Chapter 19: Construction*

19.1 Introduction

This chapter assesses the potential impacts of the construction of buildings expected to result on sites in the Jerome Avenue Rezoning from the Proposed Actions. The following sections discuss the potential impacts resulting from the construction of the projected development sites as described in the Reasonable Worst-Case Development Scenario (RWCDS) presented in Chapter 1, "Project Description." Construction impacts, although temporary, can include noticeable and disruptive effects from an action that is associated with construction or could induce construction. As stated in the *City Environmental Quality Review* (CEQR) *Technical Manual*, determination of the significance of construction impacts and need for mitigation is generally based on the duration and magnitude of the impacts. Construction impacts are usually important when construction activity could affect traffic conditions, hazardous materials, archaeological resources, the integrity of historic resources, community noise patterns, and air quality conditions.

The Proposed Actions consist of zoning map and text amendments for an approximately 92-block area in the Southwest Bronx, primarily along Jerome Avenue between 184th Street to the north and East 165th Street to the south. The Proposed Actions are expected to facilitate the construction of new predominantly multi-unit residential buildings with ground floor retail, community facility, and light industrial uses. As discussed in Chapter 1, "Project Description," a total of 45 projected development site have been identified for analysis purposes. In the RWCDS, the Proposed Actions would result in the incremental development of up to approximately 3,228 dwelling units (DUs); 20,866 square feet (sf) of commercial uses; and 72,272 sf of community facility uses (including 53,896 sf for a community center and 21,083 sf for a day care center); as well as a net reduction of 47,795 sf of industrial uses and 217 accessory parking spaces.

As described in other chapters of this EIS, the projected developments resulting from the Proposed Actions are expected to range from 15 to 225 feet in height. The 45 projected development sites would be completed in the 10 years following the adoption of the Proposed Actions, i.e. by the analysis year of 2026. In addition, there are 101 potential development sites considered less likely to be developed by the 2026 analysis year and are therefore not considered in this assessment.

* This chapter has been revised since the DEIS to reflect revisions to principal conclusions (adverse impacts related to traffic and pedestrians) and refinement of construction noise and air quality analyses based on coordination with the lead agency, DCP.

According to the *CEQR Technical Manual*, construction duration is often broken down into short-term (less than two years) and long-term (two or more years). Where the duration of construction is expected to be short-term, any impacts resulting from such short-term construction generally do not require detailed assessment. As described below, it is estimated that most of the projected development sites would generally take less than 24 months to complete construction, and would therefore be considered short-term. However, as construction activity associated with the RCWDS would occur on multiple development sites within the same geographic area, such that there is the potential for several construction timelines to overlap, a preliminary assessment of potential construction impacts was prepared in accordance with the guidelines of the *CEQR Technical Manual*, and is presented in this chapter.

The findings of the preliminary assessment identified the need to undertake more detailed construction impact assessments for transportation, air quality, and noise. To conduct these detailed assessments, this chapter describes the City, state, and federal regulations and policies that govern construction, followed by the conceptual construction schedule and the types of activities likely to occur during construction of the 45 projected development sites. The types of construction equipment are also discussed, along with the expected number of workers and truck deliveries. Finally, the potential impacts from construction activity are assessed and the methods that may be employed to avoid significant adverse construction-related impacts are presented.

19.2 Principal Conclusions

TRANSPORTATION

Construction travel demand is expected to peak in the second quarter of 2024 and was selected as a reasonable worst-case analysis period for assessing potential cumulative transportation impacts from operational trips from completed portions of the project and construction trips associated with construction activities. Construction of the Proposed Actions are expected to result in significant adverse traffic impacts, as described below. No significant adverse impacts to parking, transit, or pedestrian conditions are anticipated.

Traffic

During construction, traffic would be generated by construction workers commuting via autos and by trucks making deliveries to projected development sites. The results of a detailed traffic analysis for 2024 (Q2) show that the Proposed Actions would result in no significant adverse impacts during the construction 6-7 AM peak hour and significant adverse impacts at 13 intersections during the construction 3-4 PM peak hour. Measures to address these impacts are described in Chapter 21, “Mitigation.”

Transit

The construction sites are located in an area that is well served by public transportation, with a total of eleven subway stations, nine bus routes, and four commuter rail station located in the vicinity of the rezoning area. In 2024 (Q2), transit conditions during the 6-7 AM and 3-4 PM construction peak hours are expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2026. No subway station impacts are expected during construction as the Proposed Actions are not expected to result in any significant subway station impacts. The Proposed Actions’ significant adverse bus impact would also be less likely to occur during construction than with full build-out of the Proposed Actions in 2026 as incremental demand would be lower during construction and would not occur during the peak hours of commuter demand. It is expected that the mitigation measures identified for 2026 operational transit impacts in Chapter 21, “Mitigation,” would also be effective at mitigating any potential impacts from construction transit trips during the 2024 (Q2) construction periods.

Pedestrians

In 2024 (Q2), pedestrian trips by construction workers would be widely distributed among the eleven projected development sites that would be under construction in this period and would primarily occur outside of the weekday AM and PM commuter peak periods and weekday midday peak period when area pedestrian facilities typically experience their greatest demand. Pedestrian conditions during the 6-7 AM and 3-4 PM construction peak hours are expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2026. The Proposed Actions’ significant adverse sidewalk impact would therefore be less likely to occur during this construction period than with full build-out of the Proposed Actions in 2026. It is expected that the mitigation measure identified for 2026 operational pedestrian impacts in Chapter 21, “Mitigation,” would also be effective at mitigating any potential impacts from construction pedestrian trips during the 2024 (Q2) construction period.

Parking

Based on the extent of available on-street parking spaces within ¼-mile of the rezoning area, there would be sufficient on-street parking capacity to accommodate all of the projected construction worker parking demand during the 2024 (Q2) cumulative construction and operational parking demand. Therefore, significant adverse parking impacts during construction are not anticipated.

AIR QUALITY

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes as well as New York City Local Law 77. These include dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel and best available tailpipe reduction technologies. A quantitative air quality analysis Implementing these emissions reduction measures for the two construction analysis areas (Projected Development Sites 33, 34, 35, and 36 for the peak emissions year 2018 and Projected Development Sites 43, 44, and 45 for the peak emissions year 2022) indicated that the construction activities of the Proposed Action would not result in any exceedance of the National Ambient Air Quality Standards (NAAQS) or the City's *de minimis* criteria. Therefore, construction under the Proposed Actions would not result in significant adverse air quality impacts due to construction sources.

NOISE AND VIBRATION

Noise

Based on the construction predicted to occur at each development site during each of the selected analysis periods, each receptor is expected to experience an exceedance of the *CEQR Technical Manual* noise impact threshold. One peak construction period per year was analyzed for each of the two, development site clusters (Projected Development Sites 43, 44, 45 and Projected Development Sites 33, 34, 35, 36). The peak construction analysis years identified for the two construction clusters were identified as 2018 and 2022. Receptors where noise level increases are predicted to exceed the noise impact threshold criteria were identified. The noise analysis results show that the predicted noise levels could exceed the *CEQR Technical Manual* impact criteria throughout the rezoning area. This analysis is based on a conceptual site plan and construction schedule. It is possible that the actual construction may be of less magnitude, or that construction on multiple projected development sites may not overlap, in which case construction noise would be less intense than the analysis predicts.

Vibration

The buildings of most concern with regard to the potential for structural or architectural damage due to vibration would be historic buildings and other structures immediately adjacent to the projected development sites. For those historic buildings and structures that would be within 90 feet of the projected development sites, vibration monitoring would be required per New York City Department of Buildings (DOB) Technical Policy and Procedure Notices (TPPN) #10/88 regulations, and PPV during construction would be prohibited from exceeding the 0.50 inches/second threshold. For non-historic buildings and other structures immediately adjacent to projected development sites, vibration levels within 25 feet may result in peak particle velocity (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 also the pile driver. 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 under the Proposed Actions.

HISTORIC AND CULTURAL RESOURCES

The rezoning area is substantially contiguous to the Croton Aqueduct System at approximately West 183rd Street and also at approximately Ogden Avenue and Dr. Martin Luther King, Jr., Boulevard (just south of the Cross-Bronx Expressway). In each of these two areas, there is one potential development site within 90 feet of the mapped Croton Aqueduct System/Aqueduct Walk; as described following, in this chapter, it is presumed that appropriate protections would be in place during construction to ensure that the aqueduct system and the public park would not experience construction-related impacts.

Any designated NYCL or S/NR-listed historic buildings located within 90 linear feet of a projected or potential new construction site are subject to the protections of the New York City Department of Building's (DOB's) Technical Policy and Procedure Notice (TPPN) #10/88. In effect, this policy would prevent construction-related impacts to properties within the Grand Concourse Historic District that would be within 90 feet of potential development sites 75, 76, and 77. Therefore, no construction impacts to the Grand Concourse Historic District would result with the Proposed Actions. There are no projected or potential development sites within the Morris Avenue Historic District, and the nearest site that would be developed with the Proposed Actions would be Potential Development Site 43, which is located approximately 170 feet southwest of the historic district boundary; therefore, the Proposed Actions would result in no construction impacts to the Morris Avenue Historic District.

As described following, in this chapter, one projected development site and four potential development sites are located within approximately 90 feet of the U.S. Post Office – Morris Heights Station (S/NR-eligible). As defined in the procedure notice TPPN #10/88, “historic resources” that are considered adjacent to construction activities, only include designated NYCLs and S/NR-listed properties that are within 90 feet of a lot under development or alteration. They do not include S/NR-eligible, NYCL-eligible, potential, or unidentified architectural resources. Without the particular protections of TPPN #10/88, or similar protections in place, the Proposed Actions could result in construction impacts on the U.S. Post Office – Morris Heights Station, with the development of potential development sites 96 and 97, the boundaries of which are nearly adjacent to the post office building structure.

OTHER ANALYSIS AREAS

Construction of the 45 projected development sites would not result in significant adverse impacts in any other technical areas analyzed in this EIS. Based on the RWCDS construction schedule, construction activities would be spread out over a period of approximately 9 years, throughout an approximately 92-block rezoning area, and construction of most of the projected development sites would be short-term (i.e., lasting up to 24 months). While construction of the projected development sites would result in temporary increases in traffic during the construction period, access to residences, businesses, and institutions in the area surrounding the development sites would be maintained throughout the construction period (as required by City regulations). No open space resources would be located on any of the projected development construction sites, nor would any access to publically accessible open space be impeded during construction within the proposed rezoning area. In addition, measures would be implemented to control noise, vibration, emissions, and dust on construction sites, including the erection of construction fencing incorporating sound reducing measures. While construction of the new buildings due to the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that such impacts in any given area would be relatively short term, even under the worst-case construction sequencing, and therefore would not create an open space or neighborhood character impact.

Any potential construction-related hazardous materials would be avoided by the inclusion of (E) designations, or other measures comparable to such a designation, for all RWCDS development sites. In addition, demolition of interiors, portions of buildings, or entire buildings are regulated by DOB and require abatement of asbestos prior to any intrusive construction activities, including demolition. OSHA regulates construction activities to prevent excessive exposure of workers to contaminants in the building materials, including lead paint. New York State Solid Waste regulations control where demolition debris and contaminated materials associated with construction are handled and disposed of. Adherence to these existing regulations would prevent impacts from construction activities at any of the projected development sites in the rezoning area.

19.3 Regulatory Framework

GOVERNMENTAL COORDINATION AND OVERSIGHT

The governmental oversight of construction in New York City is extensive and involves a number of City, state, and federal agencies. Table 19-1, "Construction Oversight in New York City," shows the main agencies involved in construction oversight and each agency's areas of responsibility. The primary responsibilities lie with New York City agencies. The New York City Department of Buildings (DOB) has the primary responsibility for ensuring that the construction meets the requirements of the New York City Building Code and that buildings are structurally, electrically, and mechanically safe. In addition, DOB enforces safety regulations to protect both construction workers and the public. The areas of responsibility include the enforcement of regulations pertaining to the installation and operation of construction equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding. The New York City Department of Environmental Protection (DEP) enforces 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) and the DEP Notice of Adoption Rules for Citywide Construction Noise Mitigation (also known as Chapter 28), approves Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs), regulates water disposal into the sewer system, and oversees dust control for construction activities. The New York City Fire Department (FDNY) has primary oversight for compliance with the New York City Fire Code and for the installation of tanks containing flammable materials. The New York City Department of Transportation (DOT) reviews and approves any traffic lane and sidewalk closures. New York City Transit (NYCT) is in charge of bus stop relocations, and any subsurface construction within 200 feet of a subway. The New York City Landmarks Preservation Commission (LPC) approves studies and testing to prevent loss of archaeological materials and to prevent damage to fragile historic structures.

On the state level, the New York State Department of Environmental Conservation (NYSDEC) regulates discharge of water into rivers and streams, disposal of hazardous materials, and construction, operation, and removal of bulk petroleum and chemical storage tanks. The New York State Department of Labor (DOL) licenses asbestos workers. On the federal level, the U.S. Environmental Protection Agency (EPA) has wide ranging authority over environmental matters, including air emissions, noise emission standards, hazardous materials, and the use of poisons. Much of the responsibility is delegated to the state level. The U.S. Occupational Safety and Health Administration (OSHA) sets standards for work site safety.

Table 19-1: Construction Oversight in New York City

Agency	Area(s) of Responsibility
New York City	
Department of Buildings (DOB)	Primary oversight for Building Code and site safety
Department of Environmental Protection (DEP)	Noise, hazardous materials, dewatering, dust
Fire Department (FDNY)	Compliance with Fire Code, tank operation
Department of Transportation (DOT)	Traffic lane and sidewalk closures
New York City Transit (NYCT)	Bus stop relocation; any subsurface construction within 200 feet of a subway
Landmarks Preservation Commission	Archaeological and historic architectural protection
New York State	
Department of Labor (DOL)	Asbestos workers
Department of Environmental Conservation (NYSDEC)	Dewatering, hazardous materials, tanks, Stormwater Pollution Prevention Plan, Industrial SPDES, if any discharge into the Hudson River
United States	
Environmental Protection Agency (EPA)	Air emissions, noise, hazardous materials, toxic substances
Occupational Safety and Health Administration (OSHA)	Worker safety

Source: STV Incorporated, 2017.

