Chapter 19: Construction

A. INTRODUCTION

This chapter assesses the potential for significant adverse impacts that could result from the proposed actions—minor modifications to the Two Bridges Large Scale Residential Development (LSRD) in the Lower East Side neighborhood of Manhattan to facilitate the development of three new mixed-use buildings within the Two Bridges LSRD. The three project sites are Site 4 (4A/4B), located on the west side of Rutgers Slip, between Cherry Street to the north and South Street to the south; Site 5, located between Cherry Street, South Street, Rutgers Slip, and the former alignment of Jefferson Street; and Site 6A, located on the west side of Clinton Street at South Street. The proposed projects each would be developed in a single phase. The construction period for each proposed building is anticipated to be between 30 and 36 months and the proposed projects are anticipated to be complete and operational by 2021. The chapter also describes the City, state, and federal regulation and policies that govern construction, followed by the anticipated construction schedule and the types of activities likely to occur during construction. The types of equipment to be used during construction are discussed, along with the anticipated number of workers and truck deliveries. The chapter's assessment of potential impacts of construction activity follows the 2014 *City Environmental Quality Review (CEQR) Technical Manual* and focuses on transportation, air quality, noise, vibration, as well as consideration of other technical areas including land use and neighborhood character, socioeconomic conditions, community facilities and services, open space, historic and cultural resources, natural resources, and hazardous materials.

PRINCIPAL CONCLUSIONS

Construction of the proposed project would have the potential to result in significant adverse construction-period traffic impacts, a parking shortfall during peak construction, and construction-period noise impacts.

Construction of the proposed projects—as is the case with most construction projects—would result in temporary disruptions in the surrounding area. However, the project applicants have committed to implementing a variety of measures during construction to minimize the effects of the proposed projects on the nearby community, including:

COMMUNICATION WITH COMMUNITY

- Information about upcoming construction activities would be provided to the community members through regular email updates.
- The applicants would provide regular construction updates to the community and local leaders.

- A dedicated hotline would be established for community members to register concerns or problems that may arise during the construction period. In addition, New York City maintains a 24-hour telephone hotline (311) so that concerns can be registered with the City.

COMMUNITY SAFETY

- A number of measures would be employed to ensure public safety during the construction of the proposed projects including the erection of sidewalk bridges, the employment of flag persons, and the installation of safety nettings;
- Maintenance and Protection of Traffic (MPT) plans would be developed for any temporary sidewalk, lane, and/or street closures. Approval of these plans and implementation of the closures would be coordinated with the New York City Department of Transportation (DOT)'s Office of Construction Mitigation and Coordination (OCMC);
- A pest management program would be implemented to reduce the presence of rodents at and near the project sites; and
- All New York City Department of Building (DOB) safety requirements and protocols would be followed and construction of the proposed projects would be undertaken so as to ensure the safety of the community and the construction workers themselves.

ENVIRONMENTAL PERFORMANCE

- An emissions reduction program would be implemented during construction to minimize the effects on air quality and would include to the extent practicable measures such as the use of dust control, ultra-low sulfur diesel (ULSD) fuel, best available technologies, and newer and cleaner equipment;
- A report documenting the subsurface investigation findings along with a Remedial Action Plan (RAP) establishing procedures to be followed prior to, during, and following construction (e.g., for soil management, dust control, air monitoring for workers and the community, health and safety, and vapor controls for each new building). These reports would be submitted to the NYC Office of Environmental Remediation (OER), for review and approval;
- Construction of the proposed projects would not only include noise control measures as required by the *New York City Noise Control Code*, but may also include measures such as the use of quieter equipment, where practicable;
- If determined appropriate byIn consultation with the New York City Landmarks Preservation Commission (LPC) and DOT, the applicants for Site 5 and Site 6A would prepare a Construction Protection Plan (CPP) would be developed in coordination with LPC and DOT to protect the nearby portion of the Franklin Delano Roosevelt (FDR) Drive located within 90 feet of Sites 5 and 6A; and
- All landscaping and tree replacement and/or restitution for removed trees would be performed in compliance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York.

With the implementation of the measures described above, the construction effects of the proposed projects on the surrounding area would be substantially reduced. As described below, an emissions reduction program and source and path control measures would be memorialized in a Restrictive Declarations to minimize the effects of construction activities on the surrounding community and to ensure appropriate implementation during construction. The Restrictive Declarations for the proposed projects will require that an independent monitor oversee, on behalf of DCP, the implementation and performance of the construction phase commitments, as described below. The Restrictive Declarations will also require the establishment of a community construction task force in order to provide, on a regular basis, a forum for communications relating the construction schedule and community outreach and to respond to concerns of members of the community relating to the construction activities. Although the implementation of these measures would reduce some effects of construction, as described below, construction activities associated with the proposed projects would result in temporary significant adverse temporary impacts in the areas of transportation and noise. Additional information for key technical areas is summarized below.

TRANSPORTATION

Subsequent to the publication of the DEIS, detailed construction traffic and pedestrian analyses were prepared to identify specific temporary impacts that may occur during construction. For these impacts, mitigation measures akin to those recommended to address the anticipated operational impacts upon the full build-out of the proposed projects were also identified. Based on the analysis of projected peak construction trip projectionsactivities and comparison with the operational trip analysis results, construction of the proposed projects would have the potential to result in significant adverse traffic and pedestrian impacts, and the potential for a parking shortfall during peak construction, as summarized below.

Traffic

During peak construction, project-generated vehicle trips would be less than what would be realized with the full build-out of the proposed projects in 2021. However, temporary significant adverse impacts would still be expected at a subset of intersections that were identified to incur impacts with the full build-out of the proposed projects. For the early morning construction peak hour, significant adverse impacts were identified for two study area intersections, one of which requires the early implementation of proposed operational mitigation. At the other impacted intersection, a temporary change in off-peak signal timing would mitigate the construction impact. For the mid-afternoon construction peak hour, significant adverse impacts were identified for five study area intersections. The temporary construction traffic impacts at three of the five intersections could be mitigated with the early implementation of the traffic engineering measures identified in Chapter 21, "Mitigation." For the remaining two intersections,Therefore, the potential traffic impacts during peak construction would be within the envelope of significant adverse traffic impacts identified for the future with the proposed projects (With Action condition) in Chapter 14, "Transportation." As summarized in Chapter 21, "Mitigation," all of the significant adverse traffic impacts identified at the 13 study area intersections could be fully mitigated except for those at the South Street and Montgomery Street and the Chatham Square and Worth Street/Oliver Street intersections, no feasible measures were found to mitigate either the operational or the construction period impacts. Thewhere the impacts have been deemed unmitigatable. During construction of the proposed projects, any significant adverse construction traffic impacts could similarly be mitigated with the measures described in Chapter 21, "Mitigation." At the South Street and Montgomery Street and the Chatham Square and Worth Street/Oliver Street intersections, there could similarly be the potential for unmitigated significant adverse construction traffic impacts at these two intersections during constructionwould, therefore, also remain unmitigated.

Parking

The anticipated construction activities are projected to generate a maximum parking demand of 355 spaces during peak construction. Conservatively assuming the parking utilization under the No Action condition where there would be a total parking shortfall of 646 spaces during the weekday midday period, the construction worker demand of 355 spaces would result in a parking shortfall of 1,001 spaces during the peak construction period. The parking demand associated with construction workers commuting via auto would be temporary in nature. It is expected that excess parking demand resulting from the proposed projects during the weekday peak periods would need to be accommodated by limited on-street parking spaces, or in off-street parking facilities located more than a ½-mile walk from the project sites. Alternatively, motorists could choose to use alternate modes of transportation. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation.

Transit

During peak construction, project-generated transit trips would be less than those with the full build-out of the proposed projects in 2021. In addition, construction worker trips would occur outside of typical commuter peak periods (when transit ridership is typically higher). Nonetheless, since significant adverse stairway impacts were identified for the commuter peak periods in Chapter 14, "Transportation," additional counts and analyses for the East Broadway F train station were undertaken for the construction peak hours, which verified that construction of the proposed projects is not expected to result in the potential for any significant adverse transit impacts.

Pedestrians

During peak construction, the project-generated pedestrian trips would be less than those with the full build-out of the proposed projects in 2021. Although significant adverse pedestrian impacts were identified for a sidewalk and three crosswalk locations during peak periods in Chapter 14, "Transportation," for the full build-out of the proposed projects, the construction worker trips would be made outside of these peak periods when background pedestrian levels would be lower. Analysis results showed that there would not be a potential for any significant adverse ~~Therefore, the potential~~ pedestrian impacts during peak construction.~~ are expected to be within the envelope of significant adverse pedestrian impacts identified in Chapter 14, "Transportation," for the full build-out of the proposed projects, and therefore the construction-period pedestrian impacts could be similarly mitigated by the recommended measures summarized in Chapter 21, "Mitigation."~~

AIR QUALITY

An emissions reduction program, which would be memorialized in a Restrictive Declaration, would be implemented at each of the projects sites to minimize the effects of construction activities on the surrounding community. Measures would include, to the extent practicable, dust suppression measures, use of ULSD fuel, idling restrictions, diesel equipment reduction, best available tailpipe reduction technologies, and the utilization of newer equipment. With the implementation of these emission reduction measures, the dispersion modeling analysis of construction-related air emissions for both nonroad and on-road sources determined that particulate matter ($PM_{2.5}$ and PM_{10}), annual-average nitrogen dioxide (NO_2), and carbon monoxide (CO) concentrations would be below their corresponding *de minimis* thresholds or National Air Quality Ambient Standards (NAAQS), respectively. Therefore, construction of the proposed projects would not result in significant adverse air quality impacts due to construction sources.

NOISE

The detailed modeling analysis concluded that construction of the proposed projects has the potential to result in construction noise levels that exceed *CEQR Technical Manual* noise impact criteria for an extended period of time at the façades of residences facing the project sites on Cherry Street; the eastern, southern, and western façades of 64 Rutgers Street; 80 Rutgers Slip; the northern, eastern, and a portion of the southern façades of 82 Rutgers Slip; a portion of the northern façade and the eastern, and western façades of 265 and 275 Cherry Street; residences immediately adjacent to Site 6A; portions of the northern and western façades of 286 South Street; and portions of the northern and eastern façades of the residences west of Site 4 (4A/4B). Construction noise levels of this magnitude for such an extended duration would constitute a significant adverse impact.

At other receptors near the project construction areas—including open space, residential, and institutional receptors—noise resulting from construction of the proposed projects may at times be noticeable, but would be limited to the construction period and would generally not exceed typical noise levels in the nearby area, and therefore, would not be considered a significant adverse noise impact.

VIBRATION

The buildings of most concern with regard to the potential for structural or architectural damage due to vibration are the existing residential buildings immediately surrounding the project construction areas. At the buildings and other structures immediately adjacent to the project construction areas, vibration due to construction of the proposed projects within 25 feet may result in PPV levels between 0.50 and 2.0 in/sec, which is generally considered acceptable for a non-historic building or structure.

In terms of potential vibration levels that would be perceptible and annoying, the equipment that would have the most potential for producing levels that exceed the 65 vibration decibels (VdB) limit is the pile driver. The pile driver has the potential to produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 550 feet depending on soil conditions. However, the operation of the pile driver would only occur for limited periods of time at a particular location and therefore would not result in any significant adverse impacts. Therefore, there is no potential for significant adverse vibration impacts from the proposed projects.

B. GOVERNMENTAL COORDINATION AND OVERSIGHT

Construction oversight involves several City, state, and federal agencies. **Table 19-1** lists the primary involved agencies and their areas of responsibility. For projects in New York City, primary construction oversight lies with DOB, which oversees compliance with the New York City Building Code. The areas of oversight include installation and operation of equipment such as cranes, sidewalk bridges, safety netting, and scaffolding. DOB also enforces safety regulations to protect workers and the general public during construction. The New York City Department of Parks and Recreation (NYC Parks) has oversight on tree protection and tree removal during construction. The New York City Department of Environmental Protection (DEP) enforces the *New York City Noise Code* and regulates water disposal into the sewer system. OER reviews and approves any needed RAPs and abatement of hazardous materials. The New York City Fire Department (FDNY) has primary oversight of compliance with the *New York City Fire Code* and the installation of tanks containing flammable materials. DOT's OCMC reviews and approves any traffic lane and sidewalk closures. LPC approves the historic and cultural resources analysis, the CPP, and oversees measures established to prevent damage to historic structures.

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

Table 19-1
Summary of Primary Agency Construction Oversight

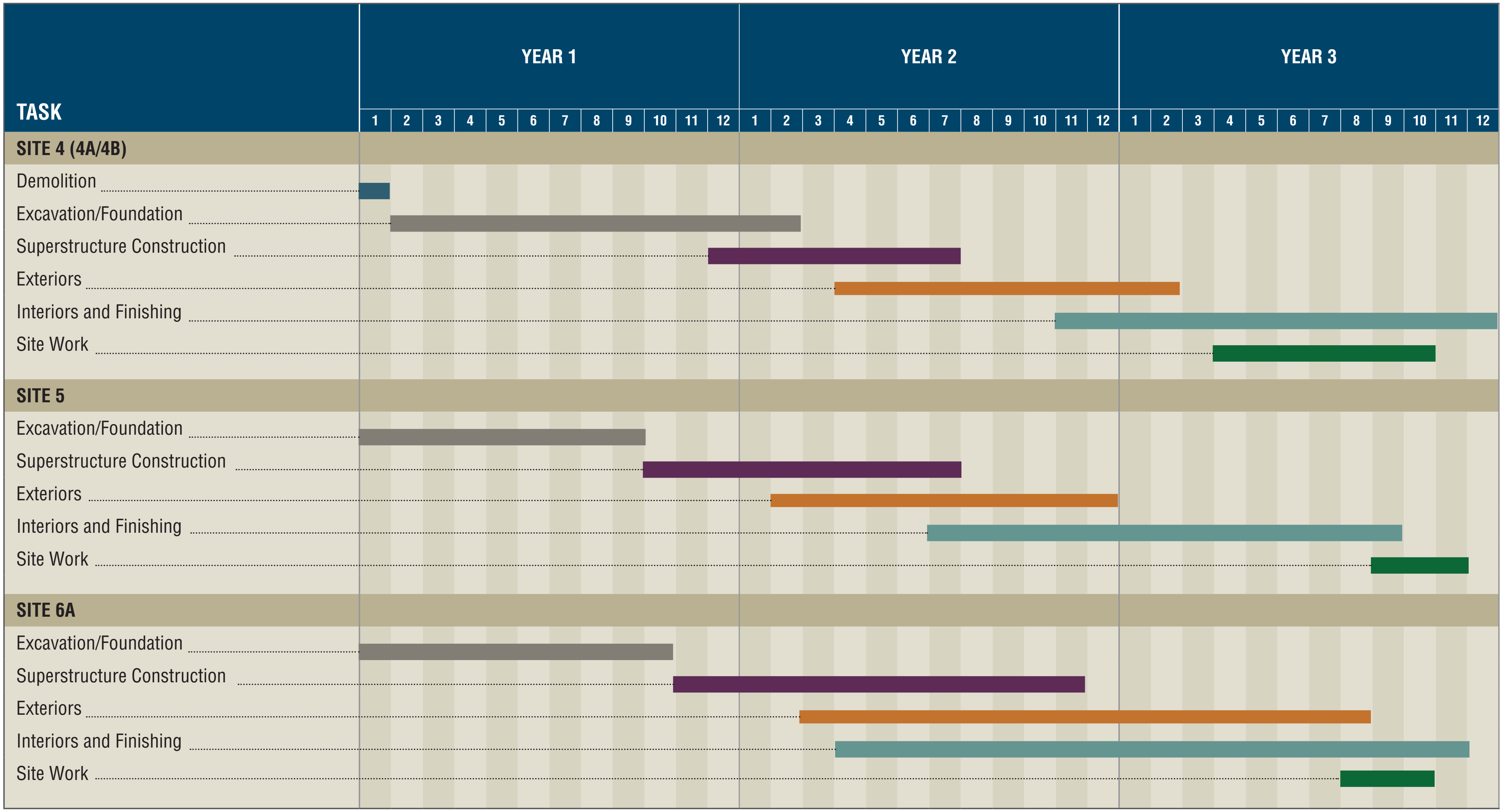
Agency	Areas of Responsibility
New York City	
Department of Buildings	Building Code, site safety, and public protection
Department of Parks and Recreation	Tree protection and removal
Department of Environmental Protection	Noise Code, dewatering discharge
Office of Environmental Remediation	RAPs and hazardous materials abatement
Fire Department	Compliance with Fire Code, fuel tank installation
Department of Transportation	Lane and sidewalk closures
Landmarks Preservation Commission	Archaeological and architectural protection
New York State	
Department of Labor	Asbestos Workers
Department of Environmental Conservation	Hazardous materials and fuel/chemical storage tanks
United States	
Environmental Protection Agency	Air emissions, noise, hazardous materials
Occupational Safety and Health Administration	Worker safety

C. CONSTRUCTION SCHEDULE

The anticipated construction schedules for the proposed projects are presented in **Tables 19-1 through 19-4** and **Figure 19-1**. The proposed projects would each be developed in a single phase with an anticipated construction period between 30 and 36 months and a completion year of 2021. In order to understand how the cumulative construction impacts of the proposed projects might change if one or more of the projects is delayed indefinitely or ultimately not pursued, an analysis of such permutations is provided in Chapter 22, "Project Permutations."

Table 19-2
Anticipated Construction Schedule for Site 4 (4A/4B)

Construction Task	Approximate Start Month	Approximate Finish Month	Approximate Duration
Demolition	Month 1	Month 1	1
Excavation and Foundation	Month 2	Month 14	13
Superstructure	Month 12	Month 19	8
Exteriors	Month 16	Month 26	11
Interiors and Finishing	Month 23	Month 36	14
Site Work	Month 27	Month 33	7
Source: JDS Construction Group, February 2017			



Anticipated Construction Schedule

Figure 19-1

Table 19-3
Anticipated Construction Schedule for Site 5

Construction Task	Approximate Start Month	Approximate Finish Month	Approximate Duration
Excavation and Foundation	Month 1	Month 9	9
Superstructure	Month 10	Month 19	10
Exteriors	Month 14	Month 24	11
Interiors and Finishing	Month 19	Month 36	18
Site Work	Month 33	Month 35	3
Source: Urban Atelier Group, February 2017			

Table 19-4
Anticipated Construction Schedule for Site 6A

Construction Task	Approximate Start Month	Approximate Finish Month	Approximate Duration
Excavation and Foundation	Month 1	Month 10	10
Superstructure	Month 10	Month 24	14
Exteriors	Month 15	Month 31	17
Interiors and Finishing	Month 17	Month 35	20
Site Work	Month 32	Month 34	3
Source: Gilbane Building Company, May 2017			

Construction for each of the proposed projects would consist of the following primary construction stages, which may overlap at certain times: excavation and foundation; superstructure construction; exteriors; interiors and finishing; and landscaping. These construction stages are described in greater detail under "General Construction Tasks." In addition to these primary stages of construction, on Site 4 (4A/4B), the proposed building would require renovation and demolition of limited portions of the existing 80 Rutgers Slip building on Lot 70. On Site 5, the ground-floor retail of the two existing 26-story apartment buildings at 265 and 275 Cherry Street would be enlarged in one-story expansions.

