A. INTRODUCTION

This chapter assesses the potential impacts from construction activities in the Project Area anticipated in the future with the Proposed Actions. Construction impacts, although temporary, can include noticeable and disruptive effects. As stated in the 2014 *City Environmental Quality Review* (CEQR) *Technical Manual*, a determination of the significance of construction impacts and the need for mitigation is generally based on the duration and magnitude of the impacts. Construction activity could cause impacts with a significant adverse effect with respect to traffic conditions, hazardous materials, archaeological resources, the integrity of historic resources, community noise patterns, and/or air quality conditions.

The Proposed Actions consist of a series of land use actions that would facilitate the redevelopment of Block 1863, Lots 5, 10, 13, and 26 (the "Development Site") with affordable and supportive housing and community facility uses. Specifically, the Proposed Project would consist of two buildings: the approximately 193,000 gsf Building 1 to be located on Lots 5, 10, and 13, and the approximately 45,000 gsf Building 2 to be located on Lot 26. Construction of Building 1 is expected to begin in 2018, with all building elements complete by early 2020; construction of Building 2 is expected to begin in 2023, with all building elements complete by the end of 2024.

Under the *CEQR Technical Manual*, construction duration is often broken down into short-term (less than two years) and long-term (two or more years) time frames. Where the duration of construction is expected to be short-term, impacts resulting from such short-term construction generally do not require detailed assessment. Multi-sited projects, projects with overall construction periods lasting longer than two years, and projects that are near sensitive receptors undergo a preliminary impact assessment.

Construction of the Proposed Project is expected to take place over a period greater than two years and is, therefore, considered long-term. The construction activities also have the potential to affect sensitive receptors over a sustained period of time. In addition, based on the construction schedule for the Proposed Project, there is the potential for a building with sensitive receptors (Building 1) to be completed before the final build-out of the Proposed Project.

Accordingly, this chapter of the EIS provides a preliminary impact assessment following the guidelines in the *CEQR Technical Manual*. The preliminary assessment evaluates the duration and severity of the disruption or inconvenience to residents or users at nearby sensitive receptors.

The findings of the preliminary assessment identified the need to undertake more detailed construction impact assessments for 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 construction schedule and the types of activities likely to occur during construction of the Proposed Project. 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.

For each of the various technical areas presented below, appropriate construction analysis periods were selected to represent reasonable worst-case conditions relevant to that technical area, which can occur at different times for different analyses. For example, the noisiest part of construction may not be at the same time as the heaviest construction traffic.

B. PRINCIPAL CONCLUSIONS

According to The construction analysis presented in this chapter, the Proposed Project would not result in significant adverse construction impacts in the areas of transportation, air quality, land use and neighborhood character, socioeconomic conditions, community facilities, open space, historic and cultural resources, or hazardous materials. However, as described below, construction of the Proposed Project has the potential to result in significant adverse noise impacts on a temporary basis during portions of the construction period.

Development of the Proposed Project would commence shortly after all necessary public approvals are granted. Construction of Building 1 is anticipated to begin in 2018, with all building elements complete by early 2020 (for a total construction period of 28 months, from demolition to completion). Construction of Building 2 is expected to begin in 2023, with all building elements complete by the end of 2024 (for a total construction period of 22 months). It is anticipated that no construction would occur during the approximately 32-month period between completion of Building 1 and the start of construction of Building 2.

Transportation

Construction travel demand associated with the Proposed Project is expected to be the greatest during the demolition phase of Building 1's development (the first quarter of 2018). While the Proposed Project would generate incremental traffic, pedestrian, and transit demand, peaking in 2018, the incremental traffic, pedestrian, and transit demand would not exceed the *CEQR Technical Manual* detailed analysis thresholds, and, as such, no significant adverse impacts are anticipated. In addition, while the Proposed Project would likely result in some traffic lane and/or sidewalk closures during limited periods of the Proposed Project's construction, as is typical for construction in New York City, the applicant would be required to prepare detailed Maintenance and Protection of Traffic (MPT) plans for any temporary sidewalk and lane closures, which would be submitted for approval to the New York City Department of Transportation's (DOT's) Office of Construction Mitigation and Coordination (OCMC), the entity that insures that critical arteries are not interrupted, especially in peak travel periods.

Air Quality

Since emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust-generating construction activities, have the potential to affect air quality, the analysis of potential impacts on air quality from construction of the Proposed Project includes a quantitative analysis of both on-site and on-road sources of air emissions. The detailed construction air quality analysis estimates the overall construction emissions profile for both buildings in order to select the worst-case analysis time periods for short-term air quality standards and annual air quality standards. The analysis included consideration of the potential impacts to existing sensitive land uses surrounding the construction areas, as well as project-on-project impacts, since Building 1 would be occupied before the completion of Building 2.

Measures would be taken to reduce pollutant emission during construction. These include the use of clean fuel, implementing dust control measures and idling restrictions, incorporating best available tailpipe reduction methodologies, and using newer equipment. With the incorporation of these measures, the detailed construction air quality analysis determined that no significant adverse impacts would result.

Noise

Since construction of the Proposed Project would involve the construction of multiple buildings near sensitive receptors over a period longer than two years, with the potential for project-on-project impacts (due to the phased nature of the Proposed Project, i.e. one of the proposed buildings (Building 1) would have completed construction and be occupied while the other (Building 2) is under construction), and the Proposed Project would also operate multiple pieces of diesel equipment in a single location, a quantitative construction noise assessment was performed in accordance with *CEQR Technical Manual* methodology. The construction noise assessment was performed with the modeling software SoundPlan. In addition to standard noise control measures required pursuant to the New York City Noise Control Code (including a variety of source and path controls, such as ensuring that all equipment employs the manufacturer's appropriate noise reduction device(s) and that construction devices with internal combustion engines keep their engine's housing doors closed, covering portable noise-generating equipment with noise-insulating fabric, preventing vehicle engine idling on-site, etc.) the analysis also assumed use of a temporary 15-foot perimeter noise wall as a noise control measure committed to by the project sponsor. Three primary types of receptors were the focus of the analysis: nearby residential buildings, schools, and open space resources. The analysis conclusions for each type of receptor are discussed below. As outlined below, significant adverse construction noise impacts on residential buildings along West 109th Street and Amsterdam and Columbus avenues were identified; no significant adverse construction noise impacts on Booker T. Washington Middle School or area open spaces were identified. As discussed in Chapter 10, "Public Health," while the noise levels predicted to occur during construction at these sensitive receptors would exceed the construction noise impact thresholds, these noise levels are below the level that would constitute significant adverse public health impacts. Refer to Chapter 13, "Mitigation," for a discussion of mitigation considered for the significant adverse impacts.

Residential Buildings

During the construction of Building 1, the maximum noise levels would occur at residential receptors directly north (along the rear of buildings on West 109th Street) and west (along the rear of buildings on Amsterdam Avenue) of the construction site. The maximum interior noise levels at residential receptors would exceed the 45 dBA CEQR building interior impact criterion by up to seven dBA, 16 dBA, and 14 dBA during initial site preparation, the building construction phase (represented by Month 7), and exterior finish (represented by Month 26), respectively. Construction noise levels would be substantially less and would not exceed the 45 dBA criterion at the ground level of the buildings shielded by the construction noise barrier. Overall, despite the extensive construction noise control measures incorporated in the Proposed Project duration of impacts would be up to 28 months at some receptors.[1]

During the construction of Building 2 (anticipated between 2023 and 2024), the maximum noise levels would occur directly east (along the rear of buildings on Columbus Avenue) and north (along the rear of buildings on West 109th Street) of Building 2. The maximum interior noise levels at residential receptors would exceed the 45 dBA CEQR building interior impact by up to ten dBA, 15 dBA, and 13 dBA during initial site preparation, the building construction phase (represented by Month 7), and exterior finish (represented by Month 21), respectively. Overall, despite the extensive construction noise control measures incorporated in the Proposed Project duration of impacts would be up to 21 months at some receptors.[2]

The magnitude and duration of construction noise were considered for the construction of Building 1 and Building 2. The impacts constitute a significant adverse impact for certain locations as discussed in detail in the noise section.

School

During the construction of Building 1, the highest interior noise levels at the Booker T. Washington Middle School would occur in the gymnasium (on the north façade of the building), with construction noise levels ranging from the mid to high 50s of dBA (the gymnasium lacks air conditioning and was assumed to have windows open for purposes of estimating interior noise levels). Noise levels would be lower at the windows closest to ground level (which is where gym users would be located) due to the shielding provided by the construction noise barrier. Noise would be 18 dBA lower during the winter when the windows of gymnasium would be closed; therefore, the higher predicted noise levels would occur during warm weather only. Considering the active recreation uses occurring in the gym (which themselves generate substantial sound levels) and that noise levels would be lower at the ground level occupied by users and higher at the upper portions of the gym facility, the construction noise level would not be disruptive and is not considered a significant adverse impact. Also during the construction of Building 1, the CEQR 45 dBA impact criterion would be exceeded by less than two dBA at a single third-story classroom receptor on the northern end of the western façade (facing Building 1; receptor ID 619) during Month 7. Given the low magnitude of the exceedance and the limited duration, the exceedance would not be considered a significant adverse impact. Other than the gym and classroom discussed above, interior noise levels in the remainder of the school would not exceed 45 dBA.

During the construction of Building 2, highest interior noise levels would occur in the gymnasium (on the north façade of the school), with construction noise levels ranging from 61 to 71 dBA. The daytime use of the gymnasium involves active recreation, which would generate substantially greater noise levels than the construction noise. Noise levels would be lower at the windows closest to ground level (which is where gym users would be located) due to the shielding provided by the construction noise barrier. Noise would be 18 dBA lower during the winter when the windows of gymnasium would be closed; therefore, the

[1] It should also be noted that, while the representative construction equipment mix for each modeled month was conservatively used to estimate the overall duration of impacts, by its very nature, construction noise varies substantially day to day depending on the specific work activities being undertaken. The predicted elevated noise levels due to construction would occur intermittently during the construction period.

[2] It should also be noted that, while the representative construction equipment mix for each modeled month was conservatively used to estimate the overall duration of impacts, by its very nature, construction noise varies substantially day to day depending on the specific work activities being undertaken. The predicted elevated noise levels due to construction would occur intermittently during the construction period.

higher predicted noise levels would occur during warm weather only. Considering the type of use affected and that noise levels would be lower at the ground level occupied by users and higher at the upper portions of the gym facility, the construction noise level would not be disruptive and is not considered a significant adverse impact.

Also during the construction of Building 2, the 45 dBA impact criterion would be exceeded by up to eight dBA in the auditorium on the northern façade of the school during Month 7; however, impacts at the ground level of the auditorium would only exceed 45 dBA by 2.7 dBA due to the shielding provided by the construction noise barrier. Construction noise would be noticeable when the auditorium is quiet, but the noise would not substantially interfere with the typical uses of the auditorium, such as school-wide events, performances, or rehearsals. An interior noise level of 48 to 53 dBA would still be below typical speech levels (57 dBA average for normal voice level, 64 dBA average for raised voice level).[3] Due the limitation of construction noise to the daytime hours, there would be no impact on the nighttime use of the auditorium. Considering the type of uses affected, duration, and magnitude, the exceedance is not considered a significant adverse impact.

The 45 dBA impact criterion would also be exceeded during Building 2 construction by up to 2.6 dBA at classroom receptors on the third floor of the north façade of the school above the auditorium and gymnasium, set back from the edge of the building (receptor IDs 644 and 647-649). The exceedances are anticipated to occur during Month 7 only (representing 11 months of construction activity). Given the low magnitude of the exceedance and the limited duration, the exceedance is not considered a significant adverse impact.

Other than the auditorium, gymnasium, and third floor classrooms discussed above, interior noise levels at the remainder of the school would not exceed 45 dBA during both Building 1 and Building 2 construction. It should also be noted that the project sponsor has committed to work with Booker T. Washington Middle School to coordinate the timing of more intensive construction activities, so that they do not interfere with critical testing or school dates.

Open Space

During the construction of the Proposed Project, noise levels would be in the low 70s to mid 60s dBA or less at Anibal Aviles Playground and Booker T. Washington Playground for the duration of construction. While noise from construction of Buildings 1 and 2 would be noticeable at these open space resources, noise levels would not substantially interfere with the usability of these areas for active recreation. Since all the playground receptors are at ground level, the 15-foot-high construction site perimeter noise barrier would serve to substantially reduce noise levels. Taking into consideration the control measures incorporated in the Proposed Project (e.g., the 15-foot-high perimeter fence), the construction of the Proposed Project would not result in significant adverse noise impacts on area open spaces.

Project-on-Project

Project-on-Project impacts were examined by modeling receptors on the completed Building 1 during the construction of Building 2. The maximum predicted interior noise levels would occur during Month 7 of Building 2's construction and would be 45.5 dBA, just exceeding the 45 dBA impact criterion. The exceedance would be limited to floors four through eight on the eastern facade of Building 1 (facing

[3] US EPA. 1977. Speech Levels in Various Noise Environments.

Building 2). Given the very small magnitude of the exceedance of 45 dBA and limited duration (11 months, represented by Month 7), this impact is not considered significant.

Other Technical Areas

Based on the analyses conducted, construction of the Proposed Project would not result in significant adverse construction impacts in the areas of land use and neighborhood character, socioeconomic conditions, community facilities, open space, historic and cultural resources, or hazardous materials. Construction activities associated with the Proposed Project would affect Project Area land use temporarily, but would not alter surrounding land uses, block or restrict access to any facilities in the area, affect the operations of any nearby businesses, or significantly obstruct thoroughfares used by customers or businesses. In addition, as no historic resources are located within 90 feet of the Project Area, construction of the Proposed Project does not have the potential to result in significant adverse impacts on historic resources.

