Chapter 20: Construction Impacts

A. INTRODUCTION

The proposed rezoning of the development parcels and other discretionary actions would result in substantial construction activities. The construction schedule and methods for the proposed development program are discussed in this chapter, and the potential for construction-period impacts in the project area is assessed. Potential impacts that could occur during construction are assessed and presented in this chapter. Measures to be implemented during the project's construction activities that avoid or reduce the potential for significant adverse impacts are presented, and mitigation measures to avoid or reduce potential significant adverse impacts are identified. The proposed development's potential construction impacts are also compared with those anticipated under the four general construction plans analyzed in the FGEIS.

Under current plans, the timing of the construction of the Second Avenue Subway in the vicinity of the proposed project would not overlap with construction on the project sites. Therefore, an analysis of the potential cumulative effects of the two projects, which was prepared for the FGEIS, is not included here.

B. SUMMARY OF FGEIS FINDINGS

The FGEIS analyzed the potential construction impacts that would generally be associated with large-scale construction of mid- to high-rise building complexes in Manhattan and found that redevelopment of the parcels would not result in significant adverse impacts caused by construction activities.

The FGEIS considered four preliminary construction phasing and schedule scenarios: one for the As-of-Right Development Scenario, and one for each of the three illustrative development programs associated with a 12.0 FAR Rezoning Scenario. Each of these phasing and schedule scenarios assumed two phases of work: an initial phase for the 616, 685, and 708 First Avenue parcels, and a second phase for the 700 First Avenue (Waterside) parcel. Depending on the parcel and development program, the total duration of construction was estimated to range from a minimum of 15-18 months to a maximum of 36-48 months.

Because development of the UNDC building could result in construction activities concurrent with those of the proposed development, the FGEIS considered the effects of the potential overlap in construction phasing between these two projects. The analyses determined that UNDC construction could affect traffic and transportation by altering the placement of on-street staging areas for the 708 First Avenue parcel, but that street capacity could provide staging areas for both projects. Furthermore, although the overlap of the two projects would exacerbate the temporary disruptions associated with such large-scale construction projects, these disruptions could be managed to the extent practicable through permitting and other existing regulatory mandates for construction processes in New York City.

Now, since there is a specific development plan and a more refined construction program, this chapter reflects more detailed construction analyses than those provided in the FGEIS.

C. CONSTRUCTION ACTIVITIES

SCHEDULE

The 616, 685, and 708 First Avenue development parcels are all currently remediated and vacant. The former Waterside Plant on the 700 First Avenue parcel has been demolished, and the site is expected to be remediated and vacant by the end of 2007, prior to the start of construction of this project. The remediation must be approved by the New York State Department of Environmental Conservation (NYSDEC).

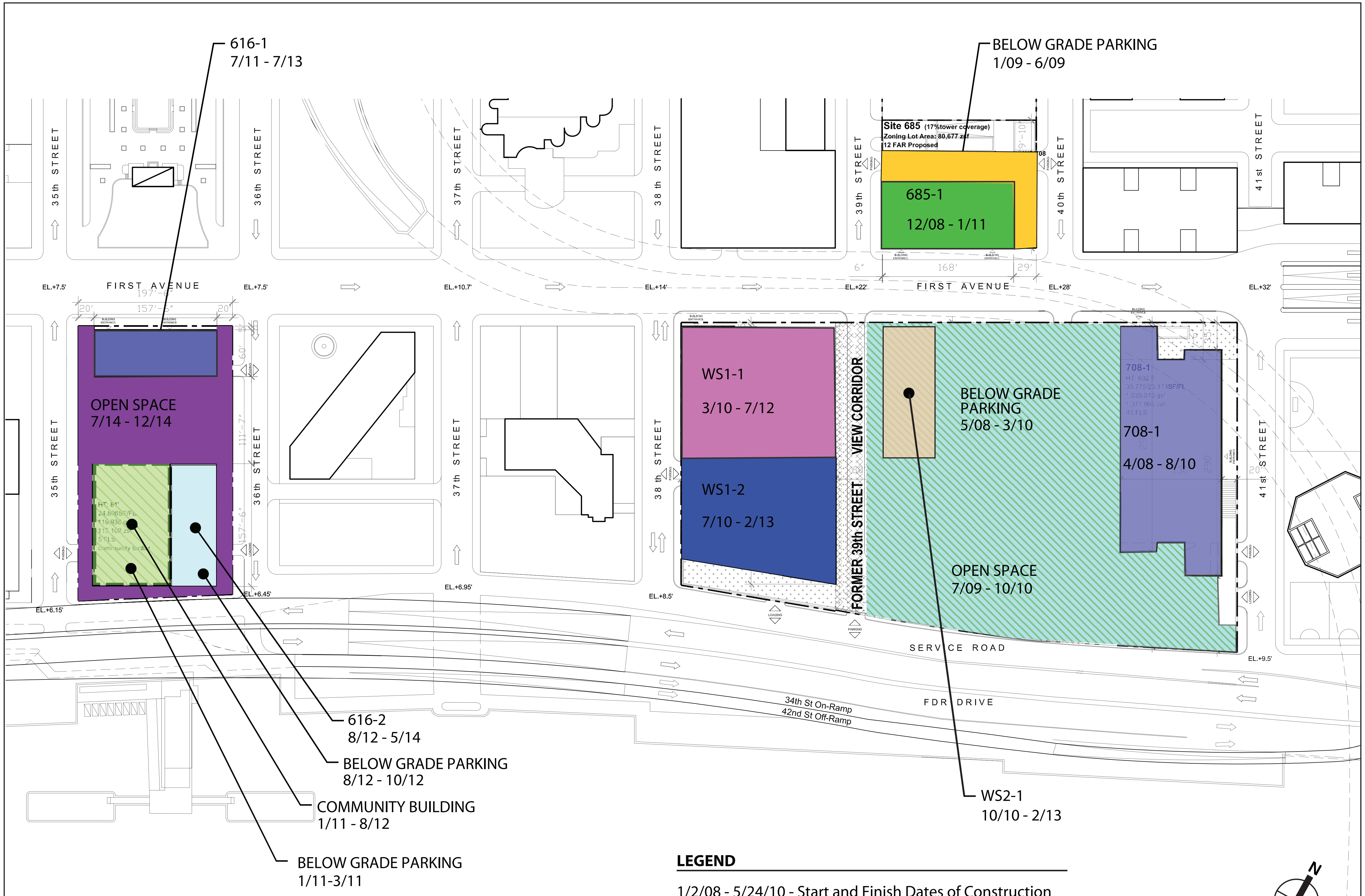
DURATION AND TIMING

The total anticipated period of construction for the project is approximately seven years. The locations of principal construction components are shown on Figure 20-1. The duration of construction on individual development parcels would range from two and one half to three and three quarter years. Construction of all development parcels is expected to be completed by the end of 2014.

As shown in Table 20-1 and Figure 20-2, the duration and timing of construction would vary from building to building on the development parcels. The shortest task would be to construct the below grade parking at 685 and 616 First Avenue and would last five to six months. The longest building duration is 28 to 31 months to build the tallest buildings. For almost all of the seven-year construction period, at least three individual components (i.e., buildings, garages, open space) of the proposed project would be under construction; the maximum number of components simultaneously under construction would be four. Typically, construction would occur simultaneously on two of the development parcels throughout the seven-year construction period. A detailed construction schedule can be found in Appendix F.

Since the issuance of the Draft SEIS, the Applicant has indicated that the phasing of building construction could vary from that which is depicted in Table 20-1 and Figures 20-1 and 20-2. Rather than beginning construction with the 708 First Avenue commercial office building, the Applicant currently anticipates that the residential building at 685 First Avenue would be the first building developed within the proposed development program, followed by the development of the commercial building at 708 First Avenue. This alternative construction schedule is assessed in Section E, “Alternative Construction Schedule.” As described in that section, this alternative construction schedule would result in comparable or fewer construction-related significant adverse impacts than identified for the construction schedule depicted in Table 20-1 and Figure 20-2 and analyzed in Section D.

As described in Chapter 1, “Project Description,” the Applicant and the School Construction Authority (SCA) will enter into an agreement for the construction of an approximately 630-seat, K-8 public school, which is planned to be operational by September 2012. The school would occupy approximately 92,500 square feet of the 119,936-square-foot community facility space on the eastern portion of the 616 First Avenue parcel. The timing of the construction of the 616 First Avenue community facility space and a portion of the 616 First Avenue below-ground parking area would be earlier than depicted in both the construction schedule analyzed in the Draft SEIS and the Alternative Construction Scenario presented in this chapter. Chapter 23,



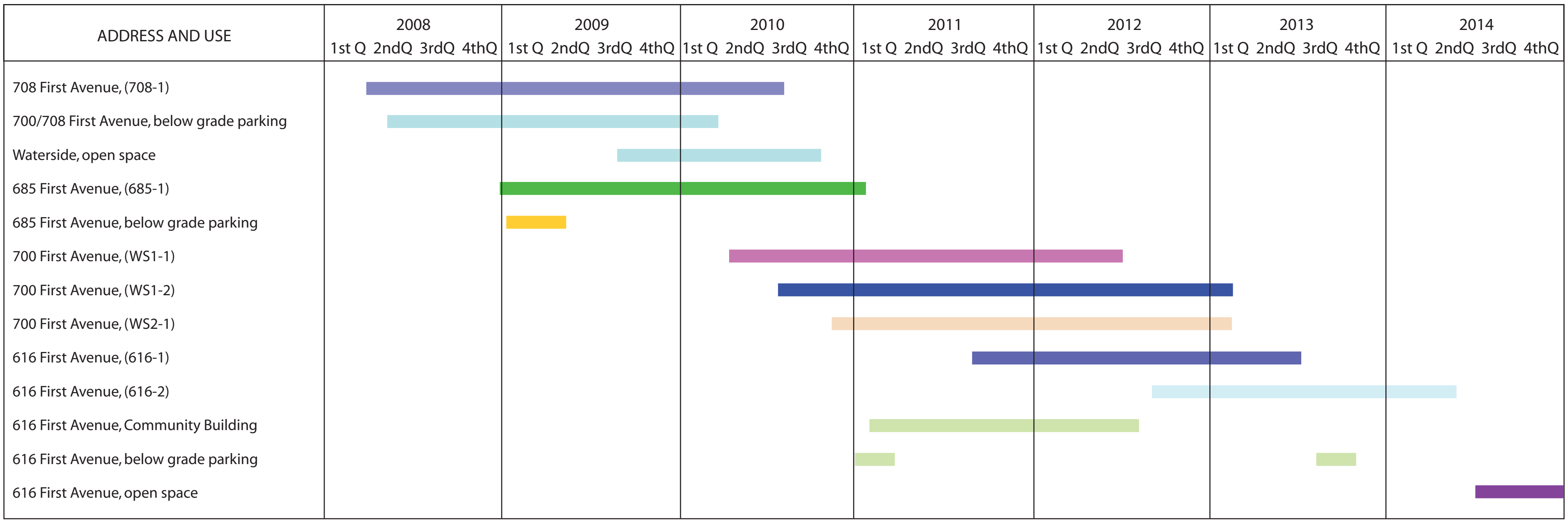
NOTE: The project's construction schedule would likely commence one quarter later than assumed in the analyses in this chapter. The revised schedule, presented in the figure above, as been addressed in the FEIS. It is not expected that the change schedule will materially affect the findings presented in this chapter.

SOURCE: EAST RIVER REALTY COMPANY, LLC

1.16.08

Construction Plan
Figure 20-1

1.16.08



SOURCE: EAST RIVER REALTY COMPANY, LLC

FIRST AVENUE PROPERTIES REZONING

Construction Schedule
Figure 20-2

"Mitigation," contains a full analysis of the potential environmental effects of advancing the construction timing for the community facility building in order to accommodate a school on the 616 First Avenue parcel by September 2012. That analysis finds that the advancement of construction of the community facility (school) space would not result in any new construction-related significant adverse impacts not identified for the construction schedule depicted in Table 20-1 and the Alternative Construction Scenario in Section E.

GENERAL CONSTRUCTION PRACTICES

Certain practices would be observed throughout the project. The developer would designate a contact person for the community throughout the construction period. This person would serve as the contact for the community to voice concerns about construction activities, and would be available to meet with the community to resolve concerns or problems.

The following describes typical construction practices in New York City. In certain instances, project practices may vary from those described below.

DELIVERIES AND ACCESS

Access to the construction sites would be tightly controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Typically, worker vehicles would not be allowed into the construction area. Security guards and flaggers would be posted, and all persons and trucks would have to pass through security points. 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. Unauthorized access would be prevented after work hours and over the weekends.

Material deliveries to the site would be highly controlled and scheduled. Unscheduled or haphazard deliveries would not be allowed.

To aid in adhering to the delivery schedules, flaggers would be employed at each of the entry and exit gates. The flaggers would control trucks entering and exiting the site, so that they would not interfere with one another and minimize disruptions to local on-street traffic.

HOURS OF WORK

Construction activities for the buildings would take place in accordance with New York City laws and regulations which allow construction activities to take place between 7:00 AM and 6:00 PM. Construction work would begin at 7:00 AM on weekdays, with most workers arriving between 6:00 AM and 7:00 AM. Typically, work would end at 3:30 PM, but could be extended until 6:00 PM for such tasks as completing the drilling of piles, finishing a concrete pour for a floor deck, or completing the bolting of a steel frame erected that day. Extended workday activities may not include all construction workers on site, but only those involved in the specific task. Extended workdays would occur during foundation and superstructure tasks, and limited extended workdays could occur during other tasks over the course of construction.

Table 20-1
Construction Activities and Projected Durations

Component	Estimated Duration	Start Date	Finish Date
708 First Avenue	29 Months	April 2008	August 2010
708 First Avenue and Waterside Below Grade Parking	22 Months	May 2008	March 2010
Waterside Open Space	15 Months	July 2009	October 2010
685 First Avenue	25 Months	December 2008	January 2011
685 First Avenue Below Grade Parking	5 Months	January 2009	June 2009
Waterside 1 Building 1 (WS1-1)	28 Months	March 2010	July 2012
Waterside 1 Building 2 (WS1-2)	31 Months	July 2010	February 2013
Waterside 2 (WS2)	28 Months	October 2010	February 2013
616 First Avenue Building 1 (616-1)	23 Months	July 2011	July 2013
616 First Avenue Building 2 (616-2) Residential	21 Months	August 2012	May 2014
616-2 Community Building*	19 Months	January 2011	September 2012
616 First Avenue Below Grade Parking	6 Months	February 2013	August 2013
616 First Avenue Open Space	6 Months	July 2014	December 2014

Notes: The project's construction schedule would likely commence one quarter later than assumed in the analyses in this chapter. The shift in schedule (presented in the table above), will not materially affect the findings presented in this chapter.

* As described above, it is now expected that the community facilities building, which would contain a proposed school, would be operational by September 2012. While the analyses presented in this chapter assume that the 616 First Avenue community facility component would be completed according to the previous schedule (reported in the Draft SEIS) in 2014, Chapter 23, "Mitigation," analyzes the potential construction-related impacts resulting from building a school and a portion of the below grade parking at the 616 First Avenue parcel by 2012.

Source: East River Realty Company, LLC

At limited times over the course of constructing a building, weekend work would be required. Weekend work requires a permit from the New York City Department of Buildings (DOB) and, in certain instances, approval of a noise mitigation plan from the New York City Department of Environmental Protection (DEP) under the City's Noise Code. The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007 limits construction (absent 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 PM and 7 AM and on weekends) may be permitted only to accommodate: (i) emergency conditions; (ii) public safety; (iii) construction projects by or on behalf of city agencies; (iv) construction activities with minimal noise impacts; and (v) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts and/or financial considerations. In such cases, the numbers of workers and pieces of equipment in operation 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. The typical weekend workday would be on Saturday from 7:00 AM with worker arrival and site preparation to 5:00 PM for site cleanup.

A few tasks may have to be completed without interruption, and the work can extend past 6:00 PM. In certain situations, concrete must be poured continuously to form one structure without joints. This type of concrete pour is usually associated with foundations, which would require a minimum of 12 hours or more to complete.

STAGING AND LAY DOWN AREAS

Because of the size of the sites, the staging and lay down of materials would be done on the properties and would not be on outside properties. Materials that are needed during the day are usually delivered early. These materials, such as reinforcing bars and prefabricated pieces, are stored until needed in lay down areas. The Waterside site is sufficiently large for temporary storage of these construction materials during the construction of 708, 700, and 685 First Avenue. During the construction at 616 First Avenue, the lay down area would be on site or possibly on a curb lane of either East 35th or 36th Streets after consultation with the New York City Department of Transportation (NYCDOT).

Concrete pours for foundations and floor slabs are usually continuous, and a staging area is needed for the concrete mixer trucks. Because concrete in mixer trucks usually needs to be poured within 90 minutes, the concrete trucks drive directly from the plant to the construction site. If several trucks arrive at the same time, a queue forms for the concrete pumps. It is expected that this queue or staging would take place on the Waterside site. For construction of 685 First Avenue, the concrete trucks would exit onto First Avenue and drive to the curb lane on the west side between East 39th and 40th Streets, where the concrete would be pumped. For the buildings on 708 and 700 First Avenue, the concrete trucks would approach them internally from the site. At 616 First Avenue, the concrete trucks may queue internally on the project site or on curb lanes along either East 35th or 36th Streets.

