Chapter 19: Construction

A. INTRODUCTION

This chapter summarizes a conceptual construction scenario for the Seward Park Mixed-Use Development Project and assesses the potential for significant adverse construction impacts. For construction activities of the scale and duration estimated for the proposed development, the *City Environmental Quality Review (CEQR) Technical Manual* (January 2012 edition) calls for an assessment of construction-related impacts, with a focus on transportation, air quality, and noise, as well as consideration of other technical areas such as historic and cultural resources, hazardous materials, and open space. The assessment focuses on project construction activities within the project site. As described in Chapter 1, "Project Description," the project site encompasses the 10 City-owned sites located in Manhattan Community District 3 generally along Delancey and Essex Streets on the Lower East Side, the demapped sections of Broome and Suffolk Streets that would be mapped as City streets, and sections of Clinton and Delancey Streets that would be demapped. There would be no construction on Site 7 pursuant to the proposed actions and it would retain its current function as a municipal parking garage.

For each of the various technical areas presented below, appropriate construction analysis years were selected to represent reasonable worst-case conditions relevant to that technical area, which can occur at different times for different analyses. For example, the noisiest part of the construction may not be at the same time as the heaviest construction traffic. Therefore, the analysis periods may differ for different analysis areas. Where appropriate, the analysis accounted for the effects of project elements that would be completed and operational during the selected construction analysis years.

While the anticipated construction durations have been developed with an experienced New York City construction manager, the discussion is only illustrative as specific means and methods will be chosen at the time of construction. At this time, there are no specific construction programs or designs for any development that is projected to result from the proposed actions. The construction durations are conservatively chosen to serve as the basis of the analyses in this chapter and are representative of the reasonable worst-case for potential impacts. The conceptual schedule represents a compressed and conservative potential timeline for construction, which shows overlapping construction activities and simultaneously operating construction equipment for development sites in proximity of one another. Thus, the analysis captures the cumulative nature of construction impacts, which would result in the greatest impacts at nearby receptors.

PRINCIPAL CONCLUSIONS

TRANSPORTATION

Traffic

Construction activities would generate the highest amount of construction-related traffic in the third quarter of 2017. Construction-related traffic is expected to occur earlier than the commuter peak hours, typically at 6-7 AM and 3-4 PM, and the total number of vehicle trips generated during construction would be approximately 68 percent and 86 percent lower than the total number of vehicle trips generated by the completed development project during the AM and PM hours, respectively. Nevertheless, a detailed analysis of traffic conditions was completed for nine key intersections near the construction sites, and this analysis indicated that significant adverse traffic impacts could occur at four of these locations during construction, but at lesser magnitudes than impacts identified under the With-Action condition. Where impacts during construction may occur, measures similar to the ones recommended to mitigate impacts of the proposed actions could be implemented early to aid in alleviating congested traffic conditions. Sidewalk and lane closures would be finalized as the maintenance and protection of traffic (MPT) plans are developed and reviewed with the New York City Department of Transportation (NYCDOT).

Parking

The majority of construction workers are expected to commute to the job site by public transportation; only 29 percent are expected to drive to work. There would be no parking provided for them at the construction sites but the overall peak parking demand for 80 spaces would be able to park in off-street parking facilities within a quarter-mile distance (about a five-minute walk) from the project site.

Transit

The study area is well served by public transit, including the F, J, M, and Z subway lines at the Essex Street-Delancey Street station. There are also several local bus routes, including the M9, M14A, M15, M21, and M22. Based on the number of projected construction workers being distributed among the various subway and bus routes, station entrances, and bus stops near the project area, only nominal increases in transit demand would be experienced along each of these routes and at each of the transit access locations during hours outside of the typical commuter peak hours of 8-9 AM and 5-6 PM. Hence, there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips. Any temporary relocation of bus stops along bus routes that operate adjacent to the project area would be coordinated with and approved by NYCDOT and the New York City Transit (NYCT) to ensure proper access is maintained.

Pedestrians

Considering that pedestrian trips generated by construction workers would occur during hours outside of the typical commuter peak hours of 8-9 AM and 5-6 PM and would be distributed among numerous sidewalks and crosswalks in the area, the preliminary analysis found that there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips. During the course of construction, sidewalks may be closed for varying periods of time to allow for certain construction activities but pedestrian circulation and access would be maintained through the use of temporary sidewalks or sidewalk bridges.

This sidewalk work would be coordinated with and approved by NYCDOT and the New York City Department of Buildings (NYCDOB).

AIR QUALITY

The proposed actions would not result in significant adverse impacts with respect to air quality. A detailed analysis of on-site and on-road emissions determined that annual-average nitrogen dioxide (NO_2), carbon monoxide (CO), and particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}) concentrations would be below their corresponding National Ambient Air Quality Standards (NAAQS). Therefore, construction under the proposed actions would not cause or contribute to any significant adverse air quality impacts with respect to these standards.

Dispersion modeling determined that the maximum predicted incremental concentrations of particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$) (using a worst-case emissions scenario) would exceed the City's applicable 24-hour interim guidance criterion of 2 micrograms per cubic meter ($\mu g/m^3$) at near-side sidewalk receptor locations and four residential locations. The occurrences of elevated 24-hour average concentrations for $PM_{2.5}$ would be limited in duration, frequency, and magnitude. Therefore, taking into account the limited duration and extent of these predicted exceedances, and the limited area-wide extent of the 24-hour impacts, it was concluded that no significant adverse air quality impacts for $PM_{2.5}$ would occur from the on-site construction sources.

Because background concentrations are not known and the analysis methodology for mobile and construction sources have not been developed for the new 1-hour NO_2 NAAQS, exceedances of the 1-hour NO_2 standard resulting from construction activities cannot be ruled out. Therefore, measures including diesel equipment reduction, utilization of newer equipment, and idling restriction, would be implemented to the extent feasible and practicable to minimize NO_x emissions from construction activities under the proposed actions.

NOISE AND VIBRATION

Noise

Development pursuant to the proposed actions would result in significant adverse impacts with respect to construction noise. This conclusion is based on a conservative analysis of the construction procedures, including peak quarterly levels assumed to represent each year of construction, a maximum amount of construction equipment assumed to be operational on each development site and at locations closest to nearby receptors, and a compressed construction schedule with a maximum amount of development sites under construction simultaneously.

Construction on the proposed development sites would include noise control measures as required by the New York City Noise Control Code, including both path and source controls. Even with these measures, the results of detailed construction analyses indicate that elevated noise levels are predicted to occur for two or more consecutive years at forty-five (45) of the eighty-three (83) receptor sites analyzed. Affected locations include residential, institutional and open space areas adjacent to the proposed development sites and along routes expected to be traveled by construction-related vehicles to and from the project site. However, most affected buildings have double-glazed windows and air-conditioning, and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA, which would be considered acceptable according to CEQR criteria. At affected locations that do not already have double-glazed windows and air conditioning interior, $L_{10(1)}$ values resulting from construction may exceed 45 dBA. Additional options for source and path controls would be incorporated into the construction methodology to the extent practicable and feasible.

Thus, should the development sites be developed and constructed as conservatively presented in this conceptual schedule, up to 15 locations could experience significant impacts for certain limited periods during construction. At the four locations with the potential to experience construction noise impacts only at outdoor balconies, there would be no feasible or practicable mitigation to mitigate the construction noise impacts. Further assessment related to construction impacts at Seward Park High School (350 Grand Street) will be conducted between DGEIS and FGEIS to refine the area of potential impact. The project sponsors will also explore potential mitigation measures at the school between DGEIS and FGEIS. In the event that mitigation measures are not determined to be feasible and practicable, the impact would be unmitigated.

Some potential receptor controls that could be used to mitigate the impacts at the 10 residential/commercial locations where interior L_{10} values would be expected to exceed the value considered acceptable by CEQR criteria include the installation of interior storm windows at locations with single-glazed windows, replacement of single-glazed windows with acoustically rated windows, improvements in the sealing of the existing windows, and/or the provision of air-conditioning so that the impacted structures can maintain a closed-window condition. Such measures may affect the ability to achieve project goals with regard to the development of affordable housing and/or other project amenities; however, further exploration of the measures will be conducted between DGEIS and FGEIS to determine the practicability and feasibility of implementing these measures to minimize or avoid the potential significant adverse impacts, taking into account the practicability relative to project goals. Should it be determined that there are no practicable mitigation measures, taking into account project goals, and should the development sites be developed and constructed as conservatively presented in this conceptual schedule, up to 10 residential/commercial locations would be expected to experience an unmitigated significant adverse impact at various times.

Vibration

Development pursuant to the proposed actions is not expected to result in significant adverse construction impacts with respect to vibration. Use of construction equipment that would have the most potential to exceed the 65 VdB criterion within a distance of 230 feet of sensitive receptor locations (e.g., equipment used during pile driving) would be perceptible and annoying. Therefore, for limited time periods, perceptible vibration levels may be experienced by occupants and visitors to all of the buildings and locations on and immediately adjacent to the construction sites. However, the operations which would result in these perceptible vibration levels would only occur for finite periods of time at any particular location and, therefore, the resulting vibration levels, while perceptible, would not result in any significant adverse impacts.

OTHER TECHNICAL AREAS

Historic and Cultural Resources

Construction would involve subsurface disturbance to areas that have been identified as archaeologically sensitive by the Phase 1A studies. The Phase 1A recommended a Phase 1B archaeological investigation to determine the presence or absence of archaeological resources in the areas identified as archaeologically sensitive. These potential archaeological resources could include shaft features (i.e., privies, cisterns, or wells) associated with the residential occupation of these historic lots in the early to mid-19th century. The Phase 1A was submitted to the New

York City Landmarks Preservation Commission (LPC) and the New York State Office of Parks, Recreation and Historic Preservation (OPRHP) for review and comment. In letters dated January 23, 2012 and January 31, 2012, LPC and OPRHP, respectively, concurred with the findings of the Phase 1A. With implementation of Phase 1B testing and continued consultation with LPC and/or OPRHP regarding the need for, and implementation of, any Phase 2 and 3 investigations, no significant adverse impacts on archaeological resources would result from construction.

Architectural resources are defined as buildings, structures, objects, sites or districts listed on the State and National Registers of Historic Places (S/NR) or determined eligible for such listing based on the criteria defined below, National Historic Landmarks (NHLs), New York City Landmarks (NYCLs) and Historic Districts, and properties that have been found by the LPC to appear eligible for designation, considered for designation ("heard") by LPC at a public hearing, or calendared for consideration at such a hearing (these are "pending" NYCLs). The proposed actions could have adverse physical impacts on five architectural resources that are located within 90 feet of proposed construction activities, close enough to potentially experience adverse construction-related impacts from ground-borne construction-period vibrations, falling debris, subsidence, collapse, or damage from construction machinery. NYCDOB *Technical Policy and Procedure Notice* (*TPPN) #10/88*, applies to New York City Landmarks, properties within New York City Historic Districts, and National Register-listed properties. *TPPN #10/88* supplements the standard building protections afforded by the Building Code by requiring a monitoring program to reduce the likelihood of construction damage to adjacent New York City Landmarks and National Register-listed properties (within 90 feet) and to detect at an early stage the beginnings of damage so that construction procedures can be changed. With these required measures, significant adverse construction-related impacts would not occur to the former Norfolk Street Baptist Church (NYCL, S/NR) or to the contributing buildings within the Lower East Side Historic District (S/NR) that are located within 90 feet of project construction. Further, for sites that may be developed under the jurisdiction of HPD, Construction Protection Plans to protect historic resources within 90 feet of construction will be likely required to be developed and implemented in coordination with OPRHP by the developer(s) through provisions in the Land Disposition Agreement (LDA) between HPD and the developer(s).

For the non-designated or listed resources—the potential Clinton, Rivington, Station Street Historic District (NYCL-eligible, S/NR-eligible) and the Williamsburg Bridge (S/NR-eligible)—construction under the proposed actions could potentially result in construction-related impacts on the resources. Additional protective measures afforded under *TPPN #10/88* would only become applicable if those resources are designated or listed in the future prior to the initiation of adjacent construction or if the adjacent sites are developed under the jurisdiction of HPD. Further, for sites that may be developed under the jurisdiction of HPD, Construction Protection Plans to protect historic resources within 90 feet of construction will be likely required to be developed and implemented in coordination with OPRHP by the developer(s) through provisions in the LDA between HPD and the developer(s). If the resources are not designated or listed and the adjacent sites are developed under the management of NYCEDC, they would not be subject to *TPPN #10/88* and may, therefore, be adversely impacted by adjacent development resulting from the proposed actions.

Hazardous Materials

The proposed actions would result in the demolition of existing structures and surface parking areas on Sites 1 through 6 and 8 through10 followed by subsurface disturbance associated with construction of new structures. Site 7 would not be redeveloped pursuant to the proposed actions and the existing parking garage would remain. The proposed actions would include appropriate health and safety/remedial measures, as warranted, that would precede or govern demolition, construction, and soil disturbance activities on the development sites. With the implementation of these measures, no significant adverse impacts related to hazardous materials would be expected to result from the proposed actions.

Open Space

There are no publicly accessible open spaces within the project site, and no open space resources would be used for staging or other construction activities. The nearest open space is the 0.45-acre Broome Seward Park Extension, which is located on Broome Street between Clinton Street and Ridge Street, approximately 130 feet east of Site 6. At limited times, activities such as excavation and foundation construction may generate noise that could impair the enjoyment of nearby open space users, but such noise effects would be temporary. Construction fences around the project site would shield the park from construction activities. Construction under the proposed actions would not limit access to the park or other open space resources in the vicinity of the project site. Therefore, construction under the proposed actions would not result in significant adverse impacts on open space.

Socioeconomic Conditions

Construction activities could temporarily affect pedestrian and vehicular access. However, lane and/or sidewalk closures would not obstruct entrances to any existing businesses, and businesses are not expected to be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities. Utility service would be maintained to all businesses, although short term interruptions (i.e., hours) may occur when new equipment/infrastructure (e.g., a transformer, or a sewer or water line) is put into operation. Overall, construction activities associated with the proposed actions would not result in any significant adverse impacts on surrounding businesses.

Construction would create direct benefits resulting from expenditures on labor, materials, and services, and indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the direct activity. Construction also would contribute to increased tax revenues for the City and State, including those from personal income taxes.

Community Facilities

The construction sites would be surrounded by construction fencing and barriers that would limit the effects of construction on nearby facilities. Construction workers would not place any burden on public schools and would have minimal, if any, demands on libraries, child care facilities, and health care. Construction of the proposed buildings would not block or restrict access to any facilities in the area, and would not materially affect emergency response times significantly. New York Police Department (NYPD) and Fire Department (FDNY) emergency services and response times would not be materially affected due to the geographic distribution of the police and fire facilities and their respective coverage areas. As discussed below (See "Noise and Vibration"), at limited times during the construction period, Seward Park High School would be expected to experience significant noise impacts that may be considered unmitigated. For the predicted noise impact on the school, an additional assessment will be undertaken between the DGEIS and FGEIS to further refine the area of potential impact on the school and potential mitigation measures to minimize this significant construction noise impact will be further explored. It is important to note that the conceptual schedule on which the noise analysis was based represented a compressed and conservative potential timeline for construction that tended to show the most construction activity and most construction equipment operating simultaneously, which conditions would result in the largest increase in noise levels at the nearby receptors.

Land Use and Neighborhood Character

Construction activities would affect land use on the project site but would not alter surrounding land uses. As is typical with construction projects, during periods of peak construction activity there would be some disruption, predominantly noise, to the nearby area. There would be construction trucks and construction workers coming to the site. There would also be noise, sometimes intrusive, from building construction as well as trucks and other vehicles backing up, loading, and unloading. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as most construction activities would take place within the project site or within portions of sidewalks, curbs, and travel lanes of public streets immediately adjacent to the project site. Overall, while the construction at the site would be evident to the local community, the limited duration of construction would not result in significant or long-term adverse impacts on local land use patterns or the character of the nearby area.

B. METHODOLOGY

The analyses in this chapter represent the reasonable worst-case development scenario (RWCDS) for each analysis area. The RWCDS can occur at different times for different analyses. For example, the noisiest part of the construction may not be at the same time as the heaviest construction traffic. Therefore, the analysis periods may differ for traffic, air quality, and noise. In each section, the methodologies to determine the period of RWCDS potential impacts are explained. For all construction-related analysis areas, the methodologies used to assess potential construction-related impacts can be found in the chapters for each analysis area addressing potential operational impacts. Additional details relevant only to the construction air quality and noise analysis methodologies are given in their respective analysis sections below.

This section describes the expected construction schedule, the construction methods to be used, and City, state, and federal regulations and policies that govern construction. This section also establishes the framework used for the assessment of potential impacts from construction. The construction timeline—determined by the timing of the various major construction stages associated with constructing a building—such as excavation and foundation, core and shell construction, and interior finishing—is described. The types of equipment are discussed, and the number of workers and truck deliveries estimated. The analyses use these data to determine the potential for significant adverse environmental impacts.

CONCEPTUAL CONSTRUCTION PHASING AND SCHEDULE

While the anticipated construction durations described below have been developed with an experienced New York City construction manager, the discussion is only illustrative as means and methods may be chosen at the time of construction. At this time, there are no specific construction programs or designs for any development that is projected to result from the proposed actions. The described construction durations are conservatively chosen to serve as the basis of the analyses in this chapter and are representative of the reasonable worst-case for potential impacts. The analyses conservatively account for overlapping construction activities for development sites in proximity of one another to capture the cumulative nature of construction impacts. **Figure 19-1** and **Table 19-1** present a conceptual schedule of construction for the proposed buildings. In the conceptual construction schedule, construction is assumed to begin in 2016. However, due to the conservative nature of this conceptual schedule as explained above, construction may start at an earlier time. If the proposed actions are approved, complete build-out of the proposed development would occur over time with the last building being completed by approximately 2022.

Table 19-1
Conceptual Construction Schedule

Reasonable Worst Case Development Scenario (RWCDS) Site	Start Month	Finish Month	Approximate duration (months)
Site 1	1st quarter 2019	3rd quarter 2020	21
Site 2	3rd quarter 2016	2nd quarter 2018	24
Site 3	3rd quarter 2017	3rd quarter 2019	27
Site 4	3rd quarter 2017	1st quarter 2020	33
Site 5	3rd quarter 2016	3rd quarter 2018	27
Site 6	1st quarter 2019	3rd quarter 2020	21
Site 7 [1]	--	--	--
Site 8	2nd quarter 2020	3rd quarter 2021	18
Site 9	2nd quarter 2020	4th quarter 2021	21
Site 10	2nd quarter 2020	2nd quarter 2021	15

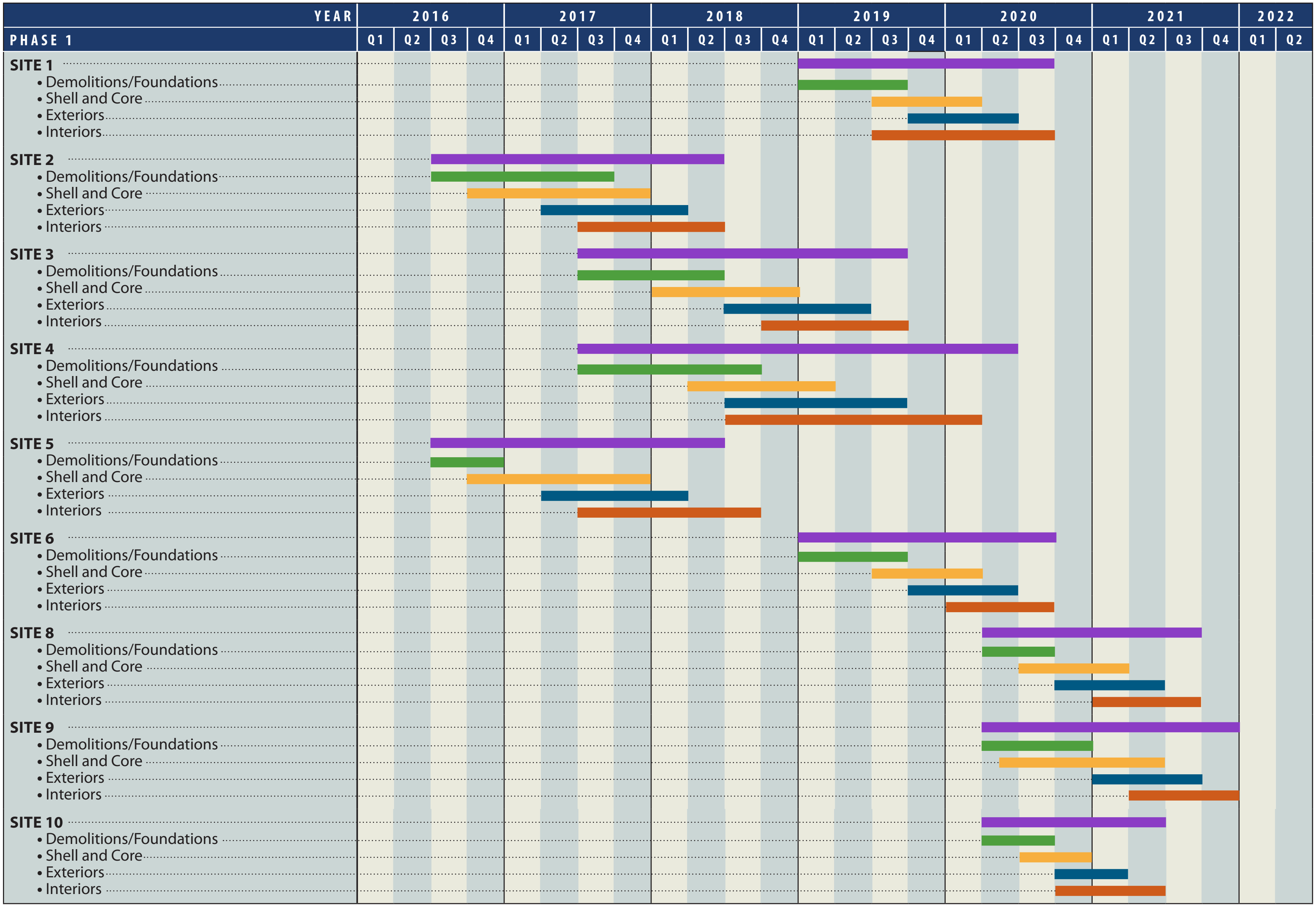
Note:
[1] Site 7 would retain its current function as a municipal parking garage, which would continue to support the existing neighborhood uses, as well as the potential new development on the development sites. Therefore, Site 7 is not included in this analysis.
Source: Hunter Roberts Construction Group

Construction on Sites 2 and 5 would begin in the third quarter of 2016. Site 2 would be completed in approximately two years while Site 5 is expected to take about 27 months to complete. Construction on Sites 3 and 4 would begin in the third quarter of 2017, and would take about 27 months and 33 months to complete, respectively. At the beginning of 2019, construction would commence on Sites 1 and 6, and would be completed by the third quarter of 2020. By the second quarter of 2020, construction on Sites 10 would begin and would take approximately 15 months to complete. Construction on Sites 8 and 9 would also begin in the second quarter of 2020, and would be completed by the third quarter of 2021 and by the end of 2021, respectively.