Construction of the Proposed Project would incorporate use of extensive noise control measures, including a 15-foot-high construction fence, and these would be required per the land disposition agreement (LDA) between the project sponsor and the City of New York – Department of Housing Preservation and Development (HPD). These control measures would serve to reduce noise levels and avoid impacts to Booker T. Washington Middle School, as well as Anibal Aviles Playground and Booker T. Washington Playground and other open areas. In addition, the project sponsor has committed to work with the school to coordinate the timing of more intensive construction activities, so that they do not interfere with critical testing or school dates. Additional construction noise mitigation measures are currently being explored and are presented in Chapter 13, “Mitigation.” These measures will be further refined between the Draft and Final EIS. In addition, with the emission control measures to be required of the project sponsor, per the LDA between the project sponsor and HPD, no significant adverse construction air quality impacts would occur at the school. Lastly, with adherence to site remedy approved by either the New York City Office of Environmental Remediation (OER) or the New York City Department of Environmental Protection (DEP) and the regulated asbestos-containing material (ACM) and lead-based paint (LBP) removal protocols, to be mandated per the LDA, as well, no significant adverse hazardous materials impacts would occur at the school during the Proposed Project’s construction.

The project sponsor is in discussion with the New York City Department of Parks and Recreation (DPR) regarding any encroachments that might occur at the neighboring Anibal Aviles Playground during the Proposed Project’s construction; the project sponsor has committed to restoring any affected areas, should construction activities temporarily encroach on this open space resource. In addition, measures would be implemented to control noise, vibration, emissions and dust from the construction sites on the adjacent and nearby open space. Therefore, no significant construction impacts to open space are expected.

C. CONSTRUCTION SCHEDULE AND ACTIVITIES

This section 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 would require that construction contractors comply with applicable environmental regulations and obtain necessary permits for the duration of construction. Construction of the Proposed Project would follow applicable federal, state, and local laws for building and safety, as well as local noise ordinances, as appropriate.

Construction Sequencing

As presented in **Table 12-1**, construction of Building 1 is anticipated to begin in 2018, with all building elements complete by early 2020 (for a total construction period of 28 months, from demolition to completion). Construction of Building 2 is expected to begin in 2023, with all building elements complete by the end of 2024 (for a total construction period of 22 months). It is anticipated that no construction would occur during the approximately 32-month period between completion of Building 1 and the start of construction of Building 2. It should also be noted that, while construction activities associated at Buildings 1 and 2 would be occurring over 28 and 22 months, respectively, construction would not be occurring at the same level, or magnitude, during the entirety of the construction periods.

TABLE 12-1
Preliminary Construction Schedule

Year		2018				2019				2020				2021	2022	2023				2024			
Quarter		1	2	3	4	1	2	3	4	1	2	3	4	1-4	1-4	1	2	3	4	1	2	3	4
Building 1	Demolition/ Excavation/ Foundation	Jan. 2018 – Jan. 2019																					
	Superstructure/ Exterior			June 2018 – April 2020																			
	Interior/ Finishing				Dec. 2018 – April 2020																		
Building 2	Demolition/ Excavation/ Foundation															Jan. 2023 – Dec. 2023							
	Superstructure/ Exterior																	May 2023 – July 2024					
	Interior/ Finishing																			Nov. 2023 – Oct. 2024			

Source: Lettire Construction and Dattner Architects.

Construction Activities

Overview

Construction of mid-rise buildings in New York City typically follows a general pattern. The first task is construction startup, which involves the siting of work trailers, the installation of temporary power and communication lines, and the erection of site perimeter fencing. Then, if there is an existing building on the site, any potential hazardous materials (such as asbestos) are abated, and the building is then demolished with some of the materials recycled and debris taken to a licensed disposal facility. For sites requiring new or upgraded public utility connections, these activities are undertaken next (e.g., electrical connection, installation of new water or sewer lines and hook-ups, etc.). Excavation and removal and/or addition and re-grading of the soils is the next step, followed by construction of the foundation. When the below-grade construction is completed, construction of the core and shell of the new building begins. The core is the central part of the building and is the main part of the structural system. It contains the elevators and the mechanical systems for heating, ventilation, and air conditioning (HVAC). The shell is the outside of the building. As the core and floor decks of the building are being erected, installation of the mechanical and electrical internal networks starts. As the building progresses upward, the exterior cladding is placed, and the interior fit-out begins. During the busiest time of building construction, the upper core and structure are built while the mechanical/electrical connections, exterior cladding, and interior finishing progress on lower floors. Finally, site work, including outdoor components, is undertaken, and site access and protection measures required during construction are removed.

General Construction Practices

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 12-2** 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 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. DOB enforces regulations pertaining to the installation and operation of construction equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding. DEP enforces the New York City Noise Control Code (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 (Chapter 28), regulates water disposal into the sewer system, oversees dust control for construction activities, and—in instances when there is not a hazardous materials (E) designation assigned to the site and/or the site is not subject to New York City's Voluntary Cleanup Program (NYCVCP)—approves Remedial Action Plans (RAPs) and Construction Health and Safey Plans (CHASPs). Alternately, if a hazardous materials (E) designation is assigned to a site and/or the site is enrolled in the NYCVCP, OER approves RAPs and CHASPs. 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. DOT reviews and approves any traffic lane and sidewalk closures. 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. New York City Transit (NYCT) is in charge of bus stop relocations (along with DOT) and any subsurface construction within 200 feet of a subway. The New York State Department of Labor (NYSDOL) 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.

COMMUNITY OUTREACH

During construction of the Proposed Project, the project sponsor has committed to continued community outreach. Specifically, a Construction Advisory Group would be organized by Manhattan Community Board (CB) 7, which would be made up of area stakeholders, elected officials, City agencies, and the development team. The Construction Advisory Group would allow for review and comment on scheduling and construction issues for the Proposed Project. This group would commence its activities just prior to the start of construction of the Proposed Project.

TABLE 12-2
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
Office of Environmental Remediation (OER)	Hazardous materials
Fire Department (FDNY)	Compliance with Fire Code, tank operation
Department of Transportation (DOT)	Traffic lane and sidewalk closures; bus stop relocation
Landmarks Preservation Commission (LPC)	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
New York City Transit (NYCT)	Bus stop relocation; any subsurface construction within 200 feet of a subway
United States	
Environmental Protection Agency (EPA)	Air emissions, noise, hazardous materials, toxic substances
Occupational Safety and Health Administration (OSHA)	Worker safety

DELIVERIES AND ACCESS

During construction of the Proposed Project, access to the Project Area would be controlled. The work areas would be fenced off, and limited access points for workers and trucks would be provided. Security guards and flaggers would be posted, as necessary. After work hours, the gates would be closed and locked. Security guards may patrol the site after work hours and over the weekends to prevent unauthorized access.

Material deliveries to the site would be controlled and scheduled. Unscheduled or haphazard deliveries would be minimized. To aid in adhering to the delivery schedules, as is normal for building construction in New York City, flaggers would be employed at each of the gates. The flaggers could be supplied by the sub-contractor on-site at the time or by the construction manager. The flaggers would control trucks entering and exiting the site so that they would not interfere with one another. In addition, they would provide a traffic aid as the trucks enter and exit the on-street traffic streams.

HOURS OF WORK

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 Development Site 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 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 arrival and site preparation to 5 PM for site cleanup.

While the above-described construction work hours are reflective of the typical work hours throughout the year, it should be noted that the project sponsor has committed to work with the nearby Booker T. Washington Middle School to coordinate the timing of more intensive construction activities, so that they do not interfere with critical testing or school dates.

CONSTRUCTION STAGING AREAS AND 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. Staging areas would typically be fenced and lit for security and would adhere to New York City Building Code.

It is anticipated that much of the Proposed Project's construction staging would likely occur within the Development Site itself. However, as is typical with construction projects in New York City, it is anticipated that some sidewalks immediately adjacent to the Project Area would be closed to accommodate heavy loading areas for at least several months of the construction period for each parcel and that portions of West 108th Street may need to be temporarily closed during certain limited periods of construction. 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. The applicant would be required to prepare MPT plans for any temporary sidewalk and lane closures, which would be submitted for approval to the DOT OCMC, the entity that ensures 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.

In addition, given the proximity of Anibal Aviles Playground to the Development Site, the project sponsor is in discussion with DPR regarding any encroachments that might occur during the Proposed Project's construction. The project sponsor has committed to restoring any affected areas, should construction activities temporarily encroach on this open space resource. Appropriate protective measures for ensuring pedestrian safety surrounding the Development Site 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.

RODENT CONTROL

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

General Construction Tasks

CONSTRUCTION STARTUP TASKS

The following tasks are considered to be typical startup work to prepare for site construction. Construction startup work prepares a site for the construction work and would involve the installation of public safety measures, such as fencing, sidewalk sheds, and Jersey barriers. The construction site would be fenced off, typically with solid fencing to minimize interference between the persons passing by the site and the construction work. Gates for workers and for trucks would be installed, and sidewalk sheds and Jersey barriers would be erected. Trailers for the construction engineers and managers would be hauled to the site and installed. Also, portable toilets, dumpsters for trash, and water and fuel tankers would be brought to the site and installed. Temporary utilities would be connected to the construction trailers. During the startup period, permanent utility connections may be made, especially if the construction manager has obtained early electric power for construction use, but utility connections may be made at almost any time during the construction sequence.

ABATEMENT, DEMOLITION, AND REMEDIATION

Development of the Proposed Project would require the demolition of the existing structures currently located within the Project Area. As the limited asbestos, lead paint, and polychlorinated biphenyl (PCB) caulk survey report identified the presence of ACMs and LBP, a full survey of the existing Development Site buildings will be conducted by a New York City certified asbestos investigator once the buildings are fully vacated. These materials would be removed by a NYSDOL-licensed asbestos abatement contractor prior to building demolition. Asbestos abatement is strictly regulated by DEP, the NYSDOL, the EPA, and OSHA to protect the health and safety of construction workers and nearby residents and workers. DEP, the NYSDOL, and possibly the EPA (depending on the extent of asbestos that is ultimately present) would be notified of the asbestos removal project, and DEP may inspect the abatement site to ensure that work is being performed in accordance with applicable regulations. These regulations specify abatement methods, including wet removal of ACMs that minimize asbestos fibers from becoming airborne. The areas of the building ACMs would be isolated from the surrounding area with a containment system and a decontaminant system. The types of these systems would depend on the type and quantity of ACMs that are ultimately identified in the Development Site buildings and may include hard barriers, isolation barriers, and/or critical barriers. Specially trained and certified workers wearing personal protective equipment would remove the ACMs and place them in bags or containers lined with plastic sheering for disposal at an asbestos-permitted landfill. Depending on the extent and type of ACMs that are ultimately identified in the Development Site buildings, an independent third-party air monitoring firm would collect air samples before, during, and after the asbestos abatement. These samples would be analyzed in a laboratory to ensure that regulated fiber levels are not exceeded. After the abatement is complete and the work areas have passed a visual inspection and monitoring, if applicable, an “Asbestos Project Completion Form” is submitted to the DOB prior to issuance of a demolition permit. Only after this regulated process is completed can the general demolition work can begin.

At the same time that the ACMs are being abated, removal of other materials that could be hazardous could take place. Any activities with the potential to disturb LBP would be performed in accordance with the applicable OSHA regulations (including federal OSHA regulations 29 CFR 1926.62—*Lead Exposure in Construction*).

General demolition is the next step. First, any economically salvageable materials are removed. Then, the building is deconstructed using large equipment. Typical demolition requires solid temporary walls around the building to prevent the accidental dispersal of building materials into areas accessible to the general public. The demolition debris would be sorted prior to being disposed at landfills to maximize recycling opportunities. It should be noted that, as the existing Development Site buildings are cement block and plank structures with no interior walls or materials, the amount of debris would be less for the existing garage structures than of other buildings of a similar size.

EXCAVATION AND FOUNDATION

As the first step of the excavation and foundation phase of construction, a backhoe would be used to drill mini-piles along the perimeter of the construction site to hold back soil around the excavation area; the Proposed Project would not involve any pile driving. Next, drill rig rock excavators would be used for the task of digging the building foundations. It should be noted that, as the Development Site is currently occupied by existing buildings, and much of the new buildings would be constructed within the footprints of these existing buildings to be demolished, the Proposed Project would require substantially less excavation that a similarly sized building constructed on a vacant lot. Any excavated soil to be removed from the Development Site would be loaded onto dump trucks for transport to a licensed disposal facility or for reuse elsewhere on the Development Site or on another construction site. This stage of construction would also include construction of the Proposed Project’s foundation.

As described in greater detail below under “Hazardous Materials,” to reduce the potential for public exposure to contaminants during excavation activities, construction activities would be performed in accordance with all applicable regulatory requirements. The project sponsor is actively working with OER, and the project sponsor intends to formally enroll in New York City’s Voluntary Cleanup Program (NYCVCP) to fully address the testing and remediation requirements at the site. All construction sub-surface soil disturbances would be performed in accordance with the OER-approved RAP and CHASP. As presented in Chapter 6, “Hazardous Materials,” the RAP addresses requirements for items such as soil stockpiling, soil disposal and transportation, dust control, and quality assurance, as well as contingency measures, should additional underground petroleum storage tanks and/or soil/groundwater contamination be unexpectedly encountered. The RAP also addresses measures to be incorporated into the new building, including the installation of a vapor barrier system beneath the buildings’ slab and along foundation sidewalls. The CHASP includes measures for worker and community protection, including personal protective equipment, dust control, and air monitoring. Required remediation pursuant to the OER-reviewed and –approved RAP would be enforced through the LDA between HPD and the project sponsor. As the NYCVCP is a voluntary program, should the project sponsor elect to withdraw from the NYCVPC prior to the conveyance of the Development Site by the City, allocation of City funding and start of any demolition or construction activity, DEP would assume the lead role in approving the final remedy developed for the site, in coordination with OER and HPD. Under either scenario, the LDA would serve as the mechanism to ensure the approved site remedy is implemented.