SIDEWALK AND LANE CLOSURES

During the course of construction, sidewalks and some curb lanes would have to be closed or protected for varying periods of time. NYCDOT review and approval would have to be obtained before any lanes or sidewalks can be temporarily closed for construction purposes. Bus stops and bus lay over areas may have to be temporarily relocated and crosswalks redirected. Certain curb lanes and sidewalks would be continuously closed for several months to about two years, and some lanes and sidewalks would be closed only intermittently to allow for certain construction activities. Pedestrians would be guided through the construction area in safe, protected routes. Generally, the sites are vacant and large enough to allow staging within the sites. However, at times, curb lanes may be closed to allow for deliveries. As discussed under “Probable Impacts of the Proposed Project,” curb lanes on First Avenue may be closed to enable access to 685 and, intermittently, to 708 First Avenue. This would be done to avoid affecting open spaces and residences on the side streets. Parking lane closures for construction access to 616 First Avenue would likely be from the side streets.

It is expected that a curb lane closure would occur on the west side of First Avenue between East 39th and East 40th Streets from third quarter 2008 to third quarter 2010 to allow for the construction of the building at 685 First Avenue. Any further loss of curb lanes along First Avenue is expected to be sporadic and not long term.

The sidewalk along the south side of East 41st Street between First Avenue and the FDR service road would have a protective walkway for pedestrians during the construction of the building at 708 First Avenue. The protective walkway is expected to be in place for about two years. From about mid-block eastward on East 40th Street to First Avenue, south on First Avenue and then west to mid-block on East 39th Street, a protective walkway would be installed for pedestrians during the construction of the building at 685 First Avenue. This protective walkway would be in place for about two and a half years. During the construction of the building WS2-1, a protective walkway would be in place on First Avenue for about two and a half years. For the construction of the building WS1-1, the protective walkway would be along First Avenue and East 38th Street. From second quarter 2012 to fourth quarter 2014, a protective walkway would wrap around the north, west, and south sides of 616 First Avenue during the construction of the buildings, below-grade parking, and open space.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 20-2 shows the estimated maximum numbers of workers and deliveries to the project site by calendar quarter. These represent peak days of work within each quarter, and a number of days during the quarter would have fewer construction workers and delivery trucks. The average number of workers would be about 1,304 during the construction of the project and would peak during the third quarter of 2009 at 2,326 workers. The number of truck trips would peak in the first quarter of 2009 with 154 trucks arriving per day on average. Detailed workforce and delivery projections can be found in Appendix F.

Table 20-2
Maximum Numbers of Construction Workers and Delivery Trucks (per day)

Year	**2008**				**2009**				**2010**				**2011**			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	52	172	512	1,533	1,849	2,218	2,326	2,092	1,898	1,392	1,544	1,462	1,916	1,986	2,028	1,950
Trucks	44	106	106	139	154	129	114	119	75	98	91	93	91	59	89	89
Year	**2012**				**2013**				**2014**				**Project**			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Peak		Average	
Workers	2,006	1,333	1,101	724	595	1,077	872	353	270	106	70	65	2,326		1,304	
Trucks	77	72	72	61	126	95	82	52	72	93	39	39	154		92	

Note: This table represents maximum conditions within each quarter and differs from the numbers discussed in some analysis sections.
Source: Turner Construction

CONSTRUCTION OF BUILDINGS

All of the development parcels would be abated and fully remediated prior to the commencement of construction activities. A detailed list of construction means can be found in Appendix F.

ABATEMENT, DEMOLITION, AND REMEDIATION

Normally, the first step in the development of a site that has been previously developed is to abate potentially harmful materials that were used in the buildings, such as asbestos, lead-based paint, and PCB/mercury-containing electrical components, and then demolish the buildings. Any potentially hazardous materials in the soil or groundwater would then be remediated by removal or isolation. However, all of these activities have to be completed and approved by the appropriate state and local agencies prior to the start of construction of this project. Therefore, since abatement, demolition, and remediation are not part of this project, they are not discussed in this chapter.

EXCAVATION AND FOUNDATION

Excavation Activities

Typically, soil excavation and foundation construction for a building takes approximately seven to nine months to complete, depending on the size of the development component. Trucks would remove excavated material for off-site disposal in a licensed landfill or recycling facility. Depending on the size of the excavation, the peak number of workers would range from about 50 per day on the smaller buildings to about 292 workers per day on a large building, such as 708 First Avenue. Typical mobile equipment would include excavators, backhoes, bulldozers, loaders, and compactors.

The bedrock depth in the area varies, ranging from 5 to 400 feet below street level. Where bedrock is shallow it is likely that solid rock excavation would be necessary. While the specific methods used for rock excavation cannot be determined until a subcontractor is selected, excavation typically includes rock drilling and/or controlled blasting, and the use of heavy excavation equipment and cranes to remove broken rock from the site.

On the 616 First Avenue parcel, bedrock is relatively deep throughout the site, so the need for solid rock excavation is unlikely, though some may be required. On the 685 First Avenue parcel, bedrock is shallow and would likely require rock excavation. On the 700 First Avenue (Waterside) and 708 First Avenue parcels, the majority of the site will have already been excavated to mean sea level (zero elevation) as part of site remediation. Based on available boring data it is estimated that, overall, approximately 30,700 cubic yards of solid rock would be excavated from the development parcels. The rock removal would most likely be accomplished via mechanical means, although blasting may be required.

In the areas where blasting is necessary, it would occur for short periods of time. Blasting in New York City is tightly regulated and restricted. All blasting would conform to Fire Department of New York City (FDNY) regulations and any other applicable regulations. The regulations are intended to prevent endangering the public and to minimize vibrations that could affect nearby buildings. Blasting would involve the use of timed multiple charges with limited blast intensity, which would reduce potential impacts, and blastmats would be placed over the blasting areas.

In areas where a controlled drill-and-blast method would be used, there would typically be one or two controlled blasting periods per day, each lasting for only a few seconds. More frequent blasting using smaller charges could also occur. Properties near these activities would be documented and monitored before, during, and following each blasting period, and strict parameters would be established and maintained by a safety officer at all times. Blasting would not occur at night. The time between controlled blasts is required for the removal of debris and to setup for the next blast. Some vibrations on the street and inside adjacent properties may be detected due to drilling and blasting activities. The extent of vibrations would vary based on: the density of the material being mined, with hard rock the most efficient in transmitting vibrations; the depth of blasting below ground; proximity to structures; the foundation configuration of the adjacent structures; and the response of the adjacent structures to vibration.

In consultation with the New York City Landmarks Preservation Commission (LPC) and New York State Office of Parks, Recreation, and Historic Preservation (OPRHP), measures would also be taken to protect historic resources from any potential effects during excavation. These measures are described under “Historic Resources,” below, and would include the development of a specific construction protection plan (CPP) in consultation with OPRHP and/or LPC to avoid inadvertent construction-related damage to Windsor Tower and the former Kips Bay Brewery.

Foundation Activities

Foundation work would include pile driving and pouring concrete footings and foundation. Ready-mix concrete trucks would deliver concrete to the site. As discussed in “Traffic and Transportation,” below, the number of trucks that would visit the site in a given day would vary for each development parcel. Like excavation, the number of workers on site each day would depend on the size of the foundation and would range from about 362 to 545.

Dewatering

The excavation would have to be dewatered during the excavation and foundation activities because of rain fall and inflow from the nearby East River. The water would be sent to an on-site sedimentation tank so that the suspended solids could settle out. The decanted water would be discharged into the New York City sewer system and the settled sediment conveyed to a licensed disposal area. Water discharged into the New York City sewerage is regulated by DEP. In the event dewatering is necessary, a DEP Sewer Discharge Permit or NYSDEC State Pollutant Discharge Elimination System Permit must be obtained prior to discharge.

SUPERSTRUCTURE

Superstructure construction typically takes between 8 and 16 months to complete, depending on the size of the development component.

Construction of the structure would create the framework (beams and columns) and floor decks. The structure would consist of either steel and concrete or reinforced concrete. Construction of the interior structure, or “core,” of the proposed buildings would create elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment rooms; core stairs; and restroom facilities. Core construction would begin when the foundation is ready and would continue through the interior construction and finishing stage.

Superstructure activities would require the use of cranes, derricks, delivery trucks, fork lifts or loaders, and other heavy equipment such as tower cranes, concrete pumps, welding machines, rebar benders and cutters, and compressors. Temporary construction elevators (hoists) would also be constructed for the delivery of materials and vertical movement of workers during this stage. Cranes would be used to lift structural components, façade elements, large construction equipment, and other large materials. Smaller construction materials and debris generated during this stage of construction would generally be moved with hoists. During peak construction, the number of workers would be up to 1,145. Trucks would continue to deliver materials and remove construction debris as described in “Traffic and Transportation,” below.

EXTERIOR CONSTRUCTION

Exterior construction involves the installation of the façade (exterior walls, windows, and cladding) and the roof. Exterior construction would take about three to six months, and would overlap with the completion of the superstructure and the interior finishing. Cranes would be used to lift the façade into place, and welding machines and impact wrenches would secure the exterior to the superstructure. Anywhere from 627 to 903 workers per day would be needed for the exterior construction.

INTERIOR CONSTRUCTION AND FINISHING

Installation of mechanical, electrical, and plumbing systems begun in the superstructure stage would continue during the interior construction and finishing stage. Other activities in this stage would include the installation of heating, ventilation, and air conditioning (HVAC) equipment and ductwork; installation of elevator, escalator, and life safety systems; construction of interior walls; installation of lighting fixtures; and interior finishing work (e.g., flooring, painting).

Interior construction and finishing typically takes between 6 and 12 months to complete, depending on the size of the development component. Up to 800 workers per day would be used for the interior finishing. As stated above, some superstructure and exterior construction would overlap with the interior construction and finishing stage.

D. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

Construction may at times be disruptive to nearby residential buildings and open spaces during the construction period. The following analysis describes the overall temporary effects of construction on the relevant areas of concern: land use, socioeconomic conditions, community facilities, open space, cultural resources, hazardous materials, infrastructure, traffic and transportation, air quality, and noise.

LAND USE

Construction would cause some disruptions to activities in the surrounding area. Although construction would occur over several years, most disruptions would be temporary in nature and would not occur for the entire construction period. In addition, the location of the construction activity would move over the course of the construction period. Construction activities would be similar to construction activities at other large sites in the City, and the hours of the construction would be regulated by DOB and DEP.

In general, construction would not alter surrounding land uses. During the construction, access to all adjacent businesses, residences, and other uses would be maintained according to the regulations established by DOB. When work would take place within building shells, effects on the surrounding uses would be substantially reduced as compared to excavation and foundation activities. Construction management practices would be developed and implemented to minimize the effects of construction-related changes in access to land uses in the vicinity of the development parcels. Other changes, such as sidewalk closures, would also affect people living and working in the surrounding area, but implementation of the construction management practices would minimize the effects of these closures. There would be no significant adverse impacts on land use due to construction activity.

SOCIOECONOMIC CONDITIONS

Construction activities on the development parcels would include various land and/or sidewalk closures for different stages of construction. However, there are no businesses on or immediately adjacent to the project sites, and construction would not obstruct throughways used by customers.

Construction would create major direct benefits resulting from expenditures on labor, materials, and services, as well as substantial indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the direct activity.

Construction would also contribute to increased tax revenues for the City and state, including those from personal income taxes. There would be no significant adverse impacts on socioeconomic conditions due to construction.

COMMUNITY FACILITIES

Construction activities on the development parcels would result in some interruptions to activities in the surrounding area and would include limited curb lane and/or sidewalk closures for different stages of construction. However, no community facilities are located on blocks where these measures would be implemented. All of the streets affected would remain accessible to emergency vehicles. Coordination with both the New York City Police Department (NYPD) and the FDNY would be undertaken throughout the construction period to ensure that unimpeded emergency access and adequate emergency response could be achieved. There would be no significant adverse impacts on community facilities due to construction.

OPEN SPACE

Construction of the proposed development program would occur in close proximity to a number of open spaces surrounding the development parcels, most notably St. Vartan Park, Robert Moses Playground, Joseph Slifka Park, and Trygve Lie Plaza. All open spaces are expected to remain open during the entire construction period, and access to these open spaces would not be compromised at any time.

Construction activities would be conducted with the care mandated by the close proximity of several open spaces to the development parcels. Dust control measures—including watering of exposed areas and dust covers for trucks—would be implemented to ensure compliance with Section 1402.2-9.11 of the New York City Air Pollution Control Code, which regulates construction-related dust emissions. As discussed below, there would be no significant adverse air quality impacts on open spaces. While low-noise emission level equipment and operational procedures would be used as specified in the restrictive declaration, significant adverse noise impacts are predicted to occur during construction at Manhattan Place Plaza, as discussed below. In addition, during limited time periods, construction activities would result in intrusive noise levels at other open space areas in the project study area, as described below.

HISTORIC RESOURCES

A Construction Protection Plan (CPP) would be developed in coordination with the New York City Landmark Preservation Commission (LPC) and implemented for construction activities at the 685 First Avenue parcel to avoid any adverse physical impacts to Windsor Tower (which sits immediately north and west of the parcel in Tudor City) and the Kips Bay Brewery (which is located across East 38th Street from and immediately south of the 700 First Avenue [Waterside] parcel) resulting from ground-borne, construction-period vibrations. This CPP would follow the guidelines set forth in LPC's Guidelines for Construction Adjacent to a Historic Landmark and Protection Programs for Landmark Buildings. Construction procedures to protect the foundations and structures of these resources would be developed and monitored by structural and foundation engineers. The resulting CPP would:

- Describe in detail the excavation and construction procedures that would occur on the development parcel;
- Provide for the inspecting and reporting of existing conditions;

- Establish protection procedures;
- Establish a monitoring program to measure vertical and lateral movement and vibration;
- Establish and monitor construction methods to limit vibrations; and
- Establish methods and materials to be used for any repairs.

The structural and foundation engineers would be empowered to issue “stop work” orders to prevent damage to Windsor Tower and the Kips Bay Brewery building; restarting work following a “stop work” order would require approval of LPC.

HAZARDOUS MATERIALS

As discussed in Chapter 11, “Hazardous Materials,” the proposed development program is not expected to result in an increase of potential pathways to exposure by introducing new activities and/or processes using hazardous materials. While uncontrolled excavation activities could increase pathways by exposing sub-surface contaminated materials, it is anticipated that potential impacts would be avoided by performing construction activities in accordance with federal, state, and local regulations, and the requirements of NYSDEC. Further activities at the site (e.g., health and safety during construction, handling and disposal of any additional soil/groundwater disturbed during construction and requirements for clean fill placed in landscaped areas) will be governed by Site Management Plans (SMPs) to be approved by NYSDEC. The applicant will enter into a restrictive declaration which would require that the applicant implement any additional testing, remediation, and other protective measures deemed necessary by the New York City Department of Environmental Protection (NYCDEP) to prevent any potential impacts related to hazardous materials. These measures, implemented pursuant to a NYCDEP-approved remedial action plan and construction health and safety plan, would ensure that there would be no significant adverse impacts on public health, workers’ safety, or the environment as a result of potential hazardous materials exposed by or encountered during construction.

INFRASTRUCTURE

Prior to the start of construction, all utilities that could potentially be affected by construction activities on the development parcels would be relocated in accordance with all applicable New York City regulations.

The proposed buildings would receive some combination of electric, gas, and steam service via extensions of the existing Con Edison underground distribution system. During the superstructure stage of construction, some sidewalk and on-street construction activities would be required to connect the proposed buildings to existing utility networks. For electrical connections, short-term sidewalk excavations ranging from approximately 50 to 150 feet in length would be required. In addition, electric lines would be extended from existing manholes to the new transformer vaults, requiring roadway excavation. For natural gas connections, the existing 8-inch gas line that served the former Waterside Station would be adequate to supply the proposed development. As part of the analysis conducted for the FGEIS, Con Edison estimated that no distribution system infrastructure reinforcement or additions would be necessary to provide steam connections to the proposed development.

The construction activities that would be required to connect the proposed development to existing energy systems are part of Con Edison’s normal operations for providing services to new customers, and occur on a regular basis throughout the city. Therefore, these construction activities would not result in a significant adverse impact to infrastructure and energy systems.

Management of stormwater runoff during construction is discussed in Chapter 10, "Natural Resources."

TRAFFIC AND PARKING

The construction of the proposed project, from 2008 to 2014, would result in some surface disruptions and generate construction worker and truck traffic. Because of the lengthy duration of these activities, a detailed evaluation of construction sequencing and worker/truck projections was undertaken to assess the potential transportation-related impacts. As demonstrated below, the projected construction activities are not expected to result in significant adverse parking impacts. However, some significant adverse construction-related traffic impacts are anticipated as construction activities begin to accelerate in late 2008.

CONSTRUCTION TRAFFIC PROJECTIONS

Average daily construction worker and truck activities by month, quarter, and rolling annual average were projected for the full seven years of construction. These projections were further refined to account for worker modal splits and vehicle occupancy, arrival and departure distribution, and the passenger car equivalent (PCE) factor for truck traffic (i.e., each truck is considered to be the equivalent of two passenger cars).

Daily Workforce and Truck Deliveries

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the average of the daily workforce and truck trip projections in the peak quarter was used as the basis for estimating peak hour construction trips. Based on a schedule of commencing construction in the beginning of 2008, the combined construction worker and truck traffic peak would occur in the third quarter of 2009. The daily average numbers of construction workers and truck deliveries during this construction peak quarter were estimated at 2,270 workers and 66 truck deliveries per day. These estimates of construction activities are further discussed below.