D. DESCRIPTION OF CONSTRUCTION ACTIVITIES

GENERAL CONSTRUCTION PRACTICES

HOURS OF WORK

Construction of the proposed projects would be carried out in accordance with New York City laws and regulations, which allow construction activities between 7:00 AM and 6:00 PM on weekdays, with most workers arriving between 6:00 AM and 7:00 AM. Normally work would end at 3:30 PM, but it can be expected that, in order to complete certain critical tasks (e.g., finishing a concrete pour for a floor deck), the workday may occasionally be extended beyond normal work hours. Any extended workdays would generally last until approximately 6:00 PM and would not include all construction workers on-site, but only those involved in the specific task requiring additional work time.

Weekend or night work may also be occasionally required for certain construction activities, such as the erection of the tower crane. Appropriate work permits from DOB would be obtained for any necessary work outside of normal construction and no work outside of normal construction hours would be performed until such permits are obtained. The numbers of workers and pieces of equipment in operation for weekend work would typically be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend or night work would be less than that of a normal workday. The weekend workday, if necessary, would typically occur from 8:00 AM to 4:00 PM.

ACCESS, DELIVERIES, AND STAGING AREAS

Access to the project construction areas would be fully controlled. For each of the construction sites, the work areas would be fenced off, and limited access points for workers and construction-related trucks would be provided. Construction workers are generally prohibited from parking their vehicles on-site during the construction period.

MPT plans would be developed for any required temporary sidewalk, lane, and/or street closures to ensure the safety of the construction workers and the public passing through the area. Approval of these plans and implementation of the closures would be coordinated with DOT’s OCMC. Measures specified in the MPT plans that are anticipated to be implemented for all sites would include but not be limited to the following: curbside lane closures; safety signs; safety barriers; and construction fencing.

Additional details on the preliminary construction logistics for each of the project construction areas are described below.

Site 4 (4A/4B)

The proposed Site 4 (4A/4B) project would include an 80-story building that would cantilever over the existing one-story retail building on Lot 76 (235 Cherry Street) and the 10-story residential building on Lot 70 (80 Rutgers Slip). Access to the partially vacant retail building at 235 Cherry Street and the affordable senior housing at 80 Rutgers Slip would be maintained at all times during construction. During construction, 10 dwelling units (DUs) in the 80 Rutgers Slip building would be removed and replaced in the new Site 4 (4A/4B) building. An additional nine DUs in the 80 Rutgers Slip building would be renovated. The Site 4 (4A/4B) applicant intends to relocate the approximately 19 residents living in these units during the construction period to comparable, newly renovated units within the 80 Rutgers Slip building as they become available, or, if necessary, to units in neighboring buildings. As units in 80 Rutgers Slip become available prior to construction, they would not be re-tenanted, but instead would be renovated and offered as temporary or permanent dwelling units for residents of the relocated or renovated units. There are currently nine vacant units within the 80 Rutgers Slip building that would be renovated and made available. Because the 80 Rutgers Slip building is under a U.S. Department of Housing and Urban Development (HUD) regulatory agreement, the dwelling units and residents could only be moved under a relocation plan approved by HUD. Such approval would be granted by HUD and is not part of the proposed actions. To date, the Site 4 (4A/4B) applicant has detailed its proposed relocation~~submitted a~~ plan to HUD, and HUD confirmed that the plan tentatively meets the requirements for approval. Additional filings will be required, and therefore, final approval is ~~pending~~forthcoming. The Site 4 (4A/4B) applicant has stated that they would coordinate the project construction to minimize disruptions to these tenants and to ensure that, to the extent possible, residents of these units remain in the building throughout construction. No residents would be permanently displaced from Site 4 (4A/4B).

Based on preliminary construction logistics, construction trucks such as dump trucks are anticipated to enter and exit the project construction area via Cherry Street and/or Rutgers Slip. Temporary curb-lane closure is anticipated to be needed on the south side of Cherry Street immediately north of the Site 4 (4A/4B) project site to accommodate construction staging and deliveries. Pedestrian access on the south side of Cherry Street may be temporarily diverted to the north side of Cherry Street during construction. Approval and implementation of the closures would be coordinated with DOT's OCMC. Flag persons would be employed where necessary to control trucks entering and exiting the project construction areas and/or to provide guidance for public safety. Sidewalk bridges would be installed to provide overhead protection for the public traversing the existing walkways (i.e., along Cherry Street, along Rutgers Slip, immediately south of the proposed building) adjacent to the construction site. In addition, roof protection would be installed on the adjacent 235 Cherry Street and 80 Rutgers Slip to protect these buildings during construction of the proposed Site 4 (4A/4B) project. All DOB safety requirements would be strictly followed to ensure the safety of the community and adjacent buildings, including 80 Rutgers Slip and 235 Cherry Street.

Site 5

The proposed Site 5 project would include two towers (63 and 70 stories) on a shared base. The two towers are anticipated to be constructed concurrently. The new development would be oriented perpendicular to the existing buildings at 265 and 275 Cherry Street to the north, and parallel to South Street. The proposed Site 5 project would also include one-story expansions of the retail at the north end of the 265 and 275 Cherry Street buildings. Access to the 265 and 275 Cherry Street buildings, as well as the courtyard area between the two buildings, would be maintained at all times during construction.

Based on preliminary construction logistics, construction trucks are anticipated to enter and exit the construction site via South Street. Temporary sidewalk closure is anticipated to be needed on South Street immediately adjacent to the Site 5 project site to accommodate construction staging and deliveries. However, there would be a temporary pedestrian pathway (protected by a sidewalk bridge and/or safety barriers) in the curb lane on South Street adjacent to the existing sidewalk to ensure that pedestrian circulation through this area is maintained throughout construction. Approval and implementation of the closures would be coordinated with DOT's OCMC. Flag persons would be employed where necessary to control trucks entering and exiting the project construction areas and/or to provide guidance for public safety.

Sidewalk bridges would be installed to provide overhead protection for the public traversing the existing walkways (i.e., along South Street, the portion of the courtyard on Site 5 immediately north of the project construction area) adjacent to the construction site. In addition, roof protection would be installed at the southern portions of the 265 and 275 Cherry Street buildings. Further, the existing windows on the southern façades of the 265 and 275 Cherry Street buildings facing the Site 5 construction area would be protected with blankets/insulation permanently closed/sealed.

Site 6A

The proposed Site 6A project would include a ~~62~~63-story building. Access to the one-story DEP building at 285 South Street to the southeast of the proposed Site 6A building would be maintained at all times during construction. In addition, access to the FDNY easement area to the north of the Site 6A project site would be maintained throughout construction.

Based on preliminary construction logistics, construction trucks are anticipated to enter and exit the construction site via Clinton and South Streets. Temporary sidewalk closure is anticipated to be needed on South and Clinton Streets immediately adjacent to the Site 6A project site to accommodate construction staging and deliveries. A temporary pedestrian pathway (protected by a sidewalk bridge and/or safety barriers) would be located in the curb lane on South Street adjacent to the existing sidewalk to ensure that pedestrian circulation through this area is maintained throughout construction. However, pedestrian access on the west side of Clinton Street may be temporarily diverted to the east side of the street during construction. Approval and implementation of the closures would be coordinated with DOT's OCMC. Flag persons would be employed where necessary to control trucks entering and exiting the project construction areas and/or to provide guidance for public safety.

Sidewalk bridges would be installed to provide overhead protection for the public traversing the areas adjacent to the construction site. In addition, roof protection would be installed at 285 South Street to protect this building during construction.

PUBLIC SAFETY

A variety of measures would be employed to ensure public safety during the construction of the proposed projects including, but not limited to, sidewalk bridges to provide overhead protection; safety signs to alert the public about active construction work; safety barriers to ensure the safety of the public passing by the project construction areas; flag persons to control trucks entering and exiting the project construction areas and/or to provide guidance for pedestrians and bicyclists safety; and safety nettings during demolition and on the sides of the proposed buildings as the superstructure work advances upward to prevent debris from failing to the ground. In addition, roof protection would be installed on the surrounding buildings where necessary. All DOB safety requirements would be followed and construction of the proposed projects would be undertaken, so as to ensure the safety of the community and the construction workers themselves.

RODENT CONTROL

Construction contracts for all projects sites would include provisions for a rodent control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation. During construction, the contractor would carry out a maintenance program, as necessary. Measures that may be implemented during construction include baiting the project sites within fenced construction areas, providing covered trash receptacles that would be emptied daily, trimming all vegetation regularly, and elevating construction trailers dumpsters and sheds to discourage rodents from nesting in them. To keep the community safe, signage on all baiting areas would be posted, and coordination would be conducted with the appropriate public agencies.

GENERAL CONSTRUCTION STAGES

Prior to the commencement of construction, the work area for each of the project sites would be prepared for construction. Preparation of the work areas would include the installation of public safety measures such as fencing, netting, and signs. The fencing would typically be a solid construction fence to minimize interference between passersby and the construction work. The project construction areas would be cleared and worker and truck access points would be established. Portable toilets, construction trailers, and dumpsters for trash would be brought on site and installed.

After site work activities are complete, construction of each of the proposed projects would proceed with the construction stages detailed below.

DEMOLITION AND RENOVATION ACTVITIES

The proposed building for Site 4 (4A/4B) would require renovation and demolition of limited portions of the existing 80 Rutgers Slip building. The affected apartment units at 80 Rutgers Slip would be reconfigured by removing the existing interior apartment partition walls, kitchen, and bathroom areas to accommodate laundry rooms for the 80 Rutgers Slip residents on each floor. The exterior windows for currently existing PTACs at these affected apartment units would also be sealed off for weather proofing. Based on current plans, there would be no removal of structural elements and only limited removal of a portion of the exterior façade on the first floor only (i.e., an existing window and potentially some bricks around it) to provide for connections of the trash chute to the proposed building. This penetration work is anticipated to take approximately one week to complete. Only small hand tools such as sledge hammers, crowbars, saws, and scrapers would be required to facilitate the limited penetration activity on the first floor, removal of existing interior partition walls, and construction of new interior partition walls for the laundry rooms. The limited extent and duration of these construction activities at 80 Rutgers Slip would occur during the foundation construction activities for the proposed Site 4 (4A/4B) building as described further below.

On Site 5, the ground-floor retail of the two existing 26-story apartment buildings at 265 and 275 Cherry Street would be enlarged in 1-story expansions. Site 6A is vacant.

Before the commencement of demolition or renovation activities, the portion of the buildings to be demolished or renovated would first be abated of any hazardous materials. A New York City-certified asbestos investigator would inspect the building for asbestos-containing materials (ACM), and if present, those materials would be removed by a DOL-licensed asbestos abatement contractor prior to interior demolition. Asbestos abatement is strictly regulated by DEP, DOL, EPA, and OSHA to protect the health and safety of construction workers and nearby residents, workers, and visitors. Depending on the extent and type of ACMs (if any), these agencies would be notified of the asbestos removal and may inspect the abatement area to ensure that work is being performed in accordance with applicable NY State and NYC regulations. Any activities with the potential to disturb lead-based paint (LBP) would be performed in accordance with the applicable OSHA regulation (including federal OSHA regulation 29 CFR 1926.62—*Lead Exposure in Construction*). In addition, any suspected poly-chlorinated biphenyls (PCB)-containing equipment (such as fluorescent light ballasts) that would be disturbed would be evaluated prior to disturbance. Unless labeling or test data indicate the contrary, such equipment would be assumed to contain PCBs, and would be removed and disposed of at properly licensed facilities in accordance with all applicable regulatory requirements.

Prior to demolition, any economically salvageable materials that could be reused would typically be removed. Then the interior of the building would be deconstructed to the floor plates and columns before these structural elements are demolished and removed. Netting around the exterior of the building would be used to prevent falling materials. Hand tools and excavators with hoe ram attachments would be used for the demolition of the existing structure and loaders would be used to load the debris into dump trucks. Demolition debris would be sorted prior to being disposed at landfills to maximize recycling opportunities.

For renovation work, any economically salvageable materials are first removed followed by the disassembly of non-structural elements and interior partitions. Then such interior work as the construction of interior partitions, installation of lighting fixtures, and interior finishes (e.g., flooring, painting, etc.), would commence. A variety of handheld tools would generally be used for renovation.

EXCAVATION AND FOUNDATION

Excavation and foundation work would follow similar procedures for all three project sites. First, sheeting would be installed to contain soil around the excavation area and excavators would then be used to excavate soil. The soil would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse on any portion of the project sites that need fill. As the excavation becomes deeper, a temporary ramp may be built to provide access for the dump trucks to the excavation area. No blasting is anticipated for the construction of the proposed projects, but a rock splitter and rock-breaking equipment would be used to break down any rock encountered during excavation. Concrete trucks would be used to pour the foundation and the below-grade structures including walls and columns. Excavation and foundation activities may also involve the use of, drill rigs, generators, compressors, and/or rebar benders.

Dewatering

Water from rain and snow collected in the excavation area during construction would be removed using a dewatering pump. If groundwater dewatering is required, it would be performed in accordance with DEP sewer use requirements.

SUPERSTRUCTURE

The superstructure work for all three project sites would be similar and would include each of the proposed buildings' frameworks, such as beams, slabs, and columns. Construction of the interior structure—or core—of the buildings would include elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment rooms; core stairs; and restroom areas. A tower crane would first be brought onto each of the project construction areas during the superstructure task and would be used to lift structural components and other large materials. The tower cranes would be on-site for both the superstructure and exterior façade stages of construction. Superstructure activities may also include the use of a hydraulic crane, bar bending machines, concrete pumps, concrete vibrators, and a variety of trucks. In addition, temporary construction elevators (hoists) would be used for the vertical movement of workers and materials during superstructure activities.

EXTERIORS

The exterior façades of the proposed buildings would be installed during this stage of construction. This stage of construction would overlap with a portion of the superstructure work. The façade elements would arrive on trucks and typically be lifted into place for attachment by a crane.

INTERIORS AND FINISHING

Interiors and finishing activities would include the construction of interior partitions, installation of lighting fixtures, and interior finishes (e.g., flooring, painting, etc.), and mechanical and electrical work, such as the installation of elevators and lobby finishes. Final cleanup and touchup of the buildings and final building system (e.g., electrical system, fire alarm, plumbing, etc.) testing and inspections would be part of this stage of construction. Equipment used during interiors and finishing would include exterior hoists, welders, delivery trucks, and a variety of small handheld tools. At Site 4 (4A/4B), the proposed building and existing building at 80 Rutgers Slip would be connected at the ground floor.

Interiors and finishing would be the quietest period of construction in terms of its effect on the public, because most of the construction activities would occur inside the building with the façades substantially complete and the proposed buildings enclosed.

SITEWORK

The proposed Site 4 (4A/4B) project would provide new amenities at the existing open space on Lots 15 (82 Rutgers Slip), 70 (80 Rutgers Slip), and 76 (235 Cherry Street). The proposed Site 5 project would enlarge the existing private Rutgers Slip Open Space by replacing a paved surface parking area between the private Rutgers Slip Open Space and the west side of the 265 Cherry Street building with new open space amenities. This area, in addition to the existing private Rutgers Slip Open Space, would be dedicated as publicly accessible open space. New amenities would be installed in the enlarged Rutgers Slip Open Space, including play equipment, basketball courts, landscaping, walking paths, and seating. In addition, the existing private courtyard between the 265 and 275 Cherry Street buildings would be enlarged and new amenities would be installed, inlcuding landscaping, seating, and play areas. The proposed Site 6A project would provide approximately 3,200 square feet (sf) of new private open space on site. During sitework, soil would be brought to the site for the grassy areas and landscaping and trees would be planted. Site work would include equipment such as loaders and pavers.

NUMBER OF CONSTRUCTION WORKERS AND MATERIAL DELIVERIES

Table 19-5 shows the estimated average daily numbers of workers and deliveries for the proposed projects by calendar quarter for the duration of the construction period. The average number of workers throughout the entire construction period for all three sites would be approximately 519 per day. The peak number of workers by calendar quarter would be approximately 899 per day, and would occur when exteriors and interiors and finishing stages of construction would overlap during the first quarter of Year 3 construction. As shown in **Table 19-5**, the peak level of construction workers would not persist throughout the entire three-year construction period. During non-peak periods of construction, the number of construction workers would be less, and sometimes much less, than the 899 average workers per day estimated for the peak period.

Table 19-5
Average Number of Daily Workers and Trucks by Year and Quarter

Year	Year 1				Year 2				Year 3					
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	Average	Peak
Workers	71	94	134	336	599	660	652	869	**899**	799	655	457	519	899
Trucks	44	41	51	70	80	**82**	49	65	56	55	57	41	58	82

Sources:
Site 4 (4A/4B) – JDS Construction Group
Site 5 – Urban Atelier Group
Site 6 – Gilbane Building Company

For truck trips, the average number of trucks throughout the entire construction period would be approximately 58 per day, and the peak number of deliveries by calendar quarter would occur when superstructure, exteriors and interiors, and finishing stages of construction overlap during the second quarter of Year 2 construction, with approximately 82 trucks per day. As shown in **Table 19-5**, the peak level of construction truck trips would not persist throughout the entire three-year construction period. During non-peak periods of construction, the number of construction truck trips would be less, and sometimes much less, than the average 82 truck trips per day estimated for the peak period.

E. FUTURE WITHOUT THE PROPOSED PROJECTS

As described in Chapter 1, "Project Description," absent the proposed projects, it is assumed that the project sites would continue in their existing conditions and that the existing retail in the Lot 76 building (235 Cherry Street) on Site 4 (4A/4B) would be re-tenanted. No new development would occur on the project sites.

F. FUTURE WITH THE PROPOSED PROJECTS

Construction of the proposed projects—as is the case with most large construction projects—would result in some temporary disruptions in the surrounding area. The following analysis describes the overall temporary effects on transportation, air quality, noise, vibration, as well as consideration of other technical areas including land use and neighborhood character, socioeconomic conditions, community facilities and services, open space, historic and cultural resources, natural resources, and hazardous materials.

TRANSPORTATION

The construction transportation analysis assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities. The analysis is based on the peak worker and truck trips during construction of the proposed projects, which are developed based on several factors including worker modal splits, vehicle occupancy and trip distribution, truck passenger car equivalents (PCEs), and arrival/departure patterns.

The following sections evaluate the potential for the proposed projects' peak construction worker and truck trips to result in significant adverse impacts to traffic, parking, transit facilities, and pedestrian elements.

TRAFFIC

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

Construction Trip-Generation Projections

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

Construction Worker Modal Splits and Vehicle Occupancy

Based on the latest available U.S. Census data (2000 Census data) for workers in the construction and excavation industry, it is anticipated that 49 percent of construction workers would commute to the project sites using private autos at an average occupancy of approximately 1.24 persons per vehicle. Similarly, it is expected that approximately 44 percent of construction workers would commute to the project sites via transit and the remaining 7 percent would walk to the project sites.

Daily Workforce and Truck Deliveries

To assess a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily combined workforce and truck trip projections in the peak quarter were used as the basis for estimating peak-hour construction trips. It is expected that construction of the proposed projects would generate a peak of approximately 869 workers and 65 truck deliveries per day during the fourth quarter of Year 2 construction. These estimates of construction activities are discussed further below.

