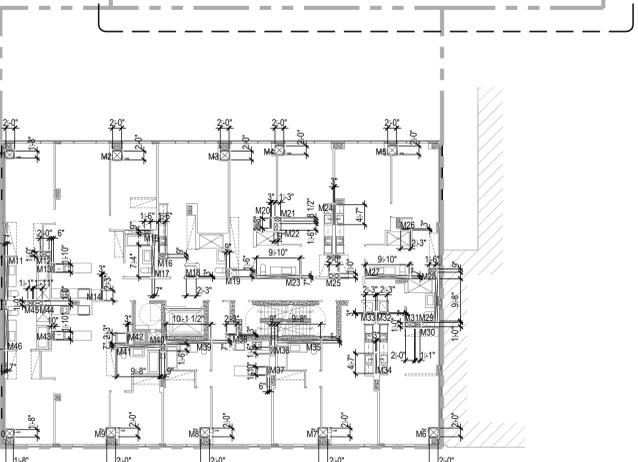
6 TOWER B 2ND FLOOR TABULATION  
SCALE: 1/16" = 1'-0"

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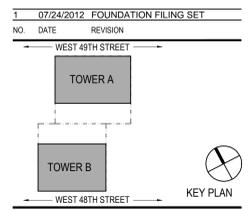
M1	4.0 SF	M29	2.0 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	0.9 SF
M4	2.8 SF	M32	0.6 SF
M5	4.0 SF	M33	2.0 SF
M6	4.0 SF	M34	1.1 SF
M7	2.8 SF	M35	5.6 SF
M8	4.0 SF	M36	5.7 SF
M9	4.0 SF	M37	2.0 SF
M10	4.0 SF	M38	5.6 SF
M11	4.0 SF	M39	0.6 SF
M12	4.0 SF	M40	0.6 SF
M13	5.6 SF	M41	0.6 SF
M14	0.6 SF	M42	4.7 SF
M15	0.6 SF	M43	4.7 SF
M16	1.1 SF	M44	2.0 SF
M17	2.0 SF	M45	2.0 SF
M18	1.2 SF	M46	1.1 SF
M19	5.6 SF	M47	0.6 SF
M20	5.6 SF	M48	5.6 SF
M21	0.6 SF	M49	0.6 SF
M22	0.6 SF	M50	1.9 SF
M23	0.6 SF	M51	0.6 SF
M24	0.6 SF	M52	1.9 SF
M25	1.1 SF	M53	1.1 SF
M26	5.6 SF	M54	2.0 SF
M27	4.4 SF	M55	5.6 SF
M28	2.0 SF		

7 TOWER A 3RD-6TH FLOOR TABULATION  
SCALE: 1/16" = 1'-0"



M1	2.8 SF	M29	5.6 SF
M2	4.0 SF	M30	1.1 SF
M3	4.0 SF	M31	2.0 SF
M4	4.0 SF	M32	0.6 SF
M5	4.0 SF	M33	0.6 SF
M6	4.0 SF	M34	1.1 SF
M7	4.0 SF	M35	5.6 SF
M8	4.0 SF	M36	1.1 SF
M9	4.0 SF	M37	0.9 SF
M10	2.8 SF	M38	0.6 SF
M11	5.7 SF	M39	5.9 SF
M12	2.0 SF	M40	1.1 SF
M13	0.9 SF	M41	5.6 SF
M14	0.6 SF	M42	0.6 SF
M15	1.1 SF	M43	0.9 SF
M16	1.1 SF	M44	1.9 SF
M17	4.3 SF	M45	0.5 SF
M18	0.6 SF	M46	5.3 SF
M19	1.1 SF		
M20	0.6 SF		
M21	0.9 SF		
M22	1.1 SF		
M23	5.7 SF		
M24	1.1 SF		
M25	2.0 SF		
M26	0.6 SF		
M27	5.7 SF		
M28	1.1 SF		

8 TOWER B 3RD-6TH FLOOR TABULATION  
SCALE: 1/16" = 1'-0"



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45 MAIN STREET, SUITE 800  
BROOKLYN, NY TEL # 718-967-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY TEL # 212-465-3455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY TEL # 212-352-8636

Structural:  
WSP CANTOR SEINUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY TEL # 212-687-8888

MEP:  
MOTTOLARI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY TEL # 212-627-7299

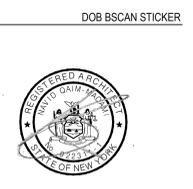
Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00

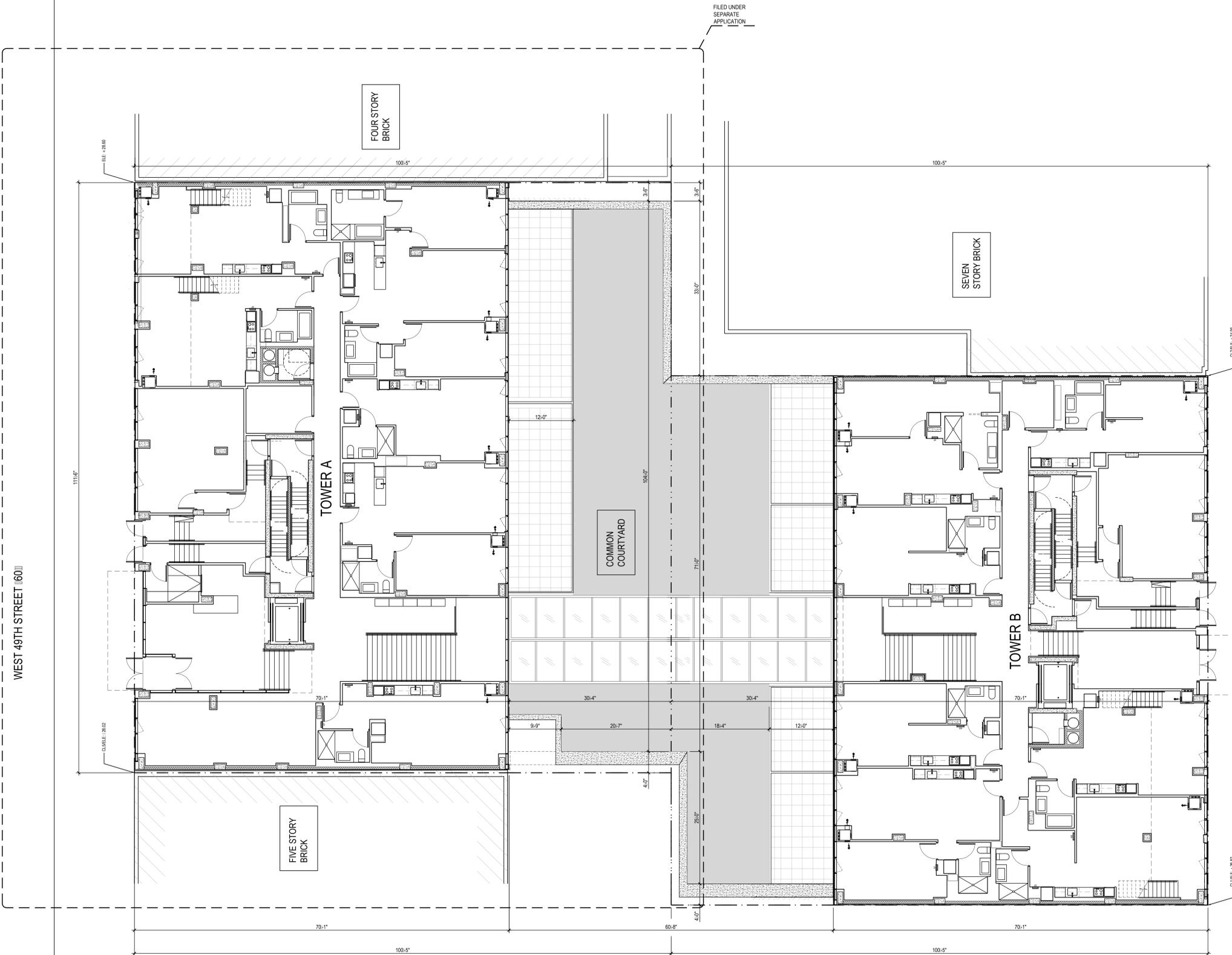
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SCALE: AS NOTED PAGE 05 OF 18  
**Z-002B**



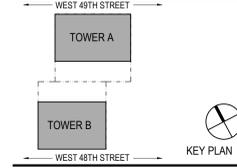
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 45 MAIN STREET, SUITE 800  
 BROOKLYN, NY, TEL# 718-967-7700

**Construction Manager:**  
 WONDER WORKS CONSTRUCTION CORPORATION  
 18 WEST 21ST STREET, 4TH FL  
 NEW YORK, NY, TEL# 212-465-9455

**Civil / Site:**  
 SULLIVAN GROUP DESIGN LLC  
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 NEW YORK, NY, TEL# 212-352-8636

**Structural:**  
 WSP CANTOR SEINUK  
 228 EAST 45TH ST, 3RD FL  
 NEW YORK, NY, TEL# 212-687-8888

**MEP:**  
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 36 WEST 25TH ST  
 NEW YORK, NY, TEL# 212-627-7299

**Geotechnical:**  
 RA CONSULTANTS LLC  
 47 WILKENS DRIVE  
 DUMONT, NJ, TEL# 201-374-1794

**PROJECT TITLE:**  
**545 W48TH ST**

545 WEST 48TH ST  
 NEW YORK, NY  
 PROJECT No: 47440.00  
 DOB No: 121324049  
 DRAWING TITLE:  
**SITE PLAN**

SCALE: AS NOTED PAGE 07 OF 18  
**A-020B**

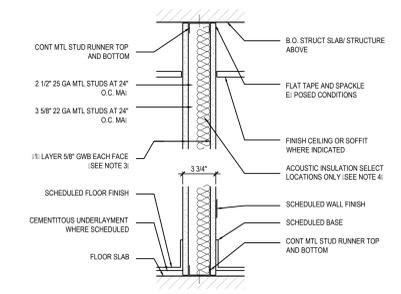


DOB BSCAN STICKER



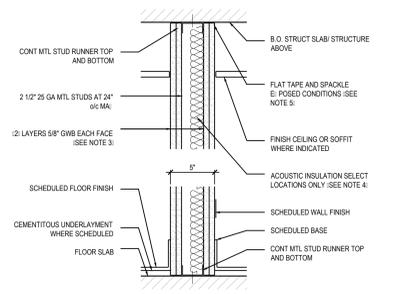
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 XX/XX/2012



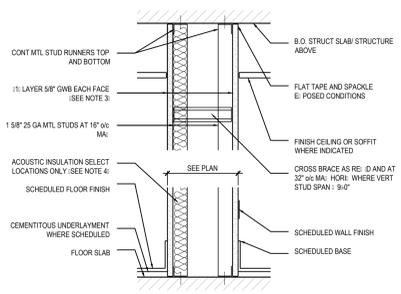
TYPE A: UNRATED  
 TYPE A1: ONE HOUR FIRE RATING - CGS 11-83 BSA # 301-603M  
 TYPE A2: UNRATED WITH 3/8" MTL STUD @ 24" O.C. TO UNDERSIDE OF CONC. PLANK  
 STC RATING: 47 WITH INSULATION

**A A1 A2** **GWB PARTITION**



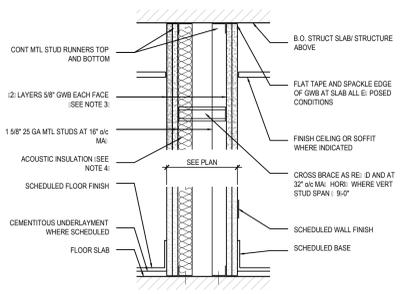
TYPE B: UNRATED  
 TYPE B1: ONE HOUR FIRE RATING - 3M UL L419 BSA # 301-603M  
 TYPE B2: TWO HOUR FIRE RATING - UL L419 BSA # 301-603M  
 STC RATING: 48 WITHOUT INSULATION / 56 WITH INSULATION

**B B1 B2** **GWB PARTITION**



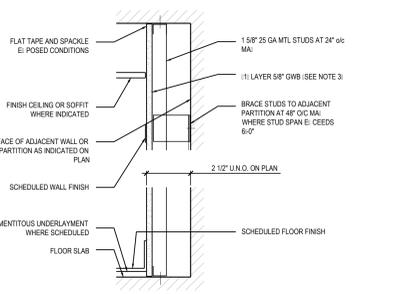
TYPE C: UNRATED  
 TYPE C1: ONE HOUR FIRE RATING - UL U420 BSA # 301-603M  
 STC RATING: 52 WITH INSULATION

**C C1** **GWB CHASE**  
 1 1/2" = 1'-0"



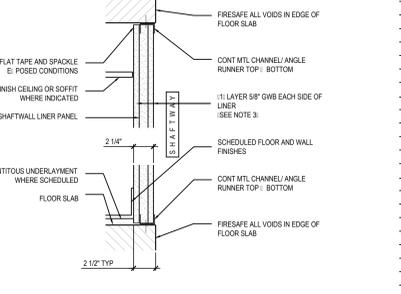
TYPE D: UNRATED  
 TYPE D1: ONE HOUR FIRE RATING - 3M UL L419 MEA #  
 TYPE D2: TWO HOUR FIRE RATING - UL L419 MEA #  
 STC RATING: 48 WITHOUT INSULATION / 56 WITH INSULATION

**D D1 D2** **GWB PARTITION**



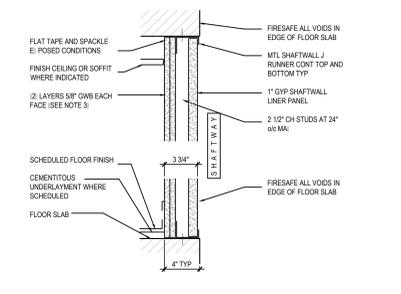
TYPE E: UNRATED  
 STC RATING: NA

**E** **FURRED GYP FINISH**  
 1 1/2" = 1'-0"



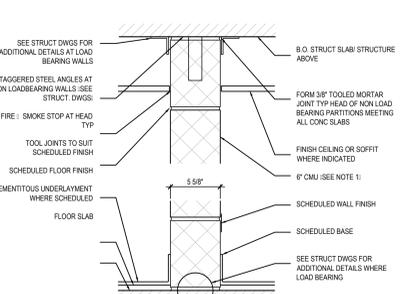
TYPE F: TWO HOUR FIRE RATED - UL U529 BSA # 898-473M  
 STC RATING: NA

**F** **GYP SHAFTWALL**  
 1 1/2" = 1'-0"



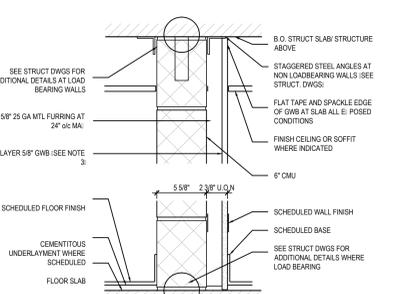
TYPE G: TWO HOUR FIRE RATED - UL L415 BSA # 354-76 5M  
 STC RATING: 39 WITHOUT INSULATION / 47 WITH INSULATION

**G** **GYP SHAFTWALL**  
 1 1/2" = 1'-0"



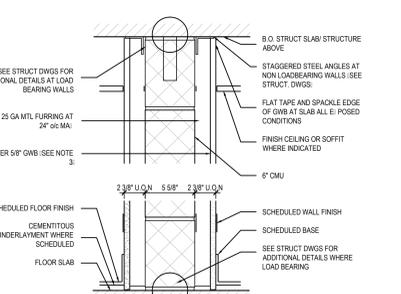
TYPE H: UNRATED  
 TYPE H1: ONE HOUR FIRE RATING  
 TYPE H2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2; MEA # 1-74 M  
 TYPE H3: TYPE M3: THREE HOUR FIRE RATING - 3M UL U906 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

**H H2 H3** **CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



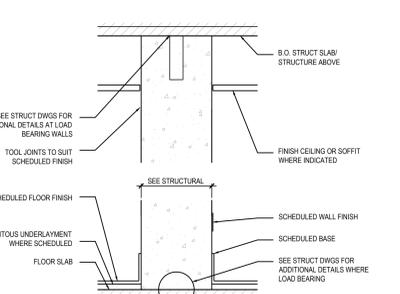
TYPE J1: UNRATED  
 TYPE J2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2; MEA # 1-74 M  
 STC RATING: NA

**J1 J2** **FURRED CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



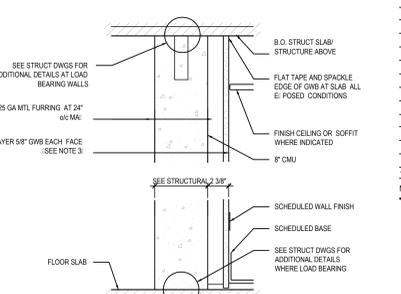
TYPE K1: UNRATED  
 TYPE K2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2; MEA # 1-74 M  
 STC RATING: NA

**K1 K2** **FURRED CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



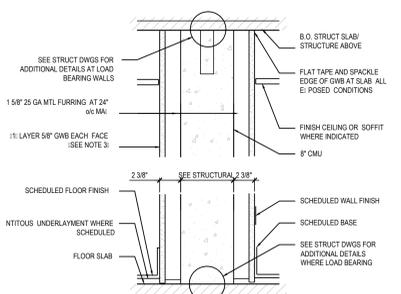
TYPE L1: ONE HOUR FIRE RATING  
 TYPE L2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2; MEA # 1-74 M  
 TYPE L3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

**L1 L2 L3** **CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



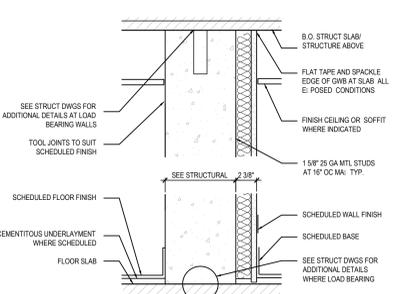
TYPE M1: ONE HOUR FIRE RATING  
 TYPE M2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2; MEA # 1-74 M  
 TYPE M3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

**M1 M2 M3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



TYPE N1: ONE HOUR FIRE RATING  
 TYPE N2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2; MEA # 1-74 M  
 TYPE N3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

**N1 N2 N3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



TYPE P1: ONE HOUR FIRE RATING  
 TYPE P2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2; MEA # 1-74 M  
 TYPE P3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

**P1 P2 P3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"

- PARTITION NOTES**
- SEE SECTION 0420 "UNIT MASONRY" FOR ADDITION UNIT MASONRY RE: UREMENTS, INCLUDING RE: URED JOINT REINFORCEMENT. WALLS AND PARTITIONS INDICATED ON THE STRUCT DWGS ARE LOAD BEARING AND STRUCTURAL. FOLLOW ADDITIONAL DETAILS AND NOTES AS MAY BE INDICATED ON STRUCT DWGS FOR SUCH LOAD BEARING WALLS AND PARTITIONS.
  - SEE SPECIFICATION SECTION 0920 "GYPSUM BOARD ASSEMBLIES" FOR ADDITIONAL RE: UREMENTS REGARDING GYPSUM PARTITION AND SHAFTWALL CONSTRUCTION.
  - PROVIDE 5/8" GLASS MAT GYPSUM WALL BOARD EN LIEU MOISTURE RESISTANT GYPSUM WALL BOARD ON THE FACE LAYER OF ALL PARTITIONS AND SOFFITS WITHIN BATHROOMS, INCLUDING PARTITIONS AND SOFFITS OF BATHUB AND SHOWER SURROUNDS.
  - PROVIDE ACOUSTIC INSULATION PER SPECIFICATION SECTION 0920 "GYPSUM BOARD ASSEMBLIES" WITHIN PARTITIONS SEPARATING APARTMENT UNITS AND WITHIN PARTITIONS SEPARATING APARTMENT UNITS FROM CORRIDORS, AMENITY SPACE, AND OTHER COMMON SPACES.
  - PROVIDE 3/4" PTD FIRE RETARDANT PLYWOOD AT ALL ELECTRIC PANELS AND DATA/TELEPHONE CLOSET LOCATIONS.



TYPE J1: UNRATED  
 TYPE J2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2; MEA # 1-74 M  
 STC RATING: NA

**J1 J2** **FURRED CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



TYPE K1: UNRATED  
 TYPE K2: TWO HOUR FIRE RATING - UL U906 USING BLOCK D-2; MEA # 1-74 M  
 STC RATING: NA

**K1 K2** **FURRED CMU WALL/PARTITION**  
 1 1/2" = 1'-0"



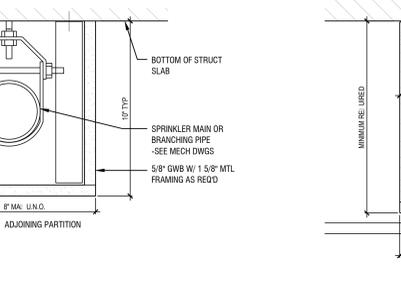
TYPE L1: ONE HOUR FIRE RATING  
 TYPE L2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2; MEA # 1-74 M  
 TYPE L3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

**L1 L2 L3** **CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"

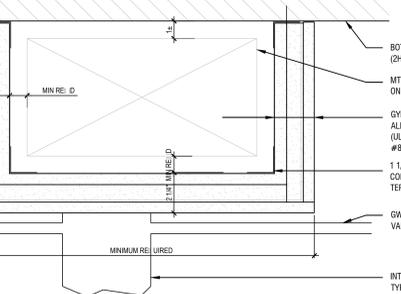


TYPE M1: ONE HOUR FIRE RATING  
 TYPE M2: TWO HOUR FIRE RATING - UL U906 USING BLOCK CLASS D-2; MEA # 1-74 M  
 TYPE M3: THREE HOUR FIRE RATING - UL U904 USING BLOCK CLASS C-3; MEA # 1-74 M  
 STC RATING: NA

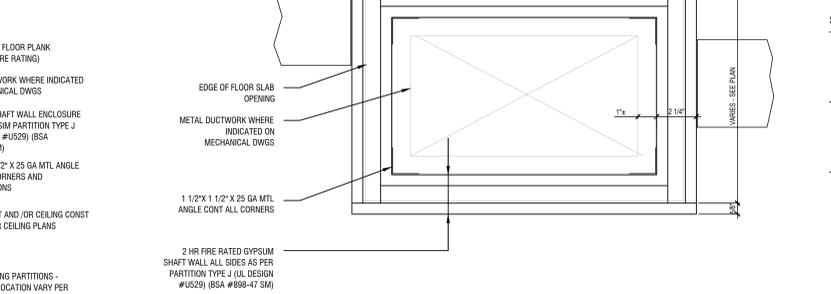
**M1 M2 M3** **FURRED CONC. WALL/PARTITION**  
 1 1/2" = 1'-0"



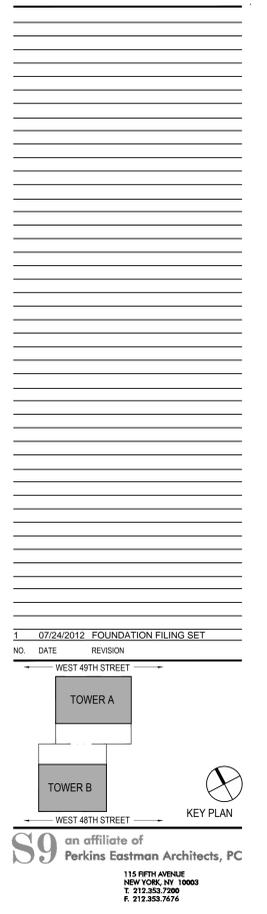
**1** **TYP. SPRINKLER PIPE ENCLOSURE**  
 3" = 1'-0"