SUPERSTRUCTURE AND EXTERIOR FACADE

Construction of the buildings' cores would include construction of the buildings' frameworks (installation of beams and columns) and floor decks; elevator shafts; vertical risers for mechanical, electrical, and plumbing systems; electrical and mechanical equipment; core stairs; and restroom areas. Exterior construction involves the installation of the façade (exterior walls, windows, and cladding and the roof). Temporary construction elevators (hoists) would be constructed for the delivery of materials and vertical movement of workers, when necessary.

INTERIOR AND FINISHING

This stage would include the construction of interior partitions, installation of lighting fixtures, amenity construction, interior finishes (floor, painting, millwork, glass and glazing, door and hardware, etc.), mechanical and electrical work (such as the installation of elevators), and plumbing and fire protections fit-out work. This stage of construction is typically the quietest, as most of the construction activities would occur within the buildings with the facades substantially complete.

Estimate of Construction Workers and Construction Period Trucks

Worker and truck projections were based on information provided by Lettire Construction and Dattner Architects. The resultant estimate of the number of trucks and workers per quarter are summarized in **Table 12-3**. As indicated in the table, during construction of the Proposed Project, the number of daily construction workers would average 17, the number of daily construction worker vehicles would average 2.7, and the number of daily construction trucks would average 2.5. The number of construction trucks would peak during the initial demolition phase of Building 1 (first quarter of 2018), with an estimated 15 daily trucks. The number of construction workers is similarly expected to peak in this initial phase of construction, with a maximum of 30 workers on-site during the first quarter of construction.

D. PRELIMINARY ASSESSMENT

In accordance with the guidelines of the *CEQR Technical Manual*, this preliminary assessment evaluated the effects associated with the Proposed Project's 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 preliminary construction transportation analysis assesses the potential for construction activities to result in significant adverse impacts to traffic, parking conditions, and transit and pedestrian facilities.

TABLE 12-3
Estimated Total Number of Construction Workers, Construction Worker Vehicles, and Construction Trucks On-Site Per Day

Year	2018				2019				2020		2023				2024			2025	Project Total	
Quarter[1]	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*1st*	*Peak*	*Average[5]*
Construction Workers[2]	30	12	8	24	16	26	24	20	16	9	8	10	12	23	18	24	18	14	30	17
Construction Worker Vehicles[3]	5	2	1	4	2	4	4	3	2	1	1	2	2	4	3	4	3	2	5	2.7
Construction Trucks[2]	15	4	4	2	1	1	1	1	2	1	2	2	2	1	1	1	1	1	15	2.4
Total Construction Vehicles (Worker Vehicles + Trucks) in PCEs[4]	35	10	9	8	4	6	6	5	6	3	5	6	6	6	5	6	5	4	35	7.5

Notes:
[1] Represents the monthly average for each quarter.
[2] Construction worker and truck estimates based on average worker and truck estimates provided by Lettire Construction and Dattner Architects.
[3] Based on 2000 Census reverse-journey-to-work data for employees in the construction industry (Manhattan census tracts 185, 187, 189, 191, 193, 195, 197.01, 197.02, 199, 201.01, 201.02, 203, and 216).
[4] To calculate total daily vehicle trips in PCEs, each truck trips has a PCE of 2.0.
[5] Reflects average of quarters during which construction is underway (i.e., does not include the ten quarters between construction of the two Proposed Project buildings).
Yellow highlighting denotes peak periods.

Traffic

Construction activities associated with the Proposed Project would generate construction worker and truck traffic. Similar to other construction projects in New York City, most of the construction activity at the Development Site is expected to take place during the construction shift of 7 AM to 3:30 PM. Construction worker modal splits and vehicle occupancy rates were based on the latest available U.S. Census data for workers in the construction industry (2000 Census data); based on this data, it is anticipated that 21.7 percent of construction workers would commute to the Project Area by private autos at an average occupancy of approximately 1.42 persons per vehicle. The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns of construction workers and trucks. While construction truck trips would be made throughout the day (with more trips typically made during the early morning), construction workers would typically commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two truck trips during the same hour (one “in” and one “out”), and each truck trip has a Passenger Car Equivalent (PCE) of 2.0. **Table 12-4** presents the hourly construction trip estimates in PCEs for the 2018 (Q1) peak construction period, based on the construction worker and truck estimates presented in **Table 12-3** and the assumptions outlined above. As shown in the table, during the 2018 (Q1) peak construction period, the number of hourly vehicle trips (in PCEs) would peak at 20 trips in the 6-7 AM peak hour, with significantly fewer vehicle trips anticipated in all other peak hours. As construction of the Proposed Project would not generate 50 vehicle trips in any peak hour (the

CEQR Technical Manual Level 1 screening threshold), no significant adverse construction traffic impacts are anticipated, and further analysis is not warranted.

TABLE 12-4
Estimated Hourly Construction-Related Vehicle Trips for the Peak Construction Quarter (2020, Q1)

	Trucks (Vehicles)			Trucks (PCEs)			Worker Autos			
	In	Out	Total	In	Out	Total	In	Out	Total	Total PCEs
6-7 AM	4	4	8	8	8	16	4	0	4	20
7-8 AM	2	2	4	4	4	8	1	0	1	9
8-9 AM	2	2	4	4	4	8	0	0	0	8
9-10 AM	2	2	4	4	4	8	0	0	0	8
10-11 AM	1	1	2	2	2	4	0	0	0	4
11 AM-12 PM	1	1	2	2	2	4	0	0	0	4
12-1 PM	1	1	2	2	2	4	0	0	0	4
1-2 PM	1	1	2	2	2	4	0	0	0	4
2-3 PM	1	1	2	2	2	4	0	0	0	4
3-4 PM	0	0	0	0	0	0	0	4	4	4
4-5 PM	0	0	0	0	0	0	0	1	1	1

Transit

As discussed previously and shown in **Table 12-3**, during the peak period for construction worker travel demand, up to approximately 30 workers would travel to and from the Project Area each day. Approximately 63.8 percent of these construction workers are expected to travel to and from the Project Area by transit. Based on this anticipated transit share, during the 2018 (Q1) construction transportation peak period, construction of the Proposed Project would generate a total of 38 daily transit trips (in/out combined). As stated in the *CEQR Technical Manual*, if a project would generate 200 or fewer peak hour transit trips, significant adverse impacts are not likely, and no further analysis is warranted. As noted above, construction of the Proposed Project would generate less than 200 transit trips in any peak hour. Therefore, no significant adverse transit impacts are anticipated during the Proposed Project's construction, and further analysis is not warranted.

Pedestrians

Of the peak 30 construction workers expected to travel to and from the Development Site in the 2018 (Q1) construction worker travel demand peak, 14.4 percent (eight construction workers) are expected to walk to the Project Area. Accounting for construction workers walking from area transit facilities and off-site parking, construction of the Proposed Project would result in a total of 60 daily pedestrian trips (30 in and 30 out). As stated in the *CEQR Technical Manual*, if a project would generate 200 or fewer peak hour pedestrian trips, significant adverse impacts are not likely, and no further analysis is warranted. As construction of the Proposed Project would generate fewer than 200 pedestrian trips in any peak hour, no significant adverse pedestrian impacts are anticipated during the Proposed Project's construction, and further analysis is not warranted.

Parking

As presented in **Table 12-3**, the peak number of workers during construction of the Proposed Project would be approximately 30 per day and would occur in the first quarter of 2018. As noted above, based on 2000 Census data for area workers in the construction industry, it is anticipated that approximately 21.8 percent of construction workers would commute to the Project Area by private autos, at an average occupancy of approximately 1.42 persons per vehicle. The anticipated construction activities are, therefore, projected to generate a maximum parking demand of five spaces; the peak parking demand would occur during construction of Building 1, prior to the demolition of the existing 125-space public parking garage on Lot 26. Even accounting for the Lot 26 garage remaining in the 2018 construction parking peak period, however, with the displacement of the two garages on the Building 1 site (with their combined approximately 550 spaces), there would be an on- and off-street parking deficit in the weekday midday 2018(Q1) No-Action condition. As such, the five construction worker vehicles projected during the construction peak period may have to seek available parking beyond a ½-mile of the Development Site.

As presented in Chapter 7, "Transportation," the Project Area is located in CEQR Parking Zone 1, which encompasses all Manhattan blocks south of 110th Street. As per the *CEQR Technical Manual*, the inability of proposed projects in Parking Zones 1 and 2 (which, combined, include all of Manhattan, in addition to transit-rich areas in the South Bronx, Brooklyn, and Queens) to accommodate future parking demands is considered a shortfall, but is generally not considered a significant environmental impact due to the magnitude of alternative modes of transportation that are readily available for commutation, shopping and other day-to-day needs. As such, given the transit accessibility of the Development Site, this parking shortfall would not represent a significant adverse impact, in accordance with *CEQR Technical Manual* methodology, and construction workers would continue to have access to alternate means to travel to/from the site.

Air Quality

According to the *CEQR Technical Manual*, a quantitative assessment of air quality for construction activities is likely not warranted if the project's construction activities: (1) are considered short-term, which for air quality assessments has generally been accepted as two years or less; (2) are not located near sensitive receptors; (3) do not involve the construction of multiple buildings where there is a potential for cumulative impacts from different buildings under simultaneous construction before the final build-out; and (4) would not operate multiple pieces of diesel equipment in a single location during peak construction. If a project does not meet one or more of the criteria above, a quantitative air quality assessment could be required.

Construction of the Proposed Project would involve the construction near sensitive receptors over a period longer than two years, and the Proposed Project would operate multiple pieces of diesel equipment in a single location. Therefore, a quantitative air quality assessment was performed. The methodologies and results of this analysis are described in the "Detailed Analysis" section, below.

Noise

According to the *CEQR Technical Manual*, an assessment of noise for construction activities is likely not warranted if the project's construction activities: (1) are considered short-term; (2) are not located near sensitive receptors; (3) do not involve the construction of multiple buildings where there is a potential for cumulative impacts from different buildings under simultaneous construction before the final build-out; and (4) would not operate multiple pieces of diesel equipment in a single location during peak construction. If a project does not meet one or more of the criteria above, a quantitative noise assessment could be required.

Construction of the Proposed Project would involve the construction near sensitive receptors over a period longer than two years and the Proposed Project would operate multiple pieces of diesel equipment in a single location. Therefore, a quantitative construction noise assessment was performed. The methodologies and results of this analysis are described in the "Detailed Analysis" section, below.

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 construction purposes 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 activities associated with the Proposed Project would affect Project Area land use temporarily and would not require the continuous use of surrounding sites during the construction period. Overall, while Project Area construction activities would be evident to the local community, the limited duration of construction would not result in any significant or long-term adverse impacts on local land use patterns or the character of the nearby area.

Socioeconomic Conditions

According to the *CEQR Technical Manual*, construction impacts to socioeconomic conditions are possible if the project would entail construction of a long duration that could affect access to and thereby viability of a number of businesses and if the failure of those businesses has the potential to affect neighborhood character. As noted above, most construction activities would take place within the Project Area, which comprises two parcels on the north side of West 108th Street. Construction activities associated with the Proposed Project would not block or restrict access to any facilities in the area, affect the operations of any nearby businesses, or significantly obstruct thoroughfares used by customers or businesses.

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.). The Proposed Project would not result in the direct displacement of any community facilities, as defined in the *CEQR Technical Manual*. Access to and from any community facilities in the surrounding area would not be affected during the construction period. In addition, the construction sites 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 direct construction impacts would be expected to community facilities in the area, and no further assessment is 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 or access to the open space would be impeded for an extended period during construction activities. The project sponsor is in discussion with DPR regarding any encroachments that might occur at the neighboring Anibal Aviles Playground during the Proposed Project's construction; the project sponsor has committed to restoring any affected areas, should construction activities temporarily encroach on this open space resources. In addition, measures would be implemented to control noise, vibration, emissions and dust from the construction sites on the adjacent and nearby open spaces, and, as outlined in greater detail below, no significant adverse construction noise impacts would occur at nearby open space resources. Therefore, no significant construction impacts to open space are expected.

Historic and Cultural Resources

According to the guidelines in the *CEQR Technical Manual*, the assessment of construction impacts on historic and cultural resources considers the possibility of physical damage to any architectural or archaeological resources identified in the historic and cultural resources assessment. A construction assessment is not warranted if a project would not involve construction activities within 400 feet of a historic resource.

In a letter dated April 14, 2017, the LPC determined that the Project Area does not contain any eligible or designated historic architectural or archaeological resources. The closest historic resource to the Project Area is the State and National Register (S/NR) –eligible historic architectural resources located at 101-105 West 109th Street, approximately 165 feet to the north of the Project Area, at its closest point. This is approximately 83 percent more than the 90-foot maximum distance at which a resource could be damaged from vibration, and there is no potential for additional damage from adjacent construction that could occur from falling objects, subsidence, collapse, or damage from construction machinery, as defined by the DOB. Therefore, no construction-related impacts on historic resources would be expected as a result of the Proposed Project.

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 also be disclosed here. 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 presented in Chapter 6, “Hazardous Materials,” similar to many sites in urban areas that contain soil and/or groundwater that are known to be contaminated, the Phase II Environmental Site Investigation (ESI) prepared for the Development Site confirmed the presence of hazardous materials. In addition, and as is common for building structures built at the time of the existing Development Site structures, the limited asbestos, lead paint, and PCB caulk survey report identified the presence of ACM and LBP in the existing Development Site building materials.

