Chapter 20: Construction

A. INTRODUCTION

This chapter assesses the potential impacts associated with the construction under the proposed actions. As described in Chapter 1, "Project Description," the applicants, the New York City Department of City Planning (DCP) and SJC 33 Owner 2015 LLC, are proposing a series of discretionary actions (the proposed actions) that would facilitate the redevelopment of St. John's Terminal Building at 550 Washington Street (Block 596, Lot 1) (the development site) with a mix of residential and commercial uses, and public open space (the proposed project) in Manhattan Community District 2. The development site is located south of Clarkson Street between Washington and Route 9A/West Streets, across from Pier 40 of Hudson River Park. The development site comprises the North, Center, and South Sites, as shown in Figure 1-4. The full build-out of the proposed project is assumed to be 1,961,200 gross square feet (gsf). In the future without the proposed actions, it is assumed that there will be 1,152,000 gsf of No Action development. As described in Chapter 1, "Project Description," in the future with the proposed actions the development site is assumed to be redeveloped with one of the two development programs: the proposed project or the proposed project with big box retail. However, since there is no substantial difference in construction schedule and activities between the two scenarios, the information presented in this chapter are applicable for both scenarios unless otherwise specified.

The proposed project could be built all at once or may be phased, and development of the three sites may take place in any order. The construction analysis considers the potential for the proposed project to result in significant adverse environmental impacts based on the reasonable worst-case construction phasing plan(s) for each construction-related impact area where all three phases of the project would undergo demolition, excavation, and foundation work simultaneously, which would likely result in the worst-case construction-generated effects. Since the construction of the proposed project could instead be phased, the effects of project construction activities on completed portions of the proposed project are also examined for the relevant technical areas, including transportation, air quality, and noise. This chapter summarizes the construction program and assesses the potential for significant adverse impacts during construction. City, state, and federal regulations and policies that govern construction are described, followed by the anticipated construction schedule and the types of activities likely to occur during the construction of the proposed buildings. The types of equipment to be used during construction are discussed, along with the expected number of workers and truck deliveries. Based on this information an assessment is provided of the potential impacts from construction activities.

PRINCIPAL CONCLUSIONS

The detailed qualitative analysis presented in this chapter finds that the proposed actions would not result in significant adverse construction impacts to transportation, air quality, land use and neighborhood character, socioeconomic conditions, community facilities, historic and cultural resources, and hazardous materials. However, as described below, there ~~is a potential for~~would be temporary construction-period ~~air quality and~~ noise impacts.

The construction analysis conservatively considers the case where all three phases of the project would undergo demolition, excavation, and foundation work simultaneously, which would likely result in the worst-case construction-generated effects. Since the construction of the proposed project could instead be phased, the effects of project construction activities on completed portions of the proposed project are also examined for the relevant technical areas. As described in detail below, construction activities associated with the proposed project could result in significant adverse construction impacts with respect to vehicular traffic; additional information for key technical areas is summarized below.

TRANSPORTATION

Peak construction conditions were considered for the analysis. Construction of the proposed project (the With Action condition) is expected to result in significant adverse traffic impacts during peak construction, as summarized below. For purposes of the construction traffic analysis, two periods were assessed—the second quarter of 2023 (peak construction traffic is expected to occur during this quarter) and 2024 with the full build-out of the proposed project. The proposed project is not expected to result in any significant adverse parking, transit, or pedestrian impacts during construction.

Traffic

Compared with the construction of the No Action development, construction activities associated with the proposed project would generate 135 more passenger car equivalents (PCEs) during peak construction. The incremental construction PCEs would exceed the 2014 *City Environmental Quality Review (CEQR) Technical Manual* threshold of 50 vehicle-trips. However, the peak construction traffic increments during the second quarter of 2023 would be lower than the full operational traffic increments associated with the proposed project in 2024, except for the early 6:00 to 7:00 AM construction peak hour. Although the projected construction increment during this hour (in PCEs) would be slightly greater than the projected operational increment during the 8:00 to 9:00 AM commuter peak hour (also in PCEs), background traffic levels are correspondingly more than 25 percent lower during this early morning hour. Therefore, the potential traffic impacts during peak construction are expected to be within the envelope of significant adverse traffic impacts identified for the With-Action condition in Chapter 14, “Transportation.” In addition to the above comparison between operational and construction traffic increments, an assessment of cumulative operational and construction effects showed that the cumulative trip-making during any point of project development in the morning and afternoon hours would be lower than the critical 8:00 to 9:00 AM and 5:00 to 6:00 PM commuter peak hours, for which project-related impacts were identified. Therefore, all potential traffic impacts and required mitigation measures have been identified as part of the assessment of the full build-out of the proposed project.

As detailed in Chapter 22, “Mitigation,” measures to mitigate the 2024 operational traffic impacts were recommended for implementation at up to nine ~~six~~ intersections during one or more of the weekday analysis peak hours. These measures would encompass primarily signal timing changes and approach daylighting, all of which could be implemented early at the discretion of the New York City Department of Transportation (DOT) to address actual conditions experienced at that time. As with the operational condition (proposed project with big box retail scenario), there could also be significant adverse traffic impacts at the intersections of

Canal Street and Hudson Street, ~~and~~ West Houston Street and West Street, West Houston Street and Varick Street, and Spring Street and West Street that could not be fully mitigated during one or more analysis peak hours. Coordination with DOT's Office of Construction Mitigation and Coordination (OCMC) would be undertaken to ensure proper implementation of Maintenance and Protection of Traffic (MPT) plans and requirements.

Parking

Construction of the proposed project is projected to generate a maximum parking demand of 356 spaces. This parking demand could be fully accommodated by the off-street spaces and parking facilities available within a ¼-mile radius of the development site, where nearly 1,270 public parking spaces are currently available during the peak morning parking utilization period. Therefore, the construction for the proposed project would not result in any significant adverse parking impacts.

Transit

Compared with the construction of the No Action development, construction of the proposed project would generate 226 additional transit trips during the peak construction period, which would exceed the *CEQR Technical Manual* 200-transit-trip analysis. However, approximately 89 percent of the total transit trips would be by subway and 11 percent of the total transit trips would be by bus, which would correspond to approximately 202 peak hour subway trips and 24 peak hour bus trips. Since the proposed project and No Action development could be accessed by three different subway lines at two different subway stations, neither subway station would exceed the *CEQR* threshold of 200 or more peak hour subway trips per station and therefore, construction for the proposed project would not result in any significant adverse subway impacts. Additionally, since peak hour bus trips would not exceed 50, no bus route would incur 50 or more peak hour riders in either direction for any peak hour and therefore construction of the proposed project would not result in any significant adverse bus line-haul impacts.

Pedestrians

Compared with the construction of the No Action development, construction associated with the proposed project would generate 348 additional pedestrian trips during the peak construction period, which would exceed the *CEQR Technical Manual* threshold of 200 pedestrian trips. These pedestrian trips would primarily occur outside of the typical commuter peak hours (8:00 to 9:00 AM and 5:00 to 6:00 PM), spread across multiple entrances, several nearby transit services, and a number of area parking facilities (as well as among numerous sidewalks and crosswalks in the area). Therefore, there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips.

AIR QUALITY

The area immediately surrounding the development site consists of predominantly industrial, manufacturing, and commercial uses built to varying heights. A residential building, 354-361 West Street, is proposed on the block to the immediate north of the project across Clarkson Street, approximately 60 feet away from the development site. Other residential uses are further away, with the nearest being 547 Greenwich Street, approximately 280 feet east of the development site (and separated from the proposed project by Washington and Greenwich Streets). These neighboring streets (Clarkson, Washington, and Greenwich Streets) would serve as a buffer between the emission sources and this sensitive residential receptor location, and the distance between the sources and the receptor would result in enhanced dispersion of pollutants. To ensure that construction of the proposed project would result in the lowest practicable diesel particulate matter (DPM) emissions, the project would implement an emissions reduction program for construction activities that would include, to the extent practicable: diesel equipment reduction, the use of ultra-low sulfur diesel (ULSD) fuel; best available tailpipe reduction technologies; the utilization of newer equipment; implementation of dust control measures; and restriction on vehicle idling. ~~Therefore, construction activities associated with the proposed project would not result in any significant adverse stationary or mobile source air quality impacts.~~

In the event of phased construction, one proposed project building may be completed and occupied while construction activity is underway at another proposed project building (e.g., North Site complete and occupied while Center Site and South Site are undergoing demolition, excavation, and foundation work). Each of the proposed project buildings are separated by a distance of approximately 60 feet. As discussed above, such distance between the sources and the receptor would result in enhanced dispersion of pollutants. Furthermore, the proposed project's emission reduction program would greatly reduce air emissions levels. ~~Therefore, the effects of project construction on the completed portion of the project would be within the envelope of impacts analyzed for the reasonable worst-case construction phasing plan when all three construction phases of the project would undergo simultaneously. Between the Draft Environmental Impact Statement (DEIS) and the Final Environmental Impact Statement (FEIS), a~~A detailed modeling analysis ~~will be~~was conducted to quantify the levels of construction air quality concentrations that may occur at ~~project elements and/or~~ existing tenants and project elements should they be completed and occupied during construction on one or more of the other project buildings. ~~If any potential exceedances of the National Ambient Air Quality Standards (NAAQS), or applicable de minimis criteria are identified, the analysis will examine the practicability and feasibility of implementing additional control measures as necessary to reduce or eliminate the impacts.~~ The maximum predicted pollutant concentrations are predicted to be below the applicable National Ambient Air Quality Standards (NAAQS) or de minimis thresholds. Therefore, no significant adverse impacts on air quality are predicted during the construction of the proposed project.

NOISE AND VIBRATION

Noise generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria at the nearest existing sensitive receptors (i.e., ~~the proposed residential building at 354-361 West Street approximately 60 feet north of the development site,~~ Hudson River Park, located approximately 100 feet west of the development site, and the existing residence at 547 Greenwich Street approximately 280 feet east of the development site). With the construction noise control measures—including noise barriers around the perimeter of the development site and equipment that meets the sound level standards specified in Subchapter 5 of the *New York City Noise Control Code*—maximum $L_{eq(1)}$ noise levels at the nearest sensitive receptors during construction would be expected to be approximately in the low 60s to mid 70s A-weighted sound level or "dBA." In addition, measured existing noise levels near these locations were in the high 60s and low 70s dBA, and would be expected to remain relatively unchanged in the future without the proposed project. Therefore, construction activities associated with the proposed project would not result in any significant adverse noise impacts.

Between the DEIS and the FEIS, a detailed modeling analysis will bewas conducted to quantify the levels of construction noise that may occur at the future 354-361 West Street development, and/or at project elements and/or existing tenants should they be completed and occupied during construction on one or more of the other project buildings. The proposed project buildings would be newly introduced sensitive receptors subject to *CEQR Technical Manual* noise exposure guidelines (requiring interior $L_{10(1)}$ noise levels less than or equal to 45 dBA for residential and hotel guest room spaces or 50 dBA for commercial spaces).

The detailed modeling analysis concluded that construction of the proposed project has the potential to result in construction noise levels that exceed *CEQR Technical Manual* noise impact criteria at the future 354-361 West Street development site. Furthermore, should the proposed project proceed by a phased schedule resulting in one or more project buildings being completed and occupied while construction occurs at one or more other project buildings, construction would have the potential to result in elevated noise levels at completed and occupied project building(s) that are predicted to result in exceedances of *CEQR Technical Manual* noise exposure guidelines and would constitute significant adverse noise impacts at some façades. However, because 354-361 West Street and the proposed project buildings are or will be mapped with Noise (E) designations (E-218 and E-384, respectively) requiring between 26 and 41 dBA of window/wall attenuation, which would be achieved by means of installing acoustically rated insulated glass windows, and an alternate means of ventilation (i.e., air conditioning that does not degrade the acoustical performance of the façade) to allow for the maintenance of a closed-window condition, there are no feasible and practicable mitigation measures that would be able to reduce or eliminate the potential significant adverse noise impacts.

At the proposed elevated outdoor space included in the proposed project, the detailed modeling analysis indicated that noise levels during construction would exceed the *CEQR Technical Manual* recommended noise level threshold for open space. The applicant will ensure this open space will be closed during the demolition, excavation, and foundation construction at either of the building sites immediately adjacent to it to avoid the highest potential levels of construction noise at the open space. During other phases of construction, construction noise would still exceed the CEQR recommended noise level; however, as described in Chapter 17, "Noise," noise levels at this location exceed this threshold in the existing condition and would exceed this threshold in the future with the proposed project as well. The detailed analysis found that construction would affect noise levels at this proposed open space only for construction hours during a relatively short period of time beyond the already relatively high noise levels resulting from traffic.

~~Based on the results of this analysis, noise control measures beyond those specified in this chapter and/or window/wall attenuation levels beyond those specified in Chapter 17, "Noise," may be identified.~~

~~In the event of phased construction, at the proposed outdoor publicly accessible open space on a platform spanning West Houston Street, construction activities occurring at the Center Site or the North Site (depending on the construction phasing) would produce noise levels in the high 70s to low 80s dBA, which would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). While this is not desirable, noise levels in many parks and open space areas throughout the city (which are located near heavily trafficked roadways and/or near construction sites) experience comparable – and sometimes higher – noise levels. Nonetheless, noise levels in this range at the project-generated publicly accessible open space could constitute a significant adverse noise impact. The predicted level of construction noise that would occur at~~

~~this publicly accessible open space under a phased construction schedule will be examined further in the detailed noise modeling analysis to be conducted between the DEIS and FEIS.~~

Vibration generated by on-site construction activities would not be expected to result in exceedances of even the most stringent vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second at the nearest sensitive receptors (i.e., the proposed residential building at 354-361 West Street, approximately 60 feet north of the development site, and the residence at 547 Greenwich Street, approximately 280 feet east of the development site) based on the distance from the development site. While, occupants at these receptors may experience perceptible levels of construction vibration that may be perceptible and potentially intrusive, these levels would be of limited duration, and as such would not be considered significant.

OTHER TECHNICAL AREAS

Based on the analyses conducted, construction of the proposed project would not result in significant adverse construction impacts in the areas of land use and neighborhood character; socioeconomic conditions; community facilities; open space; historic and cultural resources; or hazardous materials.

B. GOVERNMENTAL COORDINATION AND OVERSIGHT

Construction oversight involves several city, state, and federal agencies. **Table 20-1** lists the primary involved agencies and their areas of responsibility. For projects in New York City, primary construction oversight lies with the New York City Department of Buildings (DOB), which oversees compliance with the New York City Building Code. In addition, DOB enforces safety regulations to protect workers and the general public during construction. The areas of oversight include installation and operation of equipment such as cranes, sidewalk bridges, safety netting, and scaffolding. The New York City Department of Environmental Protection (DEP) enforces the *New York City Noise Code*, reviews and approves any needed Remedial Action Plans (RAPs) and associated Construction Health and Safety Plans (CHASPs), regulates water disposal into the sewer system, reviews and approves any rerouting of wastewater flow, as well as removal of fuel tanks and abatement of hazardous materials. The New York City Fire Department (FDNY) has primary oversight of compliance with the *New York City Fire Code* and the installation of tanks containing flammable materials. DOT's OCMC reviews and approves any traffic lane and sidewalk closures. New York City Transit (NYCT) is responsible for bus stop relocations, if necessary.

At the state level, the New York State Department of Transportation (NYSDOT) reviews and approves any Route 9A traffic lane closures. The New York State Department of Labor (DOL) licenses asbestos workers. The New York State Department of Environmental Conservation (DEC) regulates disposal of hazardous materials, and construction and operation of bulk petroleum and chemical storage tanks. At the federal level, although the U.S. Environmental Protection Agency (EPA) has wide-ranging authority over environmental matters, including air emissions, noise, hazardous materials, and the use of poisons, much of its responsibility is delegated to the state level. The Occupational Safety and Health Administration (OSHA) sets standards for work site safety and construction equipment.