**2** **HORIZONTAL SHAFT ENCLOSURE**  
 3" = 1'-0"



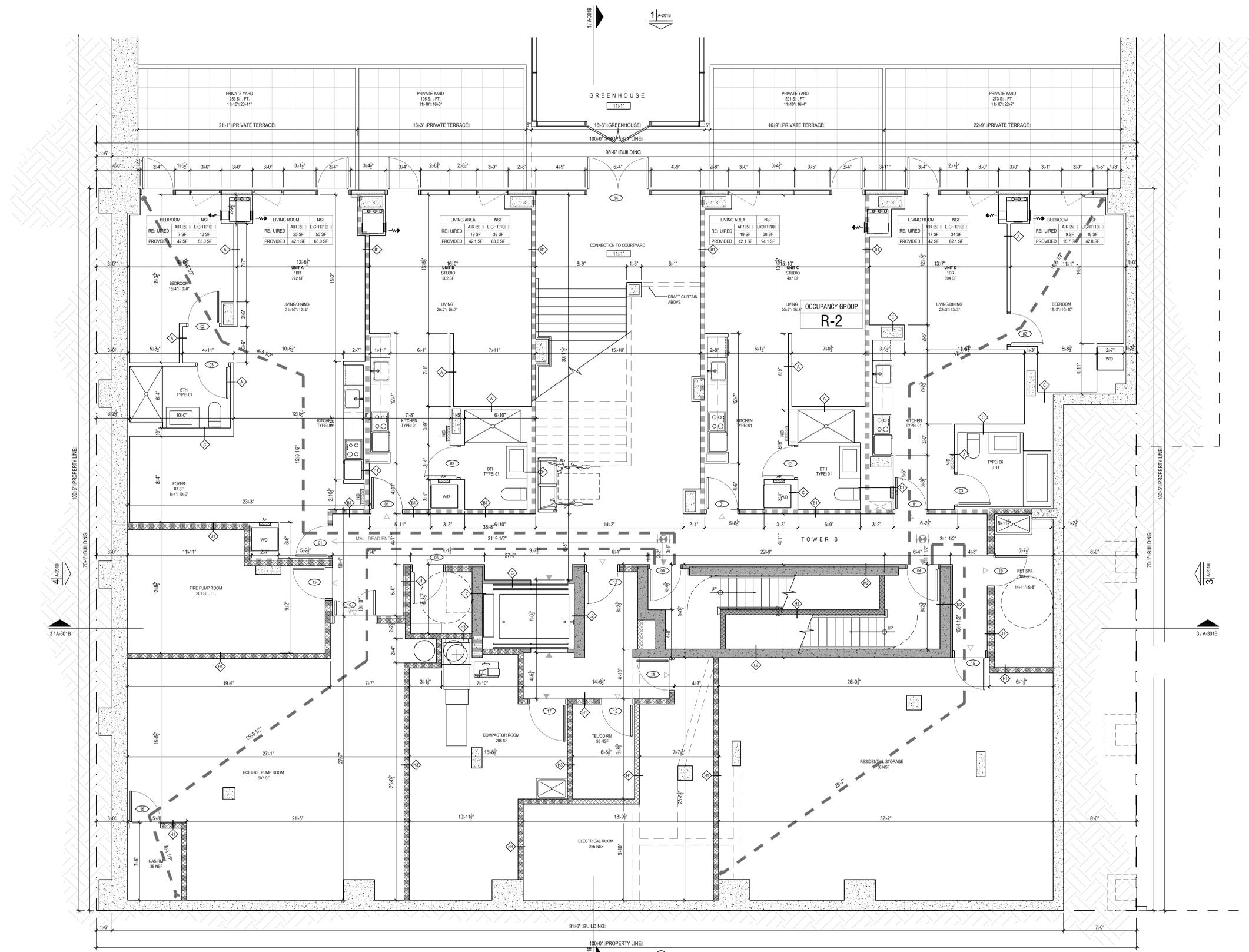
**3** **VERTICAL SHAFT ENCLOSURE**  
 3" = 1'-0"



07/24/2012 FOUNDATION FILING SET  
 NO. DATE REVISION  
 WEST 49TH STREET  
 TOWER A  
 TOWER B  
 WEST 48TH STREET  
 KEY PLAN  
**S9** an affiliate of Perkins Eastman Architects, PC  
 115 FIFTH AVENUE  
 NEW YORK, NY 10003  
 T. 212.353.7000  
 F. 212.353.7676  
 Owner:  
 FORTIS PROPERTY GROUP WEST 48TH ST LLC  
 45 MAIN STREET, SUITE 800  
 BROOKLYN, NY, TEL # 718-907-7700  
 Construction Manager:  
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 18 WEST 21ST STREET, 4TH FL  
 NEW YORK, NY, TEL # 212-465-9455  
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 228 EAST 45TH ST, 3RD FL  
 NEW YORK, NY, TEL # 212-687-8988  
 MEP:  
 MOTTOLA RINI ENGINEERS P.C.  
 36 WEST 25TH ST  
 NEW YORK, NY, TEL # 212-627-7299  
 Geotechnical:  
 RA CONSULTANTS LLC  
 47 WILKENS DRIVE  
 DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**  
 545 WEST 48TH ST  
 NEW YORK, NY  
 PROJECT No: 474400  
 DRAWING No: 121324049  
 DRAWING TITLE:  
**PARTITION SCHEDULE**

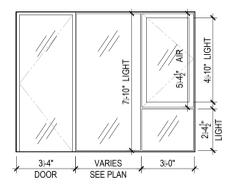
SCALE: AS NOTED PAGE 08 OF 18  
**A-030B**  
 DOB BSCAN STICKER  
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OCCUPANCY LOAD | EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 | 1005

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQUARE FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (S. FT.)	NO. OF OCCUPANTS	RE. UIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	RE. UIRED EGRESS DOOR WIDTH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAI TRAVEL DISTANCE PERMITTED (FT)	MAI TRAVEL DISTANCE PROVIDED (FT)	MAI DEAD END DISTANCE PERMITTED (FT)	MAI DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL GROSS AREA	R-2	2,455 S. FT.	200	12	3.7		2.5					
ELECTRICAL ROOM	INCIDENTAL TO R-2	256 S. FT.	-	0	-							
FIRE PUMP ROOM	INCIDENTAL TO R-2	201 S. FT.	-	0	-							
COMPACTOR ROOM	INCIDENTAL TO R-2	288 S. FT.	-	0	-			36   2   72	200	78.3'	40	33-11"
BOILER / PUMP ROOM	INCIDENTAL TO R-2	607 S. FT.	-	0	-							
GAS ROOM	INCIDENTAL TO R-2	36 S. FT.	-	0	-							
TELCO ROOM	INCIDENTAL TO R-2	55 S. FT.	-	0	-							
RESIDENTIAL STORAGE	INCIDENTAL TO R-2	736 S. FT.	-	0	-							
PET SPA	INCIDENTAL TO R-2	108 S. FT.	-	0	-							
TOTAL				12	4		2					

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS A FIRE DOOR (34 HR) | 1 1/2 EI IT UNITS, EU, UNO
  - CLASS B FIRE DOOR (1-1/2 HR) | 1 1/2 EI IT UNITS, EU, UNO
  - FIRE STAND PIPE W/VALVE & IT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARDWIRED)



1 CELLAR LEVEL PLAN  
A-100B SCALE: 1/4" = 1'-0"

07/24/2012 FOUNDATION FILING SET  
NO. DATE REVISION

WEST 49TH STREET  
TOWER A  
WEST 48TH STREET  
TOWER B  
KEY PLAN

S9 an affiliate of Perkins Eastman Architects, PC  
115 FIFTH AVENUE  
NEW YORK, NY 10003  
T. 212.353.7000  
F. 212.353.7476

Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049  
DRAWING TITLE:  
**TOWER B  
CELLAR PLAN  
(GARDEN LEVEL)**

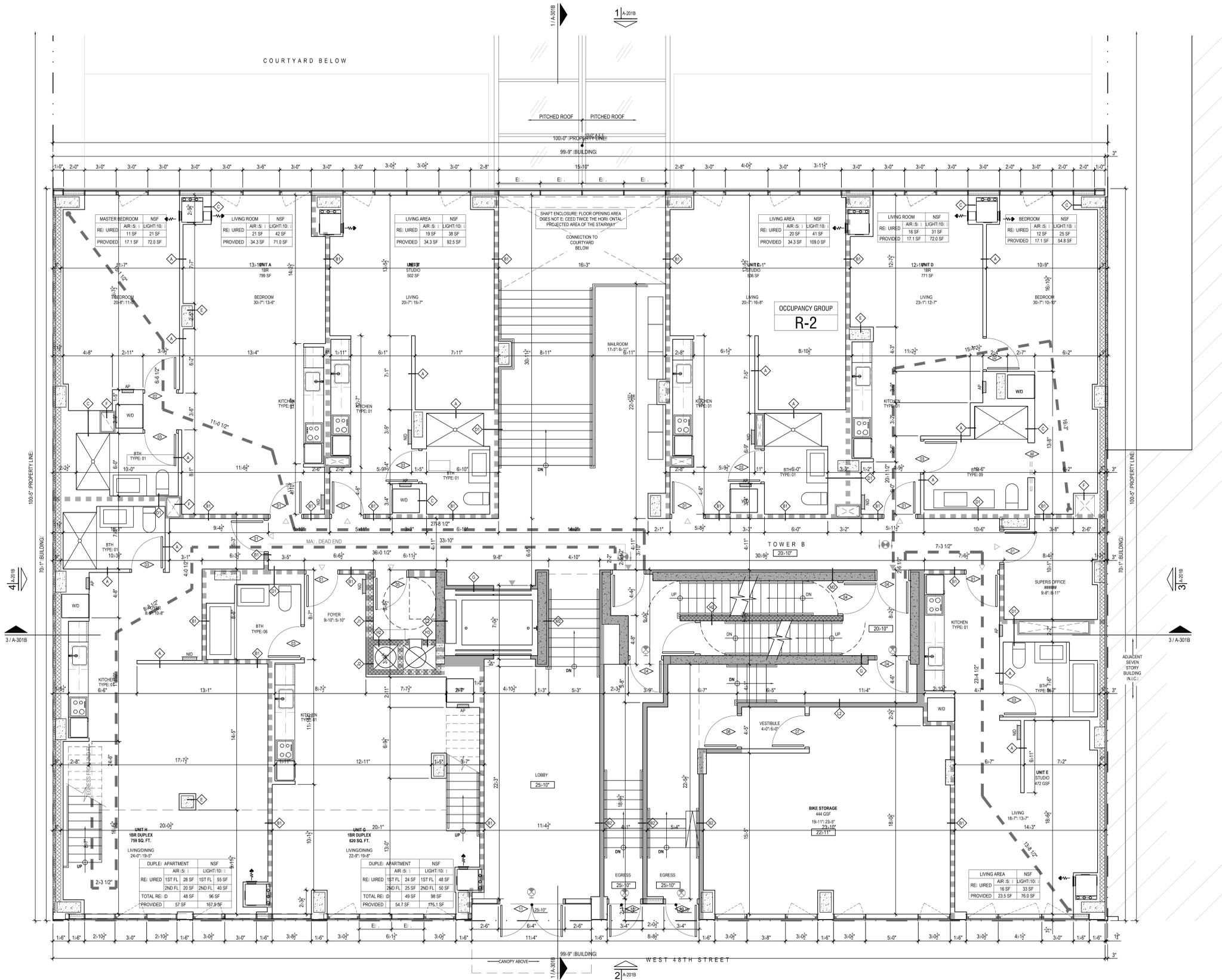
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**A-100B.00**

DOB BSCAN STICKER

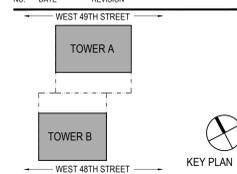


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1 07/24/2012 FOUNDATION FILING SET  
NO. DATE REVISION



KEY PLAN  
an affiliate of  
**S9** Perkins Eastman Architects, PC  
115 FIFTH AVENUE  
NEW YORK, NY 10003  
T 212.263.7000  
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Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049

DRAWING TITLE:  
**TOWER B  
1ST FLOOR PLAN  
(LOBBY LEVEL)**

SCALE: AS NOTED PAGE 10 OF 18

**A-101B.00**

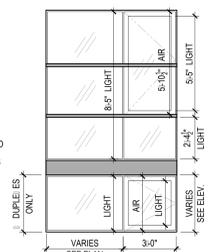
DOB BSCAN STICKER



SEAL

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (S. UARE FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (S. UARE FEET)	NO. OF OCCUPANTS	RE. UURED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	RE. UURED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MA. TRAVEL DISTANCE PERMITTED (FT)	MA. TRAVEL DISTANCE PROVIDED (FT)	MA. DEAD END DISTANCE PERMITTED (FT)	MA. DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL GROSS AREA	R-2	4,459 S. FT.	200	22	6.7		4.5					
INCIDENTAL TO R-2												
LOBBY	INCIDENTAL TO R-2	247 S. FT.	-	0	-	40   2   80	-	36   2   72	200	114'-9"	40	36'-4"
BIKE STORAGE	INCIDENTAL TO R-2	472 S. FT.	-	0	-		-					
MAIL ROOM	INCIDENTAL TO R-2	139 S. FT.	-	0	-		-					
SUPERS OFFICE	INCIDENTAL TO R-2	108 S. FT.	-	0	-		-					

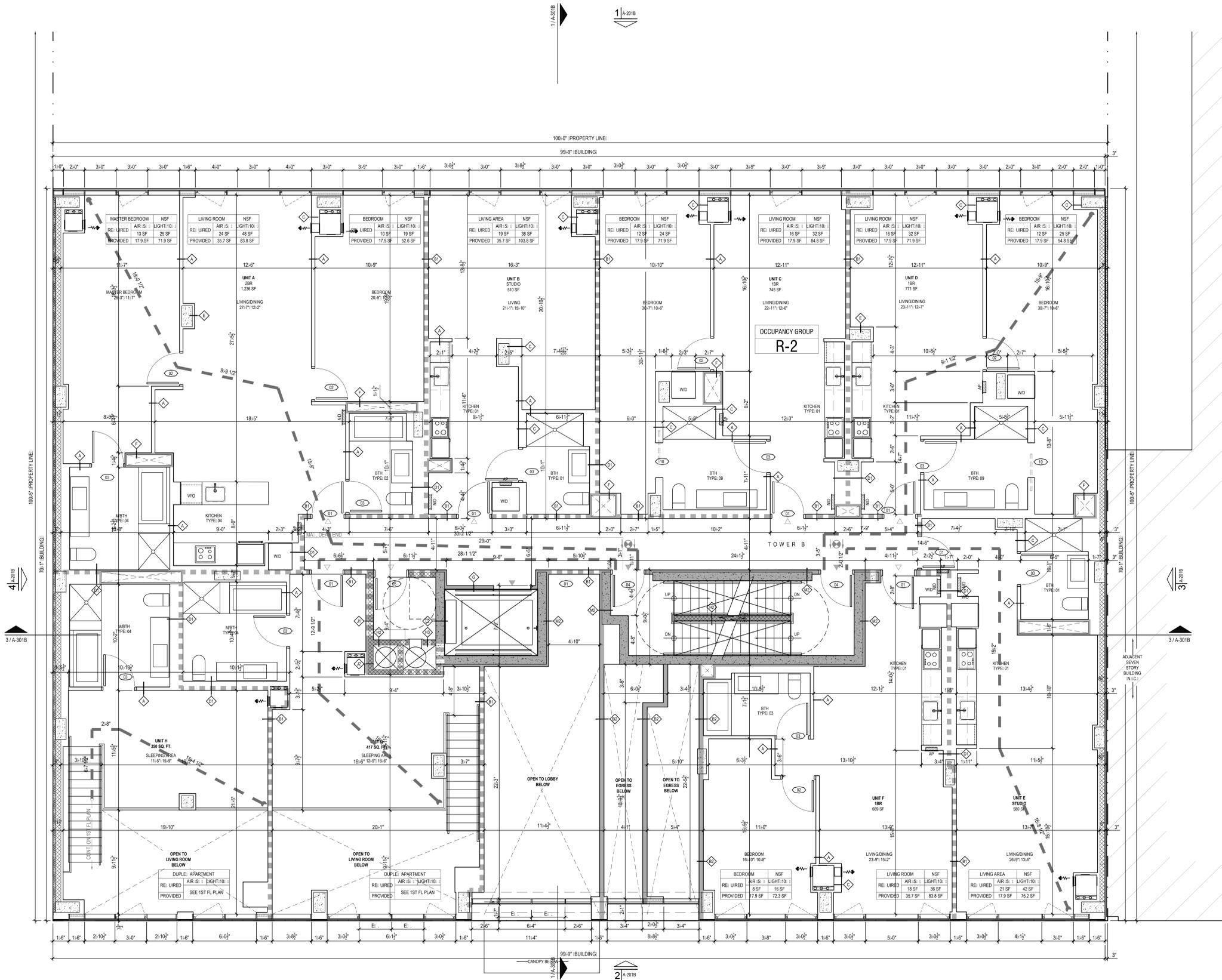
- SYMBOLS LEGEND**
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS A FIRE DOOR (34 HRI) 1 1/2 EI IT UNITS, EU, UNO
  - CLASS B FIRE DOOR (1-1/2 HRI) 1 1/2 EI IT UNITS, EU, UNO
  - FIRE STAND PIPE W/VALVE E IT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



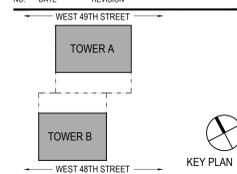
LEVEL	NO. OF OCCUPANTS	RE. UURED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	RE. UURED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)
CELLAR	12	3.6		2.4	
GROUND FLOOR	22	6.6	80	4.4	72
TOTAL	34	10.2		6.8	

1 1ST FLOOR PLAN  
A-100B SCALE: 1/4" = 1'-0"

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XX/XX/2012



1 07/24/2012 FOUNDATION FILING SET  
NO. DATE REVISION



**S9** an affiliate of Perkins Eastman Architects, PC  
115 FIFTH AVENUE  
NEW YORK, NY 10003  
T 212.353.7000  
F 212.353.7476

Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W 48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049

DRAWING TITLE:  
**TOWER B  
2ND FLOOR PLAN**

SCALE: AS NOTED PAGE: 11 OF 18

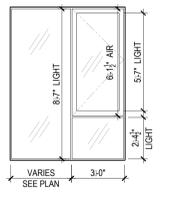
**A-102B.00**

DOB SCAN STICKER

OCCUPANCY LOAD: EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004 & 1005

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (S. UARE FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (S. FT.)	NO. OF OCCUPANTS	RE. U/RED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	RE. U/RED EGRESS DOOR WIDTH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MA. TRAVEL DISTANCE PERMITTED (FT)	MA. TRAVEL DISTANCE PROVIDED (FT)	MA. DEAD END DISTANCE PERMITTED (FT)	MA. DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL GROSS AREA	R-2	5,279 S. FT.	200	26	7.9	40   2   80	5.3	36   2   72	200	74'-6"	40	33'-4"

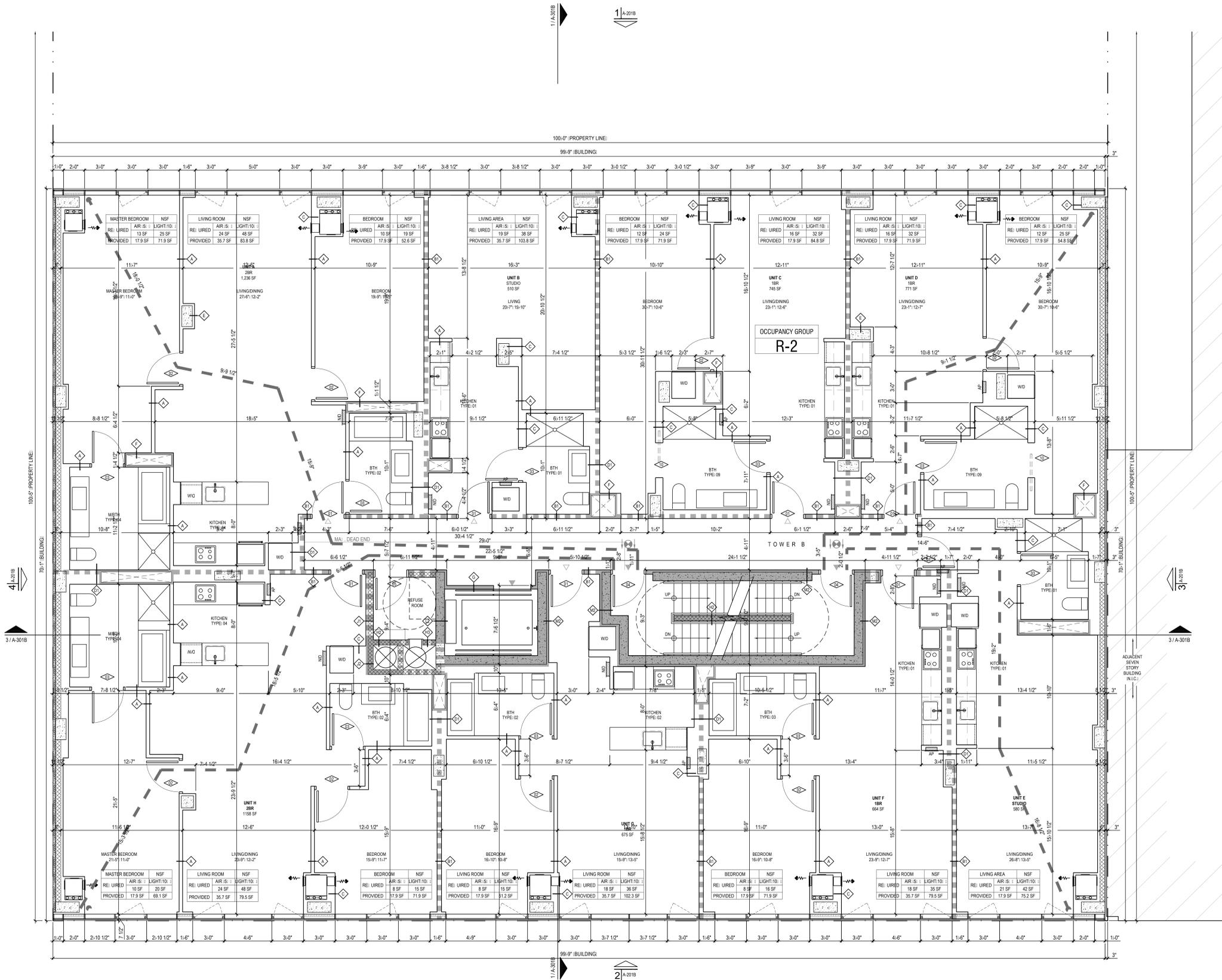
- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS A FIRE DOOR (34 HRS) 1 1/2 EI IT UNITS/EU, UNO
  - CLASS B FIRE DOOR (1-12 HRS) 1 1/2 EI IT UNITS/EU, UNO
  - FIRE STAND PIPE W/VALVE EI IT SIGN, ARROW INDICATES DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



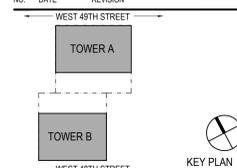
1 2ND FLOOR PLAN  
A-102B SCALE: 1/4" = 1'-0"



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NO. DATE REVISION



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Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL.  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENIUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049