19.4 Conceptual Construction Schedule and Activities

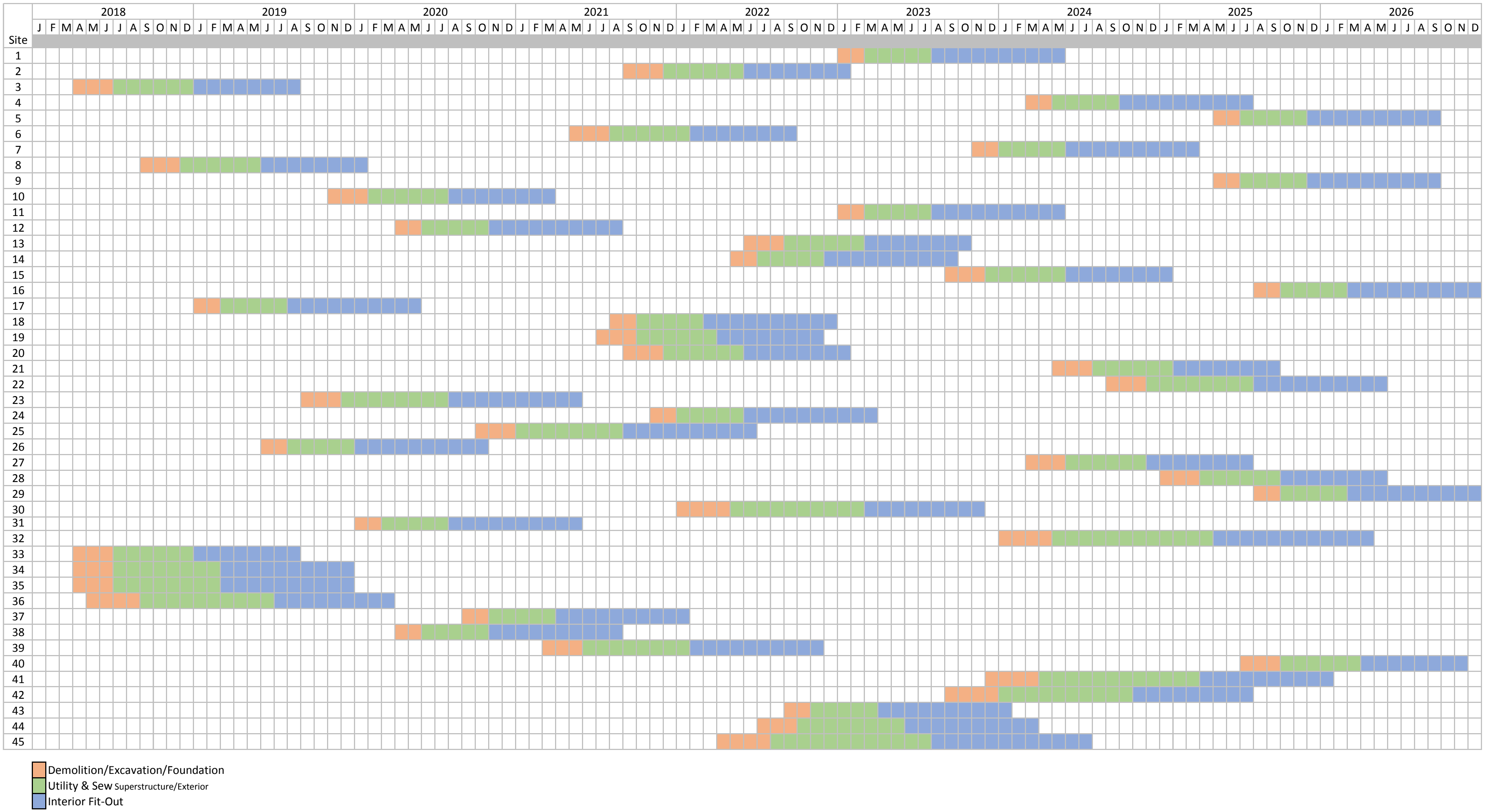
This chapter presents a description of the construction process for the purposes of quantification of environmental-effect-causing activities only. It is not intended to describe the precise construction methods that may ultimately be used, nor is it intended to dictate or confine the construction process. Actual construction methods and materials may vary, depending in part on how the construction contractors choose to implement their work to be most cost effective, within the requirements set forth in bid, contract, and construction documents. Construction specifications will require that construction contractors comply with applicable environmental regulations and obtain necessary permits for the duration of construction. Construction of each development site would follow applicable federal, state, and local laws for building and safety, as well as local noise ordinances, as appropriate.

CONSTRUCTION SEQUENCING

Because the projected development sites within the area to be rezoned are predominantly in private ownership, the timing of the development of those sites is unknown. As such, the RWCDS presented in Chapter 1, "Project Description," does not describe which of the sites would be developed first or assume a particular sequence of development. However, it is conservatively assumed that construction of all projected development sites would be completed by the end of the 2026 analysis year. Market considerations would ultimately determine the demand for development.

A reasonable worst-case for the anticipated schedule of construction activities and phases was provided by the New York City Department of City Planning (DCP) for the purposes of assessing potential construction impacts. Generally, the most underutilized land near transit was weighted greater for redevelopment, with earlier construction dates. In addition, the larger projected development sites where there are known plans are assumed to begin construction earlier, closer to the time of project approvals (i.e., soon after the beginning of 2018). In estimating the duration of the construction period for each site, it is generally assumed that sites that would accommodate less than 200,000 sf of development would take 24 months or less to complete construction, whereas sites with a greater amount of anticipated development floor area (e.g., Projected Development Sites 32, 41, and 45) are assumed to take longer.

An anticipated construction sequencing for use in the analysis of the Proposed Actions was developed based on the above assumptions and is illustrated on Figure 19-1, "Assumed Construction Scheduled for Assessment of Construction Impacts." As shown on the figure, construction of the 45 projected development sites is anticipated to begin in 2018 and would be gradual, taking place over a nine-year period. It is conservatively assumed that construction of all projected development sites would be completed by the end of the 2026 analysis year.



Source: NYC Department of City Planning

Figure 19-1

ASSUMED CONSTRUCTION SCHEDULE FOR ASSESSMENT OF CONSTRUCTION IMPACTS

TYPICAL CONSTRUCTION ACTIVITIES

Construction of various components of the projected development sites would occur over a number of years, with construction activities and intensities varying, depending upon which components of the overall development sites are underway at a given time. Following is a general outline of typical construction stages on the development sites. It should be noted, however, that the duration and extent of new construction activities would vary based on which site is being developed. For smaller sites, the construction process is much simpler and shorter in duration, typically lasting 24 or fewer months, while construction of projected development sites 32, 41, and 45 would be more intensive, and is conservatively estimated to last for approximately 26 to 28 months.

- Months 1-4: Site clearance, excavation, and foundation. The first four months of construction would entail site clearance (including demolition of existing buildings); digging, pile-driving, pile capping, and excavation for the foundation; dewatering (to the extent required); and reinforcing and pouring of the foundation. Typical equipment used for these activities would include excavators, backhoes, tractors, pile-drivers, hammers, and cranes. Trucks would arrive at the site with pre-mixed concrete and other building materials and would remove any excavated material and construction debris.

- Months 5-14: Underground parking foundation (if any), erection of the superstructure, and façade and roof construction. Once the foundations have been completed, the construction of the building’s steel framework, parking ramp (if any), and decking would take place. This process involves the installation of beams, columns and decking, and would require the use of cranes, derricks, hoists, and welding equipment, as warranted. This stage of construction would also include the assembly of exterior walls and cladding, as well as roof construction.

- Months 15-24: Mechanical installation, interior and finishing work. This would include the installation of heating, ventilation, and air conditioning (HVAC) equipment and ductwork; installation and checking of elevator, utility, and life safety systems; and work on interior walls and finishes. During these activities, hoists and cranes would continue to be used, and trucks would remain in use for material supply and construction waste removal. It should be noted that since much of this stage of construction would occur when the building is fully enclosed, disruption to the surrounding neighborhood would be minimized.

The phases, duration, and overlap of construction activities specific to a particular development site are identified on Figure 19-1. It should be noted that the actual duration of such activities could vary based upon which site is developed. For example, the time necessary for each activity would vary depending upon such factors as work hours, traffic restrictions, and contractors’ means and methods. Other factors would include the number and type of utilities requiring relocation and the location and condition of nearby surface and subsurface structures.

ESTIMATE OF CONSTRUCTION WORKERS AND CONSTRUCTION PERIOD TRUCKS

Worker and truck projections were based on representative sites of similar sizes and uses from the 2016 East New York Rezoning FEIS. Projected development sites were categorized based on similar size and use, and the most intense month from each stage of construction (demolition/excavation/foundation, superstructure/exterior, interior) for each site was identified and used as a scaling factor for projections. Each of the 45 projected development sites was then assigned to the appropriate size category and the projections were scaled on a worker or truck per square foot basis.

The resultant estimate of the number of trucks and workers per quarter are summarized in Table 19-2, "Estimated Total Number of Construction Workers and Construction Trucks On-Site Per Day (45 Projected Development Sites)." The number of workers and trucks would peak in the second quarter of 2024, with an estimated 633 workers and 87 trucks per day. During this peak construction worker and truck period, eleven of the 45 projected development sites are expected to be under construction (refer to Figure 19-1).

Table 19-2: Estimated Total Number of Construction Workers and Construction Trucks On-Site Per Day (45 Projected Development Sites)

Year	**2018**				**2019**				**2020**				**2021**				**2022**			
Quarter	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***
Construction Workers	0	129	285	305	306	308	291	317	238	179	160	154	185	180	209	310	379	493	570	567
Construction Trucks	0	37	43	43	49	55	51	50	41	32	24	32	36	38	48	54	62	92	91	85

Year	**2023**				**2024**				**2025**				**2026**			
Quarter	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***	***1st***	***2nd***	***3rd***	***4th***
Construction Workers	469	396	390	389	538	633	596	492	506	439	469	396	386	288	119	78
Construction Trucks	75	51	64	68	91	87	76	73	75	65	68	58	58	55	32	20

	Project Total	
	Peak	**Average**
Construction Workers	**633**	**337**
Construction Trucks	**92**	**55**

Source: STV Incorporated, 2017.

DETERMINING PEAK YEAR FOR CUMULATIVE CONSTRUCTION AND OPERATIONAL EFFECTS

According to the *CEQR Technical Manual*, if a project involves multiple development sites over varying construction timelines, a preliminary assessment must be undertaken to determine if the operational trips from completed portions of the project and construction trips associated with construction activities could overlap. For the purposes of establishing a reasonable worst-case for the construction assessment, based on the conceptual construction schedule presented in Figure 19-1, the second quarter of 2024 was selected as the construction peak year for the transportation assessment in this chapter. As shown on Figure 19-1, in 2024, there would be 27 sites that are already completed and operational (projected development sites 2, 3, 6, 8, 10, 12, 13, 14, 17, 18, 19, 20, 23, 24, 25, 26, 30, 31, 33, 34, 35, 36, 37, 38, 39, 43, and 44), and eleven sites that are under construction (1, 4, 7, 11, 15, 21, 27, 32, 41, 42, and 45). Any prior year would not have sufficient operational sites in close proximity to one another for assessment purposes, whereas subsequent years would not have an adequate number of sites under construction.

CONSTRUCTION WORK HOURS

Construction activities for buildings in the City generally take place Monday through Friday, with exceptions that are discussed separately below. In accordance with City laws and regulations, construction work at the projected development sites would generally begin at 7 AM on weekdays, with workers arriving to prepare work areas between 6 and 7 AM. Construction work activities would typically finish around 3:30 PM, but on some occasions, the workday could be extended depending upon the need to complete some specific tasks beyond normal work hours, such as completing the drilling of piles, finishing a concrete pour for a floor deck, or completing the bolting of a steel frame erected that day. The extended workday would generally last until about 6 PM and would not include all construction workers on-site, but just those involved in the specific tasks requiring additional work time.

Occasionally, Saturday or overtime hours may be required to complete some time-sensitive tasks. Weekend work requires a permit from the DOB and, in certain instances, approval of a noise mitigation plan from DEP under the City's Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1st, 2007, limits construction (absent special circumstances as described below) to weekdays between the hours of 7 AM and 6 PM and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM or on weekends) may be permitted only to accommodate: (i) emergency conditions; (ii) public safety; (iii) construction projects by or on behalf of City agencies; (iv) construction activities with minimal noise impacts; and (v) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. In such cases, the number of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. The typical weekend workday would be on Saturday from 7 AM with worker arrivals and site preparation to 5 PM for site cleanup.

CONSTRUCTION STAGING AREAS, SIDEWALK AND LANE CLOSURES

Construction staging areas, also referred to as “laydown areas,” are sites that would be used for the storage of materials and equipment and other construction-related activities. Work zones are those areas where the construction is occurring. Field offices for contractors and construction managers would be situated in temporary job site trailers at staging areas or existing office space near the work areas. Staging areas would typically be fenced and lit for security and would adhere to New York City Building Codes.

Staging areas of adequate size and proximity to the construction sites are essential to minimize construction traffic through the Jerome Avenue rezoning area and to provide adequate space and access for construction activities. While vacant parcels are available within close proximity to several of the projected development sites that could be used for staging areas, it is anticipated that construction staging would most likely occur on the projected development sites themselves and may in some cases, extend within the curb and travel lanes and sidewalks of public streets adjacent to the construction site.

No rerouting of traffic is anticipated during construction activities and all moving lanes on streets are expected to be available to traffic at all times. It is anticipated that some sidewalks immediately adjacent to construction sites would be closed to accommodate heavy loading areas for at least several months of the construction period for each site. Pedestrians would either use a temporary walkway in a sectioned-off portion of the street or be diverted to walk on the opposite side of the street. Detailed Maintenance and Protection of Traffic (MPT) plans for each construction site would be submitted for approval to the DOT Office of Construction Mitigation and Coordination (OCMC), the entity that insures critical arteries are not interrupted, especially in peak travel periods. Builders would be required to plan and carry out noise and dust control measures during construction.

Appropriate protective measures for ensuring pedestrian safety surrounding each of the projected development sites would be implemented under these plans. Construction activities would also be subject to compliance with the New York City Noise Code and by the EPA noise emission standards for construction equipment. In addition, there would be requirements for street crossing and entrance barriers, protective scaffolding, and compliance with applicable construction safety measures.

19.5 Preliminary Assessment

In accordance with the guidelines of the *CEQR Technical Manual*, this preliminary assessment evaluated the effects associated with the Proposed Actions’ construction-related activities including transportation (traffic, transit, pedestrians, and parking), air quality, noise, land use and neighborhood character, socioeconomic conditions, community facilities, open space, historic and cultural resources, and hazardous materials.

TRANSPORTATION

The Proposed Actions would result in the construction of predominantly mixed-use developments on 45 projected development sites in the rezoning area from 2018 to 2026. These developments would replace vacant land, as well as existing and anticipated No-Action uses on the development sites. During construction periods, projected development sites would generate trips by workers traveling to/from the construction sites, as well as trips associated with the movement of materials and equipment. Given typical construction hours, worker trips would be concentrated in the early morning and mid-afternoon periods on weekdays and are generally not expected to represent a substantial increment during the area's peak travel periods.

Traffic

As discussed above, average daily on-site construction workers and trucks were forecast for new construction anticipated on each of the projected development sites. The number of workers and trucks would peak in the second quarter of 2024, with an estimated 633 workers and 87 trucks per day (see Table 19-2, "Estimated Total Number of Construction Workers and Construction Trucks On-Site Per Day (45 Projected Development Sites)" above). These represent peak days of work, and many days during the construction period would have fewer construction workers and trucks on-site.

The second quarter of 2024 was selected as the reasonable worst-case analysis period for assessing potential cumulative traffic impacts from operational trips from completed portions of the project and construction trips associated with construction activities. During this peak construction period, eleven of the 45 projected development sites are expected to be under construction and 27 sites will be completed and operational.

Cumulative Construction and Operational Traffic – 2024 (Q2)

Modal split and vehicle occupancy rates for construction workers were based on 2011-2015 American Community Survey journey-to-work data for New York City. It is anticipated that approximately 37 percent of construction workers are expected to travel by personal automobile at an average occupancy rate of approximately 1.11 persons per vehicle. 53 percent would use public transportation in their commute to and from the construction sites in the rezoning area.

Table 19-3, "2024 (Q2) Peak Incremental Construction Vehicle Trip Projections (in PCEs)," lists the forecast of hourly construction worker auto and construction truck trips during the 2024 (Q2) peak construction period. The temporal distribution for these vehicle trips was based on typical work shift allocations and conventional arrival/departure patterns for construction workers. Each worker vehicle was assumed to arrive in the morning and depart in the afternoon or early evening; whereas, truck deliveries would occur throughout the construction day. To avoid congestion and ensure that materials are on-site for the start of each shift, construction truck deliveries would often peak during the hour before the regular day shift, overlapping with construction worker arrival traffic. Each truck delivery was assumed to result in two truck trips during the same hour (one inbound and one outbound). For analysis purposes, truck trips were converted into Passenger Car Equivalents (PCEs) based on one truck being equivalent to an average of two PCEs.