Table 20-1
Summary of Primary Agency Construction Oversight

Agency	Areas of Responsibility
New York City	
Department of Buildings	Building Code and site safety
Department of Environmental Protection	Noise Code, RAPs/CHASPs, dewatering, fuel tank removal, hazardous materials abatement, wastewater flow reroute
Fire Department	Compliance with Fire Code, fuel tank installation
Department of Transportation	Lane and sidewalk closures
New York City Transit	Bus stop relocation
New York State	
Department of Transportation	Route 9A lane closures
Department of Labor	Asbestos Workers
Department of Environmental Conservation	Hazardous materials and fuel/chemical storage tanks
United States	
Environmental Protection Agency	Air emissions, noise, hazardous materials, poisons
Occupational Safety and Health Administration	Worker safety

C. CONSTRUCTION PHASING AND SCHEDULE

The anticipated construction schedule for the proposed mixed-use buildings at the development site is presented in **Table 20-2** and reflects the construction durations as currently contemplated. The proposed project could be built all at once or may be phased, and development of the three sites may take place in any order. The construction analysis will consider the potential for the proposed project to result in significant adverse environmental impacts based on the reasonable worst-case construction phasing plan(s) for each construction-related impact area where all three phases of the project would undergo demolition, excavation, and foundation work simultaneously, which would likely result in the worst-case construction-generated effects. Since the construction of the proposed project could instead be phased, the effects of project construction activities on completed portions of the proposed project are also examined for the relevant technical areas.

Table 20-2
Anticipated Construction Schedule

General Construction Task	Approximate Start Month	Approximate Finish Month	Approximate Duration (months)
North Site			
Mobilization and ACM Removal	Month 1	Month 5	5
Demolition	Month 5	Month 12	8
Excavation and Foundation	Month 7	Month 10	4
Superstructure	Month 10	Month 29	20
Exteriors	Moth 16	Month 35	20
Interior Fit-out and Site work	Month 16	Month 45	30
Center Site			
Mobilization and ACM Removal	Month 1	Month 4	4
Demolition	Month 5	Month 12	8
Excavation & Foundation	Month 7	Month 11	5
Superstructure	Month 12	Month 34	23
Exteriors	Month 19	Month 40	22
Site-Work	Month 19	Month 46	28
South Site			
Mobilization and ACM Removal	Month 1	Month 3	3
Demolition	Month 4	Month 9	6
Excavation & Foundation	Month 7	Month 10	4
Superstructure	Month 10	Month 26	17
Exteriors	Month 14	Month 34	21
Interior Fit-out and Site work	Month 14	Month 41	28
Source: Plaza Construction, LLC.			

Construction activities at each of the three sites would consist of the following primary stages, which may overlap at certain times: mobilization and asbestos-containing materials (ACM) removal; demolition; excavation and foundation; superstructure; exteriors; site-work; and interiors and finishing. These construction stages are described in greater detail below in "General Construction Tasks."

D. CONSTRUCTION DESCRIPTION

This section describes construction activities for the proposed mixed-use buildings at the development site, including the types of equipment to be used. The approach and procedures for constructing the proposed building would be typical of the methods utilized in other building construction projects throughout New York City.

GENERAL CONSTRUCTION PRACTICES

HOURS OF WORK

Construction of the proposed project would be carried out in accordance with New York City laws and regulations, which allow construction activities between 7:00 AM and 6:00 PM on weekdays. Construction work would occur on weekdays and typically begin at 7:00 AM, with most workers arriving between 6:00 AM and 7:00 AM. Normally work would end at 4:00 PM, but it can be expected that, in order to complete certain critical tasks (i.e., finishing a concrete pour for a floor deck), the workday may occasionally be extended beyond normal work hours. Any extended workdays would generally last until approximately 5:30 PM or 6:00 PM and would not include all construction workers on-site, but only those involved in the specific task requiring additional work time.

Weekend work may also be required for certain construction activities, such as the erection of the tower crane, and to make up for weather delays or other unforeseen circumstances. Weekend work requires a permit from DOB and, in certain instances, approval of a noise mitigation plan from DEP under the City's Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1, 2007, limits construction (other than special circumstances as described below) to weekdays between the hours of 7:00 AM and 6:00 PM and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM and on weekends) may be permitted only to accommodate: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. Appropriate work permits from DOB would be obtained for any necessary work outside of normal construction hours (i.e., weekend work) and no work outside of normal construction hours could be performed until such permits are obtained. The numbers of workers and pieces of equipment in operation for weekend work would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. If it were to become necessary, the weekend workday would typically be on a Saturday.

LANE AND WALKWAY CLOSURES

As is typical with construction projects in New York City, temporary curb-lane and sidewalk closures would be required adjacent to the development site. Based on current logistics, temporary curb lane closure is expected to be required along Washington Street (during construction of the North, Center, and South Sites), West Houston Street (during construction of the North Site), and Clarkson Street (during construction of the North Site) immediately adjacent to the development site to allow for deliveries and laydown of construction materials. MPT plans would be developed for any temporary curb-lane and sidewalk closures as required by DOT. Approval of these plans and implementation of the closures would be coordinated with DOT's OCMC.

ACCESS, DELIVERIES, AND STAGING AREAS

Access to the development site during construction would be controlled. The work areas would be fenced off and limited access points for workers and construction-related trucks would be provided. Typically, worker vehicles would not be allowed into the construction area. Workers or trucks without a need to be on the site would not be allowed entry. After work hours, the gates would be closed and locked. Construction activities would be staged primarily within the project area, and/or on parking lanes adjacent to the construction area. Trucks delivering materials are anticipated to enter or exit the construction site primarily via Washington Street.

PUBLIC SAFETY

A variety of measures would be employed to ensure public safety during the construction of the proposed project, including the tenants at the existing buildings within the development site who may be present or users of the completed portions of the proposed project if the construction is phased instead of occurring simultaneously. For example, sidewalk bridges would be erected along Washington Street, West Houston Street, West Street, and Clarkson Street when necessary (e.g., during demolition and above-grade construction activities) to provide overhead protection for pedestrians passing by the construction site. Flaggers would be posted as necessary to control trucks entering and exiting the construction site, to provide guidance to pedestrians, and/or to alert or slow down the traffic. The installation and operation of tower cranes would follow stringent DOB requirements to ensure safe operation of the equipment. Safety nettings would be installed on the sides of the proposed project as the superstructure advances upward to prevent debris from falling to the ground. All DOB safety requirements would be followed and construction of the proposed building would be conducted with care so as to minimize the disruption to the community.

UTILITY RELOCATION

For both the construction of the No Action development and construction associated with the proposed project, existing utilities would be relocated to eliminate interference with new structure construction. Relocation of the utility lines would be coordinated with DEP to ensure that service to customers in nearby areas is not disrupted. In addition, MPT plans would be developed for any temporary curb-lane and sidewalk closures as required by DOT during utility relocation activities. Approval of these plans and implementation of the closures would be coordinated with DOT's OCMC.

RODENT CONTROL

Construction contracts may include provisions for a rodent (i.e., mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During construction, the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be conducted with appropriate public agencies. Only EPA- and NYSDEC-registered rodenticides would be permitted, and the contractor would be required to implement the rodent control program in a manner that is not hazardous to the general public, domestic animals, and non-target wildlife.

GENERAL CONSTRUCTION TASKS

Construction activities at each of the three sites would consist of the following primary stages, which may overlap at certain times: mobilization and ACM removal; demolition; excavation and foundation; superstructure; exteriors; site work; and interiors and finishing. These construction stages are described in greater detail in this section.

MOBILIZATION AND ACM REMOVAL

Prior to the commencement of construction, the work area would first be prepared for construction and would involve the installation of public safety measures (such as fencing, netting, and signs). The construction areas would be fenced off, typically with solid fencing to minimize interference between the persons passing by the site and the construction work. Access points to the development site would be established. Field office trailers for the construction engineers and managers, portable toilets, and dumpsters for trash would be hauled to the site and installed. Site set-up activities would also include the installation of sidewalk bridges.

Once site set-up activities are complete, the existing building(s) on the portion of the development site to be constructed would first be abated of asbestos and any other hazardous materials before the start of demolition. A New York City-certified asbestos investigator would inspect the building for ACM, and those materials must be removed by a DOL-licensed asbestos abatement contractor prior to interior demolition. Asbestos abatement is strictly regulated by DEP, DOL, EPA, and OSHA to protect the health and safety of construction workers and nearby residents and workers. Depending on the extent and type of ACMs, these agencies would be notified of the asbestos removal project and may inspect the abatement site to ensure that work is being performed in accordance with applicable regulations. Any activities with the potential to disturb lead-based paint (LBP) would be performed in accordance with the applicable OSHA regulation (including federal OSHA regulation 29 CFR 1926.62—*Lead Exposure in Construction*). In addition, any suspected polychlorinated biphenyl (PCB)-containing equipment (such as fluorescent light ballasts) that would be disturbed would be evaluated prior to disturbance. Unless labeling or test data indicate that the suspected PCB-containing equipment does not contain PCBs, such equipment would be assumed to contain PCBs, and would be removed and disposed of at properly licensed facilities in accordance with all applicable regulatory requirements.

For the North Site, this stage of construction would also include the installation of overhead protection at West Houston Street. The mobilization and ACM removal stage of construction is anticipated to take approximately five months to complete for the North Site, four months to complete for the Center site, and three months to complete for the South Site.

DEMOLITION

General demolition is the next step. First, any economically salvageable materials are removed. Then the interior of the building is deconstructed to the floor plates and structural columns. Netting around the exterior of the building would be used to prevent materials from falling into public areas. Hand tools and excavators with a hoe ram attachment would mainly be used in the demolition of the existing structure, while bobcats and skid steer loaders would be used to load the debris into dump trucks. The demolition debris would be sorted prior to being disposed at landfills to maximize recycling opportunities. The demolition stage of construction is anticipated to take approximately eight months for the North Site, eight months for the Center Site, and six months for the South Site.

EXCAVATION AND FOUNDATION

First, piles would be installed along the perimeter of the construction site to hold back soil around the excavation area. Next, excavators would be used for the task of excavation. The soil would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse on a construction site that needs fill. As the excavation becomes deeper, a temporary ramp would be built where necessary to provide access for the dump trucks to the work site. Blasting activities are not anticipated to be needed for construction at the development site. This stage of construction would also include the construction of the proposed project's foundation and below-grade elements. Columns and concrete walls would be built to the grade level. Concrete trucks would be used to pour the foundation and the below-grade structures. These trucks would stage on the parking lane(s) adjacent to the development site. Excavation and foundation activities would also involve the use of hydraulic drills, crane, dewatering pumps, generators, and compressors. The excavation and foundation stage of construction is anticipated to take approximately four months for the North Site, five months for the Center Site, and four months for the South Site.

Below-Grade Hazardous Materials

As described in greater details below under "Hazardous Materials," to reduce the potential for public exposure to contaminants during excavation activities, construction activities would be performed in accordance with all applicable regulatory requirements. All construction subsurface soil disturbances would be performed in accordance with a DEP-approved RAP and CHASP. The RAP would address requirements for items such as soil stockpiling; soil disposal and transportation; dust control; and quality assurance; as well as contingency measures should additional underground petroleum storage tanks or soil/groundwater contamination be unexpectedly encountered. The RAP would also address any measures required to be incorporated into the new building, such as a vapor barrier. The CHASP would include measures for worker and community protection, including personal protective equipment, dust control and air monitoring. The RAP and CHASP are required for the development site and would be implemented during the subsurface disturbance associated with the construction of the proposed project.

Dewatering

During construction, rain and snow may collect in the excavation area, and that water would have to be removed. If dewatering is required, it would be performed in accordance with DEP sewer use requirements. These requirements require testing to ensure any potentially contaminated groundwater is treated before it can be discharged to the sewer system.

SUPERSTRUCTURE

The superstructures of the proposed buildings on the development site would include the building's framework (beams and columns) and floor decks. Construction of the interior structures, or core, of the buildings would include elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment rooms; core stairs; and restroom areas. The tower crane would first be brought onto the construction site during the superstructure task and would be used to lift structural components and other large materials. The tower crane would be on-site for both the superstructure and exterior façade stages of construction. Superstructure activities would also require the use of mobile cranes, welders, impact wrenches, and variety of trucks. In addition, temporary construction elevators (hoists) would be used for the delivery of materials and vertical movement of workers during superstructure activities. The superstructure stage of construction is anticipated to take approximately 20 months to complete for the North Site, 23 months to complete for the Center Site, and 17 months to complete for the South Site.

EXTERIORS

During this stage of construction, the exterior façades of the proposed buildings would be installed. The precast façades would arrive on trucks and be lifted into place for attachment by the tower crane and/or mobile crane. This stage of construction would overlap with the superstructure stage of construction and is anticipated to take approximately 20 months to complete for the North Site, 22 months to complete for the Center Site, and 21 months to complete for the South Site.

INTERIOR FIT-OUT AND SITEWORK

Interior fit-out activities would include the construction of interior partitions; installation of lighting fixtures and interior finishes (i.e., flooring, painting, etc.); mechanical and electrical work, such as the installation of elevators; and lobby finishes. In addition, final cleanup and touchup of the proposed buildings and final building systems (i.e., electrical system, fire alarm, plumbing, etc.) testing and inspections would be part of this stage of construction. Equipment used during interior fit-out would include exterior hoists, compressors, delivery trucks, and a variety of small hand-held tools. Interior fit-out would be the quietest because most of the construction activities would occur within the buildings with the façades substantially complete. This stage of construction would also include punch list completion activities, which are typically small tasks that were not completely finished and project commissioning to ensure compliance with contract requirements.

This stage of construction would also include site-work activities such as the installation of grassy areas and landscaping. In addition, the North Site would include the construction of an approximately 14,200-sf outdoor publicly accessible open space on the platform spanning West Houston Street. The existing platform would be modified to create large openings that would allow light and air to reach the street level.

This stage of construction is anticipated to take approximately 30 months to complete for the North Site, 28 months to complete for the Center Site, and 28 months to complete for the South Site.

Table 20-3 shows the estimated average daily numbers of workers and deliveries for the proposed project by calendar quarter for the duration of the construction period. For the reasonable worst-case traffic assumption, the proposed project would be built all at once and that full development would be complete by 2024, the average number of workers throughout the entire construction period would be approximately 662 per day. The peak number of workers by calendar quarter would be approximately 1,368 per day, and would occur in the second quarter of 2023 during superstructure, exteriors, interior fit-out and site work stages of construction. The estimated 1,368 workers per day is not the maximum number of construction workers anticipated for each individual construction stage but rather the anticipated cumulative total number of construction workers when different construction stages for the North, Center, and South sites all occur simultaneously during the peak construction period. For truck trips, the average number of trucks throughout the entire construction period would be approximately 47 per day, and the peak number of deliveries by calendar quarter would occur in the second quarter of 2023, with approximately 96 trucks per day during superstructure; exteriors; and interior fit-out and site work stages of construction. Note that the estimated 96 trucks per day is not the maximum number of construction trucks anticipated for each individual construction stage but rather the anticipated cumulative total number of construction trucks when different construction stages for the North, Center, and South sites all occur simultaneously during the peak construction period.

Table 20-3
Average Number of Daily Construction Workers and Trucks by Year and Quarter
Proposed Project[1]

Year	2021				2022				2023				2024			
Quarter	1st	2nd	3rd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	76	103	173	185	203	449	726	1,051	1,323	1,368	1,324	1,193	985	548	227	23
Trucks	11	18	22	23	15	26	54	78	94	96	85	72	62	34	8	-
	Peak				Average											
Workers	1,368				662											
Trucks	96				47											

Note: [1.] Reasonable worst-case traffic assumption that the proposed project would be built all at once and that full development would be complete by 2024.
Source: Plaza Construction, LLC.

Table 20-4 shows the estimated average daily numbers of workers and deliveries for the No Action condition by calendar quarter for the duration of the construction period. The average number of workers throughout the entire construction period would be approximately 387 per day. The peak number of workers by calendar quarter would be approximately 933 per day, and would occur in the second quarter of 2023 during superstructure, exteriors, and interior fit-out and site work stages of construction. For truck trips, the average number of trucks throughout the entire construction period would be approximately 24 per day, and the peak number of deliveries by calendar quarter would occur in the second quarter of 2023, with approximately 53 trucks per day during superstructure; exteriors; and interior fit-out and site work stages of construction.

Table 20-4
Average Number of Daily Construction Workers and Trucks by Year and Quarter
No Action

Year	2021				2022				2023				2024			
Quarter	1st	2nd	3rd	1st	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	68	75	156	192	150	293	578	795	895	933	527	410	285	67	0	0
Trucks	10	17	23	23	15	22	37	43	46	53	19	16	11	5	0	0
	Peak				Average											
Workers	933				387											
Trucks	53				24											

Note: [1.] Reasonable worst-case traffic assumption that the proposed project would be built all at once and that full development would be complete by 2024.
Source: Plaza Construction, LLC.

E. FUTURE WITHOUT THE PROPOSED PROJECT

In the No Action condition, the development site is expected to be redeveloped with new commercial buildings that do not require any discretionary approvals. The No Action development would utilize the available unused floor area as well as existing floor area above Houston Street that would be demolished and reused on the North Site. The platform space above Houston Street would be developed as a private open space serving building tenants.

