

**DOMINO SUGAR SITE B**

**270-290 KENT AVENUE**

**BROOKLYN, NEW YORK**

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# **Remedial Action Work Plan**

**NYC VCP Number: 15CVCP003K**

**E-Designation Site Number: 14EHAN401K**

**Prepared for:**

Two Trees Management, LLC

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Brooklyn, NY 11201

**Prepared by:**

***EBC***

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**AUGUST 2014**

# **REMEDIAL ACTION WORK PLAN**

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## LIST OF ACRONYMS

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

# CERTIFICATION

I, Ariel Czemerinski, am a Professional Engineer licensed in the State of New York. I have primary direct responsibility for implementation of the remedial action for the Domino Sugar Site B Redevelopment Project located at 270-290 Kent Avenue, Brooklyn, NY, NYC VCP Site number 15CVCP003K and OER Project No. 14EHAN401K.

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

\_\_\_\_\_  
Name

\_\_\_\_\_  
NYS PE License Number

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



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## EXECUTIVE SUMMARY

Two Trees Management, LLC has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a 76,464 ft<sup>2</sup> Site located at 270-290 Kent Avenue in Brooklyn, New York. A remedial investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP). The remedial action described in this document provides for the protection of public health and the environment consistent with the intended property use, complies with applicable environmental standards, criteria and guidance and conforms with applicable laws and regulations.

### Site Location and Current Usage

Domino Sugar Site B is located at 270 to 290 Kent Avenue in the Williamsburg-South Side section of Brooklyn, New York, and is currently identified as a portion of Block 2414 Lot 1 on the New York City Tax Map. Figure 1 shows the Site location. Lot 1 is a 717,000 ft<sup>2</sup> water front lot located on the west side of Kent Avenue between Grand Street to the north and South 5th Street to the south. Lot 1 has historically consisted of multiple industrial/commercial buildings utilized by the Domino Sugar Company and other sugar refinery companies. All of the buildings on Lot 1, with the exception of the Refinery Building, are currently being demolished. The majority of the portion of Lot 1 identified as Site B was historically utilized as parking, and the remainder of Site B was utilized as the fuel tank area (southeast portion), truck fueling area (northeastern portion), the eastern half of the raw sugar warehouse (western portion), raw sugar scale house (southwest corner), and a Domino Sugar roadway that extended South 2nd Street through Lot 1. The fuel tank area consists of two 200,754 gallon No. 6 fuel oil underground storage tanks that are registered with the New York State Department of Environmental Conservation as a Major Oil Storage Facility (MOSF).

Site B is currently bordered by Site A to the north (which includes the former Domino Sugar Research and Development Lab Building and Raw Sugar Warehouse Building), the former sugar refinery building (Site D) to the south, Kent Avenue to the east and the western half of the former Raw Sugar Warehouse to the west. Site B is a slightly irregular rectangular shaped area

consisting of 340.958 feet of street frontage on Kent Avenue and a depth of approximately 224.75 feet, for a total of approximately 76,464 ft<sup>2</sup>.

Following redevelopment, Site B will be subdivided to create a new tax lot (Proposed Lot B), and newly mapped streets including South 1st Street, South 2nd Street and River Street. A new recreational and shoreline walkway/park will be created on the opposite side of River Street, which will span along the west side of Sites A, B, C, D and F.

Following redevelopment, Proposed Lot B will be bordered by Kent Avenue to the east, newly mapped South 1st Street to the north, newly mapped South 2nd Street to the south, and newly mapped River Street to the west. Proposed Lot B will consist of 220 feet of street frontage on Kent Avenue and River Avenue, and approximately 189.875 feet of street frontage on South 1st Street and South 2nd Street, creating a 41,772-square feet lot. The portion of Site B which will be converted into Proposed Lot B currently consists of the parking lot and MOSF fuel tank area, and the truck fueling area along Kent Avenue.

Site B (Proposed Lot B and the areas of each of the newly mapped streets), and the recreational and shoreline walkway/park to be constructed on the opposite side of River Street were investigated as part of the Remedial Investigation and are discussed within this Remedial Investigation Report. A map of the current site boundary for both Site B (as shown in blue dash marks) and Proposed Lot B (as shown in red dash marks) is shown on Figure 2.

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

Redevelopment of the former Domino Sugar properties (Block 2414, Lot 1 and Block 2428, Lot 1) will include four new mixed-use buildings (Sites A, B, D, E), adaptively reuse the existing landmarked Refinery building (Site F), create a one acre inland green space to be called Domino Square (Site C) and develop a new waterfront park.

The redevelopment project would encompass approximately 3 million ft<sup>2</sup>, consisting of approximately 2.2 million ft<sup>2</sup> of residential floor area (to consist of both market rate and affordable housing), 500,000 ft<sup>2</sup> of commercial space, and 150,000 ft<sup>2</sup> of community facility space, as well as approximately 1,050 parking spaces. Publicly accessible open space, totaling approximately 4.8 acres, would also be created along the waterfront and throughout the

Development Site. Additionally, new public sidewalks and streets (extension of South 1st Street, South 2nd Street, South 3rd Street and South 4th Street, and creation of River Street between Sites A, B, C, D and F and the waterfront park) totaling approximately 2.0 acres are proposed, providing increased public access to the waterfront.

In mixed-use buildings, residential units would generally be located on the upper floors, while office, retail, and community facility uses, including a 375-seat school within the Proposed Lot B building, would generally occupy the ground and lower floors.

The public access areas would be landscaped with large lawn areas, improved with planters and seating areas. This area would be programmed for passive uses, including seating areas and an artifact walk with historic elements from the Domino Sugar factory buildings on display, and active uses, such as playing fields and a dog run. The portion of the waterfront park to be constructed immediately west of Site B will consist of the passive recreation area, which will include lawn areas, picnic space, a lounge area, and the artifacts display area. Although this waterfront park immediately west of Site B was investigated as a part of this Remedial Investigation, it will be redeveloped under a separate Remedial Action Work Plan from Site B.

The proposed future use of Proposed Lot B will consist of a new 530-foot tall mixed-use building containing approximately 1,000,000 SF of space, and consisting of commercial retail use, community facility use including a school, and residential use. This building would also include a 300-space accessory parking facility.

A cellar level parking garage will be constructed across the majority of Proposed Lot B, with the exception of an unexcavated area along River Street. The cellar level will consist of parking, bicycle storage, the electrical, telecom, gas, water, sewer, mechanical and fire pump rooms, and three elevator pits. The ground level will consist of retail space along Kent Avenue and River Street, the school's lobby and bicycle storage room, the residential lobbies for the north tower and south tower, additional vehicular parking spaces and the parking garage entrance/exits from South 1st Street and South 2nd Street. The second floor will consist of additional vehicular parking spaces. The building's third and fourth floors will consist of the school's classrooms, gymnasium, restrooms, kitchen, and storage areas. The building then divides into the north and

south towers. The 5th through 35th floors will each consist of residential apartments, and the roofs of the two towers will house the boiler rooms, generator room, electrical rooms, and Cogen rooms.

Excavation for the building's cellar level will be performed to an elevation of approximately +5ft. The eastern end of Site B has an approximate elevation of +22ft and the western end of Site B has an approximate elevation of +10 to +12ft. Therefore, the excavation to a depth of approximately 17 feet will be required on the eastern end of the Site B, and excavation to a depth of approximately 5 to 7 feet will be required on the western end of Site B. Assuming an average excavation depth of approximately 10 feet across the cellar's 220 ft by 168 ft area, a total of approximately 14,000 cubic yards (21,000 tons) of soil will require removal for the new building's cellar. Additional excavation up to depths of 4 to 5 feet may be required along the River Street end of Proposed Lot B to construct the building's foundation and install the building's concrete slab. Limited excavation (1 to 2 ft maximum) will be required for the sidewalks and streets surrounding Site B to install a 6" layer of aggregate base and either asphalt (streets) or concrete (sidewalks/driveways). Layout of the proposed site development is presented in Figure 3. The current zoning designation is C6-2. The proposed use is consistent with existing zoning for the property.

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

### **Summary of the Remedy**

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC

- VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
  3. Establishment of Site-Specific (Track 4) Soil Cleanup Objectives (SCOs);
  4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
  5. Performance of geophysical/test pits/trenches prior to start of building construction in proposed roads area and areas of the building footprint where excavation will not occur;
  6. Completion of a Waste Characterization Study prior to excavation activities;
  7. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs. For development purposes, 75% of the Site will be excavated, to depth of approximately 17 feet on the east end of Proposed Lot B, and approximately 5 to 7 feet towards the west end of Proposed Lot B. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the buildings is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs. In addition, four hotspot areas (Borings B-4, SB-4, SB-3, and BSB-5) identified during investigations will be excavated from 4 feet to 12 feet depths to achieve Track 4 SCOs. Approximately, 21,000 tons of soils will be excavated and removed from this Site;
  8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
  9. Management of excavated materials including temporarily stockpiling and segregating to prevent co-mingling of contaminated material and non-contaminated materials.
  10. Removal of nine (9) suspected underground storage tanks (USTs) along Kent Avenue sidewalk and other USTs (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;
  11. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities.

- Appropriate segregation of excavated media on-Site;
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs;
  13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
  14. Installation of a waterproofing membrane system below the cellar slab and slab on-grade portion of the building, as well as behind subgrade portions of foundation walls of the proposed building. The waterproofing membrane system will consist of Preprufe 300R and Bituthene 4000 as manufacturing by Grace. Preprufe 300 is a 1.2 mm (0.046in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. Preprufe 300 will be installed below the building's cellar slab and on grade portion of the building slab along River Street. Bituthene 4000 is a flexible preformed waterproof membrane combining a high performance cross laminated, HDPE carrier film with a unique super sticky self-adhesive rubber bitumen compound. Bituthene 4000 will be installed behind the building's foundation walls to grade;
  15. Construction and maintenance of an engineered composite cover consisting of the building's 2.5 ft and 5 ft thick pile-supported mat building slab to prevent human exposure to residual soil/fill remaining under the Site. Sidewalks and roadways will consist of a geotextile layer installed above a prepared subgrade, a 6 inch thick layer of a compacted aggregate base, and a 4 inch or 7 thick layer of concrete (sidewalks/driveways) or a layer of asphaltic concrete binder course below a asphaltic concrete top course (street);
  16. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
  17. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
  18. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.

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

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## COMMUNITY PROTECTION STATEMENT

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

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

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

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

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

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addressed under this cleanup plan.

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

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

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

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

**Odor, Dust and Noise Control.** This cleanup plan includes actions for odor and dust control. These actions are designed to prevent off-Site odor and dust nuisances and includes steps to be taken if nuisances are detected. Generally, dust is managed by application of physical covers and by water sprays. Odors are controlled by limiting the area of open excavations, physical covers, spray foams and by a series of other actions (called operational measures). The project is also required to comply with NYC noise control standards. If you observe problems in these areas, please contact the on-Site Project Manager, Mr. Kevin Waters at (631) 504-6000 or NYC Office of Environmental Remediation Project Manager, Ms. Shana Holberton (212) 788-3220.

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

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

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

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

**Complaint Management.** The contractor performing this cleanup is required to address all complaints. If you have any complaints, you can call the facility Project Manager, Mr. Kevin Brussee (EBC) at (631) 504-6000, the NYC Office of Environmental Remediation Project Manager, Shana Holberton at (212) 788-3220, or call 311 and mention the Site is in the NYC Voluntary Cleanup Program.

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

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

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

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

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

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

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

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

**Truck Routing.** Truck routes have been selected to: (a) limit transport through residential areas and past sensitive nearby properties; (b) maximize use of city-mapped truck routes; (c) limit total distance to major highways; (d) promote safety in entry to highways; (e) promote overall safety

in trucking; and (f) minimize off-Site line-ups (queuing) of trucks entering the property. Operators of loaded trucks leaving the Site will be instructed not to stop or idle in the local neighborhood.

**Final Report.** The results of all cleanup work will be fully documented in a final report (called a Remedial Action Report) that will be available for you to review online at OER's website.

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

# REMEDIAL ACTION WORK PLAN

## 1.0 SITE BACKGROUND

Two Trees Management, LLC has applied to enroll in the New York City Voluntary Cleanup Program (NYC VCP) to investigate and remediate a property located at 270 to 290 Kent Avenue in the Williamsburg section of Brooklyn, New York (the Site). A Remedial Investigation (RI) was performed to compile and evaluate data and information necessary to develop this Remedial Action Work Plan (RAWP) in a manner that will render the Site protective of public health and the environment consistent with the contemplated end use. This RAWP establishes remedial action objectives, provides remedial alternatives analysis that includes consideration of a permanent cleanup, and provides a description of the selected remedial action. The remedial action described in this document provides for the protection of public health and the environment, complies with applicable environmental standards, criteria and guidance and applicable laws and regulations.

### 1.1 Site Location and Current Usage

Domino Sugar Site B is located at 270 to 290 Kent Avenue in the Williamsburg-South Side section of Brooklyn, New York, and is currently identified as a portion of Block 2414 Lot 1 on the New York City Tax Map. Figure 1 shows the Site location. Lot 1 is a 717,000 ft<sup>2</sup> water front lot located on the west side of Kent Avenue between Grand Street to the north and South 5th Street to the south. Lot 1 has historically consisted of multiple industrial/commercial buildings utilized by the Domino Sugar Company and other sugar refinery companies. All of the buildings on Lot 1, with the exception of the Refinery Building, are currently being demolished. The majority of the portion of Lot 1 identified as Site B was historically utilized as parking, and the remainder of Site B was utilized as the fuel tank area (southeast portion), truck fueling area (northeastern portion), the eastern half of the raw sugar warehouse (western portion), raw sugar scale house (southwest corner), and a Domino Sugar roadway that extended South 2nd Street through Lot 1. The fuel tank area consists of two 200,754 gallon No. 6 fuel oil underground storage tanks that are registered with the New York State Department of Environmental Conservation as a Major Oil Storage Facility (MOSF).

Site B is currently bordered by Site A to the north (which includes the former Domino Sugar Research and Development Lab Building and Raw Sugar Warehouse Building), the former sugar refinery building (Site D) to the south, Kent Avenue to the east and the western half of the former Raw Sugar Warehouse to the west. Site B is a slightly irregular rectangular shaped area consisting of 340.958 feet of street frontage on Kent Avenue and a depth of approximately 224.75 feet, for a total of approximately 76,464 ft<sup>2</sup>.

Following redevelopment, Site B will be subdivided to create a new tax lot (Proposed Lot B), and newly mapped streets including South 1st Street, South 2nd Street and River Street. A new recreational and shoreline walkway/park will be created on the opposite side of River Street, which will span along the west side of Sites A, B, C, D and F.

Following redevelopment, Proposed Lot B will be bordered by Kent Avenue to the east, newly mapped South 1st Street to the north, newly mapped South 2nd Street to the south, and newly mapped River Street to the west. Proposed Lot B will consist of 220 feet of street frontage on Kent Avenue and River Avenue, and approximately 189.875 feet of street frontage on South 1st Street and South 2nd Street, creating a 41,772-square feet lot. The portion of Site B which will be converted into Proposed Lot B currently consists of the parking lot and MOSF fuel tank area, and the truck fueling area along Kent Avenue.

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## 1.2 Proposed Redevelopment Plan

Redevelopment of the former Domino Sugar properties (Block 2414, Lot 1 and Block 2428, Lot 1) will include four new mixed-use buildings (Sites A, B, D, E), adaptively reuse the existing landmarked Refinery building (Site F), create a one acre inland green space to be called Domino Square (Site C) and develop a new waterfront park.

The redevelopment project would encompass approximately 3 million ft<sup>2</sup>, consisting of approximately 2.2 million ft<sup>2</sup> of residential floor area (to consist of both market rate and affordable housing), 500,000 ft<sup>2</sup> of commercial space, and 150,000 ft<sup>2</sup> of community facility space, as well as approximately 1,050 parking spaces. Publicly accessible open space, totaling approximately 4.8 acres, would also be created along the waterfront and throughout the Development Site. Additionally, new public sidewalks and streets (extension of South 1st Street, South 2nd Street, South 3rd Street and South 4th Street, and creation of River Street between Sites A, B, C, D and F and the waterfront park) totaling approximately 2.0 acres are proposed, providing increased public access to the waterfront.

In mixed-use buildings, residential units would generally be located on the upper floors, while office, retail, and community facility uses, including a 375-seat school within the Proposed Lot B building, would generally occupy the ground and lower floors.

The public access areas would be landscaped with large lawn areas, improved with planters and seating areas. This area would be programmed for passive uses, including seating areas and an artifact walk with historic elements from the Domino Sugar factory buildings on display, and active uses, such as playing fields and a dog run. The portion of the waterfront park to be constructed immediately west of Site B will consist of the passive recreation area, which will include lawn areas, picnic space, a lounge area, and the artifacts display area. Although this waterfront park immediately west of Site B was investigated as a part of this Remedial Investigation, it will be redeveloped under a separate Remedial Action Work Plan from Site B.

The proposed future use of Proposed Lot B will consist of a new 370 foot tall mixed-use building containing approximately 1,000,000 SF of space, and consisting of commercial retail use, community facility use including a school, and residential use. This building would also include a 300-space accessory parking facility.

A cellar level parking garage will be constructed across the majority of Proposed Lot B, with the exception of an unexcavated area along River Street. The cellar level will consist of parking, bicycle storage, the electrical, telecom, gas, water, sewer, mechanical and fire pump rooms, and three elevator pits. The ground level will consist of retail space along Kent Avenue and River

Street, the school's lobby and bicycle storage room, the residential lobbies for the north tower and south tower, additional vehicular parking spaces and the parking garage entrance/exits from South 1st Street and South 2nd Street. The second floor will consist of additional vehicular parking spaces. The building's third and fourth floors will consist of the school's classrooms, gymnasium, restrooms, kitchen, and storage areas. The building then divides into the north and south towers. The 5th through 35th floors will each consist of residential apartments, and the roofs of the two towers will house the boiler rooms, generator room, electrical rooms, and Cogen rooms.

Excavation for the building's cellar level will be performed to an elevation of approximately +5ft. The eastern end of Site B has an approximate elevation of +22ft and the western end of Site B has an approximate elevation of +10 to +12ft. Therefore, the excavation to a depth of approximately 17 feet will be required on the eastern end of the Site B, and excavation to a depth of approximately 5 to 7 feet will be required on the western end of Site B. Assuming an average excavation depth of approximately 10 feet across the cellar's 220 ft by 168 ft area, a total of approximately 14,000 cubic yards (21,000 tons) of soil will require removal for the new building's cellar. Additional excavation up to depths of 4 to 5 feet may be required along the River Street end of Proposed Lot B to construct the building's foundation and install the building's concrete slab. Limited excavation (1 to 2 ft maximum) will be required for the sidewalks and streets surrounding Site B to install a 6" layer of aggregate base and either asphalt (streets) or concrete (sidewalks/driveways). Layout of the proposed site development is presented in Figure 3. The current zoning designation is C6-2. The proposed use is consistent with existing zoning for the property.

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

### 1.3 Description of Surrounding Property

The area immediately surrounding Site B consists of the former Domino Sugar facility buildings to the south and north, the East River to the west and other former industrial/manufacturing buildings to the east across Kent Avenue. Figure 4 shows the surrounding land usage of the adjacent properties listed below as well as additional properties located up to 500 feet away from

the Site. No hospitals, schools or daycare facilities are located within a 250 ft radius of the Site. The nearest school is P.S. 084, which is located at 283 Berry Street, approximately 500 feet east Site B.

**Surrounding Property Usage**

<b>Direction</b>	<b>Property Description</b>
<b>North</b> – Adjacent Property	<u>Block 2414, Lot 1 (SITE A)</u> - 254-268 Kent Avenue A one/two story industrial/office building formerly utilized by Domino Sugar as a research and development laboratory. The building is being demolished for construction of a new residential tower. As part of redevelopment, South 1st Street will be expanded to divide Proposed Lot B from Proposed Lot A.
<b>South</b> – Adjacent Property	<u>Block 2414, Lot 1 (SITE F)</u> - 292 to 314 Kent Avenue The former Domino Sugar Refinery Building is located on the opposite side of a roadway. As part of redevelopment, the Refinery Building will be renovated, and the roadway will be converted into South 2nd Street.
<b>East</b> – Opposite side of Kent Avenue	<u>Block 2403, Lot 1</u> - 285 Kent Avenue A 37,800 ft <sup>2</sup> property developed with a one and two story industrial/manufacturing building currently occupied with a dance studio and Windmill Studios.
<b>West</b> –	<u>East River</u>

**1.4 Remedial Investigation**

A remedial investigation was performed and the results are documented in a companion document called “*Remedial Investigation Report, 270-290 Kent Avenue, Brooklyn, NY*”, dated June 2014 (RIR).

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

Two Phase I Environmental Site Assessment Reports have been completed for Sites A, B, C, D, E and F.

A Phase I Environmental Site Assessment Report was completed by Environmental Health Investigations, Inc. in 2004 for Sites A, B, C, D, E and F. At the time the Phase I ESA was completed, the Site B portion of Lot 1 consisted of two 200,754-gallon No. 6 fuel oil underground storage tanks, a part of the former raw sugar warehouse, a wash house, and two large above ground storage tanks for the storage of sugar liquor. The two ASTs were used to store up to 2.5 million gallons of "A liquor". These two tanks have since been removed, but their circular concrete bases are visible on recent aerial photographs.

The Phase I ESA indicated Lot 1 has been developed as a sugar refinery since the 1850's by companies such as the Brooklyn Sugar Refining Company (circa 1887), American Sugar Refining Company, Havemeyer and Elder Plant (from 1904 to 1970's), and the Amstar Corporation/Amstar Sugar Corporation, Domino Sugar Corporation, and Tate & Lyle North American Sugar, Inc. (1970's to 1990's). In June 1999 the facility ceased raw sugar refining, and instead began receiving partially raw sugar liquor from an affiliate facility. The northern most portion of Lot 1 (Site A) was also utilized by the Scranton Coal Company as a coal yard. Tate & Lyle North American Sugar, Inc. operated until early 2004.

The Phase I ESA revealed the following Recognized Environmental Conditions in connection with the Site B:

- The facility is a major oil storage facility. There is a tank area with a capacity over 400,000 gallons. There is visible staining of soil in the tank farm area. A subsurface investigation should be conducted in the vicinity of the tank farm.

A Phase I Environmental Site Assessment Report was completed by Emteque LLC in 2012, for Sites A, B, C, D, E, and F. Historic Sanborn maps provided within the report were reviewed by EBC and the following information was obtained:

Prior to 1935, River Street which currently terminates at Grand Street, formerly continued south along the eastern end of Site B, creating a small triangular property between River Street, Kent Avenue and South 1st Street. In the late 1880's, the triangular property was developed with two small houses and a property labeled as junk. The rest of the footprint of Site B was developed with multiple industrial buildings labeled as part of the Brooklyn Sugar Refining Co. The industrial buildings included: (1) a 2 story building labeled as the coal house which contained 10 boilers on the first floor and an additional 6 boilers on the second floor, (2) a three story building labeled as the kiln & filter house, (3) an 11 story building containing vacuum pans, a centrifugal machine, and a pump and dynamo room, (4) a five story building labeled as a machine shop, and (5) 3- and 5-story buildings labeled as mixing and sugar storage.

By 1904, the houses and junk yard on the triangular lot were replaced with a 2-story building that extended over the top of River Street, and all of the industrial buildings are labeled as part of

American Sugar Refining Co. The 11-story building formerly containing the vacuum pans was converted into the refinery. The 1918 Sanborn map indicated most of the industrial buildings were vacant or converted into storage, and by 1935, all of the buildings except the existing raw sugar storage warehouse were demolished. The 1950 Sanborn maps notes the two MOSF tanks that are currently present on Site B, and the 1965 Sanborn map shows the small fuel oil pump house, and an underground gasoline tank and two small sheds/buildings immediately north of the MOSF tanks. The rest of Site B was utilized as parking. Sanborn maps from the late 1970s to the early 1990's, labeled all of Lot 1 as Amstar Corp., and from the early 1990's to 2007, the facility was labeled as Domino Sugar.

The Emteque LLC Phase I Environmental Site Assessment Report identified multiple recognized environmental conditions in connection with Lot 1. However, only four are believed to be associated with Site B: (1) underground storage tanks (USTs) and associated piping, (2) stained soils/stressed vegetation, (3) historic/urban fill, and (4) neighboring properties.

The AOCs identified for Site B include:

1. Two underground storage tanks with a combined capacity of 400,000 gallons are located in the southeast corner of Site B.
2. Historic fill layer is present at the Site at depths as great as 16 feet below grade.
3. Evidence of as many as nine gasoline or diesel underground storage tanks were observed near the Kent Avenue sidewalk in the former truck fueling area.

### **Summary of the Work Performed under the Remedial Investigation**

EBC performed the following scope of work within Site B in April of 2014:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed five soil borings within Site B, and one soil boring west of Site B within an area to be converted into the waterfront park/recreation area, and collected twelve soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed two groundwater monitoring wells within Site B, and one groundwater monitoring well west of Site B within an area to be converted into the waterfront park/recreation area, to establish groundwater flow and collected three groundwater

- samples from three monitoring wells and collected one groundwater sample from one of the four existing MOSF tank monitoring wells to evaluate groundwater quality; and
4. Installed four soil vapor probes within Proposed Lot B and collected four soil vapor samples for chemical analysis.

### Summary of Environmental Findings

1. The elevation of Site B is approximately 7 feet on the western end, and approximately 16 feet along Kent Avenue.
2. Depth to groundwater varies across Site B from approximately 5 feet on the western end, to approximately 14 feet along Kent Avenue.
3. Depth to bedrock is at the Site is greater than 100 feet.
4. The stratigraphy of Site B, from the surface down, consists of a layer of historic fill material that varies from 8 to approximately 16ft, underlain by a medium brown sand or black/grey silty sand with a bog odor.
5. Soil/fill samples collected during the 2014 EBC RI, 2004 Nova Phase II, 2004 Nova Phase III, and 2008 AKRF Phase II showed the following VOCs at a detectable concentration below Unrestricted Use SCOs; 1,2,4-trimethylbenzene (maximum [max] of 62 micrograms per kilogram [ $\mu\text{g}/\text{Kg}$ ]), 1,3,5-trimethylbenzene (16  $\mu\text{g}/\text{Kg}$ ), benzene (6.6  $\mu\text{g}/\text{Kg}$ ), carbon disulfide (max of 25  $\mu\text{g}/\text{Kg}$ ), ethylbenzene (37  $\mu\text{g}/\text{Kg}$ ), Freon 113 (12  $\mu\text{g}/\text{Kg}$ ), isopropylbenzene (max of 48  $\mu\text{g}/\text{Kg}$ ), m&p-xylenes (max of 95  $\mu\text{g}/\text{Kg}$ ), methylene chloride (max of 46  $\mu\text{g}/\text{Kg}$ ), naphthalene (max of 9,000  $\mu\text{g}/\text{Kg}$ ), o-xylene (max of 58  $\mu\text{g}/\text{Kg}$ ), p-diethylbenzene (41  $\mu\text{g}/\text{Kg}$ ), p-ethyltoluene (230  $\mu\text{g}/\text{Kg}$ ), p-isopropyltoluene (max of 200  $\mu\text{g}/\text{Kg}$ ), and toluene (max of 57  $\mu\text{g}/\text{Kg}$ ). The VOC acetone (max of 480  $\mu\text{g}/\text{Kg}$ ) was detected within four soil samples at a concentration above Unrestricted Use SCOs, and the VOC methyl ethyl ketone (max of 130  $\mu\text{g}/\text{Kg}$ ) was detected within one soil sample at a concentration above Unrestricted Use SCOs. All VOS's were below Restricted Residential SCO's. Eight SVOCs including benz(a)anthracene (max of 18,000  $\mu\text{g}/\text{Kg}$ ), benzo(a)pyrene (max of 9,100  $\mu\text{g}/\text{Kg}$ ), benzo(b)fluoranthene (max of 7,700  $\mu\text{g}/\text{Kg}$ ), benzo(k)fluoranthene (max of 7,700  $\mu\text{g}/\text{Kg}$ ), chrysene (max of 19,000  $\mu\text{g}/\text{Kg}$ ), dibenz(a,h)anthracene (max of 1,200  $\mu\text{g}/\text{Kg}$ ), indeno(1,2,3-cd)pyrene (max of 2,400) and phenanthrene (max of 160,000  $\mu\text{g}/\text{Kg}$ ) were

detected above Unrestricted Use and Restricted Residential Use SCOs within soil samples retained from the historic fill layer. All of these maximum values were detected in the 0 to 2 foot interval at boring B-4, which represents a hotspot. Several metals including arsenic (max of 51.6 milligrams per kilogram [mg/Kg]), barium (max of 520 mg/Kg), chromium (max of 38.8 mg/Kg), copper (max of 1,060 mg/Kg), lead (max of 17,900 mg/Kg), mercury (max of 0.63 mg/Kg), nickel (max of 51.2 mg/Kg), and zinc (max of 1,430 mg/Kg) were detected above Unrestricted Use SCOs. Of these metals, arsenic, barium, copper, and lead also exceeded Restricted Residential Use SCOs within soil samples collected from the historic fill layer. The maximum value for lead was detected in the 10 to 12 foot interval at boring SB-3. The second highest value for lead was detected at 1,550 mg/Kg in the 0.5 to 2.5 foot interval at boring SB-4 within the future park area immediately west of Site B. Both of these locations represent hotspots. The maximum arsenic value was detected in the 0 to 2 foot interval at boring BSB-5, which also represents a hotspot. The pesticide 4,4'-DDT (6.9 µg/Kg), was detected within one soil sample at a concentration above Unrestricted Use SCOs. Overall, the findings were consistent with observations for historical fill sites in areas throughout NYC except for the SVOC hotspot, the two lead hotspots, and the arsenic hotspot.

6. Groundwater samples collected during the 2014 EBC RI, 2004 Nova Phase III, and 2008 AKRF Phase II showed no detectable concentrations of pesticides or PCBs. No VOCs were detected above GQS, but the following VOCs were detected in one or more of the groundwater samples at concentrations below GQS: acetone (max of 46 micrograms per liter [µg/L]), methyl ethyl ketone (max of 5.6 µg/L), naphthalene (3 µg/L), p-isopropyltoluene (1 µg/L), and trichloroethylene (2 µg/L). SVOCs detected above GQS included 2-nitroaniline (12 µg/L), benzo(a)anthracene (6.4 µg/L), chrysene (4.1 µg/L), and/or nitrobenzene (2.5 µg/L) in two of the six monitoring wells. Several metals were detected in groundwater, but only iron, lead (0.26 mg/L), magnesium, manganese, and sodium exceeded their respective GQS in dissolved samples. The presence of some of these metals in groundwater, specifically those that are common salinity indicators, can be attributed to intrusion of road salting and proximity to the East River.
7. Soil vapor samples collected during the 2014 EBC RI indicated petroleum related VOCs and chlorinated VOCs were present at low concentrations. Petroleum-related VOCs

(BTEX) were detected at a maximum concentration of 18.81  $\mu\text{g}/\text{m}^3$ . Overall the highest reported concentrations were for acetone (maximum of 942  $\mu\text{g}/\text{m}^3$ ), ethanol (maximum of 70  $\mu\text{g}/\text{m}^3$ ), methyl ethyl ketone (92.8  $\mu\text{g}/\text{m}^3$ ), propylene (maximum of 165  $\mu\text{g}/\text{m}^3$ ), and trichloro-fluoro-methane (maximum of 62.9  $\mu\text{g}/\text{m}^3$ ). Chlorinated VOC, trichloroethylene (TCE) was not detected in any of the four soil gas samples. Tetrachloroethylene (PCE) was detected in three of the four soil gas samples at a maximum concentration of 0.67  $\mu\text{g}/\text{m}^3$ . Carbon tetrachloride was detected within two of the four soil gas samples at a maximum concentration of 0.503  $\mu\text{g}/\text{m}^3$ , and 1,1,1-trichloroethane (TCA) was detected in only one of the four soil gas samples at a concentration of 4.42  $\mu\text{g}/\text{m}^3$ . The PCE, carbon tetrachloride and TCA concentrations are below the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

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

## 2.0 REMEDIAL ACTION OBJECTIVES

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

### Groundwater

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

### Soil

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

### Soil Vapor

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

### 3.0 REMEDIAL ALTERNATIVES ANALYSIS

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

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

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

#### **Alternative 1 involves:**

- Selection of 6NYCRR Part 375 Table 6.8 (a) Unrestricted Use (Track 1) Soil Cleanup Objectives (SCOs).
- Removal of all soil/fill exceeding Track 1 Unrestricted Use SCOs throughout the Site and confirmation that Track 1 Unrestricted Use SCOs have been achieved with post-excavation endpoint sampling. Based on the results of the Remedial Investigation, it is expected that this alternative would require excavation across Site B to a depth of approximately 9 feet below grade for removal of historic fill, with some areas requiring

additional excavation to depths as great as 15 feet. Therefore, to remove all soil/fill containing analytes at concentrations above Unrestricted Use SCOs, additional excavation of historic fill material would be required within the streets and sidewalks surrounding Proposed Lot B, and the western end of Lot B that will be finished as slab-on grade.

- No Engineering or Institutional Controls can be utilized in a Track 1 cleanup, but installation of a vapor barrier/waterproofing membrane system beneath the cellar's foundation and behind foundation sidewalls of the new building would be installed as part of development to prevent exposures from off-Site soil vapor.
- Placement of a final cover over the entire Site as part of new development.

### **Alternative 2 involves**

- Establishment of Track 4 Site-Specific SCOs.
- Removal of all soil/fill exceeding Track 4 Site-Specific SCOs and confirmation that Track 4 Site-Specific SCOs have been achieved with post-excavation endpoint sampling. Excavation for construction of the building's cellar would take place to a depth of approximately 17 feet on the east end of Proposed Lot B, and approximately 5 to 7 feet towards the west end of Proposed Lot B, with the exception of the far west end of Proposed Lot B which will be slab-on grade. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the buildings is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs. Three hotspot areas identified during investigations will require additional soil excavations to achieve Track 4 Site-Specific SCOs. These three hotspot areas are: 1) soil boring location, B-4 (2' to 4' below grade) within the area to be converted into South 2nd Street; 2) soil boring location SB-3 for lead hotspot at 10 to 12 feet below grade; and 3) soil boring SB-4 for lead hotspot within the area to be converted into River Street. Additional excavation at all three soil boring locations would need to occur to achieve Track 4 Site-Specific SCOs.
- Placement of a final cover over the entire Site to prevent exposure to remaining soil/fill;

- Installation of a soil vapor barrier/waterproofing membrane system beneath the building's slab and along foundation side walls to prevent any potential future exposures from off-Site soil vapor;
- Establishment of use restrictions including prohibitions on the use of groundwater from the Site; prohibitions of sensitive Site uses, such as farming or vegetable gardening, to prevent future exposure pathways; and prohibition of a higher level of land use without OER approval;
- Establishment of an approved Site Management Plan (SMP) to ensure long-term management of these Engineering and Institutional Controls including the performance of periodic inspections and certification that the controls are performing as they were intended; and
- Continued registration as an E-designated property to memorialize the remedial action and the Engineering and Institutional Controls required by the RAWP.

### 3.1 Threshold Criteria

#### Protection of Public Health and the Environment

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

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

**Alternative 2** would achieve comparable protections of human health and the environment by excavating historic fill at the Site and by ensuring that remaining soil/fill on-Site meets Track 4 Site-Specific SCOs, as well as by placement of Institutional and Engineering controls, including a composite cover system. The composite cover system would prevent direct contact with any remaining on-Site soil/fill. The vapor barrier/waterproofing membrane system would prevent any

soil vapors from entering the new building. Implementing Institutional Controls including a Site Management Plan would ensure that the composite cover system remains intact and protective. Establishment of Track 4 Site-Specific SCOs would minimize the risk of contamination leaching into groundwater.

For both Alternatives, potential exposure to contaminated soils or groundwater during construction would be minimized by implementing a Construction Health and Safety Plan, an approved Soil/Materials Management Plan and Community Air Monitoring Plan (CAMP). Potential contact with contaminated groundwater would be prevented as its use is prohibited by city laws and regulations. Potential future migration of off-Site soil vapors into the buildings would be prevented by installing a vapor barrier/waterproofing membrane system below the new building's cellar slab and continuing the vapor barrier/waterproofing membrane around foundation walls.

### **3.2. Balancing Criteria**

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

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

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

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

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

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

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

Both alternatives 1 and 2 have similar short-term effectiveness during their respective implementations, as each requires excavation of historic fill material. Both alternatives would result in short-term dust generation impacts associated with excavation, handling, load out of materials, and truck traffic. Short term impacts would be higher for Alternative 1 due to a greater amount of historical fill material required to be excavated from the streets surrounding Proposed Lot B and below the building. However, focused attention to means and methods during the remedial action during a Track 1 removal action, including community air monitoring and appropriate truck routing, would minimize or negate the overall impact of these activities.

An additional short-term adverse impact and risks to the community associated with both remedial alternatives is increased truck traffic. Approximately 840, 25-ton capacity truck trips would be necessary for Alternative 2 to transport fill and soil excavated during Site development. Truck traffic will be routed on the most direct course using major thoroughfares where possible and flaggers will be used to protect pedestrians at Site entrances and exits.

The effects of these potential adverse impacts to the community, workers and the environment will be minimized through implementation of corresponding control plans including a

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

### **Long-term effectiveness and permanence**

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

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

Alternative 2 would provide long-term effectiveness by removing most on-Site contamination and attaining Track 4 Site-Specific SCOs; a composite cover system across the Site, maintaining use restrictions, establishing an SMP to ensure long-term management of Institutional Controls (ICs), Engineering Controls (ECs), and maintaining continued registration as an E-designated property to memorialize these controls for the long term. The SMP would ensure long-term effectiveness of all ECs and ICs by requiring periodic inspection and certification that these controls and restrictions continue to be in place and are functioning as they were intended assuring that protections designed into the remedy would provide continued high level of protection in perpetuity.

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

### **Reduction of toxicity, mobility, or volume of contaminated material**

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

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

Alternative 2 would remove a large quantity of the historic fill at the Site, and any remaining on-Site soil beneath the building and within the streets surrounding Proposed Lot B would meet Track 4 - Site-Specific SCOs. Alternative 1 would eliminate a greater total mass of contaminants on Site.

### **Implementability**

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

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

### **Cost effectiveness**

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

Costs associated with Alternative 1 would be significantly higher than Alternative 2 since historic fill with analytes above Unrestricted Use SCOs is present both below the excavation depth required for new building and in areas not required to be excavated for the both the new building and streets/sidewalks surrounding Proposed Lot B. Additional costs would include disposal of additional soil/fill, and import of clean soil for backfill. Additional long-term costs would be required for Alternative 2 based on implementation of a Site Management Plan as part of Alternative 2.

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

### **Community Acceptance**

This evaluation criterion addresses community opinion and support for the remedial action. Observations here will be supplemented by public comment received on the RAWP. Based on the overall goals of the remedial program and initial permitting associated with the proposed site development, no adverse community opinion is anticipated for either alternative. This RAWP

will be subject to a public review under the NYC VCP and will provide the opportunity for detailed public input on the remedial alternatives and the selected remedy. This public comment will be considered by OER prior to approval of this plan. The Citizen Participation Plan for the project is provided in Attachment B.

### **Land use**

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

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

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

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

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

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

## 4.0 REMEDIAL ACTION

### 4.1 Summary of Preferred Remedial Action

The preferred remedial action is Alternative 2, the Track 4 Alternative. The preferred remedial action alternative achieves protection of public health and the environment for the intended use of the property. The preferred remedial action alternative will achieve all of the remedial action objectives established for the project and addresses applicable SCGs. The preferred remedial action alternative is effective in both the short-term and long-term and reduces mobility, toxicity and volume of contaminants. The preferred remedial action alternative is cost effective and implementable and uses standards methods that are well established in the industry.

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Site-Specific (Track 4) Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Performance of geophysical/test pits/trenches prior to start of building construction in proposed roads area and areas of the building footprint where excavation will not occur;
6. Completion of a Waste Characterization Study prior to excavation activities;
7. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs. For development purposes, 75% of the Site will be excavated, to depth of approximately 17 feet on the east end of Proposed Lot B, and approximately 5 to 7 feet towards the west end of Proposed Lot B. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the buildings is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs. In addition, four hotspot areas (Borings B-4, SB-4, SB-3, and BSB-5) identified during investigations will be excavated from 4 feet to 12 feet depths to achieve Track 4 SCOs. Approximately, 21,000 tons of soils will be excavated and removed from this Site;

8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
9. Management of excavated materials including temporarily stockpiling and segregating to prevent co-mingling of contaminated material and non-contaminated materials.
10. Removal of 9 suspected underground storage tanks (USTs) along Kent Avenue sidewalk and other USTs (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;
11. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site;
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs;
13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
14. Installation of a waterproofing membrane system below the cellar slab and slab on-grade portion of the building, as well as behind subgrade portions of foundation walls of the proposed building. The waterproofing membrane system will consist of Preprufe 300R and Bituthene 4000 as manufacturing by Grace. Preprufe 300 is a 1.2 mm (0.046in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. Preprufe 300 will be installed below the building's cellar slab and on grade portion of the building slab along River Street. Bituthene 4000 is a flexible preformed waterproof membrane combining a high performance cross laminated, HDPE carrier film with a unique super sticky self-adhesive rubber bitumen compound. Bituthene 4000 will be installed behind the building's foundation walls to grade.
15. Construction and maintenance of an engineered composite cover consisting of the building's 2.5 ft and 5 ft thick pile-supported mat building slab to prevent human exposure to residual soil/fill remaining under the Site. Sidewalks and roadways will consist of a geotextile layer installed above a prepared subgrade, a 6 inch thick layer of a

compacted aggregate base, and a 4 inch or 7 thick layer of concrete (sidewalks/driveways) or a layer of asphaltic concrete binder course below a asphaltic concrete top course (street);

- 16. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
- 17. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
- 18. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
- 19. Submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual materials, including plans for operation, maintenance,, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
- 20. The property will continue to be registered with an E-Designation at the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

**4.2 Soil Cleanup Objectives and Soil/Fill Management**

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

<u>Contaminant</u>	<u>Track 4 SCOs</u>
Total SVOCs	250 ppm
Arsenic	24 ppm
Mercury	1.5 ppm
Lead	1,200 ppm

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

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

### **Estimated Soil/Fill Removal Quantities**

The total quantity of soil/fill expected to be excavated and disposed off-Site is 21,000 tons. Disposal location(s) will be reported promptly to the OER Project Manager prior to the start of the remedial action.

### **End-Point Sampling**

Removal actions under this plan will be performed in conjunction with remedial end-point sampling. Post-excavation end-point sampling and testing will be performed promptly following materials removal and completed prior to Site development activities. To evaluate attainment of Track 4 - Site-Specific SCOs, 11 endpoint soil samples will be collected and analyzed for SVOCs and selected metals. The approximate collection location of the endpoint soil samples is shown on Figure 8. Four hot-spots were identified within the RI. Soil boring B-4 performed as part of the 2004 NOVA Phase II identified SVOCs above Track 4 Site-Specific SCOs at a depth of 2 to 4 feet below grade, within the area to be converted into South 2nd Street. Soil boring SB-3 performed as part of the 2008 AKRF Phase II identified lead at a concentration of 17,900 mg/kg at 10 to 12 feet below grade, within the area to be excavated to approximately 8 feet below grade for the new building. Soil boring SB-4 performed as part of the 2008 AKRF Phase II identified lead at a concentration of 1,550 mg/kg within the area to be converted into River Street. Additional excavation and hotspot sampling at all three soil boring locations will need to occur to achieve Track 4 Site-Specific SCOs. The arsenic hotspot identified in the RI at soil boring B-SB5 will be excavated to 13 feet below grade for the new building. The sampling locations are shown on Figure 8.

In addition, if additional hotspots are encountered, hotspot removal end-point sampling frequency will consist of the following:

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

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

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

Soil analytical methods will include:

- Volatile organic compounds by EPA Method 8260;
- Semi-volatile organic compounds by EPA Method 8270;

- Target Analyte List metals; and
- Pesticides/PCBs by EPA Method 8081/8082.

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

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

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

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

Collected samples will be appropriately packaged, placed in coolers and shipped via overnight courier or delivered directly to the analytical laboratory by field personnel. Samples will be containerized in appropriate laboratory provided glassware and shipped in plastic coolers. Samples will be preserved through the use of ice or “cold-paks” to maintain a temperature of 4°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 on-Site will be performed in conformance with the Soil/Materials Management Plan in Attachment D. The estimated quantity of soil to be imported into the Site for backfill and cover soil is 0 tons. The estimated quantity of onsite soil/fill expected to be reused as backfill behind Site perimeter shoring is approximately 0 tons.

### **4.3 Engineering Controls**

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

#### **Composite Cover System**

All of Site B will be covered by an engineered composite cover system. This cover system will be comprised of the building's 2.5 ft and 5 ft thick pile-supported mat building slab with a minimum 6-inch subbase beneath the area of the proposed building (cellar and slab-on grade portions). Sidewalks and roadways will consist of a geotextile layer installed above a prepared subgrade, a 6 inch thick layer of a compacted aggregate base, and a 4 inch or 7 thick layer of concrete (sidewalks/driveways) or a layer of asphaltic concrete binder course below a asphaltic concrete top course (street).

The composite cover system will be a permanent engineering control to address residual soils. The composite cover system will serve as a permanent engineering control for the Site. The system will be inspected and reported at specified intervals as required by this RAWP and the Site Management Plan. A Soil and Materials Management Plan (SMMP) 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/Vapor Barrier**

Migration of potential soil vapor from off-Site in the future will be achieved with a combination of building slab and vapor barrier waterproofing membrane system. The waterproofing membrane system will consist of Preprufe 300R system and Bituthen 4000 as manufactured by Grace. Preprufe 300 is a 1.2 mm (0.046in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. Preprufe 300 will be installed below the building's cellar slab and on grade portion of the building slab along River Street. Bituthene 4000 is a flexible preformed waterproof membrane combining a high performance cross laminated, HDPE carrier film with a unique super sticky self-adhesive rubber bitumen compound. Bituthene 4000 will be installed behind the building's foundation walls to grade.

The Preprufe 300R system will extend throughout the area occupied by the footprint of the new building and Bituthen 4000 will extend up the subgrade portions of foundation sidewalls to grade in accordance with manufacturer specifications.

The project's Professional Engineer licensed by the State of New York will have primary direct responsibility for overseeing the implementation of the vapor barrier. The extent of the proposed waterproofing membrane system is provided in Figure 9. Installation details (penetrations, joints, etc.) with respect to the proposed buildings' foundations, footings, slab, and sidewalls are provided in Figure 7. Product specification sheets are provided in Attachment E. The Remedial Closure Report will include photographs (maximum of two photos per page) of the installation process, PE/RA certified letter (on company letterhead) from primary contractor responsible for installation oversight and field inspections, and a copy of the manufacturers certificate of warranty.

#### 4.4 Institutional Controls

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

Institutional Controls for this remedial action are:

- The property will continue to be registered with an E-Designation at the NYC Buildings Department. This RAWP includes a description of all ECs and ICs and summarizes the requirements of the Site Management Plan which will note that the property owner and property owner's successors and assigns must comply with the approved SMP;
- Submittal of a Site Management Plan in the RAR for approval by OER that provides procedures for appropriate operation, maintenance, inspection, reporting and certification of ECs. SMP will require that the property owner and property owner's successors and assigns will submit to OER a periodic written statement that certifies that: (1) controls employed at the Site are unchanged from the previous certification or that any changes to the controls were approved by OER; and, (2) nothing has occurred that impairs the ability of the controls to protect public health and environment or that constitute a violation or failure to comply with the SMP. OER retains the right to enter the Site in order to evaluate the continued maintenance of any controls. This certification shall be submitted annually and will comply with RCNY §43-1407(1)(3).
- Vegetable gardens and farming on the Site are prohibited;
- Use of groundwater underlying the Site is prohibited without treatment rendering it safe for its intended use;
- All future activities on the Site that will disturb residual material must be conducted pursuant to the soil management provisions in an approved SMP;
- The Site will be used for residential, commercial, and institutional use and will not be used for a higher level of use without prior approval by OER.

#### 4.5 Site Management Plan

Site Management is the last phase of remediation and begins with the approval of the Remedial Action Report and issuance of the Notice of Completion (NOC) for the Remedial Action. The

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

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

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

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

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

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

Investigations reported in the Remedial Investigation Report (RIR) are sufficient to complete a Qualitative Human Health Exposure Assessment (QHHEA). As part of the VCP process, a QHHEA was performed to determine whether the Site poses an existing or future health hazard to the Site's exposed or potentially exposed population. The sampling data from the RI were evaluated to determine whether there is any health risk by characterizing the exposure setting,

identifying exposure pathways, and evaluating contaminant fate and transport. This EA was prepared in accordance with Appendix 3B and Section 3.3 (b) 8 of the NYSDEC Draft DER-10 Technical Guidance for Site Investigation and Remediation.

### **Known and Potential Sources**

Historic fill material is present at the Site from grade to depths as great as 15 feet below grade. Based on the results of the Remedial Investigation Report, the contaminants of concern found are:

#### Soil

- VOCs, including acetone and methyl ethyl ketone were detected at concentrations exceeding Unrestricted Use SCOs, however, all VOC's were below Restricted Residential Use SCO's;
- SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, phenanthrene, and indeno(1,2,3-cd)pyrene, were detected at concentrations exceeding Restricted Residential Use SCOs; and
- Metals, including arsenic, barium, copper, and lead were detected at concentrations exceeding Restricted Residential Use SCOs;

#### Groundwater

- SVOCs, including benzo(a)anthracene, chrysene, nitrobenzene, and 2-nitroaniline were detected above GQS; and
- Metals, including iron, lead, magnesium, manganese and sodium were detected above GQS;

#### Soil vapor

- Chlorinated VOCs detected at low concentrations including 1,1,1-trichloroethylene, carbon tetrachloride and tetrachloroethylene. Chlorinated VOC's were all below monitoring values established by State DOH; and
- Petroleum VOCs detected at low concentrations including benzene, toluene, ethylbenzene and xylenes.

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## Nature, Extent, Fate and Transport of Contaminants

SVOCs and metals are present in the historic fill materials throughout the Site. Two of these SVOCs found in soil, benzo(a)anthracene and chrysene, and one metal, lead, were also detected in groundwater samples at a concentration above their respective GQSs. Dissolved metals including iron manganese, magnesium and sodium were detected above GQS. The chlorinated VOCs in soil vapor were well below guidance issued by New York State DOH and were not found in any of the on-Site soil or groundwater samples collected.

## Receptor Populations

On-Site Receptors – Site B formerly consisted of the MOSF tanks, an uncapped parking area for the Domino Sugar facility, the eastern portion of the raw sugar warehouse, and an asphalt capped roadway between the MOSF tanks and the refinery building. Demolition of the former Raw Sugar Warehouse building is scheduled to begin on September 1, 2014, and is expected to be completed in November 2014. The MOSF tanks has been emptied and cleaned and expected to be removed in late August/early September, 2014. Closure of the two MOSF tanks will be performed in accordance with the New York State Department of Environmental Conservation approved Former Domino Sugar Refinery MOSF Facility No. 2-2440 Site Assessment Work Plan for Facility Closure dated June 2014, prepared by EBC. The Tank Closure Report and modified NYSDEC Petroleum Bulk Storage filing will be provided to OER upon approval from NYSDEC. Due to the current demolition activities, On-Site receptors for all of Lot 1 are limited to the Site owner's and contractors. During redevelopment of the Site, the on-Site potential receptors will include construction workers, site representatives, and visitors. Once the Site is redeveloped, the on-Site potential sensitive receptors will include adult and child building residents, workers and visitors.

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

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

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## 5. Schools (up to .25 mile) – existing and future

### **Potential Routes of Exposure**

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

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

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

Current Conditions: The majority of Site B is uncapped, therefore the potential for exposure to surficial historic fill exists under current conditions. Groundwater is marginally contaminated but is not exposed at the Site, and because the Site is served by the public water supply and groundwater use for potable supply is prohibited, groundwater is not used at the Site and there is no potential for exposure under current conditions. There are no buildings on Site B, with the exception of a portion of the Raw Sugar Warehouse building which is scheduled for demolition in September 2014. The Raw Sugar Warehouse building is currently vacant. Therefore, accumulation of soil vapor does not pose an exposure threat.

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

Soil/Materials Management Plan, dust controls, and through the implementation of the Community Air-Monitoring Program and a Construction Health and Safety Plan. Because groundwater is shallow, there may be a direct pathway for exposure during the remedial construction period. As there will be building within the footprint of Site B during the remedial period and the construction phase is short term, on-Site, accumulation of soil vapor during the remedial period will not pose an exposure threat.

Proposed Future Conditions: Under future remediated conditions, all soils in excess of Track 4 SCOs will be removed. The Site will be fully capped, eliminating potential direct exposure to soil and groundwater remaining in place, and the vapor barrier/waterproofing membrane system will prevent any exposure to potential off-Site soil vapors in the future. The Site is served by a public water supply, and groundwater is not used at the Site for potable supply. There are no plausible off-Site pathways for ingestion, inhalation, or dermal exposure to contaminants derived from the Site under future conditions.

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

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

Based upon this analysis, complete on-Site exposure pathways appear to be present during current conditions and during the remedial action phase. During remedial construction, on-Site and off-Site exposures to contaminated dust from historic fill material will be addressed through dust controls, and through the implementation of the Community Air Monitoring Program, the Soil/Materials Management Plan, and a Construction Health and Safety Plan. After the remedial

action is complete, there will be no remaining exposure pathways to on-Site soil/fill, as all soil above Track 4 Site Specific SCOs will have been removed and a vapor barrier/waterproofing membrane system will have been installed as part of development. For the long term, a Site Management Plan will ensure that any residual materials are properly managed if future construction is required and that engineering controls will remain in place. Periodic inspections will be performed to ensure those controls remain effective. In addition, the site will continue to be registered with an E-Designation, requiring involvement of OER before new construction that could alter the engineering controls can take place.

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## 5.0 REMEDIAL ACTION MANAGEMENT

### 5.1 Project Organization and Oversight

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

### 5.2 Site Security

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

### 5.3 Work Hours

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

### 5.4 Construction Health and Safety Plan

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

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

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

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

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

### **5.5 Community Air Monitoring Plan**

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

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

### **VOC Monitoring, Response Levels, and Actions**

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

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

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

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

### **Particulate Monitoring, Response Levels, and Actions**

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

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

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ( $\text{mcg}/\text{m}^3$ ) 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.

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### **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**

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

### **Equipment and Material Staging**

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

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**Stabilized Construction Entrance**

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

**Truck Inspection Station**

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

**Extreme Storm Preparedness and Response Contingency Plan**

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

**Storm Preparedness**

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

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

### **Storm Response**

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

## Storm Response Reporting

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

## 5.8 Traffic Control

Drivers of trucks leaving the NYC VCP Site with soil/fill will be instructed to proceed without stopping in the vicinity of the site to prevent neighborhood impacts. The planned route on local roads for trucks leaving the Site is shown on Figure 11.

## 5.9 Demobilization

Demobilization will include:

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

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

## 5.10 Reporting and Record Keeping

### Daily Reports

Daily reports providing a general summary of activities for each day of *active remedial work* will be emailed to the OER Project Manager by the end of the following day. Those reports will include:

- Project number and statement of the activities and an update of progress made and locations of work performed;
- Quantities of material imported and exported from the Site;
- Status of on-Site soil/fill stockpiles;
- A summary of all citizen complaints, with relevant details (basis of complaint; actions taken; etc.);
- A summary of CAMP excursions, if any;
- Photograph of notable Site conditions and activities.

The frequency of the reporting period may be revised in consultation with OER project manager based on planned project tasks. Daily email reports are not intended to be the primary mode of communication for notification to OER of emergencies (accidents, spills), requests for changes to the RAWP or other sensitive or time critical information. However, such information will be included in the daily reports. Emergency conditions and changes to the RAWP will be communicated directly to the OER project manager by personal communication. Daily reports will be included as an Appendix in the Remedial Action Report.

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

### Record Keeping and Photo-Documentation

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

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

### **5.11 Complaint Management**

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

### **5.12 Deviations from the Remedial Action Work Plan**

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

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

## 6.0 REMEDIAL ACTION REPORT

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

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

### **Remedial Action Report Certification**

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

*I, \_\_\_\_\_, am currently a professional engineer licensed by the State of New York. I had primary direct responsibility for implementation of the remedial program for the Domino Sugar Site B Redevelopment Project located at 270-290 Kent Avenue, Brooklyn, NY, NYC VCP Site number 15CVCP003K.*

*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 24 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	104
Demobilization	105	1
Submit Remedial Action Report	140	-

# **TABLES**

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

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

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

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

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

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

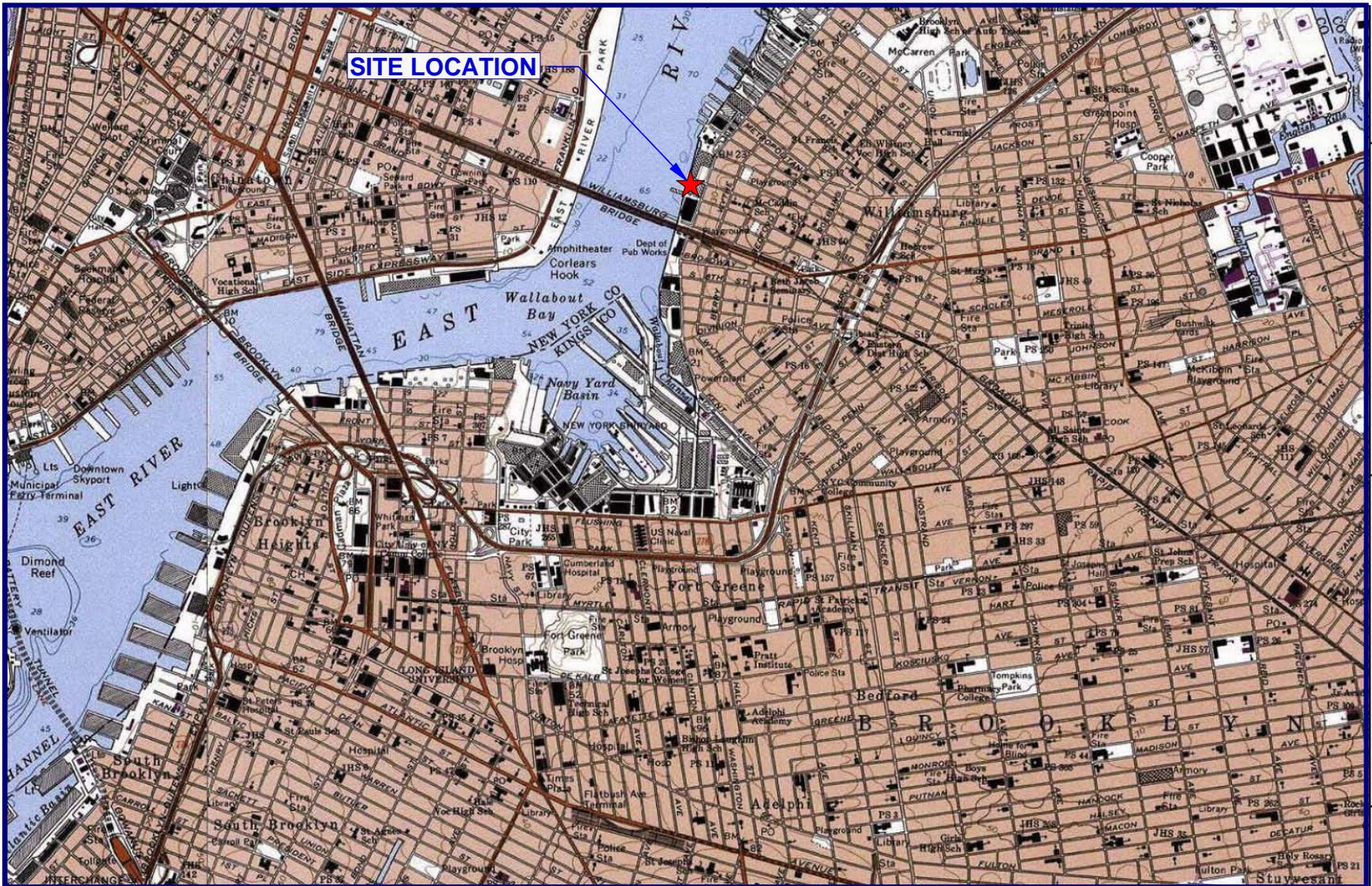
b The SCOs for commercial use were capped at a maximum value of 500 ppm. See TSD section 9.3.