CONSTRUCTION DESCRIPTION

OVERVIEW

Construction of mid-rise or large-scale buildings in New York City typically follows a general pattern. The first task is construction startup, which involves the siting of work trailers, installation of temporary power and communication lines, and the erection of site perimeter fencing. Then, if there is an existing building on the site, any potential hazardous materials (such as asbestos) are abated, and the building is then demolished with some of the materials recycled and the debris taken to a licensed disposal facility. Excavation and removal of the soils is next, followed by construction of the foundations. When the below-grade construction is completed, construction of the core and shell of the new building begins. The core is the central part of the building and is the main part of the structural system. It contains the elevators and the mechanical systems for heating, ventilation, and air conditioning (HVAC). The shell is the



This conceptual schedule represents a compressed and conservative timeline for a reasonable worst-case analysis to capture the maximum potential impacts.

Conceptual Construction Schedule

Figure 19-1

outside of the building. As the core and floor decks of the building are being erected, installation of the mechanical and electrical internal networks would start. As the building progresses upward, the exterior cladding is placed, and the interior fit out begins. During the busiest time of building construction, the upper core and structure is being built while mechanical/electrical connections, exterior cladding, and interior finishing are progressing on lower floors.

GENERAL CONSTRUCTION PRACTICES

Certain practices would be observed throughout the construction of the project buildings. Each construction manager would designate a contact person for community relations 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. New York City maintains a 24-hour-a-day telephone hotline (311) so that concerns can be registered with the city.

Governmental Coordination and Oversight

The following describes construction oversight by government agencies, which in New York City is extensive and involves a number of city, state, and federal agencies. **Table 19-2** shows the main agencies involved in construction oversight and the agencies' areas of responsibilities. Primary responsibilities lie with NYCDOB, which ensures that the construction meets the requirements of the Building Code and that the buildings are structurally, electrically, and mechanically safe. In addition, NYCDOB enforces safety regulations to protect both the workers and the public. The areas of oversight include installation and operation of the equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding. The New York City Department of Environmental Protection (NYCDEP) enforces the Noise Code, reviews and approves Remedial Action Plans (RAPs)/ Construction Health and Safety Plans (CHASPs), regulates water disposal into the sewer system, and the removal of tanks. FDNY has primary oversight for compliance with the Fire Code and for the installation of tanks containing flammable materials. NYCDOT reviews and approves any traffic lane and sidewalk closures. NYCT is responsible for subway access and, if necessary, bus stop relocations. NYCT also coordinates construction work which could affect the subway system. LPC approves studies and monitoring plans to prevent damage to historic resources, both archaeological and architectural. New York City Department of Parks and Recreation is responsible for the oversight, enforcement, and permitting of the replacement of street trees that are lost due to construction. Section 5-102 et. seq. of the Laws of the City of New York requires a permit to remove any trees and the replacement of the trees as determined by calculating the size, condition, species, and location rating of the tree proposed for removal.

NYSDEC regulates disposal of hazardous materials, and construction and operation of bulk petroleum and chemical storage tanks. The New York City Department of Labor (NYCDOL) licenses asbestos workers. On the federal level, the EPA has wide ranging authority over environmental matters, including air emissions, noise, hazardous materials, and the use of poisons. Much of the responsibility is delegated to the state level. The Occupational Safety and Health Administration (OSHA) sets standards for work site safety and the construction equipment.

Table 19-2
Construction Oversight in New York City

Agency	Areas of Responsibility
New York City	
Department of Buildings	Primary oversight for Building Code and site safety
Department of Environmental Protection	Noise, hazardous materials, dewatering, tanks
Fire Department	Compliance with Fire Code, tanks
Department of Transportation	Lane and sidewalk closures
New York City Transit	Subway access, bus stop relocation
Landmarks Preservation Commission	Archaeological and architectural protection
Department of Parks and Recreation	Street trees
New York State	
Department of Labor	Workers/Asbestos workers
Department of Environmental Conservation	Hazardous materials and tanks
United States	
Environmental Protection Agency	Air emissions, noise, hazardous materials, poisons
Occupational Safety and Health Administration	Worker safety

Deliveries and Access

Access to the construction sites would be controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Private worker vehicles would not be allowed into the construction area. Security guards and flaggers may be posted as necessary, 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. Security guards may patrol the construction sites after work hours and over the weekends to prevent unauthorized access.

Material deliveries to the site would be controlled and scheduled. Unscheduled or haphazard deliveries would be minimized.

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 3:00 or 3:30 PM, but could be extended until 6:00 PM for such tasks as finishing a concrete pour for a floor deck, or completing the bolting of a steel frame erected that day. Extended workday activities would not include all construction workers on site, but only those involved in the specific task. Limited extended workdays could occur on weekdays over the course of construction.

At limited times over the course of constructing a building, weekend work may be required to make up for weather delays or other unforeseen circumstances. 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, beginning with worker arrival and site preparation at 7:00 AM, and ending with site cleanup at 5:00 PM.

Some tasks may have to be continuous, and the work could extend to more than a typical 8-hour day. For example, in certain situations, concrete must be poured continuously to form one structure without joints. This type of concrete pour is usually associated with foundations and structural slabs at grade, which would require a minimum of 12 hours or more to complete.

Sidewalk and Lane Closures

During the course of construction, traffic lanes and sidewalks may be closed or protected for varying periods of time. Some street lanes and sidewalks may be continuously closed, and some lanes and sidewalks may be closed only intermittently to allow for certain construction activities. This work would be coordinated with and approved by the NYCDOT.

GENERAL CONSTRUCTION TASKS

Construction Startup Tasks

The following tasks are considered to be typical startup work to prepare a site for construction. The tasks could include, but are not limited to, the following items. The means and methods and order of completion of these tasks could change as necessary. Startup work generally involves the installation of public safety measures, such as fencing, sidewalk sheds, and Jersey barriers. The site is fenced off, typically with solid fencing to minimize interference between the persons passing by the site and the construction work. Separate gates for workers and for trucks are installed, and sidewalk shed and Jersey barriers are erected. Trailers for the construction engineers and managers are hauled to the site and installed. These trailers could be placed within the fence line, in curb lane, or over the sidewalk sheds. Also, portable toilets, dumpsters for trash, and water and fuel tankers are brought to the site and installed. Temporary utilities are connected to the construction trailers. During the startup period, permanent utility connections may be made, especially if the contractor has obtained early electric power for construction use, but utility connections may be made almost any time during the construction sequence. Construction startup tasks are normally completed within weeks.

Abatement, Demolition, and Remediation

The proposed actions would result in the demolition of surface parking areas on Sites 1–6. In addition, existing buildings on Sites 2, 5, 8, 9, and 10 would be demolished. These facilities would be abated of asbestos and any other hazardous materials within the existing buildings and structures, where applicable.

A New York City-certified asbestos investigator would inspect the buildings for asbestos-containing materials (ACMs), and those materials must be removed by a NYCDOL-licensed asbestos abatement contractor prior to interior demolition. Asbestos abatement is strictly regulated by NYCDEP, NYCDOL, EPA, and OSHA to protect the health and safety of construction workers and nearby residents and workers. Depending on the extent and type of ACMs, these agencies would be notified of the asbestos removal project and may inspect the abatement site to ensure that work is being performed in accordance with applicable regulations, including the new February 2, 2011 NYCDEP regulations. These regulations specify abatement methods, including wet removal of ACMs that minimize asbestos fibers from becoming airborne, and containment measures. The areas of the building with ACMs would be isolated from the surrounding area with a containment system and a decontamination system. The types of these systems would depend on the type and quantity of ACMs, and may include hard barriers, isolation barriers, critical barriers, and caution tape. Specially trained and certified workers, wearing personal protective equipment, would remove the ACMs and place them in bags or containers lined with plastic sheeting for disposal at an asbestos-permitted landfill. Depending on the extent and type of ACMs, an independent third-party air-monitoring firm would collect air samples before, during, and after the asbestos abatement. These samples would be analyzed in a laboratory to ensure that regulated fiber levels are not exceeded. After the abatement is completed and the work areas have passed a visual inspection and monitoring, if applicable, the general demolition work can begin.

Any activities with the potential to disturb lead-based paint would be performed in accordance with the applicable OSHA regulation (OSHA 29 CFR 1926.62—*Lead Exposure in Construction*). When conducting demolition (unlike lead abatement work), lead-based paint is generally not stripped from surfaces. Structures may be disassembled or broken apart with most paint still intact. Dust control measures (spraying with water) would be used if necessary. The lead content of any resulting dust is therefore expected to be low. Work zone air monitoring for lead may be performed during certain activities with a high potential for releasing airborne lead-containing particulates in the immediate work zone, such as manual demolition of walls with lead paint or cutting of steel with lead-containing coatings. Such monitoring would be performed to ensure that workers performing these activities are properly protected against lead exposure.

Any suspected PCB-containing equipment (such as fluorescent light ballasts) that would be disturbed would be evaluated prior to disturbance. Unless labeling or test data indicate that the suspected PCB-containing equipment does not contain PCBs, it would be assumed to contain PCBs and removed and disposed of at properly licensed facilities in accordance with all applicable regulatory requirements.

All of these procedures related to the handling of ACM, lead-based paint, and potential PCB-containing equipment would be contained in the NYCDEP-approved CHASP.

General demolition is the next step, where necessary. Demolition would occur in accordance with NYCDOB guidelines/requirements. In general, the first step is to remove any economically salvageable materials. Then the building is deconstructed using large equipment. Typical demolition requires fencing around the building to prevent accidental dispersal of building materials into areas accessible to the general public. The demolition debris would be sorted prior to being disposed at landfills to maximize recycling opportunities. About 10 to 20 workers per day are expected to be on site, and typically two to four truckloads of debris would be removed per hour. The general demolition phase is expected to last one to two months per site.

Excavation and Foundation

Typically, soil excavation and foundation construction for a building takes approximately 6 to 15 months to complete, depending on the size of the development. Excavators would be used for the task of digging foundations. The soil would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse on another construction site. Foundation work could include pile driving and pouring concrete footings and foundation. The excavation/foundation task could involve the use of excavators, cranes, pile drivers, concrete pumps, concrete trucks, generators, and hand tools. Anywhere from 10 to 70 workers would be on-site at any given time. About 10 to 20 trucks per day are expected for this phase of work.

Below-Grade Hazardous Materials

All construction subsurface soil disturbances would be performed in accordance with a NYCDEP-approved RAP and CHASP. At a minimum, the RAP would provide for the appropriate handling, stockpiling, testing, transportation, and disposal of excavated materials, as well as any unexpectedly encountered tanks, in accordance with all applicable federal, state, and local regulatory requirements. The RAP would also provide for vapor control measures such as vapor barriers. The CHASP would ensure that all subsurface disturbances are done in a manner protective of workers, the community, and the environment.

Dewatering

The excavated area could be subject to accumulating groundwater until the slab-on-grade is built. In addition to groundwater, rain and snow could collect in the excavation, and that water would have to be removed. If necessary, the water would be pretreated prior to discharge. The decanted water would then be discharged into the New York City sewer system. Discharge in the sewer system is governed by NYCDEP regulations.

NYCDEP has a formal procedure for issuing a Letter of Approval to discharge into the New York City sewer system. The authorization is issued by the NYCDEP Borough office if the discharge is less than 10,000 gallons per day; an additional approval by the Division of Connections & Permitting is needed if the discharge is more than 10,000 gallons per day. All chemical and physical testing of the water has to be done by a laboratory that is certified by the New York State Department of Health (NYSDOH). The design of the pretreatment system has to be signed by a New York State Professional Engineer or Registered Architect. For water discharged into New York City sewers, NYCDEP regulations specify the following maximum concentration of pollutants.

- Petroleum hydrocarbons — 50 parts per million (ppm)
- Cadmium — 2 ppm
- Hexavalent chromium — 5 ppm
- Copper — 5 ppm
- Amenable cyanide — 0.2 ppm
- Lead — 2 ppm
- Mercury — 0.05 ppm
- Nickel — 3 ppm
- Zinc — 5 ppm
- pH — between 5 to 12
- Temperature — less than 150 degrees Fahrenheit (F)
- Flash Point — greater than 140 degrees F
- Benzene — 134 parts per billion (ppb)
- Ethylbenzene — 380 ppb
- Methyl-Tert-Butyl-Ether (MTBE) — 50 ppb
- Naphthalene — 47 ppb
- Tetrachloroethylene (perc) — 20 ppb
- Toluene — 74 ppb
- Xylenes — 74 ppb
- PCB — 1 ppb
- Total Suspended Solids — 350 ppm

Any groundwater discharged in the New York City system would meet these limits. NYCDEP can also impose project-specific limits, depending on the location of the project and contamination that has been found in nearby areas.

Core and Shell

In general, core and shell construction of the proposed buildings would last approximately 6 to 15 months, depending on the size of the building. Construction of the interior structure, or core, of the proposed buildings would include elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment rooms; core stairs; and restroom areas. This phase of work would also include construction of the building's framework (installation of beams and columns), and floor decks. These activities would require the use of cranes, delivery trucks, concrete pumps, concrete trowels, welding equipment, and a variety of handheld tools. Temporary construction elevators (hoists) would also be constructed for the delivery of materials and vertical movement of workers during this stage where necessary. Each day, about 20 to 100 workers and about 5 to 15 truck deliveries would be required for the core and shell construction of each building.

Exteriors

Exterior construction involves the installation of the façade (exterior walls, windows, and cladding) and the roof. Exterior construction would take about 6 to 15 months. 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 15 to 55 workers and 5 to 15 trucks per day would be needed for the exterior construction.

Interiors

This stage would include the construction of interior partitions, installation of lighting fixtures, interior finishes (flooring, painting, etc.), and mechanical and electrical work, such as the installation of elevators. Mechanical and other interior work would overlap with the building core and shell construction. This activity would employ the greatest number of construction workers: with about 30 to 120 workers per day. In addition, anywhere from 5 to 10 truck deliveries would be expected per day at each building. Equipment used during interior construction would include hoists, delivery trucks, and a variety of small hand-held tools. However, this stage of construction is the quietest.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Construction is labor intensive, and the number of workers varies with the general construction task and the size of the building. Likewise, material deliveries generate many trucks, and the number also varies. **Table 19-3** shows the estimated numbers of workers and deliveries to the project site by calendar quarter for all construction based on the conceptual schedule outlined above. These represent the average number of daily workers and trucks within each quarter. The average number of workers would be about 305 per day throughout the construction period. The peak number of workers would be 566 per day in the third quarter of 2017. For truck trips, the average number of trucks would be 56 per day, and the peak would occur in the third quarter of 2017 with 109 trucks per day.

Table 19-3
Average Number of Daily Workers and Trucks by Quarter

Year	2016				2017				2018				2019			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	--	--	101	244	172	281	566	537	483	479	430	513	455	350	385	237
Trucks	--	--	35	57	36	55	109	92	81	76	75	72	79	65	64	38
Year	**2020**				**2021**				**Project**							
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Average		Peak					
Workers	362	218	241	121	168	190	114	58	305		566					
Trucks	47	59	59	42	41	36	14	4	56		109					

Note: This table represents estimated conditions in each quarter and may differ from the numbers discussed in some analysis sections. The analyses are based on RWCDS assumptions for that particular analysis area.
Source: Hunter Roberts Construction Group

C. EXISTING CONDITIONS

As described in Chapter 1, "Project Description," the project site contains a mix of parking, vacant and partially vacant commercial uses, and a residential building. Within the project area, Suffolk Street is demapped between Grand and Delancey Streets and Broome Street is demapped between Norfolk and Clinton Streets. Sites 1, 3, 4, and 6 are each entirely occupied by surface parking. Sites 2 and 5 also contain surface parking. The remainder of Site 2 is occupied by a former Essex Street Market building. Site 5 contains three buildings, including a residential building, a three-story building that is mostly vacant except for a ground-floor use, and a former fire station. The Site 7 municipal public parking garage would retain its current function. Site 9 contains the public Essex Street Market. Sites 8 and 10 contain former Essex Street Market buildings, and the building on Site 8 is vacant and used for storage of refuse generated by the market in the building on Site 9.

D. THE FUTURE WITHOUT THE PROPOSED ACTIONS

In the future without the proposed actions (No Action condition), it is expected that existing uses on the projected development sites would remain. In addition, the future without the proposed actions would account for other development projects that are planned to be in place by 2022 absent the proposed actions.

E. PROBABLE IMPACTS OF THE PROPOSED ACTIONS

Similar to many large development projects in New York City, construction can be disruptive to the surrounding area for limited periods of time throughout the construction period. The following analyses describe potential construction impacts on transportation, air quality, noise and vibration, as well as other areas including historic and cultural resources, hazardous materials, open space, socioeconomic conditions, community facilities, and land use and neighborhood character

TRANSPORTATION

TRAFFIC AND PARKING

Construction activity would extend from 2016 to 2022 and would generate construction worker and truck traffic. Because of the lengthy duration of these activities, an evaluation of construction sequencing and worker/truck projections was completed in order to identify potential construction traffic impacts. As described below, the projected construction activities would yield less total traffic than projected for the proposed actions. However, significant adverse traffic impacts could still occur at some of the study area locations during construction, similar to the impacts identified in Chapter 13, "Transportation." Therefore, a detailed traffic construction analysis was performed for nine critical intersections within the traffic study area, and the conclusions of this analysis are presented below.

CONSTRUCTION TRAFFIC PROJECTIONS

Average daily construction worker and truck activities by quarter were projected for six years of construction. These projections were further refined to account for worker modal splits and vehicle occupancy, and arrival and departure distribution.

Daily Workforce and Truck Deliveries

For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections in the peak quarter of the peak construction year were used as the basis for estimating peak hour construction trips. Based on a schedule of commencing construction in 2016, the combined construction worker and truck traffic peak would occur in the third quarter of 2017. As shown in **Table 19-3**, the daily average numbers of construction workers and truck deliveries during the peak quarters was estimated at 566 workers and 109 truck deliveries per day. These estimates of construction activities are further discussed below.

Construction Worker Modal Splits

Based on the survey conducted at the construction site of the New York Times Building in 2006, it is anticipated that construction workers' travel within or commute to Manhattan would be primarily by public transportation (approximately 70 percent), with a smaller percentage by private auto (approximately 30 percent with an average auto occupancy rate of 2.04). The study area is well served by mass transit, and it is expected that most of the construction workers would commute via mass transit to and from the project site. Transit service within the study area includes the F, J, M, and Z subway lines and the M9, M14A, M15, M21, and M22 bus routes.

Peak Hour Construction Worker Vehicle and Truck Trips

Site activities would mostly take place during the typical construction shift of 7 AM to 3 PM. 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, whereas each truck delivery was assumed to result in two truck trips during the same hour (one "in" and one "out").

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 arrivals and 3-4 PM for departures). For construction trucks, deliveries would occur throughout the day when the construction site is active. Construction truck deliveries typically peak during the hour before the regular day shift (25 percent of the daily total), overlapping with construction worker arrival traffic. Based on these assumptions, peak hour construction traffic was estimated for the entire construction period. The peak construction hourly trip projections for the third quarter of 2017 are summarized in **Table 19-4**.

TRAFFIC

As discussed above and shown in **Table 19-4**, construction activities would result in maximum combined auto and truck traffic of 118 and 74 vehicle trips during the 6-7 AM and 3-4 PM construction peak hours, respectively. In comparison, the proposed actions would generate 371, 527, and 540 vehicle trips during typical weekday AM (8-9 AM), midday (1-2 PM), and PM (5:15-6:15 PM) peak hours, respectively, as shown in **Table 19-5**.

Vehicle trips generated by construction activities were assigned to the roadway network, and nine critical study area intersections with a potential for significant impacts were selected for analysis during the AM and PM construction peak hours: East Houston Street and Essex Street/Avenue A; Delancey Street with Allen Street, Essex Street, Norfolk Street, Suffolk Street, and Clinton Street; Broome Street with Norfolk Street; and Grand Street with Allen Street and Essex Street.