On the North Site, the No Action development would include hotel, office, and retail uses in a 48-story (approximately 630–foot-tall) building. On the Center and South sites, the existing building would be demolished and rebuilt but there would be no substantial change in floor area. The South and Center Sites would include office uses, event space, and retail uses.

GRANTING SITE

In the No Action condition, Pier 40 would remain in its current use, with a public parking facility, athletic fields, other recreational uses, and offices for the Hudson River Park Trust (HRPT). The proposed transfer of floor area from Pier 40 to the development site will not occur.

F. THE FUTURE WITH THE PROPOSED ACTIONS

Construction activities associated with the proposed project, as is the case with any construction activities, may result in some temporary disruptions in the surrounding area. The proposed project could be built all at once or may be phased, and development of the three sites may take place in any order. The construction analysis will consider the potential for the proposed project to result in significant adverse environmental impacts based on the reasonable worst-case construction phasing plan(s) for each construction-related impact area. The following analysis describes the overall temporary construction effects on transportation, air quality, noise and vibration, land use and neighborhood character, socioeconomic conditions, community facilities, open space, historic and cultural resources, and hazardous materials.

TRANSPORTATION

The construction transportation analysis assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities. The analysis is based on the peak worker and truck trips during construction of the proposed project, which are developed based on several factors including worker modal splits, vehicle occupancy and trip distribution, truck PCEs, and arrival/departure patterns. For the proposed project, the combined peak-construction, worker-vehicle and truck-trip generation would occur during superstructure and exteriors construction activities; the greatest construction-related parking, transit, and pedestrian demand would occur during exterior and interior construction activities.

For the reasonable worst-case traffic assumption, the proposed project would be built all at once and full development would be complete by 2024. The following sections evaluate the potential for the proposed project’s peak construction worker and truck trips to result in significant adverse impacts to traffic, parking, transit facilities, and pedestrian facilities.

TRAFFIC

An evaluation of construction sequencing and worker/truck projections was undertaken to assess potential traffic impacts.

Construction Trip Generation Projections

The average worker and truck trip projections (discussed above in "Number of Construction and Materials Deliveries") were further refined to account for worker modal splits and vehicle occupancy, arrival and departure distribution, and truck PCEs.

Daily Workforce and Truck Deliveries

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarter were used as the basis for estimating peak-hour construction trips. It is expected that construction activities would generate the highest amount of daily traffic during superstructure, exteriors, and interior fit-out and site work activities, with a peak of approximately 1,368 workers and 96 truck deliveries per day. These estimates of construction activities are discussed further below.

Construction Worker Modal Splits and Vehicle Occupancy

Based on the latest available U.S. Census data (2000 Census data) for workers in the construction and excavation industry, it is anticipated that 32 percent of construction workers would commute to the development site by private autos at an average occupancy of approximately 1.23 persons per vehicle.

Peak-Hour, Construction-Worker Vehicle and Truck Trips

Similar to other construction projects in New York City, most of the construction activities at the development site are expected to take place between 7:00 AM and 3:30 PM. While construction truck trips would occur throughout the day (with more trips during the early morning), and most trucks would remain in the area for short durations, construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips during the same hour (one "in" and one "out"), whereas each worker vehicle was assumed to arrive near the work shift start hour and depart near the work shift end hour. Further, in accordance with the 2014 *CEQR Technical Manual*, the traffic analysis assumed that each truck has a PCE of 2.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns for construction workers and trucks. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would take place during the hour before and after each work shift (6:00 AM to 7:00 AM for arrival and 3:30 PM to 4:30 PM for departure on a regular day shift). Construction truck deliveries typically peak during the hour before each shift (25 percent), overlapping with construction worker arrival traffic. **Table 20-5** presents the hourly trip projections for the peak construction quarter (second quarter of 2023) for the proposed development. As shown, the maximum construction-related traffic increments would be approximately 381 PCEs between 6:00 AM and 7:00 AM and 305PCEs between 3:00 PM and 4:00 PM.

Using the same methodology, construction vehicle trip projections were also developed for the No Action development (see **Table 20-6**). The construction vehicle activities associated with the future without the proposed project scenario represent the baseline to which projected construction activities would be compared to determine potential construction traffic impacts.

Table 20-5
Peak Construction Vehicle Trip Projections
Proposed Development

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
6 AM - 7 AM	285	0	285	24	24	48	309	24	333	333	48	381
7 AM - 8 AM	71	0	71	10	10	20	81	10	91	91	20	111
8 AM - 9 AM	0	0	0	10	10	20	10	10	20	20	20	40
9 AM -10 AM	0	0	0	10	10	20	10	10	20	20	20	40
10 AM -11 AM	0	0	0	10	10	20	10	10	20	20	20	40
11 AM - 12 PM	0	0	0	10	10	20	10	10	20	20	20	40
12 PM - 1 PM	0	0	0	9	9	18	9	9	18	18	18	36
1 PM - 2 PM	0	0	0	4	4	8	4	4	8	8	8	16
2 PM - 3 PM	0	18	18	4	4	8	4	22	26	8	26	34
3 PM - 4 PM	0	285	285	5	5	10	5	290	295	10	295	305
4 PM - 5 PM	0	53	53	0	0	0	0	53	53	0	53	53
Daily Total	356	356	712	96	96	192	452	452	904	548	548	1096

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

Table 20-6
Peak Construction Vehicle Trip Projections
No Action Development

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
6 AM - 7 AM	194	0	194	13	13	26	207	13	220	220	26	246
7 AM - 8 AM	49	0	49	6	6	12	55	6	61	61	12	73
8 AM - 9 AM	0	0	0	5	5	10	5	5	10	10	10	20
9 AM -10 AM	0	0	0	5	5	10	5	5	10	10	10	20
10 AM -11 AM	0	0	0	5	5	10	5	5	10	10	10	20
11 AM - 12 PM	0	0	0	5	5	10	5	5	10	10	10	20
12 PM - 1 PM	0	0	0	5	5	10	5	5	10	10	10	20
1 PM - 2 PM	0	0	0	3	3	6	3	3	6	6	6	12
2 PM - 3 PM	0	12	12	3	3	6	3	15	18	6	18	24
3 PM - 4 PM	0	194	194	3	3	6	3	197	200	6	200	206
4 PM - 5 PM	0	37	37	0	0	0	0	37	37	0	37	37
Daily Total	243	243	486	53	53	106	296	296	592	349	349	698

Note: Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

The incremental construction trips in PCEs are presented in **Table 20-7**. Compared with the construction of the No Action development, with peak quarter construction activities expected to yield 246 and 206 peak hour PCEs during the 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM hours, respectively, construction activities associated with the proposed development (worst-case with big box retail scenario) would generate 135 and 99 more PCEs, respectively. The incremental construction PCEs would exceed the *CEQR Technical Manual* threshold of 50 vehicle-trips during the 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM peak hours.

Table 20-7
Incremental Peak Hour
Construction Vehicle Trips in PCEs

Scenario	Auto Trips			Truck Trips			Total (PCE)		
	In	Out	Total	In	Out	Total	In	Out	Total
Peak Hour (6:00 AM to 7:00AM)									
Proposed Development	285	0	285	24	24	48	333	48	381
No Action Development	194	0	194	13	13	26	220	26	246
Incremental	91	0	91	11	11	22	113	22	135
Peak Hour (3:00 PM to 4:00PM)									
Proposed Development	0	285	285	5	5	10	10	295	305
No Action Development	0	194	194	3	3	6	6	200	206
Incremental	0	91	91	2	2	4	4	95	99

Note: Peak construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

A comparison of the projected traffic levels generated during peak construction and those upon full build-out of the proposed project is summarized in **Table 20-8**. As presented in **Table 20-8**, the construction traffic increments would be lower than the operational traffic increments for the full build-out under the proposed project in 2024, except for the early 6:00 to 7:00 AM construction peak hour. Although the projected construction increment during this hour (in PCEs) would be slightly greater than the projected operational increment during the 8:00 to 9:00 AM commuter peak hour (also in PCEs), background traffic levels are correspondingly more than 25 percent lower during this early morning hour. Therefore, the potential traffic impacts during peak construction are expected to be within the envelope of significant adverse traffic impacts identified for the With Action condition in Chapter 14, "Transportation."

Table 20-8
Comparison of Incremental Construction and Operational
Peak Period Vehicle Trips in PCEs

Time	Peak Incremental Construction Vehicle Trips in PCEs			Peak Incremental Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)						
6-7 AM	113	22	135	9	7	16
7-8 AM	30	8	38	1	91	92
8-9 AM	10	10	20	-17	145	128
PM Peak Period (3:00 PM to 6:00PM)						
3-4 PM	4	95	99	93	92	185
4-5 PM	0	16	16	114	37	151
5-6 PM	0	0	0	139	8	147

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour.

The construction and operational traffic increments summarized above provide an indication that although significant adverse impacts during construction would be likely, the peak hour traffic conditions during peak construction are expected to be more favorable than those identified for the full build-out of proposed project (worst-case with big box scenario) in 2024. As detailed in Chapter 22, "Mitigation," measures to mitigate the operational traffic impacts in 2024 were recommended for implementation at up to ninesix intersections during one or more of the weekday analysis peak hours. These measures would encompass primarily signal timing changes and approach daylighting, all of which could be implemented early at the discretion of DOT to address actual conditions experienced at that time. However, as with the With Action condition (proposed project with big box retail scenario), there could also be significant adverse traffic impacts at the intersections of Canal Street and Hudson Street, ~~and~~ West Houston Street and West Street, West Houston Street and Varick Street, and Spring Street and West Street that could not be fully mitigated during one or more analysis peak hours.

Cumulative Operational and Construction Traffic Effects for Phased Development of the Proposed Project

Since the above assessment concluded the potential for significant adverse traffic impacts during construction, a more in-depth breakdown of cumulative operational and construction traffic effects was prepared to assess conditions during various points in time should the project be developed in phases rather than constructed all at once. Illustratively, trip-making during six interim scenarios had been identified for comparison to that from the full build-out of the proposed project with big box retail to determine if the cumulative operational and construction effects on traffic conditions surrounding the project site during any point in time could be beyond those concluded for the full operation of the proposed project. Specifically, **Tables 20-9 through 20-11** compare the cumulative trip-making with one of the three project sites (North, Center, and South) completed and occupied and the other two sites under construction, and **Tables 20-12 through 20-14** compare the cumulative trip-making with two of the three project sites completed and occupied and the remaining site under construction.

Table 20-9
North Site Operational and Center/South Sites Construction Cumulative Peak Period Vehicle Trips in PCEs

Time	Center and South Sites Construction Vehicle Trips in PCEs			North Site Operational Vehicle Trips in PCEs			Total Construction and Operational Vehicle Trips in PCEs			Full Build-Out (with Big Box Retail) Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)												
6-7 AM	214	30	244	3	2	5	217	32	249	9	7	16
7-8 AM	58	12	70	6	33	39	64	45	109	25	101	126
8-9 AM	12	12	24	46	70	116	58	82	140	185	253	438
PM Peak Period (3:00 PM to 6:00PM)												
3-4 PM	6	190	196	48	45	93	54	235	289	223	211	434
4-5 PM	0	34	34	58	49	107	58	83	141	309	242	551
5-6 PM	0	0	0	73	60	133	73	60	133	408	333	741

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour. Correspondingly, general traffic levels for the 3 to 4 PM hour are approximately the same as the 5 to 6 PM hour.

Table 20-10
Center Site Operational and North/South Sites Construction Cumulative Peak Period Vehicle Trips in PCEs

Time	North and South Sites Construction Vehicle Trips in PCEs			Center Site Operational Vehicle Trips in PCEs			Total Construction and Operational Vehicle Trips in PCEs			Full Build-Out (with Big Box Retail) Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)												
6-7 AM	177	24	201	6	5	11	183	29	212	9	7	16
7-8 AM	48	10	58	15	64	79	63	74	137	25	101	126
8-9 AM	10	10	20	108	147	255	118	157	275	185	253	438
PM Peak Period (3:00 PM to 6:00PM)												
3-4 PM	6	159	165	166	147	313	172	306	479	223	211	434
4-5 PM	0	28	28	174	165	339	174	193	367	309	242	551
5-6 PM	0	0	0	205	193	398	205	193	398	408	333	741

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour. Correspondingly, general traffic levels for the 3 to 4 PM hour are approximately the same as the 5 to 6 PM hour.

Table 20-11
South Site Operational and North/Center Sites Construction Cumulative Peak Period Vehicle Trips in PCEs

Time	North and Center Sites Construction Vehicle Trips in PCEs			South Site Operational Vehicle Trips in PCEs			Total Construction and Operational Vehicle Trips in PCEs			Full Build-Out (with Big Box Retail) Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)												
6-7 AM	280	42	322	0	0	0	280	42	322	9	7	16
7-8 AM	78	18	96	4	4	8	82	22	104	25	101	126
8-9 AM	18	18	36	31	36	67	49	54	103	185	253	438
PM Peak Period (3:00 PM to 6:00PM)												
3-4 PM	8	246	254	9	19	28	17	265	282	223	211	434
4-5 PM	0	44	44	77	28	105	77	72	149	309	242	551
5-6 PM	0	0	0	130	80	210	130	80	210	408	333	741

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour. Correspondingly, general traffic levels for the 3 to 4 PM hour are approximately the same as the 5 to 6 PM hour.

Table 20-12
North and Center Sites Operational and South Site Construction Cumulative Peak Period Vehicle Trips in PCEs

Time	South Site Construction Vehicle Trips in PCEs			North and Center Sites Operational Vehicle Trips in PCEs			Total Construction and Operational Vehicle Trips in PCEs			Full Build-Out (with Big Box Retail) Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)												
6-7 AM	56	6	62	9	7	16	65	13	78	9	7	16
7-8 AM	14	2	16	21	97	118	35	99	134	25	101	126
8-9 AM	2	2	4	154	217	371	156	219	375	185	253	438
PM Peak Period (3:00 PM to 6:00PM)												
3-4 PM	2	52	54	214	192	406	216	244	460	223	211	434
4-5 PM	0	9	9	232	214	446	232	223	455	309	242	551
5-6 PM	0	0	0	278	253	531	278	253	531	408	333	741

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour. Correspondingly, general traffic levels for the 3 to 4 PM hour are approximately the same as the 5 to 6 PM hour.

Table 20-13
North and South Sites Operational and Center Site Construction Cumulative Peak Period Vehicle Trips in PCEs

Time	Center Site Construction Vehicle Trips in PCEs			North and South Sites Operational Vehicle Trips in PCEs			Total Construction and Operational Vehicle Trips in PCEs			Full Build-Out (with Big Box Retail) Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)												
6-7 AM	159	24	183	3	2	5	162	26	188	9	7	16
7-8 AM	44	10	54	10	37	47	54	47	101	25	101	126
8-9 AM	10	10	20	77	106	183	87	116	203	185	253	438
PM Peak Period (3:00 PM to 6:00PM)												
3-4 PM	4	139	143	57	64	121	61	203	264	223	211	434
4-5 PM	0	25	25	135	77	212	135	102	237	309	242	551
5-6 PM	0	0	0	203	140	343	203	140	343	408	333	741

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour. Correspondingly, general traffic levels for the 3 to 4 PM hour are approximately the same as the 5 to 6 PM hour.

Table 20-14
Center and South Sites Operational and North Site Construction Cumulative Peak Period Vehicle Trips in PCEs

Time	North Site Construction Vehicle Trips in PCEs			Center and South Sites Operational Vehicle Trips in PCEs			Total Construction and Operational Vehicle Trips in PCEs			Full Build-Out (with Big Box Retail) Operational Vehicle Trips in PCEs		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Period (6:00 AM to 9:00AM)												
6-7 AM	121	18	139	6	5	11	127	23	150	9	7	16
7-8 AM	34	8	42	19	68	87	53	76	129	25	101	126
8-9 AM	8	8	16	139	183	322	147	191	338	185	253	438
PM Peak Period (3:00 PM to 6:00PM)												
3-4 PM	4	107	111	175	166	341	179	273	452	223	211	434
4-5 PM	0	19	19	251	193	444	251	212	463	309	242	551
5-6 PM	0	0	0	335	273	608	335	273	608	408	333	741

Note: Based on the study area ATRs, general traffic levels for the 6 to 7 AM hour are approximately 73 percent of the 8 to 9 AM hour. Correspondingly, general traffic levels for the 3 to 4 PM hour are approximately the same as the 5 to 6 PM hour.