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

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

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

# **FIGURES**



74°00.000' W

73°59.000' W

73°58.000' W

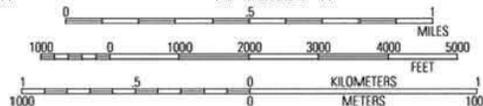
73°57.000' W

WGS84 73°56.000' W

40°43.000' N

40°42.000' N

40°41.000' N



USGS Brooklyn Quadrangle 1995, Contour Interval = 10 feet

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

Phone 631.504.6000  
 Fax 631.924.2780

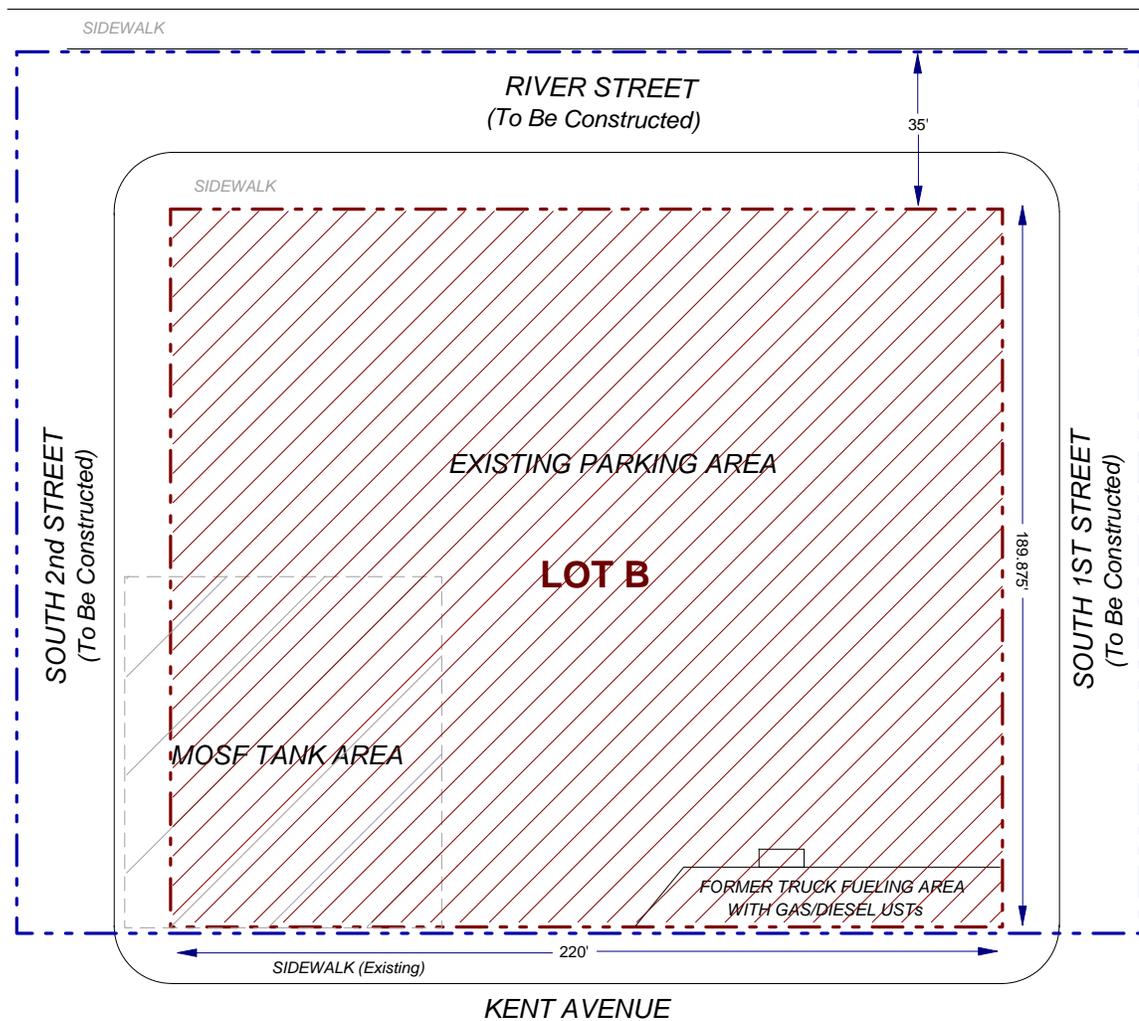
**FORMER DOMINO SUGAR SITE**  
**BROOKLYN, NY**

**FIGURE 1** SITE LOCATION MAP

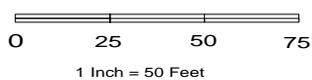
**B**

EAST RIVER

**Passive  
Recreation Area**  
(To Be Constructed)



**SCALE**



**KEY:**

- - - - - Boundary of Proposed Lot B
- - - - - Boundary of Site B



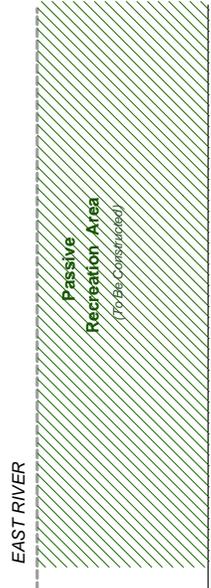
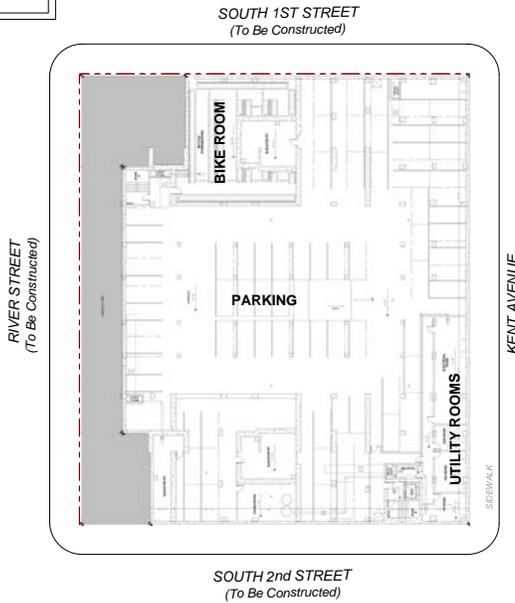
Phone 631.504.6000  
Fax 631.924.2870

**Figure No.**  
**2**

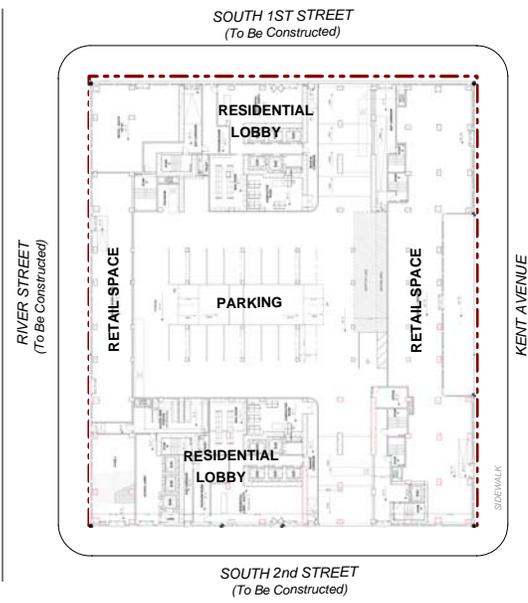
Site Name: Domino Sugar Site - Site B  
Site Address: 270 to 290 Kent Avenue, Brooklyn, NY  
Drawing Title: Site Boundary Map

**B**

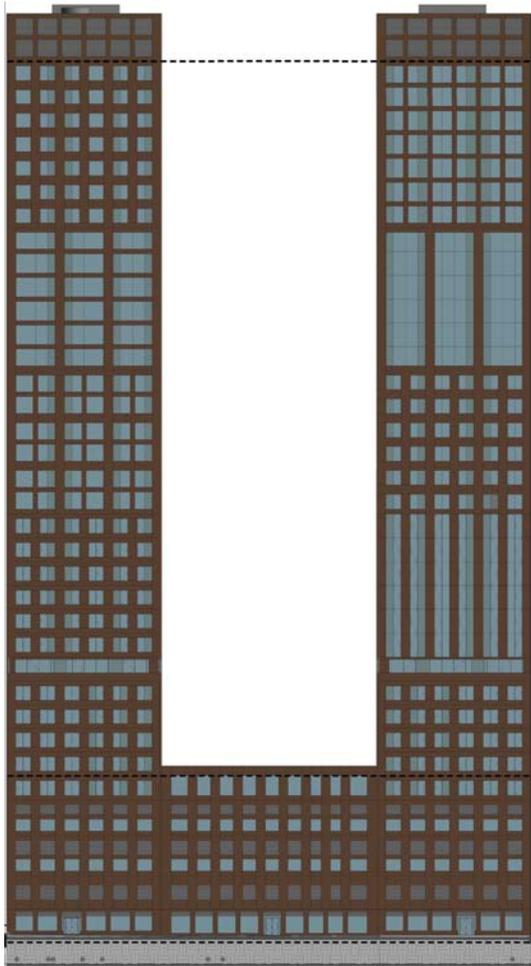
**CELLAR PLAN**



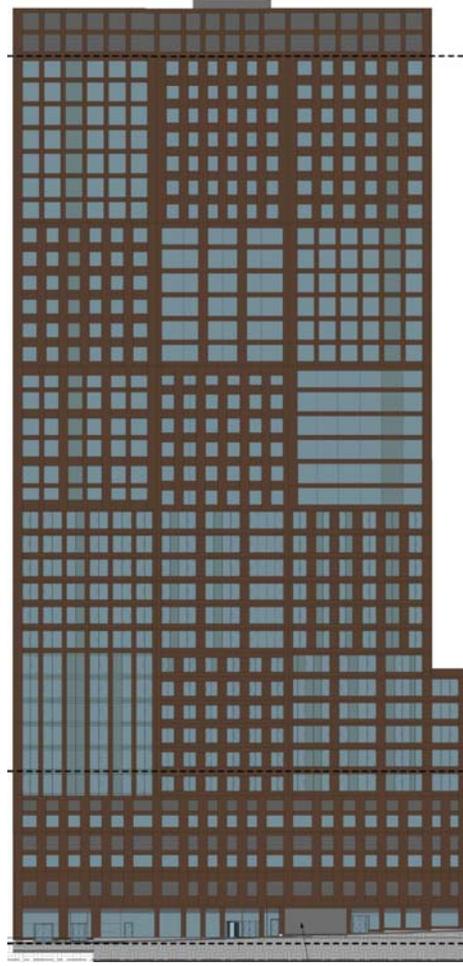
**FIRST FLOOR PLAN**



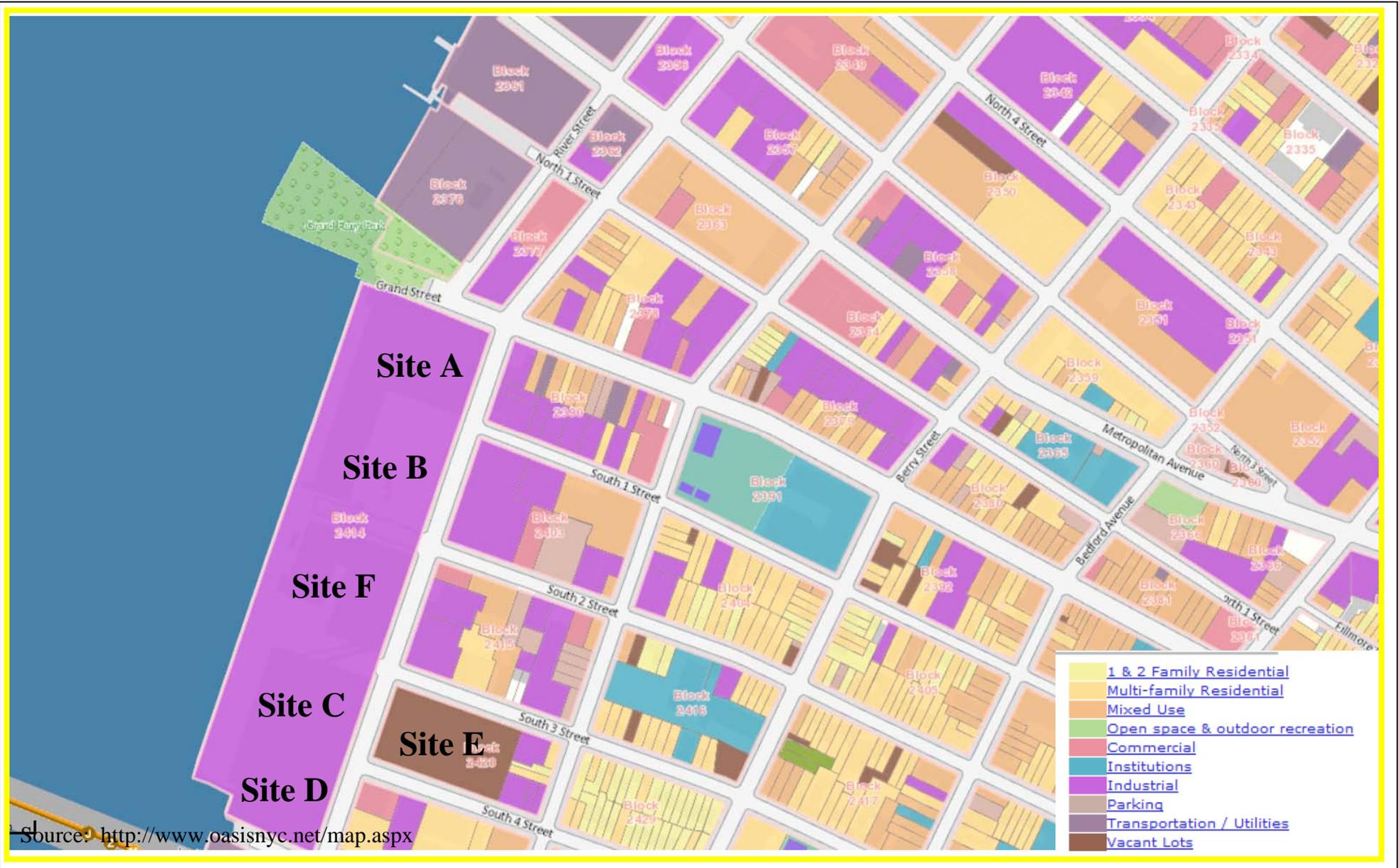
**ELEVATION DRAWING - East**



**ELEVATION DRAWING - South**



- UPPER FLOORS - Residential Apartments
- FOURTH - School - Classrooms/Cafeteria
- THIRD - School - Classrooms/Gynasium
- SECOND - Parking
- FIRST - Parking, Residential Lobbies and Retail Space
- CELLAR - Parking and Utility Rooms



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

**SITE B**  
 332-350 KENT AVENUE, BROOKLYN, NY



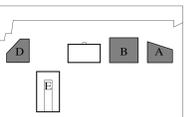
**ENVIRONMENTAL BUSINESS CONSULTANTS**  
 1808 MIDDLE COUNTRY ROAD, RIDGE, NEW YORK 11961  
 PHONE: (631) 504-6000 FAX: (631) 924-2870





No	Date	Rev	Issue
1	05/02/14		DOB SUBMISSION

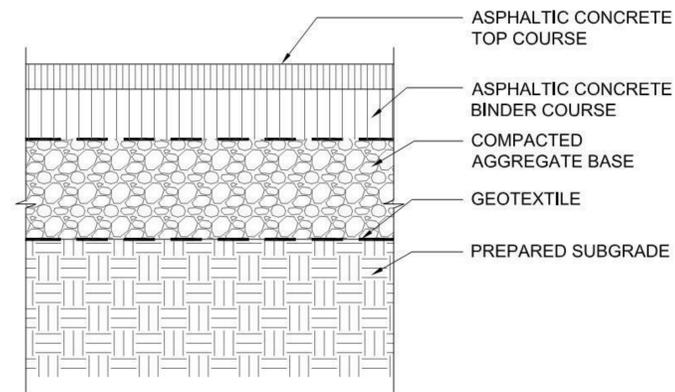
NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988). BROOKLYN HIGHWAY DATUM (BHD) IS +1.40'



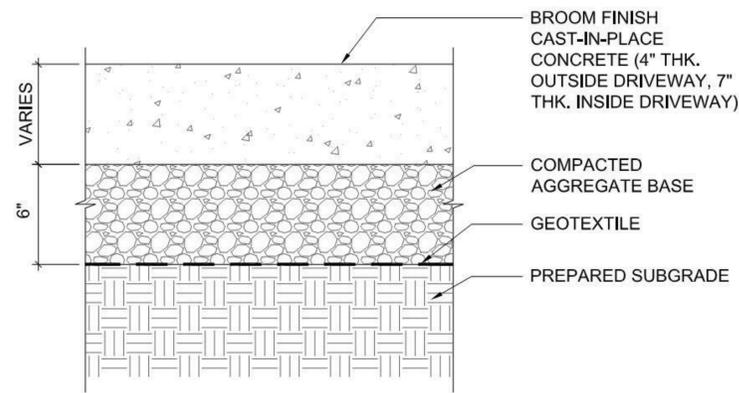
CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Brooklyn, NY  
TITLE  
Foundation Details

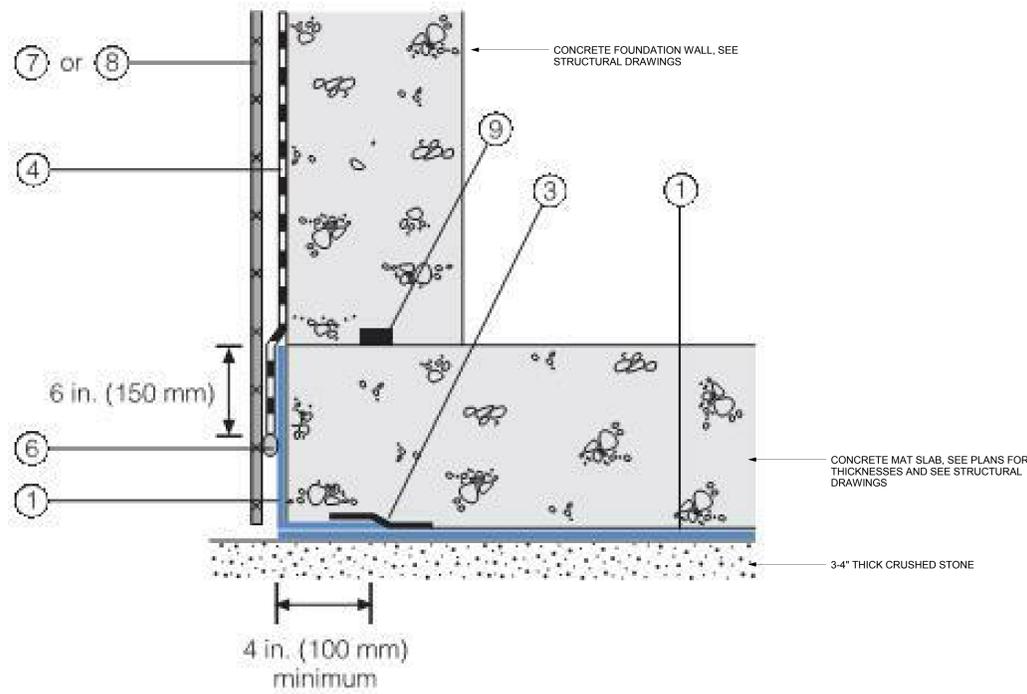
SCALE: 3" = 1'-0"  
DATE: 06/27/14  
PROJECT No: 13,143.01



2 TYPICAL ASPHALT ROADWAY DETAIL  
SCALE: 3" = 1'-0"



3 TYPICAL CONCRETE WALKWAY DETAIL  
SCALE: 3" = 1'-0"

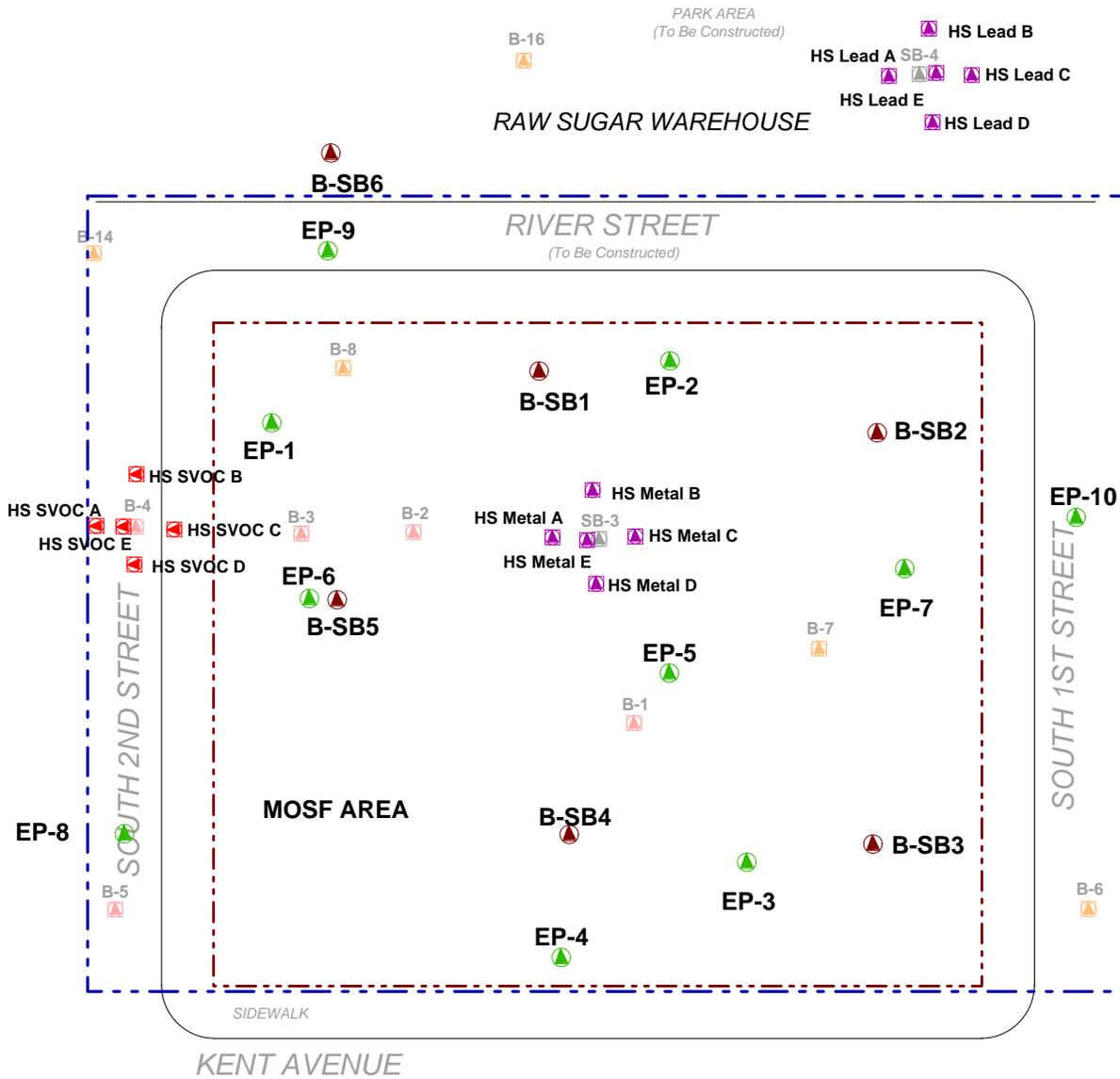


- 1 PREPRUFE 300R PLUS, OR EQUAL
- 2 PROCOR, OR EQUAL
- 3 PREPRUFE TAPE, OR EQUAL
- 4 BITUTHENE, OR EQUAL
- 5 BITUTHENE LIQUID MEMBRANE, OR EQUAL
- 6 PROTECTION
- 7 HYDRODUCT, OR EQUAL
- 8 ADCOR ES, OR EQUAL
- 9 PREPRUFE CJ TAPE, OR EQUAL
- 10

1 TYPICAL MAT SLAB DETAIL  
SCALE: 3" = 1'-0"

# B

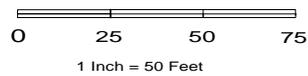
## EAST RIVER



**KEY:**

- - - - Boundary of Proposed Lot B
- - - - Boundary of Site B
- Existing Building
- Soil Boring Location (AKRF Phase II 2008)
- Soil Boring Location (NOVA Phase II 2004)
- Soil Boring Location (NOVA Phase III 2004)
- 2014 EBC RI Soil Boring Location
- SVOC Hot-Spot Endpoint Sample Location  
Analysis for SVOCs 8270
- Lead Hot-Spot Endpoint Sample Location  
Analysis for Lead
- Excavation Endpoint Sample Location  
Analysis for SVOCs 8270 and TAL Metals

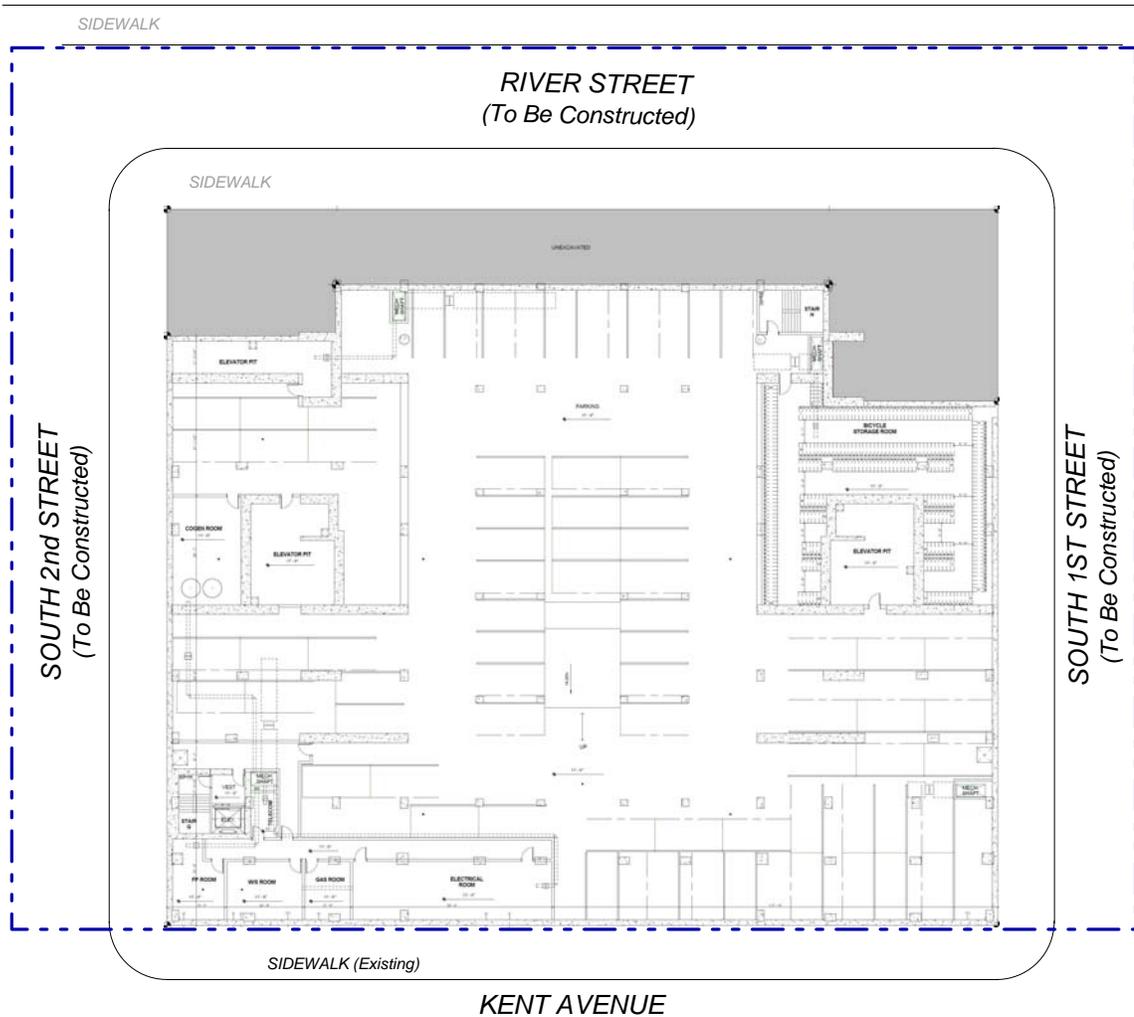
**SCALE:**



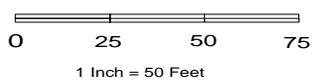
**B**

**EAST RIVER**

**Passive  
Recreation Area**  
(To Be Constructed)



**SCALE**



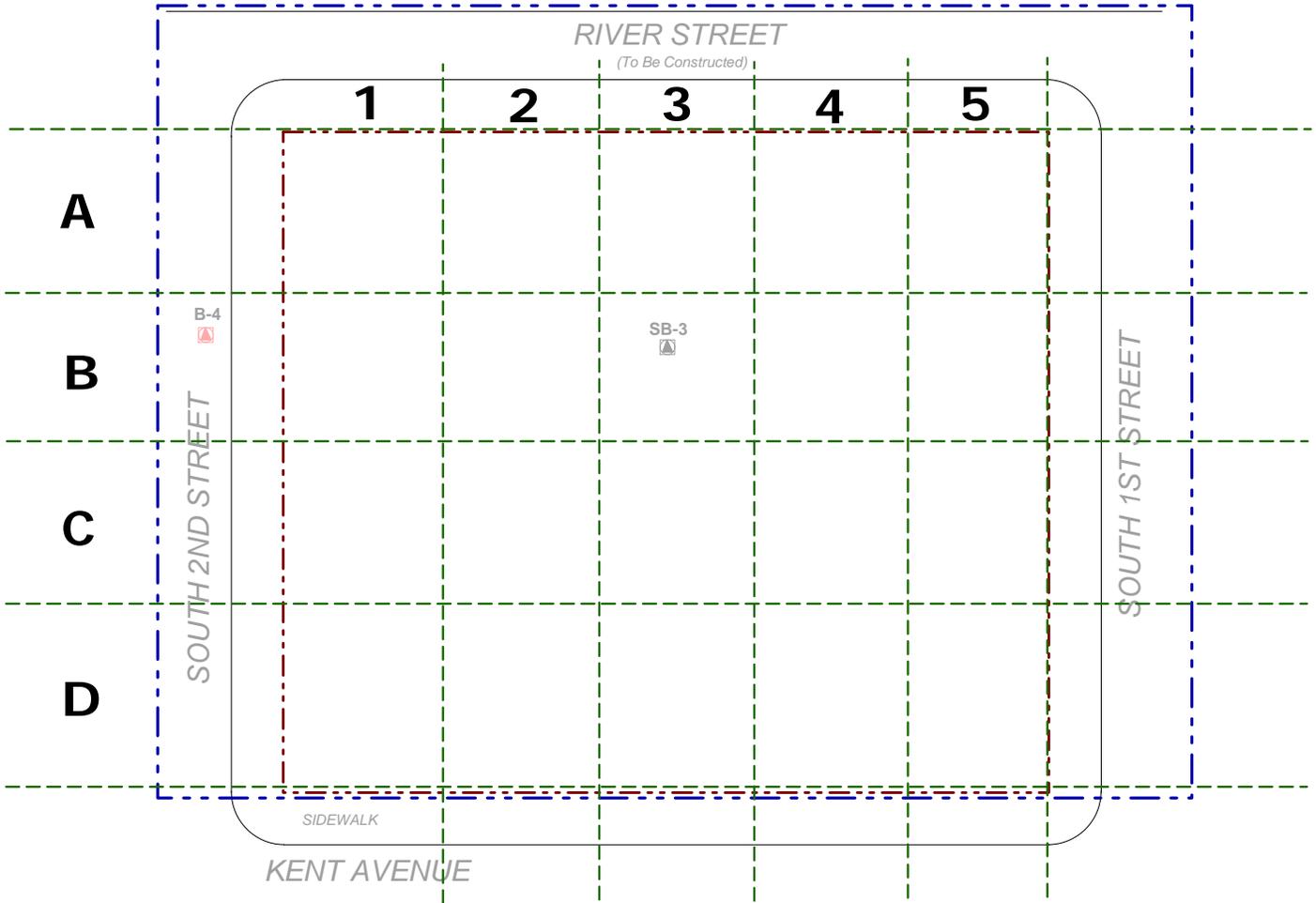
**KEY:**

- Bituthene 4000 Behind All Foundation Walls to grade
- - - - Boundary of Site B

**B**

*EAST RIVER*

PARK AREA  
(To Be Constructed)



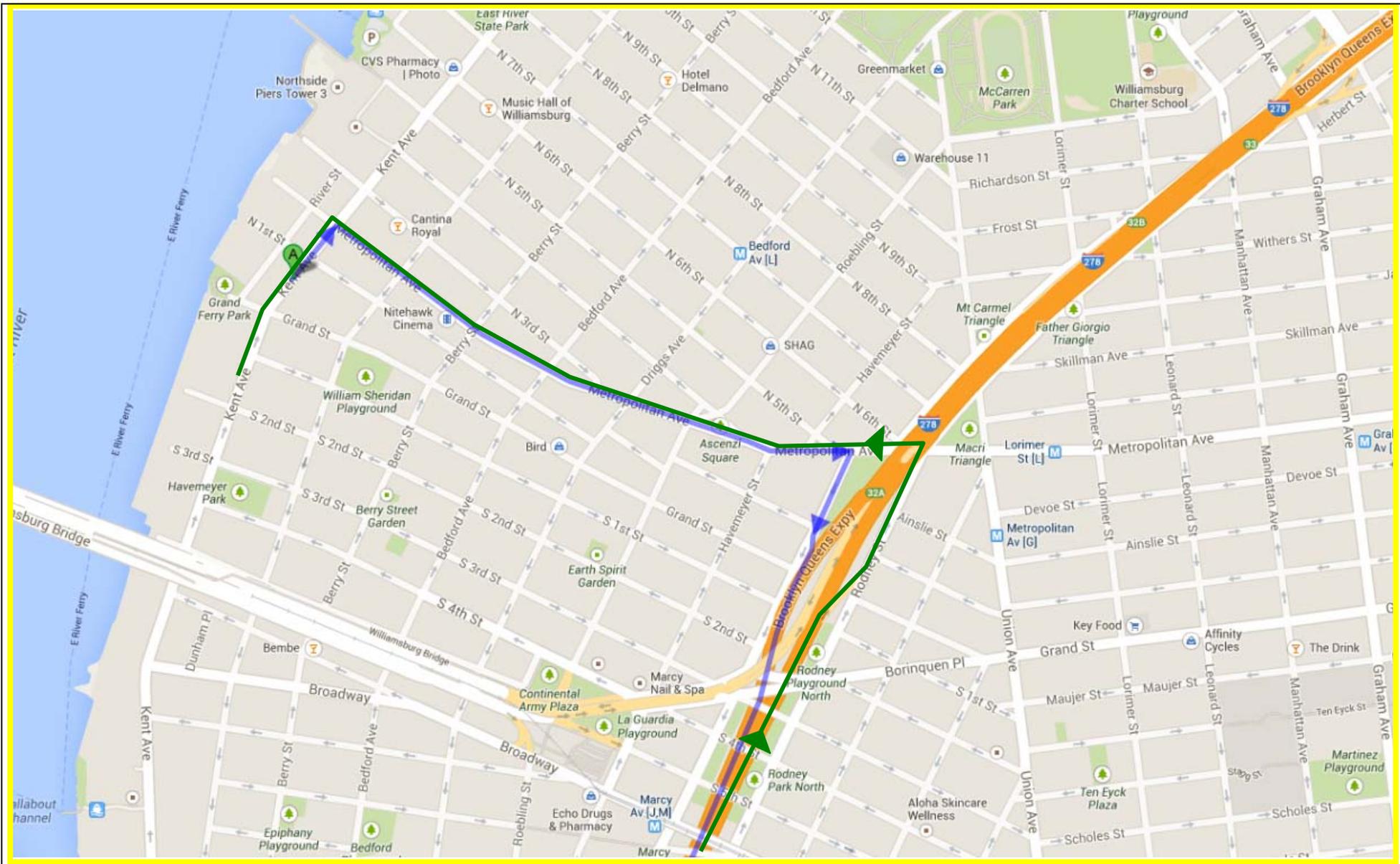
**KEY:**

- Boundary of Proposed Lot B
- Boundary of Site B

**SCALE:**



1 Inch = 50 Feet



## FIGURE 11 – TRUCK ROUTE MAP

DOMINO SITE B - 270-290 KENT AVE, BROOKLYN, NY  
 REMEDIAL ACTION WORK PLAN



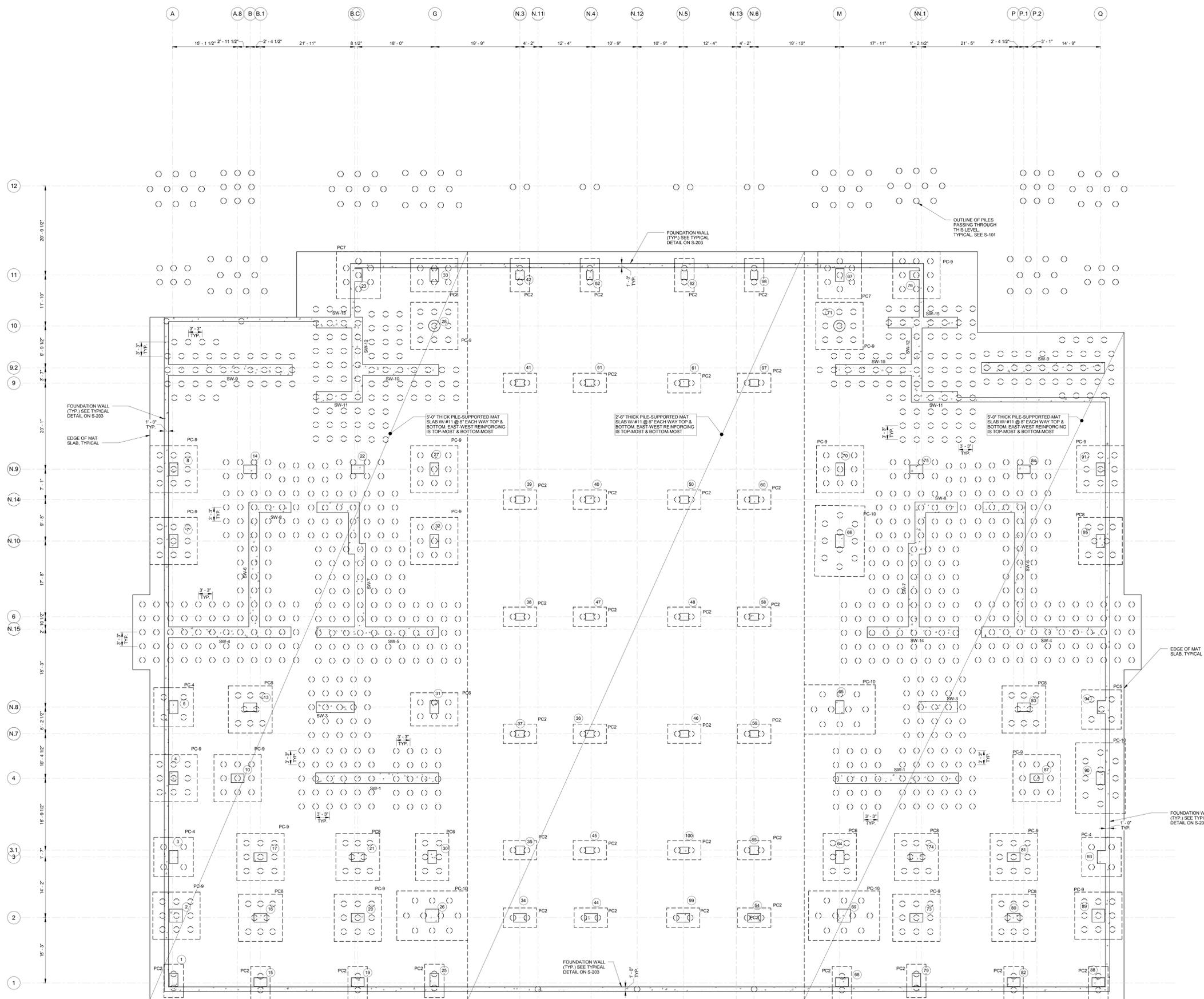
**ENVIRONMENTAL BUSINESS CONSULTANTS**  
 1808 MIDDLE COUNTRY ROAD, RIDGE, NEW YORK 11961  
 PHONE: (631) 504-6000 FAX: (631) 924-2870

**LEGEND**

- T OR B INDICATES ADDITIONAL TOP OR BOTTOM REINFORCING
- PC-X INDICATES CONCRETE PILE CAP TYPE PC-X SEE TYPICAL DETAILS
- INDICATES 200-TON STEEL PIPE PILE
- ▭ INDICATES REINFORCED CONCRETE WALL
- SW-X INDICATES REINFORCED CONCRETE SHEAR WALL TYPE X SEE SHEAR WALL DETAILS ON S-203
- INDICATES REINFORCED CONCRETE COLUMN SEE SCHEDULE ON S-210 SERIES AND TYPICAL DETAILS
- # INDICATES COLUMN NUMBER SEE SCHEDULE ON S-210 FOR SIZE AND REINFORCING

**NOTES**

1. T.O. CONCRETE SLAB EL. = 10'-0" UNLESS NOTED THUS (XXX)
2. T.O. PILE CAP = T.O. MAT SLAB
3. HORIZONTAL SPACING BETWEEN ADJACENT PILES IN AREAS UNDER WALLS IS 3'-3" TYP.
4. PILE CAP EXTENTS SHOWN IN MAT SLAB FOR REFERENCE OF PILE LAYOUTS. SEE TYPICAL PILE CAP DETAILS ON S-203 FOR LAYOUT DIMENSIONS. PILE CAP DEPTH EQUALS MAT DEPTH. DASHED LINES DO NOT INDICATE STEP IN SLAB AND ARE FOR DIMENSIONAL LOCATING PURPOSES ONLY.
5. FOUNDATIONS SHALL BE SUPPORTED ON 200-TON STEEL PIPE PILES AS PER INFORMATION FROM URS CORPORATION DATED JANUARY 16, 2014.
6. SEE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS NOT SHOWN ON STRUCTURAL DRAWINGS.
7. BUILDING IS IN AN AE ZONE AS PER THE 2013 ADVISORY NYC FEMA FLOOD MAPS. FOUNDATION IS DESIGNED FOR A DESIGN FLOOD ELEVATION OF 13 FEET (PROJECT ELEVATION + NAVD83).



No	Date	Rev	Issue
05/02/14			DOB SUBMISSION

NOTES:

**CLIENT**  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

**PROJECT**  
Domino - Site B  
314 Kent Avenue  
Brooklyn, NY

**TITLE**  
FOUNDATION PLAN/B1 LEVEL  
FRAMING PLAN

**SCALE:** 1/8" = 1'-0"  
**DATE:** May 2, 2014  
**PROJECT No:** 15599

FO-100.00

- LEGEND**
- INDICATES NEW 12" FLAT CONCRETE SLAB WITH #10 E.W. BOTTOM BARS UNLESS NOTED OTHERWISE. SHOWN REINFORCING IS ADDITIONAL UNLESS NOTED OTHERWISE. SEE TYPICAL DETAILS FOR BALANCE OF INFORMATION AND REINFORCING.
  - INDICATES DIRECTION OF TOPMOST & BOTTOMMOST REINFORCING.
  - T OR B INDICATES ADDITIONAL TOP OR BOTTOM REINFORCING.
  - PC-X INDICATES CONCRETE PILE CAP TYPE. PC-X SEE TYPICAL DETAILS.
  - INDICATES 200-TON STEEL PIPE PILE.
  - INDICATES REINFORCED CONCRETE WALL.
  - SW-X INDICATES REINFORCED CONCRETE SHEAR WALL TYPE X. SEE SHEAR WALL PLANS/DETAILS ON S-220.
  - INDICATES REINFORCED CONCRETE COLUMN. SEE SCHEDULE ON S-210 SERIES AND TYPICAL DETAILS.
  - INDICATES CONCRETE COLUMN BELOW.
  - B-XX, TB-X, MF-X INDICATES CONCRETE BEAM BELOW. SEE SCHEDULE ON S-201.
  - INDICATES COLUMN NUMBER. SEE SCHEDULE ON S-210 FOR SIZE AND REINFORCING.

- NOTES**
1. T.O. CONCRETE SLAB EL. 23'-0" UNLESS NOTED THUS: "T.O. XX"
  2. T.O. PILE CAP = T.O. MAT SLAB.
  3. FOUNDATIONS SHALL BE SUPPORTED ON 200-TON STEEL PIPE PILES AS PER INFORMATION FROM URS CORPORATION DATED JANUARY 16, 2014.
  4. SEE ARCHITECTURAL DRAWINGS FOR COORDINATES OF ALL NEW SLAB EDGES, OPENINGS, AND RECESSES.
  5. PILE CAP EXTENTS SHOWN IN MAT SLAB FOR REFERENCE OF PILE LAYOUTS. SEE TYPICAL PILE CAP DETAILS ON S-203 FOR LAYOUT DIMENSIONS. PILE CAP DEPTH EQUALS MAT DEPTH. DASHED LINES DO NOT INDICATE STEP IN SLAB AND ARE FOR DIMENSIONAL LOCATING PURPOSES ONLY.

No	Date	Rev	Issue
	05/02/14		DOB SUBMISSION

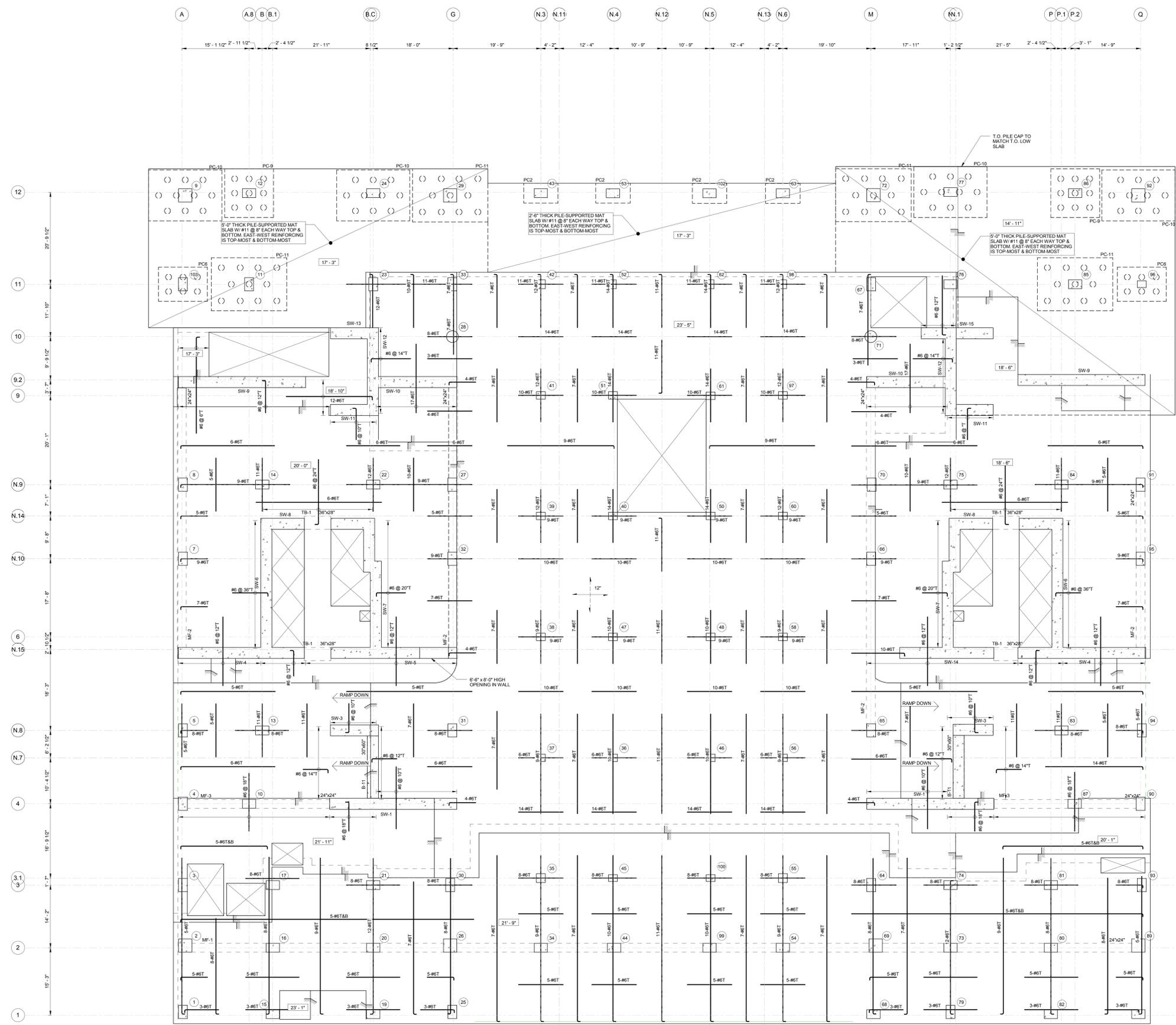
NOTES:

**CLIENT**  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

**PROJECT**  
Domino - Site B  
314 Kent Avenue  
Brooklyn, NY

**TITLE**  
FIRST FLOOR FRAMING PLAN

SCALE: 1/8" = 1'-0"  
DATE: May 2, 2014  
PROJECT No: 15599



**FIRST FLOOR FRAMING PLAN**  
S-101.00 1/8" = 1'-0"

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

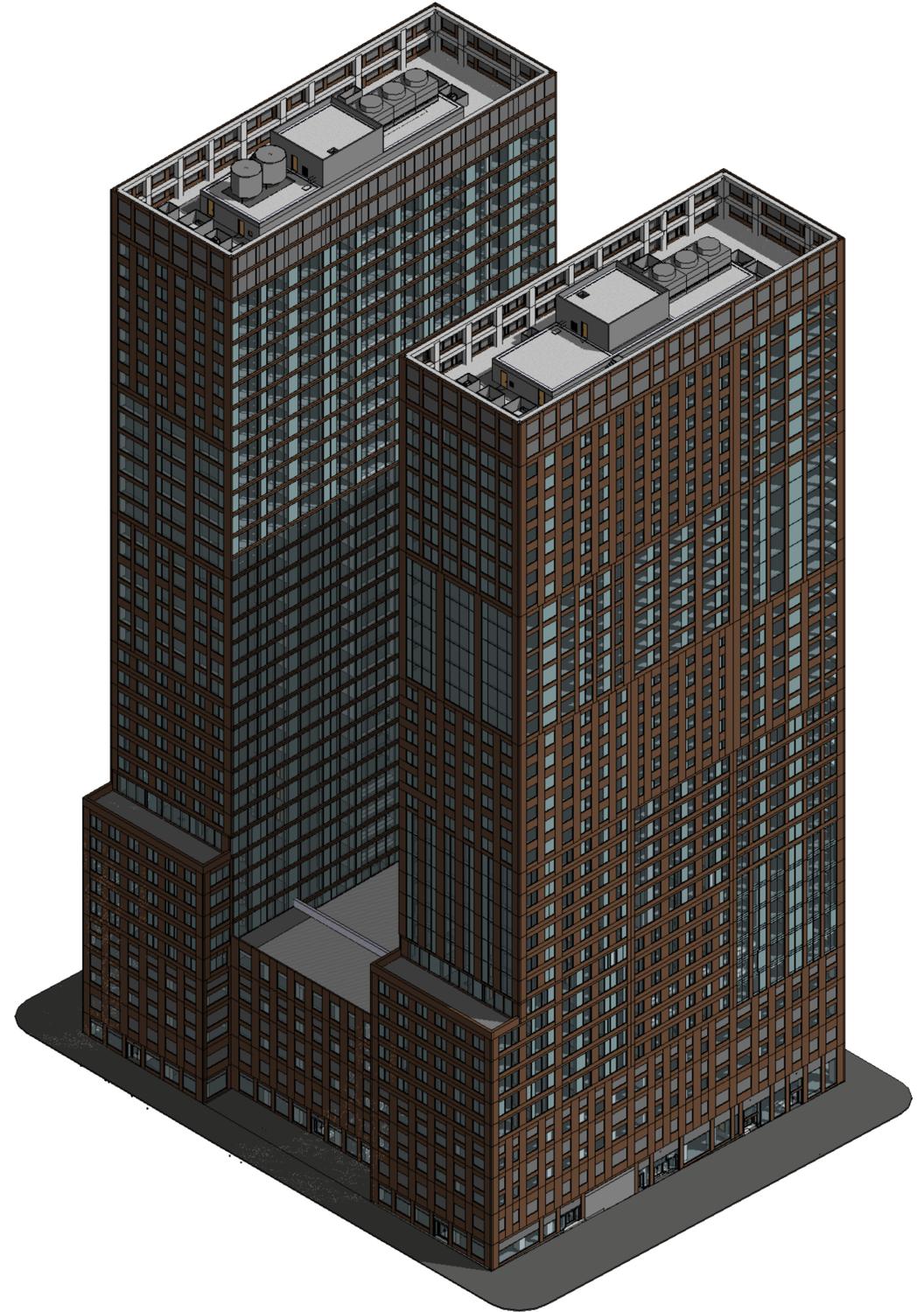
PROJECT

**DOMINO SUGAR**  
**LOT A - BUILDING B**

CLIENT

**TWO TREES MANAGEMENT**

45 Main Street, Suite 602  
Brooklyn, NY 11201  
PH: (718) 222-2500



ARCHITECT

**ISMAEL LEYVA**  
ARCHITECTS, P.C.  
48 West 37th St. New York, NY 10018  
TEL: (212) 290 -1444 FAX: (212) 290 - 1425

**sh p**  
233 Broadway 11th Floor  
New York, NY 10027  
TEL: (212) 886-9005  
FAX: (212) 886-9006

CONSULTANTS

Robert Silman Associates  
Structural Engineers  
88 University Place  
New York, NY 10003  
TEL: (212) 620-7970  
FAX: (212) 620-8157

Eitinger & Associates  
MEP/FS Engineers  
505 8th Ave, 24th Floor  
New York, NY 10018  
TEL: (212) 224-2410  
FAX: (212) 643-1606

URS  
Geotechnical Engineer  
1255 Broad Street, Suite 201  
Clifton, NJ 07011  
TEL: (973) 883-8500  
FAX: (973) 883-8501

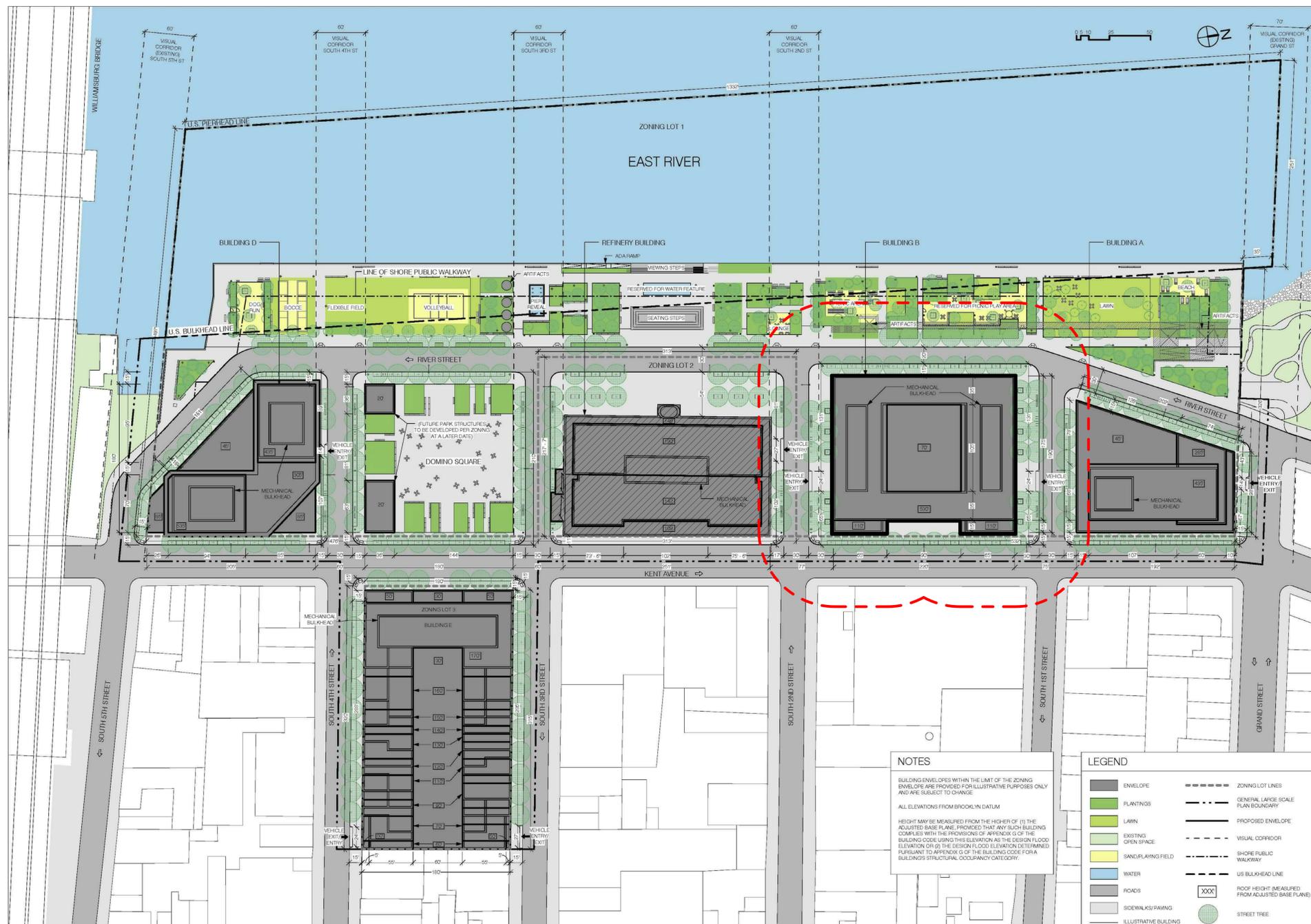
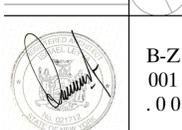
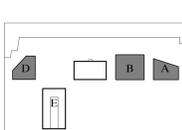
Philip Habib & Associates  
Traffic Consultant  
102 Madison Avenue, 11th Floor  
New York, NY 10016  
TEL: (212) 926-9556  
FAX: (212) 926-9665

William Vitacco Associates  
Building & Zoning Law Consultant  
299 Broadway  
New York, NY 10007  
TEL: (212) 791-4575  
FAX: (212) 513-9637

YR&G  
Sustainability Consultant  
161 Bowery, 4th Floor  
New York, NY 10002  
TEL: (917) 677-8023  
FAX: (917) 677-8023

DOB Submission  
May 02, 2014

ARCHITECTURAL



- BOUNDARY OF GENERAL LARGE SCALE DEVELOPMENT
- - - 90' RADIUS FROM PROPERTY LINE
- - - SITE OF PROPOSED NEW DEVELOPMENT
- ▨ EXISTING HISTORIC BUILDINGS

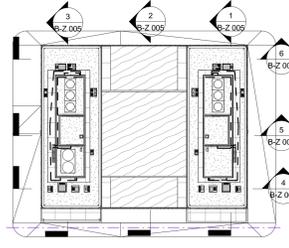
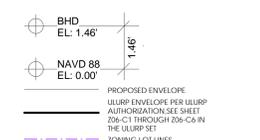
NOTE: ALL LANDMARKED BUILDINGS WITHIN 90 FEET OF THE SITE WILL BE MONITORED PER TAPP 10/88

**NOTES**  
BUILDING ENVELOPES WITHIN THE LIMIT OF THE ZONING ENVELOPE ARE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.  
ALL ELEVATIONS FROM BROOKLYN DATUM  
HEIGHT MAY BE MEASURED FROM THE HIGHER OF (1) THE ADJUSTED BASE PLANE, PROVIDED THAT ANY SUCH BUILDING COMPLEX WITH THE PROVISIONS OF APPENDIX G OF THE BUILDING CODE USING THIS ELEVATION AS THE DESIGN FLOOD ELEVATION OR (2) THE DESIGN FLOOD ELEVATION DETERMINED PURSUANT TO APPENDIX G OF THE BUILDING CODE FOR A BUILDING'S STRUCTURAL OCCUPANCY CATEGORY.

- LEGEND**
- ENVELOPE
  - PLANTINGS
  - LAWN
  - EXISTING OPEN SPACE
  - SAND/PLAYING FIELD
  - WATER
  - ROADS
  - SIDEWALKS/PAVING
  - ILLUSTRATIVE BUILDING WALL
  - ZONING LOT LINES
  - GENERAL LARGE SCALE PLAN BOUNDARY
  - PROPOSED ENVELOPE
  - VISUAL CORRIDOR
  - SHORE PUBLIC WALKWAY
  - U.S. BULKHEAD LINE
  - ROOF HEIGHT (MEASURED FROM ADJUSTED BASE PLANE)
  - STREET TREE

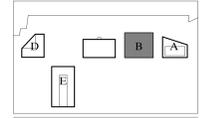
1 Building B - Site Context Plan  
SCALE: 1" = 50'-0"

**NOTES:**  
BUILDING SECTIONS WITHIN THE LIMIT OF ZONING ENVELOPE ARE PROVIDED FOR ILLUSTRATIVE PURPOSES ONLY AND ARE SUBJECT TO CHANGE.  
ALL DISTANCES BETWEEN BUILDINGS AND WINDOWS COMPLY WITH REGULATIONS UNLESS SPECIFICALLY WAIVED.  
MECHANICAL BULKHEADS TO EXCEED PROPOSED ZONING ENVELOPES.  
HEIGHT MAY BE MEASURED FROM THE HIGHER OF (1) THE ADJUSTED BASE PLANE, PROVIDED THAT ANY SUCH BUILDING COMBLES WITH THE PROVISIONS OF APPENDIX G OF THE BUILDING CODE USING THIS ELEVATION AS THE DESIGN FLOOR ELEVATION OR (2) THE DESIGN FLOOR ELEVATION DETERMINED PURSUANT TO APPENDIX G OF THE BUILDING CODE FOR THE BUILDING'S STRUCTURAL OCCUPANCY CATEGORY.