Construction Worker Modal Splits

According to the U.S. Census reverse journey-to-work (RJTW) data, commuting to work via auto in New York City is more prevalent among construction and excavation personnel than for workers in most other occupations. According to the census data, approximately 40 percent of construction workers commute to project sites via auto, with an average auto-occupancy of 1.23. Recent experience and surveys conducted at actual construction sites showed that the census information on worker modal split is comparable to what actually takes place. However, carpooling has become substantially more prevalent, particularly at large construction sites. The likely reasons for this trend include: (1) more opportunities would be available within a large workforce for workers to commute together; (2) parking spaces have become more difficult to find; and (3) the cost of driving has escalated in recent years as a result of increases in tolls and in the price of gasoline and parking. For these reasons, a higher auto-occupancy of 1.90, as used in the construction traffic analysis for the *Atlantic Yards Arena and Redevelopment Project FEIS* (2006), was used for this analysis.

Peak Hour Construction Worker Vehicle and Truck Trips

Site activities would mostly take place during the typical construction shift of 7:00 AM to 3:30 PM. However, some construction tasks, such as foundation and superstructure work, would extend to 6:00 PM, requiring a portion of the construction workforce to remain for this extended shift. A nominal number of truck deliveries may also be expected during these later hours.

While construction truck trips would be made throughout the day (with more trips made during the early morning), and most trucks would remain in the area for short durations, construction worker travel would typically take place during the hours before and after the work shift. For analysis purposes, each worker vehicle was assumed to arrive in the morning and depart in the afternoon or evening, whereas each truck delivery was assumed to result in two truck trips during the same hour. Furthermore, in accordance with the *CEQR Technical Manual*, each truck was assumed to have a PCE of 2. Hence, a truck delivery to the project sites would result in an equivalent of four vehicle trips (two entering and two exiting) during the same analysis hour.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns of construction workers and trucks. For construction workers, the majority (80 percent) of the arrival and departure trips would take place during the hour before and after each shift (6-7 AM for arrival and 3-4 PM for departure on a normal day shift or 6-7 PM for days with extended shifts). For construction trucks, deliveries would occur throughout the day when the construction site is active. However, to avoid traffic congestion, construction truck deliveries would also often peak during the hour before the regular day shift (25 percent of shift total), overlapping with construction worker arrival traffic. Based on these assumptions, the peak hour construction traffic was estimated for the entire construction period. The peak construction hourly trip projections for the third quarter of 2009 are summarized in Table 20-3. Detailed projections of construction-related traffic are summarized in Appendix F.1.

TRAFFIC

Vehicles generated by construction activities were assigned to the street network to determine the location of critical intersections. 7-8 AM and 3-4 PM peak hours were analyzed at nine critical locations on First and Second Avenues, including First Avenue from 38th to 42nd Streets and Second Avenue from 39th to 42nd Streets. To account for the use of curb lanes adjacent to the 685 and 700/708 First Avenue construction sites for staging, four travel lanes on First Avenue instead of five were assumed (which retains an AM/PM bus lane on the east side of First Avenue), and parking would be prohibited on the west side of First Avenue between 39th and 40th Streets for the 685 First Avenue site and on the north side of 38th Street between First Avenue and the FDR Drive Service Road for the 700/708 First Avenue site (No Standing Anytime regulations would not affect parking on the south side of 41st Street between First Avenue and the FDR Drive Service Road). Under future conditions with construction, significant adverse impacts would occur at one location in the 7-8 AM peak hour and five locations in the 3-4 PM peak hour, which could be mitigated using measures similar to those recommended under Build conditions, with the exception of two unmitigated impacts in the 3-4 PM peak hour.

Table 20-3
Peak Construction Trip Projections—Third Quarter of 2009

Hour	Construction Workers Trips				Construction Truck Trips		Total Vehicle-Trips		
	Worker-Trips		Auto-Trips						
	In	Out	In	Out	In	Out	In	Out	Total
6 AM - 7 AM	1,816	0	382	0	16	16	398	16	414
7 AM - 8 AM	454	0	96	0	7	7	103	7	110
8 AM - 9 AM	0	0	0	0	7	7	7	7	14
9 AM - 10 AM	0	0	0	0	7	7	7	7	14
10 AM - 11 AM	0	0	0	0	7	7	7	7	14
11- AM -12 PM	0	0	0	0	7	7	7	7	14
12 PM - 1 PM	0	0	0	0	6	6	6	6	12
1 PM - 2 PM	0	0	0	0	6	6	6	6	12
2 PM - 3 PM	0	115	0	24	3	3	3	27	30
3 PM - 4 PM	0	919	0	193	0	0	0	193	193
4 PM - 5 PM	0	115	0	24	0	0	0	24	24
5 PM - 6 PM	0	224	0	48	0	0	0	48	48
6 PM-7 PM	0	897	0	189	0	0	0	189	189
Day Total	**2,270**	**2,270**	**478**	**478**	**66**	**66**	**544**	**544**	**1,088**

Note: Hourly construction worker and truck trips were derived from projected estimates of 2,270 workers and 66 trucks making two daily trips each (arrival and departure) in the third quarter of 2009. Numbers of construction worker vehicles were calculated with a 40-percent auto split with a vehicle occupancy of 1.90.
Source: Turner Construction and AKRF, Inc.

AM Construction Peak Traffic Volumes and Conditions—Existing

The 6-7 AM peak hour carries about 53 percent of the traffic that the 8-9 AM peak hour does. However, the 7-8 AM peak hour carries about 86 percent of the traffic that the 8-9 AM peak hours does. Therefore, 7-8 AM was chosen as the AM peak construction analysis hour because the potential for construction-related impacts would be greater from 7-8 AM. The 7-8 AM existing volumes were calculated by decreasing the 8-9 AM volumes by 14 percent. Overall intersection levels of service are at mid-LOS D or better during the 7-8 AM peak hour.

AM Construction Peak Traffic Volumes and Conditions—Future without Construction in 2009

The 7-8 AM existing volumes were increased to 2009 using a background growth rate of 0.5 percent per year. To be conservative, all background project trips except for Hudson Yards Build trips were added to the traffic network (some Hudson Yards No Build trips contain projects that would be built in 2010 or later, but for simplicity, all were assigned). Overall intersection levels of service would be unacceptable at Second Avenue and 41st Street (LOS E).

AM Construction Peak Traffic Volumes and Conditions—Future with Construction in 2009

During the 7-8 AM peak hour, the construction activities would generate 96 construction worker auto trips and 14 delivery trips. Auto trips were assigned to available off-street parking facilities, and delivery trips were assigned along designated NYCDOT truck routes. Overall intersection levels of service would be unacceptable at Second Avenue and 41st Street (LOS E). Significant adverse impacts would occur at Second Avenue and 41st Street. The 2009 AM peak hour construction impacts at Second Avenue and 41st Street could be mitigated by applying signal timing modifications as was recommended under Build conditions.

PM Construction Peak Traffic Volumes and Conditions—Existing

The 3-4 PM peak hour carries approximately 98 percent of the traffic that the 5:30-6:30 PM peak hour does. Therefore, the 5:30-6:30 PM peak hour existing traffic volumes and analyses were used to analyze the 3-4 PM peak hour for construction traffic. Under existing conditions, unacceptable overall intersection levels of service occur at Second Avenue at 39th, 40th and 42nd Streets (unacceptable LOS D).

PM Construction Peak Traffic Volumes and Conditions—Future without Construction in 2009

The 3-4 PM existing volumes were increased to 2009 using a background growth rate of 0.5 percent per year. To be conservative, all background project trips except for Hudson Yards Build trips were added to the traffic network. In the future without construction, unacceptable overall intersection levels of service would occur at Second Avenue at 39th and 41st Streets (LOS E).

PM Construction Peak Traffic Volumes and Conditions—Future with Construction in 2009

There would be 382 auto trips and 2 delivery trips during the 3-4 PM peak hour on typical work days (193 auto trips would be made when averaging typical and extended shift work days). Overall levels of service would be unacceptable at First Avenue and 39th Street (LOS F), First Avenue and 42nd Street (marginally unacceptable LOS D), Second Avenue at 39th Street (LOS F), and at 40th and 41st Streets (LOS E). Significant adverse impacts would occur at First Avenue at 39th and 42nd Streets, and Second Avenue at 39th, 40th and 42nd Streets. The 2009 PM peak hour construction impacts at First Avenue and 39th Street, and Second Avenue at 39th Street could be mitigated by applying signal timing modifications, and the same strict enforcement of existing regulations and modification of parking regulations recommended under Build conditions. Second Avenue and 42nd Street, which could only be partially mitigated under Build conditions, could be mitigated via signal timing modifications in the 2009 PM peak hour.

First Avenue and 42nd Street, which could not be mitigated under Build conditions, could also not be mitigated under 3-4 PM peak hour construction conditions. Second Avenue and 40th Street, which would require a signal timing shift of 8 seconds to be fully mitigated, could not be mitigated because Second Avenue corridor signal progression limitations would not permit a shift of 8 seconds. The two unmitigated impacts would occur during the 3-4 PM peak hour, and would not disrupt the commuter PM peak hour from 5:30 to 6:30 PM. Furthermore, the unmitigated impacts related to construction activities would be temporary.

DELIVERIES

Construction trucks would not use the FDR Drive because commercial vehicle traffic is prohibited on that highway. Some trucks approaching the construction area would also be prohibited from using certain bridge or tunnel crossings into Manhattan—such as the Queens-Midtown, Lincoln, and Holland Tunnels—due to vehicle height restrictions. Commercial carriers would be advised to avoid specific routes, including local cross-town streets in Midtown Manhattan that prohibit large vehicles, cross-town streets that do not provide direct through passage to the development parcels, and cross-town streets that pass through Queens-Midtown Tunnel feeder roadways. Trucks would be required to use DOT-designated truck routes. At the project sites, flaggers would manage the access and movements of trucks. Limited site deliveries may occur along the perimeters of the construction sites within delineated closed-off areas for concrete pour or steel delivery.

CURB LANE CLOSURES AND STAGING

Based on the current construction plan, curb lane and/or sidewalk closures are anticipated adjacent to all of the development parcels, along First Avenue and several of the cross-town streets. Sidewalk protection or temporary sidewalks would be provided to maintain pedestrian access. With no lane closures proposed along the FDR Drive service road, none of the anticipated curb-lane closures would result in a loss of traffic lanes. Staging areas would be required from the start of foundation work until the hoists are completely removed at the completion of the core and shell stage. Because the majority of construction activities would be accommodated on-site, construction trucks would be staged primarily within the development parcels.

Maintenance and protection of traffic plans would be developed for all anticipated curb lane and sidewalk closures. Approval of these plans and implementation of all temporary sidewalk and curb lane closures during construction would be coordinated with DOT's Office of Construction Mitigation and Coordination (OCMC). Where temporary bus stop and layover relocations are required, approvals would also be obtained from the New York City Transit (NYCT).

PARKING

Construction Worker Auto Parking—Future with Construction in 2009

Construction worker auto trips were assigned to facilities on 40th Street (Nos. 18, 20 and 21 as illustrated in the SEIS Figure 15-9 for off-street parking), 39th Street (No. 25), First Avenue between 38th and 39th Streets (No. 26), 38th Street (No. 28), and 37th Street (Nos. 29 and 33). The overall parking utilization in the AM period within ½ mile of the site would increase from 68 percent in the future without construction to 76 percent with construction, and would increase during the midday period from 87 to 95 percent. Thus, there would be sufficient parking to accommodate construction workers driving to the area.

TRANSIT AND PEDESTRIANS

As described below, the project construction activities are not expected to result in significant adverse transit and pedestrian impacts.

TRANSIT

With approximately 40 percent of the construction workers predicted to commute via auto, the bulk of the remaining 60 percent would travel to and from the project sites via transit. Based on the peak third quarter 2009 projections discussed above and summarized in Table 20-3, there would be approximately 1,100 construction-related transit trips during the 6-7 AM hour, and 550 construction-related transit trips during the 3-4 PM and 6-7 PM hours. The transit trip demand during the morning and afternoon construction shoulder peak hours would range from 50 to 275 trips. Distributed among the various subway and bus routes, station entrances, and bus stops near the project sites, only nominal increases in transit demand would be experienced along each of those routes and at each of the transit access locations during hours within and outside of the typical commuter peak periods. Hence, no further evaluation of nearby transit services is required, and there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips. The temporary relocation of bus stops along bus routes that operate adjacent to the project sites would be coordinated with DOT and NYCT to ensure proper access is maintained.

PEDESTRIANS

For the same reasons discussed above, with respect to transit operations, a detailed pedestrian analysis to address the projected demand from the travel of construction workers to and from the project sites is also not warranted. Considering that these pedestrian trips would primarily occur outside of peak hours and 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. During construction, where temporary sidewalk closures are required, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements.

AIR QUALITY

INTRODUCTION

During construction, emissions from on-site construction equipment and on-road construction-related vehicles, and their effect on background traffic congestion, have the potential to affect air quality. The analysis of potential impacts of the construction of the proposed development program on air quality 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, most construction engines are diesel-powered and produce relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM). Construction activities also emit fugitive dust. Although diesel engines emit much lower levels of carbon monoxide (CO) than gasoline engines, the stationary nature of construction emissions and the large quantity of engines could lead to elevated CO concentrations, and impacts on traffic could increase mobile source-related emissions of CO as well. Therefore, the pollutants analyzed for the construction period are nitrogen dioxide (NO_2), CO, particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), and particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$). Since ultra-low-sulfur diesel (ULSD) would be used for all engines used in the construction of the proposed development program, sulfur oxides (SO_x) emitted from those construction activities would be negligible. For more details on air pollutants, see Chapter 17, “Air Quality.”

Construction activity in general, and large-scale construction in particular, has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine PM. To ensure that the construction of the proposed development program results in the lowest feasible diesel particulate matter (DPM) emissions, the project sponsors will implement an emissions reduction program for all construction activities, consisting of the following:

1. *Diesel Equipment Reduction.* The construction of the proposed development program would minimize the use of diesel engines and use electric engines operating on grid power instead, to the extent practicable. To that end, the project sponsors will seek the connection of grid power to the construction sites by the start of construction. Construction contracts would specify the use of electric engines where practicable and ensure the distribution of power connections throughout the development parcels as needed. Equipment that would use grid

power instead of diesel engines would include, but may not be limited to, rebar benders, compressors, and welders. This would also eliminate some generators that would normally be needed for construction equipment.

2. *Clean Fuel.* ULSD would be used exclusively for all diesel engines throughout the development parcels. This would enable the use of tailpipe reduction technologies (see below) and would directly reduce DPM and SO_x emissions.

3. *Best Available Tailpipe Reduction Technologies.* Nonroad 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 sponsor, such as concrete mixing and pumping trucks) would utilize the best available tailpipe technology for reducing DPM emissions. Diesel particle filters (DPFs) have been identified as the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs or other tailpipe reduction technology, either original equipment manufacturer (OEM) or retrofit technology with add-on controls, verified to reduce DPM emissions by at least 85 percent (when compared with the uncontrolled exhaust of an equivalent engine). Reduction levels of more than 90 percent have been verified by a study of actual reductions of $PM_{2.5}$ emissions from comparable engines used at a New York City construction site. Controls may include active DPFs,[1] if necessary. Exceptions would be made only in cases when DPFs cannot be used for safety reasons or when it is proven that an engine that would not function properly with a DPF is necessary for a certain task; in those cases, the use of diesel oxidation catalyst (DOC) or other tailpipe reduction technology verified to reduce DPM by at least 25 percent would be required.

4. *Location of Sources Away from Sensitive Land Uses.* In addition, to reduce the resulting concentration increments at residential and school locations, large-emissions sources and activities, such as concrete trucks and pumps, would be located away from residential buildings and playgrounds, to the extent practicable.

5. *Fugitive Dust Control.* Fugitive dust control plans will 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 large construction sites. Truck routes within the sites would be either watered as needed or, in cases where such routes 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. In addition to regular cleaning by the city, area roads would be cleaned as frequently as needed. The fugitive emissions reduction program would reduce $PM_{2.5}$ emissions by at least 50 percent for stock piles and handling of excavated materials. <u>Water spray would be applied to all demolition and excavation activities as needed to avoid dust emissions.</u>

Additional measures would be taken to reduce pollutant emissions during construction of the proposed development program in accordance with all applicable laws, regulations, and building

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[1] There are two types of DPFs currently in use: passive and active. Most DPFs currently in use are the "passive" type, which means that the heat from the exhaust is used to regenerate (burn off the PM) in order to eliminate the buildup of PM in the filter. Some engines do not maintain temperatures high enough for passive regeneration. In such cases, "active" DPFs can be used, i.e., DPFs that are heated either by an electrical connection from the engine, by plugging in during periods of inactivity, or by removal of the filter for external regeneration.

codes. These include the restriction of on-road vehicle idle time to 3 minutes for all vehicles that are not using the engine to operate a loading, unloading, or processing device (e.g., concrete-mixing trucks).

All of the project sponsor's commitments will be included in a restrictive declaration.

METHODOLOGY

Introduction

Chapter 17, "Air Quality," contains a review of the pollutants for analysis; applicable regulations, standards, and benchmarks; and general methodology for stationary and mobile source air quality analyses. Additional details relevant only to the construction air quality analysis methodology are presented in the following section. As described in Chapter 17, "Air Quality," the U.S. Environmental Protection Agency (EPA) has recently revised the $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS), effective December 18, 2006. The revisions include lowering the 24-hour average standard from the previous level of 65 micrograms per cubic meter $\mu g/m^3$ to 35 $\mu g/m^3$ and revoking the annual standard for PM_{10}.