In all instances, the cumulative trip-making during any point of project development in the morning and afternoon hours would be lower than the critical 8:00 to 9:00 AM and 5:00 to 6:00 PM commuter peak hours, for which project-related impacts were identified. Therefore, all potential traffic impacts and required mitigation measures have been identified as part of the assessment of the full build-out of the proposed project and a detailed construction traffic analysis is not warranted.

PARKING

As shown in **Table 20-3**, the peak number of workers during construction of the proposed project would be approximately 1,368 per day, and would occur in the second quarter of 2023. Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that 32 percent of construction workers would commute to the development site by private autos at an average occupancy of approximately 1.23 persons per vehicle. The anticipated construction activities are therefore projected to generate a maximum parking demand of 356 spaces. This parking demand could be fully accommodated by the off-street spaces and parking facilities available within a ¼-mile radius of the development site, where nearly 1,270 public parking spaces are currently available during the peak morning parking utilization period, as shown in Chapter 14, “Transportation.” Therefore, the construction for the proposed project would not result in any significant adverse parking impacts.

TRANSIT

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that approximately 65 percent of construction workers would commute to the development site via transit (58 percent by subway and 7 percent by bus). The study area is well-served by mass transit, including three subway lines (No. 1, C, and E) and numerous bus routes. During the peak construction worker shift (a maximum of 1,368 average daily construction workers in the 7:00 AM to 3:30 PM shift during the peak construction period for the proposed project and a maximum of 933 average daily construction workers in the 7:00 AM to 3:30 PM shift during peak construction period for the No Action development), this would correspond to approximately 889 and 606 workers traveling by transit, respectively. With 80 percent of these workers arriving or departing during the construction peak hours, the estimated number of peak-hour transit trips would be 711 and 485, respectively. **Table 20-15** provides a summary of the peak transit trip generation during peak construction for the proposed project and the No Action development.

Table 20-15
Incremental Peak Hour
Construction Transit Trip Projections

Scenario	Peak Construction Period (2nd Quarter of 2023)		
	Daily Construction Workers	Daily Construction Transit Trips	Peak Hour Construction Transit Trips
Proposed Project	1,368	889	711
No Action Development	933	606	485
Incremental	435	283	226

As shown in **Table 20-15,** compared with the construction without the proposed actions, construction associated with the proposed project would generate 226 additional transit trips during the peak construction period, which would exceed the *CEQR Technical Manual* threshold of 200-transit-trips. However, approximately 89 percent of the total transit trips would be by subway and 11 percent of the total transit trips would be by bus, which would correspond to approximately 202 peak hour subway trips and 24 peak hour bus trips. As described above, since the proposed project and No Action development could be accessed by three different subway lines within two different subway stations, neither subway station would exceed the *CEQR* threshold of 200 or more peak hour subway trips per station and therefore, construction for the proposed project would not result in any significant adverse subway impacts, and no further analysis is required. Additionally, since the peak hour bus trips would not exceed 50, no bus route would incur 50 or more peak hour riders in either direction for any peak hour and therefore construction of the proposed project would not result in any significant adverse bus line-haul impacts.

PEDESTRIANS

As summarized above, up to 1,368 average daily construction workers are projected in the 7:00 AM to 3:30 PM shift during peak construction for the proposed project and 933 average daily construction workers during peak construction for the No Action development. With 80 percent of these workers arriving or departing during the construction peak hours (6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM), the corresponding numbers of peak-hour pedestrian trips traversing the area's sidewalks, corners, and crosswalks would be approximately 1,094 and 746, respectively. **Table 20-16** provides a summary of the peak pedestrian trip generation during peak construction for the proposed project and the No Action development.

Table 20-16
Incremental Peak Hour
Construction Pedestrian Trip Projections

Scenario	Peak Construction Period (2nd Quarter of 2023)	
	Daily Construction Workers	Peak Hour Construction Pedestrian Trips
Proposed Project	1,368	1,094
No Action Development	933	746
Incremental	435	348

As shown in **Table 20-16,** compared with the construction without the proposed actions, construction associated with the proposed project would generate 348 additional pedestrian trips during the peak construction period, which would exceed the 2014 *CEQR Technical Manual* threshold of 200 pedestrian trips. Considering that these pedestrian trips would primarily occur outside of the typical commuter peak hours (8 to 9 AM and 5 to 6 PM), spread over multiple entrances, several nearby transit services, and a number of area parking facilities, and therefore be distributed among numerous sidewalks and crosswalks in the area, there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips. In addition, sidewalk protection or temporary sidewalks would be provided in accordance with DOT requirements to maintain pedestrian access if needed.

AIR QUALITY

Emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust generating construction activities, have the potential to affect air quality. The analysis of potential impacts on air quality from the construction of the proposed project includes a quantitative analysis of both on-site and on-road sources of air emissions, and the overall combined impact of both sources where applicable.

In general, much of the heavy equipment used in construction has diesel-powered engines and produces relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM). Fugitive dust generated by construction activities also contains particulate matter. Finally, gasoline engines produce relatively high levels of carbon monoxide (CO). As a result, the primary air pollutants of concern for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO. For more details regarding air pollutants see Chapter 15, "Air Quality."

For the quantitative analysis, concentrations was predicted using dispersion models to determine the potential for air quality impacts during on-site construction activities and due to construction-generated traffic on local roadways. Concentrations for each pollutant of concern due to construction activities at each sensitive receptor was predicted during the most representative worst-case time period where all three phases of the project would undergo demolition, excavation, and foundation work simultaneously. Additionally, concentrations were predicted during secondary worst-case time periods where two of the three phases of the project would undergo demolition, excavation, and foundation work simultaneously and the third site would be assumed to be completed in order to examine the effects of project construction activities on the completed portions of the proposed project.

EMISSION CONTROL MEASURSES

Construction activity in general has the potential to adversely affect air quality as a result of diesel emissions. To ensure that construction of the proposed building would result in the lowest practicable diesel particulate matter emissions, an emissions reduction program would be implemented for all construction activities, consisting of the following components:

- *Clean Fuel.* ULSD[1] fuel would be used exclusively for all diesel engines throughout the construction site.

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[1] The Environmental Protection Agency (EPA) required a major reduction in the sulfur content of diesel fuel intended for use in locomotive, marine, and non-road engines and equipment, including construction equipment. As of 2015, the diesel fuel produced by all large refiners, small refiners, and importers must be ULSD; fuel sulfur levels in non-road diesel fuel are limited to a maximum of 15 parts per million.

- *Dust Control Measures.* To minimize fugitive dust emissions from construction activities, a strict fugitive dust control plan including a robust watering program would be required as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the construction sites; truck routes within the development site would be either watered as needed or, in cases where such route would remain in the same place for an extended duration, the routes would be stabilized, covered with gravel, or temporarily paved to avoid the resuspension of dust; all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the development site; water sprays will be used for all demolition, excavation, and transfer of soils to ensure that materials will be dampened as necessary to avoid the suspension of dust into the air. Loose materials will be watered or covered. All measures required by the portion of the *New York City Air Pollution Control Code* regulating construction-related dust emissions will be implemented.
- *Idling Restriction.* In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time will also be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.
- *Diesel Equipment Reduction.* Construction would minimize the use of diesel engines and utilize electric engines to the extent practicable. To that end, the project sponsors would meet with Con Edison to arrange for the provision of grid power to each building site for use during construction to ensure the availability of grid power and reduce the need for on-site generators. Equipment that would use grid power in lieu of diesel engines includes, but may not be limited to, welders, rebar benders, scissor lifts, and hydraulic articulating boom lifts.
- *Best Available Tailpipe Reduction Technologies.* Non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project) including but not limited to concrete mixing and pumping trucks would utilize the best available tailpipe (BAT) technology for reducing diesel particulate matter (DPM) emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Construction contracts shall specify that all diesel non-road engines rated at 50 hp or greater would utilize DPFs, either installed by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPFs must be verified by EPA or the California Air Resources Board (CARB). Active DPFs or other technologies proven to achieve an equivalent reduction may also be used.
- *Utilization of Newer Equipment.* EPA's Tier 1 through 4 standards for non-road engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons (HC). All non-road construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3[2] emissions standard (alternatively at least the Tier 4

[2] The first federal regulations for new nonroad diesel engines were adopted in 1994, and signed by EPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3 standards for equipment manufactured in 2000 through 2008. In 2004, the EPA introduced Tier 4 emissions standards with a phased-in period of 2008 to 2015. The Tier 1 through 4 standards regulate the EPA criteria pollutants, including particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NO_x) and

final emissions standard). All non-road engines in the project rated less than 50 hp would meet at least the Tier 2 emissions standard.

Overall, this emissions control program is expected to significantly reduce DPM emissions by a similar reduction level that would be achieved by applying the currently defined best available control technologies under New York City Local Law 77 of 2003, which are required only for publically funded City projects.

METHODOLOGY

The following sections delineate additional details relevant only to the construction air quality analysis methodology. A review of the pollutants for analysis; applicable regulations, standards, and benchmarks; and general methodology for stationary source air quality analyses can be found in Chapter 15, "Air Quality." NAAQS are presented in Table 15-1.

The *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[3] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS would be deemed to have a potential significant adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted. The impact criteria for the construction analysis are consistent with those considered in Chapter 15, "Air Quality."

On-Site Construction Activity Assessment

To determine which construction periods constitute the worst-case periods for the pollutants of concern (PM, CO, NO_2), construction-related emissions were calculated for each calendar year throughout the duration of construction on a rolling annual and peak day basis for $PM_{2.5}$. $PM_{2.5}$ was selected for determining the worst-case periods for all pollutants analyzed, because the ratio of predicted $PM_{2.5}$ incremental concentrations to impact criteria is anticipated to be higher than for other pollutants. Therefore, initial estimates of $PM_{2.5}$ emissions throughout the construction years would be used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of PM_{10} and NO_2 would follow $PM_{2.5}$ emissions, since they are related to diesel engines by horsepower. CO emissions may have a somewhat different pattern but would also be anticipated to be highest during periods when the most activity would occur. The most representative worst-case time period would occur when all three phases of the project would undergo demolition, excavation, and foundation work simultaneously.

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carbon monoxide (CO). Prior to 1998, emissions from nonroad diesel engines were unregulated. These engines are typically referred to as Tier 0.

[3] New York City. *CEQR Technical Manual*. Chapter 1, section 222. March 2014; and New York State Environmental Quality Review Regulations, 6 NYCRR § 617.7

However, since the construction of the proposed project could instead be phased, the effects of project construction activities on completed portions of the proposed project including the proposed open space, were also examined.

Engine Exhaust Emissions

Emission factors for NO_x, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines were developed using the latest EPA NONROAD Emission Model (NONROAD2008a). The model is based on source inventory data accumulated for specific categories of -non-road equipment. The emission factors for each type of equipment, with the exception of trucks, were determined from the output files for the NONROAD model (i.e., calculated from regional emissions estimates). Tailpipe emission rates for NO_x, CO, PM_{10}, and $PM_{2.5}$ from heavy trucks on-site (e.g., dump trucks, concrete trucks) and construction worker vehicles were developed using the most recent version of the EPA Mobile Source Emission Simulator (MOVES2014a) as referenced in the *CEQR Technical Manual*. This emissions model is capable of calculating engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway types, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOVES incorporate the most current guidance available from NYSDEC. For analysis purposes, it was assumed that the concrete trucks would operate for 60 minutes per hour and heavy trucks, such as dump trucks and tractors would have a maximum of a three-minute idle time.

Annual NO_2 concentrations were estimated using a NO_2 to NO_x ratio of 0.75 (Tier 2), as described in USEPA's Guideline on Air Quality Models at 40 CFR part 51 Appendix W, Section 5.2.4.[4]

The air quality analysis also took into account the application of required and available pollutant control technologies. As discussed above in "Emission Reduction Measures," an emissions reduction program would be implemented for all construction activities, including the use of Tier 3 or later equipment with DPFs. Therefore, estimated PM emission rates for non-road equipment were reduced to account for this add-on control technology. The control efficiency assumed for the DPFs is 90 percent, although a much higher percentage of control is likely.[5] Based on the proposed project's requirements and the availability of construction technologies, NONROAD emission factors for non-road engines were calculated assuming the use of ULSD and the application of DPFs on all non-road diesel engines 50 hp or greater. 2017 MOVES emission factors were conservatively used for construction trucks (the fleet-average emissions during the first year of construction are higher than the fleet-average emissions during subsequent years of construction as older equipment gets replaced by newer equipment with lower emissions standards).

Fugitive Emission Sources

In addition to engine emissions, fugitive dust emissions from operations (e.g., excavation and transferring of excavated materials into dump trucks) were calculated based on procedures delineated in AP-42 Table 13.2.3-1. The analysis of material handling activities also accounted

[4] http://www.epa.gov/scram001/guidance/guide/appw_05.pdf

[5] USEPA Verified Technologies List, http://epa.gov/cleandiesel/verification/verif-list.htm accessed on November 16, 2011.

for a dust control plan with at least a 50 percent reduction in PM_{10} and $PM_{2.5}$ emissions from fugitive dust through wet suppression as discussed above in "Emission Reduction Measures." Road dust emissions from vehicle travel on the on-site roadways (park access road) were calculated using equations from USEPA's AP-42, Section 13.2 for paved roads.

Location of nearby Nearby sensitive Sensitive receptorsReceptors

The area immediately surrounding the development site consists predominantly of industrial, manufacturing, and commercial uses; however, Hudson River Park is located west of the development site across Route 9A, and residential locations exist to the north and east of the development site as well. The nearest existing residential building (i.e., six-story 547 Greenwich Street) is located approximately 280 feet east of the development site, although it is shielded by a 3-story building at Kingston Street. The next nearest residential building (i.e., six-story 43 Clarkson Street) is located to the west of the northernmost edge of the development site approximately 300 feet from the development site. Hudson River Park is located approximately 100 feet west of the development site. In addition, the proposed residential building at 354-361 West Street is located approximately 60 feet north of the development site across Clarkson Street.

DURATION AND INTENSITY OF CONSTRUCTION ACTIVITIES

Construction of the proposed building, as is the case with any construction project, may be disruptive to the surrounding area. While the overall construction duration for the North Site, Center Site, and South Site are approximately 45 months, 46 months, and 41 months, respectively, the construction duration for the most intense construction activities in terms of air pollutant emissions (demolition, excavation, and foundation stages, where the largest number of large non-road diesel engines would be employed) is anticipated to occur for only a portion of the duration approximately 10 months for the North Site, approximately 11 months for the Center Site, and approximately 10 months for the South Site. The other stages of construction, including superstructure, exteriors, interior fit-out and site work, would result in much lower air emissions since they would require few pieces of heavy duty diesel equipment. The equipment required for the latter stages of construction would generally have small engines and would be dispersed vertically throughout the building, resulting in very low concentration increments in adjacent areas. In addition, the latter stages of construction would not involve soil disturbance activities and therefore would result in significantly lower dust emissions. Further, most of the interiors and finishing activities would be shielded from nearby sensitive receptors by the proposed structure itself. Moreover, as discussed above, the area immediately surrounding the development site consists predominantly of industrial, manufacturing, and commercial uses with the nearest sensitive receptor being the proposed residential building at 354-361 West Street, located approximately 60 feet north of the development site across Clarkson Street. Air emissions generated by construction activities would be greatly dispersed at such distances before reaching the sensitive receptor locations, and would result in low concentration increments.

Large non-road diesel engines (i.e., excavators and loaders) utilized during construction would generally move and be distributed throughout the development site. The air pollutant emission levels associated with construction of the proposed project are typical of high-rise building construction in New York City that would require demolition, excavation, and foundation construction (where large equipment such as excavators and loaders would be employed). However, emissions would generally be lower due to the emission control measures that would be implemented during construction for the proposed project (see "Emission Control Measures," below).

Effects of Construction on Completed Portions of the Proposed Project

The construction analysis considered the potential for the proposed project to result in significant adverse environmental impacts based on the reasonable worst-case construction phasing plan, which conservatively assumes that all three construction phases of the project would undergo simultaneously. However, since the construction of the proposed project could instead be phased, the effects of project construction activities on completed portions of the proposed project are also examined.