DRAWING TITLE:  
**TOWER B  
TYPICAL FLOOR PLANS  
3RD-6TH**

SCALE: AS NOTED PAGE.12 OF 18

**A-103B.00**

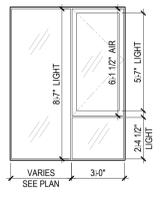
DOB SCAN STICKER



SEAL

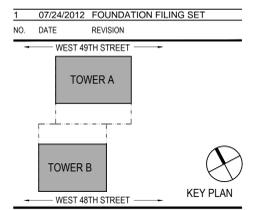
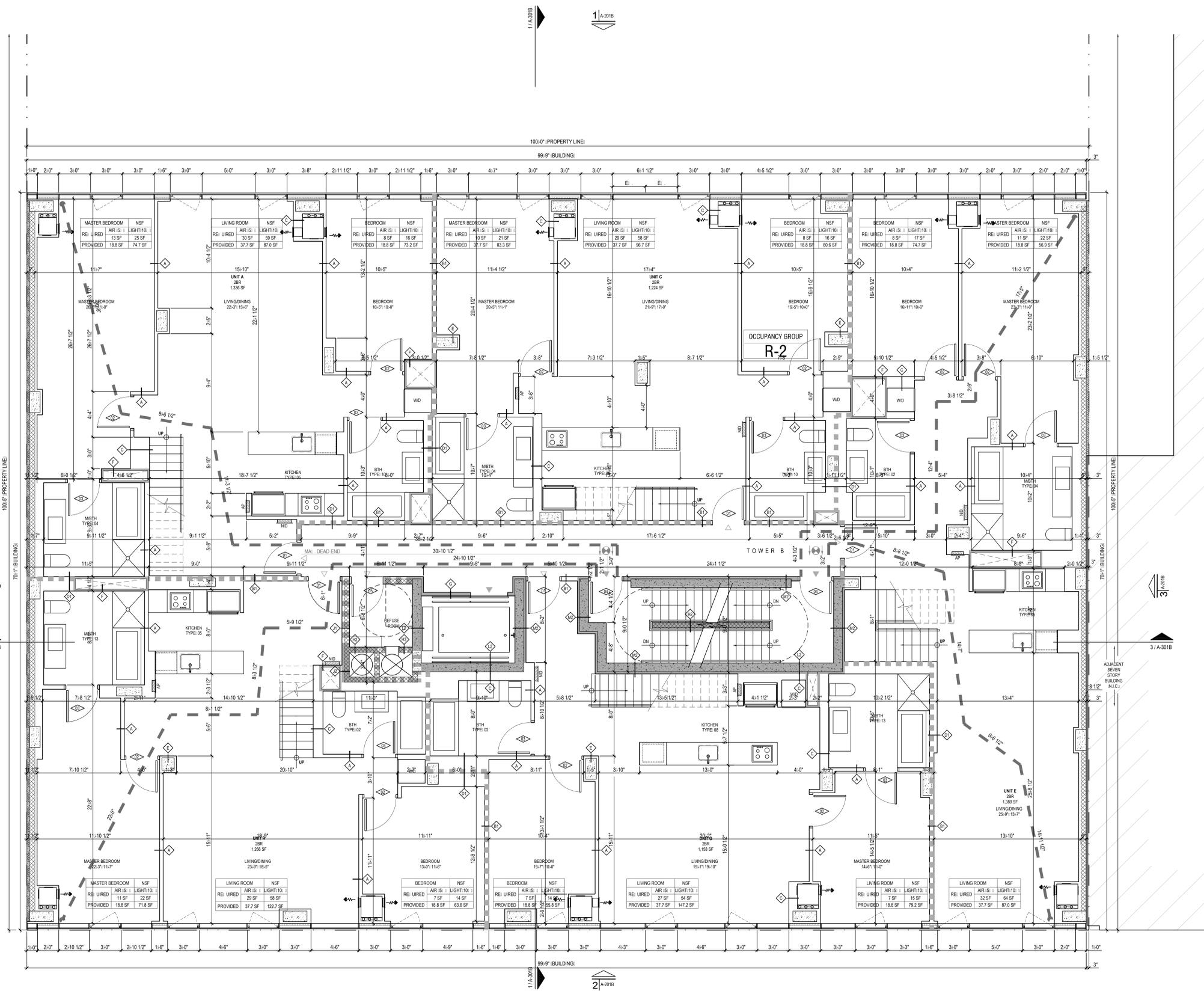
OCCUPANCY LOAD   EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004   1005												
ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (S. UARE FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (S. FT.)	NO. OF OCCUPANTS	RE. U. IREED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAR WIDTH PROVIDED (IN)	RE. U. IREED EGRESS DOOR WITH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MA. TRAVEL DISTANCE PERMITTED (FT)	MA. TRAVEL DISTANCE PROVIDED (FT)	MA. DEAD END DISTANCE PERMITTED (FT)	MA. DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL GROSS AREA	R-2	6,340 S. FT.	200	32	9.5	40   2   80	6.3	36   2   72	200	74'-6"	40	33'-1"

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS A FIRE DOOR (34 HRS) 1 1/2 EI IT UNITS/EO, UNO
  - CLASS B FIRE DOOR (1-1/2 HRS) 1 1/2 EI IT UNITS/EO, UNO
  - FIRE STAND PIPE W/VALVE EI IT SIGN, ARROW INDICATES DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



1 A-103B TYPICAL FLOOR PLAN SCALE: 1/4" = 1'-0"

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 115 FIFTH AVENUE  
 NEW YORK, NY 10003  
 T. 212.353.7000  
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Owner:  
 FORTIS PROPERTY GROUP WEST 48TH ST LLC  
 45 MAIN STREET, SUITE 800  
 BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
 WONDER WORKS CONSTRUCTION CORPORATION  
 18 WEST 21ST STREET, 4TH FL  
 NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
 SULLIVAN GROUP DESIGN LLC  
 109 WEST 27TH ST  
 NEW YORK, NY, TEL # 212-352-8636

Structural:  
 WSP CANTOR SENUK  
 228 EAST 45TH ST, 3RD FL  
 NEW YORK, NY, TEL # 212-687-8988

MEP:  
 MOTTOLA RINI ENGINEERS P.C.  
 36 WEST 25TH ST  
 NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
 RA CONSULTANTS LLC  
 47 WILKENS DRIVE  
 DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
 NEW YORK, NY  
 PROJECT No: 47440.00  
 DOB No: 121324049

DRAWING TITLE:  
**TOWER B  
 7TH FLOOR PLAN  
 (PENTHOUSE LEVEL)**

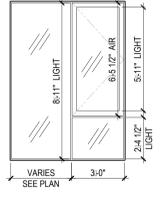
SCALE: AS NOTED PAGE 13 OF 18

**A-104B.00**

DOB SCAN STICKER

OCCUPANCY LOAD   EGRESS CALCULATIONS AS PER NYC BC SECTIONS 1004   1005							
ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQUARE FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (S.F.)	NO. OF OCCUPANTS	RE U/RED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	RE U/RED EGRESS DOOR WIDTH (IN)
RESIDENTIAL GROSS AREA	R-2	6,372 S.F.	200	32	9.6	40   2   80	6.4
							36   2   72
							200
							79.9'
							40
							310.0'

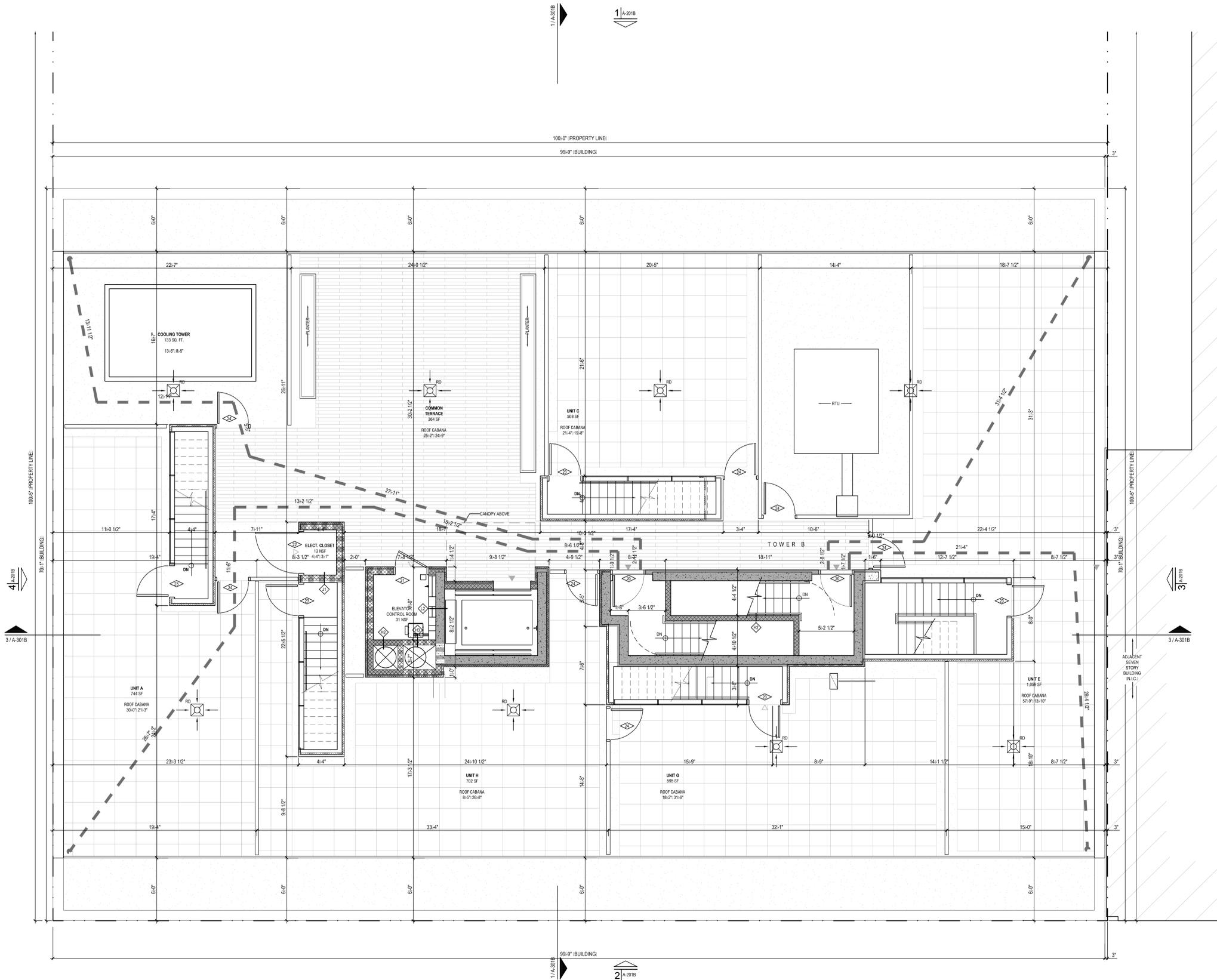
- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS A FIRE DOOR (34 HR) 1 1/2 EI IT UNITS, EU, UNO
  - CLASS B FIRE DOOR (1-1/2 HR) 1 1/2 EI IT UNITS, EU, UNO
  - FIRE STAND PIPE W/VALVE EI IT SIGN, ARROW INDICATES DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARD-WIRED)



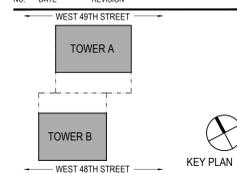
**1** PENTHOUSE LEVEL PLAN  
 A-104B SCALE: 1/4" = 1'-0"



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115 FIFTH AVENUE  
NEW YORK, NY 10003  
T. 212.353.7000  
F. 212.353.7476

Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL # 718-907-7700

Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
18 WEST 21ST STREET, 4TH FL.  
NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL # 212-352-8636

Structural:  
WSP CANTOR SENUK  
228 EAST 45TH ST, 3RD FL  
NEW YORK, NY, TEL # 212-687-8988

MEP:  
MOTTOLA RINI ENGINEERS P.C.  
36 WEST 25TH ST  
NEW YORK, NY, TEL # 212-627-7299

Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, NJ, TEL # 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049  
DRAWING TITLE:  
**TOWER B  
ROOF PLAN**

SCALE: AS NOTED PAGE 14 OF 18  
**A-105B.00**

DOB SCAN STICKER



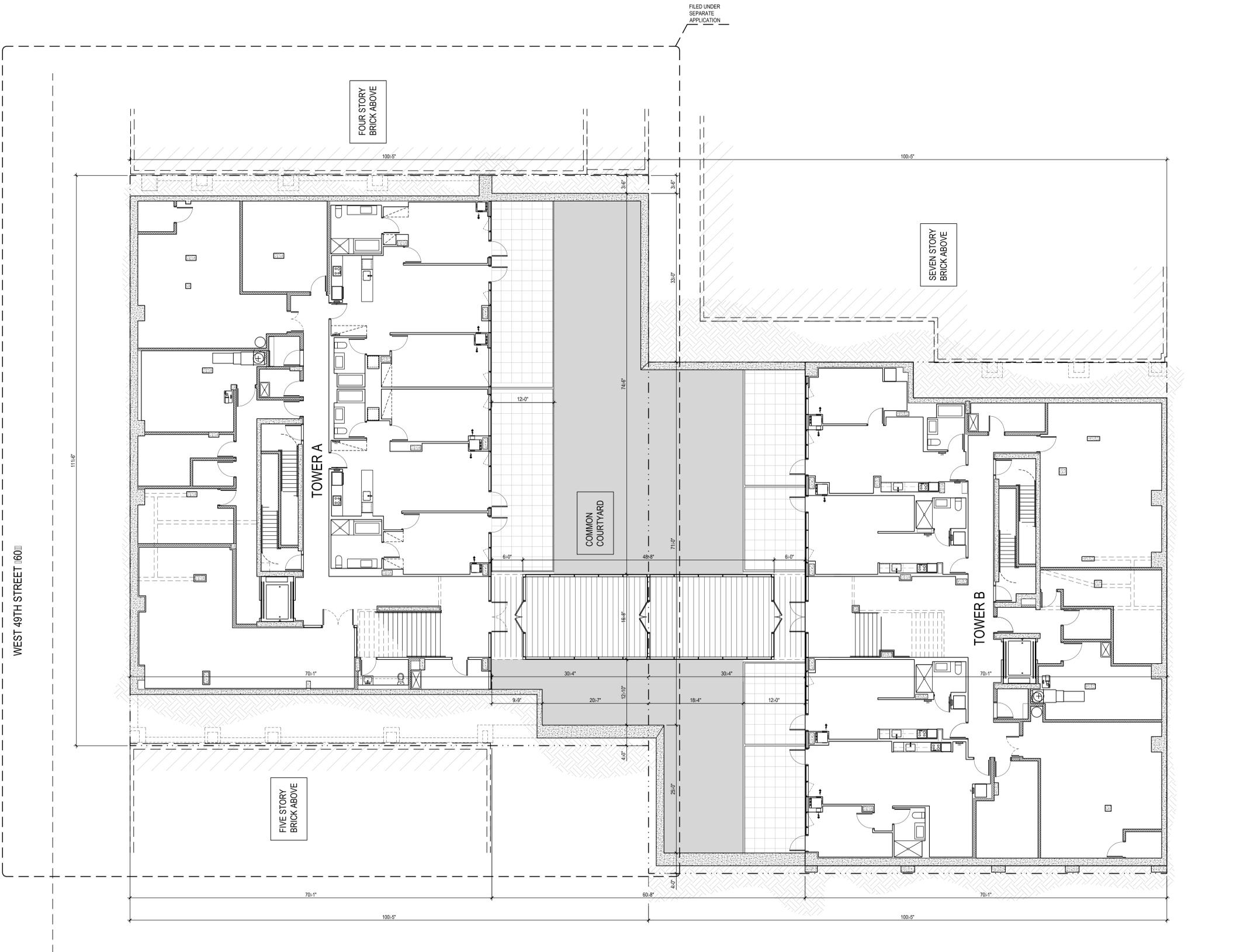
SEAL

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XX/XX/2012

ROOM / SPACE	OCCUPANCY GROUP	GROSS FLOOR AREA (SQUARE FEET) WITHIN DU	GROSS FLOOR AREA PER OCCUPANT (SQUARE FEET)	NO. OF OCCUPANTS	REWIRED EGRESS STAIR WIDTH (IN)	TOTAL EGRESS STAIR WIDTH PROVIDED (IN)	REWIRED EGRESS DOOR WIDTH (IN)	TOTAL EGRESS DOOR WIDTH PROVIDED (IN)	MAX. TRAVEL DISTANCE PERMITTED (FT)	MAX. TRAVEL DISTANCE PROVIDED (FT)	MAX. DEAD END DISTANCE PERMITTED (FT)	MAX. DEAD END DISTANCE PROVIDED (FT)
RESIDENTIAL GROSS AREA	R-2	4,237 S. FT.	30	141	42.4	40   2   80	28.2	36   2   72	200	76-10'	N/A	N/A

- SYMBOLS LEGEND
- 1 HR RATED INTERIOR SEPARATION/DIVISION
  - 2 HR RATED INTERIOR SEPARATION/DIVISION
  - 3 HR RATED INTERIOR SEPARATION/DIVISION
  - CLASS A FIRE DOOR (3/4 HR); 1 1/2 EI IT UNITS/ELI, UNO
  - CLASS B FIRE DOOR (1-1/2 HR); 1 1/2 EI IT UNITS/ELI, UNO
  - FIRE STAND PIPE W/VALVE EI IT SIGN, ARROW INDICATES
  - DIRECTION OF EGRESS
  - MECHANICAL VENTILATION
  - SMOKE/CO2 DETECTOR (HARDWIRED)

**1 ROOF PLAN**  
A-105B SCALE: 1/4" = 1'-0"

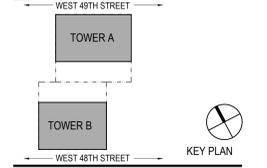


FILED UNDER SEPARATE APPLICATION

WEST 49TH STREET (60')

WEST 48TH STREET (60')

NO.	DATE	REVISION
1	07/24/2012	FOUNDATION FILING SET



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 115 FIFTH AVENUE  
 NEW YORK, NY 10003  
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 F 212.353.7676

- Owner:**  
 FORTIS PROPERTY GROUP WEST 48TH ST LLC  
 45 MAIN STREET, SUITE 800  
 BROOKLYN, NY, TEL# 718-907-7700
- Construction Manager:**  
 WONDER WORKS CONSTRUCTION CORPORATION  
 18 WEST 21ST STREET, 4TH FL  
 NEW YORK, NY, TEL# 212-465-9455
- Civil / Site:**  
 SULLIVAN GROUP DESIGN LLC  
 109 WEST 27TH ST  
 NEW YORK, NY, TEL# 212-352-8636
- Structural:**  
 WSP CANTOR SENUK  
 228 EAST 45TH ST, 3RD FL  
 NEW YORK, NY, TEL# 212-687-8988
- MEP:**  
 MOTTOLA RINI ENGINEERS P.C.  
 36 WEST 25TH ST  
 NEW YORK, NY, TEL# 212-627-7299
- Geotechnical:**  
 RA CONSULTANTS LLC  
 47 WILKENS DRIVE  
 DUMONT, NJ, TEL# 201-374-1794