Although construction of the Proposed Project would involve the demolition of four existing buildings, as well as new in-ground disturbance, which could increase pathways for human exposure to hazardous materials, impacts would be avoided by performing site development activities in accordance with the following measures (to be required of the project sponsor in accordance with the LDA):

- The project sponsor will enroll in the NYCVCP. As part of the NYCVCP, the project sponsor submitted a draft RAP to OER. The draft RAP describes the remedial actions that are necessary to render a site protective of public health and the environment for the intended use. The draft RAP includes a remedial alternatives analysis that provides a basis for selecting the proposed remedial action and explains why the remedial action is protective of public health and the environment for the intended use. The draft RAP also includes a proposed remedial work schedule, a health and safety plan, a description of all engineering and institutional controls, and an explanation of site management requirements that make sure that any remaining contamination does not pose any exposure risk in the future. The draft RAP also includes a Community Protection Statement that summarizes community protections to be implemented during the remedial process, summarizing such issues as the community air monitoring plan, all odor, dust, and noise control measures, hours of operation, and other good housekeeping practices that will be implemented at the NYCVCP site. All remedial and mitigation measures would be performed in accordance with applicable laws and regulations and the site-specific CHASP. As the NYCVCP is a voluntary program, should the project sponsor elect to withdraw from the NYCVPC prior to the conveyance of the Development Site by the City, allocation of City funding and start of any demolition or construction activity, DEP would assume the lead role in approving the final remedy developed for the site, in coordination with OER and HPD. Under either scenario, the LDA would serve as the mechanism to ensure the approved site remedy is implemented.
- As the limited asbestos, lead paint, and PCB caulk survey report identified the presence of ACMs and LBP, a full survey of the existing Development Site buildings will be conducted by a New York City-certified asbestos investigator once the buildings are fully vacated. The ACMs would be removed by a NYSDOL-licensed asbestos abatement contractor prior to building demolition. Asbestos abatement is strictly regulated by DEP, the NYSDOL, the EPA, and OSHA to protect the health and safety of construction workers and nearby residents and workers. DEP, the NYSDOL, and possibly the EPA (depending on the extent of asbestos that is ultimately present) would be notified of the asbestos removal project and may inspect the abatement site to ensure that work is being performed in accordance with applicable regulations. These regulations specify

abatement methods, including wet removal of ACMs that minimize asbestos fibers from becoming airborne. The areas of the building ACMs would be isolated from the surrounding area with a containment system and a decontaminant system. The types of these systems would depend on the type and quantity of ACMs ultimately identified and may include hard barriers, isolation barriers, and/or critical barriers. Specially trained and certified workers wearing personal protective equipment would remove the ACMs and place them in bags or containers lined with plastic sheering for disposal at an asbestos-permitted landfill. Depending on the extent and type of ACMs ultimately identified, an independent third-party air monitoring firm would collect air samples before, during, and after the asbestos abatement. These samples would be analyzed in a laboratory to ensure that regulated fiber levels are not exceeded.

- Any activities with the potential to disturb LBP would be performed in accordance with applicable requirements (including federal OSHA regulations 29 CFR 1926.62—*Lead Exposure in Construction*).
- If dewatering is necessary as part of the proposed construction activities, water would be discharged to sewers in accordance with DEP requirements.

With implementation of these measures, to be required of the project sponsor in accordance with the LDA, no significant adverse hazardous materials impacts would occur during construction of the Proposed Project.

E. DETAILED ANALYSES

Air Quality

Emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust generating construction activities, generally have the potential to affect air quality. Therefore, analysis of potential impacts on air quality from the construction of the Proposed Project includes a quantitative analysis of both on-site and on-road sources of air emissions. In general, much of the heavy equipment used in construction utilizes diesel-powered engines and produces relatively high levels of nitrogen oxides (NO_x) and particulate matter (PM). Fugitive dust generated by construction activities also contains PM. Finally, gasoline engines produce relatively high levels of carbon monoxide (CO). As a result, the primary air pollutants of concern for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to ten micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO.

The detailed construction air quality analysis estimates the overall construction emissions profile for the Proposed Project and evaluates the worst-case analysis time periods for short-term air quality standards and annual air quality standards. For Building 1, the peak year of construction emissions is 2018. For Building 2, the peak year of construction emissions is 2023. $PM_{2.5}$ exhaust emissions were quantified for each month of construction for Buildings 1 and 2 to identify three representative peak periods during the two analyzed years (2018 and 2023, respectively). The month with the highest emissions for each pollutant was used for purposes of modeling short-term standards. Modeling of annual standards took into account the monthly variation in emissions over the year.

For both buildings, receptors were placed surrounding the Project Area, and dispersion models were used to predict and compare the concentration of pollutants to the National Ambient Air Quality Standards (NAAQS) and/or CEQR *de minimis* impact criteria, as appropriate.

Regarding project-on-project impacts during construction, Building 1 is anticipated to be complete and fully operational by the end of 2020, well before the anticipated start date for construction of Building 2. The potential for significant adverse impacts to sensitive receptors at Building 1 has been accounted for in the dispersion model by placing receptors at multiple locations and elevations along the façade of Building 1 to account for project-on-project impacts during the construction of Building 2.

Emission Control Measures

Construction activity, in general, has the potential to adversely affect air quality as a result of diesel emissions. To ensure that construction of the Proposed Project would result in the lowest practicable diesel particulate matter (DPM) emissions, an emissions reduction program would be implemented for all construction activities, consisting of the following components, which would be required of the project sponsor through the terms of the LDA:

- *Clean Fuel*. Ultra-low sulfur diesel (ULSD) fuel would be used exclusively for all diesel engines throughout the construction site.
- *Dust Control Measures*. To minimize fugitive dust emissions from construction activities, a strict fugitive dust control plan, including a robust watering program, would be required as part of contract specifications. For example, stabilized truck exit areas would be established for washing off the wheels of all trucks that exit the construction site; truck routes within the Development Site would be either watered as needed or, in cases where such route would remain in the same place for an extended duration, the routes would be stabilized, covered with gravel, or temporarily paved to avoid the resuspension of dust; all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the Development Site; water sprays would be used for all demolition, excavation, and transfer of soils to ensure that materials would be dampened, as necessary, to avoid the suspension of dust into the air. Loose materials would be watered or covered. All measures required by the portion of the New York City Air Pollution Control Code regulating construction-related dust emissions would be implemented.
- *Idling Restriction*. In addition to adhering to the local law restricting unnecessary idling on roadways, on-site vehicle idle time would also be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.
- *Best Available Tailpipe Reduction Technologies*. Non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract for the Proposed Project), including but not limited to concrete mixing and pumping trucks, would utilize the best available tailpipe (BAT) technology for reducing DPM emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel non-road engines rated at 50 hp or greater would utilize DPFs, either installed by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPFs must be verified by EPA or the California Air Resources Board (CARB). Active DPFs or other technologies proven to achieve an equivalent reduction may also be used.

- *Utilization of Newer Equipment.* EPA's Tier 1 through 4 standards for non-road engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons (HC).[4] All non-road construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3 emissions standard (alternatively at least the Tier 4 final emissions standard). All non-road engines rated less than 50 hp would meet at least the Tier 2 emissions standard.

Methodology

AIR QUALITY STANDARDS

As required by the Clean Air Act (CAA), primary and secondary NAAQS have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are required to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary standards are generally either the same as the secondary standards or more restrictive. The NAAQS are presented in **Table 12-5**.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations and *CEQR Technical Manual* indicate that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large, or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[5] In terms of the magnitude of air quality impacts, any project predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 12-5**) would be deemed to have a potential significant adverse impact. However, the magnitude, duration, and impacted area are taken into consideration when determining if the construction impact is significant.

In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas (NAAs), threshold levels have been defined for certain pollutants; any project predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicted. The NAAQS and CEQR *de minimis* criteria are intended for permanent project impacts and are used for screening purposes for construction impacts. If construction impacts are below these thresholds, no further assessment of the magnitude and duration of impacts is needed.

<u>CO *de minimis* Criteria</u>

The *CEQR Technical Manual* provides the following *de minimis* criteria for CO: (1) an increase of 0.5 parts per million (ppm) or more in the maximum eight-hour average CO concentration at a location where the predicted No-Action eight-hour concentration is equal to or between 8.0 and 9.0 ppm; or (2) an increase

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[4] For summary of the phase in of Tiers 1-4 exhaust emission standards for nonroad compression ignition (diesel) engines, see: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf

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

of more than half the difference between baseline (i.e., No-Action condition) concentrations and the eight-hour standard, when No-Action concentrations are below 8.0 ppm.

TABLE 12-5
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary		Secondary	
	ppm	µg/m³	ppm	µg/m³
Carbon Monoxide (CO)				
Eight-Hour Average[1]	9	10,000	None	
One-Hour Average[1]	35	40,000		
Lead (Pb)				
Rolling Three-Month Average[2]	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
One-Hour Average[3]	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
Eight-Hour Average[4,5]	0.070	N/A	0.070	N/A
Respirable Particulate Matter (PM_{10})				
24-Hour Average[1]	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean[6]	NA	12	NA	15
24-Hour Average[7]	NA	35	NA	35
Sulfur Dioxide (SO_2)[8]				
One-Hour Average[9]	0.075	196	NA	NA
Maximum Three-Hour Average[1]	NA	NA	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
µg/m³ – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in µg/m³ are presented.
[1] Not to be exceeded more than once a year.
[2] EPA has lowered the NAAQS down from 1.5 µg/m³, effective January 12, 2009.
[3] 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
[4] 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
[5] EPA has lowered the primary standard from 0.075 ppm to 0.070 ppm, effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas.
[6] 3-year average of annual mean. EPA has lowered the primary standard from 15 µg/m³, effective March 2013.
[7] Not to be exceeded by the annual 98th percentile when averaged over 3 years.
[8] EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
[9] 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.
Sources: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards. https://www.epa.gov/criteria-air-pollutants/naaqs-table

$PM_{2.5}$ *de Minimis* Criteria

The NYSDEC has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts.[6] This policy applies only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. The policy states that such a project will be deemed to have a potentially significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or by more than five $\mu g/m^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold must assess the severity of the impacts, evaluate alternatives, and employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

In addition, New York City uses *de minimis* criteria to determine the potential for significant adverse $PM_{2.5}$ impacts under CEQR, as follows:

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard;
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.1 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately one square kilometer, centered on the location where the maximum ground level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete receptor location (elevated or ground level).

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the above *de minimis* criteria are considered to have a potential significant adverse impact. The *de minimis* criteria have been used to evaluate the significance of predicted impacts of construction on $PM_{2.5}$ concentrations.

ON-SITE CONSTRUCTION ACTIVITY ASSESSMENT

Based on the construction schedule for each building, a construction resource estimate was prepared by the contractor to estimate the likely type, number, and usage data for off-road construction equipment on a monthly basis.

For 24-hour $PM_{2.5}$ and PM_{10}, the worst-case time period for detailed analysis is in the first few months of construction when demolition and excavation activity is occurring, and the highest number of truck trips are expected. Therefore, short-term $PM_{2.5}/PM_{10}$ impacts were analyzed based on the second month of the 2018 and 2023 analysis years, when demolition on the Building 1 and 2 sites, respectively, would be underway. The early demolition phases have the highest $PM_{2.5}/PM_{10}$ emissions largely due to the influence of fugitive dust emissions. For short-term CO emissions, the peak month is the ninth month of 2018 and the eighth month of 2023, reflecting the peak in equipment use associated with superstructure construction. The CO peak emissions months are different than the $PM_{2.5}/PM_{10}$ peak emissions months because CO is emitted by equipment/truck only.

[6] CP33/Assessing and Mitigating Impacts of Fine Particulate Emissions, NYSDEC 12/29/2003.

Annual $PM_{2.5}$ and NO_2 emissions were analyzed using representative months based on the annual $PM_{2.5}$ exhaust emissions profile (see **Figures 12-1** and **12-2**). For Building 1 (2018), Month 2 emissions represented months one through four, Month 9 emissions represented months five through ten, and Month 11 emissions represented months 11 and 12. For Building 2, Month 2 emissions represented months one through five, Month 8 emissions represented months six through nine, and Month 10 emissions represented months ten through 12.

Engine Exhaust Emissions

Emission factors for NO_x, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines were developed using the latest EPA NONROAD Emission Model, which is incorporated in EPA's MOVES2014a model interface. The NONROAD model is based on source inventory data accumulated for specific categories of non-road equipment. The emission factors in grams per horsepower-hour for each type of equipment, with the exception of trucks, were determined from the output files for the NONROAD model (i.e., calculated from regional emissions estimates) and the application of EPA-generated post-processing scripts. With the incorporation of DPFs (as discussed under "Emission Control Measures," above), PM emissions for equipment of 50 hp or greater would be similar to Tier 4 standards. For purposes of CO and NO_x emissions, equipment of 50 hp or greater would to meet Tier 3 standards. For smaller equipment less than 50 hp, Tier 2 emission factors were utilized.

Tailpipe emission rates for NO_x, CO, PM_{10}, and $PM_{2.5}$ from heavy trucks on-site (e.g., dump trucks, concrete trucks) were developed using the most recent version of the EPA Mobile Source Emission Simulator (MOVES2014a), as referenced in the *CEQR Technical Manual*. Since dump trucks and concrete trucks are not available as vehicle types directly covered in MOVES2014a, combination long-haul (e.g., tractor trailer) emissions were used to represent on-road truck activity. Dump trucks were assumed to be actively traveling on the site for ten minutes per truck trip at an average speed of five miles per hour (mph). A separate idle emission factor was determined using MOVES to account for truck idling activity. Dump trucks were assumed to idle five minutes per trip to account for loading and unloading. Concrete trucks were assumed to idle continuously throughout the workday. To meet project emission requirements (e.g., DPFs), a 2008 model year was assumed for haul trucks.