In the event of phased construction, one proposed project building may be completed and occupied while construction activity is underway at another proposed project building (e.g., North Site complete and occupied while Center Site and South Site are undergoing demolition, excavation, and foundation work). Each of the proposed project buildings are separated by a distance of approximately 60 feet, which is similar to the distance from the development site to the proposed residential building at 354-361 West Street. As discussed above, while the overall construction duration for the Center Site and South Site are approximately 46 month, and 41 months, respectively, the construction duration for the most intense construction activities in terms of air pollutant emissions (demolition, excavation, and foundation stages, where the largest number of large non-road diesel engines would be employed) is anticipated to occur for only a portion of the duration—approximately 11 months for the Center Site, and approximately 10 months for the South Site. Furthermore, the proposed project's emission reduction program would greatly reduce air emissions levels. Therefore, the effects of project construction on the completed portion of the projectis expected to be within the envelope of impacts analyzed for the reasonable worst-case construction phasing plan when all three construction phases of the project would undergo simultaneously. In order to verify this conclusion, between the DEIS and FEIS, a detailed modeling analysis will be performed of air quality concentrations at completed and occupied project buildings resulting from construction of the proposed project. If any potential exceedances of NAAQS, or applicable *de minimis* criteria are identified, the analysis will examine the practicability and feasibility of implementing additional control measures as necessary to reduce or eliminate the impacts.

Depending on the construction phasing, the proposed outdoor open space on the platform spanning West Houston Street may be completed and become publicly accessible during construction activities at theNorth Site , Center Site, or the South Site. However, due to the proximity of the open space to the proposed building towers, strict safety requirements must be implemented to protect this area during construction such that there would unlikely be a direct pathway between the construction sources and this future sensitive receptor location. In addition, as discussed above, the proposed project's emission reduction program would greatly reduce air emissions levels. Nevertheless, in order to verify this conclusion, between the DEIS and FEIS, a detailed modeling analysis will be performed of air quality concentrations at the proposed outdoor open space resulting from construction of the proposed project. If any potential exceedances of NAAQS, or applicable *de minimis* criteria are identified, the analysis will examine the practicability and feasibility of implementing additional control measures as necessary to reduce or eliminate the impacts.

Dispersion Modeling

Potential impacts from non-road sources were evaluated using the EPA/AMS AERMOD dispersion model (version 15181). AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources), and the preferred model by both EPA and NYSDEC. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of the interaction between the plume and terrain. The AERMOD model calculates pollutant concentrations from one or more points (e.g. exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations when the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures.

Source Simulation

During construction, various types of construction equipment would be used at different locations throughout the project areas. Some of the equipment would be mobile and operate throughout specified areas, while some would remain fixed at distinct locations for short-term and even annual periods. For the short-term model scenarios (predicting concentration averages for periods of 24 hours or less), ~~all~~ non-road diesel-powered or gasoline powered ~~sources~~engines of all sizes –such as compressors, pile drivers, cranes, or concrete trucks, which are likely to operate in a fixed location at a given day, were simulated as point sources. Other -engines such as excavators and loaders, which would move around the site on any given hour or day, were simulated as area sources. All sources would move around the site throughout the year and were therefore simulated as area sources in the annual analyses.

Meteorological Data

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at La Guardia Airport (2011-2015) and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data were processed using the EPA AERMET program to develop data in a format which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data were available were classified using categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

Background Concentrations

To estimate the maximum expected total pollutant concentrations, the calculated impacts from the emission sources must be added to a background value that accounts for existing pollutant concentrations from other sources (see **Table 20-17**). The background levels are based on concentrations monitored at the nearest NYSDEC ambient air monitoring stations. These represent the most recent 3-year average for 24-hour average $PM_{2.5}$, the highest value from the three most recent years of available data for PM_{10}, and the highest value from the five most recent years of data available for all other pollutants and averaging period combinations.

For the 24-hour PM_{10} concentration, the highest second-highest measured values over the most recent three years were used. The annual average background values are the highest measured average concentrations for these pollutants.

$PM_{2.5}$ impacts are assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria. The $PM_{2.5}$ 24-hour average background concentration of 23.9 $\mu g/m^3$ (based on the 98th percentile concentrations, averaged over 2013 to 2015) was used to establish the *de minimis* value.

Table 20-17
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m^3)	NAAQS (µg/m^3)
NO_2	Annual	Queens College, Queens	32.9	100
CO	1-hour	CCNY, Manhattan	2.7 (ppm)	35 (ppm)
CO	8-hour	CCNY, Manhattan	1.6 (ppm)	9 (ppm)
PM_{10}	24-hour	Division Street, Manhattan	48	150
$PM_{2.5}$	24-hour	Division Street, Manhattan	23.9	35

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2011–2015.

Off-site Site sourcesSources

As discussed above under "Transportation," the peak hour traffic conditions during peak construction would be more favorable than those identified for the full build-out of the proposed project in since peak construction would not result in increases in vehicle volumes higher than those identified in the operational condition. In addition, although temporary curb-lane closures would be required adjacent to the development site (as is typical with New York City construction projects), construction of the proposed project would not result in any roadway closures or traffic diversions. Furthermore, construction worker commuting trips and construction truck deliveries would generally occur during off-peak hours. Moreover, when distributed over the transportation network, the construction trip increments would not concentrate at any single location. Therefore, construction of the proposed project would not result in significant adverse air quality impacts related to vehicular traffic, and further mobile-source analysis is not required. Between the DEIS and the FEIS, Nevertheless, since emissions from on-site construction equipment and on-road construction-related vehicles may contribute to concentration increments concurrently, on-road emissions adjacent to the construction sites were included with the on-site dispersion analysis (in addition to on-site truck and non-road engine activity) in order to address all local project-related emissions cumulatively.

cumulative impacts from on-site and on-road sources will be assessed at completed and occupied project buildings resulting from construction of the proposed project.

On-Road Vehicle Emissions Vehicular engine emission factors were computed using the EPA mobile source emissions model, MOVES2014a.[6] This emissions model is capable of calculating engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway type and grade, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOVES incorporate the most current guidance available from NYSDEC.

On-Road Fugitive Dust

$PM_{2.5}$ and PM_{10} emission rates were determined with fugitive road dust to account for their impacts. However, fugitive road dust were not included in the annual average $PM_{2.5}$ microscale analyses, as per current *CEQR Technical Manual* guidance used for mobile source analysis. Road dust emission factors were calculated according to the latest procedure delineated by

[6] EPA, Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES2014a, November 2015.

EPA[7]. An average weight of 17.5 tons and 2.5 tons was assumed for construction trucks and worker vehicles in the analyses, respectively.

CONSTRUCTION EFFECTS OF THE PROPOSED PROJECT

CONCLUSIONS Between the DEIS and FEIS, a detailed modeling analysis will be conducted to quantify the levels of construction air quality concentrations that may occur at project elements and/or existing tenants should they be completed and occupied during construction on one or more of the other project buildings. Should any potential exceedances of NAAQS, or applicable *de minimis* criteria are identified, the analysis will examine the practicability and feasibility of implementing additional control measures as necessary to reduce or eliminate the impacts.

As discussed above in "Methodology," concentrations for each pollutant of concern due to construction activities at each sensitive receptor were predicted during the period where all three phases of the project would undergo demolition, excavation, and foundation work simultaneously. In addition, since the construction of the proposed project could instead be phased, the effects of project construction activities on completed portions of the proposed project including the proposed open space, were also examined.

Maximum predicted concentration increments and overall concentrations including background concentrations from simultaneous construction activity at all three project sites and at two of the three project sites are presented in **Tables 20-18**. Maximum CO and NO_2 concentrations would predominantly occur at sidewalk locations to the east and west of the project site – along West Street and Washington Street. However, maximum PM_{10} and $PM_{2.5}$ results would occur along the northern façade of the project building located on the South Site when construction activity would occur simultaneously at the North Site and Center Site.

Table 20-18
Pollutant Concentrations from Construction Site Sources (μg/m³)

Pollutant	Averaging Period	Maximum Predicted Increment	Background Concentration	Maximum Predicted Total Concentration	*De Minimis* Criteria (1)	NAAQS
Simultaneous Construction at All Three Project Sites						
$PM_{2.5}$	24-hour	4.4	23.9	-	5.6	35
	Annual	0.296	-	-	0.3	15
PM_{10}	24-hour	4.4	48	51.9	-	150
NO_2	Annual	12.0	32.9	44.9	-	100
CO	1-hour	7.8	2.7	10.5	-	35 ppm
	8-hour	2.3	1.6	3.9	-	9 ppm
Simultaneous Construction at Two Project Sites with One Project Building Complete and Operational						
$PM_{2.5}$	24-hour	4.4	23.9	-	5.6	35
	Annual	0.288	-	-	0.3	15
PM_{10}	24-hour	4.4	48	52.1	-	150
NO_2	Annual	11.7	32.9	44.6	-	100
CO	1-hour	7.8	2.7	10.5	-	35 ppm
	8-hour	2.3	1.6	3.9	-	9 ppm

Notes:
$PM_{2.5}$ concentration increments are compared to the *de minimis* criteria. Increments of all other pollutants are compared with the NAAQS to evaluate the magnitude of the increments. Comparison to the NAAQS is based on total concentrations.
(1) $PM_{2.5}$ *de minimis* criteria is defined as: 24-hour average not to exceed more than half the difference between the background concentration and the 24-hour NAAQS; annual average not to exceed more than 0.3 μg/m³ at discrete receptor locations.

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[7] EPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1, NC, http://www.epa.gov/ttn/chief/ap42, January 2011.

As shown, the maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are below the applicable NAAQS for construction activities under both scenarios. In addition, the maximum predicted $PM_{2.5}$ incremental concentrations under both scenarios would not exceed the applicable CEQR *de minimis* criteria of 5.6 $\mu g/m^3$ in the 24-hour average period or 0.3 $\mu g/m^3$ in the annual average period. Therefore, no significant adverse impacts on air quality are predicted during the construction of the proposed project.

NOISE

Impacts on community noise levels during construction of the proposed project could result from noise from construction equipment operation and from construction and delivery vehicles traveling to and from the construction site. Noise levels caused by construction activities vary widely and depend on the stage of construction and the location of the construction relative to sensitive receptor locations. The most significant construction noise sources are expected to be the operation of impact equipment such as hydraulic break rams as well as movements of trucks to and from the development site. Noise from construction activities and some construction equipment is regulated by the *New York City Noise Control Code*. The *New York City Noise Control Code* requires the adoption and implementation of a noise mitigation plan for each construction site, limits construction (absent special approvals) to weekdays between the hours of 7:00 AM and 6:00 PM, and sets noise limits for certain specific pieces of construction equipment.

CONSTRUCTION NOISE IMPACT CRITERIA

The *CEQR Technical Manual* breaks construction duration into “short-term” and “long-term”, and states that assessment of construction noise is not likely to result in an impact unless it “affects a sensitive receptor over a long period of time.” Consequently, the construction noise analysis considers both the potential for construction of the proposed project to create high noise levels (the “intensity”), and whether construction noise would occur for an extended period of time (the “duration”) in evaluating potential construction noise impacts.

The *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No Action noise level as the baseline, should be used for assessing construction impacts. As recommended in the *CEQR Technical Manual*, this study uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

- If the No Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would be considered a significant increase.
- If the No Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the *CEQR* criteria as being between 10:00 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$.
- For residential spaces to be created as part of the proposed project, noise levels during construction were evaluated based on the *CEQR Technical Manual* noise exposure guidance for residential uses, which specify an $L_{10(1)}$ noise level of 45 dBA as acceptable for residential use. Exceedances of this threshold that do not occur “over a long period of time,” as mentioned above, are not considered to constitute significant adverse noise impacts.

NOISE ANALYSIS FUNDAMENTALS

Construction activities for the proposed project would be expected to result in increased noise levels as a result of: (1) the operation of construction equipment on-site; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the roadways to and from the development site.

Noise from the operation of construction equipment on-site at a specific receptor location near a construction site is generally calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise level at a receptor site is a function of the following:

- The noise emission level of the equipment;
- A usage factor, which accounts for the percentage of time the equipment is operating at full power;
- The distance between the piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.

Similarly, noise levels due to construction-related traffic are a function of the following:

- The noise emission levels of the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Volume of vehicular traffic on each roadway segment;
- Vehicular speed;
- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

LOCATION OF NEARBY SENSITIVE RECEPTORS

As discussed above under "Air Quality," the area immediately surrounding the development site consists predominantly of industrial, manufacturing, and commercial uses; however, Hudson River Park is located west of the development site across Route 9A, and residential locations exist to the north and east of the development site as well. The nearest existing residential building (i.e., six-story 547 Greenwich Street) is located approximately 280 feet east of the development site, although it is shielded by a 3 story building at Kingston Street. The next nearest residential building (i.e., six-story 43 Clarkson Street) is located to the west of the northernmost edge of the development site approximately 300 feet from the development site. Hudson River Park is located approximately 100 feet west of the development site. In addition, the proposed residential building at 354-361 West Street is located approximately 60 feet north of the development site.

Should the buildings included in the proposed project be constructed in phases such that one or more project buildings would be completed and occupied while construction occurs at another building or buildings, those completed and occupied buildings would constitute newly introduced sensitive receptors subject to CEQR noise exposure guidelines, including exposure to noise resulting from construction. The distance between the North Site and Center Site is approximately 65 feet. The distance between the Center Site and South Site is approximately 60 feet. The distance between the North Site and South Site is approximately 470 feet. The proposed elevated open space between the North Site and Center Site is immediately adjacent to both of those Sites.

NOISE REDUCTION MEASURES

Construction of the proposed project would follow the requirements of the *New York City Noise Control Code* (*New York City Noise Code*) for construction noise control measures. Specific noise control measures would be described in a noise mitigation plan required under the *New York City Noise Code*. These measures would include a variety of source and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures would be implemented in accordance with the New York City Noise Code:

- Equipment that meets the sound level standards specified in Subchapter 5 of the *New York City Noise Control Code* would be used from the start of construction. **Table 20-~~17~~ 19** shows the noise levels for typical construction equipment.
- Piles for the proposed project buildings are expected to be drilled caissons rather than impact-driven piles[8];
- As early in the construction period as logistics would allow, diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as pumps, compressors, and hoists (i.e., early electrification) to the extent feasible and practicable.
- Where feasible and practical, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for construction would be implemented to the extent feasible and practical:

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations. Once building foundations are completed, delivery trucks would operate behind a construction fence, where possible;
- Noise barriers would be utilized to provide shielding (i.e., the construction sites would have a 8-foot site perimeter barrier).

[8] While there is no expectation for the use of impact-driven piles for project buildings, the construction noise analysis included impact pile drivers to ensure a conservative analysis.

Table 20-~~17~~19
Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	NYCDEP Mandated Noise Level at 50 feet[1]
Backhoe/Loader	80
Bobcat	85
Bulldozer	85
Compactor	80
Compressor	80
Concrete Pump	82
Concrete Truck	85
Cranes (Mobile)	85
Cranes (Tower)	85
Delivery Truck	84
Dump Truck	84
Excavator	85
Generator	82
Hydraulic Break Ram	90
Hoist	75
Hydraulic Pile Driver	95
Impact Wrench	85
Jack Hammer	85
Pump	77

Note: 1. Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007.

Sources: Table 22-1, Noise Emission Reference Levels (A-weighted decibels with RMS "slow" time constant), Chapter 22, 2014 *CEQR Technical Manual*. Transit Noise and Vibration Impact Assessment, Federal Transportation Administration (FTA), May 2006.

The residential receptor sites described above each have receptor control measures (i.e., measures that reduce the effects of construction noise at the receptor) as well. The future residential building at 354-361 West Street is subject to an (E) designation requiring it provide between 26 and 39 dBA of window/wall attenuation depending on the façade and floor, as well as an alternate means of ventilation. The proposed project buildings will also be mapped with (E) designations as described in Chapter 17, "Noise" requiring 26 to 41 dBA window/wall attenuation depending on the specific façade, as well as an alternate means of ventilation. Consequently, the interior noise levels at these buildings would be lower than the predicted exterior levels by the amount shown for each façade in Table 17-5.

CONSTRUCTION NOISE ANALYSIS

The construction noise analysis considers the noise generated by construction-related traffic, including delivery trucks and worker vehicles, traveling to and from the development site as well as by on-site construction equipment and activity. The analysis looks first at the intensity of noise levels during construction, then assesses the potential duration of those noise levels, and finally makes a determination of the potential for impact. The most noise-sensitive construction activities would be demolition, excavation and foundation work, which would last approximately 10 months for the North Site, approximately 11 months for the Center Site, and approximately 10 months for the South Site.

Construction noise was analyzed separately for existing noise receptors, the 354-361 West Street building expected to be completed and occupied during construction of the proposed project, and future noise receptors that would be introduced by the project buildings themselves, which could experience construction noise should they be completed and occupied while construction is ongoing at adjacent project development sites.