SEQRA regulations and the *CEQR Technical Manual* state that the significance of a likely consequence (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. In terms of the magnitude of air quality impacts, an action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the NAAQS, or increase the concentration of $PM_{2.5}$ above the interim guidance thresholds, could have an adverse impact of significant magnitude. The factors identified above would then be considered in determining the overall significance of the potential impact.

Mobile Sources

Overall, the construction related traffic increments (worker vehicle and truck trips) are predicted to be lower than those predicted once the project is completed. Since mobile-source impacts were predicted to be insignificant in the worst-case operational analysis, no significant adverse air quality impacts would be expected from mobile sources during construction at any location.

DEP has determined, as a screening level for CEQR purposes, that 8 truck trips per hour based on MOBILE5B output for 2002, would not result in significant adverse PM impacts. MOBILE5B provides a $PM_{2.5}$ emission factor of 0.611 grams of $PM_{2.5}$ per truck-mile. Therefore, the screening level is 5.1 grams of $PM_{2.5}$ per mile.

The proposed construction operations, at peak predicted activity levels, would result in up to 26 truck trips at peak hours at some nearby intersections in 2008. These trips would include 15 concrete truck trips and 11 other truck trips. The concrete trucks would be equipped with DPFs which reduce PM emissions by at least 85 percent. The $PM_{2.5}$ emission factor for trucks (from MOBILE6) is 0.25 grams of $PM_{2.5}$ per truck-mile, and 0.038 grams per mile for trucks equipped with DPFs. The total emission rate from the projected 26 truck trips (sum of emission factors multiplied by the number of trucks of each type) would be 3.3 grams per mile—well below the 5.1 grams per mile screening level. Therefore, a quantified assessment of PM emissions from on-road trucks is not warranted. Nonetheless, on-road truck emissions adjacent to the facility 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.

On-Site Construction Activity Assessment

Overall, construction of the proposed development program is expected to occur over a period of seven years. To determine which construction periods constitute the worst-case periods for the pollutants of concern (PM, CO, NO_2), construction-related emissions were calculated throughout the duration of construction on an annual and peak-day basis for $PM_{2.5}$. $PM_{2.5}$ was selected for determining the worst-case periods for all pollutants, because the ratio of $PM_{2.5}$ emissions to impact criteria is higher than for other pollutants. Therefore, initial estimates of $PM_{2.5}$ emissions throughout the construction years were 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 (hp). CO emissions may have a somewhat different pattern but generally would also be highest during periods when the most activity would occur. Based on the resulting multi-year profiles of annual average and peak day average emissions of $PM_{2.5}$, a worst-case year and a worst-case short-term period were identified for dispersion modeling of annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods. Dispersion of the relevant air pollutants from the site during these periods was then analyzed, and the highest resulting concentrations are presented in the following sections. Broader conclusions regarding potential concentrations during other periods, which were not modeled, are presented as well, based on the multi-year emissions profiles and the worst-case period results.

The general methodology for stationary source modeling (regarding model selection, receptor placement, and meteorological data) presented in Chapter 17 was followed for modeling the dispersion of pollutants from on-site sources during the construction period.

The sizes, types, and number of construction equipment were estimated based on the construction activity schedule. Emission factors for NO_x, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines were developed using the EPA's NONROAD2005 Emission Model (NONROAD). Since emission factors for concrete pumps are not available from either MOBILE6 or NONROAD, emission factors specifically developed for this type of application were used.[1] The model is based on source inventory data accumulated for specific categories of nonroad equipment. The emission factors for each type of equipment were calculated from the NONROAD output files (i.e., calculated from regional emissions estimates). With respect to trucks, emission rates for NO_X, CO, PM_{10}, and $PM_{2.5}$ for on-site truck engines were developed using the EPA MOBILE6.2 Emission Model (MOBILE6).

As described in the introduction above, the project sponsors have committed to a number of measures to greatly reduce air pollutant emissions during construction of the proposed development program, with special attention given to DPM. The implementation of these measures will be required by the restrictive declaration recorded by the project sponsors. These measures include the use of electric-powered engines instead of diesel engines where practicable; the exclusive use of ULSD for all construction engines; the use of DPFs on all nonroad construction engines with an engine output rating of 50 hp or greater, which are predicted to

[1] Concrete pumps are truck mounted and use the truck engine to power the pumps at high load. This application of truck engines is not addressed by the MOBILE6 model, and since it is not a non-road engine, it is not included in the NONROAD model. Emission factors were obtained from a study which developed factors specifically for this type of activity.
FEIS for the Proposed Manhattanville In West Harlem Rezoning And Academic Mixed-Use Development, CPC–NYCDCP, November 16, 2007.

reduce PM tailpipe emissions by at least 85 percent compared with the uncontrolled exhaust of an equivalent engine (and actually often reduce such emissions by 90 percent or more); and DOCs, which are predicted to reduce PM emissions by at least 25 percent (DOCs would be used for applications where DPFs are not effective or not practical for safety reasons, and no such instances were identified in these analyses). In addition, controlled truck fleets (i.e., truck fleets under long-term contract with the project sponsor, such as concrete trucks) would only use trucks equipped with DPFs.

Based on the project sponsor's commitments, emission factors for the construction of the proposed development program were calculated assuming the exclusive use of ULSD and the application of DPFs on all nonroad diesel engines 50 hp or greater, and concrete trucks; other trucks were assumed to have emissions consistent with the general truck fleet (all on-road diesel vehicles currently use ULSD, as mandated by federal regulations). DPFs were conservatively assumed to reduce PM emissions by only 85 percent to account for the small fraction of engines, if any, that might not practicably be retrofitted with DPFs. $PM_{2.5}$ emission factors for engines retrofit with a DPF (i.e., all nonroad engines with a power output of 50 hp or greater and all concrete delivery trucks) were calculated as 15 percent of the 2006 NONROAD baseline emissions for all construction years; in cases where the NONROAD future year fleet-average emission factor was lower than the reduced DPF emission factor, indicating that future technologies were predicted to achieve higher reductions, the lower factor was used for future years. For all other engines and for pollutants other than $PM_{2.5}$, MOBILE6 and NONROAD fleet-average emissions were used based on the first year of construction for each parcel[1]. All rebar benders, welders, compressors, and some other small equipment would be electric and would therefore have no associated emissions. Since it may take a few weeks to prepare for receiving grid power at each location, it was assumed that grid power would be available at each site six weeks after the start of excavation, and after that time no generators would be used on-site. In addition, dust emissions from operations (e.g., grading, excavation, loading excavated materials into dump trucks) were calculated based on EPA procedures delineated in AP-42 Table 13.2.3-1 (EPA, 1995-2006). Vehicle speeds on-site would be limited to 5 miles per hour to avoid the resuspension of dust. The resulting engine emission factors were used for the emissions and dispersion analyses.

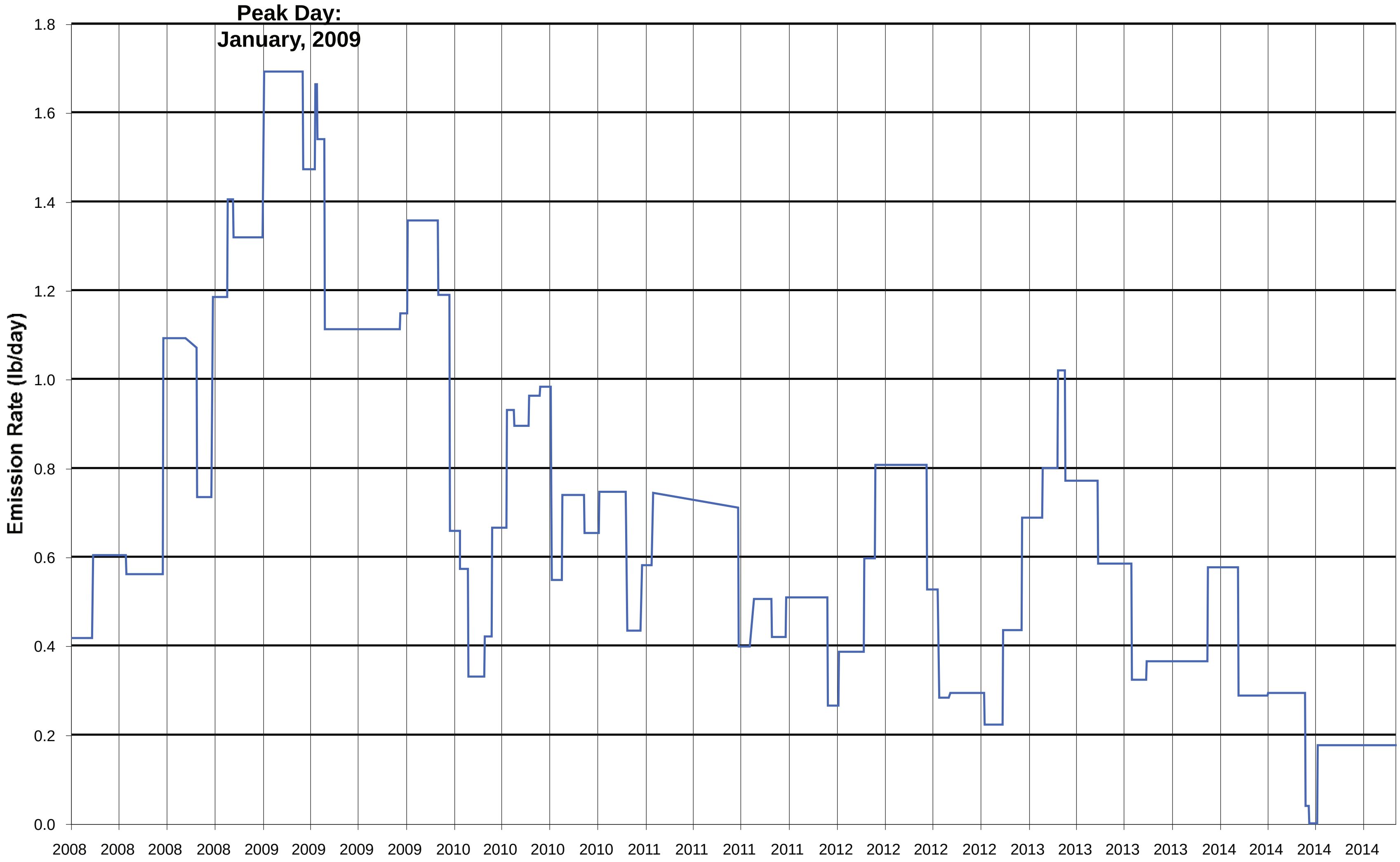
Average annual (running 12-month averages) and peak-day $PM_{2.5}$ emissions profiles for the entire duration of the construction were prepared by multiplying the above emission rates by the number of engines, the work hours per day, and fraction of the day each engine would be expected to work during each month. The construction activity details are presented in Appendix F, and details of the emissions calculations are presented in Appendix F.2. The resulting overall peak day and annual emission profiles are presented in Figures 20-3 and 20-4, respectively.

Based on the $PM_{2.5}$ construction emission profiles, a short-term and an annual period were selected for modeling. January 2009 and the year from July 2008 to June 2009 were identified as the worst-case short-term and annual periods respectively, based on project-wide emissions.

The dispersion of pollutants during the short-term and annual periods with the highest emissions was then modeled in detail to predict resulting maximum concentration increments from

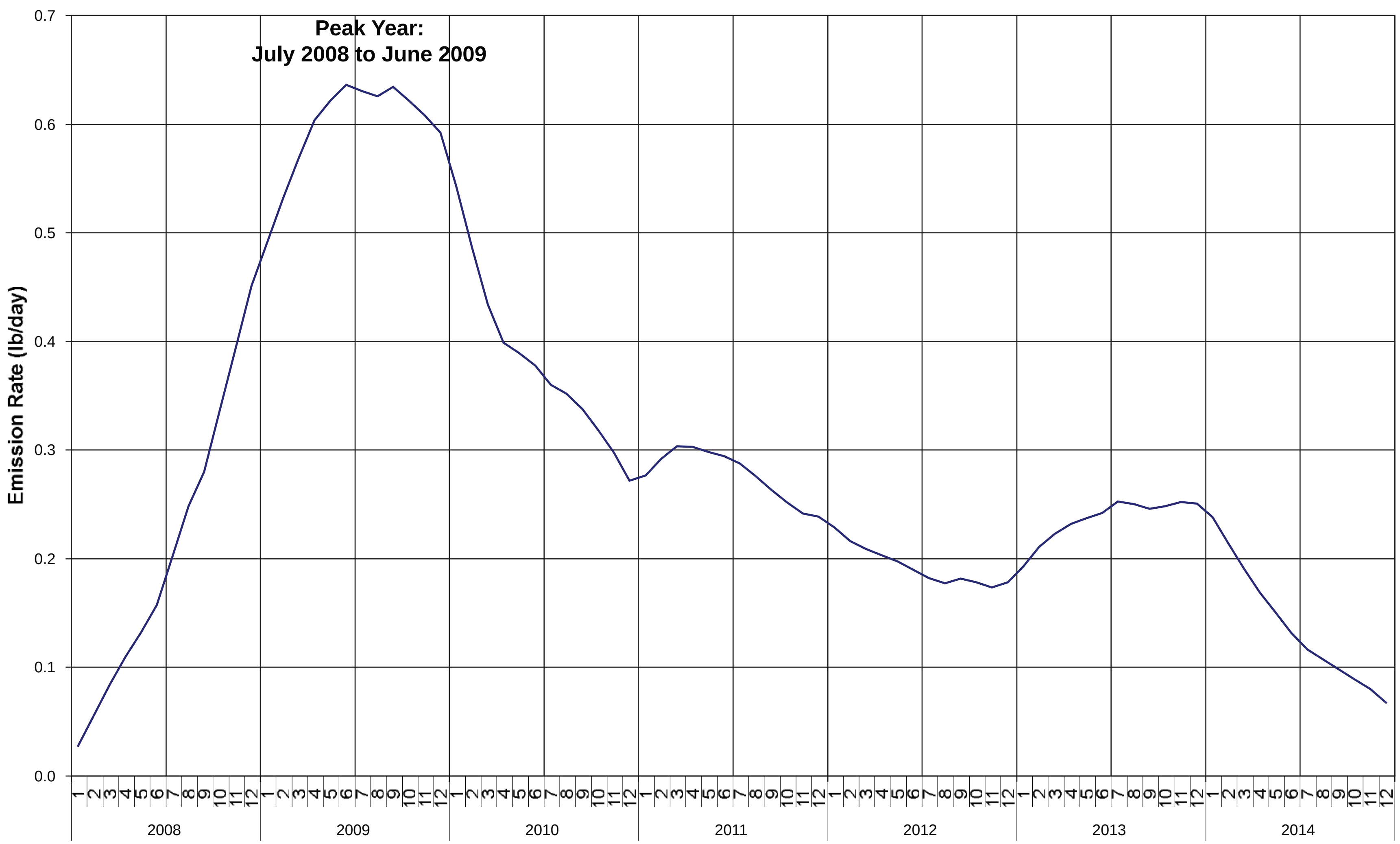
[1] Generally, fleet-average emission factors diminish by year as new engines conforming to lower emission standards enter the fleet. However, the conservative assumption was made that for a given task, engine emissions would not change throughout construction. This is true even in cases where certain engines would not be used until a later year than the start of the task.

12.20.07



Peak (24-hr Average) $PM_{2.5}$
Construction Emissions Profile
Figure 20-3

FIRST AVENUE PROPERTIES REZONING



Annual (Moving 12-Month Average) $PM_{2.5}$
Construction Emissions Profile
Figure 20-4

construction activity and total concentrations (including background concentrations) in the surrounding area. For the purpose of this analysis, a conservative assumption was made that 55 percent of NO_x would be transformed to NO_2 at all receptors.[1] This assumption is based on the ambient long-term fraction of NO_x measured as NO_2 at NYSDEC monitoring stations. Assuming that 55 percent of the NO_x emitted from construction engines on-site would be transformed from NO to NO_2 in the span of seconds to minutes—the time it takes for pollutants to travel downwind from the engine exhaust point to the nearest receptors where the maximum increments are predicted—is very conservative since this full transformation to steady-state conditions with ambient air would be expected to take at least half an hour.

Although the modeled results are based on construction scenarios for specific sample periods, conclusions regarding other periods were derived based on the fact that lower concentration increments from construction would generally be expected during periods with lower construction emissions. As presented in Figures 20-3 and 20-4, emissions during other periods would be lower, often much lower, than the peak emissions. However, since the worst-case short-term results may often be indicative of very local impacts, similar maximum local impacts may occur at any stage at various locations but would not persist in any single location, since emission sources would not be located continuously at any single location throughout the construction period. Equipment would move throughout the site as construction progresses.

For the short-term model scenarios, predicting concentration averages for periods of 24 hours or less, all stationary sources, such as compressors, pumps, or concrete trucks, which idle in a single location while unloading, were simulated as point sources. Other engines, which would move around the site on any given day, were simulated as area sources. For periods of 8 hours or less (less than the length of a shift), it was assumed that all engines would be active simultaneously. With the exception of generators, all sources would move around the site throughout the year and were therefore simulated as area sources in the annual analyses. All staging and concrete operations would occur within the project sites away from the perimeter, except for 685 First Avenue, where the concrete pumps and concrete trucks would operate at the curb lane on the north side of West 39th Street. These locations were selected to avoid having concentrated emissions sources near the playground to the north of the 708 First Avenue site, the park to the west of the 616 First Avenue site, and residential locations to the north and south of the 616 First Avenue site and south of the Waterside site.