Table 19-4
Peak Construction Vehicle Trip Projections – Third Quarter of 2017

Hour	AutoTrips		Truck Trips		Total VehicleTrips		
	In	Out	In	Out	In	Out	Total
6 AM - 7 AM	64	0	27	27	91	27	118
7 AM - 8 AM	16	0	11	11	27	11	38
8 AM - 9 AM	0	0	11	11	11	11	22
9 AM - 10 AM	0	0	11	11	11	11	22
10 AM - 11 AM	0	0	11	11	11	11	22
11- AM -12 PM	0	0	11	11	11	11	22
12 PM - 1 PM	0	0	11	11	11	11	22
1 PM - 2 PM	0	0	6	6	6	6	12
2 PM - 3 PM	0	4	5	5	5	9	14
3 PM - 4 PM	0	64	5	5	5	69	74
4 PM - 5 PM	0	12	0	0	0	12	12
5 PM - 6 PM	0	0	0	0	0	0	0
6 PM-7 PM	0	0	0	0	0	0	0

Note: Hourly construction worker and truck trips were derived from projected estimates of 566 workers and 109 trucks making two daily trips each (arrival and departure) in the third quarter of 2017. Numbers of construction worker vehicles were calculated using a 28.9-percent auto split with an auto-occupancy of 2.04.

Table 19-5
Comparison of Vehicle Trips—Construction Phase vs. With Action Conditions

Construction Phase (Third Quarter 2017)				With Action Conditions (2022 Proposed Action)			
Weekday Peak Period	In	Out	Total	Weekday Peak Period	In	Out	Total
6-7 AM Arrival Peak Hour	91	27	118	8 - 9 AM Peak Hour	209	162	371
3-4 PM Departure Peak Hour	5	69	74	1-2 PM Midday Peak Hour	267	260	527
				5:15 - 6:15 PM Peak Hour	244	296	540

Construction Peak Hour Traffic Volumes and Condition—Existing

Based on the Automatic Traffic Recorder (ATR) traffic volume data, background traffic volumes during the 6-7 AM construction peak hour are approximately 68 percent lower than the 8-9 AM commuter peak hour. Therefore, there would likely be fewer significant traffic impacts during the peak construction hour of 6-7 AM since background traffic volumes are considerably lower at that hour.

During the 3-4 PM construction peak hour, background traffic volumes are comparable to the 5:15-6:15 PM commuter peak hour volumes. However, due to the turn prohibitions currently in place between 4 and 7 PM, traffic patterns during the 3-4 PM construction peak hour are comparable to the 1-2 PM midday peak hour while traffic patterns at 5:15-6:15 PM are not. Based on a comparison of the ATR count data for these afternoon/evening hours, it was determined that weekday midday 1-2 PM peak hour volumes were approximately 18 percent lower than those at 3-4 PM and were therefore increased by 18 percent to develop the 3-4 PM construction peak hour volumes. During the 3-4 PM construction peak hour, the construction phase would generate less than one-sixth of the overall projected PM peak hour volume than when the proposed development is fully built out and operational. Traffic impacts are expected to be lower in magnitude during the 3-4 PM construction peak hour in comparison to the weekday PM peak hour.

Each of the nine intersections identified for analysis were evaluated. All nine intersections currently operate at an overall acceptable level of service during the 6-7 AM construction peak hour, and just one intersection—the intersection of Grand Street and Allen Street—operates at overall unacceptable LOS D during the 3-4 PM construction peak hour. Of the approximately 45 traffic movements analyzed during the AM and PM construction peak hours, three and 15 movements, respectively, operate at unacceptable levels of services (i.e. mid-LOS D or worse). Detailed descriptions of the existing conditions traffic levels of service are provided in **Table 19-6**.

Construction Peak Hour Traffic Volumes and Conditions—2017 No Action Without Construction

An annual background growth rate of 0.25 percent was assumed for the first five years (year 2011 to year 2016) and 0.125 percent for the remaining years (year 2016 to year 2017) as per the *CEQR Technical Manual* and was used to estimate the background volumes for the 2017 No Action without Construction condition. Of the 34 No Action background development sites expected to be developed in the area, 25 are considered small enough to be considered as part of the background growth or would not yet be built. The remaining nine No Action background development sites are expected to be completed by year 2017 and vehicle trips generated from these sites were assigned to the roadway network.

Under future No Action conditions in year 2017, all nine intersections would continue to operate at acceptable overall levels of service during the AM construction peak hour. During the PM construction peak hour, the intersection of Delancey Street and Norfolk Street would operate at overall LOS E, and the intersections of Delancey Street and Essex Street, and Grand Street and Allen Street would operate at unacceptable LOS D. The number of traffic movements operating at unacceptable levels of service would increase by one movement for both construction peak analysis hours during the No Action condition. Detailed descriptions of the No Action Without Construction conditions traffic levels of service are provided in **Table 19-7**.

It should be noted that NYCDOT is currently developing an area wide plan to improve traffic and pedestrian safety along the Delancey Street corridor. Also, signal timing modifications are being proposed by NYCDOT along Allen Street to improve service along the M15 bus line. Details of these plans when finalized will be incorporated between the completion of the DGEIS and FGEISs.

Construction Peak Hour Traffic Volumes and Conditions—2017 With Action with Construction

Construction activities would generate 64 construction worker auto trips and 27 construction truck trips during the weekday AM peak hour, and 64 construction worker auto trips and 5 construction truck trips during the weekday PM peak hour. Construction trucks would be required to use NYCDOT-designated truck routes to get to the project site and would then use local streets to access the construction sites.

The intersections of East Houston Street with Essex Street/Avenue A, and Delancey Street with Essex Street and Norfolk Street would be significantly impacted during the weekday PM peak hour. The intersection of Grand Street and Allen Street would be significantly impacted during both the weekday AM and PM peak hours.

Table 19-6
2011 Existing Construction Traffic Levels of Service

INTERSECTION & APPROACH		Weekday AM (6:00 - 7:00 AM) Mvt.	V/C	Control Delay	LOS	Weekday PM (3:00 - 4:00 PM) Mvt.	V/C	Control Delay	LOS
EAST HOUSTON STREET AND ESSEX STREET / AVENUE A									
East Houston Street	EB	L	0.34	14.3	B	L	0.45	14.0	B
		TR	0.35	21.7	C	TR	0.56	23.7	C
	WB	L	0.40	15.0	B	L	0.75	29.7	C
		TR	0.47	23.3	C	TR	0.53	24.2	C
Essex Street / Avenue A	NB	LTR	0.59	29.4	C	LTR	0.77	35.1	D
	SB	LTR	0.76	32.8	C	LTR	1.04	60.6	E
Overall Intersection		-	**0.62**	**24.2**	**C**	-	**0.74**	**30.3**	**C**
DELANCEY STREET AND ALLEN STREET									
Delancey Street	EB	TR	0.77	31.0	C	TR	0.84	25.9	C
	WB	L	0.72	40.5	D	L	1.05	94.5	F
		TR	0.83	17.8	B	TR	0.89	18.6	B
Allen Street	NB	T	0.57	31.9	C	T	0.76	37.6	D
		R	0.48	33.7	C	R	0.87	59.1	E
	SB	TR	0.45	30.2	C	TR	0.81	37.3	D
Overall Intersection		-	**0.75**	**25.8**	**C**	-	**0.89**	**30.1**	**C**
DELANCEY STREET AND ESSEX STREET									
Delancey Street	EB	TR	0.42	13.0	B	TR	0.77	18.4	B
	WB	TR	0.83	20.7	C	TR	1.04	41.4	D
Essex Street	NB	LTR	0.67	38.2	D	LTR	1.04	87.7	F
	SB	DefL	0.80	47.9	D	DefL	1.05	95.3	F
		TR	0.63	36.9	D	TR	0.86	54.6	D
Overall Intersection		-	**0.82**	**21.7**	**C**	-	**0.90**	**40.0**	**D**
DELANCEY STREET AND NORFOLK STREET									
Delancey Street	EB	T	0.50	11.2	B	T	0.82	16.4	B
	WB	TR	0.76	14.3	B	TR	1.05	46.2	D
Norfolk Street	NB	TR	0.78	41.1	D	TR	0.92	56.2	E
		R	0.77	40.5	D	R	0.91	55.3	E
Overall Intersection		-	**0.77**	**16.9**	**B**	-	**1.00**	**35.3**	**D**
DELANCEY STREET AND SUFFOLK STREET									
Delancey Street	EB	T	0.65	14.6	B	TR	0.92	20.6	C
	WB	T	0.77	15.8	B	TR	0.88	17.3	B
Delancey Street Service Road	EB	TR	0.16	10.0	B	TR	0.17	8.6	A
Suffolk Street	SB	R	0.09	21.2	C	R	0.07	22.9	C
Overall Intersection		-	**0.52**	**15.1**	**B**	-	**0.64**	**18.7**	**B**
DELANCEY STREET AND CLINTON STREET									
Delancey Street	EB	T	0.52	8.9	A	T	0.84	13.8	B
Williamsburg Bridge	WB	T	0.87	17.5	B	T	1.02	37.2	D
		R	0.88	39.2	D	R	1.02	67.6	E
Delancey Street Service Road	EB	TR	0.11	6.4	A	TR	0.14	6.5	A
	WB	TR	0.73	48.3	D	TR	0.57	49.7	D
Clinton Street	NB	R	0.14	27.6	C	R	0.10	27.0	C
Overall Intersection		-	**0.67**	**19.8**	**B**	-	**0.77**	**29.0**	**C**
BROOME STREET AND NORFOLK STREET									
Broome Street	EB	L	0.10	10.1	B	L	0.10	10.1	B
	WB	R	0.34	12.7	B	R	0.37	13.2	B
Norfolk Street	NB	T	0.63	26.9	C	T	0.81	32.5	C
Overall Intersection		-	**0.45**	**19.8**	**B**	-	**0.54**	**23.5**	**C**
GRAND STREET AND ALLEN STREET									
Grand Street	EB	LTR	0.78	32.2	C	LTR	1.05	63.2	E
	WB	LTR	0.64	35.9	D	LTR	0.98	71.9	E
Allen Street	NB	L	0.57	53.3	D	L	0.48	48.4	D
		TR	0.45	19.8	B	TR	0.53	21.3	C
	SB	L	0.71	56.9	E	L	1.05	101.2	F
		TR	0.47	20.0	B	TR	0.83	28.1	C
Overall Intersection		-	**0.61**	**28.2**	**C**	-	**0.87**	**45.0**	**D**
GRAND STREET AND ESSEX STREET									
Grand Street	EB	LTR	0.61	23.9	C	LTR	0.76	29.8	C
	WB	LTR	0.59	19.5	B	LTR	0.72	22.2	C
Essex Street	NB	LTR	0.31	16.9	B	LTR	0.34	17.4	B
	SB	DefL	0.31	19.0	B	LTR	0.37	18.2	B
		TR	0.24	16.7	B	-	-	-	-
Overall Intersection		-	**0.46**	**19.7**	**B**	-	**0.57**	**22.3**	**C**

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.

Table 19-7
2017 No Action Without Construction Traffic Levels of Service

INTERSECTION & APPROACH		Weekday AM (6:00 - 7:00 AM) Mvt.	V/C	Control Delay	LOS	Weekday PM (3:00 - 4:00 PM) Mvt.	V/C	Control Delay	LOS
EAST HOUSTON STREET AND ESSEX STREET / AVENUE A									
East Houston Street	EB	L	0.41	16.5	B	L	0.55	16.4	B
		TR	0.57	25.0	C	TR	0.93	32.9	C
	WB	L	0.48	17.3	B	L	0.98	69.7	E
		T	0.64	26.6	C	T	0.72	28.8	C
		R	0.09	19.6	B	R	0.12	20.0	C
Essex Street / Avenue A	NB	LTR	0.63	30.2	C	LTR	0.81	37.6	D
	SB	LTR	0.78	33.6	C	LTR	1.08	74.6	E
Overall Intersection		-	**0.69**	**26.5**	**C**	-	**1.00**	**39.5**	**D**
DELANCEY STREET AND ALLEN STREET									
Delancey Street	EB	TR	0.79	31.4	C	TR	0.99	42.7	D
	WB	L	0.74	42.0	D	L	0.84	47.0	D
		TR	0.86	18.9	B	TR	0.92	20.6	C
Allen Street	NB	T	0.59	32.3	C	T	0.79	39.0	D
		R	0.50	34.3	C	R	0.93	69.2	E
	SB	TR	0.46	30.4	C	TR	0.83	38.0	D
Overall Intersection		-	**0.78**	**26.6**	**C**	-	**0.93**	**34.2**	**C**
DELANCEY STREET AND ESSEX STREET									
Delancey Street	EB	TR	0.43	13.2	B	TR	0.80	19.1	B
	WB	TR	0.85	21.6	C	TR	1.07	55.7	E
Essex Street	NB	LTR	0.69	39.0	D	LTR	1.07	99.0	F
	SB	DefL	0.84	52.7	D	DefL	1.14	127.2	F
		TR	0.65	37.8	D	TR	0.89	58.2	E
Overall Intersection		-	**0.85**	**22.6**	**C**	-	**1.10**	**49.5**	**D**
DELANCEY STREET AND NORFOLK STREET									
Delancey Street	EB	T	0.52	11.4	B	T	0.84	17.2	B
	WB	TR	0.78	14.8	B	TR	1.15	89.3	F
Norfolk Street	NB	TR	0.80	42.3	D	TR	0.92	56.6	E
		R	0.78	41.6	D	R	0.94	61.3	E
Overall Intersection		-	**0.79**	**17.3**	**B**	-	**1.08**	**57.5**	**E**
DELANCEY STREET AND SUFFOLK STREET									
Delancey Street	EB	T	0.67	14.9	B	T	0.95	22.9	C
	WB	T	0.80	16.2	B	T	0.91	18.4	B
Delancey Street Service Road	EB	TR	0.16	10.0	B	TR	0.17	8.7	A
Suffolk Street	SB	R	0.10	21.3	C	R	0.07	23.0	C
Overall Intersection		-	**0.53**	**15.5**	**B**	-	**0.66**	**20.3**	**C**
DELANCEY STREET AND CLINTON STREET									
Delancey Street	EB	T	0.54	9.0	A	T	0.87	14.5	B
Williamsburg Bridge	WB	T	0.90	18.9	B	T	1.05	46.4	D
		R	0.90	42.1	D	R	1.05	73.7	E
Delancey Street Service Road	EB	TR	0.11	6.4	A	TR	0.14	6.5	A
	WB	TR	0.86	59.2	E	TR	0.78	68.9	E
Clinton Street	NB	R	0.15	27.6	C	R	0.10	27.0	C
Overall Intersection		-	**0.69**	**18.4**	**B**	-	**0.79**	**34.0**	**C**
BROOME STREET AND NORFOLK STREET									
Broome Street	EB	L	0.10	10.1	B	L	0.10	10.1	B
	WB	R	0.34	12.8	B	R	0.38	13.2	B
Norfolk Street	NB	T	0.65	27.2	C	T	0.83	33.3	C
Overall Intersection		-	**0.46**	**20.0**	**B**	-	**0.55**	**24.0**	**C**

Table 19-7 (cont'd)
2017 No Action Without Construction Traffic Levels of Service

INTERSECTION & APPROACH		Weekday AM (6:00 - 7:00 AM) Mvt.	V/C	Control Delay	LOS	Weekday PM (3:00 - 4:00 PM) Mvt.	V/C	Control Delay	LOS
GRAND STREET AND ALLEN STREET									
Grand Street	EB	LTR	0.85	34.8	C	LTR	1.17	110.3	F
	WB	LTR	0.66	36.5	D	LTR	1.01	79.8	E
Allen Street	NB	L	0.53	49.8	D	L	0.46	46.8	D
		TR	0.45	19.7	B	TR	0.53	21.2	C
	SB	L	0.72	57.9	E	L	1.06	104.5	F
		TR	0.49	20.3	C	TR	0.87	30.2	C
Overall Intersection		-	**0.63**	**28.6**	**C**	-	**0.92**	**53.7**	**D**
GRAND STREET AND ESSEX STREET									
Grand Street	EB	LTR	0.63	24.4	C	LTR	0.78	30.9	C
	WB	LTR	0.60	19.7	B	LTR	0.75	22.8	C
Essex Street	NB	LTR	0.32	17.1	B	LTR	0.36	17.6	B
	SB	DefL	0.33	19.5	B	LTR	0.40	18.7	B
		TR	0.25	16.8	B	-	-	-	-
Overall Intersection		-	**0.48**	**19.9**	**B**	-	**0.59**	**22.9**	**C**

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.

Significant impacts at these analyzed intersections could be mitigated using standard mitigation measures typically implemented by the NYCDOT. Significant impacts could be mitigated at most locations with signal timing modifications except for the intersections of Delancey Street with Essex Street and Norfolk Street. At these two locations, mitigation measures may include installing "No Standing 11 AM to 7 PM Monday to Friday" regulations along the north curb of the westbound approach for 100 feet—entailing a loss of approximately three parking spaces at each intersection—in order to "daylight" the approach to the intersections in addition to signal timing modifications. Detailed descriptions of the Construction traffic levels of service and all traffic mitigation measures are presented in **Tables 19-8 and 19-9**. It should be noted that as a result of roadway and signal timing modifications currently being developed by NYCDOT, mitigation measures presented in the FGEIS may be different than those identified in the DGEIS.

DELIVERIES

Construction trucks would be required to use NYCDOT-designated truck routes, including the Williamsburg Bridge, Delancey Street, Allen Street, and East Houston Street. Trucks would then use local streets to access the construction sites. Trucks would service the construction sites at its designated loading zones.

Table 19-8
2017 No Action Without Construction Vs. 2017 Construction Vs. 2017 Construction With Mitigation Weekday AM Peak Hour Traffic Levels of Service

INTERSECTION & APPROACH		2017 No Build				2017 Construction				2017 Construction with Mitigation				
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mitigation Measures
EAST HOUSTON STREET														
EAST HOUSTON STREET AND ESSEX STREET / AVENUE A														
East Houston Street	EB	L	0.41	16.5	B	L	0.41	16.6	B				-	
		TR	0.57	25.0	C	TR	0.59	25.4	C					
	WB	L	0.48	17.3	B	L	0.51	18.0	B					
		T	0.64	26.6	C	T	0.65	26.7	C					
		R	0.09	19.6	B	R	0.09	19.6	B					Mitigation not required.
Essex Street / Avenue A	NB	LTR	0.63	30.2	C	LTR	0.64	30.5	C					
	SB	LTR	0.78	33.6	C	LTR	0.80	34.4	C					
Overall Intersection			**0.69**	**26.5**	**C**	-	**0.70**	**26.8**	**C**					
DELANCEY STREET														
DELANCEY STREET AND ALLEN STREET														
Delancey Street	EB	TR	0.79	31.4	C	TR	0.80	31.6	C				-	
	WB	L	0.74	42.0	D	L	0.78	45.1	D					
		TR	0.86	18.9	B	TR	0.86	18.9	B					
Allen Street	NB	T	0.59	32.3	C	T	0.59	32.4	C					Mitigation not required.
		R	0.50	34.3	C	R	0.50	34.3	C					
	SB	TR	0.46	30.4	C	TR	0.47	30.6	C					
Overall Intersection			**0.78**	**26.6**	**C**	-	**0.78**	**26.9**	**C**					
DELANCEY STREET AND ESSEX STREET														
Delancey Street	EB	TR	0.43	13.2	B	TR	0.44	13.2	B				-	
	WB	TR	0.85	21.6	C	TR	0.86	22.1	C					
Essex Street	NB	LTR	0.69	39.0	D	LTR	0.71	39.7	D					
	SB	DefL	0.84	52.7	D	DefL	0.86	55.6	E					Mitigation not required.
		TR	0.65	37.8	D	TR	0.67	38.6	D					
Overall Intersection			**0.85**	**22.6**	**C**	-	**0.87**	**23.1**	**C**					
DELANCEY STREET AND NORFOLK STREET														
Delancey Street	EB	T	0.52	11.4	B	T	0.52	11.4	B				-	
	WB	TR	0.78	14.8	B	TR	0.79	15.0	B					
Norfolk Street	NB	TR	0.80	42.3	D	TR	0.81	43.2	D					Mitigation not required.
		R	0.78	41.6	D	R	0.82	44.9	D					
Overall Intersection			**0.79**	**17.3**	**B**	-	**0.80**	**17.8**	**B**					
DELANCEY STREET AND SUFFOLK STREET														
Delancey Street	EB	T	0.67	14.9	B	T	0.67	15.0	B				-	
	WB	T	0.80	16.2	B	T	0.81	16.4	B					
Delancey Street Service Road	EB	TR	0.16	10.0	B	TR	0.19	10.2	B					Mitigation not required.
Suffolk Street	SB	R	0.10	21.3	C	R	0.10	21.3	C					
Overall Intersection			**0.53**	**15.5**	**B**	-	**0.54**	**15.6**	**B**					
DELANCEY STREET AND CLINTON STREET														
Delancey Street	EB	T	0.54	9.0	A	T	0.54	9.1	A				-	
Williamsburg Bridge	WB	T	0.90	18.9	B	T	0.91	19.7	B					
		R	0.90	42.1	D	R	0.91	43.0	D					
Delancey Street Service Road	EB	TR	0.11	6.4	A	TR	0.12	6.4	A					Mitigation not required.
	WB	TR	0.86	59.2	E	TR	0.86	59.2	E					
Clinton Street	NB	R	0.15	27.6	C	R	0.15	27.6	C					
Overall Intersection			**0.69**	**18.4**	**B**	**-**	**0.70**	**18.9**	**B**					
BROOME STREET														
BROOME STREET AND NORFOLK STREET														
Broome Street	EB	L	0.10	10.1	B	L	0.10	10.1	B				-	
	WB	R	0.34	12.8	B	R	0.35	12.9	B					Mitigation not required.
Norfolk Street	NB	T	0.65	27.2	C	T	0.67	27.7	C					
Overall Intersection			**0.46**	**20.0**	**B**	-	**0.47**	**20.3**	**C**					
GRAND STREET														
GRAND STREET AND ALLEN STREET														
Grand Street	EB	LTR	0.85	34.8	C	LTR	0.90	37.9	D	LTR	0.90	37.9	D	Modify signal timing: Shift 1s from the NB/SB phase to the SB-lead phase [SB-lead phase green time shifts from 10 s to 11 s; NB/SB green time shifts from 23 s to 22 s; signal timing during all other phases remain the same].
	WB	LTR	0.66	36.5	D	LTR	0.69	38.4	D	LTR	0.69	38.4	D	
Allen Street	NB	L	0.53	49.8	D	L	0.53	49.8	D	L	0.53	49.8	D	
		TR	0.45	19.7	B	TR	0.45	19.7	B	TR	0.46	20.5	C	
	SB	L	0.72	57.9	E	L	0.78	63.8	E	L	0.71	55.4	E	
		TR	0.49	20.3	C	TR	0.50	20.5	C	TR	0.50	20.5	C	
Overall Intersection			**0.63**	**28.6**	**C**	-	**0.66**	**30.1**	**C**	-	**0.66**	**29.7**	**C**	

Table 19-8 (cont'd)
2017 No Action Without Construction Vs. 2017 Construction Vs. 2017 Construction With Mitigation Weekday AM Peak Hour Traffic Levels of Service

INTERSECTION & APPROACH		2017 No Build				2017 Construction				2017 Construction with Mitigation				
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mitigation Measures
GRAND STREET AND ESSEX STREET														
Grand Street	EB	LTR	0.63	24.4	C	LTR	0.67	25.9	C				-	Mitigation not required.
	WB	LTR	0.60	19.7	B	LTR	0.62	20.0	B					
Essex Street	NB	LTR	0.32	17.1	B	LTR	0.32	17.1	B					
	SB	DefL	0.33	19.5	B	DefL	0.33	19.6	B					
		TR	0.25	16.8	B	TR	0.25	16.8	B					
Overall Intersection			**0.48**	**19.9**	**B**	-	**0.50**	**20.5**	**C**					

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.