CONSTRUCTION NOISE AT EXISTING NOISE RECEPTORS

The noise analysis for existing noise receptors conservatively considers the case where all three phases of the project would undergo demolition, excavation, and foundation work simultaneously, which would result in the worst-case construction-generated noise levels at these receptors.

~~The noise analysis also considers the potential for phased construction, including the possibility that one or more project buildings would be completed and occupied during construction on one or more of the other building(s). Between the DEIS and FEIS, a detailed modeling analysis will be conducted to quantify the levels of construction noise that may occur at project buildings should they be completed and occupied during construction on one or more of the other project buildings. Based on the results of this analysis, noise control measures beyond those specified in this chapter and/or window/wall attenuation levels beyond those specified in Chapter 17, "Noise," may be identified.~~

Mobile Construction Noise Sources

Throughout the construction period, vehicles including construction-related trucks and vehicles driven by workers at the construction would travel near the development site. Trucks approaching the construction site would enter from Washington Street. They would access Washington Street from West Street via Clarkson Street or Spring Street. Consequently, the roadways where construction-generated vehicle trips would have the greatest potential to result in significant increases in noise would be West Street, Clarkson Street, Spring Street, and Washington Street. At other roadways, the construction-related vehicles would be distributed amongst the different routes to and from the development site, and would thus not be concentrated enough to result in a significant increase in noise.

As described above in "Transportation," the amount of traffic generated by the construction of the proposed project would be less than traffic volumes in the existing condition along West Street, because the existing condition traffic volumes are so high. There are no existing noise sensitive receptors along Clarkson Street or Spring Street between West Street and Washington Street or along Washington Street between Clarkson Street and Spring Street. Should the construction proceed according to a phased schedule such that one or more project buildings would be completed and occupied during construction on one or more of the other building(s), a completed and occupied project building may be located along one of these routes. ~~The potential effects of these construction-related trips on noise levels at completed and occupied project buildings will be examined as part of the detailed noise modeling analysis to be conducted between the DEIS and FEIS.~~

Intensity of Construction Noise from On-Site Sources

With the construction noise control measures described above, maximum $L_{eq(1)}$ noise levels during construction would be expected to be approximately in the mid 80s dBA at 10 to 20 feet from the construction site boundary[9] or the mid to high-70s dBA at 50 to 100 feet from the

[9] Based on detailed noise analyses prepared for several large-scale construction projects with comparable noise-control measure commitments, including Seward Park (*CEQR* No.

construction site boundary. These maximum noise levels would occur during the loudest periods of construction, which would be pile driving for support of excavation (no structural piles are required for the proposed buildings). These levels are construction-only levels, not including background noise, to be applied in this noise analysis by projecting them to noise receptors within the study area. Noise levels resulting from construction of the proposed project were projected at the receptors described above based on distance and shielding provided by existing buildings and structures or project buildings already constructed. To project the reference construction noise levels described above to the surrounding receptors, a 6 dBA reduction in construction noise level per doubling of distance from the construction site boundary was assumed. Receptors whose line of sight to the development site is broken by a taller building were assumed to experience a 10 dBA reduction in construction noise level due to shielding.

The nearest existing residential building (i.e., 547 Greenwich Street), which is approximately 280 feet east of the development site, represents the sensitive receptor location most likely to experience increased noise levels resulting from the operation of stationary construction equipment. With the construction noise control measures described above and based on the distance and shielding projections described above, maximum $L_{eq(1)}$ noise levels at this building would be expected to be approximately in the low to mid 60s dBA during the loudest periods of demolition, excavation, and foundation work. The maximum noise levels during these stages of construction would occur during demolition using a hydraulic break ram or during excavation/foundation construction including the use of pile installation rigs (these pieces of equipment would not be used simultaneously). These pieces of equipment would not be used continuously throughout the duration of these stages of construction, nor would they be used continuously throughout each day that they would be used. Measured existing noise levels as shown in Chapter 17, "Noise," near this location were in the high 60s to low 70s dBA, and would be expected to remain relatively unchanged in the future without the proposed project, as this provides a conservative estimate of background noise levels for comparison. Consequently, at this residential building, the maximum noise levels predicted to be generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria. This receptor is not discussed further.

At the next nearest existing residential building (i.e., 43 Clarkson Street), located approximately 300 feet from the development, maximum $L_{eq(1)}$ noise levels would be expected to be approximately in the low to mid 60s dBA during the demolition, excavation, and foundation work based on the distance and shielding projections described above. Measured existing noise levels near this location were in the low 70s dBA, as shown in Chapter 17, "Noise," and would be expected to remain relatively unchanged in the future without the proposed project, as this provides a conservative estimate of background noise levels for comparison. Consequently, noise generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria. This receptor is not discussed further.

At the Hudson River Park open space approximately 100 feet west of the development site, maximum $L_{eq(1)}$ noise levels would be expected to be approximately in the low to mid 70s dBA during the demolition, excavation, and foundation work. Measured existing noise levels near this

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11DME012M) and Halletts Point (*CEQR* No. 09DCP084Q). These assumptions will be verified and adjusted as necessary based on the detailed analysis of construction at the proposed project site to be conducted between the DEIS and FEIS.

location were in the high 70s to low 80s dBA as shown in Chapter 17, "Noise," and would be expected to remain relatively unchanged in the future without the proposed project as this provides a conservative estimate of background noise levels for comparison. Consequently, noise generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria. This receptor is not discussed further.

DETAILED CONSTRUCTION NOISE ANALYSIS FOR COMPLETED PORTIONS OF THE PROPOSED PROJECT AND FUTURE RESIDENTIAL BUILDING AT 354-361 WEST STREET

A detailed modeling analysis was conducted between the DEIS and FEIS to quantify the levels of construction noise that may occur at 354-361 West Street under a worst-case construction schedule that would result in construction of all three project buildings simultaneously while 354-361 West Street is completed and occupied. A separate analysis was also conducted between the DEIS and FEIS to quantify the levels of construction noise that may occur at project buildings under a phased construction schedule that would result in construction of project buildings immediately adjacent to newly completed residential buildings.

Construction Noise Modeling

Noise effects from construction activities were evaluated using the CadnaA model, a computerized model developed by DataKustik for noise prediction and assessment. The model can be used for the analysis of a wide variety of noise sources, including stationary sources (e.g., construction equipment, industrial equipment, power generation equipment), transportation sources (e.g., roads, highways, railroad lines, busways, airports), and other specialized sources (e.g., sporting facilities). The model takes into account the reference sound pressure levels of the noise sources at 50 feet, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, etc. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. This standard is currently under review for adoption by the American National Standards Institute (ANSI) as an American Standard. The CadnaA model is a state-of-the-art tool for noise analysis and is approved for construction noise level prediction by the *CEQR Technical Manual*.

Geographic input data used with the CadnaA model included CAD drawings that define site work areas, adjacent building footprints and heights, locations of streets, and locations of sensitive receptors. For each analysis period, the geographic location and operational characteristics—including equipment usage rates (percentage of time operating at full power) for each piece of construction equipment operating at the project site, as well as noise control measures—were input to the model. In addition, reflections and shielding by barriers erected on the construction site, and shielding from both adjacent buildings and project buildings as they are constructed, were accounted for in the model. In addition, construction-related vehicles were assigned to the adjacent roadways (i.e., Clarkson Street and Washington Street). The model produced A-weighted $L_{eq(1)}$ noise levels at each receptor location on the project buildings and West Street building for each analysis period, as well as the contribution from each noise source. The construction $L_{10(1)}$ noise levels at project buildings and the West Street building were conservatively estimated by adding 3 dBA to the $L_{eq(1)}$ noise levels, as is standard practice[10].

[10] Federal Highway Administration Roadway Construction Noise Model User's Guide, Page 15. http://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf

Analysis Time Period Selection

Because the expected order in which the project buildings would be constructed has not been determined, multiple potential phasing orders were considered based on the worst-case scenario for each group of receptors. For 354-361 West Street, simultaneous construction of all three project buildings was determined to be the worst case scenario. For the project buildings, each building was assumed to be completed and occupied while both of the other two buildings were undergoing simultaneous construction. The following four potential phasing orders were considered: 1) the future 354-361 West Street building completed and occupied during simultaneous construction of all three project buildings, 2) the North Site building completed and occupied during simultaneous construction of the Center and South Sites, 3) the Center Site building completed and occupied during simultaneous construction of the North and South Sites, and 4) the South Site building completed and occupied during simultaneous construction of the North and Center Sites,

Based on conceptual construction schedules for each building developed by an experienced New York City construction manager, an analysis was performed to determine the month during each year of construction at each building Site when the maximum potential for construction noise would occur. This analysis conservatively assumed that the selected worst-case month of each year would represent the entire year, and the year was modeled according to its peak month. To be conservative, the noise analysis assumed that both peak on-site construction activities and peak construction-related traffic conditions would occur simultaneously. For each year of construction in each construction phasing scenario, the worst-case period for each construction site was assumed to be happening simultaneously. The coincidence of worst-case time periods was assumed in order to provide a conservative analysis.

Determination of Non-Construction Noise Levels

Noise generated by construction activities (calculated using the CadnaA model as described above) was added to noise generated by non-construction traffic on adjacent roadways in order to determine the total noise levels at each receptor location. Noise levels generated by traffic in the future with the proposed project were used as non-construction noise levels to which construction noise levels were added. Upon completion of each of the three development sites (i.e., North Site, Center Site, and South Site), 1/3 of the increment between existing-condition non-construction noise levels and maximum build-condition non-construction noise levels (all of which are shown in Table 17-4 of Chapter 17, "Noise") was assumed to have occurred. For example, during construction on the Center Site and South SIte, when the North Site would be completed and occupied, the non-construction noise level at each receptor was assumed to be the existing-condition noise level plus 1/3 of the increment between existing-condition level and the maximum build-condition level. The non-construction noise level from the nearest operational noise receptor site (i.e., Sites 1 through 4) was applied to each calculation point in the CadnaA model.

~~At the proposed residential building (i.e., 354-361 West Street), located approximately 60 feet north of the development site, maximum $L_{eq(1)}$ noise levels would be expected to be approximately in the low to mid 70s dBA during the demolition, excavation, and foundation work. Measured existing noise levels near this location were in the low 70s dBA, as shown in Chapter 17, "Noise," and would be expected to remain relatively unchanged in the future without the proposed project as this provides a conservative estimate of background noise levels for comparison. Consequently, noise generated by on-site construction activities would not be expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria. However, this conclusion will be verified as part of a detailed construction noise modeling~~

analysis to be conducted between the DEIS and FEIS. The detailed analysis will assess the potential for noise impacts form the proposed development to the proposed residential building at 354-361 West Street.

Effects of Construction on Completed Portions of the Proposed Project

In the event of phased construction, one proposed project building may be completed and occupied while construction activity is underway at another proposed project building (e.g., North Site complete and occupied while Center Site and South Site are undergoing demolition, excavation, and foundation work). The proposed project buildings would be newly introduced sensitive receptors subject to *CEQR Technical Manual* noise exposure guidelines (requiring interior $L_{10(1)}$ noise levels less than or equal to 45 dBA for residential and hotel guest room spaces or 50 dBA for commercial spaces). Consequently, the projected $L_{10(1)}$ noise levels that may occur at project buildings in the event of phased construction resulting in one or more buildings being completed and occupied while construction occurs at one or more other project buildings were projected.

Each of the proposed project buildings are separated by a distance of approximately 60 feet. Based on this distance and the distance and shielding projections described above, the maximum construction-generated $L_{10(1)}$ noise levels at any completed and occupied project building would be expected to be in the low to mid 70s dBA during the loudest period of demolition, excavation, and foundation work on an adjacent building (i.e., support of excavation pile driving). As described in Chapter 17, “Noise,” the proposed buildings’ façades are required to provide a minimum window/wall attenuation between 33 and 41 dBA. Between the DEIS and the FEIS, a detailed modeling analysis will be conducted to quantify the levels of construction noise that may occur at project buildings should they be completed and occupied during construction on one or more of the other project buildings. Based on the results of this analysis, noise control measures beyond those specified in this chapter and/or window/wall attenuation levels beyond those specified in Chapter 17, “Noise,” may be identified.

At the proposed outdoor publicly accessible open space on a platform spanning West Houston Street, construction activities occurring at the Center Site or the North Site (depending on the construction phasing) would produce noise levels in the high 70s to low 80s dBA based on the distance and shielding projections described above, which would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in this area exceed CEQR recommended values for existing and No Build conditions.) While this is not desirable, noise levels in many parks and open space areas throughout the city, which are located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher, noise levels. Nonetheless, noise levels in this range at the project-generated publicly accessible open space would constitute a significant adverse noise impact. The predicted level of construction noise that would occur at this publicly accessible open space under a phased construction schedule will be examined further in the detailed noise modeling analysis to be conducted between the DEIS and FEIS.

Construction Noise Analysis Results – 354-361 West Street

Construction noise levels were predicted for the future residential 354-361 West Street building as described above. The predicted noise levels are shown in **Table 20-20**.

Table 20-20
354-361 West Street Construction Noise Levels (dBA)

Façade	Existing		Year 1			Year 2			Year 3			Year 4		
	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	Inc.	$L_{10(1)}$	$L_{eq(1)}$	Inc.	$L_{10(1)}$	$L_{eq(1)}$	Inc.	$L_{10(1)}$	$L_{eq(1)}$	Inc.	$L_{10(1)}$
North	74.4	76.0	74.5-74.7	0.1-0.3	76.0	74.4-74.5	0.0-0.1	76.0	74.4-74.5	0.0-0.1	76.0	74.4-74.5	0.0-0.1	76.0
South	74.4	76.0	78.7-84.3	**4.3-9.9**	81.7-87.3	77.9-79.4	**2.6-5.0**	76.0-82.4	77.9-79.1	**2.5-4.7**	76.0-82.1	75.0-76.2	0.6-1.8	76.0
West	82.7	82.8	82.7-82.9	0.0-0.2	82.8	82.8	0.1	82.8	82.8	0.1	82.8	82.8	0.0-0.1	82.8
Notes: Exceedances of CEQR noise impact criteria are shown in **bold**.														

At the north and west façades of 354-361 West Street, which faces away from the proposed development sites, construction of the proposed project would result in noise level increments less than 1 dBA, which would be below CEQR impact criteria and would be considered imperceptible.

At the south façade of 354-361 West Street, which is immediately adjacent and facing the North Site, construction of the proposed project during the first year of construction — when North Site demolition, foundation and superstructure work; Center Site demolition and foundation work; and South Site demolition and foundation work would all simultaneously occur — are predicted to result in noise levels in the high 70s to mid 80s and noise level increments up to approximately 10 dBA. These maximum levels of construction noise are predicted to occur primarily as a result of building demolition, pile installation, and rock excavation work occurring on the North Site and would occur only for the duration of these activities. These activities would include the use of concrete saws, hydraulic break rams, and pile driving equipment, which would be primary sources of construction noise. According to the conceptual construction schedule, the combined duration of demolition and excavation/foundation work when these pieces of equipment would be used would be approximately 8 total months at the North Site. Consequently, these maximum noise levels are predicted to last for no longer than approximately 8 months. Furthermore, because the concrete saws, pile drivers, and hydraulic break rams would not be constantly in use during demolition and excavation/foundation work, the exceedances would not represent a constant condition during the approximately 8 months of use.

During the second and third years of the construction period, noise levels at these façades resulting from construction are predicted to be in the high 70s, and noise level increments would be up to approximately 5 dBA. Such noise level increments, while they would exceed the CEQR impact criteria are considered "just noticeable" to "clearly noticeable" according to the *CEQR Technical Manual*.

Because the noise levels resulting from the proposed project at the south façade of 354-361 West Street are predicted to exceed the CEQR impact criteria for a duration of more than two years, construction of the proposed project has the potential to result in a significant adverse construction noise impact at these receptors.

While the predicted levels of construction noise at the 354-361 West Street south façade would constitute a significant adverse noise impact, this building is mapped with a Noise (E) Designation requiring its south façade to provide at least 31 dBA of window/wall attenuation up to 100 feet above street level, and at least 28 dBA of window/wall attenuation greater than 100 feet above street level. The building would thus be required to include acoustically rated insulated glass windows and an alternate means of ventilation that does not degrade the acoustical performance of the façade such that the minimum attenuation requirements would be met. The building façade would consequently result in interior noise levels during much of the construction period that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). However, the building would have acoustically rated windows and alternate ventilation, during some limited time periods (i.e., the periods when exterior $L_{10(1)}$ noise levels due to construction exceed 73 to 76 dBA) construction activities may result in interior noise levels at residences along the south façade of 354-361 West Street that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for residential use.