**PROJECT TITLE:**  
 545 W48TH ST

545 WEST 48TH ST  
 NEW YORK, NY  
 PROJECT No: 47440.00  
 DOB No: 121324049

**DRAWING TITLE:**  
 COURTYARD PLAN

SCALE: AS NOTED PAGE 15 OF 18

**A-106B**

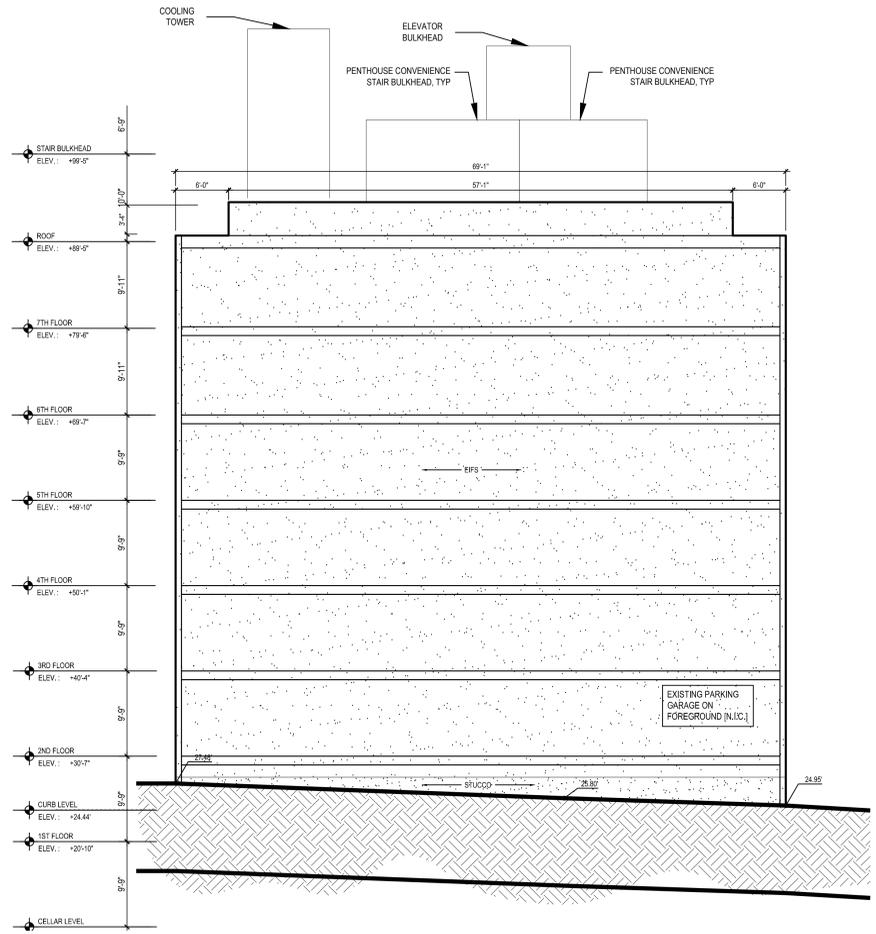


DOB BSCAN STICKER

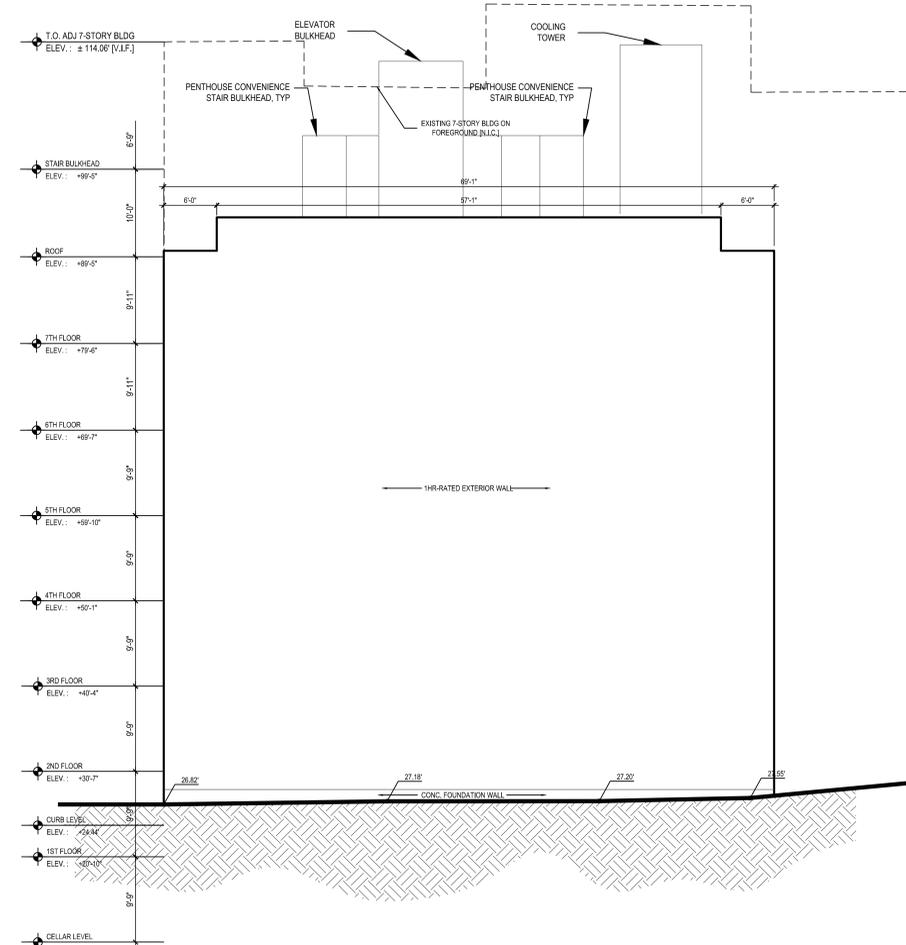


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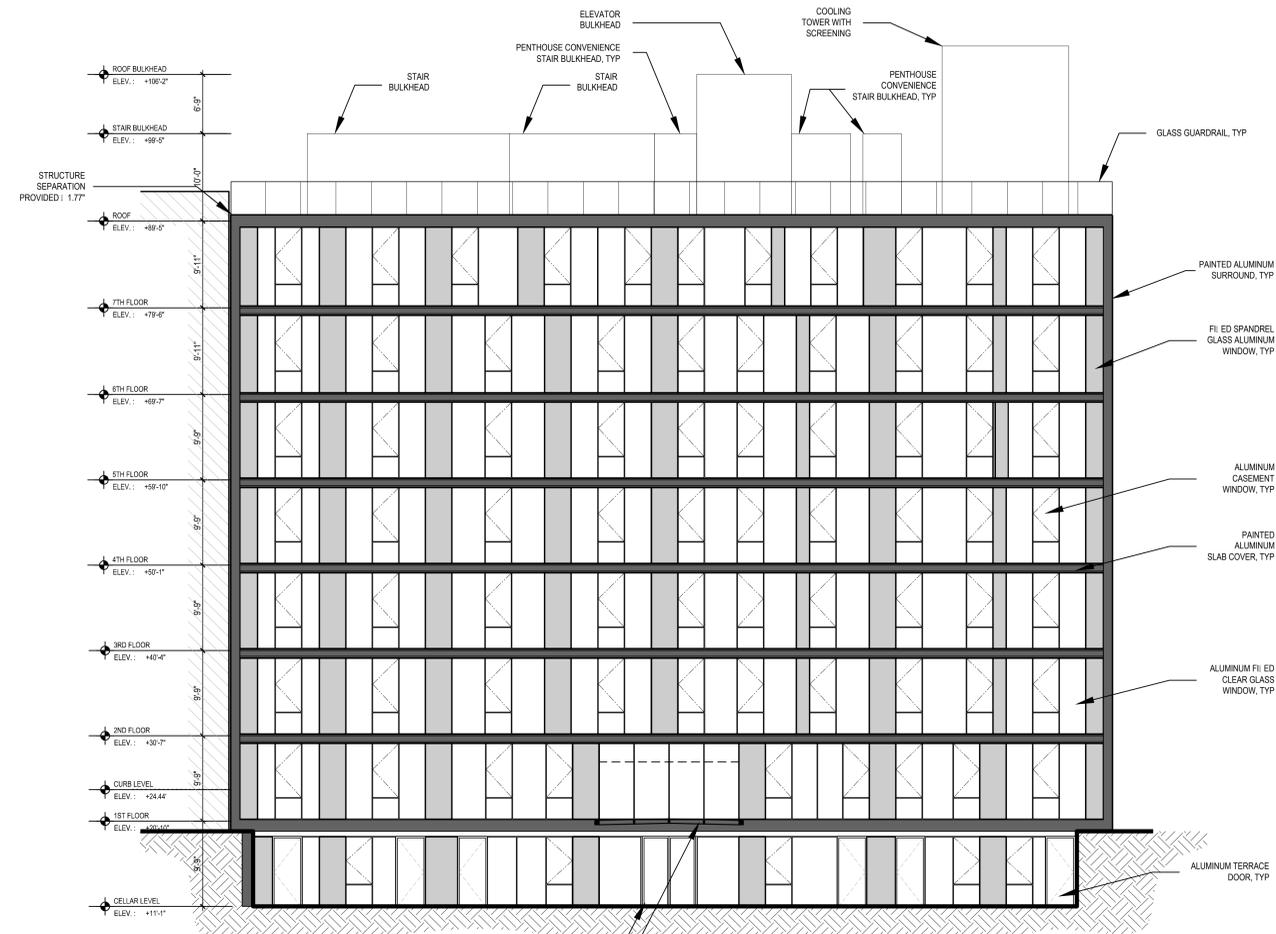
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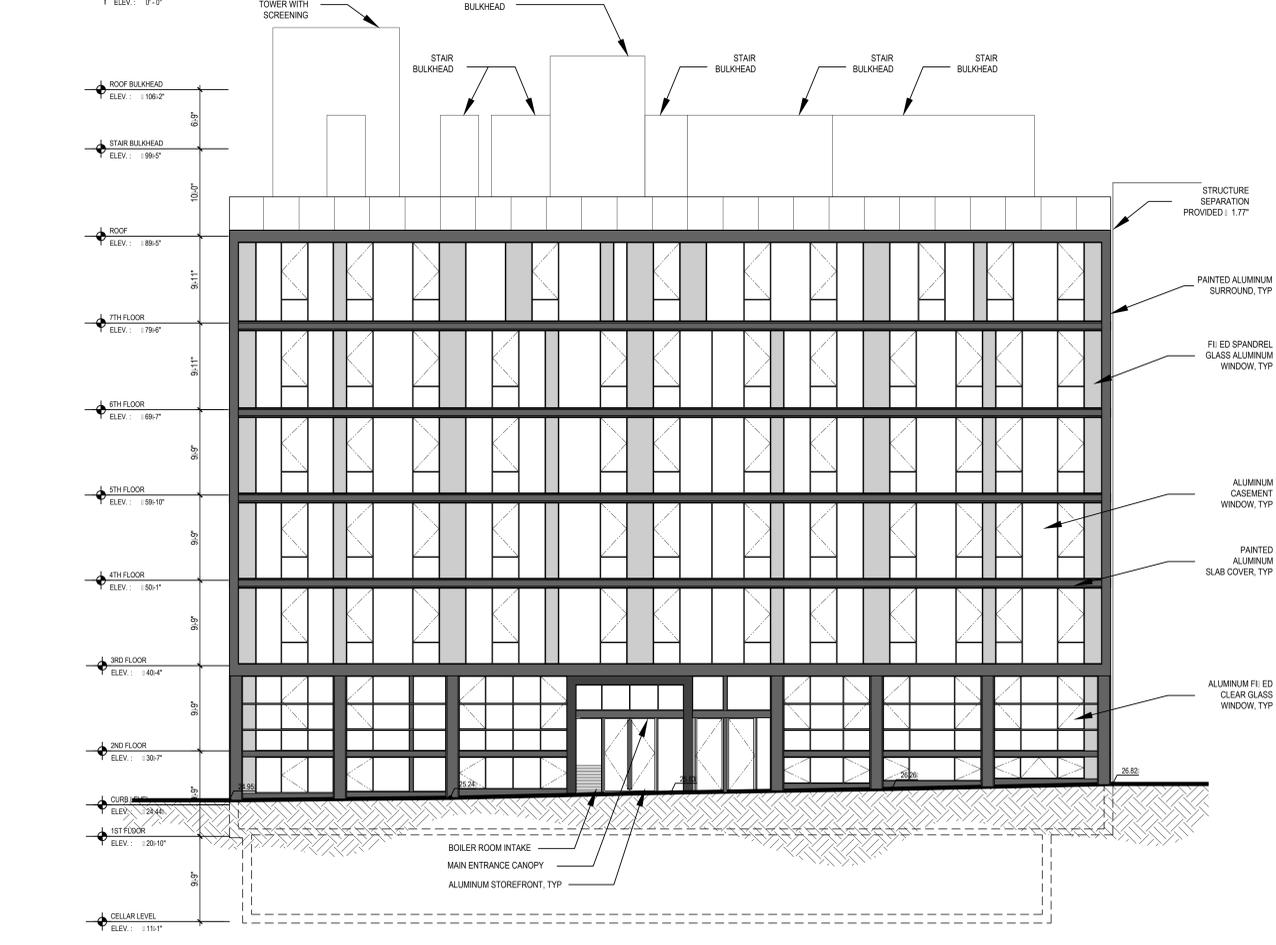
4 TOWER B WEST LOT LINE ELEVATION  
A-201B SCALE: 1/8" = 1'-0"



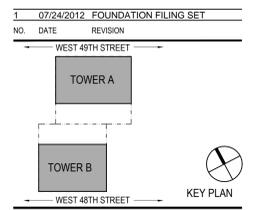
3 TOWER B EAST LOT LINE ELEVATION  
A-201B SCALE: 1/8" = 1'-0"



2 TOWER B COURTYARD ELEVATION  
A-201B SCALE: 1/8" = 1'-0"



1 TOWER B STREET ELEVATION  
A-201B SCALE: 1/8" = 1'-0"



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Construction Manager:  
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NEW YORK, NY, TEL # 212-465-9455

Civil / Site:  
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Structural:  
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228 EAST 45TH ST, 3RD FL.  
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MEP:  
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36 WEST 25TH ST  
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Geotechnical:  
RA CONSULTANTS LLC  
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PROJECT TITLE:  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY

PROJECT No: 47440.00

DOB No: 121324049

DRAWING TITLE:  
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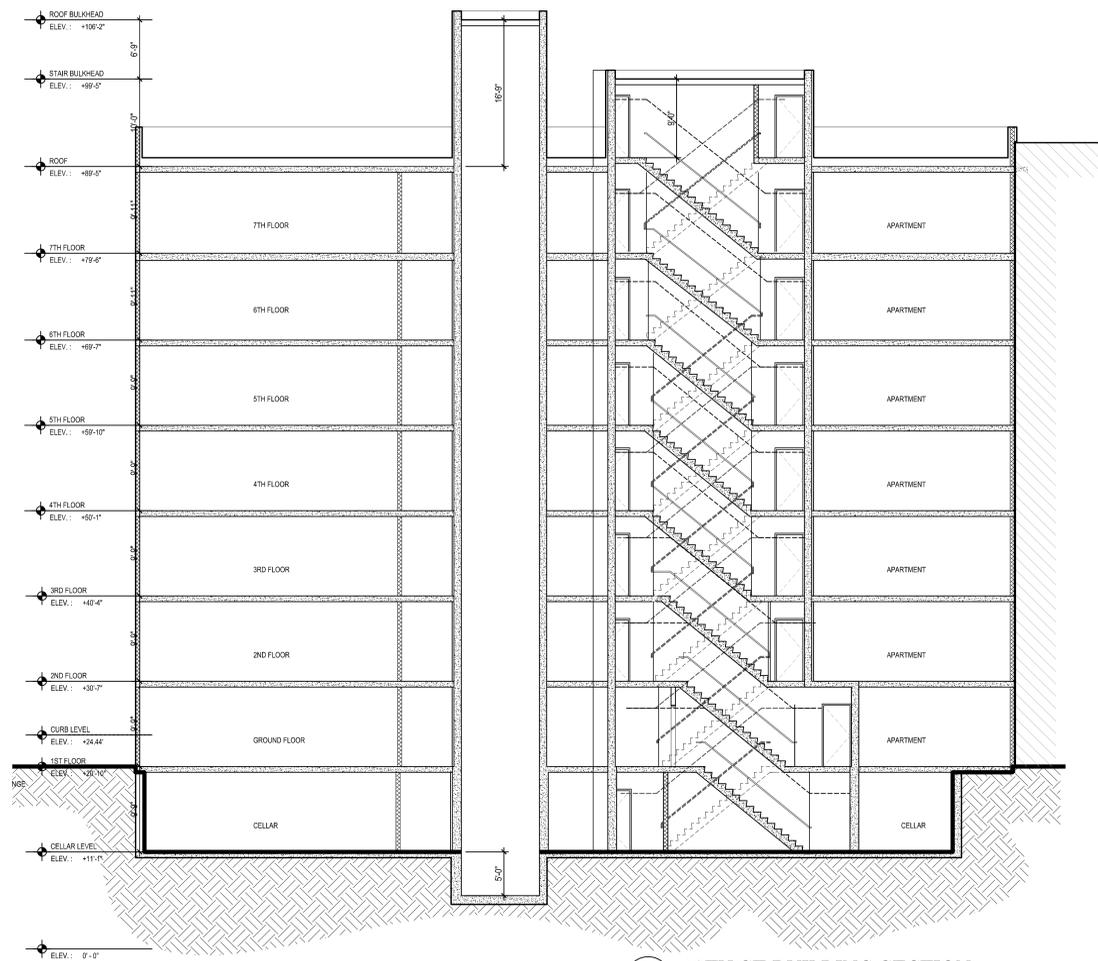
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**A-201B**

DOB BSCAN STICKER

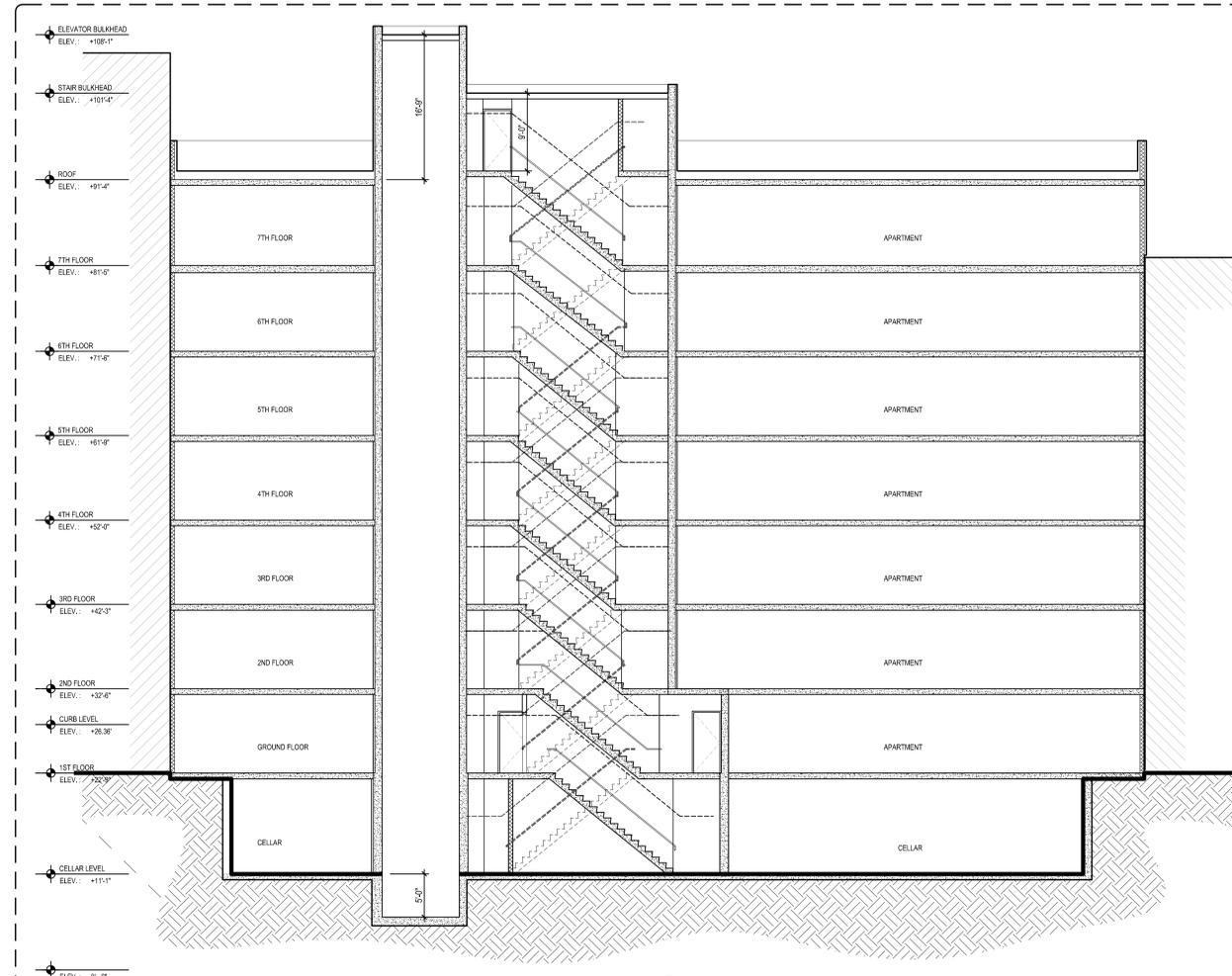


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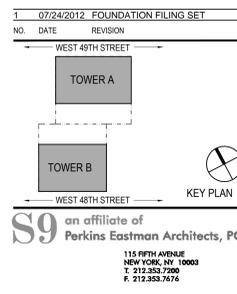


3 48TH ST BUILDING SECTION  
A-301 SCALE: 1/8" = 1'-0"

FILED UNDER SEPARATE APPLICATION  
FILED UNDER SEPARATE APPLICATION



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A-301 SCALE: 1/8" = 1'-0"

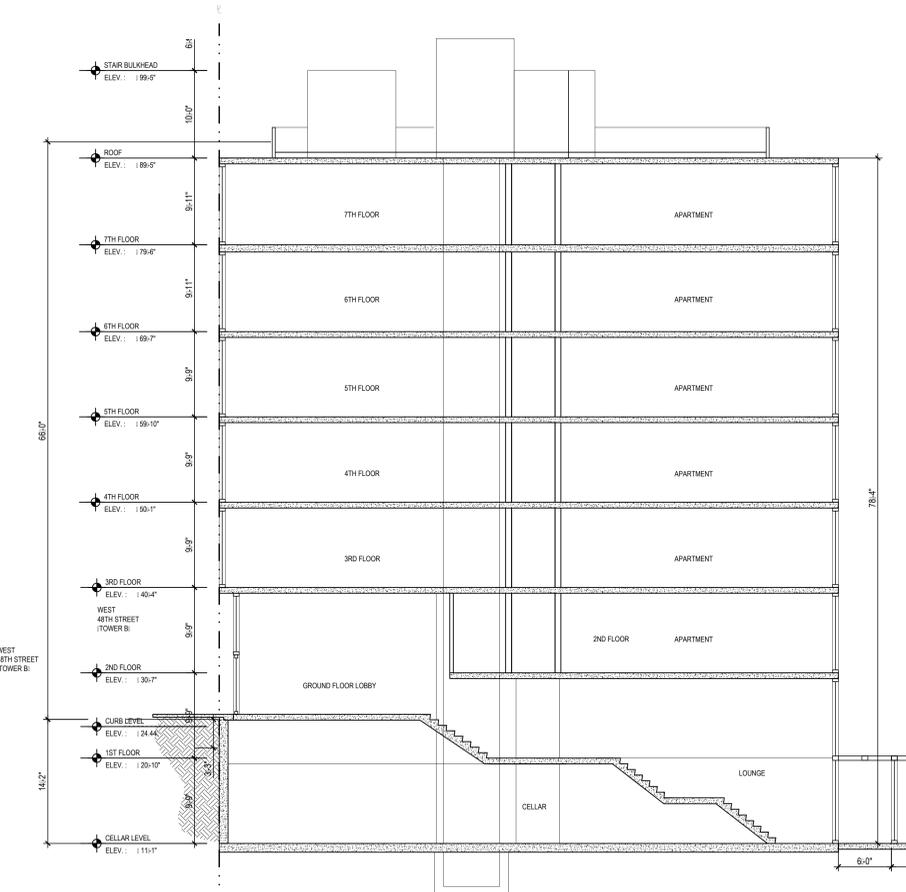


1 07/24/2012 FOUNDATION FILING SET  
NO. DATE REVISION  
WEST 49TH STREET  
TOWER A  
WEST 48TH STREET  
TOWER B  
KEY PLAN  
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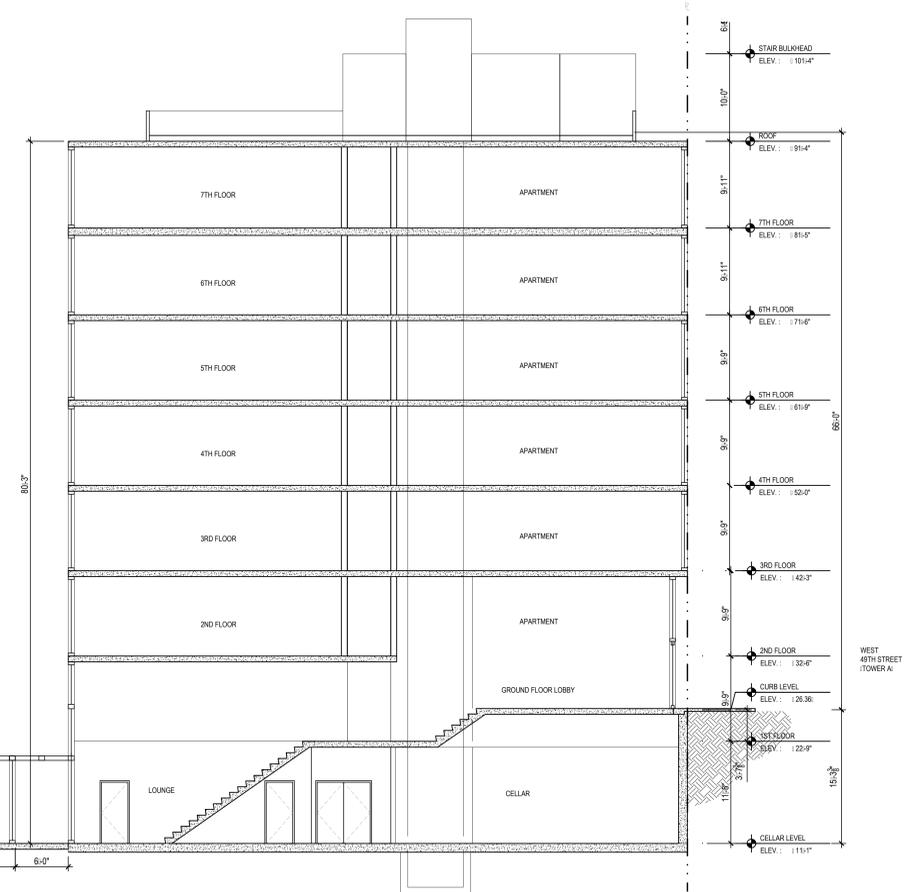
Owner:  
FORTIS PROPERTY GROUP WEST 48TH ST LLC  
45 MAIN STREET, SUITE 800  
BROOKLYN, NY, TEL# 718-907-7700  
Construction Manager:  
WONDER WORKS CONSTRUCTION CORPORATION  
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NEW YORK, NY, TEL# 212-465-9455  
Civil / Site:  
SULLIVAN GROUP DESIGN LLC  
109 WEST 27TH ST  
NEW YORK, NY, TEL# 212-352-8636  
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228 EAST 45TH ST, 3RD FL  
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MOTTOLA RINI ENGINEERS P.C.  
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NEW YORK, NY, TEL# 212-627-7299  
Geotechnical:  
RA CONSULTANTS LLC  
47 WILKENS DRIVE  
DUMONT, N.J, TEL# 201-374-1794

PROJECT TITLE:  
**545 W48TH ST**  
545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049  
DRAWING TITLE:  
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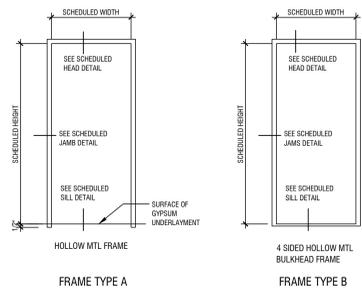
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DOB BSCAN STICKER



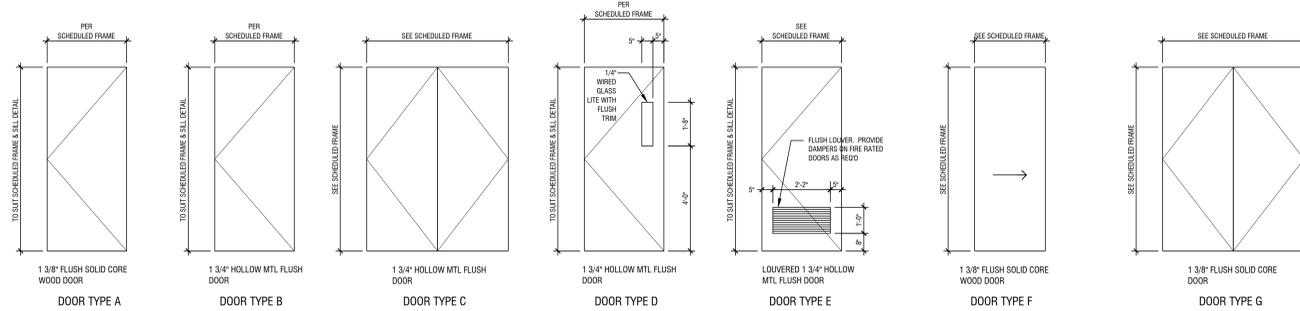
1 LONGITUDINAL BUILDING SECTION  
A-301 SCALE: 1/8" = 1'-0"



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**FRAME TYPES**  
3/8" = 1'-0"



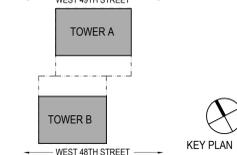
**DOOR TYPE**  
3/8" = 1'-0"