Table 19-9
2017 No Action Without Construction Vs. 2017 Construction Vs. 2017 Construction With Mitigation Weekday PM Peak Hour Traffic Levels of Service

INTERSECTION & APPROACH		2017 No Build				2017 Construction				2017 Construction with Mitigation				
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mitigation Measures
EAST HOUSTON STREET														
EAST HOUSTON STREET AND ESSEX STREET / AVENUE A														
East Houston Street	EB	L	0.55	16.4	B	L	0.56	16.5	B	L	0.56	17.2	B	Modify signal timing: Shift 1 s of green time from the EB/WB phase to the EBL/WBL lead phase and 1 s of green time from the EB/WB phase to the NB/SB phase [EBL/WBL lead phase green time shifts from 9 s to 10 s; EB/WB green time shifts from 32 s to 30 s; NB/SB green time shifts from 27 s to 28 s; the LPI phase remains the same].
		TR	0.93	32.9	C	TR	0.93	32.9	C	TR	0.99	43.0	D	
	WB	L	0.98	69.7	E	L	0.98	69.7	E	L	0.95	64.8	E	
		T	0.72	28.8	C	T	0.73	29.0	C	T	0.78	32.1	C	
		R	0.12	20.0	C	R	0.12	20.0	C	R	0.13	21.5	C	
Essex Street / Avenue A	NB	LTR	0.81	37.6	D	LTR	0.86	41.3	D	LTR	0.82	37.3	D	
	SB	LTR	1.08	74.6	E	LTR	1.10	82.8	F	LTR	1.03	56.5	E	
DELANCEY STREET														
DELANCEY STREET AND ALLEN STREET														
Delancey Street	EB	TR	0.99	42.7	D	TR	0.99	43.0	D				-	Mitigation not required.
	WB	L	0.84	47.0	D	L	0.84	47.5	D					
		TR	0.92	20.6	C	TR	0.92	20.7	C					
Allen Street	NB	T	0.79	39.0	D	T	0.79	39.0	D					
		R	0.93	69.2	E	R	0.93	69.2	E					
	SB	TR	0.83	38.0	D	TR	0.83	38.0	D					
Overall Intersection			**0.93**	**34.2**	**C**	-	**0.93**	**34.4**	**C**					
DELANCEY STREET AND ESSEX STREET														
Delancey Street	EB	TR	0.80	19.1	B	TR	0.80	19.2	B	TR	0.82	20.3	C	Installing "No Standing 11 AM - 7 PM Mon - Fri" regulation along the north curb of the WB approach for 100-feet from the intersection to provide daylighting.
	WB	TR	1.07	55.7	E	TR	1.07	56.0	E	TR	1.02	36.4	D	
Essex Street	NB	LTR	1.07	99.0	F	LTR	1.08	102.6	F	LTR	1.03	85.2	F	
	SB	DefL	1.14	127.2	F	DefL	1.16	134.2	F	DefL	1.13	121.2	F	Modify signal timing: Shift 1 s of green time from the EB/WB phase to the NB phase [EB/WB green time shifts from 48 s to 47 s; NB green time shifts from 25 s to 26 s; the LPI phase remains the same].
		TR	0.89	58.2	E	TR	0.94	67.1	E	TR	0.90	59.0	E	
Overall Intersection			**1.10**	**49.5**	**D**	-	**1.11**	**50.8**	**D**	-	**1.17**	**39.5**	**D**	
DELANCEY STREET AND NORFOLK STREET														
Delancey Street	EB	T	0.84	17.2	B	T	0.84	17.2	B	T	0.86	18.4	B	Installing "No Standing 11 AM - 7 PM Mon - Fri" regulation along the north curb of the WB approach for 100-feet from the intersection to provide daylighting.
	WB	TR	1.15	89.3	F	TR	1.15	90.1	F	TR	1.10	66.4	E	
Norfolk Street	NB	TR	0.92	56.6	E	TR	0.97	67.4	E	TR	0.94	58.8	E	
		R	0.94	61.3	E	R	0.95	63.3	E	R	0.92	55.8	E	Modify signal timing: Shift 1 s of green time from the EB/WB phase to the NB phase [EB/WB green time shifts from 53 s to 52 s; NB green time shifts from 27 s to 28 s].
Overall Intersection			**1.08**	**57.5**	**E**	-	**1.09**	**58.6**	**E**	-	**1.04**	**46.5**	**D**	

Table 19-9 (cont'd)
2017 No Action Without Construction Vs. 2017 Construction Vs. 2017 Construction With Mitigation Weekday PM Peak Hour Traffic Levels of Service

INTERSECTION & APPROACH		2017 No Build				2017 Construction				2017 Construction with Mitigation				Mitigation Measures
		Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	Mvt.	V/C	Control Delay	LOS	
DELANCEY STREET AND SUFFOLK STREET														
Delancey Street	EB	T	0.95	22.9	C	T	0.96	23.7	C				-	Mitigation not required.
	WB	T	0.91	18.4	B	T	0.91	18.4	B					
Delancey Street Service Road	EB	TR	0.17	8.7	A	TR	0.18	8.8	A					
Suffolk Street	SB	R	0.07	23.0	C	R	0.08	23.0	C					
Overall Intersection			**0.66**	**20.3**	**C**	-	**0.66**	**20.7**	**C**					
DELANCEY STREET AND CLINTON STREET														
Delancey Street	EB	T	0.87	14.5	B	T	0.87	14.8	B				-	Mitigation not required.
Williamsburg Bridge	WB	T	1.05	46.4	D	T	1.05	46.7	D					
		R	1.05	73.7	E	R	1.05	73.7	E					
Delancey Street Service Road	EB	TR	0.14	6.5	A	TR	0.14	6.6	A					
	WB	TR	0.78	68.9	E	TR	0.78	68.9	E					
Clinton Street	NB	R	0.10	27.0	C	R	0.10	27.0	C					
Overall Intersection			**0.79**	**34.0**	**C**	-	**0.79**	**34.2**	**C**					
BROOME STREET														
BROOME STREET AND NORFOLK STREET														
Broome Street	EB	L	0.10	10.1	B	L	0.12	10.3	B				-	Mitigation not required.
	WB	R	0.38	13.2	B	R	0.38	13.3	B					
Norfolk Street	NB	T	0.83	33.3	C	T	0.84	33.9	C					
Overall Intersection			**0.55**	**24.0**	**C**	-	**0.56**	**24.2**	**C**					
GRAND STREET														
GRAND STREET AND ALLEN STREET														
Grand Street	EB	LTR	1.17	110.3	F	LTR	1.17	110.3	F	LTR	1.10	83.1	F	Modify signal timing: Shift 1 s from the NB/SB phase to the SB-lead phase and 1 s from the NB/SB phase to the EB/WB phase [SB-lead phase green time shifts from 10 s to 11 s; NB/SB green time shifts from 23 s to 22 s; EB/WB green time shifts from 27 s to 28 s; NB-lag phase green time remains the same].
	WB	LTR	1.01	79.8	E	LTR	1.03	86.2	F	LTR	0.99	74.1	E	
Allen Street	NB	L	0.46	46.8	D	L	0.46	46.8	D	L	0.46	46.8	D	
		TR	0.53	21.2	C	TR	0.53	21.2	C	TR	0.56	23.1	C	
	SB	L	1.06	104.5	F	L	1.07	107.8	F	L	0.98	79.6	E	
		TR	0.87	30.2	C	TR	0.88	30.6	C	TR	0.90	33.3	C	
Overall Intersection			**0.92**	**53.7**	**D**	-	**0.92**	**55.2**	**E**	-	**0.92**	**48.5**	**D**	
GRAND STREET AND ESSEX STREET														
Grand Street	EB	LTR	0.78	30.9	C	LTR	0.82	34.3	C				-	Mitigation not required.
	WB	LTR	0.75	22.8	C	LTR	0.76	22.9	C					
Essex Street	NB	LTR	0.36	17.6	B	LTR	0.36	17.6	B					
	SB	LTR	0.40	18.7	B	LTR	0.40	18.8	B					
Overall Intersection			**0.59**	**22.9**	**C**	-	**0.61**	**23.8**	**C**					

Notes:
(1) Control delay is measured in seconds per vehicle.
(2) Overall intersection V/C ratio is the critical lane groups' V/C ratio.

CURB LANE CLOSURES AND STAGING

During construction, long-term parking lane closures may be required. In the case where a travel lane closure is necessary, the closure would not be in effect for the entire block length. Lane closures would be delineated such that there would be enough space for a travel lane at the intersection approach to maintain the roadway capacity. It is anticipated that sidewalk closures may be required to the extent practicable. Short-term roadway closures and temporary sidewalk narrowings could occur along the sides at development sites during the construction period. Sidewalk and lane closures will be finalized as the maintenance and protection of traffic (MPT) plans are developed and reviewed with NYCDOT.

All lane and sidewalk closures during construction would be coordinated with NYCDOT's Office of Construction Mitigation and Coordination (OCMC). Traffic control agents may need to be deployed at times to facilitate traffic flow near the project site.

PARKING

Construction workers would generate an estimated maximum daily parking demand for up to 80 spaces during the peak construction phase. This parking demand could be accommodated by the off-street spaces available within a quarter-mile radius. A small portion of worker auto trips (18 percent) would find parking within one to two blocks from the construction sites—in the municipal garage located on Essex Street north of Delancey Street, and in the municipal lot south of Delancey between Essex Street and Ludlow Street. The remaining 82 percent would be expected to park within a quarter-mile radius in the parking lot along Essex Street between East Houston Street and Stanton Street (28 percent), the parking garage along Allen Street south of Grand Street (27 percent), and the parking garage at the intersection of the Delancey Street service road and Columbia Street (27 percent).

TRANSIT

The study area is well served by public transit, including the F, J, M, and Z subway lines at the Essex Street-Delancey Street station. There are also several local bus routes, including the M9, M14A, M15, M21, and M22.

With nearly 30 percent of the construction workers projected to travel via auto, the bulk of the remaining 70 percent would travel to and from the project area via transit. During peak construction (maximum of 566 average daily construction workers, as shown in **Table 19-3**), this distribution would represent approximately 400 daily workers traveling by transit. With 80 percent of these workers arriving or departing during the construction peak hours, the total estimated number of peak hour transit trips would be approximately 320. Since these incremental construction transit trips would be distributed among the various available subway and bus services, no single transit element is expected to experience an increase of more than 200 peak hour transit riders, the recommended CEQR threshold for a detailed quantified analysis. Hence, there would not be a potential for significant adverse transit impacts attributable to the projected construction worker transit trips. Any temporary relocation of bus stops along bus routes that operate adjacent to the project area would be coordinated with and approved by NYCDOT and NYCT to ensure proper access is maintained.

PEDESTRIANS

For the same reasons provided on transit operations, a detailed pedestrian analysis would also not be warranted to address the projected demand from the travel of construction workers to and from the project area. With a maximum of 566 average daily construction workers, as shown in **Table 19-3**, there would be up to approximately 450 workers arriving or departing during the construction peak hours via various modes of transportation. Considering that these pedestrian trips would primarily occur outside of the typical commuter peak hours (8 to 9 AM and 5 to 6 PM), spread over four development sites, several nearby transit services, and a number of area parking facilities, and therefore be distributed among numerous sidewalks and crosswalks in the area, there would not be a potential for significant adverse pedestrian impacts attributable to the projected construction worker pedestrian trips. In addition, sidewalk protection or temporary sidewalks would be provided in accordance with NYCDOT requirements to maintain pedestrian access if needed.

AIR QUALITY

INTRODUCTION

Emissions from on-site construction equipment and on-road construction-related vehicles, and the effect of construction vehicles on background traffic congestion, have the potential to affect air quality. The analysis of potential impacts of the construction under the proposed actions 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), particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO. Since ultra-low-sulfur diesel (ULSD) would be used for all diesel engines used in the construction of the proposed buildings, sulfur oxides (SO_x) emitted from those construction activities would be negligible. For more details on air pollutants, see Chapter 14, "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 under the proposed actions results in the lowest practicable diesel particulate matter (DPM) emissions, the following emissions reduction measures would be implemented to the extent feasible and practicable:

1. *Diesel Equipment Reduction.* Construction of the proposed buildings would minimize the use of diesel engines and use electric engines, to the extent feasible and practicable. Equipment that would use electric power instead of diesel engines could include, but would not be limited to, small compressors, and material/personnel hoists.
2. *Clean Fuel.* ULSD would be used exclusively for all diesel engines throughout the construction sites. 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) including but not limited to concrete mixing and pumping trucks, would utilize the best available tailpipe (BAT) technology for reducing DPM emissions, to the extent feasible and practicable. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Diesel nonroad engines rated at 50 hp or greater would utilize DPFs, to the extent feasible and practicable, either installed on the engine by the original equipment manufacturer (OEM) or a retrofit DPF verified by EPA or the California Air Resources Board, and may

include active DPFs,[1] if necessary; or other technology proven to reduce DPM by at least 90 percent. This measure is expected to reduce site-wide tailpipe PM emissions by at least 90 percent.

4. *Utilization of Newer Equipment.* In addition to the tailpipe controls commitments, construction equipment rated Tier 2[2] or higher for all nonroad diesel engines with a power output of 50 hp or greater would be used to the extent feasible and practicable. The use of newer engine models with lower PM emissions is expected to reduce the likelihood of DPF plugging due to soot loading (i.e., clogging of DPF filters by accumulating particulate matter). In addition, while all engines undergo some deterioration over time, newer and better maintained engines will emit less PM than their older Tier or unregulated counterparts. Therefore, use of construction equipment rated Tier 2 or higher with lower tailpipe emission values would enhance this emissions reduction program and implementation of DPF systems as well as reduce maintenance frequency due to soot loading (i.e., less downtime for construction equipment to replace clogged DPF filters).

In addition, in order to reduce the resulting concentration increments at sensitive receptor locations (i.e., residences, parks), fugitive dust control plans will be implemented. For example, truck routes within the sites would be either watered as needed or, in cases where such routes may remain in the same place for an extended duration; the routes could be stabilized, covered with gravel, or temporarily paved to avoid the re-suspension of dust. Stabilized truck exit areas could be established for washing off the wheels of all trucks that exit the construction sites. In addition to regular cleaning by the City, streets adjacent to the sites could be cleaned frequently. All trucks hauling loose material would have their loads securely covered prior to leaving the sites. An on-site vehicular speed limit of 5 mph could be imposed. Water sprays would be used for all excavation, demolition, and transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. The fugitive dust emissions reduction program described above would provide at least a 50 percent reduction in particulate emissions from fugitive dust.

Additional measures would be taken to reduce pollutant emissions during construction of the proposed buildings in accordance with all applicable laws, regulations, and building codes. These include the restriction of on-site vehicle idle time to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.

---

[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 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).

[2] The first federal regulations for new nonroad diesel engines were adopted in 1994, and signed by EPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3 standards for equipment manufactured in 2000 through 2008. In 2004, the EPA introduced Tier 4 emissions standards with a phased-in period of 2008 to 2015. The Tier 1 through 4 standards regulate the EPA criteria pollutants, including particulate matter (PM), hydrocarbons (HC), oxides of nitrogen (NO_x) and carbon monoxide (CO). Prior to 1998, emissions from nonroad diesel engines were unregulated. These engines are typically referred to as Tier 0.

As discussed in Chapter 14, "Air Quality," EPA recently established a 1-hour average standard for NO_2. Great uncertainty exists as to 1-hour NO_2 background concentrations at ground level, especially near roadways, since these concentrations have not been measured. In addition, there are no clear methods to predict the rate of transformation of NO to NO_2 at ground-level given the level of existing data and models. Therefore, the significance of predicted construction impacts cannot be determined based on comparison with the new 1-hour NO_2 NAAQS since total 98th percentile values, including local area roadway contributions, cannot be estimated. In addition, methods for accurately predicting 1-hour NO_2 concentrations from construction activities have not been developed. However, exceedances of the 1-hour NO_2 standard resulting from construction activities cannot be ruled out and therefore, newer construction equipment would be used, where feasible and practicable, to reduce NO_x emissions. The electrification and idling restrictions mentioned above would also reduce NO_X emissions and NO_2 concentration levels.

METHODOLOGY

Chapter 14, "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.

The *CEQR Technical Manual* states 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.

On-Site Construction Activity Assessment

To determine which construction periods constitute the worst-case periods for the pollutants of concern (PM, CO, NO_2), construction-related emissions were calculated 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 as analyzed, 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 $PM_{2.5}$, and the proximity of the construction activities to residences, academic buildings, and publicly accessible open spaces, a worst-case year and 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 14, "Air Quality," was followed for modeling 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 NONROAD2008 Emission Model (NONROAD). Since emission factors for concrete pumps are not available from either the EPA MOBILE6.2 emission model (MOBILE6) or NONROAD, emission factors specifically developed for this type of application were used.[1] With respect to trucks, emission rates for NO_X, CO, PM_{10}, and $PM_{2.5}$ for truck engines were developed using MOBILE6.