Since, as discussed in the parking assessment of the "Transportation" section above, no on-site parking is expected to be available for construction workers during construction, workers would not be driving directly to the Project Area. Therefore, emissions associated with worker commutes were not included in the analysis.

Fugitive Emission Sources

In addition to engine emissions, fugitive dust emissions from operations (e.g., excavation and transferring of excavated materials into dump trucks) were calculated based on procedures delineated in EPA AP-42 Table 13.2.3-1.[7] The quantity of soil loaded into trucks was estimated based on the truck trip generation estimate described above under "Transportation." It was assumed that all dump truck trips would involve handling soil or construction debris, and the number of truck trips was used to determine the quantity of soil moved and potential dust emissions generated. The analysis of material handling activities also accounted for a dust control plan with at least a 50 percent reduction in PM_{10} and $PM_{2.5}$ emissions from fugitive dust through wet suppression, as discussed above in "Emission Reduction Measures." Fugitive dust emissions would primarily be a concern during the first three to four months of excavation and site

[7] U.S. Environmental Protection Agency, *Compilation of Air Pollutant Emission Factors (AP-42)*, Section 13.2.3 Heavy Construction Operations.

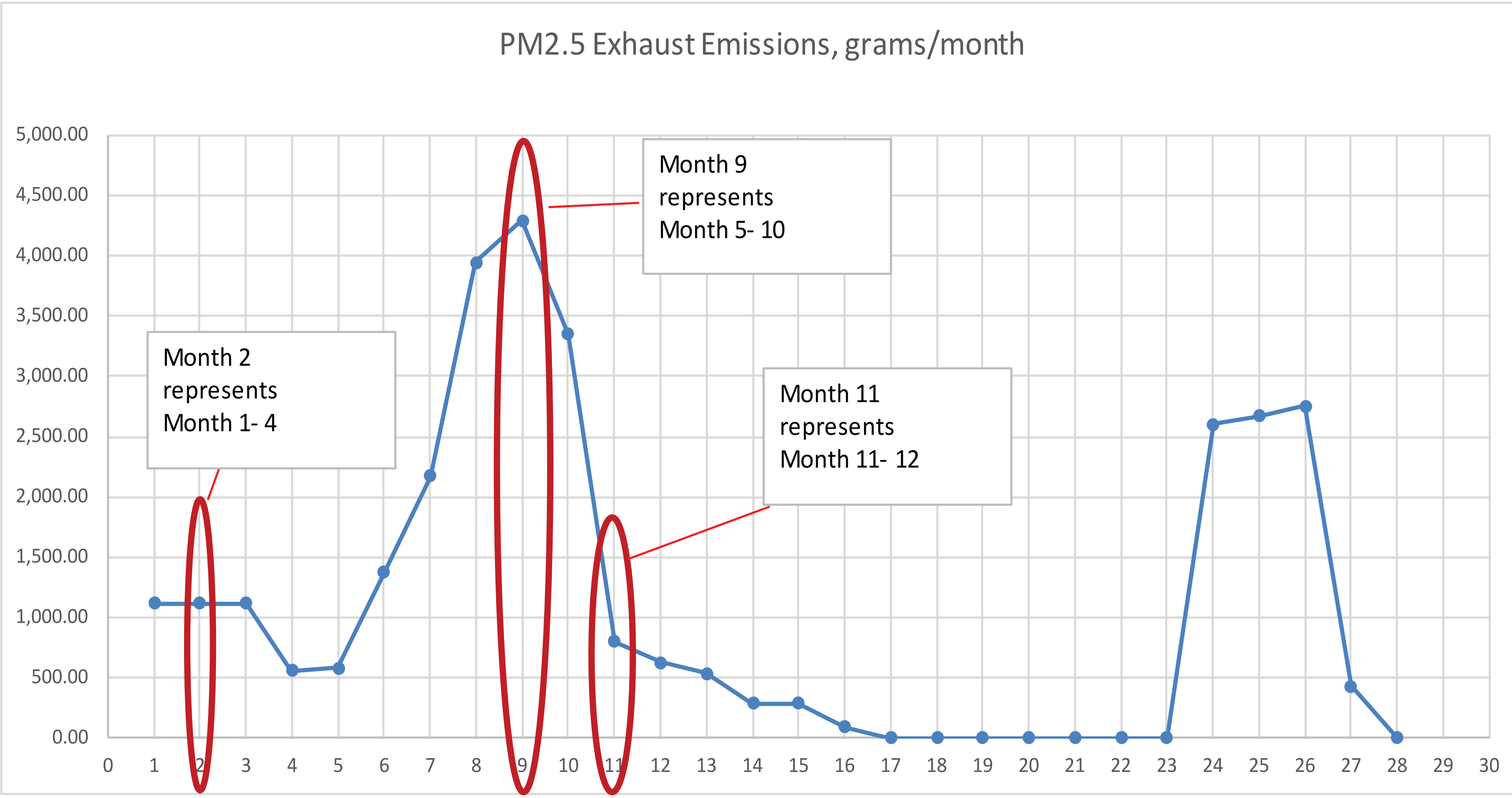
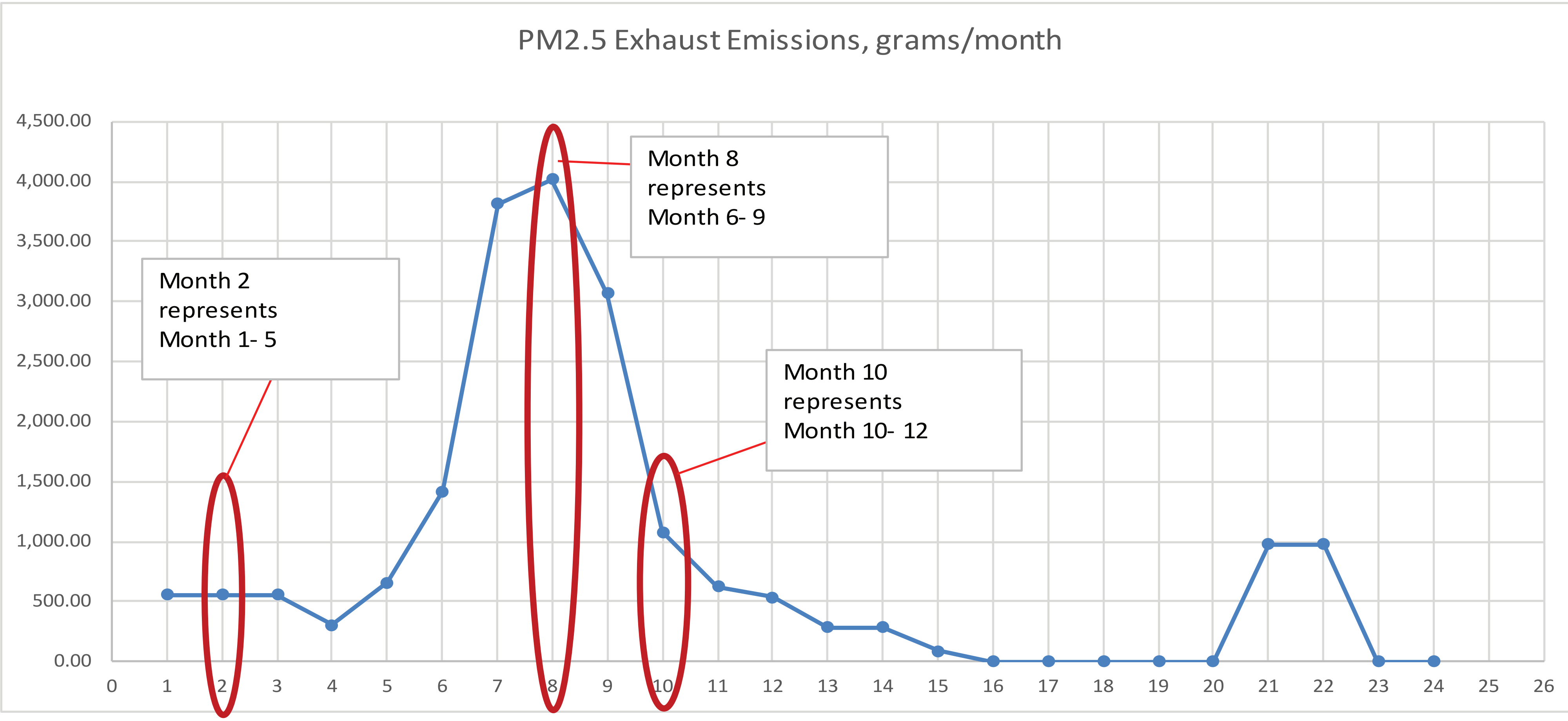


Figure 12-1

Building 1 PM2.5 Exhaust Emissions Profile



Building 2 PM2.5 Exhaust Emissions Profile

preparation activities. In later construction phases soil handling would be minimal, and it was assumed that on-site roadways would be appropriately stabilized and watered to prevent fugitive dust.

DISPERSION MODELING

Potential impacts from non-road sources were evaluated using the latest version of the EPA/ American Meteorological Society (AMS) AERMOD dispersion model (version 16216r). AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources), and the preferred model by both the EPA and NYSDEC. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and handling of the interaction between the plume and terrain. The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) and/or areas that aggregate fugitive dust and construction equipment emissions across the construction site, based on hourly meteorological data and has the capability to calculate pollutant concentrations at locations when the plume from the emission points/areas is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures.

<u>Location of Nearby Sensitive Receptors</u>

Residential uses surround the Development Site to the west (along Amsterdam Avenue), to the north (along West 109th Street), and to the east (along Columbus Avenue). Commercial uses are located on the ground floors of the residential buildings along Amsterdam and Columbus avenues. Anibel Aviles Playground is located between the two components of the Proposed Project, while Booker T. Washington Middle School and Booker T. Washington Playground are located along the south side of West 108th Street. Two churches and a childhood education facility operated by Bloomingdale Family Program are located adjacent to the southwest corner of Building 1, with additional residential uses and ground floor retail space near the corner of West 108th Street and Amsterdam Avenue, in proximity to the Building 1 site.

Receptors were placed at multiple elevations along the facades of the buildings facing the Development Site to represent each floor. In addition, receptors were placed to represent nearby parks and open spaces, including, but not limited to, Booker T. Washington Playground, Anibel Aviles Playground, West 11th Street People's Garden, Morningside Park, Central Park, and Riverside Park. In addition, sidewalk receptors were included along West 108th Street, assuming the sidewalks in front of the Development Site would remain open during construction.

<u>Source Simulation</u>

During construction, various types of construction equipment would be used at different locations throughout the Development Site. Some of the equipment would be mobile and operate throughout specified areas, while some would remain fixed at distinct locations for short-term periods. Cranes and other equipment that would remain stationary on a short-term basis are included in the project equipment mix. However, these stationary equipment sources are not active during the months of peak emissions. Therefore, all construction equipment emissions during the modeled months were treated as an area source for both short-term and annual analyses.

<u>Meteorological Data</u>

The meteorological data set consisted of five consecutive years of meteorological data: surface data collected at La Guardia Airport (2011-2015) and concurrent upper air data collected at Brookhaven, New

York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevations over the five-year period. These data were processed using the EPA AERMET program to develop data in a format that can be readily processed by the AERMOD model. The land uses around the Project Area where meteorological surface data were available were classified using categories defined in digital United States Geological Survey (USGS) maps to determine surface parameters used by the AERMET program.

NO_x-NO_2 Conversion

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

Background Concentrations

To estimate the maximum expected total pollutant concentrations, the calculated impacts from the emission sources must be added to a background value that accounts for existing pollutant concentrations from other sources. The background concentrations used for the construction air quality analysis are based on 2013-2015 design values, as shown in **Table 12-6**, below. The design values are calculated by the EPA and conform to the statistical form of each air quality standard.

TABLE 12-6
Representative Monitored Ambient Air Quality Data Used for Background Concentrations (2013-2015)

Pollutant	Site Name	Site ID	Site Address	Units	Averaging Period	Concentration	NAAQS
CO	CCNY	360610135	City College of New York 160 Convent Avenue	ppm	One-hour	2.3	9
					Eight-hour	1.5	35
PM_{10}	IS 52	360050110	School IS 52, 681 Kelly Street	µg/m^3	24-hour	42	150
$PM_{2.5}$	PS19	360610128	School PS 19 185 1St Avenue	µg/m^3	Annual	11	12
					24-hour	26	35
NO_2	IS 52	360050110	School IS 52, 681 Kelly Street	µg/m^3	Annual	21	53

Sources: U.S. EPA 2013-2015 Design Values, https://www.epa.gov/air-trends/air-quality-design-values and NYSDEC New York State Ambient Air Quality Reports for 2013, 2014 and 2015, http://www.dec.ny.gov/chemical/8536.html

Construction Effects of the Proposed Project

Maximum predicted concentration increments and overall concentrations, including background concentrations, are presented in **Tables 12-7** and **12-8** for Buildings 1 and 2, respectively. The highest concentrations would occur at sidewalk receptors and residential buildings directly adjacent to the Development Site.