Table 19-3: 2024 (Q2) Peak Incremental Construction Vehicle Trip Projections (in PCEs)

Hour	Auto Trips					Truck Trips					Total Vehicle Trips		
	In		Out		Total	In		Out		Total	In	Out	Total
	%	#	%	#		%	#	%	#				
6-7 AM	80	169	0	0	169	25	44	25	44	88	213	44	257
7-8 AM	20	42	0	0	42	10	18	10	18	36	60	18	78
8-9 AM	0	0	0	0	0	10	18	10	18	36	18	18	36
9-10 AM	0	0	0	0	0	10	17	10	17	34	17	17	34
10-11 AM	0	0	0	0	0	10	17	10	17	34	17	17	34
11-12 PM	0	0	0	0	0	10	17	10	17	34	17	17	34
12-1 PM	0	0	0	0	0	10	17	10	17	34	17	17	34
1-2 PM	0	0	0	0	0	5	9	5	9	18	9	9	18
2-3 PM	0	0	5	11	11	5	9	5	9	18	9	20	29
3-4 PM	0	0	80	169	169	2.5	4	2.5	4	8	4	173	177
4-5 PM	0	0	15	31	31	2.5	4	2.5	4	8	4	35	39
Total	**100**	**211**	**100**	**211**	**422**	**100**	**174**	**100**	**174**	**348**	**385**	**385**	**770**

During this cumulative construction and operational traffic analysis period, there would be 27 sites that are already completed and operational and eleven sites that are under construction. Prior years are unlikely to see completion of substantial concentrations of new development, whereas subsequent years would see a decreasing intensity of construction activity and lower levels of construction traffic. During the 6-7 AM construction peak hour 257 vehicle trips (in PCEs), including 213 inbound trips and 44 outbound trips, are anticipated; during the 3-4 PM construction peak hour a total of 177 PCE trips, including four inbound trips and 173 outbound trips, are anticipated (see Table 19-3, "2024 (Q2) Peak Incremental Construction Vehicle Trip Projections [in PCEs]"). By comparison, construction vehicle trips would total approximately 57 (averaging the 7-8 AM and 8-9 AM totals) during the 7:30-8:30 AM operational peak hour and zero during the 5-6 PM operational peak hour.

There would be net increases of 396 vehicle trips during the 6-7 AM construction peak hour and 491 trips during the 3-4 PM construction peak hour (see Table 19-4, “2024 (Q2) Peak Incremental Construction and Operational Traffic Volumes”). As these levels of trip generation would exceed the *CEQR Technical Manual* threshold of 50 peak-hour vehicle trips, a secondary traffic screening analysis was prepared for the weekday 6-7 AM and 3-4 PM construction peak hours and is provided in the Detailed Assessment section. By comparison, during the 7:30-8:30 AM and 5-6 PM operational peak hours, combined operational and construction vehicle trips would total 314 and 454 PCEs, respectively. During these operational peak-hours, construction-vehicle would only account for 57 of the combined trips in the AM and zero in the PM.

Table 19-4: 2024 (Q2) Peak Incremental Construction and Operational Traffic Volumes (in PCEs)

Hour	Construction Trips	Operational Trips[1]	Total Trips
6-7 AM	257	139	396
7:30-8:30[2] AM	57	257	314
3-4 PM	177	431	608
5-6 PM	0	454	454

Notes:
[1] Operational trips reflect the net increment from With-Action developments expected to be completed by the 2024 (Q2) cumulative analysis period.
[2] Construction trips during this period based on the average for the 7-8 AM and 8-9 AM periods.
Source: STV Incorporated, 2017.

Street Lane and Sidewalk Closures

Temporary curb lane and sidewalk closures are anticipated adjacent to construction sites, similar to other construction projects in New York City, and these would be expected to have dedicated gates, driveways, and/or ramps for access by trucks making deliveries. Truck movements would be spread throughout the day and would generally occur between 6 AM and 5 PM, depending on the stage of construction. As noted above, no rerouting of traffic is anticipated during construction activities and all moving lanes on streets are expected to be available to traffic at all times. Flaggers are also expected to be present during construction to manage the access and movement of trucks. As also noted above, detailed MPT plans for each construction site would be submitted for approval by DOT OCMC.

Transit

It is estimated that approximately 633 construction workers would travel to and from projected development sites each day during the 2024 (Q2) peak analysis period for cumulative construction and operational travel demand (see table 19-2). Approximately 53 percent of these construction workers are expected to travel to and from the rezoning area by public transit (subway, bus, and/or commuter rail). The construction sites are located in an area that is well served by public transportation, with a total of eleven subway stations, nine bus routes, and four commuter rail stations located in the vicinity of the rezoning area.

As noted above, it is estimated that approximately 80 percent of all construction workers would arrive and depart in the peak hour before and after each shift. Therefore, construction worker travel demand is expected to generate a total of approximately 268 transit trips in both the 6-7 AM and 3-4 PM construction peak hours. During these same periods, operational transit trips from completed projected development sites would total approximately 653 and 1,625, respectively. By comparison, transit trips with full build-out of the Proposed Actions in 2026 would be substantially greater in number, totaling 2,014 and 2,766 during the analyzed weekday commuter peak periods when overall demand on area transit facilities and services typically peaks. Therefore, 2024 (Q2) transit conditions during the 6-7 AM and 3-4 PM construction peak hours are expected to be generally better than during the analyzed commuter peak hours with full build-out of the Proposed Actions in 2026. No subway station or line-haul impacts are expected during construction in 2024 (Q2) as the construction phase would have fewer transit trips than the Proposed Actions and the Proposed Actions are not expected to result in any significant subway station or line-haul impacts. For buses, there would be less likelihood of significant adverse impacts during the construction peak hours than during the 2026 operational peak hours with full build-out as the number of transit trips would be less during the construction phase. It is expected that the mitigation measures identified for 2026 operational transit impacts in Chapter 21, “Mitigation,” would also be effective at mitigating any potential impacts from construction transit trips during the 2024 (Q2) peak quarter for cumulative construction and operational travel demand.

Pedestrians

As discussed above, during the 2024 (Q2) peak analysis period for cumulative construction and operational travel demand, it is estimated that there would be approximately 633 construction workers on-site daily. Approximately five percent of these workers would be expected to walk to the rezoning area, in addition to the 53 percent whom would be expected to travel to the rezoning area by transit, walking to and from area subway stations and bus stops.

Construction worker travel demand on area sidewalks and crosswalks is expected to total approximately 294 trips in both the 6-7 AM and 3-4 PM construction peak hours, when 80 percent of construction workers are expected to arrive and depart. These trips would be widely distributed among the eleven projected development sites that would be under construction in 2024 (Q2) and would primarily occur outside of the weekday AM and PM commuter peak periods and weekday midday peak period when area pedestrian facilities typically experience their greatest demand. During these same periods, operational pedestrian trips (including walk trips and bus and subway trips) from completed projected development sites would total approximately 1,165 and 4,165, respectively. By comparison, pedestrian trips (including walk trips and transit trips) with full build-out of the Proposed Actions in 2026 would be substantially greater in number, totaling 3,621, 8,985, and 6,912 during the analyzed weekday 7:30-8:30 AM, 1-2 PM midday, and 5-6 PM operational peak hours, respectively. Therefore, 2024 (Q2) pedestrian conditions during the 6-7 AM and 3-4 PM construction peak hours are expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2026. Consequently, there would be less likelihood of significant adverse pedestrian impacts during the construction peak hours in the cumulative analysis year than with full build-out of the Proposed Actions in 2026. It is expected that the mitigation measures identified for 2026 operational pedestrian impacts in Chapter 21, "Mitigation," would also be effective at mitigating any potential impacts from construction pedestrian trips during the 2024 (Q2) analysis period for cumulative construction and operational travel demand. Adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements at locations where temporary sidewalk closures are required during construction activities.

Parking

The 2024 (Q2) peak analysis period for cumulative construction and operational travel demand would result in approximately 633 workers on-site daily, approximately 37 percent of whom would be expected to travel to the rezoning area by private auto. Based on an average vehicle occupancy of 1.11 persons per vehicle, the maximum daily parking demand from project site construction workers would total approximately 211 spaces (see Table 19-5, "2024 (Q2) Construction Worker Parking Accumulation"). As there are relatively few off-street public parking facilities in proximity to projected development sites, the majority of workers are expected to park on-street. As discussed in Chapter 14, "Transportation," within a ¼-mile radius of the rezoning area, there are approximately 24,841 and 24,318 on- and off-street parking spaces in the weekday overnight and midday periods in existing conditions, respectively. There would be approximately 3,954 and 2,391 available spaces in the 2026 No-Action and 1,751 and 1,362 available spaces in the 2026 With-Action operational conditions during the weekday overnight and midday periods, respectively. Based on the extent of available parking spaces, there would be sufficient on- and off-street parking capacity to accommodate all of the projected demand. As such, construction activities during the 2024 (Q2) peak construction traffic period would not result in a significant adverse parking impact.

Table 19-5: 2024 (Q2) Construction Worker Parking Accumulation

Hour	2024 (Q2)		
	In	Out	Total Accumulation
6-7 AM	169	0	169
7-8 AM	42	0	211
8-9 AM	0	0	211
9-10 AM	0	0	211
10-11 AM	0	0	211
11 AM-12 PM	0	0	211
12-1 PM	0	0	211
1-2 PM	0	0	211
2-3 PM	0	11	200
3-4 PM	0	169	31
5-6 PM	0	31	0

HISTORIC AND CULTURAL RESOURCES

The potential for construction-related impacts associated with the Proposed Actions would be limited to the vicinity of each projected and potential development site, because those are the locations where construction would occur as part of the Proposed Actions. Therefore, the following discussion of construction-related impacts is limited to the historic resources that are at least partly within the rezoning area.

Potential Construction Impacts to Designated Resources within the Rezoning Area

Historic Districts – Morris Avenue Historic District and Grand Concourse Historic District

Any designated NYCL or S/NR-listed historic buildings located within 90 linear feet of a projected or potential new construction site are subject to the protections of the New York City Department of Building's (DOB's) Technical Policy and Procedure Notice (TPPN) #10/88, development resulting from the Proposed Actions. In effect, this policy would prevent construction-related impacts to properties within the Grand Concourse Historic District that would be within 90 feet of potential development sites 68, 69, and 70. Therefore, no construction impacts to the Grand Concourse Historic District would result with the Proposed Actions. There are no projected or potential development sites within the Morris Avenue Historic District, and the nearest site is Projected Development Site 43, which is approximately 170 feet away from the historic district boundary; therefore, the Proposed Actions would result in no construction impacts to the Morris Avenue Historic District.

Individual Property – Croton Aqueduct System

In addition, the rezoning area is substantially contiguous to the Croton Aqueduct System at approximately West 183rd Street and also at approximately Ogden Avenue and Dr. Martin Luther King, Jr., Boulevard (just south of the Cross-Bronx Expressway). In each of these two areas, there is one potential development site within 90 feet of the mapped Croton Aqueduct System/Aqueduct Walk; it is presumed that appropriate protections would be in place during construction to ensure that the aqueduct system and the public park would not experience construction-related impacts.

Potential Construction Impacts to Eligible Resources within the Rezoning Area

Individual Property – U.S. Post Office -Morris Heights Station

Adjacent historic resources, as defined in the procedure notice, only include designated NYCLs and S/NR-listed properties that are within 90 feet of a lot under development or alteration. They do not include S/NR-eligible, NYCL-eligible, potential, or unidentified architectural resources. Construction period impacts on any designated historic resources would be protected, by ensuring that adjacent development projected as a result of the Proposed Actions adheres to all applicable construction guidelines and follows the requirements laid out in TPPN #10/88.

Several potential development sites and one projected development site are located adjacent to, or otherwise substantially contiguous to the U.S. Post Office – Morris Heights Station, which is located on the east side of Jerome Avenue. Projected Development Site 12 and as potential development sites 17 and 23, are located across Jerome Avenue, to the west. Potential development sites 96 and 97 are the lots adjacent to the U.S. Post Office property, located north and south of it, respectively. All five of these projected and potential development sites are located within 90 feet of the U.S. Post Office property, as is potential development site 95, which is just to the north, separated from the U.S. Post Office property by potential development site 96.

However, as the U.S. Post Office – Morris Heights Station, is not designated or calendared for landmark designation by LPC or SHPO, it would not be afforded the protections of TPPN #10/88. As described previously in this chapter, the New York City Building Code provides some measures of protection for all properties against accidental damage from adjacent construction by requiring that all buildings, lots, and service facilities adjacent to the foundation and earthwork areas be protected and supported. However, without the particular protections of TPPN #10/88, or similar protections in place, the Proposed Actions could result in construction impacts on the U.S. Post Office – Morris Heights Station, with the development of potential development sites 96 and 97, the boundaries of which are nearly adjacent to the post office building structure.

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. A land use and neighborhood character assessment for construction impacts examines construction activities that would occur on the site (or portions of the site) and their duration. The analysis determines whether the type and duration of the activities would affect neighborhood land use patterns or neighborhood character. For example, a single property might be used for staging for several years, resulting in a "land use" that would be industrial in nature. Depending upon the nature of existing land uses in the surrounding area, the use of a single piece of property for an extended duration and its compatibility with neighboring properties may be assessed to determine whether it would have a significant adverse impact on the surrounding area.

Construction of the 45 projected development sites would not result in significant adverse impacts in any other technical areas analyzed in this EIS. Based on the RWCDS construction schedule, construction activities would be spread out over a period of approximately 9 years, throughout an approximately 92-block rezoning area, and construction of most of the projected development sites would be short-term (i.e., lasting up to 24 months). Throughout the construction period (as required by City regulations), access to residences, businesses, and institutions in the area surrounding the development sites would be maintained. In addition, measures would be implemented to control noise, vibration, emissions, and dust on construction sites, including the erection of construction fencing incorporating sound reducing measures. Since none of these impacts would be continuous or ultimately permanent, they would not create significant impacts on land use patterns or neighborhood character in the area. Therefore, while construction of the new buildings resulting from the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that such impacts in any given area would be relatively short term, even under the worst-case construction sequencing and, therefore, would not create a neighborhood character impact. Therefore, no significant construction impacts to land use and neighborhood character are expected.

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. Construction of the 45 projected development sites would not result in significant adverse impacts in any other technical areas analyzed in this EIS. Based on the RWCDS construction schedule, construction activities would be spread out over a period of approximately nine years, throughout an approximately 92-block rezoning area, and construction of most of the projected development sites would be short-term (i.e., lasting up to 24 months).

Community Facilities

According to the *CEQR Technical Manual*, construction impacts to community facilities are possible if a community facility would be directly affected by construction (e.g., if construction would disrupt services provided at the facility or close the facility temporarily, etc.). While there are community facilities throughout the rezoning area, and surrounding neighborhoods, as discussed in Chapter 4, "Community Facilities and Services," the Proposed Actions would not result in the direct displacement of any community facilities, as defined in the *CEQR Technical Manual*. While construction of the projected development sites would result in temporary increases in traffic during the construction period, access to and from any community facilities in the rezoning area would not be affected during the construction period. In addition, each construction site would be surrounded by construction fencing and barriers as required by DOB, which 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 services. New York City Police Department (NYPD) and FDNY emergency services and response times would not be materially affected by construction due to the geographic distribution of the police and fire facilities and their respective coverage areas. Therefore, no construction impacts would be expected to community facilities in the area, and a further preliminary assessment is not needed for the disclosure of potential construction impacts to 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. While several of the projected development sites are located in close proximity to existing open space resources, no open space resources would be located on any of the projected development construction sites, nor would any access to publically accessible open space be impeded during construction within the proposed rezoning area. In addition, measures would be implemented to control noise, vibration, emissions, and dust on construction sites, including the erection of construction fencing incorporating sound reducing measures. Since none of these impacts would be continuous or ultimately permanent, they would not create significant impacts on open space in the area. Therefore, while construction of the new buildings due to the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that such impacts in any given area would be relatively short term, even under the worst-case construction sequencing, and therefore would not create an open space impact. Therefore, no significant construction impacts to open space are expected.

Hazardous Materials

According to the guidelines in the *CEQR Technical Manual*, any impacts from in-ground disturbance that are identified in hazardous materials studies should be identified in this chapter as well. Institutional controls, such as (E) designations or restrictive declarations should be disclosed here as well. If the impact identified in hazardous materials studies is fully mitigated or avoided, no further analysis of the effects from construction activities on hazardous materials is needed.