Receptors (locations in the model where concentrations are predicted) were placed along the sidewalks surrounding the construction sites on both sides of the street at all locations that would be publicly accessible, at residential and other sensitive uses at both ground-level and elevated locations (e.g., residential windows), and at publicly accessible open spaces. In addition, a ground-level receptor grid was placed to enable extrapolation of concentrations throughout the entire area at locations more distant from the proposed development program.

Detailed modeling parameters for sources and the location of model elements are presented in Appendix F.2.

POTENTIAL CONSTRUCTION AIR QUALITY IMPACTS

Maximum predicted concentration increments from construction of the proposed development program and overall concentrations, including background concentrations, are presented in

[1] Diesel engines emit approximately 10 percent of the NO_x as NO_2 and 90 percent as NO.

Table 20-4. For $PM_{2.5}$, monitored concentrations are not added to modeled concentrations from sources, since impacts are determined by comparing the predicted changes between the Proposed Actions and the No Build with the interim guidance criteria. The maximum predicted $PM_{2.5}$ concentration increments are presented in isopleth form (lines representing constant concentration) in Figures 20-5 and 20-6. The total concentrations in Table 20-4 are the sum of background concentrations and construction increments. (Since the numbers presented in the tables include significant figures only, there may be some rounding differences.)

Table 20-4
Pollutant Concentrations from Construction Site Sources (µg/m³)

Pollutant	Averaging Period	No Build	Proposed Actions	Increment	Interim Guidance Threshold	NAAQS
Residence						
$PM_{2.5}$	24-hour[1]	--	--	1.7	5/2[2]	35 [3]
	Annual local[1]	--	--	0.08	0.3	15
PM_{10}	24-hour	60	96	36	—	150
NO_2	Annual	72	78	7	—	100
CO	1-hour	4.0 ppm	28.3 ppm	24.3 ppm	—	35 ppm
	8-hour	2.5 ppm	4.5 ppm	2.0 ppm	—	9 ppm
Sidewalks and Covered Walkways Adjacent to Construction						
$PM_{2.5}$	24-hour[1]	--	--	2.4	5/2[2]	35 [3]
	Annual Local[1]	--	--	0.14	0.3	15
PM_{10}	24-hour	60	117	57	—	150
NO_2	Annual	72	81	10	—	100
CO	1-hour	4.0 ppm	30.2 ppm	26.2 ppm	—	35 ppm
	8-hour	2.5 ppm	4.9 ppm	2.4 ppm	—	9 ppm

Notes:
Results for any other time period or locations other than these sites would be lower.
Results include construction-related truck traffic along First Avenue.
$PM_{2.5}$ concentration increments should be compared with threshold values. Total concentrations should be compared with the NAAQS.
1 Monitored concentrations are not added to modeled $PM_{2.5}$ values.
2 DEP is currently applying threshold criteria for assessing the significance of 24-hour average $PM_{2.5}$ impacts. For temporary impacts such as those caused by construction activities, the significance of any concentration increment greater than 2 µg/m³ is assessed in the context of the magnitude, frequency, duration, location and size of area affected by the concentration increment.
3 EPA has recently reduced the 24-hour $PM_{2.5}$ standard from 65 µg/m³ to 35 µg/m³ and revoked the annual PM_{10} standard, effective December 18, 2006.

Total concentrations of PM_{10}, CO, and NO_2 are not expected to exceed the NAAQS.

From the on-site sources related to the construction, there were no predicted 24-hour average $PM_{2.5}$ concentration increments greater than 2 µg/m³ at residences, where exposure for periods of 24-hours or more can be reasonably expected. Local annual average $PM_{2.5}$ concentration increments would not exceed the threshold level of 0.3 µg/m³. The highest annual average neighborhood-scale $PM_{2.5}$ increment would potentially reach 0.01 µg/m³, which is much lower than the threshold level of 0.1 µg/m³.

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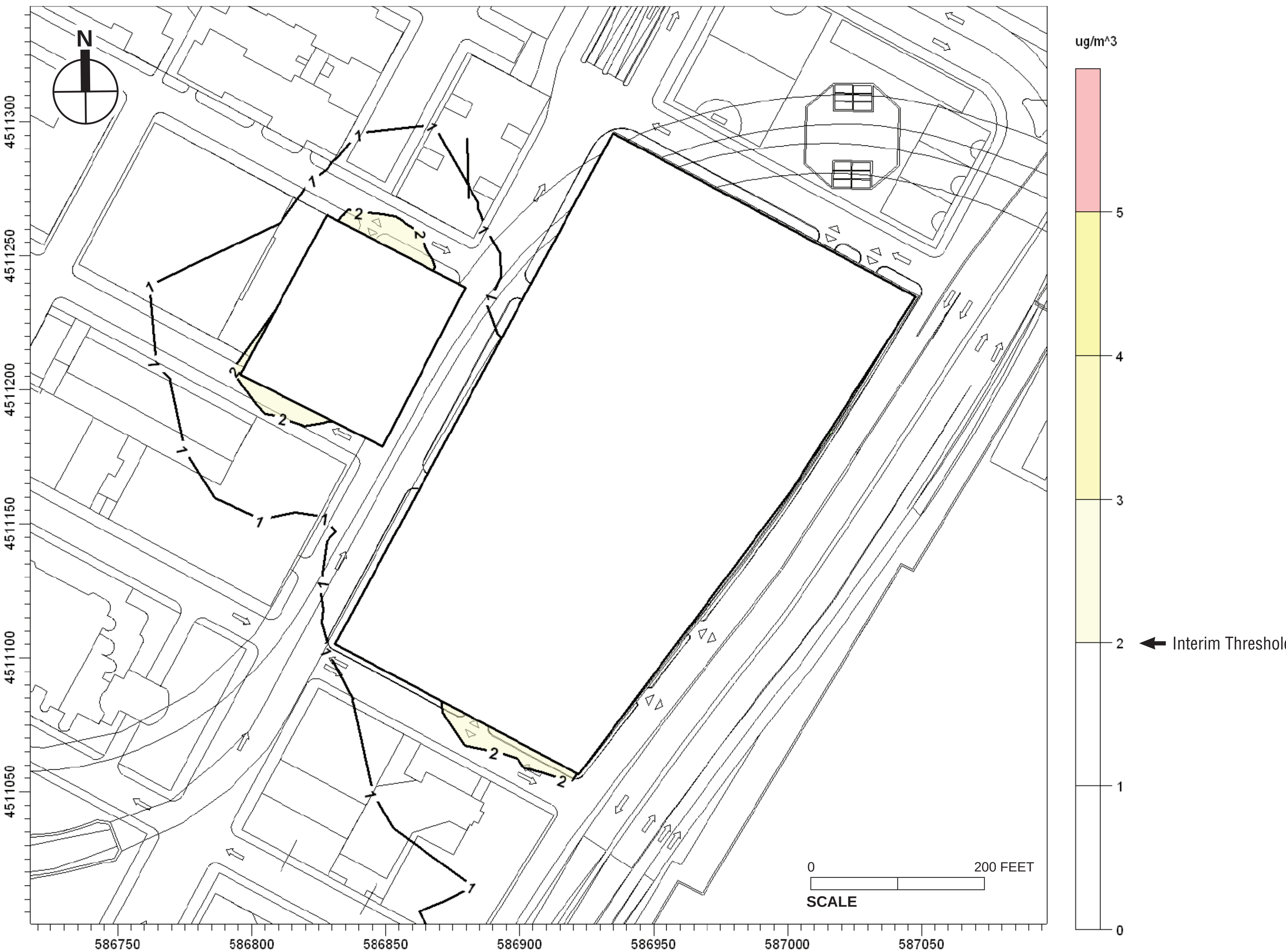

Maximum Predicted 24-Hour Average Increase in $PM_{2.5}$ Concentration
Figure 20-5

FIRST AVENUE PROPERTIES REZONING

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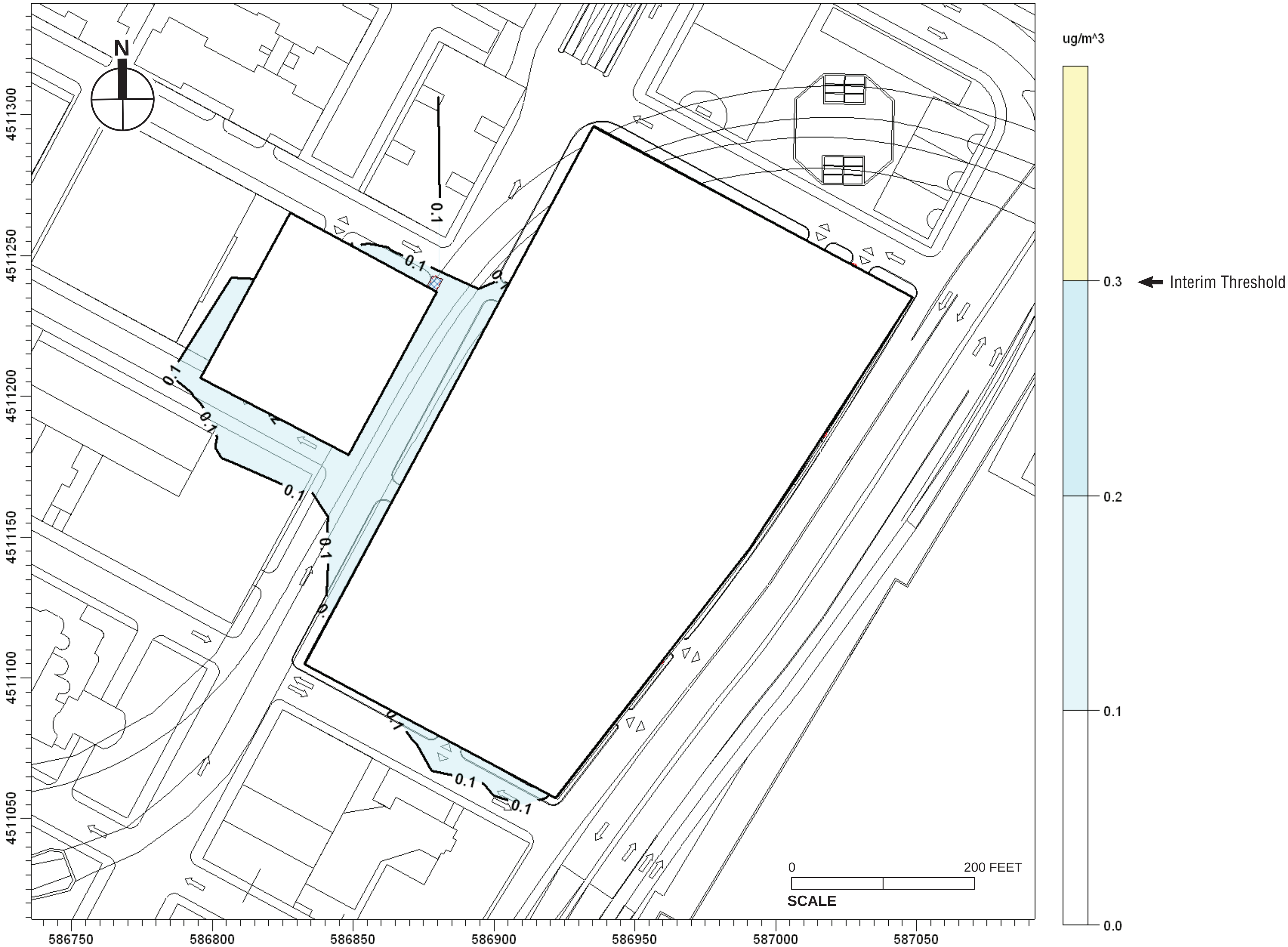


Maximum Predicted Annual Average Increase in $PM_{2.5}$ Concentration

Figure 20-6

The highest $PM_{2.5}$ concentration increments from the Proposed Actions' construction activity would occur at protected sidewalk locations immediately adjacent to the construction fence. The location of the maximum 24-hour average increments would vary based on the location of the sources, which would move throughout the sites. Continuous, daily and annual exposures would not be likely to occur at these locations. These maximum increments were computed for the peak construction period; for other construction time periods with lesser emissions, the potential 24-hour increments may be less. It should be noted that the maximum increments, predicted at sidewalks and covered walkways adjacent to construction, are overstated, since they do not include the effect of the fence on mixing, which would reduce pollutant concentrations. Peak (24-hour or less) increments would not persist in any single location, since the engines would be moved around the site.

CONCLUSIONS

Under SEQRA and CEQR, determination of the significance of impacts is based on the assessment of the intensity, duration, geographic extent, reversibility, and the number of people that would be affected by the predicted impacts. In most cases, the predicted effect of construction of the Proposed Actions on air quality would be limited in extent, duration, and severity.

The construction of the Proposed Actions would not result in predicted significant adverse impacts on air quality. The Proposed Actions would implement an emissions reduction program that would substantially reduce particulate matter (PM) emissions so that there will not be a significant adverse impact from $PM_{2.5}$ due to construction. CO, PM_{10} and NO_2 concentrations would increase at sites near the areas of construction, but would not result in predicted significant adverse impacts.

NOISE

FOREWORD

The Draft SEIS identified that project-related construction activities would be expected to result in significant noise impacts at:

- Manhattan Place, the residential building located at 630 First Avenue, from the first floor to the top residential floor and at the public plaza adjacent to the building;
- Rivergate, the residential building located at 606 First Avenue, from the first floor to the top residential floor and the adjacent Joseph Slifka Park;
- Corinthian, the residential building located at 345 East 37th Street, from the first floor to the top residential floor and at the public plaza adjacent to the building;
- 5 Tudor City Place, the residential building facing First Avenue and East 40th Street, from the first floor to the top residential floor and at the adjacent Trygve Lie Plaza;
- New York Tower, the residential building located at 330 East 39th Street, from approximately the third floor to the top residential floor;
- Bide-A-Wee Home Association building located at 410 East 38th Street, from the first floor to the top floor;
- Horizon, the residential building located at 415 East 37th Street, from the fifth floor to the top residential floor;

- United Nations building located at 752 First Avenue, from approximately the 20th floor to the top floor; and
- The residential building located at 300 East 40th Street, from the fifth floor to the top residential floor.

In addition, a commitment was made in the Draft SEIS to explore, between the Draft and Final SEIS, a number of options to: (1) determine whether any additional measures beyond those assumed in the Draft SEIS analysis could be implemented during construction to reduce the magnitude of or eliminate project impacts; and (2) determine the practicability and feasibility of implementing additional control measures (e.g., replacing existing windows with windows which would provide a higher level of attenuation) at the residences cited above where significant adverse construction noise impacts are predicted to occur. With respect to the latter, it was determined that replacing existing windows at the impacted buildings with windows which would provide a higher level of attenuation at the residences where significant adverse construction noise impacts are predicted to occur would not be a practicable and feasible mitigation measure. The cost and dislocations associated with such mitigation would be disproportionate to the marginal benefit to be realized However, after a review of the control measures assumed for the analysis presented in the Draft SEIS, it was determined that the implementation of other additional measures could potentially reduce the magnitude of or eliminate project impacts. Therefore, this Final SEIS reflects a number of changes that were made to the construction noise analysis. The revised analysis presented below in this Final SEIS assumes the following changes from the Draft SEIS:

- The revised analysis assumes that several types of construction equipment would be specified that are quieter than the construction equipment assumed for the Draft SEIS analysis, and in addition, noise path control measures (i.e., portable noise barriers or panels, enclosures, and acoustical tents, which feasible) are assumed to be used for certain dominant noise equipment. This includes motor mixers, concrete pumps, hoists, tower cranes, impact wrenches, hole diggers, jack hammers, pile drivers, masonry saws, tampers, and toweling machines.
- All trucking operations associated with construction activities for Site 4 (685 First Avenue) that were assumed in the Draft SEIS to take place on First Avenue were relocated to East 39th Street for the Final SEIS analysis.
- Operation of the bucket hoists for Site 4 (685 First Avenue) that were assumed in the Draft SEIS to take place on First Avenue were moved to East 39th Street for the Final SEIS analysis.
- Acoustical curtains and/or equipment enclosures were assumed for internal construction activities at Sites 1 (708 First Avenue) and 4 (685 First Avenue), to break the line-of-sight and provide acoustical shielding between noise sources at Sites 1 (708 First Avenue) and 4 (685 First Avenue) and receptors at 5 Tudor City[1].
- A more realistic, but conservative assumption, was made relative to maximum truck volumes. For purposes of the Draft SEIS maximum hourly truck volumes, which occur during the hour between 6AM and 7AM, (which is prior to the hours when construction

[1] Acoustical curtains and/or equipment enclosures were not assumed at other construction buildings since they would not eliminate and/or substantially reduce noise levels at significantly impacted locations.

equipment would be operating) were assumed to occur simultaneously with the hours when construction equipment would be operating (which would be between 7 AM and 6 PM). For the refined analysis for the Final SEIS the maximum hourly truck volume between the hours of 7AM and 6 PM was assumed to occur simultaneously during the hours when construction equipment would be operating.

The analyses presented below reflect the effects of the changes described above. With the above changes, noise levels due to construction operations would be reduced approximately between 3 and 7 dBA at those noise receptor locations where significant noise impacts were predicted to occur in the Draft SEIS, and significant noise impacts would be eliminated at several receptor sites. In particular, at receptor locations at 5 Tudor City Place (a building with neither double-glazed windows nor air conditioning, i.e., alternative ventilation), the additional measures committed to be implemented as part of the Final SEIS analysis would eliminate the significant noise impacts at these locations where significant noise impacts were predicted to occur in the Draft SEIS (see below).