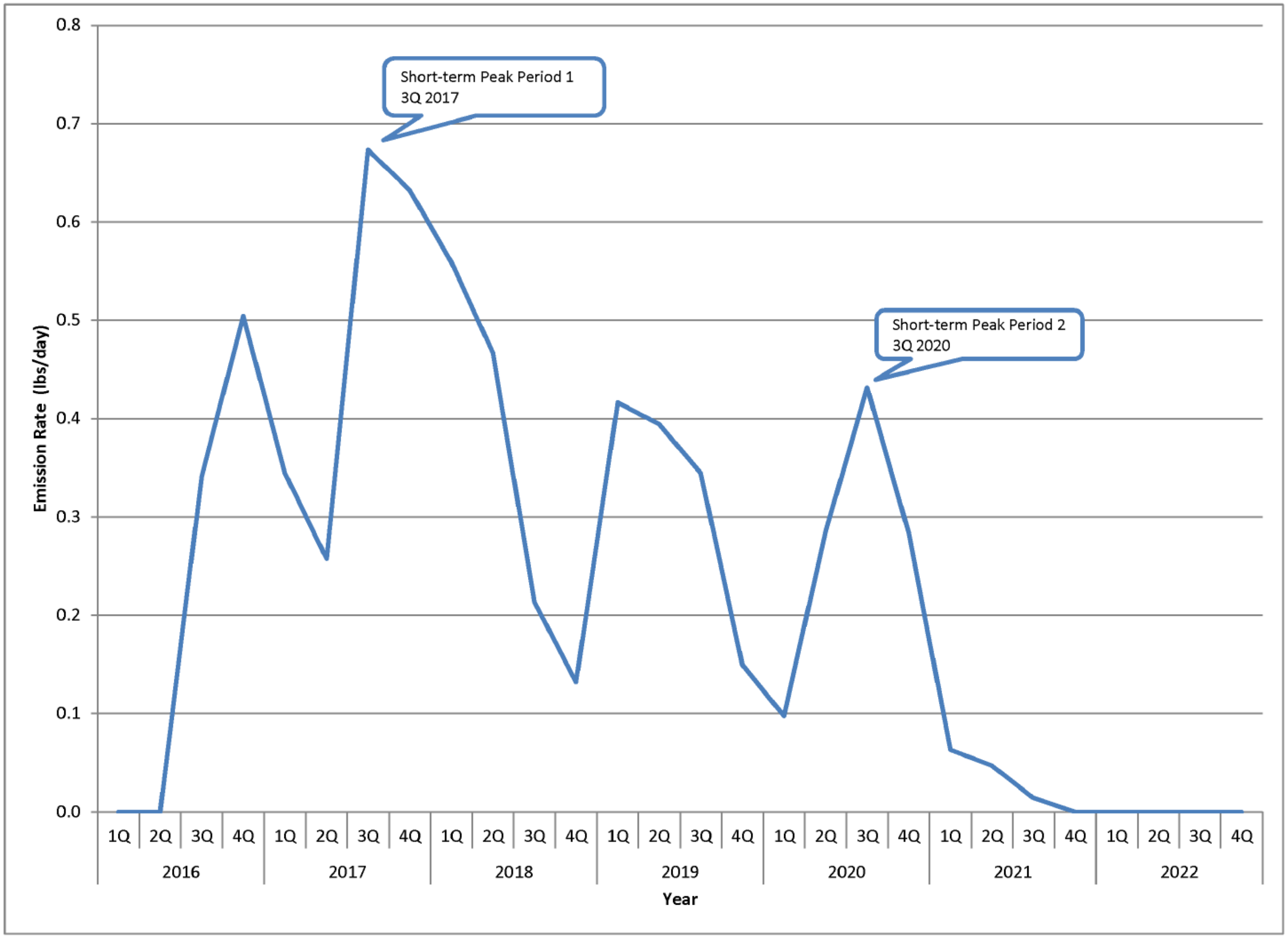
As described in the introduction above, an emissions reduction program would be implemented to reduce air pollutant emissions during construction of the proposed buildings where feasible and practicable. Based on the project's commitments, emission factors for construction under the proposed actions were calculated assuming the exclusive use of ULSD, diesel engines of Tier 2 certification, and the application of DPFs on all nonroad diesel engines 50 hp or greater and on concrete delivery and pumping 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). $PM_{2.5}$ 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 10 percent of the NONROAD Tier 2 emission factors. The emission factors specifically developed for concrete pump trucks were also reduced by 90 percent to account for the DPFs. All personnel/material hoists and small hand tools would be electric and powered by either diesel generators or connected to grid power when it becomes available. Therefore, these engines would have no associated emissions.

In addition to engine emissions, fugitive dust emissions from operations (e.g., excavation and loading excavated materials into dump trucks) were calculated based on EPA procedures delineated in AP-42 Table 13.2.3-1. It was estimated that the planned control of fugitive emissions would reduce PM emissions from such processes by 50 percent. To avoid the re-suspension of dust, a watering program would be implemented for all demolition, excavation, and transfer of loose materials to and from trucks.

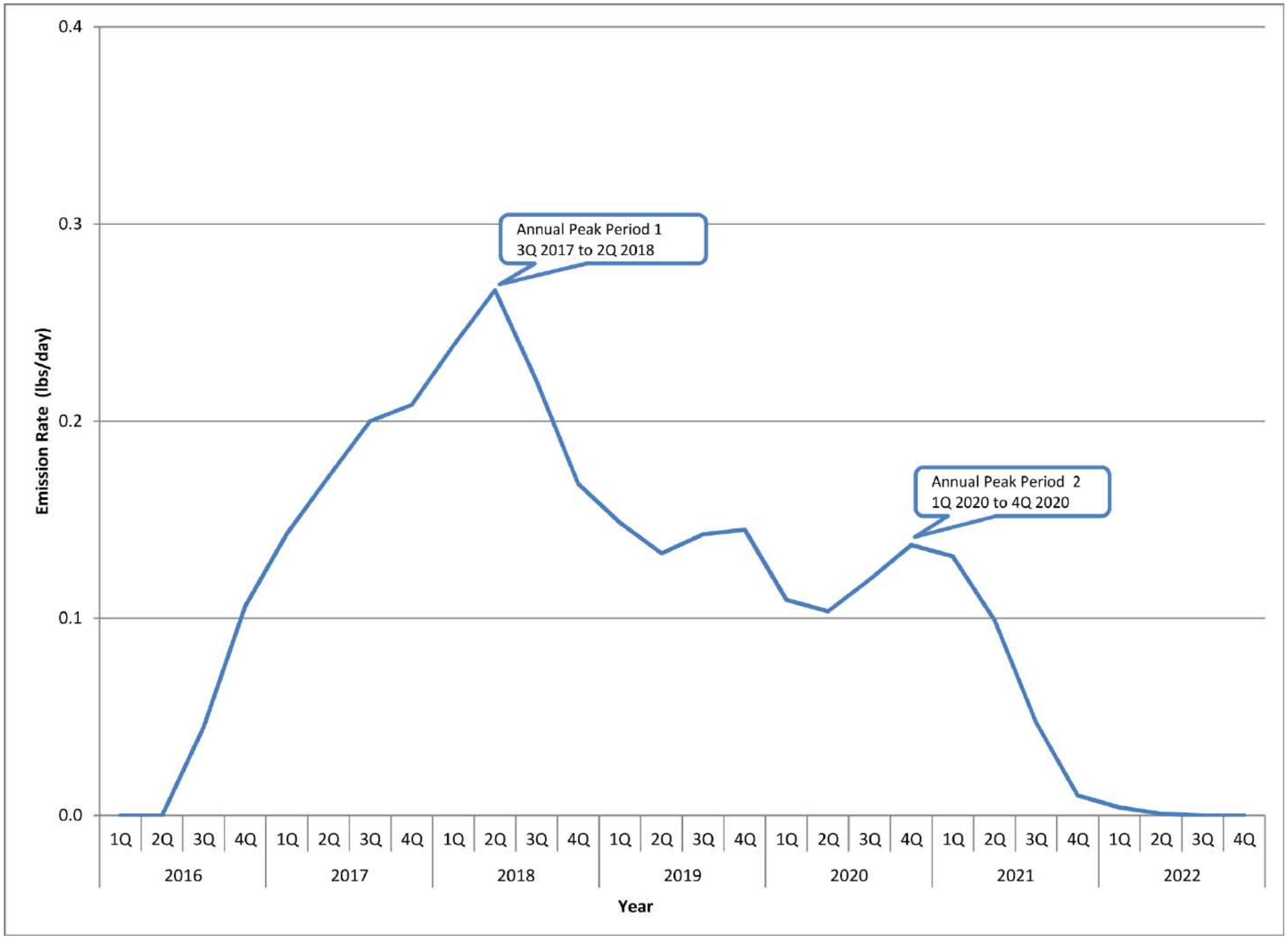
The resulting emission factors were used for the emissions and dispersion analyses. Average annual (running 12-month averages) and peak-day $PM_{2.5}$ engine emissions profiles for the entire duration of the construction were prepared by multiplying the above emission rates by the number of engines, the work hours per day, and fraction of the day each engine would be expected to work during each month. The resulting overall peak day and annual average emission profiles are presented in **Figures 19-2 and 19-3**.

Based on the $PM_{2.5}$ construction emissions profiles, two peak short-term and annual periods were selected for modeling, representing the RWCDS. The third quarter of 2017 and the year from the third quarter of 2017 to the second quarter of 2018, where construction would occur simultaneously

[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.



Short Term (24-Hour Average)
$PM_{2.5}$ Construction Emissions Profile
Figure 19-2



Annual (Moving 12-Month Average)
$PM_{2.5}$ Construction Emissions Profile
Figure 19-3

at Sites 2, 3, 4, and 5, were identified as the worst-case short-term and annual periods, respectively, since the highest project-wide emissions were predicted in these periods. In addition, one short-term period (the third quarter of 2020) and one annual period (the year 2020) were also analyzed. Although overall construction emissions during this secondary period would be lower, this period would include simultaneous construction activities at Sites 8, 9, and 10, and will take place in close proximity to existing residential buildings. The selected analysis periods are indicated in **Figures 19-2 and 19-3**. The dispersion of pollutants during the worst-case short-term and annual periods was then modeled in detail to predict resulting maximum concentration increments from construction activity and total concentrations (including background concentrations) in the surrounding area.

Although the modeled results are based on construction scenarios for specific sample periods, conclusions regarding other periods, such as the construction at Sites 1 and 6, 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 19-2 and 19-3**, emissions during other periods would be lower than the peak emissions. However, since the worst-case short-term results may often be indicative of 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 construction. 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, generators, 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 tower cranes, all sources would move around the site throughout the year and were therefore simulated as area sources in the annual analyses.

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 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 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 construction sites. For the modeling of the secondary period, receptors were also placed on completed project elements at Sites 2, 3, 4, and 5.

Background Concentrations

Where needed to determine potential air quality impacts from the construction of the project, background ambient air quality data for criteria pollutants were added to the predicted off-site concentrations. The background data were obtained from nearby NYSDEC monitoring stations that best represented the area surrounding the site. Those monitoring years were 2006 through 2010. These background concentrations are provided below in **Table 19-10**. Short-term concentrations (i.e., 24- and 8-hour averages) represent the second highest concentration of the five year data set, with the exception of PM_{10}, which is based on three years of data, consistent with current NYCDEP guidance (2008-2010). The annual concentration represents the maximum value of the five year data set. For $PM_{2.5}$, background concentrations are not considered, since impacts are determined on an incremental basis only.

Table 19-10
Background Pollutant Concentrations

Pollutant	Monitoring Station	Averaging Period	Background Concentration ($\mu g/m^3$)	Ambient Standard ($\mu g/m^3$)
NO_2	Queens College 2	Annual	68	100
CO	Queens College 2	1-hr	3,894	40,000
		8-hr	2,290	10,000
PM_{10}	Division Street	24-hr	52	150
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2006–2010.				

Mobile Source Assessment

The general methodology for mobile source modeling presented in Chapter 14, “Air Quality,” was followed for intersection modeling during the construction period. The CAL3QHC model was used to perform mobile source CO computations, while CAL3QHCR, a refined version of the CAL3QHC model, was used to determine motor vehicle generated PM concentrations.

Based on the predicted traffic conditions, the traffic scenario for the third quarter of 2017 was determined to demonstrate the highest overall volumes of construction-related vehicles and traffic disruptions, such as street or lane closures; this period would generally represent the highest potentials for air quality impacts. The worst-case period was also used to demonstrate the highest predicted mobile source CO and PM increments for all other construction periods when added to the concurrent on-site emissions from construction equipment and activity; this is a conservative assumption, since concentration increments from mobile sources during periods with lower vehicle increments would be lower.

Location for mobile source analysis was selected based on the construction model scenarios and truck trip assignments analyzed for the assessment of traffic impacts during construction. The site was chosen with the objective of capturing the highest construction-related concentration increment, the highest expected increments at locations where background concentrations were predicted to be high in the No Action condition, and the mobile source increments in areas near the project site at intersections where relatively high increments are predicted from on-site construction activity. Based on those criteria, the intersection of Delancey Street and Norfolk Street was selected for CO and PM modeling, as presented in **Table 19-11**.

Table 19-11
Mobile Source Analysis Sites

Analysis Site	Intersection
1	Delancey Street and Norfolk Street

Cumulative Assessment

Since emissions from on-site construction equipment and on-road construction-related vehicles may contribute to concentration increments concurrently, a cumulative assessment was undertaken to determine the potential maximum effect of these sources combined. Total cumulative concentrations were estimated by combining the highest results from the on-site construction analysis with the construction related-mobile source concentrations at the nearest location. The mobile source and stationary source analyses are performed separately with different dispersion models, as appropriate for the different types of analyses. The combination of the highest results is therefore a conservatively high estimate of potential impacts, since it is likely that the highest results from different sources would occur under different meteorological conditions (e.g., different wind direction and speed), would not actually occur simultaneously, and would not necessarily occur when the highest background concentrations are present.

THE FUTURE WITHOUT THE PROPOSED ACTIONS

Background Air Quality

In the future without the proposed actions, air quality is anticipated to be similar to that described for existing conditions. Land uses are expected to remain generally the same in this neighborhood in Manhattan. Since air quality regulations mandated by the Clean Air Act are anticipated to maintain or improve air quality in the region, it can be expected that air quality conditions in the future without the proposed actions would be similar to those that presently exist.

Mobile Source Assessment

CO

CO concentrations without the proposed actions were determined using the methodology previously described. **Table 19-12** shows future maximum predicted 8-hour average CO concentrations at the analysis intersection without the proposed actions. The value shown is the highest predicted concentration for the receptor locations for any of the time periods analyzed. As indicated in **Table 19-12**, the predicted 8-hour concentration of CO, including background, is below the corresponding ambient air quality standard.

Table 19-12
Maximum Predicted Future No Action
8-Hour Average Carbon Monoxide Concentrations

Analysis Site	Location	8-Hour Concentration (ppm)	NAAQS (ppm)
1	Delancey Street and Norfolk Street	4.2	9
Note: An adjusted ambient background concentration of 2.0 ppm is included in the No Action values presented above.			

PM

Concentrations of PM_{10} and $PM_{2.5}$ from mobile sources without the proposed actions were also determined at the intersection of Delancey Street and Norfolk Street. Concentration of PM_{10} included a 24-hour averaging period and $PM_{2.5}$ included the 24-hour and annual averaging periods. As shown in **Table 19-13**, including a background concentration of 52 $\mu g/m^3$, the maximum PM_{10} 24-hour No Action concentration is predicted to be approximately 88 $\mu g/m^3$ and is below the applicable NAAQS of 150 $\mu g/m^3$. Note that $PM_{2.5}$ concentrations for the No Action condition are not presented, since impacts are assessed on an incremental basis.

Table 19-13
Maximum Predicted Future No Action
24-Hour Average PM_{10} Concentrations

Analysis Site	Location	24-Hour Concentration ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
1	Delancey Street and Norfolk Street	88	150
Note: An adjusted ambient background concentration of 52 $\mu g/m^3$ is included in the No Action values presented above.			

THE FUTURE WITH THE PROPOSED ACTIONS

On-Site Construction Activity Assessment – Sites 2, 3, 4, and 5

Maximum predicted concentration increments from simultaneous construction activities at Sites 2, 3, 4, and 5, and overall concentrations including background concentrations, are presented in **Table 19-14**. For $PM_{2.5}$, monitored concentrations are not added to modeled concentrations from sources, since impacts are determined by comparing the predicted increment from the proposed actions as compared to the No Action condition with the interim guidance criteria. The total maximum combined concentrations, including mobile sources and construction, are presented in the "Cumulative Assessment" section, below.

Table 19-14
Maximum Predicted Pollutant Concentrations from Construction Site Sources—Sites 2, 3, 4, and 5 (μg/m³)

Pollutant	Averaging Period	No Action	Proposed Actions	Increment	Interim Guidance Threshold	NAAQS
Residence, Academic Buildings or Open Space						
$PM_{2.5}$	24-hour[2]	—	—	1.3	2 [3]	35 [1]
	Annual Local[2]	—	—	0.09	0.3	15
PM_{10}	24-hour	52	56	4	—	150
NO_2	Annual	68	75	7	—	100
CO	1-hour	3.4 ppm	10.4 ppm	7.0 ppm	—	35 ppm
	8-hour	2.0 ppm	3.2 ppm	1.2 ppm	—	9 ppm
Sidewalks and Covered Walkways Adjacent to Construction						
$PM_{2.5}$	24-hour[2]	—	—	3.1 [4]	2 [3]	35 [1]
	Annual Local[2]	—	—	0.25	0.3	15
PM_{10}	24-hour	52	58	6	—	150
NO_2	Annual	68	89	21	—	100
CO	1-hour	3.4 ppm	23.1 ppm	19.7 ppm	—	35 ppm
	8-hour	2.0 ppm	7.2 ppm	5.2 ppm	—	9 ppm

Notes:

$PM_{2.5}$ concentration increments should be compared with threshold values. Total concentrations should be compared with the NAAQS.

1 EPA has 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. A full discussion of the NAAQS can be found in Chapter 14, "Air Quality."

2 Monitored concentrations are not added to modeled $PM_{2.5}$ values.

3 NYCDEP is currently applying threshold criteria for assessing the significance of 24-hour average $PM_{2.5}$ impacts. The significance of temporary concentration increments 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.

4 This value exceeds the interim guidance threshold level. See text for further discussion.

The maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are not expected to exceed the NAAQS.

From the on-site sources related to the construction, the maximum predicted 24-hour average $PM_{2.5}$ incremental concentration occurred at a near-side sidewalk receptor location immediately adjacent to the construction, as shown in **Appendix E-3**. The maximum frequency of predicted concentrations above 2.0 μg/m³ at any near-side sidewalk locations would be nine occurrences in a single year (using five years of meteorological data). 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 solid fence and sidewalk protection on mixing. The location of the maximum 24-hour average increments would vary based on the location of the sources, which would move throughout the site over time. Therefore, continuous daily exposures would not be likely to occur at any one location. Based on the limited duration and extent of these predicted exceedances, the low frequency of occurrence, and the limited potential for exposure, this would not result in significant adverse impacts. The maximum predicted 24-hour average $PM_{2.5}$ concentration increments at sensitive receptor locations (e.g., residential buildings or open space locations) would not exceeded 2 µg/m^3.

The maximum predicted neighborhood-scale annual average $PM_{2.5}$ concentration would be 0.01 µg/m^3—lower than the interim guidance threshold level of 0.1 µg/m^3, and the maximum predicted local annual average $PM_{2.5}$ concentration would be less than the applicable interim guidance threshold.

On-Site Construction Activity Assessment – Sites 8, 9, and 10

Maximum predicted concentration increments from simultaneous construction activities at Sites 8, 9, and 10, and overall concentrations including background concentrations, are presented in **Table 19-15**. For $PM_{2.5}$, monitored concentrations are not added to modeled concentrations from sources, since impacts are determined by comparing the predicted increment from the proposed actions as compared to the No Action condition with the interim guidance criteria. The total maximum combined concentrations, including mobile sources and construction, are presented in the "Cumulative Assessment" section, below.

Table 19-15
Maximum Predicted Pollutant Concentrations from Construction Site Sources— Sites 8, 9, and 10 (µg/m^3)

Pollutant	Averaging Period	No Action	Proposed Actions	Increment	Interim Guidance Threshold	NAAQS
Residence, Academic Buildings or Open Space						
$PM_{2.5}$	24-hour[2]	—	—	3.2 [4]	2 [3]	35 [1]
	Annual Local[2]	—	—	0.16	0.3	15
PM_{10}	24-hour	52	62	10	—	150
NO_2	Annual	68	75	7	—	100
CO	1-hour	3.4 ppm	28.1 ppm	24.7 ppm	—	35 ppm
	8-hour	2.0 ppm	6.0 ppm	4.0 ppm	—	9 ppm
Sidewalks and Covered Walkways Adjacent to Construction						
$PM_{2.5}$	24-hour[2]	—	—	3.1 [4]	2 [3]	35 [1]
	Annual Local[2]	—	—	0.18	0.3	15
PM_{10}	24-hour	52	63	11	—	150
NO_2	Annual	68	81	13	—	100
CO	1-hour	3.4 ppm	22.7 ppm	19.3 ppm	—	35 ppm
	8-hour	2.0 ppm	6.0 ppm	4.0 ppm	—	9 ppm

Notes:
$PM_{2.5}$ concentration increments should be compared with threshold values. Total concentrations should be compared with the NAAQS.

[1] EPA has reduced the 24-hour $PM_{2.5}$ standard from 65 µg/m^3 to 35 µg/m^3 and revoked the annual PM_{10} standard, effective December 18, 2006. A full discussion of the NAAQS can be found in Chapter 14, "Air Quality."

[2] Monitored concentrations are not added to modeled $PM_{2.5}$ values.

[3] NYCDEP is currently applying threshold criteria for assessing the significance of 24-hour average $PM_{2.5}$ impacts. The significance of temporary concentration increments greater than 2 µg/m^3 is assessed in the context of the magnitude, frequency, duration, location and size of area affected by the concentration increment.

[4] This value exceeds the interim guidance threshold level. See text for further discussion.

The maximum predicted total concentrations of PM_{10}, CO, and annual-average NO_2 are not expected to exceed the NAAQS.

From the on-site sources related to the construction, the maximum predicted 24-hour average $PM_{2.5}$ incremental concentration occurred at a residential location (127 Stanton Street) immediately adjacent to the construction activities at Site 10, as shown in **Appendix E-3**. The maximum frequency of predicted concentrations above 2.0 $\mu g/m^3$ at this location would only be five occurrences in a single year (using five years of meteorological data). The predicted 24-hour average $PM_{2.5}$ concentration increments would also exceed 2.0 $\mu g/m^3$ at five other residential locations: 125 Stanton Street, 135 Norfolk Street, 137 Norfolk Street, 151 Norfolk Street, and 153 Norfolk Street. These residential locations are either immediately adjacent to the construction activities at Site 8 or Site 10. The maximum frequency of predicted concentrations above 2.0 $\mu g/m^3$ at these locations would be nine occurrences in a single year (using five years of meteorological data) and an average of five occurrences in five years, at 151 Norfolk Street located directly east of Site 10. It should be noted that the maximum increments, predicted at locations adjacent to construction, are overstated, since they do not include the effect of the solid fence on mixing. The location of the maximum 24-hour average increments would vary based on the location of the sources, which would move throughout the site over time. Therefore, continuous daily exposures would not be likely to occur at any one location. Based on the limited duration and extent of these predicted exceedances, the low frequency of occurrence, and the limited potential for exposure, this would not result in significant adverse impacts.