**DOOR SCHEDULE**

DOOR TAG	ROOM/SPACE	NOMINAL WIDTH	NOMINAL HEIGHT	DOOR TYPE	FRAME TYPE	JAMB DETAIL	HEAD DETAIL	SILL DETAIL	HARDWARE SET	FIRE RATING	NOTES
01	APARTMENT ENTRY	3'-0"	8'-0"	B	A	J2	H2	S2	-	3/4 HR	
02	BEDROOM	3'-0"	8'-0"	A	A	J1	H1	S1	-	UNRATED	
03	BATHROOM	3'-0"	8'-0"	A	A	J1	H1	S1	-	UNRATED	
04	EXIT STAIR (INTERIOR)	3'-0"	8'-0"	D	A	J2/S	H2/H5	S4	-	1 1/2 HR	
05	HURLOCK ROOM	3'-0"	8'-0"	B	A	J1	H1	S1	-	3/4 HR	
06	BIKE ROOM (ADA)	3'-0"	8'-0"	B	A	J1	H1	S1	-	3/4 HR	
07	BIKE ROOM (VESTRIBULE)	3'-0"	8'-0"	D	A	J1	H1	S1	-	UNRATED	
08	BIKE ROOM (TO PASSAGEWAY)	3'-0"	8'-0"	D	A	J2	H2	S1	-	1 1/2 HR	
09	PACKAGE ROOM	3'-0"	8'-0"	D	A	J2	H2	S4	-	1 1/2 HR	
10	PACKAGE & BATHROOM (POCKET)	3'-0"	8'-0"	F	A	-	-	S6	-	UNRATED	
11	LOBBY ENTRANCE (EXTERIOR)	(2) 3'-0"	10'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
12	LOBBY ENTRANCE (INTERIOR)	(2) 3'-0"	10'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
13	EXIT PASSAGEWAY	3'-0"	8'-0"	B	A	J2	H2	S1	-	1 1/2 HR	
14	COURTYARD ENTRANCE	(2) 3'-0"	10'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
15	UTILITY/STORAGE/SEER. CORRIDOR	3'-0"	7'-0"	E	A	J3/H4	H3/H4	S4	-	3/4 HR	
16	BOILER ROOM (PREPARED)	4'-0"	7'-0"	C	A	J4	H4	S4	-	3/4 HR	
17	CONTRACTOR ROOM	3'-0"	7'-0"	B	A	J2	H2	S1	-	1 1/2 HR	
18	EXERCISE ROOM	(2) 3'-0"	7'-0"	N/A	N/A	J1	H1	S5	-	3/4 HR	
19	TOILET/PET SPA	3'-0"	7'-0"	B	A	J1	H1	S5	-	3/4 HR	
20	STAR BULKHEAD	3'-0"	7'-0"	D	B	J2	H2	S1	-	1 1/2 HR	
21	ELEVATOR CONTROL ROOM	3'-0"	7'-0"	B	B	J1	H1	S1	-	3/4 HR	
22	ELECTRICAL CLOSET	4'-0"	7'-0"	B	B	J1	H1	S1	-	UNRATED	
23	PENTHOUSE STAIR BULKHEAD	3'-0"	7'-0"	N/A	N/A	N/A	N/A	-	-	UNRATED	
24	ROOF CABANA	3'-0"	N/A	N/A	N/A	N/A	N/A	-	-	UNRATED	

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**Construction Manager:**  
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**Civil / Site:**  
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109 WEST 27TH ST  
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**Structural:**  
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**MEP:**  
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**Geotechnical:**  
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47 WILKENS DRIVE  
DUMONT, N.J. TEL # 201-374-1794

**PROJECT TITLE:**  
**545 W48TH ST**

545 WEST 48TH ST  
NEW YORK, NY  
PROJECT No: 47440.00  
DOB No: 121324049

**DRAWING TITLE:**  
**DOOR SCHEDULE**

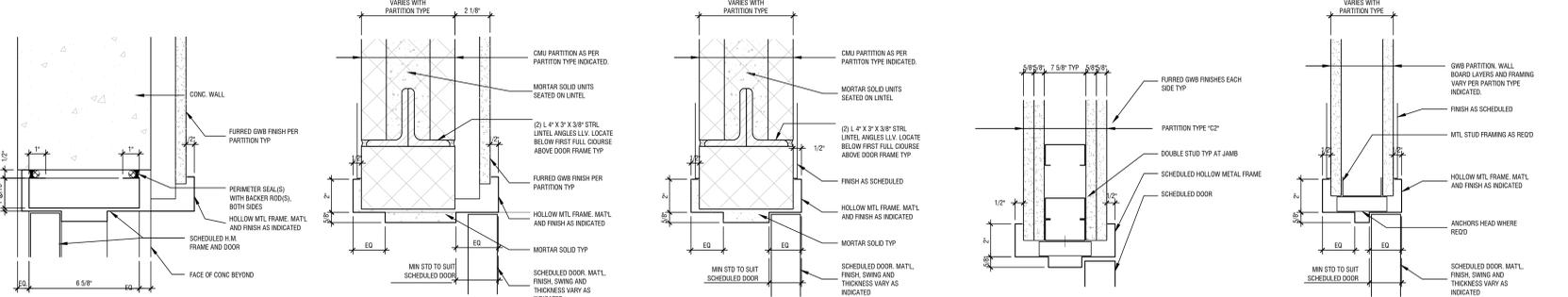
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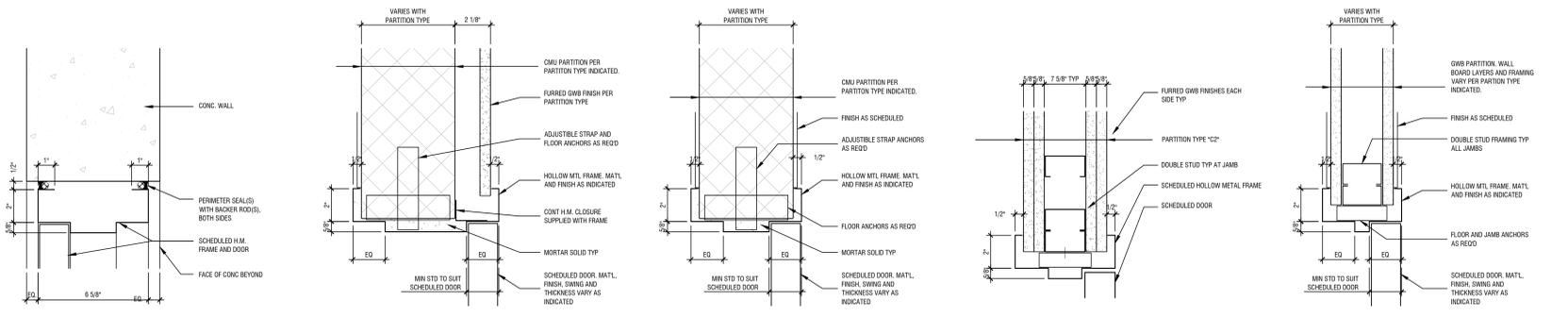
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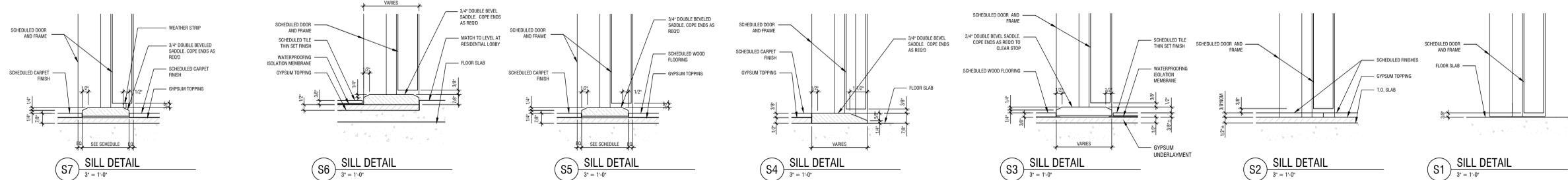
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**H5 HEAD DETAIL** 3" = 1'-0"  
**H4 DOOR HEAD DETAIL** 3" = 1'-0"  
**H3 DOOR HEAD DETAIL** 3" = 1'-0"  
**H2 DOOR HEAD DETAIL** 3" = 1'-0"  
**H1 DOOR HEAD DETAIL** 3" = 1'-0"



**J5 JAMB DETAIL** 3" = 1'-0"  
**J4 DOOR JAMB DETAIL** 3" = 1'-0"  
**J3 DOOR JAMB DETAIL** 3" = 1'-0"  
**J2 DOOR JAMB DETAIL** 3" = 1'-0"  
**J1 DOOR JAMB DETAIL** 3" = 1'-0"



**S7 SILL DETAIL** 3" = 1'-0"  
**S6 SILL DETAIL** 3" = 1'-0"  
**S5 SILL DETAIL** 3" = 1'-0"  
**S4 SILL DETAIL** 3" = 1'-0"  
**S3 SILL DETAIL** 3" = 1'-0"  
**S2 SILL DETAIL** 3" = 1'-0"  
**S1 SILL DETAIL** 3" = 1'-0"

**ATTACHMENT B**  
**CITIZEN PARTICIPATION PLAN**

## **ATTACHMENT B**

### **Citizen Participation Plan**

The NYC Office of Environmental Remediation and FPG W. 48<sup>th</sup> Street LLC, have established this Citizen Participation Plan because the opportunity for citizen participation is an important component of the NYC Voluntary Cleanup Program. This Citizen Participation Plan describes how information about the project will be disseminated to the Community during the remedial process. As part of its obligations under the NYC VCP, FPG W. 48<sup>th</sup> Street LLC will maintain a repository for project documents and provide public notice at specified times throughout the remedial program. This Plan also takes into account potential environmental justice concerns in the community that surrounds the project Site. Under this Citizen Participation Plan, project documents and work plans are made available to the public in a timely manner. Public comment on work plans is strongly encouraged during public comment periods. Work plans are not approved by the NYC Office of Environmental Remediation (OER) until public comment periods have expired and all comments are formally reviewed. An explanation of cleanup plans in the form of a public meeting or informational session is available upon request to OER's project manager assigned to this Site, Breanna Gribble who can be contacted about these issues or any others questions, comments or concerns that arise during the remedial process at (212) 442-7126.

**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](mailto:brownfields@cityhall.nyc.gov).

**Repositories.** A document repository is maintained in the nearest public library that maintains evening and weekend hours. This document repository is intended to house, for community review, all principal documents generated during the cleanup program including Remedial Investigation plans and reports, Remedial Action work plans and reports, and all public notices and fact sheets produced during the lifetime of the remedial project. FPG W. 48<sup>th</sup> Street LLC will inspect the repositories to ensure that they are fully populated with project information. The repository for this project is:

Repository Name: New York Public Library - Columbus Library

Repository Address: 742 10th Avenue New York, NY

Repository Telephone Number: (212) 586-5098

Repository Hours of Operation

Mon	12:00 PM - 7:00 PM
Tue	10:00 AM - 6:00 PM
Wed	12:00 PM - 7:00 PM
Thu	10:00 AM - 6:00 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.

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 FPG W. 48<sup>th</sup> Street LLC, reviewed and approved by OER prior to distribution and mailed by FPG W. 48<sup>th</sup> Street LLC. Public comment is solicited in public notices for all work plans developed under the NYC Voluntary Cleanup Program. Final review of all work plans by OER will consider all public comments. Approval will not be granted until the public comment period has been completed.

**Citizen Participation Milestones.** Public notice and public comment activities occur at several steps during a typical NYC BCP 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.**

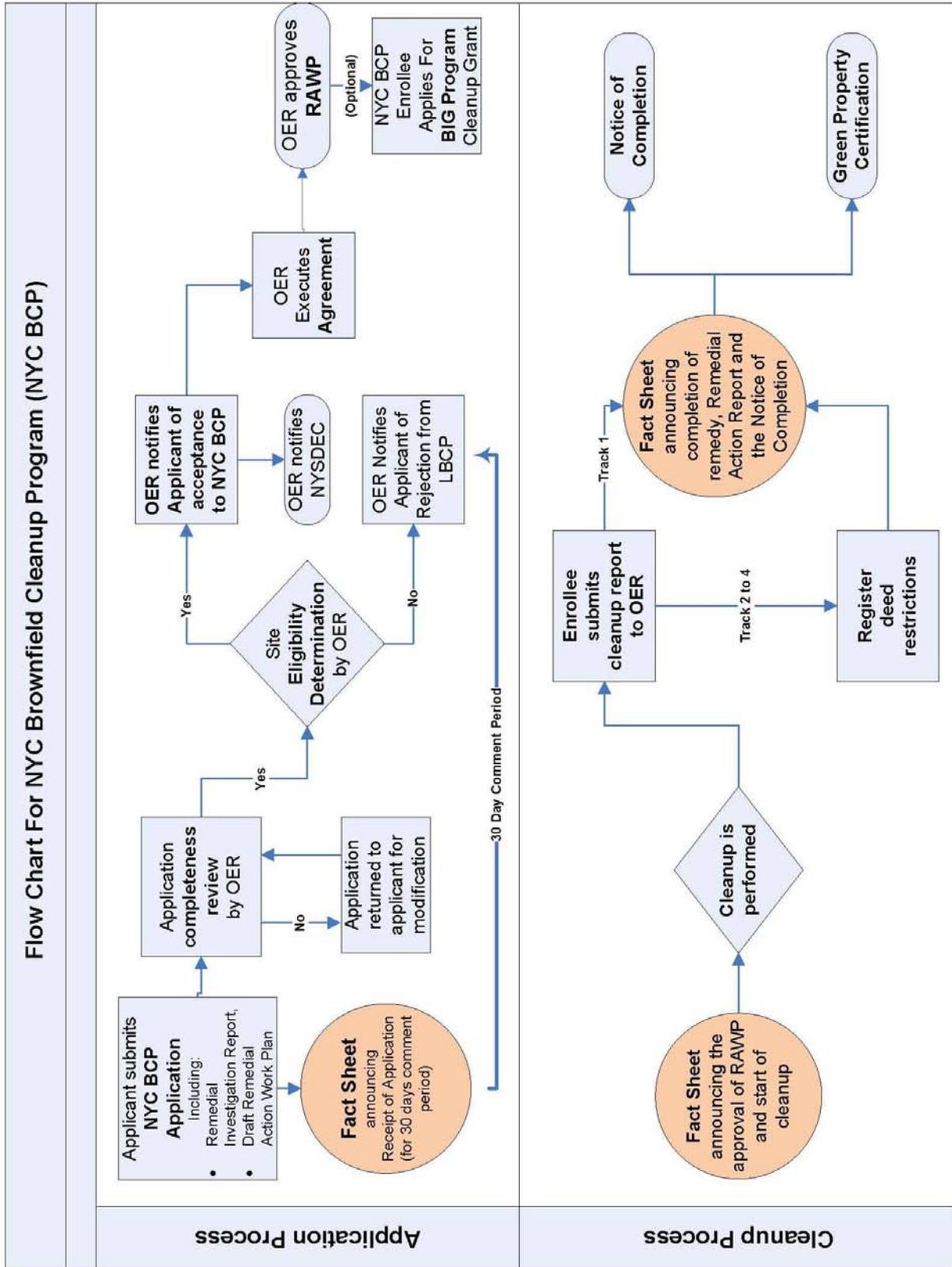
Public notice in the form of a Fact Sheet is sent to all parties listed on the Site Contact List announcing the availability of the Remedial Investigation Report and Remedial Action Work Plan and the initiation of a 30-day public comment period on the Remedial Action Work Plan. The Fact Sheet summarizes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



**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.** FPG W. 48<sup>th</sup> Street LLC is participating in OER's Paperless Voluntary Cleanup Program. Under this program, submission of electronic documents will replace submission of hard copies for the review of project documents, communications and milestone reports.

**Low-Energy Project Management Program.** FPG W. 48<sup>th</sup> Street LLC is participating in OER's low-energy project management program. Under this program, whenever possible, meetings are held using remote communication technologies, such as videoconferencing and teleconferencing to reduce energy consumption and traffic congestion associated with personal transportation.

**ATTACHMENT D**  
**SOIL MATERIALS MANAGEMENT PLAN**

## **ATTACHMENT D**

### **SOIL/MATERIALS MANAGEMENT PLAN**

#### **1.1 Soil Screening Methods**

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

#### **1.2 Stockpile Methods**

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

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

#### **1.3 Characterization of Excavated Materials**

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

## 1.4 Materials Excavation, Load-Out and Departure

The PE/QEP overseeing the remedial action will:

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

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

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

## 1.5 Off-Site Materials Transport

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

Outbound truck transport routes are The planned route on local roads for trucks leaving the Site is to proceed west on W. 49<sup>th</sup> Street (1-way) 1-block to 11<sup>th</sup> Avenue, turn left onto 11<sup>th</sup> Avenue (2-way) heading south to W.40<sup>th</sup> Street. Turn left heading east on W.40<sup>th</sup> 1 block to the Lincoln tunnel entrance. Turn right onto the Lincoln tunnel entrance and proceed to the tunnel exit at Rt 495. Continue on Rt 495 to Rt 1 or Interstate 95.

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 Manhattan, New York under a governmental remediation program. The letter will provide the project identity and the name and phone number of the PE/QEP or Enrollee. The letter will include as an attachment a summary of all chemical data for the material being transported; and (2) a letter from each disposal facility stating it is in receipt of the correspondence (1, above) and is approved to accept the material. These documents will be included in the RAR.

The 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.

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

<b>Analysis</b>	<b>Frequency</b>	<b>Sample Type</b>
VOCs	1 per 500 yd <sup>3</sup>	Composite of 5-point grab
SVOCs (PAHs)	1 per 500 yd <sup>3</sup>	Composite of 5-point grab
Metals	1 per 500 yd <sup>3</sup>	Composite of 5-point grab
Pesticides	1 per 500 yd <sup>3</sup>	Composite of 5-point grab

Organic matter (wood, roots, stumps, etc.) or other waste derived from clearing and grubbing of the Site will not be buried on-Site. Soil or fill excavated from the Site for grading or other purposes will not be reused within a cover soil layer or within landscaping berms.

## **1.8 Demarcation**

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer. A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

This demarcation will constitute the top of the site management horizon. Materials within this horizon require adherence to special conditions during future invasive activities as defined in the Site Management Plan.

### **1.9 Import of Backfill Soil from Off-Site Sources**

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site.

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**  
**WATERPROOFING MENBRANE**  
**SPECIFICATIONS**

## 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:

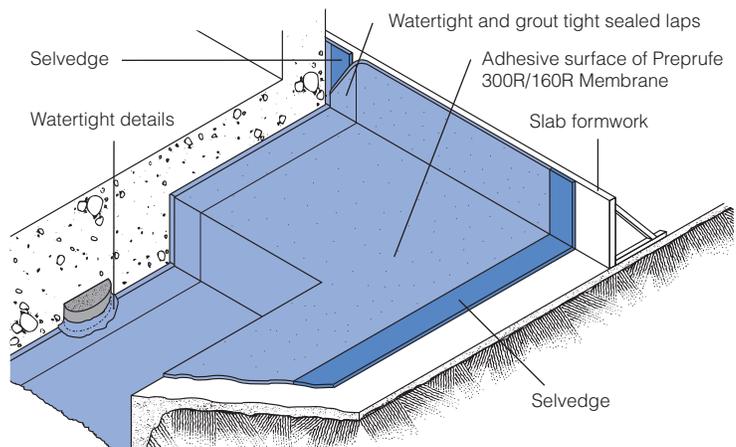
- **Preprufe 300R**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R**—thinner grade for blindside, zero property line applications against soil retention systems.
- **Preprufe 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](http://graceconstruction.com) for specific application details.

## Installation

The most current application instructions, detail drawings and technical letters can be viewed at [graceconstruction.com](http://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 selvage 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 selvage. 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 clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvage 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](http://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 selvage 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<sup>2</sup>) 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

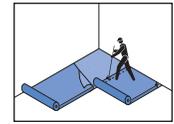
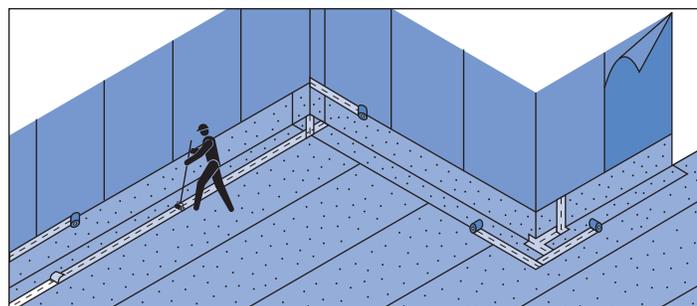
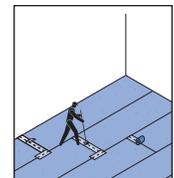


Figure 3

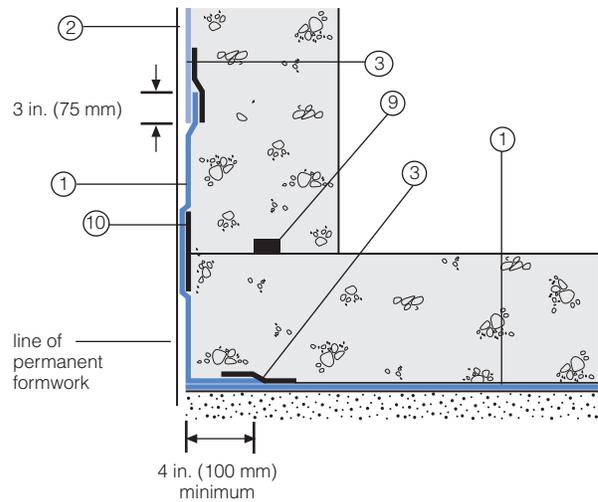


## Detail Drawings

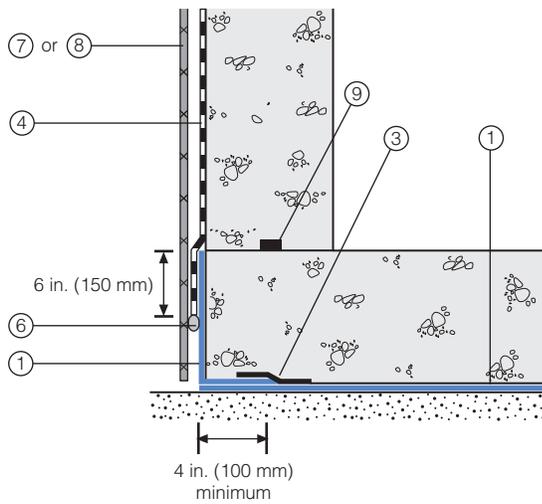
Details shown are typical illustrations and not working details. For a list of the most current details, visit us at [graceconstruction.com](http://graceconstruction.com).

For technical assistance with detailing and problem solving please call toll free at 866-333-3SBM (3726).