INTRODUCTION

Impacts on community noise levels during construction of the Proposed Actions could result from noise from construction equipment operation, and from construction vehicles and delivery vehicles traveling to and from the site. Noise and vibration levels at a given location are dependent on the kind and number of pieces of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or barriers). Noise levels caused by construction activities would vary widely, depending on the phase of construction and the location of the construction relative to receptor locations.

Construction activities would include rock excavation activities which typically include some amount of rock drilling, controlled blasting (or a combination of drilling and blasting), and the use of heavy excavation equipment and cranes to remove broken rock from the site. The technologies to be utilized for rock excavation would not be determined until the selection of a subcontractor. However, to minimize adverse effects resulting from rock drilling, blasting, and excavation activities, a protection and monitoring program will be implemented. Such a program would include:

- Conducting vibration monitoring to ensure that blasting and excavation activities are done in conformance with applicable building codes; and
- Surveying existing building foundations adjacent to the construction site to establish baseline conditions. Monitoring of structural movement would be conducted and compared against the baseline conditions to safeguard the integrity of nearby structures from construction-generated activities.

For the noise analysis, limited blasting is anticipated, but the blasting is not anticipated to result in significant noise impacts. The most significant construction noise sources are expected to be impact equipment such as jackhammers, impact wrenches, pile drivers, and paving breakers, as well as the movements of trucks and cranes.

Given the scope and duration of construction activities for the Proposed Actions, a quantified construction noise analysis was performed. The purpose of this analysis was to determine if it is likely that significant adverse noise impacts would occur during construction, and if so, to examine the feasibility of implementing mitigation measures to reduce or eliminate such impacts.

CONSTRUCTION NOISE IMPACT CRITERIA

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." This has been interpreted to mean that such impacts would occur only at sensitive receptors where high noise levels would occur for approximately two years or longer. In addition, the *CEQR Technical Manual* states that impact criteria for vehicular sources, using existing noise levels as the baseline, should be used for assessing construction impacts. See Chapter 20, "Noise," for an explanation of noise measurement and sound levels. The criteria are as follows:

> If the existing noise levels are less than 60 decibels, A-weighted equivalent sound level for one hour (dBA $L_{eq(1)}$) and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resulting proposed action condition noise level with the proposed action would have to be equal to or less than 65 dBA. If the existing 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 $L_{eq(1)}$. (If the existing noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

The impact criteria contained in the *CEQR Technical Manual* were used for assessing impacts from mobile and on-site construction activities.

NOISE ANALYSIS METHODOLOGY

Construction activities for the Proposed Actions 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 surrounding roadways. The effect of each of these noise sources was evaluated. The results presented below show the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicles operation) and the total cumulative impacts due to operational effects (caused by project-generated vehicular trips) and construction effects (as construction proceeds on uncompleted components of the project).

Noise from the operation of construction equipment on-site at a specific receptor location near a construction site is 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 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 noise emission levels of the type of vehicle (e.g., auto, light-duty truck, heavy-duty truck, bus, etc.)
- Vehicular speed;
- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

Construction Noise Modeling

Noise effects from construction activities were evaluated using the Cadna A 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, etc.), transportation sources (e.g., roads, highways, railroad lines, busways, airports, etc.), and other specialized sources (e.g., sporting facilities, etc.). 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 Cadna A 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 as an American Standard. The Cadna A model is a state-of-the-art analysis for noise analysis.

Geographic input data used with the Cadna A model included CAD drawings that defined 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 equipment with full-horse power is used) 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. The model produced A-weighted $L_{eq(1)}$ noise levels at each receptor location, for each analysis period, which showed the noise level at each receptor location, as well as the contribution from each noise source.

Determination of Existing and Non-Construction Noise Levels

Existing and non-construction (i.e., operational) noise levels were calculated using the methodology discussed in Chapter 18. As discussed in that chapter, operational noise was calculated using proportional modeling or the TNM model (the Federal Highway Administration's [FHWA] *Traffic Noise Model* version 2.5) to calculate noise from traffic on adjacent and nearby streets and roadways.

Analysis Years

The proposed development program is expected to be constructed over approximately seven years. Since the duration and timing of the construction stages and activities would vary from parcel to parcel, a screening analysis was performed to determine the years during the construction period (i.e., 2008 to 2014) when the maximum potential for significant noise increases would occur at sensitive noise receptors adjacent to each parcel. The analysis was based on the construction schedule, which includes workforce, equipment, and construction vehicle projections for all construction years (see Appendix F.3). Based upon this screening analysis, on-site construction activities were estimated to produce maximum noise levels in the 2nd quarter of 2008, the 1st quarter of 2009, and the 2nd quarter of 2010 when construction activities are taking place at 685 and 708 First Avenue; and the 1st quarter of 2011, the 3rd quarter of 2012, the 1st quarter of 2013, and the 3rd quarter of 2014 when construction activities are taking place at 616 First Avenue. To be conservative, the noise analysis assumed that both peak on-site construction activities and peak construction-related traffic conditions occurred simultaneously. Consequently, the 2009 peak construction traffic values (during construction at 685 and 708 First Avenue sites) and the 2013 peak construction traffic values (during construction at the 616 First Avenue site) were used for the construction noise analysis.

Noise Reduction Measures

The construction noise analysis for this project assumed a proactive approach by the project sponsors during construction activities. This approach employs a wide variety of measures that exceeded standard construction practices, but the implementation of which was deemed feasible and practicable to minimize construction noise and reduce potential noise impacts. These measures will be described in the noise mitigation plan required as part of the New York City Noise Control Code. This program includes: source controls and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during most sensitive time periods), the following measures for construction, which go beyond typical construction techniques, will be implemented:

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code will be utilized from the start of construction activities, along with a wide range of equipment, including construction trucks, which produce lower noise levels than typical construction. Table 20-5 shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the Proposed Actions. In addition, several types of construction equipment would be specified that are quieter than the construction equipment used in Draft SEIS. This would include asphalt pavers, asphalt laying equipment, backhoes, bulldozers, and excavators (these lower noise levels reflected in Table 20-5).
- Where feasible, construction procedures that reduce noise levels and equipment (such as generators, concrete trucks, delivery trucks, and trailers) that is quieter than that required by the New York City Noise Control Code would be used.
- As early in the construction period as practicable, diesel-powered equipment would be replaced with electrical-powered equipment, such as electric scissor lifts and electric articulating forklifts (i.e., early electrification).
- Contractors and subcontractors would be required to properly maintain their equipment and have quality mufflers installed.

Table 20-5
Construction Equipment Noise Emission Levels

Equipment	FTA (or FHWA) Typical Noise Level (dBA) at 50 feet	Proposed Project Analysis Noise Level (dBA) at 50 feet
Angle Grinder	75	75
Arc Welder	73	73
Asphalt Pavers	85	75**
Asphalt laying equipment	85	76**
Backhoe	80	77**
Bulldozer	85	77**
Compactor	80	77*
Compressors	80	56*
Motor Mixer	85	75**
Concrete Pumps	82	72***
Concrete Trucks	85	80**
Delivery Trucks	84	80**
Dual Hoist	85	75***
Crane (Tower Crane)	85	75***
Dump Trucks	84	80**
Excavators	85	77**
Forklift	85	63**
Generators	82	70**
Impact Wrenches	85	75***
Jack Hammers	85	75***
Pile driving rig	95	80***
Rebar Bender	80	80
Roller	85	80**
Saw (Masonry Bench)	85	75***
Saw (others)	76	76
Scissor Lift	85	65**
Tamper	85	75***
Trailers	85	80**
Toweling Machine	85	75***
Water Pumps	77	77

Notes:
* NYC Noise Code, effective on July 1, 2007.
** Project-mandated quieter equipment.
*** Path noise control measures (i.e., portable noise barriers, acoustical enclosures, etc).
Sources:
Transit Noise and Vibration Impact Assessment, FTA, May 2006, and
FHWA Roadway Construction Noise Model (FHWA RCNM), 2006.

In terms of path controls (e.g., placement of equipment, implementation of barriers between equipment and sensitive receptors), the following measures for construction, which go beyond typical construction techniques, will be implemented to the extent feasible:

- Noisy equipment, such as generators, cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations. For example, during the early construction phases of work, delivery and dump trucks, as well as many construction equipment operations, would be located and take place below grade to take advantage of shielding benefits. Once building foundations are completed, delivery trucks would operate behind noise barriers.
- Noise barriers would be utilized to provide shielding (e.g., the construction sites would have a minimum 8-foot barrier along First Avenue and each side street, with a 16-foot barrier adjacent to residential and other sensitive locations, and truck deliveries would take place behind these barriers once building foundations are completed).
- Noise path control measures (i.e., portable noise barriers or panels, enclosures, and acoustical tents, which feasible) were used for certain dominant noise equipment, i.e., motor

mixers, concrete pumps, hoists, tower cranes, impact wrenches, hole diggers, jack hammers, pile drivers, masonry saws, tampers, and toweling machines. The details to construct portable noise barriers, enclosures, tents, etc., are based on the instructions of DEP Citywide Construction Noise Mitigation[1]. Table 20-5 lists noise levels for each of the types of equipment that would be utilized.

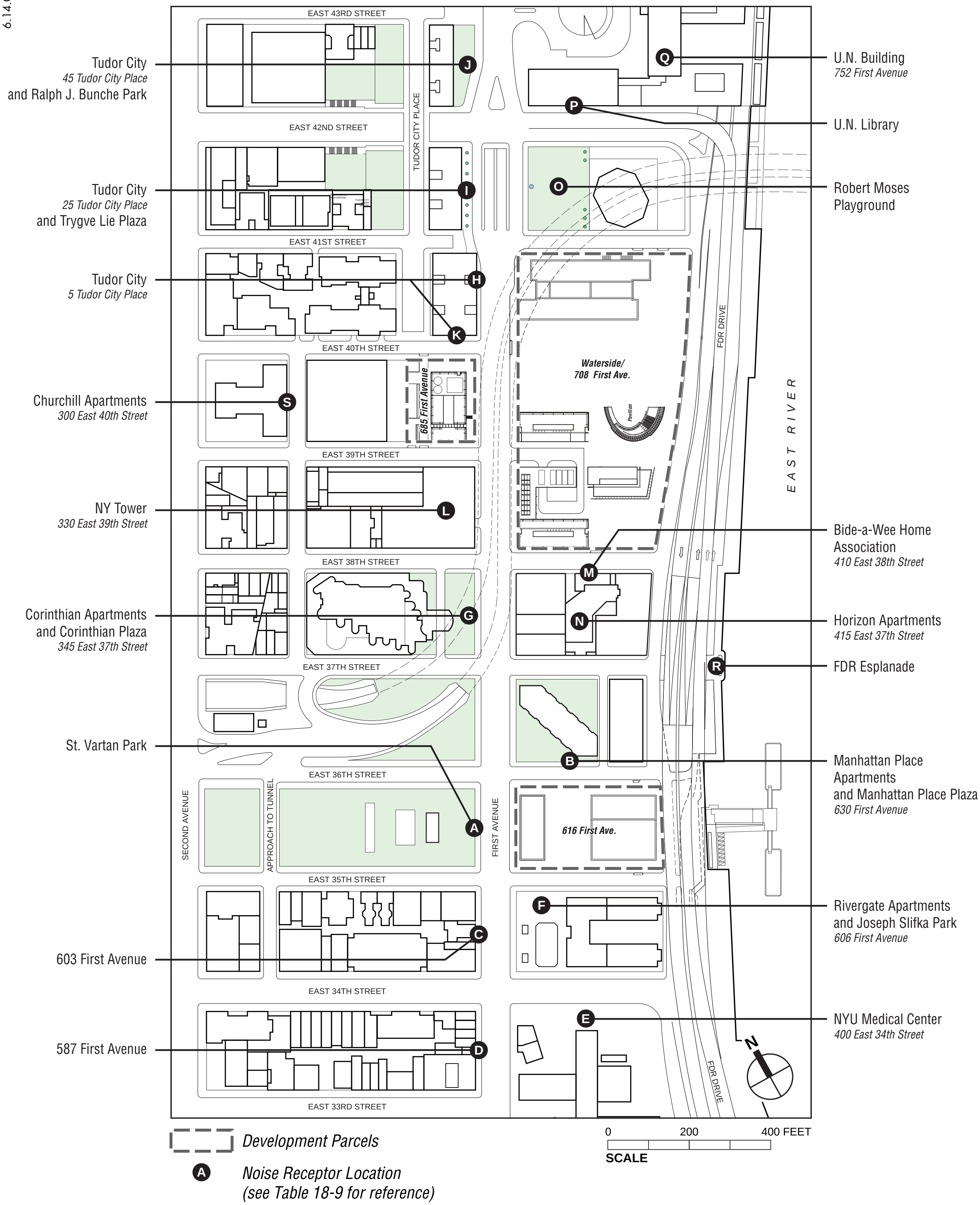
- All trucking operations associated with construction activities for Site 4 (685 First Avenue) that were assumed in the Draft SEIS to take place on First Avenue were relocated to East 39th Street.
- Operation of the bucket hoists for Site 4 that were assumed in the Draft SEIS to take place on First Avenue were moved to East 39th Street.
- Acoustical curtains and/or equipment enclosures were assumed for internal construction activities at Sites 1 (708 First Avenue) and 4 (685 First Avenue), to break the line-of-sight and provide acoustical shielding between noise sources at Sites 1 (708 First Avenue) and 4 (685 First Avenue) and receptors at 5 Tudor City.
- The assumptions on equipment placement for Site 2 (the underground garages) and Site 3 (landscaping) were refined to reflect the fact that equipment during the third and fourth quarters of 2009 would be located on the eastern portion of the Sites.
- A more realistic, but conservative assumption, was made relative to maximum truck volumes. For purposes of the Draft SEIS maximum hourly truck volumes, which occur during the hour between 6AM and 7AM, (which is prior to the hours when construction equipment would be operating) were assumed to occur simultaneously with the hours when construction equipment would be operating (which would be between 7 AM and 6 PM). For the refined analysis the maximum hourly truck volume between the hours of 7AM and 6 PM was assumed to occur simultaneously during the hours when construction equipment would be operating.

All of the project sponsor’s commitments will be included in a restrictive declaration.

Receptor Sites

Nineteen (19) receptor locations close to the project site were selected as discrete noise receptor sites for the construction noise analysis. These sites are located directly adjacent to the project site where construction activities would be taking place. Each receptor site is the location of a residence or other noise sensitive use. At high-rise buildings, noise receptors were selected at multiple elevations. At open space locations, receptors were selected at street level. Figure 20-7 shows the location of the 19 noise receptor locations, and Table 20-6 lists the noise receptor locations, the approximate location of the receptor sites, and the associated land use at the receptor locations. The 19 receptor sites selected for detailed analysis are representative of other noise receptors in the immediate project area, and are the locations where maximum project impacts due to construction noise would be expected.

[1] *Citywide Construction Noise Mitigation*, Chapter 28, Department of Environmental Protection of New York City, 2007.



Noise Receptor Locations
Figure 20-7

Table 20-6
Construction Noise Receptor Locations

Receptor	Location	Associated Land Use
A	First Avenue between East 35th & East 36th Streets	Open space (St. Vartan Park)
B	East 36th Street between First Avenue & FDR Drive	Residential/Open Space (Manhattan Place)
C	First Avenue between East 34th & East 35th Streets	Residential
D	First Avenue between East 33rd & East 34th Streets	Residential/Commercial
E	East 34th Street between First Avenue & FDR Drive	Institutional
F	East 35th Street between First Avenue & FDR Drive	Residential/Open Space (Joseph Slifka Park)
G	First Avenue between East 37th & East 38th Streets	Residential/Open Space (Corinthian Plaza)
H	First Avenue between East 40th & East 41st Streets	Residential
I	First Avenue between East 41st & East 42nd Streets	Residential/Open Space (Trygve Lie Plaza)
J	First Avenue between East 42nd & East 43rd Streets	Residential
K	East 40th Street between First & Second Avenues	Residential
L	East 39th Street between First & Second Avenues	Residential
M	East 38th Street between First Avenue & FDR Drive	Institutional
N	East 38th Street between First Avenue & FDR Drive	Residential
O	East 41st Street between First Avenue & FDR Drive	Open Space (Robert Moses Playground)
P	East 42nd Street between First Avenue & FDR Drive	Institutional
Q	East 42nd Street between First Avenue & FDR Drive	Institutional
R	FDR Drive between East 37th & East 38th Streets	Open Space (Esplanade)
S	Queens Midtown Tunnel Approach between 39th & 40th Streets	Residential

In addition to the 19 site-specific noise receptor sites, noise contours depicting the incremental noise due to construction activities (both on-site construction equipment operation and construction-related traffic) were developed for the area surrounding the project site and are presented in Appendix F.3.

CONSTRUCTION NOISE ANALYSIS RESULTS

Using the methodology described above, and considering the noise abatement measures for source and path controls specified above, noise analyses were performed to determine maximum one-hour equivalent ($L_{eq(1)}$) noise levels that would be expected to occur during each year of construction. Table 20-7 shows the following for each year of construction:

- Existing noise levels;
- Maximum predicted total noise levels (i.e., cumulative noise levels), which are the sum of noise due to construction activities[1] and noise due to traffic on the adjacent street; and
- Maximum predicted increases in noise levels based upon comparing the total noise levels with existing noise levels.

[1] The maximum predicted noise level due to construction activities alone includes the noise generated by on-site construction activities, assuming maximum construction activity during the analysis time period, and noise generated by construction vehicles traveling to and from the project site during the hour which generated the maximum number of construction vehicles.