No.	Date	Rev.	Issue
1	05/02/14		DCB SUBMISSION

**NOTES:**  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

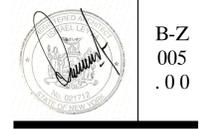


**CLIENT**  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

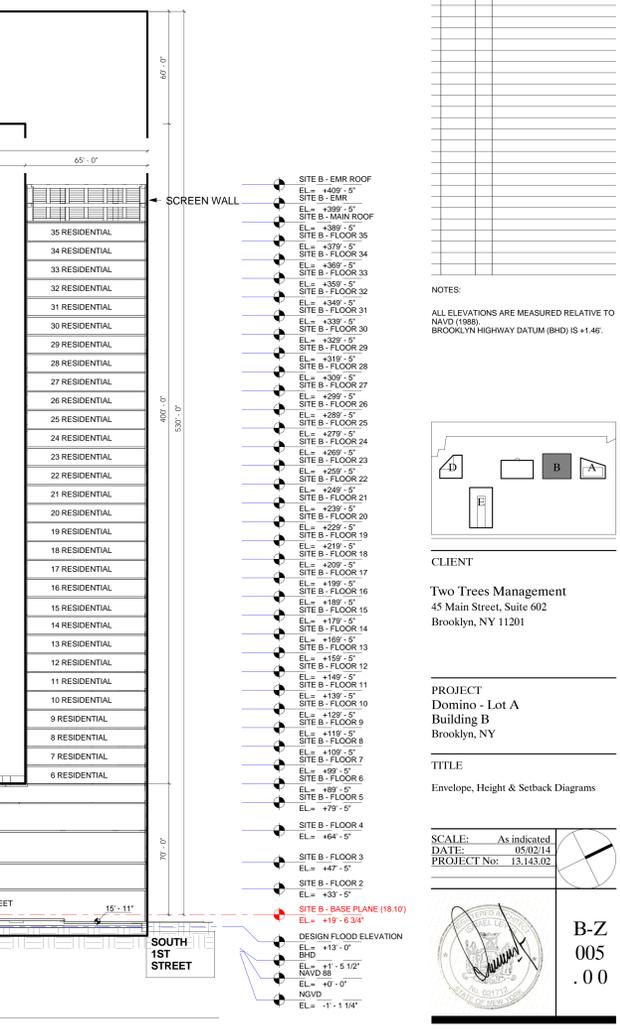
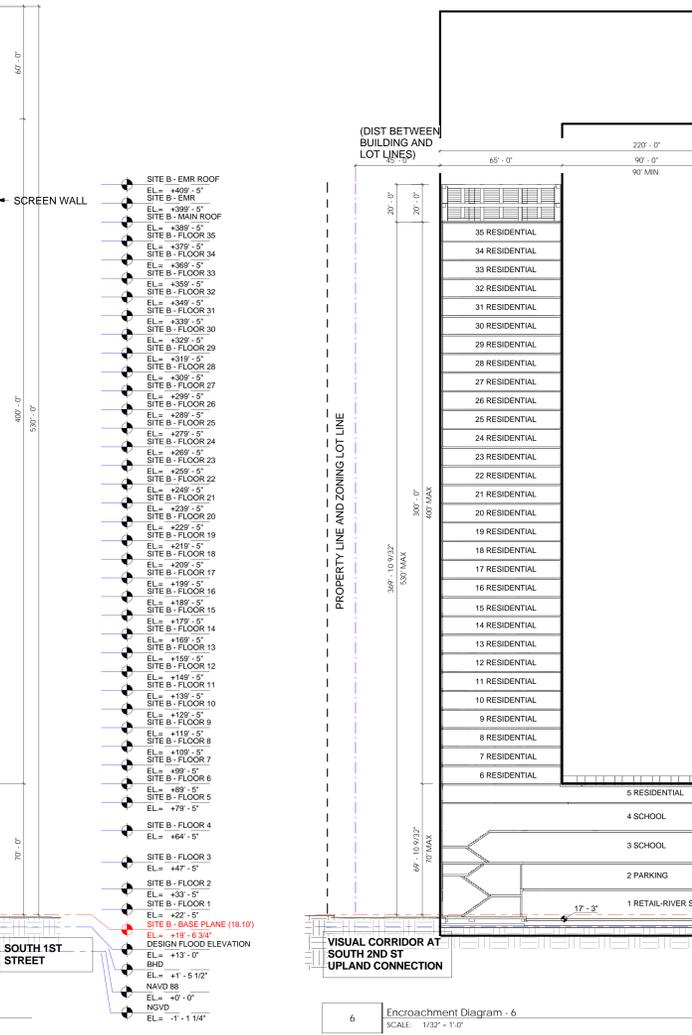
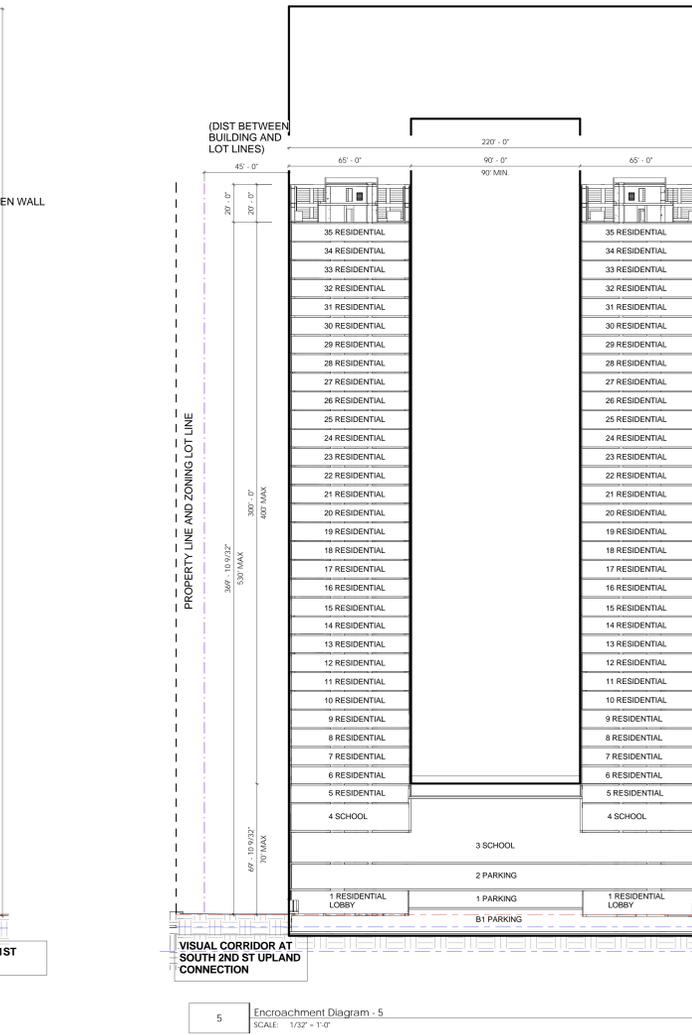
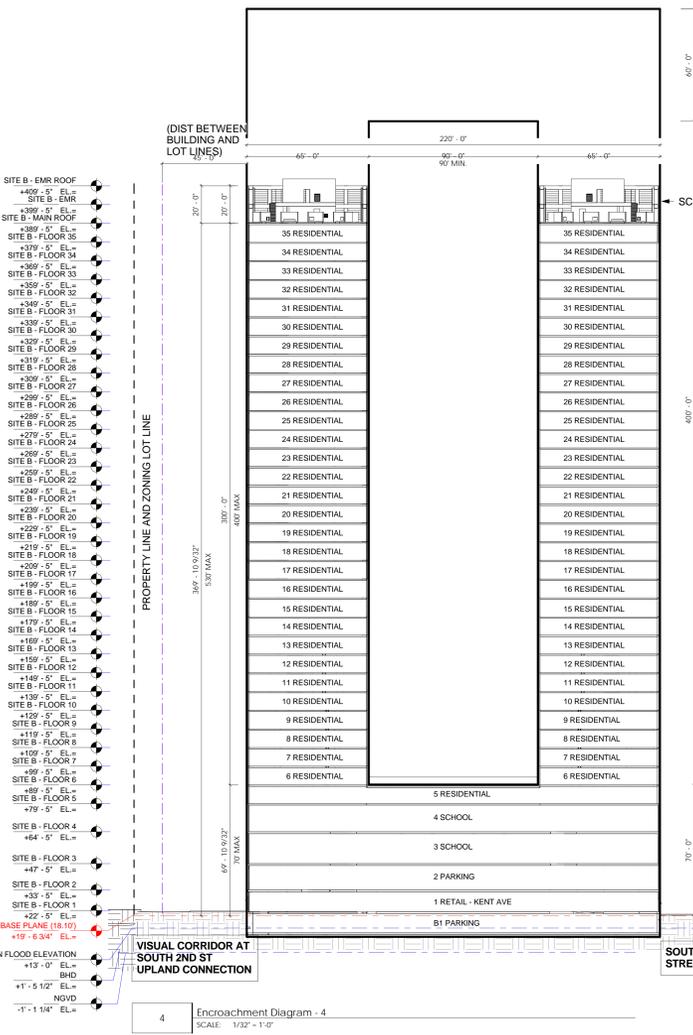
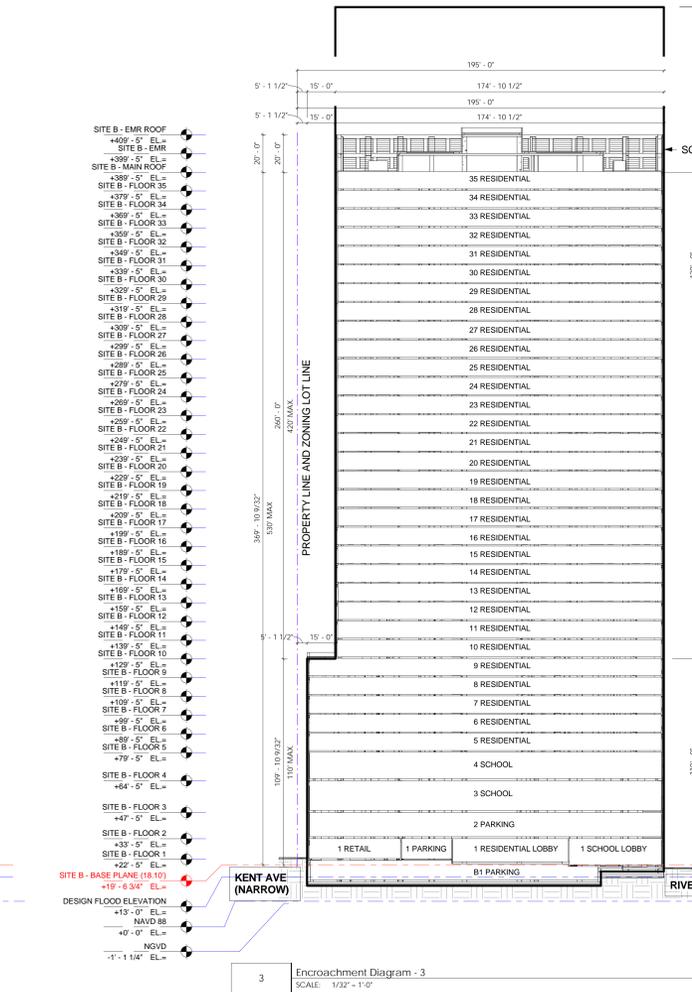
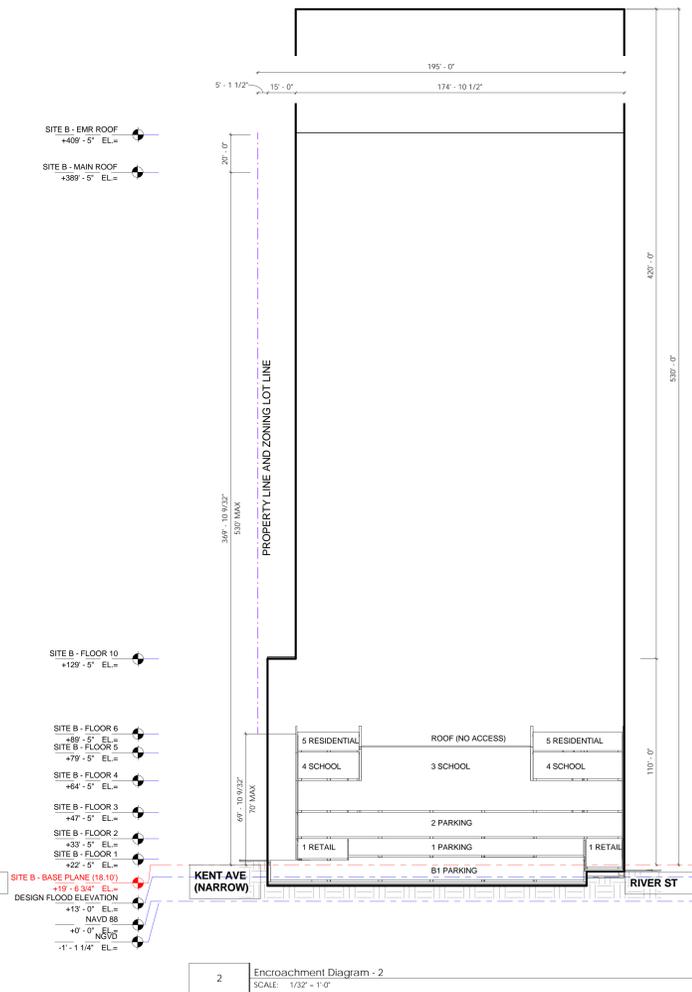
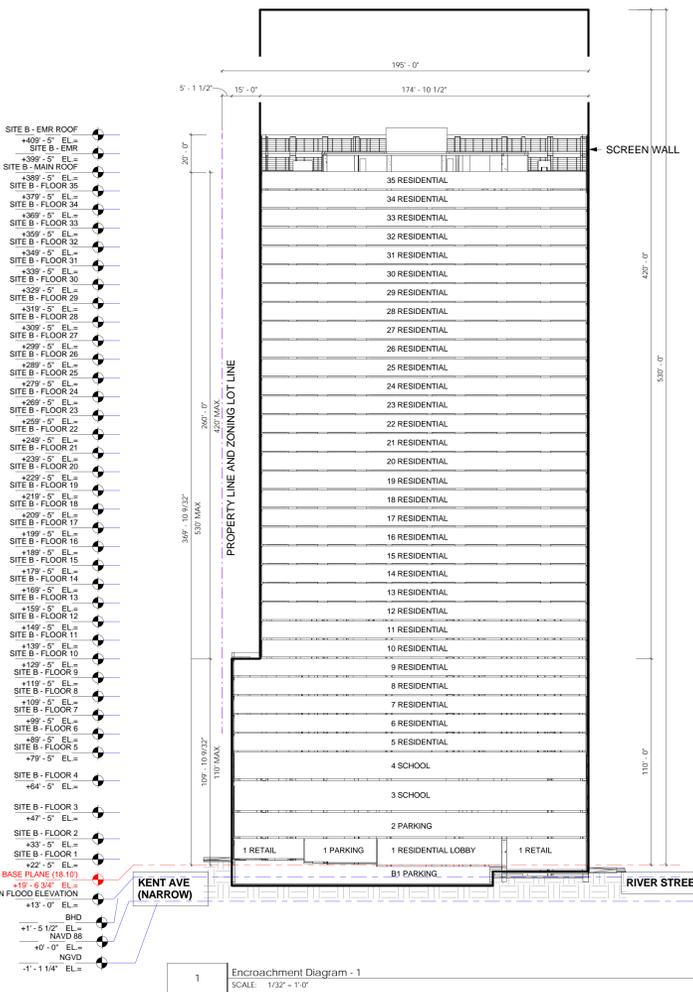
**PROJECT**  
Domino - Lot A  
Building B  
Brooklyn, NY

**TITLE**  
Envelope, Height & Setback Diagrams

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13.143.02



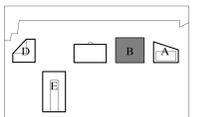
**B-Z**  
005  
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Rev	Date	Issue
1	05/02/14	DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988). BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

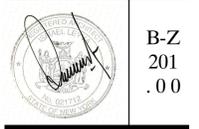


CLIENT  
**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
Building B  
Brooklyn, NY

TITLE  
Area Diagram - Floor 1

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13,143.02



**Space Legend**

MECHANICAL	RESIDENTIAL ACCESSORY PARKING	SCHOOL BICYCLE STORAGE
PARKING ELEVATOR	RESIDENTIAL LOBBY	SCHOOL LOBBY
PARKING OFFICE	RETAIL	STAIR

**Mechanical Deduction**

MECHANICAL
PLUMBING
ELECTRICAL

Building B - Schedule A - Floor 1

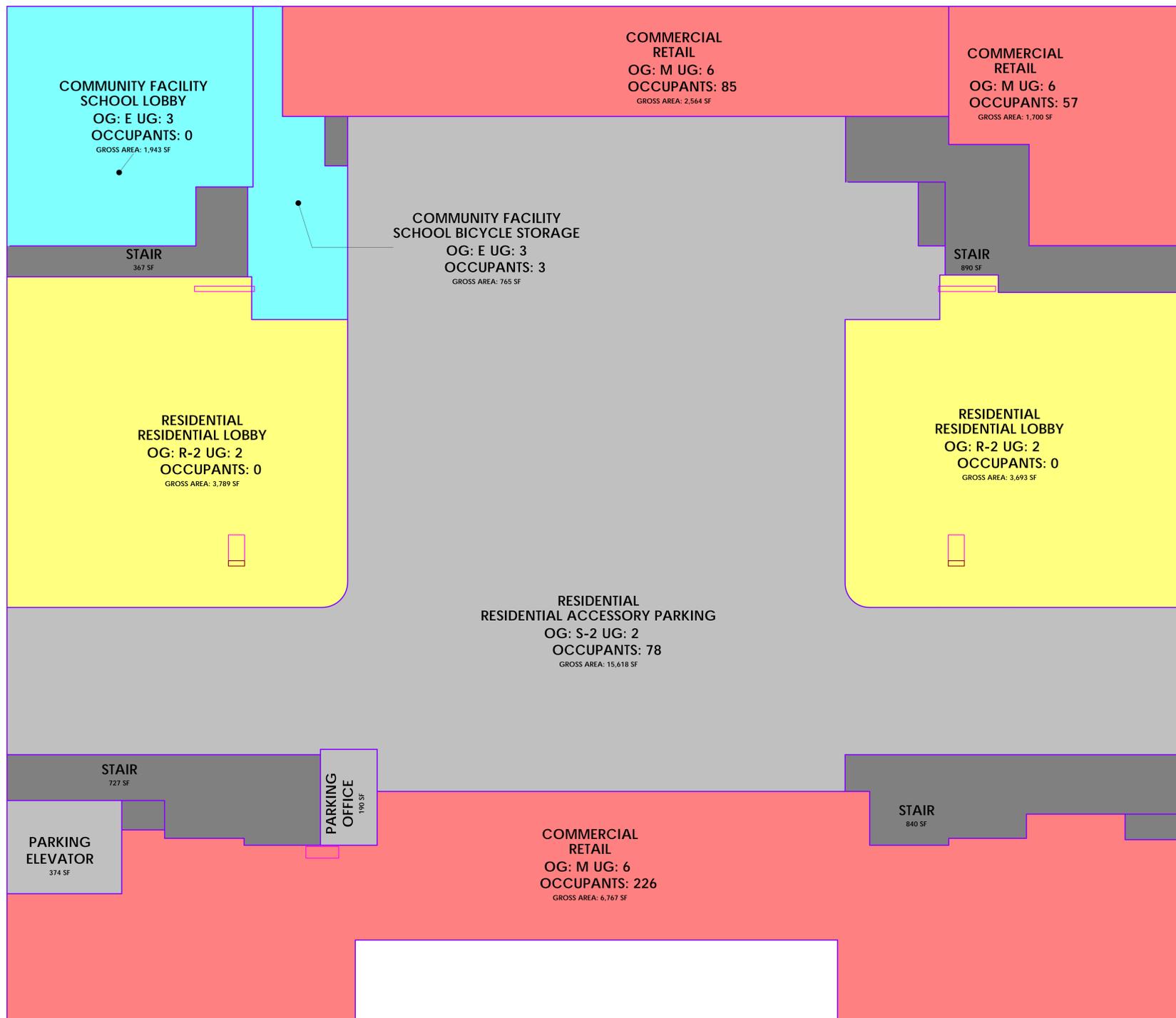
FAR Category	Name	Occupancy Group	Use Group	Gross Area
COMMERCIAL	RETAIL	M	6	2,564 SF
COMMERCIAL	RETAIL	M	6	1,700 SF
COMMERCIAL	RETAIL	M	6	6,767 SF
COMMERCIAL	PARKING ELEVATOR	S-2	6	374 SF
				11,405 SF

COMMUNITY FACILITY	SCHOOL LOBBY	E	3	1,943 SF
COMMUNITY FACILITY	STAIR	E	3	367 SF
COMMUNITY FACILITY	STAIR	E	3	727 SF
COMMUNITY FACILITY	STAIR	E	3	840 SF
COMMUNITY FACILITY	STAIR	E	3	890 SF
COMMUNITY FACILITY	SCHOOL BICYCLE STORAGE	E	3	765 SF
				5,531 SF

RESIDENTIAL	RESIDENTIAL LOBBY	R-2	2	3,789 SF
RESIDENTIAL	RESIDENTIAL LOBBY	R-2	2	3,693 SF
RESIDENTIAL	RESIDENTIAL ACCESSORY PARKING	S-2	2	15,618 SF
RESIDENTIAL	PARKING OFFICE	S-2	2	190 SF
RESIDENTIAL	MECHANICAL	S-2	2	44 SF
RESIDENTIAL	MECHANICAL	S-2	2	54 SF
RESIDENTIAL	MECHANICAL	S-2	2	39 SF
RESIDENTIAL	MECHANICAL	S-2	2	60 SF
				23,487 SF
				40,423 SF

Building B - MD\_1ST FLOOR

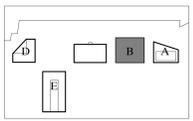
Mark	TYPE	AREA
RESIDENTIAL	M	3.00 SF
RESIDENTIAL	M	3.00 SF
RESIDENTIAL	P	11.17 SF
RESIDENTIAL	P	14.50 SF
RESIDENTIAL	P	10.67 SF
RESIDENTIAL	P	14.50 SF
RESIDENTIAL	P	56.83 SF
RETAIL	P	13.27 SF
		13.27 SF



1 SITE B - FLOOR 1  
SCALE: 1/8" = 1'-0"

No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988). BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

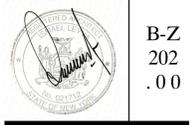


CLIENT  
**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
**Building B**  
Brooklyn, NY

TITLE  
Area Diagram - Floor 2

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13,143.02



**Space Legend**

- ELEVATOR - NO ACCESS
- NO ACCESS
- STAIR
- MECHANICAL
- OPEN TO BELOW
- RESIDENTIAL ACCESSORY PARKING
- MECHANICAL SHAFT

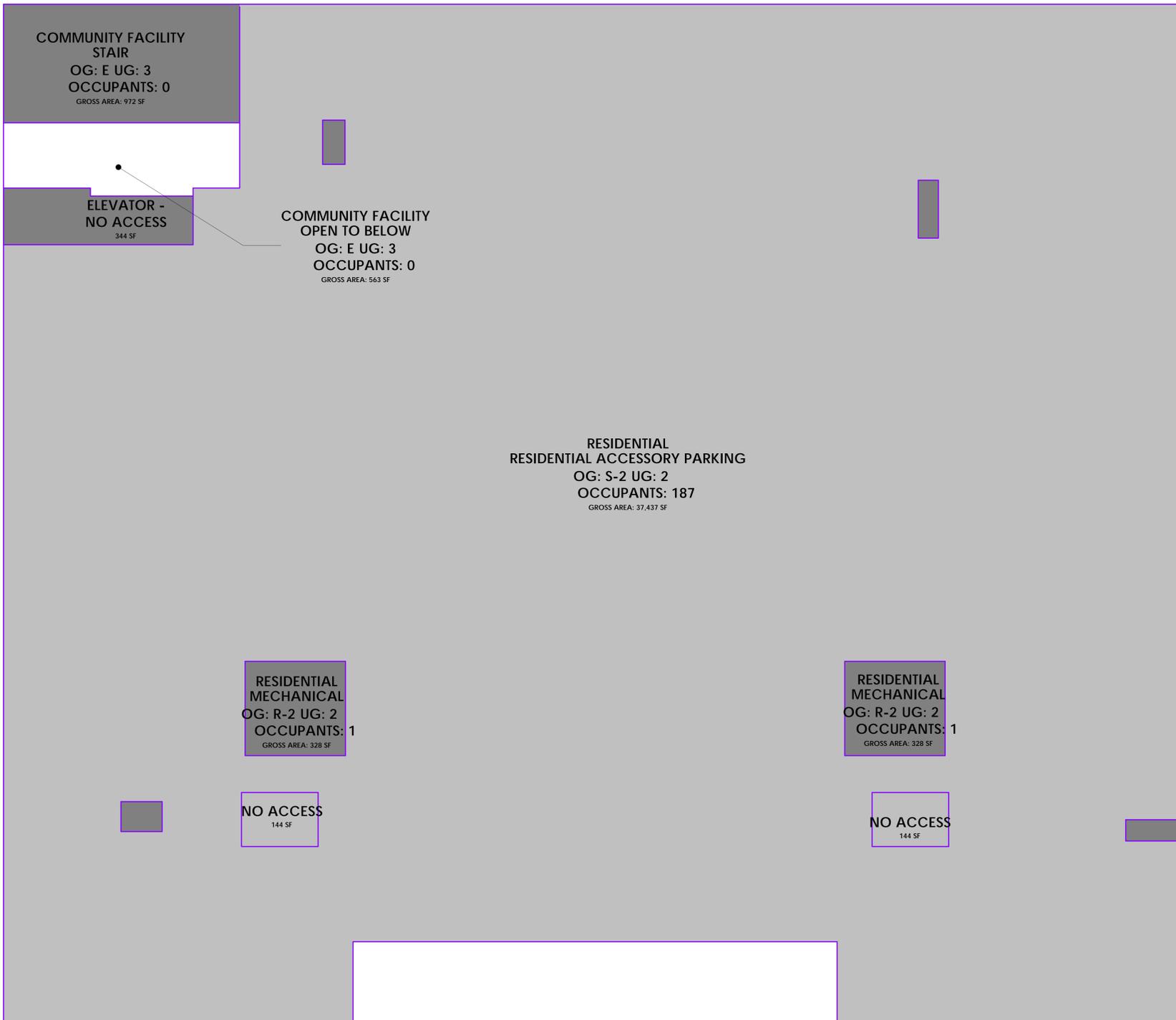
**Mechanical Deduction**

- MECHANICAL
- PLUMBING
- ELECTRICAL

Building B - Schedule A - Floor 2				
FAR Category	Name	Occupancy Group	Use Group	Gross Area
COMMUNITY FACILITY	OPEN TO BELOW	E	3	563 SF
COMMUNITY FACILITY	ELEVATOR - NO ACCESS	E	3	344 SF
COMMUNITY FACILITY	STAIR	E	3	972 SF
COMMUNITY FACILITY	NO ACCESS	E	3	144 SF
COMMUNITY FACILITY	NO ACCESS	E	3	144 SF
				2,166 SF

RESIDENTIAL	MECHANICAL SHAFT	R-2	2	43 SF
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	45 SF
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	40 SF
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	34 SF
RESIDENTIAL	MECHANICAL	R-2	2	328 SF
RESIDENTIAL	MECHANICAL	R-2	2	328 SF
RESIDENTIAL	RESIDENTIAL ACCESSORY PARKING	S-2	2	37,437 SF
				38,256 SF
				40,423 SF

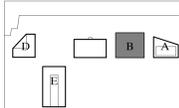
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	43 SF
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	45 SF
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	40 SF
RESIDENTIAL	MECHANICAL SHAFT	R-2	2	34 SF
RESIDENTIAL	MECHANICAL	R-2	2	328 SF
RESIDENTIAL	MECHANICAL	R-2	2	328 SF
RESIDENTIAL	RESIDENTIAL ACCESSORY PARKING	S-2	2	37,437 SF
				38,256 SF
				40,423 SF



1 SITE B - FLOOR 2  
SCALE: 1/8" = 1'-0"







CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

TITLE  
Area Diagram - Floor 5

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13.143.02

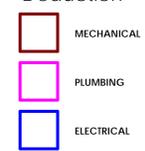


B-Z  
205  
.00

Space Legend



Mechanical Deduction



Apartment Area - Floor 5

s	Area
0BR	663 SF
0BR	663 SF
0BR	638 SF
0BR	638 SF
0BR: 4	2,602 SF
1BR	1,001 SF
1BR	908 SF
1BR	1,049 SF
1BR	1,021 SF
1BR	936 SF
1BR	909 SF
1BR	901 SF
1BR	927 SF
1BR	883 SF
1BR	1,001 SF
1BR: 10	9,535 SF
2BR	1,338 SF
2BR	1,338 SF
2BR	1,309 SF
2BR	1,138 SF
2BR	1,138 SF
2BR	1,310 SF
2BR: 6	7,572 SF
Grand total: 20	19,709 SF

Building B - Schedule A - Floor 5

FAR Category	Name	Occupancy Group	Use Group	Gross Area
RESIDENTIAL	2BR	R-2	2	1,338 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	1,882 SF
RESIDENTIAL	1BR	R-2	2	1,001 SF
RESIDENTIAL	2BR	R-2	2	1,338 SF
RESIDENTIAL	0BR	R-2	2	663 SF
RESIDENTIAL	1BR	R-2	2	908 SF
RESIDENTIAL	1BR	R-2	2	1,049 SF
RESIDENTIAL	2BR	R-2	2	1,309 SF
RESIDENTIAL	2BR	R-2	2	1,138 SF
RESIDENTIAL	2BR	R-2	2	1,138 SF
RESIDENTIAL	2BR	R-2	2	1,310 SF
RESIDENTIAL	1BR	R-2	2	1,021 SF
RESIDENTIAL	1BR	R-2	2	936 SF
RESIDENTIAL	0BR	R-2	2	663 SF
RESIDENTIAL	0BR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	909 SF
RESIDENTIAL	1BR	R-2	2	901 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	3,196 SF
RESIDENTIAL	NO ACCESS	R-2	2	8,100 SF
RESIDENTIAL	1BR	R-2	2	927 SF
RESIDENTIAL	1BR	R-2	2	883 SF
RESIDENTIAL	0BR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	1,001 SF
RESIDENTIAL	CORRIDOR	R-2	2	4,114 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	416 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	416 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	416 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	269 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	269 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	232 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	232 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	397 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	397 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	40,423 SF
RESIDENTIAL	ACCESSORY TO RESIDENTIAL	R-2	2	40,423 SF

Building B - MD\_5TH FLOOR

Mark	TYPE	AREA
2068	P	8.11 SF
2128	P	3.44 SF
2129	P	6.74 SF
2130	P	2.08 SF
2131	P	7.78 SF
2132	P	5.64 SF
2133	P	7.19 SF
2134	P	1.42 SF
2137	P	2.00 SF
2138	P	6.81 SF
2139	P	2.24 SF
2140	P	2.06 SF
2141	P	2.00 SF
2142	P	2.11 SF
2143	P	1.92 SF
2144	P	3.45 SF
2145	P	1.46 SF
2146	P	1.71 SF
2147	P	3.50 SF
2148	P	1.92 SF
2149	P	5.64 SF
2150	P	5.64 SF
2151	P	2.06 SF
2152	P	5.38 SF
2153	P	6.81 SF
2154	P	14.50 SF
2155	P	3.00 SF
2156	P	7.50 SF
2157	P	2.00 SF
2158	P	2.00 SF
2159	P	8.64 SF
2160	P	2.01 SF
2161	P	4.25 SF
2162	P	3.84 SF
2163	P	3.99 SF
2164	P	6.00 SF
2166	P	5.38 SF
2167	P	2.36 SF
2169	P	6.42 SF
2178	P	7.78 SF
2179	P	6.81 SF
2182	P	6.81 SF
2183	P	3.44 SF
3787	P	9.17 SF
3789	P	2.22 SF
3790	P	4.48 SF
3791	P	4.48 SF
3792	P	7.00 SF
3795	P	6.87 SF
3796	P	5.23 SF
3797	P	6.42 SF
3802	P	8.11 SF
5222	P	3.44 SF
5223	P	6.74 SF
5224	P	2.08 SF
5225	P	7.78 SF
5226	P	5.64 SF
5227	P	7.19 SF
5228	P	1.42 SF
5229	P	2.00 SF
5230	P	6.81 SF
5231	P	2.24 SF
5232	P	2.06 SF
5233	P	2.00 SF
5234	P	2.11 SF
5235	P	1.92 SF
5236	P	3.45 SF
5237	P	1.46 SF
5238	P	1.71 SF
5239	P	3.50 SF
5240	P	1.92 SF
5241	P	5.64 SF
5242	P	5.64 SF
5243	P	2.06 SF
5244	P	5.38 SF
5245	P	6.81 SF
5246	P	14.50 SF

Building B - MD\_5TH FLOOR

Mark	TYPE	AREA
5247	P	3.00 SF
5248	P	7.50 SF
5249	P	2.00 SF
5250	P	2.00 SF
5251	P	8.64 SF
5252	P	2.01 SF
5253	P	4.25 SF
5254	P	3.84 SF
5255	P	3.99 SF
5256	P	6.00 SF
5257	P	5.38 SF
5258	P	2.36 SF
5259	P	6.42 SF
5260	P	7.78 SF
5261	P	5.86 SF
5262	P	6.81 SF
5263	P	3.44 SF
5264	P	9.17 SF
5266	P	2.22 SF
5267	P	4.48 SF
5268	P	4.48 SF
5269	P	7.00 SF
5272	P	6.87 SF
5273	P	5.23 SF
5274	P	6.42 SF
3786	E	0.70 SF
2102	E	0.50 SF
2103	E	0.50 SF
2104	E	0.50 SF
2105	E	0.50 SF
2106	E	0.75 SF
2107	E	0.50 SF
2108	E	0.50 SF
2109	E	0.50 SF
2110	E	0.50 SF
2111	E	0.50 SF
2112	E	0.50 SF
2113	E	0.50 SF
2114	E	0.50 SF
2115	E	0.50 SF
2116	E	0.50 SF
2118	E	25.47 SF
2120	E	0.50 SF
2121	E	0.50 SF
2122	E	0.50 SF
2124	E	22.12 SF
3800	E	0.50 SF
3801	E	0.70 SF
3806	E	0.50 SF
3827	E	0.50 SF
3828	E	0.50 SF
3829	E	0.50 SF
3830	E	0.75 SF
3831	E	0.50 SF
3832	E	0.50 SF
3833	E	0.50 SF
3834	E	0.50 SF
3835	E	0.50 SF
3836	E	0.50 SF
3837	E	0.50 SF
3838	E	0.50 SF
3839	E	0.50 SF
3840	E	0.50 SF
5217	E	25.47 SF
5218	E	0.50 SF
5219	E	0.50 SF
5220	E	0.50 SF
5221	E	22.12 SF
5277	E	0.50 SF
2337	M	18.17 SF
2069	M	5.11 SF
2070	M	6.10 SF
2071	M	6.14 SF
2072	M	6.95 SF
2073	M	3.66 SF
2077	M	4.18 SF
2078	M	2.83 SF

Building B - MD\_5TH FLOOR

Mark	TYPE	AREA
2079	M	2.83 SF
2080	M	3.18 SF
2081	M	4.14 SF
2082	M	7.32 SF
2083	M	21.17 SF
2089	M	5.39 SF
2091	M	8.30 SF
2092	M	4.77 SF
2093	M	6.95 SF
2094	M	4.14 SF
2095	M	10.09 SF
2096	M	4.14 SF
2097	M	6.64 SF
2098	M	4.64 SF
2099	M	4.14 SF
2117	M	4.80 SF
3788	M	6.68 SF
3793	M	4.77 SF
3794	M	5.31 SF
3798	M	4.14 SF
3799	M	4.14 SF
3803	M	18.17 SF
3804	M	5.11 SF
3805	M	6.10 SF
3806	M	6.14 SF
3807	M	6.95 SF
3808	M	3.66 SF
3809	M	4.18 SF
3810	M	2.83 SF
3811	M	2.83 SF
3812	M	3.18 SF
3813	M	4.14 SF
3814	M	7.32 SF
3815	M	21.17 SF
3816	M	5.39 SF
3817	M	8.30 SF
3818	M	4.77 SF
3819	M	6.95 SF
3820	M	4.14 SF
3821	M	10.09 SF
3822	M	4.14 SF
3823	M	6.64 SF
3824	M	4.64 SF
3825	M	4.14 SF
5216	M	4.80 SF
5265	M	6.68 SF
5270	M	4.77 SF
5271	M	5.31 SF
5275	M	4.14 SF
5276	M	4.14 SF
959.22	SF	

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 5  
GROSS AREA: 232 SF

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 4  
GROSS AREA: 232 SF

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 38  
GROSS AREA: 1,882 SF

MULTI-PURPOSE ROOM  
RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 8  
GROSS AREA: 793 SF

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 8  
GROSS AREA: 397 SF

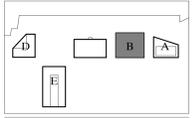
RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 8  
GROSS AREA: 397 SF

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 1  
GROSS AREA: 416 SF

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 64  
GROSS AREA: 3,196 SF

RESIDENTIAL  
ACCESSORY TO RESIDENTIAL  
OG: R-2 UG: 2  
OCCUPANTS: 2  
GROSS AREA: 416 SF





CLIENT  
 Two Trees Management  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

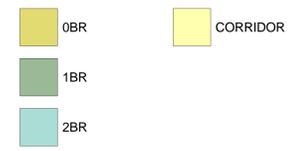
PROJECT  
 Domino - Lot A  
 Building B  
 Brooklyn, NY

TITLE  
 Area Diagram - Floors 7-9

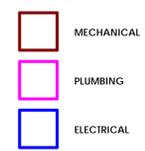
SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13,143.02



Space Legend



Mechanical Deduction



Apartment Area - Floor 6-9

Name	Area
0BR	637 SF
0BR	646 SF
0BR	653 SF
0BR	638 SF
0BR	646 SF
0BR	682 SF
6	3,902 SF
1BR	910 SF
1BR	901 SF
1BR	1,021 SF
1BR	937 SF
1BR	909 SF
1BR	901 SF
1BR	1,021 SF
1BR	936 SF
8	7,536 SF
2BR	1,337 SF
2BR	1,421 SF
2BR	1,140 SF
2BR	1,310 SF
2BR	1,338 SF
2BR	1,420 SF
2BR	1,139 SF
2BR	1,310 SF
8	10,414 SF
Grand total: 22	21,853 SF

Building B - Schedule A - Floor 7

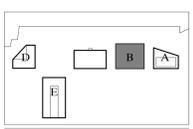
FAR Category	Name	Occupancy Group	Use Group	Gross Area
RESIDENTIAL	2BR	R-2	2	1,337 SF
RESIDENTIAL	2BR	R-2	2	1,421 SF
RESIDENTIAL	0BR	R-2	2	637 SF
RESIDENTIAL	1BR	R-2	2	910 SF
RESIDENTIAL	0BR	R-2	2	646 SF
RESIDENTIAL	2BR	R-2	2	1,140 SF
RESIDENTIAL	2BR	R-2	2	1,310 SF
RESIDENTIAL	1BR	R-2	2	1,021 SF
RESIDENTIAL	1BR	R-2	2	937 SF
RESIDENTIAL	0BR	R-2	2	653 SF
RESIDENTIAL	2BR	R-2	2	1,338 SF
RESIDENTIAL	2BR	R-2	2	1,420 SF
RESIDENTIAL	0BR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	909 SF
RESIDENTIAL	1BR	R-2	2	901 SF
RESIDENTIAL	0BR	R-2	2	646 SF
RESIDENTIAL	2BR	R-2	2	1,139 SF
RESIDENTIAL	2BR	R-2	2	1,310 SF
RESIDENTIAL	1BR	R-2	2	1,021 SF
RESIDENTIAL	1BR	R-2	2	936 SF
RESIDENTIAL	0BR	R-2	2	682 SF
RESIDENTIAL	CORRIDOR	R-2	2	1,428 SF
RESIDENTIAL	CORRIDOR	R-2	2	1,403 SF
				24,684 SF

Building B - ...		Building B - ...		Building B - ...		Building B - ...	
TYPE	AREA	TYPE	AREA	TYPE	AREA	TYPE	AREA
P	8.11 SF	P	5.41 SF	E	0.70 SF	M	3.18 SF
P	6.81 SF	P	0.97 SF	E	0.50 SF	M	4.14 SF
P	4.84 SF	P	6.81 SF	E	0.50 SF	M	7.32 SF
P	7.00 SF	P	2.24 SF	E	0.50 SF	M	4.77 SF
P	3.44 SF	P	2.06 SF	E	0.50 SF	M	4.14 SF
P	7.27 SF	P	2.00 SF	E	0.50 SF	M	4.14 SF
P	2.08 SF	P	2.11 SF	E	0.44 SF	M	5.37 SF
P	7.78 SF	P	1.92 SF	E	0.50 SF	M	1.88 SF
P	5.64 SF	P	3.45 SF	E	0.50 SF	M	5.52 SF
P	7.19 SF	P	1.46 SF	E	0.50 SF	M	4.23 SF
P	1.42 SF	P	1.71 SF	E	0.50 SF	M	3.82 SF
P	6.42 SF	P	3.50 SF	E	0.50 SF	M	8.30 SF
P	5.41 SF	P	1.92 SF	E	0.50 SF	M	4.77 SF
P	0.97 SF	P	5.64 SF	E	0.50 SF	M	6.95 SF
P	6.81 SF	P	5.64 SF	E	0.50 SF	M	4.14 SF
P	2.24 SF	P	2.06 SF	E	0.50 SF	M	5.00 SF
P	2.06 SF	P	5.38 SF	E	25.47 SF	M	6.64 SF
P	2.00 SF	P	6.81 SF	E	0.50 SF	M	6.64 SF
P	2.11 SF	P	14.50 SF	E	0.50 SF	M	4.64 SF
P	1.92 SF	P	3.00 SF	E	0.50 SF	M	4.14 SF
P	3.45 SF	P	7.50 SF	E	0.50 SF	M	5.33 SF
P	1.46 SF	P	2.00 SF	E	0.50 SF	M	21.17 SF
P	1.71 SF	P	2.00 SF	E	22.12 SF	M	4.80 SF
P	3.50 SF	P	8.64 SF	E	0.50 SF		
P	1.92 SF	P	2.01 SF	M	18.17 SF		1061.61 SF
P	5.64 SF	P	4.25 SF	M	5.11 SF		
P	5.64 SF	P	3.84 SF	M	6.10 SF		
P	2.06 SF	P	3.99 SF	M	6.14 SF		
P	5.38 SF	P	6.00 SF	M	6.95 SF		
P	6.81 SF	P	6.88 SF	M	3.66 SF		
P	14.50 SF	P	9.72 SF	M	4.88 SF		
P	3.00 SF	P	2.36 SF	M	4.33 SF		
P	7.50 SF	P	2.06 SF	M	4.67 SF		
P	2.00 SF	P	2.06 SF	M	4.18 SF		
P	2.00 SF	P	6.81 SF	M	2.83 SF		
P	8.64 SF	P	5.38 SF	M	2.83 SF		
P	2.01 SF	P	6.42 SF	M	3.18 SF		
P	4.25 SF	P	5.23 SF	M	4.14 SF		
P	3.84 SF	P	2.22 SF	M	7.32 SF		
P	3.99 SF	P	6.42 SF	M	4.77 SF		
P	6.00 SF	P	1.82 SF	M	4.14 SF		
P	6.88 SF	P	1.77 SF	M	4.14 SF		
P	9.72 SF	P	1.51 SF	M	5.37 SF		
P	2.36 SF	P	7.19 SF	M	1.88 SF		
P	2.06 SF	P	5.34 SF	M	5.52 SF		
P	2.06 SF	P	7.78 SF	M	4.23 SF		
P	6.81 SF	P	3.44 SF	M	3.82 SF		
P	5.38 SF	E	0.70 SF	M	8.30 SF		
P	6.42 SF	E	0.50 SF	M	4.77 SF		
P	5.23 SF	E	0.50 SF	M	6.95 SF		
P	2.22 SF	E	0.50 SF	M	4.14 SF		
P	6.42 SF	E	0.50 SF	M	5.00 SF		
P	1.82 SF	E	0.50 SF	M	6.64 SF		
P	1.77 SF	E	0.44 SF	M	6.64 SF		
P	1.51 SF	E	0.50 SF	M	4.64 SF		
P	7.19 SF	E	0.50 SF	M	4.14 SF		
P	5.34 SF	E	0.50 SF	M	5.33 SF		
P	7.78 SF	E	0.50 SF	M	21.17 SF		
P	3.44 SF	E	0.50 SF	M	4.80 SF		
P	8.11 SF	E	0.50 SF	M	18.17 SF		
P	6.81 SF	E	0.50 SF	M	5.11 SF		
P	4.84 SF	E	0.50 SF	M	6.10 SF		
P	7.00 SF	E	0.50 SF	M	6.14 SF		
P	3.44 SF	E	25.47 SF	M	6.95 SF		
P	7.27 SF	E	0.50 SF	M	3.66 SF		
P	2.08 SF	E	0.50 SF	M	4.88 SF		
P	7.78 SF	E	0.50 SF	M	4.33 SF		
P	5.64 SF	E	0.50 SF	M	4.67 SF		
P	7.19 SF	E	0.50 SF	M	4.18 SF		
P	1.42 SF	E	22.12 SF	M	2.83 SF		
P	6.42 SF	E	0.50 SF	M	2.83 SF		

1 SITE B - FLOOR 7  
 SCALE: 1/8" = 1'-0"

Mark	TYPE	AREA
6369	M	5.00 SF
6370	M	6.64 SF
6371	M	6.64 SF
6372	M	4.64 SF
6373	M	4.14 SF
6389	M	4.80 SF
6448	M	9.78 SF
929.07 SF		

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'



CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

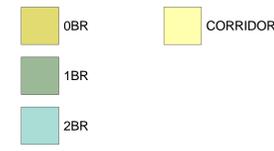
TITLE  
Area Diagram - Floor 10

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13,143.02

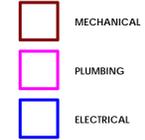


B-Z  
210  
.00

Space Legend



Mechanical Deduction



Apartment Area - Floor 10

Name	Area
OBR	638 SF
OBR	549 SF
OBR	651 SF
OBR	815 SF
OBR	558 SF
OBR	653 SF
6	3,686 SF
1BR	909 SF
1BR	901 SF
1BR	850 SF
1BR	815 SF
1BR	1,021 SF
1BR	936 SF
1BR	893 SF
1BR	917 SF
1BR	839 SF
1BR	806 SF
1BR	1,037 SF
1BR	919 SF
12	10,843 SF
2BR	1,340 SF
2BR	1,420 SF
2BR	1,345 SF
2BR	1,420 SF
4	5,525 SF
Grand total: 22	20,055 SF

Building B - Schedule A - Floor 10

FAR Category	Name	Occupancy Group	Use Group	Gross Area
RESIDENTIAL	2BR	R-2	2	1,340 SF
RESIDENTIAL	2BR	R-2	2	1,420 SF
RESIDENTIAL	OBR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	909 SF
RESIDENTIAL	1BR	R-2	2	901 SF
RESIDENTIAL	1BR	R-2	2	850 SF
RESIDENTIAL	OBR	R-2	2	549 SF
RESIDENTIAL	1BR	R-2	2	815 SF
RESIDENTIAL	1BR	R-2	2	1,021 SF
RESIDENTIAL	OBR	R-2	2	936 SF
RESIDENTIAL	2BR	R-2	2	1,345 SF
RESIDENTIAL	2BR	R-2	2	1,420 SF
RESIDENTIAL	OBR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	893 SF
RESIDENTIAL	1BR	R-2	2	917 SF
RESIDENTIAL	1BR	R-2	2	839 SF
RESIDENTIAL	OBR	R-2	2	558 SF
RESIDENTIAL	1BR	R-2	2	806 SF
RESIDENTIAL	1BR	R-2	2	1,037 SF
RESIDENTIAL	1BR	R-2	2	919 SF
RESIDENTIAL	OBR	R-2	2	653 SF
RESIDENTIAL	CORRIDOR	R-2	2	1,347 SF
RESIDENTIAL	CORRIDOR	R-2	2	1,342 SF
				22,734 SF
				22,734 SF

Building B - MD\_10TH-35TH...

Mark	TYPE	AREA
6238	P	8.11 SF
6290	P	6.81 SF
6291	P	4.84 SF
6292	P	7.00 SF
6293	P	3.44 SF
6294	P	7.27 SF
6295	P	2.08 SF
6296	P	7.78 SF
6297	P	5.64 SF
6298	P	7.19 SF
6299	P	1.42 SF
6300	P	6.42 SF
6301	P	5.41 SF
6302	P	0.97 SF
6303	P	6.81 SF
6304	P	2.24 SF
6305	P	2.06 SF
6306	P	2.00 SF
6307	P	2.11 SF
6308	P	1.92 SF
6309	P	3.45 SF
6310	P	1.46 SF
6311	P	1.71 SF
6312	P	3.50 SF
6313	P	1.92 SF
6314	P	5.64 SF
6315	P	5.64 SF
6316	P	2.06 SF
6317	P	5.38 SF
6318	P	6.81 SF
6319	P	14.50 SF
6320	P	3.00 SF
6321	P	7.50 SF
6322	P	2.00 SF
6323	P	2.00 SF
6324	P	8.64 SF
6325	P	2.01 SF
6326	P	4.25 SF
6327	P	3.84 SF
6328	P	3.99 SF
6329	P	6.00 SF
6330	P	5.08 SF
6331	P	2.01 SF
6332	P	1.94 SF
6333	P	2.36 SF
6334	P	2.00 SF
6335	P	2.46 SF
6336	P	6.01 SF
6338	P	6.59 SF
6339	P	3.44 SF
6340	P	6.81 SF
6342	P	1.45 SF
6343	P	6.50 SF
6345	P	8.11 SF
6397	P	6.81 SF
6398	P	4.84 SF
6399	P	7.00 SF
6400	P	3.44 SF
6401	P	7.27 SF
6402	P	2.08 SF
6403	P	7.78 SF
6404	P	5.64 SF
6405	P	7.19 SF
6406	P	1.42 SF
6407	P	6.42 SF
6408	P	5.41 SF
6409	P	0.97 SF
6410	P	6.81 SF
6411	P	2.24 SF

Building B - MD\_10TH-35TH...

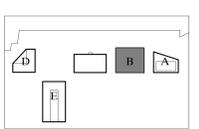
Mark	TYPE	AREA
6412	P	2.06 SF
6413	P	2.00 SF
6414	P	2.11 SF
6415	P	1.92 SF
6416	P	3.45 SF
6417	P	1.46 SF
6418	P	1.71 SF
6419	P	3.50 SF
6420	P	1.92 SF
6421	P	5.64 SF
6422	P	5.64 SF
6423	P	2.06 SF
6424	P	5.38 SF
6425	P	6.81 SF
6426	P	14.50 SF
6427	P	3.00 SF
6428	P	7.50 SF
6429	P	2.00 SF
6430	P	2.00 SF
6431	P	8.64 SF
6432	P	2.01 SF
6433	P	4.25 SF
6434	P	3.84 SF
6435	P	3.99 SF
6436	P	6.00 SF
6437	P	5.08 SF
6438	P	2.01 SF
6439	P	1.94 SF
6440	P	2.36 SF
6441	P	2.00 SF
6442	P	2.46 SF
6443	P	6.01 SF
6445	P	6.59 SF
6446	P	3.44 SF
6447	P	6.81 SF
6449	P	1.45 SF
6450	P	6.50 SF
6237	E	0.70 SF
6267	E	0.50 SF
6268	E	0.50 SF
6269	E	0.50 SF
6270	E	0.50 SF
6271	E	0.50 SF
6272	E	0.44 SF
6273	E	0.50 SF
6274	E	0.50 SF
6275	E	0.50 SF
6276	E	0.50 SF
6277	E	0.50 SF
6278	E	0.50 SF
6279	E	0.50 SF
6280	E	0.50 SF
6281	E	0.50 SF
6283	E	25.47 SF
6284	E	0.31 SF
6285	E	0.50 SF
6286	E	0.50 SF
6287	E	0.50 SF
6288	E	0.50 SF
6289	E	22.12 SF
6337	E	0.63 SF
6344	E	0.70 SF
6374	E	0.50 SF
6375	E	0.50 SF
6376	E	0.50 SF
6377	E	0.50 SF
6378	E	0.50 SF
6379	E	0.44 SF
6380	E	0.50 SF

Building B - MD\_10TH-35TH...

Mark	TYPE	AREA
6381	E	0.50 SF
6382	E	0.50 SF
6383	E	0.50 SF
6384	E	0.50 SF
6385	E	0.50 SF
6386	E	0.50 SF
6387	E	0.50 SF
6388	E	0.50 SF
6390	E	25.47 SF
6391	E	0.31 SF
6392	E	0.50 SF
6393	E	0.50 SF
6394	E	0.50 SF
6395	E	0.50 SF
6396	E	22.12 SF
6444	E	0.63 SF
6239	M	18.17 SF
6240	M	5.11 SF
6241	M	6.10 SF
6242	M	6.14 SF
6243	M	6.95 SF
6244	M	3.66 SF
6245	M	4.88 SF
6246	M	4.33 SF
6247	M	4.67 SF
6248	M	4.18 SF
6249	M	2.83 SF
6250	M	2.83 SF
6251	M	3.18 SF
6252	M	4.14 SF
6253	M	6.63 SF
6254	M	4.20 SF
6255	M	6.62 SF
6256	M	2.83 SF
6257	M	9.14 SF
6258	M	8.30 SF
6259	M	4.77 SF
6260	M	6.95 SF
6261	M	4.14 SF
6262	M	5.00 SF
6263	M	6.64 SF
6264	M	6.64 SF
6265	M	4.64 SF
6266	M	4.14 SF
6282	M	4.80 SF
6341	M	9.78 SF
6346	M	18.17 SF
6347	M	5.11 SF
6348	M	6.10 SF
6349	M	6.14 SF
6350	M	6.95 SF
6351	M	3.66 SF
6352	M	4.88 SF
6353	M	4.33 SF
6354	M	4.67 SF
6355	M	4.18 SF
6356	M	2.83 SF
6357	M	2.83 SF
6358	M	3.18 SF
6359	M	4.14 SF
6360	M	6.63 SF
6361	M	4.20 SF
6362	M	6.62 SF
6363	M	2.83 SF
6364	M	9.14 SF
6365	M	8.30 SF
6366	M	4.77 SF
6367	M	6.95 SF
6368	M	4.14 SF

Mark	TYPE	AREA
6369	M	5.00 SF
6370	M	6.64 SF
6371	M	6.64 SF
6372	M	4.64 SF
6373	M	4.14 SF
6389	M	4.80 SF
6448	M	9.78 SF
929.07 SF		

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988).  
BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

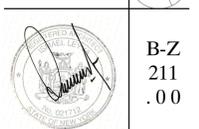


CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

TITLE  
Area Diagram - Floors 11-35

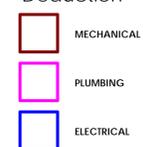
SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13,143.02



Space Legend



Mechanical Deduction



Apartment Area - Floor 11-35

Name	Area
0BR	638 SF
0BR	549 SF
0BR	651 SF
0BR	638 SF
0BR	558 SF
0BR	653 SF
6	3,686 SF
1BR	909 SF
1BR	901 SF
1BR	850 SF
1BR	815 SF
1BR	1,021 SF
1BR	936 SF
1BR	893 SF
1BR	917 SF
1BR	830 SF
1BR	806 SF
1BR	1,037 SF
1BR	919 SF
12	10,843 SF
2BR	1,340 SF
2BR	1,420 SF
2BR	1,345 SF
2BR	1,420 SF
4	5,525 SF
Grand total: 22	20,055 SF

Building B - Schedule A - Floor 11-35

FAR Category	Name	Occupancy Group	Use Group	Gross Area
RESIDENTIAL	2BR	R-2	2	1,340 SF
RESIDENTIAL	2BR	R-2	2	1,420 SF
RESIDENTIAL	0BR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	909 SF
RESIDENTIAL	1BR	R-2	2	901 SF
RESIDENTIAL	1BR	R-2	2	850 SF
RESIDENTIAL	0BR	R-2	2	549 SF
RESIDENTIAL	1BR	R-2	2	815 SF
RESIDENTIAL	1BR	R-2	2	1,021 SF
RESIDENTIAL	1BR	R-2	2	936 SF
RESIDENTIAL	0BR	R-2	2	651 SF
RESIDENTIAL	2BR	R-2	2	1,345 SF
RESIDENTIAL	2BR	R-2	2	1,420 SF
RESIDENTIAL	0BR	R-2	2	638 SF
RESIDENTIAL	1BR	R-2	2	893 SF
RESIDENTIAL	1BR	R-2	2	917 SF
RESIDENTIAL	1BR	R-2	2	830 SF
RESIDENTIAL	0BR	R-2	2	558 SF
RESIDENTIAL	1BR	R-2	2	806 SF
RESIDENTIAL	1BR	R-2	2	1,037 SF
RESIDENTIAL	1BR	R-2	2	919 SF
RESIDENTIAL	0BR	R-2	2	653 SF
RESIDENTIAL	CORRIDOR	R-2	2	1,337 SF
RESIDENTIAL	CORRIDOR	R-2	2	1,342 SF
				22,734 SF

Site B - Apartment Summary

Name	Count	%	Area
0BR	184	27	114,050 SF
1BR	354	52	321,607 SF
2BR	142	21	192,885 SF
680			628,542 SF
			926 SF

Building B - MD\_10TH-35TH...

Mark	TYPE	AREA
------	------	------

6238	P	8.11 SF
6290	P	6.81 SF
6291	P	4.84 SF
6292	P	7.00 SF
6293	P	3.44 SF
6294	P	7.27 SF
6295	P	2.08 SF
6296	P	7.78 SF
6297	P	5.64 SF
6298	P	7.19 SF
6299	P	1.42 SF
6300	P	6.42 SF
6301	P	5.41 SF
6302	P	0.97 SF
6303	P	6.81 SF
6304	P	2.24 SF
6305	P	2.06 SF
6306	P	2.00 SF
6307	P	2.11 SF
6308	P	1.92 SF
6309	P	3.45 SF
6310	P	1.46 SF
6311	P	1.71 SF
6312	P	3.50 SF
6313	P	1.92 SF
6314	P	5.64 SF
6315	P	5.64 SF
6316	P	2.06 SF
6317	P	5.38 SF
6318	P	6.81 SF
6319	P	14.50 SF
6320	P	3.00 SF
6321	P	7.50 SF
6322	P	2.00 SF
6323	P	6.81 SF
6324	P	8.64 SF
6325	P	2.01 SF
6326	P	4.25 SF
6327	P	3.84 SF
6328	P	3.99 SF
6329	P	6.00 SF
6330	P	5.08 SF
6331	P	2.01 SF
6332	P	1.94 SF
6333	P	2.36 SF
6334	P	2.00 SF
6335	P	2.46 SF
6336	P	6.01 SF
6338	P	6.59 SF
6339	P	3.44 SF
6340	P	6.81 SF
6342	P	1.45 SF
6343	P	6.50 SF
6345	P	8.11 SF
6397	P	6.81 SF
6398	P	4.84 SF
6399	P	7.00 SF
6400	P	3.44 SF
6401	P	7.27 SF
6402	P	2.08 SF
6403	P	7.78 SF
6404	P	5.64 SF
6405	P	7.19 SF
6406	P	1.42 SF
6407	P	6.42 SF
6408	P	5.41 SF
6409	P	0.97 SF
6410	P	6.81 SF
6411	P	2.24 SF

Building B - MD\_10TH-35TH...

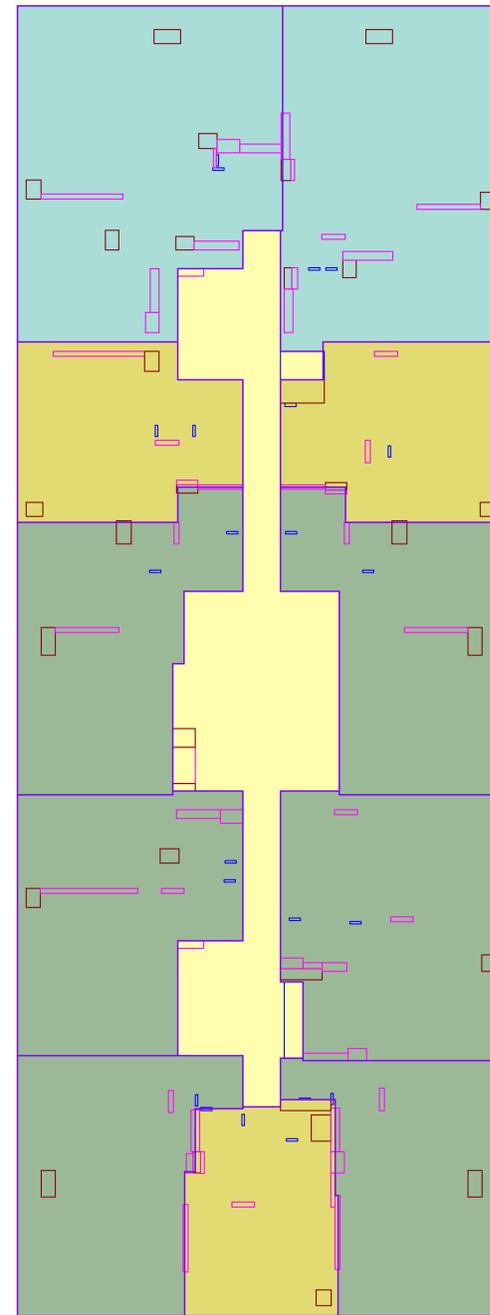
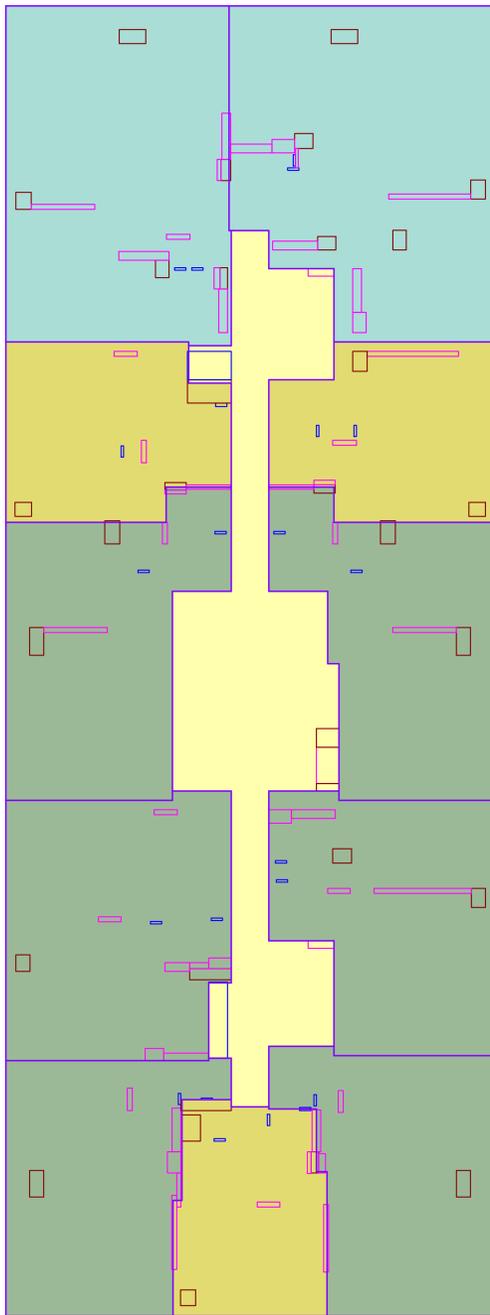
Mark	TYPE	AREA
------	------	------

6412	P	2.06 SF
6413	P	2.00 SF
6414	P	2.11 SF
6415	P	1.92 SF
6416	P	3.45 SF
6417	P	1.46 SF
6418	P	1.71 SF
6419	P	3.87 SF
6420	P	1.92 SF
6421	P	5.64 SF
6422	P	5.64 SF
6423	P	2.06 SF
6424	P	5.38 SF
6425	P	6.81 SF
6426	P	14.50 SF
6427	P	3.00 SF
6428	P	7.50 SF
6429	P	2.00 SF
6430	P	2.00 SF
6431	P	8.64 SF
6432	P	2.01 SF
6433	P	4.25 SF
6434	P	3.84 SF
6435	P	3.99 SF
6436	P	6.00 SF
6437	P	5.08 SF
6438	P	2.01 SF
6439	P	1.94 SF
6440	P	2.36 SF
6441	P	2.00 SF
6442	P	2.46 SF
6443	P	6.01 SF
6445	P	6.59 SF
6446	P	3.44 SF
6447	P	6.81 SF
6449	P	1.45 SF
6450	P	6.50 SF
6237	E	0.70 SF
6267	E	0.50 SF
6268	E	0.50 SF
6269	E	0.50 SF
6270	E	0.50 SF
6271	E	0.50 SF
6272	E	0.44 SF
6273	E	0.50 SF
6274	E	0.50 SF
6275	E	0.50 SF
6276	E	0.50 SF
6277	E	0.50 SF
6278	E	0.50 SF
6279	E	0.50 SF
6280	E	0.50 SF
6281	E	0.50 SF
6283	E	25.47 SF
6284	E	0.31 SF
6285	E	0.50 SF
6286	E	0.50 SF
6287	E	0.50 SF
6288	E	0.50 SF
6289	E	22.12 SF
6337	E	0.63 SF
6344	E	0.70 SF
6374	E	0.50 SF
6375	E	0.50 SF
6376	E	0.50 SF
6377	E	0.50 SF
6378	E	0.50 SF
6379	E	0.44 SF
6380	E	0.50 SF

Building B - MD\_10TH-35TH...

Mark	TYPE	AREA
------	------	------

6381	E	0.50 SF
6382	E	0.50 SF
6383	E	0.50 SF
6384	E	0.50 SF
6385	E	0.50 SF
6386	E	0.50 SF
6387	E	0.50 SF
6388	E	0.50 SF
6390	E	25.47 SF
6391	E	0.31 SF
6392	E	0.50 SF
6393	E	0.50 SF
6394	E	0.50 SF
6395	E	0.50 SF
6396	E	22.12 SF
6444	E	0.63 SF
6239	M	18.17 SF
6240	M	5.11 SF
6241	M	6.10 SF
6242	M	6.14 SF
6243	M	6.95 SF
6244	M	3.66 SF
6245	M	4.88 SF
6246	M	4.33 SF
6247	M	4.67 SF
6248	M	4.18 SF
6249	M	2.83 SF
6250	M	2.83 SF
6251	M	3.18 SF
6252	M	4.14 SF
6253	M	6.63 SF
6254	M	4.20 SF
6255	M	6.62 SF
6256	M	2.83 SF
6257	M	9.14 SF
6258	M	8.30 SF
6259	M	4.77 SF
6260	M	6.95 SF
6261	M	4.14 SF
6262	M	5.00 SF
6263	M	6.64 SF
6264	M	6.64 SF
6265	M	4.64 SF
6266	M	4.14 SF
6282	M	4.80 SF
6341	M	9.78 SF
6346	M	18.17 SF
6347	M	5.11 SF
6348	M	6.10 SF
6349	M	6.14 SF
6350	M	6.95 SF
6351	M	3.66 SF
6352	M	4.88 SF
6353	M	4.33 SF
6354	M	4.67 SF
6355	M	4.18 SF
6356	M	2.83 SF
6357	M	2.83 SF
6358	M	3.18 SF
6359	M	4.14 SF
6360	M	6.63 SF
6361	M	4.20 SF
6362	M	6.62 SF
6363	M	2.83 SF
6364	M	9.14 SF
6365	M	8.30 SF
6366	M	4.77 SF
6367	M	6.95 SF
6368	M	4.14 SF

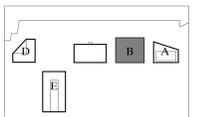


1 SITE B - FLOOR 11 (TYPICAL FOR FLOORS 11-35)  
SCALE: 1/8" = 1'-0"



No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988). BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'.