Peak-Hour, Construction-Worker Vehicle, and Truck Trips

Similar to other construction projects in New York City, most of the construction activities at the project sites are expected to take place from 7:00 AM to 3:30 PM. While construction truck trips would occur throughout the day, most trucks would remain in the area for short durations, and construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips (one “in” and one “out”) and would start arriving to the project sites during the hour before each work shift). Construction truck deliveries typically peak during the hour before each shift (25 percent), overlapping with construction worker arrival traffic. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would generally occur during the hour before and after each work shift. In accordance with the *CEQR Technical Manual*, the traffic analysis assumed that each truck has a PCE of 2 while private construction worker autos have a PCE of 1.

As shown in **Table 19-6**, the maximum construction-related traffic increments would be approximately 339 PCEs between 6:00 AM and 7:00 AM and 287 PCEs between 3:00 PM and 4:00 PM. These incremental construction PCEs would exceed the *CEQR Technical Manual* threshold of 50 vehicle-trips. Projected traffic levels generated during peak construction and those upon full build-out of the proposed projects are compared in **Table 19-7**~~.~~, which shows that ~~As presented in **Table 19-7**,~~ the construction traffic increments would be much lower than the operational traffic increments for the full build-out under the proposed projects in 2021.

Table 19-6
Peak Construction Vehicle Trip Projections

	Auto Trips			Truck Trips			Total					
	Regular Shift			Regular Shift			Vehicle Trips			PCE Trips		
Hour	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6 AM–7 AM	**275**	**0**	**275**	**16**	**16**	**32**	**291**	**16**	**307**	**307**	**32**	**339**
7 AM–8 AM	68	0	68	6	6	12	74	6	80	80	12	92
8 AM–9 AM	0	0	0	6	6	12	6	6	12	12	12	24
9 AM–10 AM	0	0	0	7	7	14	7	7	14	14	14	28
10 AM–11 AM	0	0	0	7	7	14	7	7	14	14	14	28
11 AM–12 PM	0	0	0	7	7	14	7	7	14	14	14	28
12 PM–1 PM	0	0	0	7	7	14	7	7	14	14	14	28
1 PM–2 PM	0	0	0	3	3	6	3	3	6	6	6	12
2 PM–3 PM	0	17	17	3	3	6	3	20	23	6	23	29
3 PM–4 PM	**0**	**275**	**27**	**3**	**3**	**6**	**3**	**278**	**281**	**6**	**281**	**287**
4 PM–5 PM	0	51	51	0	0	0	0	51	51	0	51	51
Daily Total	343	343	686	65	65	130	408	408	816	473	473	946

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

Table 19-7
Comparison of Incremental Construction and Operational Peak Period Vehicle Trips in PCEs

Time	Peak Incremental Construction Vehicle Trips in PCEs			Peak Incremental Operational Vehicle Trips in PCEs			Difference
	In	Out	Total	In	Out	Total	
AM Peak Period (6:00 AM to 9:00 AM)							
AM Peak Hour[1]	307	32	339	134	301	435	(96)
PM Peak Period (3:00 PM to 6:00 PM)							
PM Peak Hour[2]	6	281	287	265	159	424	(137)

Notes:
[1] The AM peak hour is 6:00 to 7:00 AM for construction and 8:00 to 9:00 AM for operational.
[2] The PM peak hour is 3:00 to 4:00 PM for construction and 5:00 to 6:00 PM for operational.

While the potential traffic impacts during peak construction are expected to be within the envelope of significant adverse traffic impacts identified for the future with the proposed actions condition in Chapter 14, "Transportation,." a detailed construction traffic analysis was prepared subsequent to the publication of the DEIS to identify specific temporary traffic impacts that may occur during construction. For these impacts, mitigation measures akin to those recommended to address the anticipated operational impacts upon the full build-out of the proposed projects were also identified.

The projected 6:00 to 7:00 AM and 3:00 to 4:00 PM construction traffic were assigned to the surrounding roadway network, with trucks assigned to DOT-designated truck routes. Intersections that would incur 50 or more incremental construction PCEs were identified for analysis. Those that would have fewer than 50 incremental construction PCEs but were identified to be impacted with the full build-out and occupancy of the proposed projects were also included for analysis. In total, the detailed construction traffic analyses encompassed a study area of 15 intersections, as summarized in **Table 19-8**. These are among the 31 intersections analyzed in Chapter 14, "Transportation."

Table 19-8
Construction vs. Operational Traffic Level 2 Screening Analysis Results

Traffic Intersections	Operational Traffic AM	Operational Traffic PM	Construction Traffic AM	Construction Traffic PM	Included for Analysis
Grand Street and the Bowery	34	33	21	3	
Grand Street and Allen Street	39	44	44	5	
Hester Street and the Bowery	33	29	15	9	
Hester Street and Pike Street	51	36	23	27	
Canal Street/Manhattan Bridge Entrance (BK) and the Bowery	62	53	43	33	
Canal Street and Manhattan Bridge Lower Level	4	9	3	1	
Canal Street and Manhattan Bridge Upper Level/Chrystie Street	5	14	28	0	
Canal Street and Forsyth Street	5	14	28	0	
Canal Street and Eldridge Street	3	5	0	0	
Canal Street and Allen Street	54	41	23	27	✓
The Bowery and Bayard Street	46	29	23	32	
Pell Street and the Bowery	46	29	23	32	
Division Street and the Bowery	73	39	23	40	✓
Division Street and Market Street	10	25	36	0	✓
Division Street and Forsyth Street/Eldridge Street	11	17	22	6	
Division Street and Allen Street	34	31	23	27	
Worth Street/Oliver Street and Chatham Square	61	51	28	23	✓
Chatham Square and East Broadway	93	74	51	13	✓
East Broadway and Catherine Street	56	60	51	5	✓
East Broadway and Market Street	56	62	~~30~~43	~~3~~5	
East Broadway and Forsyth Street	56	50	~~16~~29	~~9~~11	
East Broadway and Allen Street	86	64	~~39~~52	~~30~~32	✓
East Broadway and Essex Street	40	31	~~13~~13	~~3~~2	
Henry Street and Market Street	2	11	28	0	
Henry Street and Mechanics Alley	2	9	0	0	
Henry Street and Forsyth Street	2	9	0	6	
Henry Street and Pike Street	69	52	~~26~~39	~~33~~36	
Henry Street and Rutgers Street	31	24	0	~~0~~6	
Henry Street and Jefferson Street	20	15	0	~~0~~6	
Henry Street and Clinton Street	17	18	25	~~0~~6	
Henry Street and Montgomery Street	48	23	~~13~~13	~~39~~44	
Madison Street and Market Street	3	8	~~41~~28	~~2~~0	
Madison Street and Mechanics Alley	2	2	~~1~~30	~~2~~0	
Madison Street and Pike Street	70	54	~~39~~39	~~35~~30	✓
Madison Street and Rutgers Street	72	58	~~1~~35	~~2~~1	
Madison Street and Jefferson Street	45	35	~~1~~35	~~2~~1	
Madison Street and Clinton Street	48	44	~~38~~30	~~2~~1	
Madison Street and Montgomery Street	103	62	~~26~~18	~~49~~45	✓
Monroe Street and Market Street	2	12	36	0	
Monroe Street and Mechanics Alley	1	6	8	0	
Monroe Street and Pike Street	59	44	~~26~~34	~~41~~37	
Monroe Street/ Catherine Street and Montgomery Street	103	62	~~26~~18	~~49~~45	
Cherry Street and Market Street	2	12	36	0	
Cherry Street and Pike Street	78	56	~~26~~34	~~49~~45	
Cherry Street and Rutgers Street	79	74	27	4	
Cherry Street and Clinton Street	43	47	29	1	
Cherry Street and Montgomery Street	103	62	~~26~~18	~~49~~45	
Water Street and Market Street	2	12	36	0	
Water Street and Montgomery Street	103	61	~~26~~18	~~49~~45	
South Street and Market Street	36	38	48	8	
South Street and Pike Street	83	62	~~38~~46	~~53~~49	✓
South Street and Rutgers Street	81	65	55	~~55~~49	✓
South Street and Clinton Street	87	76	~~78~~70	~~55~~47	✓
South Street/ FDR North Ramp and Montgomery Street	138	100	~~78~~70	~~99~~89	✓
Worth Street and Church Street	45	34	19	19	
Worth Street and Broadway	50	51	36	19	
Worth Street and Lafayette Street	54	54	36	19	
Worth Street and Centre Street	63	61	42	37	✓
Worth Street and Baxter Street	63	61	42	37	
Worth Street and Mulberry Street	63	61	42	37	
Delancey Street and Allen Street	53	50	41	4	✓
Broome Street and Allen Street	37	45	41	4	

Note: ✓ denotes intersections selected for detailed construction traffic analysis.

To establish a construction No Action condition against which to measure the potential construction traffic impacts, automatic traffic recorder (ATR) data collected for the operational analyses were reviewed to determine relative traffic levels between the operational and construction analysis peak hours (i.e., 8:00 to 9:00 AM vs. 6:00 to 7:00 AM and 5:00 to 6:00 PM vs. 3:00 to 4:00 PM). Based on this review, the operational No Action traffic volumes were reduced by 34 percent for the AM peak hour and 9 percent for the PM peak hour to arrive at the representative construction analysis traffic volumes. Although peak construction would occur approximately one year prior to project completion, a reduction in background growth was conservatively not applied for purposes of the construction traffic analyses. Projected construction traffic volumes were then overlaid onto the above construction No Action traffic volumes to yield the construction With Action condition. Analysis methodologies in accordance with guidance prescribed in the *CEQR Technical Manual*, as detailed in Chapter 14, “Transportation,” were followed to assess the potential construction traffic impacts. Where impacts were identified, the same traffic engineering measures identified for operational traffic impacts were explored to mitigate the construction traffic impacts to the extent practicable. **Tables 19-9 and 19-10** itemize the recommended mitigation measures that would address the temporary traffic impacts that may occur during construction. As shown in **Table 19-11**, significant adverse traffic impacts were identified for ~~one~~two intersections during the construction AM peak hour and five intersections during the construction PM peak hour, as follows.

Construction AM Peak Hour

- East Broadway and Pike Street – northbound left-turn movement; and
- Allen Street and Delancey Street – westbound left-turn movement.

Construction PM Peak Hour

- South Street and Pike Street – southbound left-turn movement;
- South Street and Clinton Street – eastbound left-through lane group;
- South Street (South) and Montgomery Street – southbound left-through lane group;
- Madison Street and Montgomery Street – northbound approach; and
- Chatham Square and Worth Street/Oliver Street – eastbound Worth Street approach.

All ~~six~~seven intersections listed above were also identified to incur significant adverse impacts with the full build-out of the proposed projects. During the construction AM peak hour, the significant adverse impact identified for the northbound left-turn movement at East Broadway and Pike Street could be mitigated with the same lane restriping and signal retiming proposed ~~in~~to mitigate the operational ~~period~~impacts. In addition, a significant adverse impact was identified for the westbound left-turn movement at Allen Street and Delancey Street. Impacts at this intersection were also identified for the full build-out of the proposed projects but only during the weekday midday and PM peak hours. During the 6:00 to 7:00 AM construction AM peak hour, DOT operates off-peak signal timing at this intersection and allocates 10 fewer seconds of green time to the westbound left-turn movement than the hour after. As shown in **Table 19-11**, a shift of two seconds of green time from the east-west phase to the westbound left-turn phase would mitigate this impact. This signal timing adjustment can be made for only peak construction and revert to regular operations afterwards. At three of the five intersections identified to be impacted during the construction PM peak hour (i.e., South Street and Pike Street, South Street and Clinton Street, and Madison Street and Montgomery Street), the same or similar traffic engineering measures identified to mitigate the operational impacts (see Chapter 21, “Mitigation”) could be implemented early to mitigate these impacts during peak construction. For the remaining two intersections (i.e., South

Street and Montgomery Street and Chatham Square and Worth Street/Oliver Street), no feasible measures were found to mitigate either the operational or the construction period impacts. The construction traffic impacts at these two intersections would, therefore, also remain unmitigated.

Table 19-9
Recommended Construction Mitigation Measures
Weekday 6–7 AM

Intersection	No Action Signal Timing	Recommended Construction Mitigation Measures	Recommended Signal Timing
East Broadway and Pike Street (East and West)	EB/WB: Green = 30 s SB: Green = 8 s NB/SB: Green = 22 s NB: Green = 10 s	1) Restripe the EB approach from one 11-foot moving lane, one 5-foot bike lane, and one 10-foot parking lane to one 11-foot moving lane, one 5-foot bike lane, and one 10-foot right-turn lane. 2) Install "No Standing Anytime: for 100-feet at the EB approach to create an additional right-turn lane. 3) Shift 2 second of green time from the NB/SB phase to the NB phase.	EB/WB: Green = 30 s SB: Green = 8 s NB/SB: Green = 20 s NB: Green = 12 s
Allen Street and Delancey Street	EB/WB: Green = 35 s WB: Green = 15 s NB/SB: Green = 24 s	Shift 2 seconds of green time from the EB/WB phase to the WB phase.	EB/WB: Green = 33 s WB: Green = 17 s NB/SB: Green = 24 s

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; L = Left; T = Through; R = Right

Table 19-10
Recommended Construction Mitigation Measures
Weekday 3–4 PM

Intersection	No Action Signal Timing	Recommended Construction Mitigation Measures	Recommended Signal Timing
South Street and Pike Slip	EB-L: Green = 14 s EB/WB: Green = 35 s LPI: Green = 7 s SB: Green = 19 s	Shift 1 second of green time from the EB/WB phase to the SB phase.	EB-L: Green = 14 s EB/WB: Green = 34 s LPI: Green = 7 s SB: Green = 20 s
South Street and Clinton Street	EB/WB: Green = 49 s NB/SB: Green = 31 s	Shift 4 seconds of green time from the NB/SB phase to the EB/WB phase.	EB/WB: Green = 53 s NB/SB: Green = 27 s
South Street and Montgomery Street (North and South)	EB/WB: Green = 49 s NB/SB: Green = 31 s	Unmitigated	No change from No Action
Madison Street and Montgomery Street	EB/WB: Green = 40 s NB/SB: Green = 40 s	Shift 2 seconds of green time from the EB/WB phase to the NB/SB phase.	EB/WB: Green = 38 s NB/SB: Green = 42 s
East Broadway and Pike Street (East and West)	EB/WB: Green = 30 s SB: Green = 8 s NB/SB: Green = 22 s NB: Green = 10 s	1) Restripe the EB approach from one 11-foot moving lane, one 5-foot bike lane, and one 10-foot parking lane to one 11-foot moving lane, one 5-foot bike lane, and one 10-foot right-turn lane. 2) Install "No Standing Anytime: for 100-feet at the EB approach to create an additional right-turn lane.	No change from No Action
Chatham Square and Worth Street/Oliver Street	EB (Mott Street): Green = 18 s EB/WB (Worth/Oliver Streets): Green = 28 s NB/SB: Green = 29 s	Unmitigated	No change from No Action

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; L = Left; T = Through; R = Right; LPI = Lead Pedestrian Interval

Table 19-11
Construction No Action, With Action, and Mitigation Conditions Level of Service Analysis
Signalized Intersections

Intersection	Weekday 6–7 AM														Weekday 3–4 PM												
	Construction No Action				Construction With Action				Construction Mitigation				Recommended Mitigation Measures	Construction No Action				Construction With Action				Construction Mitigation				Recommended Mitigation Measures
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS		Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	
South Street and Pike Slip																										
Eastbound	L	0.41	11.4	B	L	0.42	11.9	B						L	0.49	15.4	B	L	0.49	15.4	B	L	0.51	16.3	B	Same as the proposed operational mitigation.
	T	0.40	21.8	C	T	0.41	22.0	C						T	0.45	22.7	C	T	0.47	23.0	C	T	0.48	23.9	C	
Westbound	T	0.37	21.1	C	T	0.41	21.8	C						T	0.66	27.5	C	T	0.66	27.5	C	T	0.68	29.0	C	
	R	0.25	19.9	B	R	0.27	20.2	C						R	0.39	22.3	C	R	0.39	22.3	C	R	0.40	23.3	C	
Southbound	L	0.34	33.4	C	L	0.38	34.2	C						L	0.57	39.3	D	L	0.73	47.5	D +	L	0.70	44.0	D	
	R	0.56	42.4	D	R	0.56	42.4	D						R	0.46	36.3	D	R	0.46	36.3	D	R	0.44	34.8	C	
South Street and Rutgers Slip																										
Eastbound	LT	0.37	13.0	B	LT	0.42	13.7	B						LT	0.61	17.4	B	LT	0.69	20.0	B					
Westbound	TR	0.38	12.9	B	TR	0.44	13.6	B						TR	0.65	17.6	B	TR	0.65	17.6	B					
South Street and Clinton Street																										
Eastbound	LT	0.37	13.1	B	LT	0.38	13.3	B						LT	0.88	37.1	D	LT	0.96	50.4	D +	LT	0.82	26.5	C	Same as the proposed operational mitigation.
Westbound	T	0.40	13.3	B	T	0.46	14.3	B						T	0.76	22.1	C	T	0.76	22.2	C	T	0.70	17.4	B	
	R	0.12	10.4	B	R	0.18	11.1	B						R	0.23	11.5	B	R	0.23	11.5	B	R	0.21	9.4	A	
South Street (North) and Montgomery Street																										
Westbound	LTR	0.60	16.5	B	LTR	0.66	18.0	B						LTR	1.03	56.2	E	LTR	1.03	56.2	E					
Northbound	LT	0.12	20.6	C	LT	0.12	20.6	C						LT	0.69	35.3	D	LT	0.77	41.7	D					
Southbound	TR	0.45	26.0	C	TR	0.50	27.3	C						TR	0.61	30.5	C	TR	0.72	35.2	D					
South Street (South) and Montgomery Street																										
Eastbound	LTR	0.25	11.5	B	LTR	0.25	11.5	B						LTR	0.35	12.6	B	LTR	0.41	13.3	B	Unmitigated				Same as the proposed operational mitigation.
Northbound	TR	0.08	20.1	C	TR	0.08	20.1	C						TR	0.43	25.1	C	TR	0.43	25.1	C					
Southbound	LT	0.47	26.8	C	LT	0.47	26.7	C						LT	1.26	170.8	F	LT	1.47	260.0	F +					
Madison Street and Pike Street (East)																										
Eastbound	L	0.60	36.9	D	L	0.60	36.9	D						L	0.65	41.8	D	L	0.65	41.8	D					
	T	0.21	22.6	C	T	0.21	22.6	C						T	0.32	24.2	C	T	0.32	24.2	C					
Westbound	TR	0.44	26.7	C	TR	0.44	26.7	C						TR	0.61	31.8	C	TR	0.61	31.8	C					
Northbound	L	0.16	38.4	D	L	0.16	38.4	D						L	0.19	38.9	D	L	0.19	38.9	D					
	TR	0.31	18.7	B	TR	0.34	19.1	B						TR	0.39	19.6	B	TR	0.39	19.6	B					
Madison Street and Pike Street (West)																										
Eastbound	TR	0.57	30.2	C	TR	0.57	39.2	C						TR	0.70	35.4	D	TR	0.70	35.4	D					
Westbound	L	0.05	20.8	C	L	0.05	20.8	C						L	0.14	22.7	C	L	0.14	22.7	C					
	T	0.28	23.5	C	T	0.28	23.5	C						T	0.26	23.0	C	T	0.26	23.0	C					
Southbound	L	0.32	45.7	D	L	0.37	47.8	D						L	0.29	44.5	D	L	0.30	44.8	D					
	TR	0.27	19.4	B	TR	0.28	19.5	B						TR	0.42	21.6	C	TR	0.45	21.9	C					