Table 20-7
Construction Noise Analysis Results (Leq(1) values in dBA)

Noise Receptor	Receptor Height	Existing dBA	2008		2009		2010		2011		2012		2013		2014	
			Total	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change
A	At grade	71.4	71.5	0.1	71.5	0.1	71.5	0.1	72.5	1.1	72.7	1.3	71.7	0.3	71.7	0.3
B	1st floor	64.3	64.3	0.0	64.4	0.1	64.4	0.1	67.8	**3.5**	68.8	**4.5**	71.7	**7.4**	67.1	2.8
	35th floor	64.6	64.6	0.0	64.7	0.1	64.7	0.1	70.3	**5.7**	70.9	**6.3**	72.6	**8.0**	68.7	**4.1**
C	1st floor	71.8	71.9	0.1	71.9	0.1	71.9	0.1	72.2	0.4	72.2	0.4	72.4	0.6	72.0	0.2
	14th floor	71.5	71.5	0.0	71.5	0.0	71.6	0.1	73.1	1.6	72.7	1.2	73.5	2.0	72.1	0.6
D	1st floor	71.7	71.8	0.1	71.8	0.1	71.8	0.1	71.9	0.2	71.9	0.2	72.0	0.3	71.9	0.2
	35th floor	71.1	71.1	0.0	71.1	0.0	71.1	0.0	71.8	0.7	71.6	0.5	71.8	0.7	71.5	0.4
E	1st floor	69.0	69.0	0.0	69.0	0.0	69.0	0.0	69.2	0.2	69.1	0.1	69.0	0.0	69.0	0.0
	8th floor	68.9	68.9	0.0	68.9	0.0	68.9	0.0	69.4	0.5	69.3	0.4	69.0	0.1	68.9	0.0
F	1st floor	68.3	68.3	0.0	68.3	0.0	68.3	0.0	69.9	1.6	70.6	2.3	72.1	**3.8**	70.2	1.9
	30th floor	67.5	67.5	0.0	67.6	0.1	67.6	0.1	71.8	**4.3**	71.9	**4.4**	73.8	**6.3**	70.6	**3.1**
G	1st floor	65.5	65.9	0.4	66.2	0.7	67.6	2.1	66.9	1.4	66.1	0.6	66.6	1.1	66.0	0.5
	30th floor	65.4	67.0	1.6	69.0	**3.6**	70.5	**5.1**	68.7	**3.3**	66.8	1.4	67.6	2.2	66.4	1.0
H	1st floor	69.6	71.5	1.9	70.2	0.6	70.7	1.1	70.3	0.7	69.7	0.1	69.7	0.1	69.7	0.1
	20th floor	69.2	72.6	3.4	70.5	1.3	71.4	2.2	70.5	1.3	69.3	0.1	69.2	0.0	69.2	0.0
I	5th floor	67.5	70.4	2.9	67.8	0.3	68.4	0.9	68.0	0.5	67.6	0.1	67.6	0.1	67.6	0.1
	23rd floor	67.0	69.9	2.9	67.4	0.4	67.9	0.9	67.5	0.5	67.1	0.1	67.0	0.0	67.0	0.0
J	1st floor	66.2	66.6	0.4	66.3	0.1	66.4	0.2	66.3	0.1	66.2	0.0	66.2	0.0	66.2	0.0
	25th floor	66.5	68.2	1.7	66.7	0.2	67.0	0.5	66.8	0.3	66.6	0.1	66.5	0.0	66.5	0.0
K	1st floor	65.7	66.1	0.4	66.4	0.7	67.7	2.0	66.8	1.1	65.8	0.1	65.8	0.1	65.8	0.1
	20th floor	66.0	67.5	1.5	68.5	2.5	70.9	**4.9**	68.2	2.2	66.0	0.0	66.0	0.0	66.0	0.0
L	5th floor	70.1	70.8	0.7	72.9	2.8	71.9	1.8	71.2	1.1	70.1	0.0	70.1	0.0	70.1	0.0
	35th floor	69.5	70.6	1.1	72.8	**3.3**	71.7	2.2	71.1	1.6	69.5	0.0	69.5	0.0	69.5	0.0
M	1st floor	69.1	69.2	0.1	70.0	0.9	72.0	2.9	69.7	0.6	69.9	0.8	69.9	0.8	69.9	0.8
N	5th floor	67.8	68.8	1.0	73.0	**5.2**	76.9	**9.1**	69.8	2.0	67.9	0.1	67.9	0.1	67.9	0.1
	40th floor	67.5	68.8	1.3	71.0	**3.5**	72.2	**4.7**	68.4	0.9	67.5	0.0	67.6	0.1	67.5	0.0
O	At grade	71.8	72.5	0.7	71.8	0.0	71.8	0.0	71.8	0.0	71.8	0.0	71.8	0.0	71.8	0.0
P	1st floor	71.5	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0
Q	20th floor	66.7	67.5	0.8	67.0	0.3	67.0	0.3	66.9	0.2	66.7	0.0	66.7	0.0	66.7	0.0
	50th floor	66.0	67.8	1.8	66.3	0.3	66.3	0.3	66.2	0.2	66.0	0.0	66.0	0.0	66.0	0.0
R	At grade	69.3	69.3	0.0	69.3	0.0	69.3	0.0	69.5	0.2	69.4	0.1	69.8	0.5	69.3	0.0
S	5th floor	61.6	62.8	1.2	62.4	0.8	62.3	0.7	61.9	0.3	61.6	0.0	61.6	0.0	61.6	0.0
	30th floor	62.0	64.4	2.4	64.9	2.9	65.2	**3.2**	62.8	0.8	62.0	0.0	62.0	0.0	62.0	0.0

Note: Locations where predicted noise levels exceed the CEQR impact criteria are shown in bold.

Representative elevated receptor information is provided in Table 20-7 for specified buildings. However, construction effects have been analyzed for several elevated receptor locations on each building, and the values shown are only representative values of the highest noise levels at elevated receptor locations. (Additional details of the construction analysis are presented in Appendix F.3.)

In Table 20-7, locations where noise levels exceed the CEQR impact criteria (i.e., increase by more than 3 dBA comparing the total noise level with existing noise level) are shown in bold. The noise analysis results show that maximum predicted noise levels would exceed the 3 dBA CEQR impact criteria during two or more consecutive years at receptor sites B, F, G, and N. At all of these locations, the exceedance of the 3 dBA CEQR impact criteria would be due principally to noise generated by on-site construction activities.

Where exceedances of the 3 dBA CEQR impact criterion are predicted to occur on a building's upper locations, exceedances would also be expected to occur at other locations on the building that have a direct line-of-sight to one or more construction sites.

For impact determination purposes, the significance of adverse noise impacts is determined based on whether maximum predicted incremental noise levels at sensitive receptor locations would be greater than the impact criteria suggested in the *CEQR Technical Manual* for two consecutive years or more. While increases exceeding the CEQR impact criteria for one year or less may be noisy and intrusive, they are not considered to be significant adverse noise impacts. An assessment was made of the duration of exceedances of the CEQR impact criteria.

Construction activities would be expected to result in significant adverse noise impacts at the following locations:

- Receptor site B (Manhattan Place, the residential building located at 630 First Avenue), from the first floor to the top residential floor during the years 2011 through 2014 at locations which have a direct line of sight to construction activities that are taking place at 616 First Avenue and at the public plaza adjacent to the building during the years 2011 through 2013;
- Receptor site F (Rivergate, the residential building located at 606 First Avenue), from the third floor to the top residential floor during the years 2011 through 2014 at locations which have a direct line-of-sight to construction activities that are taking place at 616 First Avenue;
- Receptor site G (Corinthian, the residential building located at 345 East 37th Street), from the tenth floor to the top residential floor during the years 2009 through 2011 at locations which have a direct line-of-sight to construction activities that are taking place at 616, 685, and 708 First Avenue; and
- Receptor site N (Horizon, the residential building located at 415 East 37th Street), from the fifth floor to the top residential floor during the years 2009 through 2010 at locations which have a direct line-of-sight to construction activities that are taking place at 685 and 708 First Avenue.

Construction activities at other sites in the study area would at times produce noise levels which would be noisy and intrusive, but due to their limited duration, they would not produce significant adverse noise impacts.

With regard to the residential locations where significant adverse noise impacts are predicted to occur, all of the residential buildings (i.e., Manhattan Place [630 First Avenue], Rivergate [606 First Avenue], Corinthian [345 East 37th Street], Horizon [415 East 37th Street], have double-glazed windows and have some form of alternative ventilation (i.e., central air conditioning or packaged terminal air conditioner [PTAC] units). Consequently, even during warm weather conditions, interior noise levels would be approximately 30-35 dBA less than exterior noise levels. Although these would be considered significant adverse noise impacts based on the CEQR construction noise impact criteria, the double-glazed windows and alternative ventilation at these residential structures would provide a significant amount of sound attenuation, and would result in interior noise levels during much of the time that are below 45 dBA L_{10} (the CEQR acceptable interior noise level criteria).

With regard to the Manhattan Place Plaza, the only open space area adjacent to the project site where significant adverse noise impacts are predicted to occur (during the years 2011 through 2013, there are no feasible or practicable measures that could be implemented to mitigate project construction impacts, such as erecting barriers around the parks, which would present access and security concerns. Consequently, these significant adverse impacts would remain unmitigated.

WITH THE UNDC PROJECT

The UNDC project would create a 35-story, 950,000-square-foot office building at the site of the Robert Moses Playground, on the western portion of the block bounded by East 42nd Street, the FDR Drive, East 41st Street, and First Avenue. An analysis was performed using the CadnaA model to examine whether the reflections due to the UNDC building would significantly increase ambient noise levels generated by project construction activities at sensitive receptor locations. For purposes of this analysis conditions in the year 2012 were analyzed. The analysis result showed that the UNDC building would shield Receptors P and Q at the United Nations complex, but would have a very small effect on noise levels due only to on-site construction activities at sensitive residential receptor sites, and would have a negligible effect (less than 0.1 dBA) on maximum predicted total noise levels (i.e., the sum of noise due to construction activities and noise due to traffic on the adjacent street) at all receptor locations. Consequently, it can be concluded that project impacts with the UNDC building would be the same as project impacts without the UNDC building.

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 quantitatively access potential vibration impacts of construction activities on structures and residences near the project 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 20-8 shows vibration source levels for construction equipment.

Table 20-8
Vibration Source Levels for Construction Equipment

Equipment	PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (sonic)	0.170	93
Clam Shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall in rock)	0.017	75
Vibratory Roller	0.210	94
Hoe Ram	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

Note: * Sonic rather than impact pile drivers will be utilized.
Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

Construction Vibration Analysis Results

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration are 5 Tudor City Place, 330 East 39th Street, 410 East 38th Street, 606 and 630 First Avenue, all of which are immediately adjacent to the project construction sites, and are considered fragile buildings. Vibration levels at these buildings and structures would be kept below the 0.50 inches/second PPV limit. In addition, the project sponsors would implement a monitoring program to ensure that this limit is not exceeded, and that no architectural or structural damage would occur. At all other locations, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the three pieces of equipment that would have the most potential for producing levels which exceed the 65 VdB limit are pile drivers, the clam shovel drop, and vibratory roller. Operation of this equipment would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 214 feet. However, operation of this equipment would only occur for limited periods of time at a particular location and therefore would not result in any significant adverse impacts.

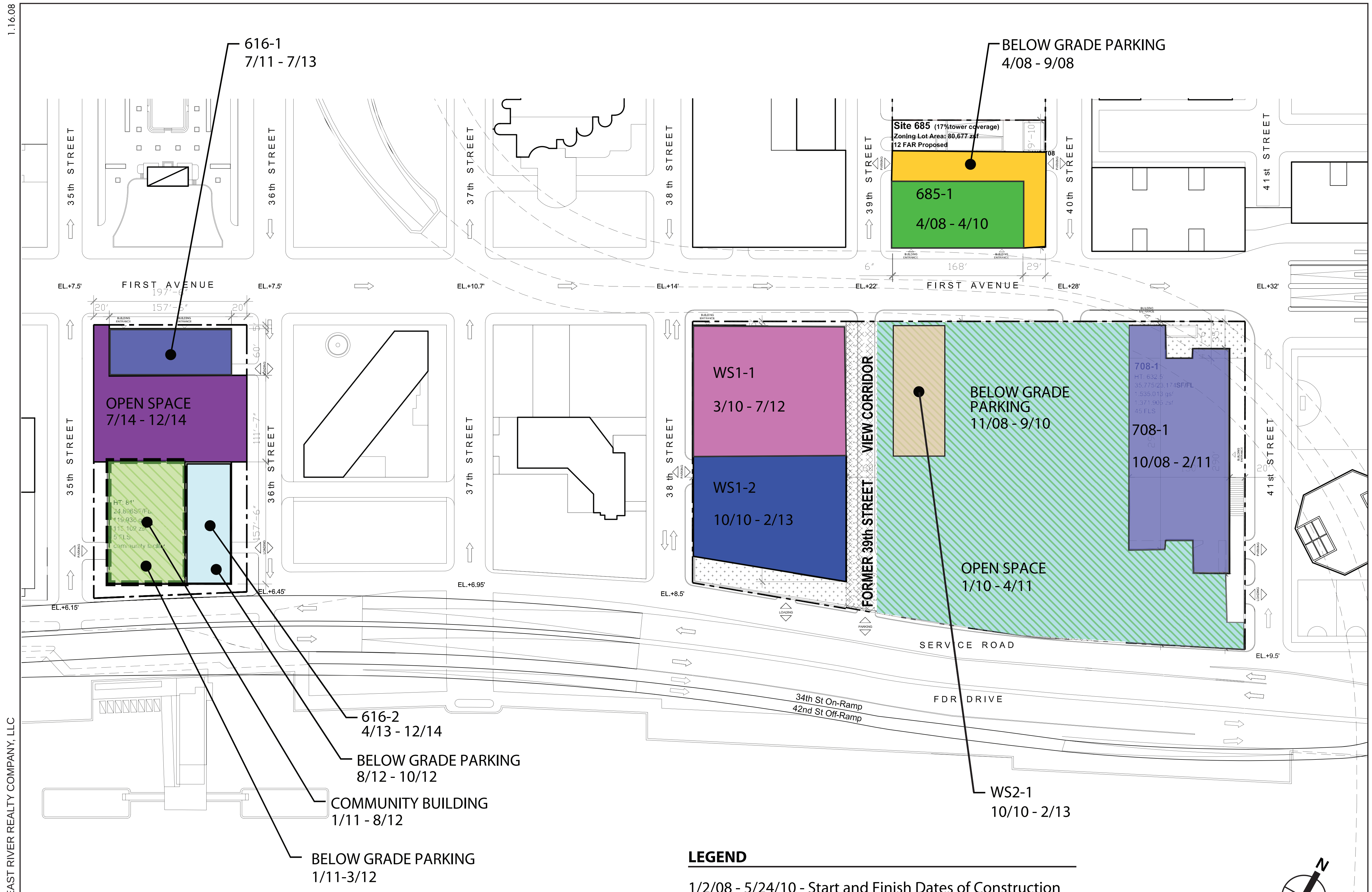
As mentioned previously, a limited amount of blasting may be necessary. All blasting would be performed in conformity with regulations of FDNY and any other applicable regulations, and would use timed, multiple charges of limited intensity and blastmats to limit potential impacts. With these measures, blasting would result in PPV levels that are below the impact criteria, and the limited amount of blasting would not result in any significant adverse vibration impacts.

E. ALTERNATIVE CONSTRUCTION SCENARIO

Since the issuance of the Draft SEIS, the Applicant has indicated that the phasing of building construction could vary from that which is depicted in Table 20-1 and Figures 20-1 and 20-2 and analyzed in Section D, above. Rather than beginning construction with the 708 First Avenue commercial office building, the Applicant currently anticipates that the residential building at 685 First Avenue would be the first building developed within the proposed development program, followed by the development of the commercial office building at 708 First Avenue (see Figures 20-8 and 20-9). Table 20-9 provides a comparison of the schedules for the proposed development scenario and this “Alternative Construction Scenario.” As shown in the table, only those construction components associated with 708 First Avenue, Waterside Open Space and 685 First Avenue would be affected by a change in schedule. The estimated duration for each of these components would remain unchanged.

The Alternative Construction Scenario is assessed in this section to determine whether it could result in any significant adverse impacts different from those identified in Section D, above.