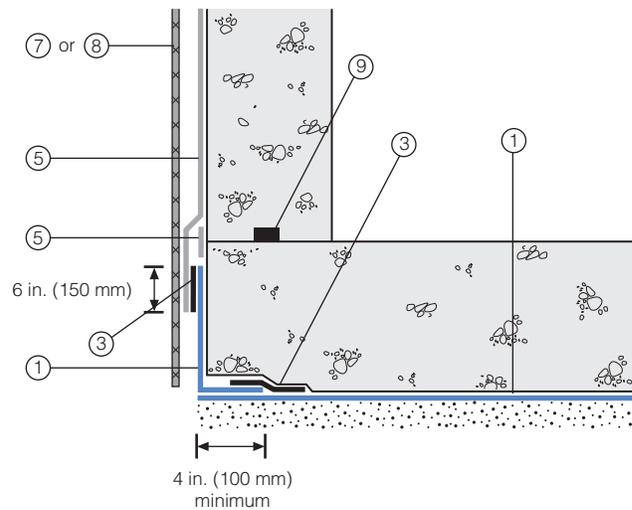
### Wall base detail against permanent shutter



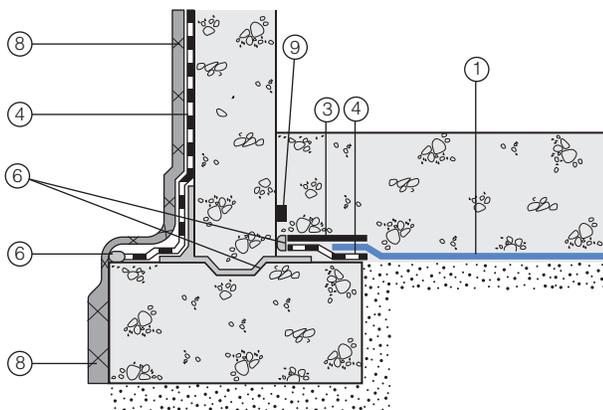
### Bituthene wall base detail (Option 1)



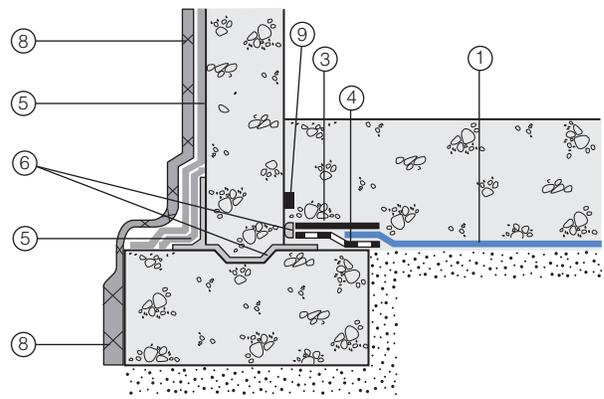
### Procor wall base detail (Option 1)



### 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 ft <sup>2</sup> (36 m <sup>2</sup> )	460 ft <sup>2</sup> (42 m <sup>2</sup> )	
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))			
<b>Ancillary Products</b>			
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 <sup>1</sup>
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 <sup>2</sup>
Elongation	500%	500%	ASTM D412, modified <sup>3</sup>
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 <sup>4</sup>
Lap peel adhesion	5 lbs/in. (880 N/m)	5 lbs/in. (880 N/m)	ASTM D1876, modified <sup>5</sup>
Permeance to water vapor transmission	0.01 perms (0.6 ng/(Pa x s x m <sup>2</sup> ))	0.01 perms (0.6 ng/(Pa x s x m <sup>2</sup> ))	ASTM E96, method B
Water absorption	0.5%	0.5%	ASTM D570

### Footnotes:

- 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.
- 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.
- Elongation of membrane is run at a rate of 2 in. (50 mm) per minute.
- 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.
- 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](http://www.graceconstruction.com)

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

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

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

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**GRACE**

## **Section 071324**

### **Pre-Applied Sheet Membrane Waterproofing**

#### **PART 1 — GENERAL**

##### **1.01 SUMMARY**

- A. The Work of this Section includes, but is not limited to, pre-applied sheet membrane waterproofing that forms an integral bond to poured concrete for the following applications:
  - 1. Vertical Applications: Membrane applied against soil retention system prior to placement of concrete foundation walls;
  - 2. Horizontal Applications: Membrane applied on prepared subbase prior to placement of concrete slabs.
- B. Related sections include, but are not limited to, the following:
  - 1. Section 031000 - Concrete Forming
  - 2. Section 312000 – Earth Moving
  - 3. Section 031500 – Concrete Accessories
  - 4. Section 031500 – Hydrophilic Waterstop
  - 5. Section 316200 - Driven Piles
  - 6. Section 316400 - Caissons
  - 1. Section 032000 - Concrete Reinforcing
  - 2. Section 033000 – Cast-In-Place Concrete

**NOTE TO SPECIFIER: For vertical applications, coordinate with concrete formwork section to require one-sided wall forming system to minimize punctures to the sheet membrane waterproofing during formwork installation.**

##### **1.02 SUBMITTALS**

- A. Submit manufacturer's product data, installation instructions and membrane samples for approval.

##### **1.03 REFERENCE STANDARDS**

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Society for Testing and Materials (ASTM):
  - C 836 Standard Specification for High Solids, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course
  - D 412 Standard Test Methods for Rubber Properties in Tension
  - D 570 Standard Test Method for Water Absorption of Plastics
  - D 903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds
  - D 1876 Standard Test Method for Peel Release of Adhesives (T-Peel)
  - D 1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection

- D 3767 Standard Practice for Rubber - Measurements of Dimensions
- D 5385 Standard Test Method for Hydrostatic Pressure Resistance of Waterproofing Membranes
- E 96 Standard Test Methods for Water Vapor Transmission of Materials
- E 154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

#### **1.04 QUALITY ASSURANCE**

- A. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of 20 years experience in the production and sales of sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past 5 years.
- B. Installer: A firm which has at least 3 years experience in work of the type required by this section.
- C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.
- D. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.
- E. Schedule Coordination: Schedule work such that membrane will not be left exposed to weather for longer than that recommended by the manufacturer.

#### **1.05 DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

#### **1.06 PROJECT CONDITIONS**

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials used. Proceed with installation only when the substrate construction and preparation work is complete and in condition to receive sheet membrane waterproofing.

#### **1.07 WARRANTY**

- A. Sheet Membrane Waterproofing: Provide written five year material warranty issued by the membrane manufacturer upon completion of work.

## PART 2 — PRODUCTS

### 2.01 MATERIALS

- A. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: Preprufe® 300R Membrane [or Preprufe 300LT Membrane for application temperatures between 25°F (-4°C) and 60°F (+16°C)] by Grace Construction Products, a 1.2mm (0.046 in) nominal thickness composite sheet membrane comprising 0.8 mm (0.030 in.) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

**NOTE TO SPECIFIER: Preprufe 300R and Preprufe 300LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) Grace Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 300R. Alternatively, contractors may elect the use of Preprufe 300LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, Grace suggests that both products be incorporated into the specification.**

#### PHYSICAL PROPERTIES FOR PREPRUFE 300R (or 300LT) MEMBRANE:

Property	Test Method	Typical Value
Color		White
Thickness	ASTM D 3767 Method A	1.2 mm (0.046 in.) nominal
Lateral Water Migration Resistance	ASTM D 5385 Modified <sup>1</sup>	Pass at 71 m (231 ft) of hydrostatic head pressure
Low Temperature Flexibility	ASTM D 1970	Unaffected at -29°C (-20°F)
Elongation	ASTM D 412 Modified <sup>2</sup>	500%
Crack Cycling at -23°C (-9.4°F), 100 Cycles	ASTM C 836	Unaffected, Pass
Tensile Strength, film	ASTM D 412	27.6 MPa (4,000 lbs/in. <sup>2</sup> )
Peel Adhesion to Concrete	ASTM D 903 Modified <sup>3</sup>	880 N/m (5.0 lbs/in.)
Lap Adhesion	ASTM D 1876 Modified <sup>4</sup>	880 N/m (5.0 lbs/in.)
Resistance to Hydrostatic Head	ASTM D 5385 Modified <sup>5</sup>	71 m (231 ft)
Puncture Resistance	ASTM E 154	990 N (221 lbs)
Permeance	ASTM E 96 Method B	0.6 ng/Pa x s x m <sup>2</sup> (0.01 perms)
Water Absorption	ASTM D 570	0.5%

*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 blind side waterproofing membrane. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.
2. Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.
3. Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.
4. The test is conducted 15 minutes after the lap is formed as per manufacturer's instructions and run at a rate of 50 mm (2 in.) per minute.
5. Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets a 3 mm (0.125 in.) 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 a head of 71 m (231 ft) of water which is the limit of the apparatus.



- B. Pre-applied Integrally Bonded Sheet Waterproofing Membrane: Preprufe® 160R Membrane [or Preprufe 160LT Membrane for application temperatures between 25°F (-4°C) and 60°F (+16°C)] by Grace Construction Products, a 1.0mm (0.032 in) nominal thickness composite sheet membrane comprising 0.4 mm (0.016 in.) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

**NOTE TO SPECIFIER: Preprufe 160R and Preprufe 160LT can both be installed at temperatures 25°F (-4°C) and above. For temperatures 25°F (-4°C) to 55°F (13°C) Grace Technical Bulletin #16 states the use of Preprufe LT Tape is recommended at all sidelaps when using Preprufe 160R. Alternatively, contractors may elect the use of Preprufe 160LT which does not require the use of Preprufe LT Tape at sidelaps in temperature ranges 25°F (-4°C) to 55°F (13°C). For this reason, Grace suggests that both products be incorporated into the specification.**

**PHYSICAL PROPERTIES FOR PREPRUFE 160R (or 160LT) MEMBRANE:**

Property	Test Method	Typical Value
Color		White
Thickness	ASTM D 3767 Method A	1.0 mm (0.032 in.) nominal
Lateral Water Migration Resistance	ASTM D5385, Modified <sup>1</sup>	Pass at 71 m (231 ft) of hydrostatic head pressure
Low Temperature Flexibility	ASTM D 1970	Unaffected at -29°C (-20°F)
Elongation	ASTM D 412 Modified <sup>2</sup>	500%
Crack Cycling at -23°C (-9.4°F), 100 Cycles	ASTM C 836	Unaffected, Pass
Tensile Strength, film	ASTM D 412	27.6 MPa (4,000 lbs/in. <sup>2</sup> )
Peel Adhesion to Concrete	ASTM D 903 Modified <sup>3</sup>	880 N/m (5.0 lbs/in.)
Lap Adhesion	ASTM D 1876 Modified <sup>4</sup>	880 N/m (5.0 lbs/in.)
Resistance to Hydrostatic Head	ASTM D 5385 Modified <sup>5</sup>	Pass at 71 m (231 ft)
Puncture Resistance	ASTM E 154	445 N (100 lbs)
Permeance	ASTM E 96 Method B	0.6 ng/Pa x s x m <sup>2</sup> (0.01 perms)
Water Absorption	ASTM D 570	0.5%

*Footnotes:*

- 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 blind side waterproofing membrane. A hydrostatic head pressure of 71 m (231 ft) of water is the limit of the apparatus.*
- Elongation of membrane is run at a rate of 50 mm (2 in.) per minute.*
- Concrete is cast against the protective coating surface of the membrane and allowed to cure (7 days minimum). Peel adhesion of membrane to concrete is measured at a rate of 50 mm (2 in.) per minute at room temperature.*
- The test is conducted 15 minutes after the lap is formed as per manufacturer's instructions and run at a rate of 50 mm (2 in.) per minute.*
- Hydrostatic head tests are performed by casting concrete against the membrane with a lap. Before the concrete sets a 3 mm (0.125 in.) 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 a head of 71 m (231 ft) of water which is the limit of the apparatus.*

- C. Waterstop: Adcor™ ES hydrophilic non-bentonite waterstop by Grace Construction Products for non-moving concrete construction joints.

**PHYSICAL PROPERTIES FOR GRACE ADCOR™ ES HYDROPHYLIC WATERSTOP:**

Property	Typical Value
Color	Green
Size	1.0 in. x ½ in. x 16 ft. rolls (25.4 mm x 12.7 mm x 4.9 m)
Hydrostatic Head Resistance	70 m (231 ft)
Wet - Dry Cycling [25 Cycles @ 231 ft. (70 m)]	No Effect
Adhesion to Concrete using Adcor ES Adhesive	Excellent

- D. Preformed Soil Retention Wall Tieback Cover: Preprufe Tieback Cover by Grace Construction Products as a prefabricated detail for soil retention wall tiebacks.
- E. Preformed Inside and Outside Corners: Preprufe Preformed Corners by Grace Construction Products as prefabricated inside and outside corners.
- F. Tape for covering cut edges, roll ends, penetrations and detailing: Preprufe Tape LT (for temperatures between 25°F (-4°C) and 86°F (+30°C)) and Preprufe Tape HC (for use in Hot Climates, minimum 50°F (10°C))
- G. Miscellaneous Materials: accessories specified or acceptable to manufacturer of pre-applied waterproofing membrane.

**PART 3 — EXECUTION**

**3.01 EXECUTION**

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

**3.02 SUBSTRATE PREPARATION**

- A. 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.
1. Horizontal Surfaces - 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.
  2. Vertical Surfaces - 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.

### **3.03 INSTALLATION, HORIZONTAL APPLICATIONS**

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
1. 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.
  2. Leave the plastic release liner in position until overlap procedure is completed.
  3. 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.
  4. 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.
  5. Completely remove the plastic liner to expose the protective coating. Any initial tack will quickly disappear.

### **3.04 INSTALLATION, VERTICAL APPLICATIONS**

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
1. Mechanically fasten the membrane vertically using fasteners appropriate to the substrate with the clear plastic release liner facing towards the concrete pour. The membrane may be installed in any convenient length.
  2. Fastening through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps.
  3. Immediately remove the plastic release liner.
  4. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap.
  5. Roll firmly to ensure a watertight seal.
  6. 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.
  7. Allow to dry and apply Preprufe Tape LT (or HC in hot climates) centered over the lap edges and roll firmly.
  8. Immediately remove printed plastic release liner from the tape.

### **3.05 WATERSTOP INSTALLATION**

- A. Strictly comply with installation instructions in manufacturer's published literature, including but not limited to, the following:
1. Secure Adcor ES using masonry nails 1½ in. - 2 in. (40 mm – 50 mm) long with a washer ¾ in. (20 mm) in diameter. Hilti EM6-20-12 FP8 shot fired fixings with ¼ in. (6 mm) nuts and ¾ in. (20 mm) diameter washers may also be used. Fixings should be spaced at a maximum of 12 in. (300 mm) centers with a minimum spacing that ensures proper contact to substrate.
  2. On irregular concrete faces, or on vertical surfaces, apply a ½ in. (12 mm) bead of Adcor ES Adhesive as bedding for Adcor ES.

3. Adcor ES joints should overlap a minimum of 4 in. (100 mm), ensuring full contact between jointed pieces.

### **3.06 PROTECTION**

- A. Protect membrane in accordance with manufacturer's recommendations until placement of concrete. Inspect for damage just prior to placement of concrete and make repairs in accordance with manufacturer's recommendations.

**END OF SECTION**

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**W.R. Grace & Co.-Conn. 62 Whittemore Avenue Cambridge, MA 02140**

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**ATTACHMENT F**  
**SITE SPECIFIC CONSTRUCTION**  
**HEALTH AND SAFETY PLAN**

**545-551 WEST 48<sup>th</sup> STREET  
534-542 WEST 49<sup>th</sup> STREET  
MANHATTAN, NEW YORK  
Block 1077, Lots 8, 9, 10, 55, & 56**

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**CONSTRUCTION HEALTH  
AND SAFETY PLAN**

AUGUST 2012

*Prepared for:*  
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45 Main Street, Suite 302  
Brooklyn, NY 11201

*Prepared By:*

***EBC***

***ENVIRONMENTAL BUSINESS CONSULTANTS***

1808 Middle Country Road  
Ridge, NY 11961

**CONSTRUCTION HEALTH AND SAFETY PLAN**  
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## CONSTRUCTION HEALTH AND SAFETY PLAN

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## STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Action planned for 545-551 West 48<sup>th</sup> Street and 534-542 West 49<sup>th</sup> Street, Manhattan, New York.

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



## 1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of Remedial Action at the site located 545-551 West 48<sup>th</sup> Street and 534-542 West 49<sup>th</sup> Street, Manhattan, New York, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during subsurface investigation activities. 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 FPG W. 48<sup>th</sup> Street LLC (“the owner”) or upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC’s project manager, site safety officer and/or the EBC health and safety consultant.

### 1.1 Scope

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

- 1) Site mobilization of General Contractor (GC) and Subcontractors to install the building foundation.
  - a) Excavate historic fill to bedrock surface and transport off-site.
  - b) Excavate bedrock as necessary for installation of new building's foundation.

### 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:

- 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:

Name	Title	Address	Contact Numbers
Mr. Charles B. Sosik	EBC Principal	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (631) 357-4927
Mr. Konstantin Shaporov	Wonder Works Const. Construction Supervisor	18 West 21st Street, 4th Fl New York, NY 10010	(212) 465-8455
Mr. Kevin Brussee	EBC Project Manager	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000 Cell (631) 338-1749
Mr. Kevin Waters	EBC Site Safety Officer	1808 Middle Country Road Ridge, NY 11961	(631) 504-6000

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

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

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

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

## 2.0 SITE BACKGROUND AND SCOPE OF WORK

### 2.1 Location

The Site is located at 545-551 West 48th Street and 534-542 West 49th Street in the Clinton section in Manhattan, New York and is identified as Block 1077 and Lots 8, 9, 10, 55, and 56 on the New York City Tax Map. The Site is 21,237.71-square feet and is bounded by West 49th Street to the north, West 48th Street to the south, both a 5-story office building occupied by the American Red Cross (514 West 49th Street) and a 7-story office building occupied by the Salvation Army (535 West 48th Street) to the east, and both a 5-story brick residential building (544 West 49th Street) and a car dealership lot (666 11th Avenue) to the west.

### 2.2 Current Use

Currently, Lot 55 of the Site is developed with a one-story parking garage building with a basement level and Lot 56 is developed with a one-story brick building used for auto repair. Lots 8, 9 and 10 are undeveloped and are used as an open-air parking lot.

Lots 8, 9 and 10 are adjacent rectangular lots that front West 48th Street. Lots 8 and 9 both have 25 feet of street frontage and a depth of approximately 100.42 feet, for a total of approximately 2,510 ft<sup>2</sup> for each lot. Lot 10 has 50 feet of street frontage and a depth of 100.42 ft for a total of 5,020 ft<sup>2</sup>.

Lots 55 and 56 are adjacent lots located north of Lots 8, 9 and 10 that have street frontage on West 49th Street. Lot 55 has 86.5 feet of street frontage and a depth of 100.42 feet for a total of 8,686 ft<sup>2</sup> and Lot 56 has 25 feet of street frontage and a depth of 100.42 feet for a total of 2,510 ft<sup>2</sup>.

### 2.3 Historic Use

#### *Lots 8 & 9 – 549-551 W. 48<sup>th</sup> Street*

Lots 8 and 9 were each developed prior to 1890 with residential buildings. The buildings were demolished between 1968 and 1979. According to the 1995 Sanborn map, the lots were combined with Lot 10 and used as a parking facility.

#### *Lot 10 – 545-547 W. 48<sup>th</sup> Street*

Lot 10 was originally two separate lots labeled as 545 and 547 W. 48<sup>th</sup> Street. Both lots were developed prior to 1890 with residential buildings. The buildings were demolished by 1968. The lot remained vacant until it was combined with Lots 8 and 9 sometime prior to 1995 and used as a parking facility.

#### *Lot 55 – 534-540 W. 49<sup>th</sup> Street*

Prior to 1890, Lot 55 consisted of three lots with street addresses 534-536, 538, and 540 which were each developed as residential properties with outbuildings. By 1911, 534-536 and 538 W. 49<sup>th</sup> Street were combined and redeveloped into a 2-story garage/repair shop. In 1911, 540 W. 49<sup>th</sup> Street was utilized as a wagon repair shop. Sometime between 1911 and 1919, 540 W. 49<sup>th</sup> Street was combined with 534-536 W. 49<sup>th</sup> Street and redeveloped into a 1-story automobile service station and repair shop. The tank in the sidewalk was no longer shown but a 275 gallon gasoline tank appears in the southwest corner of the building. In 1959 the property is redeveloped with a new 1-story garage building and appears to have been used as a parking

garage, auto repair facility and for auto sales through the 1980's. It was then used as a parking garage to the present time. A 250 gallon underground gasoline tank is present beneath the sidewalk in the 1911 Sanborn map. A 275 gallon gasoline tank is shown in the southwest corner of the building in the 1919, 1930 and 1950 Sanborn maps.

#### *Lot 56 – 542 W. 49<sup>th</sup> Street*

Prior to 1890, Lot 56 was developed with a residential home and outbuildings. By 1911 the property was used labeled “dairyman”. According to NYC DOB records and the 1919 Sanborn map, the lot was redeveloped in 1919 into a 1-story auto repair shop in the front of the lot and an adjoining 2-story machine shop in the rear of the lot. By 1930, the property was used by a trucking company. The building reverted back to an auto repair facility by 1947 and has remained an auto repair facility since.

## **2.4 Prior Investigations**

### *2.4.1 Phase I ESA – EBC April, 2012*

A Phase I Environmental Site Assessment was performed by EBC in May of 2012. Historic information on the sites from the Phase I investigation are listed above in **Section 2.3**.

Mr. Kevin Waters of EBC performed the Site inspection on April 9, 2012, with a follow-up visit on May 11, 2012. The reconnaissance included a visual inspection of the Site, the sidewalk and street in front of the Site, and the exterior of each of the adjacent properties. Access to the building utilized as an auto repair facility was not provided on either date. The auto repair facility was closed, and the steel rollup garage doors were closed preventing any visual inspection of the interior.

At the time of the inspection, Lot 55 was developed with a one-story parking garage building and Lot 56 was developed with a one-story brick building currently utilized as an auto repair facility. A steel roll up door and standard steel door provide access to the automotive repair building from West 49th Street. However, EBC was unable to obtain access to the interior of the automotive repair facility during the Site inspections. A remote fill port and vent pipe typically associated with an underground No. 2 fuel oil tank was identified in the sidewalk in front of the auto repair facility on W 49th Street. Lot 56 was developed with a one story building and used as an automobile parking garage. The building had a basement which is used for additional automobile parking. An electrical/utility room was present in the basement. A steel roll up door provided access to the building from W49th Street.

The remaining three lots (Lots 8, 9 and 10) were undeveloped. The three undeveloped lots were used by the automobile parking garage for additional parking.

Although no evidence of an AST was observed during the Site inspection, EBC did note a 275-gallon waste oil tank within the interior of the automotive repair facility (542 West 49th Street - Danny's Towing and Repair) using Google Maps, street view. The 275-gallon tank was located just beyond the roll-up garage door against the east wall of the building. The tank was painted white and had black spray painted letters that stated "Waste Oil".

EBC noted a remote fuel oil tank fill port within the sidewalk in front of the automotive repair facility (542 West 49th Street - Danny's Towing and Repair), just east of the curb cut. A No. 2

fuel oil tank vent pipe believed to be connected to the same tank as the fill port was also noted between roll-up garage door and the standard steel door against the exterior wall of the automotive repair facility. The vent pipe extended approximately 12 inches above the sidewalk and was painted white. EBC was unable to access the interior of the automotive repair facility to determine if the fill port and vent pipe were connected to an aboveground storage tank located within the small basement noted on historic Sanborn maps at the front of the building. No sidewalk repairs were observed which would indicate an underground No. 2 fuel oil tank was recently abandoned-in-place or removed.

The AOCs identified for this Site include:

1. A possible underground or aboveground No. 2 fuel oil storage tank below the sidewalk immediately in front of the automotive repair facility building, or within the basement of the automotive repair facility.
2. Historic fill is present at the Site to a depth of at least 4 feet below the basement level of the parking garage and a depth of approximately 7 feet or to the bedrock surface in the asphalt paved parking lot located behind the automotive repair facility and parking garage building.

#### 2.4.2 Remedial Investigation – EBC May 2012

A Remedial Investigation was conducted by EBC in May of 2012 as a part of due diligence supporting the purchase of the property. The Remedial Investigation sampling identified soil contamination related to Historic Fill, common in Manhattan. Groundwater samples collected from the same area also contamination related to Historic Fill present throughout the five borrows. Soil gas and soil vapor samples showed one location with elevated levels of TCE and PCE, but neither compounds were found in soil or groundwater and are therefore attributed to an off-site source. Additional information on the Remedial Investigation can be found in the Remedial Action Work Plan. Contaminants of concern are listed below in **Section 3.3 Chemical Hazards**.

The AOCs identified for this Site include:

1. Historic fill is present at the Site to a depth of at least 4 feet below the basement level of the parking garage and a depth of approximately 7 feet or to the bedrock surface in the asphalt paved parking lot located behind the automotive repair facility and parking garage building.

## 2.5 Redevelopment Plans

The proposed future use of the Site will consist of residential use. The current zoning designation is R8 with a C2-4 commercial overlay. The proposed use is consistent with existing zoning for the property.

Redevelopment plans for the property includes the demolition of the 1-story parking garage on Lot 55 and the 1-story auto repair shop building on Lot 56. Two new 7-story buildings (Towers A and B) will be constructed on the Site. The buildings will front both W. 48<sup>th</sup> Street and W. 49<sup>th</sup> Street and will cover approximately 70 percent of the combined area of the 5 lots. Each building will have a full basement level which will be utilized for residential apartments, common and recreation areas and mechanical equipment rooms. Floors 2 through 7 will consist of residential

apartments. The total gross building square footage for Tower A will be 55,023 ft<sup>2</sup> and 49,258 ft<sup>2</sup> for Tower B.

The open space between the two towers will consist of a sub-grade green space (greenhouse) enclosed in glass. The cellar levels in each tower and the sub grade greenhouse area between the buildings will result in excavation of the entire property to a depth of 12 feet below street level. This is expected to require excavation of at least 2 to 3 feet into the bedrock over the majority of the Site.

## **2.6 Description of Remedial Action**

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

1. Excavation and removal of soil/fill exceeding SCOs to the bedrock surface.
2. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID.
3. 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.
4. Sampling and analysis of excavated media as required by disposal facility(ies). Appropriate segregation of excavated media onsite.
5. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media onsite.
6. Collection and analysis of end-point samples if any soil remains to determine the performance of the remedy with respect to attainment of SCOs.
7. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations.
8. Installation of a waterproofing membrane beneath the building slabs.

### **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 remedial action may be required to lift heavy objects. Therefore, all members of the field crew should be trained in the proper methods of lifting heavy objects. All workers should be cautioned against lifting objects too heavy for one person.