CLIENT  
**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
**Domino - Lot A Building B**  
Brooklyn, NY

TITLE  
Area Diagram - EMR

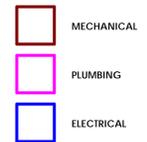
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DATE: 05/02/14  
PROJECT No: 13,143.02

**B-Z**  
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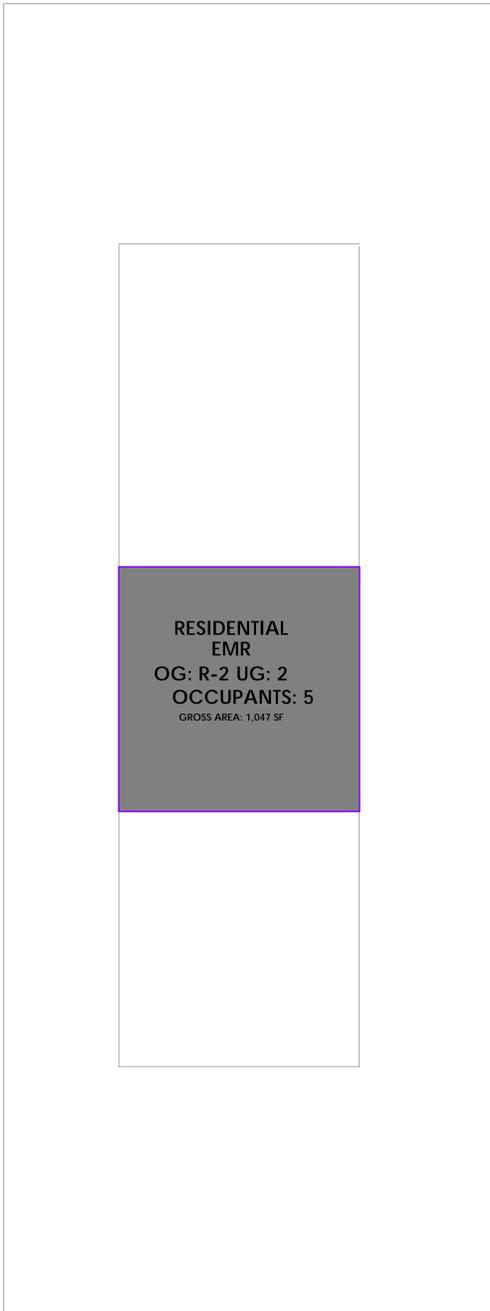
Space Legend



Mechanical Deduction



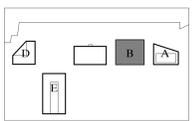
Building B - Schedule A - EMR				
FAR Category	Name	Occupancy Group	Use Group	Gross Area
RESIDENTIAL	EMR	R-2	2	1,047 SF
RESIDENTIAL	EMR	R-2	2	1,047 SF
				2,093 SF
				2,093 SF



1 SITE B - EMR  
SCALE: 1/8" = 1'-0"

No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988).  
BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'.

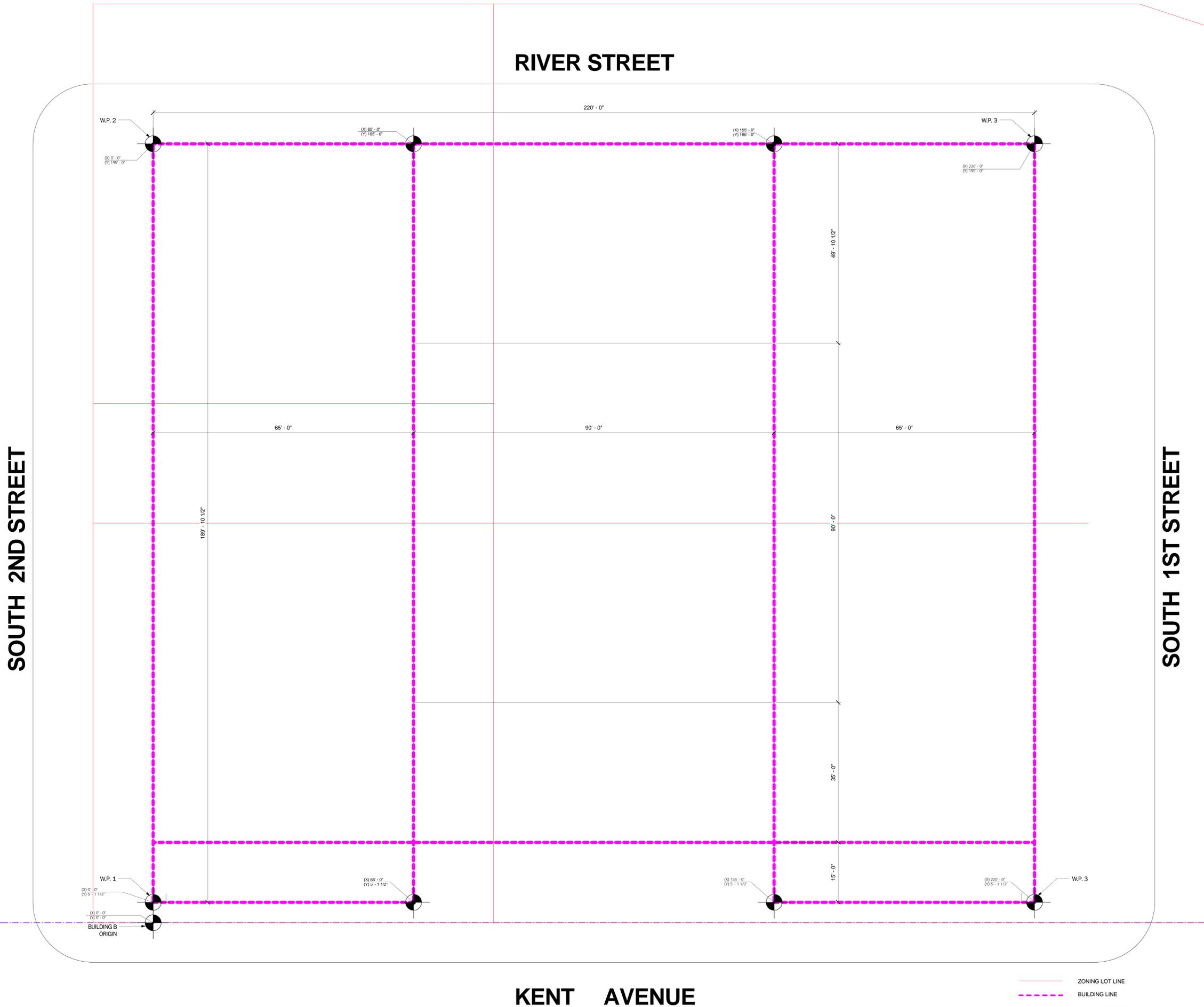
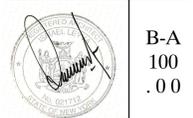


CLIENT  
**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
Building B  
Brooklyn, NY

TITLE  
Building Line Diagram

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13,143.02



1 BLD - LINKED VIEW  
SCALE: 1/8" = 1'-0"





**OCCUPANT LOAD AND EGRESS ANALYSIS**

**B1 FLOOR SECTION BC 1004 - OCCUPANCY LOAD CALCULATION TABLE 1004.1.2:**

OCCUPANCY	AREA	CALCULATION	OCCUPANTS
PARKING	26,882 S.F.	26,882 S.F./200 GROSS	134
MECHANICAL	5,026 S.F.	5,026 S.F./300 GROSS	17
BIKE STORAGE	3,266 S.F.	3,266 S.F./300 GROSS	11
MECHANICAL SHAFT	206 S.F.	N.S.O.	N.S.O.
<b>TOTAL OCCUPANT LOAD: 162 OCCUPANTS</b>			

**SECTION BC 1004 - OCCUPANCY LOAD CALCULATION TABLE 1005.1:**

EGRESS DOOR	REQUIRED	PROVIDED	COMPLIANCE
EGRESS DOOR	OCCUPANT LOAD X 0.2' 162 X 0.2' = 32.4 TOTAL = 32.4	STAIR G DOOR = 36" STAIR H DOOR = 36"	YES
EGRESS STAIR	OCCUPANT LOAD X 0.3' 162 X 0.3' = 48.6 TOTAL = 48.6	STAIR G = 45" STAIR H = 62"	YES

**EG PATH - B1**

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF.	COMPLIANCE
PARKING (S-2)	A	250'-0" MAX	235' - 9"	1015.1	Y
PARKING (S-2)	B	250'-0" MAX	148' - 6"	1015.1	Y
PARKING (S-2)	C	250'-0" MAX	165' - 4"	1015.1	Y
PARKING (S-2)	D	250'-0" MAX	235' - 1"	1015.1	Y
RESIDENTIAL (R-2)	E	200'-0" MAX	128' - 10"	1015.1	Y

**EGRESS NOTES:**

SECTION BC 302 CLASSIFICATION  
 1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
 2. BUSINESS: B  
 3. EDUCATIONAL: E  
 4. RESIDENTIAL: R  
 5. MERCANTILE: S  
 6. STORAGE: S  
 7. UTILITY: U

§28.2-706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP: A, B, E, F, 2, 4, H, 5, I, M, R, S-2  
 FIRE-RESISTANCE RATING(HOURS): 2

SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS

OCCUPANT LOAD: MINIMUM # OF EXITS  
 1-500: 2  
 501-1000: 3  
 MORE THAN 1000: 4

§28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:

1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

OCCUPANCY: R: 20 PERSONS  
 A, B, E, M, U: 74 PERSONS  
 S: 30 PERSONS

§28.2-1014.2 TWO EXITS OR EXIT ACCESS DOORWAYS. EXCEPTIONS:

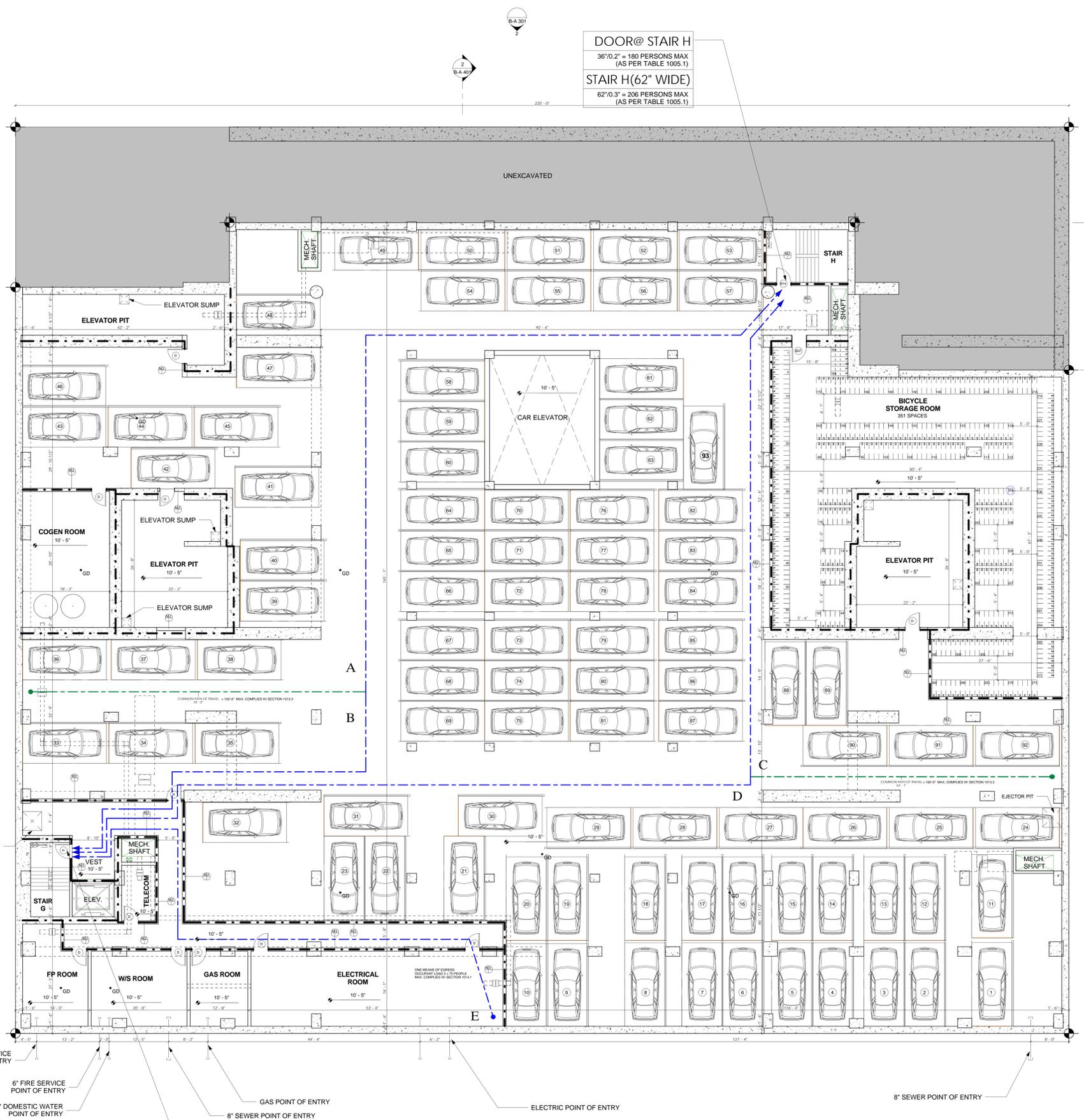
3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.

3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4671mm)

**LEGEND:**

- NO ACCESS ZONE
- NON-SIMULTANEOUS OCCUPANCY (N.S.O.)
- EXIT TO GRADE
- TRAVEL DISTANCE
- SAFE AREA
- NON-RATED PARTITION
- CONCRETE WALL/COLUMN
- EXIT SIGN
- DEAD END TRAVEL DIST.
- DIST. BETWEEN 2 EXITS
- COMMON PATH OF TRAVEL
- 1 HR.-RATED PARTITION
- 2 HR.-RATED PARTITION
- 3 HR.-RATED PARTITION

**NOTE:**  
 ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.



**DOOR@ STAIR H**  
 36'0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR H(62" WIDE)**  
 62'0.3" = 206 PERSONS MAX  
 (AS PER TABLE 1005.1)

**DOOR@ STAIR G**  
 36'0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR G(45" WIDE)**  
 45'0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02

**CLIENT**  
 Two Trees Management  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

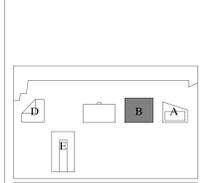
**PROJECT**  
 Domino - Lot A  
 Building B  
 Brooklyn, NY

**TITLE**  
 Floor Plan - Floor B1

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No.	Date	Rev.	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
 ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

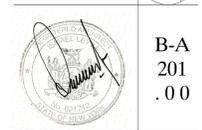


CLIENT  
**Two Trees Management**  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
 Building B  
 Brooklyn, NY

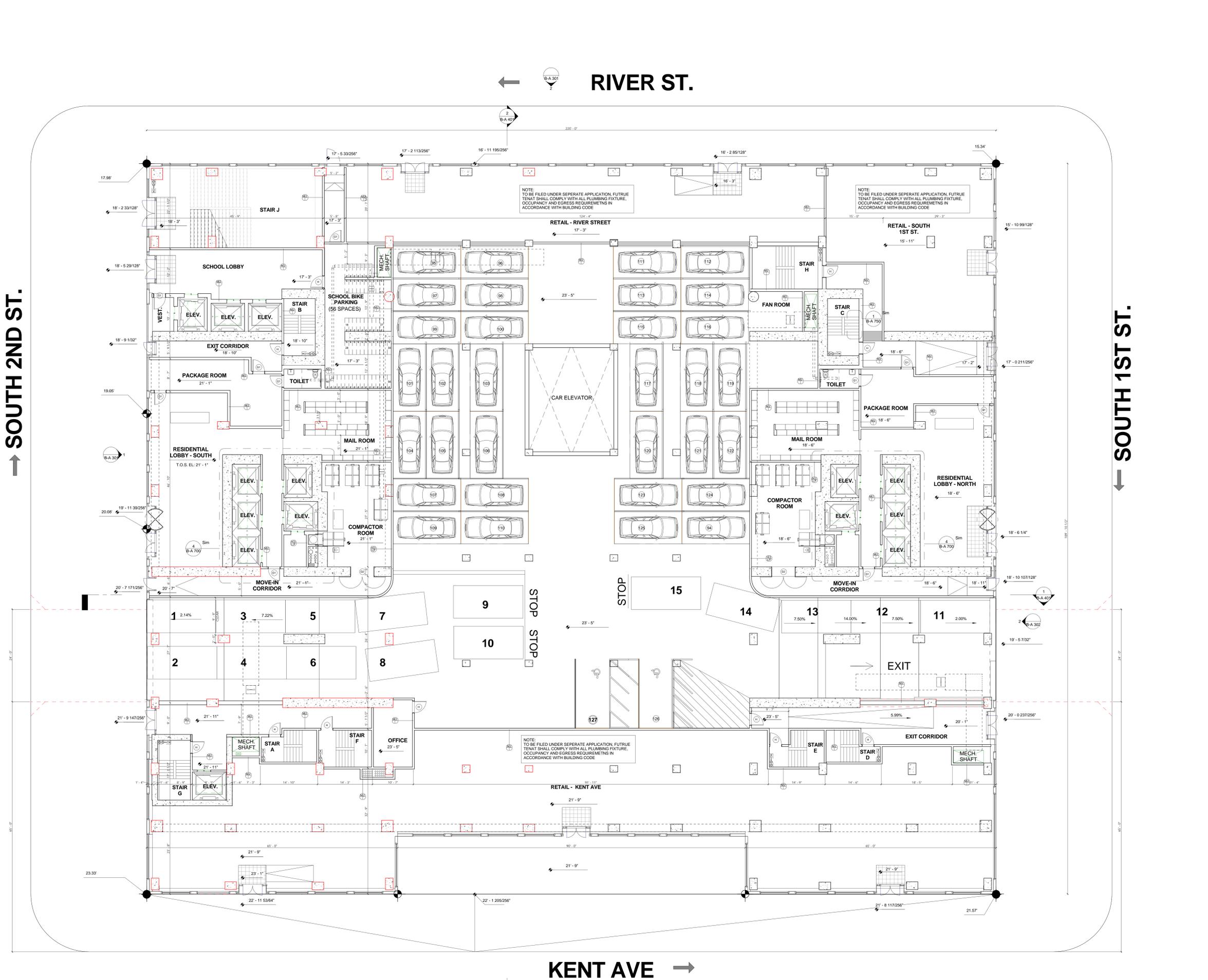
TITLE  
 Floor Plan - Floor 1

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02



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- FLOOR PLAN GENERAL NOTES  
 (FLOORS BY 300)
- FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.
  - FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c.
  - ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'
  - U.O.N. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST CURB AT FURRING, CHASE & SHAFT WALLS.
  - FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.
  - IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.
  - TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRS.
  - EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.
  - TYPICAL INTERIOR PARTITION NOTES:  
 A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE D0 U.O.N.  
 B. CHASE WALL PARTITIONS TO BE TYPE C0 U.O.N.  
 C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE D1FF U.O.N.  
 D. FURRING AROUND COLUMNS TO BE TYPE F0R-U.O.N.  
 E. FURRING AT ELEVATOR HOSTING AGAINST HABITABLE ROOMS TO BE TYPE F0 U.O.N.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.N.  
 H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE D2 U.O.N.  
 I. NOT USED  
 J. CHASE WALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRWELLS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2.  
 K. ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLY TYPE H2.  
 L. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOSTING TO BE 2 HR. RATED TYPE H2.  
 M. TRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
 N. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLY WITH IMPACT RESISTANT GWB TYPE D2.  
 O. PROVIDE 3/4" THICK FIRE RETARDANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.  
 P. FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES REFER TO RCP'S A 600 SERIES.
  - FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.
  - NOT USED
  - ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.
  - NOT USED
  - PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 11.4.4.
  - FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.
  - CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM
  - SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.N.
  - INDICATES OPERABLE VENTILATION WINDOW. SEE DETAIL XXXXX FOR SCHEDULE, ASSEMBLY, AND ENERGY PERFORMANCE ANALYSIS AND SHEETS B-2 100 FOR NATURAL LIGHT AND VENTILATION CALCULATIONS.



SPACE NAME	OCCUPANCY	OCCUPANT LOAD	MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES				DRINKING FOUNTAIN 1 PER 1000	OTHER	NOTES
			W.C. REQUIRED 1 PER 500	LAVATORIES 1 PER 750	BAITUBS/ SHOWERS	OTHER			
RIVER ST RETAIL	M	93	1	1	1	NONE	1 SERVICE SINK	TO BE PROVIDED BY TENANT	
1ST ST RETAIL	M	53	1	1	1	NONE	1 SERVICE SINK	TO BE PROVIDED BY TENANT	
KENT AVE RETAIL	M	259	1	1	1	NONE	1 SERVICE SINK	TO BE PROVIDED BY TENANT	

NOTE:  
 1. AS PER 419.2, URINALS SHALL NOT BE SUBSTITUTED FOR MORE THAN 50% OF THE REQUIRED WATER CLOSETS.  
 2. ALL NON-RESIDENTIAL FACILITIES UNDER FUTURE TENANT BUILD-OUT TO COMPLY WITH IC: 1109 & ICCANSI A117.1-2003. REQUIRED CLEARANCE AROUND WATER CLOSETS TO COMPLY WITH ICCANSI A117.1-2003 604.3. REQUIRED GRAB BARS INCLUDING VERTICAL TO COMPLY WITH ICCANSI A117.1-2003 604.5.

OCCUPANT LOAD AND EGRESS ANALYSIS

1ST FLOOR  
SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
TABLE 1004.1.2

GROSS AREA = 40,423 S.F.

OCCUPANCY	AREA	CALCULATION	OCCUPANTS
COMMERCIAL(RETAIL-RIVER ST)	2,564 S.F.	2,564 S.F. / 30 GROSS	86
COMMERCIAL(RETAIL-SOUTH 1ST ST)	1,700 S.F.	1,700 S.F. / 30 GROSS	57
COMMERCIAL(RETAIL-KENT AVE)	6,767 S.F.	6,767 S.F. / 30 GROSS	226
COMMERCIAL(ELEVATOR)	374 S.F.	N.S.O.	N.S.O.
RESIDENTIAL(NORTH LOBBY)	3,693 S.F.	3,693 S.F. / 300 GROSS	12
RESIDENTIAL(SOUTH LOBBY)	3,789 S.F.	3,789 S.F. / 300 GROSS	13
COMMUNITY FACILITY(SCHOOL LOBBY)	1,943 S.F.	N.S.O.	N.S.O.
COMMUNITY FACILITY(BIKE STORAGE)	765 S.F.	765 S.F. / 300 GROSS	3
PARKING	15,618 S.F.	15,618 S.F./200 GROSS	78
MECHANICAL SHAFT	197 S.F.	N.S.O.	N.S.O.
STAIRS	2,824 S.F.	N.S.O.	N.S.O.

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
TABLE 1005.1

EGRESS DOOR	REQUIRED OCCUPANT LOAD X 0.2"	PROVIDED	COMPLIANCE
COMMERCIAL(RETAIL-RIVER ST)	86 X 0.2" = 17.2	DOORS @ RETAIL = 144"	YES
COMMERCIAL(RETAIL-NORTH)	56 X 0.2" = 11.2	DOORS @ RETAIL = 72"	YES
COMMERCIAL(RETAIL-KENT AVE)	226 X 0.2" = 45.2	DOORS @ RETAIL = 216"	YES
RESIDENTIAL(NORTH LOBBY)	12 X 0.2" = 2.4	DOORS@RES. LOBBY= 108"	YES
RESIDENTIAL(SOUTH LOBBY)	13 X 0.2" = 2.6	DOORS@RES. LOBBY= 108"	YES
COMMUNITY FACILITY(BIKE STORAGE)	3 X 0.2" = 0.6	DOORS@B.P.= 36"	YES
PARKING	78 X 0.2" = 15.6	DOORS@PARKING= 72"	YES

EG PATH - 1ST FLOOR

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
COMMERCIAL (M)	A	200' 0" MAX.	47' - 8"	1015.1	Y
COMMERCIAL (M)	B	200' 0" MAX.	47' - 1"	1015.1	Y
SCHOOL (E)	C	200' 0" MAX.	83' - 3"	1015.1	Y
SCHOOL (E)	C1	200' 0" MAX.	79' - 10"	1015.1	Y
RESIDENTIAL (R-2)	D	200' 0" MAX.	88' - 3"	1015.1	Y
RESIDENTIAL (R-2)	D1	200' 0" MAX.	105' - 3"	1015.1	Y
RESIDENTIAL (R-2)	E	200' 0" MAX.	91' - 2"	1015.1	Y
RESIDENTIAL (R-2)	E1	200' 0" MAX.	105' - 7"	1015.1	Y
COMMERCIAL (M)	F	200' 0" MAX.	109' - 11"	1015.1	Y
COMMERCIAL (M)	G	200' 0" MAX.	105' - 3"	1015.1	Y
PARKING (S-2)	H	250' 0" MAX.	129' - 11"	1015.1	Y
PARKING (S-2)	I	250' 0" MAX.	121' - 2"	1015.1	Y
PARKING (S-2)	J	250' 0" MAX.	49' - 9"	1015.1	Y

EGRESS NOTES:

SECTION BC 302 CLASSIFICATION  
1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
2. BUSINESS: B  
3. EDUCATIONAL: E  
4. RESIDENTIAL: R  
5. MERCANTILE: M  
6. STORAGE: S  
7. UTILITY: U

§28.2706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS  
OCCUPANCY GROUP A,B,E,F-2,H-4,M,R,S-2 FIRE-RESISTANCE RATING(HOURS)  
SECTION 28-21018.1 MINIMUM NUMBER OF EXITS  
OCCUPANT LOAD MINIMUM # OF EXITS  
1-500 2  
501-1000 3  
MORE THAN 1000 4

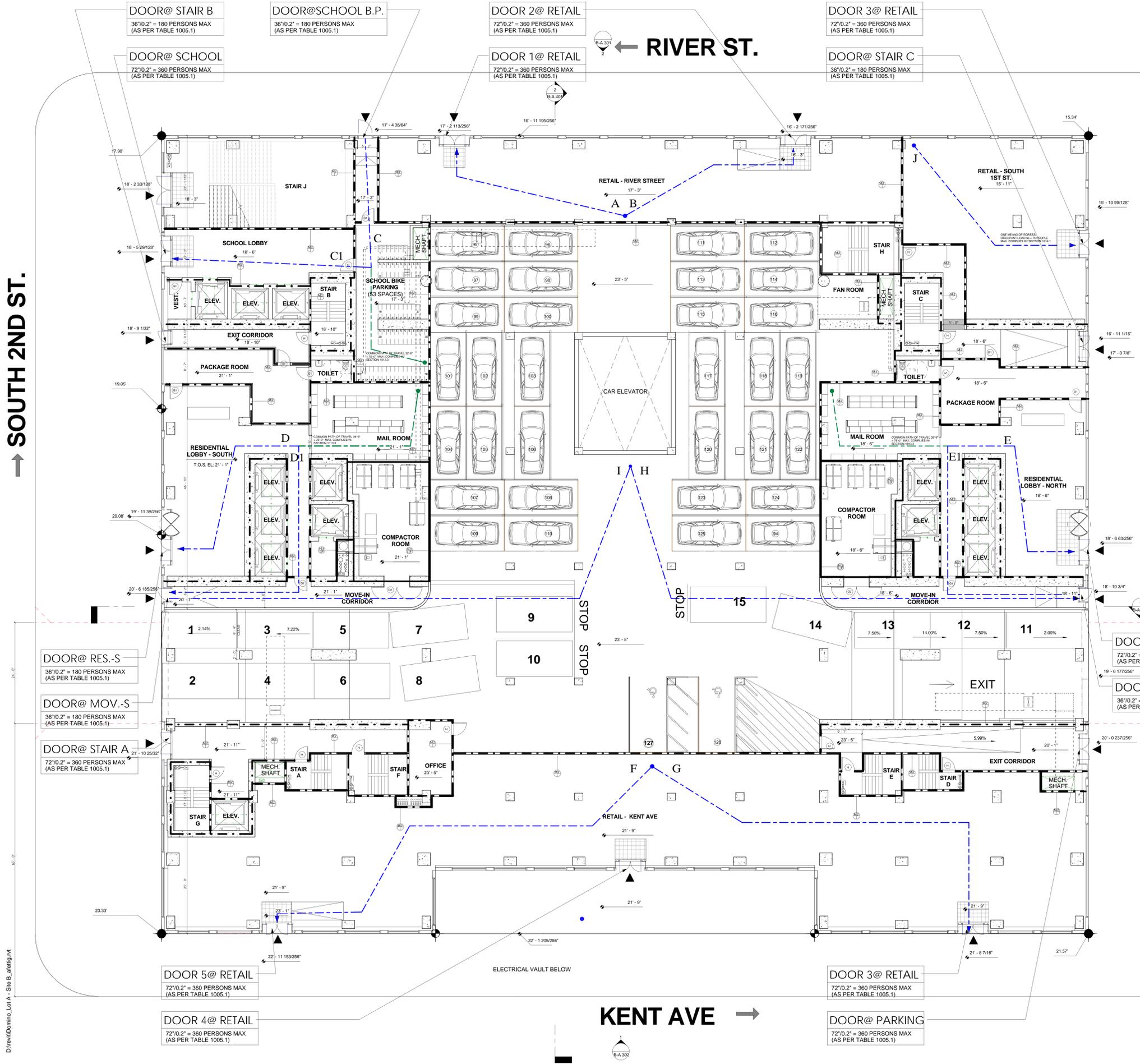
§28-21014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.  
OCCUPANCY R A, B, E, M, U 20 PERSONS  
S 74 PERSONS  
S 30 PERSONS

§28-21014.2.1 TWO EXITS OR EXIT ACCESS DOORWAYS.  
EXCEPTIONS:  
3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.  
3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

LEGEND:

- NO ACCESS ZONE
- NON-SIMULTANEOUS OCCUPANCY (N.S.O.)
- EXIT TO GRADE
- TRAVEL DISTANCE
- SAFE AREA
- NON-RATED PARTITION
- CONCRETE WALL/COLUMN
- EXIT SIGN
- DEAD END TRAVEL DIST.
- DIST. BETWEEN 2 EXITS
- COMMON PATH OF TRAVEL
- 1 HR-RATED PARTITION
- 2 HR-RATED PARTITION
- 3 HR-RATED PARTITION

NOTE:  
ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.



SOUTH 2ND ST. →

← SOUTH 1ST ST.

KENT AVE →

← RIVER ST.

NO.	DESCRIPTION
1	ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'
2	ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.
3	NOT USED
4	PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLLUMS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 14.4.
5	FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.
6	CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM
7	SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 8" THICK U.O.N.
8	INDICATES OPERABLE VENTILATION WINDOW. SEE DETAIL XAKX FOR SCHEDULE, ASSEMBLY, AND ENERGY PERFORMANCE ANALYSIS AND SHEETS B-2 100 FOR NATURAL LIGHT AND VENTILATION CALCULATIONS

CLIENT

**Two Trees Management**  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
 Building B  
 Brooklyn, NY

TITLE  
 Floor Plan - Floor 2

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02

NOTE:  
 ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02

B-A  
 202  
 .00

Level	Count	Family	Comments
SITE B - B1	93	Parking Space	
SITE B - FLOOR 1	32	Parking Space	
SITE B - FLOOR 1	2	Parking Space - ADA	
SITE B - FLOOR 2	43	Parking Space	
SITE B - FLOOR 2	118	Parking Space - Stacker	
Grand total:	288	288	

**OCCUPANT LOAD AND EGRESS ANALYSIS**

2ND FLOOR  
 SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1004.1.2

GROSS AREA	AREA	CALCULATION	OCCUPANTS
37,437 S.F.	37,437 S.F.	37,437 S.F./200 GROSS	187
656 S.F.	656 S.F.	656 S.F./300 GROSS	2
162 S.F.	N.S.O.	N.S.O.	N.S.O.
2,166 S.F.	N.S.O.	N.S.O.	N.S.O.
<b>TOTAL OCCUPANT LOAD: 189 OCCUPANTS</b>			

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1005.1

EGRESS DOOR	REQUIRED	PROVIDED	COMPLIANCE
OCCUPANT LOAD X 0.2'	189 X 0.2' = 37.8	STAIR A DOOR = 36" STAIR B DOOR = 36" STAIR C DOOR = 36" STAIR D DOOR = 36" TOTAL = 144"	NO
OCCUPANT LOAD X 0.3'	189 X 0.3' = 56.7	STAIR A = 45" STAIR B = 45" STAIR C = 45" STAIR D = 45" TOTAL = 180"	YES

EG PATH - 2ND FLOOR

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
PARKING (S-2)	A	250'-0" MAX	113'-7"	1015.1	Y
PARKING (S-2)	B	250'-0" MAX	114'-6"	1015.1	Y
PARKING (S-2)	C	250'-0" MAX	119'-1"	1015.1	Y
PARKING (S-2)	D	250'-0" MAX	117'-4"	1015.1	Y

EGRESS NOTES:

SECTION BC 302 CLASSIFICATION  
 1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
 2. BUSINESS: B  
 3. EDUCATIONAL: E  
 4. RESIDENTIAL: R  
 5. MERCANTILE: M  
 6. STORAGE: S  
 7. UTILITY: U

SECTION BC 302 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS  
 OCCUPANCY GROUP FIRE-RESISTANCE RATING(HOURS)  
 A, B, E, F, 2-H, 4-H, S, M, R, S-2 2

SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS  
 OCCUPANT LOAD MINIMUM # OF EXITS  
 1-500 2  
 501-1000 3  
 MORE THAN 1000 4

SECTION 28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
 1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

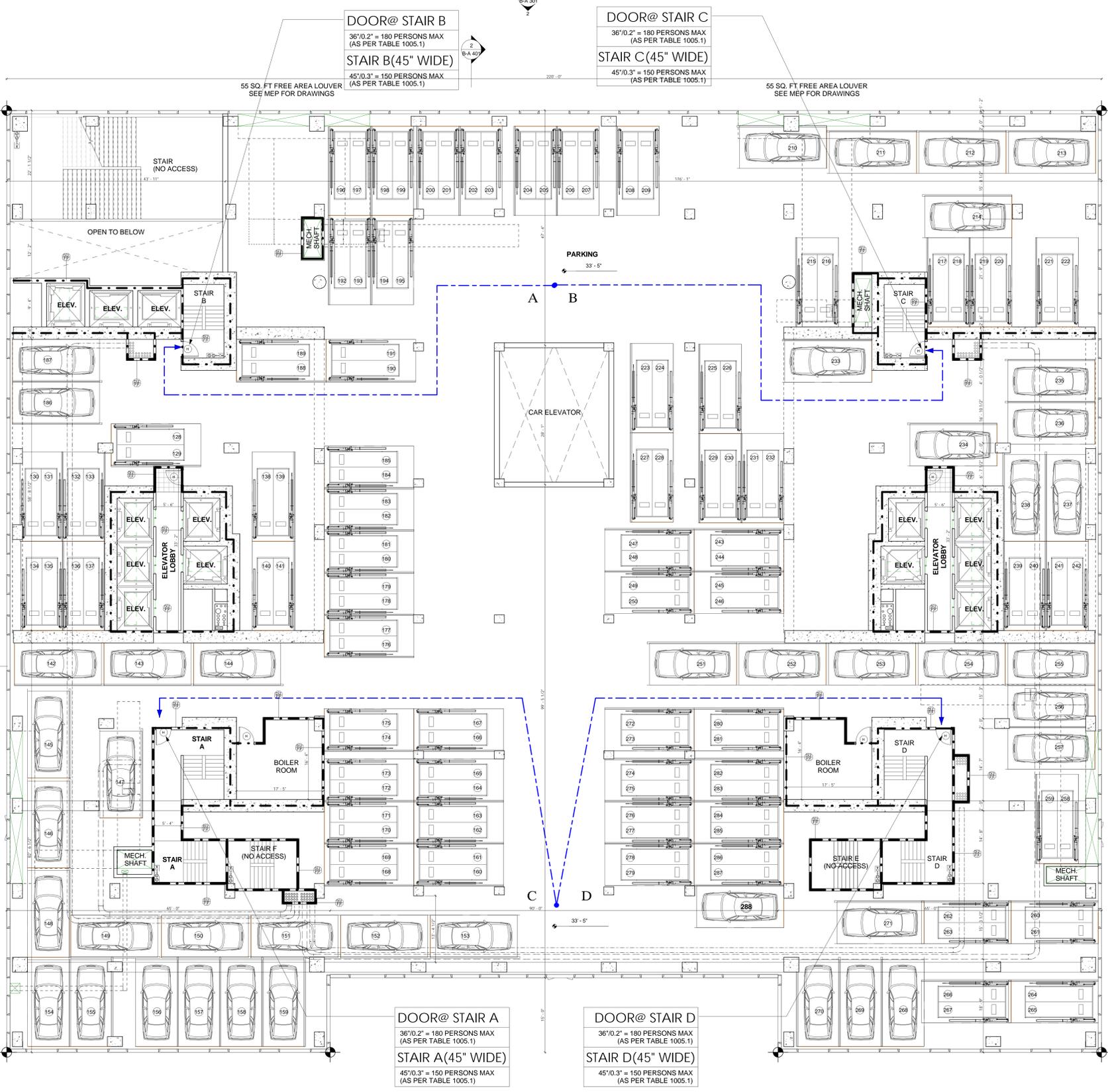
OCCUPANCY R A, B, E, M, U  
 20 PERSONS 74 PERSONS 30 PERSONS

SECTION 28.2-1014.2 TWO EXITS OR EXIT ACCESS DOORWAYS.  
 EXCEPTIONS:  
 3. R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES:  
 3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

**LEGEND:**

[Red dashed box]	NO ACCESS ZONE	[Red line]	DEAD END TRAVEL DIST.
[Grey box]	NON-SIMULTANEOUS OCCUPANCY (N.S.O.)	[Orange line]	DIST. BETWEEN 2 EXITS
[Red arrow]	EXIT TO GRADE	[Green line]	COMMON PATH OF TRAVEL
[Blue dashed line]	TRAVEL DISTANCE	[Black dashed line]	1 HR-RATED PARTITION
[Green line]	SAFE AREA	[Black dashed line]	2 HR-RATED PARTITION
[Black line]	NON-RATED PARTITION	[Black dashed line]	3 HR-RATED PARTITION
[Grey box]	CONCRETE WALL/COLUMN		
[Star symbol]	EXIT SIGN		

NOTE:  
 ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.



**DOOR@ STAIR B**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR B (45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

**DOOR@ STAIR C**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR C (45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

**DOOR@ STAIR A**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR A (45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

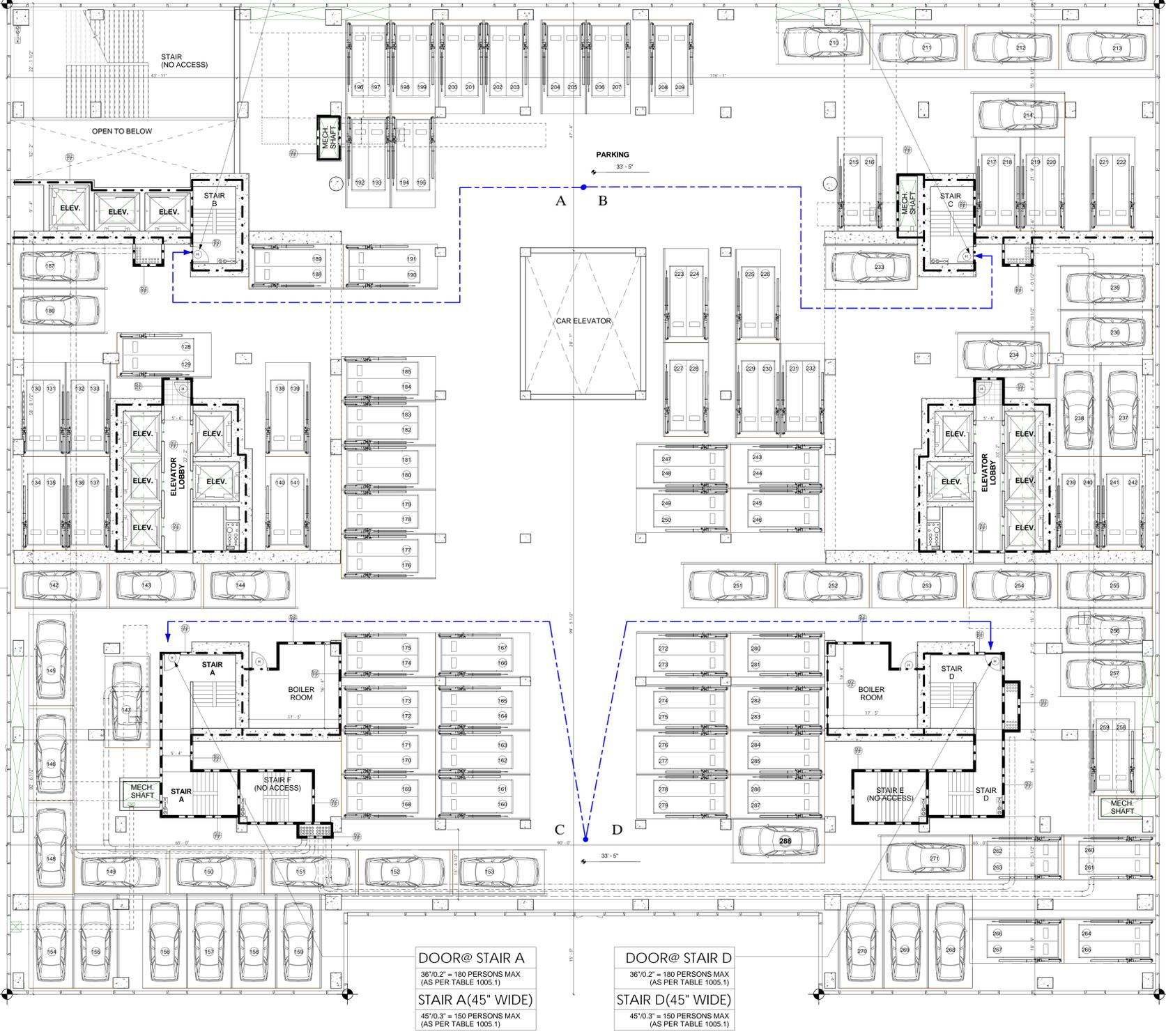
**DOOR@ STAIR D**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR D (45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

55 SQ. FT FREE AREA LOUVER  
 SEE MEP FOR DRAWINGS

55 SQ. FT FREE AREA LOUVER  
 SEE MEP FOR DRAWINGS

55 SQ. FT FREE AREA LOUVER  
 SEE MEP FOR DRAWINGS

55 SQ. FT FREE AREA LOUVER  
 SEE MEP FOR DRAWINGS



55 SQ. FT FREE AREA LOUVER  
 SEE MEP FOR DRAWINGS

55 SQ. FT FREE AREA LOUVER  
 SEE MEP FOR DRAWINGS

B-A 301

B-A 302

B-A 401

B-A 302

B-A  
 202  
 .00

FLOOR PLAN GENERAL NOTES  
 FLOORS B1-B30:  
 1. FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.  
 2. FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c  
 3. ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'  
 4. U.O.M. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.  
 5. FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 701 SERIES.  
 6. IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.  
 7. TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRS.  
 8. EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.  
 9. TYPICAL INTERIOR PARTITION NOTES:  
 A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE D0 U.O.M.  
 B. CHASE WALL PARTITIONS TO BE TYPE C0 U.O.M.  
 C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE DUFF U.O.M.  
 D. FURRING AROUND COLUMNS TO BE TYPE F04 U.O.M.  
 E. FURRING AT ELEVATOR HOISTWAYS AGAINST HABITABLE ROOMS TO BE TYPE F0 U.O.M.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.M.  
 H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2.  
 I. ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
 J. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOISTWAYS TO BE 2 HR. RATED TYPE H2.  
 K. TRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
 L. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.  
 10. PROVIDE 3/4" THICK FIRE RETARDANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.  
 11. FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.  
 12. FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 6" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.  
 13. NOT USED  
 14. ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.  
 15. NOT USED  
 16. PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 11.4.  
 17. FLOOR STIPPLING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.  
 18. CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM.  
 19. SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.M.  
 20. INDICATES OPERABLE VENTILATION WINDOW. SEE DETAIL X100X FOR SCHEDULE, ASSEMBLY, AND ENERGY PERFORMANCE ANALYSIS. SEE SHEETS B-2 100 FOR NATURAL LIGHT AND VENTILATION CALCULATIONS.

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**James Corner Field Operations**  
 Landscape Architect  
 478 Tribeca Avenue  
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 TEL: (212) 433-1450

No Date: \_\_\_\_\_ Rev: \_\_\_\_\_ Issue: \_\_\_\_\_  
 1 05/02/14 DDB SUBMISSION

NO.	DESCRIPTION	DATE	BY
1	05/02/14	DDB	SUBMISSION

NOTES:  
 ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

CLIENT  
 Two Trees Management  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

PROJECT  
 Domino - Lot A  
 Building B  
 Brooklyn, NY

TITLE  
 Floor Plan - Floor 3

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02

1. AS PER 419.2, URINALS SHALL NOT BE SUBSTITUTED FOR MORE THAN 50% OF THE REQUIRED WATER CLOSETS.  
 2. ALL NON-RESIDENTIAL FACILITIES UNDER FUTURE TENANT BUILD-OUT TO COMPLY WITH BC 1109 & ICCANSI A117.1-2003. REQUIRED CLEARANCE AROUND WATER CLOSETS TO COMPLY WITH ICCANSI A117.1-2003 604.3. REQUIRED GRAB BARS INCLUDING VERTICAL TO COMPLY WITH ICCANSI A117.1-2003 604.5.

PROJECT  
 Domino - Lot A  
 Building B  
 Brooklyn, NY

TITLE  
 Floor Plan - Floor 3

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02

B-A  
 203  
 .00

### OCCUPANT LOAD AND EGRESS ANALYSIS

3RD FLOOR  
 SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1004.1.2:  
 GROSS AREA = 40,423 S.F.

OCCUPANCY	AREA	CALCULATION	OCCUPANTS
CLASSROOM	17,636 S.F.	17,636 S.F. / 20 NET	882
GYMNASIUM	9,220 S.F.	N.S.O.	N.S.O.
CIRCULATION	6,428 S.F.	N.S.O.	N.S.O.
MECHANICAL	1,181 S.F.	INACCESSIBLE	N.S.O.
CAFETERIA	1,980 S.F.	1,980 S.F. / 50 NET	40
ACCESSORY	3,704 S.F.	N.S.O.	N.S.O.
STORAGE	1,274 S.F.	1,274 S.F. / 300 GROSS	4
<b>TOTAL OCCUPANT LOAD: 926 OCCUPANTS</b>			

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1005.1:  
 GROSS AREA = 40,423 S.F.

EGRESS DOOR	REQUIRED	PROVIDED	COMPLIANCE
STAIR A DOOR	36"	36"	YES
STAIR B DOOR	36"	36"	YES
STAIR C DOOR	36"	36"	YES
STAIR D DOOR	36"	36"	YES
STAIR E DOOR	36"	36"	YES
STAIR F DOOR	36"	36"	YES
<b>TOTAL = 216"</b>			

EGRESS STAIR	REQUIRED	PROVIDED	COMPLIANCE
STAIR A	45"	45"	YES
STAIR B	45"	45"	YES
STAIR C	45"	45"	YES
STAIR D	54"	54"	YES
STAIR E	54"	54"	YES
STAIR F	54"	54"	YES
<b>TOTAL = 288"</b>			

EG PATH - 3RD FLOOR

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
SCHOOL (E)	A	200'-0" MAX.	123'-7"	1015.1	Y
SCHOOL (E)	B	200'-0" MAX.	112'-3"	1015.1	Y
SCHOOL (E)	C	200'-0" MAX.	74'-4"	1015.1	Y
SCHOOL (E)	D	200'-0" MAX.	173'-7"	1015.1	Y

EGRESS NOTES:  
 SECTION BC 302 CLASSIFICATION  
 1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
 2. BUSINESS: B  
 3. EDUCATIONAL: E  
 4. RESIDENTIAL: R  
 5. MERCANTILE: M  
 6. STORAGE: S  
 7. UTILITY: U

§28.2-706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS:  
 OCCUPANCY GROUP FIRE-RESISTANCE RATING(HOURS)  
 A,B,E,F-2-4-4-6-1,M,R,S-2 2

SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS  
 OCCUPANT LOAD MINIMUM # OF EXITS  
 1-500 2  
 501-1000 3  
 MORE THAN 1000 4

§28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
 1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.  
 OCCUPANCY R 20 PERSONS  
 A, B, E, M, U 74 PERSONS  
 S 30 PERSONS

§28.2-1014.2.1 TWO EXITS OR EXIT ACCESS DOORWAYS.  
 EXCEPTIONS:  
 3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES:  
 3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

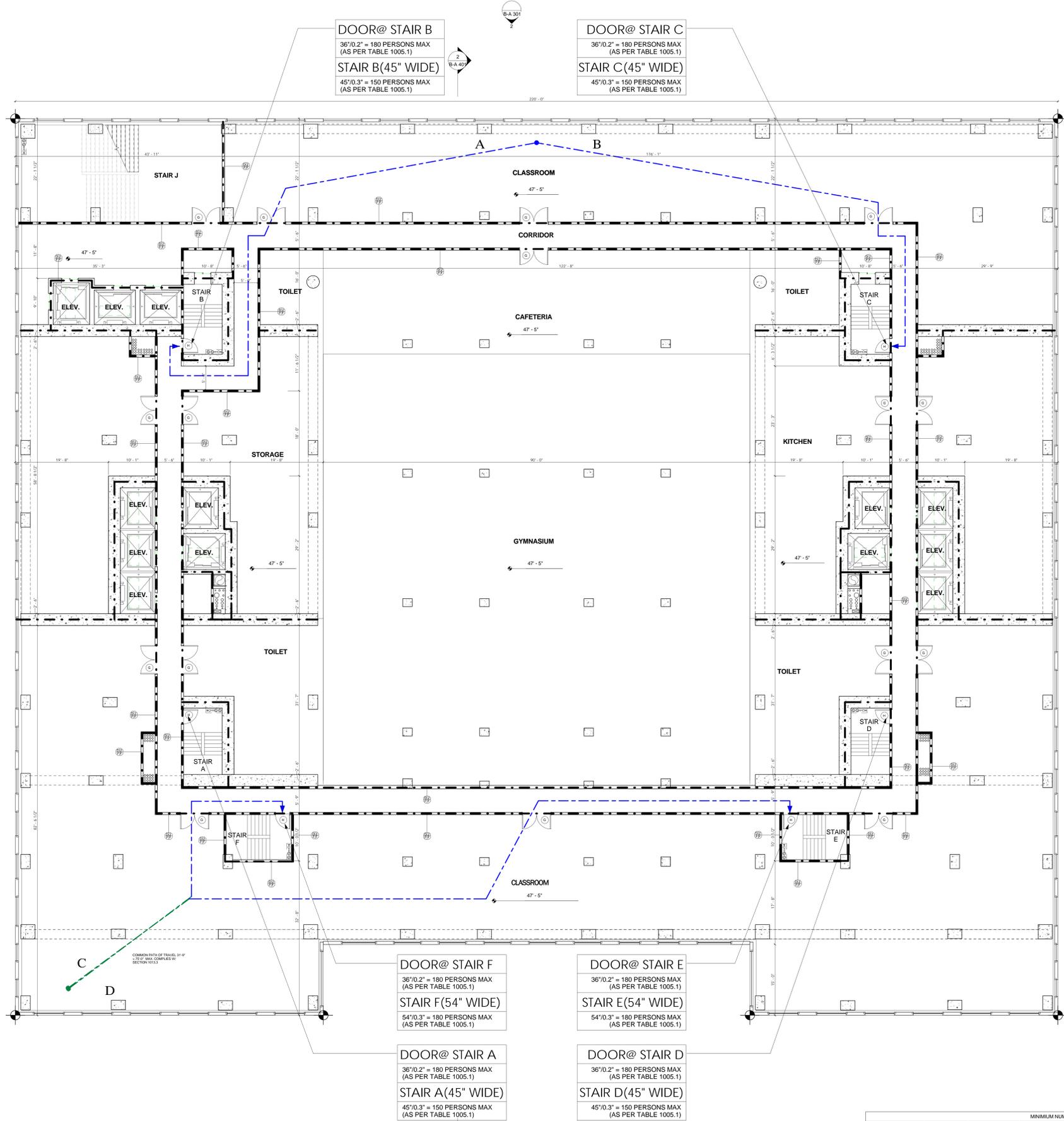
**LEGEND:**

[Red dashed box]	NO ACCESS ZONE	[Red line]	DEAD END TRAVEL DIST.
[Grey box]	NON-SIMULTANEOUS OCCUPANCY (N.S.O.)	[Orange line]	DIST. BETWEEN 2 EXITS
[Red arrow]	EXIT TO GRADE	[Green line]	COMMON PATH OF TRAVEL
[Blue dashed line]	TRAVEL DISTANCE	[Black dashed line]	1 HR-RATED PARTITION
[Green box]	SAFE AREA	[Black solid line]	2 HR-RATED PARTITION
[White box]	NON-RATED PARTITION	[Black thick solid line]	3 HR-RATED PARTITION
[Grey box]	CONCRETE WALL/COLUMN		
[Black circle]	EXIT SIGN		

NOTE:  
 ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.

MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES

SPACE NAME	OCCUPANCY	OCCUPANT LOAD	W/C REQUIRED		LAVATORIES		BATH/UBS/SHOWERS	DRINKING FOUNTAIN	OTHER	NOTES
			MALE	FEMALE	MALE	FEMALE				
GYMNASIUM	A-3	541	1 PER 70/35	1 PER 30/3				1 PER 500		
			8	16	3	3	NONE	2	1 SERVICE SINK	TO BE PROVIDED BY TENANT
EDUCATIONAL	E	963	1 PER 50	1 PER 50				1 PER 100		
			20	20	20	20	NONE	10	1 SERVICE SINK	TO BE PROVIDED BY TENANT



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FLOOR PLAN GENERAL NOTES  
 (FLOORS BY 302)

- FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.
- FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c
- ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'
- U.O.M. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.
- FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.
- IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.
- TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRWAYS.
- EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.
- TYPICAL INTERIOR PARTITION NOTES:  
 A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE D0 U.O.M.  
 B. CHASE WALL PARTITIONS TO BE TYPE C0 U.O.M.  
 C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE DUFF U.O.M.  
 D. FURRING AROUND COLUMNS TO BE TYPE F0 U.O.M.  
 E. FURRING AT ELEVATOR HOISTWAYS AGAINST HABITABLE ROOMS TO BE TYPE F0 U.O.M.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.M.  
 H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.M.  
 I. NOT USED  
 J. CHASE WALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRWELLS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.M.  
 K. ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
 L. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOISTWAY TO BE 2 HR. RATED TYPE H2.  
 M. CRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
 N. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.
- PROVIDE 3/4" THICK FIRE RETARDANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.
- FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.
- FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.
- NOT USED
- ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.
- NOT USED
- PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 114.4.
- FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.
- CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM
- SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.M.
- INDICATES OPERABLE VENTILATION WINDOW. SEE DETAIL X100X FOR SCHEDULE, ASSEMBLY, AND ENERGY PERFORMANCE ANALYSIS SHEETS B-2 100 FOR NATURAL LIGHT AND VENTILATION CALCULATIONS

BHD EL: 1.46'  
 NAVD 88 EL: 0.00'

U.O.M. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.

FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.

IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.

TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRWAYS.

EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.

TYPICAL INTERIOR PARTITION NOTES:  
 A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE D0 U.O.M.  
 B. CHASE WALL PARTITIONS TO BE TYPE C0 U.O.M.  
 C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE DUFF U.O.M.  
 D. FURRING AROUND COLUMNS TO BE TYPE F0 U.O.M.  
 E. FURRING AT ELEVATOR HOISTWAYS AGAINST HABITABLE ROOMS TO BE TYPE F0 U.O.M.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.M.  
 H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.M.  
 I. NOT USED  
 J. CHASE WALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRWELLS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.M.

ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
 SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOISTWAY TO BE 2 HR. RATED TYPE H2.  
 CRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
 PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.

PROVIDE 3/4" THICK FIRE RETARDANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.

FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.

FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.

NOT USED

ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.

NOT USED

PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 114.4.

FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.

CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM

SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.M.

**OCCUPANT LOAD AND EGRESS ANALYSIS**

4TH FLOOR  
 SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1004.1.2:

OCCUPANCY	AREA	CALCULATION	OCCUPANTS
CLASSROOM	17,772 S.F.	17,772 S.F. / 20 NET	889
CAFETERIA	1,980 S.F.	1,980 S.F. / 50 NET	40
CIRCULATION	6,456 S.F.	N.S.O.	N.S.O.
MECHANICAL	1,186 S.F.	INACCESSIBLE	N.S.O.
ACCESSORY	3,616 S.F.	N.S.O.	N.S.O.
OPEN TO BELOW	8,100 S.F.	N.S.O.	N.S.O.
STORAGE	1,274 S.F.	1,274 S.F. / 200 GROSS	4
<b>TOTAL OCCUPANT LOAD: 933 OCCUPANTS</b>			

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1005.1:

EGRESS DOOR	REQUIRED OCCUPANT LOAD X 0.2'	PROVIDED STAIR DOOR = 36"	COMPLIANCE
	933 X 0.2' = 186.6	STAIR B DOOR = 36"	
	TOTAL = 186.6	STAIR C DOOR = 36"	
		STAIR D DOOR = 36"	
		STAIR E DOOR = 36"	
		STAIR F DOOR = 36"	
		<b>TOTAL = 216"</b>	<b>YES</b>

EGRESS STAIR	REQUIRED OCCUPANT LOAD X 0.3'	PROVIDED STAIR A = 45"	COMPLIANCE
	933 X 0.3' = 279.9	STAIR B = 45"	
	TOTAL = 279.9	STAIR C = 45"	
		STAIR D = 45"	
		STAIR E = 54"	
		STAIR F = 54"	
		<b>TOTAL = 298"</b>	<b>YES</b>

**EG PATH - 4TH FLOOR**

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
SCHOOL (E)	A	200'-0" MAX.	118' - 11"	1015.1	Y
SCHOOL (E)	B	200'-0" MAX.	112' - 3"	1015.1	Y
SCHOOL (E)	C	200'-0" MAX.	77' - 11"	1015.1	Y
SCHOOL (E)	D	200'-0" MAX.	177' - 5"	1015.1	Y

EGRESS NOTES:  
 SECTION BC 302 CLASSIFICATION  
 1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
 2. BUSINESS: B  
 3. EDUCATIONAL: E  
 4. RESIDENTIAL: R  
 5. MERCANTILE: M  
 6. STORAGE: S  
 7. UTILITY: U

§28.2-706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS  
 OCCUPANCY GROUP FIRE-RESISTANCE RATING(HOURS)  
 A,B,E,F,2-4,H-6,I,M,R,S-2 2

SECTION 28-2-1018.1 MINIMUM NUMBER OF EXITS  
 OCCUPANT LOAD MINIMUM # OF EXITS  
 1-500 2  
 501-1000 3  
 MORE THAN 1000 4

§28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
 1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

OCCUPANCY R A, B, E, M, U  
 20 PERSONS 74 PERSONS 30 PERSONS  
 S

§28.2-1014.2 TWO EXITS OR EXIT ACCESS DOORWAYS.  
 EXCEPTIONS:  
 3. R-2 OCCUPANCY IN R-2 OCCUPANCY WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.

3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4575mm)

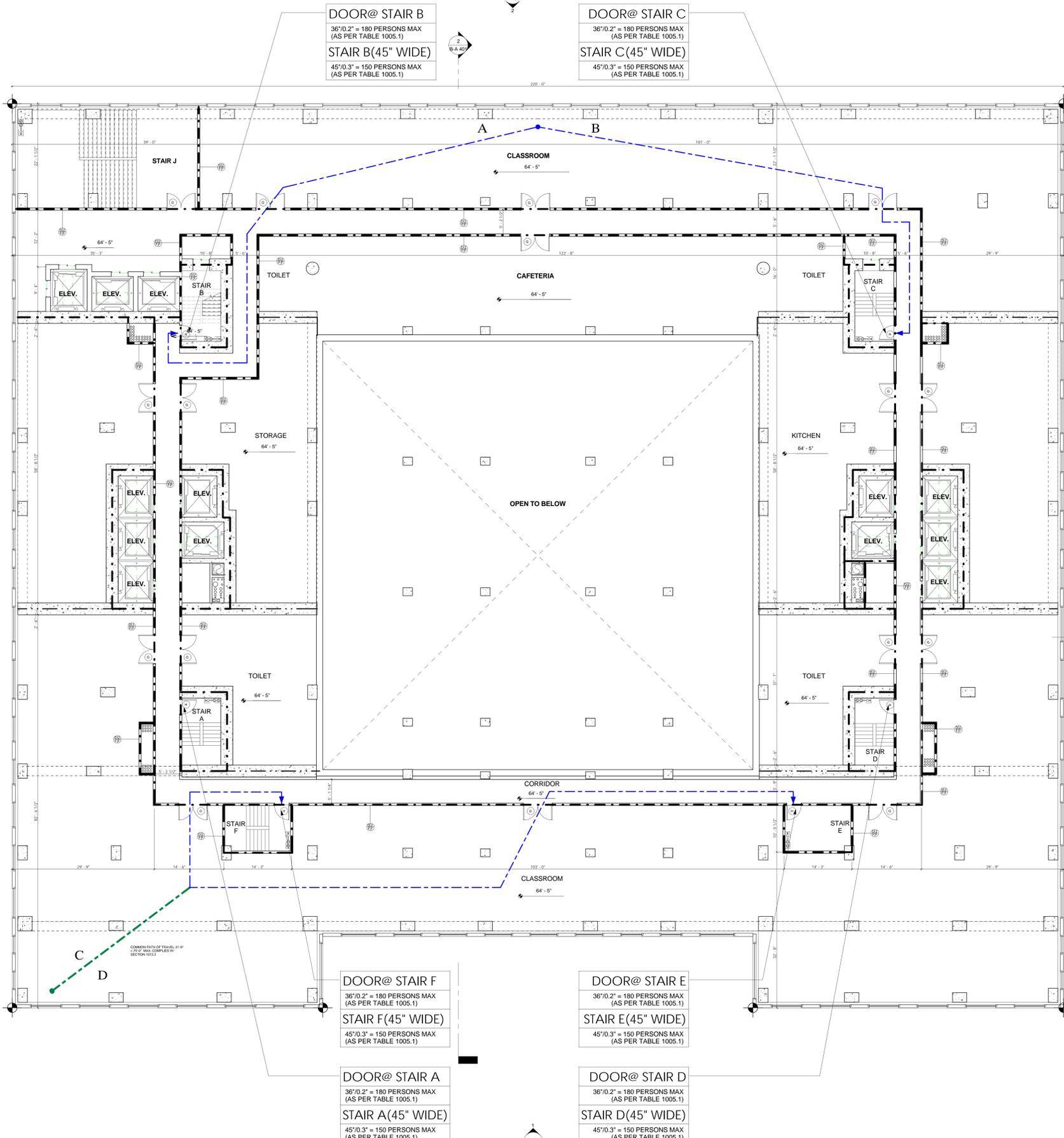
**LEGEND:**

- NO ACCESS ZONE
- NON-SIMULTANEOUS OCCUPANCY (N.S.O.)
- EXIT TO GRADE
- TRAVEL DISTANCE
- SAFE AREA
- NON-RATED PARTITION
- CONCRETE WALL/COLUMN
- EXIT SIGN
- DEAD END TRAVEL DIST.
- DIST. BETWEEN 2 EXITS
- COMMON PATH OF TRAVEL
- 1 HR.-RATED PARTITION
- 2 HR.-RATED PARTITION
- 3 HR.-RATED PARTITION

NOTE:  
 ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.

SPACE NAME	OCCUPANCY	OCCUPANT LOAD	MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES				BATHTUBS/SHOWERS	DRINKING FOUNTAIN	OTHER	NOTES
			W.C. REQUIRED	LAVATORIES	MALE	FEMALE				
EDUCATIONAL	E	1341	1 PER 50	1 PER 50				1 PER 100		
			27	27	27	27	NONE	14	1 SERVICE SINK TO BE PROVIDED BY TENANT	

NOTE:  
 1. AS PER 419.2, URINALS SHALL NOT BE SUBSTITUTED FOR MORE THAN 50% OF THE REQUIRED WATER CLOSETS.  
 2. ALL NON-RESIDENTIAL FACILITIES UNDER FUTURE TENANT BUILD-OUT TO COMPLY WITH IBC 1109.4. ICCANS 1117.1.2003. REQUIRED CLEARANCE AROUND WATER CLOSETS TO COMPLY WITH ICCANS 1117.1.2003 604.3. REQUIRED GRAB BARS INCLUDING VERTICAL TO COMPLY WITH ICCANS 1117.1.2003 604.5.