Construction Noise Analysis Results – North Site

Construction noise levels were predicted for the proposed North Site building as described above. To represent the worst-case construction noise levels, the North Site building was assumed to be completed and occupied during simultaneous construction of the proposed Center Site and South Site buildings. The North Site building is located approximately 60 feet from the Center Site and approximately 470 feet from the South Site. The predicted noise levels are shown in **Table 20-21.**

Table 20-21
Construction Noise Levels on North Site (dBA)

Façade	Non-Construction Noise		Construction Noise Year 1		Construction Noise Year 2		Construction Noise Year 3		Construction Noise Year 4	
	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$
East Tower										
North	75.0	76.6	75.0-75.2	76.6	75.0-75.1	76.6	75.0-75.1	76.6	75.0-75.1	76.6
South	72.4	73.3	72.8-83.5	73.3-86.5	72.5-78.7	73.3-81.7	72.5-78.4	73.3-81.4	72.4-77.7	83.3-80.7
West	72.4	73.3	73.7-78.4	73.3-81.4	72.9-74.3	73.3	72.8-74.2	73.3	72.6-73.9	73.3
East	72.4	73.3	72.5-75.3	73.3	72.4-74.4	73.3	72.4-74.2	73.3	72.4-74.1	73.3
West Tower										
North	75.0	76.6	75.0-75.2	76.6	75.0-75.2	76.6	75.0-75.1	76.6	75.0-75.1	76.6
South	72.4	73.3	75.2-83.2	76.6-86.2	75.1-78.2	76.6-81.2	75.1-78.2	76.6-81.2	75-77.8	76.6-76.6
West	82.9	83.3	82.9-83.3	83.3	82.9-83.0	83.3	82.9-83.0	83.3	82.9-83.0	83.3
East	72.4	73.3	75.4-79.5	76.6-82.5	75.1-76.5	76.6	75.1-76.4	76.6	75.1-76.1	76.6

Noise levels at the proposed North Site building – should it be completed and occupied during construction – resulting from construction of the Center Site and South Site buildings are predicted to be in the low 70s to mid 80s dBA. The specific noise levels predicted to occur at the proposed North Site building are shown in **Appendix D**. These predicted noise levels are based on modeling the worst-case hour of the worst-case month during each year of construction, based on a schedule of equipment and activity provided by the construction managers. The predicted noise levels would likely not persist at such a high level throughout the day or throughout the year. The design of the proposed North Site building would be required to include building façades providing not less than 33 – 41 dBA of attenuation (see Table 17-5), and alternate means of ventilation (i.e., air conditioners) that does not degrade the acoustical performance of the façade. During the time that the proposed North Site building would be occupied and loud construction activities would be underway at the adjacent Center Site (approximately 4 years according to the conceptual construction schedule on which the construction noise analysis is based), interior noise levels would, during some times (i.e., the periods when exterior $L_{10(1)}$ noise levels due to construction exceed 86 dBA on or within 50 feet of the building's west façade or exceed 78 dBA elsewhere on the building, as shown in **Appendix D**), exceed 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria for residential uses).

On the north, east, and west façades of the proposed North Site building, which do not directly face the adjacent construction site, exceedances of the acceptable interior noise level criteria are expected to occur only during the first year of construction of the other project buildings. While these exceedances may be considered noisy and intrusive, but would be only temporary and of relatively short duration. Consequently, the predicted levels of construction noise at these façades do not rise to the level of a significant adverse impact.

On the south façade of the proposed North Site building, which faces the adjacent construction site, exceedances of the acceptable interior noise level criteria are expected to occur during all four years of construction of the other project buildings. Construction noise levels exceeding this threshold would occur primarily as a result of use of the use of concrete saws, hydraulic break rams, pile driving equipment, tower cranes, excavators, and dump trucks and are expected to occur only for the duration that these equipment would operate in proximity to the North Site building. These equipment would not be constantly in use during the phases of construction with which they are associated, and consequently the maximum predicted noise levels would not persist throughout the entire period. However, because the south façade of the proposed North Site building is expected to experience extensive exceedances of the acceptable interior noise level threshold as a result of construction over an extended duration, this location is expected to experience a significant adverse construction noise impact should it be completed and occupied during construction of the other project buildings.

Construction Noise Analysis Results – Center Site

Construction noise levels were predicted for the proposed Center Site building as described above. To represent the worst-case construction noise levels, the Center Site building was assumed to be completed and occupied during simultaneous construction of the proposed North Site and South Site buildings. The Center Site building is located approximately 60 feet from the North Site and approximately 60 feet from the South Site. The predicted noise levels are shown in **Table 20-22.**

Table 20-22
Construction Noise Levels on Center Site (dBA)

Façade	Non-Construction Noise		Construction Noise Year 1		Construction Noise Year 2		Construction Noise Year 3		Construction Noise Year 4	
	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$
Base Building										
North	75.0	76.6	80.0-85.2	83.0-88.2	77.5-79.8	76.6-82.8	77.6-80.1	76.6-83.1	75.6-76.7	76.6
Southeast	71.2	74.0	78.0-84.9	81.0-87.9	76.1-79.3	79.1-82.3	73.8-77.9	74.0-80.9	72.5-75.4	74.0-78.4
Southwest	82.9	83.3	83.8-86.4	83.3-89.4	83.4-84.0	83.3	83.1-83.7	83.3	83.0-83.2	83.3
West	82.9	83.3	83.0-83.1	83.3	83.0	83.3	83.0	83.3	82.9	83.3
East	71.2	74.0	72.6-75.7	74.0-78.7	72.3-73.7	74.0	72.0-73.3	74.0	71.8-72.8	74.0
Northeast Tower										
North	75.0	76.6	75.9-81.7	76.6-84.7	75.3-77.6	76.6	75.3-77.6	76.6	75.1-75.9	76.6
South	71.2	74.0	72.0-76.7	74.0-79.7	71.5-73.3	74.0	71.4-72.7	74.0	71.2-71.7	74.0
West	71.2	74.0	72.1-79.9	74.0-82.9	71.8-75.0	74.0-78.0	71.5-74.5	74.0-77.5	71.3-72.1	74.0
East	71.2	74.0	71.5-73.4	74.0-74	71.3-72.4	74.0	71.3-72.3	74.0	71.3-72.1	74.0
Northwest Tower										
North	71.2	74.0	74.1-82.2	74.0-85.2	72.3-77.8	74.0-77.8	72.3-77.8	74.0-77.7	71.5-75.8	74.0-76.6
South	71.2	74.0	71.8-76.5	74.0-79.5	71.5-73	74.0	71.3-72.4	74.0	71.3-71.8	74.0
West	82.9	83.3	83.0-83.1	83.3	82.9-83.0	83.3	82.9-83.0	83.3	82.9	83.3
East	71.2	74.0	72.8-79.8	74.0-82.8	71.9-75.3	74.0-78.3	71.7-75.2	74.0-78.2	71.4-72.7	74.0
Southeast Tower										
North	71.2	74.0	71.8-74.2	74.0	71.4-72.4	74.0	71.3-72.1	74.0	71.2-71.6	74.0
South	71.2	74.0	77.2-83.2	80.2-86.2	74.4-77.6	77.4-80.6	73.2-76.5	74.0-79.5	72.3-74.3	74.0-77.3
West	71.2	74.0	73.7-81.8	74.0-84.8	72.5-76	74.0-79.0	71.8-74.7	74.0-77.7	71.4-72.4	74.0
East	71.2	74.0	72.0-75.6	74.0-78.6	71.7-74.0	74.0	71.6-73.8	74.0	71.5-73.1	74.0
Southwest Tower										
North	71.2	74.0	71.7-75.1	74.0-78.1	71.4-72.8	74.0	71.3-72.6	74.0	71.3-71.6	74.0
South	82.9	83.3	83.5-85.8	83.3	83.1-83.7	83.3	83.0-83.5	83.3	83.0-83.1	83.3
West	82.9	83.3	83.0-83.5	83.3	82.9-83.1	83.3	82.9-83	83.3	82.9	83.3
East	71.2	74.0	76.0-81.5	79.0-84.5	72.9-76.1	74.0-79.1	72.5-75.3	74.0-78.3	71.9-73.3	74.0

Noise levels the proposed Center Site building – should it be completed and occupied during construction – resulting from construction of the North Site and South Site buildings are predicted to be in the low 70s to high 80s dBA. The specific noise levels predicted to occur at the proposed Center Site building are shown in **Appendix D**. These predicted noise levels are based on modeling the worst-case hour of the worst-case month during each year of construction, based on a schedule of equipment and activity provided by the construction managers. The predicted noise levels would likely not persist at such a high level throughout the day or throughout the year. The design of the proposed Center Site building would be required to include building façades providing not less than 31 – 41 dBA of attenuation (see Table 17-5), and alternate means of ventilation (i.e., air conditioners) that does not degrade the acoustical performance of the façade. During the time that the proposed Center Site building would be occupied and loud construction activities would be underway at the adjacent North and Site and South Site (approximately 4 years according to the conceptual construction schedule on which the construction noise analysis is based), interior noise levels would, during some times (i.e., the periods when exterior $L_{10(1)}$ noise levels due to construction exceed 86 dBA on or within 50 feet of the building's west façade, exceed 78 dBA on the building's north façade, or 76 dBA on the building's south or east façades, as shown in **Appendix D**), exceed 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria for residential uses).

On the west façade of the proposed Center Site building, which does not directly face the adjacent construction site and which has the highest required level of window/wall attenuation, exceedances of the acceptable interior noise level criteria are expected to occur only during the first year of construction of the other project buildings. While these exceedances may be considered noisy and intrusive, but would be only temporary and of relatively short duration. Consequently, the predicted levels of construction noise at this façade do not rise to the level of a significant adverse impact.

On the north façade of the proposed Center Site building, which faces the adjacent North Site, exceedances of the acceptable interior noise level criteria are expected to occur during each of the first three years of construction of the other project buildings. Construction noise levels exceeding this threshold would occur primarily as a result of use of the use of concrete saws, hydraulic break rams, pile driving equipment, tower cranes, excavators, and dump trucks and are expected to occur only for the duration that these equipment would operate in proximity to the Center Site building's north façade. These equipment would not be constantly in use during the phases of construction with which they are associated, and consequently the maximum predicted noise levels would not persist throughout the entire period. However, because the north façade of the proposed Center Site building is expected to experience extensive exceedances of the acceptable interior noise level threshold as a result of construction over an extended duration, this location is expected to experience a significant adverse construction noise impact should it be completed and occupied during construction of the other project buildings.

On the east façade of the proposed Center Site building, which has a line of sight to both the adjacent North Site and South Site, exceedances of the acceptable interior noise level criteria are expected to occur during each of the first three years of construction of the other project buildings. Construction noise levels exceeding this threshold would occur primarily as a result of use of the use of concrete saws, hydraulic break rams, pile driving equipment, tower cranes, excavators, and dump trucks and are expected to occur only for the duration that these equipment would operate in proximity to the Center Site building's east façade. These equipment would not be constantly in use during the phases of construction with which they are associated, and consequently the maximum predicted noise levels would not persist throughout the entire period. However, because the east façade of the proposed Center Site building is expected to experience extensive exceedances of the acceptable interior noise level threshold as a result of construction over an extended duration, this location is expected to experience a significant adverse construction noise impact should it be completed and occupied during construction of the other project buildings.

On the south façade of the proposed Center Site building, which faces the adjacent South Site, exceedances of the acceptable interior noise level criteria are expected to occur during all four years of construction of the other project buildings. Construction noise levels exceeding this threshold would occur primarily as a result of use of the use of concrete saws, hydraulic break rams, pile driving equipment, tower cranes, excavators, and dump trucks and are expected to occur only for the duration that these equipment would operate in proximity to the Center Site building's south façade. These equipment would not be constantly in use during the phases of construction with which they are associated, and consequently the maximum predicted noise levels would not persist throughout the entire period. However, because the south façade of the proposed Center Site building is expected to experience extensive exceedances of the acceptable interior noise level threshold as a result of construction over an extended duration, this location is expected to experience a significant adverse construction noise impact should it be completed and occupied during construction of the other project buildings.

Construction Noise Analysis Results – South Site

Construction noise levels were predicted for the proposed South Site building as described above. To represent the worst-case construction noise levels, the South Site building was assumed to be completed and occupied during simultaneous construction of the proposed North Site and Center Site buildings. The South Site building is located approximately 470 feet from the North Site and approximately 60 feet from the Center Site. The predicted noise levels are shown in **Table 20-23.**

Table 20-23
Construction Noise Levels on South Site (dBA)

Façade	Non-Construction Noise		Construction Noise Year 1		Construction Noise Year 2		Construction Noise Year 3		Construction Noise Year 4	
	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$
Base Building										
North	71.2	74.0	73.3-85.2	74.0-85.4	72.0-83.6	74.0-83.3	72.0-83.6	74.0-83.3	71.5-83.5	74.0-83.3
West	82.9	83.3	82.9-83.0	83.3	82.9-83.0	83.3	82.9-83.0	83.3	82.9-83.0	83.3
East	71.2	74.0	71.5-77.8	74.0-80.8	71.4-73.7	74.0	71.4-73.9	74.0	71.4-73.9	74.0
Tower										
North	71.2	74.0	78.9-79.3	81.9-82.3	74.3-74.8	77.3-77.8	74.4-74.8	77.4-77.8	74.0-74.3	74.0-77.3
South	71.2	74.0	71.3	74.0	71.2	74.0	71.2	74.0	71.2	74.0
West	71.2	74.0	71.8-76.8	74.0-79.8	71.5-73.0	74.0	71.4-73.0	74.0	71.3-72.7	74.0
East	71.2	74.0	71.5-75.0	74.0-78.0	71.4-72.8	74.0	71.8-72.8	74.0	71.4-72.6	74.0

Noise levels the proposed South Site building – should it be completed and occupied during construction – resulting from construction of the North Site and Center Site buildings are predicted to be in the low 70s to mid 80s dBA. The specific noise levels predicted to occur at the proposed Center Site building are shown in **Appendix D**. These predicted noise levels are based on modeling the worst-case hour of the worst-case month during each year of construction, based on a schedule of equipment and activity provided by the construction managers. The predicted noise levels would likely not persist at such a high level throughout the day or throughout the year. The design of the proposed South Site building would be required to include building façades providing not less than 31 – 41 dBA of attenuation (see Table 17-5), and alternate means of ventilation (i.e., air conditioners) that does not degrade the acoustical performance of the façade. During the time that the proposed South Site building would be occupied and loud construction activities would be underway at the adjacent Center Site (approximately 4 years according to the conceptual construction schedule on which the construction noise analysis is based), interior noise levels would, during some times (i.e., the periods when exterior $L_{10(1)}$ noise levels due to construction exceed 86 dBA on or within 50 feet of the building's west façade or exceed 76 dBA elsewhere on the building, as shown in **Appendix D**), exceed 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria for residential uses).

On the south and west façades of the proposed South Site building, which do not directly face the adjacent construction site, exceedances of the acceptable interior noise level criteria are expected to occur only during the first year of construction of the other project buildings. While these exceedances may be considered noisy and intrusive, but would be only temporary and of relatively short duration. Consequently, the predicted levels of construction noise at these façades do not rise to the level of a significant adverse impact.

On the north façade of the proposed South Site building, which face the adjacent construction site, exceedances of the acceptable interior noise level criteria are expected to occur during all four years of construction of the other project buildings. Construction noise levels exceeding this threshold would occur primarily as a result of use of the use of concrete saws, hydraulic break rams, pile driving equipment, tower cranes, excavators, and dump trucks and are expected to occur only for the duration that these equipment would operate in proximity to the South Site building. These equipment would not be constantly in use during the phases of construction with which they are associated, and consequently the maximum predicted noise levels would not persist throughout the entire period. However, because the north façade of the proposed South Site building is expected to experience extensive exceedances of the acceptable interior noise level threshold as a result of construction over an extended duration, this location is expected to experience a significant adverse construction noise impact should it be completed and occupied during construction of the other project buildings.