Table 19-11 (cont'd)
Construction No Action, With Action, and Mitigation Conditions Level of Service Analysis
Signalized Intersections

Intersection	Weekday 6–7 AM													Weekday 3–4 PM													
	Construction No Action				Construction With Action				Construction Mitigation				Recommended Mitigation Measures	Construction No Action				Construction With Action				Construction Mitigation				Recommended Mitigation Measures
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS		Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	
Madison Street and Montgomery Street																										
Eastbound	LTR	0.30	17.6	B	LTR	0.31	17.8	B						LTR	0.38	19.1	B	LTR	0.38	19.2	B	LTR	0.42	21.1	C	Shift 2 seconds of green time from the EB/WB phase to the NB/SB phase.
Westbound	LTR	0.19	15.9	B	LTR	0.19	15.9	B						LTR	0.47	20.5	C	LTR	0.47	20.5	C	LTR	0.49	22.5	C	
Northbound	LTR	0.29	17.3	B	LTR	0.29	17.3	B						LTR	0.99	70.8	E	LTR	1.06	90.1	F +	LTR	0.98	67.5	E	
Southbound	LTR	0.39	18.7	B	LTR	0.41	19.1	B						LTR	0.57	22.7	C	LTR	0.65	25.0	C	LTR	0.61	22.6	C	
East Broadway and Catherine Street																										
Eastbound	TR	0.34	9.7	A	TR	0.41	10.7	B						TR	0.49	11.8	B	TR	0.49	11.8	B					
Westbound	LT	0.33	9.8	A	LT	0.36	10.2	B						LT	0.42	11.1	B	LT	0.43	11.1	B					
Southbound	LTR	0.01	23.6	C	LTR	0.01	23.6	C						LTR	0.05	24.1	C	LTR	0.05	24.1	C					
East Broadway and Pike Street (East)																										
Eastbound	L	0.30	26.0	C	L	0.30	26.0	C	L	0.30	26.0	C	Same as the proposed operational mitigation.	L	0.76	53.1	D	L	0.76	53.1	D	L	0.76	53.1	D	Applied AM peak hour restriping mitigation without signal timing adjustments.
	T	0.30	23.8	C	T	0.33	24.3	C	T	0.33	24.3	C		T	0.40	25.3	C	T	0.40	25.4	C	T	0.40	25.4	C	
Westbound	TR	0.45	27.1	C	TR	0.45	27.1	C	TR	0.45	27.1	C		TR	0.61	31.9	C	TR	0.61	31.9	C	TR	0.61	31.9	C	
Northbound	L	0.46	48.3	D	L	0.61	56.5	E +	L	0.51	47.0	D		L	0.80	72.8	E	L	0.82	76.5	E	L	0.82	76.5	E	
	TR	0.43	20.3	C	TR	0.44	20.5	C	TR	0.44	20.5	C		TR	0.50	21.3	C	TR	0.50	21.4	C	TR	0.50	21.4	C	
East Broadway and Pike Street (West)																										
Eastbound	-	-	-	-	-	-	-	-	T	0.42	26.6	C	Same as the proposed operational mitigation.	-	-	-	-	-	-	-	-	T	0.67	32.7	C	Applied AM peak hour restriping mitigation without signal timing adjustments.
	TR	0.64	33.4	C	TR	0.68	35.0	C	-	-	-	-		TR	1.00	75.2	E	TR	1.01	77.1	E	-	-	-	-	
	-	-	-	-	-	-	-	-	R	0.17	22.6	C		-	-	-	-	-	-	-	-	R	0.23	23.8	C	
Westbound	L	0.18	23.5	C	L	0.18	23.7	C	L	0.14	22.5	C		L	0.43	33.9	C	L	0.44	34.1	C	L	0.33	28.0	C	
	T	0.27	23.4	C	T	0.27	23.4	C	T	0.27	23.4	C		T	0.31	23.9	C	T	0.31	23.9	C	T	0.31	23.9	C	
Southbound	L	0.23	42.8	D	L	0.23	42.8	D	L	0.23	42.8	D		L	0.29	44.5	D	L	0.29	44.5	D	L	0.29	44.5	D	
	T	0.25	19.2	B	T	0.27	19.4	B	T	0.28	20.9	C		T	0.38	20.8	C	T	0.41	21.2	C	T	0.41	21.2	C	
Division Street and Market Street																										
Westbound	T	0.18	17.2	B	T	0.20	17.4	B						T	0.25	17.8	B	T	0.25	17.8	B					
Northbound	L	0.41	23.9	C	L	0.45	24.7	C						L	0.65	31.2	C	L	0.65	31.2	C					
Allen Street and Canal Street																										
Eastbound	LTR	1.10	109.4	F	LTR	1.10	109.4	F						LTR	1.19	137.8	F	LTR	1.19	137.8	F					
Westbound	LTR	0.22	23.0	C	LTR	0.22	23.0	C						LTR	0.31	24.5	C	LTR	0.31	24.5	C					
Northbound	TR	0.37	20.7	C	TR	0.38	20.9	C						TR	0.55	23.4	C	TR	0.55	23.4	C					
Southbound	LTR	0.25	10.7	B	LTR	0.26	10.8	B						LTR	0.26	10.8	B	LTR	0.22	10.4	B					
Allen Street and Delancey Street																										
Eastbound	T	0.47	21.6	C	T	0.47	21.6	C	T	0.50	23.3	C	Shift 2 seconds of green time from the EB/WB phase to the WB phase.	T	0.83	29.7	C	T	0.83	29.7	C					
	R	0.07	17.6	B	R	0.07	17.6	B	R	0.07	18.9	B		R	0.11	18.1	B	R	0.11	18.1	B					
Westbound	L	1.00	95.2	F	L	1.15	141.1	F +	L	1.01	94.7	F		L	0.95	81.8	F	L	0.96	83.5	F					
	TR	0.44	9.9	A	TR	0.44	9.9	A	TR	0.44	9.9	A		TR	0.52	10.7	B	TR	0.52	10.7	B					
Northbound	T	0.53	30.9	C	T	0.53	30.9	C	T	0.53	30.9	C		T	0.52	30.6	C	T	0.52	30.6	C					
	R	0.28	15.1	B	R	0.31	15.5	B	R	0.30	14.1	B		R	0.57	21.4	C	R	0.58	21.5	C					

Table 19-11 (cont'd)
Construction No Action, With Action, and Mitigation Conditions Level of Service Analysis Signalized Intersections

Intersection	Weekday 6–7 AM													Weekday 3–4 PM												
	Construction No Action				Construction With Action				Construction Mitigation				Recommended Mitigation Measures	Construction No Action				Construction With Action				Construction Mitigation				Recommended Mitigation Measures
	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS		Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	Lane Group	v/c Ratio	Delay (sec)	LOS	
Southbound	TR	0.27	27.0	C	TR	0.27	27.0	C	TR	0.27	27.0	C		TR	0.48	29.9	C	TR	0.48	29.9	C					
Bowery and Division Street/Doyers Street																										
Eastbound	R	0.02	26.0	C	R	0.02	26.0	C						R	0.06	26.7	C	R	0.06	26.7	C					
Westbound	L	0.48	38.5	D	L	0.48	38.5	D						L	0.56	40.7	D	L	0.59	42.1	D					
	R	0.39	15.5	B	R	0.39	15.5	B						R	0.54	18.0	B	R	0.58	18.8	B					
Northbound	TR	0.24	19.0	B	TR	0.25	19.1	B						TR	0.55	23.2	C	TR	0.55	23.3	C					
Southbound	T	0.24	19.1	B	T	0.25	19.2	B						T	0.22	18.8	B	T	0.22	18.8	B					
Chatham Square and East Broadway																										
Westbound	L	0.21	16.1	B	L	0.22	16.3	B						L	0.28	17.0	B	L	0.28	17.0	B					
	R	0.11	15.0	B	R	0.13	15.3	B						R	0.20	16.1	B	R	0.20	16.1	B					
Northbound	T	0.15	15.1	B	T	0.15	15.1	B						T	0.41	18.0	B	T	0.41	18.0	B					
	R	0.29	17.6	B	R	0.35	18.6	B						R	0.75	34.4	C	R	0.75	34.4	C					
Southbound	L	0.39	20.0	B	L	0.43	21.0	C						L	0.60	29.6	C	L	0.60	30.0	C					
	T	0.19	15.5	B	T	0.19	15.5	B						T	0.17	15.3	B	T	0.18	15.3	B					
Chatham Square and Worth Street/Oliver Street																										
Eastbound (Worth Street)	L	0.47	36.2	D	L	0.57	41.7	D						L	1.07	114.9	F	L	1.13	133.4	F +					
	LTR	0.53	33.4	C	LTR	0.64	39.9	D						LTR	1.03	90.5	F	LTR	1.07	102.5	F +					
Eastbound (Mott Street)	LTR	0.37	35.6	D	LTR	0.37	35.6	D						LTR	0.75	53.2	D	LTR	0.75	53.2	D					
Westbound	LT	0.55	29.7	C	LT	0.55	29.7	C						LT	0.51	28.6	C	LT	0.54	29.2	C					Same as the proposed operational mitigation.
	R	0.45	29.0	C	R	0.45	29.0	C						R	1.00	80.8	F	R	1.00	80.8	F	Unmitigated				
Northbound	LTR	0.05	21.2	C	LTR	0.05	21.2	C						LTR	0.07	21.4	C	LTR	0.07	21.4	C					
Southbound	L	0.54	33.1	C	L	0.54	33.1	C						L	0.62	37.3	D	L	0.62	37.3	D					
	TR	0.50	28.2	C	TR	0.52	28.5	C						TR	0.82	45.4	D	TR	0.84	48.4	D					
Worth Street and Centre Street																										
Eastbound	L	0.20	16.2	B	L	0.20	16.2	B						L	0.19	11.7	B	L	0.20	12.2	B					
	T	0.34	15.4	B	T	0.40	16.3	B						T	0.63	17.3	B	T	0.63	17.3	B					
Westbound	T	0.48	27.5	C	T	0.48	27.5	C						T	0.36	20.8	C	T	0.40	21.5	C					
	R	0.30	25.5	C	R	0.34	26.4	C						R	0.19	18.6	B	R	0.25	19.5	B					
Northbound	L	0.06	16.9	B	L	0.06	16.9	B						L	0.11	21.4	C	L	0.11	21.4	C					
	TR	0.40	20.4	C	TR	0.40	20.4	C						TR	0.58	27.4	C	TR	0.58	27.4	C					

Notes: L = Left Turn, T = Through, R = Right Turn, LOS = Level of Service, EB = Eastbound, WB = Westbound, NB = Northbound, SB = Southbound
+ Denotes a significant adverse traffic impact

~~As summarized in Chapter 21, "Mitigation," all of the significant adverse traffic impacts identified at the 13 study area intersections could be fully mitigated except for those at the South Street and Montgomery Street and the Chatham Square and Worth Street/Oliver Street intersections, where the impacts have been deemed unmitigatable. During construction of the proposed projects, any significant adverse construction traffic impacts could be mitigated with the measures described in Chapter 21, "Mitigation." At the South Street and Montgomery Street and the Chatham Square and Worth Street/Oliver Street intersections, there could be the potential for unmitigated significant adverse traffic impacts during construction.~~

PARKING

As shown in **Table 19-5**, the peak number of workers during construction of the proposed projects would be approximately 899 per day, and would occur in the first quarter of Year 3 construction. The anticipated construction activities are therefore projected to generate a maximum parking demand of 355 spaces. Based on the parking analysis presented in Chapter 14, "Transportation," although there are currently 441 spaces available during the midday peak hour when the maximum parking demand is expected, there will be a parking shortfall of 646 spaces during the weekday midday period under the No Action condition. Conservatively assuming the parking utilization under the No Action condition, the construction worker demand of 355 spaces would result in a parking shortfall of 1,001 spaces during the peak construction period. The parking demand associated with construction workers commuting via auto would be temporary in nature. It is expected that excess parking demand resulting from the proposed projects during the weekday peak periods would need to be accommodated by limited on-street parking spaces, or in off-street parking facilities located more than a ½-mile walk from the project sites. Alternatively, motorists could choose to use alternate modes of transportation. As stated in the *CEQR Technical Manual*, a parking shortfall resulting from a project located in Manhattan does not constitute a significant adverse parking impact, due to the magnitude of available alternative modes of transportation.

TRANSIT

Based on 2000 U.S. Census data on workers in the construction and excavation industry, it is anticipated that approximately 44 percent of construction workers would commute to the project sites via transit (33 percent by subway and 11 percent by bus). The study area is served by one subway line (the F line) and four bus routes (M9, M15, M15 Select Bus Service, and M22). During the peak construction worker shift (a maximum of 899 average daily construction workers in the 7:00 AM to 3:30 PM shift) during the peak construction period for the proposed projects, this would correspond to approximately 396 workers traveling by transit (297 workers by subway and 99 workers by bus). With 80 percent of these workers arriving or departing during the construction peak hours, the estimated number of peak-hour transit trips would be 316, with 238 workers traveling by subway and 79 by bus.

Projected subway levels generated during peak construction and those upon full build-out of the proposed projects are compared in **Table 19-12**. As presented in **Table 19-12**, the subway increments during construction would be substantially lower than the operational subway increments for the full build-out under the proposed projects in 2021. Although significant adverse subway stairway impacts were identified for the commuter peak periods in Chapter 14, "Transportation," for the full build-out of the proposed projects, the construction worker trips would not have an effect on conditions during these commuter peak periods when subway ridership is typically substantially higher. Similar conclusions could also be made for bus ridership. Nonetheless, since significant adverse stairway impacts were identified for the commuter peak periods in Chapter 14, "Transportation," additional counts and analyses for the East Broadway F train station were undertaken for the construction peak hours, which verified that construction of the proposed projects is not expected to result in the potential for any significant adverse transit impacts.

Table 19-12
Comparison of Incremental Construction and Operational Peak Period Transit Trips

Time	Peak Incremental Construction Transit Trips			Peak Incremental Operational Transit Trips			Difference
	In	Out	Total	In	Out	Total	
AM Peak Period (6:00 AM to 9:00 AM)							
AM Peak Hour[1]	316	0	316	171	846	1,017	(701)
PM Peak Period (3:00 PM to 6:00 PM)							
PM Peak Hour[2]	0	316	316	770	351	1,121	(805)

Notes:
[1] The AM peak hour is 6:00 to 7:00 AM for construction and 8:00 to 9:00 AM for operational.
[2] The PM peak hour is 3:00 to 4:00 PM for construction and 5:00 to 6:00 PM for operational.

PEDESTRIANS

As summarized above, up to 899 average daily construction workers are projected in the 7:00 AM to 3:30 PM shift during peak construction for the proposed projects. With 80 percent of these workers arriving or departing during the construction peak hours (6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM), the corresponding numbers of peak-hour pedestrian trips traversing the area's sidewalks, corners, and crosswalks would be approximately 719. Projected pedestrian levels generated during peak construction and those upon full build-out of the proposed projects are compared in **Table 19-13**. As presented in **Table 19-13**, the construction pedestrian increments would be much lower than the operational pedestrian increments for the full build-out under the proposed projects in 2021. Although significant adverse pedestrian impacts were identified for a sidewalk and three crosswalk locations during peak periods in Chapter 14, "Transportation" for the full build-out of the proposed projects, the construction worker trips would be made outside of these peak periods when background pedestrian levels would be relatively lower.

Table 19-13
Comparison of Incremental Construction and Operational Peak Period Pedestrian Trips

Time	Peak Incremental Construction Pedestrian Trips			Peak Incremental Operational Pedestrian Trips			Difference
	In	Out	Total	In	Out	Total	
AM Peak Period (6:00 AM to 9:00 AM)							
AM Peak Hour[1]	719	0	719	517	1,958	2,475	(1,756)
PM Peak Period (3:00 PM to 6:00 PM)							
PM Peak Hour[2]	0	719	719	1,838	977	2,815	(2,096)

Notes:
[1] The AM peak hour is 6:00 to 7:00 AM for construction and 8:00 to 9:00 AM for operational.
[2] The PM peak hour is 3:00 to 4:00 PM for construction and 5:00 to 6:00 PM for operational.

Therefore,While the potential pedestrian impacts that would occur during peak construction are expected to be within the envelope of significant adverse pedestrian impacts identified in Chapter 14, "Transportation," a detailed construction pedestrian analysis was prepared subsequent to the publication of the DEIS to identify specific temporary pedestrian impacts that may occur during construction.for the full build-out of the proposed projects. Based on the assignment of construction-related pedestrian trips, locations that would incur 200 or more incremental pedestrians were identified for analysis. Those that would have fewer than 200 incremental pedestrians but were identified to be impacted with the full build-out and occupancy of the proposed projects were also included for analysis. In total, the detailed construction pedestrian analyses encompassed a study area of 15 total pedestrian elements, including 5 sidewalks, 6 corner reservoirs, and 4 crosswalks, as summarized in **Table 19-14**. These are among the 46 pedestrian elements analyzed in Chapter 14, "Transportation."

The same analysis procedure described above for analyzing construction traffic was used to assess potential pedestrian impacts during construction. As shown in **Tables 19-15 to 19-17**, the analysis results show that there would not be the potential for any significant adverse pedestrian impacts during peak construction. As summarized in Chapter 21, "Mitigation," all of the significant adverse construction-period pedestrian impacts could be fully mitigated. The recommended mitigation measures could be advanced by DOT to similarly address any temporary pedestrian impacts that may potentially occur during the construction period. Adjacent to the project sites, sidewalk protection or temporary sidewalks would also be provided during the construction period in accordance with DOT requirements to maintain pedestrian access where needed.