As shown in the tables, the maximum predicted total concentrations of 24-hour PM_{10}, one- and eight-hour CO, 24-hour and annual-average $PM_{2.5}$, and annual-average NO_2 are below the applicable NAAQS. In addition, the maximum predicted $PM_{2.5}$ incremental concentrations would not exceed the applicable CEQR *de minimis* criteria of 4.5 µg/m^3 in the 24-hour average period or 0.3 µg/m^3 in the annual average period. Likewise, the maximum predicted CO incremental concentrations would not exceed the applicable

CEQR *de minimis* criteria of 3.6 ppm in the one-hour average period. Therefore, no significant adverse impacts on air quality are predicted during construction of the Proposed Project.

TABLE 12-7
Pollutant Concentrations from Construction Site Sources – Building 1 (2018)

Pollutant	Averaging Period	Units	Maximum Predicted Increment	Background Concentration	Maximum Predicted Total Concentration	*De Minimis* Criteria[1,2]	NAAQS
$PM_{2.5}$	24-hour	$\mu g/m^3$	2.73	26	-	4.5	35
	Annual	$\mu g/m^3$	0.17	11	-	0.3	12
PM_{10}	24-hour	$\mu g/m^3$	21.99	42	64	-	150
NO_2	Annual	PPB	0.89	20	21	-	53
CO	One-hour	PPM	1.02	2.3	3	-	35
	Eight-hour	PPM	0.23	1.5	2	3.6	9

Notes: $PM_{2.5}$ and eight-hour CO concentration increments are compared to the *de minimis* criteria. Increments of all other pollutants are compared with the NAAQS to evaluate the magnitude of the increments. Comparison to the NAAQS is based on total concentrations.

[1] $PM_{2.5}$ *de minimis* criteria are defined as: (a) 24-hour average not to exceed more than half the difference between the background concentration and the 24-hour NAAQS; and (b) annual average not to exceed more than 0.3 $\mu g/m^3$ at discrete receptor locations.

[2] 8-hour CO *de minimis* criteria are defined as: (a) an increase of 0.5 ppm or more in the maximum eight-hour average CO con-centration at a location where the predicted No-Action eight-hour concentration is equal to eight ppm or between eight ppm and nine ppm; and (b) an increase of more than half the difference between baseline (i.e., No-Action) concentrations and the eight-hour standard, when No-Action concentrations are below eight ppm.

$\mu g/m^3$ - micrograms per cubic meter
PPB - parts per billion
PPM - parts per million

TABLE 12-8
Pollutant Concentrations from Construction Site Sources – Building 2 (2023)

Pollutant	Averaging Period	Units	Maximum Predicted Increment	Background Concentration	Maximum Predicted Total Concentration	*De Minimis* Criteria[1,2]	NAAQS
$PM_{2.5}$	24-hour	$\mu g/m^3$	1.22	24	-	4.5	35
	Annual	$\mu g/m^3$	0.11	8.8	-	0.3	12
PM_{10}	24-hour	$\mu g/m^3$	9.20	42	51	-	150
NO_2	Annual	PPB	1.19	20	21	-	53
CO	One-hour	PPM	2.03	2.3	4	-	35
	Eight-hour	PPM	0.43	1.5	2	3.6	9

Notes: $PM_{2.5}$ concentration increments are compared to the *de minimis* criteria. Increments of all other pollutants are compared with the NAAQS to evaluate the magnitude of the increments. Comparison to the NAAQS is based on total concentrations.

[1] $PM_{2.5}$ *de minimis* criteria are defined as: (a) 24-hour average not to exceed more than half the difference between the background concentration and the 24-hour NAAQS; and (b) annual average not to exceed more than 0.3 $\mu g/m^3$ at discrete receptor locations.

[2] 8-hour CO *de minimis* criteria are defined as: (a) an increase of 0.5 ppm or more in the maximum eight-hour average CO con-centration at a location where the predicted No-Action eight-hour concentration is equal to 8 ppm or between eight ppm and nine ppm; and (b) an increase of more than half the difference between baseline (i.e., No-Action) concentrations and the eight-hour standard, when No-Action concentrations are below eight ppm.

$\mu g/m^3$ - micrograms per cubic meter
PPB - parts per billion
PPM - parts per million

Noise

Potential impacts on noise levels during construction of a proposed project can result from noise from construction equipment operation and from construction vehicles and delivery vehicles traveling to and from a construction site. Noise levels at a given location are dependent on the type and quantity of construction equipment being operated, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating), the distance from the construction site, and any shielding effects (from structures such as buildings, walls, or barriers). Noise levels caused by construction activities vary widely, depending on the phase of construction (e.e., demolition, superstructure, interior fit-outs, etc.) and the location of the construction activities relative to noise-sensitive receptor locations. The most significant construction noise sources are expected to be the operation of heavy equipment, such as dozers, cranes, and excavators.

As previously stated, construction noise is regulated by the requirements of the New York City Noise Control Code (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113), the DEP Notice of Adoption Rules for Citywide Construction Noise Mitigation (also known as Chapter 28), and the EPA's noise emission standards. These local and federal requirements mandate that specific construction equipment and motor vehicles meet specified noise emission standards; that construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that construction materials be handled and transported in such a manner as not to create unnecessary noise. For weekend and after hours work, permits would be required, as specified in the New York City Noise Control Code. The New York City Noise Control Code also requires the adoption and implementation of a noise mitigation plan for each construction site.

Construction Noise Impact Criteria

Chapter 19 of the *CEQR Technical Manual* provides noise impact criteria designed for use with projects introducing a permanent new noise source or introducing receptors near an existing noise source. Construction noise is fundamentally different from long-term noise exposure because it is intermittent when it occurs and does not result in the same duration of exposure of sensitive receptors to noise as a permanent noise source, such as a highway, airport, or industrial facility. No quantitative significance criteria specific to construction noise exist under CEQR. The *CEQR Technical Manual* recommends two years as a <u>screening indicator</u> of long-term duration construction noise that could warrant detailed analysis. However, the *CEQR Technical Manual* cautions against consideration of construction duration alone in determining whether a detailed analysis is required, emphasizing the need to also consider site-specific factors, such as the locations of sensitive receptors, the magnitude of construction noise, and the extent to which the project incorporates commitments to appropriate noise control measures (2014 *CEQR Technical Manual*, page 22-6).

The determination of significance and need for related mitigation is generally based on the duration and magnitude of the potential construction noise. The following sections describe the basis for the construction noise impact criteria considered as a guideline in the evaluation of impacts for the Proposed Project.

RESIDENTIAL AND SCHOOL NOISE IMPACT CRITERIA

Numerous residential buildings are adjacent to both the Building 1 and Building 2 construction sites. New residential uses created by Building 1 could also be affected by the construction of Building ("project-on-project" impacts). Booker T. Washington Middle School is located approximately 110 feet southeast from the Building 1 site and 70 feet across West 108th Street from the Building 2 site.

The Proposed Project would be constructed during the daytime hours. *CEQR Technical Manual* long-term noise impact criteria for daytime noise are three to five dBA above the ambient level. The factors considered when determining the significance of construction noise are the magnitude, duration of the impact, and the impacted area. The interior noise level is also considered. It is used to assess if the construction noise level would affect the use of the interior space/quality of life. Generally, an interior noise level of 45 dBA L_{10} (noise level exceeded ten percent of the time) is considered acceptable. Although not designed specifically for construction noise, the CEQR long-term noise criteria for building interiors were used to as a screen to determine which receptors needed further assessment. Receptors exceeding interior 45 dBA require further assessment of the magnitude and duration of the noise impact, as well as the specific type of use affected, to conclude whether or not the impact is significant.

Construction noise impact metrics used by state and federal agencies are also considered. The daytime exterior residential noise limit recommended for residential land uses by the Federal Transit Administration is 80 dBA (eight-hour L_{eq}).[8] The New York State Department of Transportation (NYSDOT) recommends 80 to 85 dBA (one-hour L_{eq}) as a general exterior construction noise impact indicator.[9] As buildings with double-paned windows and window air conditioning units are estimated to provide 28 dBA exterior to interior attenuation, the state and federal exterior construction noise level would correspond to an interior noise level of approximately 52 to 57 dBA L_{eq}.

The CEQR criteria are expressed in terms of L_{10} (noise level exceeded ten percent of the time), while the noise impact modeling was performed based on L_{eq} (energy-equivalent noise level). In a construction context, L_{10} is typically three dB higher than L_{eq} based on extensive empirical data from the Central Artery/Tunnel Project (CA/T).[10] Therefore, a +3 dB adjustment was applied to estimate L_{10} from the modeled L_{eq} results.

OPEN SPACE NOISE IMPACT CRITERIA

Open space resources within the immediate vicinity of the construction activity associated with the Proposed Project include Anibal Aviles Playground and Booker T. Washington Playground. As active recreation areas, neither open space resource falls under the CEQR criteria of facilities where serenity and quiet are essential for the area to serve its intended purpose. As a result, a daytime exterior criterion of 80 dBA is used as an indicator of potentially significant impacts to open space resources, and such exceedances are discussed in greater detail in terms of their magnitude and duration.

Construction Noise Analysis Methodology

EXISTING NOISE LEVELS

As described in Chapter 9, "Noise," noise levels were monitored at three locations near the Project Area to characterize existing noise conditions during the weekday AM, midday, and PM periods. The existing noise levels range from approximately 59 to 67 dBA (L_{eq}). The lowest noise level within the AM and midday

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[8] https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf

[9] NYSDOT, The Environmental Manual (TEM) Chapter 4.4.18 https://www.dot.ny.gov/divisions/engineering/environmental-analysis/manuals-and-guidance/epm/repository/4_4_18Noise.pdf

[10] Federal Highway Administration. 2006. FHWA Roadway Construction Noise Model User's Guide. Available at: https://www.fhwa.dot.gov/environment/noise/construction_noise/rcnm/rcnm.pdf

periods was used to characterize the noise level for existing conditions. This noise level (59.09 dBA) was used as a conservative estimate for the noise levels without the Proposed Project (i.e., if actual existing noise levels are higher, incremental noise would be less than predicted).

Potential impacts to surrounding neighborhoods can occur due to both on-site equipment (stationary sources) and the movement of construction-related vehicles (i.e., worker trips and material and equipment trips; mobile sources). A discussion of the methodology used for the mobile source and stationary source construction noise analysis is presented below.

MOBILE SOURCES (OFF-SITE)

Increased noise levels that would be comparable or slightly less than those identified in Chapter 9, "Noise" are anticipated during the construction traffic peak period. In the vicinity of the site, both Columbus and Amsterdam avenues are local truck routes. Construction-related vehicles would be distributed among the different routes to and from the Development Site and are not expected to be concentrated enough to result in a significant increase in noise.

ON-SITE SOURCES

The same construction equipment assumptions used for the construction air quality analysis were used for the construction noise analysis, in terms of the types and number of pieces of equipment in use during each month.

SoundPLAN 7.4 was used to quantify the construction noise sources consistent with ISO 9613-02 standards. SoundPLAN 7.4 has the following benefits:

- It incorporates reflections from building surfaces in the calculations;
- It allows a three-dimensional calculation of noise propagation for receptors in multi-story buildings; and
- It considers the effects of noise walls.

The model's emission library provides high specificity in defining emission levels, enabling accurate depictions of point, line, and area noise sources. The model takes into account absorption and reflection off the ground and buildings. While accounting for these factors, the model calculates the noise levels by calculating noise attenuation, ground contours, and shielding. SoundPLAN outputs model results as noise levels at a receptor or noise contours within a region, allowing the comprehensive assessment of potential noise impacts. Input into the SoundPLAN model included:

- Building footprints;
- Digital ground model;
- Hard ground cover areas;
- Delineation of the 15-foot perimeter wall around the construction sites;
- Receiver locations; and
- Assumed construction equipment locations based on the equipment type and associated noise levels from L_{max} reference sound levels (the reference levels account for use of appropriate noise control and equipment maintenance as discussed further below).

As shown in **Table 12-1**, construction activity associated with the Proposed Project is expected to occur over two non-overlapping construction periods. In total, construction of the Proposed Project is estimated to span approximately 50 months, with Building 1 expected to be constructed during an approximately 28-month period (between 2018 and 2020), and Building 2 expected to be constructed during an approximately 22-month period (between 2023 and 2024).

A peak period analysis was performed to determine the analysis periods with the greatest construction noise. The screening analysis was based on the anticipated construction activity schedule described above. The number of workers, types and number of pieces of equipment, and number of construction vehicles anticipated to be operating during each month of the construction period was estimated by the construction contractor. The projected noise emissions of the construction vehicles was summed for each building using the L_{max} reference sound levels that account for the New York City Noise Control code limits as shown in **Table 12-9**, below. **Table 12-9** also shows the standard usage factor, or the percent of the time during a typical hour that the equipment is operated.

TABLE 12-9
Construction Equipment Noise Levels and Usage Factors

Equipment	Usage Factor (%)[1]	Mandated Noise Level at 50 feet[2] Under Subchapter 5 of the NYC Noise Control Code
Backhoe/Loader	40	77
Compressor	40	67
Concrete Pump	20	79
Cranes	16	77
Drill Rigs	20	84
Dump Trucks	40	79
Excavator	40	77
Generators	50	68
Mortar Mixer	50	63
Rebar Bender	20	80
Saw (Circular & Cut Off)	20	76
Saw (Concrete Saw)	20	85
Vibratory Plate Compactor	20	80
Welding Machines	40	73

Notes:
[1] 2014 *CEQR Technical Manual* (Revised 4/27/2016) Chapter 22: Construction
[2] Mandated noise levels are achieved by using quieter equipment, better engine mufflers, and refinements in fan design and improved hydraulic systems.