On the east façade of the proposed South Site building, which has a line of sight to the adjacent Center Site, exceedances of the acceptable interior noise level criteria are expected to occur during all four years of construction of the other project buildings. Construction noise levels exceeding this threshold would occur primarily as a result of use of the use of concrete saws, hydraulic break rams, pile driving equipment, tower cranes, excavators, and dump trucks and are expected to occur only for the duration that these equipment would operate in proximity to the Center Site building's east façade. These equipment would not be constantly in use during the phases of construction with which they are associated, and consequently the maximum predicted noise levels would not persist throughout the entire period. However, because the east façade of the proposed South Site building is expected to experience extensive exceedances of the acceptable interior noise level threshold as a result of construction over an extended duration, this location is expected to experience a significant adverse construction noise impact should it be completed and occupied during construction of the other project buildings.

not, couldConstruction Noise Analysis Results – Elevated Open Space

Based on the conceptual construction schedule, the proposed elevated open space over East Houston Street would be completed and occupied during construction at the Center Site and

South Site. The elevated open space would be located immediately north of the Center Site and approximately 410 feet from the South Site. The predicted noise levels are shown in **Table 20-24.**

Table 20-24
Elevated Open Space Construction Noise Levels (dBA)

Façade	Existing		Year 1		Year 2		Year 3		Year 4	
	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$	$L_{eq(1)}$	$L_{10(1)}$
West	78.9	82.8	86.5	89.5	83.8	83.3	83.8	83.3	83.6	83.3
Center	71.7	74.0	86.4	89.4	81.0	84.0	80.7	83.7	80.3	83.3
East	68.2	68.6	84.7	87.7	80.9	83.9	80.3	83.3	79.5	82.5

During simultaneous Center Site and South Site construction, the proposed elevated open space would experience elevated noise levels as a result of construction. Predicted noise levels at the proposed elevated open space would range from 87.7 to 89.5 dBA during the first year of Center Site construction, which are greater than the threshold level of 55 dBA $L_{10(1h)}$ specified in the *CEQR Technical Manual* for open space use, and includes levels greater than measured existing noise levels at the nearby Hudson River Park open space area. The dominant construction noise sources resulting in these exceedances include concrete saws used for demolition, hydraulic break rams used for rock excavation, and pile installation. According to the conceptual construction schedule, the combined duration of demolition and excavation/foundation work when these pieces of equipment would be used would be approximately 12 total months at the Center Site. Consequently, these particularly high noise levels are predicted to last for no longer than approximately 12 months. To avoid the potential for noise levels in the proposed elevated open space resulting from construction that could potentially result in public health impacts over a prolonged period of exposure, the proposed elevated open space would be closed during the demolition, excavation, and foundation construction stages at either of the adjacent building sites, i.e., the North or Center Sites.

During subsequent years of Center Site construction, noise levels at the proposed elevated open space would range from 82.5 dBA to 84.0 dBA, which would be greater than the threshold level of 55 dBA $L_{10(1h)}$ specified in the *CEQR Technical Manual* for open space use, but would be comparable to measured existing noise levels at the nearby Hudson River Park open space area.

The CEQR noise level guidelines for open space are a worthwhile goal for outdoor areas requiring serenity and quiet, such as passive open spaces. However, due to the level of activity on the surrounding streets present at most New York City open space areas and parks, a relatively low noise level is often not achieved, and noise levels can be much louder at open space near highways, such as the proposed open space to be included in the proposed project or the existing Hudson River Park on the other side of West Street from the project site. And other than during the first year of construction immediately adjacent to the proposed elevated open space for hours when construction is in progress (i.e., typically weekday daytime), construction would not substantially affect total noise levels at the proposed elevated open space. Consequently no additional noise control measures are proposed.

Conclusions

As described above, construction noise is ~~not~~ expected to result in exceedances of the *CEQR Technical Manual* noise impact criteria at ~~any existing~~ some nearby noise receptors. ~~However,~~ The detailed modeling analysis concluded that construction of the proposed project has the potential to result in construction noise levels that exceed *CEQR Technical Manual* noise impact criteria at the future 354-361 West Street development site. Furthermore, , should it the proposed project proceed by a phased schedule resulting in one or more project buildings being completed and occupied while construction occurs at one or more other project buildings, construction would have would have the potential to result in elevated noise levels at completed and occupied project building(s) that would potentially are predicted to result in exceedances of *CEQR Technical Manual* noise exposure guidelines and would constitute significant adverse noise impacts at the south façades. Between the DEIS and the FEIS, a detailed modeling analysis will be conducted to quantify the levels of construction noise that may occur at project buildings under such a phased construction scheduleHowever, because 354-361 West Street and the proposed project buildings are or will be mapped with Noise (E) designations (E-218 and E-384, respectively) requiring between 26 and 41 dBA of window/wall attenuation, which would be achieved by means of installing acoustically rated insulated glass windows, and an alternate means of ventilation (i.e., air conditioning that does not degrade the acoustical performance of the façade) to allow for the maintenance of a closed-window condition, there are no feasible and practicable mitigation measures that would be able to reduce or eliminate the potential significant adverse noise impacts. Source or path controls beyond those already identified for the construction of the proposed project would not be effective in reducing the level of construction noise at the receptors that have the potential to experience significant adverse construction noise impacts. Additional noise receptor controls at these locations would require change to the building design that would have disproportionately high cost considering that the potential noise impacts would be temporary, the interior noise levels during construction are expected to be no more than approximately 10 dBA over the acceptable threshold levels, and that the potential impacts would be limited to construction hours, which would not include regular night-time or weekend periods.

. Based on the results of this analysis, noise control measures beyond those specified in this chapter and/or window/wall attenuation levels beyond those specified in Chapter 17, "Noise," may be identified, and the potential for significant adverse impacts would be examined. In the event of phased construction, at the proposed elevated outdoor space included in the proposed project, the detailed modeling analysis indicated that noise levels during construction would exceed the *CEQR Technical Manual* recommended noise level threshold for open space. The applicant will ensure this open space will be closed during the demolition, excavation, and foundation construction at either of the building sites immediately adjacent to it to avoid the highest potential levels of construction noise at the open space. During other phases of construction, construction noise would still exceed the CEQR recommended noise level; however, as described in Chapter 17, "Noise," noise levels at this location exceed this threshold in the existing condition and would exceed this threshold in the future with the proposed project as well. The detailed analysis found that construction would affect noise levels at this proposed open space only for construction hours during a relatively short period of time beyond the already relatively high noise levels resulting from traffic.

VIBRATION

INTRODUCTION

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibratory levels at a receiver are a function of the source strength (which in turn is dependent upon the construction equipment and methods utilized), the distance between the equipment and the receiver, the characteristics of the transmitting medium, and the receiver building construction. Construction equipment operation causes ground vibrations which spread through the ground and decrease in strength with distance. Vehicular traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With the exception of the case of fragile and possibly historically significant structures or buildings, generally construction activities do not reach the levels that can cause architectural or structural damage, but can achieve levels that may be perceptible and annoying in buildings very close to a construction site. An assessment has been prepared to quantify potential vibration impacts of construction activities on structures and residences near the development site.

CONSTRUCTION VIBRATION CRITERIA

For purposes of assessing potential structural or architectural damage, the determination of a significant impact was based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second. For non-fragile buildings, vibration levels below 0.60 inches/second would not be expected to result in any structural or architectural damage.

For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 vibration decibels (VdB) would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time.

ANALYSIS METHODOLOGY

For purposes of assessing potential structural or architectural damage, the following formula was used:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV_{equip} is the peak particle velocity in in/sec of the equipment at the receiver location;

PPV_{ref} is the reference vibration level in in/sec at 25 feet; and

D is the distance from the equipment to the received location in feet.

For purposes of assessing potential annoyance or interference with vibration sensitive activities, the following formula was used:

$$L_v(D) = L_v(ref) - 30\log(D/25)$$

where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;

$L_v(ref)$ is the reference vibration level in VdB at 25 feet; and

D is the distance from the equipment to the receiver location in feet.

Table 20-~~18~~ 25 shows vibration source levels for typical construction equipment.

Table 20-~~18~~25
Vibration Source Levels for Construction Equipment

Equipment		PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (impact)	upper range	1.518	112
	Typical	0.644	104
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Ram Hoe		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58
Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.			

Construction Vibration Analysis Results

The building of most concern with regard to the potential for structural or architectural damage due to vibration is the six-story 547 Greenwich Street mixed use residential building located approximately 280 feet east of the of the development site. Based on the distance from the development site, PPV would not exceed the most stringent 0.5 in/sec threshold at the receptor location mentioned above. In terms of potential vibration levels that would be perceptible and annoying, the equipment that would have the most potential for producing levels which exceed the 65 VdB limit is the impact pile driver. It would not produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at grade-level receptors within approximately 650 feet. While vibration resulting from impact pile driving may be perceptible and potentially intrusive, it would be of limited duration as pile driving activities would not last more than approximately five to seven months (two to three months at each building site). Furthermore, vibration levels would be lower at floors above the grade level (reducing by approximately 2 dB per floor), and at the nearest receptor (i.e., 547 Greenwich Street), vibration levels would be below the perceptible threshold at the fifth floor and above.

At the proposed residential building (i.e., 354-361 West Street), located approximately 60 feet north of the development site, PPV during impact pile driving would not exceed the most stringent 0.5 in/sec threshold at the receptor location based on the distance from the development site. In the event that the proposed development is completed and occupied while the development site is undergoing demolition, excavation, or foundation construction activity, occupants may experience perceptible levels of construction vibration. However, while the vibration may be perceptible and potentially intrusive, it would be lower at higher floors of the building and would be of limited duration as pile driving activities would not last more than approximately five to seven months (two to three months at each building site). As such the predicted level of vibration would not be considered significant.

In the event of phased construction, one proposed project building may be completed and occupied while construction activity is underway at another proposed project building (e.g., North Site complete and occupied while Center Site and South Site are undergoing demolition, excavation, and foundation work). In this condition, residents in a completed and occupied building adjacent to demolition, excavation, or foundation construction activity may experience perceptible levels of construction vibration. However, while the vibration may be perceptible and potentially intrusive, it would be lower at higher floors of the building and would be of limited duration as pile driving activities would not last more than approximately five to seven months (two to three months at each building site). As such, the predicted level of vibration would not be considered significant.

In no case are significant adverse impacts from vibrations expected to occur.

OTHER TECHNICAL AREAS

LAND USE AND NEIGHBORHOOD CHARACTER

Construction activities would affect land use on the development site, but would not alter surrounding land uses. As is typical with construction projects, during periods of peak construction activity there would be some disruption to the nearby area. There would be construction trucks and construction workers coming to the development site. There would also be noise, sometimes intrusive, from demolition, excavation, and foundation activities as well as trucks and other vehicles backing up, loading, and unloading. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as most construction activities would take place within the development site or within portions of sidewalk and curb lane on Washington Street, West Houston Street, and Clarkson Street immediately adjacent to the construction site. In addition, throughout the construction period, measures would be implemented to control noise, vibration, and dust on the development site, including the erection of construction fencing and barriers. The fencing would reduce potentially undesirable views of construction site and buffer noise emitted from construction activities. Barriers would be used to protect the safety of pedestrians and to reduce noise from particularly disruptive activities where practicable.

Overall, while construction activities at the development site would be evident to the local community, the limited duration of construction would not result in any significant or long-term adverse impacts on local land use patterns or the character of the nearby area.

SOCIOECONOMIC CONDITIONS

Construction activities associated with the proposed project would not result in any significant adverse impacts on socioeconomic conditions. Construction activities would not block or restrict access to any facilities in the area, affect the operations of any nearby businesses, or obstruct major thoroughfares used by customers or businesses. Construction would create direct benefits resulting from expenditures on labor, materials, and services, and indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the construction activity. Construction also would contribute to increased tax revenues for the City and State, including those from personal income taxes.

COMMUNITY FACILIITIES

Community facilities would not be adversely affected by construction activities associated with the proposed project. The construction site would be surrounded by construction fencing and barriers that would limit the effects of construction on nearby facilities. Measures outlined in the MPT Plan would ensure that lane closures and sidewalk closures are kept to a minimum and that adequate pedestrian access is maintained. Construction workers would not place any burden on nearby community facilities and services. New York City Police Department (NYPD), and

FDNY emergency services and response times would not be materially affected by construction significantly due to the geographic distribution of the police and fire facilities and their respective coverage areas.

OPEN SPACE

At limited times, activities such as demolition, excavation, and foundation construction may generate noise that could impair the enjoyment of nearby open space users, including those at Hudson River Park across West Street, but such noise effects would be temporary. As discussed above in "Noise," most of the construction–related vehicles would be expected to use West Street, Washington Street, West Houston Street and Clarkson Street where there already is heavily trafficked**.** Accordingly, the construction of the proposed buildings would not result in substantially increased noise at these open spaces. Construction of the proposed project would not limit access to any open space resources in the vicinity of the development site. Therefore, the proposed project would not result in significant adverse impacts on these open spaces during construction. However, there is a potential for temporary construction-period ~~air quality and~~ noise impacts on the open space that would be built as part of the proposed project.

HISTORIC AND CULTURAL RESOURCES

A detailed assessment of potential impacts on historic and cultural resources is described in Chapter 8, "Historic and Cultural Resources." Pier 40 is not a historic architectural resource and no architectural of historic resources are located in the proposed project's 400-foot study area. The proposed project would not result in any construction period impacts to historic architectural resources, as there are no historic architectural resources within 90 feet of the development site.

HAZARDOUS MATERIALS

The proposed project would entail demolition of the existing structure and excavation (as the proposed cellar would extend below the depth of the existing basement). A detailed assessment of the potential risks related to the construction of the proposed project with respect to any hazardous materials is described in Chapter 11, "Hazardous Materials." As discussed in that chapter, impacts would be avoided by performing the project in accordance with the following:

- ~~Prior to the proposed disturbance, a Subsurface (Phase II) Investigation involving the collection of subsurface samples for laboratory analysis would be conducted in accordance with a DEP-approved Work Plan. Based on the findings of the Phase II, a RAP and associated CHASP would be prepared and submitted to DEP for review and approval. The RAP and CHASP would be implemented during the subsurface disturbance associated with the proposed project.~~
- A RAP and associated CHASP were prepared by AKRF, Inc. and approved by DEP on July 21, 2016. The RAP and CHASP would be implemented during the subsurface disturbance associated with the proposed project. The RAP and CHASP address: proper handling, transportation, and disposal of excavated material and construction/demolition debris; stockpiling procedures; air monitoring procedures; dust control procedures; the installation of two feet of certified clean fill across portions of the site in any landscaped/grass covered areas not capped with concrete/asphalt; the installation of a demarcation layer, such as orange snow fence, under the clean soil layer, as well as the installation of a vapor barrier system, a minimum thickness of 15 mil, outside of exterior below-grade foundation walls and beneath the building slab. The existing above ground storage tanks (ASTs) would be

removed prior to or as part of demolition in accordance with applicable New York State Department of Environmental Conservation (DEC) and Fire Department City of New York (FDNY) requirements, including those relating to registration and spill reporting. Similarly, the closed-in-place Underground Storage Tank (UST) would be removed, along with any associated contaminated soil.

- The existing above ground storage tanks would be removed prior to or as part of demolition in accordance with applicable DEC and FDNY requirements, including those relating to registration and spill reporting. Similarly, the closed-in-place Underground Storage Tank would be removed, along with any associated contaminated soil.
- If dewatering is necessary for the proposed construction, water would be discharged to sewers in accordance with DEP requirements.
- Prior to demolition, the building would be surveyed for asbestos by a New York City-certified asbestos investigator. All such ACM would be removed and disposed of prior to demolition in accordance with local, state and federal requirements.
- With respect to lead-based paint, demolition work would be performed in accordance with applicable requirements (including federal Occupational Safety and Health Administration regulation 29 CFR 1926.62 — Lead Exposure in Construction).
- Unless there is labeling or test data indicating that any suspect PCB-containing electrical equipment and fluorescent lighting fixtures do not contain PCBs, and that any fluorescent lighting bulbs do not contain mercury, disposal would be conducted in accordance with applicable federal, state and local requirements.

As discussed in Chapter 11, "Hazardous Materials," a A Subsurface (Phase II) Investigation Work Plan was prepared and approved by DEP. The investigation was performed in May 2016 and the findings were presented in a Subsurface (Phase II) Investigation report, dated June 2016. The Phase II report along with a RAP and CHASP, setting out procedures to be followed during development of the proposed project, were submitted to DEP and approved on July 21, 2016.and the Applicant intends to implement this work plan and submit a Phase II Report and a RAP/CHASP for DEP's approval before the Final Environmental Impact Statement (FEIS) is issued. If the Work Plan is not implemented and the RAP/CHASP is not approved by DEP prior to the issuance of an FEIS, an (E) Designation will be placed on the project site to avoid any potential significant adverse impacts related to hazardous materials. As discussed in Chapter 11, "Hazardous Materials," Therefore, with the inclusion of any the remedial measures described in the DEP-approved RAP and CHASP or the placement of an (E) Designation on the project site, the proposed development would not result in any significant adverse impacts related to hazardous materials during construction. ✷