**DOOR@ STAIR B**  
 36"/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR B(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR C**  
 36"/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR C(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR F**  
 36"/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR F(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

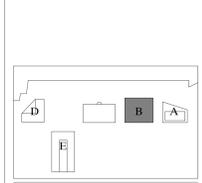
**DOOR@ STAIR E**  
 36"/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR E(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR A**  
 36"/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR A(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR D**  
 36"/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR D(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

1. FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.  
 2. FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c  
 3. ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'  
 4. U.O.M. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.  
 5. FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.  
 6. IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT ENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.  
 7. TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRWAYS.  
 8. EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.  
 9. TYPICAL INTERIOR PARTITION NOTES:  
 A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE D U.O.M.  
 B. CHASE WALL PARTITIONS TO BE TYPE CO U.O.M.  
 C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE DFF U.O.M.  
 D. FURRING AROUND COLUMNS TO BE TYPE FOR U.O.M.  
 E. FURRING AT ELEVATOR HOSTWAY TO BE TYPE HOSTWAY U.O.M.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE CT U.O.M.  
 H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE D U.O.M.  
 I. NOT USED  
 J. CHASE WALL PARTITIONS BETWEEN APARTMENTS & COMMON STAIRWELLS, CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2.  
 K. ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
 L. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOSTWAY TO BE 2 HR. RATED TYPE H2.  
 M. TRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
 N. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.  
 10. PROVIDE 3/4" THICK FIRE RETARDANT PLYWOOD PASTED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.  
 11. FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.  
 12. FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB REGARDLESS OF TYPICAL OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.  
 13. NOT USED  
 14. ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.  
 15. NOT USED  
 16. PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLLARS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 14.4.  
 17. FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.  
 18. CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM  
 19. SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.M.  
 20.

NOTES:  
 ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'.

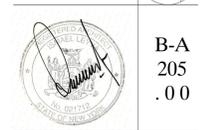


CLIENT  
 Two Trees Management  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

PROJECT  
 Domino - Lot A  
 Building B  
 Brooklyn, NY

TITLE  
 Floor Plan - Floor 5

SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02



B-A  
 205  
 .00

**OCCUPANT LOAD AND EGRESS ANALYSIS**

**5TH FLOOR SECTION BC 1004 - OCCUPANCY LOAD CALCULATION TABLE 1004.1.2:**

GROSS AREA	AREA	CALCULATION	OCCUPANTS
GROSS AREA = 40,423 S.F.			
OCCUPANCY	19,710 S.F.	19,710 S.F./200 GROSS	99
GROSS AREA WITHIN D.U.	8,100 S.F.	N.S.O.	N.S.O.
TERRACE (NO ACCESS) CORRIDOR	4,114 S.F.	N.S.O.	N.S.O.
ACC. TO RESIDENTIAL EXERCISE ROOM	3,196 S.F.	3,196 S.F. / 50 GROSS	64
LOCKER ROOM	1,882 S.F.	1,882 S.F. / 50 GROSS	9
LOCKER ROOM	464 S.F.	464 S.F. / 50 GROSS	9
MULTI-PURPOSE ROOM	793 S.F.	793 S.F. / 100 GROSS	8
LIBRARY	397 S.F.	397 S.F. / 50 GROSS	8
DAYCARE	397 S.F.	397 S.F. / 50 GROSS	8
STORAGE	832 S.F.	832 S.F. / 300 GROSS	3
TOILETS	538 S.F.	N.S.O.	N.S.O.
<b>ACC. TOTAL</b>			<b>138</b>
<b>TOTAL OCCUPANT LOAD:</b>			<b>237 OCCUPANTS</b>

**SECTION BC 1004 - OCCUPANCY LOAD CALCULATION TABLE 1005.1:**

EGRESS DOOR	REQUIRED	PROVIDED	COMPLIANCE
OCCUPANT LOAD X 0.2'	237 X 0.2' = 47.4	STAIR A DOOR = 36"	
TOTAL = 47.4		STAIR B DOOR = 36"	
		STAIR C DOOR = 36"	
		STAIR D DOOR = 36"	
<b>TOTAL = 144"</b>			<b>YES</b>
EGRESS STAIR	REQUIRED	PROVIDED	COMPLIANCE
OCCUPANT LOAD X 0.3'	237 X 0.3' = 71.1	STAIR A = 45"	
TOTAL = 71.1		STAIR B = 45"	
		STAIR C = 45"	
		STAIR D = 45"	
<b>TOTAL = 180"</b>			<b>YES</b>

**EG PATH - 5TH FLOOR**

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
RESIDENTIAL (R-2)	A	200'-0" MAX.	111'-2"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT E 1	200'-0" MAX.	90'-11"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT E 2	200'-0" MAX.	90'-11"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT K1	200'-0" MAX.	81'-5"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT K2	200'-0" MAX.	81'-5"	1015.1	Y
RESIDENTIAL (R-2)	B	200'-0" MAX.	112'-11"	1015.1	Y
RESIDENTIAL (R-2)	C1	200'-0" MAX.	94'-5"	1015.1	Y
RESIDENTIAL (R-2)	C2	200'-0" MAX.	136'-11"	1015.1	Y
RESIDENTIAL (R-2)	D1	200'-0" MAX.	136'-2"	1015.1	Y
RESIDENTIAL (R-2)	D2	200'-0" MAX.	136'-6"	1015.1	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 1	80'-0" MAX.	46'-0"	1016.3	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 2	80'-0" MAX.	36'-6"	1016.3	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 3	80'-0" MAX.	46'-0"	1016.3	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 4	80'-0" MAX.	36'-10"	1016.3	Y
RESIDENTIAL (R-2)	DIST. BETWEEN 2 EXITS A	15'-0" MIN.	87'-0"	1014.2.1	Y
RESIDENTIAL (R-2)	DIST. BETWEEN 2 EXITS B	15'-0" MIN.	87'-0"	1014.2.1	Y

**EGRESS NOTES:**

- SECTION BC 302 CLASSIFICATION
- 1 ASSEMBLY
- 2 BUSINESS
- 3 EDUCATIONAL
- 4 RESIDENTIAL
- 5 MERCANTILE
- 6 STORAGE
- 7 UTILITY
- A-1, A-2, A-3, A-4, A-5
- B
- E
- M
- S
- U

**SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS**

OCCUPANT LOAD	MINIMUM # OF EXITS
1-50	2
501-1000	3
MORE THAN 1000	4

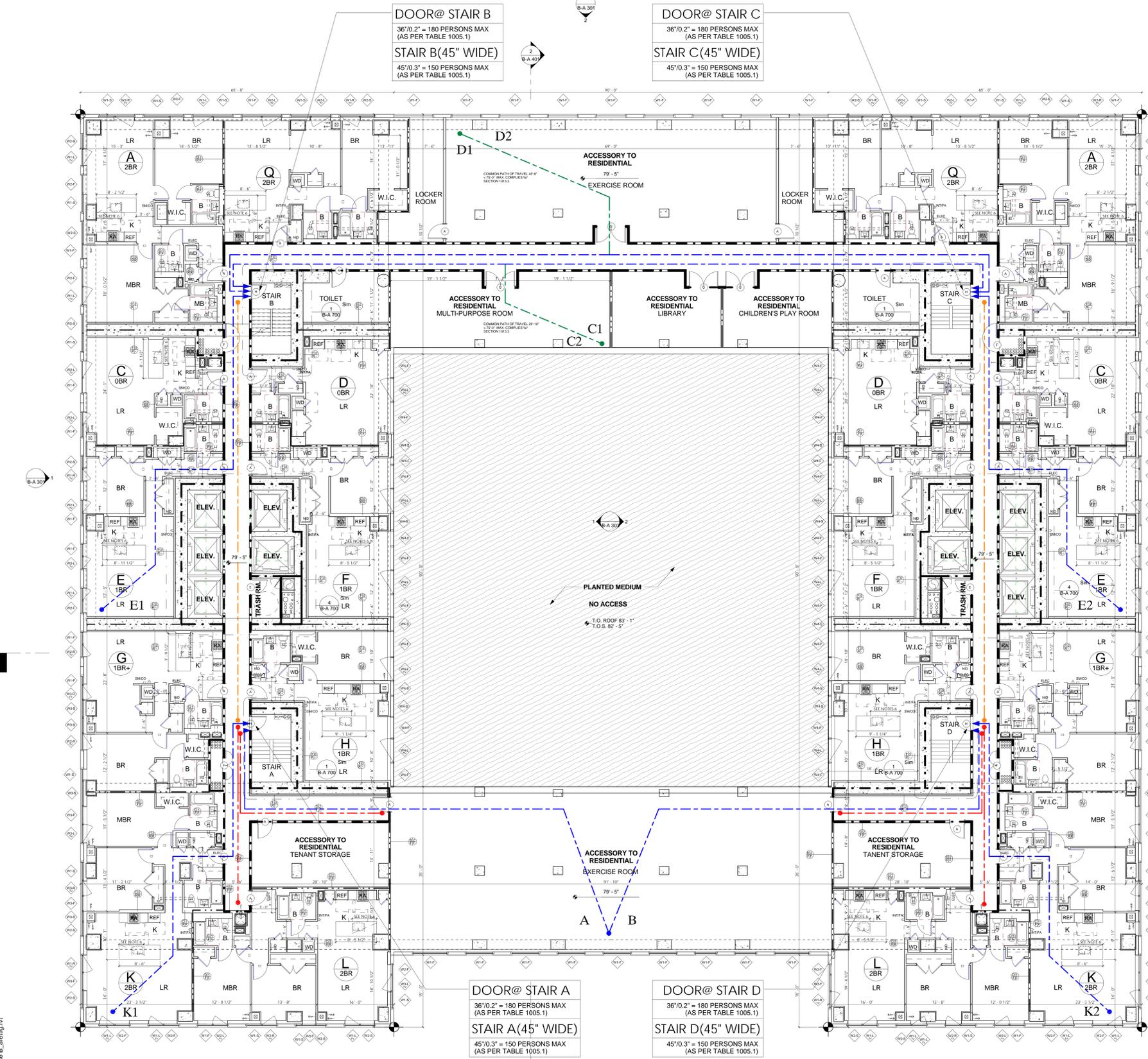
**SECTION 28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED, TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:**

- 1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.
- OCCUPANCY R  
 A, B, E, M, U  
 S
- 29 PERSONS  
 74 PERSONS  
 30 PERSONS
- 28.2-1014.2.1 TWO EXITS OR EXIT ACCESS DOORWAYS, EXCEPTIONS:  
 3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.
- 3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4575mm)

**LEGEND:**

- NO ACCESS ZONE
- NON-SIMULTANEOUS OCCUPANCY (N.S.O.)
- EXIT TO GRADE
- TRAVEL DISTANCE
- SAFE AREA
- NON-RATED PARTITION
- CONCRETE WALL/COLUMN
- EXIT SIGN
- DEAD END TRAVEL DIST.
- DIST. BETWEEN 2 EXITS
- COMMON PATH OF TRAVEL
- 1 HR.-RATED PARTITION
- 2 HR.-RATED PARTITION
- 3 HR.-RATED PARTITION

NOTE:  
 ALL CORRIDORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.



**DOOR@ STAIR B**  
 36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR B (45" WIDE)**  
 45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR C**  
 36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR C (45" WIDE)**  
 45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR A**  
 36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR A (45" WIDE)**  
 45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR D**  
 36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR D (45" WIDE)**  
 45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

- FLOOR PLAN GENERAL NOTES**  
 (FLOORS BY 300)
- FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.
  - FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c
  - ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'
  - U.O.N. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.
  - FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.
  - IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.
  - TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRS.
  - EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.
  - TYPICAL INTERIOR PARTITION NOTES:  
 A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE DO U.O.N.  
 B. CHASE WALL PARTITIONS TO BE TYPE CO U.O.N.  
 C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE DUFF U.O.N.  
 D. FURRING AROUND COLUMNS TO BE TYPE FUR-U.O.N.  
 E. FURRING AT ELEVATOR ROOMS TO BE TYPE FUR U.O.N.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.N.  
 H. DRYWALL PARTITIONS BETWEEN STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.N.  
 I. NOT USED  
 J. CHASE WALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRWELLS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2.  
 K. ALL EVALUATED AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
 L. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOISTWAY TO BE 2 HR. RATED TYPE H2.  
 M. TRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
 N. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.
  - PROVIDE 3/4" THICK FIRE RESISTANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.
  - FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.
  - FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.
  - NOT USED
  - ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.
  - NOT USED
  - PROVIDE 1 1/2" x 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 1014.4.
  - FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.
  - CROSSHATCH INDICATES LESS THAN 7'-0" HEADROOM
  - SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 8" THICK U.O.N.
  - INDICATES OPERABLE VENTILATION WINDOW. SEE DETAIL X1000 FOR SCHEDULE, ASSEMBLY, AND ENERGY PERFORMANCE ANALYSIS AND SHEETS B-2 100 FOR NATURAL LIGHT AND VENTILATION CALCULATIONS

**OCCUPANT LOAD AND EGRESS ANALYSIS**

**6TH - 9TH FLOOR**  
 SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1004.1.2

TOWER	GROSS AREA	AREA	CALCULATION	OCCUPANTS
TOWER 1	10,914 S.F.	10,914 S.F./200 GROSS		55
CORRIDOR	1,428 S.F.	N.S.O.		N.S.O.
TOWER 2	10,914 S.F.	10,914 S.F./200 GROSS		55
CORRIDOR	1,428 S.F.	N.S.O.		N.S.O.

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1005.1

EGRESS DOOR	REQUIRED OCCUPANT LOAD X 0.2'	PROVIDED	COMPLIANCE
TOWER 1	55 X 0.2' = 11	STAIR A DOOR = 36" STAIR B DOOR = 36" TOTAL = 72"	YES
TOWER 2	55 X 0.2' = 11	STAIR C DOOR = 36" STAIR D DOOR = 36" TOTAL = 72"	YES
EGRESS STAIR	REQUIRED OCCUPANT LOAD X 0.3'	PROVIDED	COMPLIANCE
TOWER 1	55 X 0.3' = 16.5	STAIR A = 45" STAIR B = 45" TOTAL = 90"	YES
TOWER 2	55 X 0.3' = 16.5	STAIR C = 45" STAIR D = 45" TOTAL = 90"	YES

**EG PATH - 6TH-9TH FLOOR**

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
RESIDENTIAL (R-2)	APARTMENT E 1	200'-0" MAX.	90'-11"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT E 2	200'-0" MAX.	90'-11"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT K1	200'-0" MAX.	81'-5"	1015.1	Y
RESIDENTIAL (R-2)	APARTMENT K2	200'-0" MAX.	81'-5"	1015.1	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 1	80'-0" MAX.	5'-6"	1016.3	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 2	80'-0" MAX.	36'-11"	1016.3	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 3	80'-0" MAX.	5'-6"	1016.3	Y
RESIDENTIAL (R-2)	DEAD END TRAVEL DIST. 4	80'-0" MAX.	36'-3"	1016.3	Y
RESIDENTIAL (R-2)	DIST. BETWEEN 2 EXITS A	15'-0" MIN.	87'-0"	1014.2.1	Y
RESIDENTIAL (R-2)	DIST. BETWEEN 2 EXITS B	15'-0" MIN.	87'-0"	1014.2.1	Y

**EGRESS NOTES:**

SECTION BC 302 CLASSIFICATION AREAS:  
 1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
 2. BUSINESS: B  
 3. EDUCATIONAL: E  
 4. RESIDENTIAL: R  
 5. MERCANTILE: M  
 6. STORAGE: S  
 7. UTILITY: U

§28.2706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS:  
 OCCUPANCY GROUP FIRE-RESISTANCE RATING(HOURS)  
 A, B, E, F, H, I, M, S, U 2  
 SECTION 28-2101.8.1 MINIMUM NUMBER OF EXITS  
 OCCUPANT LOAD MINIMUM # OF EXITS  
 1-500 2  
 501-1000 3  
 MORE THAN 1000 4

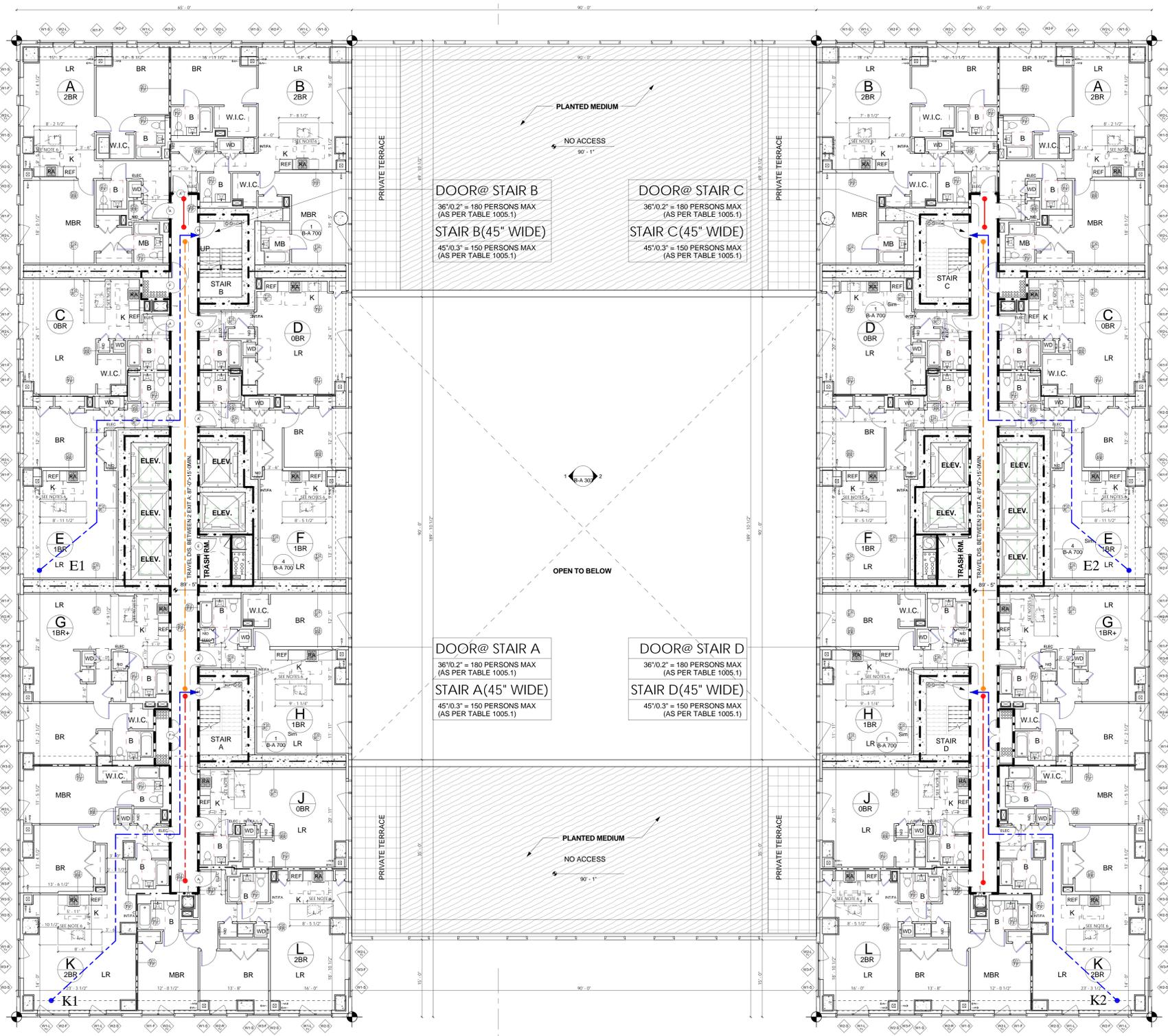
§28.2101.4.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
 1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.  
 OCCUPANCY R 20 PERSONS  
 A, B, E, M, U 74 PERSONS  
 S 30 PERSONS

§28.2101.4.2 TWO EXITS OR EXIT ACCESS DOORWAYS.  
 3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.  
 3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4576mm)

**LEGEND:**

- NO ACCESS ZONE
- NON-SIMULTANEOUS OCCUPANCY (N.S.O.)
- EXIT TO GRADE
- TRAVEL DISTANCE
- SAFE AREA
- NON-RATED PARTITION
- CONCRETE WALL/COLUMN
- EXIT SIGN
- DEAD END TRAVEL DIST.
- DIST. BETWEEN 2 EXITS
- COMMON PATH OF TRAVEL
- 1 HR.-RATED PARTITION
- 2 HR.-RATED PARTITION
- 3 HR.-RATED PARTITION

**NOTE:**  
 ALL NOTES IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.



FLOOR PLAN GENERAL NOTES  
 (FLOORS B1-B3)  
 1. FOR DOOR TYPES AND DETAILS  
 SEE DRAWING A 016 & A 017.  
 2. FOR INTERIOR PARTITION TYPES  
 SEE DRAWING A 011 a-c  
 3. ALL ELEVATIONS SHOWN ON  
 THESE PLANS ARE MEASURED  
 RELATIVE TO NAVD(1988). FOR  
 REFERENCE, BROOKLYN HIGHWAY  
 DATUM (BHD) IS +1.46'  
 4. U.O.N. INTERIOR DIMENSIONS  
 ARE MEASURED TO THE CENTERLINE  
 OF DRYWALL PARTITIONS & THE  
 FACE OF THE OUTERMOST GWB AT  
 FURRING, CHASE & SHAFT WALLS.  
 5. FOR STAIR DETAILS SEE  
 VERTICAL CIRCULATION DRAWINGS  
 A 700 SERIES.  
 6. IN ALL RESIDENTIAL STAIRS,  
 DOORS OPENING INTO AN INTERIOR  
 STAIR ENCLOSURE SHALL BE  
 LOCKED FROM THE STAIR SIDE AND  
 PROVIDED WITH AN AUTOMATIC FAIL  
 SAFE SYSTEM FOR OPENING IN THE  
 EVENT OF AN EMERGENCY. SIGNS  
 SHALL BE PROVIDED.  
 THROUGHOUT THE STAIRWAY  
 INDICATED THAT REENTRY IS  
 PROVIDED ONLY DURING FIRE  
 EMERGENCIES.  
 7. TELEPHONES OR OTHER TWO-  
 WAY COMMUNICATION SYSTEMS,  
 CONNECTED TO AN APPROVED  
 CONSTANTLY ATTENDED STATION,  
 SHALL BE PROVIDED AT NOT LESS  
 THAN EVERY FIFTH FLOOR IN ALL  
 RESIDENTIAL STAIRS.  
 8. EXIT STAIR ENCLOSURES SHALL  
 BE CONSTRUCTED OF IMPACT  
 RESISTANT WALLS.  
 9. TYPICAL INTERIOR PARTITION  
 NOTES:  
 A. DRYWALL PARTITIONS  
 WITHIN APARTMENTS TO BE TYPE DO  
 U.O.N.  
 B. CHASE WALL PARTITIONS  
 TO BE TYPE CO U.O.N.  
 C. DRYWALL PARTITIONS  
 BETWEEN APARTMENTS TO BE MIN.  
 1 HR RATED TYPE DIFF U.O.N.  
 D. FURRING AROUND  
 COLUMNS TO BE TYPE FOR U.O.N.  
 E. FURRING AT ELEVATOR  
 HOISTWAY AGAINST HABITABLE  
 ROOMS TO BE TYPE  
 FO U.O.N.  
 F. NOT USED  
 G. CHASE WALL PARTITIONS  
 BETWEEN APARTMENTS TO BE MIN.  
 1 HR. RATED TYPE C1 U.O.N.  
 H. DRYWALL PARTITIONS  
 BETWEEN APARTMENTS &  
 CORRIDORS, STAIRS, ELECTRICAL  
 CLOSETS, ETC. TO BE 2 HR.  
 RATED TYPE C2.  
 I. NOT USED  
 J. ALL EXHAUST AND  
 SUPPLY DUCT RISERS TO BE  
 ENCLOSED IN 2 HR. RATED SOLID  
 SHAFT WALL ASSEMBLIES TYPE H2.  
 K. SHAFT WALL PARTITIONS  
 BETWEEN CORRIDOR AND  
 ELEVATOR HOISTWAY TO BE 2 HR.  
 RATED TYPE H2.  
 L. TRASH CHUTE TO BE  
 ENCLOSED IN CONTINUOUS 3 HR.  
 RATED WALL TYPE H3.  
 M. PARTITIONS BETWEEN  
 STAIRWELLS AND CORRIDORS TO BE  
 2 HR. RATED ASSEMBLIES WITH  
 IMPACT RESISTANT GWB TYPE D2.  
 N. PROVIDE 3/4" THICK FIRE  
 RESISTANT PLYWOOD FASTENED  
 TO FINISHED PARTITION FOR  
 ATTACHMENT OF TELECOM PANELS  
 AND EQUIPMENT. COORDINATE  
 LOCATION WITH TELECOM DWGS.  
 11. FOR LOCATIONS OF  
 SPRINKLERS, SMOKE/CO  
 DETECTORS, LIGHT FIXTURES &  
 OTHER CEILING FIXTURES, REFER  
 TO RCP'S A 600 SERIES.  
 12. FINISH LEVEL AT ALL EXTERIOR  
 TERRACES ADJOINING APARTMENTS  
 TO BE 6" ABOVE TOP OF SLAB  
 ELEVATION TYPICAL. OWNER OR  
 BUILDING MANAGER SHALL PROVIDE  
 HANDICAP ACCESS TO TERRACES  
 FROM APARTMENT VIA RAMP  
 INSTALLED IN COMPLIANCE WITH  
 BUILDING CODE.  
 13. NOT USED  
 14. ALL MECHANICAL AND STORAGE  
 ROOMS SHALL BE PROPERLY  
 VENTILATED.  
 15. NOT USED  
 16. PROVIDE 1 1/2" X 1 1/2"  
 CHAMFER AT ALL EXPOSED  
 RECTANGULAR CORNERS IN  
 PARKING GARAGE. PROVIDE  
 SURFACE PROTECTION AS  
 REQUIRED BY SECTION 114.4  
 17. FLOOR STRIPING TO INDICATE  
 AREA LEFT CLEAR AS EGRESS  
 PATHWAY OR ACCESSIBLE ROUTE.  
 18. CROSS-HATCH INDICATES LESS  
 THAN 7'-0" HEADROOM  
 19. SOLID HATCH INDICATES  
 CONCRETE EQUIPMENT PAD, 8"  
 THICK U.O.N.  
 20.

**ISMAEL LEVYA**  
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**Ettinger & Associates**  
 MEP'S Engineers  
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 Clifton, NJ 07011  
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**Philip Habib & Associates**  
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 FAX: (212) 929-5607

**William Vitacco Associates**  
 Building & Zoning Law Consultant  
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**YR&G**  
 Sustainability Consultant  
 161 Bowery, 4th Floor  
 New York, NY 10002  
 TEL: (917) 677-8023  
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**James Corner Field Operations**  
 Landscape Architect  
 478 Tenth Avenue  
 New York, NY 10018  
 TEL: (212) 433-1450

EG PATH - 10TH FLOOR

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
RESIDENTIAL (R-2) APARTMENT E 1		200'-0" MAX.	90' - 1'	1015.1	Y
RESIDENTIAL (R-2) APARTMENT E 2		200'-0" MAX.	90' - 1'	1015.1	Y
RESIDENTIAL (R-2) APARTMENT M1		200'-0" MAX.	71' - 1'	1015.1	Y
RESIDENTIAL (R-2) APARTMENT M2		200'-0" MAX.	71' - 1'	1015.1	Y
RESIDENTIAL (R-2) DEAD END TRAVEL DIST. 1		80'-0" MAX.	5'-0"	1016.3	Y
RESIDENTIAL (R-2) DEAD END TRAVEL DIST. 2		80'-0" MAX.	18'-4"	1016.3	Y
RESIDENTIAL (R-2) DEAD END TRAVEL DIST. 3		80'-0" MAX.	5'-6"	1016.3	Y
RESIDENTIAL (R-2) DEAD END TRAVEL DIST. 4		80'-0" MAX.	18'-4"	1016.3	Y
RESIDENTIAL (R-2) DIST. BETWEEN 2 EXITS A		15'-0" MIN.	87'-0"	1014.2.1	Y
RESIDENTIAL (R-2) DIST. BETWEEN 2 EXITS B		15'-0" MIN.	87'-0"	1014.2.1	Y

**OCCUPANT LOAD AND EGRESS ANALYSIS**  
 10TH - 35TH FLOOR  
 SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1004.1.2:

TOWER 1: GROSS AREA = 11,367 S.F.  
 TOWER 2: GROSS AREA = 11,367 S.F.

OCCUPANCY	AREA	CALCULATION	OCCUPANTS
GROSS AREA	10,025 S.F.	10,025 S.F./200 GROSS	50
WITHIN D.U. (TOWER 1) CORRIDOR	1,342 S.F.	N.S.O.	N.S.O.
GROSS AREA	10,025 S.F.	10,025 S.F./200 GROSS	50
WITHIN D.U. (TOWER 2) CORRIDOR	1,342 S.F.	N.S.O.	N.S.O.

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
 TABLE 1005.1:

EGRESS STAIR	REQUIRED OCCUPANT LOAD X 0.2'	PROVIDED	COMPLIANCE
TOWER 1	50 X 0.2' = 10	STAIR A DOOR = 36" STAIR B DOOR = 36" TOTAL = 72"	YES
TOWER 2	50 X 0.2' = 10	STAIR C DOOR = 36" STAIR D DOOR = 36" TOTAL = 72"	YES
TOWER 1	50 X 0.3' = 15	STAIR A = 45" STAIR B = 45" TOTAL = 90"	YES
TOWER 2	50 X 0.3' = 15	STAIR C = 45" STAIR D = 45" TOTAL = 90"	YES

EGRESS NOTES:

SECTION BC 302 CLASSIFICATION  
 1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
 2. BUSINESS: B  
 3. EDUCATIONAL: E  
 4. RESIDENTIAL: R  
 5. MERCANTILE: M  
 6. STORAGE: S  
 7. UTILITY: U

§28.2706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS  
 OCCUPANCY GROUP  
 A, B, E, F, 2-H, 4-H, 5-L, M, R, S-2  
 FIRE-RESISTANCE RATING(HOURS)

SECTION 28.21018.1 MINIMUM NUMBER OF EXITS  
 OCCUPANT LOAD  
 1-500: 2  
 501-1000: 3  
 MORE THAN 1000: 4

§28.21014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED, TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
 1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

OCCUPANCY  
 R: 20 PERSONS  
 A, B, E, M, U: 74 PERSONS  
 S: 30 PERSONS

§28.21014.2.1 TWO EXITS OR EXIT ACCESS DOORWAYS.  
 EXCEPTIONS:  
 3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES:  
 3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

**LEGEND:**

[Red dashed box]	NO ACCESS ZONE	[Red line]	DEAD END TRAVEL DIST.
[Grey box]	NON-SIMULTANEOUS OCCUPANCY (N.S.O.)	[Orange line]	DIST. BETWEEN 2 EXITS
[Red arrow]	EXIT TO GRADE	[Green line]	COMMON PATH OF TRAVEL
[Blue dashed line]	TRAVEL DISTANCE	[Black dashed line]	1 HR-RATED PARTITION
[Green box]	SAFE AREA	[Black dashed line]	2 HR-RATED PARTITION
[White box]	NON-RATED PARTITION	[Black dashed line]	3 HR-RATED PARTITION
[Grey box]	CONCRETE WALL/COLUMN		
[Black circle]	EXIT SIGN		

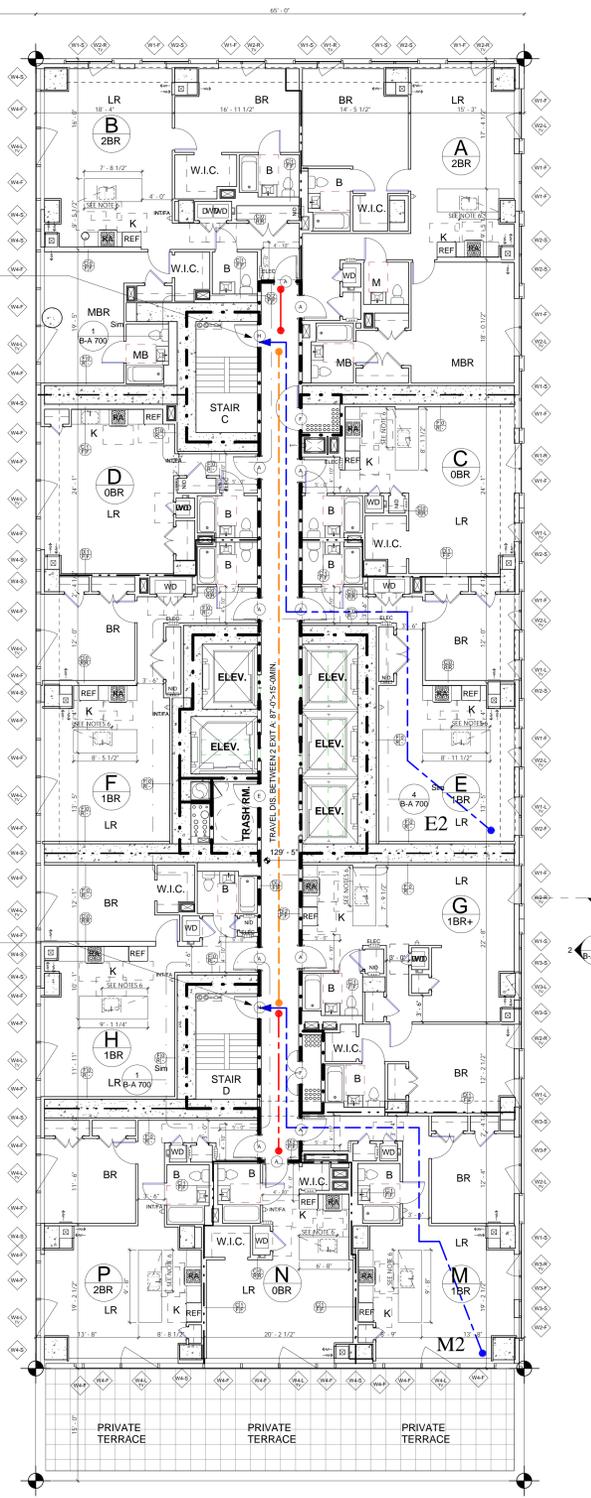
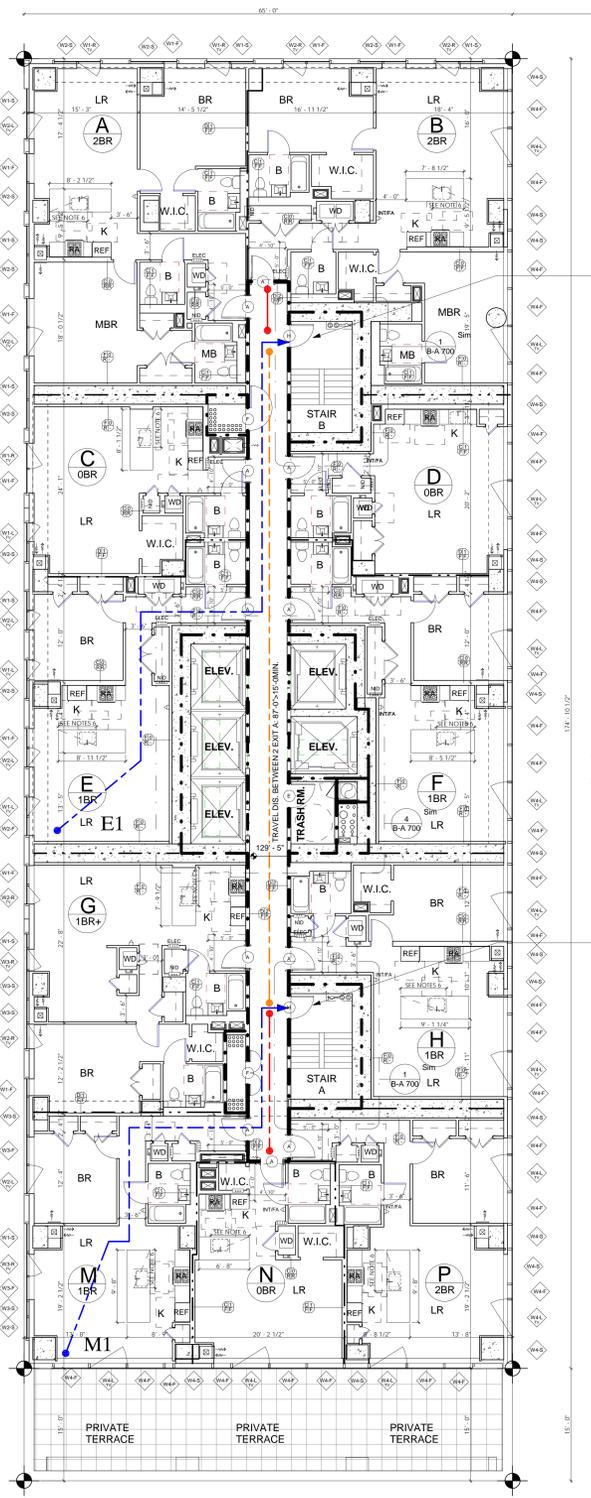
NOTE:  
 ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.

**DOOR@ STAIR B**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR B(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

**DOOR@ STAIR C**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR C(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

**DOOR@ STAIR A**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR A(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)

**DOOR@ STAIR D**  
 36"/0.2" = 180 PERSONS MAX  
 (AS PER TABLE 1005.1)  
**STAIR D(45" WIDE)**  
 45"/0.3" = 150 PERSONS MAX  
 (AS PER TABLE 1005.1)





**FLOOR PLAN GENERAL NOTES**  
(FLOOR PLAN 302)

- FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.
- FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c
- ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'
- U.O.M. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.
- FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.
- IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.
- TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRS.
- EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.
- TYPICAL INTERIOR PARTITION NOTES:  
A. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE TYPE DO U.O.M.  
B. CHASE WALL PARTITIONS TO BE TYPE CO U.O.M.  
C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE D1 U.O.M.  
D. FURRING AROUND COLUMNS TO BE TYPE FO U.O.M.  
E. FURRING AT ELEVATOR HOSTIUM AGAINST HABITABLE ROOMS TO BE TYPE FO U.O.M.  
F. NOT USED  
G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.M.  
H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.M.  
I. NOT USED  
J. CHASE WALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRWELLS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE C2 U.O.M.  
K. ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
L. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOSTIUM TO BE 2 HR. RATED TYPE H2.  
M. CRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H2.  
N. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.  
O. PROVIDE 3/4" THICK FIRE RESISTANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.
- FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.
- FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.
- NOT USED
- ALL MECHANICAL AND STORAGE ROOMS SHALL BE PROPERLY VENTILATED.
- NOT USED
- PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 1014.4
- FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.
- CROSS-HATCH INDICATES LESS THAN 7'-0" HEADROOM
- SOLID-HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.M.

**EGRESS NOTES:**  
SECTION BC 302 CLASSIFICATION  
1. ASSEMBLY: A, A-1, A-2, A-3, A-4, A-5  
2. BUSINESS: B  
3. EDUCATIONAL: E  
4. RESIDENTIAL: R  
5. MERCANTILE: M  
6. STORAGE: S  
7. UTILITY: U

§28.2-706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING(HOURS)
A, B, E, F, 2-4, H, J, L, M, R, S, 2	2

SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS

OCCUPANT LOAD	MINIMUM # OF EXITS
1-500	2
501-1000	3
MORE THAN 1000	4

§28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:

- THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

OCCUPANCY	R	A, B, E, M, U	S
20 PERSONS	2	74 PERSONS	30 PERSONS

§28.2-1014.2 TWO EXITS OR EXIT ACCESS DOORWAYS. EXCEPTIONS:

- R-2 OCCUPANCY IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.
- THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

**OCCUPANT LOAD AND EGRESS ANALYSIS**  
MAINROOF  
SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
TABLE 1004.1.2:

TOWER	GROSS AREA	AREA	CALCULATION	OCCUPANTS
TOWER 1	3,519 S.F.	3,519 S.F./200 GROSS		18
TOWER 2	3,519 S.F.	3,519 S.F./200 GROSS		18

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
TABLE 1005.1:

EGRESS DOOR	OCCUPANT LOAD X 0.2'	REQUIRED	PROVIDED	COMPLIANCE
TOWER 1	18 X 0.2' = 3.6	STAIR A DOOR = 36" STAIR B DOOR = 36" TOTAL = 72"		YES
TOWER 2	18 X 0.2' = 3.6	STAIR C DOOR = 36" STAIR D DOOR = 36" TOTAL = 72"		YES

EGRESS STAIR	OCCUPANT LOAD X 0.3'	REQUIRED	PROVIDED	COMPLIANCE
TOWER 1	18 X 0.3' = 5.4	STAIR A = 45" STAIR B = 45" TOTAL = 90"		YES
TOWER 2	18 X 0.3' = 5.4	STAIR C = 45" STAIR D = 45" TOTAL = 90"		YES

**EG PATH - MAINROOF**

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
RESIDENTIAL (R-2)	A1	200'-0" MAX.	116'-8"	1015.1	Y
RESIDENTIAL (R-2)	A2	200'-0" MAX.	105'-0"	1015.1	Y
RESIDENTIAL (R-2)	B1	200'-0" MAX.	91'-0"	1015.1	Y
RESIDENTIAL (R-2)	B2	200'-0" MAX.	87'-11"	1015.1	Y
RESIDENTIAL (R-2)	C1	200'-0" MAX.	87'-2"	1015.1	Y
RESIDENTIAL (R-2)	C2	200'-0" MAX.	90'-7"	1015.1	Y
RESIDENTIAL (R-2)	D1	200'-0" MAX.	43'-0"	1015.1	Y
RESIDENTIAL (R-2)	D2	200'-0" MAX.	45'-4"	1015.1	Y

**EGRESS NOTES:**  
SECTION BC 302 CLASSIFICATION  
1. ASSEMBLY: A, A-1, A-2, A-3, A-4, A-5  
2. BUSINESS: B  
3. EDUCATIONAL: E  
4. RESIDENTIAL: R  
5. MERCANTILE: M  
6. STORAGE: S  
7. UTILITY: U

§28.2-706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

OCCUPANCY GROUP	FIRE-RESISTANCE RATING(HOURS)
A, B, E, F, 2-4, H, J, L, M, R, S, 2	2

SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS

OCCUPANT LOAD	MINIMUM # OF EXITS
1-500	2
501-1000	3
MORE THAN 1000	4

§28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:

- THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

OCCUPANCY	R	A, B, E, M, U	S
20 PERSONS	2	74 PERSONS	30 PERSONS

§28.2-1014.2 TWO EXITS OR EXIT ACCESS DOORWAYS. EXCEPTIONS:

- R-2 OCCUPANCY IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.
- THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

**LEGEND:**

[Red dashed box]	NO ACCESS ZONE	[Red line]	DEAD END TRAVEL DIST.
[Grey box]	NON-SIMULTANEOUS OCCUPANCY (N.S.O.)	[Orange line]	DIST. BETWEEN 2 EXITS
[Green arrow]	EXIT TO GRADE	[Green line]	COMMON PATH OF TRAVEL
[Blue dashed line]	TRAVEL DISTANCE	[Dotted line]	1 HR.-RATED PARTITION
[Green box]	SAFE AREA	[Dashed line]	2 HR.-RATED PARTITION
[White box]	NON-RATED PARTITION	[Dash-dot line]	3 HR.-RATED PARTITION
[Grey box]	CONCRETE WALL/COLUMN		
[Circle with X]	EXIT SIGN		

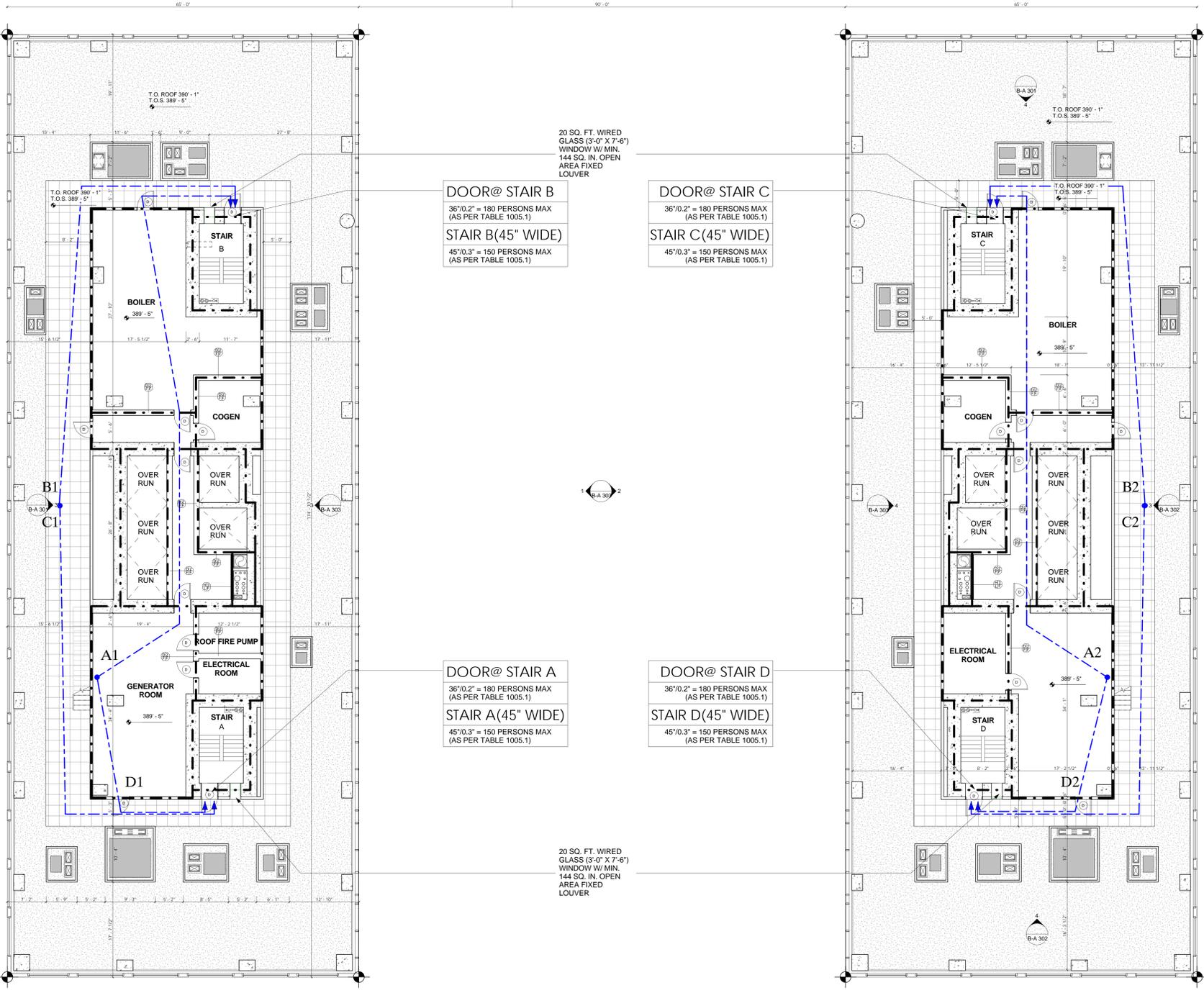
**NOTE:**  
ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.

**CLIENT**  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

**PROJECT**  
Domino - Lot A  
Building B  
Brooklyn, NY

**TITLE**  
Floor Plan - Main Roof

**SCALE:** As indicated  
**DATE:** 05/02/14  
**PROJECT No:** 13143.02



**DOOR@ STAIR B**  
36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR B (45" WIDE)**  
45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR C**  
36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR C (45" WIDE)**  
45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR A**  
36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR A (45" WIDE)**  
45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

**DOOR@ STAIR D**  
36'/0.2" = 180 PERSONS MAX (AS PER TABLE 1005.1)  
**STAIR D (45" WIDE)**  
45'/0.3" = 150 PERSONS MAX (AS PER TABLE 1005.1)

20 SQ. FT. WIRED GLASS (3'-0" X 7'-6") WINDOW W/ MIN. 144 SQ. IN. OPEN AREA FIXED LOUVER

20 SQ. FT. WIRED GLASS (3'-0" X 7'-6") WINDOW W/ MIN. 144 SQ. IN. OPEN AREA FIXED LOUVER

FLOOR PLAN GENERAL NOTES  
FLOORS B1-302:  
1. FOR DOOR TYPES AND DETAILS SEE DRAWING A 016 & A 017.  
2. FOR INTERIOR PARTITION TYPES SEE DRAWING A 011 a-c  
3. ALL ELEVATIONS SHOWN ON THESE PLANS ARE MEASURED RELATIVE TO NAVD(1988). FOR REFERENCE, BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'  
4. U.O.M. INTERIOR DIMENSIONS ARE MEASURED TO THE CENTERLINE OF DRYWALL PARTITIONS & THE FACE OF THE OUTERMOST GWB AT FURRING, CHASE & SHAFT WALLS.  
5. FOR STAIR DETAILS SEE VERTICAL CIRCULATION DRAWINGS A 700 SERIES.  
6. IN ALL RESIDENTIAL STAIRS, DOORS OPENING INTO AN INTERIOR STAIR ENCLOSURE SHALL BE LOCKED FROM THE STAIR SIDE AND PROVIDED WITH AN AUTOMATIC FAIL SAFE SYSTEM FOR OPENING IN THE EVENT OF AN EMERGENCY. SIGNS SHALL BE PROVIDED THROUGHOUT THE STAIRWAY INDICATING THAT REENTRY IS PROVIDED ONLY DURING FIRE EMERGENCIES.  
7. TELEPHONES OR OTHER TWO-WAY COMMUNICATION SYSTEMS, CONNECTED TO AN APPROVED CONSTANTLY ATTENDED STATION, SHALL BE PROVIDED AT NOT LESS THAN EVERY FIFTH FLOOR IN ALL RESIDENTIAL STAIRS.  
8. EXIT STAIR ENCLOSURES SHALL BE CONSTRUCTED OF IMPACT RESISTANT WALLS.  
9. TYPICAL INTERIOR PARTITION NOTES:  
A. DRYWALL PARTITIONS WITHIN APARTMENTS TO BE TYPE D0 U.O.M.  
B. CHASE WALL PARTITIONS TO BE TYPE C0 U.O.M.  
C. DRYWALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE D1FF U.O.M.  
D. FURRING AROUND COLUMNS TO BE TYPE F0R U.O.M.  
E. FURRING AT ELEVATOR HOISTWAY AGAINST HABITABLE ROOMS TO BE TYPE F0 U.O.M.  
F. NOT USED  
G. CHASE WALL PARTITIONS BETWEEN APARTMENTS TO BE MIN. 1 HR. RATED TYPE C1 U.O.M.  
H. DRYWALL PARTITIONS BETWEEN APARTMENTS & CORRIDORS, STAIRS, ELECTRICAL CLOSETS, ETC. TO BE 2 HR. RATED TYPE D2 U.O.M.  
I. NOT USED  
J. ALL EXHAUST AND SUPPLY DUCT RISERS TO BE ENCLOSED IN 2 HR. RATED SOLID SHAFT WALL ASSEMBLIES TYPE H2.  
K. SHAFT WALL PARTITIONS BETWEEN CORRIDOR AND ELEVATOR HOISTWAY TO BE 2 HR. RATED TYPE H2.  
L. CRASH CHUTE TO BE ENCLOSED IN CONTINUOUS 3 HR. RATED WALL TYPE H3.  
M. PARTITIONS BETWEEN STAIRWELLS AND CORRIDORS TO BE 2 HR. RATED ASSEMBLIES WITH IMPACT RESISTANT GWB TYPE D2.  
N. PROVIDE 3/4" THICK FIRE RETARDANT PLYWOOD FASTENED TO FINISHED PARTITION FOR ATTACHMENT OF TELECOM PANELS AND EQUIPMENT. COORDINATE LOCATION WITH TELECOM DWGS.  
O. FOR LOCATIONS OF SPRINKLERS, SMOKE/CO DETECTORS, LIGHT FIXTURES & OTHER CEILING FIXTURES, REFER TO RCP'S A 600 SERIES.  
P. FINISH LEVEL AT ALL EXTERIOR TERRACES ADJOINING APARTMENTS TO BE 8" ABOVE TOP OF SLAB ELEVATION TYPICAL. OWNER OR BUILDING MANAGER SHALL PROVIDE HANDICAP ACCESS TO TERRACES FROM APARTMENT VIA RAMP INSTALLED IN COMPLIANCE WITH BUILDING CODE.  
Q. NOT USED  
R. PROVIDE 1 1/2" X 1 1/2" CHAMFER AT ALL EXPOSED RECTANGULAR COLUMNS IN PARKING GARAGE. PROVIDE SURFACE PROTECTION AS REQUIRED BY SECTION 114.4.  
S. FLOOR STRIPING TO INDICATE AREA LEFT CLEAR AS EGRESS PATHWAY OR ACCESSIBLE ROUTE.  
T. CROSS-HATCH INDICATES LESS THAN 7'-0" HEADROOM  
U. SOLID HATCH INDICATES CONCRETE EQUIPMENT PAD, 6" THICK U.O.M.  
V. NOT USED  
W. INDICATES OPERABLE VENTILATION WINDOW. SEE DETAIL XXXX FOR SCHEDULE, ASSEMBLY, AND ENERGY PERFORMANCE ANALYSIS AND SHEETS B-2 100 FOR NATURAL LIGHT AND VENTILATION CALCULATIONS

**OCCUPANT LOAD AND EGRESS ANALYSIS**

EMR  
SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
TABLE 1004.1.2:

TOWER 1: GROSS AREA = 1,047 S.F.  
TOWER 2: GROSS AREA = 1,047 S.F.

OCCUPANCY	AREA	CALCULATION	OCCUPANTS
GROSS AREA (TOWER 1)	1,047 S.F.	1,047 S.F./200 GROSS	5
GROSS AREA (TOWER 2)	1,047 S.F.	1,047 S.F./200 GROSS	5

SECTION BC 1004 - OCCUPANCY LOAD CALCULATION  
TABLE 1005.1:

EGRESS STAIR	OCCUPANT LOAD	REQUIRED	PROVIDED	COMPLIANCE
TOWER 1	5 X 0.3" = 1.5	5 X 0.3" = 1.5	STAIR A = 36"	YES
TOWER 2	5 X 0.3" = 1.5	5 X 0.3" = 1.5	STAIR D = 36"	YES

EG PATH - EMR

OCCUPANCY	ID	REQUIRED WITH SPRINKLER SYSTEM	EGRESS DISTANCE	CODE REF	COMPLIANCE
RESIDENTIAL (R-2)	A1	200'-0" MAX.	103'-6"	1015.1	Y
RESIDENTIAL (R-2)	A2	200'-0" MAX.	103'-11"	1015.1	Y
RESIDENTIAL (R-2)	B1	200'-0" MAX.	52'-2"	1015.1	Y
RESIDENTIAL (R-2)	B2	200'-0" MAX.	52'-2"	1015.1	Y

EGRESS NOTES:  
SECTION BC 302 CLASSIFICATION AREAS:  
1. ASSEMBLY: A-1, A-2, A-3, A-4, A-5  
2. BUSINESS: B  
3. EDUCATIONAL: E  
4. RESIDENTIAL: R  
5. MERCANTILE: M  
6. STORAGE: S  
7. UTILITY: U

§28.2-706.3.7 FIRE-RESISTANCE RATING REQUIREMENTS FOR FIRE BARRIER ASSEMBLIES BETWEEN FIRE AREAS

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

SECTION 28.2-1018.1 MINIMUM NUMBER OF EXITS

OCCUPANT LOAD	MINIMUM # OF EXITS
1-500	2
501-1000	3
MORE THAN 1000	4

§28.2-1014.1 EXIT OR EXIT ACCESS DOORWAYS REQUIRED. TWO EXITS OR EXIT ACCESS DOORWAYS FROM ANY SPACE SHALL BE PROVIDED WHERE ONE OF THE FOLLOWING CONDITIONS EXISTS:  
1. THE OCCUPANT LOAD OF THE SPACE EXCEEDS THE VALUES IN TABLE 1014.1.

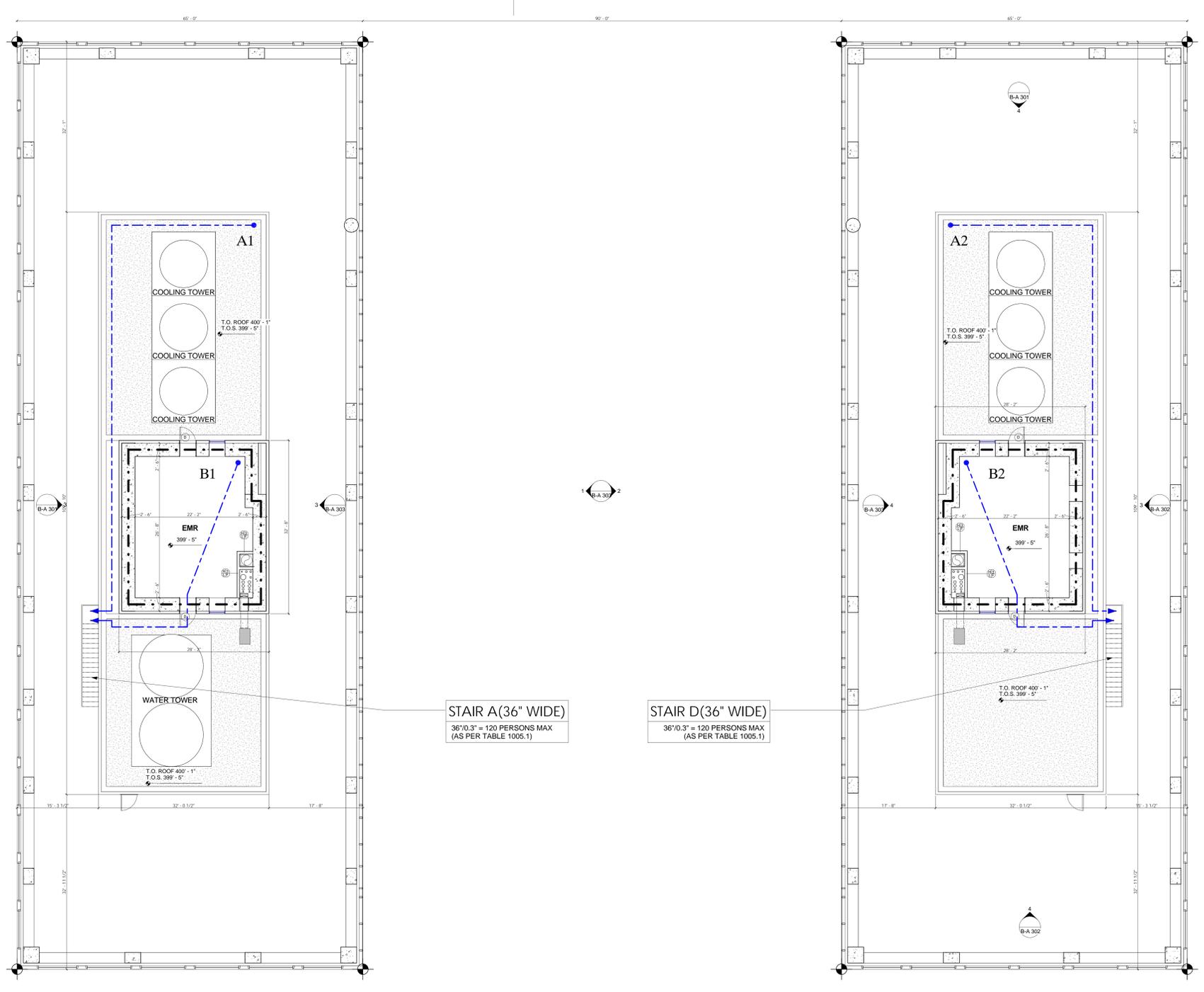
OCCUPANCY	R	20 PERSONS
A, B, E, M, U	74 PERSONS	
S	30 PERSONS	

§28.2-1014.2.1 TWO EXITS OR EXIT ACCESS DOORWAYS. EXCEPTIONS:  
3. R-2 OCCUPANCY, IN R-2 OCCUPANCY, WHERE STAIRS ARE ENCLOSED IN WALLS HAVING AT LEAST A 2-HOUR FIRE-RESISTANCE RATING AND CONSTRUCTED OF MASONRY EQUIVALENT IN ACCORDANCE WITH DEPARTMENT RULES.  
3.1 THE EXIT DOORS TO SUCH STAIRS SHALL BE PLACED A DISTANCE APART EQUAL TO NO LESS THAN 15 FEET (4571mm)

**LEGEND:**

- [Red dashed box] NO ACCESS ZONE
- [Grey box] NON-SIMULTANEOUS OCCUPANCY (N.S.O.)
- [Red arrow] EXIT TO GRADE
- [Blue dashed line] TRAVEL DISTANCE
- [Green box] SAFE AREA
- [White box] NON-RATED PARTITION
- [Grey box with lines] CONCRETE WALL/COLUMN
- [Circle with X] EXIT SIGN
- [Red line] DEAD END TRAVEL DIST.
- [Orange line] DIST. BETWEEN 2 EXITS
- [Green line] COMMON PATH OF TRAVEL
- [Dotted line] 1 HR.-RATED PARTITION
- [Dashed line] 2 HR.-RATED PARTITION
- [Solid black line] 3 HR.-RATED PARTITION

NOTE:  
ALL DOORS IN PUBLIC CORRIDORS ARE SELF-CLOSING AND HAVE A 1.5 HOUR FIRE PROTECTION RATING.