Figures 12-3 and **12-4** provide the monthly noise curves used to select the representative peak months for Building 1 and Building 2, respectively. It is important to note that these curves represent the L_{max} noise level at a distance 50 feet, assuming all the equipment in each month was operated simultaneously at a single point in space, with no noise barriers, ground cover, or other attenuating factors. This would not occur in reality and is a screening exercise to focus the remainder of the analysis on representative time periods (including a realistic equipment placement within each site). Also note that the Y-axis of the graph starts at 80 dB, and, therefore, makes the variation in noise appear greater than the actual variation, which is generally within the 95 to 105 dBA L_{max} range at 50 feet.

Using the summed noise emissions and construction-related traffic volumes, three construction phases for each building were identified based on observable local peaks of the noise emissions. The three peak

West 108th Street WSFSSH Development

Figure 12-3
Peak Period Analysis- Total Lmax at 50 Feet for Building 1

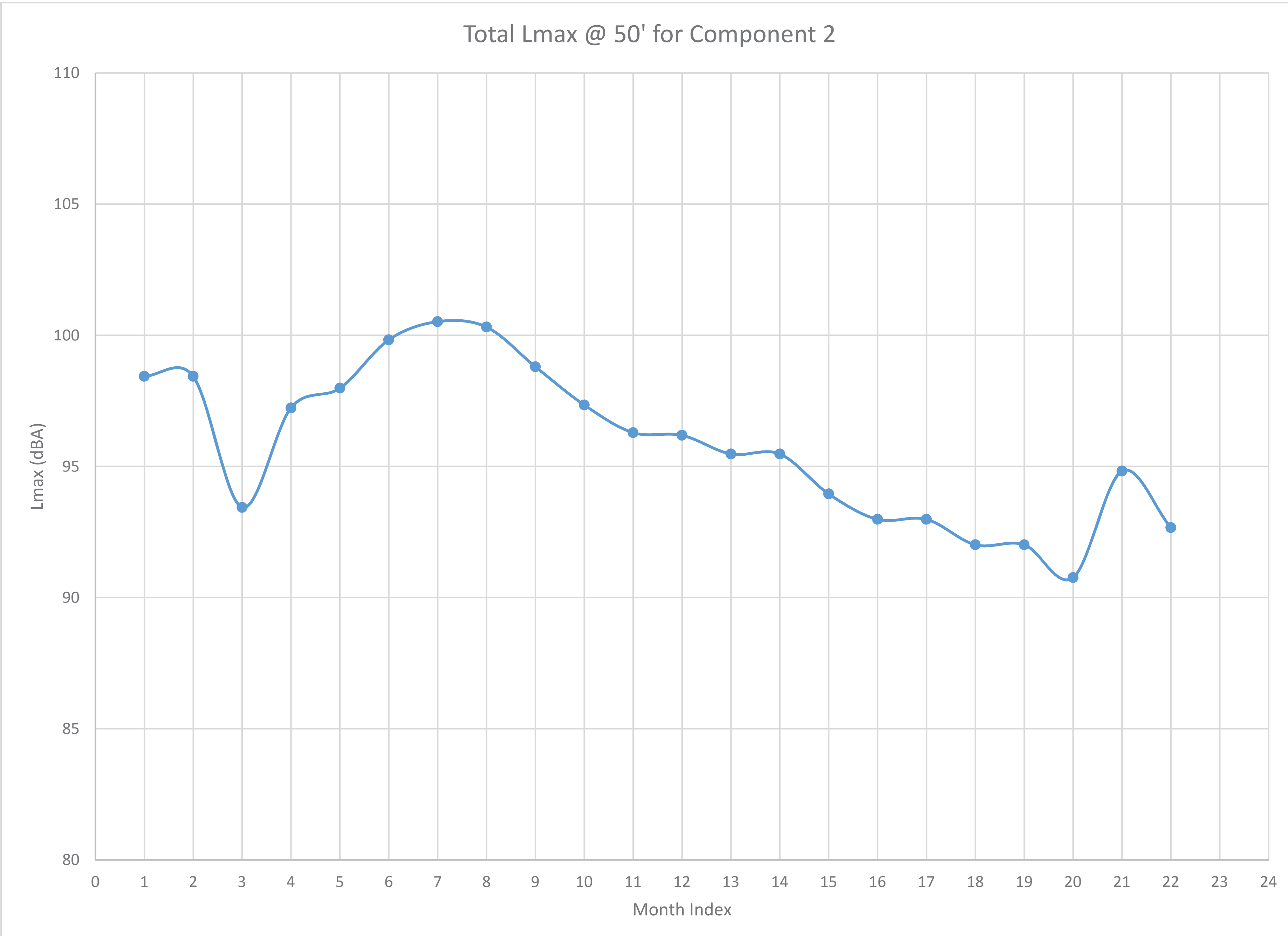


Figure 12-4
Peak Period Analysis- Total Lmax at 50 Feet for Building 2

construction months for Building 1 are expected to be Months 2, 7, and 26 of construction, and Months 2, 7, and 21 of Building 2's construction. Taken together, these six analyzed time periods provide sufficient information to characterize the duration of any potential noise impacts for each receptor in the study area. The representative months were used to conservatively assess potential impact durations as follows:

- Building 1:
  - Month 2: represents first three months of construction
  - Month 7: represents the next 16 months of construction
  - Month 26: represents the last nine months of construction
- Building 2:
  - Month 2: represents first three months of construction
  - Month 7: represents the next 11 months of construction
  - Month 21 represents the last seven months of construction

The conservatism of this approach is shown in the graphs provided in **Figures 12-3** and **12-4**, which, for example, depict Building 1 noise levels after Month 7 gradually decreasing.

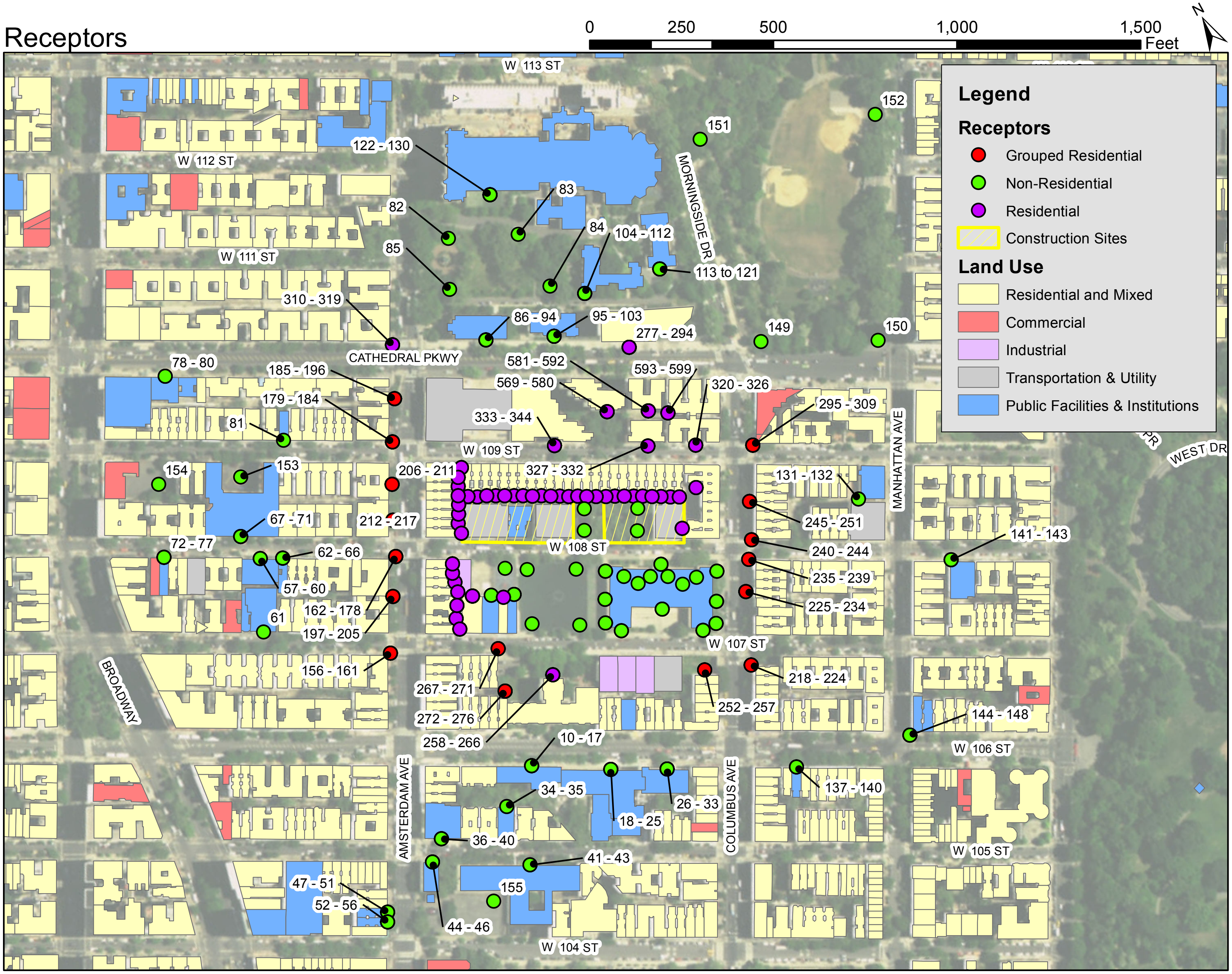
CONSTRUCTION NOISE BARRIERS

Typically an eight-foot high plywood barrier is provided around active construction sites as part of the New York City construction noise control plan. For the Proposed Project, the project sponsor has committed to provide a 15-foot-high temporary noise barrier (the maximum height allowed by the New York City Noise Code), in recognition of the noise-sensitive context of the adjoining land uses. The 15-foot-high barrier was incorporated in SoundPlan, and the effects of the barrier are included in the impact results discussed in this chapter. A standard eight-foot-high barrier was also modeled and Appendix IV includes a table summarizing the incremental difference in noise levels between the eight-foot-high barrier and the 15-foot-high barrier. Construction noise barriers provide substantial benefits for ground level receptors and lower stories of buildings where line of sight is completely blocked. For these receptors, noise levels are typically reduced by at least ten dBA by noise barriers. Noise barriers are not effective in reducing noise for upper stories of buildings where there is partial or direct line of sight into the construction work area.

SENSITIVE RECEPTORS

Receptors were placed throughout the noise model study area, consisting of an approximately 1,400-foot radius from each of the construction sites. Sensitive receptor locations, such as residential properties, churches, parks, and schools close to the Project Area were selected as noise receptor sites for the stationary source construction noise analysis. Multiple receptors were created for a single building to capture the noise levels at different floors of the building. Receptors for the proposed Building 1 development were also added for purposes of evaluating project-on-project impacts during the construction of Building 2. The table in Appendix IV and **Figures 12-5a** and **12-5b** presents the analyzed nearby sensitive receptors. In total, the detailed construction noise analysis included a total of 647 receptors. The greatest number of receptors were placed adjacent to the construction sites, generally at the level of individual buildings. At greater distances from the construction sites, receptors were used to represent groups of buildings.

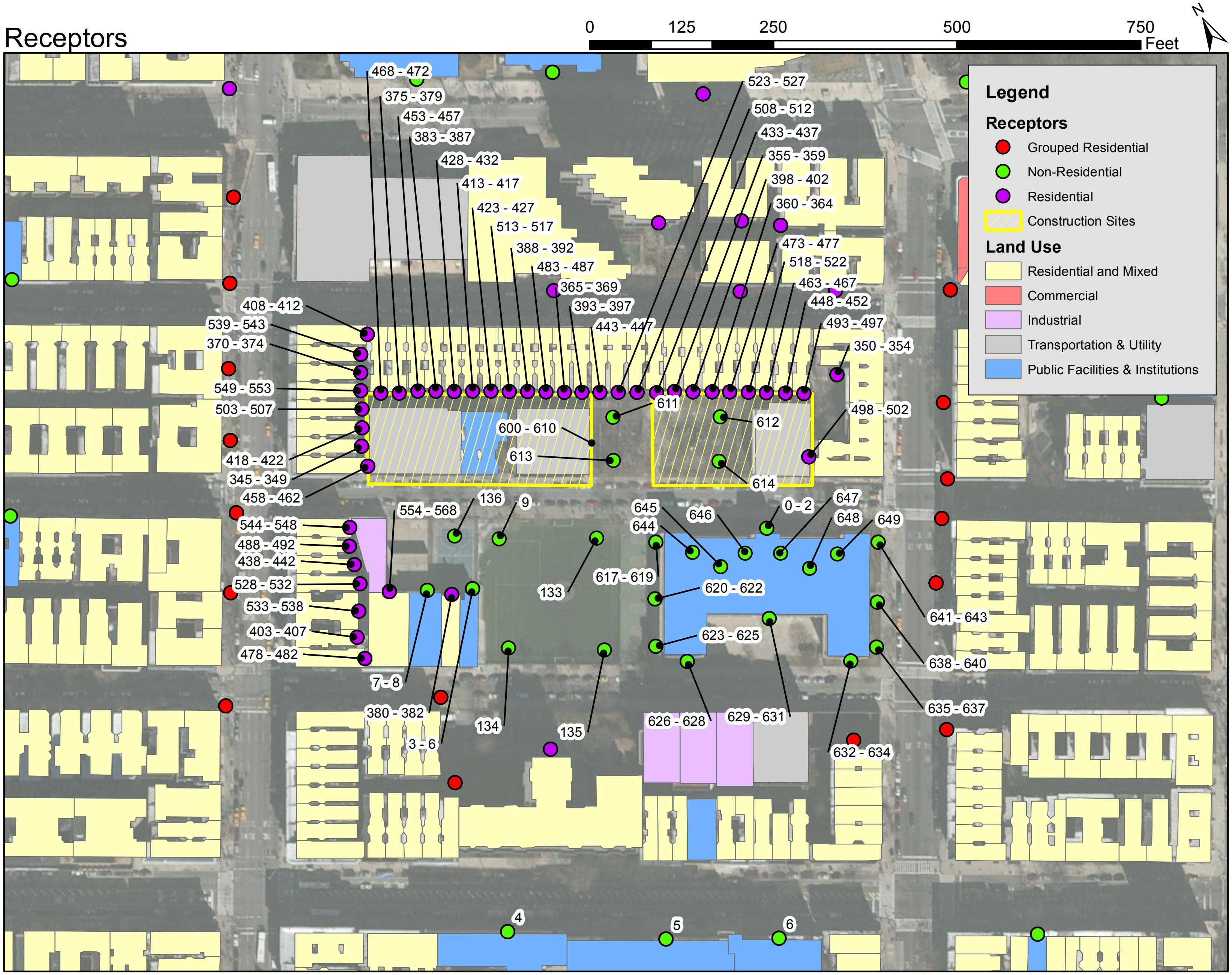
Receptors



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

West 108th Street WSFSSH Development

Figure 12-5a
Receptor Locations



Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

West 108th Street WSFSSH Development

Figure 12-5b
Receptor Locations (continued)

Given that the Proposed Project would have a phased construction schedule with Building 1 completed prior to Building 2, the construction of Building 2 could have the potential to result in elevated noise levels on the completed and occupied Building 1. Therefore, Building 1 was analyzed for potential construction-related noise impacts from Building 2.