As stated in Chapter 9, “Hazardous Materials,” the hazardous materials assessment identified that each of the projected and potential development sites has some associated concern regarding environmental conditions. Any potential construction-related hazardous materials would be avoided by the inclusion of (E) designations (or other measures comparable to such a designation) for all RWCDS development sites. As detailed in Chapter 9, “Hazardous Materials,” (E) designations or other comparable measures would be mapped on all projected development sites and potential development sites as part of the Proposed Actions. An (E) designated site is designated on a zoning map within which no change of use or development requiring a DOB permit may be issued without approval of the Mayor’s Office of Environmental Remediation (OER). These sites require OER’s review to ensure the protection of human health and the environment from any known or suspected hazardous materials associated with the site. The € designation requires that the fee owner conduct a testing and sampling protocol and remediation, where appropriate, to the satisfaction of OER before the issuance of a permit by DOB. The environmental requirements for (E) designation also include a mandatory CHASP, which must be approved by OER.

In addition, demolition of interiors, portions of buildings, or entire buildings are regulated by DOB and require abatement of asbestos prior to any intrusive construction activities, including demolition. OSHA regulates construction activities to prevent excessive exposure of workers to contaminants in the building materials, including lead paint. New York State Solid Waste regulations control where demolition debris and contaminated materials associated with construction are handled and disposed of. Adherence to these existing regulations would prevent impacts from construction activities at any of the projected development sites in the rezoning area.

19.6 Detailed Analyses

TRANSPORTATION

Traffic

Traffic volumes for the 6-7 AM and 3-4 PM construction peak hours were developed from Automatic Traffic Recorder (ATR) and manual turning movement counts collected in 2016. These data indicate that background traffic volumes from 6-7 AM are approximately 46 percent lower than 7:30-8:30 AM volumes, which is the AM peak hour analyzed in Chapter 14, "Transportation," and that background traffic volumes from 3-4 PM are approximately five percent lower than 5-6 PM volumes, which is the PM peak hour analyzed in Chapter 14, "Transportation." Baseline traffic volumes during peak construction activities in the second quarter of 2024 were established by applying a background growth rate and traffic volumes associated with No-Action development projects.

Vehicles generated by construction activities were assigned to the street network to determine the critical intersections most likely to be used by concentrations of project-generated trips. Autos used by workers to commute to construction sites were assigned to nearby off-street parking facilities with available spaces, and trucks making deliveries to construction sites were assigned using DOT designated local truck routes in the area, which include Jerome, University, Burnside, and River avenues; 167th Street; Fordham Road; and Edward L. Grant Highway. The Cross Bronx and Major Deegan expressways are through truck routes in the vicinity of the rezoning area. Vehicle trips associated with completed projects within the rezoning area were also included in the project-generated traffic volumes.

Intersections that would experience an increase of 50 or more PCEs from construction-related traffic (personal autos used by construction workers and trucks making deliveries to construction sites) during the 6-7 AM and 3-4 PM construction peak hours were selected for analysis based on the 2024 cumulative incremental construction traffic volumes and operational traffic volumes for completed projected development sites. The following ten intersections were selected for analysis in the AM period:

- Jerome Avenue and SB I-95 Ramps
- Jerome Avenue and NB I-95 Ramps
- Jerome Avenue and Mt. Eden Avenue
- Jerome Avenue and E. 172nd Street
- Jerome Avenue and Macombs Road
- Jerome Avenue and Macombs Dam Bridge
- Jerome Avenue and 170th Street
- Jerome Avenue and 167th Street
- Jerome Avenue and E. 165th Street
- Jerome Avenue and E. 164th Street

During the PM peak period, an additional 15 intersections were analyzed:

- Jerome Avenue and Kingsbridge Road
- Jerome Avenue and Fordham Road
- Jerome Avenue and 184th Street
- Jerome Avenue and E. 183rd Street
- Jerome Avenue and W. 183rd Street
- Jerome Avenue and W. 182nd Street
- Jerome Avenue and E. 181st Street
- Jerome Avenue and Burnside Avenue
- Jerome Avenue and Tremont Avenue
- Jerome Avenue and E. 176th Street
- Jerome Avenue and E. 175th Street
- Jerome Avenue and Featherbed Lane

- River Avenue and 167th Street
- Grand Concourse and 170th Street
- Grand Concourse and 167th Street

These intersections were analyzed using the traffic analysis methodology and impact criteria described in Chapter 14, "Transportation." No significant adverse impacts from cumulative incremental construction and operational trips were identified during the AM construction peak hour and significant adverse impacts were identified at 13 intersections during the PM construction peak hour (see Table 19-7, "Summary of Significant Adverse Traffic Impacts 2024 [Q2]"). Chapter 21, "Mitigation" addresses practicable measures to address these impacts.

Table 19-7: Summary of Significant Adverse Traffic Impacts 2024 (Q2)

Intersection	Peak Hour	
	6-7 AM	3-4 PM
Jerome Avenue and Kingsbridge Road	--	NB-LTR
Jerome Avenue and Fordham Road	--	NB-LTR, SB-LTR
Jerome Avenue and Burnside Avenue	--	WB-LTR, SB-LTR
Jerome Avenue and Tremont Avenue	--	EB-LTR, WB-LTR
Jerome Avenue and SB I-95 Ramps	--	SB-L
Jerome Avenue and Featherbed Lane	--	EB-L
Jerome Avenue and NB I-95 Ramps	--	SB-L
Jerome Avenue and 170th Street	--	WB-LTR
Jerome Avenue and 167th Street		EB-R, NB-DefL
River Avenue and 167th Street	--	NB-LTR
Jerome Avenue and E. 165th Street	--	WB-LR
Grand Concourse and 170th Street	--	NB-L (Mainline)
Grand Concourse and 167th Street	--	EB-L, EB-TR, WB-TR

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

Source: STV Incorporated, 2017.

AIR QUALITY

Construction activities could affect air quality because of engine emissions from on-site construction equipment and dust-generating activities. In general, much of the heavy equipment used in construction has diesel-powered engines, which produce relatively high levels of nitrogen oxides and particulate matter. Gasoline engines produce relatively high levels of carbon monoxide. Construction activities also generate fugitive dust emissions. As a result, the air pollutants analyzed for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and carbon monoxide (CO).

Since ultra-low-sulfur diesel (ULSD) would be used for all diesel engines related to construction activities under the Proposed Action, sulfur oxides (SO_x) emitted from those construction activities would be negligible, and an analysis of SOx emissions is not warranted. For more details on a description of air pollutants and standards, see Chapter 14, "Air Quality."

As stated above, construction activity in general, and large-scale construction in particular, has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine particulates. To ensure that the construction of the proposed project results in the lowest feasible diesel particulate (DPM) emissions, an emissions reduction program would have to be implemented.

The evaluation performed in this section assumes a combination of emission reduction measures that are mandated by law and are common practice in large-scale New York City construction projects. These include the following:

- **Fugitive dust control plans** – In compliance with the NYC Air Pollution Control Code regarding control of fugitive dust, contractors would be required to ensure that all trucks carrying loose material use water as a dust suppression measure, that wheel-washing stations be established for all trucks exiting the construction site; that trucks hauling loose material be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the site, that streets adjacent to the site be cleaned as frequently as needed by the construction contractor, and that water sprays be used for all transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. These measures would be expected to reduce dust generation by more than 50 percent.

- **Clean Fuel –** Ultra Low Sulfur Diesel (ULSD) would be used exclusively for all diesel engines related to construction activities under the Proposed Action. This is a federal requirement since 2010, which enables the use of tailpipe reduction technologies that reduce diesel particulate matter (DPM) and SOx emissions.

- **Diesel Equipment Reduction –** Hoists and small equipment such as lifts, compressors, welders, and pumps would be expected to use electric engines that operate on grid power instead of diesel power engines. This is a common practice that has been achieving wider use as technology improves.

- **Restrictions on Vehicle Idlin**g – This would be required in compliance with the local law restricting unnecessary idling. 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 otherwise required for the proper operation of the engine.

In addition, the evaluation assumes the following measure:

- **Best Available Tailpipe Reduction Technologies for Diesel Engines** Requires 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, such as concrete mixing and pumping trucks) to utilize the best available tailpipe technology for reducing DPM emissions. The use of diesel particulate filters (DPF) in Tier 3 (model year 2000-2008 or newer) construction diesel equipment achieves the same emission reductions as a newer Tier 4 engine. Given the timeframe of the developments to be constructed under the Proposed Action (2018-2026), equipment meeting the more restrictive Tier 4 standards (model year 2008–2015 or newer) would be expected to be in wide use and comprise the majority of contractors' fleets. The combination of Tier 4 and Tier 3 engines with DPF would achieve DPM reductions of approximately 90 percent when compared to older uncontrolled engines.

Overall, these emissions control measures would be expected to significantly reduce DPM emissions, and as recommended in the *CEQR Technical Manual*, all the necessary measures would be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed.

Air Quality Analysis Methodologies

Using the conceptual construction phasing plan developed by NYCDCP (see Figure 19-1), the analysis evaluated the peak cumulative short-term $PM_{2.5}$ emissions for each Projected Development Site during the full 2018–2026 construction period by quarter. The quarter with the highest $PM_{2.5}$ emissions from all development sites under construction was selected as the period with the highest potential $PM_{2.5}$ effects. This analysis, called the intensity assessment, was used to identify the critical quarter and year to be selected for the dispersion impact modeling analysis.

A dispersion analysis—considering the PM_{10}, $PM_{2.5}$, NO_x and CO emissions from on-site (construction equipment and fugitive dust) and off-site (trucks and other motor vehicles) source was performed to determine potential air quality effects during the peak emission construction period for the proposed building sites in close proximity under simultaneous construction.

The following sections provide additional details relevant only to the construction air quality analysis methodology. For a review of the applicable regulations, standards and criteria, and benchmarks for stationary and mobile source air quality analyses, refer to Chapter 14, "Air Quality."

The analysis was performed following the EPA and *CEQR Technical Manual* suggested procedures and analytical tools (as further discussed below) to determine source emission rates. The estimated emission rates were then used as input to an air quality dispersion model to determine potential impacts.

Emission Estimation Process

The construction analyses used an emission estimation method and a modeling approach previously developed for evaluating air quality impacts of construction projects in New York City in consultation with DCP. Because the level and types of construction activities would vary from month to month, the approach includes a determination of worst-case emission periods based on an estimated quarterly construction work schedule, the number of on-site construction equipment types, and rated horsepower of each unit, quantities of materials to be demolished and excavated, and number of trucks arriving, working and leaving the site.

The specific construction information used to calculate emissions generated from the construction process included, but is not limited to, the following:

- The number of units and fuel-type of construction equipment to be used
- Rated horsepower for each piece of equipment
- Utilization rates for equipment
- Hours of operation on-site
- Excavation, demolition and processing rates
- Average distance traveled on-site by dump trucks.

Engine Exhaust Emissions

Emission factors for NO_x, PM_{10}, $PM_{2.5}$, and CO from the combustion of ULSD fuel for on-site construction equipment were developed using the latest EPA MOVES2014a-NONROAD Emission Model (Version 2009 of NONROAD is embedded into MOVES).

The MOVES2014a-NONROAD model can generate unitary emission factors, in grams per horsepower/hour (g-hp/hr) by engine size (hp), equipment type, engine technology type, fuel type, and year of analysis. The model estimates emissions as the average emission factor by year for the county fleet sorted by the above-mentioned parameters. As an example, if New York County and the year 2022 (one of the air quality construction analysis years) were selected for diesel engines, the output generates emissions (g-hp/hr) for each type of equipment from 3 hp to 3,000 hp rating for each one of the years of the County fleet going back up to 40 years. The model calculates how many pieces of equipment for each engine technology group (emission Tiers) and model year are present in the County fleet, and produces the yearly average emission factor.

Emission rates from combustion of ULSD fuel for on-site dump trucks, concrete trucks, and other heavy trucks were developed using the EPA MOVES2014a Emission Model. New York City restrictions placed on idling times were applied for dump trucks and other heavy trucks. Short-term and annual emission rates were adjusted from the peak-hour emissions by applying usage factors for each equipment unit. Usage factors were determined using the construction equipment schedule.

Fugitive Emission Sources

Road dust (PM_{10} and $PM_{2.5}$) emissions from trucks moving inside the construction sites were calculated using equations from EPA's AP-42, Section 13.2.2 for unpaved roads. Average vehicle weights (i.e., unloaded going in and loaded going out) were used in the analysis and a reasonably conservative round trip distance was estimated for on-site travel. Dust control measures (described previously) would provide at least a 50-percent reduction in PM_{10} and $PM_{2.5}$ emissions. Also, since on-site travel speeds would be restricted to five miles per hour, on-site travel for trucks would not be a significant contributor to $PM_{2.5}$ fugitive emissions.

Particulate matter emissions could also be generated by material handling activities (i.e., transfer-loading/drop operations for debris and soil). Estimates of PM_{10} and $PM_{2.5}$ emissions from these activities were developed using EPA's AP-42 Sections 13.2.4.

Construction Activity Emissions Intensity Assessment

Overall, construction of the Proposed Action is expected to occur over a period of almost one decade. To determine which construction period constitutes the worst-case periods for the pollutants of concern, construction-related emissions were calculated throughout the duration of construction on a quarterly basis using peak daily emissions for $PM_{2.5}$.

$PM_{2.5}$ was selected as the worst-case pollutant because, as compared to other pollutants, $PM_{2.5}$ has the highest ratio of emissions-to-effects. Therefore, $PM_{2.5}$ was used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of other pollutants would follow $PM_{2.5}$ emissions, since most pollutant emissions are proportional to diesel engines by horsepower. Based on the resulting multiyear profiles by quarter, a worst-case period was identified for the modeling of annual and short-term averaging periods.

To determine the worst year and quarter, an emission intensity assessment (emission profiles) was conducted, and the second quarter of 2018 and third quarter of 2022 were identified as the worst quarters considering the cumulative emissions from all Projected Development Sites. The second quarter of 2018 was identified as the quarter with the highest cumulative emissions from all Projected Development Sites. For this peak emissions year, the construction cluster for analysis was identified as Projected Development Sites 33, 34, 35 and 36, which consist of small sized Development Sites. In addition to the peak 2018 emissions year, the third quarter of 2022 was also selected since it produces one of the peak emissions years with the highest sustained daily $PM_{2.5}$ emissions. For the 2022 peak emissions year, Projected Development Sites cluster 43, 44, 45, consisting of large sized Development Sites, was selected for analysis. For both cluster scenarios, Projected Development sites would be in close proximity to one another since the highest cumulative effects would occur when sites are adjacent to each other. This combination of emissions intensity and development site proximity would produce the highest potential air quality effects during a single year. An analysis of these two clusters would yield conservative results typical of most of the majority of project Development Sites.

Impacts Assessment

The effects of construction emissions on the surrounding environment for the relevant air pollutants were quantified using dispersion computer models. As explained in the emission intensity assessment, the impact analysis included two analysis clusters, Project Development Sites 33, 34, 35, and 36 (during the second quarter of 2018) and Project Development Sites 43, 44, 45 (during the third quarter of 2022) for the on-site dispersion analysis.

Based on the proposed schedule, for the year 2018, Projected Development Sites 33, 34, 35, and 36 would be in the demolition/excavation/foundation phase during the second quarter for all four development sites; while Projected Development Site 43, 44, and 45 would be undergoing demolition/excavation/foundation phase for Development Sites 43 and 44, and the superstructure phase for Projected Development Site 45 during the third quarter of 2022. For both construction cluster locations, the peak daily emissions generated during these highest quarters were used for the short-term pollutant analysis, and the annual average emissions were used for the annual long-term pollutant analysis.

In order to address the potential cumulative effects from off-site emissions related to construction trucks and autos, River Avenue between 165th and 167th Streets and McClellan St between Gerard and River Avenues were selected for the off-site modeling analysis. These links have the highest incremental truck volumes compared to the No-Action scenario, and it is located between the above-mentioned sites based on traffic assignments. The peak hour truck volumes which occur between 6-7 AM were used for this cumulative analysis.