##### *3.1.5 Utility Hazards*

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

##### *3.1.6 Traffic Hazards*

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

#### **3.2 Work in Extreme Temperatures**

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

### 3.2.1 Heat Stress

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

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

#### 1. Prevention

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

#### 2. Recognition and Treatment

##### a. Heat Rash (or prickly heat):

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove source or irritation and cool skin with water or wet cloths.

##### b. Heat Cramps (or heat prostration)

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.

##### c. Heat Stroke

Cause: Same as heat exhaustion. This is also an extremely serious condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

### 3.2.2 Cold Exposure

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

### 3.3 Chemical Hazards

Soil, groundwater and soil gas samples collected from the site as part of several subsurface investigations performed at the site have slightly elevated concentrations of volatile organic compounds associated with chlorinated volatile organic compounds (CVOCs), as well as elevated levels of semi-volatile organic compounds (SVOCs), pesticides, and metals.

Volatile organic compounds reported to be present in soil gas include the following:

Tetrachloroethylene	Trichloroethylene
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Semi-Volatile organic compounds reported to be present soil and/or groundwater include the following:

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

Pesticides reported to be present soil and / or groundwater include the following:

4,4-DDD	4,4-DDE	4,4-DDT	Chlordane
Dieldrin			

Metals reported to be present soil and / or groundwater include the following:

Barium	Chromium	Copper	Iron
Lead	Manganese	Mercury	Sodium
Zinc			

The VOCs were detected in only one sub-slab soil vapor sample and are likely associated with an off-site source. Elevated levels of SVOCs, Pesticides, and Metals may be associated with historic fill material common in Manhattan. The primary routes of exposure to identified contaminants in soil, soil gas and groundwater to on-site investigation and remediation workers is through inhalation, ingestion and absorption.

**Appendix C** includes information sheets for the known and suspected chemicals that may be encountered at the site.

#### 3.3.1 Respirable Dust

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

If elevated dust levels persist, the site safety office will employ dust monitoring using a particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150 µg/m<sup>3</sup> over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

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

### 3.3.2 *Dust Control and Monitoring During Earthwork*

Dust generated during excavation activities or other earthwork may contain contaminants identified in soils at the site. Dust will be controlled by wetting the working surface with water. Calcium chloride may be used if the problem cannot be controlled with water. Air monitoring and dust control techniques are specified in a site specific Dust Control Plan (if applicable). Site workers will not be required to wear APR's unless dust concentrations are consistently over 150 µg/m<sup>3</sup> 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*

Elevated levels of VOCs were detected in both soil and groundwater samples collected during previous investigations at the site. Therefore, excavation activities may cause the release of organic vapors to the atmosphere. The site safety officer will periodically monitor organic vapors with a Photoionization 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.

## 4.0 PERSONAL PROTECTIVE EQUIPMENT

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

### 4.1 Level D

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

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

### 4.2 Level C

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

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

The site safety officer will verify if Level C is appropriate by checking organic vapor concentrations using compound and/or class-specific detector tubes. The exact PPE ensemble is decided on a site-by-site basis by the Site Safety Officer with the intent to provide the most protective and efficient worker PPE.

### 4.3 Activity-Specific Levels of Personal Protection

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

## 5.0 AIR MONITORING AND ACTION LEVELS

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

### 5.1 Air Monitoring Requirements

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%	<ul style="list-style-type: none"> <li>• Continue excavating</li> <li>• Level D protection</li> <li>• Continue monitoring every 10 minutes</li> </ul>

1-5 ppm Above Background, Sustained Reading	1-10%	<ul style="list-style-type: none"> <li>• Continue excavating</li> <li>• Go to Level C protection or employ engineering controls</li> <li>• Continue monitoring every 10 minutes</li> </ul>
5-25 ppm Above Background, Sustained Reading	10-20%	<ul style="list-style-type: none"> <li>• Discontinue excavating, unless PID is only action level exceeded.</li> <li>• Level C protection or employ engineering controls</li> <li>• Continue monitoring for organic vapors 200 ft downwind</li> <li>• Continuous monitoring for LEL at excavation pit</li> </ul>
>25 ppm Above Background, Sustained Reading	>20%	<ul style="list-style-type: none"> <li>• Discontinue excavating</li> <li>• Withdraw from area, shut off all engine ignition sources.</li> <li>• Allow pit to vent</li> <li>• Continuous monitoring for organic vapors 200 ft downwind.</li> </ul>

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 than 5 ppm (see Community Air Monitoring Plan).

## 6.0 SITE CONTROL

### 6.1 Work Zones

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

**Due to the dimensions of the Site and the work area, it is expected that an exclusion zone will include the entire fenced area with the exception of the construction entrance area, which will serve as the decontamination zone. A support zone if needed will be located outside of the fenced area.** All onsite workers during excavation of historic fill materials must provide evidence of OSHA 24 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. Once the fill materials have been removed, a general excavation contractor may excavate/grade as needed for basement excavation, shoring, and other building requirements as deemed necessary by the Remedial Action Work Plan and/or Project Manager.

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.

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.

## 7.0 CONTINGENCY PLAN/EMERGENCY RESPONSE PLAN

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

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

### 7.1 Emergency Equipment On-site

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

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

### 7.2 Emergency Telephone Numbers

General Emergencies	911
Suffolk County Police	911
NYC Fire Department	911
Roosevelt Hospital Center	1-212-523-4000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 482-4909
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

### 7.3 Personnel Responsibilities During an Emergency

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

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

- Ensure appropriate decontamination, treatment, or testing for exposed or injured personnel;
- Determine the cause of incidents and make recommendations to prevent recurrence; and,
- Ensure that all required reports have been prepared.

The following key personnel are planned for this project:

- Project Manager Mr. Kevin Brussee (631) 504-6000
- Construction Superintendent Mr. Konstantin Shaporov (212) 465-8455
- Site Safety Officer Mr. Kevin Waters (631) 504-6000

#### **7.4 Medical Emergencies**

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

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

#### **7.5 Fire or Explosion**

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

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

#### **7.6 Evacuation Routes**

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

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

- Keep upwind of smoke, vapors, or spill location.
- Exit through the decontamination corridor if possible.
- If evacuation through the decontamination corridor is not possible, personnel should

remove contaminated clothing once they are in a safe location and leave it near the exclusion zone or in a safe place.

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

## 7.7 Spill Control Procedures

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

## 7.8 Vapor Release Plan

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

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

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

***APPENDIX A***  
***SITE SAFETY ACKNOWLEDGEMENT FORM***

### DAILY BRIEFING SIGN-IN SHEET

Date: \_\_\_\_\_ Person Conducting Briefing: \_\_\_\_\_

Project Name and Location: \_\_\_\_\_

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

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

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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

## TETRACHLOROETHYLENE

ICSC: 0076



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

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		STRICT HYGIENE! PREVENT GENERATION OF MISTS!	
<b>•INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
<b>•SKIN</b>	Dry skin. Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
<b>•EYES</b>	Redness. Pain.	Safety goggles , face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
<b>•INGESTION</b>	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Separated from metals ,( see Chemical Dangers ), food and feedstuffs . Keep in the dark. Ventilation along the floor.	Do not transport with food and feedstuffs. Marine pollutant. Xn symbol N symbol R: 40-51/53 S: (2-)23-36/37-61 UN Hazard Class: 6.1 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0076**

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

# International Chemical Safety Cards

## TETRACHLOROETHYLENE

ICSC: 0076

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour is heavier than air.</p> <p><b>CHEMICAL DANGERS:</b> On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes (hydrogen chloride, phosgene, chlorine). The substance decomposes slowly on contact with moisture producing trichloroacetic acid and hydrochloric acid. Reacts with metals such as aluminium, lithium, barium, beryllium.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 25 ppm as TWA, 100 ppm as STEL; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004). MAK: skin absorption (H); Carcinogen category: 3B; (DFG 2004). OSHA PEL<sup>+</sup>: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 3-hours) NIOSH REL: Ca Minimize workplace exposure concentrations. <a href="#">See Appendix A</a> NIOSH IDLH: Ca 150 ppm See: <a href="#">127184</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes , the skin and the respiratory tract . If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the liver and kidneys. This substance is probably carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 121°C Melting point: -22°C Relative density (water = 1): 1.6 Solubility in water, g/100 ml at 20°C: 0.015</p>	<p>Vapour pressure, kPa at 20°C: 1.9 Relative vapour density (air = 1): 5.8 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.09 Octanol/water partition coefficient as log Pow: 2.9</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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### NOTES

Depending on the degree of exposure, periodic medical examination is suggested. The odour warning when the exposure limit value is exceeded is insufficient. Do NOT use in the vicinity of a fire or a hot surface, or during welding. An added stabilizer or inhibitor can influence the toxicological properties of this substance, consult an expert. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1897

NFPA Code: H2; F0; R0;

### ADDITIONAL INFORMATION

<p><b>ICSC: 0076</b></p>	<p><b>TETRACHLOROETHYLENE</b></p>
<p>(C) IPCS, CEC, 1994</p>	

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only</p>
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# International Chemical Safety Cards

## TRICHLOROETHYLENE

ICSC: 0081



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

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



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

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

**SEE IMPORTANT INFORMATION ON BACK**

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

ICSC: 0081

OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## TRICHLOROETHYLENE

ICSC: 0081

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour is heavier than air. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive fumes ( phosgene , hydrogen chloride ). The substance decomposes on contact with strong alkali producing dichloroacetylene , which increases fire hazard. Reacts violently with metal powders such as magnesium, aluminium, titanium, and barium. Slowly decomposed by light in presence of moisture, with formation of corrosive hydrochloric acid.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 50 ppm as TWA; 100 ppm as STEL; A5; BEI issued; (ACGIH 2004). MAK: Carcinogen category: 1; Germ cell mutagen group: 3B; (DFG 2007). OSHA PEL<sup>†</sup>: TWA 100 ppm C 200 ppm 300 ppm (5-minute maximum peak in any 2 hours) NIOSH REL: Ca <a href="#">See Appendix A</a> <a href="#">See Appendix C</a> NIOSH IDLH: Ca 1000 ppm See: <a href="#">79016</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes and the skin . Swallowing the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis. The substance may cause effects on the central nervous system , resulting in respiratory failure . Exposure could cause lowering of consciousness.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis. The substance may have effects on the central nervous system , resulting in loss of memory. The substance may have effects on the liver and kidneys (see Notes). This substance is probably carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 87°C Melting point: -73°C Relative density (water = 1): 1.5 Solubility in water, g/100 ml at 20°C: 0.1 Vapour pressure, kPa at 20°C: 7.8 Relative vapour density (air = 1): 4.5</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.3 Auto-ignition temperature: 410°C Explosive limits, vol% in air: 8-10.5 Octanol/water partition coefficient as log Pow: 2.42 Electrical conductivity: 800pS/m</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is harmful to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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**NOTES**

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

Transport Emergency Card: TEC (R)-61S1710

NFPA Code: H2; F1; R0;

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

**ADDITIONAL INFORMATION**

**ICSC: 0081****TRICHLOROETHYLENE**

(C) IPCS, CEC, 1994

**IMPORTANT  
LEGAL  
NOTICE:**

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# 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
<b>FIRE</b>	Combustible.		Water spray, powder. In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>		<b>AVOID ALL CONTACT!</b>	
<b>•INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
<b>•SKIN</b>		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
<b>•EYES</b>		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.
<b>•INGESTION</b>		Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth.

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0385**

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

# International Chemical Safety Cards

ICSC: 0385

# BENZ(a)ANTHRACENE

<p>I M P O R T A N T D A T A</p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS TO YELLOW BROWN FLUORESCENT FLAKES OR POWDER.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b></p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: A2 (suspected human carcinogen); (ACGIH 2004). MAK: Carcinogen category: 2 (as pyrolysis product of organic materials) (DFG 2005).</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b></p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> This substance is probably carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Sublimation point: 435°C Melting point: 162°C Relative density (water = 1): 1.274 Solubility in water: none</p>	<p>Vapour pressure, Pa at 20°C: 292 Octanol/water partition coefficient as log Pow: 5.61</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>Bioaccumulation of this chemical may occur in seafood.</p>	
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## NOTES

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

<p><b>ICSC: 0385</b></p>	<p><b>BENZ(a)ANTHRACENE</b></p>
<p>(C) IPCS, CEC, 1994</p>	

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

**BENZO(a)PYRENE**

ICSC: 0104



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

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Water spray, foam, powder, carbon dioxide.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>	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.

# International Chemical Safety Cards

# BENZO(a)PYRENE

ICSC: 0104

<p><b>I M P O R T A N T A D V I S O R Y</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> PALE-YELLOW CRYSTALS</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> 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).</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b></p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> 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.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 496°C Melting point: 178.1°C Density: 1.4 g/cm<sup>3</sup></p>	<p>Solubility in water: none (&lt;0.1 g/100 ml) Vapour pressure : negligible Octanol/water partition coefficient as log Pow: 6.04</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>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.</p>	
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**NOTES**

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

**ADDITIONAL INFORMATION**

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<b>ICSC: 0104</b>	(C) IPCS, CEC, 1994	<b>BENZO(a)PYRENE</b>
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# International Chemical Safety Cards

**BENZO(b)FLUORANTHENE**

ICSC: 0720



Benz(e)acephenanthrylene  
2,3-Benzofluoranthene  
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
<b>FIRE</b>			In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		AVOID ALL CONTACT!	
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		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.
• <b>INGESTION</b>		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

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



**NOTES**

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<sup>3</sup>. 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**

(C) IPCS, CEC, 1994

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# International Chemical Safety Cards

**BENZO(k)FLUORANTHENE**

ICSC: 0721



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

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>			In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		AVOID ALL CONTACT!	
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		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.
• <b>INGESTION</b>		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	<b>PHYSICAL STATE; APPEARANCE:</b> YELLOW CRYSTALS	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its aerosol and through the skin.
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**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.



**NOTES**

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<sup>3</sup>. 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**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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

# International Chemical Safety Cards

**CHRYSENE**

ICSC: 1672



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

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



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

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

**SEE IMPORTANT INFORMATION ON BACK**

# International Chemical Safety Cards

## CHRYSENE

ICSC: 1672

<p><b>I M P O R T A N T  D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS TO BEIGE CRYSTALS OR POWDER</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on burning producing toxic fumes Reacts violently with strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2006). MAK not established.</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its aerosol, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful concentration of airborne particles can be reached quickly when dispersed</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b></p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> This substance is possibly carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 448°C Melting point: 254 - 256°C Density: 1.3 g/cm<sup>3</sup></p>	<p>Solubility in water: very poor Octanol/water partition coefficient as log Pow: 5.9</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is very toxic to aquatic organisms. Bioaccumulation of this chemical may occur in seafood. It is strongly advised that this substance does not enter the environment.</p>	
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**NOTES**

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

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

**ADDITIONAL INFORMATION**

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ICSC: 1672

CHRYSENE

(C) IPCS, CEC, 1994

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

**DIBENZO(a,h)ANTHRACENE**

ICSC: 0431



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

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



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

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0431**

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

# International Chemical Safety Cards

**DIBENZO(a,h)ANTHRACENE**

ICSC: 0431

<b>I</b>	<b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS CRYSTALLINE POWDER.	<b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.
<b>M</b>	<b>PHYSICAL DANGERS:</b>	<b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration
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**CHEMICAL DANGERS:**

of airborne particles can, however, be reached quickly.

**OCCUPATIONAL EXPOSURE LIMITS:**

TLV not established.

**EFFECTS OF SHORT-TERM EXPOSURE:**

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

The substance may have effects on the skin, resulting in photosensitization. This substance is probably carcinogenic to humans.

**PHYSICAL PROPERTIES**

Boiling point: 524°C  
Melting point: 267°C  
Relative density (water = 1): 1.28

Solubility in water:  
none  
Octanol/water partition coefficient as log Pow: 6.5

**ENVIRONMENTAL DATA**

Bioaccumulation of this chemical may occur in seafood.



**NOTES**

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

**ADDITIONAL INFORMATION**

**ICSC: 0431**

**DIBENZO(a,h)ANTHRACENE**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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# International Chemical Safety Cards

**INDENO(1,2,3-cd)PYRENE**

ICSC: 0730



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

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

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>			In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		AVOID ALL CONTACT!	
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		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.
• <b>INGESTION</b>		Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0730

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

# International Chemical Safety Cards

**INDENO(1,2,3-cd)PYRENE**

ICSC: 0730

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

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**CHEMICAL DANGERS:**  
Upon heating, toxic fumes are formed.

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

**OCCUPATIONAL EXPOSURE LIMITS:**  
TLV not established.  
MAK:  
Carcinogen category: 2;  
(DFG 2004).

**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.



**NOTES**

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<sup>3</sup>. 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**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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# International Chemical Safety Cards

**BARIUM SULFATE**

ICSC: 0827



Barium sulphate  
Blanc fixe  
Artificial barite  
BaSO<sub>4</sub>

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

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0827**

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

# International Chemical Safety Cards

## BARIUM SULFATE

ICSC: 0827

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

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<b>ICSC: 0827</b>	<b>BARIUM SULFATE</b>
(C) IPCS, CEC, 1994	

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

**CHROMIUM**

ICSC: 0029



Chrome  
Cr  
Atomic mass: 52.0  
(powder)

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

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

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0029**

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

# International Chemical Safety Cards

**CHROMIUM**

ICSC: 0029

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

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**CHEMICAL DANGERS:**

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

**EFFECTS OF SHORT-TERM EXPOSURE:**

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

**OCCUPATIONAL EXPOSURE LIMITS:**

TLV: (as Cr metal, Cr(III) compounds) 0.5 mg/m<sup>3</sup> as TWA A4 (ACGIH 2004).  
MAK not established.

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

OSHA PEL\*: TWA 1 mg/m<sup>3</sup> [See Appendix C](#) \*Note: The PEL also applies to insoluble chromium salts.

NIOSH REL: TWA 0.5 mg/m<sup>3</sup> [See Appendix C](#)

NIOSH IDLH: 250 mg/m<sup>3</sup> (as Cr) See: [7440473](#)

**PHYSICAL PROPERTIES**

Boiling point: 2642°C  
Melting point: 1900°C  
Density: 7.15 g/cm<sup>3</sup>

Solubility in water:  
none

**ENVIRONMENTAL DATA**

**NOTES**

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

**ADDITIONAL INFORMATION**

**ICSC: 0029**

**CHROMIUM**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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# International Chemical Safety Cards

**COPPER**

ICSC: 0240



Cu  
(powder)

ICSC # 0240

CAS # 7440-50-8

RTECS # [GL5325000](#)

September 24, 1993 Validated

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

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0240**

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

# International Chemical Safety Cards

**COPPER**

ICSC: 0240

<p><b>I</b></p> <p><b>M</b></p> <p><b>P</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> RED POWDER, TURNS GREEN ON EXPOSURE TO MOIST AIR.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p>
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Shock-sensitive compounds are formed with acetylenic compounds, ethylene oxides and azides. Reacts with strong oxidants like chlorates, bromates and iodates, causing explosion hazard.

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

**OCCUPATIONAL EXPOSURE LIMITS:**  
TLV: 0.2 mg/m<sup>3</sup> fume (ACGIH 1992-1993).  
TLV (as Cu, dusts & mists): 1 mg/m<sup>3</sup> (ACGIH 1992-1993).  
Intended change 0.1 mg/m<sup>3</sup>  
Inhal.,  
A4 (not classifiable as a human carcinogen);  
MAK: 0.1 mg/m<sup>3</sup> (Inhalable fraction)  
Peak limitation category: II(2) Pregnancy risk group: D (DFG 2005).  
OSHA PEL\*: TWA 1 mg/m<sup>3</sup> \*Note: The PEL also applies to other copper compounds (as Cu) except copper fume.  
NIOSH REL\*: TWA 1 mg/m<sup>3</sup> \*Note: The REL also applies to other copper compounds (as Cu) except Copper fume.  
NIOSH IDLH: 100 mg/m<sup>3</sup> (as Cu) See: [7440508](#)

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

**PHYSICAL PROPERTIES**

Boiling point: 2595°C  
Melting point: 1083°C  
Relative density (water = 1): 8.9

Solubility in water:  
none

**ENVIRONMENTAL DATA**

**NOTES**

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

**ADDITIONAL INFORMATION**

**ICSC: 0240**

**COPPER**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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# International Chemical Safety Cards

## IRON (III)-o-ARSENITE, PENTAHYDRATE

ICSC: 1241



Ferric arsenite  
 $As_2Fe_2O_6 \cdot Fe_2O_3 \cdot 5H_2O$   
 Molecular mass: 607.3

ICSC # 1241  
 CAS # 63989-69-5  
 RTECS # [NO4600000](#)  
 UN # 1607  
 EC # 033-002-00-5  
 October 27, 1994 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		AVOID ALL CONTACT!	IN ALL CASES CONSULT A DOCTOR!
<b>•INHALATION</b>	Cough. Shortness of breath. Sore throat. Weakness. See Ingestion.	Avoid inhalation of fine dust and mist. Closed system and ventilation.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
<b>•SKIN</b>	Redness. Burning sensation.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
<b>•EYES</b>	Redness. Pain.	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.
<b>•INGESTION</b>	Abdominal pain. Burning sensation. Diarrhoea. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Induce vomiting (ONLY IN CONSCIOUS PERSONS!). Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Vacuum spilled material. 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 .	Unbreakable packaging; put breakable packaging into closed unbreakable container. Do not transport with food and feedstuffs. Marine pollutant. Note: A, 1 T symbol N symbol R: 23/25-50/53 S: 1/2-20/21-28-45-60-61 UN Hazard Class: 6.1 UN Packing Group: II

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 1241**

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

## IRON (III)-o-ARSENITE, PENTAHYDRATE

ICSC: 1241

<p><b>I</b></p> <p><b>M</b></p> <p><b>P</b></p> <p><b>O</b></p> <p><b>R</b></p> <p><b>T</b></p> <p><b>A</b></p> <p><b>N</b></p> <p><b>T</b></p> <p><b>D</b></p> <p><b>A</b></p> <p><b>T</b></p> <p><b>A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> BROWN POWDER.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on heating or on burning producing toxic fumes of arsenic and iron.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: (as As) 0.01 mg/m<sup>3</sup> as TWA; A1 (confirmed human carcinogen); BEI issued; (ACGIH 2004). MAK: Carcinogen category: 1; Germ cell mutagen group: 3A; (DFG 2004).</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed, especially if powdered.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes , the skin and the respiratory tract . The substance may cause effects on the nervous system, liver, skin, kidneys and gastrointestinal tract , resulting in kidney impairment, neuropathy, severe gastroenteritis, degenerative liver damage and dermatitis. Exposure may result in death. The effects may be delayed. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis, grey skin and hyperkeratosis. The substance may have effects on the nervous system,liver,cardiovascular system and respiratory tract , resulting in neuropathy, gangrene, degenerative liver damage and perforation of nasal septum. This substance is carcinogenic to humans.</p>
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<b>PHYSICAL PROPERTIES</b>	Solubility in water: none
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<b>ENVIRONMENTAL DATA</b>	This substance may be hazardous to the environment; special attention should be given to plants, air quality and water quality. It is strongly advised that this substance does not enter the environment.	
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**NOTES**

Do NOT take working clothes home. See also ICSC0013 Arsenic. Card has been partly updated in April and October 2005. See sections Occupational Exposure Limits, EU classification, Emergency Response.

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

**ADDITIONAL INFORMATION**

<b>ICSC: 1241</b>	<b>IRON (III)-o-ARSENITE, PENTAHYDRATE</b>
(C) IPCS, CEC, 1994	

<b>IMPORTANT LEGAL NOTICE:</b>	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.
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# International Chemical Safety Cards

**LEAD**

ICSC: 0052



Lead metal  
Plumbum  
Pb  
Atomic mass: 207.2  
(powder)

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

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>	See EFFECTS OF LONG-TERM OR REPEATED EXPOSURE.	PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>		Local exhaust or breathing protection.	Fresh air, rest.
• <b>SKIN</b>		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	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:
<b>SEE IMPORTANT INFORMATION ON BACK</b>			
<b>ICSC: 0052</b>		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 1994. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.	