Table 19-14
Construction vs. Operational Pedestrian Level 2 Screening Analysis Results

Pedestrian Intersections	Operational Pedestrian AM	Operational Pedestrian PM	Construction Pedestrian AM	Construction Pedestrian PM	Included for Analysis
Pike Street and Henry Street					
East Crosswalk	179	199	63	71	
NE Corner	318	353	65	73	
SE Corner	194	215	69	77	
West Sidewalk between Madison Street and Henry Street	156	192	120	108	
East Sidewalk between Madison Street and Henry Street	341	355	79	79	
Rutgers Street and Henry Street					
East Sidewalk between Madison Street and Henry Street	146	238	52	25	
West Sidewalk between Madison Street and Henry Street	180	202	15	7	
Pike Street and Madison Street (West)					
SW Corner	240	293	186	182	
NW Corner	193	232	140	128	
Pike Street and Madison Street (East)					
East Sidewalk between Madison Street and Monroe Street	257	273	145	137	
NE Corner	263	269	124	116	
SE Corner	245	261	168	164	
Rutgers Street and Madison Street					
North Crosswalk	259	220	47	86	✓
East Crosswalk	402	461	99	111	
South Crosswalk	255	279	42	53	
West Crosswalk	928	1012	171	171	✓
NE Corner	661	681	146	197	
SE Corner	669	754	149	164	
SW Corner	1200	1309	234	245	✓
NW Corner	1187	1232	218	257	✓
North Sidewalk between Rutgers Street and Pike Street	1017	1039	203	250	✓
East Sidewalk between Madison Street and Monroe Street	643	728	149	149	
West Sidewalk between Madison Street and Monroe Street	714	776	151	159	
Pike Street and Monroe Street					
East Sidewalk between Monroe Street and Cherry Street	296	322	148	140	
Pike Street and Cherry Street					
East Crosswalk	258	286	127	121	
NE Corner	394	440	154	144	
SE Corner	342	376	156	152	
South Sidewalk between Pike Street and Site 4 (4A/4B) Residential Entrance	355	397	157	162	
Rutgers Street/Frank T. Modica Way and Cherry Street					
North Crosswalk	283	327	122	128	
East Crosswalk	882	995	271	277	✓
South Crosswalk	540	629	213	212	✓
West Crosswalk	574	621	91	88	
NE Corner	1166	1324	393	405	✓
SE Corner	540	631	213	212	✓
SW Corner	1115	1255	304	300	✓
NW Corner	785	873	197	204	✓
East Sidewalk between Monroe Street and Cherry Street	642	724	149	149	
South Sidewalk between Frank T. Modica Way and Site 5 Entrance	1403	1577	466	471	✓
South Sidewalk (east) between Frank T. Modica Way and Site 4 (4A/4B) Residential Entrance	549	614	166	168	
West Sidewalk between Cherry St and Monroe Street	742	816	186	194	
Cherry Street and Jefferson Street					
South Sidewalk Between Site 5 Entrance and Clinton Street	818	945	293	289	✓
Cherry Street and Clinton Street					
West Sidewalk (north) between Cherry Street and Plaza Entrance	376	419	228	228	✓
South Sidewalk between Plaza entrance and Clinton St	468	532	280	280	✓
South Street and Clinton Street					
West Sidewalk between Cherry Street and South Street	621	688	0	0	

Notes: ✓ denotes sidewalks, corners, or crosswalks selected for detailed construction pedestrian analysis.

Table 19-15
Construction No Action and With Action Conditions: Sidewalk Analysis

Location	Sidewalk	Effective Width (ft)	Construction No Action Condition: Two-way Peak Hour Volume	Construction No Action Condition: PHF	Construction No Action Condition: SFP	Construction No Action Condition: Platoon LOS	Construction With Action Condition: Two-way Peak Hour Volume	Construction With Action Condition: PHF	Construction With Action Condition: SFP	Construction With Action Condition: Platoon LOS
Weekday AM Peak Hour										
Madison Street between Rutgers Street and Subway Entrance	North	5.0	1004	0.71	55.0	C	1207	0.75	48.1	C
Cherry Street between Frank T. Modica Way (Rutgers Street) and Site 5 Entrance	South	8.5	329	0.71	290.4	B	795	0.77	130.0	B
Cherry Street Between Site 5 Entrance and Jefferson Street	South	10.0	384	0.77	317.5	B	677	0.79	184.5	B
Clinton Street between Cherry Street and Plaza Entrance	West	6.5	62	0.72	1195.6	A	228	0.78	352.1	B
Cherry Street between Jefferson Street and Clinton Street	South	5.5	239	0.68	247.7	B	519	0.74	123.8	B
Weekday PM Peak Hour										
Madison Street between Rutgers Street and Subway Entrance	North	5.0	1550	0.83	41.1	C	1800	0.83	35.0	D
Cherry Street between Frank T. Modica Way (Rutgers Street) and Site 5 Entrance	South	8.5	793	0.80	135.4	B	1264	0.80	84.6	C
Cherry Street Between Site 5 Entrance and Jefferson Street	South	10.0	732	0.83	179.3	B	1021	0.83	128.3	B
Clinton Street between Cherry Street and Plaza Entrance	West	6.5	136	0.61	461.7	B	228	0.74	334.0	B
Cherry Street between Jefferson Street and Clinton Street	South	5.5	396	0.75	164.7	B	676	0.78	100.0	B

Note: SFP = square feet per pedestrian

Table 19-16
Construction No Action and With Action Conditions: Corner Analysis

Location	Corner	Weekday AM Peak Hour: Construction No Action Condition SFP	LOS	Weekday AM Peak Hour: Construction With Action Condition SFP	LOS	Weekday PM Peak Hour: Construction No Action Condition SFP	LOS	Weekday PM Peak Hour: Construction With Action Condition SFP	LOS
Rutgers Street and Madison Street	Northwest	76.0	A	62.9	A	77.9	A	67.6	A
	Southwest	140.9	A	111.8	A	113.4	A	91.4	A
Cherry Street and Rutgers Street	Northeast	383.4	A	180.4	A	298.5	A	158.3	A
	Southwest	196.1	A	109.5	A	77.1	A	57.8	B
	Northwest	879.6	A	445.8	A	332.6	A	242.1	A
	Southeast	429.8	A	236.3	A	144.5	A	106.6	A

Note: SFP = square foot per pedestrian

Table 19-17
Construction No Action and With Action Conditions: Crosswalk Analysis

Location	Crosswalk	Crosswalk Length (ft)	Crosswalk Width (ft)	Construction No Action Condition			Construction With Action Condition		
				Two-way Peak Hour Volume	SFP	LOS	Two-way Peak Hour Volume	SFP	LOS
Weekday AM Peak Hour									
Rutgers Street and Madison Street	North	29.5	14.0	853	36.1	C	900	34.0	C
	West	50.0	15.0	590	44.2	B	761	33.6	C
Rutgers Street and Cherry Street	East	50.5	13.5	132	256.8	A	403	80.8	A
	South	21.5	14.5	232	98.5	A	445	48.7	B
Weekday PM Peak Hour									
Rutgers Street and Madison Street	North	29.5	14.0	770	44.1	B	856	39.3	C
	West	50.0	15.0	699	40.7	B	870	32.2	C
Rutgers Street and Cherry Street	East	50.5	13.5	203	171.4	A	480	70.2	A
	South	21.5	14.5	648	32.7	C	860	23.6	D

Note: SFP = square feet per pedestrian.

AIR QUALITY

Emissions from nonroad construction equipment and on-road construction vehicles, as well as dust-generating construction activities, all have the potential to affect air quality. The analysis of potential construction air quality impacts included an analysis of both nonroad and on-road sources of air emissions, and the combined impact of both sources, where applicable.

In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM) emissions. Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of CO. Since the EPA mandates the use of ULSD fuel for all highway and non-road diesel engines, sulfur oxides (SO_x) emitted from the proposed action’s construction activities would be negligible. Therefore, the pollutants to be analyzed for the construction period are NO_2, PM_{10}, $PM_{2.5}$, and CO.

Chapter 15, “Air Quality,” contains a review of the pollutants for analysis; applicable regulations, standards, and benchmarks; background concentrations; and general methodology for the air quality analysis. Additional details relevant only to the construction air quality analysis methodology are presented in the following section. The detailed approach for assessing the effect of construction activities resulting from the proposed projects on air quality is discussed further below.

NONROAD CONSTRUCTION ACTIVITY ASSESSMENT

The proposed projects each would be developed in a single phase. The construction period for each is anticipated to be between 30 and 36 months and the proposed projects are anticipated to be complete and operational by 2021. Because the level of construction activities would vary throughout the overall construction period, a determination of the reasonable worst-case analysis period for the construction air quality analysis was selected for each proposed project based on the estimated monthly construction work schedule, equipment to be employed and their usage factors, and equipment emission rates. The periods of highest emissions nearest to sensitive receptor locations are expected to be the periods of greatest impacts. Based on these factors, it is anticipated the short-term peak construction period in terms of air quality at each project construction area would occur during excavation and foundation activities where a large number of heavy diesel equipment such as excavators and loaders would be employed simultaneously in proximity to nearby sensitive receptor locations. It was conservatively assumed that peak construction activities at all three project construction areas would occur simultaneously. The worst-case annual analysis, which covers a 12-month period, would each occur during excavation, foundation, and superstructure activities.

The dispersion modeling analysis was performed for the reasonable worst-case annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods. The potential for significant adverse impacts were determined by comparing modeled NO_2, CO, and PM_{10} concentrations to the NAAQS, and modeled $PM_{2.5}$ and CO increments to applicable *de minimis* thresholds in the context of magnitude, duration, and locations and the size of the area affected by the concentration increment.

Construction Emission Sources

Construction emissions sources include nonroad construction equipment, on-road vehicles, and dust-generating construction activities. The nonroad construction equipment and on-road vehicles that would likely be operated during the modeled reasonable worse-case analysis periods were developed by experienced construction managers for the proposed projects.

Nonroad Construction Equipment

Nonroad construction equipment includes equipment operating on-site, such as cranes, loaders, excavators, and dozers. Emission rates for NO_x, CO, PM_{10}, and $PM_{2.5}$ from nonroad construction equipment engines were developed using the EPA's NONROAD2008 emission model (NONROAD[1]). Based on the emissions reduction program that would be implemented during the construction of the proposed projects (see Emissions Reduction Measures below), emission factors were calculated assuming the application of diesel particulate filters (original equipment manufacturer, retrofitted, or an equivalent tailpipe controls to reduce DPM emissions by at least 90 percent compared with equivalent uncontrolled diesel engines) and meeting at least EPA's Tier 3 certification on all non-road diesel engines 50 horsepower or greater.

On-Road Construction Vehicles

On-road vehicles include construction worker vehicles and construction trucks arriving to and from the construction sites, as well as operating on-site. Since emissions from nonroad construction equipment and on-road vehicles may contribute to concentration increments concurrently, both nonroad construction equipment and on-road vehicles were modeled together to address all local project-related construction emissions.

Vehicular engine emission factors were computed using the EPA Motor Vehicle Emission Simulator (MOVES2014a[2]) emission model.

Fugitive Dust Generating Activities

In addition to engine emissions, fugitive dust emissions are generated from operations (e.g., transferring excavated materials into dump trucks), vehicle travel on-site, and excavated soil

[1] NONROAD Model (Nonroad Engines, Equipment, and Vehicles) User Guide, EPA420-R-05-013, December 2005.

[2] EPA, Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES2014a, EPA-420-B-15-095, November 2015.

stockpiles. Fugitive dust emissions from operations were calculated using EPA procedures provided in AP-42[3] Table 13.2.3-1. Road dust emissions from vehicle travel on-site were calculated using equations from EPA's AP-42, Section 13.2.1 for paved roads.

The construction of the proposed projects is required to follow the DEP Construction Dust Rules[4] regarding construction-related dust emissions. Therefore, a 50 percent reduction in particulate emissions from fugitive dust was conservatively assumed in the calculations to account for required dust control measures that would be employed at the projects sites, such as wet suppression.

Emissions Reduction Measures

Construction activity in general has the potential to adversely affect air quality as a result of diesel emissions. Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. In addition, an emissions reduction program would be implemented to minimize the air quality effects from construction of the proposed projects, which would be memorialized in a Restrictive Declaration, consisting of the following components:

- *Dust Control.* The construction of the Project is required to follow the *DEP Construction Dust Rules*[5] regarding construction-related dust emissions. To minimize fugitive dust emissions from construction activities, a fugitive dust control plan including a robust watering program would be required as part of contract specifications. For example, all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the project construction areas and where necessary, water sprays would be used for all demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air.
- *Clean Fuel*. ULSD[6] fuel will be used exclusively for all diesel engines throughout the project construction areas.
- *Idling Restriction.* In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time would be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or are otherwise required for the proper operation of the engine.
- *Diesel Equipment Reduction*. Electrically powered equipment would be preferred over diesel-powered and gasoline-powered versions of that equipment to the extent practicable. Equipment that would use the grid power in lieu of diesel engines includes, but may not be limited to, hoists, the tower crane that would be employed during construction, and small equipment such as welders.

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[3] EPA Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources*, Chapter 13: Miscellaneous Sources.

[4] http://www.nyc.gov/html/dep/html/air/construction_dust_debris.shtml.

[5] http://www.nyc.gov/html/dep/html/air/construction_dust_debris.shtml.

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

- *Best Available Tailpipe Reduction Technologies*. Non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project) including but not limited to concrete mixing and pumping trucks would utilize the best available tailpipe (BAT) technology for reducing diesel particulate matter (DPM) emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel nonroad engines rated at 50 hp or greater would utilize DPFs to the extent practicable, either installed by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPFs must be verified by EPA or the California Air Resources Board (CARB). Active DPFs or other technologies proven to achieve an equivalent reduction may also be used.
- *Utilization of Newer Equipment.* EPA's Tier 1 through 4 standards for nonroad diesel engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons. To the extent practicable, all diesel-powered nonroad construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3[7] emissions standard. All diesel-powered engines in the project rated less than 50 hp would meet at least the Tier 2 emissions standard.

Overall, this emissions control program is expected to significantly reduce air pollutant emissions during construction of the proposed projects.

Dispersion Model

Potential impacts from the proposed projects' nonroad construction equipment, on-road vehicles, and fugitive dust generating activities were evaluated using the EPA/AMS AERMOD model (version 16216r), a refined dispersion model. AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain and includes updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and handling of terrain interactions.

Source Simulation

For short-term model scenarios (predicting concentration averages for periods of 24 hours or less), nonroad construction sources, such as idling trucks, which would likely remain at a single location on a given day, were simulated as point sources in the model. Other nonroad construction sources, such as excavators or loaders, which would move around the site on any given day, as well as on-road vehicles, were simulated as area sources in the model. For short-term averaging periods of 8 hours or less, it was assumed that all engines would be active simultaneously. For the annual analysis, because all sources are anticipated to move around the project construction areas throughout the year, these sources were simulated as area sources in the model. Additionally,

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[7] 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 PM, hydrocarbons (HC), 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.

equipment operations, number of workers, and numbers of trucks were simulated to operate continuously throughout the annual modeling period at levels equivalent to the average across the 12-month period.

Meteorological Data

The meteorological data set consists of five consecutive years of meteorological data: surface data collected at LaGuardia Airport (2012–2016), and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data sets were processed using the USEPA AERMET program (version 16216) to develop data in a format which can be readily processed by the AERMOD model. The land uses around the site where meteorological surface data is available was classified using categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

Receptor Locations

Receptors were placed at publicly accessible locations, at residential and other sensitive uses at both ground-level and elevated locations (e.g., residential windows and balconies), at adjacent sidewalk locations, and at publicly accessible open spaces including the Cherry Clinton Playground and the East River Esplanade.

In addition, a ground-level receptor grid extending 1 kilometer from each site was placed to enable extrapolation of concentrations near the project construction areas at locations more distant from construction activities and to capture any potential cumulative construction effects from of the proposed projects.

Background Concentrations

To estimate the maximum expected total pollutant concentrations, the modeled impacts from the emission sources were added to an ambient background value that accounts for existing pollutant concentrations from other sources. The background levels were based on concentrations monitored at the nearest DEC ambient air monitoring stations, and were consistent with the background concentrations used for the operational stationary source air quality analysis.

Combined Impact Assessment

The construction analyses conservatively assume that peak construction activities would occur simultaneously at the project construction areas in order to capture the cumulative nature of construction impacts. The combined effect from construction activities were assessed within the AERMOD model and presented.

PROBABLE IMPACTS OF THE PROJECT

Maximum predicted concentrations during the representative worst-case construction period for the proposed projects are presented in **Table 19-18**. To estimate the maximum total pollutant NO_2, CO, and PM_{10} concentrations, the modeled concentrations from the proposed projects were added to a background value that accounts for existing pollutant concentrations from other nearby sources.

Table 19-18
Maximum Pollutant Concentrations from the Proposed Projects
(micrograms/cubic meter [µg/m³])

Pollutant	Averaging Period Units	Maximum Modeled Impact	Background Concentration(1)	Total Concentration	Criterion
NO_2	Annual	29	33	72	100(2)
CO	1-hour	26,206	2,634	28,840	40,000(2)
	8-hour	4,257	1,718	5,975	10,000(2)
PM_{10}	24-hour	40	44	84	150(2)
$PM_{2.5}$	24-hour	6.4	21.6	N/A	6.7(3)
	Annual—Local	0.284	N/A	N/A	0.3(4)
	Annual—Neighborhood	0.01	N/A	N/A	0.1(4)

Notes: N/A—Not Applicable
1 The background levels are based on the most representative concentrations monitored at DEC ambient air monitoring stations (see Table 15-3 in Chapter 15, "Air Quality").
2 NAAQS
3 $PM_{2.5}$ *de minimis* criterion—24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35 µg/m³
4 $PM_{2.5}$ *de minimis* criterion—annual (local and neighborhood scale)

As shown in **Table 19-18**, the maximum predicted total concentrations of NO_2, CO and PM_{10} are below the applicable NAAQS. The maximum predicted $PM_{2.5}$ concentrations would also not exceed the applicable CEQR *de minimis* thresholds in the 24-hour[8] and annual averaging periods.

Emissions from the other less intensive construction stages would be less than the emissions during the peak construction period. Therefore, the resulting concentrations from the non-peak periods of construction are expected to be less than the concentrations presented in **Table 19-18** below.

NOISE

INTRODUCTION

Potential impacts on community noise levels during construction of the proposed projects could result from noise due to construction equipment operation and from noise due to 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 stage 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 hydraulic break rams, tower cranes, and paving breakers, as well as the movements of trucks.

Construction noise is regulated by the requirements of the *New York City Noise Control Code* (also known as Chapter 24 of the *Administrative Code of the City of New York*, or Local Law 113)

8 The CEQR 24-hour $PM_{2.5}$ *de minimis* criterion is equal to half the difference between the 24-hour background concentration (21.3 µg/m³) and the 24-hour standard (35 µg/m³).

and the DEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation (also known as Chapter 28). These requirements mandate that specific construction equipment and motor vehicles meet specified noise emission standards; that construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that construction materials be handled and transported in such a manner as not to create unnecessary noise. As described above, for weekend and after hour work, permits would be required to be obtained, as specified in the *New York City Noise Control Code*. As required under the *New York City Noise Control Code*, a site-specific noise mitigation plan for each proposed project would be developed and implemented that may include source controls, path controls, and receiver controls. These source and path control measures would be memorialized in a Restrictive Declaration to ensure appropriate implementation during construction.

CONSTRUCTION NOISE IMPACT CRITERIA

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

The *CEQR Technical Manual* also states that the impact criteria for vehicular sources, using conditions without the proposed project, or the “No Action” noise level as the baseline, should be used for assessing construction effects. As recommended in the *CEQR Technical Manual*, this study uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

- If the No Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ or greater increase would be considered significant.
- If the No Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would be considered a significant increase.
- If the No Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR criteria as being between 10PM and 7AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$.

NOISE ANALYSIS FUNDAMENTALS

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

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

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

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

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

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) and transportation sources (e.g., roads, highways, railroad lines, busways, waterways, airports). 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. 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 to be used with the CadnaA model includes CAD drawings defining planned 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 of each piece of construction equipment were input to the model. Reflections and shielding by barriers and project elements erected on the construction site and shielding from adjacent buildings were also accounted for in the model. The model produces A-weighted $L_{eq(1)}$ noise levels at each receptor location for each analysis period, as well as the contribution from each noise source.