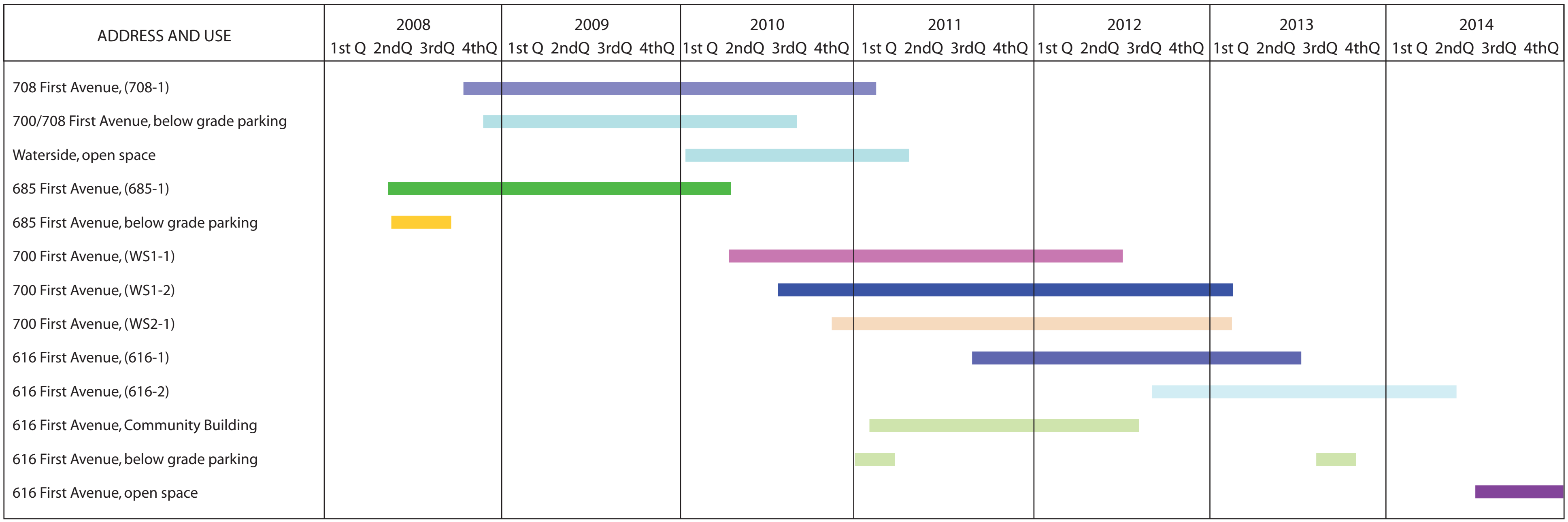
As with the proposed development program, the modifications proposed as part of the Alternative Construction Scenario would not result in any significant adverse impacts due to construction activities on Land Use, Socioeconomic Conditions, Community Facilities, Historic Resources, Hazardous Materials, and Infrastructure. With respect to Traffic and Parking, Air Quality, and Noise, the potential for impacts from the Alternative Construction Scenario is described below. Potential significant Open Space impacts from construction noise are discussed below under “Noise.” As detailed below, the Alternative Construction Scenario would not generate any significant adverse impacts or require any mitigation measures not identified in the Draft SEIS.



NOTE: The project's construction schedule would likely commence one quarter later than assumed in the analyses in this chapter. The revised schedule, presented in the figure above, has been addressed in the FEIS. It is not expected that the change schedule will materially affect the findings presented in this chapter.

Alternative Construction Scenario
Figure 20-8

1.16.08



SOURCE: EAST RIVER REALTY COMPANY, LLC

Alternative Construction Scenario Schedule

Figure 20-9

Table 20-9
Comparison of Construction Schedules for Proposed Development Scenario and Alternative Construction Scenario

Component	Estimated Duration	Proposed Development Scenario Schedule	Alternative Construction Scenario Schedule
708 First Avenue	29 Months	April 2008 – August 2010	Oct. 2008 – Feb. 2011
708 First Avenue and Waterside Below Grade Parking	22 Months	May 2008 – March 2010	Nov. 2008 – Sep. 2010
Waterside Open Space	15 Months	July 2009 – Oct. 2010	Jan. 2010 – April 2011
685 First Avenue	25 Months	Dec. 2008 – Jan. 2011	April 2008 – April 2010
685 First Avenue Below Grade Parking	5 Months	Jan. 2009 – June 2009	April 2008 – Sept. 2008
Waterside 1 Building 1 (WS1-1)	28 Months	March 2010 – July 2012	Unchanged
Waterside 1 Building 2 (WS1-2)	31 Months	July 2010 – Feb. 2013	Unchanged
Waterside 2 (WS2)	28 Months	Oct. 2010 – Feb. 2013	Unchanged
616 First Avenue Building 1 (616-1)	23 Months	July 2011 – July 2013	Unchanged
616 First Avenue Building 2 (616-2) Residential	21 Months	August 2012 – May 2014	Unchanged
616-2 Community Building*	19 Months	January 2011-Sept. 2012	Unchanged
616 First Avenue Below Grade Parking	6 Months	Feb. 2013 – August 2013	Unchanged
616 First Avenue Open Space	6 Months	July 2014 – Dec. 2014	Unchanged

Notes: The project's construction schedule would likely commence one quarter later than assumed in the analyses in this chapter. The shift in schedule (presented in the table above), will not materially affect the findings presented in this chapter.

* As described above, it is now expected that the community facilities building, which would contain a proposed school, would be operational by September 2012. While the analyses presented in this chapter assume that the 616 First Avenue community facility component would be completed according to the previous schedule (reported in the Draft SEIS) in 2014, Chapter 23, "Mitigation," analyzes the potential construction-related impacts resulting from building a school and a portion of the below grade parking at the 616 First Avenue parcel by 2012.

Source: East River Realty Company, LLC

TRAFFIC AND PARKING

Under the Alternative Construction Scenario, work at 708 First Avenue would begin later, and work at 685 First Avenue would begin earlier. The peak period selected for the traffic analysis in Section D would be the same under this Alternative Construction Scenario, and the number of workers and peak truck delivery trips would be comparable to those analyzed for the proposed development scenario in Section D. Therefore, the significant traffic-related construction impacts under this Alternative Construction Scenario would be similar to those identified in Section D (for the proposed development scenario). As with the proposed development scenario, these significant impacts could be mitigated using measures similar to those recommended under Build conditions.

AIR QUALITY

The peak period selected for the air quality analysis presented in Section D included the following concurrent construction tasks: superstructure of the 708 First Avenue commercial tower; excavation, foundation, and finishing work for the large underground parking facility; and foundation of 685 First Avenue. That analysis, addressing the worst-case period in terms of air pollutant emissions from construction, resulted in predicted peak concentration increment in areas adjacent to the 685 First Avenue site which were not predicted to result in significant adverse impacts.

Under the Alternative Construction Scenario, work at 708 First Avenue would begin later, and work at 685 First Avenue would begin earlier. Under this scenario, the peak period would occur when the superstructure task at 685 First Avenue would coincide with the foundation task at 708 First Avenue and the excavation, foundation, and finishing work for the large underground parking facility; the emissions during this peak would be similar in intensity to the emissions analyzed in Section D, above, but higher emissions would be expected from 708 First Avenue, where construction work would be more distant from any sensitive receptors than the distance between 685 first Avenue and adjacent residential buildings, where peak concentration increments were predicted.

Overall, the peaks would be similar, but the resulting concentration increments at sensitive receptors under the Alternative Construction Scenario would be lower than identified for the construction scenario analyzed in Section D, above. Since no significant adverse air quality impacts were predicted under that analysis, none would occur under the Alternative Construction Scenario either.

NOISE

The analysis methodology and assumptions used for the construction noise analysis for this Alternative Construction Scenario were the same as those used for the proposed development scenario described above. Table 20-9 shows maximum one-hour equivalent ($L_{eq(1)}$) noise levels that would be expected to occur during each year of construction.

Under the Alternative Construction Scenario, construction activities would be expected to result in significant noise impacts at the following locations:

- Receptor site B (Manhattan Place, the residential building located at 630 First Avenue), from the first floor to the top residential floor during the years 2011 through 2014 at locations which have a direct line of sight to construction activities that are taking place at 616 First Avenue and at the public plaza adjacent to the building during the years 2011 through 2013;
- Receptor site F (Rivergate, the residential building located at 606 First Avenue), from the third floor to the top residential floor during the years 2011 through 2014 at locations which have a direct line-of-sight to construction activities that are taking place at 616 First Avenue;
- Receptor site G (Corinthian, the residential building located at 345 East 37th Street), from the tenth floor to the top residential floor during the years 2009 through 2011 at locations which have a direct line-of-sight to construction activities that are taking place at 616, 685, and 708 First Avenue;
- Receptor site N (Horizon, the residential building located at 415 East 37th Street), from the fifth floor to the top residential floor during the years 2009 through 2010 at locations which have a direct line-of-sight to construction activities that are taking place at 685 and 708 First Avenue; and

Construction activities at other sites in the study area would at times produce noise levels which would be noisy and intrusive, but due to their limited duration, they would not produce significant noise impacts.

Table 20-9
Construction Noise Analysis Results (Leq(1) values in dBA)

Noise Receptor	Receptor Height	Existing dBA	2008		2009		2010		2011		2012		2013		2014	
			Total	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change	Total dBA	Change
A	At grade	71.4	71.5	0.1	71.5	0.1	71.6	0.2	72.5	1.1	72.7	1.3	71.7	0.3	71.7	0.3
	1st floor	64.3	64.3	0.0	64.4	0.1	64.4	0.1	67.8	**3.5**	68.8	**4.5**	71.7	**7.4**	67.1	2.8
B	35th floor	64.6	64.6	0.0	64.7	0.1	64.7	0.1	70.3	**5.7**	70.9	**6.3**	72.6	**8.0**	68.7	**4.1**
	1st floor	71.8	71.9	0.1	71.9	0.1	71.9	0.1	72.2	0.4	72.2	0.4	72.4	0.6	72.0	0.2
C	14th floor	71.5	71.5	0.0	71.5	0.0	71.6	0.1	73.1	1.6	72.7	1.2	73.5	2.0	72.1	0.6
	1st floor	71.7	71.8	0.1	71.8	0.1	71.8	0.1	71.9	0.2	71.9	0.2	72.0	0.3	71.9	0.2
D	35th floor	71.1	71.1	0.0	71.1	0.0	71.2	0.1	71.8	0.7	71.6	0.5	71.8	0.7	71.5	0.4
	1st floor	69.0	69.0	0.0	69.0	0.0	69.0	0.0	69.2	0.2	69.1	0.1	69.0	0.0	69.0	0.0
E	8th floor	68.9	68.9	0.0	68.9	0.0	68.9	0.0	69.4	0.5	69.3	0.4	69.0	0.1	68.9	0.0
	1st floor	68.3	68.3	0.0	68.3	0.0	68.3	0.0	69.9	1.6	70.6	2.3	72.1	**3.8**	70.2	1.9
F	30th floor	67.5	67.5	0.0	67.6	0.1	67.5	0.0	71.8	**4.3**	71.9	**4.4**	73.8	**6.3**	70.6	**3.1**
	1st floor	65.5	65.8	0.3	66.0	0.5	67.7	2.2	66.9	1.4	66.1	0.6	66.6	1.1	66.0	0.5
G	30th floor	65.4	67.3	1.9	68.6	**3.2**	70.6	**5.2**	68.7	**3.3**	66.8	1.4	67.6	2.2	66.4	1.0
	1st floor	69.6	70.9	1.3	70.1	0.5	72.7	**3.1**	70.3	0.7	69.7	0.1	69.7	0.1	69.7	0.1
H	20th floor	69.2	71.8	2.6	71.4	2.2	73.6	**4.4**	70.5	1.3	69.3	0.1	69.2	0.0	69.2	0.0
	5th floor	67.5	69.3	1.8	68.1	0.6	69.1	1.6	68.0	0.5	67.6	0.1	67.6	0.1	67.6	0.1
I	23rd floor	67.0	68.9	1.9	68.1	1.1	68.7	1.7	67.5	0.5	67.1	0.1	67.0	0.0	67.0	0.0
	1st floor	66.2	66.4	0.2	66.3	0.1	66.4	0.2	66.3	0.1	66.2	0.0	66.2	0.0	66.2	0.0
J	25th floor	66.5	67.5	1.0	66.8	0.3	67.1	0.6	66.8	0.3	66.6	0.1	66.5	0.0	66.5	0.0
	1st floor	65.7	69.6	**3.9**	66.0	0.3	68.2	2.5	66.8	1.1	65.8	0.1	65.8	0.1	65.8	0.1
K	20th floor	66.0	74.0	**8.0**	67.7	1.7	72.3	**6.3**	68.2	2.2	66.0	0.0	66.0	0.0	66.0	0.0
	5th floor	70.1	78.1	**8.0**	70.6	0.5	70.4	0.3	71.2	1.1	70.1	0.0	70.1	0.0	70.1	0.0
L	35th floor	69.5	73.6	**4.1**	70.7	1.2	70.7	1.2	71.1	1.6	69.5	0.0	69.5	0.0	69.5	0.0
M	1st floor	69.1	69.2	0.1	69.9	0.8	71.8	2.7	69.7	0.6	69.9	0.8	69.9	0.8	69.9	0.8
	5th floor	67.8	68.8	1.0	72.9	**5.1**	76.2	**8.4**	69.8	2.0	67.9	0.1	67.9	0.1	67.9	0.1
N	40th floor	67.5	69.3	1.8	70.8	**3.3**	72.0	**4.5**	68.4	0.9	67.5	0.0	67.6	0.1	67.5	0.0
O	At grade	71.8	72.2	0.4	72.3	0.5	71.9	0.1	71.8	0.0	71.8	0.0	71.8	0.0	71.8	0.0
P	1st floor	71.5	71.6	0.1	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0	71.5	0.0
	20th floor	66.7	67.6	0.9	67.1	0.4	66.9	0.2	66.9	0.2	66.7	0.0	66.7	0.0	66.7	0.0
Q	50th floor	66.0	67.7	1.7	67.2	1.2	66.2	0.2	66.2	0.2	66.0	0.0	66.0	0.0	66.0	0.0
R	At grade	69.3	69.3	0.0	69.3	0.0	69.4	0.1	69.5	0.2	69.4	0.1	69.8	0.5	69.3	0.0
	5th floor	61.6	65.0	**3.4**	62.6	1.0	63.3	1.7	61.9	0.3	61.6	0.0	61.6	0.0	61.6	0.0
S	30th floor	62.0	69.1	**7.1**	64.4	2.4	65.4	**3.4**	62.8	0.8	62.0	0.0	62.0	0.0	62.0	0.0

Note: Locations where predicted noise levels exceed the CEQR impact criteria are shown in bold.

With regard to the residential locations where significant noise impacts are predicted to occur, all of the residential buildings (i.e., Manhattan Place [630 First Avenue], Rivergate [606 First Avenue], Corinthian [345 East 37th Street] have double-glazed windows and have some form of alternative ventilation (i.e., central air conditioning or packaged terminal air conditioner [PTAC] units). Consequently, even during warm weather conditions, interior noise levels would be approximately 30-35 dBA less than exterior noise levels. Although these would be considered significant noise impacts based on the CEQR construction noise impact criteria, the double-glazed windows and alternative ventilation at these residential structures would provide a significant amount of sound attenuation, and would result in interior noise levels during much of the time that are below 45 dBA L_{10} (the CEQR acceptable interior noise level criteria).

With regard to the Manhattan Place Plaza, the only open space area adjacent to the project site where significant noise impacts are predicted to occur (during the years 2011 through 2013), there are no feasible or practicable measures that could be implemented to mitigate project construction impacts, such as erecting barriers around the parks, which would present access and security concerns. Consequently, these significant adverse impacts would remain unmitigated.

F. FUTURE CONDITIONS WITH OTHER PROJECTS

The following analysis describes the potential for cumulative construction impacts resulting from simultaneous construction activities in the study area, including the proposed development program, the proposed UNDC project and the reconstruction of the FDR Drive.

UNDC PROJECT

The FGEIS included an "Analysis of UNDC Project" chapter that examined the potential impacts of the simultaneous construction of a UNDC office building at East 41st Street and First Avenue and the proposed development. Because the UNDC project is complex and requires approvals from the New York State Legislature, the New York City Economic Development Corporation, and possibly other public agencies, including its own environmental review, it is uncertain whether the project will be completed by 2014 or, in fact, ever built. Therefore, the UNDC project is not included as part of the baseline conditions for the proposed actions; instead, it is addressed as an alternative baseline condition.

Simultaneous construction of the UNDC project and the proposed development program could affect on-street staging areas for the 708 First Avenue parcel, which is located directly south of the proposed UNDC site across East 41st Street. Given that a specific project plan has not been developed for the UNDC project, the exact location of its staging areas, timing and duration of its construction stages, and its potential overlap with construction on 708 First Avenue cannot be fully determined. However, it is possible that some on-street staging for the UNDC project could be positioned on East 41st Street between First Avenue and the FDR Drive. It is anticipated that some on-street construction staging for the 708 First Avenue parcel may also occur on that portion of East 41st Street. Therefore, the two projects would be expected to stagger any lane closures associated with their respective staging areas on this cross-town street. In the event that this portion of East 41st Street did not provide enough space for off-site staging for both developments, it is possible that a section of the curbside lane along First Avenue immediately west of the 708 First Avenue parcel would be used. The potential closure along First Avenue would be set back from East 41st Street by at least 50 feet to allow vehicular traffic safe access to the First Avenue Access ramp to East 42nd Street.

Should the UNDC project be completed prior to the commencement of construction at 708 First Avenue, the staggering of off-site staging areas on East 41st Street would not be an issue.

Construction of the proposed development program would not cause significant adverse impacts to users of the UNDC building, as construction activities at 708 First Avenue would neither close East 41st Street nor disrupt access to the UNDC building.

FDR DRIVE RECONSTRUCTION

Rehabilitation of the FDR Drive viaduct between East 25th and East 42nd Streets is currently in the planning study phase by the New York State Department of Transportation (NYSDOT). At the present time, NYSDOT has no definite plans for adding, removing, or modifying the location of the FDR Drive ramps within the segment that serves the development parcels or for adding capacity (in the form of additional travel lanes) to the roadway.

Were a rehabilitation to proceed, NYSDOT would maintain all three travel lanes in each direction during the rehabilitation, and little if any diversion of traffic off of the FDR Drive onto local streets would be anticipated. Detailed plans have not yet been established, and it is not yet known how a specific project plan would change traffic at any given location or interact with the construction activities of the proposed development program. ✷