As shown in **Appendix E-3**, the maximum predicted 24-hour average $PM_{2.5}$ concentration increments would also exceeded 2 $\mu g/m^3$ at near-side sidewalk locations. The maximum frequency of predicted concentrations above 2.0 $\mu g/m^3$ at any near-side sidewalk locations would be ten occurrences in a single year (using five years of meteorological data). 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 solid fence and sidewalk protection on mixing. The location of the maximum 24-hour average increments would vary based on the location of the sources, which would move throughout the site over time. Therefore, continuous daily exposures would not be likely to occur at any one location. Based on the limited duration and extent of these predicted exceedances, the low frequency of occurrence, and the limited potential for exposure, this would not result in significant adverse impacts.

The maximum predicted neighborhood-scale annual average $PM_{2.5}$ concentration would be 0.01 $\mu g/m^3$—lower than the interim guidance threshold level of 0.1 $\mu g/m^3$, and the maximum predicted local annual average $PM_{2.5}$ concentration would be less than the applicable interim guidance threshold.

Mobile Source Assessment

A mobile source air quality analysis was conducted for the project during construction activities at the site for the peak construction traffic year of 2017. Localized pollutant impacts from the vehicles queuing at the selected intersection were analyzed for CO for the 8-hour averaging period. PM_{10} was analyzed for the 24-hour averaging period and $PM_{2.5}$ was analyzed for the 24-hour and annual averaging periods.

CO

CO concentrations with the proposed actions were determined using the methodology previously described. **Table 19-16** shows the future maximum predicted 8-hour average CO concentration with the proposed actions at the analysis intersection studied. (No 1-hour values are shown, since no exceedances of the NAAQS would occur and the *de minimis* criteria are only applicable to 8-hour

Table 19-16
Maximum Predicted Future No Action and With Action 8-Hour Average Carbon Monoxide Concentrations

Analysis Site	Location	No Action 8-Hour Concentration (ppm)	With Action 8-Hour Concentration (ppm)	NAAQS (ppm)
1	Delancey Street and Norfolk Street	4.2	4.2	9
Note:	An adjusted ambient background concentration of 2.0 ppm is included in the No Action values presented above.			

concentrations; therefore, the 8-hour values are the most critical for impact assessment.) The values shown are the highest predicted concentrations for the time periods analyzed. In addition, the incremental increase in 8-hour average CO concentration is small, and consequently would not result in a violation of the CEQR *de minimis* CO criteria. Therefore, the proposed actions would not result in any significant CO air quality impacts in the With Action condition.

PM

Concentrations of PM_{10} and $PM_{2.5}$ from mobile sources with the proposed actions were also determined at the intersection of Delancey Street and Norfolk Street. **Table 19-17** shows the future maximum predicted 24-hour average PM_{10} concentration with the proposed actions. The value shown is the highest predicted concentration for all locations analyzed and includes the ambient background concentrations. The result indicates that the proposed actions would not result in any violations of the PM_{10} standard or any significant adverse impacts on air quality.

Table 19-17
Maximum Predicted Future No Action and With Action 24-Hour Average PM_{10} Concentrations

Analysis Site	Location	No Action 24-Hour Concentration (µg/m^3)	With Action 24-Hour Concentration (µg/m^3)	NAAQS (µg/m^3)
1	Delancey Street and Norfolk Street	88.0	88.1	150
Note:	An adjusted ambient background concentration of 52 µg/m^3 is included in the No Action values presented above.			

Future maximum predicted 24-hour and annual average $PM_{2.5}$ concentration increments were calculated so that they could be compared to the interim guidance criteria that would determine the potential significance of any impacts from the proposed actions. Based on this analysis, the maximum predicted localized 24-hour average and neighborhood-scale annual average incremental $PM_{2.5}$ concentrations are presented in **Tables 19-18** and **19-19**, respectively. The results show that the annual and daily (24-hour) $PM_{2.5}$ increments are predicted to be well below the interim guidance criteria and, therefore, the proposed actions would not result in significant $PM_{2.5}$ impacts at the analyzed receptor locations.

Table 19-18
Maximum Predicted Future 24-Hour Average $PM_{2.5}$ Concentrations

Analysis Site	Location	Increment (µg/m^3)	Interim Guidance Threshold (µg/m^3)
1	Delancey Street and Norfolk Street	0.03	5/2
Note:	$PM_{2.5}$ interim guidance criteria—24-hour average, 2 µg/m^3 (5 µg/m^3 not-to-exceed value).		

Table 19-19
Maximum Predicted Future
Annual Average $PM_{2.5}$ Concentrations

Analysis Site	Location	Increment (µg/m^3)	Interim Guidance Threshold (µg/m^3)
1	Delancey Street and Norfolk Street	0.001	0.1
Note: $PM_{2.5}$ interim guidance criteria—annual (neighborhood scale) 0.1 µg/m^3.			

Cumulative Assessment

A mobile source analysis of CO impacts for the intersection of Delancey Street and Norfolk Street indicated that a maximum predicted concentration would occur at receptors placed along the sidewalks adjacent to this intersection. The maximum predicted concentration of CO from stationary sources is 7.2 ppm, including background. Total cumulative concentration of CO for both mobile and stationary is estimated to be 8.6 ppm, which is less than the applicable air quality standard of 9 ppm. Therefore, no significant adverse air quality impacts for CO are expected to occur due to the combined impacts of mobile and construction sources.

The maximum predicted concentration of PM_{10} from stationary sources is 63 µg/m^3, including background. Cumulative concentrations from mobile and stationary sources (conservatively combining two different peak analysis periods) is estimated to be 96 µg/m^3, and would not exceed the applicable air quality standard of 150 µg/m^3.

For $PM_{2.5}$, the mobile source concentrations was an order of magnitude or more lower than the stationary source concentrations, and would therefore have no significant affect when combined with the stationary source concentration contribution. Therefore, no significant adverse air quality impacts for either PM_{10} or $PM_{2.5}$ would occur due to the combined impacts of mobile and stationary sources.

CONCLUSIONS

A detailed analysis of the effects of on-site and on-road emissions determined that annual-average NO_2, CO, and PM_{10} concentrations would be below their corresponding NAAQS. Therefore, the proposed actions would not cause or contribute to any significant adverse air quality impacts with respect to these standards.

Dispersion modeling determined that the maximum predicted incremental concentrations of $PM_{2.5}$ (using a worst-case emissions scenario) would exceed the City's applicable 24-hour interim guidance criterion of 2 µg/m^3 at near-side sidewalk receptor locations and four residential locations, where the likelihood of prolonged exposure is low. The occurrences of elevated 24-hour average concentrations for $PM_{2.5}$ would be limited in duration, frequency, and magnitude. Therefore, after taking into account the limited duration and extent of these predicted exceedances, and the limited area-wide extent of the 24-hour impacts, it is concluded that no significant adverse air quality impacts for $PM_{2.5}$ are expected from the on-site construction sources.

Because background concentrations are not known and the analysis methodology for mobile and stationary sources has not been developed for the new 1-hour NO_2 NAAQS, exceedances of the 1-hour NO_2 standard resulting from construction activities cannot be ruled out. Therefore, measures including diesel equipment reduction, utilization of newer equipment, and source location and idling restriction, would be implemented to the extent feasible and practicable to minimize NO_x emissions from construction activities under the proposed actions.

NOISE AND VIBRATION

INTRODUCTION

Potential impacts on community noise levels during construction of a proposed project can 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. The most significant construction noise sources are expected to be impact equipment such as jackhammers, excavators with ram hoes, drill rigs, rock drills, impact wrenches, tower cranes, and paving breakers, as well as the movements of trucks.

Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and by the U.S. Environmental Protection Agency (EPA). The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, requires the adoption and implementation of a noise mitigation plan for each construction site, 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 6:00 PM and 7:00 AM, and on weekends) may be authorized in the following circumstances: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. EPA requirements mandate that certain classifications of construction equipment meet specified noise emissions standards.

Given the scope and duration of construction activities for the RWCDS, a quantified construction noise analysis was performed. The purpose of this analysis was to determine if 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 the activity with the potential to create high noise levels would occur continuously for approximately two years or longer. In addition, the *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No Action noise level as the baseline, should be used for assessing construction impacts. As recommended in the *CEQR Technical Manual*, this study uses the criteria to define a significant adverse noise impact as follows:

- If the No Action noise level is less than 60 dB(A) $L_{eq(1)}$, a 5 dB(A) $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is 61 dB(A) $L_{eq(1)}$, a 4 dB(A) $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is equal to or greater than 62 dB(A) $L_{eq(1)}$, 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 dB(A) $L_{eq(1)}$.

NOISE ANALYSIS METHODOLOGY

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

Geographic input data used with the CadnaA model included CAD drawings that 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 operating at full power) for each piece of construction equipment operating at the project site, as well as noise control measures—were input to the model. In addition, reflections and shielding by barriers erected on the construction site, and shielding from both adjacent buildings and project buildings as they are constructed, were accounted for in the model. In addition, construction-related vehicles were assigned to the adjacent roadways. The model produced A-weighted $L_{eq(1)}$ noise levels at each receptor location for each analysis period, as well as the contribution from each noise source.

DETERMINATION OF NO ACTION AND NON-CONSTRUCTION NOISE LEVELS

Noise generated by construction activities is added to noise generated by non-construction traffic on adjacent roadways in order to determine the total noise levels at each receptor location. No Action levels would be expected to be similar to existing noise levels in the study area, because no substantial increases in traffic are predicted to occur in the No Action condition. Consequently, existing noise levels were conservatively used as the baseline noise levels for determining construction-generated noise level increases. Existing noise levels at the analysis receptors were determined by:

- Performing noise measurements at various at-grade locations;
- Calculating noise levels at the receptor sites and measurement locations using the CadnaA model with existing site geometry and existing traffic on adjacent roadways as inputs;
- Determining adjustment factors based on the difference between the measured and calculated existing noise levels at the measurement locations; and
- Applying the adjustment factors to the calculated existing noise levels at the construction noise receptors.

ANALYSIS PERIODS

As described above, construction activities are expected to take place over a period of about six years (i.e., from about 2016 through 2021). Except for unusual circumstances construction activities would occur on weekdays only. Therefore, construction noise analyses were performed only for the weekday periods.

As described above, the anticipated construction schedule and durations have been developed with an experienced New York City construction manager to serve as the basis of the analyses and are representative of the reasonable worst-case for potential impacts. The schedule also allowed for reasonable projections to be developed regarding the number of workers, types and number of pieces of equipment, and number of construction vehicles anticipated to be operating during each month of the construction period. An analysis was performed based on this construction schedule to determine the quarter during each year of the construction period (i.e., 2016-2021) when the maximum potential for significant noise impacts would occur. This analysis conservatively assumed that the worst-case quarter of each year would represent the entire year, and the year was modeled according to its peak quarter. To be conservative, the noise analysis assumed that both peak on-site construction activities and peak construction-related traffic conditions occurred simultaneously.

NOISE REDUCTION MEASURES

Any developer(s) constructing buildings on the projected development sites would be required to follow the requirements of the New York City Noise Control Code (NYC Noise Code) for construction noise control measures. Specific noise control measures will be described in a noise mitigation plan required under the NYC Noise Code. These measures could include a variety of source and path controls.

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

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code would be utilized from the start of construction. **Table 19-20** shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the RWCDS.
- As early in the construction period as logistics will allow, diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welders, water pumps, bench saws, and table saws (i.e., early electrification) to the extent feasible and practical.
- Where feasible and practical, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

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

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations. Once building foundations are completed, delivery trucks would operate behind construction fence, where possible;
- Noise barriers constructed from plywood or other materials would be utilized to provide shielding (e.g., the construction sites would have a minimum 12-foot barrier and, where logistics allow, truck deliveries would take place behind these barriers once building foundations are completed); and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be used for certain dominant noise equipment to the extent feasible and practical, i.e., asphalt pavers, drill rigs, excavators with ram hoe, hoists, impact wrenches, jackhammers, power trowels, powder actuated devices, rivet busters, rock drills, concrete saws, and sledge hammers. These barriers were conservatively assumed to offer only a 10 dBA reduction in noise levels for each piece of equipment to which they are

applied, as shown in **Table 19-20**. The details to construct portable noise barriers, enclosures, tents, etc. are based upon the instructions of NYCDEP Citywide Construction Noise Mitigation.

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

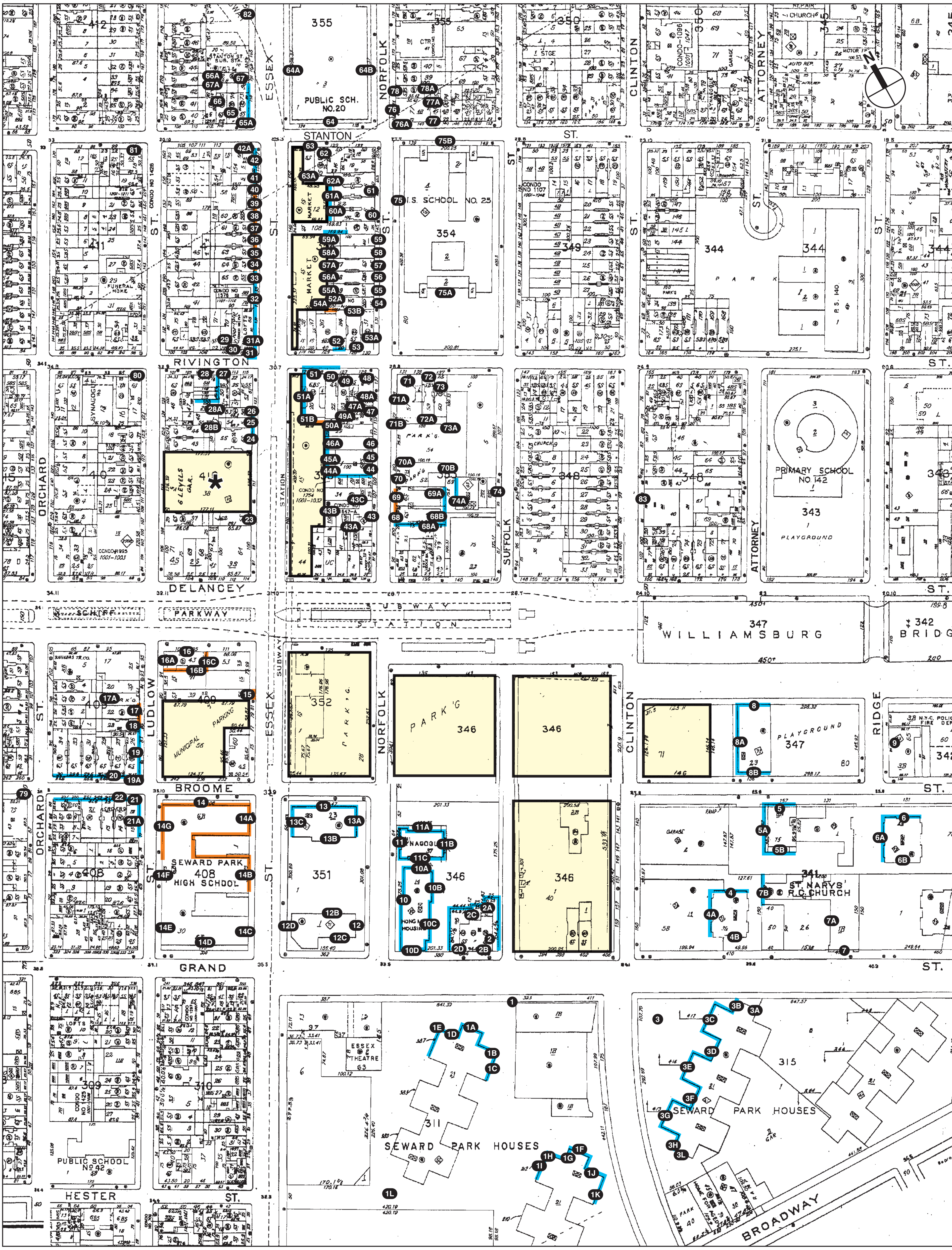
Equipment List	NYCDEP & FTA Typical Noise Level at 50 feet[1]	Noise Level with Path Controls at 50 feet[2]
Backhoe/Loader	80	
Compressors	58	
Concrete Pump	82	
Concrete Trowel	85	75
Cranes	85	75
Concrete Trucks	85	
Cranes (Tower Cranes)	85	75
Delivery Trucks	84	
Drill Rigs	84	74
Dump Trucks	84	
Excavator	85	
Generators	82	72
Hand Tool	59	
Hoist	72[3]	62
Impact Wrenches	85	75
Pile Driving Rig (Impact)	85	
Rebar Bender	80	
Welding Machines	73	

Notes:
1 Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006.
2 Path controls include portable noise barriers, enclosures, acoustical panels, and curtains, whichever feasible and practical.
3 Source: Kessler, Frederick M., “Noise Control for Construction Equipment and Construction Sites,” report for Hydro Quebec,

RECEPTOR SITES

Eight (8) noise measurement locations (i.e., sites M1 to M8) were selected to determine the baseline existing noise levels, and eighty-three (83) receptor locations (i.e., sites 1 to 83) close to the project area were selected as discrete noise receptor sites for the construction noise analysis. These receptors were either located directly adjacent to the project site or streets where construction trucks would pass. Each receptor site was the location of a residence or other noise-sensitive use. At some buildings, multiple building façades were analyzed. At high-rise buildings, noise receptors were selected at multiple elevations. At open space locations, receptors were selected at street level. **Figure 19-4** shows the locations of the 83 noise receptor sites, and **Table 19-21** lists the noise receptor sites and the associated land use at each site. The 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.

3.22.12



0 200 500 FEET
SCALE

Proposed Development Sites

* Site 7 Would Not Be Redeveloped Under the Proposed Actions

Measured Noise Receptor

Construction Noise Receptor

Significant Increase in Noise Level for 2+ Years

Temporary Significant Impact

Noise Receptor Location
Figure 19-4

Table 19-21
Noise Receptor Locations

Receptor	Location	Associated Land Use
M1	Grand Street between Suffolk and Clinton Streets	Future Residential
M2	Suffolk Street between Grand and Broome Streets	Future Residential
M3	Broome Street between Suffolk and Clinton Streets	Future Residential
M4	Delancey Street between Clinton and Ridge Streets	Future Residential
M5	Suffolk Street between Broome and Delancey Streets	Future Residential
M6	Delancey Street between Essex and Norfolk Streets	Future Commercial
M7	Essex Street between Rivington and Delancey Streets	Future Residential
M8	Delancey Street between Norfolk and Suffolk Streets	Future Residential
1-1L	South of Grand Street between Essex and Clinton Streets	Residential/Open Space
2-2D	Suffolk Street between Grand and Broome Streets	Residential
3-3I	South of Grand Street East of Clinton Street	Residential
4-7C	East of Clinton Street between Broome and Grand Streets	Residential/Church
8-8B	East of Clinton Street between Delancey and Broome Streets	Residential
9	Pitt Street between Delancey and Broome Streets	Residential
10-11C	Norfolk Street between Broome and Grand Streets	Residential/Church
12-12D	Grand Street between Essex and Norfolk Streets	Residential
13-13C	Broome Street between Essex and Norfolk Streets	Residential
14-14G	Block bounded by Ludlow, Broome, Essex, and Grand Streets	School
15	Essex Street between Delancey and Broome Streets	Residential
16-16C	Southwest corner of Delancey and Ludlow Streets	Residential/Commercial
17-17A	Ludlow Street between Delancey and Broome Streets	Residential/Commercial
20	North of Broome Street between Ludlow and Orchard Streets	Residential/Commercial
21-21A	Ludlow Street between Broome and Grand Streets	Residential/Commercial
22	South of Broome Street between Ludlow and Orchard Streets	Residential/Commercial
23-26	Ludlow Street between Rivington and Delancey Streets	Residential/Commercial
27-28B	South of Rivington Street between Ludlow and Essex Streets	Residential/Commercial/Hotel
29-31A	North of Rivington Street between Ludlow and Essex Streets	Residential/Commercial
32-42A	Essex Street between Stanton and Rivington Streets	Residential/Commercial
43-47A	West of Norfolk Street between Rivington and Delancey Streets	Residential/Commercial
48-51B	South of Rivington Street between Essex and Norfolk Streets	Residential/Commercial
52-53B	North of Rivington Street between Essex and Norfolk Streets	Residential/Commercial
54-61A	Norfolk Street between Stanton and Rivington Streets	Residential/Commercial
62-63A	Stanton Street between Essex and Norfolk Streets	Residential/Commercial
64-64B	Block bounded by Houston, Norfolk, Stanton, and Essex Streets	School/Open Space
65-66A	Stanton Street between Ludlow and Essex Streets	Residential/Commercial
67-67A	Essex Street between Houston and Stanton Streets	Residential
68-70B	East of Norfolk Street between Rivington and Delancey Streets	Residential/Commercial
71-73A	Rivington Street between Norfolk and Suffolk Streets	Residential/Commercial
74-74A	Suffolk Street between Rivington and Delancey Streets	Residential/Commercial
75-75B	Block bounded by Stanton, Suffolk, Rivington, and Norfolk Streets	School
76-76A	Northeast corner of Stanton and Norfolk Streets	Residential/Commercial
77-77A	Stanton Street between Norfolk and Suffolk Streets	Residential/Commercial
78-78A	Norfolk Street between Houston and Stanton Streets	Residential/Commercial
79	Broome Street between Allen and Orchard Streets	Residential/Commercial
80	Rivington Street between Orchard and Ludlow Streets	Residential/Commercial
81	Stanton Street between Orchard and Ludlow Streets	Residential/Commercial
82	Essex Street between Houston and Stanton Streets	Residential/Commercial
83	Clinton Street between Rivington and Delancey Streets	Residential/Commercial

CONSTRUCTION NOISE ANALYSIS RESULTS

Cumulative Analysis

Using the methodology described above, and considering the noise abatement measures for source and path controls specified above, cumulative 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.