The impact assessment results included the cumulative on-site and off-site effects associated with for the two construction clusters.

On-Site Dispersion Modeling

Potential impacts from on-site construction equipment, and off-site truck emissions were evaluated using the EPA most current version of the AERMOD dispersion model (version 16216r), which became the EPA and the New York State Department of Environmental Conservation (NYSDEC) preferred model on December 9, 2006. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion; it also includes handling of terrain interactions.

The AERMOD model calculates pollutant concentration from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures.

Source Simulation

During construction, various types of construction equipment would be used at different locations throughout the site. Some of the equipment is mobile and would operate throughout the site, while some would remain stationary on-site at distinct locations during short-term periods (i.e., daily and hourly). Stationary emission sources include (but are not limited to) air compressors, cranes, and concrete pumps. Equipment such as excavators, bobcats, concrete trowels, and dump trucks would operate throughout the site.

Since emissions during the peak quarters for 2018 and 2022 would result from demolition, excavation and foundations construction, all construction equipment sources were simulated as area sources for the purpose of the modeling analysis; their emissions were distributed evenly across each construction site. In the case of excavation, the source was assumed to be below grade at -1.4 meters, for Projected Development Sites 33, 34, 35, 36, 43, and 44 and at-grade for Projected Development Site 45.

Receptor Locations

AERMOD was used to predict maximum pollutant concentrations at nearby locations of likely public exposure ("sensitive receptors"). Discrete receptors were placed along nearby sensitive receptor locations, such as public spaces, residential and commercial buildings (e.g., operable windows and air intakes), and other general-public use areas. These sensitive receptors were located from the second floor to the 10th floor of buildings facades in all affected directions of buildings adjacent to the proposed sites.

Additionally, the maximum predicted annual incremental $PM_{2.5}$ concentration was modeled using a one kilometer grid of receptors at a height of 1.8 meters for comparison with the City's *de minimis* criteria of 0.1 $\mu g/m^3$ for annual average neighborhood-scale grid modeling.

Meteorological Data

All analyses were conducted using the latest five consecutive years of meteorological data (2011-2015). Surface data were obtained from La Guardia Airport and upper air data were obtained from Brookhaven station, New York. Data will be processed using the current EPA AERMET version 15181 and the EPA procedure.

Off-Site Dispersion Modeling

The analysis of off-site mobile source impacts included the impacts of construction-phase vehicles on the roadway network as well as the effects of anticipated changes in street configurations as a result of lane closures during the peak construction year.

The peak hour construction trucks volume for River Avenue and McClellan Street were selected for the off-site modeling analysis. These links have the highest incremental truck volumes from the No-Action scenario, and they are located adjacent to the above-mentioned construction sites. The peak hour truck volumes (6-7 AM) were used for this cumulative analysis. The construction workers' incremental vehicles trips were also assigned to these links.

The same AERMOD dispersion model (version 16216r) was used to estimate the increments caused by off-site construction activities. In order to evaluate the potential cumulative effect of the on-site and off-site emissions, this off-site analysis placed receptors on the same locations used on the AERMOD on-site dispersion analysis.

Background Concentrations

Where needed to determine potential air quality impacts from the construction of the project, background ambient air quality data for criteria pollutants (Table 19-8, "Ambient Background Concentrations") were added to the predicted off-site concentrations. The background data represent the latest available five years of data and were obtained from a nearby NYSDEC monitoring station that best represents the area surrounding the site. The latest available data from three-year period (2014-2016) were used for the 1-hour NO_2 concentration, the latest five-year period (2011-2015) data were used for annual average NO_2, and the latest (2014-2016) data were used for 24-hour PM_{10} background concentration.

The 24-hour average $PM_{2.5}$ background concentration of 24.0 µg/m^3 from the latest three-year period (2014-2016) were used to establish the *de minimis* value, consistent with the guidance provided in the *2014 CEQR Technical Manual*. The annual average $PM_{2.5}$ impacts were assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria thresholds, without considering the annual background.

Table 19-8: Ambient Background Concentrations

Pollutant	Averaging Time	Monitoring Location	Background Concentration
Carbon Monoxide (CO)	1-hour[1]	CCNY, Manhattan	1.76 ppm
	8-hour[1]	CCNY, Manhattan	1.0 ppm
Nitrogen Dioxide (NO_2)	1-hour[2]	IS 52, Bronx	120.9 µg/m^3
	Annual[3]	IS 52, Bronx	37.5 µg/m^3
Particulate Matter (PM_{10})	24-Hour[4]	Division Street, Manhattan	32 µg/m^3
Particulate Matter ($PM_{2.5}$)	24-Hour[5]	PS 19, Manhattan	24 µg/m^3

Notes:
1 1-hour CO and 8-hour CO background concentrations are based on the highest second max value from the latest five years (2012-2016) of available monitoring data from NYSDEC.
2 1-hour NO_2 background concentration is based on three-year (2014-2016) average of the 98th percentile of daily maximum 1-hour concentrations from available monitoring data from NYSDEC.
3 Annual NO_2 background concentration is based on the maximum annual average from the latest five years (2012-2016) of available monitoring data from NYSDEC.
4 24-hour PM_{10} is based on the highest second max value from the latest three years (2014-2016) of available monitoring data from NYSDEC.
5 The 24-hour $PM_{2.5}$ background concentration is based on maximum 98th percentile concentration averaged over three years (2014-2016) of data from NYSDEC.

Source: NYSDEC Ambient Air Quality Report, 2016, http://www.dec.ny.gov/chemical/29310.html.

Probable Impacts from Proposed Project

This section provides a summary of the construction air quality results from the construction activities of the proposed project. The impact analysis included the construction cluster for Projected Development Sites 33, 34, 35, and 36 and the construction cluster for Projected Development Sites 43, 44, and 45. The peak short-term emissions for CO, PM_{10} and $PM_{2.5}$ were predicted to occur during the second quarter of 2018 for Projected Development Sites 33,34,35,36 and the third quarter of 2022 for Projected Development Sites 43, 44, and 45. The annual $PM_{2.5}$ and NO_2 emissions were based on the weighted average emissions for the four quarters of 2018 and 2022 for Projected Development Sites 33, 34, 35, and 36 and Projected Development Sites 43, 44, and 45, respectively.

Analyses were conducted to determine if any concentrations of NO_2, $PM_{2.5}$, PM_{10}, and CO that exceed the NAAQS or the city's *de minimis* criteria. Tables 19-9 and 19-10 show the results of the quantitative analysis were well below the impact threshold criteria for the two clusters (Development Sites 33 through 36, and 43 through 45) analyzed. For the pollutant of the greatest concern ($PM_{2.5}$), the result for the Projected Development Sites 33, 34, 35, and 36 was 1.59 µg/m^3 for a 24-hour period. For Projected Development Sites 43, 44, and 45, a predicted concentration of 0.99 µg/m^3 was predicted for a 24-hour period which is well below the 5.5 µg/m^3 the city's *de minimis* standard. Therefore, no significant adverse air quality impacts would occur from the construction-related sources.

Table 19-9: Pollutant Concentrations at Projected Development Sites 33-36

Pollutant µg/m^3	Averaging Period	Maximum Modeled Concentration	Background Concentration	Total Concentration	NAAQS/De Minimis µg/m^3	Pass/Fail
CO	1-hour	213	2634	2847	40075	Pass
	8-hour	67	1718	1785	10305	Pass
NO2	Annual	2.53	37.5	40.0	100	Pass
PM10	24-hour	8.2	32	40.2	150	Pass
PM2.5	24-hour	1.59	24	1.59	5.5	Pass
	Annual	0.13	-	0.13	0.3	Pass
	Annual Neighborhood -Scale Grid - Small Sites	0.0099	-	-	0.1	Pass

Source: STV Incorporated, 2017.

Table 19-10: Pollutant Concentrations at Projected Development Sites 43-45

Pollutant μg/m³	Averaging Period	Maximum Modeled Concentration	Background Concentration	Total Concentration	NAAQS/De Minimis μg/m³	Pass/Fail
CO	1-hour	7563	2634	10197	40075	Pass
	8-hour	2222	1718	3940	10305	Pass
NO2	Annual	1.22	37.5	39	100	Pass
PM10	24-hour	25.9	32	58	150	Pass
PM2.5	24-hour	0.99	24	0.99	5.5	Pass
	Annual	0.09	-	0.09	0.3	Pass
	Annual Neighborhood -Scale Grid - Small Sites	0.0096	-		0.1	Pass

Source: STV Incorporated, 2017.

NOISE AND VIBRATION

Noise

Noise exposure on adjacent uses during the construction of the Proposed Action could result from the operation of construction equipment and from construction delivery vehicles traveling to and from the various construction sites. Noise and vibration levels at a given location are dependent on the type and number of pieces of construction equipment being operated at one time, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance between a noise sensitive receptor site and the construction activity and any shielding effects (from structures such as buildings, walls, or barriers) along the sound transmission path between each noise source and each receptor. Noise levels caused by construction activities could vary widely, depending on the construction phase and the location of the construction equipment relative to a given receptor location. Typically, the most significant construction related noise sources result from the operation of jackhammers, excavators with ram hoes, drill rigs, rock drills, impact wrenches, tower cranes, paving breakers and impact pile drivers. The on-street movement of heavy trucks can also result in significant noise levels.

Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and by the EPA. The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, requires the adoption and implementation of a noise mitigation plan for each construction site; limits construction (absent special circumstances as described below) to weekdays between the hours of 7:00 AM and 6:00 PM; and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM, and on weekends) may be authorized in the following circumstances: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. Furthermore, the EPA mandates that certain classifications of construction equipment meet specified noise emissions standards.

A construction noise analysis was performed to quantify the magnitude, time of occurrence, and duration of the potential exceedances of the CEQR impact criteria, and to determine the practicability and feasibility of implementing control measures that would reduce or eliminate any identified significant adverse noise impacts.

Construction Noise Impact Criteria

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." For impact determination purposes, the significance of adverse noise impacts is based on duration, intensity, area of impact and whether predicted incremental noise levels at sensitive receptor locations would be greater than the impact thresholds shown in the *CEQR Technical Manual*. In addition the *CEQR Technical Manual* states that the impact criteria for vehicular mobile noise sources, using existing noise levels as the baseline, should be used for assessing construction impacts. As recommended in the CEQR Technical Manual, this study uses these criteria to define a significant adverse noise impact as follows:

- If the No-Action noise level is less than 60 dBA $L_{eq}(1)$, a 5 dBA $L_{eq}(1)$ or greater increase would be considered significant.
- If the No-Action noise level is between 60 dBA $L_{eq}(1)$ and 62 dBA $L_{eq}(1)$, a resultant $L_{eq}(1)$ of 65 dBA or greater would be considered a significant increase.
- If the No-Action noise level is equal to or greater than 62 dBA $L_{eq}(1)$, or if the analysis period is a nighttime period (defined in the CEQR criteria as being between 10:00 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA $L_{eq}(1)$.

The determination of a significant adverse noise impact is based on whether predicted incremental noise levels at sensitive receptor locations would be greater than the impact criteria in the *CEQR Technical Manual* for two consecutive years or more. While increases exceeding the *CEQR Technical Manual* criteria for one year or less may be noisy and intrusive, they are generally not considered to be significant adverse noise impacts. However, for the purposes of this analysis, very large noise level increases (i.e., 18 dBA or more), lasting between 12 and 24 months, were also considered to constitute a significant adverse noise impact due to the very large magnitude of the increases.

Noise Analysis Methodology

Construction activities for the proposed project would be expected to result in increased noise levels as a result of (1) the operation of construction equipment on-site and (2) the movement of construction related vehicles to and from the site (i.e., worker trips, and material and equipment trips) on the surrounding roadways. As a result, the effect of each of these noise sources was evaluated. The assessment methodology considers the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicles operation) and the total cumulative impacts due to operational effects (caused by project-generated vehicular trips) and construction effects (as construction proceeds on uncompleted components of the project).

- Noise resulting from the operation of on-site construction equipment is calculated by computing the sum of the noise produced by all pieces of equipment in operation. For each piece of equipment, the on-site noise level at a nearby receptor site is a function of the following parameters
- The noise emission level characteristics of each type of equipment operating at the site
- The total number of pieces of each type of equipment operating simultaneously
- 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
- Shielding between the sound source path and the receptor.
- Similarly, noise generated by off-site traffic moving to and from a given construction site is calculated by determining the sum of the noise generated by the movement of vehicles traveling past the noise sensitive receptor site. For each adjacent roadway, the off-site traffic noise is a function of the following parameters:
- The sound and general topography in the area
- Shielding by buildings or other obstructions along the sound source path which will reduce noise levels.

Noise Modeling

Noise effects from construction activities were evaluated using the CadnaA computerized model developed by DataKustik. CadnaA represents a state-of-the-art, highly flexible software tool for the calculation of noise emissions from various sources including roadway vehicles and construction equipment. The CadnaA model is approved for the use in CEQR projects and is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. This standard is currently under review for adoption by the American National Standards Institute (ANSI) as an American Standard. The model also utilizes algorithms that incorporate the FHWA's Traffic Noise Model (TNM) calculations utilized for roadway noise. The TNM is a computerized model developed for the FHWA that takes into account various factors due to traffic flow, including traffic volumes, vehicle mix (i.e. percentage of autos, light-duty trucks, heavy-duty trucks, buses), sources/receptor geometry, and shielding (buildings, berms, and sound walls) and access attenuation from pavement types.

Input data used with CadnaA were derived from drawings that defined site work areas, an assumed location of each piece of on-site equipment, adjacent building footprints, locations of streets and locations of sensitive receptors. For each analysis period, the geographic location and operational characteristics, including equipment usage rates (percentage of time equipment with full-horse power is used) and noise source heights (based on typical construction equipment) for each piece of construction equipment operating at the development site, as well as noise control measures, were input to the model. In addition, shielding from both adjacent buildings and the project building as it is constructed were accounted for in the model. The model produced A-weighted $L_{eq}(1)$ noise levels at each receptor location for the analysis period, which showed the noise level at each receptor location and the contribution from each noise source.

Table 19-11, "Construction Equipment Noise Emission Levels (dBA)" summarizes the maximum noise emission limits of each type of construction equipment as described in DEP's Chapter 28 of the Citywide Construction Noise Mitigation and Subchapter 5 of the New York City Noise Control Code. Construction-noise level estimates using CadnaA were determined using these maximum sound emission levels and usage factors for all equipment operating on-site in the Projected Development Sites evaluated for construction noise impacts.

Table 19-11: Construction Equipment Noise Emission Levels (dBA)

Equipment List	DEP & FTA Typical Equipment List [1]	L_{max} Noise Level with Path Controls at 50 feet [1,2]
Backhoe/Loader	80	-
Concrete Trowel	67 [3]	-
Concrete Vibrator	80	-
Cranes (Crawler Cranes)	85	-
Dozer	85	-
Excavator	85	-
Forklift	64 [4]	-
Generators	82	72
Circular Saw	59	-
Hoist	75 [5]	-
Jack Hammer	85	75
Lift	85	-
Portable Cement Mixer	80	-
Pile Driving Rig(impact)	95	85
Pump	77	67
Rebar Bender	80	-
Saw	76 [6]	-
Scissor Lift	63 [7]	-
Welding Machines	73	-

Notes:
[1] Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006.
[2] Path Controls include portable noise barriers, enclosures, acoustic panels, and curtains, whichever feasible and practicable.
[3] Base on noise certifications from Columbia Manhattanville Construction project
[4] Based on product literature
[5] Based on :Noise Control for Construction Equipment and Construction Sites" for Hydro Quebec, 1985
[6] Based on FTA Manual
[7] Based on product literature

Source: East New York Rezoning FEIS, 2016.