# International Chemical Safety Cards

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> BLUISH-WHITE OR SILVERY-GREY SOLID IN VARIOUS FORMS. TURNS TARNISHED ON EXPOSURE TO AIR.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b> On heating, toxic fumes are formed. Reacts with oxidants. Reacts with hot concentrated nitric acid, boiling concentrated hydrochloric acid and sulfuric acid. Attacked by pure water and by weak organic acids in the presence of oxygen.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.05 mg/m<sup>3</sup> 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/m<sup>3</sup> (EU 2002). OSHA PEL*: 1910.1025 TWA 0.050 mg/m<sup>3</sup> <a href="#">See Appendix C</a> *Note: The PEL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C</a>. NIOSH REL*: TWA 0.050 mg/m<sup>3</sup> <a href="#">See Appendix C</a> *Note: The REL also applies to other lead compounds (as Pb) -- <a href="#">see Appendix C</a>. NIOSH IDLH: 100 mg/m<sup>3</sup> (as Pb) See: <a href="#">7439921</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> A harmful concentration of airborne particles can be reached quickly when dispersed, especially if powdered.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b></p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the blood bone marrow central nervous system peripheral nervous system kidneys , resulting in anaemia, encephalopathy (e.g., convulsions), peripheral nerve disease, abdominal cramps and kidney impairment. Causes toxicity to human reproduction or development.</p>
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<b>PHYSICAL PROPERTIES</b>	Boiling point: 1740°C Melting point: 327.5°C	Density: 11.34 g/cm <sup>3</sup> Solubility in water: none
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<b>ENVIRONMENTAL DATA</b>	Bioaccumulation of this chemical may occur in plants and in mammals. It is strongly advised that this substance does not enter the environment.	
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**NOTES**

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

**ADDITIONAL INFORMATION**

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<b>ICSC: 0052</b>	<b>LEAD</b>
(C) IPCS, CEC, 1994	

<b>IMPORTANT LEGAL NOTICE:</b>	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.
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# International Chemical Safety Cards

**MANGANESE**

**ICSC: 0174**






Mn  
Atomic mass: 54.9  
(powder)



ICSC # 0174  
CAS # 7439-96-5  
RTECS # [OO9275000](#)  
November 27, 2003 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Dry sand, special powder.
<b>EXPLOSION</b>	Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>		<b>PREVENT DISPERSION OF DUST! AVOID EXPOSURE OF (PREGNANT) WOMEN!</b>	
<b>•INHALATION</b>	Cough.	Local exhaust or breathing protection.	Fresh air, rest. Refer for medical attention.
<b>•SKIN</b>		Protective gloves.	Rinse and then wash skin with water and soap.
<b>•EYES</b>		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.
<b>•INGESTION</b>	Abdominal pain. Nausea.	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 acids. Dry.	

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0174**

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

**MANGANESE**

**ICSC: 0174**

<b>I</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> GREY - WHITE POWDER</p> <p><b>PHYSICAL DANGERS:</b></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its aerosol and by ingestion.</p>
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<p><b>M P O R T A N T D A T A</b></p>	<p>Dust explosion possible if in powder or granular form, mixed with air.</p> <p><b>CHEMICAL DANGERS:</b>                  Reacts slowly with water more rapidly with steam and acids forming flammable/explosive gas (hydrogen - see ICSC0001) causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b>                  TLV: 0.2 mg/m<sup>3</sup> (as TWA); (ACGIH 2003).                  MAK: (Inhalable fraction) 0.5 mg/m<sup>3</sup>; Pregnancy risk group: C; (DFG 2007).                  OSHA PEL*: C 5 mg/m<sup>3</sup> *Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl and Methyl cyclopentadienyl manganese tricarbonyl.                  NIOSH REL*: TWA 1 mg/m<sup>3</sup> ST 3 mg/m<sup>3</sup> *Note: Also see specific listings for Manganese cyclopentadienyl tricarbonyl, Methyl cyclopentadienyl manganese tricarbonyl, and Manganese tetroxide.                  NIOSH IDLH: 500 mg/m<sup>3</sup> (as Mn) See: <a href="#">7439965</a></p>	<p><b>INHALATION RISK:</b>                  Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b>                  The aerosol is irritating to the respiratory tract .</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b>                  The substance may have effects on the lungs and central nervous system , resulting in increased susceptibility to bronchitis, pneumonitis and neurologic, neuropsychiatric disorders (manganism). Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 1962°C                  Melting point: 1244°C                  Density: 7.47 g/cm<sup>3</sup></p>	<p>Solubility in water:                  none</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>This substance may be hazardous in the environment; special attention should be given to aquatic organisms.</p>	
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**NOTES**

Depending on the degree of exposure, periodic medical examination is suggested. The recommendations on this Card also apply to ferro manganese.

**ADDITIONAL INFORMATION**

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<b>ICSC: 0174</b>	(C) IPCS, CEC, 1994		<b>MANGANESE</b>
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<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# International Chemical Safety Cards

**MERCURY**

ICSC: 0056



Quicksilver  
Liquid silver  
Hg  
Atomic mass: 200.6

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Not combustible. Gives off irritating or toxic fumes (or gases) in a fire.		In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>	Risk of fire and explosion.		In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
<b>•INHALATION</b>	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.
<b>•SKIN</b>	MAY BE ABSORBED! Redness.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
<b>•EYES</b>		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.
<b>•INGESTION</b>		Do not eat, drink, or smoke during work. Wash hands before eating.	Refer for medical attention.

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0056**

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

# International Chemical Safety Cards

## MERCURY

ICSC: 0056

<p><b>I</b> <b>M</b> <b>P</b> <b>O</b> <b>R</b> <b>T</b> <b>A</b> <b>N</b> <b>T</b> <b>D</b> <b>A</b> <b>T</b> <b>A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> ODOURLESS, HEAVY AND MOBILE SILVERY LIQUID METAL.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> 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.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.025 mg/m<sup>3</sup> as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 0.1 mg/m<sup>3</sup> Sh Peak limitation category: II(8) Carcinogen category: 3B (DFG 2003). OSHA PEL<sub>f</sub>: C 0.1 mg/m<sup>3</sup> NIOSH REL: Hg Vapor: TWA 0.05 mg/m<sup>3</sup> skin Other: C 0.1 mg/m<sup>3</sup> skin NIOSH IDLH: 10 mg/m<sup>3</sup> (as Hg) See: <a href="#">7439976</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its vapour and through the skin, also as a vapour!</p> <p><b>INHALATION RISK:</b> A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the skin. Inhalation of the vapours may cause pneumonitis. The substance may cause effects on the central nervous system and kidneys. The effects may be delayed. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> 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.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 357°C Melting point: -39°C Relative density (water = 1): 13.5 Solubility in water: none</p>	<p>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</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is very toxic to aquatic organisms. In the food chain important to humans, bioaccumulation takes place, specifically in fish.</p>	
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### NOTES

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

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

### ADDITIONAL INFORMATION

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ICSC: 0056

MERCURY

(C) IPCS, CEC, 1994

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

## SODIUM

ICSC: 0717



Natrium  
Na  
Atomic mass: 23.0

ICSC # 0717  
CAS # 7440-23-5  
RTECS # [VY0686000](#)  
UN # 1428  
EC # 011-001-00-0  
April 06, 2006 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable. Many reactions may cause fire or explosion. Gives off irritating or toxic fumes (or gases) in a fire.	NO contact with water, acid(s) or halogens . NO open flames, NO sparks, and NO smoking.	Special powder, dry sand, NO other agents.
<b>EXPLOSION</b>	Risk of fire and explosion. on contact with acid(s) , halogens , water .		Combat fire from a sheltered position.
<b>EXPOSURE</b>			
<b>•INHALATION</b>	Cough. Sore throat. Burning sensation.	Closed system and ventilation.	Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.
<b>•SKIN</b>	Pain. Blisters. Serious skin burns.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
<b>•EYES</b>	Severe deep burns. loss of vision.	Face shield .	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
<b>•INGESTION</b>	Burning sensation. Shock or collapse.	Do not eat, drink, or smoke during work.	Rinse mouth. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area! Consult an expert! Chemical protection suit including self-contained breathing apparatus. Cover the spilled material with dry powder.	Fireproof. Keep under mineral oil. Dry. Well closed.	Airtight. Unbreakable packaging; put breakable packaging into closed unbreakable container. F symbol C symbol R: 14/15-34 S: (1/2)-5 -8-43-45 UN Hazard Class: 4.3 UN Packing Group: I Signal: Danger Flame-Corr In contact with water releases flammable gases which may ignite spontaneously Causes severe skin burns and eye damage

SEE IMPORTANT INFORMATION ON BACK

**ICSC: 0717**

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

**SODIUM**

**ICSC: 0717**

<p><b>I M P O R T A N T  D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> SILVERY SOLID IN VARIOUS FORMS</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> Reacts violently with water , causing fire and explosion hazard . The substance decomposes rapidly under the influence of air and moisture , forming flammable/explosive gas (Hydrogen - see ICSC0001) .</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV not established. MAK not established.</p>	<p><b>ROUTES OF EXPOSURE:</b> Serious local effects by all routes of exposure.</p> <p><b>INHALATION RISK:</b></p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> See ICSC 0360 (Sodium hydroxide)</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b></p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 880°C Melting point: 97.4°C Density: 0.97 g/cm<sup>3</sup></p>	<p>Solubility in water: reaction Vapour pressure, Pa at 20°C: negligible Auto-ignition temperature: 120-125°C</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	
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**NOTES**

Sodium is always kept under mineral oil. Reacts violently with fire extinguishing agents such as water and carbon dioxide .

Transport Emergency Card: TEC (R)-43S1428a  
NFPA Code: H3; F3; R2;

**ADDITIONAL INFORMATION**

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<p><b>ICSC: 0717</b></p>	<p><b>SODIUM</b></p>
<p>(C) IPCS, CEC, 1994</p>	

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

ZINC POWDER

ICSC: 1205



Blue powder  
Merrillite  
Zn  
Atomic mass: 65.4  
(powder)

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	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.
<b>EXPLOSION</b>	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.
<b>EXPOSURE</b>		<b>PREVENT DISPERSION OF DUST! STRICT HYGIENE!</b>	
• <b>INHALATION</b>	Metallic taste and metal fume fever. Symptoms may be delayed (see Notes).	Local exhaust.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin.	Protective gloves.	Rinse and then wash skin with water and soap.
• <b>EYES</b>		Safety spectacles.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• <b>INGESTION</b>	Abdominal pain. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Refer for medical attention.

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 1205**

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

# International Chemical Safety Cards

## ZINC POWDER

ICSC: 1205

<p><b>I</b> <b>M</b> <b>P</b> <b>O</b> <b>R</b> <b>T</b> <b>A</b> <b>N</b> <b>T</b> <b>D</b> <b>A</b> <b>T</b> <b>A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> ODOURLESS GREY TO BLUE POWDER.</p> <p><b>PHYSICAL DANGERS:</b> Dust explosion possible if in powder or granular form, mixed with air. If dry, it can be charged electrostatically by swirling, pneumatic transport, pouring, etc.</p> <p><b>CHEMICAL DANGERS:</b> Upon heating, toxic fumes are formed. The substance is a strong reducing agent and reacts violently with oxidants. Reacts with water and reacts violently with acids and bases forming flammable/explosive gas (hydrogen - see ICSC0001) Reacts violently with sulfur, halogenated hydrocarbons and many other substances causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV not established.</p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly when dispersed.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Inhalation of fumes may cause metal fume fever. The effects may be delayed.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> Repeated or prolonged contact with skin may cause dermatitis.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 907°C Melting point: 419°C Relative density (water = 1): 7.14</p>	<p>Solubility in water: reaction Vapour pressure, kPa at 487°C: 0.1 Auto-ignition temperature: 460°C</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	
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### NOTES

Zinc may contain trace amounts of arsenic, when forming hydrogen, may also form toxic gas arsine (see ICSC 0001 and ICSC 0222). Reacts violently with fire extinguishing agents such as water, halons, foam and carbon dioxide. The symptoms of metal fume fever do not become manifest until several hours later. Rinse contaminated clothes (fire hazard) with plenty of water.

Transport Emergency Card: TEC (R)-43GWS-II+III  
NFPA Code: H0; F1; R1;

### ADDITIONAL INFORMATION

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ICSC: 1205

ZINC POWDER

(C) IPCS, CEC, 1994

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### 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<sub>14</sub>H<sub>10</sub>Cl<sub>4</sub>  
Molecular Weight : 320.04 g/mol

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

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### 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.

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### 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.

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### 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/cm <sup>3</sup>
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

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**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.

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

2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	CAS-No. 72-54-8	Revision Date
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### Pennsylvania Right To Know Components

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

### New Jersey Right To Know Components

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

### California Prop. 65 Components

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

### Further information

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



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Search

72-55-9 msds



MSDS 250,000+

MSDS : 2,2-Bis-(4-chlorophenyl)-1,1-dichloroethylene, 99%

CAS : 72-55-9

SYNONYMS : p,p'-DDE ; ethylene,1,1-dichloro-2,2-bis-(p-chlorophenyl)- ; DDT dehydrochloride ; DDE; 1-1'-(Dichloroethenylidene)bis(4-chlorobenzene)

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

Suppliers:

Not Available

Buyers:

Not Available

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

```

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

```

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.

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## ALL MSDS PAGES IN THIS GROUP

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

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

Free MSDS Search ( Providing 250,000+ Material Properties )  
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 Last modified: 11/29/2011 16:11:11

# 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
<b>FIRE</b>	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.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
<b>•INHALATION</b>	Cough.	Local exhaust or breathing protection.	Fresh air, rest.
<b>•SKIN</b>		Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
<b>•EYES</b>	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.
<b>•INGESTION</b>	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**

ICSC: 0034

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

# International Chemical Safety Cards

ICSC: 0034

DDT

<p><b>I</b> <b>M</b> <b>P</b> <b>O</b> <b>R</b> <b>T</b> <b>A</b> <b>N</b> <b>T</b> <b>D</b> <b>A</b> <b>T</b> <b>A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS CRYSTALS WHITE POWDER. TECHNICAL PRODUCT IS WAXY SOLID.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> On combustion, forms toxic and corrosive fumes including hydrogen chloride. Reacts with aluminium and iron.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 1 mg/m<sup>3</sup> as TWA A3 (ACGIH 2004). MAK: 1 mg/m<sup>3</sup> H Peak limitation category: II(8) (DFG 2003). OSHA PEL: TWA 1 mg/m<sup>3</sup> skin NIOSH REL: Ca TWA 0.5 mg/m<sup>3</sup> <a href="#">See Appendix A</a> NIOSH IDLH: Ca 500 mg/m<sup>3</sup> See: <a href="#">50293</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly especially if powdered.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> 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.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> 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.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 260°C Melting point: 109°C Density: 1.6 g/cm<sup>3</sup></p>	<p>Solubility in water: poor Octanol/water partition coefficient as log Pow: 6.36</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>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.</p>	
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### NOTES

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

<p><b>ICSC: 0034</b></p>	<p><b>DDT</b></p>
<p>(C) IPCS, CEC, 1994</p>	

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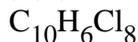
# International Chemical Safety Cards

## CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740



1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methanoindene  
1,2,4,5,6,7,8,8-Octachloro-2,3,3a,4,7,7a-hexahydro-4,7-methano-1H-indene



Molecular mass: 409.8

ICSC # 0740  
CAS # 57-74-9  
RTECS #  
UN # 2996  
EC # 602-047-00-8  
March 26, 1998 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Liquid formulations containing organic solvents may be flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Alcohol-resistant foam, powder, carbon dioxide.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		PREVENT GENERATION OF MISTS! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	IN ALL CASES CONSULT A DOCTOR!
<b>•INHALATION</b>	(See Ingestion).	Breathing protection.	Fresh air, rest. Refer for medical attention.
<b>•SKIN</b>	MAY BE ABSORBED!	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
<b>•EYES</b>	Redness. Pain.	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.
<b>•INGESTION</b>	Confusion. Convulsions. Nausea. Vomiting.	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: chemical protection suit including self-contained breathing apparatus.	Provision to contain effluent from fire extinguishing. Separated from food and feedstuffs bases and incompatible materials See Chemical Dangers. Well closed. Keep in a well-ventilated room.	Do not transport with food and feedstuffs. Severe marine pollutant. Xn symbol N symbol R: 21/22-40-50/53 S: 2-36/37-60-61 UN Hazard Class: 6.1 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0740**

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

## CHLORDANE (TECHNICAL PRODUCT)

ICSC: 0740

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> TECHNICAL: LIGHT YELLOW TO AMBER VISCOUS LIQUID</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on burning, on contact with bases producing toxic fumes including phosgene hydrogen chloride Attacks iron, zinc, plastic, rubber and coatings.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.5 mg/m<sup>3</sup> as TWA (skin) A3 (confirmed animal carcinogen with unknown relevance to humans); (ACGIH 2004). MAK: (Inhalable fraction) 0.5 mg/m<sup>3</sup> Peak limitation category: II(8); skin absorption (H); Carcinogen category: 3B; (DFG 2004). OSHA PEL: TWA 0.5 mg/m<sup>3</sup> skin NIOSH REL: Ca TWA 0.5 mg/m<sup>3</sup> skin <a href="#">See Appendix A</a> NIOSH IDLH: Ca 100 mg/m<sup>3</sup> See: <a href="#">57749</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> Exposure at high levels may result in disorientation, tremors, convulsions, respiratory failure and death. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the liver immune system, resulting in tissue lesions and liver impairment. This substance is possibly carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point at 0.27kPa: 175°C Relative density (water = 1): 1.59-1.63 Solubility in water: none</p>	<p>Vapour pressure, Pa at 25°C: 0.0013 Octanol/water partition coefficient as log Pow: 2.78</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is very toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to soil organisms, honey bees. It is strongly advised that this substance does not enter the environment. The substance may cause long-term effects in the aquatic environment.</p>	
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### NOTES

If the substance is formulated with solvents also consult the ICSCs of these materials. Carrier solvents used in commercial formulations may change physical and toxicological properties. Belt, Chlor Kil, Chlortox, Corodan, Gold Crest, Intox, Kypchlor, Niran, Octachlor, Sydane, Synklor, Termi-Ded, Topiclör, and Toxichlor are trade names. Also consult ICSC 0743 Heptachlor.

Transport Emergency Card: TEC (R)-61GT6-III

### ADDITIONAL INFORMATION

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ICSC: 0740

CHLORDANE (TECHNICAL PRODUCT)

(C) IPCS, CEC, 1994

<p><b>IMPORTANT LEGAL NOTICE:</b></p>	<p>Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.</p>
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# 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,2beta,2alpha,3beta,6beta,6alpha,7beta,7alpha)-2,7,3,6-  
dimethanonaphth(2,3-b)oxirene

HEOD



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
<b>FIRE</b>	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.
<b>EXPLOSION</b>			
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST! STRICT HYGIENE! AVOID EXPOSURE OF ADOLESCENTS AND CHILDREN!	
• <b>INHALATION</b>	(See Ingestion).	Ventilation (not if powder).	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	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.
• <b>EYES</b>		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.
• <b>INGESTION</b>	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

I M P O R T A N T D A T A	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS CRYSTALS</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> 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.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV (as TWA): 0.25 mg/m<sup>3</sup>, A4 (skin) (ACGIH 1997). MAK: (Inhalable fraction) 0.25 mg/m<sup>3</sup> ; Peak limitation category: II(8) skin absorption (H); (DFG 2007). OSHA PEL: TWA 0.25 mg/m<sup>3</sup> skin NIOSH REL: Ca TWA 0.25 mg/m<sup>3</sup> skin <a href="#">See Appendix A</a> NIOSH IDLH: Ca 50 mg/m<sup>3</sup> See: <a href="#">60571</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body through the skin and by ingestion.</p> <p><b>INHALATION RISK:</b> Evaporation at 20°C is negligible; a harmful concentration of airborne particles can, however, be reached quickly on spraying.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance may cause effects on the central nervous system, resulting in convulsions. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance accumulates in the human body. Cumulative effects are possible: see Acute Hazards/Symptoms.</p>
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<b>PHYSICAL PROPERTIES</b>	Melting point: 175-176°C Density: 1.7 g/cm <sup>3</sup> Solubility in water: none	Vapour pressure, Pa at 20°C: 0.0004 Octanol/water partition coefficient as log Pow: 6.2
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<b>ENVIRONMENTAL DATA</b>	<p>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.</p>	
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## 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

ICSC: 0787

DIELDRIN

(C) IPCS, CEC, 1994

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

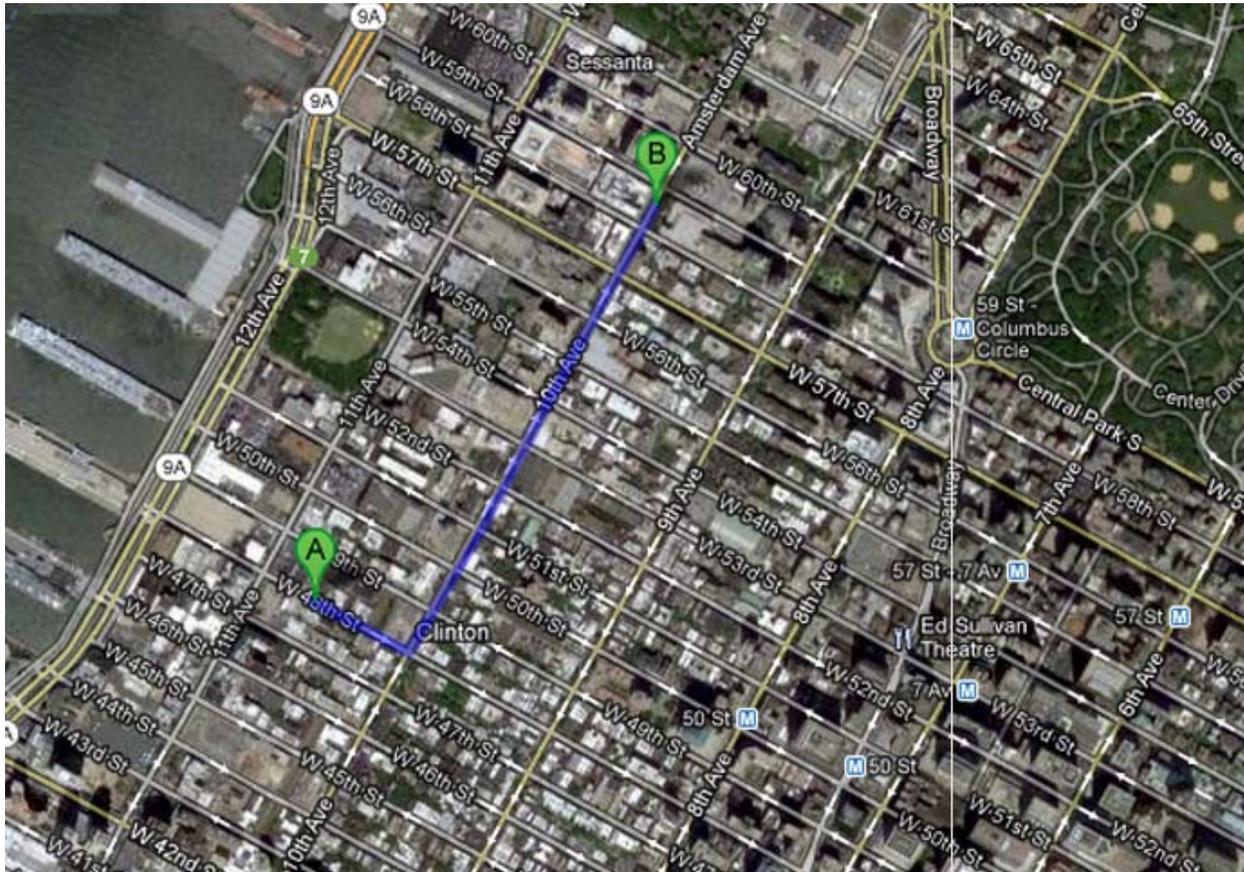
INDICATE STREET NAMES, DESCRIPTION OF VEHICLES, AND NORTH ARROW

## HOSPITAL INFORMATION AND MAP

The hospital nearest the site is:

**ROOSEVELT HOSPITAL CENTER**  
1000 10<sup>th</sup> Ave, New York, New York 10019  
212-523-4000

0.6 Miles – About 2 Minutes



### DIRECTIONS

1. Starting at 545 West 48th Street, Head Southeast on West 48th Street toward 10<sup>th</sup> Avenue.
2. Take the 1st Left onto 10th Avenue and continue for approximately 0.5 miles.
3. The Roosevelt Hospital Center (1000 10<sup>th</sup> Avenue) will be the right between West 58<sup>th</sup> Street and West 59<sup>th</sup> Street after approximately 0.5 miles.