The noise analysis results in **Appendix E-4** show that predicted noise levels due to construction-related activities would result in increases in noise levels that would exceed the CEQR impact criteria during one or more years at seventy-one (71) of the eighty-three (83) receptor sites (i.e., 1-1J, 2-2D, 3A-3I, 4-4B, 5-5B, 6-6B, 7B, 8-8B, 10-10C, 11-11C, 13-13A, 13C, 14-14B, 14G, 15, 16A-16C, 17-17A, 18, 19-19A, 20, 21-21A, 22, 23, 25, 26, 27, 28-28B, 29, 30, 31-31A, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42-42A, 43-43C, 44-44A, 45-45A, 46-46A, 47A, 48, 49-49A, 50-50A, 51-51B, 52-52A, 53, 54-54A, 55-55A, 56-56A, 57-57A, 58-58A, 60A, 61A, 62-62A, 63-63A, 65-65A, 66-66A, 68-68B, 69-69A, 70, 70B, 71-71A, 72, 73-73A, 74-74A, 75A, and 80).

For impact determination purposes, the significance of adverse noise impacts is determined based on whether 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.

The noise analysis results show that predicted noise levels would exceed the CEQR impact criteria during two or more consecutive years on one or more floors at forty-five (45) of the eighty-three (83) receptor sites (i.e., 1-1J, 2-2D, 3B-3I, 4-4A, 5-5B, 6-6A, 7B, 8-8B, 10-10C, 11-11C, 13-13A, 13C, 14-14B, 14G, 15, 16B-16C, 17, 18, 19-19A, 20, 21-21A, 22, , 28-28B, 31-31A, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43-43C, 45A, 46A, 50-50A, 51-51B, 54A, 59A, 65, 66, 68-68B, 69-69A, 70, and 74A). **Figure 19-4** shows the locations and **Table 19-22** summarizes analysis results where predicted noise level increases exceed the CEQR impact criteria for two or more consecutive years (additional details of the construction analysis are presented in **Appendix E-4**).

Construction of each proposed development site would be performed as is typical at construction sites in the vicinity of the proposed development. The conceptual schedule on which the noise analysis was based represented a compressed and conservative potential timeline for construction that tended to show the most construction activity and most construction equipment operating simultaneously, which conditions would result in the largest increase in noise levels at the nearby receptors.

As outlined above in the "Analysis Periods" section, the construction noise analysis was performed using the quarter of each year that is anticipated to result in the maximum construction noise levels. The analysis conservatively assumed that this worst-case quarter would represent construction noise levels throughout the entire year. During times of less intense construction activity, construction noise levels are anticipated to be less. For instance, pile driving at any particular development site would be expected to last only six to twelve months depending on the building, and even shorter durations for each pile location within the development site. Consequently, an individual receptor location would experience pile driving noise for only a limited period of time out of the construction period. Similarly, excavators, impact wrenches, and other noise-intensive equipment would also not operate throughout the construction period, but would function in individual locations only for limited periods of time. Since these predicted construction noise level increases are not anticipated to occur at each receptor location for the entire duration from 2016 to 2021, a timeline discussion of the proposed construction activity and associated noise effects is provided below.

2016 to 2018

Construction activity anticipated to occur between 2016 and 2018 includes Site 2 demolitions/foundations, shell and core, exteriors and interiors, Site 3 demolitions/foundations, Site 4 demolitions/foundations and Site 5 demolitions/foundations, shell and core, exteriors and

Table 19-22
Locations Where Noise Increases Exceed CEQR Criteria for Two or More Consecutive Years

Building/Location	Associated Land Use	Total Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increase(s) in dBA*	Impact Duration (year)	Associated Development Site(s)
Open Space on Grand Street at Suffolk Street	Open Space	n/a	n/a	1	n/a	3.1-3.8	2016-2018	5
Residential Building south of Grand Street between Essex and Clinton Streets	Residential	18	North	1A, 1B, 1E	2nd to top	5.0-8.8	2016-2018	5
			East (northernmost section)	1C	7th to top	5.7-10.1	2016-2018	5
			West (northernmost section)	1D	7th to top	5.4-7.3	2016-2018	5
Residential Building at the northwest corner of Clinton Street and East Broadway	Residential	18	North	1F, 1H	7th to top	5.1-8.5	2016-2018	5
			West (northernmost section)	1G	7th to top	5.6-9.8	2016-2018	5
384 Grand Street	Residential	6	East	2	all	3.0-12.2	2016-2019	2, 3, 4, 5
			North	2A, 2C	all	4.5-14.0	2016-2019	2, 3, 4, 5
			West	2D	top	3.2-3.7	2016-2018	2, 3, 4, 5
Residential Building at the southeast corner of Clinton and Grand Streets	Residential	19	North	3B	7th to top	4.7-8.4	2016-2017	5
			West (northernmost section)	3C, 3D	5th to top	3.3-8.5	2016-2018	5
			West (middle section)	3E, 3F	7th to top	5.3-9.5	2016-2018	5
			West (southernmost section)	3G, 3H	11th to top	5.2-9.3	2016-2018	5, 6
			South	3I	top	5.6-6.9	2016-2018	5
410 Grand Street	Residential	24	North	4	3rd to top	5.1-12.3	2016-2020	4, 5, 6
			West	4A	all	5.0-11.2	2016-2019	4, 5, 6
157 Broome Street	Residential	7	North	5	all	5.3-14.7	2016-2019	4, 5, 6
			West	5A	2nd to top	6.1-13.5	2016-2019	4, 5, 6
			South	5B	6th to top	5.1-8.9	2016-2019	4, 5, 6
131 Broome Street	Residential	24	North	6	7th to top	5.3-8.1	2016-2019	4, 5, 6
			West	6A	6th to top	5.1-11.7	2016-2019	4, 5, 6
440 Grand Street	Institutional	5	West	7B	3rd to top	5.7-7.5	2017-2018	4, 5, 6

Table 19-22 (cont'd)
Locations Where Noise Increases Exceed CEQR Criteria for Two or More Consecutive Years

Building/Location	Associated Land Use	Total Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increase(s) in dBA*	Impact Duration (year)	Associated Development Site(s)
150 Broome Street	Residential	23	North	8	2nd to top	3.0-5.9	2017-2019	4, 5, 6
			West	8A	2nd to top	3.4-10.2	2017-2019	4, 5, 6
			South	8B	3rd to top	5.0-11.2	2016-2019	4, 5, 6
50 Norfolk Street	Residential	13	West	10	7th to top	3.0-3.7	2017-2018	2, 3, 4, 5
			North	10A	3rd to top	4.0-10.6	2016-2019	2, 3, 4, 5
			East (northernmost section)	10B	all	4.5-9.6	2016-2019	2, 3, 4, 5
			East (southernmost section)	10C	2nd to top	3.0-7.3	2016-2019	2, 3, 4, 5
60 Norfolk Street	Institutional	7	West	11	3rd to top	3.1-6.9	2016-2018	2, 3, 4, 5
			North	11A	all	3.1-11.6	2016-2019	2, 3, 4, 5
			East	11B	all	4.8-11.4	2016-2019	2, 3, 4, 5
			South	11C	5th to top	5.0-7.2	2016-2017	2, 3, 4, 5
65 Norfolk Street	Residential	20	North	13	all	3.1-10.4	2016-2019	1, 2, 3, 4, 5
			East	13A	2nd to top	4.1-9.5	2016-2019	1, 2, 3, 4, 5
			West	13C	3rd to top	3.1-7.1	2016-2019	1, 2, 3, 4, 5
350 Grand Street	Institutional (Seward Park High School/Urban Assembly Academy of Government and Law)	10	North	14	all	5.5-17.5	2016-2019	1, 2, 3
			East (northernmost section)	14A	5th to top	3.3-6.9	2016-2018	2, 3
			East (middle section)	14B	9th to top	3.0-3.7	2016-2017	2, 3
			West (northernmost section)	14G	4th to top	4.1-11.1	2019-2020	1
83 Essex Street	Residential/ Commercial	4	East	15	2nd to top	3.1-7.5	2016-2017	2
101 Delancey Street	Residential/ Commercial	6	South	16B	all	5.1-10.0	2016-2017	2
			East	16C	top	3.2-4.2	2016-2017	2
89 Ludlow Street	Future Residential/ Commercial	n/a	East	17	3rd to top	3.4-10.6	2019-2020	1
87 Ludlow Street	Residential/ Commercial	6	East	17	3rd to top	3.4-10.6	2019-2020	1
85 Ludlow Street	Residential/ Commercial	6	East	18	2nd to top	4.1-13.1	2019-2020	1
246 Broome Street	Residential/ Commercial	7	South	19	all	5.2-14.0	2019-2020	1

Table 19-22 (cont'd) Locations Where Noise Increases Exceed CEQR Criteria for Two or More Consecutive Years

Building/Location	Associated Land Use	Total Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increase(s) in dBA*	Impact Duration (year)	Associated Development Site(s)
			East	19A	5th to top	5.6-10.4	2019-2020	1
248 Broome Street	Residential/ Commercial	7	South	20	top	5.3-7.9	2019-2020	1, 9
243 Broome Street	Residential/ Commercial		North	21	3rd to top	5.4-14.8	2019-2020	1
			East	21A	4th to top	5.1-12.3	2019-2020	1
245 Broome Street	Residential/ Commercial	6	North	22	2nd to top	5.2-12.9	2019-2020	1
107 Rivington Street	Hotel	22	North	28	8th to top	5.2-12.1	2020-2021	8, 9
			East	28A	8th to top	3.1-8.5	2020-2021	8, 9
				28B	12th to top	3.0-11.5	2020-2021	8, 9
114 Rivington Street	Residential/ Commercial	7	South	31	2nd to top	4.1-10.1	2020-2021	8, 9
			East	31A	4th to top	3.3-6.4	2020-2021	8, 9
133 Essex Street	Residential/ Commercial	9	East	32	5th to top	3.0-7.9	2020-2021	8, 9, 10
137 Essex Street	Residential/ Commercial	6	East	33	5th to top	3.0-4.7	2020-2021	8, 9, 10
139 Essex Street	Residential/ Commercial	6	East	34	5th to top	3.1-4.7	2020-2021	8, 9, 10
141 Essex Street	Residential/ Commercial	6	East	35	5th to top	3.1-4.9	2020-2021	8, 9, 10
143 Essex Street	Residential/ Commercial	6	East	36	5th to top	3.2-4.7	2020-2021	8, 9, 10
145 Essex Street	Residential/ Commercial	6	East	37	4th to top	3.2-6.0	2020-2021	8, 9, 10
147 Essex Street	Residential/ Commercial	6	East	38	4th to top	3.5-6.0	2020-2021	8, 9, 10
149 Essex Street	Residential/ Commercial	7	East	39	4th to top	3.4-7.2	2020-2021	8, 9, 10
151 Essex Street	Residential/ Commercial	7	East	40	4th to top	3.1-6.8	2020-2021	8, 9, 10
153 Essex Street	Residential/ Commercial	6	East	41	top	3.3-5.2	2020-2021	8, 9, 10
103 Norfolk Street	Residential/ Commercial	18	East	43	11th to top	3.1-5.5	2017-2018	2, 3
			South	43A	5th to top	3.2-9.3	2017-2018	2, 3
			West	46B	11th to top	4.7-17.1	2020-2021	9
			North	43C	16th to top	6.3-8.4	2020-2021	9
111 Norfolk Street	Residential	7	West	45A	top	5.8-19.0	2020-2021	9
113 Norfolk Street	Residential	8	West	46A	6th to top	5.0-17.9	2020-2021	9
125 Rivington Street	Residential/ Commercial	6	North	50	top	7.1-12.0	2020-2021	8, 9
123 Rivington Street	Residential/ Commercial	7	North	51	2nd to top	5.1-12.7	2020-2021	9

Table 19-22 (cont'd)
Locations Where Noise Increases Exceed CEQR Criteria for Two or More Consecutive Years

Building/Location	Associated Land Use	Total Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increase(s) in dBA*	Impact Duration (year)	Associated Development Site(s)
			West	51A	6th to top	8.3-19.3	2020-2021	9
			South	51B	4th to top	5.1-20.2	2020-2021	9
133 Norfolk Street	Residential/ Commercial	7	West	54A	6th to top	3.5-19.1	2020-2021	8, 9, 10
143 Norfolk Street	Residential/ Commercial	7	West	59A	all	7.5-20.6	2020-2021	8, 10
118 Stanton Street	Residential/ Commercial	6	South	65	4th to top	5.0-9.5	2020-2021	8, 10
116 Stanton Street	Residential	6	South	66	5th to top	5.1-8.3	2020-2021	8, 10
102 Norfolk Street	Residential/ Commercial	7	West	68	5th to top	3.1-4.1	2017-2018	2, 3
			South	68A	4th to top	3.5-8.0	2016-2018	2, 3
			East	68B	4th to top	5.5-11.3	2016-2018	2, 3
106 Norfolk Street	Residential/ Commercial	7	West	69	6th to top	3.1-3.7	2017-2018	2, 3
			East	69A	6th to top	5.8-10.0	2017-2018	2, 3
108 Norfolk Street	Residential/ Commercial	7	West	70	top	3.2	2017-2018	2, 3
99 Suffolk Street	Residential/ Commercial	8	West	74A	top	5.3-5.8	2016-2018	2, 3

Notes: * Range of increases values were taken from predicted noise levels compared with existing noise levels.

interiors. Sites 2, 3, 4, and 5 are bounded by Delancey Street to the north, Clinton Street to the east, Grand Street to the south and Essex Street to the west. The predicted significant increases in noise levels associated with the construction activities outlined above would most likely be limited to locations adjacent to/in proximity to these development sites. Construction noise levels would be expected to be less at locations within the project study area that are farther away from these development sites.

2018 to 2020

Construction activity anticipated to occur between 2018 and 2020 includes Site 1 demolitions/foundations, shell and core, exteriors and interiors, Site 2 exterior and interiors, Site 3 demolitions/foundations, shell and core, exteriors and interiors, Site 4 demolitions/foundations, shell and core, exteriors and interiors, Site 5 exteriors and interiors and Site 6 demolitions/foundations, shell and core and exteriors. Sites 1, 2, 3, 4, 5, and 6 are bounded by Delancey Street to the north, Attorney Street to the east, Grand Street to the south and Ludlow Street to the west. The predicted significant increases in noise levels associated with the construction activities outlined above would most likely be limited to locations adjacent to/in proximity to these development sites. Construction noise levels would be expected to be less at locations within the project study area that are farther away from these development sites.

2020 to 2021

Construction activity anticipated to occur between 2020 and 2021 includes Site 1 shell and core, exteriors and interiors, Site 4 interiors, Site 6 shell and core and exteriors, Site 8 demolitions/foundations, shell and core, exteriors and interiors, Site 9 demolitions/foundations, shell and core, exteriors and interiors and Site 10 demolitions/foundations, shell and core, exteriors and interiors. Sites 1, 4, and 6 are bounded by Delancey Street to the north, Attorney Street to the east, Broome Street to the south and Ludlow Street to the west. Sites 8, 9, and 10 are bounded by Stanton Street to the north, Norfolk Street to the east, Delancey Street to the south and Essex Street to the west. The predicted significant increases in noise levels associated with the construction activities outlined above would most likely be limited to locations adjacent to/in proximity to these development sites. Construction noise levels would be expected to be less at locations within the project study area that are farther away from these development sites.

At these locations, the exceedance of the CEQR impact criteria would be due principally to noise generated by on-site construction activities (rather than construction-related traffic). As previously discussed, this noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increase in noise levels. Typically, the loudest hourly noise level during the most intense quarter of construction would not persist throughout the entire year. Furthermore, this analysis is based on a conceptual site plan and construction schedule. It is possible that the actual construction may be of lesser magnitude, or that construction on multiple development sites may not overlap, in which case construction noise would be less intense than the analysis predicts.

Most buildings listed in **Table 19-22** have double-glazed windows and alternate ventilation (i.e., air conditioners). For buildings with double-glazed windows and window air conditioners, interior noise levels would be approximately 20 to 25 dBA less than exterior noise levels, and for buildings with double-glazed windows and well-sealed through-the-wall/sleeve/PTAC air conditioners interior noise levels would be approximately 25 to 30 dBA less than exterior noise levels. The typical attenuation provided by double-glazed windows and the alternate ventilation outlined above would be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). However, although these structures have double-glazed windows and alternate ventilation, during some limited time periods construction activities may result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for these uses.

At 89 Ludlow Street, a projected development site in the No Action condition (see No. 39c on Figure 2-3 in Chapter 2, "Land Use, Zoning and Public Policy), if a residential building is operational during 2019 and 2020, it could experience exceedances of CEQR impact criteria for 24 continuous months. However, since any development at this location would include a newly constructed building, it would be expected to include double-glazed windows and alternate ventilation (i.e., air conditioners) and therefore provide at least 20 to 30 dBA of window/wall attenuation. Although this structure would have double-glazed windows and alternate ventilation, during some limited time periods construction activities may result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for residential use.

Based on the locations outlined above in **Table 19-22** where predicted noise level increases exceed the CEQR impact criteria for two or more consecutive years, a visual survey was performed to identify which locations may not currently have double-glazed windows and/or a means of alternative ventilation, and which locations may have balconies, whose exterior space would have the potential to experience impact. **Table 19-23** identifies fifteen (15) locations that would experience interior noise levels exceeding CEQR's acceptability guideline for residential use and/or substantially elevated noise levels for at least 24 continuous months at an exterior location. Of the fifteen (15) locations with predicted noise impacts that would experience interior noise levels exceeding CEQR's acceptability guideline for residential use, one location is at a high school and the other 14 locations are at mixed use residential/commercial uses. At these locations, typical attenuation provided by single-paned windows would range from 5 dBA for an open window condition (i.e., no alternate means of ventilation) to 20 dBA (i.e., with an alternate means of ventilation/closed-window condition). This level of attenuation would not be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria).

Table 19-23
Predicted Noise Impact Locations

Building/Location	Associated Land Use	Total Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Impact Duration (year)	Range of Increase(s) in dBA*	# of Impacted Single-Glazed Windows	Air-Conditioning
Balconies of Residential Building south of Grand Street between Essex and Clinton Streets	Residential	18	North	1A, 1B, 1E	2nd to top	2016-2018	5.0-8.8	n/a	
			East (northernmost section)	1C	7th to top	2016-2018	5.7-10.1		
			West (northernmost section)	1D	7th to top	2016-2018	5.4-7.3		
Residential Building at the southeast corner of Clinton and Grand Streets	Residential	19	North	3B	7th to top	2016-2017	4.7-8.4	n/a	
			West (northernmost section)	3C, 3D	5th to top	2016-2018	3.3-8.5		
			West (middle section)	3E, 3F	7th to top	2016-2018	5.3-9.5		
			West (southernmost section)	3G, 3H	11th to top	2016-2018	5.2-9.3		
			South	3I	top	2016-2018	5.6-6.9		
350 Grand Street	Institutional (Seward Park High School/ Urban Assembly Academy of Government and Law)	10	North	14	All	2016-2019	5.5-17.5	111	Existing Window A/C
			East (northernmost section)	14A	5th to top	2016-2018	3.3-6.9	110	
			East (middle section)	14B	9th to top	2016-2017	3.0-3.7	192	
			West (northernmost section)	14G	4th to top	2019-2020	4.1-11.1	156	
83 Essex Street	Residential/ Commercial	4	East	15	2nd to top	2016-2017	3.1-7.5	9	None visible

Table 19-23 (cont'd)
Predicted Noise Impact Locations

Building/Location	Associated Land Use	Total Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Impact Duration (year)	Range of Increase(s) in dBA*	# of Impacted Single-Glazed Windows	Air-Conditioning
101 Delancey Street	Residential/ Commercial	6	East	16C	Top	2016-2017	3.2-4.2	Not Visible	Not Visible
			South	16B	All	2016-2017	5.1-10.0	Not Visible	Not Visible
87 Ludlow Street	Residential/ Commercial	6	East	17	3rd to top	2019-2020	3.4-10.6	5	Existing Window A/C
249-255 Broome Street (indoor and balconies)	Residential/ Commercial	7	North	21	3rd to top	2019-2020	5.4-14.8	43	Existing Window A/C
141 Essex Street	Residential/ Commercial	6	East	35	5th to top	2020-2021	3.1-4.9	6	Existing Window A/C
145 Essex Street	Residential/ Commercial	6	East	37	4th to top	2020-2021	3.2-6.0	2	Existing Window A/C
149 Essex Street (indoor and balconies)	Residential/ Commercial	7	East	39	4th to top	2020-2021	3.4-7.2	18	Existing PTAC
Balconies of 153 Essex Street	Residential/ Commercial	6	East	41	top	2020-2021	3.3-5.2	n/a	
Balconies of 113 Norfolk Street	Residential	8	West	46A	6th to top	2020-2021	5.0-17.9	n/a	
123 Rivington Street	Residential/ Commercial	7	South	51B	4th to top	2020-2021	5.1-20.2	5	Existing Window A/C
133 Norfolk Street	Residential/ Commercial	7	West	54A	6th to top	2020-2021	3.5-19.1	3	None visible
106 Norfolk Street	Residential/ Commercial	7	West	69	6th to top	2017-2018	3.1-3.7	30	Existing Window A/C

Note: * Range of increases values were taken from predicted noise levels compared to existing noise levels.