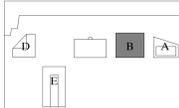
**STAIR A (36" WIDE)**  
36"/0.3" = 120 PERSONS MAX  
(AS PER TABLE 1005.1)

**STAIR D (36" WIDE)**  
36"/0.3" = 120 PERSONS MAX  
(AS PER TABLE 1005.1)



NO	DATE	REV	ISSUE
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'



CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

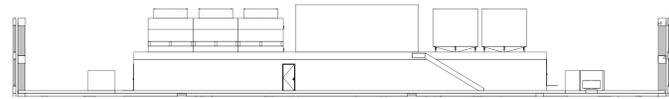
TITLE  
Building Elevations

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



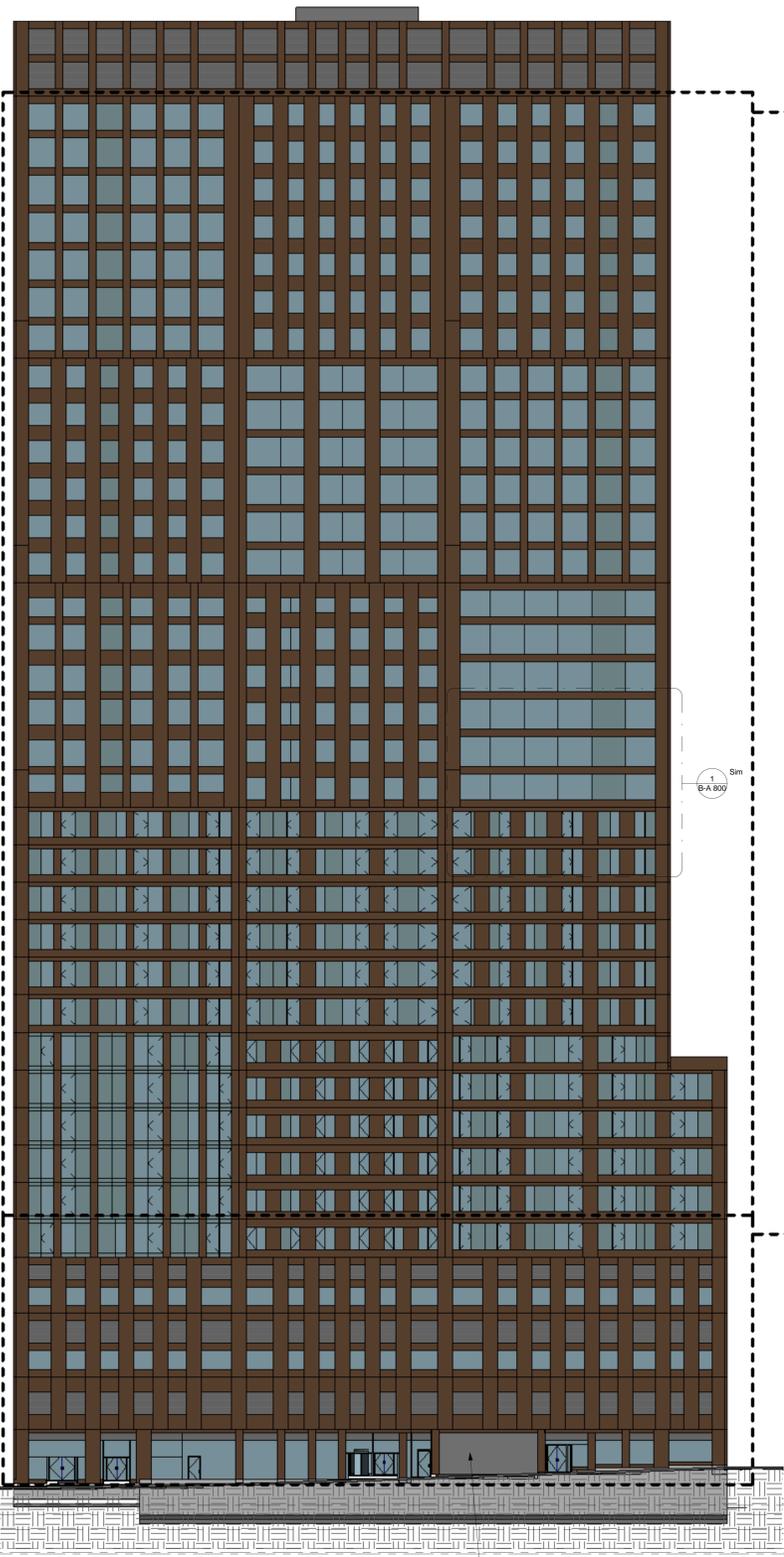
B-A  
301  
.00

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"



3 Elevation - South Bulkhead  
SCALE: 1/16" = 1'-0"

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"
- SITE B - FLOOR 35 379' - 5"
- SITE B - FLOOR 34 369' - 5"
- SITE B - FLOOR 33 359' - 5"
- SITE B - FLOOR 32 349' - 5"
- SITE B - FLOOR 31 339' - 5"
- SITE B - FLOOR 30 329' - 5"
- SITE B - FLOOR 29 319' - 5"
- SITE B - FLOOR 28 309' - 5"
- SITE B - FLOOR 27 299' - 5"
- SITE B - FLOOR 26 289' - 5"
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- SITE B - FLOOR 24 269' - 5"
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- SITE B - FLOOR 21 239' - 5"
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- SITE B - FLOOR 14 169' - 5"
- SITE B - FLOOR 13 159' - 5"
- SITE B - FLOOR 12 149' - 5"
- SITE B - FLOOR 11 139' - 5"
- SITE B - FLOOR 10 129' - 5"
- SITE B - FLOOR 9 119' - 5"
- SITE B - FLOOR 8 109' - 5"
- SITE B - FLOOR 7 99' - 5"
- SITE B - FLOOR 6 89' - 5"
- SITE B - FLOOR 5 79' - 5"
- SITE B - FLOOR 4 64' - 5"
- SITE B - FLOOR 3 47' - 5"
- SITE B - FLOOR 2 33' - 5"
- SITE B - FLOOR 1 22' - 5"
- SITE B - BASE PLANE (18.10) 19' - 6 23/32"
- DESIGN FLOOD ELEVATION 13' - 0"
- SITE B - B1 10' - 5"
- DESIGN GROUND WATER EL 6' - 5 133/256"
- BHD 1' - 5 133/256"
- SITE B - B2 0' - 5"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"



6TH - 55TH FLOOR  
OITC MIN. RATING = 31 dBA

1ST - 5TH FLOOR  
OITC MIN. RATING = 31 dBA

1 Elevation - South  
SCALE: 1/16" = 1'-0"

South Facade									
Panel Type	Area	Cavity R-Value	Cont. R-Value	U-Factor	OITC	SHGC	Type Mark	Manufacturer	Model
FIXED VISION GLASS	18092 SF		0.45	0.35	35	0.35		FA & PARTNERS	FA100
LOUVER PANEL	3805 SF		0	0	0	0	L	GREENHECK	EDJ-430
OPERABLE VISION GLASS	3347 SF		0.45	0.35	35	0.35		FA & PARTNERS	FA100
SPANDREL GLASS	6347 SF		0.45	0.35	35	0.35		FA & PARTNERS	FA100

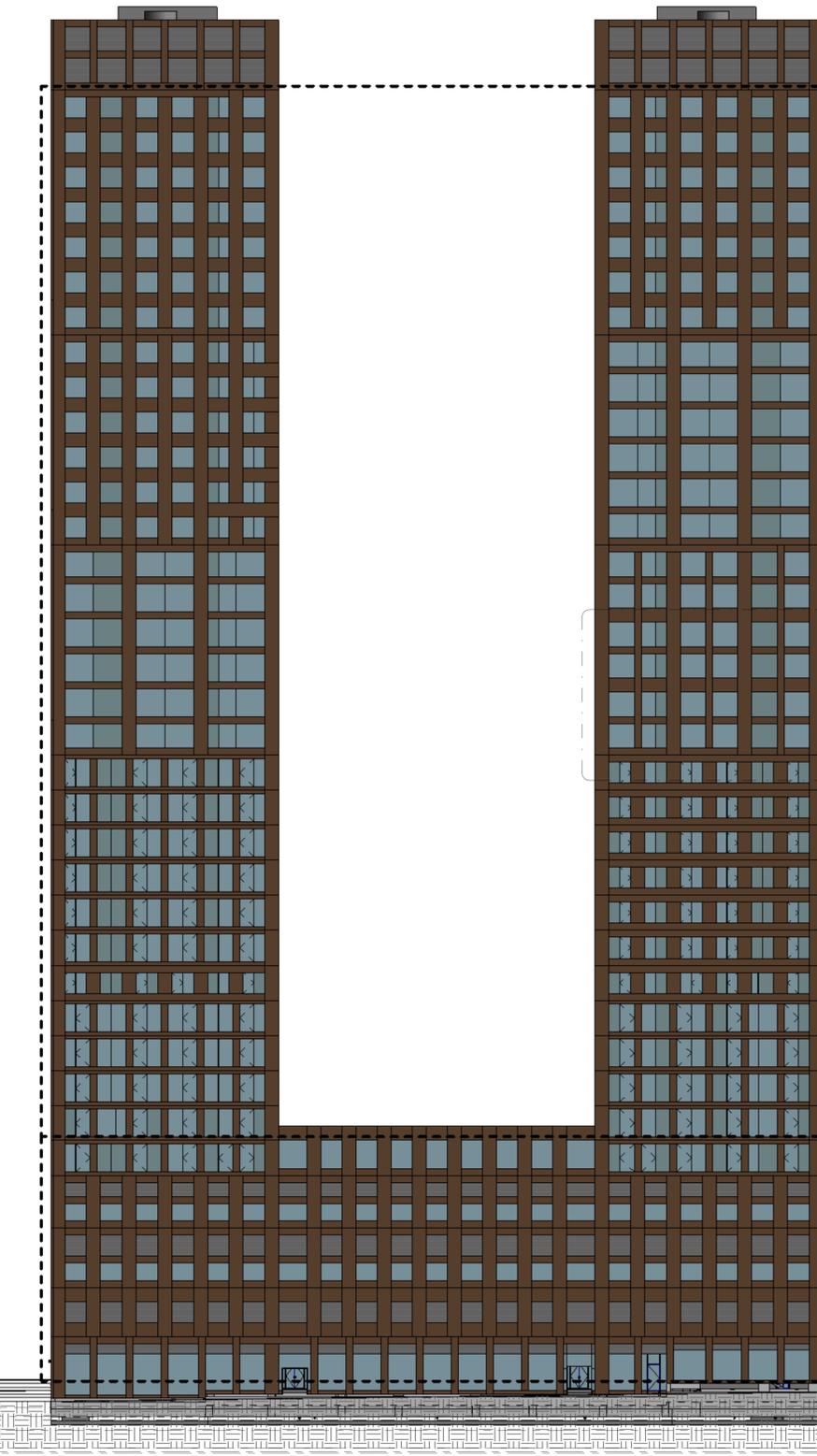
SURFACE AREA: 66,116 SF  
GLAZING AREA (VISION GLASS): 21,439 SF  
SOUTH FACADE: 32.4% GLAZING

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"



4 Elevation - West Bulkhead  
SCALE: 1/16" = 1'-0"

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"
- SITE B - FLOOR 35 379' - 5"
- SITE B - FLOOR 34 369' - 5"
- SITE B - FLOOR 33 359' - 5"
- SITE B - FLOOR 32 349' - 5"
- SITE B - FLOOR 31 339' - 5"
- SITE B - FLOOR 30 329' - 5"
- SITE B - FLOOR 29 319' - 5"
- SITE B - FLOOR 28 309' - 5"
- SITE B - FLOOR 27 299' - 5"
- SITE B - FLOOR 26 289' - 5"
- SITE B - FLOOR 25 279' - 5"
- SITE B - FLOOR 24 269' - 5"
- SITE B - FLOOR 23 259' - 5"
- SITE B - FLOOR 22 249' - 5"
- SITE B - FLOOR 21 239' - 5"
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- SITE B - FLOOR 14 169' - 5"
- SITE B - FLOOR 13 159' - 5"
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- SITE B - FLOOR 7 99' - 5"
- SITE B - FLOOR 6 89' - 5"
- SITE B - FLOOR 5 79' - 5"
- SITE B - FLOOR 4 64' - 5"
- SITE B - FLOOR 3 47' - 5"
- SITE B - FLOOR 2 33' - 5"
- SITE B - FLOOR 1 22' - 5"
- SITE B - BASE PLANE (18.10) 19' - 6 23/32"
- DESIGN FLOOD ELEVATION 13' - 0"
- SITE B - B1 10' - 5"
- DESIGN GROUND WATER EL 6' - 5 133/256"
- BHD 1' - 5 133/256"
- SITE B - B2 0' - 5"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"



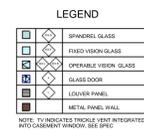
6TH - 55TH FLOOR  
OITC MIN. RATING = 31 dBA

1ST - 5TH FLOOR  
OITC MIN. RATING = 31 dBA

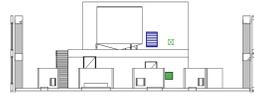
2 Elevation - West  
SCALE: 1/16" = 1'-0"

West Facade									
Panel Type	Area	Cavity R-Value	Cont. R-Value	U-Factor	OITC	SHGC	Type Mark	Manufacturer	Model
FIXED VISION GLASS	14434 SF		0.45	0.35	35	0.35		FA & PARTNERS	FA100
LOUVER PANEL	3897 SF		0	0	0	0	L	GREENHECK	EDJ-430
OPERABLE VISION GLASS	2685 SF		0.45	0.35	35	0.35		FA & PARTNERS	FA100
SPANDREL GLASS	4784 SF		0.45	0.35	35	0.35		FA & PARTNERS	FA100

SURFACE AREA: 55,113 SF  
GLAZING AREA (VISION GLASS): 17,117 SF  
WEST FACADE: 31.1% GLAZING

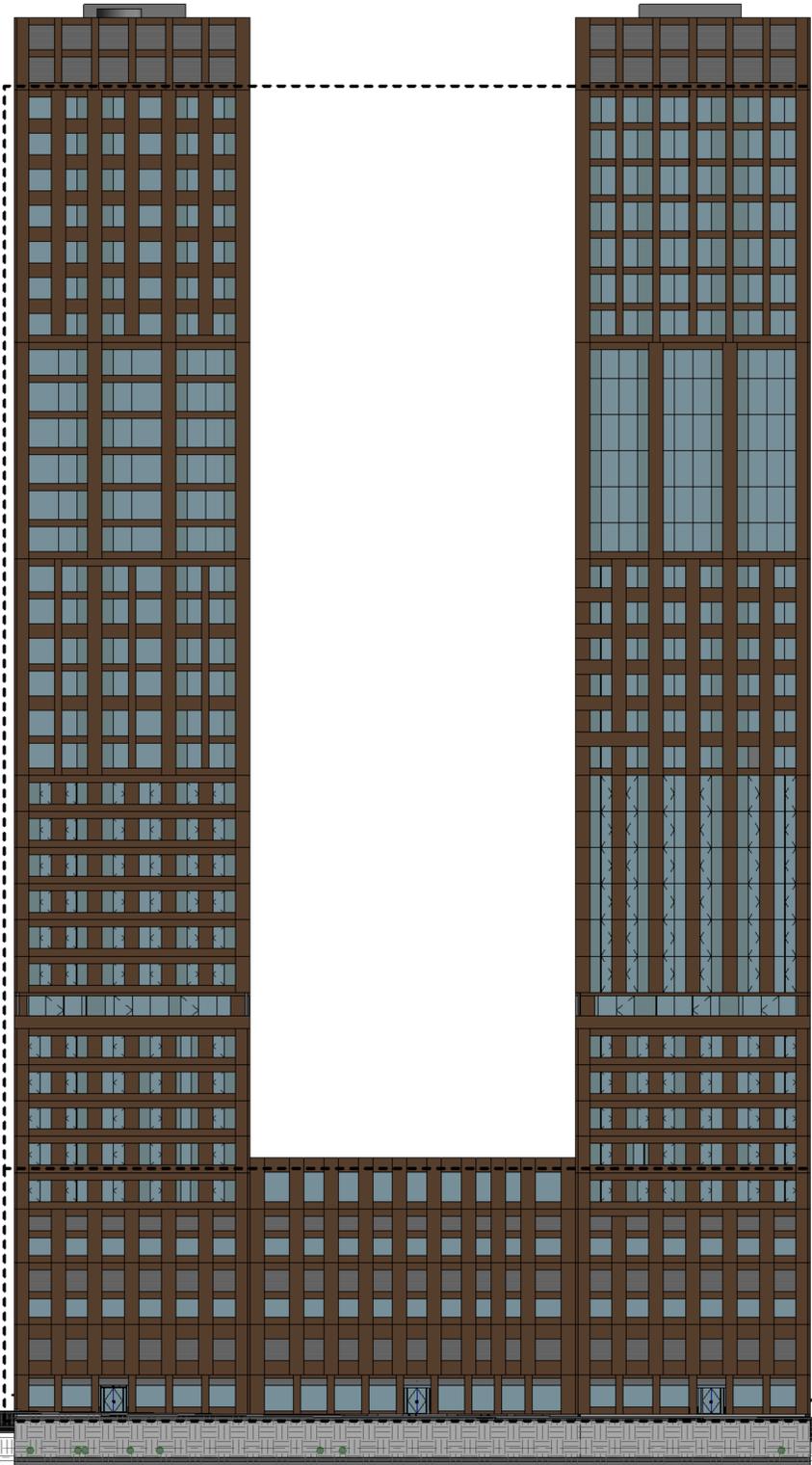


- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"



4 Elevation - East Bulkhead  
SCALE: 1/16" = 1'-0"

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"
- SITE B - FLOOR 35 379' - 5"
- SITE B - FLOOR 34 369' - 5"
- SITE B - FLOOR 33 359' - 5"
- SITE B - FLOOR 32 349' - 5"
- SITE B - FLOOR 31 339' - 5"
- SITE B - FLOOR 30 329' - 5"
- SITE B - FLOOR 29 319' - 5"
- SITE B - FLOOR 28 309' - 5"
- SITE B - FLOOR 27 299' - 5"
- SITE B - FLOOR 26 289' - 5"
- SITE B - FLOOR 25 279' - 5"
- SITE B - FLOOR 24 269' - 5"
- SITE B - FLOOR 23 259' - 5"
- SITE B - FLOOR 22 249' - 5"
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- SITE B - FLOOR 14 169' - 5"
- SITE B - FLOOR 13 159' - 5"
- SITE B - FLOOR 12 149' - 5"
- SITE B - FLOOR 11 139' - 5"
- SITE B - FLOOR 10 129' - 5"
- SITE B - FLOOR 9 119' - 5"
- SITE B - FLOOR 8 109' - 5"
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- SITE B - FLOOR 5 79' - 5"
- SITE B - FLOOR 4 64' - 5"
- SITE B - FLOOR 3 47' - 5"
- SITE B - FLOOR 2 33' - 5"
- SITE B - FLOOR 1 22' - 5"
- SITE B - BASE PLANE (18.10) 19' - 6 23/32"
- DESIGN FLOOD ELEVATION 13' - 0"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"



6TH - 55TH FLOOR  
OITC MIN. RATING = 31 dBA

1ST - 5TH FLOOR  
OITC MIN. RATING = 35 dBA

1 Elevation - East  
SCALE: 1/16" = 1'-0"

East Facade									
Panel Type	Area	Cavity R-Value	Cont. R-Value	U-Factor	OITC	SHGC	Type Mark	Manufacturer	Model
FIXED VISION GLASS	12742 SF								
LOUVER PANEL	3620 SF		0	0	0	0	L	GREENHECK	EDJ-430
OPERABLE VISION GLASS	2994 SF		0.45	0.35	0.35	0.35		FA & PARTNERS	FA100
SPANDREL GLASS	5668 SF		0.45	0.35	0.35	0.35		FA & PARTNERS	FA100

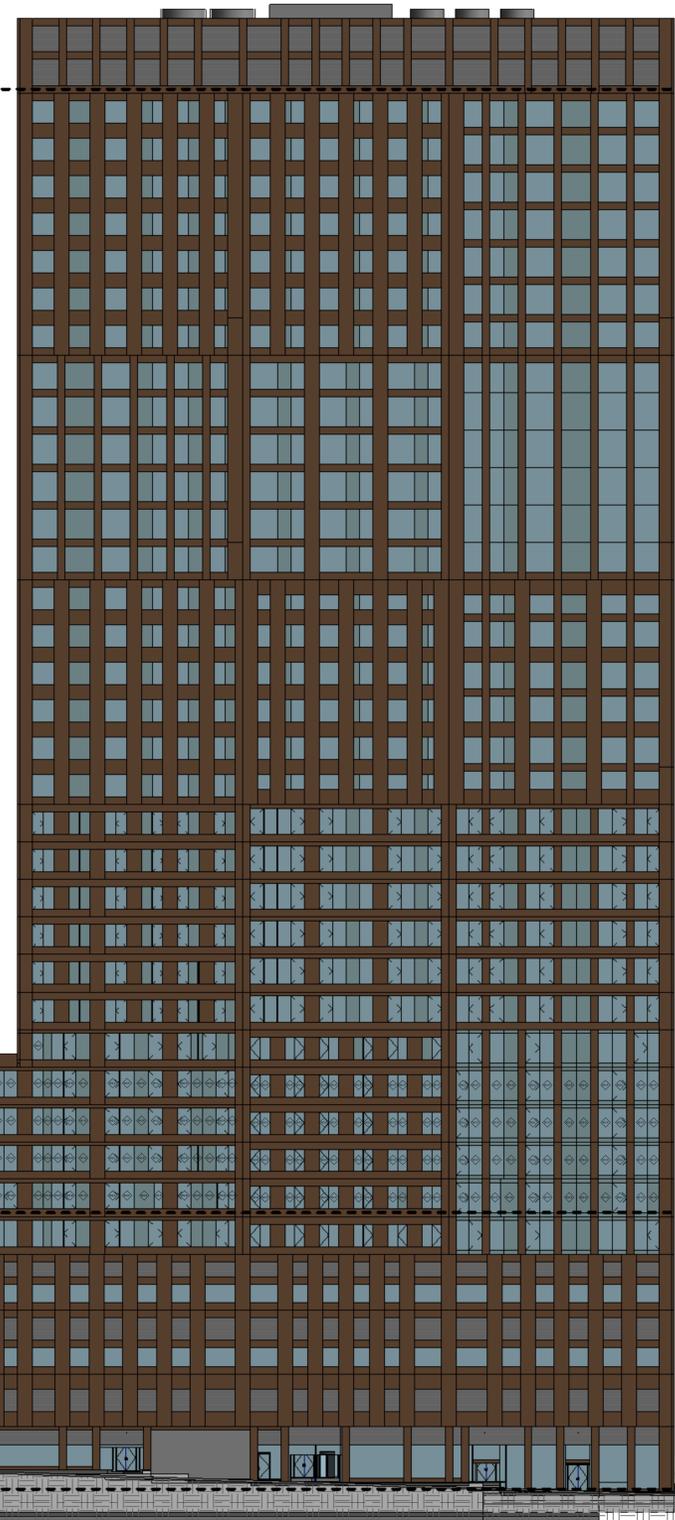
SURFACE AREA: 55,113 SF  
GLAZING AREA (VISION GLASS): 15,734 SF  
EAST FACADE: 28.5% GLAZING

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"



3 Elevation - North Bulkhead  
SCALE: 1/16" = 1'-0"

- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"
- SITE B - FLOOR 35 379' - 5"
- SITE B - FLOOR 34 369' - 5"
- SITE B - FLOOR 33 359' - 5"
- SITE B - FLOOR 32 349' - 5"
- SITE B - FLOOR 31 339' - 5"
- SITE B - FLOOR 30 329' - 5"
- SITE B - FLOOR 29 319' - 5"
- SITE B - FLOOR 28 309' - 5"
- SITE B - FLOOR 27 299' - 5"
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- SITE B - FLOOR 24 269' - 5"
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- SITE B - FLOOR 22 249' - 5"
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- SITE B - FLOOR 16 189' - 5"
- SITE B - FLOOR 15 179' - 5"
- SITE B - FLOOR 14 169' - 5"
- SITE B - FLOOR 13 159' - 5"
- SITE B - FLOOR 12 149' - 5"
- SITE B - FLOOR 11 139' - 5"
- SITE B - FLOOR 10 129' - 5"
- SITE B - FLOOR 9 119' - 5"
- SITE B - FLOOR 8 109' - 5"
- SITE B - FLOOR 7 99' - 5"
- SITE B - FLOOR 6 89' - 5"
- SITE B - FLOOR 5 79' - 5"
- SITE B - FLOOR 4 64' - 5"
- SITE B - FLOOR 3 47' - 5"
- SITE B - FLOOR 2 33' - 5"
- SITE B - FLOOR 1 22' - 5"
- SITE B - BASE PLANE (18.10) 19' - 6 23/32"
- DESIGN FLOOD ELEVATION 13' - 0"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"



6TH - 55TH FLOOR  
OITC MIN. RATING = 28 dBA

1ST - 5TH FLOOR  
OITC MIN. RATING = 31 dBA

2 Elevation - North  
SCALE: 1/16" = 1'-0"

North Facade									
Panel Type	Area	Cavity R-Value	Cont. R-Value	U-Factor	OITC	SHGC	Type Mark	Manufacturer	Model
FIXED VISION GLASS	16285 SF		0.45	0.35	0.35	0.35		FA & PARTNERS	FA100
LOUVER PANEL	4154 SF		0	0	0	0	L	GREENHECK	EDJ-430
OPERABLE VISION GLASS	3789 SF		0.45	0.35	0.35	0.35		FA & PARTNERS	FA100
SPANDREL GLASS	7456 SF		0.45	0.35	0.35	0.35		FA & PARTNERS	FA100

SURFACE AREA: 66,116 SF  
GLAZING AREA (VISION GLASS): 19,921 SF  
NORTH FACADE: 30.1% GLAZING

LEGEND

	SPANDREL GLASS
	FIXED VISION GLASS
	OPERABLE VISION GLASS
	GLASS DOOR
	LOUVER PANEL
	METAL PANEL WALL

NOTE: TYPOGRAPHS THICK LINE INDICATED BY CAD WINDOW; SEE SPEC

**Robert Silman Associates**  
Structural Engineers  
88 University Place  
New York, NY 10003  
TEL: (212) 620-7970  
FAX: (212) 620-6157

**Ettinger & Associates**  
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**Philip Habib & Associates**  
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102 Madison Avenue, 11th Floor  
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TEL: (212) 929-5656  
FAX: (212) 929-5605

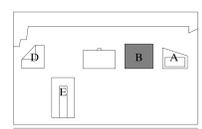
**William Vitacco Associates**  
Building & Zoning Law Consultant  
299 Broadway  
New York, NY 10007  
TEL: (212) 791-8778  
FAX: (212) 513-0637

**YR&G**  
Sustainability Consultant  
161 Bowery, 4th Floor  
New York, NY 10002  
TEL: (917) 677-8025  
FAX: (917) 677-8025

**James Corner Field Operations**  
Landscape Architect  
474 Tomp Avenue  
New York, NY 10014  
TEL: (212) 433-1450

No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988).  
BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'



CLIENT  
**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
Building B  
Brooklyn, NY

TITLE  
Building Elevations

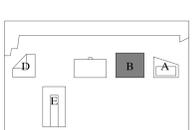
SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



B-A  
302  
.00

No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
 ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'



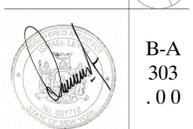
CLIENT

Two Trees Management  
 45 Main Street, Suite 602  
 Brooklyn, NY 11201

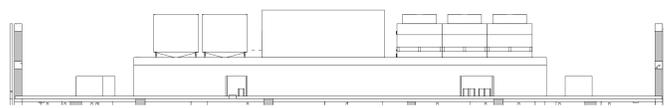
PROJECT  
 Domino - Lot A  
 Building B  
 Brooklyn, NY

TITLE  
 Building Elevations

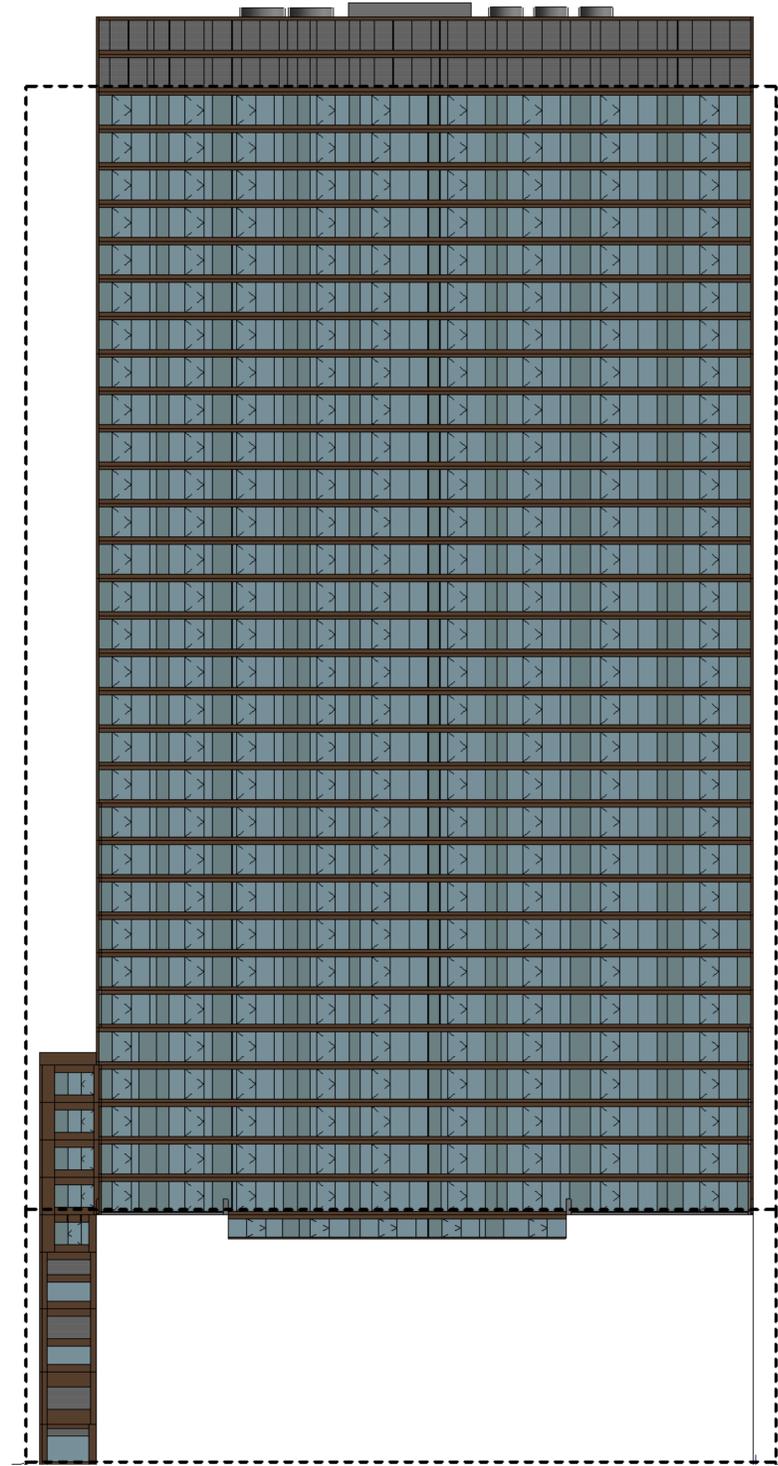
SCALE: As indicated  
 DATE: 05/02/14  
 PROJECT No: 13143.02



B-A  
 303  
 .00



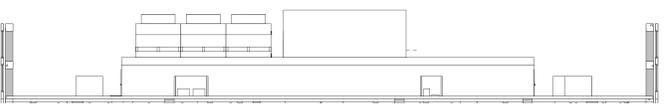
3 Elevation - South Tower Interior Bulkhead  
 SCALE: 1/16" = 1'-0"



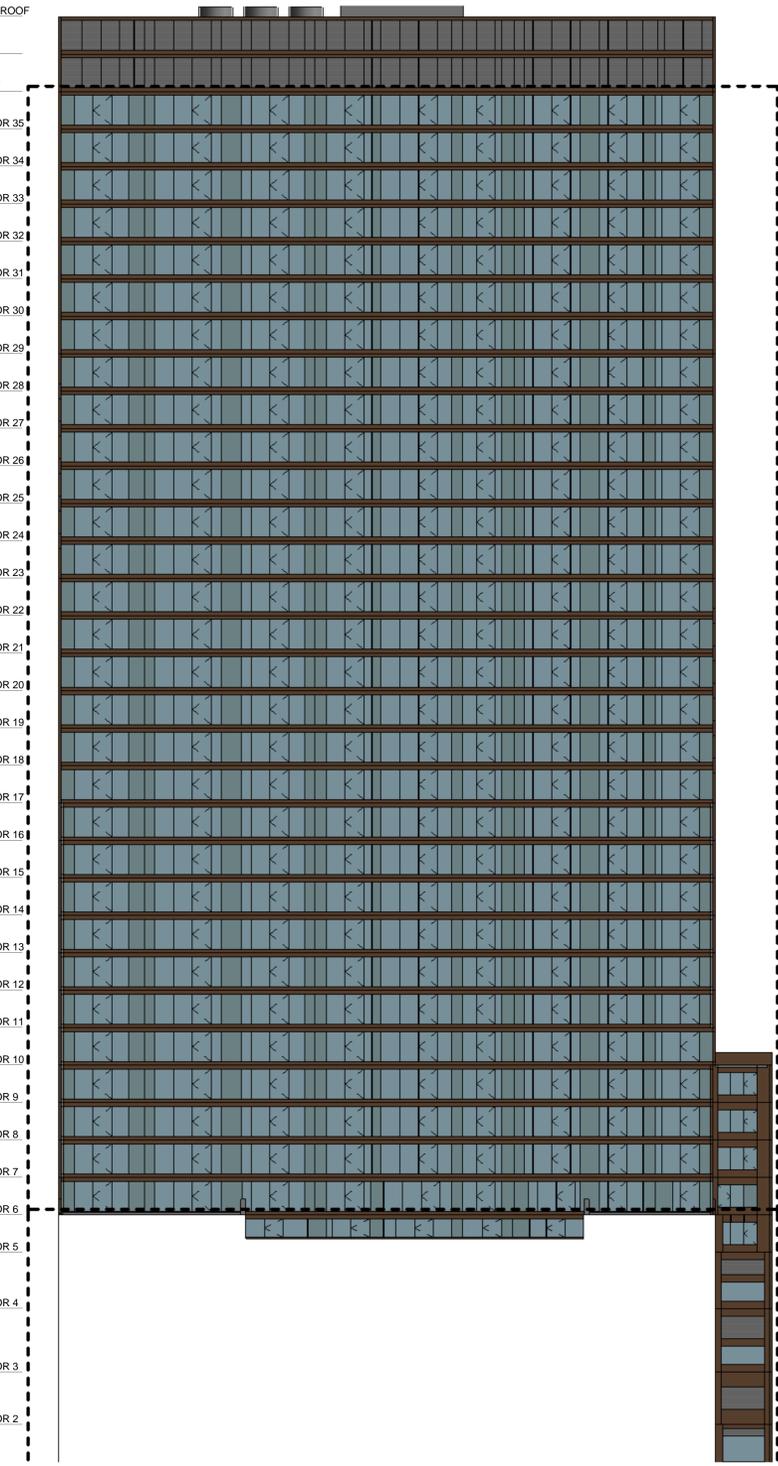
1 Elevation - South Tower Interior  
 SCALE: 1/16" = 1'-0"

South Tower - North Facade									
Panel Type	Area	Cavity R-Value	Cont. R-Value	U-Factor	OITC	SHGC	Type Mark	Manufacturer	Model
FIXED VISION GLASS	19959 SF			0.45	35	0.35		FA & PARTNERS	FA100
LOUVER PANEL	2954 SF						L		
OPERABLE VISION GLASS	11035 SF			0.45	35	0.35		FA & PARTNERS	FA100
SPANDREL GLASS	11609 SF			0.45	35	0.35		FA & PARTNERS	FA100

SURFACE AREA: 54,632 SF  
 GLAZING AREA (VISION GLASS): 31,998 SF  
 INTERIOR FACADE: 58.6% GLAZING



4 Elevation - North Tower Interior Bulkhead  
 SCALE: 1/16" = 1'-0"



2 Elevation - North Tower Interior  
 SCALE: 1/16" = 1'-0"

North Tower - South Facade									
Panel Type	Area	Cavity R-Value	Cont. R-Value	U-Factor	OITC	SHGC	Type Mark	Manufacturer	Model
FIXED VISION GLASS	20201 SF			0.45	35	0.35		FA & PARTNERS	FA100
LOUVER PANEL	2954 SF						L		
OPERABLE VISION GLASS	10787 SF			0.45	35	0.35		FA & PARTNERS	FA100
SPANDREL GLASS	10723 SF			0.45	35	0.35		FA & PARTNERS	FA100

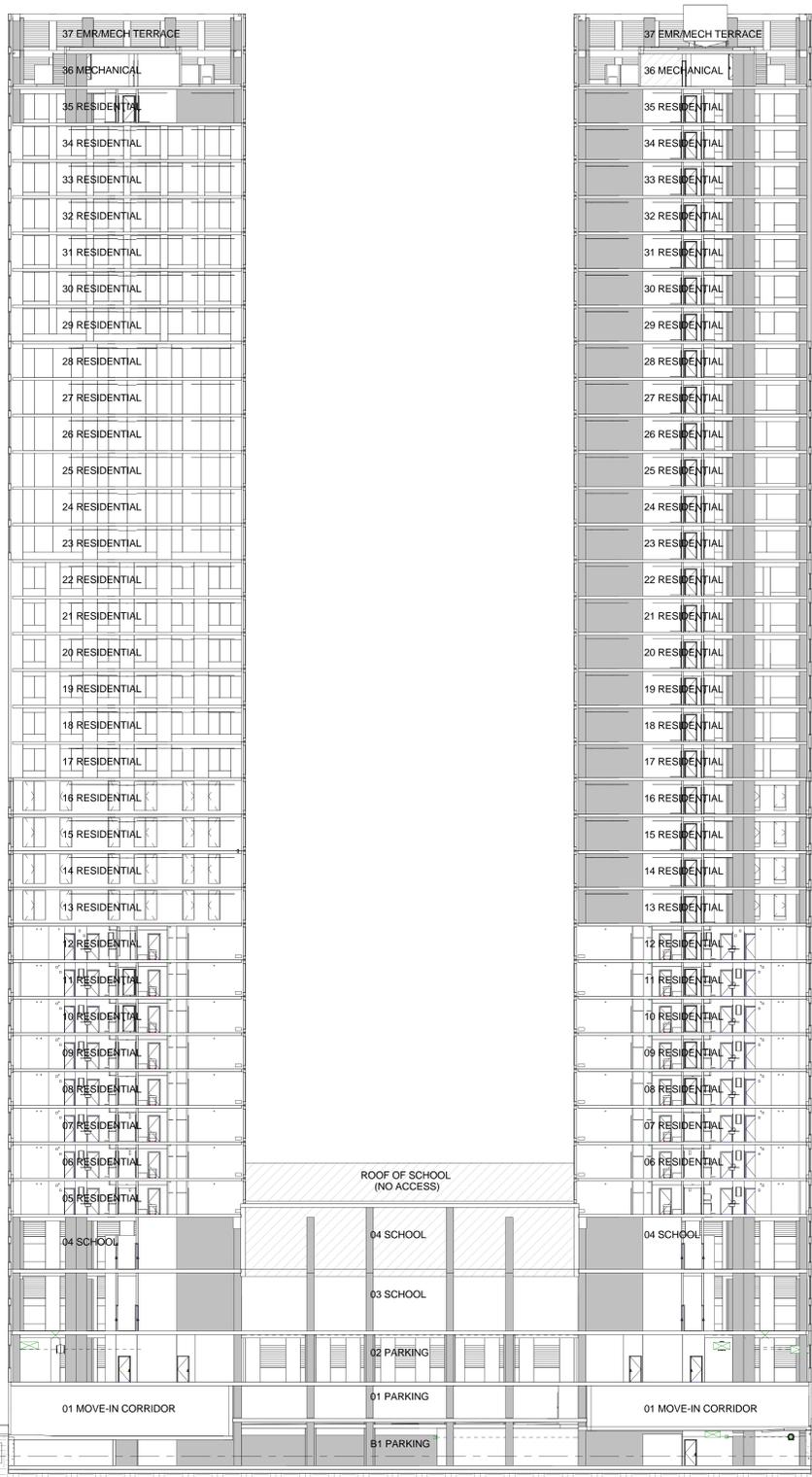
SURFACE AREA: 54,621 SF  
 GLAZING AREA (VISION GLASS): 31,971 SF  
 INTERIOR FACADE: 58.5% GLAZING

LEGEND

[Symbol]	SPANDREL GLASS
[Symbol]	FIXED VISION GLASS
[Symbol]	OPERABLE VISION GLASS
[Symbol]	GLASS DOOR
[Symbol]	LOUVER PANEL
[Symbol]	METAL PANEL WALL

NOTE: UN-GLAZED PANELS WERE NOT REPORTED INTO CAD/TEAM WINDOW. SEE SPEC.

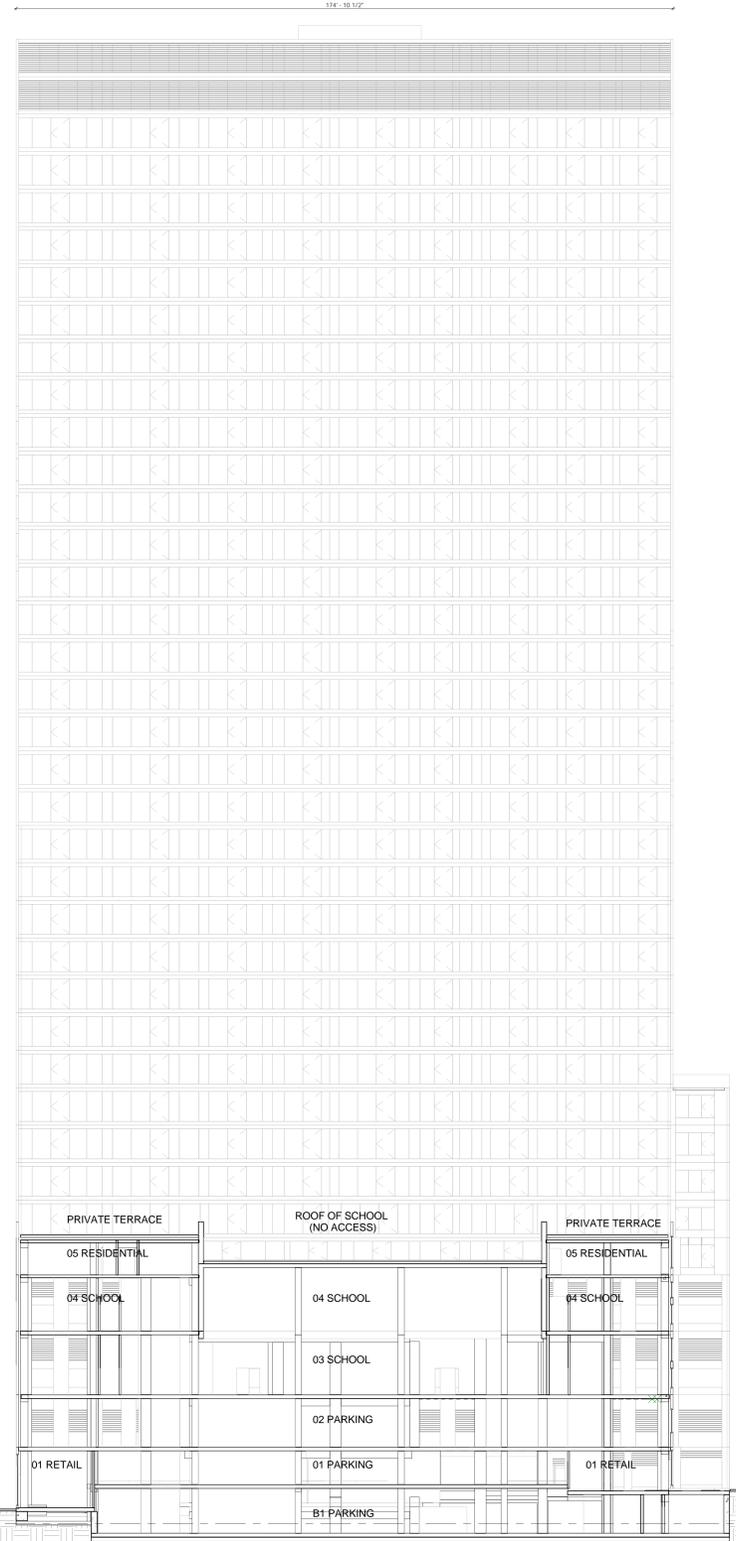
- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"
- SITE B - FLOOR 35 379' - 5"
- SITE B - FLOOR 34 369' - 5"
- SITE B - FLOOR 33 359' - 5"
- SITE B - FLOOR 32 349' - 5"
- SITE B - FLOOR 31 339' - 5"
- SITE B - FLOOR 30 329' - 5"
- SITE B - FLOOR 29 319' - 5"
- SITE B - FLOOR 28 309' - 5"
- SITE B - FLOOR 27 299' - 5"
- SITE B - FLOOR 26 289' - 5"
- SITE B - FLOOR 25 279' - 5"
- SITE B - FLOOR 24 269' - 5"
- SITE B - FLOOR 23 259' - 5"
- SITE B - FLOOR 22 249' - 5"
- SITE B - FLOOR 21 239' - 5"
- SITE B - FLOOR 20 229' - 5"
- SITE B - FLOOR 19 219' - 5"
- SITE B - FLOOR 18 209' - 5"
- SITE B - FLOOR 17 199' - 5"
- SITE B - FLOOR 16 189' - 5"
- SITE B - FLOOR 15 179' - 5"
- SITE B - FLOOR 14 169' - 5"
- SITE B - FLOOR 13 159' - 5"
- SITE B - FLOOR 12 149' - 5"
- SITE B - FLOOR 11 139' - 5"
- SITE B - FLOOR 10 129' - 5"
- SITE B - FLOOR 9 119' - 5"
- SITE B - FLOOR 8 109' - 5"
- SITE B - FLOOR 7 99' - 5"
- SITE B - FLOOR 6 89' - 5"
- SITE B - FLOOR 5 79' - 5"
- SITE B - FLOOR 4 64' - 5"
- SITE B - FLOOR 3 47' - 5"
- SITE B - FLOOR 2 33' - 5"
- SITE B - FLOOR 1 22' - 5"
- SITE B - BASE PLANE (18.10) 19' - 6 23/32"
- DESIGN FLOOD ELEVATION 13' - 0"
- SITE B - B1 10' - 5"
- DESIGN GROUND WATER EL 6' - 5 133/256"
- BHD 1' - 5 133/256"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"



1 Section A-A  
SCALE: 1/16" = 1'-0"

- DESIGN FLOOD ELEVATION 13' - 0"
- DESIGN GROUND WATER EL 6' - 5 133/256"
- BHD 1' - 5 133/256"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"

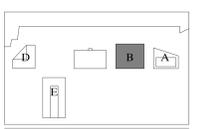
- SITE B - EMR ROOF 409' - 5"
- SITE B - EMR 399' - 5"
- SITE B - MAIN ROOF 389' - 5"
- SITE B - FLOOR 35 379' - 5"
- SITE B - FLOOR 34 369' - 5"
- SITE B - FLOOR 33 359' - 5"
- SITE B - FLOOR 32 349' - 5"
- SITE B - FLOOR 31 339' - 5"
- SITE B - FLOOR 30 329' - 5"
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- SITE B - FLOOR 6 89' - 5"
- SITE B - FLOOR 5 79' - 5"
- SITE B - FLOOR 4 64' - 5"
- SITE B - FLOOR 3 47' - 5"
- SITE B - FLOOR 2 33' - 5"
- SITE B - FLOOR 1 22' - 5"
- SITE B - BASE PLANE (18.10) 19' - 6 23/32"
- DESIGN FLOOD ELEVATION 13' - 0"
- SITE B - B1 10' - 5"
- DESIGN GROUND WATER EL 6' - 5 133/256"
- BHD 1' - 5 133/256"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"



2 Section B-B  
SCALE: 1/16" = 1'-0"

- DESIGN FLOOD ELEVATION 13' - 0"
- DESIGN GROUND WATER EL 6' - 5 133/256"
- NAVD 88 0' - 0"
- NGVD 29 -1' - 1 51/256"

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988).  
BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

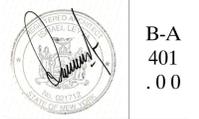


CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

TITLE  
Building Sections

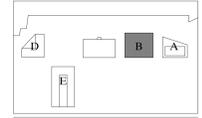
SCALE: 1/16" = 1'-0"  
DATE: 05/02/14  
PROJECT No: 13143.02



B-A  
401  
.00

No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'



**CLIENT**  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

**PROJECT**  
Domino - Lot A  
Building B  
Brooklyn, NY

**TITLE**  
RCP - Floor B1

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



**POWER LEGEND**

INT#A INTERCOM, FLUSH MTD. @ 54" AFF. U.O.N.  
**SPRINKLER LEGEND**

CEILING-MOUNTED PENDANT  
SIDE WALL MOUNTED

**FIXTURES /DEVICES LEGEND**

RECESSED DOWNLIGHT- KITCHEN & BATHROOMS,  
RECESSED DOWNLIGHT - CORRIDOR SEE NOTE 10  
SURFACE-MOUNTED FIXTURE, SEE LIGHTING SCHEDULE

L.T.-3 or L.T.-4 SURFACE MTD OR SUSPENDED FLUORESCENT LIGHTING FIXTURE SEE LIGHTING SCHEDULE

L.T.-A SURFACE MTD OR SUSPENDED FLUORESCENT LIGHTING FIXTURE ON EMERGENCY AND NIGHT LIGHT CIRCUIT. SEE LIGHTING SCHEDULE

L.T.-B SURFACE MTD OR SUSPENDED FLUORESCENT LIGHTING FIXTURE ON EMERGENCY AND NIGHT LIGHT CIRCUIT. SEE LIGHTING SCHEDULE

CR CEILING REGISTER

TR TOP REGISTER

SMCO SMOKE/ CARBON MONOXIDE DETECTOR WALL MTD @ 6" BELOW BOTTOM OF SLAB

**CEILING LEGEND**  
**RESIDENTIAL FLRS:**

Gypsum Board Ceiling +8'-2" TOS U.O.N.

KADEX CLG AT UNDERSIDE OF CONC. U.O.N.

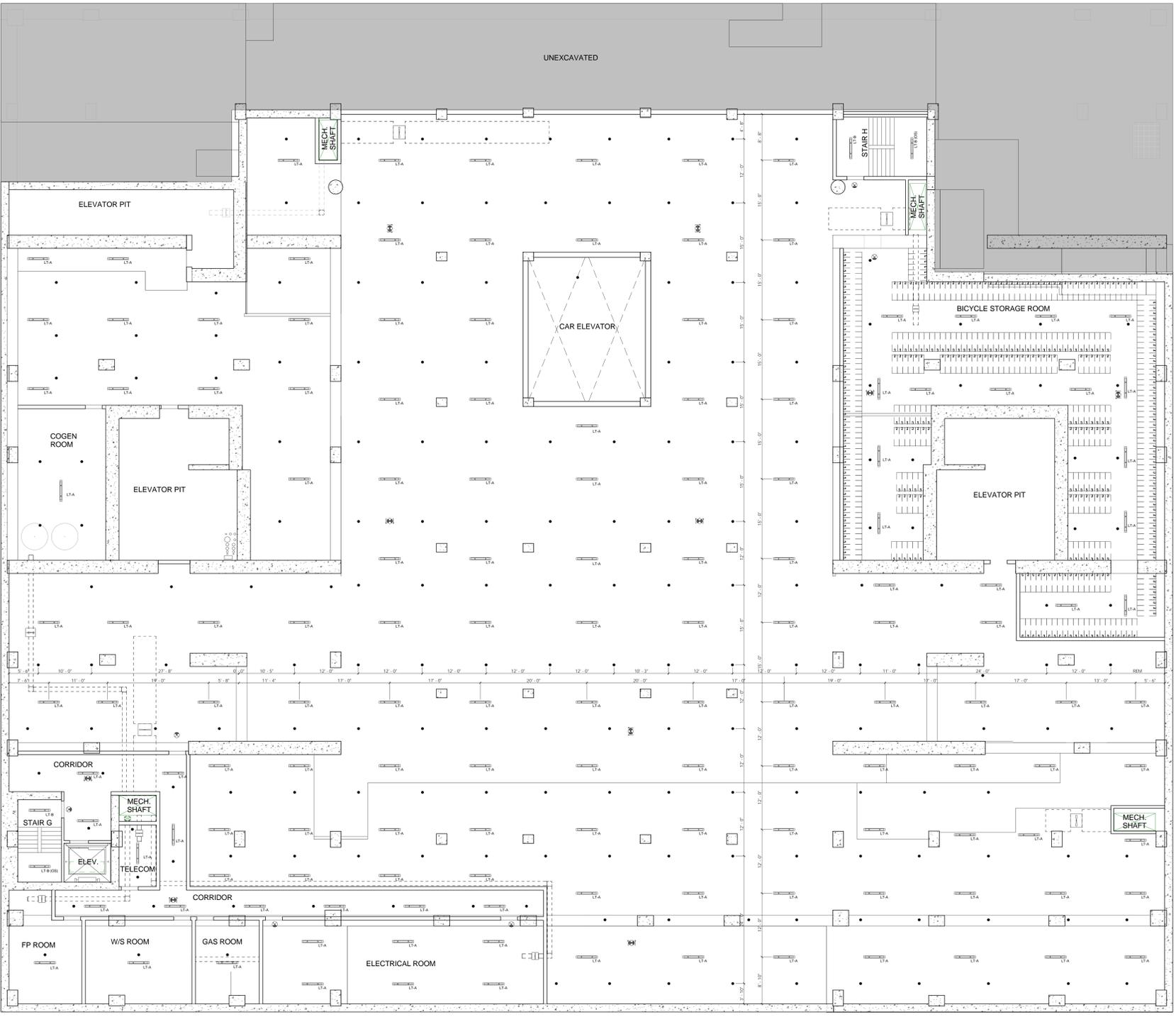
2 HR. RATED GYPSUM SOFFIT

**TYP. NOTES.**

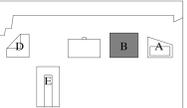
- FOR FINISH TYPES.
- NOT USED
- CEILING @ STAIR & EMR., TRASH RM, ELEC. CLOSET AND MECH. RM. TO BE EXPOSED CONCRETE.
- ALL DUCT OFFSETS TO BE 2HR RATED W/ 3/8" OR EQUAL FIRE MASTER BLANKET.
- ALL ACCESS DOOR LOCATIONS MUST BE APPROVED BY THE ARCHITECT DURING FINAL COORDINATION & SIGN OFF.
- ALL ACCESS DOOR LOCATIONS FOR PLUMBING SHUT OFF'S MUST BE LOCATED IN THE PUBLIC CORRIDORS ONLY.
- SPRINKLERS ARE SUGGESTED FOR DESIGN LAYOUT ONLY. FINAL PER APPROVED SHOP DRAWINGS.
- NO PROJECTIONS FROM THE FIRE STANDPIPE SHALL IMPEDE THE PATH OF EGRESS AS SHOWN.
- ALL LIGHTS INDICATED AS (O.S) SHALL BE ON OCCUPANCY SENSORS.
- ALL LIGHTS INDICATED AS (EM) SHALL BE ON EMERGENCY POWER SUPPLY FOR CORRIDOR EM LIGHTING SEE MEP DWGS. FOR COUNT AND LOCATION.
- NOT USED
- PROVIDE DAYLIGHT SENSORS AND TIMERS FOR ALL EXTERIOR LIGHT FIXTURES
- ALL LIGHT FIXTURES SHALL BE ENERGY STAR RATED.

**CARBON MONOXIDE DETECTORS:**

- EACH DWELLING UNIT SHALL BE EQUIPPED WITH AN APPROVED CARBON MONOXIDE DETECTION DEVICE RECEIVING ITS PRIMARY POWER FROM A HARD WIRE SYSTEM.
- SUCH CARBON MONOXIDE DETECTOR SHALL BE EITHER THE IONIZATION CHAMBER TYPE OR THE PHOTOELECTRIC TYPE.
- ALL CARBON MONOXIDE DETECTORS MUST BE INSTALLED WITHIN 15 FEET OF THE ENTRANCE TO ANY SLEEPING RM., WALL OR CLG. MTD., AND INDICATED ON PLANS.
- A CERTIFICATE OF SATISFACTORY INSTALLATION SHALL BE FILED WITH THE DIVISION OF CODE ENFORCEMENT 10 DAYS AFTER THE INSTALLATION IS COMPLETE.



# RIVER STREET



CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

TITLE  
RCP - Floor 1

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02

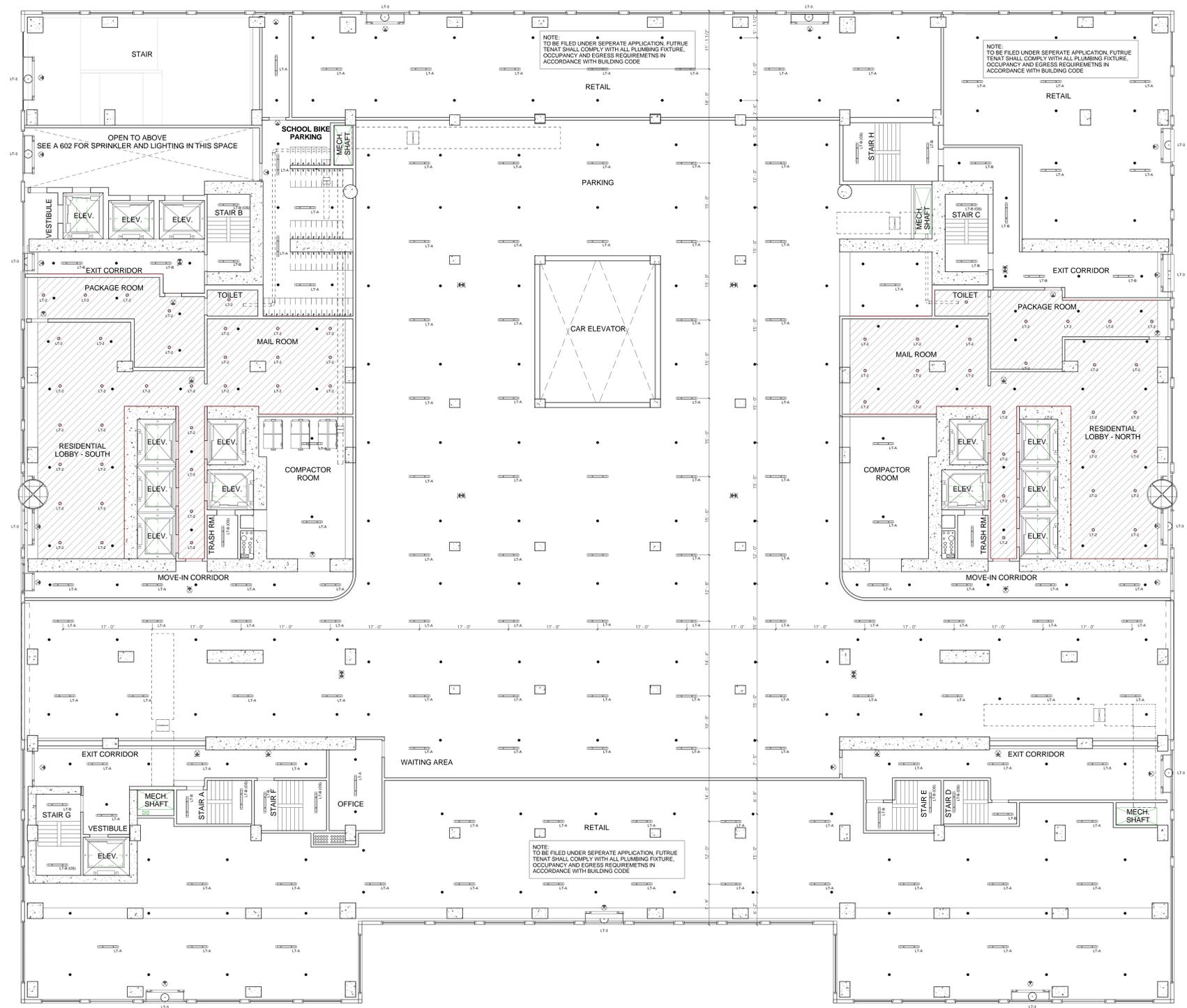


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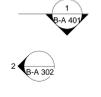
# SOUTH 2ND STREET

# SOUTH 1ST STREET

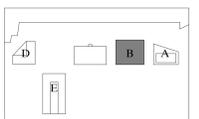
# KENT AVENUE



- POWER LEGEND**
- INT-FA INTERCOM, FLUSH MTD. @ 54" AFT. U.O.N.
- SPRINKLER LEGEND**
- CEILING-MOUNTED PENDANT
  - SIDE WALL MOUNTED
- FIXTURES/DEVICES LEGEND**
- LT-1 RECESSED DOWNLIGHT - KITCHEN & BATHROOMS,
  - LT-2 RECESSED DOWNLIGHT - CORRIDOR SEE NOTE 10
  - LT-3 or LT-4 SURFACE-MOUNTED FIXTURE, SEE LIGHTING SCHEDULE
  - LT-A SURFACE MTD OR SUSPENDED FLUORESCENT LIGHTING FIXTURE SEE LIGHTING SCHEDULE
  - LT-B SURFACE MTD OR SUSPENDED FLUORESCENT LIGHTING FIXTURE ON EMERGENCY AND NIGHT LIGHT CIRCUIT. SEE LIGHTING SCHEDULE
- CR CEILING REGISTER
  - TR TOP REGISTER
  - SM/CO SMOKE/ CARBON MONOXIDE DETECTOR WALL MTD @ 6" BELOW BOTTOM OF SLAB
- CEILING LEGEND RESIDENTIAL FLRS:**
- GYPSON BOARD CEILING +8'-2" TOS U.O.N.
  - KADEX CLG AT UNDERSIDE OF CONC. U.O.N.
  - 2 HR. RATED GYPSON SOFFIT
- TYP. NOTES.**
- FOR FINISH TYPES.
  - NOT USED
  - CEILING @ STAIR & EMR., TRASH RM, ELEC. CLOSET AND MECH. RM. TO BE EXPOSED CONCRETE.
  - ALL DUCT OFFSETS TO BE 2HR RATED W/ 3/8" OR EQUAL FIRE MASTER BLANKET.
  - ALL ACCESS DOOR LOCATIONS MUST BE APPROVED BY THE ARCHITECT DURING FINAL COORDINATION & SIGN OFF.
  - ALL ACCESS DOOR LOCATIONS FOR PLUMBING SHUT OFF'S MUST BE LOCATED IN THE PUBLIC CORRIDORS ONLY.
  - SPRINKLERS ARE SUGGESTED FOR DESIGN LAYOUT ONLY. FINAL PER APPROVED SHOP DRAWINGS.
  - NO PROJECTIONS FROM THE FIRE STANDPIPE SHALL IMPEDE THE PATH OF EGRESS AS SHOWN.
  - ALL LIGHTS INDICATED AS (O.S) SHALL BE ON OCCUPANCY SENSORS.
  - ALL LIGHTS INDICATED AS (EM) SHALL BE ON EMERGENCY POWER SUPPLY FOR CORRIDOR EM LIGHTING SEE MEP DWGS. FOR COUNT AND LOCATION.
  - NOT USED
  - PROVIDE DAYLIGHT SENSORS AND TIMERS FOR ALL EXTERIOR LIGHT FIXTURES
  - ALL LIGHT FIXTURES SHALL BE ENERGY STAR RATED.
- CARBON MONOXIDE DETECTORS:**
- EACH DWELLING UNIT SHALL BE EQUIPPED WITH AN APPROVED CARBON MONOXIDE DETECTION DEVICE RECEIVING ITS PRIMARY POWER FROM A HARD WIRE SYSTEM.
  - SUCH CARBON MONOXIDE DETECTOR SHALL BE EITHER THE IONIZATION CHAMBER TYPE OR THE PHOTOELECTRIC TYPE.
  - ALL CARBON MONOXIDE DETECTORS MUST BE INSTALLED WITHIN 15 FEET OF THE ENTRANCE TO ANY SLEEPING RM., WALL OR CLG. MTD., AND INDICATED ON PLANS.
  - A CERTIFICATE OF SATISFACTORY INSTALLATION SHALL BE FILED WITH THE DIVISION OF CODE ENFORCEMENT 10 DAYS AFTER THE INSTALLATION IS COMPLETE.