NOISE ANALYSIS METHODOLOGY

The construction noise methodology involved the following process:

1. Select analysis hours for cumulative on-site equipment and construction truck noise analysis. The 7 AM hour was selected as the analysis hour because this would be the hour when the highest number of truck trips to and from the construction site would overlap with on-site equipment operation.

2. Select receptor locations for cumulative on-site equipment and construction truck noise analysis. Selected receptors were representative of open space, residential, or other noise-sensitive uses potentially affected by the construction of the proposed projects during operation of on-site construction equipment and/or along routes taken to and from the project site by construction trucks.
3. Establish existing noise levels at selected receptors. Noise levels were measured at several at-grade locations and one elevated location, and calculated for the other noise receptor locations included in the analysis. **Figure 19-2** shows the construction noise measurement locations. Existing noise levels at noise receptors other than the selected noise measurement locations were established using the CadnaA model along with existing-condition traffic information.
4. Establish worst-case noise analysis periods under the projected construction phasing schedule. The worst-case noise analysis periods are the periods during the construction schedule that are expected to have the greatest potential to result in construction noise effect. These periods were determined based on number and type of equipment operating on-site, and the amount of construction-related vehicular traffic expected to occur according to the construction schedule and logistics. At least one analysis period was selected per year of construction. Six analysis periods throughout the construction schedule were selected.
5. Calculate construction noise levels for each analysis period at each receptor location. Given the on-site equipment and construction truck trips that are expected during each of the analysis periods, and the location of the equipment, which was based on construction logistics diagrams and construction truck and worker vehicle trip assignments, a CadnaA model file for each analysis period was created. All model files included each of the construction noise sources during the analysis period and hour, calculation points representing multiple locations on various façades and floors of the associated receptors previously identified, as well as the noise control measures that would be used on the site, as described below.
6. Determine total noise levels and noise level increments during construction. For each analysis period and each noise receptor, the calculated level of construction noise was logarithmically added to the existing noise level to determine the cumulative total noise level. The existing noise level at each receptor was then arithmetically subtracted from the cumulative noise level in each analysis period to determine the noise level increments.
7. Establish construction noise duration. For each receptor, the noise level increments in each analysis period were examined to determine the duration during construction that the receptor would experience substantially elevated noise levels.
8. Compare noise level increments with impact criteria as set forth in Chapter 19, Section 421 of the *CEQR Technical Manual*. At each receptor, based on the magnitude and duration of predicted noise level increases due to construction, a determination of whether the proposed projects would have the potential to result in significant adverse construction noise effects was made.

NOISE REDUCTION MEASURES

Construction of the proposed projects would be required to follow the requirements of the *NYC Noise Control Code* (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113) for construction noise control measures. Specific noise control measures would be incorporated in noise mitigation plan(s) required under the *NYC Noise Code*. These measures could include a variety of source and path controls.

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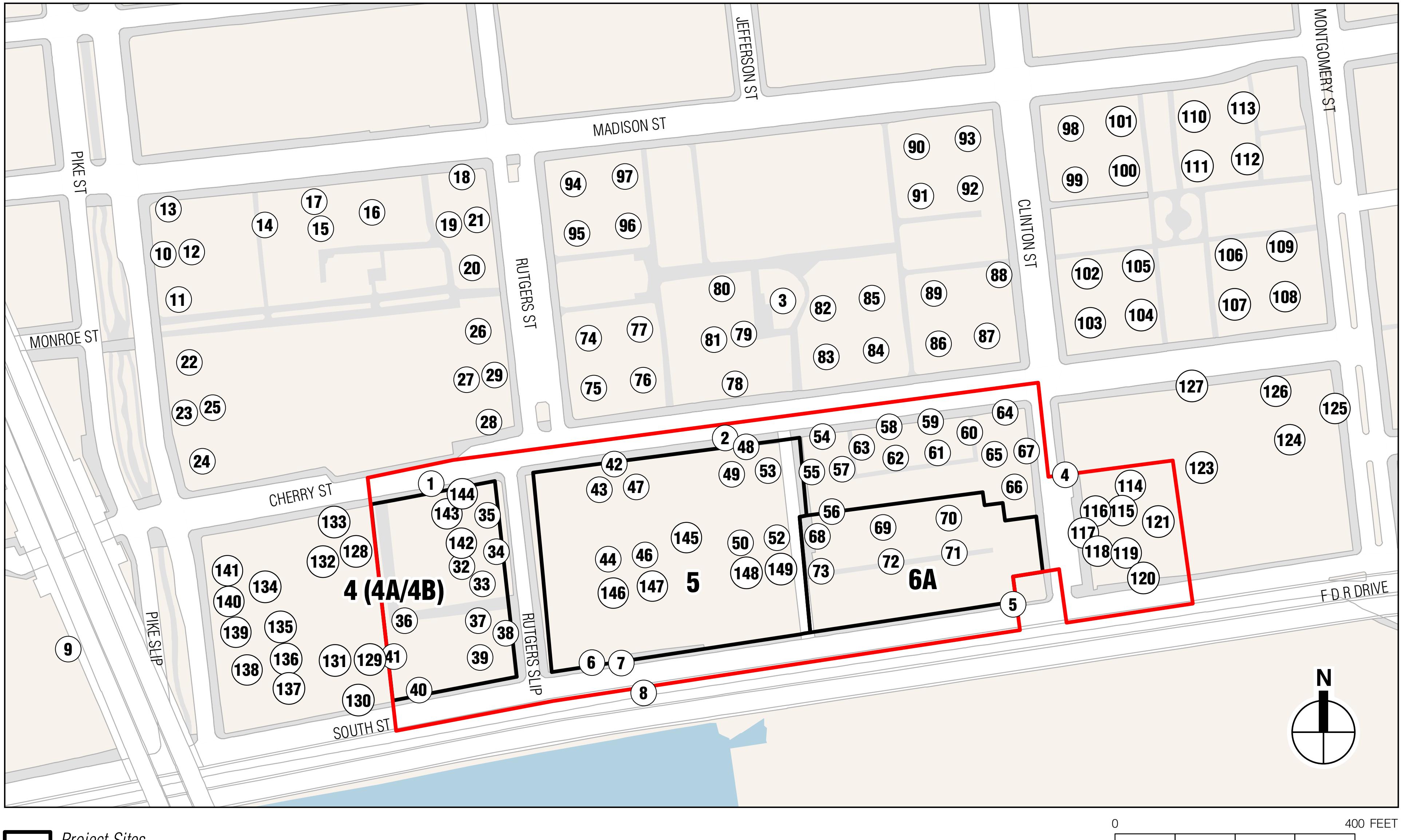

Source: NYC Dept. of City Planning MapPLUTO v. 16v2, edited by AKRF.

Project Sites

Boundary of Two Bridges LSRD

① Noise Receptor Location

TWO BRIDGES LSRD

Construction Noise Receptor Locations

Figure 19-2

The applicant for Site 4 (4A/4B) has committed to the use of drilled caissons in lieu of driven piles, including for construction activities such as support of excavation (SOE). However, if a driven pile is required for a specialty operation or is needed for utility work, the applicant for Site 4 (4A/4B) would coordinate with the appropriate agency requiring the driven piles(s) work to be performed.

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 *NYC Noise Control Code* would be utilized from the start of construction. The proposed projects would be committed to using some pieces of equipment that produce lower noise levels than typical construction equipment as required by the New York City Noise Control Code. **Table 19-19** shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the proposed projects.
- Where feasible and practicable, 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 Title 24, Chapter 1, Subchapter 7, Section 24-163 of the *NYC Administrative Code*.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

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

- 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.
- As early in the construction period as logistics would 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 practicable.
- Noise barriers constructed from plywood or other materials would be utilized to provide shielding (e.g., the construction sites would have a minimum 8-foot barrier);
- Where logistics allow, truck deliveries would take place behind the noise barriers; and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) for certain dominant noise equipment to the extent feasible and practical based on the results of the construction noise calculations. The details to construct portable noise barriers, enclosures, tents, etc. are shown in DEP's "Rules for Citywide Construction Noise Mitigation."[9]

These source and path control measures would be memorialized in a Restrictive Declaration to ensure appropriate implementation during construction.

[9] As found at: http://www.nyc.gov/html/dep/pdf/noise_constr_rule.pdf

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

Equipment List	NYCDEP L_{max} Noise Level Limit at 50 feet[1]
Auger Drill Rig	85
Backhoe	80
Bar Bender	80
Compactor (ground)	80
Compressor (air, less than or equal to 350 cfm)	53
Compressor (air, greater than 350 cfm)	58
Concrete Mixer Truck	85
Concrete Pump Truck	82
Concrete Saw	90
Concrete Trowel	67[2]
Crane	85
Dozer	85
Drill Rig Truck	84
Dump Truck	84
Dumpster/Rubbish Removal	78
Excavator	85
Flat Bed Truck	84
Front End Loader	80
Generator	82
Generator (< 25 KVA, VMS signs)	70
Gradall	85
Hoist	75[3]
Impact Pile Driver	95
Jackhammer	73
Man Lift	85
Paver	85
Pickup Truck	55
Pneumatic Tools	85
Pumps	77
Rock Drill	85
Roller	85
Slurry Plant	78
Soil Mix Drill Rig	80
Tractor	84
Welder/Torch	73

Sources:
[1] "Rules for Citywide Construction Noise Mitigation," Chapter 28, DEP, 2007.
[2] Columbia Manhattanville Noise Certification.
[3] "Noise Control for Construction Equipment…" Report for Hydro Quebec, 1985.

NOISE RECEPTOR SITES

Within the study area, 140 receptor locations (i.e., sites 9 to 29, 32 to 121, 123 to 145, beyond the measurement sites 1 to 8 as established in Chapter 17, "Noise") were selected to represent buildings or noise-sensitive open space locations close to the project construction areas for the construction noise analysis. These receptors were either located adjacent to planned areas of activity or streets where construction trucks would pass. At some buildings, multiple façades were analyzed as receptors. At high-rise buildings, noise receptors were selected at multiple elevations. At open space locations, receptors were selected at street level. The receptor sites selected for detailed analysis are representative locations where maximum project effects due to construction noise would be expected. At-grade noise measurements were conducted at sites 1, 2, 3, 4, 5, 7, and 8 and elevated noise measurements were conducted at site 6 to determine existing noise levels in the study area.

Figure 19-2 shows the locations of the 144 noise receptor sites, and **Table 19-20** lists the eight noise measurement sites as well as the 136 noise receptor sites and the associated land use at these sites.

Table 19-20
Noise Receptor Locations by Location and Associated Land Use

Receptor	Location	Associated Land Use
1	Cherry Street between Pike and Rutgers Slips	n/a (measurement location)
2	Cherry Street between Rutgers Slip and Jefferson Street	n/a (measurement location)
3	Corner of Jefferson Street and Monroe Street	n/a (measurement location)
4	Clinton Street between Cherry Street and South Street	n/a (measurement location)
5	Corner of Clinton Street and South Street	n/a (measurement location)
6	South Street between Rutgers Slip and Clinton Street (elevated approximately 45 feet above the ground)	n/a (measurement location)
7	South Street between Rutgers Slip and Clinton Street	n/a (measurement location)
8	Park area Below the FDR Drive between Rutgers Slip and Clinton Street	n/a (measurement location)
9	Murry Bergtraum Softball Field	Recreation
10–13	45 Pike Street	Residential
14–17	200 Madison Street	Residential
18–21	38-48 Rutgers Street	Residential
22–25	61 Pike Street	Residential
26–29	64 Rutgers Street	Residential
32–35, 142–144	80 Rutgers Slip	Residential
36–41	82 Rutgers Slip	Residential
42–44, 46–47, 146–147	265 Cherry Street	Residential/Ground Floor Retail
48–50, 52–53, 148–149	275 Cherry Street	Residential
54–57	291 Cherry Street	Residential
58–63	305-311 Cherry Street	Residential
64–67	251-255 Clinton Street	Residential
68–73	275 South Street	Residential
74–77	300 Cherry Street	Residential
78–81	272 Cherry Street	Residential
82–85	65 Jefferson Street	Residential
86–89	300 Cherry Street	Residential
90–93	225 Madison Street	Residential
94–97	45 Rutgers Street	Residential
98–101	230 Clinton Street	Residential
102–105	250 Clinton Street	Residential
106–109	340 Cherry Street	Residential
110–113	40 Montgomery Street	Residential
114–121	286 South Street	Residential
123–127	292 South Street	Institutional
128–133	250 South Street	Residential (under construction)
134–141	250 South Street	Residential (under construction)
145	Open Space between 265 and 275 Cherry Street	Open Space

NOISE MEASUREMENT RESULTS

Equipment Used During Noise Survey

Measurements were performed using a Brüel & Kjær Sound Level Meters (SLMs) Type 2260 and Type 2250, Brüel & Kjær ½-inch microphones Type 4189, and Brüel & Kjær Sound Level Calibrators Type 4231. The SLMs had a valid laboratory calibration within 1 year, as is standard practice. The Brüel & Kjær SLMs are a Type 1 instrument according to ANSI Standard S1.4-1983 (R2006). The microphones used at sites 1, 2, 3, 4, 5, 7, and 8 were mounted at a height of approximately five feet above the ground surface on a tripod and at least approximately 5 feet away from any large reflecting surfaces. The microphone used at site 6 was mounted at a height of approximately 45 feet above the ground surface in a bucket lift with clear line-of-sight to the elevated FDR Drive viaduct. The SLMs were calibrated before and after readings with Brüel & Kjær Type 4231 Sound Level Calibrators using the appropriate adaptor. Measurements were made on the A-scale (dBA). The data were digitally recorded by the sound level meters and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, L_{90}, and 1/3 octave band levels. A windscreen was used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

Noise Survey Results

The baseline noise levels at each of the noise survey locations during the AM peak hours (i.e., 7 to 9 AM) are shown in **Table 19-21**. At all noise measurement locations, the dominant existing noise source was vehicular traffic on the adjacent roadways.

Table 19-21
Noise Survey Results in dBA

Measurement Location		L_{EQ}
1	Cherry Street between Pike and Rutgers Slips	65.9
2	Cherry Street between Rutgers Slip and Jefferson Street	65.1
3	Corner of Jefferson Street and Monroe Street	63.7
4	Clinton Street between Cherry Street and South Street	67.3
5	Corner of Clinton Street and South Street	73.6
6	South Street between Rutgers Slip and Clinton Street (elevated approximately 45 feet above the ground)	77.1
7	South Street between Rutgers Slip and Clinton Street	72.4
8	Park area below the FDR Drive between Rutgers Slip and Clinton Street	73.6

In terms of CEQR noise exposure guidelines (shown in Table 17-5 in Chapter 17, "Noise"), during the morning analysis hour, existing noise levels at sites 1, 2, 3, and 4 are in the "marginally acceptable" category and existing noise levels at receptor sites 5, 6, 7, and 8 are in the "marginally unacceptable" category.

CONSTRUCTION NOISE ANALYSIS RESULTS

Using the methodology described above, and considering the noise abatement measures from path controls specified above, cumulative noise analyses were performed to determine maximum 1-hour equivalent ($L_{eq(1)}$) noise levels that would be expected during each of the five months of the construction period selected for analysis at each of the 131 noise receptor locations. This resulted in a predicted range of peak hourly construction noise levels throughout the construction period.

The results of the detailed construction noise analysis are summarized in **Table 19-22**.

Table 19-22
Construction Noise Analysis Results in dBA

Receptor	Location	Existing L_{EQ}		Total L_{EQ}		Change in L_{EQ}	
		Min	Max	Min	Max	Min	Max
3	Corner of Jefferson Street and Monroe Street	65.5	65.5	65.6	68.9	0.1	3.4
4	Clinton Street between Cherry Street and South Street	67.3	67.3	69.0	79.8	2.4	12.5
8	Park area Below the FDR Drive between Rutgers Slip and Clinton Street	73.6	73.6	76.7	89.0	3.1	15.4
9	Murry Bergtraum Softball Field	71.1	71.1	71.2	71.2	0.1	0.1
10–13	45 Pike Street	65.5	70.9	65.7	71.7	0.1	3.8
14–17	200 Madison Street	65.5	68.3	65.7	71.6	0.2	5.0
18–21	38-48 Rutgers Street	65.5	68.4	65.9	72.2	0.3	5.7
22–25	61 Pike Street	65.5	72.5	65.7	73.7	0.1	6.0
26–29	64 Rutgers Street	65.5	68.1	65.9	79.6	0.4	14.1
32–35, 142–144	80 Rutgers Slip	65.5	67.5	66.2	88.7	0.7	23.2
36–41	82 Rutgers Slip	65.5	76.8	65.8	79.5	0.1	12.5
42–44, 46–47, 146-147	265 Cherry Street	65.5	70.1	65.8	90.6	0.2	23.2
48–50, 52–53, 148-149	275 Cherry Street	65.5	70.9	65.7	83.6	0.1	15.7
54–57	291 Cherry Street	65.5	65.5	65.7	77.0	0.2	11.5
58–63	305-311 Cherry Street	65.5	65.5	65.8	78.7	0.2	13.2
64–67	251-255 Clinton Street	65.5	69.2	65.8	82.0	0.2	14.3
68–73	275 South Street	65.5	73.4	65.7	89.3	0.2	18.3
74–77	300 Cherry Street	65.5	65.5	65.6	74.1	0.1	8.5
78–81	272 Cherry Street	65.5	68.0	65.6	73.4	0.1	7.9
82–85	65 Jefferson Street	65.5	65.5	65.6	75.1	0.1	9.6
86–89	300 Cherry Street	65.5	65.5	65.6	75.4	0.1	9.9
90–93	225 Madison Street	65.5	65.5	65.6	71.5	0.1	6.0
94–97	45 Rutgers Street	65.5	66.4	65.8	71.1	0.2	5.6
98–101	230 Clinton Street	65.5	66.6	65.6	71.6	0.1	5.7
102–105	250 Clinton Street	65.5	66.5	65.6	74.3	0.1	8.8
106–109	340 Cherry Street	65.5	66.3	65.6	72.3	0.1	6.8
110–113	40 Montgomery Street	65.5	66.4	65.6	70.4	0.1	4.8
114–121	286 South Street	65.5	77.6	65.8	83.5	0.1	14.5
123–127	292 South Street	65.5	70.2	66.0	73.4	0.1	5.0
128–133	250 South Street	65.5	76.8	65.8	77.9	0.1	10.5
134–141	250 South Street	65.5	75.5	65.7	75.5	0.0	8.1
145	Open Space between 265 and 275 Cherry Street	72.9	72.9	73.0	79.2	0.1	6.3

Open Spaces

At open space receptors in Little Flower Playground, Cherry Clinton Playground, the East River Esplanade, Murry Bergtraum Softball Field, and the open space between the 265 and 275 Cherry

Street buildings—Receptors 3, 4, 8, 9, and 145—the existing noise levels are in the mid-60s to mid-70s dBA.