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Analysis Periods

Construction activity associated with the Proposed Action would be spread out over a 9-year period and be dispersed throughout the rezoning area and vicinity. Two worst-case locations were chosen for the noise analysis for their unique potential for significant adverse noise impacts when compared to other sites in the rezoning area. For both worst-case locations, adjacent Projected Development Sites would be under construction during the same time frame. In addition, it is assumed that for both worst-case locations, impact pile driving activities would be conducted during the foundation phase of construction.

Construction Assessment Area #1

One worst-case location near Projected Development Sites 43, 44, and 45 was chosen for assessment based on the proximity of the three projected sites to each other, the proposed construction schedule and their combined size in terms of square footage. In addition, Projected Development Site 45 is the largest development sites for the entire Proposed Action. Together, the three development sites would be located between River and Gerard Avenues and East 165th and East 167th Streets. A subsequent screening analysis was performed to determine the one analysis quarter with the greatest construction activity—and therefore the loudest construction period. While construction activities for the Proposed Action as a whole would take place from 2018 and 2026, the anticipated construction activities at Projected Development Sites 44 through 45 would occur across an approximate 2.5-year period between 2022 and 2024. An examination of the construction schedule identified the third quarter of the year 2022 as the peak construction time period. The period was selected because the cumulative activities for the three development are anticipated to be noisiest during the 3rd quarter of 2022 since during this quarter, at least two of the three sites would be undergoing the demolition/excavation/foundation phase simultaneously. The number of workers; types and number of equipment; and number of construction vehicles anticipated to be operating during each quarter of the construction period was determined. To be conservative, the construction activity screening analysis for each analysis quarter assumed that both on-site construction activities and off-site construction-related traffic movements occurred simultaneously. Construction activities for each phase would be expected to overlap with the average construction completion time period of approximately two years per development site. The construction noise impact assessment therefore was focused on noise sensitive land uses in the immediate vicinity of Projected Development Sites 43, 44, and 45.

Construction Assessment Area #2

The second worst-case location was conducted for Projected Development Sites 33, 34, 35, and 36. These sites are locate over a large area bounded by Jerome Avenue and Edward L Grant Highway and West 169th Street and West 170th Street. Overall construction activities at the four Projected Development Sites is expected to occur between 2018 and 2020, for a total duration of 2 years. As with Construction Assessment Area #1, impact pile driving would occur during the foundation stage of construction for all four development sites. The worst-case construction phase was analyzed for the second quarter of 2018, when all four development sites would be undergoing the demolition/excavation/foundation phase simultaneously. In particular, during the foundation stage, when construction activities would include the use of pile drivers. The number of workers, types and number of equipment, and number of construction vehicles anticipated to be operating during the construction period was determined. To be conservative, the construction activity screening analysis for each analysis quarter assumed that both on-site construction activities and off-site construction-related traffic movements occurred simultaneously. The construction noise impact assessment of Project Development Sites 33, 34, 35, and 36 focused on noise sensitive land uses in the immediate vicinity of the site.

Noise Reduction Measures

The construction noise analysis assumes that development constructed under the Proposed Action would commit to a proactive approach to minimize noise during construction activities by submitting a Noise Mitigation Plan prior to the start of construction (in accordance with the requirements of the New York City Noise Control Code). These requirements are promulgated by DEP, became effective in 2007 and are described in Chapter 28, Title 15 of the Rules of the City of New York. A construction contractor would be required to enclose the site with a portable free-standing noise barrier that would provide shielding from construction noise generated on the site. The barriers would break the line-of-sight between noise sources on the site. The barriers should have a minimum height of 8 feet and consist of ¾-inch plywood.

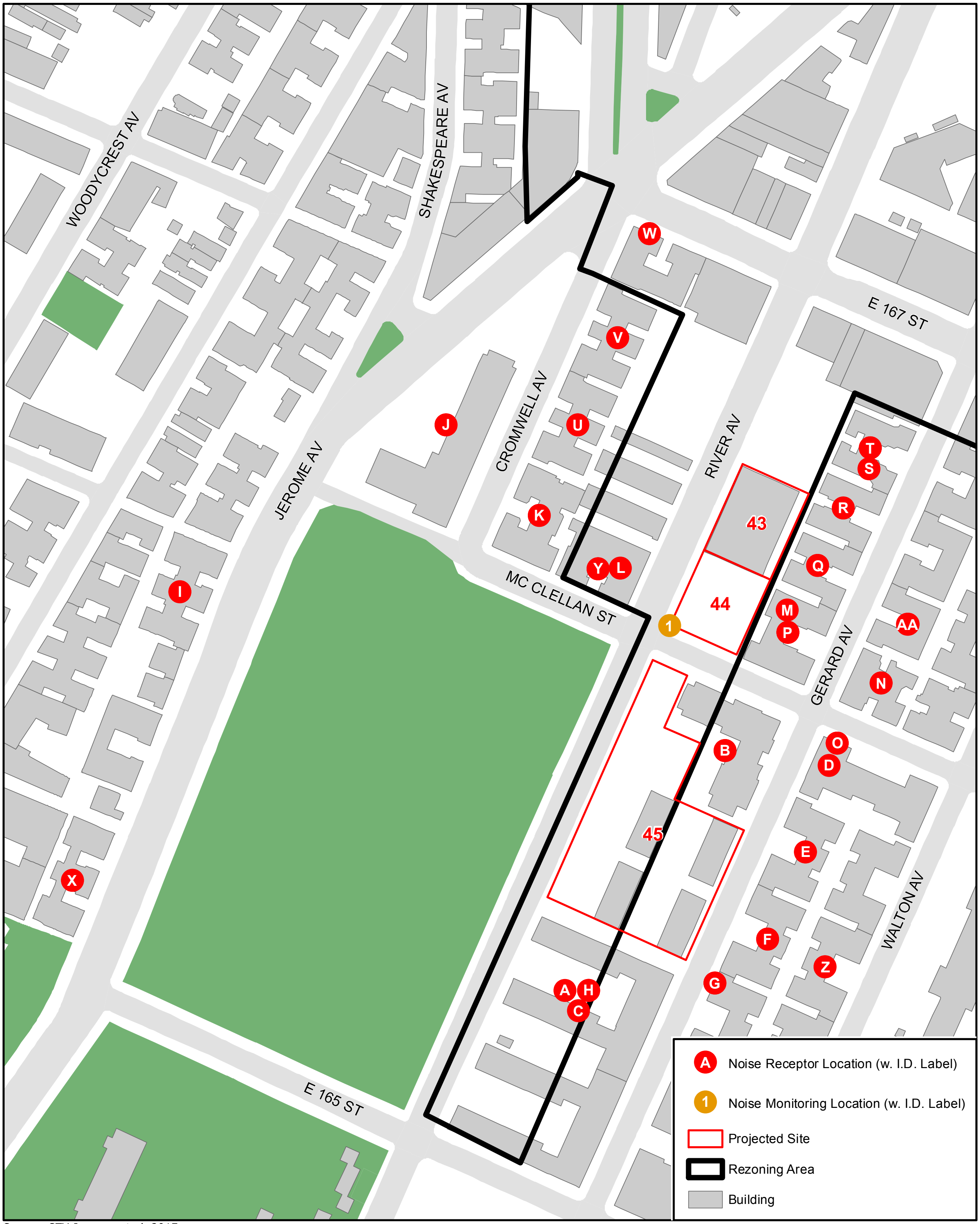
There are a wide variety of other measures that, when found to be feasible and practicable, would minimize construction noise exposure and therefore reduce potential noise impacts. For example, a construction contractor could use equipment that would produce maximum noise emission levels below the requirements of the New York City Noise Control Code. This construction noise analysis did not assume specific abatement measures beyond a perimeter barrier fence; however, potential noise-reducing measures, if found to be feasible, could include both source controls and path controls, as outlined below.

- Generally, construction contractors would schedule and perform noisy work during times of highest ambient noise levels (for example, between 7:00 AM and 10:00 AM).

- Dominant noisier equipment, such as tower cranes, loading and unloading trucks, concrete pumps, concrete trucks, and trash hauling trucks, would minimize banging, clattering, and buzzing.
- Minimize the use of impact devices, such as jackhammers, pavement breakers, impact wrenches, pneumatic tools, and hoe rams, and only necessary equipment would be on-site.
- Where practicable and feasible, construction sites would be configured to minimize back-up alarm noise.
- Contractors and subcontractors would properly maintain their equipment and have quality mufflers installed.
- Noisier equipment, such as tower cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from sensitive receptors.
- During the early construction phases of work, delivery and dump trucks would be located, and many construction equipment operations would take place, below grade in order to take advantage of shielding benefits.

Receptor Sites

A total of 47 receptor sites were evaluated for construction noise impact assessment; 26 receptors at Projected Development Sites 43, 44, and 45 and a total of 21 receptors at Projected Development Sites 33, 34, 35, and 36. Figure 19-2, "Noise Receptor Locations #1," and Figure 19-3, "Noise Receptor Locations #2," depict the noise receptor locations at ground level, and Table 19-12, "Construction Noise Receptor Locations," lists the noise receptor sites, their associated land uses, and the associated construction site. The receptor sites selected for detailed analysis are representative of locations where maximum noise impact due to construction activity would be expected. The construction noise impact assessment was therefore focused on noise sensitive land uses in the immediate vicinity of Projected Development Sites 33, 34, 35, 36 and 43, 44, 45 which were identified as the areas where most of the construction activity is projected to occur during the second quarter of 2018 and during the third quarter of 2022, respectively.



Source: STV Incorporated, 2017.

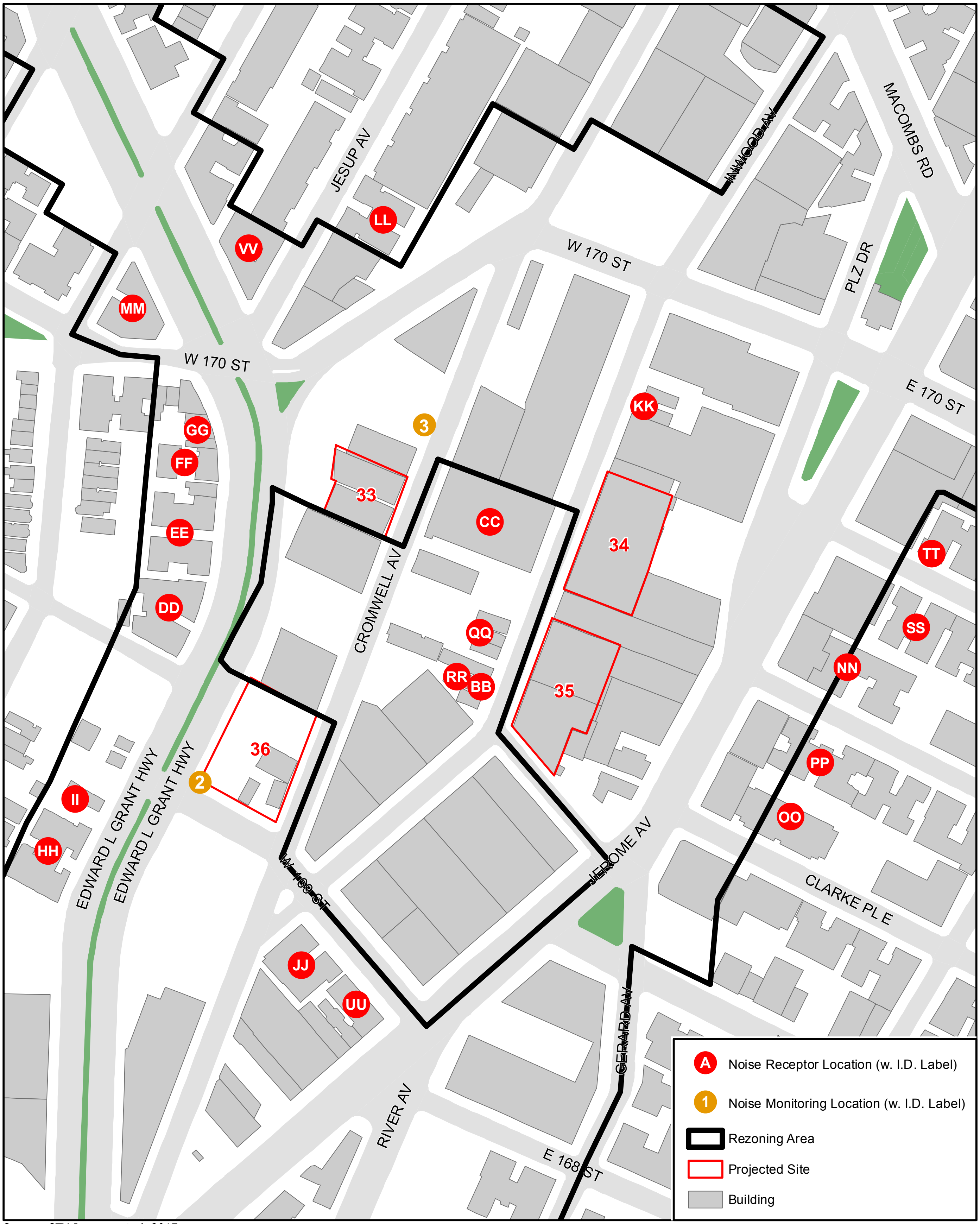
N

0 200 400 Feet

Jerome Avenue Rezoning EIS

Figure 19-2

NOISE MONITORING AND RECEPTOR LOCATIONS CONSTRUCTION CLUSTER #1



Source: STV Incorporated, 2017.

N

0 200 400 Feet

Figure 19-3

NOISE MONITORING AND RECEPTOR LOCATIONS CONSTRUCTION CLUSTER #2

Table 19-12: Construction Noise Receptor Locations

Receptor	Associated Construction Sites	Location	Land Use
A	S43/S44/S45	1075 GERARD AVENUE	Residential
B	S43/S44/S45	1111 GERARD AVENUE	Residential
D	S43/S44/S45	80 MC CLELLAN STREET	Residential
E	S43/S44/S45	1112 GERARD AVENUE	Residential
F	S43/S44/S45	1098 GERARD AVENUE	Residential
G	S43/S44/S45	1082 GERARD AVENUE	Residential
H	S43/S44/S45	1075 GERARD AVENUE	Residential
I	S43/S44/S45	1105 JEROME AVENUE	Residential
J	S43/S44/S45	1165 CROMWELL AVENUE	Residential
K	S43/S44/S45	1160 CROMWELL AVENUE	Residential
L	S43/S44/S45	35 MC CLELLAN STREET	Residential
M	S43/S44/S45	1155 GERARD AVENUE	Residential
N	S43/S44/S45	85 MC CLELLAN STREET,	Residential
O	S43/S44/S45	80 MC CLELLAN STREET	Residential
P	S43/S44/S45	1155 GERARD AVENUE	Residential
Q	S43/S44/S45	1165 GERARD AVENUE	Residential
R	S43/S44/S45	1175 GERARD AVENUE	Residential
S	S43/S44/S45	1183 GERARD AVENUE	Residential
T	S43/S44/S45	1183 GERARD AVENUE	Residential
U	S43/S44/S45	1164 CROMWELL AVENUE	Residential
V	S43/S44/S45	1184 CROMWELL AVENUE	Residential
W	S43/S44/S45	2 EAST 167 STREET	Residential
X	S43/S44/S45	MULLALY Park	Park
Y	S43/S44/S45	35 MC CLELLAN STREET	Residential
Z	S43/S44/S45	1097 WALTON AVENUE	Residential
AA	S43/S44/S45	1166 GERARD AVENUE	Residential
BB	S33/S34/S35/S36	1323 INWOOD AVENUE	Residential
CC	S33/S34/S35/S36	1349 INWOOD AVENUE	Residential
DD	S33/S34/S35/S36	1307 EDWARD L GRANT HWY	Residential
EE	S33/S34/S35/S36	1325 EDWARD L GRANT HWY	Residential
FF	S33/S34/S35/S36	1337 EDWARD L GRANT HWY	Residential
GG	S33/S34/S35/S36	1345 EDWARD L GRANT HWY	Residential
HH	S33/S34/S35/S36	1275 EDWARD L GRANT HWY	Residential
II	S33/S34/S35/S36	1281 EDWARD L GRANT HWY	Residential
JJ	S33/S34/S35/S36	8 WEST 169 STREET	Residential

Table 19-12 (continued): Construction Noise Receptor Locations

Receptor	Associated Construction Sites	Location	Land Use
KK	S33/S34/S35/S36	1376 INWOOD AVENUE	Residential
LL	S33/S34/S35/S36	1400 JESUP AVENUE	Residential
MM	S33/S34/S35/S36	1350 SHAKESPEARE AVENUE	Residential
NN	S33/S34/S35/S36	15 MARCY PLACE	Residential
OO	S33/S34/S35/S36	15 CLARKE PLACE EAST	Residential
PP	S33/S34/S35/S36	14 MARCY PLACE	Residential
QQ	S33/S34/S35/S36	1331 INWOOD AVENUE	Residential
RR	S33/S34/S35/S36	1323 INWOOD AVENUE	Residential
SS	S33/S34/S35/S36	16 ELLIOT PLACE	Residential
TT	S33/S34/S35/S36	15 ELLIOT PLACE	Residential
UU	S33/S34/S35/S36	1265 JEROME AVENUE	Residential
VV	S33/S34/S35/S36	1387 JESUP AVENUE	Residential

Source: STV Incorporated, 2017.