CLIENT

**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

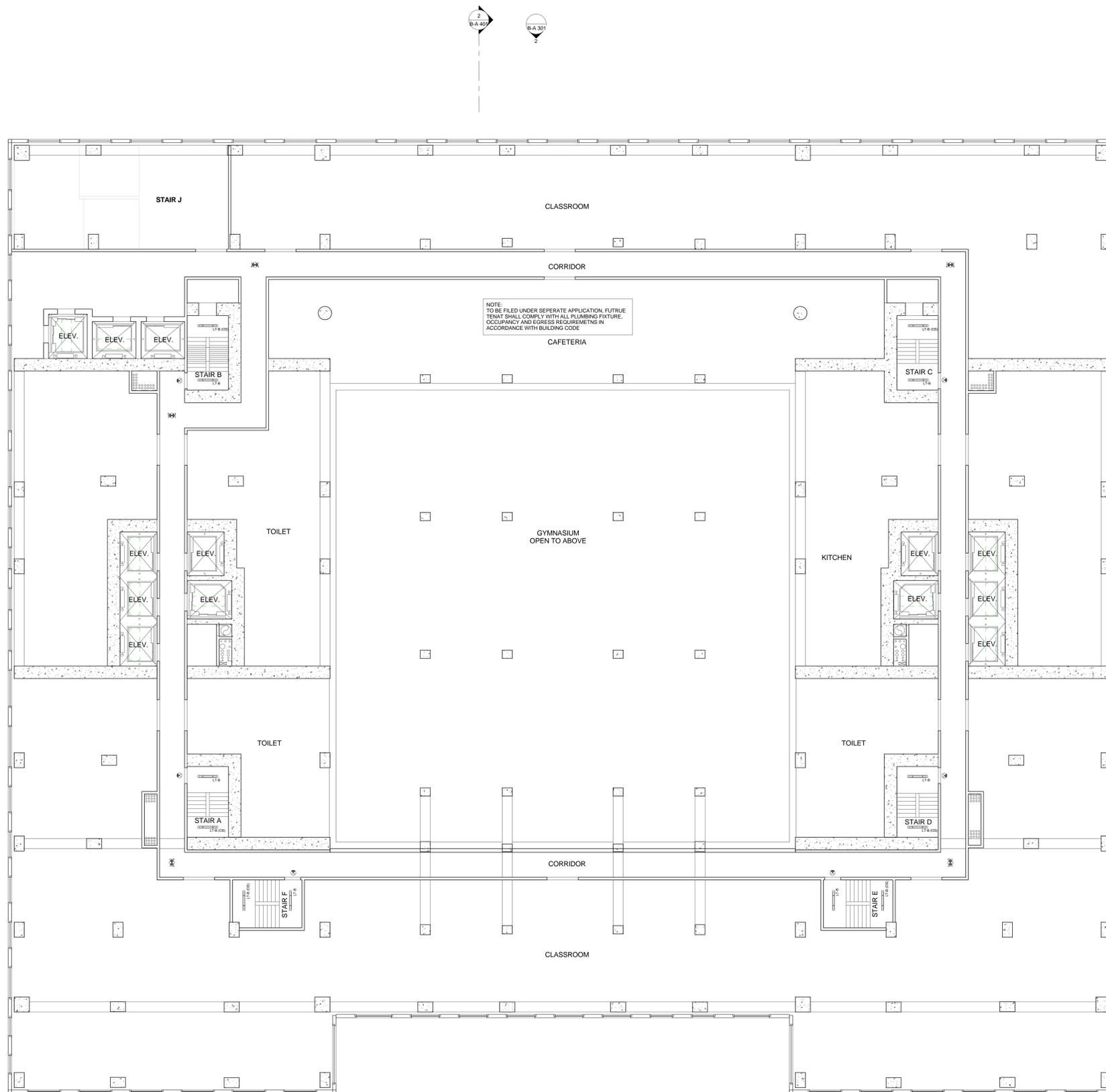
PROJECT  
**Domino - Lot A**  
**Building B**  
Brooklyn, NY

TITLE  
RCP - Floor 3

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



B-A  
603  
.00



**POWER LEGEND**

INTFA INTERCOM, FLUSH MTD.  
@ 54" AFF. U.O.N.

**SPRINKLER LEGEND**

CEILING-MOUNTED PENDANT  
SIDE WALL MOUNTED

**FIXTURES/DEVICES LEGEND**

RECESSED DOWNLIGHT -  
KITCHEN & BATHROOMS,  
LT-1  
RECESSED DOWNLIGHT -  
CORRIDOR  
SEE NOTE 10  
SURFACE-MOUNTED FIXTURE,  
SEE LIGHTING SCHEDULE  
LT-3 or  
LT-4  
SURFACE MTD OR  
SUSPENDED FLUORESCENT  
LIGHTING FIXTURE,  
SEE LIGHTING SCHEDULE  
LT-A  
SURFACE MTD OR SUSPENDED  
FLUORESCENT LIGHTING  
FIXTURE ON EMERGENCY AND  
NIGHT LIGHT CIRCUIT,  
SEE LIGHTING SCHEDULE  
SEE NOTE 9  
LT-B

CEILING REGISTER  
TR  
TOP REGISTER  
SMICO SMOKE/ CARBON MONOXIDE  
DETECTOR WALL MTD @ 6"  
BELOW BOTTOM OF SLAB

**CEILING LEGEND**

GYPSUM BOARD CEILING  
+8'-2" TOS U.O.N.  
KADEX CLG AT UNDERSIDE  
OF CONC., U.O.N.  
2 HR. RATED GYPSUM SOFFIT

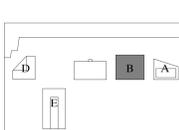
**TYP. NOTES.**

- FOR FINISH TYPES.
- NOT USED
- CEILING @ STAIR & EMR., TRASH RM, ELEC. CLOSET AND MECH. RM. TO BE EXPOSED CONCRETE.
- ALL DUCT OFFSETS TO BE 2HR RATED W/ 3M(OH EQUAL FIRE MASTER BLANKET.
- ALL ACCESS DOOR LOCATIONS MUST BE APPROVED BY THE ARCHITECT DURING FINAL COORDINATION & SIGN OFF.
- ALL ACCESS DOOR LOCATIONS FOR PLUMBING SHUT OFF'S MUST BE LOCATED IN THE PUBLIC CORRIDORS ONLY.
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- ALL LIGHTS INDICATED AS (EM) SHALL BE ON EMERGENCY POWER SUPPLY. FOR CORRIDOR EM LIGHTING SEE MEP DWGS. FOR COUNT AND LOCATION.
- NOT USED
- PROVIDE DAYLIGHT SENSORS AND TIMERS FOR ALL EXTERIOR LIGHT FIXTURES
- ALL LIGHT FIXTURES SHALL BE ENERGY STAR RATED.

**CARBON MONOXIDE DETECTORS:**

- EACH DWELLING UNIT SHALL BE EQUIPPED WITH AN APPROVED CARBON MONOXIDE DETECTION DEVICE RECEIVING ITS PRIMARY POWER FROM A HARD WIRE SYSTEM.
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- CERTIFICATE OF SATISFACTORY INSTALLATION SHALL BE FILED WITH THE DIVISION OF CODE ENFORCEMENT 10 DAYS AFTER THE INSTALLATION IS COMPLETE.





**POWER LEGEND**

INTFA INTERCOM, FLUSH MTD.  
@ 54" AFF. U.O.N.

**SPRINKLER LEGEND**

CEILING-MOUNTED PENDANT  
SIDE WALL MOUNTED

**FIXTURES/DEVICES LEGEND**

RECESSED DOWNLIGHT-  
KITCHEN & BATHROOMS,  
RECESSED DOWNLIGHT -  
CORRIDOR  
SEE NOTE 10

SURFACE-MOUNTED FIXTURE,  
SEE LIGHTING SCHEDULE

SURFACE MTD OR SUSPENDED  
FLUORESCENT LIGHTING  
FIXTURE  
SEE LIGHTING SCHEDULE

SURFACE MTD OR SUSPENDED  
FLUORESCENT LIGHTING  
FIXTURE ON EMERGENCY AND  
NIGHT LIGHT CIRCUIT.  
SEE LIGHTING SCHEDULE  
SEE NOTE 9

CEILING REGISTER

TOP REGISTER

SMOKE/ CARBON MONOXIDE  
DETECTOR WALL MTD @ 6"  
BELOW BOTTOM OF SLAB

**CEILING LEGEND**

**RESIDENTIAL FLRS:**

GYPSON BOARD CEILING  
+8'-2" TOS U.O.N.

KADEX CLG AT UNDERSIDE  
OF CONC. U.O.N.

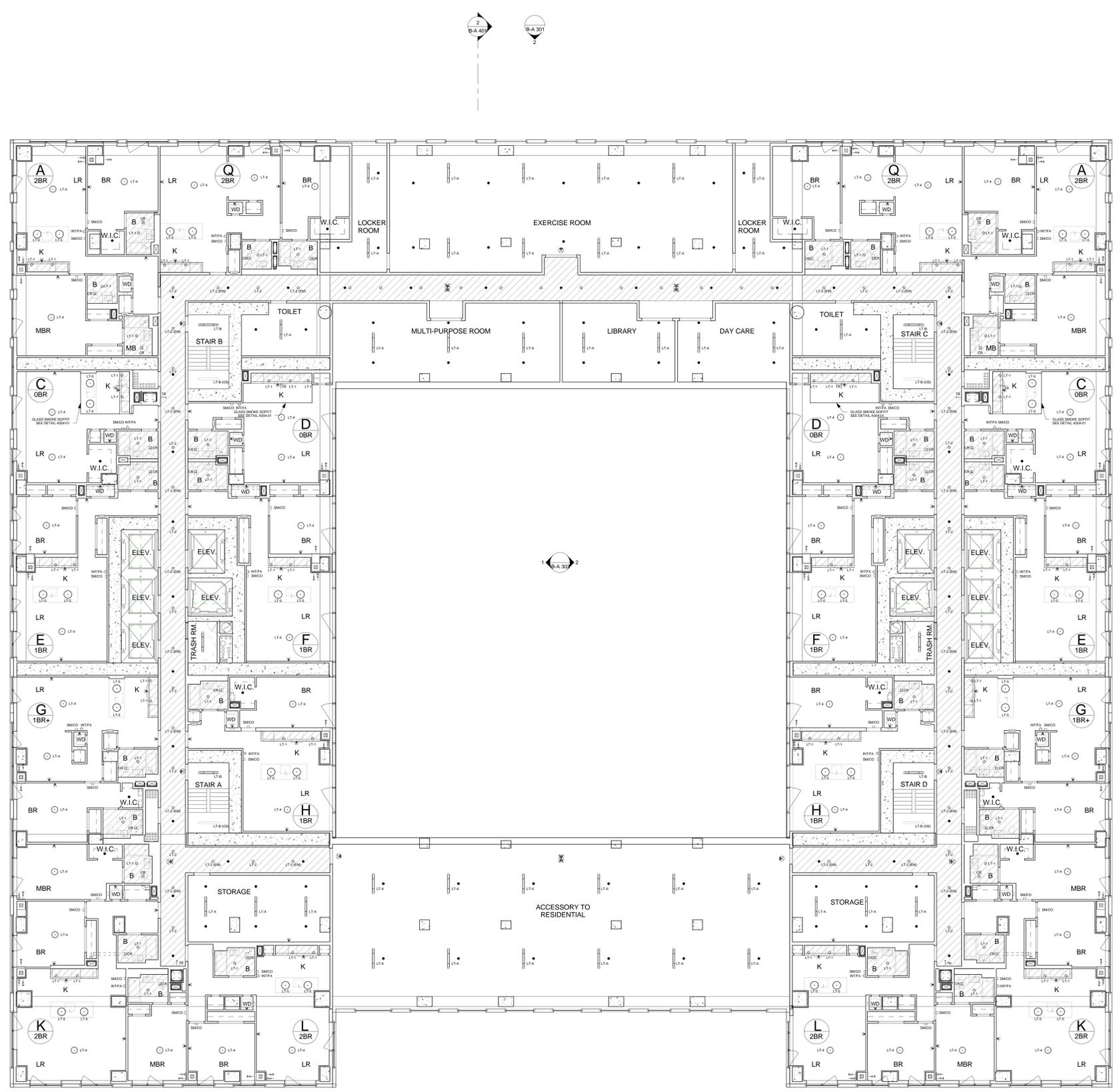
2 HR. RATED GYPSON SOFFIT

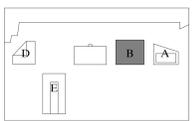
**TYP. NOTES.**

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- NOT USED
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- ALL LIGHT FIXTURES SHALL BE ENERGY STAR RATED.

**CARBON MONOXIDE DETECTORS:**

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- A CERTIFICATE OF SATISFACTORY INSTALLATION SHALL BE FILED WITH THE DIVISION OF CODE ENFORCEMENT 10 DAYS AFTER THE INSTALLATION IS COMPLETE.





CLIENT

Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

TITLE  
RCP - Floors 6-9

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



B-A  
606  
.00

**POWER LEGEND**

INTFA INTERCOM, FLUSH MTD.  
@ 54" AFF. U.O.N.

**SPRINKLER LEGEND**

CEILING-MOUNTED PENDANT  
SIDE WALL MOUNTED

**FIXTURES/DEVICES LEGEND**

RECESSED DOWNLIGHT-  
KITCHEN & BATHROOMS,  
RECESSED DOWNLIGHT -  
CORRIDOR  
SEE NOTE 10  
SURFACE-MOUNTED FIXTURE,  
SEE LIGHTING SCHEDULE  
SURFACE MTD OR  
SUSPENDED FLUORESCENT  
LIGHTING FIXTURE  
SEE LIGHTING SCHEDULE  
SURFACE MTD OR SUSPENDED  
FLUORESCENT LIGHTING  
FIXTURE ON EMERGENCY AND  
NIGHT LIGHT CIRCUIT.  
SEE LIGHTING SCHEDULE  
SEE NOTE 9

CEILING REGISTER

TOP REGISTER

SMOKE/ CARBON MONOXIDE  
DETECTOR WALL MTD @ 6"  
BELOW BOTTOM OF SLAB

**CEILING LEGEND**  
**RESIDENTIAL FLRS:**

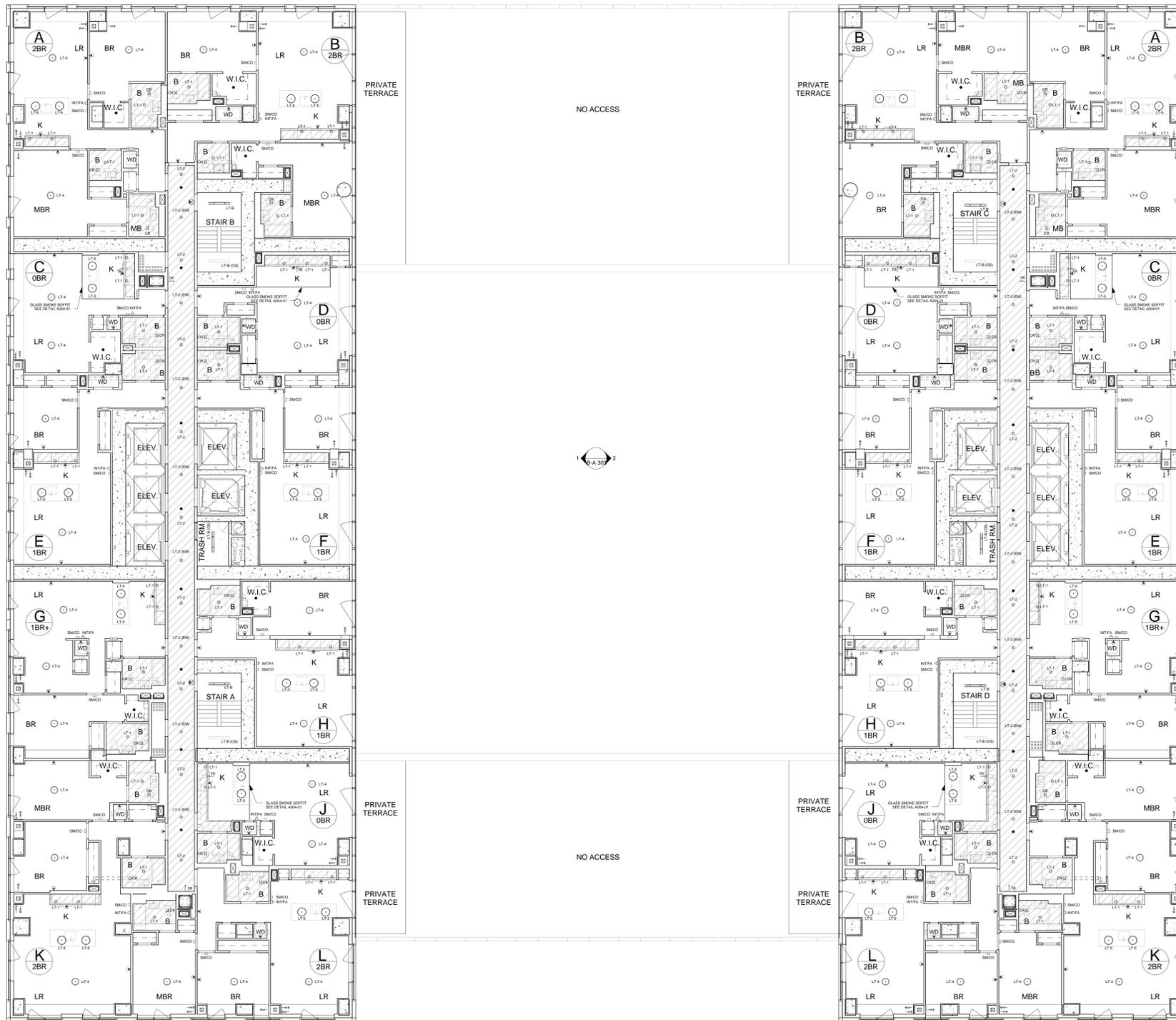
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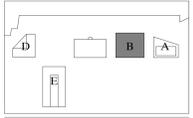
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CLIENT  
Two Trees Management  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
Domino - Lot A  
Building B  
Brooklyn, NY

TITLE  
RCP - Floor 10

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



B-A  
610  
.00

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SEE LIGHTING SCHEDULE  
SEE NOTE 9  
CEILING REGISTER  
TOP REGISTER  
SMOKE/ CARBON MONOXIDE  
DETECTOR WALL MTD @ 6"  
BELOW BOTTOM OF SLAB

**CEILING LEGEND**

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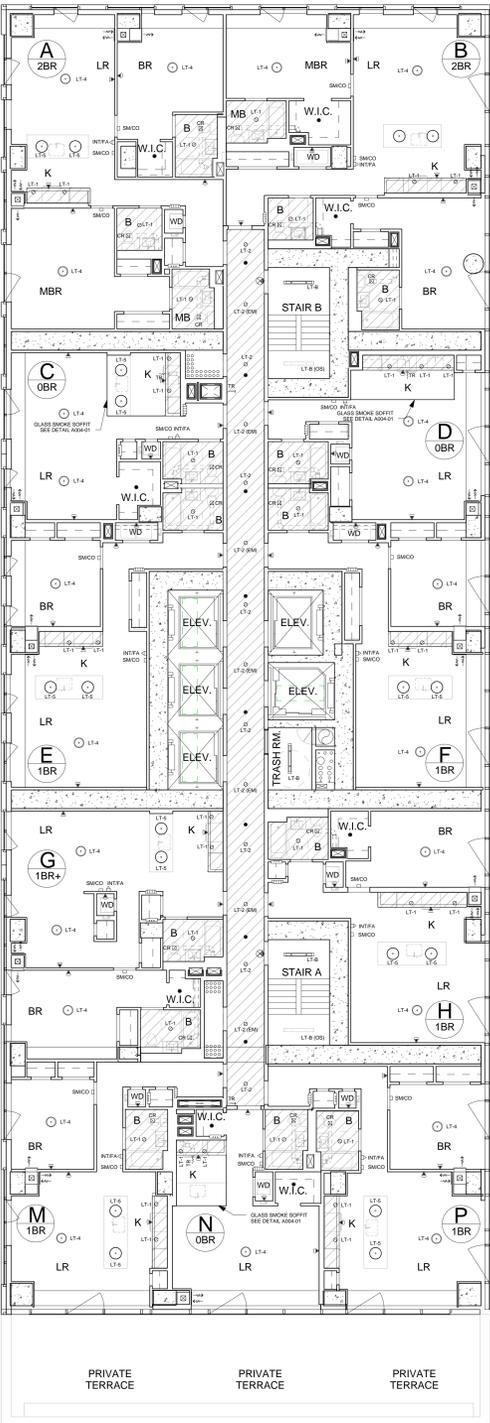
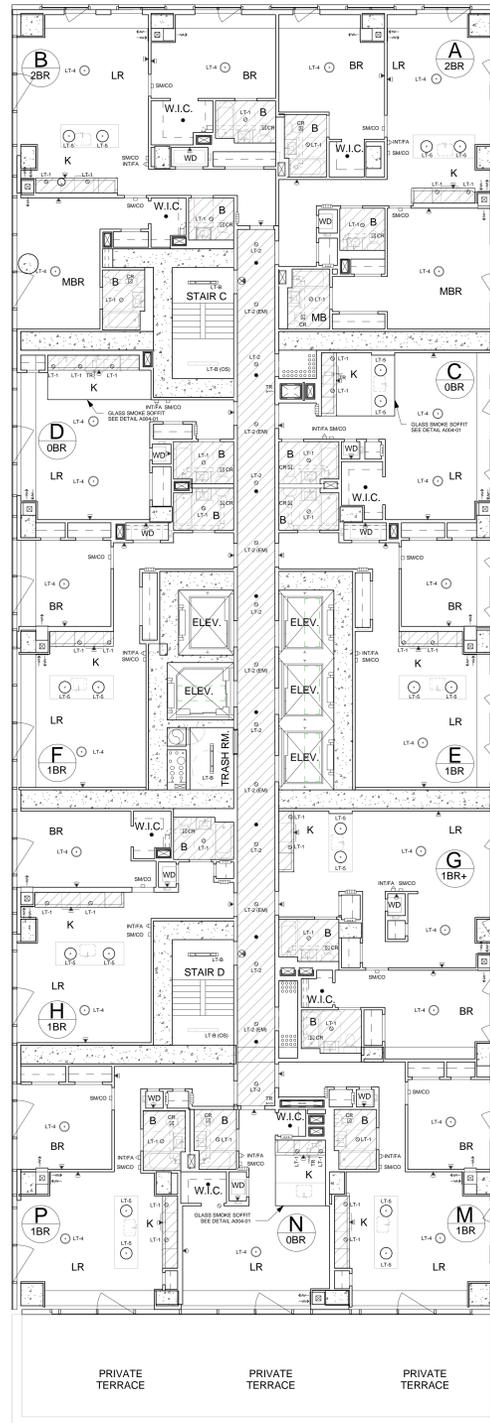
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B-A 401

B-A 301

B-A 302

B-A 401

B-A 302

B-A 302

No	Date	Rev	Issue
1	05/02/14		DCB SUBMISSION

NOTES:  
ALL ELEVATIONS ARE MEASURED RELATIVE TO NAVD (1988), BROOKLYN HIGHWAY DATUM (BHD) IS +1.46'

CLIENT  
**Two Trees Management**  
45 Main Street, Suite 602  
Brooklyn, NY 11201

PROJECT  
**Domino - Lot A**  
Building B  
Brooklyn, NY

TITLE  
RCP - Floors 11-35

SCALE: As indicated  
DATE: 05/02/14  
PROJECT No: 13143.02



B-A  
611  
.00

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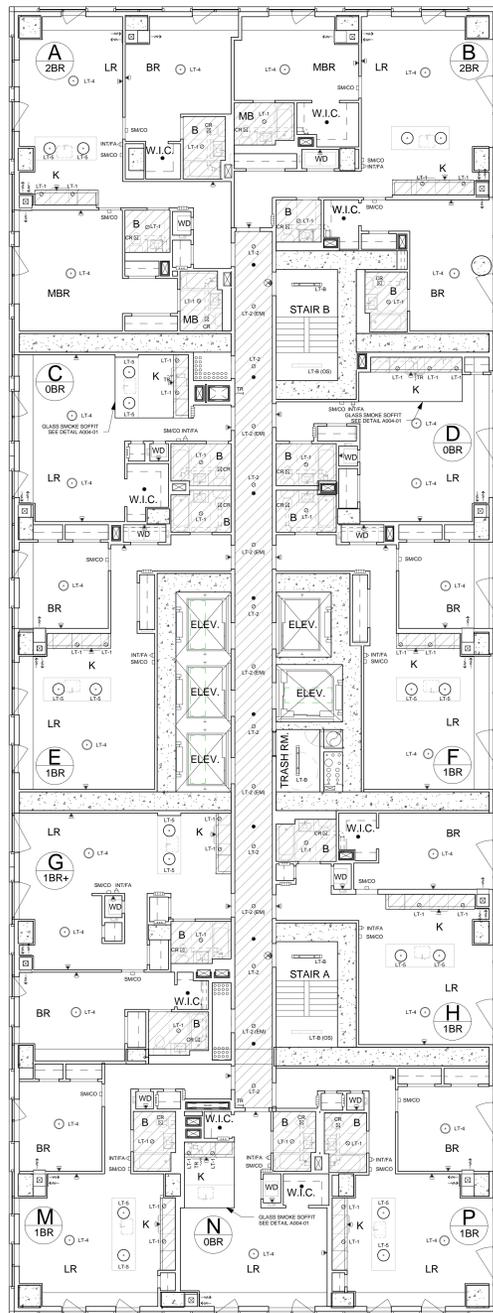
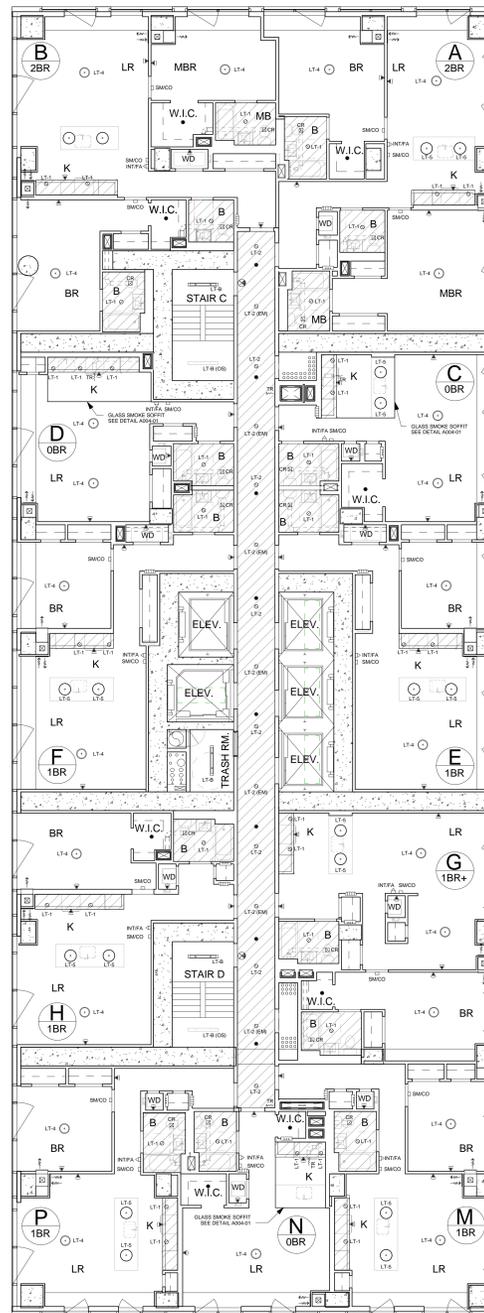
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**ATTACHMENT B**  
**CITIZEN PARTICIPATION PLAN**

## **ATTACHMENT B**

### **CITIZEN PARTICIPATION PLAN**

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

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

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

**Repositories.** A document repository is maintained online. Internet access to view OER’s document repositories is available at public libraries. 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.

The library nearest the Site is:

Brooklyn Library - Leonard Branch

81 Devoe Street, Brooklyn, NY 11215

Telephone Number: 718-486-3365

Hours of Operation:

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

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

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

monitor the potential for exposure including a Construction Health and Safety Plan and a Community Air Monitoring Plan are required components of the remedial program. Implementation of these plans will be under the direct oversight of the NYC OER.

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

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

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

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

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

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

**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.

**Storm-water Retention.** Storm-water retention improves water quality by lowering the rate of combined storm-water and sewer discharges to NYC's sewage treatment plants during periods of precipitation, and reduces the volume of untreated influent to local surface waters.

An estimate of the enhanced storm-water retention capability of the redevelopment project will be included in the RAR.

**Linkage with Green Building.** Green buildings provide a multitude of benefits to the city across a broad range of areas, such as reduction of energy consumption, conservation of resources, and reduction in toxic materials use.

The number of Green Buildings that are associated with this brownfield redevelopment property



will be reported in the RAR. The total square footage of green building space created as a function of this brownfield redevelopment will be quantified for residential, commercial and industrial/manufacturing uses.

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

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

## **ATTACHMENT D**

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

#### **1.1 SOIL SCREENING METHODS**

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

#### **1.2 STOCKPILE METHODS**

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

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

#### **1.3 CHARACTERIZATION OF EXCAVATED MATERIALS**

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

## 1.4 MATERIALS EXCAVATION, LOAD-OUT AND DEPARTURE

The PE/QEP overseeing the remedial action will:

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

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

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

## 1.5 OFF-SITE MATERIALS TRANSPORT

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

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

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

## 1.6 MATERIALS DISPOSAL OFF-SITE

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

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

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

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

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

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

### **1.7 MATERIALS REUSE ON-SITE**

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

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

### **1.8 DEMARCATION**

After completion of hotspot removal and any other invasive remedial activities, and prior to backfilling, the top of the residual soil/fill will be defined by one of three methods: (1) placement of a demarcation layer. The demarcation layer will consist of geosynthetic fencing or equivalent material to be placed on the surface of residual soil/fill to provide an observable reference layer.

A description or map of the approximate depth of the demarcation layer will be provided in the SMP; or (2) a land survey of the top elevation of residual soil/fill before the placement of cover soils, pavement and associated sub-soils, or other materials or structures or, (3) all materials beneath the approved cover will be considered impacted and subject to site management after the remedy is complete. Demarcation may be established by one or any combination of these three methods. As appropriate, a map showing the method of demarcation for the Site and all associated documentation will be presented in the RAR.

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

### **1.9 IMPORT OF BACKFILL SOIL FROM OFF-SITE SOURCES**

This Section presents the requirements for imported fill materials to be used below the cover layer and within the clean soil cover layer. All imported soils will meet OER-approved backfill and cover soil quality objectives for this Site. The backfill and cover soil quality objectives are listed in Table 1.

A process will be established to evaluate sources of backfill and cover soil to be imported to the Site, and will include an examination of source location, current and historical use(s), and any applicable documentation. Material from industrial sites, spill sites, environmental remediation sites or other potentially contaminated sites will not be imported to the Site.

The following potential sources may be used pending attainment of backfill and cover soil quality objectives:

- Clean soil from construction projects at non-industrial sites in compliance with applicable laws and regulations;
- Clean soil from roadway or other transportation-related projects in compliance with applicable laws and regulations;
- Clean recycled concrete aggregate (RCA) from facilities permitted or registered by the regulations of NYS DEC.

All materials received for import to the Site will be approved by a PE/QEP and will be in compliance with provisions in this RAWP. The RAR will report the source of the fill, evidence that an inspection was performed on the source, chemical sampling results, frequency of testing, and a Site map indicating the locations where backfill or soil cover was placed.

### **Source Screening and Testing**

Inspection of imported fill material will include visual, olfactory and PID screening for evidence of contamination. Materials imported to the Site will be subject to inspection, as follows:

- Trucks with imported fill material will be in compliance with applicable laws and regulations and will enter the Site at designated locations;
- The PE/QEP is responsible to ensure that every truck load of imported material is inspected for evidence of contamination; and
- Fill material will be free of solid waste including pavement materials, debris, stumps, roots, and other organic matter, as well as ashes, oil, perishables or foreign matter.

Composite samples of imported material will be taken at a minimum frequency of one sample for every 500 cubic yards of material. Once it is determined that the fill material meets imported backfill or cover soil chemical requirements and is non-hazardous, and lacks petroleum contamination, the material will be loaded onto trucks for delivery to the Site.

Recycled concrete aggregate (RCA) will be imported from facilities permitted or registered by NYSDEC. Facilities will be identified in the RAR. A PE/QEP is responsible to ensure that the facility is compliant with 6NYCRR Part 360 registration and permitting requirements for the period of acquisition of RCA. RCA imported from compliant facilities will not require additional testing, unless required by NYSDEC under its terms for operation of the facility. RCA imported to the Site must be derived from recognizable and uncontaminated concrete. RCA material is not acceptable for, and will not be used as cover material.

### **1.10 FLUIDS MANAGEMENT**

All liquids to be removed from the Site, including dewatering fluids, will be handled, transported and disposed in accordance with applicable laws and regulations. Liquids discharged into the New York City sewer system will receive prior approval by New York City Department of

Environmental Protection (NYC DEP). The NYC DEP regulates discharges to the New York City sewers under Title 15, Rules of the City of New York Chapter 19. Discharge to the New York City sewer system will require an authorization and sampling data demonstrating that the groundwater meets the City's discharge criteria. The dewatering fluid will be pretreated as necessary to meet the NYC DEP discharge criteria. If discharge to the City sewer system is not appropriate, the dewatering fluids will be managed by transportation and disposal at an off-Site treatment facility.

Discharge of water generated during remedial construction to surface waters (i.e. a stream or river) is prohibited without a SPDES permit issued by New York State Department of Environmental Conservation.

### **1.11 STORM-WATER POLLUTION PREVENTION**

Applicable laws and regulations pertaining to storm-water pollution prevention will be addressed during the remedial program. Erosion and sediment control measures identified in this RAWP (silt fences and barriers, and hay bale checks) will be installed around the entire perimeter of the remedial construction area and inspected once a week and after every storm event to ensure that they are operating appropriately. Discharge locations will be inspected to determine whether erosion control measures are effective in preventing significant impacts to receptors. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by OER. All necessary repairs shall be made immediately. Accumulated sediments will be removed as required to keep the barrier and hay bale check functional. Undercutting or erosion of the silt fence toe anchor will be repaired immediately with appropriate backfill materials. Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

### **1.12 CONTINGENCY PLAN**

This contingency plan is developed for the remedial construction to address the discovery of unknown structures or contaminated media during excavation. Identification of unknown contamination source areas during invasive Site work will be promptly communicated to OER's Project Manager. Petroleum spills will be reported to the NYS DEC Spill Hotline. These findings will be included in the daily report. If previously unidentified contaminant sources are found

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

### 1.13 ODOR, DUST AND NUISANCE CONTROL

#### Odor Control

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

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

#### Dust Control

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

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

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

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

**Other Nuisances**

Noise control will be exercised during the remedial program. All remedial work will conform, at a minimum, to NYC noise control standards.

Rodent control will be provided, during Site clearing and grubbing, and during the remedial program, as necessary, to prevent nuisances.

**ATTACHMENT E**  
**SITE SPECIFIC CONSTRUCTION**  
**HEALTH AND SAFETY PLAN**

# DOMINO SUGAR SITE B

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270-290 KENT AVENUE

BROOKLYN, NEW YORK

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## CONSTRUCTION HEALTH AND SAFETY PLAN

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AUGUST 2014

*Prepared for:*

Two Trees Management, LLC

45 Main Street, Suite 602

Brooklyn, NY 11201

*Prepared By:*

**EBC**

**ENVIRONMENTAL BUSINESS CONSULTANTS**

1808 Middle Country Road

Ridge, NY 11961

## HEALTH AND SAFETY PLAN

Site: **Redevelopment Project - TRG**

Location: **270-290 Kent Avenue, Brooklyn, NY**

Prepared By: **ENVIRONMENTAL BUSINESS CONSULTANTS**

Date Prepared: **August - 2014**

Version: **1**

Revision: **0**

Project Description:

Waste types: Solid

Characteristics: Semi-Volatile Organic Compounds, and metals – in historic fill (Grade to 15 feet of soil)

Overall Hazard: Low

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

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APPENDIX C                      CHEMICAL HAZARDS  
APPENDIX D                      HOSPITAL INFORMATION, MAP AND FIELD ACCIDENT REPORT

## STATEMENT OF COMMITMENT

This Health and Safety Plan (HASP) has been prepared to ensure that workers are not exposed to risks from hazardous materials during the Remedial Activities planned for 270-290 Kent Avenue, Brooklyn, New York.

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



## 1.0 INTRODUCTION

This document describes the health and safety guidelines developed by Environmental Business Consultants (EBC) for implementation of a Remedial Action Plan at Redevelopment Project located at 270-290 Kent Avenue, Brooklyn, NY, to protect on-site personnel, visitors, and the public from physical harm and exposure to hazardous materials or wastes during the removal of underground storage tanks and the excavation and loading of contaminated soil. In accordance with the Occupational Safety and Health Administration (OSHA) 29 CFR Part 1910.120 Hazardous Waste Operations and Emergency Response Final rule, this CHASP, including the attachments, addresses safety and health hazards related to subsurface sample collection activities and is based on the best information available. The CHASP may be revised by EBC at the request of Two Trees Management LLC (“the Developer”) and/or the New York State Department of Environmental Conservation (NYSDEC) or New York City Office of Environmental Remediation (NYCOER) upon receipt of new information regarding site conditions. Changes will be documented by written amendments signed by EBC’s Project Manager, site safety officer and/or the EBC Health and Safety Consultant.

### 1.1 Scope

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

- 1) Site mobilization of General Contractor (GC) and Subcontractors to install the building foundation.
  - a) Excavate top 8 to 17 feet of historic fill from Site.
  - b) Excavate as necessary for installation of new building's foundation.

### 1.2 Application

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

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

### 1.3 Site Safety Plan Acceptance, Acknowledgment and Amendments

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

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

## 1.4 Key Personnel - Roles and Responsibilities

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

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

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

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

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

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

## 2.0 SITE BACKGROUND AND SCOPE OF WORK

Domino Sugar Site B is located at 270 to 290 Kent Avenue in the Williamsburg-South Side section of Brooklyn, New York, and is currently identified as a portion of Block 2414 Lot 1 on the New York City Tax Map. Lot 1 is a 717,000 ft<sup>2</sup> water front lot located on the west side of Kent Avenue between Grand Street to the north and South 5th Street to the south. Lot 1 has historically consisted of multiple industrial/commercial buildings utilized by the Domino Sugar Company and other sugar refinery companies. All of the buildings on Lot 1, with the exception of the Refinery Building, are currently being demolished. The majority of the portion of Lot 1 identified as Site B was historically utilized as parking, and the remainder of Site B was utilized as the fuel tank area (southeast portion), truck fueling area (northeastern portion), the eastern half of the raw sugar warehouse (western portion), raw sugar scale house (southwest corner), and a Domino Sugar roadway that extended South 2nd Street through Lot 1. The fuel tank area consists of two 200,754 gallon No. 6 fuel oil underground storage tanks that are registered with the New York State Department of Environmental Conservation as a Major Oil Storage Facility (MOSF).

Site B is currently bordered by Site A to the north (which includes the former Domino Sugar Research and Development Lab Building and Raw Sugar Warehouse Building), the former sugar refinery building (Site D) to the south, Kent Avenue to the east and the western half of the former Raw Sugar Warehouse to the west. Site B is a slightly irregular rectangular shaped area consisting of 340.958 feet of street frontage on Kent Avenue and a depth of approximately 224.75 feet, for a total of approximately 76,464 ft<sup>2</sup>.

Following redevelopment, Site B will be subdivided to create a new tax lot (Proposed Lot B), and newly mapped streets including South 1st Street, South 2nd Street and River Street. A new recreational and shoreline walkway/park will be created on the opposite side of River Street, which will span along the west side of Sites A, B, C, D and F.

Following redevelopment, Proposed Lot B will be bordered by Kent Avenue to the east, newly mapped South 1st Street to the north, newly mapped South 2nd Street to the south, and newly mapped River Street to the west. Proposed Lot B will consist of 220 feet of street frontage on Kent Avenue and River Avenue, and approximately 189.875 feet of street frontage on South 1st Street and South 2nd Street, creating a 41,772-square feet lot. The portion of Site B which will be converted into Proposed Lot B currently consists of the parking lot and MOSF fuel tank area, and the truck fueling area along Kent Avenue.

Site B (Proposed Lot B and the areas of each of the newly mapped streets), and the recreational and shoreline walkway/park to be constructed on the opposite side of River Street were investigated as part of the Remedial Investigation and are discussed within this Remedial Investigation Report.

### 2.1 Prior Investigations

Two Phase I Environmental Site Assessment Reports have been completed for Sites A, B, C, D, E and F.

A Phase I Environmental Site Assessment Report was completed by Environmental Health Investigations, Inc. in 2004 for Sites A, B, C, D, E and F. At the time the Phase I ESA was completed, the Site B portion of Lot 1 consisted of two 200,754-gallon No. 6 fuel oil

underground storage tanks, a part of the former raw sugar warehouse, a wash house, and two large above ground storage tanks for the storage of sugar liquor. The two ASTs were used to store up to 2.5 million gallons of "A liquor". These two tanks have since been removed, but their circular concrete bases are visible on recent aerial photographs.

The Phase I ESA indicated Lot 1 has been developed as a sugar refinery since the 1850's by companies such as the Brooklyn Sugar Refining Company (circa 1887), American Sugar Refining Company, Havemeyer and Elder Plant (from 1904 to 1970's), and the Amstar Corporation/Amstar Sugar Corporation, Domino Sugar Corporation, and Tate & Lyle North American Sugar, Inc. (1970's to 1990's). In June 1999 the facility ceased raw sugar refining, and instead began receiving partially raw sugar liquor from an affiliate facility. The northern most portion of Lot 1 (Site A) was also utilized by the Scranton Coal Company as a coal yard. Tate & Lyle North American Sugar, Inc. operated until early 2004.

The Phase I ESA revealed the following Recognized Environmental Conditions in connection with the Site B:

- The facility is a major oil storage facility. There is a tank area with a capacity over 400,000 gallons. There is visible staining of soil in the tank farm area. A subsurface investigation should be conducted in the vicinity of the tank farm.

A Phase I Environmental Site Assessment Report was completed by Emteque LLC in 2012, for Sites A, B, C, D, E, and F. Historic Sanborn maps provided within the report were reviewed by EBC and the following information was obtained:

Prior to 1935, River Street which currently terminates at Grand Street, formerly continued south along the eastern end of Site B, creating a small triangular property between River Street, Kent Avenue and South 1st Street. In the late 1880's, the triangular property was developed with two small houses and a property labeled as junk. The rest of the footprint of Site B was developed with multiple industrial buildings labeled as part of the Brooklyn Sugar Refining Co. The industrial buildings included: (1) a 2 story building labeled as the coal house which contained 10 boilers on the first floor and an additional 6 boilers on the second floor, (2) a three story building labeled as the kiln & filter house, (3) an 11 story building containing vacuum pans, a centrifugal machine, and a pump and dynamo room, (4) a five story building labeled as a machine shop, and (5) 3- and 5-story buildings labeled as mixing and sugar storage.

By 1904, the houses and junk yard on the triangular lot were replaced with a 2-story building that extended over the top of River Street, and all of the industrial buildings are labeled as part of American Sugar Refining Co. The 11-story building formerly containing the vacuum pans was converted into the refinery. The 1918 Sanborn map indicated most of the industrial buildings were vacant or converted into storage, and by 1935, all of the buildings except the existing raw sugar storage warehouse were demolished. The 1950 Sanborn maps notes the two MOSF tanks that are currently present on Site B, and the 1965 Sanborn map shows the small fuel oil pump house, and an underground gasoline tank and two small sheds/buildings immediately north of the MOSF tanks. The rest of Site B was utilized as parking. Sanborn maps from the late 1970s to the early 1990's, labeled all of Lot 1 as Amstar Corp., and from the early 1990's to 2007, the facility was labeled as Domino Sugar.

The Emteque LLC Phase I Environmental Site Assessment Report identified multiple recognized environmental conditions in connection with Lot 1. However, only four are believed to be associated with Site B: (1) underground storage tanks (USTs) and associated piping, (2) stained soils/stressed vegetation, (3) historic/urban fill, and (4) neighboring properties.

The AOCs identified for Site B include:

1. Two underground storage tanks with a combined capacity of 400,000 gallons are located in the southeast corner of Site B.
2. Historic fill layer is present at the Site at depths as great as 16 feet below grade.
3. Evidence of as many as nine gasoline or diesel underground storage tanks were observed near the Kent Avenue sidewalk in the former truck fueling area.

### **Summary of the Work Performed under the Remedial Investigation**

EBC performed the following scope of work within Site B in April of 2014:

1. Conducted a Site inspection to identify AOCs and physical obstructions (i.e. structures, buildings, etc.);
2. Installed five soil borings within Site B, and one soil boring west of Site B within an area to be converted into the waterfront park/recreation area, and collected twelve soil samples for chemical analysis from the soil borings to evaluate soil quality;
3. Installed two groundwater monitoring wells within Site B, and one groundwater monitoring well west of Site B within an area to be converted into the waterfront park/recreation area, to establish groundwater flow and collected three groundwater samples from three monitoring wells and collected one groundwater sample from one of the four existing MOSF tank monitoring wells to evaluate groundwater quality; and
4. Installed four soil vapor probes within Proposed Lot B and collected four soil vapor samples for chemical analysis.

### **Summary of Environmental Findings**

1. The elevation of Site B is approximately 7 feet on the western end, and approximately 16 feet along Kent Avenue.
2. Depth to groundwater varies across Site B from approximately 5 feet on the western end, to approximately 14 feet along Kent Avenue.
3. Depth to bedrock is at the Site is greater than 100 feet.
4. The stratigraphy of Site B, from the surface down, consists of a layer of historic fill material that varies from 8 to approximately 16ft, underlain by a medium brown sand or black/grey silty sand with a bog odor.
5. Soil/fill samples collected during the 2014 EBC RI, 2004 Nova Phase II, 2004 Nova Phase III, and 2008 AKRF Phase II showed the following VOCs at a detectable concentration below Unrestricted Use SCOs; 1,2,4-trimethylbenzene (maximum [max] of 62 micrograms per kilogram [ $\mu\text{g}/\text{Kg}$ ]), 1,3,5-trimethylbenzene (16  $\mu\text{g}/\text{Kg}$ ), benzene (6.6  $\mu\text{g}/\text{Kg}$ ), carbon disulfide (max of 25  $\mu\text{g}/\text{Kg}$ ), ethylbenzene (37  $\mu\text{g}/\text{Kg}$ ), Freon 113 (12  $\mu\text{g}/\text{Kg}$ ), isopropylbenzene (max of 48  $\mu\text{g}/\text{Kg}$ ), m&p-xylenes (max of 95  $\mu\text{g}/\text{Kg}$ ), methylene chloride (max of 46  $\mu\text{g}/\text{Kg}$ ), naphthalene (max of 9,000  $\mu\text{g}/\text{Kg}$ ), o-xylene (max of 58  $\mu\text{g}/\text{Kg}$ ), p-diethylbenzene (41  $\mu\text{g}/\text{Kg}$ ), p-ethyltoluene (230  $\mu\text{g}/\text{Kg}$ ), p-isopropyltoluene (max of 200  $\mu\text{g}/\text{Kg}$ ), and toluene (max of 57  $\mu\text{g}/\text{Kg}$ ). The VOC acetone (max of 480  $\mu\text{g}/\text{Kg}$ ) was detected within four soil samples at a concentration above Unrestricted Use SCOs, and the VOC methyl ethyl ketone (max of 130  $\mu\text{g}/\text{Kg}$ ) was detected within one soil sample at a concentration above Unrestricted Use SCOs. All

VOS's were below Restricted Residential SCO's. Eight SVOCs including benz(a)anthracene (max of 18,000 µg/Kg), benzo(a)pyrene (max of 9,100 µg/Kg), benzo(b)fluoranthene (max of 7,700 µg/Kg), benzo(k)fluoranthene (max of 7,700 µg/Kg), chrysene (max of 19,000 µg/Kg), dibenz(a,h)anthracene (max of 1,200 µg/Kg), indeno(1,2,3-cd)pyrene (max of 2,400) and phenanthrene (max of 160,000 µg/Kg) were detected above Unrestricted Use and Restricted Residential Use SCOs within soil samples retained from the historic fill layer. All of these maximum values were detected in the 0 to 2 foot interval at boring B-4, which represents a hotspot. Several metals including arsenic (max of 51.6 milligrams per kilogram [mg/Kg]), barium (max of 520 mg/Kg), chromium (max of 38.8 mg/Kg), copper (max of 1,060 mg/Kg), lead (max of 17,900 mg/Kg), mercury (max of 0.63 mg/Kg), nickel (max of 51.2 mg/Kg), and zinc (max of 1,430 mg/Kg) were detected above Unrestricted Use SCOs. Of these metals, arsenic, barium, copper, and lead also exceeded Restricted Residential Use SCOs within soil samples collected from the historic fill layer. The maximum value for lead was detected in the 10 to 12 foot interval at boring SB-3. The second highest value for lead was detected at 1,550 mg/Kg in the 0.5 to 2.5 foot interval at boring SB-4 within the future park area immediately west of Site B. Both of these locations represent hotspots. The maximum arsenic value was detected in the 0 to 2 foot interval at boring BSB-5, which also represents a hotspot. The pesticide 4,4'-DDT (6.9 µg/Kg), was detected within one soil sample at a concentration above Unrestricted Use SCOs. Overall, the findings were consistent with observations for historical fill sites in areas throughout NYC except for the SVOC hotspot, the two lead hotspots, and the arsenic hotspot.

6. Groundwater samples collected during the 2014 EBC RI, 2004 Nova Phase III, and 2008 AKRF Phase II showed no detectable concentrations of pesticides or PCBs. No VOCs were detected above GQS, but the following VOCs were detected in one or more of the groundwater samples at concentrations below GQS: acetone (max of 46 micrograms per liter [µg/L]), methyl ethyl ketone (max of 5.6 µg/L), naphthalene (3 µg/L), p-isopropyltoluene (1 µg/L), and trichloroethylene (2 µg/L). SVOCs detected above GQS included 2-nitroaniline (12 µg/L), benzo(a)anthracene (6.4 µg/L), chrysene (4.1 µg/L), and/or nitrobenzene (2.5 µg/L) in two of the six monitoring wells. Several metals were detected in groundwater, but only iron, lead (0.26 mg/L), magnesium, manganese, and sodium exceeded their respective GQS in dissolved samples. The presence of some of these metals in groundwater, specifically those that are common salinity indicators, can be attributed to intrusion of road salting and proximity to the East River.
7. Soil vapor samples collected during the 2014 EBC RI indicated petroleum related VOCs and chlorinated VOCs were present at low concentrations. Petroleum-related VOCs (BTEX) were detected at a maximum concentration of 18.81 µg/m<sup>3</sup>. Overall the highest reported concentrations were for acetone (maximum of 942 µg/m<sup>3</sup>), ethanol (maximum of 70 µg/m<sup>3</sup>), methyl ethyl ketone (92.8 µg/m<sup>3</sup>), propylene (maximum of 165 µg/m<sup>3</sup>), and trichlorofluoro-methane (maximum of 62.9 µg/m<sup>3</sup>). Chlorinated VOC, trichloroethylene (TCE) was not detected in any of the four soil gas samples. Tetrachloroethylene (PCE) was detected in three of the four soil gas samples at a maximum concentration of 0.67 µg/m<sup>3</sup>. Carbon tetrachloride was detected within two of the four soil gas samples at a maximum concentration of 0.503 µg/m<sup>3</sup>, and 1,1,1-trichloroethane (TCA) was detected in only one of the four soil gas samples at a concentration of 4.42 µg/m<sup>3</sup>. The PCE, carbon tetrachloride and TCA concentrations are below the monitoring level ranges established within the NYSDOH Final Guidance on Soil Vapor Intrusion.

### 2.3 Description of Remedial Action Plan

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

The proposed remedial action will consist of:

1. Preparation of a Community Protection Statement and performance of all required NYC VCP Citizen Participation activities according to an approved Citizen Participation Plan;
2. Performance of a Community Air Monitoring Program for particulates and volatile organic carbon compounds;
3. Establishment of Site-Specific (Track 4) Soil Cleanup Objectives (SCOs);
4. Site mobilization involving Site security setup, equipment mobilization, utility mark outs and marking & staking excavation areas;
5. Performance of geophysical/test pits/trenches prior to start of building construction in proposed roads area and areas of the building footprint where excavation will not occur;
6. Completion of a Waste Characterization Study prior to excavation activities;
7. Excavation and removal of soil/fill exceeding Track 4 Site-Specific SCOs. For development purposes, 75% of the Site will be excavated, to depth of approximately 17 feet on the east end of Proposed Lot B, and approximately 5 to 7 feet towards the west end of Proposed Lot B. If soil/fill containing analytes at concentrations above Track 4 Site-Specific SCOs is still present at the base of the excavation after removal of all soil required for construction of the buildings is complete, additional excavation will be performed to meet Track 4 Site-Specific SCOs. In addition, four hotspot areas (Borings B-4, SB-4, SB-3, and BSB-5) identified during investigations will be excavated from 4 feet to 12 feet depths to achieve Track 4 SCOs. Approximately, 21,000 tons of soils will be excavated and removed from this Site;
8. Screening of excavated soil/fill during intrusive work for indications of contamination by visual means, odor, and monitoring with a PID. Appropriate segregation of excavated media on-Site;
9. Management of excavated materials including temporarily stockpiling and segregating to prevent co-mingling of contaminated material and non-contaminated materials.
10. Removal of nine (9) suspected underground storage tanks (USTs) along Kent Avenue sidewalk and other USTs (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;
11. Transportation and off-Site disposal of all soil/fill material at permitted facilities in accordance with applicable laws and regulations for handling, transport, and disposal, and this plan. Sampling and analysis of excavated media as required by disposal facilities. Appropriate segregation of excavated media on-Site;
12. Collection and analysis of end-point samples to determine the performance of the remedy with respect to attainment of SCOs;
13. Import of materials to be used for backfill and cover in compliance with this plan and in accordance with applicable laws and regulations;
14. Installation of a waterproofing membrane system below the cellar slab and slab on-grade portion of the building, as well as behind subgrade portions of foundation walls of the proposed building. The waterproofing membrane system will consist of Preprufe 300R and Bituthene 4000 as manufacturing by Grace. Preprufe 300 is a 1.2 mm (0.046in) thick HDPE film with a pressure sensitive adhesive that bonds to the poured concrete. Preprufe 300 will be installed below the building's cellar slab and on grade portion of the building

slab along River Street. Bituthene 4000 is a flexible preformed waterproof membrane combining a high performance cross laminated, HDPE carrier film with a unique super sticky self-adhesive rubber bitumen compound. Bituthene 4000 will be installed behind the building's foundation walls to grade;

15. Construction and maintenance of an engineered composite cover consisting of the building's 2.5 ft and 5 ft thick pile-supported mat building slab to prevent human exposure to residual soil/fill remaining under the Site. Sidewalks and roadways will consist of a geotextile layer installed above a prepared subgrade, a 6 inch thick layer of a compacted aggregate base, and a 4 inch or 7 thick layer of concrete (sidewalks/driveways) or a layer of asphaltic concrete binder course below a asphaltic concrete top course (street);
16. Performance of all activities required for the remedial action, including permitting requirements and pretreatment requirements, in compliance with applicable laws and regulations;
17. Implementation of storm-water pollution prevention measures in compliance with applicable laws and regulations.
18. Submission of a Remedial Action Report (RAR) that describes the remedial activities, certifies that the remedial requirements have been achieved, defines the Site boundaries, describes all Engineering and Institutional Controls to be implemented at the Site, and lists any changes from this RAWP.
19. Submission of an approved Site Management Plan (SMP) in the RAR for long-term management of residual materials, including plans for operation, maintenance, inspection and certification of Engineering and Institutional Controls and reporting at a specified frequency.
20. The property will continue to be registered with an E-Designation by the NYC Buildings Department. Establishment of Engineering Controls and Institutional Controls in this RAWP and a requirement that management of these controls must be in compliance with an approved SMP. Institutional Controls will include prohibition of the following: (1) vegetable gardening and farming; (2) use of groundwater without treatment rendering it safe for the intended use; (3) disturbance of residual contaminated material unless it is conducted in accordance with the SMP; and (4) higher level of land usage without OER-approval.

### **3.0 HAZARD ASSESSMENT**

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

#### **3.1 Physical Hazards**

##### *3.1.1 Tripping Hazards*

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

##### *3.1.2 Climbing Hazards*

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

##### *3.1.3 Cuts and Lacerations*

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

##### *3.1.4 Lifting Hazards*

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

##### *3.1.5 Utility Hazards*

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

##### *3.1.6 Traffic Hazards*

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

#### **3.2 Work in Extreme Temperatures**

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

### 3.2.1 Heat Stress

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

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

#### 1. Prevention

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

#### 2. Recognition and Treatment

##### a. Heat Rash (or prickly heat):

Cause: Continuous exposure to hot and humid air, aggravated by chafing clothing.

Symptoms: Eruption of red pimples around sweat ducts accompanied by intense itching and tingling.

Treatment: Remove source or irritation and cool skin with water or wet cloths.

##### b. Heat Cramps (or heat prostration)

Cause: Profuse perspiration accompanied by inadequate replenishment of body water and electrolytes.

Symptoms: Muscular weakness, staggering gait, nausea, dizziness, shallow breathing, pale and clammy skin, approximately normal body temperature.

Treatment: Perform the following while making arrangement for transport to a medical facility. Remove the worker to a contamination reduction zone. Remove protective clothing. Lie worker down on back in a cool place and raise feet 6 to 12 inches. Keep warm, but loosen all clothing. If conscious, provide sips of salt-water solution, using one teaspoon of salt in 12 ounces of water. Transport to a medical facility.

##### c. Heat Stroke

Cause: Same as heat exhaustion. This is also an extremely serious condition.

Symptoms: Dry hot skin, dry mouth, dizziness, nausea, headache, rapid pulse.

Treatment: Cool worker immediately by immersing or spraying with cool water or sponge bare skin after removing protective clothing. Transport to hospital.

### 3.2.2 Cold Exposure

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

### 3.3 Chemical Hazards

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

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

Acetone	1,2,4-trimethylbenzene	1,3,5-trimethylbenzene	isopropylbenzene
benzene	carbon disulfide	ethylbenzene	Freon 113
m&p-xylenes	methylene chloride	naphthalene	o-xylene
p-diethylbenzene	p-ethyltoluene	isopropyltoluene	toluene
	Methyl ethyl ketone		

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

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

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

Arsenic	Barium	Chromium	Copper	Mercury	Lead	Nickel	Zinc
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Pesticides reported to be present at elevated concentrations in historic fill materials at the Site include the following:

4,4'-DDT
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The primary routes of exposure to identified contaminants in soil to on-site construction workers are through inhalation, ingestion and absorption.

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

#### 3.3.1 Respirable Dust

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

particulate monitor (Miniram or equivalent). If monitoring detects concentrations greater than 150  $\mu\text{g}/\text{m}^3$  over daily background, the site safety officer will take corrective actions as defined herein, including the use of water for dust suppression and if this is not effective, requiring workers to wear APRs with efficiency particulate air (HEPA) cartridges.

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

### 3.3.2 *Dust Control and Monitoring During Earthwork*

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

### 3.3.3 *Organic Vapors*

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

## 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</li> </ul>

		<p>engineering controls</p> <ul style="list-style-type: none"> <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 or 40-hour Hazardous Waste Operations and Emergency Response Operations training to conduct work within the exclusion zone established by the site safety officer. The exclusion zone is defined by the site safety officer but will typically be a 50-foot area around work activities. Gross decontamination (as determined by the site Health and Safety Officer) is conducted in the exclusion zone; all other decontamination is performed in the decontamination zone or trailer, if provided.

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

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

## 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
Woodhull Medical Center	(718) 963-8000
NYSDEC Spills Hotline	1-800-457-7362
NYSDEC Project Manager	(718) 482-4010
NYC Department of Health	(212) 676-2400
National Response Center	1-800-424-8802
Poison Control	1-800-222-1222
Project Manager	1-631-504-6000
Site Safety Officer	1-631-504-6000

### 7.3 Personnel Responsibilities During an Emergency

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

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



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

## 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE

ICSC: 0050



Trichlorotrifluoroethane  
 CFC 113  
 R 113  
 $C_2Cl_3F_3 / Cl_2FCCClF_2$   
 Molecular mass: 187.4

ICSC # 0050  
 CAS # 76-13-1  
 RTECS # [KJ4000000](#)  
 March 07, 2002 Validated

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible under specific conditions. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	In case of fire in the surroundings: use appropriate extinguishing media.
<b>EXPLOSION</b>			In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>			
• <b>INHALATION</b>	Cardiac arrhythmia. Confusion. Drowsiness. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
• <b>SKIN</b>	Redness.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• <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>		Do not eat, drink, or smoke during work.	Rinse mouth. 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 let this chemical enter the environment. Personal protection: self-contained breathing apparatus.	Separated from metals and alloys. See Chemical Dangers. Cool. Ventilation along the floor.	

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0050**

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

# 1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE

ICSC: 0050

<p><b>I M P O R T A N T N O T I C E</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS VOLATILE LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour is heavier than air and may accumulate in low ceiling spaces causing deficiency of oxygen.</p> <p><b>CHEMICAL DANGERS:</b> On contact with hot surfaces or flames this substance decomposes forming toxic and corrosive gases (hydrogen chloride ICSC 0163, phosgene ICSC 0007, hydrogen fluoride ICSC 0283, carbonyl fluoride ICSC 0633). Reacts violently with powdered metals causing fire and explosion hazard. Attacks magnesium and its alloys.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 1000 ppm as TWA; 1250 ppm as STEL; A4 (not classifiable as a human carcinogen); (ACGIH 2004). MAK: 500 ppm, 3900 mg/m<sup>3</sup>; Peak limitation category: II(2); Pregnancy risk group: D; (DFG 2006). OSHA PEL<sup>†</sup>: TWA 1000 ppm (7600 mg/m<sup>3</sup>) NIOSH REL: TWA 1000 ppm (7600 mg/m<sup>3</sup>) ST 1250 ppm (9500 mg/m<sup>3</sup>) NIOSH IDLH: 2000 ppm See: <a href="#">76131</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> On loss of containment this liquid evaporates very quickly displacing the air and causing a serious risk of suffocation when in confined areas.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance is irritating to the eyes . The substance may cause effects on the cardiovascular system and central nervous system , resulting in cardiac disorders and central nervous system depression. Exposure could cause lowering of consciousness. See Notes.</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: 48°C Melting point: -36°C Relative density (water = 1): 1.56 Solubility in water, g/100 ml at 20°C: 0.02 Vapour pressure, kPa at 20°C: 36</p>	<p>Relative vapour density (air = 1): 6.5 Relative density of the vapour/air-mixture at 20°C (air = 1): 3.0 Auto-ignition temperature: 680°C Octanol/water partition coefficient as log Pow: 3.30</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms. This substance may be hazardous to the environment; special attention should be given to its impact on the ozone layer.</p>	
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### NOTES

High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death. Check oxygen content before entering area. 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. Freon 113, Frigen 113, Halon 113 are trade names.

Card has been partially updated in July 2007: see Occupational Exposure Limits.

### ADDITIONAL INFORMATION

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<b>ICSC: 0050</b>	<b>1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE</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

1,2,4-TRIMETHYLBENZENE

ICSC: 1433



Pseudocumene  
 $C_9H_{12}$   
 Molecular mass: 120,2

ICSC # 1433  
 CAS # 95-63-6  
 RTECS # [DC3325000](#)  
 UN # 1993  
 EC # 601-043-00-3  
 March 06, 2002 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
<b>EXPLOSION</b>	Above 44°C explosive vapour/air mixtures may be formed.	Above 44°C use a closed system, ventilation, and explosion-proof electrical equipment. 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!	
• <b>INHALATION</b>	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Redness. Dry skin.	Protective gloves.	Rinse skin with plenty of water or shower.
• <b>EYES</b>	Redness. Pain.	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>	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. 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. Do NOT let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Xn symbol N symbol R: 10-20-36/37/38-51/53 S: 2-26-61 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

ICSC: 1433

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

## 1,2,4-TRIMETHYLBENZENE

ICSC: 1433

<b>I M P O R T A N T D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on burning producing toxic and irritating fumes Reacts violently with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: (as mixed isomers) 25 ppm as TWA (ACGIH 2004). MAK: (as mixed isomers) 20 ppm 100 mg/m<sup>3</sup> Peak limitation category: II(2) Pregnancy risk group: C (DFG 2004). OSHA PEL<sup>†</sup>: none NIOSH REL: TWA 25 ppm (125 mg/m<sup>3</sup>) 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.</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; on spraying or dispersing, however, much faster.</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</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure , resulting in chronic bronchitis The substance may have effects on the central nervous system blood See Notes.</p>
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<b>PHYSICAL PROPERTIES</b>	<p>Boiling point: 169°C Melting point: -44°C Relative density (water = 1): 0.88 Solubility in water: very poor Relative vapour density (air = 1): 4.1</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 44°C c.c. Auto-ignition temperature: 500°C Explosive limits, vol% in air: 0.9-6.4 Octanol/water partition coefficient as log Pow: 3.8</p>
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<b>ENVIRONMENTAL DATA</b>	<p>The substance is toxic to aquatic organisms. Bioaccumulation of this chemical may occur in fish.</p>	
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### NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is suggested. See also ICSC 1155 1,3,5-Trimethylbenzene (Mesitylene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethylbenzene (mixed isomers). 1,3,5-Trimethylbenzene (Mesitylene) is classified as a marine pollutant.