Construction of the proposed projects is predicted to produce noise levels at these receptors in the low 50s to high 80s dBA, with noise level increases of approximately 15 dBA during the most noise-intensive stages of construction (i.e., demolition, excavation, and exterior work at Site 4 (4A/4B), excavation work at Site 5 and superstructure and interiors work at Site 6A) and construction noise levels in the high 40s to mid-70s dBA with noise level increases of approximately 7 dBA during other stages of construction. The loudest construction activities would occur for approximately 13 months.

The predicted noise levels during construction at these open spaces areas would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). However, noise levels in these areas already exceed CEQR recommended values under existing conditions. In addition, because of the relatively short duration (approximately 13 months) of the most noise-intensive stages of construction and the lower magnitude of construction noise during other stages of construction, these receptors would not be expected to result in a significant adverse construction noise impact.

Residences Located One or More Blocks Away from Project Sites

Existing noise levels at residences located one or more blocks away from the project sites—Receptors 10 through 21, 90 through 101, and 110 through 113—range from the mid-60s to low 70s dBA depending on height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors in the low 50s to low 70s dBA with noise level increases up to approximately 6 dBA during the most noise-intensive stages of construction (i.e., foundation, superstructure, exteriors, and interiors work at all project sites). Construction noise levels are predicted in the high 40s to mid-60s dBA with noise level increases approximately less than 3 dBA during other stages of construction.

Based on field observations, these residential buildings located one or more blocks away from the project sites were determined to have insulated glass windows and an alternate means of ventilation (i.e., through-the-wall air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at these receptors would be in the high 40s dBA during construction, up to approximately 4 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of project construction, the construction activities at the project sites that would produce the highest noise levels would be concrete work and peak truck operations. The loudest period of concrete work and peak truck operations would occur for approximately 17 months during superstructure work at Site 6A. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum noise levels would still result in exceedances of CEQR impact criteria at certain times, but would be substantially lower than the maximum levels during maximum concrete work and peak truck-generated construction noise levels.

Based on the prediction of construction noise levels up to the low 70s dBA with construction noise level increments up to approximately 6 dBA and a duration of maximum construction noise up to approximately 17 consecutive months, construction noise associated with the proposed projects at these receptors would not be expected to result in a significant adverse construction noise impact.

Residential Buildings on Cherry Street

At residential buildings on Cherry Street between Rutgers and Clinton Streets and 250 Clinton Street—Receptors 22 through 25, 74 through 89, and 102 through 109—the existing noise levels range from the mid-60s to low 70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors on the façades facing the project sites in the mid-60s to mid-70s dBA with noise level increases up to approximately 10 dBA during the most noise-intensive stages of construction (i.e., foundation at Site 4 (4A/4B) and superstructure, exterior, and interior work at all sites) and construction noise levels in the high 40s to low 70s dBA with noise level increases up to approximately 8 dBA during other stages of construction. The other façades of these residential buildings on Cherry Street are predicted to experience construction noise levels in the low 50s to low 70s dBA with noise level increases up to approximately 7 dBA during the most noise-intensive stages of construction and construction noise levels in the high 40s to high 60s dBA with noise level increases of approximately 3 dBA or less during other stages of construction.

These buildings were determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., through-the-wall air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at these receptors would be in the low 50s dBA during construction, up to approximately 6 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activities that would produce the highest noise levels would be concrete and saw work. The loudest period of concrete work and saw operations would occur for approximately 12 months during superstructure and interiors work at Site 6A. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum concrete work and saw operations construction noise levels.

Based on the prediction of construction noise levels up to the mid-70s dBA with construction noise level increments up to approximately 10 dBA and a duration of maximum construction noise up to approximately 12 months with CEQR impact criteria exceedances occurring for up to a total of approximately three years, construction noise associated with the proposed projects would have the potential to result in a significant adverse construction noise impact at the façades facing the project sites of residential buildings on Cherry Street.

64 Rutgers Street

The residential building at 64 Rutgers Street is located on the northwest corner of Cherry and Rutgers Streets—Receptors 26 through 29. The existing noise levels range from the mid-to-high 60s dBA depending on height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at receptors on the eastern, southern, and western façades in the mid-60s to high 70s dBA with noise level increases up to approximately 14 dBA during the most noise-intensive stages of construction (i.e., superstructure exterior and interior work at all Sites) and construction noise levels in the low 60s to mid-70s dBA with noise level increases up to approximately 12 dBA during other stages of construction. The northern façade of 64 Rutgers Street is predicted to experience construction noise levels in the mid-50s to mid-60s with noise level increases of less than 3 dBA.

Based on field observations, the building at 64 Rutgers Street was determined to have insulated glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at residences along the southern and western façades of 64 Rutgers Street would be in the mid-50s dBA during construction, up to approximately 12 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activities that would produce the highest noise levels would be crane operations and peak truck operation. The loudest period of crane operations would occur for up to approximately five months during exterior work at Site 4 (4A/4B). The loudest period of peak truck operation would occur for approximately seven months during exteriors work at Site 4 (4A/4B). Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum crane operations and peak truck-generated construction noise levels.

Based on the prediction of construction noise levels up to the high 70s dBA with construction noise level increments up to approximately 14 dBA and a duration of maximum construction noise up to approximately 12 months with CEQR impact criteria exceedances occurring for up to a total of approximately three years, construction noise associated with the proposed projects would have the potential to result in a significant adverse impact at the eastern, southern, and western façades of 64 Rutgers Street.

80 Rutgers Slip

At 80 Rutgers Slip, located on Site 4 (4A/4B) at the southwest corner of Cherry Street and Rutgers Slip—Receptors 32 through 35 and 142 through 144—the existing noise levels range from the mid-to-high 60s dBA depending on height above grade (i.e., floor of the building). Nine residential units in the building's western portion would be temporarily vacated during construction of the Site 4 (4A/4B) building as these units would be renovated. These units may be retenanted during construction. To account for the potential occupancy of these residential units during construction, this analysis conservatively includes receptors at locations near these residential units.

Construction of the proposed projects is predicted to produce noise levels at these receptors in the high 50s to high 80s dBA with noise level increases up to approximately 23 dBA during the most noise-intensive stages of construction (i.e., excavation, foundation, superstructure, exteriors, and interiors work at Site 4 [4A/4B]) and construction noise levels in the low 60s to low 80s dBA with noise level increases up to approximately 15 dBA during other stages of construction.

The building at 80 Rutgers Slip was determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., through-the-wall air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, maximum interior noise levels at 80 Rutgers Slip during construction would be in the low 60s dBA, up to approximately 18 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the activities that would produce the highest noise levels would be excavator operations, concrete work, and peak crane operations. The loudest period of excavator operations would occur for approximately 1 month during excavation work at Site 4 (4A/4B). The loudest period of peak crane operations would occur for approximately 12 months during excavation work at Site 4 (4A/4B), approximately 5 months during exteriors work at Site 4 (4A/4B) and approximately 5 months during interiors work at Site 4 (4A/4B). The loudest period of concrete work would occur for approximately 7 months during superstructure work at Site 4 (4A/4B). Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum excavator operations, concrete work, and peak crane operation construction noise levels.

Based on the prediction of construction noise levels up to the high 80s dBA with construction noise level increments up to approximately 23 dBA and a duration of maximum construction noise up to approximately 30 months with CEQR impact criteria exceedances occurring for up to a total of approximately three years, construction noise associated with the proposed projects would have the potential to result in a significant adverse effect at 80 Rutgers Slip.

82 Rutgers Slip

At 82 Rutgers Slip, located on the southwest corner of Cherry Street and Rutgers Slip—Receptors 36 through 41—the existing noise levels range from the mid-60s to mid-70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors on the northern, eastern, and a portion of the southern façades in the mid-60s to high 70s dBA with noise level increases up to approximately 13 dBA during the most noise-intensive stages of construction (i.e., exterior and interior work at Site 4 [4A/4B]) and construction noise levels in the mid-50s to high 70s dBA with noise level increases up to approximately 11 dBA during other stages of construction. The other façades of 82 Rutgers Slip are predicted to experience construction noise levels in the mid-50s to mid-70s with noise level increases up to 4 dBA during the most noise-sensitive stages of construction and construction noise levels in the low 50s to low 70s, with noise level increases of less than 3 dBA during other stages of construction.

The building at 82 Rutgers Slip was determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., PTAC units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at residences along the northern and eastern façades of 82 Rutgers Slip would be in the mid-50s dBA during construction, up to approximately 10 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activities that would produce the highest noise levels would be peak truck operations. The loudest period of peak truck operations would occur for approximately 11 months during exterior and interior work at Site 4 (4A/4B). Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum peak truck construction noise levels.

Based on the prediction of construction noise levels up to the mid-70s dBA with construction noise level increments up to approximately 10 dBA and a duration of maximum construction noise up to approximately 11 months with CEQR impact criteria exceedances occurring for up to a total of approximately three years, construction noise associated with the proposed projects would have the potential to result in a significant adverse effect at the northern and eastern façades of 82 Rutgers Slip.

265 and 275 Cherry Street Buildings

At the 265 and 275 Cherry Street buildings on Site 5—Receptors 42 through 44, 46 through 50, 52 through 53, and 146 through 149—the existing noise levels range from the mid-60s to low 70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors on portions of the northern, eastern, and western façades of the 265 and 275 Cherry Street buildings in the low 60s to low 90s dBA with noise level increases up to approximately 23 dBA during the most noise-intensive stage of construction (i.e., excavation work at Site 5) and construction noise levels in the low 50s to low 80s dBA with noise level increases up to approximately 15 dBA during other stages of construction. A portion of the northern façades of the 265 and 275 Cherry Street buildings are predicted to experience construction noise levels in the low to mid-60s dBA with noise level increases up to 4 dBA during the most noise-sensitive stages of construction and construction noise levels in the low to mid-60s, with noise level increases of less than 3 dBA during other stages of construction. The existing south façade windows on the 265 and 275 Cherry Street buildings would be infilled in preparation of construction of the proposed Site 5 building.

The residential buildings at 265 and 275 Cherry Street were determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., through-the-wall air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at residences would be in the low 60s dBA during construction, up to approximately 17 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activities that would produce the highest noise levels would be pile driving and concrete work. Although the sub-grade structural systems are anticipated to be drilled caissons, driven piles may be needed for certain minor periods for such construction activities as SOE. The loudest period of pile driving operations, if required, would occur intermittently for up to approximately one month during excavation work at Site 5. The loudest period of concrete work would occur for approximately seven months during superstructure work at Site 5. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum pile driving operations and concrete work construction noise levels.

Based on the prediction of construction noise levels up to the low 90s dBA with construction noise level increments up to approximately 23 dBA and a duration of maximum construction noise up to approximately 1 month. Construction noise levels in the low 50s to low 80s dBA with noise level increases up to approximately 15 dBA is predicted to occur for up to a total of approximately three years. Therefore, construction noise associated with the proposed projects would have the potential to result in a significant adverse effect at 265 and 275 Cherry Street.

Residential Buildings Immediately Adjacent to Site 6A

At residential buildings immediately adjacent to Site 6A—Receptors 54 through 73—the existing noise levels range from the mid-60s to low 70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors in the high 50s to high 80s dBA with noise level increases up to approximately 18 dBA during the most noise-intensive stages of construction (foundation and exteriors work at Site 5 and excavation, foundation, superstructure, exteriors and interiors/finishing work at Site 6A), construction noise levels in the low 50s to low 80s dBA with noise level increases up to approximately 11 dBA during other noise-sensitive stages of construction (superstructure, exteriors and interiors work at Site 5 and superstructure, exteriors, and interiors work at Site 6A) and construction noise levels in the low 50s to high 60s with noise level increases less than 3 dBA during other stages of construction.

These buildings were determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., through-the-wall air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at these receptors would be in the mid-60s dBA during construction, up to approximately 21 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activities that would produce the highest noise levels would be pile driving and concrete work. Although the sub-grade structural systems are anticipated to be drilled caissons, driven piles may be needed for certain minor periods for such construction activities as SOE. The loudest period of pile driving operations, if required, would occur intermittently for up to approximately one month during excavation work at Site 6A and the loudest period of concrete work would occur for approximately 17 months during excavation, foundation, and interiors work at Site 6A. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum pile driving and concrete work construction noise levels.

Based on the prediction of construction noise levels up to the high 80s dBA with construction noise level increments up to approximately 18 dBA and a duration of maximum construction noise up to approximately 18 months with CEQR impact criteria exceedances occurring for up to a total of approximately 30 months, construction noise associated with the proposed projects would have the potential to result in a significant adverse construction noise impact at residences immediately adjacent to Site 6A.

286 South Street

At the 286 South Street residential building, located on the southeast corner of Clinton and South Streets—Receptors 114 through 121—the existing noise levels range from the mid-60s to high 70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors on portions of the northern and western façades in the low 50s to low 80s dBA with noise level increases up to approximately 15 dBA during the most noise-intensive stages of construction (i.e., excavation, foundation, superstructure, exteriors, and interiors work at Site 6A) and construction noise levels in the low 50s to high 70s with noise level increases up to approximately 12 dBA during other stages of construction. The other façades of 286 South Street are predicted to experience construction noise levels in the low 50s to low 70s dBA with noise level increases up to approximately 9 dBA during the most noise sensitive stages of construction, construction noise levels in the low 50s to low 70s dBA with noise level increases up to approximately 6 dBA during other noise sensitive stages of construction, and construction noise levels in the low 50s to mid-60s dBA with noise level increases of less than 3 dBA during other stages of construction.

The building at 286 South Street was determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., through-the-wall air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at residences along the northern and western façades of 286 South Street would be in the high 50s dBA during construction, up to approximately 14 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activities that would produce the highest noise levels would be excavator and concrete operations, and peak-truck activities. The loudest period of excavator operations would occur for approximately 12 months during excavation and foundation work at Site 6A. The loudest period of concrete operations would occur for approximately 19 months during excavation, foundation, and superstructure work at Site 6A, and the loudest period of peak-truck activities would occur for approximately 5 months during interior work at Site 6A. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum excavator, concrete work, and peak-truck activities construction noise levels.

Based on the prediction of construction noise levels up to the low 80s dBA with construction noise level increments up to approximately 15 dBA and a duration of maximum construction noise up to approximately 24 months with CEQR impact criteria exceedances occurring for up to a total of approximately three years, construction noise associated with the proposed projects at portions of the northern and western façades of 286 South Street would have the potential to result in a significant adverse effect.

292 Cherry Street

At the school located at 292 Cherry Street—Receptors 123 through 127—the existing noise levels range from the mid-60s to low 70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors in the high 50s to low 70s dBA with noise level increases up to approximately 5 dBA during the most noise-intensive stages of construction (superstructure, exteriors, and interiors/finishing work at Site 6A) and construction noise levels in the low 50s to high 60s dBA with noise level increases approximately less than 3 dBA during other stages of construction.

The building at 292 Cherry Street was determined by field observations to have insulated glass windows and an alternative means of ventilation (i.e., window air conditioning units), which would be expected to provide approximately 25 dBA window/wall attenuation. Consequently, interior noise levels at these receptors would be in the high 40s dBA during construction, up to approximately 4 dBA higher than the 45 dBA threshold recommended for classroom use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activity that would produce the highest noise levels would be peak concrete truck operations. The loudest period of peak concrete truck operations would occur for approximately 5 months during superstructure, and interiors work at Site 6A. Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum peak concrete truck construction noise levels.

Based on the prediction of construction noise levels up to the low 70s dBA with construction noise level increments up to approximately 6 dBA and a duration of maximum construction noise up to approximately 12 total months, construction noise associated with the proposed projects at these receptors would not be expected to result in a significant adverse impact.

Residences West of Site 4 (4A/4B)

At residences west of Site 4 (4A/4B)—Receptors 128 through 141—the existing noise levels range from the mid-60s to high 70s dBA depending on shielding from the FDR Drive and height above-grade (i.e., floor of the building).

Construction of the proposed projects is predicted to produce noise levels at these receptors on portions of the buildings' northern and eastern façades in the mid-50s to mid-70s dBA with noise level increases up to approximately 11 dBA during the most noise-intensive stages of construction (i.e., superstructure and exterior work at Site 4 [4A/4B]) and construction noise levels in the low 50s to mid-70s dBA with noise level increases up to approximately 9 dBA during other stages of construction. The other façades of residences west of Site 4 (4A/4B) are predicted to experience construction noise levels in the high 40s to low 70s dBA with noise level increases up to approximately 6 dBA during the most noise sensitive stages of construction and construction noise levels in the mid-40s to high 60s dBA with noise level increases of less than 3 dBA during other stages of construction.

These buildings are currently under construction and are assumed to have insulated glass windows and an alternative means of ventilation (i.e., central air conditioning units), which would be expected to provide approximately 30 dBA window/wall attenuation. Consequently, interior noise levels at these receptors would be in the high 40s dBA during construction, up to approximately 4 dBA higher than the 45 dBA threshold recommended for residential use according to CEQR noise exposure guidelines.

During the approximately three years of construction, the construction activity that would produce the highest noise levels would be peak truck operations. The loudest period of peak truck operations would occur for approximately seven months during superstructure work at Site 4 (4A/4B) and approximately five months during exterior work at Site 4 (4A/4B). Consequently, the maximum noise levels predicted by the construction noise analysis would not persist throughout the construction period and would occur immediately adjacent to each receptor area only for a limited period of time. Construction-period noise levels occurring outside the period of the maximum would still result in exceedances of CEQR impact criteria at some times, but would be substantially lower than the maximum levels during maximum pile driving and peak truck-generated construction noise levels.

Based on the prediction of construction-period noise levels up to the mid-70s dBA with construction noise level increments up to approximately 11 dBA and a duration of maximum construction-period noise up to approximately 12 months with CEQR impact criteria exceedances occurring for up to a total of approximately three years, construction-period noise associated with the proposed projects at portions of the northern and eastern façades of the residences west of Site 4 (4A/4B) would have the potential to result in a significant adverse effect.

CONCLUSIONS

The detailed modeling analysis concluded that construction of the proposed projects has the potential to result in construction noise levels that exceed *CEQR Technical Manual* noise impact criteria for an extended period of time at the façades of residences facing the project sites on Cherry Street, the eastern, southern, and western façades of 64 Rutgers Street, 80 Rutgers Slip, the northern, eastern, and a portion of the southern façades of 82 Rutgers Slip, a portion of the northern façade and the eastern and western façades of 265 and 275 Cherry Street, residences immediately adjacent to Site 6A, portions of the northern and western façades of 286 South Street, and portions of the northern and eastern façades of the residences west of Site 4 (4A/4B) (see **Figure 19-3**).