Determining Existing Noise Levels

Existing noise measurements were collected at one location adjacent to Development Sites 43, 44, and 45. Two additional measurements were collected at two locations adjacent to Development Sites 33, 34, 35, and 36. These measurement sites are identified as #1, in Figure 19-2 and #2 and #3 in Figure 19-3. All noise measurements were collected for 20-minute periods during the peak construction time period of 6:00 to 7:00 AM. The noise meter was mounted on a tripod at approximately five feet above the ground level. Both measurement locations were used to represent existing noise levels at all building façades near or adjacent to Projected Development Sites. It was conservatively assumed that the measured noise levels would be applicable for both ground level and elevated receptor locations, as it is anticipated that the difference between ground and elevated existing noise levels in the vicinity of Projected Development Sites would not be significant. Although the elevated NYCT #4 train line runs adjacent to the Development Sites 43, 44, and 45, ground level and elevated noise measurements taken for the operational noise section of this EIS confirms this assumption as differences between ground level and elevated receptors were generally less than 3dB(A) when taken in the area. The collected sound level results are shown in Table 19-13, "Existing Short-Term Noise Levels (dBA)."

Table 19-13: Existing Short-Term Noise Levels (dBA)

Site	Description	Period	Leq	L10	L50	L90
1	River Avenue @McClellan Street	6-7AM	74.5	72.8	59.2	56.6
2	Edward L Grant Highway @ West 169th Street	6-7AM	68.2	71.2	63.6	56.6
3	Cromwell Ave between West 170th Street & West 169th Street	6-7AM	59.5	61.6	57.3	51.8

Source: STV, Incorporated 2017.

Construction Noise Analysis Results

Using the methodology described previously, and considering the noise abatement measures for source and path controls specified above, noise analyses were performed to determine maximum one-hour equivalent (L_{eq}[1]) noise levels that would be expected to occur during each day for the two worst-case analysis locations.

Table 18.13 provides a summary of the following:

- Existing noise levels
- Maximum predicted total noise levels (i.e., cumulative noise levels), which are the sum of noise due to construction activities and street traffic movements at ground level and at intermediate elevations adjacent to existing buildings
- Maximum predicted increases in noise levels based upon comparing the total noise levels with existing noise levels and future No-Action noise levels (2018 for Projected Development Sites 33,34,35,36 and 2022 for Projected Development Sites 43, 44, 45)
- A quantitative construction noise analysis was performed to quantify the magnitude of construction-related noise exposure for the peak-construction period of the second quarter of 2018 for Projected Development Sites 33, 34, 35, 36 and the 3rd quarter of 2022 for Projected Development Sites 43, 44, 45).

Table 19-14, "Construction Noise Analysis Results (Construction Scenario #1) (dBA)," and Table 19-15, "Construction Noise Analysis Results (Construction Scenario #2) (dBA)," summarize the construction noise analysis findings at the 27 representative locations for Projected Development Sites 43, 44, 45 (Construction Scenario #1), and at the 21 representative locations for Projected Development Sites 33, 34, 35, and 36 (Construction Scenario #2). CEQR noise level exceedances are shown in bold text in both Table 19-14 and Table 19-15 respectively. Projected noise-level exposure under construction activities were determined based on the difference between total noise levels at a particular site caused by construction activity and those estimated under existing and future No-Action conditions. Elevated receptor sites were modeled at locations where an existing building was identified across from or adjacent to one of the studied projected development sites. Additionally, ground-level receptor Site X representing Mullaly Park was modeled at the sidewalk location across River Avenue from Projected Development Site 45. In addition to results Tables 19-4 and 19-5, noise contour maps of the construction noise analysis results can be found in Appendix H for both scenarios. Figure H6 shows the

77 dBA contour line for construction noise sources related to Development Sites 43, 44 and 45. As indicated in the figure, the geographic extent of the 77 dBA contour line does not extend more than 140 feet from the edge of the Development Site construction boundary. Figure H7 shows the 60 dBA contour line for construction noise sources related to Development Sites 33,34,35, and 36. As indicated in the figure, the geographic extent of the 60 dBA contour line does not extend more than 130 feet from the edge of the Development Site construction boundary.

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Table 19-14: Construction Noise Analysis Results (Construction Scenario #1) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
A	1075 GERARD AVENUE	Residential	North	6	Ground Floor	74.5	74.6	78.2	**3.7**	**3.6**	Yes
=	=	Residential	North	35	Mid-Level Floor	74.5	74.6	81.9	**7.4**	**7.3**	Yes
=	=	Residential	North	70	Top Floor	74.5	74.6	81.0	**6.5**	**6.4**	Yes
=	=	Residential	North	6	Ground Floor	74.5	74.6	78.5	**4.0**	**3.9**	Yes
=	=	Residential	North	35	Mid-Level Floor	74.5	74.6	82.6	**8.1**	**8.0**	Yes
=	=	Residential	North	70	Top Floor	74.5	74.6	81.6	**7.1**	**7.0**	Yes
=	=	Residential	North	6	Ground Floor	74.5	74.6	78.3	**3.8**	**3.7**	Yes
=	=	Residential	North	35	Mid-Level Floor	74.5	74.6	82.1	**7.6**	**7.5**	Yes
=	=	Residential	North	70	Top Floor	74.5	74.6	81.2	**6.7**	**6.6**	Yes
B	1111 GERARD AVENUE	Residential	South	6	Ground Floor	74.5	74.6	78.9	**4.4**	**4.3**	Yes
=	=	Residential	South	35	Mid-Level Floor	74.5	74.6	83.9	**9.4**	**9.3**	Yes
=	=	Residential	South	70	Top Floor	74.5	74.6	82.5	**8.0**	**7.9**	Yes
		Residential	West	6	Ground Floor	74.5	74.6	79.3	**4.8**	**4.7**	Yes
=	=	Residential	West	35	Mid-Level Floor	74.5	74.6	84.5	**10.0**	**9.9**	Yes
=	=	Residential	West	70	Top Floor	74.5	74.6	83.2	**8.7**	**8.6**	Yes
=	=	Residential	North	6	Ground Floor	74.5	74.6	78.8	**4.3**	**4.2**	Yes
=	=	Residential	North	35	Mid-Level Floor	74.5	74.6	82.4	**7.9**	**7.8**	Yes
=	=	Residential	North	70	Top Floor	74.5	74.6	82.1	**7.6**	**7.5**	Yes
=	=	Residential	East	6	Ground Floor	74.5	74.6	78.1	**3.6**	**3.5**	Yes
=	=	Residential	East	35	Mid-Level Floor	74.5	74.6	80.9	**6.4**	**6.3**	Yes

Table 19-14 (continued): Construction Noise Analysis Results (Construction Scenario #1) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
-	-	Residential	East	70	Top Floor	74.5	74.6	80.6	**6.1**	**6.0**	Yes
-	-	Residential	South	6	Ground Floor	74.5	74.6	79.0	**4.5**	**4.4**	Yes
-	-	Residential	South	35	Mid-Level Floor	74.5	74.6	83.2	**8.7**	**8.6**	Yes
-	-	Residential	South	70	Top Floor	74.5	74.6	82.5	**8.0**	**7.9**	Yes
-	-	Residential	West	6	Ground Floor	74.5	74.6	78.9	**4.4**	**4.3**	Yes
-	-	Residential	West	35	Mid-Level Floor	74.5	74.6	82.9	**8.4**	**8.3**	Yes
-	-	Residential	West	70	Top Floor	74.5	74.6	82.2	**7.7**	**7.6**	Yes
D	80 MC CLELLAN STREET	Residential	West	6	Ground Floor	74.5	74.6	77.5	3.0	2.9	no
-	-	Residential	West	40	Mid-Level Floor	74.5	74.6	78.9	**4.4**	**4.3**	Yes
-	-	Residential	West	80	Top Floor	74.5	74.6	78.8	**4.3**	**4.2**	Yes
E	1112 GERARD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	77.9	**3.4**	**3.3**	Yes
-	-	Residential	West	30	Mid-Level Floor	74.5	74.6	80.5	**6.0**	**5.9**	Yes
-	-	Residential	West	60	Top Floor	74.5	74.6	80.3	**5.8**	**5.7**	Yes
F	1098 GERARD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	78.1	**3.6**	**3.5**	Yes
-	-	Residential	West	30	Mid-Level Floor	74.5	74.6	81.1	**6.6**	**6.5**	Yes
-	-	Residential	West	60	Top Floor	74.5	74.6	80.8	**6.3**	**6.2**	Yes
G	1082 GERARD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	77.7	**3.2**	**3.1**	Yes
-	-	Residential	West	30	Mid-Level Floor	74.5	74.6	79.9	**5.4**	**5.3**	Yes
-	-	Residential	West	60	Top Floor	74.5	74.6	79.8	**5.3**	**5.2**	Yes

Table 19-14 (continued): Construction Noise Analysis Results (Construction Scenario #1) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
H	1075 GERARD AVENUE	Residential	East	6	Ground Floor	74.5	74.6	77.4	2.9	2.8	no
-	-	Residential	East	35	Mid-Level Floor	74.5	74.6	78.9	**4.4**	**4.3**	Yes
-	-	Residential	East	70	Top Floor	74.5	74.6	78.8	**4.3**	**4.2**	Yes
I	1105 JEROME AVENUE	Residential	East	6	Ground Floor	74.5	74.6	76.8	2.3	2.2	no
-	-	Residential	East	40	Mid-Level Floor	74.5	74.6	76.9	2.4	2.3	no
-	-	Residential	East	80	Top Floor	74.5	74.6	77.0	2.5	2.4	no
J	1165 CROMWELL AVENUE	Residential	Southeast	6	Ground Floor	74.5	74.6	76.9	2.4	2.3	no
-	-	Residential	Southeast	30	Mid-Level Floor	74.5	74.6	77.3	2.8	2.7	no
-	-	Residential	Southeast	60	Top Floor	74.5	74.6	77.3	2.8	2.7	no
K	1160 CROMWELL AVENUE	Residential	South	6	Ground Floor	74.5	74.6	77.0	2.5	2.4	no
-	-	Residential	South	30	Mid-Level Floor	74.5	74.6	77.4	2.9	2.8	no
-	-	Residential	South	60	Top Floor	74.5	74.6	77.5	3.0	2.9	no
L	35 MC CLELLAN STREET	Residential	South	6	Ground Floor	74.5	74.6	77.2	2.7	2.6	no
-	-	Residential	South	30	Mid-Level Floor	74.5	74.6	78.5	**4.0**	**3.9**	Yes
-	-	Residential	South	60	Top Floor	74.5	74.6	78.5	**4.0**	**3.9**	Yes
M	1155 GERARD AVENUE	Residential	South	6	Ground Floor	74.5	74.6	77.3	2.8	2.7	no
-	-	Residential	South	30	Mid-Level Floor	74.5	74.6	78.6	**4.1**	**4.0**	Yes
-	-	Residential	South	60	Top Floor	74.5	74.6	78.5	**4.0**	**3.9**	Yes
N	85 MC CLELLAN STREET,	Residential	Southwest	6	Ground Floor	74.5	74.6	77.1	2.6	2.5	no
-	-	Residential	Southwest	35	Mid-Level Floor	74.5	74.6	77.8	**3.3**	**3.2**	Yes

Table 19-14 (continued): Construction Noise Analysis Results (Construction Scenario #1) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
-	-	Residential	Southwest	70	Top Floor	74.5	74.6	77.8	**3.3**	**3.2**	Yes
O	80 MC CLELLAN STREET	Residential	North	6	Ground Floor	74.5	74.6	77.2	2.7	2.6	no
-	-	Residential	North	40	Mid-Level Floor	74.5	74.6	78.3	**3.8**	**3.7**	Yes
-	-	Residential	North	80	Top Floor	74.5	74.6	78.2	**3.7**	**3.6**	Yes
P	1155 GERARD AVENUE	Residential	West	6	1st Floor	74.5	74.6	80.1	**5.6**	**5.5**	Yes
-	-	Residential	West	18	2nd Floor	74.5	74.6	87.0	**12.5**	**12.4**	Yes
-	-	Residential	West	30	3rd Floor	74.5	74.6	86.6	**12.1**	**12.0**	Yes
-	-	Residential	West	40	4th Floor	74.5	74.6	85.9	**11.4**	**11.4**	Yes
-	-	Residential	West	50	5th Floor	74.5	74.6	85.3	**10.8**	**10.7**	Yes
-	-	Residential	West	60	6th Floor	74.5	74.6	84.8	**10.3**	**10.2**	Yes
Q	1165 GERARD AVENUE	Residential	West	6	1st Floor	74.5	74.6	80.5	**6.0**	**5.9**	Yes
-	-	Residential	West	18	2nd Floor	74.5	74.6	87.3	**12.8**	**12.7**	Yes
-	-	Residential	West	30	3rd Floor	74.5	74.6	86.9	**12.4**	**12.3**	Yes
-	-	Residential	West	40	4th Floor	74.5	74.6	86.4	**11.9**	**11.8**	Yes
-	-	Residential	West	50	5th Floor	74.5	74.6	85.9	**11.4**	**11.3**	Yes
-	-	Residential	West	60	6th Floor	74.5	74.6	85.4	**10.9**	**10.8**	Yes
R	1175 GERARD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	79.4	**4.9**	**4.8**	Yes
-	-	Residential	West	30	Mid-Level Floor	74.5	74.6	84.9	**10.4**	**10.3**	Yes
-	-	Residential	West	60	Top Floor	74.5	74.6	83.6	**9.1**	**9.0**	Yes
S	1183 GERARD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	78.2	**3.7**	**3.6**	Yes