Transport Emergency Card: TEC (R)-30GF1-III  
NFPA Code: H0; F2; R0;

### ADDITIONAL INFORMATION

<b>ICSC: 1433</b>	<b>1,2,4-TRIMETHYLBENZENE</b>
<small>(C) IPCS, CEC, 1994</small>	

<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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# International Chemical Safety Cards

## 1,3,5-TRIMETHYLBENZENE

ICSC: 1155



Mesitylene  
 $C_9H_{12}$   
 Molecular mass: 120.2

ICSC # 1155  
 CAS # 108-67-8  
 RTECS # [OX6825000](#)  
 UN # 2325  
 EC # 601-025-00-5  
 March 06, 2002 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Alcohol-resistant foam, dry powder, carbon dioxide.
<b>EXPLOSION</b>	Above 50°C explosive vapour/air mixtures may be formed.	Above 50°C use a closed system, ventilation, and explosion-proof electrical equipment. 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!	
• <b>INHALATION</b>	Confusion. Cough. Dizziness. Drowsiness. Headache. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Redness. Dry skin.	Protective gloves.	Remove contaminated clothes. Rinse skin with plenty of water or shower.
• <b>EYES</b>	Redness. Pain.	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>	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. 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. Do NOT let this chemical enter the environment. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants. Well closed. Keep in a well-ventilated room.	Marine pollutant. Xi symbol N symbol R: 10-37-51/53 S: 2-61 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 1155**

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

## 1,3,5-TRIMETHYLBENZENE

ICSC: 1155

<b>I M P O R T A N T D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> The substance decomposes on burning producing toxic and irritating fumes. Reacts violently with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV (as mixed isomers): 25 ppm; (ACGIH 2001). MAK (all isomers): 20 ppm; 100 mg/m<sup>3</sup>; class II 1 © (2001) OSHA PEL<sup>†</sup>: none NIOSH REL: TWA 25 ppm (125 mg/m<sup>3</sup>) 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.</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; on spraying or dispersing, however, much faster.</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.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. Lungs may be affected by repeated or prolonged exposure, resulting in chronic bronchitis. The substance may have effects on the central nervous system blood See Notes.</p>
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<b>PHYSICAL PROPERTIES</b>	<p>Boiling point: 165°C Melting point: -45°C Relative density (water = 1): 0.86 Solubility in water: very poor Vapour pressure, kPa at 20°C: 0.25</p>	<p>Relative vapour density (air = 1): 4.1 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 50°C (c.c.) Auto-ignition temperature: 550°C Octanol/water partition coefficient as log Pow: 3.42</p>
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<b>ENVIRONMENTAL DATA</b>	<p>The substance is harmful to aquatic organisms. Bioaccumulation of this chemical may occur in fish.</p>	
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### NOTES

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. See ICSC 1433 1,2,4-Trimethylbenzene (Pseudocumene), ICSC 1362 1,2,3-Trimethylbenzene (Hemimellitene), ICSC 1389 Trimethylbenzene (mixed isomers).

Transport Emergency Card: TEC (R)-30S2325  
NFPA Code: H0; F2; R0

### ADDITIONAL INFORMATION

<b>ICSC: 1155</b>	<b>1,3,5-TRIMETHYLBENZENE</b>
<small>(C) IPCS, CEC, 1994</small>	

<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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# International Chemical Safety Cards

**BENZENE**

ICSC: 0015



Cyclohexatriene  
Benzol  
C<sub>6</sub>H<sub>6</sub>  
Molecular mass: 78.1

ICSC # 0015  
CAS # 71-43-2  
RTECS # [CY1400000](#)  
UN # 1114  
EC # 601-020-00-8  
May 06, 2003 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Vapour/air mixtures are explosive. Risk of fire and explosion: see Chemical Dangers.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools. 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>		<b>AVOID ALL CONTACT!</b>	
<b>•INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea. Shortness of breath. Convulsions. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
<b>•SKIN</b>	MAY BE ABSORBED! Dry skin. Redness. Pain. (Further see Inhalation).	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
<b>•EYES</b>	Redness. Pain.	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>	Abdominal pain. Sore throat. Vomiting. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Remove all ignition sources. 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. Do NOT let this chemical enter the environment. Personal protection: complete protective clothing including self-contained breathing apparatus.	Fireproof. Separated from food and feedstuffs oxidants halogens	Do not transport with food and feedstuffs. Note: E F symbol T symbol R: 45-46-11-36/38-48/23/24/25-65 S: 53-45 UN Hazard Class: 3 UN Packing Group: II

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0015**

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

**BENZENE**

**ICSC: 0015**

<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 and may travel along the ground; distant ignition possible. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts violently with oxidants, nitric acid, sulfuric acid and halogens causing fire and explosion hazard. Attacks plastic and rubber.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 0.5 ppm as TWA 2.5 ppm as STEL (skin) A1 BEI (ACGIH 2004). MAK: H Carcinogen category: 1 Germ cell mutagen group: 3A (DFG 2004). OSHA PEL: 1910.1028 TWA 1 ppm ST 5 ppm <a href="#">See Appendix F</a> NIOSH REL: Ca TWA 0.1 ppm ST 1 ppm <a href="#">See Appendix A</a> NIOSH IDLH: Ca 500 ppm See: <a href="#">71432</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> 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 eyes the skin and the respiratory tract 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 lowering of consciousness Exposure far above the occupational exposure limit value may result in unconsciousness death</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the bone marrow immune system , resulting in a decrease of blood cells. This substance is carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 80°C Melting point: 6°C Relative density (water = 1): 0.88 Solubility in water, g/100 ml at 25°C: 0.18 Vapour pressure, kPa at 20°C: 10 Relative vapour density (air = 1): 2.7</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.2 Flash point: -11°C c.c. Auto-ignition temperature: 498°C Explosive limits, vol% in air: 1.2-8.0 Octanol/water partition coefficient as log Pow: 2.13</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is very toxic to aquatic organisms.</p>	
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**NOTES**

Use of alcoholic beverages enhances the harmful effect. Depending on the degree of exposure, periodic medical examination is indicated. The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-30S1114 / 30GF1-II  
NFPA Code: H2; F3; R0

**ADDITIONAL INFORMATION**

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**ICSC: 0015** **BENZENE**

(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

**ACETONE**

ICSC: 0087



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

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



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

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0087**

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

# International Chemical Safety Cards

**ACETONE**

**ICSC: 0087**

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

Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1090

NFPA Code: H 1; F 3; R 0;

Card has been partially updated in July 2007: see Occupational Exposure Limits.  
Card has been partially updated in January 2008: see Storage.

**ADDITIONAL INFORMATION**

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**ICSC: 0087** **ACETONE**

(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

**ETHYLBENZENE**

ICSC: 0268



Ethylbenzol  
Phenylethane  
EB  
 $C_8H_{10} / C_6H_5C_2H_5$   
Molecular mass: 106.2

ICSC # 0268  
CAS # 100-41-4  
RTECS # [DA0700000](#)  
UN # 1175  
EC # 601-023-00-4  
March 13, 1995 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling.	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		PREVENT GENERATION OF MISTS!	
• <b>INHALATION</b>	Cough. Dizziness. Drowsiness. Headache.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. 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. Blurred vision.	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>	(Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give a slurry of activated charcoal in water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Collect leaking liquid in covered containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Personal protection: A filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-20 S: 2-16-24/25-29 UN Hazard Class: 3 UN Packing Group: II

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0268**

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

## ETHYLBENZENE

ICSC: 0268

<p><b>I M P O R T A N T N O T I C E</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH AROMATIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour mixes well with air, explosive mixtures are easily formed.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong oxidants. Attacks plastic and rubber.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 125 ppm as STEL A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 3A; (DFG 2004). OSHA PEL<sup>†</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 125 ppm (545 mg/m<sup>3</sup>) NIOSH IDLH: 800 ppm 10%LEL See: <a href="#">100414</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of its vapour, through the skin 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 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 Exposure far above the OEL 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.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 136°C Melting point: -95°C Relative density (water = 1): 0.9 Solubility in water, g/100 ml at 20°C: 0.015 Vapour pressure, kPa at 20°C: 0.9 Relative vapour density (air = 1): 3.7</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 18°C c.c. Auto-ignition temperature: 432°C Explosive limits, vol% in air: 1.0-6.7 Octanol/water partition coefficient as log Pow: 3.2</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is harmful to aquatic organisms.</p>	
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**NOTES**

The odour warning when the exposure limit value is exceeded is insufficient.

Transport Emergency Card: TEC (R)-30S1175 or 30GF1-I+II  
NFPA Code: H2; F3; R0

**ADDITIONAL INFORMATION**

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**ICSC: 0268** **ETHYLBENZENE**

(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

CUMENE

ICSC: 0170



(1-Methylethyl)benzene  
2-Phenylpropane  
Isopropylbenzene  
 $C_9H_{12}$  /  $C_6H_5CH(CH_3)_2$   
Molecular mass: 120.2

ICSC # 0170  
CAS # 98-82-8  
RTECS # [GR8575000](#)  
UN # 1918  
EC # 601-024-00-X  
April 13, 2000 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 31°C explosive vapour/air mixtures may be formed.	Above 31°C use a closed system, ventilation, and explosion-proof electrical equipment. 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!	
• <b>INHALATION</b>	Dizziness. Ataxia. Drowsiness. Headache. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
• <b>SKIN</b>	Dry skin.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
• <b>EYES</b>	Redness. Pain.	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>	(See Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. 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 let this chemical enter the environment. Personal protection: filter respirator for organic gases and vapours.	Fireproof. Separated from strong oxidants, acids. Cool. Keep in the dark. Store only if stabilized.	Marine pollutant. Note: C Xn symbol N symbol R: 10-37-51/53-65 S: 2-24-37-61-62 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0170**

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

**CUMENE**

**ICSC: 0170**

<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> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts violently with acids and strong oxidants causing fire and explosion hazard. The substance can form explosive peroxides.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 50 ppm as TWA (ACGIH 2004). MAK: 50 ppm 250 mg/m<sup>3</sup> Peak limitation category: II(4); skin absorption (H); Pregnancy risk group: C; (DFG 2004). OSHA PEL: TWA 50 ppm (245 mg/m<sup>3</sup>) skin NIOSH REL: TWA 50 ppm (245 mg/m<sup>3</sup>) skin NIOSH IDLH: 900 ppm 10%LEL See: <a href="#">98828</a></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation and through the skin.</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 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 Exposure far above the OEL may result in unconsciousness.</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: 152°C Melting point: -96°C Relative density (water = 1): 0.90 Solubility in water: none Vapour pressure, Pa at 20°C: 427 Relative vapour density (air = 1): 4.2</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 31°C c.c. Auto-ignition temperature: 420°C Explosive limits, vol% in air: 0.9-6.5 Octanol/water partition coefficient as log Pow: 3.66</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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**NOTES**

Check for peroxides prior to distillation; eliminate if found.

Transport Emergency Card: TEC (R)-30S1918 or 30GF1-III  
NFPA Code: H2; F3; R1

**ADDITIONAL INFORMATION**

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**ICSC: 0170** **CUMENE**

(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

## DICHLOROMETHANE

ICSC: 0058



Methylene chloride  
DCM  
CH<sub>2</sub>Cl<sub>2</sub>  
Molecular mass: 84.9

ICSC # 0058  
CAS # 75-09-2  
RTECS # [PA8050000](#)  
UN # 1593  
EC # 602-004-00-3  
December 04, 2000 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible under specific conditions. 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 (see Chemical Dangers).	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>		<b>PREVENT GENERATION OF MISTS! STRICT HYGIENE!</b>	
<b>•INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea. Weakness. Unconsciousness. Death.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Artificial respiration may be needed. Refer for medical attention.
<b>•SKIN</b>	Dry skin. Redness. Burning sensation.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse and then wash skin with water and soap.
<b>•EYES</b>	Redness. Pain. Severe deep burns.	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>	Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rinse mouth. Do NOT induce vomiting. Give plenty of water to drink. Rest.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Personal protection: filter respirator for organic gases and vapours. Do NOT let this chemical enter the environment. 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.	Separated from metals ( see Chemical Dangers ), food and feedstuffs . Cool. Ventilation along the floor.	Do not transport with food and feedstuffs. Xn symbol R: 40 S: (2-)23-24/25-36/37 UN Hazard Class: 6.1 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0058**

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

## DICHLOROMETHANE

ICSC: 0058

<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. Reacts violently with metals such as aluminium powder and magnesium powder, strong bases and strong oxidants causing fire and explosion hazard. Attacks some forms of plastic rubber and coatings.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 50 ppm as TWA; A3 (confirmed animal carcinogen with unknown relevance to humans); BEI issued; (ACGIH 2004). MAK: Carcinogen category: 3A; (DFG 2004). OSHA PEL: 1910.1052 TWA 25 ppm ST 125 ppm NIOSH REL: Ca <a href="#">See Appendix A</a> NIOSH IDLH: Ca 2300 ppm See: <a href="#">75092</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 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 eyes , the skin and the respiratory tract . Exposure could cause lowering of consciousness. Exposure could cause the formation of methaemoglobin.</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 and liver . This substance is possibly carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 40°C Melting point: -95.1°C Relative density (water = 1): 1.3 Solubility in water, g/100 ml at 20°C: 1.3 Vapour pressure, kPa at 20°C: 47.4</p>	<p>Relative vapour density (air = 1): 2.9 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.9 Auto-ignition temperature: 556°C Explosive limits, vol% in air: 12-25 Octanol/water partition coefficient as log Pow: 1.25</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 ground water contamination.</p>	
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### NOTES

Addition of small amounts of a flammable substance or an increase in the oxygen content of the air strongly enhances combustibility. 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. R30 is a trade name. Card has been partly updated in April 2005. See section Occupational Exposure Limits.

Transport Emergency Card: TEC (R)-61S1593

NFPA Code: H2; F1; R0;

### ADDITIONAL INFORMATION

<p><b>ICSC: 0058</b></p>	<p><b>DICHLOROMETHANE</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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modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

# International Chemical Safety Cards

## NAPHTHALENE

ICSC: 0667



Naphthene  
C<sub>10</sub>H<sub>8</sub>

Molecular mass: 128.18

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Combustible.	NO open flames.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 80°C explosive vapour/air mixtures may be formed. Finely dispersed particles form explosive mixtures in air.	Prevent deposition of dust; closed system, dust explosion-proof electrical equipment and lighting.	
<b>EXPOSURE</b>		PREVENT DISPERSION OF DUST!	
<b>•INHALATION</b>	Headache. Weakness. Nausea. Vomiting. Sweating. Confusion. Jaundice. Dark urine.	Ventilation (not if powder), local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
<b>•SKIN</b>	MAY BE ABSORBED! (Further see Inhalation).	Protective gloves.	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>	Abdominal pain. Diarrhoea. Convulsions. Unconsciousness. (Further see Inhalation).	Do not eat, drink, or smoke during work. Wash hands before eating.	Rest. Refer for medical attention.

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0667**

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

# International Chemical Safety Cards

## NAPHTHALENE

ICSC: 0667

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> WHITE SOLID IN VARIOUS FORMS , WITH CHARACTERISTIC ODOUR.</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 combustion, forms irritating and toxic gases. Reacts with strong oxidants .</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 10 ppm as TWA; 15 ppm as STEL; (skin); A4 (not classifiable as a human carcinogen); (ACGIH 2005). MAK: skin absorption (H); Carcinogen category: 2; Germ cell mutagen group: 3B; (DFG 2004). OSHA PEL<sup>†</sup>: TWA 10 ppm (50 mg/m<sup>3</sup>) NIOSH REL: TWA 10 ppm (50 mg/m<sup>3</sup>) ST 15 ppm (75 mg/m<sup>3</sup>) NIOSH IDLH: 250 ppm See: <a href="#">91203</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> A harmful contamination of the air will be reached rather slowly on evaporation of this substance at 20°C. See Notes.</p> <p><b>EFFECTS OF SHORT-TERM EXPOSURE:</b> The substance may cause effects on the blood , resulting in lesions of blood cells (haemolysis) . See Notes. The effects may be delayed. Exposure by ingestion may result in death. Medical observation is indicated.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The substance may have effects on the blood , resulting in chronic haemolytic anaemia. The substance may have effects on the eyes , resulting in the development of cataract. This substance is possibly carcinogenic to humans.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 218°C</p> <p>Sublimation slowly at room temperature</p> <p>Melting point: 80°C</p> <p>Density: 1.16 g/cm<sup>3</sup></p> <p>Solubility in water, g/100 ml at 25°C: none</p>	<p>Vapour pressure, Pa at 25°C: 11</p> <p>Relative vapour density (air = 1): 4.42</p> <p>Flash point: 80°C c.c.</p> <p>Auto-ignition temperature: 540°C</p> <p>Explosive limits, vol% in air: 0.9-5.9</p> <p>Octanol/water partition coefficient as log Pow: 3.3</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is very toxic to aquatic organisms. The substance may cause long-term effects in the aquatic environment.</p>	
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**NOTES**

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

Transport Emergency Card: TEC (R)-41S1334 (solid); 41GF1-II+III (solid); 41S2304 (molten)

NFPA Code: H2; F2; R0;

**ADDITIONAL INFORMATION**

<b>ICSC: 0667</b>	<b>NAPHTHALENE</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

**o-XYLENE**

ICSC: 0084



ortho-Xylene  
1,2-Dimethylbenzene  
o-Xylol  
 $C_6H_4(CH_3)_2 / C_8H_{10}$   
Molecular mass: 106.2

ICSC # 0084  
CAS # 95-47-6  
RTECS # [ZE2450000](#)  
UN # 1307  
EC # 601-022-00-9  
August 03, 2002 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 32°C explosive vapour/air mixtures may be formed.	Above 32°C use a closed system, ventilation, and explosion-proof electrical equipment. 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>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. 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.	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. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. 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. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0084**

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

**o-XYLENE**

**ICSC: 0084**

<p><b>I M P O R T A N T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong acids strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m<sup>3</sup> Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL<sup>†</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 150 ppm (655 mg/m<sup>3</sup>) NIOSH IDLH: 900 ppm See: <a href="#">95476</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> 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 and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system. Exposure to the substance may enhance hearing damage caused by exposure to noise. 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: 144°C Melting point: -25°C Relative density (water = 1): 0.88 Solubility in water: none Vapour pressure, kPa at 20°C: 0.7</p>	<p>Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 32°C c.c. Auto-ignition temperature: 463°C Explosive limits, vol% in air: 0.9-6.7 Octanol/water partition coefficient as log Pow: 3.12</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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**NOTES**

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0086 p-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III  
NFPA Code: H 2; F 3; R 0;

**ADDITIONAL INFORMATION**

<b>ICSC: 0084</b>	<b>o-XYLENE</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

p-XYLENE

ICSC: 0086



para-Xylene  
1,4-Dimethylbenzene  
p-Xylol  
 $C_6H_4(CH_3)_2 / C_8H_{10}$   
Molecular mass: 106.2

ICSC # 0086  
CAS # 106-42-3  
RTECS # [ZE2625000](#)  
UN # 1307  
EC # 601-022-00-9  
August 03, 2002 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. 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>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
• <b>INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. 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.	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. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. 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. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants, strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0086**

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-XYLENE**

ICSC: 0086

<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> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong acids strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m<sup>3</sup> Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL<sup>±</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 150 ppm (655 mg/m<sup>3</sup>) NIOSH IDLH: 900 ppm See: <a href="#">95476</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> 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 and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system. 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: 138°C Melting point: 13°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.9</p>	<p>Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 528°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.15</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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## NOTES

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0085 m-Xylene.

Transport Emergency Card: TEC (R)-30S1307-III  
NFPA Code: H 2; F 3; R 0;

## ADDITIONAL INFORMATION

<p><b>ICSC: 0086</b></p>	<p><b>p-XYLENE</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

m-XYLENE

ICSC: 0085



meta-Xylene  
1,3-Dimethylbenzene  
m-Xylol  
 $C_6H_4(CH_3)_2 / C_8H_{10}$   
Molecular mass: 106.2

ICSC # 0085  
CAS # 108-38-3  
RTECS # [ZE2275000](#)  
UN # 1307  
EC # 601-022-00-9  
August 03, 2002 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, water spray, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 27°C explosive vapour/air mixtures may be formed.	Above 27°C use a closed system, ventilation, and explosion-proof electrical equipment. 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>		STRICT HYGIENE!	
• <b>INHALATION</b>	Dizziness. Drowsiness. Headache. Nausea.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. 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.	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. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Ventilation. Remove all ignition sources. 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. (Extra personal protection: filter respirator for organic gases and vapours.)	Fireproof. Separated from strong oxidants strong acids	Note: C Xn symbol R: 10-20/21-38 S: 2-25 UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

ICSC: 0085

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

**m-XYLENE**

**ICSC: 0085**

<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> As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts with strong acids strong oxidants</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 100 ppm as TWA 150 ppm as STEL A4 (ACGIH 2001). BEI (ACGIH 2001). MAK: 100 ppm 440 mg/m<sup>3</sup> Peak limitation category: II(2) skin absorption (H); Pregnancy risk group: D (DFG 2005). EU OEL: 50 ppm as TWA 100 ppm as STEL (skin) (EU 2000). OSHA PEL<sup>±</sup>: TWA 100 ppm (435 mg/m<sup>3</sup>) NIOSH REL: TWA 100 ppm (435 mg/m<sup>3</sup>) ST 150 ppm (655 mg/m<sup>3</sup>) NIOSH IDLH: 900 ppm See: <a href="#">95476</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> 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 and the skin The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system 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: 139°C Melting point: -48°C Relative density (water = 1): 0.86 Solubility in water: none Vapour pressure, kPa at 20°C: 0.8</p>	<p>Relative vapour density (air = 1): 3.7 Relative density of the vapour/air-mixture at 20°C (air = 1): 1.02 Flash point: 27°C c.c. Auto-ignition temperature: 527°C Explosive limits, vol% in air: 1.1-7.0 Octanol/water partition coefficient as log Pow: 3.20</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms.</p>	
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**NOTES**

Depending on the degree of exposure, periodic medical examination is indicated. The recommendations on this Card also apply to technical xylene. See ICSC 0084 o-Xylene and 0086 p-Xylene.

NFPA Code: H 2; F 3; R 0;  
Transport Emergency Card: TEC (R)-30S1307-III

**ADDITIONAL INFORMATION**

<b>ICSC: 0085</b>	<b>m-XYLENE</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

**p-CYMENE**

ICSC: 0617



1-Methyl-4-isopropylbenzene  
 Dolcymene  
 Camphogen  
 $C_{10}H_{14} / CH_3C_6H_4CH(CH_3)_2$   
 Molecular mass: 134.2

ICSC # 0617  
 CAS # 99-87-6  
 RTECS # [GZ5950000](#)  
 UN # 2046  
 November 04, 1997 Validated



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Above 47°C explosive vapour/air mixtures may be formed.	Above 47°C use a closed system, ventilation, and explosion-proof electrical equipment. 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!	
<b>•INHALATION</b>	Dizziness. Drowsiness. Vomiting.	Ventilation.	Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention.
<b>•SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Wear protective gloves when administering first aid.
<b>•EYES</b>	Redness.	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>	Diarrhoea. Drowsiness. Headache. Nausea. Vomiting. Unconsciousness.	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Rest. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. (Extra personal protection: filter respirator for organic gases and vapours).	Fireproof.	UN Hazard Class: 3 UN Packing Group: III

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0617**

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-CYMENE**

ICSC: 0617

<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> Reacts with oxidants. Attacks rubber.</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 of its vapour and by ingestion.</p> <p><b>INHALATION RISK:</b> No indication can be given about the rate in which a harmful concentration in the air is reached 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.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Boiling point: 177°C Melting point: -68°C Relative density (water = 1): 0.85 Solubility in water, g/100 ml at 25°C: 0.002 Vapour pressure, Pa at 20°C: 200</p>	<p>Relative vapour density (air = 1): 4.62 Flash point: 47°C c.c. Auto-ignition temperature: 435°C Explosive limits, vol% in air: 0.7-5.6 Octanol/water partition coefficient as log Pow: 4.1</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	
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**NOTES**

Transport Emergency Card: TEC (R)-30G35  
NFPA Code: H2; F2; R0;

**ADDITIONAL INFORMATION**

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<p><b>ICSC: 0617</b></p>	<p><b>p-CYMENE</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

**TOLUENE**

ICSC: 0078



Methylbenzene  
Toluol  
Phenylmethane  
 $C_6H_5CH_3 / C_7H_8$   
Molecular mass: 92.1

ICSC # 0078  
CAS # 108-88-3  
RTECS # [XS5250000](#)  
UN # 1294  
EC # 601-021-00-3  
October 10, 2002 Peer reviewed



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Highly flammable.	NO open flames, NO sparks, and NO smoking.	Powder, AFFF, foam, carbon dioxide.
<b>EXPLOSION</b>	Vapour/air mixtures are explosive.	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water.
<b>EXPOSURE</b>		STRICT HYGIENE! AVOID EXPOSURE OF (PREGNANT) WOMEN!	
<b>•INHALATION</b>	Cough. Sore throat. Dizziness. Drowsiness. Headache. Nausea. Unconsciousness.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Refer for medical attention.
<b>•SKIN</b>	Dry skin. Redness.	Protective gloves.	Remove contaminated clothes. Rinse and then wash skin with water and soap. Refer for medical attention.
<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>	Burning sensation. Abdominal pain. (Further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Do NOT induce vomiting. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Evacuate danger area in large spill! Consult an expert in large spill! Remove all ignition sources. Ventilation. Collect leaking liquid in sealable containers. Absorb remaining liquid in sand or inert absorbent and remove to safe place. Do NOT wash away into sewer. Do NOT let this chemical enter the environment. Personal protection: self-contained breathing apparatus	Fireproof. Separated from strong oxidants.	F symbol Xn symbol R: 11-38-48/20-63-65-67 S: 2-36/37-46-62 UN Hazard Class: 3 UN Packing Group: II

## SEE IMPORTANT INFORMATION ON BACK

ICSC: 0078

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

TOLUENE

ICSC: 0078

<b>I M P O R T A N T D A T A</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> COLOURLESS LIQUID, WITH CHARACTERISTIC ODOUR.</p> <p><b>PHYSICAL DANGERS:</b> The vapour mixes well with air, explosive mixtures are formed easily. As a result of flow, agitation, etc., electrostatic charges can be generated.</p> <p><b>CHEMICAL DANGERS:</b> Reacts violently with strong oxidants causing fire and explosion hazard.</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 50 ppm as TWA (skin) A4 BEI issued (ACGIH 2004). MAK: 50 ppm 190 mg/m<sup>3</sup> H Peak limitation category: II(4) Pregnancy risk group: C (DFG 2004). OSHA PEL<sup>†</sup>: TWA 200 ppm C 300 ppm 500 ppm (10-minute maximum peak) NIOSH REL: TWA 100 ppm (375 mg/m<sup>3</sup>) ST 150 ppm (560 mg/m<sup>3</sup>) NIOSH IDLH: 500 ppm See: <a href="#">108883</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> 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 respiratory tract The substance may cause effects on the central nervous system If this liquid is swallowed, aspiration into the lungs may result in chemical pneumonitis. Exposure at high levels may result in cardiac dysrhythmia and unconsciousness.</p> <p><b>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</b> The liquid defats the skin. The substance may have effects on the central nervous system Exposure to the substance may enhance hearing damage caused by exposure to noise. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<b>PHYSICAL PROPERTIES</b>	Boiling point: 111°C Melting point: -95°C Relative density (water = 1): 0.87 Solubility in water: none Vapour pressure, kPa at 25°C: 3.8 Relative vapour density (air = 1): 3.1	Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 4°C c.c. Auto-ignition temperature: 480°C Explosive limits, vol% in air: 1.1-7.1 Octanol/water partition coefficient as log Pow: 2.69
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<b>ENVIRONMENTAL DATA</b>	The substance is toxic to aquatic organisms.	
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## NOTES

Depending on the degree of exposure, periodic medical examination is suggested. Use of alcoholic beverages enhances the harmful effect.

Transport Emergency Card: TEC (R)-30S1294

NFPA Code: H 2; F 3; R 0;

## ADDITIONAL INFORMATION

ICSC: 0078

TOLUENE

(C) IPCS, CEC, 1994

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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

**ICSC: 0385**

**BENZ(a)ANTHRACENE**

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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>I M P O R T A N T A D V I S I O N</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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<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(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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A

**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

**IMPORTANT LEGAL NOTICE:**

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# International Chemical Safety Cards

**BENZO(g,h,i)FLUORANTHENE**

ICSC: 0527



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

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

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

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0527**

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

# International Chemical Safety Cards

**BENZO(g,h,i)FLUORANTHENE**

ICSC: 0527

<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>P</b>		

O  
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N  
T  
D  
A  
T  
A

**INHALATION RISK:**

**CHEMICAL DANGERS:**

The substance decomposes on heating producing toxic fumes.

**EFFECTS OF SHORT-TERM EXPOSURE:**

**OCCUPATIONAL EXPOSURE LIMITS:**

TLV not established.

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

See Notes.

**PHYSICAL PROPERTIES**

Melting point: 149°C  
Solubility in water: none  
Vapour pressure, Pa at 20°C: <10

Relative vapour density (air = 1): 7.8  
Relative density of the vapour/air-mixture at 20°C (air = 1): 1.0  
Octanol/water partition coefficient as log Pow: 7.23

**ENVIRONMENTAL DATA**

This substance may be hazardous to the environment; special attention should be given to the total environment. In the food chain important to humans, bioaccumulation takes place, specifically in oils and fats.



**NOTES**

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

**ADDITIONAL INFORMATION**

**ICSC: 0527**

**BENZO(g,h,i)FLUORANTHENE**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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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	<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.
M		

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A  
T  
A

**PHYSICAL DANGERS:**

**CHEMICAL DANGERS:**

Upon heating, toxic fumes are formed.

**OCCUPATIONAL EXPOSURE LIMITS:**

TLV not established.

MAK:

Carcinogen category: 2;  
(DFG 2004).

**INHALATION RISK:**

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

**EFFECTS OF SHORT-TERM EXPOSURE:**

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

This substance is possibly carcinogenic to humans.

**PHYSICAL PROPERTIES**

Boiling point: 480°C  
Melting point: 217°C  
Solubility in water:  
none

Octanol/water partition coefficient as log Pow: 6.84

**ENVIRONMENTAL DATA**

This substance may be hazardous to the environment; special attention should be given to air quality and water quality. Bioaccumulation of this chemical may occur in crustacea and in fish.



**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:**

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# International Chemical Safety Cards

**CHRYSENE**

ICSC: 1672



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

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



TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<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

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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
<b>P</b>		
<b>O</b>		

R  
T  
A  
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T  
D  
A  
T  
A

**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

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# International Chemical Safety Cards

**INDENO(1,2,3-cd)PYRENE**

ICSC: 0730



o-Phenylenepyrene  
2,3-Phenylenepyrene  
C<sub>22</sub>H<sub>12</sub>  
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

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# 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>		

O  
R  
T  
A  
N  
N  
T  
  
D  
A  
T  
A

**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**

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### 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Phenanthrene

Product Number : 695114  
Brand : Aldrich

Company : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832  
Fax : +1 800-325-5052  
Emergency Phone # : (314) 776-6555

### 2. HAZARDS IDENTIFICATION

#### Emergency Overview

##### OSHA Hazards

Harmful by ingestion., Irritant

##### Other hazards which do not result in classification

Photosensitizer.

##### GHS Label elements, including precautionary statements

Pictogram



Signal word

Warning

Hazard statement(s)

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

Precautionary statement(s)

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

#### HMIS Classification

Health hazard:	2
Flammability:	0
Physical hazards:	0

#### NFPA Rating

Health hazard:	2
Fire:	0
Reactivity Hazard:	0

#### Potential Health Effects

<b>Inhalation</b>	May be harmful if inhaled. Causes respiratory tract irritation.
<b>Skin</b>	May be harmful if absorbed through skin. Causes skin irritation.

**Eyes**  
**Ingestion**

Causes eye irritation.  
Harmful if swallowed.

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### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C<sub>14</sub>H<sub>10</sub>  
Molecular Weight : 178.23 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
<b>Phenanthrene</b>			
85-01-8	201-581-5	-	-

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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.

---

### 5. FIRE-FIGHTING MEASURES

**Suitable extinguishing media**

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

**Special protective equipment for fire-fighters**

Wear self contained breathing apparatus for fire fighting if necessary.

---

### 6. ACCIDENTAL RELEASE MEASURES

**Personal precautions**

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

**Environmental precautions**

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

**Methods and materials for containment and cleaning up**

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

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### 7. HANDLING AND STORAGE

**Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.

Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

**Conditions for safe storage**

Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas.

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### 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

Components	CAS-No.	Value	Control	Update	Basis
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**Acute toxicity**

LD50 Oral - mouse - 700.0 mg/kg

**Skin corrosion/irritation**

no data available

**Serious eye damage/eye irritation**

no data available

**Respiratory or skin sensitization**

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

**Germ cell mutagenicity**

no data available

**Carcinogenicity**

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

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

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Phenanthrene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

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

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

**Reproductive toxicity**

no data available

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

Inhalation - May cause respiratory irritation.

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

**Aspiration hazard**

no data available

**Potential health effects**

<b>Inhalation</b>	May be harmful if inhaled. Causes respiratory tract irritation.
<b>Ingestion</b>	Harmful if swallowed.
<b>Skin</b>	May be harmful if absorbed through skin. Causes skin irritation.
<b>Eyes</b>	Causes eye irritation.

**Signs and Symptoms of Exposure**

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

**Additional Information**

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**12. ECOLOGICAL INFORMATION****Toxicity**

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

and other aquatic invertebrates.

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

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

#### **Persistence and degradability**

Biodegradability Result: 55 - 95 % - Partially biodegradable.

#### **Bioaccumulative potential**

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

#### **Mobility in soil**

no data available

#### **PBT and vPvB assessment**

no data available

#### **Other adverse effects**

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

Very toxic to aquatic organisms.

---

### **13. DISPOSAL CONSIDERATIONS**

#### **Product**

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

#### **Contaminated packaging**

Dispose of as unused product.

---

### **14. TRANSPORT INFORMATION**

#### **DOT (US)**

UN-Number: 3077 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Phenanthrene)  
Reportable Quantity (RQ): 5000 lbs  
Marine pollutant: No  
Poison Inhalation Hazard: No

#### **IMDG**

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

#### **IATA**

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

#### **Further information**

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

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### **15. REGULATORY INFORMATION**

#### **OSHA Hazards**

Harmful by ingestion., Irritant

#### **DSL Status**

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

**SARA 302 Components**

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

**SARA 313 Components**

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

**SARA 311/312 Hazards**

Acute Health Hazard

**Massachusetts Right To Know Components**

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

**Pennsylvania Right To Know Components**

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

**New Jersey Right To Know Components**

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

**California Prop. 65 Components**

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

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**16. OTHER INFORMATION****Further information**

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# International Chemical Safety Cards

ARSENIC

ICSC: 0013



Grey arsenic

As

Atomic mass: 74.9

ICSC # 0013

CAS # 7440-38-2

RTECS # [CG0525000](#)

UN # 1558

EC # 033-001-00-X

October 18, 1999 Peer reviewed



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

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

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0013

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

# International Chemical Safety Cards

**ARSENIC**

**ICSC: 0013**

<p><b>I M P O R T A N T D A T A</b></p>	<p><b>PHYSICAL STATE; APPEARANCE:</b> ODOURLESS, BRITTLE, GREY, METALLIC-LOOKING CRYSTALS.</p> <p><b>PHYSICAL DANGERS:</b></p> <p><b>CHEMICAL DANGERS:</b> Upon heating, toxic fumes are formed. Reacts violently with strong oxidants and halogens, causing fire and explosion hazard. Reacts with acids to produce</p> <p><b>OCCUPATIONAL EXPOSURE LIMITS:</b> TLV: 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). OSHA PEL: 1910.1018 TWA 0.010 mg/m<sup>3</sup> NIOSH REL: Ca C 0.002 mg/m<sup>3</sup> 15-minute <a href="#">See Appendix A</a> NIOSH IDLH: Ca 5 mg/m<sup>3</sup> (as As) See: <a href="#">7440382</a></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.</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 gastrointestinal tract cardiovascular system central nervous system kidneys , resulting in severe gastroenteritis, loss of fluid, and electrolytes, cardiac disorders shock convulsions and kidney impairment Exposure above the OEL may result in death. The effects may be delayed. Medical observation is indicated.</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 mucous membranes, skin, peripheral nervous system liver bone marrow , resulting in pigmentation disorders, hyperkeratosis, perforation of nasal septum, neuropathy, liver impairment anaemia This substance is carcinogenic to humans. Animal tests show that this substance possibly causes toxicity to human reproduction or development.</p>
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<p><b>PHYSICAL PROPERTIES</b></p>	<p>Sublimation point: 613°C Density: 5.7 g/cm<sup>3</sup></p>	<p>Solubility in water: none</p>
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<p><b>ENVIRONMENTAL DATA</b></p>	<p>The substance is toxic to aquatic organisms. It is strongly advised that this substance does not enter the environment.</p>	
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**NOTES**

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

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

**ADDITIONAL INFORMATION**

**ICSC: 0013** **ARSENIC**

(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

**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.
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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

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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.,

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

Repeated or prolonged contact may cause skin sensitization.

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](#)

**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

**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:

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0052**

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

# International Chemical Safety Cards

<p><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

**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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<b>ICSC: 0056</b>	(C) IPCS, CEC, 1994			<b>MERCURY</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

NICKEL

ICSC: 0062



Ni  
Atomic mass: 58.7  
(powder)

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

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
<b>FIRE</b>	Flammable as dust. Toxic fumes may be released in a fire.		Dry sand. NO carbon dioxide. NO water.
<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 ALL CONTACT!</b>	
• <b>INHALATION</b>	Cough. Shortness of breath.	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.

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

**SEE IMPORTANT INFORMATION ON BACK**

**ICSC: 0062**

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

# International Chemical Safety Cards

NICKEL

ICSC: 0062

<b>I</b>	<p><b>PHYSICAL STATE; APPEARANCE:</b> SILVERY METALLIC SOLID IN VARIOUS FORMS.</p> <p><b>PHYSICAL DANGERS:</b></p>	<p><b>ROUTES OF EXPOSURE:</b> The substance can be absorbed into the body by inhalation of the dust.</p>
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M  
P  
O  
R  
T  
A  
N  
T  
D  
A  
T  
A

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

**CHEMICAL DANGERS:**

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

**OCCUPATIONAL EXPOSURE LIMITS:**

TLV:  
(Inhalable fraction)  
1.5 mg/m<sup>3</sup> as TWA A5 (not suspected as a human carcinogen); (ACGIH 2004).  
MAK: (Inhalable fraction) sensitization of respiratory tract and skin (Sah);  
Carcinogen category: 1;  
(DFG 2004).  
OSHA PEL\*†: TWA 1 mg/m<sup>3</sup> \*Note: The PEL does not apply to Nickel carbonyl.  
NIOSH REL\*: Ca TWA 0.015 mg/m<sup>3</sup> [See Appendix A](#)  
\*Note: The REL does not apply to Nickel carbonyl.  
NIOSH IDLH: Ca 10 mg/m<sup>3</sup> (as Ni) See: [7440020](#)

**INHALATION RISK:**

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

**EFFECTS OF SHORT-TERM EXPOSURE:**

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

**EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:**

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

**PHYSICAL PROPERTIES**

Boiling point: 2730°C  
Melting point: 1455°C  
Density: 8.9 g/cm<sup>3</sup>

Solubility in water:  
none

**ENVIRONMENTAL DATA**

**NOTES**

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

**ADDITIONAL INFORMATION**

**ICSC: 0062**

**NICKEL**

(C) IPCS, CEC, 1994

**IMPORTANT LEGAL NOTICE:**

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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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# 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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***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:

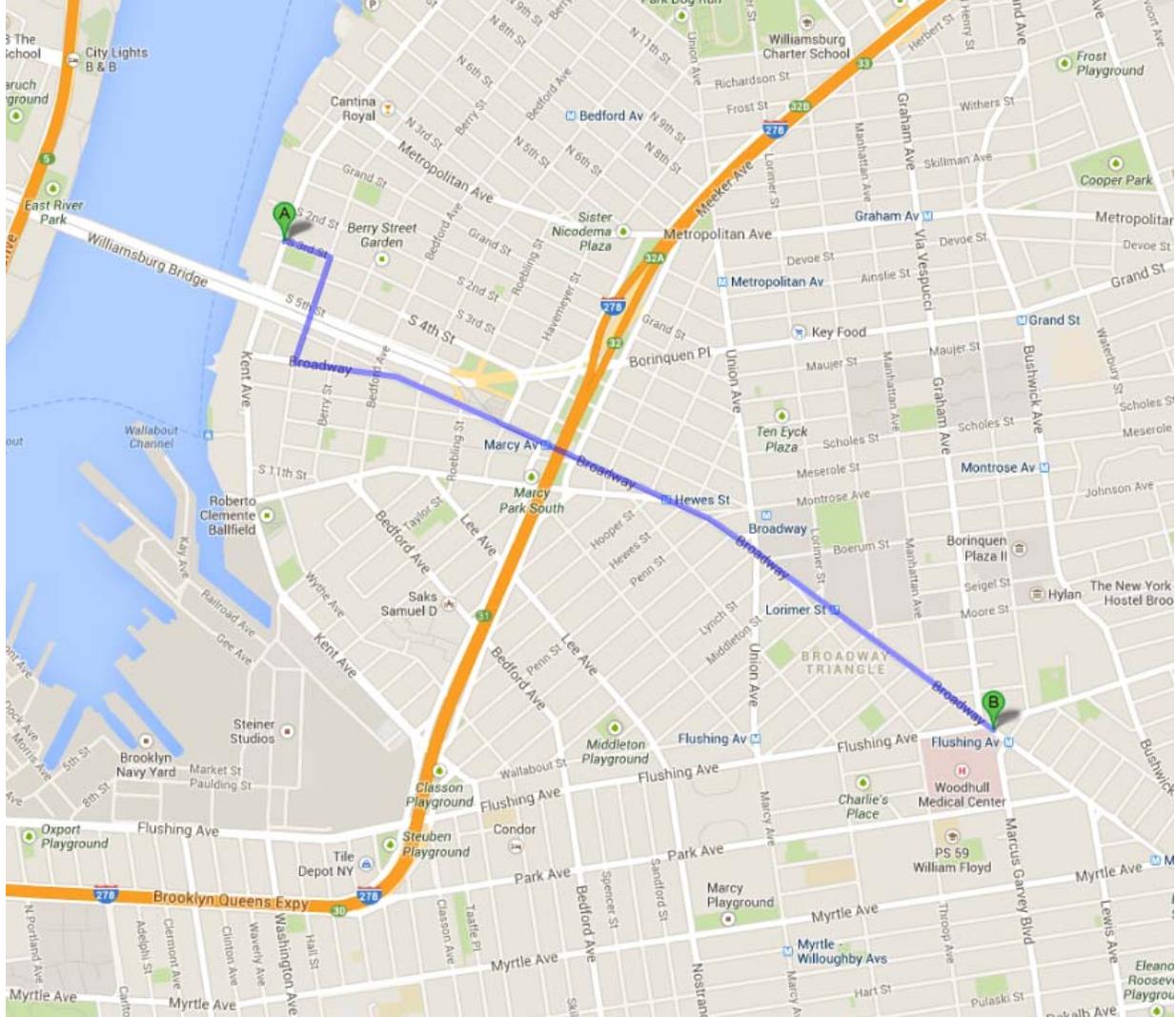
## The BROOKLYN HOSPITAL CENTER

### WOODHULL MEDICAL CENTER

760 Broadway Brooklyn, New York 11206

718-963-8000

2.0 Miles – About 10 Minutes



**A** 300 Kent Ave, Brooklyn, NY 11249

1. Head north on Kent Ave toward S 3rd St  
go 7 ft  
total 7 ft
2. Take the 1st right onto S 3rd St  
go 482 ft  
total 489 ft
3. Take the 1st right onto Wythe Ave  
go 0.2 mi  
total 0.3 mi
4. Turn left onto Broadway  
Destination will be on the right  
About 6 mins  
go 1.5 mi  
total 1.8 mi

**B** Woodhull Medical Center  
760 Broadway, Brooklyn, NY 11206

**ATTACHMENT F**  
**WATERPROOFING MEMBRANE**  
**SYSTEM SPECIFICATIONS**

# Grace Below Grade Waterproofing

## PREPRUFE® 300R Plus & 160R Plus

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

### Description

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

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 Plus System includes:

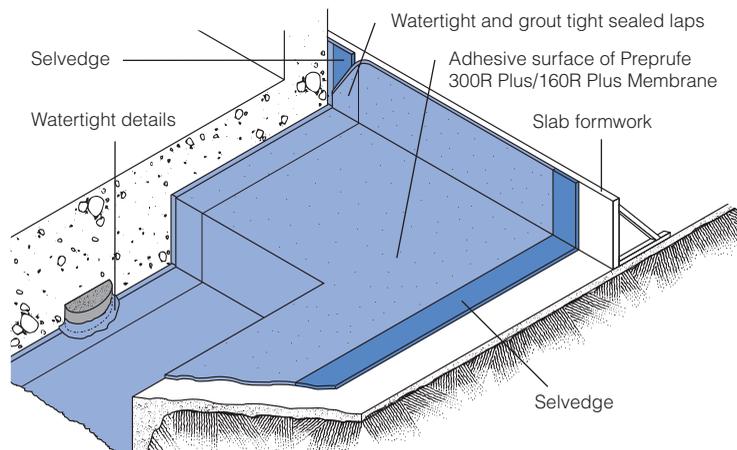
- **Preprufe 300R Plus**—heavy-duty grade for use below slabs and on rafts (i.e. mud slabs). Designed to accept the placing of heavy reinforcement using conventional concrete spacers.
- **Preprufe 160R Plus**—thinner grade for blindside, zero property line applications against soil retention systems.
- **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 Plus & 160R Plus 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 turned 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 adhesive to adhesive watertight laps and detailing**
- **Provides a barrier to water, moisture and gas**—physically isolates the structure from the surrounding ground
- **Easy roll/kick out installation**—reduces installation time and cost
- **Release Liner free**—expedites installation and reduces construction site waste
- **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 Plus has colored zip strips at the top and bottom of the seam area on the edge of the roll. Both zip strips cover an aggressive adhesive. Once the yellow zip strip on the top of the membrane and the blue zip strip on the bottom of the membrane are removed, a strong adhesive to adhesive bond is achieved in the overlap area.

### 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 <40°F (<4°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 Plus Low Temperature (LT) is available for low temperature condition applications. Refer to Preprufe Plus LT data sheet for more information.

**Horizontal substrates**—Kick out or roll out the membrane HDPE film side to the substrate with the yellow zip strip facing towards the concrete pour. End laps should be staggered to avoid a build up of layers. Leave yellow and blue zip strips on the membrane until overlap procedure is completed.

Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the yellow zip strip. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the yellow and blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the overlap. Ensure a continuous bond is achieved without creases and roll firmly with a heavy roller.

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 yellow zip strip facing towards the concrete pour. The membrane may be installed in any convenient length. Fastening can be made through the selvedge using a small and low profile head fastener so that the membrane lays flat and allows firmly rolled overlaps. Accurately position succeeding sheets to overlap the previous sheet 3 in. (75 mm) along the marked selvedge with the blue zip strip on top of the yellow zip strip. Ensure the underside of the succeeding sheet is clean, dry and free from contamination before attempting to overlap. Peel back and remove both the yellow and

blue zip strips in the overlap area to achieve an adhesive to adhesive bond at the 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 2). Immediately remove tinted 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 tinted plastic release liner from tape. Where exposed selvedge has lost adhesion or laps have not been sealed, ensure the area is clean and dry and cover with fresh Preprufe Tape, rolling firmly. Alternatively, use a hot air gun or similar to activate adhesive and firmly roll lap to achieve continuity.

### Pouring of Concrete

Ensure the plastic release liner is removed from all areas of Preprufe 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. Provide temporary protection from concrete over splash for areas of the Preprufe membrane that are adjacent to a concrete pour.

### 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

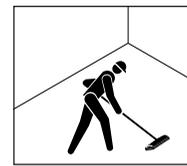
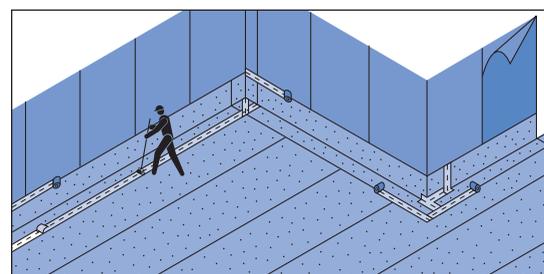
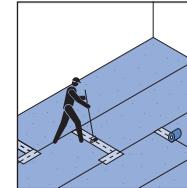


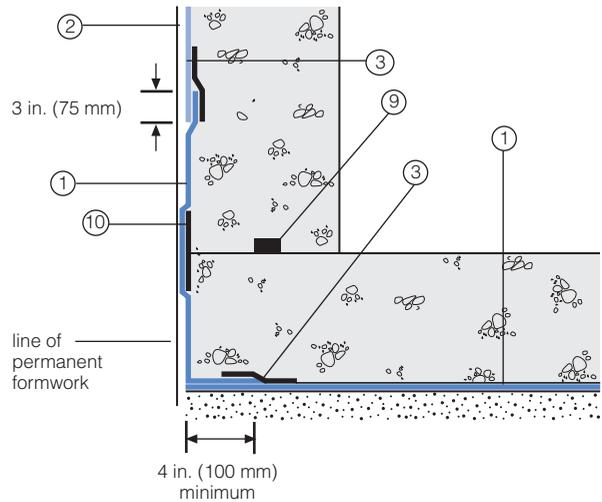
Figure 2



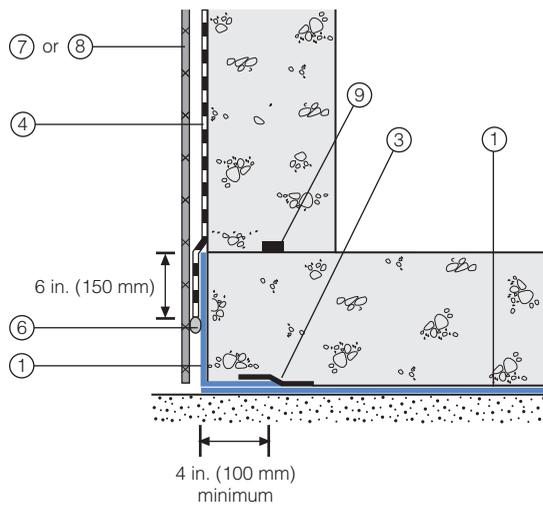
## Detail Drawings

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).

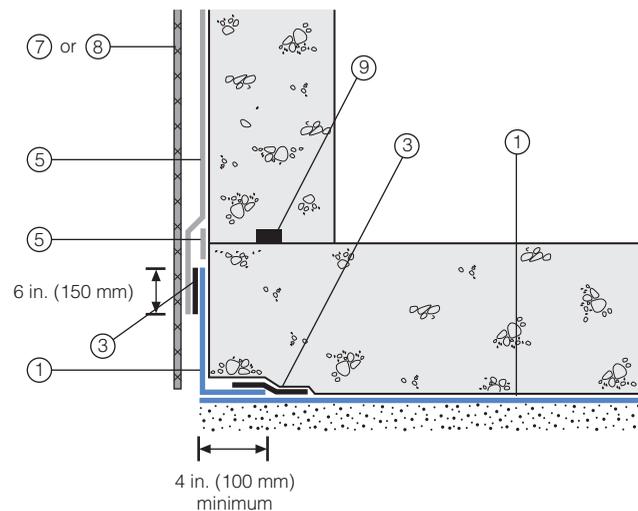
### Wall base detail against permanent shutter



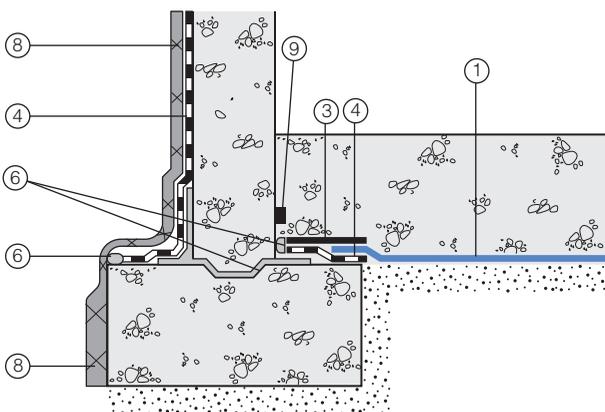
### Bituthene wall base detail (Option 1)



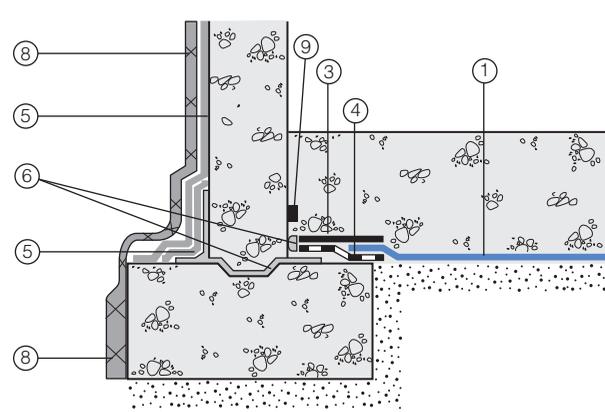
### Procor wall base detail (Option 1)



### Bituthene wall base detail (Option 2)



### Procor wall base detail (Option 2)



- 1 Preprufe 300R Plus
- 2 Preprufe 160R Plus
- 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 Plus Membrane	Preprufe 160R Plus Membrane	Preprufe Tape (LT or HC*)
Thickness	0.046 in. (1.2 mm)	0.032 in. (0.8 mm)	
Roll size	3 ft. 10 in. x 102 ft. (1.17m x 31.15m)	3 ft. 10 in. x 120 ft. (1.17m x 36.6m)	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 Plus	Typical Value 160R Plus	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 <sup>4</sup>
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>5</sup>
Lap peel adhesion at 72°F (22°C)	8 lbs/in. (1408 N/m)	8 lbs/in. (1408 N/m)	ASTM D1876, modified <sup>6</sup>
Lap peel adhesion at 40°F (4°C)	8 lbs/in. (1408 N/m)	8 lbs/in. (1408 N/m)	ASTM D1876, modified <sup>6</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

### 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 Preprufe membrane and allowed to cure (7 days minimum)
- 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 at 72°F (22°C).

## Specification Clauses

Preprufe 300R Plus or 160R Plus 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. All Preprufe 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 lifted and carried by a minimum of two persons.

[www.graceconstruction.com](http://www.graceconstruction.com)

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

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**GRACE**

# Bituthene® 4000

Self-adhesive HDPE waterproofing membrane with enhanced bonding characteristics for use with B2 moisture tolerant primer.

## Advantages

- Cold applied - simple application to substrates especially at low temperatures.
- Suitable for application to "green" concrete - reduces programme schedules
- Moisture tolerant primer system - allows application in damp or marginal weather conditions.
- Wide application temperature range - excellent bond to self and substrate from -10°C to +35°C.
- Overlap security - enhanced-bond provides additional security.
- Cross laminated high density polyethylene carrier film - provides high tear strength, puncture and impact resistance.
- Flexible - accommodates concrete shrinkage cracks.
- Gas resistant - methane, carbon dioxide and radon gas protection in excess of the standard membrane requirements in BRE Reports 211 (radon) and 212 (methane and carbon dioxide).

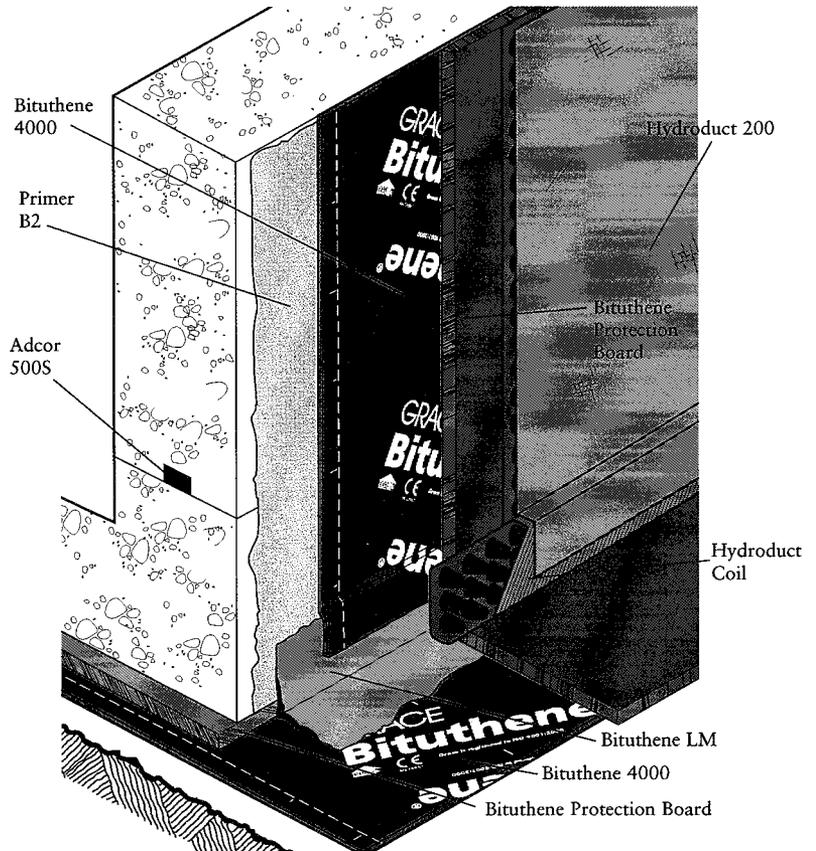
## Description

Bituthene® 4000 is a flexible preformed waterproof membrane combining a high performance cross laminated, HDPE carrier film with a unique super sticky self-adhesive rubber bitumen compound.

## Ancillary Products

### Primer B2

Primer B2 is used to prepare vertical and sloping surfaces and suspended slabs. It is moisture tolerant and can be used on "green" concrete or damp to touch substrates.



### Bituthene® LM

Waterproof continuity at angles and at penetrations is provided by Bituthene LM two component chemically curing liquid applied waterproof membrane.

### Bituthene® Protection Boards

Damage from following trades and backfill is prevented by Bituthene® Protection Boards. Located with Bitustik™ 4000 double sided tape.

*Details shown are typical illustrations only and not working drawings. For assistance with working drawings and additional technical advice please contact Grace Technical Services*



## Supply

<b>Bituthene® 4000</b>	1 m x 20 m roll (20 sq m) Weight 32 kg
<b>Palletisation</b>	15 rolls per pallet
<b>Storage</b>	Store upright in dry conditions below +30°C
<b>Primer B2</b>	5, 25 litre drums
<b>Coverage</b>	10 - 12 sq m per litre depending upon method of application, surface porosity and ambient temperature
<b>Ancillary Products</b>	
Bituthene® LM	5.7 litre packs
Bituthene®	3 mm x 1 m x 2 m
Protection Boards	
Adcor® 500S	6 x 5 m rolls
Hydroduct®	In lieu of drainage stone
Waterstops	See separate data sheet for details
Bitustik™ 4000	150 mm x 12 m roll
Lap Roller	Unit

## Installation

At air temperatures below +4°C measures should be taken to ensure that all surfaces are free from ice or frost. All surfaces except those below ground bearing slabs and Preprufe® R membranes should be primed with one coat of Primer B2 applied at a rate of approx. 10m<sup>2</sup> per litre.

Bituthene 4000 shall be laid by peeling back the protective release paper and applying the adhesive face onto the prepared surface, free from ice, frost, condensation or any contaminants which could adversely effect adhesion.

Bituthene LM to be applied at all internal and external corners, penetrations etc. prior to applying the overall membrane.

Bituthene 4000 should be brushed onto the surface to ensure good initial bond and exclude air. Adjacent rolls are aligned and overlapped 50mm minimum at side and ends and well rolled with a firm pressure, using a lap roller to ensure complete adhesion and continuity between the layers. On high walls it may be necessary to batten fix the membrane to prevent slippage.

### Repairs

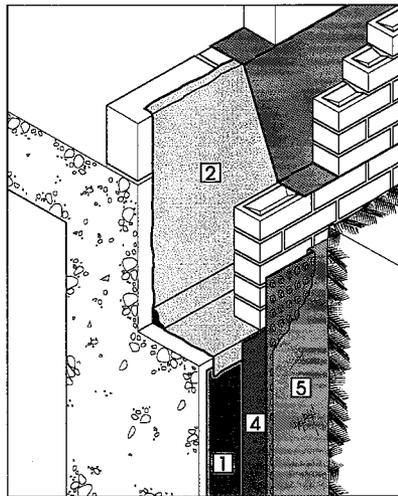
Damaged areas to be repaired by patching with an oversize patch applied to a clean dry surface and firmly rolled.

## Performance

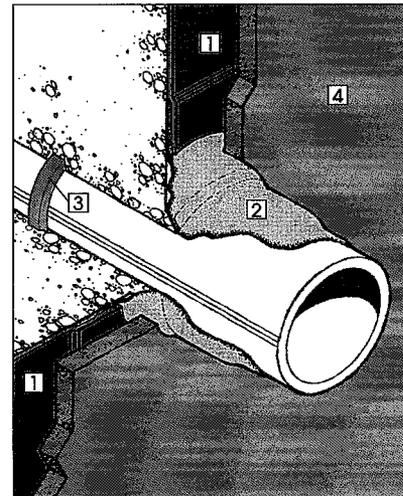
Bituthene 4000 complies with the relevant section of the following national standards: BS 8102:1990, Building Regulations (England and

## Physical Properties

Property	Typical Results	Test Method
Elongation at max load	Long 244% Trans 185%	BS 2782 320 A
Tear Resistance	Long 77N Trans 92N	MOAT 27:5.4.1
Peel Strength	76.5 N/mm <sup>2</sup>	MOAT 27:5.1.3
Tensile Strength of joints	117N	MOAT 27:5.2.2
Moisture Vapour Permeability	0.31 g/m <sup>2</sup> /24 hours	BS 3177: 1959 (75% RH/25°C)
Puncture Resistance	220 N 65mm	ASTM E154
Water Resistance (6m head)	No penetration	MOAT 27:5.1.4
Environmental Resistance	Conforms	ASTM D543



Typical ground level termination detail



Pipe through wall detail

### Key to diagrams:

- 1 Bituthene 4000 on Primer B2
- 2 Bituthene LM
- 3 Adcor 500S
- 4 Bituthene Protection Board
- 5 Hydroduct 220

Wales) 1991 (amended 1994) clause C4. Building Regulations (Northern Ireland) 1994 (amended 1995) clause B2. Building Standard (Scotland) Regulations 1990, Regulation B2.1, G2.6.

## Health and Safety

There is no legal requirement for a Material Safety Data Sheet for Bituthene 4000, Bituthene Protection Boards, Bitustik, Lap Roller, Hydroduct or waterstops. For health and safety questions on these products please contact Grace Construction Products Limited.

For Primer B2, and Bituthene LM read the product label and Material Safety Data Sheet (MSDS) before use. Users must comply with all risk and safety phrases. MSDS's can be obtained from Grace Construction Products or from our web site at [www.graceconstruction.com](http://www.graceconstruction.com).

## NBS Specification Clause

Refer to Clause 180 and 190.

**Web** Visit our web site at [www.graceconstruction.com](http://www.graceconstruction.com)

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