- The affected façades of residences on Cherry Street would experience exterior noise levels in the mid-60s to mid-70s dBA, which represents increases in noise levels up to approximately 10 dBA compared with existing levels for an approximately 12-month period during construction and exterior noise levels in the high 40s to low 70s dBA, which represents increases in noise levels up to approximately 8 dBA compared with existing levels, for up to approximately three years of construction.
- The affected façades of 64 Rutgers Street would experience noise levels in the mid-60s to high 70s dBA, which represents increases in noise levels up to approximately 14 dBA, compared with existing levels, for an approximately 12-month period during construction and exterior noise levels in the low 60s to mid-70s dBA, which represents increases in noise levels up to approximately 12 dBA, compared with existing levels, for up to approximately three years of construction.
- 80 Rutgers Slip would experience exterior noise levels in the high 50s to high 80s dBA, which represents increases in noise levels up to approximately 23 dBA compared with existing levels for an approximately 30-month period during construction and exterior noise levels in the low 60s to low 80s dBA, which represents increases in noise levels up to approximately 15 dBA, compared with existing levels, for up to approximately three years of construction.
- The affected façades of 82 Rutgers Slip would experience noise levels in the mid-60s to high 70s dBA, which represents increases in noise levels up to approximately 13 dBA compared

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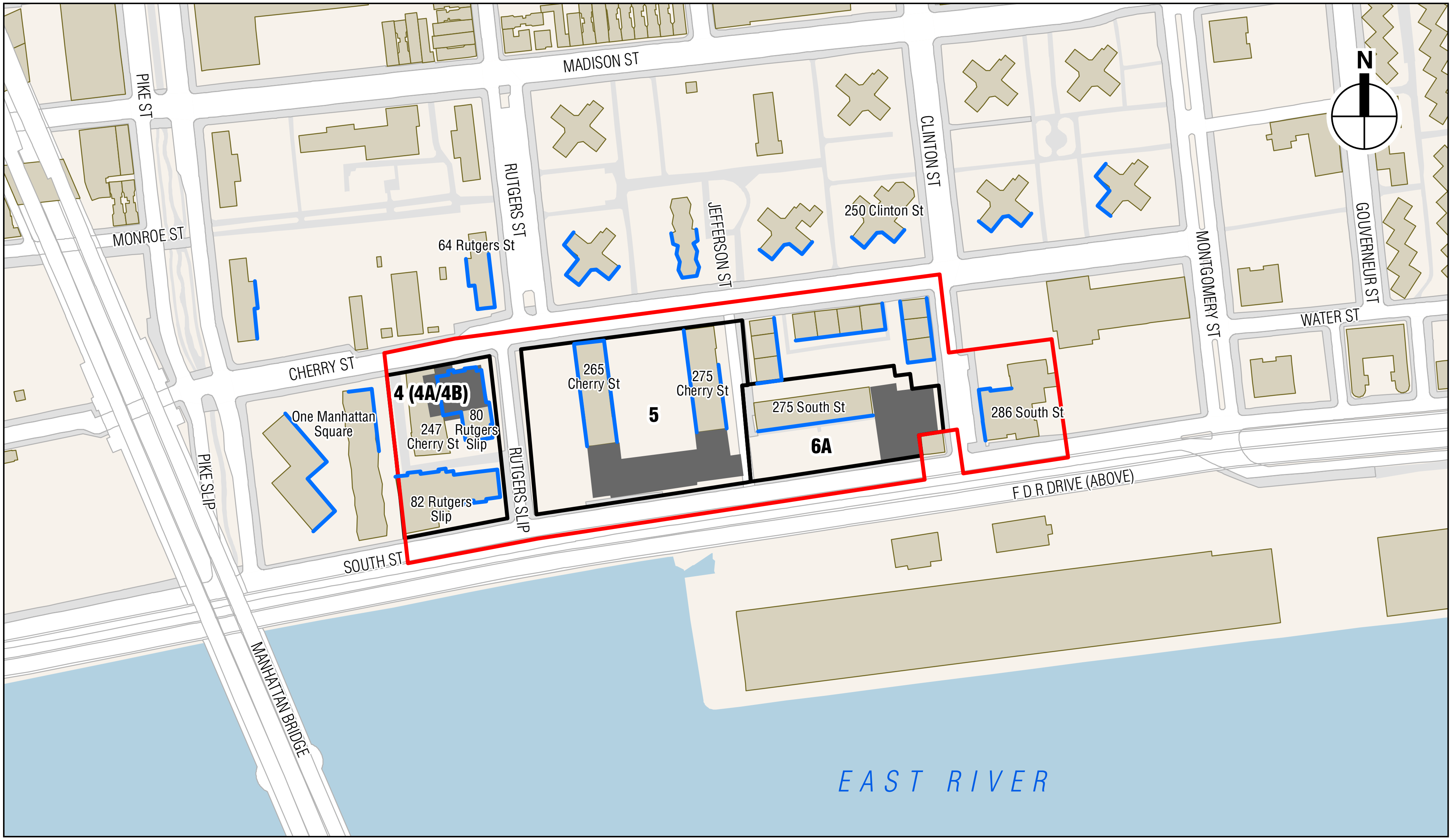

Source: NYC Dept. of City Planning MapPLUTO v. 16v2, edited by AKRF.

Project Sites

Boundary of Two Bridges LSRD

Proposed Buildings

Construction Noise Impact

TWO BRIDGES LSRD

Significant Adverse Construction Noise Impacts

Figure 19-3

with existing levels for an approximately 11 month period during construction and exterior noise levels in the mid-50s to high 70s dBA, which represents increases in noise levels up to approximately 11 dBA, compared with existing levels, for up to approximately three years of construction.

- The affected façades of the 265 and 275 Cherry Street buildings would experience noise levels in the low 60s to low 90s dBA, which represents increases in noise levels up to approximately 23 dBA compared with existing levels for an approximately one-month period during construction and exterior noise levels in the low 50s to low 80s dBA, which represents increases in noise levels up to approximately 15 dBA, compared with existing levels, for up to approximately three years of construction.
- The affected façades of residences immediately adjacent to Site 6A would experience noise levels in the high 50s to high 80s dBA, which represents increases in noise levels up to approximately 18 dBA compared with existing levels for an approximately 18-month period during construction and exterior noise levels in the low 50s to low 80s dBA, which represents increases in noise levels up to approximately 11 dBA, compared with existing levels, for up to approximately 30 months of construction.
- The affected façades of 286 South Street would experience noise levels in the low 50s to low 80s dBA, which represents increases in noise levels up to approximately 15 dBA, compared with existing levels, for an approximately 24 month period during construction and exterior noise levels in the low 50s to high 70s dBA, which represents increases in noise levels up to approximately 12 dBA, compared with existing levels, for up to approximately three years of construction.
- The affected façades of residences west of Site 4 (4A/4B) would experience noise levels in the mid-50s to mid-70s dBA, which represents increases in noise levels up to approximately 11 dBA, compared with existing levels, for an approximately 12-month period during construction and exterior noise levels in the low 50s to mid-70s dBA, which represents increases in noise levels up to approximately 9 dBA, compared with existing levels, for up to approximately three years of construction.

Construction-period noise levels of this magnitude for such an extended duration would constitute ~~a~~ significant adverse construction-period noise impacts at these receptor locations. At other receptors near the project construction areas, including open space, residential, and institutional receptors, noise resulting from construction of the proposed projects may at times be noticeable, but would be ~~temporary~~ during the construction period and would generally not exceed typical noise levels in the general area and so would not rise to the level of a significant adverse noise impact.

VIBRATION

INTRODUCTION

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

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 as specified in the New York City Department of Buildings (DOB)'s *Technical Policy and Procedure Notice (TPPN) #10/88*. 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 VdB would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time.

ANALYSIS METHODOLOGY

Table 19-23 shows vibration source levels for typical construction equipment.

The source vibration levels shown in **Table 19-23** were projected to nearby receptors to estimate the levels of construction vibration that would occur in the study area.

Table 19-23
Vibration Source Levels for Construction Equipment

Equipment		PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Pile Driver (impact)	upper range	1.518	112
	Typical	0.644	104
Hydromill (slurry wall)	In soil	0.008	66
	In rock	0.017	75
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hydraulic Break 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 of most concern with regard to the potential for structural or architectural damage due to vibration are the existing residential buildings immediately surrounding the project construction areas. At these buildings and other structures immediately adjacent to the project construction areas, vibration due to construction of the proposed projects within 25 feet may result in PPV levels between 0.50 and 2.0 in/sec, which is generally considered acceptable for a non-historic building or structure.

In terms of potential vibration levels that would be perceptible and annoying, the equipment that would have the most potential for producing levels that exceed the 65 VdB limit is also the pile driver. It would have the potential to produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 550 feet depending on soil conditions. 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.

Consequently, there is no potential for significant adverse vibration impacts from the proposed projects.

OTHER TECHNICAL AREAS

LAND USE AND NEIGHBORHOOD CHARACTER

According to the *CEQR Technical Manual*, a construction impact analysis for land use and neighborhood character is typically needed if construction would require continuous use of property for an extended duration, thereby having the potential to affect the nature of the land use and character of the neighborhood.

Construction activities would affect land use on the project sites, but would not affect land use conditions and patterns outside of them. As is typical with construction projects, during periods of peak activity there would be some disruption to the nearby area. There would be construction trucks and construction workers coming to the area 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 construction areas or within portions of sidewalks and curb lanes immediately adjacent to the project sites: along Cherry Street and Rutgers Slip for Site 4 (4A/4B), along South Street for Site 5, and along South and Clinton Streets for Site 6A. In addition, throughout the construction period, measures would be implemented to control air quality, noise, and vibration on the construction areas, including the erection of construction barriers for each project site. The barriers would reduce potentially undesirable views of construction site and buffer noise emitted from construction activities. Barriers would be used to protect the safety of pedestrians and bicyclists.

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

SOCIOECONOMIC CONDITIONS

According to the *CEQR Technical Manual*, construction impacts to socioeconomic conditions are possible if the proposed actions would entail construction of a long duration that could affect access to and thereby viability of a number of businesses, and if the failure of those businesses has the potential to affect neighborhood character. As discussed in Chapter 3, “Socioeconomic Conditions,” based on the current plans, the Stop 1 Food Market on Site 5 may be temporarily displaced during construction. The Site 5 applicant is committed to working with Stop 1 Food Market to remain in operation during construction, if determined to be feasible. Access to this business would be maintained if it remains in operation during construction. Construction of the proposed projects would not affect the operations of any other nearby businesses or obstruct major thoroughfares used by customers or businesses. Access to other businesses in the area, including the partially vacant building at 235 Cherry Street, would also be maintained during construction. Construction would create direct benefits resulting from expenditures on labor, materials, and services, and indirect benefits created by expenditures by material suppliers, construction workers, and other employees involved in the construction activities. Construction also would contribute to increased tax revenues for the City and state, including those from personal income taxes. Construction activities associated with the proposed projects would not result in any significant adverse impacts on socioeconomic conditions.

COMMUNITY FACILITIES

According to the *CEQR Technical Manual*, construction impacts to community facilities are possible if a community facility were directly affected by construction (e.g., if construction would disrupt services provided at the facility or close the facility temporarily, etc.).

Construction activities related to the proposed projects would not physically displace or alter any existing community facilities described in Chapter 4, "Community Facilities." The construction sites would be surrounded by construction 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 in the rezoning area. Construction of the projected buildings would not block or restrict access to any facilities in the area, and would not materially affect emergency response times. The New York City Police Department (NYPD) and FDNY emergency services and response time would not be materially affected as a result of the geographic distribution of the police and fire facilities and their respective coverage areas. Additionally, access to the FDNY easement area to the north of Site 6A would be maintained throughout construction. Therefore, construction activities associated with the proposed projects would not result in any significant adverse impacts on community facilities.

OPEN SPACE

According to the *CEQR Technical Manual*, construction impacts to open space are possible if the open space is taken out of service for a period of time during the construction process. As described in Chapter 5, "Open Space," there are no publicly owned open spaces on the project sites. In addition, measures would be implemented to control air emissions, dust, noise, and vibration on the three project sites during construction. While construction of the proposed projects may cause temporary disruptions to the nearby open spaces such as the Cherry Clinton Playground and nearby portions of the East River Esplanade, particularly related to noise, it is expected that such disruptions in any given area would be temporary and would not be ongoing for the full duration of the construction period. Therefore, no significant construction impacts are anticipated on open space.

HISTORIC AND CULTURAL RESOURCES

According to the *CEQR Technical Manual*, construction impacts to historical and cultural resources considers the potential for physical damage to archaeological resources and architectural resources, as identified in Chapter 7, "Historic and Cultural Resources."

As summarized in Chapter 7, "Historic and Cultural Resources," AKRF, Inc. prepared a Phase 1A Archaeological Documentary Study of the three project sites in June 2017. The Phase 1A study determined that undisturbed portions of Sites 5 and 6A possess moderate to high sensitivity for landfill deposits and landfill-retaining structures and low to moderate sensitivity for historic period streetbed deposits and early wooden water mains. Site 4 (4A/4B) was determined to have low sensitivity for both types of resources. The Phase 1A study recommended further archaeological analysis in the form of archaeological monitoring at Site 5 and Site 6A and the preparation of an Unanticipated Discoveries Plan for Site 4 (4A/4B).

In the event that archaeological monitoring during construction confirms the presence of archaeological resources within the areas of archaeological sensitivity as identified in the Phase 1A Study, then additional archaeological investigations (e.g., a Phase 2 Investigation or a Phase 3 Data Recovery as described above) would be conducted. Pursuant to CEQR, should significant (e.g., National Register-eligible) archaeological resources be identified in any of the completed archaeological investigations, the disturbance or removal of such resources through the construction of the proposed projects would constitute a significant adverse impact. However, as outlined above, at this time only the potential for archaeological resources has been identified in certain locations on the project sites. As set forth in the *CEQR Technical Manual*, a "site's actual, rather than potential, sensitivity cannot be ascertained without some field testing or excavation."[10] The presence of any significant archaeological resources would be determined through additional archaeological investigations and consultation with LPC. With the completion of the Unanticipated Discoveries Plan for Site 4 (4A/4B), the completion of additional archaeological investigations at Sites 5 and 6A, and LPC concurrence with the conclusions of those investigations, the proposed projects would not result in significant adverse impacts to archaeological resources. The applicants would enter into a Restrictive Declaration requiring that these additional archaeological investigations (including any relevant Unanticipated Discoveries and Archaeological Monitoring Protocols) would be undertaken in consultation with LPC.

There are no known or potential architectural resources on the project sites, therefore, construction of the proposed projects would not result in any significant adverse impacts related historic architectural resources on the project sites. Construction of the new buildings on Sites 5 and 6A would occur within 90 feet of portions of the FDR Drive, a historic resource that was designed to withstand the vibration effects of continuous vehicle usage. Between the DEIS and FEIS, DCP~~the applicants would~~ consulted with LPC; ~~and DOT to~~ LPC determined that~~whether~~ a CPP for ~~the~~ this portion of the FDR Drive should be prepared. ~~Should LPC and/or DOT request the preparation of a CPP,~~ Therefore, in consultation with LPC, the applicants for Site 5 and Site 6A would prepare a CPP ~~it would be prepared~~ in accordance with the guidelines of DOB's *TPPN #10/88,* as well as LPC's guidance document *Protection Programs for Landmarked Buildings* and the National Park Service's *Preservation Tech Notes, Temporary Protection #3: Protecting a Historic Structure during Adjacent Construction*. With the CPP in place, construction would not be expected to result in significant adverse impacts to the portion of the FDR Drive located within 90 feet of Sites 5 and 6A. No other architectural resources are located within 90 feet of the project sites.

NATURAL RESOURCES

New York City is affected by local flooding (e.g., flooding of inland portions of the City from short-term, high-intensity rain events in areas with poor drainage), and coastal flooding (e.g., long and short wave surges that affect the City's shorelines along the Atlantic Ocean and tidally

[10] *CEQR Technical Manual* (March 2014): page 9-10 (http://www.nyc.gov/html/oec/downloads/pdf/2014_ceqr_tm/09_Historic_Resources_2014.pdf).

influenced rivers and straights such as the Hudson River, Harlem River, and East River). Because coastal flooding is controlled by astronomic tides and meteorological forces (e.g., nor'easters and hurricanes) and is unaffected by occupancy of the floodplain, construction of the proposed projects would not adversely affect the floodplain and would not result in increased coastal flooding within or adjacent to the study area.[11]

A hazardous materials assessment identified potential historical and present sources of contamination on the project sites (see "Hazardous Materials," below). Therefore, it is anticipated that further environmental investigation would be required prior to development. Groundwater recovered during dewatering would be treated in accordance with DEP requirements prior to discharge to the municipal sewer. Therefore, construction of the proposed projects would not have the potential to adversely affect groundwater.

Ecological communities within the study area, in addition to being common throughout the region, are defined by human disturbance and provide limited habitat value to wildlife in the area. Construction of the proposed projects would result in disturbance to vegetated ecological communities common to the urban environment. Construction of the proposed projects may require removal of street trees and other trees. Street tree replacement protocols would result in the replacement and addition of any street trees lost due to construction. All work would be performed in compliance with Local Law 3 of 2010 and NYC Parks' Tree Protection Protocol, to minimize potential adverse impacts. All required replacement and/or restitution for removed trees would be provided in compliance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York. Therefore, construction of the proposed projects would not result in significant adverse impacts to ecological communities.

Only urban-adapted, generalist species can tolerate the highly degraded environments and high levels of human activity currently present within the study area. Indirect impacts to wildlife due to construction noise would be minimal as urban-tolerant species are acclimated to the increased noise of an urban environment. As disturbance from construction activities would be temporary, any wildlife individuals that may be displaced from the study area during project construction would be expected to easily move to alternative habitat. Therefore, construction of the proposed projects would not result in significant adverse impacts to wildlife at either the individual or population level.

The only federally or state-listed endangered, threatened, and special concern species, or significant natural communities with the potential to occur or are known to occur within the study area is the state-listed endangered peregrine falcon (*Falco peregrinus*). Construction activities for the proposed projects would not occur within the immediate vicinity of peregrine falcon nests and would not impact peregrine falcons at the individual or population level. Therefore, construction of the proposed projects would not have significant adverse impacts to threatened, endangered, and special concern species or significant natural communities.

Therefore, construction of the proposed projects would not result in significant adverse impacts to natural resources within the study area.

[11] The project sites are bounded by New York City streets, and comprise developed and undeveloped lots, and open spaces located in a highly developed urban area with limited existing natural resources; thus, the study area for natural resources is the boundary of the Two Bridges LSRD.

HAZARDOUS MATERIALS

Construction of the proposed projects would involve the demolition of one one-story building on Site 4 (4A/4B), and subsurface disturbance on all project sites. A detailed assessment of the potential risks related to the construction of the proposed projects with respect to any hazardous materials is described in Chapter 10, “Hazardous Materials.” The proposed projects would have no known risks with respect to hazardous materials that cannot be controlled through the use of the measures described below. These measures would be implemented prior to, during, and following construction of the proposed projects to control or avoid the potential for human or environmental exposure to known or unexpectedly encountered hazardous materials.

The potential for adverse impacts would be avoided by placing Hazardous Materials (E) Designations on each of the three project sites (Lot 2 of Site 5 already has an [E] Designation). Measures taken on all project sites to mitigate any potential adverse impacts during the projects construction of the proposed projects include:

- Complying with the Hazardous Materials (E) Designation and oversight by OER;
- Pre-construction subsurface and ACM investigations along with OED approved RAP and associated Construction Health and Safety Plan (CHASP) setting out procedures to be followed prior to, during, and following construction (the plan would include soil management (soil stockpiling, disposal, and transportation measures), dust control, air monitoring for workers and the community, health and safety, and vapor controls); and
- Contingency measures if petroleum storage tanks or other contamination should be unexpectedly encountered.

With these measures, construction of the proposed projects would not result in any significant adverse impacts related to hazardous materials. ✷