Table 19-14 (continued): Construction Noise Analysis Results (Construction Scenario #1) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
-	-	Residential	West	30	Mid-Level Floor	74.5	74.6	81.2	**6.7**	**6.6**	Yes
-	-	Residential	West	60	Top Floor	74.5	74.6	80.9	**6.4**	**6.3**	Yes
T	1183 GERARD AVENUE	Residential	East	6	Ground Floor	74.5	74.6	77.3	2.8	2.7	no
-	-	Residential	East	30	Mid-Level Floor	74.5	74.6	78.6	**4.1**	**4.0**	Yes
-	-	Residential	East	60	Top Floor	74.5	74.6	78.7	**4.2**	**4.1**	Yes
U	1164 CROMWELL AVENUE	Residential	East	6	Ground Floor	74.5	74.6	77.4	2.9	2.8	no
-	-	Residential	East	30	Mid-Level Floor	74.5	74.6	78.7	**4.2**	**4.1**	Yes
-	-	Residential	East	60	Top Floor	74.5	74.6	78.9	**4.4**	**4.3**	Yes
V	1184 CROMWELL AVENUE	Residential	East	6	Ground Floor	74.5	74.6	77.3	2.8	2.7	no
-	-	Residential	East	30	Mid-Level Floor	74.5	74.6	78.4	**3.9**	**3.8**	Yes
-	-	Residential	East	60	Top Floor	74.5	74.6	78.6	**4.1**	**4.0**	Yes
W	2 EAST 167 STREET	Residential	Southeast	6	Ground Level	74.5	74.6	77.2	2.7	2.6	no
-	-	Residential	Southeast	30	Mid-Level Floor	74.5	74.6	78.1	**3.6**	**3.5**	Yes
-	-	Residential	Southeast	60	Top Floor	74.5	74.6	78.1	**3.6**	**3.5**	Yes
X	Mullaly Park	Park	East	6	Ground Level	74.5	74.6	78.2	3.7	3.6	Yes
Y	35 MC CLELLAN STREET	Residential	East	6	Ground Level	74.5	74.6	79.1	**4.6**	**4.5**	Yes
-	-	Residential	East	30	Mid-Level Floor	74.5	74.6	83.1	**8.6**	**8.5**	Yes
-	-	Residential	East	60	Top Floor	74.5	74.6	82.7	**8.2**	**8.1**	Yes
Z	1097 WALTON AVENUE	Residential	West	6	Ground Level	74.5	74.6	77.3	2.8	2.7	no

Table 19-14 (continued): Construction Noise Analysis Results (Construction Scenario #1) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet) [1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
"	"	Residential	West	25	Mid-Level Floor	74.5	74.6	78.4	**3.9**	**3.8**	Yes
"	"	Residential	West	50	Top Floor	74.5	74.6	78.6	**4.1**	**4.0**	Yes
AA	1166 GERARD AVENUE	Residential	West	6	Ground Level	74.5	74.6	77.5	3.0	2.9	no
"	"	Residential	West	30	Mid-Level Floor	74.5	74.6	79.2	**4.7**	**4.6**	Yes
"	"	Residential	West	60	Top Floor	74.5	74.6	79.1	**4.6**	**4.5**	Yes

Table 19-15: Construction Noise Analysis Results (Construction Scenario #2) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
BB	1323 INWOOD AVENUE	Residential	East	6	Ground Floor	59.5	59.5	65.9	**6.4**	**6.3**	Yes
-	-	Residential	East	16	Top Floor	59.5	59.5	66.9	**7.4**	**7.4**	Yes
-	-	Residential	East	6	Ground Floor	59.5	59.5	66.0	**6.5**	**6.4**	Yes
-	-	Residential	East	16	Top Floor	59.5	59.5	67.1	**7.6**	**7.5**	Yes
CC	1349 INWOOD AVENUE (Bronx Academy Promise)	Residential	East	16	Ground Floor	59.5	59.5	67.1	**7.6**	**7.6**	Yes
-	-	Residential	East	36	Top Floor	59.5	59.5	69.8	**10.3**	**10.2**	Yes
-	-	Residential	South	16	Ground Floor	59.5	59.5	65.9	**6.4**	**6.4**	Yes
-	-	Residential	South	36	Top Floor	59.5	59.5	67.1	**7.6**	**7.6**	Yes
-	-	Residential	West	16	Ground Floor	59.5	59.5	66.8	**7.3**	**7.3**	Yes
-	-	Residential	West	36	Top Floor	59.5	59.5	69.2	**9.7**	**9.7**	Yes
DD	1307 EDWARD L GRANT HWY	Residential	East	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	East	35	Mid-Level Floor	68.2	68.2	73.5	**5.3**	**5.2**	Yes
-	-	Residential	East	70	Top Floor	68.2	68.2	73.6	**5.4**	**5.3**	Yes
EE	1325 EDWARD L GRANT HWY	Residential	East	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	East	30	Mid-Level Floor	68.2	68.2	73.4	**5.2**	**5.1**	Yes
-	-	Residential	East	60	Top Floor	68.2	68.2	73.5	**5.3**	**5.3**	Yes
FF	1337 EDWARD L GRANT HWY	Residential	East	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	East	30	Mid-Level Floor	68.2	68.2	73.4	**5.2**	**5.1**	Yes
-	-	Residential	East	60	Top Floor	68.2	68.2	73.5	**5.3**	**5.3**	Yes
GG	1345 EDWARD L GRANT HWY	Residential	East	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes

Table 19-15 (continued): Construction Noise Analysis Results (Construction Scenario #2) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
=	=	Residential	East	16	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	East	26	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
HH	1275 EDWARD L GRANT HWY	Residential	East	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	East	30	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	East	60	Top Floor	68.2	68.2	73.4	**5.2**	**5.1**	Yes
II	1281 EDWARD L GRANT HWY	Residential	East	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	East	16	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	East	26	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
JJ	8 WEST 169 STREET	Residential	North	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	North	30	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	North	60	Top Floor	68.2	68.2	73.4	**5.2**	**5.2**	Yes
KK	1376 INWOOD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	76.7	2.2	2.1	no
=	=	Residential	West	16	Top Floor	74.5	74.6	76.7	2.2	2.2	no
LL	1400 JESUP AVENUE	Residential	Southeast	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	Southeast	35	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	Southeast	70	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
MM	1350 SHAKESPEARE AVENUE	Residential	Southeast	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.0**	Yes
=	=	Residential	Southeast	35	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
=	=	Residential	Southeast	70	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
NN	15 MARCY PLACE	Residential	West	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes

Table 19-15 (continued): Construction Noise Analysis Results (Construction Scenario #2) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3)			
								Total Leq	**With Action Minus Existing Change**	**With Action Minus No Action Change**	**Exceed**
-	-	Residential	West	30	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	West	60	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
OO	15 CLARKE PLACE EAST	Residential	Northwest	16	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	Northwest	63	Mid-Level Floor	68.2	68.2	73.4	**5.2**	**5.1**	Yes
-	-	Residential	Northwest	130	Top Floor	68.2	68.2	73.4	**5.2**	**5.2**	Yes
PP	14 MARCY PLACE	Residential	West	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	West	30	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	West	60	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
QQ	1331 INWOOD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	76.7	2.2	2.1	no
-	-	Residential	West	16	Top Floor	74.5	74.6	76.8	2.3	2.2	no
RR	1323 INWOOD AVENUE	Residential	West	6	Ground Floor	74.5	74.6	76.7	2.2	2.1	no
-	-	Residential	West	16	Top Floor	74.5	74.6	76.7	2.2	2.2	no
SS	16 ELLIOT PLACE	Residential	West	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.0**	Yes
-	-	Residential	West	25	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	West	50	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
TT	15 ELLIOT PLACE	Residential	West	6	Ground Floor	68.2	68.2	73.3	**5.1**	**5.0**	Yes
-	-	Residential	West	30	Mid-Level Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
-	-	Residential	West	60	Top Floor	68.2	68.2	73.3	**5.1**	**5.1**	Yes
UU	1265 JEROME AVENUE	Residential	North	6	Ground Floor	59.5	59.5	65.3	**5.8**	**5.7**	Yes
-	-	Residential	North	25	Mid-Level Floor	59.5	59.5	65.4	**5.9**	**5.8**	Yes

Table 19-15 (continued): Construction Noise Analysis Results (Construction Scenario #2) (dBA)

Noise Site	Address	Land Use	Façade	Height (feet)[1]	Elevation (floor)	Existing Leq(hr)	No Action Leq(hr)	With Action (2022, Q3) Total Leq	With Action Minus Existing Change	With Action Minus No Action Change	Exceed
"	"	Residential	North	50	Top Floor	59.5	59.5	65.5	**6.0**	**5.9**	Yes
VV	1387 JESUP AVENUE	Residential	South	6	Ground Floor	59.5	59.5	65.3	**5.8**	**5.7**	Yes
"	"	Residential	South	30	Mid-Level Floor	59.5	59.5	65.4	**5.9**	**5.9**	Yes
"	"	Residential	South	59	Top Floor	59.5	59.5	65.6	**6.1**	**6.1**	Yes

Notes:
[1]Floor heights are approximate

Source: STV Incorporated, 2017.

Projected Development Sites 43, 44, and 45

Under both scenarios, noise level increases of 3 dBA or greater are projected at receptor sites A, B, D, E, F , G, H, L, M, N, O, P, Q, R, S, T, U V, W, Y, Z and AA. At these 24 locations, noise levels above the CEQR limits were determined to be caused principally from noise generated by on-site construction activities rather than from off-site traffic movements. Projected noise-level increases during the peak construction period (i.e., third quarter of 2022) are projected to range from 2.2 to 12.7 dBA. The greatest noise level increase of 12.7 dBA would occur at receptor site P for the west facing 2nd floor location. As a result, similar increases in noise levels could occur for up to three months if window wall attenuation for residential portions of the buildings are not sufficient. During this period, construction activities related to demolition and building superstructure would be occurring simultaneously.

For ground floor receptor locations, CEQR impacts would occur at 10 of the 22 studied receptor sites where impacts do occur. Impacts at mid floor locations occur at all 22 receptor sites where impacts are predicted. Since exterior noise exposure would be above the CEQR impact limits at some receptor sites, the potential does exist for similar noise-level increases at these and/or other receptor locations in the immediate vicinity of Project Development Sites 43, 44, and 45 during other construction quarters bordering this peak construction period of the third quarter of 2022. Mitigation measures that may address these impacts are discussed in Chapter 21, "Mitigation."

Projected Development Sites 33, 34, 35, and 36

Under both scenarios, noise level increases of 3 dBA or greater are projected at receptor site BB, DD, EE, FF, GG, HH, II, JJ, LL, MM, NN, OO, PP, SS, TT, UU, VV and increases of 5 dBA or greater are projected at receptor site CC (Promise School). At these 18 locations, noise levels above the CEQR limits were determined to be caused primarily from noise generated by on-site construction activities rather than from off-site traffic movements. Projected noise-level increases during the peak construction period (i.e., second quarter of 2018) are projected to range from 2.1 to 10.2 dBA. The greatest noise level increase of 10.2 dBA would occur at receptor site CC for the east facing top-level floor location. As a result, similar increases in noise levels could occur for up to four months if window wall attenuation for residential portions of the buildings are not sufficient. During this period, construction activities related to demolition and building superstructure would be occurring simultaneously.

For ground floor receptor locations, CEQR impacts would occur at all 18 of the studied receptor sites where impacts do occur. Impacts at mid floor locations also occur at all 18 receptor sites where impacts are predicted. Since exterior noise exposure would be above the CEQR impact limits at the 18 receptor sites, the potential does exist for similar noise-level increases at these and/or other receptor locations in the immediate vicinity of Project Development Sites 33,34,35,36 during other construction quarters bordering this peak construction period of the second quarter of 2018. Mitigation measures that may address these impacts are discussed in Chapter 19, “Mitigation.”

Conclusion

At locations predicted to experience an exceedance of the noise impact threshold criteria, the exceedances would be due principally to noise generated by on-site construction activities (rather than construction-related traffic). This noise analysis examined the reasonable worst-case peak noise levels that would result from construction, and therefore, is conservative in predicting significant increases in noise levels. While elevated noise levels would persist throughout the entire construction phase (including the demolition, excavation and foundation, building superstructure and interior fit out tasks), the loudest hourly noise level during each month of construction would not persist for more than four months. Furthermore, this analysis is based on a conceptual site plan and construction schedule. It is possible that the actual construction may be of less magnitude, or that construction on multiple projected development sites may not overlap, in which case construction noise would be less intense than the analysis predicts.

Some receptors may experience exterior absolute noise levels above 85 dBA at elevations above the first floor at the building façade—especially those receptors that are immediately adjacent to construction sites and above the height of site-perimeter noise barriers. However, visual inspection of the study area did not identify outdoor terraces adjacent to Development Sites within the rezoning area. As such, residents at these receptors would not experience exterior levels of construction noise. Because the buildings at these receptors would provide approximately 25 dBA window/wall attenuation, interior noise levels would be below the health-based noise threshold of 85 dBA.

Vibration

Introduction

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

Construction Vibration Criteria

Potential impacts related to construction vibration for the Proposed Action would be for a finite duration. Therefore, the primary concern regarding construction vibration would be related to potential damage to buildings. The damage criteria are based on the peak particle velocity (PPV) levels for different types of construction equipment. For structural damage, the FTA identifies criteria for several categories of buildings which could be potentially affected, the most sensitive of which include fragile and historic structures. Historic buildings have been identified within 90 feet of the construction zones in the Proposed Action. In areas adjacent to the construction activities, the most common buildings found are reinforced concrete or steel structures. For these buildings, the FTA considers that damage would occur at a vibration level of 0.50 ips. The New York City Department of Buildings (NYC DOB) construction guidance for historical structures, “Technical Policy and Procedure Notice #10/88” (TPPN # 10/88) also recognizes the building damage threshold as 0.50 ips. 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 per second. For non-fragile buildings, vibration levels below 0.60 inches per second would not be expected to result in any structural or architectural damage.

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

Analysis Methodology

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

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

Where: PPV_{equip} is the peak particle velocity in inches per second of the equipment at the receiver location;
PPV_{ref} is the reference vibration level in inches per second at 25 feet; and
D is the distance from the equipment to the received location in feet.

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

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

Where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;
$L_v(ref)$ is the reference vibration level in VdB at 25 feet;
D is the distance from the equipment to the receiver location in feet.

Table 19-15, shows vibration source levels for typical construction equipment.

Table 19-16: Vibration Source Levels for Construction Equipment

Equipment		PPV (ref) (in/sec)	Approximate Lv (ref) (VdB)
Pile Driver (impact)	upper range	0.734	105
	Typical	0.170	93
Hydromill (slurrywall)	In soil	0.008	66
	In rock	0.017	75
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006.

Construction Vibration Analysis Results

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration are those immediately adjacent to or across the street from a Projected Development Site. For Projected Development Sites 43, 44, 45 receptor sites identified as B, E, F, G, H, L, M, Q and R on Figure 19-2 are all residential buildings located immediately adjacent to Projected Development Sites 43, 44, 45, and therefore a vibration monitoring program would be implemented to ensure that the 0.50 inches/second PPV threshold limit for structural damage to occur is not exceeded. At receptor sites A, D, I, J, K, N, O, P, S, T, U, V, W, X, Y, Z and AA the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would result in architectural or structural damage.

Residential buildings adjacent to Projected Development Sites 43, 44, and 45 at the corner of McClellan Street and Gerard Avenue and adjacent to Projected Site 45 between River Avenue and Gerard Avenue as well as west facing residential buildings along Gerard Avenue between McClellan Street and West 167th Streets (adjacent to Project Developments Sites 43 and 44), would be the nearest structures that could experience elevated vibration levels. Pile driving is expected as part of construction resulting from the Proposed Action. Based on the typical PPV of impact pile driving, vibration levels may exceed 0.5 inches per second PPV within 25 feet of the equipment. The preliminary construction analysis indicates that piles may be required within 25 feet of these closest buildings near Projected Development Site 43, 44, and 45 and may result in PPV levels between 0.50 and 1.52 inches per second, which is generally considered acceptable for a building or structure. Using other construction methods, such as vibratory (sonic) pile driving, at locations within 25 feet of structures may be needed to minimize potential risk of structural damage

The closest building to Projected Development Site 33, 34, 35, and 36 would be the Promise School and several two family homes all located on Inwood Avenue between West Clarke Street and West 170th Street. These structures could all experience elevated vibration levels due to pile driving. However, these buildings would be approximately 60 feet from the closest Development Site Construction. Based on the typical PPV of impact pile driving, vibration levels may exceed 0.5 inches per second PPV within 30 feet of the equipment. As a result, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would result in architectural or structural damage.

In terms of potential annoyance, the vibration generated from impact pile driving would have the most potential to produce vibration levels above the 65 VdB threshold limit. The affected area would include a radius of approximately 500 feet extending outward from the source. However, this type of construction activity would generate vibration for limited periods of time at a particular location and therefore would not result in any significant adverse impact.