Some potential receptor controls that could be used to mitigate the impacts at the 10 residential/commercial locations where interior L_{10} values would be expected to exceed the value considered acceptable by CEQR criteria include the installation of interior storm windows at locations with single-glazed windows, replacement of single-glazed windows with acoustically rated windows, improvements in the sealing of the existing windows, and/or the provision of air-conditioning so that the impacted structures can maintain a closed-window condition. Such measures may affect the ability to achieve project goals with regard to the development of affordable housing and/or other project amenities; however, further exploration of the measures will be conducted between DGEIS and FGEIS to determine the practicability and feasibility of implementing these measures to minimize or avoid the potential significant adverse impacts, taking into account the practicability relative to project goals. Should it be determined that there are no practicable mitigation measures, taking into account project goals, and should the development sites be developed and constructed as conservatively presented in this conceptual schedule, up to 10 residential/commercial locations would be expected to experience an unmitigated significant adverse impact at various times.

At limited times during the construction period, Seward Park High School (350 Grand Street) would be expected to experience significant noise impacts that may be considered unmitigated. The west, north, and east façades of the school building may experience elevated noise as a result of the proposed actions. The DGEIS discloses worst-case construction-related noise impacts at the school. However, it is possible that based on further assessment of conditions at the school, certain façades (or portions thereof) may be less affected (or not be affected at all) by project-related construction noise. Further assessment related to construction impacts at the school will be conducted between the DGEIS and the FGEIS to refine the area of potential impact. Some potential receptor controls that could be used to mitigate the impacts include the installation of interior storm windows, replacement of single-glazed windows with acoustically rated windows, improvements in the sealing of the existing windows, and/or the provision of air-conditioning so that the impacted structures can maintain a closed-window condition. The project sponsors will explore potential mitigation measures between DGEIS and FGEIS. In the event that mitigation measures are not determined feasible and practicable, the impact would be unmitigated.

In addition, at the residential building south of Grand Street between Essex and Clinton Streets, the residential building at the southeast corner of Clinton and Grand Streets, 243 Broome Street, 149 Essex Street, 153 Essex Street, and 113 Norfolk Street, balconies on various floors may experience significant noise impacts due to construction for limited portions of the construction period. However, it should be noted that even during the portions of the construction period that would generate the most noise at these balconies, the balconies could still be enjoyed without the effects of construction noise outside of the hours that construction would occur, e.g. during night-time and on weekends. At these outdoor balconies, there would be no feasible or practicable mitigation to mitigate the construction noise impacts. Therefore these balconies would be considered to experience unmitigated significant noise impacts as a result of construction.

Proposed buildings that would be completed and occupied before construction is completed at other project development sites would also experience exterior noise levels due to construction activities in the mid-60-to-mid-70 dBA range. These predicted noise levels are based on modeling the worst-case hour of the worst-case quarter of each year of construction, based on a schedule of equipment and activity provided by the construction managers. The predicted noise levels would likely not persist at such a high level throughout the day or throughout the year. However, the design of all project buildings would include building façades providing not less than 18 – 34 dBA of attenuation, and alternate means of ventilation (i.e., air conditioners) that does not degrade the acoustical performance of the façade. During the time period when these proposed buildings would be occupied, and construction would still be underway at other proposed development sites (approximately two years according to the conceptual construction schedule on which the construction noise analysis is based), interior noise levels would, during some times, exceed 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria for residential uses). Such exceedances may be intrusive, but would be only temporary and of limited duration. Consequently, they would not result in any significant impacts.

On-site, construction activities would produce $L_{10(1)}$ noise levels at open space areas ranging from approximately 65.0 to 69.4 dBA, which would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas exceed CEQR recommended values for existing and No Action conditions.) While this is not desirable, there is no effective practical mitigation[1] that could be implemented to avoid these levels during construction. Noise levels in many parks and open space areas throughout the city, which are located near heavily trafficked roadways and/or near construction sites, experience comparable, and sometimes higher, noise levels.

[1] Noise barriers would not be practical because of security concerns.

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 construction of the receiver building. Construction equipment operation causes ground vibrations that 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 in buildings close to a construction site. An assessment has been prepared to quantify 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 19-24 shows vibration source levels for typical construction equipment.

Table 19-24
Vibration Source Levels for Construction Equipment

Equipment	PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (Impact)	0.644-1.518	104-112
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

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 the buildings along Grand, Broome and Delancey Streets between Ludlow Street and Pitt Street; buildings along Rivington and Stanton Streets between Ludlow Street and Norfolk Street; buildings along Ludlow Street between Rivington Street and Grand Street; buildings along Essex and Norfolk Streets between Grand Street and Stanton Street; and buildings along Suffolk and Clinton between Grand Street and Delancey Street, all of which are adjacent to the project construction sites. Vibration levels at all of these buildings and structures would be well below the 0.50 inches/second PPV limit. At all other locations, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would approach the levels that would have the potential to result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location and, therefore, would not result in any significant adverse impacts. In no case are significant adverse impacts from vibrations expected to occur.

OTHER TECHNICAL AREAS

HISTORIC AND CULTURAL RESOURCES

Architectural resources are defined as buildings, structures, objects, sites or districts listed on the State and National Registers of Historic Places (S/NR) or determined eligible for such listing based on the criteria defined below, National Historic Landmarks (NHLs), New York City Landmarks (NYCLs) and Historic Districts, and properties that have been found by the LPC to appear eligible for designation, considered for designation ("heard") by LPC at a public hearing, or calendared for consideration at such a hearing (these are "pending" NYCLs). Chapter 7, "Historic and Cultural Resources," provides a detailed assessment of potential impacts on architectural and archaeological resources. This section summarizes potential impacts during construction.

Construction would involve subsurface disturbance to areas that have been identified as archaeologically sensitive by the Phase 1A studies. The Phase 1A archaeological documentary study prepared for the project site recommended a Phase 1B archaeological investigation to determine the presence or absence of archaeological resources in the areas identified as archaeologically sensitive. The Phase 1A was submitted to LPC and OPRHP for review and comment. In letters dated January 23, 2012 and January 31, 2012, LPC and OPRHP, respectively, concurred with the findings of the Phase 1A. Therefore, further investigation in the form of Phase 1B archaeological testing would be conducted in any of the sensitive areas that would be affected by construction. The Phase 1B testing would determine the presence or absence of archaeological resources such as domestic shaft features (i.e., privies, cisterns, or wells) or other archaeological resources dating to the early to mid-19th century. The Phase 1B survey would be undertaken as part of the proposed actions and completed prior to the start of construction in consultation with LPC and/or OPRHP. A Phase 1B testing protocol would be prepared and submitted to LPC and/or OPRHP for review and comment before the Phase 1B survey would begin. If no archaeological resources were encountered during the Phase 1B survey, a final report summarizing the results of the Phase 1B testing would be prepared and submitted to LPC and/or OPRHP for review and comment. Should any intact archaeological resources be identified during the course of the Phase 1B survey, further testing (i.e., a Phase 2 survey) could be necessary to assess the horizontal and vertical extent of any recovered archaeological resources, as well as their potential significance (S/NR-eligibility). Any identified archaeological resources would be properly documented and evaluated in consultation with LPC and/or OPRHP. A Phase 2 survey would therefore determine if further investigation in the form of Phase 3 data recovery is warranted. With implementation of Phase 1B testing and continued consultation with LPC and/or OPRHP regarding the need for, and implementation of, any Phase 2 or 3 investigations, there would be no significant adverse impacts on archaeological resources.

At this time, it is not known which sites will be disposed of by which project sponsors, and there will be no specific, defined development projects on each site until a developer or developers are selected pursuant to a Request for Proposals (RFP) process. Further archaeological investigation (Phase 1B and possible subsequent studies) will be required to be undertaken by the developer(s) after selection. For sites that may be under the jurisdiction of HPD, remedial measures including Phase 1B testing and continued consultation with LPC and/or OPRHP will be required to be undertaken by the developer(s) through provisions in the LDA between HPD and the developer(s). For City properties that may be managed by NYCEDC, remedial measures including Phase 1B testing and continued consultation with LPC will be required to be undertaken by the developer(s) through the provisions of a contract or other legally binding agreement between NYCEDC and the developer(s).

Development under the proposed actions could have adverse physical impacts on five architectural resources that are located within 90 feet of proposed construction activities, close enough to potentially experience adverse construction-related impacts from ground-borne construction-period vibrations, falling debris, subsidence, collapse, or damage from construction machinery. The five architectural resources that could experience adverse construction-related impacts are:

- The Lower East Side Historic District (S/NR). The three contributing historic district buildings at 75 Essex Street (the Eastern Dispensary, NYCL-eligible, S/NR-eligible), 83 Essex Street, and 90 Ludlow Street are located adjacent to Site 1, and the following eight contributing historic district buildings are located within 90 feet of Site 1: Seward Park High School; 85, 87, 91, and 94 Ludlow Street; 246-248 Broome Street; and 95 and 101 Delancey

Street. The buildings at 246-248 Broome Street and 85 and 87 Ludlow Street are also located within the potential Orchard Street Historic District (NYCL-eligible). In total, eleven historic district buildings are located within 90 feet of project construction.

- The Eastern Dispensary (NYCL-eligible, S/NR-eligible) is located adjacent to Site 1, as described above.
- The potential Clinton, Rivington, Stanton Street Historic District (NYCL-eligible, S/NR-eligible). The two buildings at 121-123 and 125 Rivington Street are adjacent to Site 9 and within 90 feet of Site 8; the three buildings at 127 and 129 Rivington Street and 121 Norfolk Street are located within 90 feet of Site 9; the three buildings at 133, 135, and 137 Norfolk Street are adjacent to Site 8; and the two buildings at 128 and 130 Rivington Street are located within 90 feet of Site 8. In total, ten historic district buildings are located within 90 feet of project construction.
- The former Norfolk Street Baptist Church (NYCL, S/NR) is located within 90 feet of Site 3.
- The Williamsburg Bridge (S/NR-eligible) is located within 90 feet of Site 6.

There are two mechanisms to protect buildings in New York City from potential damage caused by adjacent construction. All buildings are provided some protection from accidental damage through NYCDOB controls that govern the protection of adjacent properties from construction activities under Building Code Section BC 3309: Protection of Adjoining Property. For all construction work, Building Code Section BC 3309 serves to protect all adjacent properties from excavation, filling, and foundation operations and from construction above the roof of the adjacent properties by requiring certain inspection and protection measures.

The second protective measure applies to New York City Landmarks, properties within New York City Historic Districts, and National Register-listed properties. For these structures, *TPPN #10/88* applies. *TPPN #10/88* supplements the standard building protections afforded by Building Code Section BC 3309 by requiring a monitoring program to reduce the likelihood of construction damage to adjacent New York City Landmarks and National Register-listed properties (within 90 feet) and to detect at an early stage the beginnings of damage so that construction procedures can be changed. With these required measures, significant adverse construction-related impacts would not occur to the former Norfolk Street Baptist Church (NYCL, S/NR) or to the contributing buildings within the Lower East Side Historic District (S/NR) that are located within 90 feet of project construction, including the Eastern Dispensary. Further, for sites that may be developed under the jurisdiction of HPD, Construction Protection Plans to protect historic resources within 90 feet of construction will be likely required to be developed and implemented in coordination with OPRHP by the developer(s) through provisions in the LDA between HPD and the developer(s).

For the non-designated or listed resources—the Williamsburg Bridge (S/NR-eligible) and the buildings within the potential Clinton, Rivington, Stanton Street Historic District (NYCL-eligible, S/NR-eligible)—construction under the proposed actions could potentially result in construction-related impacts on the resources. The resources would be afforded limited protection under DOB regulations applicable to all buildings located adjacent to construction sites (Section BC 3309); however, since the resources are not New York City Landmarks or listed National Register properties, they are not afforded special protections under *TPPN #10/88*. Additional protective measures afforded under *TPPN #10/88* would only become applicable if the Williamsburg Bridge and the potential historic district are designated or listed in the future prior to the initiation of adjacent construction or if the adjacent sites are developed under the jurisdiction of HPD. Further, for sites that may be developed under the jurisdiction of HPD, Construction Protection Plans to protect historic resources within 90 feet of construction will be likely required to be developed and implemented in coordination with OPRHP by the developer(s) through provisions in the LDA between HPD and the developer(s). If the bridge and potential historic district are not designated or listed and the adjacent sites are developed under the management of NYCEDC, they would not be subject to *TPPN #10/88* and may, therefore, be adversely impacted by adjacent development resulting from the proposed actions.

HAZARDOUS MATERIALS

To identify any potential environmental concerns from past or current on- and off-site operations, the following reports were reviewed: a September 2008 *Phase I Environmental Site Assessment* (ESA) for Sites 1 to 9 prepared by H2M in conformance with the requirements of ASTM E-1527-00 and a September 2010 Phase I ESA for Site 10 prepared by GIANCO Environmental Services in conformance with ASTM E-1527-05. Both ESAs evaluated sites for potential impacts due to hazardous materials by reviewing: (1) historical aerial photographs, topographic maps and Sanborn fire insurance maps; (2) environmental regulatory databases for the sites and buffer areas; and (3) City directories of historic occupants. Additional information included site reconnaissance to identify environmental conditions and current occupants or operations/activities.

The 2008 Phase I identified three *Recognized Environmental Conditions*, i.e., per ASTM E1527-00, "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products." These related to:

- Out of service fuel oil underground storage tanks (USTs) at Sites 3 and 5;
- A vaulted 1,500 gallon fuel oil aboveground storage tank (AST) at Site 5; and
- Potential vapor intrusion issues at Sites 1 through 9 due to possible historical releases from the many nearby USTs, ASTs and dry cleaners and/or a historical manufactured gas plant (MGP) located on Hester Street (for which no remediation is currently required by New York State).

Site 5 was also identified as associated with a facility that previously generated lead and chromium wastes that were sent for off-site disposal. The 2010 Phase I conducted separately for Site 10 did not identify any *Recognized Environmental Conditions*. Both Phase Is also identified that, due to their age, existing structures on the project site may include asbestos-containing materials (ACM) and/or lead-based paint.

At this time, there are no specific development proposals for Sites 1 through 6 and 8 through 10, and future developers will be selected pursuant to the RFP process. Since there are no site-specific proposals at this time, certain parameters necessary for a subsurface investigation (i.e., depth to foundation, building footprint, presence/absence of a cellar level) are unknown. Subsequent investigation, including soil and groundwater testing (and potential remediation), would be undertaken by the developer(s) after selection. For sites that may be under the HPD jurisdiction, these measures will be required to be undertaken by the developer(s) through provisions in the LDA between HPD and the developer(s). For City properties that may be managed by NYCEDC, these measures will be required to be undertaken by the developer(s) through the provisions of a contract or other legally binding agreement between NYCEDC and the developer(s).

At all of the sites where ground disturbance is expected to occur as a result of future development activities (i.e., at all sites except Site 7) the proposed actions could have the potential for environmental impacts due to the potential presence of hazardous materials. Although the proposed actions could result in demolition and construction activities that could increase pathways for human exposure (to workers and the community), the possibility of impacts would be reduced by the measures identified below, which will be included in the LDA between HPD and the developer(s) or the contract or other legally binding agreement between NYEDC and the developer(s).

For demolition:

- All known petroleum tanks, prior to any demolition activities with the potential to disturb these tanks, would be closed and removed, along with any contaminated soil, in accordance with applicable requirements including NYSDEC spill reporting and tank registration requirements. If additional tanks are discovered, they would be properly registered, if required, with NYSDEC and/or FDNY.
- Unless information exists to indicate that suspect ACMs do not contain asbestos, prior to demolition an asbestos survey would be completed and all ACMs that would be disturbed by the demolition would be removed and disposed of in accordance with local, state, and federal requirements.
- Any demolition activities with the potential to disturb lead-based paint would be performed in accordance with the applicable Occupational Safety and Health Administration regulation (OSHA 29 CFR 1926.62—Lead Exposure in Construction).
- Unless labeling or laboratory testing data indicates that suspected PCB-containing fluorescent lighting fixtures, transformers, other electrical equipment, lifts, and elevators do not contain PCBs, and that fluorescent lights do not contain mercury, disposal would be performed in accordance with applicable federal, state, and local requirements.
- Disposal of any chemicals (such as cleaning fluids) would be in accordance with applicable requirements.

For excavation:

- Prior to any new construction, further investigation would be performed on each site to determine the presence and nature of contaminants of concern. Specifically, a *Site Investigation Work Plan and Health and Safety Plan*, the scope of which would include laboratory analysis of soil and groundwater samples and would be pre-approved by NYCDEP, would be implemented. Depending on the Site Investigation results, one or more Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs) would be prepared and submitted to NYCDEP (and the New York State Department of Environmental Conservation, if necessary) for approval. The RAP would govern all soil disturbance and would include procedures for: removal of petroleum storage tanks; handling, stockpiling, testing, transportation and disposal of excavated materials, including any unexpectedly encountered contaminated soil and petroleum storage tanks; appropriate clean fill importation criteria and criteria for allowable reuse of excavated site soils (whether in the uppermost layer of landscaped areas or elsewhere), and, if necessary, the design of engineering controls to address vapor intrusion (such as a vapor barrier) to be included beneath a newly constructed building. The CHASP would ensure that subsurface disturbance is performed in a manner protective of workers, the community, and the environment with appropriate air monitoring, dust control, etc.

- During any required dewatering, water would be discharged to the sewer system in accordance with NYCDEP requirements. If necessary, the water would be pretreated prior to discharge.
- As with demolition, any tanks unexpectedly encountered would be closed and removed, along with any contaminated soil, in accordance with applicable requirements including NYSDEC spill reporting requirements. If historical tanks are discovered, they would be properly registered, if required, with NYSDEC and/or FDNY.

With the implementation of these measures prior to and/or during demolition and excavation, no significant adverse impacts related to hazardous materials would be expected to result from the proposed actions and subsequent development of the project site.

OPEN SPACE

There are no publicly accessible open spaces within the project site, and no open space resources would be used for staging or other construction activities. The nearest open space is the 0.45-acre Broome Seward Park Extension, which is located on Broome Street between Clinton Street and Ridge Street, approximately 130 feet east of Site 6. At limited times, activities such as excavation and foundation construction may generate noise that could impair the enjoyment of nearby open space users, but such noise effects would be temporary. Construction fences around the project site would shield the park from construction activities. Construction under the proposed actions would not limit access to the park or other open space resources in the vicinity of the project site. Therefore, construction under the proposed actions would not result in significant adverse impacts on open space.

SOCIOECONOMIC CONDITIONS

Construction activities could temporarily affect pedestrian and vehicular access. However, lane and/or sidewalk closures would not obstruct entrances to any existing businesses, and businesses are not expected to be significantly affected by any temporary reductions in the amount of pedestrian foot traffic or vehicular delays that could occur as a result of construction activities. Utility service would be maintained to all businesses, although short term interruptions (i.e., hours) may occur when new equipment/infrastructure (e.g., a transformer, or a sewer or water line) is put into operation. Overall, construction activities associated with the proposed actions would not result in any significant adverse impacts on surrounding businesses.

Construction would create direct benefits resulting from expenditures on labor, materials, and services, and indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the direct activity. Construction also would contribute to increased tax revenues for the City and State, including those from personal income taxes.

COMMUNITY FACILITIES

No community facilities would be directly affected by construction activities for an extended duration. The construction sites would be surrounded by construction fencing and barriers that would limit the effects of construction on nearby facilities. Construction workers would not place any burden on public schools and would have minimal, if any, demands on libraries, child care facilities, and health care. Construction of the proposed buildings would not block or restrict access to any facilities in the area, and would not materially affect emergency response times significantly. NYPD and FDNY emergency services and response times would not be materially affected due to the geographic distribution of the police and fire facilities and their respective coverage areas. As discussed above (See "Noise and Vibration"), at limited times during the construction period, Seward Park High School would be expected to experience significant noise impacts that may be considered unmitigated. It is important to note that the conceptual schedule on which the noise analysis was based represented a compressed and conservative potential timeline for construction that tended to show the most construction activity and most construction equipment operating simultaneously, which conditions would result in the largest increase in noise levels at the nearby receptors.

LAND USE AND NEIGHBORHOOD CHARACTER

Construction activities would affect land use on the project site but would not alter surrounding land uses. As is typical with construction projects, during periods of peak construction activity there would be some disruption, predominantly noise, to the nearby area. There would be construction trucks and construction workers coming to the site. There would also be noise, sometimes intrusive, from building construction as well as trucks and other vehicles backing up, loading, and unloading. These disruptions would be temporary in nature and would have limited effects on land uses within the study area, particularly as most construction activities would take place within the project site or within portions of sidewalks, curbs, and travel lanes of public streets immediately adjacent to the project site. Overall, while the construction at the site would be evident to the local community, the limited duration of construction would not result in significant or long-term adverse impacts on local land use patterns or the character of the nearby area.

RODENT CONTROL

Construction contracts would include provisions for a rodent (mouse and rat) control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During the construction the contractor would carry out a maintenance program, as necessary. Signage would be posted, and coordination would be maintained with appropriate public agencies. Only EPA- and NYSDEC-registered rodenticides would be permitted, and the contractor would be required to perform rodent control programs in a manner that avoids hazards to persons, domestic animals, and non-target wildlife. ✷