Construction Noise Analysis Results

BUILDING 1 CONSTRUCTION

Residential Buildings

The minimum exterior to interior noise attenuation of a masonry or brick building with double-pane windows in a closed position is approximately 28 dBA. This means that under existing conditions, the interiors of residential receptors within the study area meet the 45 dBA CEQR standard (as existing noise levels range from approximately 59 to 67 dBA (L_{eq})). While the majority of the residences in the area do not have central air conditioning (AC), most have window AC units. It is assumed that during construction activity the residences would keep their windows facing the construction site closed.

Table 12-10 shows the results for the residential buildings with interior construction noise levels of 45 dBA or greater for at least one modeled month during Building 1's construction. The table shows the results by floor of each building; these results reflect locations where noise is reduced by the noise barrier. The receptor IDs in the table correspond to **Figures 12-5a** and **12-5b**. For a complete listing of results for all modeled receptors (including those with no impacts), refer to Appendix IV.

TABLE 12-10
Residential Building Construction Noise Results: Building 1 (Buildings with Exceedance on at Least One Floor Shown)

ID No.[1]	Floor (e.g. 1/5 means first of five floors)	Address[3]	Total Interior Noise Level with Construction L_{10} (dBA)[2]		
			Month 2	Month 7	Month 26
345	1/5	983 AMSTERDAM AVENUE	39.1	43.0	40.0
346	2/5	983 AMSTERDAM AVENUE	48.9	53.1	50.2
347	**3/5**	**983 AMSTERDAM AVENUE**	**50.8**	**55.2**	**52.2**
348	**4/5**	**983 AMSTERDAM AVENUE**	**50.5**	**54.9**	**52.0**
349	**5/5**	**983 AMSTERDAM AVENUE**	**50.1**	**54.6**	**51.6**
355	1/5	114 WEST 109 STREET	39.9	42.6	41.7
356	2/5	114 WEST 109 STREET	41.1	43.9	43.1
357	3/5	114 WEST 109 STREET	43.1	46.3	45.2
358	4/5	114 WEST 109 STREET	43.8	47.4	46.4
359	5/5	114 WEST 109 STREET	44.2	47.9	46.8
360	1/5	110 WEST 109 STREET	38.8	41.3	40.5
361	2/5	110 WEST 109 STREET	39.5	42.2	41.6
362	3/5	110 WEST 109 STREET	41.1	43.8	42.8
363	4/5	110 WEST 109 STREET	41.8	45.2	44.2
364	5/5	110 WEST 109 STREET	42.1	45.7	44.8
365	1/5	126 WEST 109 STREET	39.2	44.8	42.6
366	**2/5**	**126 WEST 109 STREET**	**51.1**	**57.1**	**53.5**
367	**3/5**	**126 WEST 109 STREET**	**51.3**	**57.5**	**54.6**
368	**4/5**	**126 WEST 109 STREET**	**51.1**	**56.6**	**54.0**
369	**5/5**	**126 WEST 109 STREET**	**50.8**	**55.8**	**53.4**
370	1/5	991 AMSTERDAM AVENUE	35.7	37.9	35.7
371	2/5	991 AMSTERDAM AVENUE	38.0	41.2	37.7
372	3/5	991 AMSTERDAM AVENUE	41.3	44.9	40.7
373	4/5	991 AMSTERDAM AVENUE	41.3	45.1	40.9

ID No.[1]	Floor (e.g. 1/5 means first of five floors)	Address[3]	Total Interior Noise Level with Construction L_{10} (dBA)[2]		
			Month 2	Month 7	Month 26
374	5/5	991 AMSTERDAM AVENUE	41.8	45.2	42.0
375	1/5	170 WEST 109 STREET	38.5	45.0	38.8
376	**2/5**	**170 WEST 109 STREET**	**50.7**	**58.1**	**50.6**
377	**3/5**	**170 WEST 109 STREET**	**51.5**	**58.5**	**51.6**
378	**4/5**	**170 WEST 109 STREET**	**51.2**	**57.5**	**51.5**
379	**5/5**	**170 WEST 109 STREET**	**50.9**	**56.4**	**51.3**
380	1/3	165 WEST 107 STREET	40.6	43.5	42.2
381	2/3	165 WEST 107 STREET	42.0	45.2	43.5
382	3/3	165 WEST 107 STREET	42.7	46.6	44.3
383	1/5	142 WEST 109 STREET	39.8	49.7	40.4
384	**2/5**	**142 WEST 109 STREET**	**49.6**	**59.1**	**50.2**
385	**3/5**	**142 WEST 109 STREET**	**51.7**	**61.4**	**52.2**
386	**4/5**	**142 WEST 109 STREET**	**51.4**	**59.6**	**52.1**
387	**5/5**	**142 WEST 109 STREET**	**51.1**	**58.1**	**51.9**
388	1/5	132 WEST 109 STREET	41.0	45.3	48.4
389	**2/5**	**132 WEST 109 STREET**	**52.3**	**56.4**	**58.5**
390	**3/5**	**132 WEST 109 STREET**	**52.2**	**56.5**	**57.4**
391	**4/5**	**132 WEST 109 STREET**	**51.8**	**55.9**	**55.5**
392	**5/5**	**132 WEST 109 STREET**	**51.4**	**55.3**	**54.2**
393	1/5	126 WEST 109 STREET	38.9	45.2	41.0
394	**2/5**	**126 WEST 109 STREET**	**50.4**	**57.8**	**52.2**
395	**3/5**	**126 WEST 109 STREET**	**50.7**	**57.8**	**52.9**
396	**4/5**	**126 WEST 109 STREET**	**50.5**	**56.7**	**52.7**
397	**5/5**	**126 WEST 109 STREET**	**50.2**	**55.7**	**52.3**
398	1/5	114 WEST 109 STREET	39.3	41.9	41.0
399	2/5	114 WEST 109 STREET	40.2	43.0	42.2
400	3/5	114 WEST 109 STREET	42.1	45.0	44.0
401	4/5	114 WEST 109 STREET	42.7	46.2	45.2
402	5/5	114 WEST 109 STREET	43.2	46.7	45.7
413	1/5	138 WEST 109 STREET	40.4	46.3	41.3
414	**2/5**	**138 WEST 109 STREET**	**51.5**	**56.6**	**51.9**
415	**3/5**	**138 WEST 109 STREET**	**52.2**	**58.2**	**52.9**
416	**4/5**	**138 WEST 109 STREET**	**52.0**	**57.5**	**52.8**
417	**5/5**	**138 WEST 109 STREET**	**51.6**	**56.6**	**52.5**
418	1/5	985 AMSTERDAM AVENUE	38.9	42.9	39.5
419	2/5	985 AMSTERDAM AVENUE	49.0	53.5	49.8
420	**3/5**	**985 AMSTERDAM AVENUE**	**50.8**	**55.3**	**51.6**
421	**4/5**	**985 AMSTERDAM AVENUE**	**50.4**	**55.0**	**51.4**
422	**5/5**	**985 AMSTERDAM AVENUE**	**50.0**	**54.6**	**51.1**
423	1/5	136 WEST 109 STREET	40.7	45.4	42.1
424	**2/5**	**136 WEST 109 STREET**	**52.4**	**56.7**	**52.7**
425	**3/5**	**136 WEST 109 STREET**	**52.4**	**57.0**	**53.4**
426	**4/5**	**136 WEST 109 STREET**	**52.1**	**56.4**	**53.1**
427	**5/5**	**136 WEST 109 STREET**	**51.6**	**55.7**	**52.7**
428	1/5	140 WEST 109 STREET	39.6	47.6	40.3
429	**2/5**	**140 WEST 109 STREET**	**49.7**	**57.0**	**50.4**
430	**3/5**	**140 WEST 109 STREET**	**51.9**	**60.1**	**52.5**
431	**4/5**	**140 WEST 109 STREET**	**51.7**	**58.8**	**52.4**
432	**5/5**	**140 WEST 109 STREET**	**51.4**	**57.6**	**52.1**
433	1/5	118 WEST 109 STREET	40.1	42.7	41.7
434	2/5	118 WEST 109 STREET	41.5	44.4	43.4
435	3/5	118 WEST 109 STREET	43.6	47.0	45.9
436	4/5	118 WEST 109 STREET	44.4	48.3	47.0
437	5/5	118 WEST 109 STREET	45.2	48.6	47.5
438	1/5	971 AMSTERDAM AVENUE	35.2	36.7	35.8
439	2/5	971 AMSTERDAM AVENUE	39.1	42.3	40.2

ID No.[1]	Floor (e.g. 1/5 means first of five floors)	Address[3]	Total Interior Noise Level with Construction L_{10} (dBA)[2]		
			Month 2	Month 7	Month 26
440	3/5	971 AMSTERDAM AVENUE	42.1	45.8	43.6
441	4/5	971 AMSTERDAM AVENUE	43.7	47.9	44.7
442	5/5	971 AMSTERDAM AVENUE	44.7	48.7	45.1
443	1/5	124 WEST 109 STREET	40.9	46.1	42.5
444	2/5	124 WEST 109 STREET	47.5	53.1	49.1
445	**3/5**	**124 WEST 109 STREET**	**50.0**	**56.5**	**51.9**
446	**4/5**	**124 WEST 109 STREET**	**49.8**	**55.7**	**51.7**
447	**5/5**	**124 WEST 109 STREET**	**49.5**	**54.8**	**51.4**
453	1/5	144 WEST 109 STREET	39.6	48.0	40.1
454	**2/5**	**144 WEST 109 STREET**	**49.6**	**56.9**	**49.8**
455	**3/5**	**144 WEST 109 STREET**	**51.6**	**59.9**	**51.8**
456	**4/5**	**144 WEST 109 STREET**	**51.3**	**58.8**	**51.8**
457	**5/5**	**144 WEST 109 STREET**	**50.9**	**57.7**	**51.5**
458	1/5	981 AMSTERDAM AVENUE	37.8	41.7	39.1
459	**2/5**	**981 AMSTERDAM AVENUE**	**50.6**	**55.8**	**52.7**
460	**3/5**	**981 AMSTERDAM AVENUE**	**50.7**	**55.6**	**52.8**
461	**4/5**	**981 AMSTERDAM AVENUE**	**50.4**	**55.0**	**52.5**
462	**5/5**	**981 AMSTERDAM AVENUE**	**50.0**	**54.4**	**52.1**
468	1/5	172 WEST 109 STREET	39.6	48.0	40.1
469	**2/5**	**172 WEST 109 STREET**	**49.6**	**56.9**	**49.8**
470	**3/5**	**172 WEST 109 STREET**	**51.6**	**59.9**	**51.8**
471	**4/5**	**172 WEST 109 STREET**	**51.3**	**58.8**	**51.8**
472	**5/5**	**172 WEST 109 STREET**	**50.9**	**57.7**	**51.5**
483	1/5	126 WEST 109 STREET	39.6	48.0	40.1
484	**2/5**	**126 WEST 109 STREET**	**49.6**	**56.9**	**49.8**
485	**3/5**	**126 WEST 109 STREET**	**51.6**	**59.9**	**51.8**
486	**4/5**	**126 WEST 109 STREET**	**51.3**	**58.8**	**51.8**
487	**5/5**	**126 WEST 109 STREET**	**50.9**	**57.7**	**51.5**
488	1/5	973 AMSTERDAM AVENUE	37.8	41.7	39.1
489	**2/5**	**973 AMSTERDAM AVENUE**	**50.6**	**55.8**	**52.7**
490	**3/5**	**973 AMSTERDAM AVENUE**	**50.7**	**55.6**	**52.8**
491	**4/5**	**973 AMSTERDAM AVENUE**	**50.4**	**55.0**	**52.5**
492	5/5	973 AMSTERDAM AVENUE	50.0	54.4	52.1
503	1/5	987 AMSTERDAM AVENUE	38.7	42.7	39.2
504	2/5	987 AMSTERDAM AVENUE	48.8	53.9	49.6
505	**3/5**	**987 AMSTERDAM AVENUE**	**50.4**	**55.4**	**51.3**
506	**4/5**	**987 AMSTERDAM AVENUE**	**50.1**	**55.0**	**51.1**
507	5/5	**987 AMSTERDAM AVENUE**	49.8	54.4	50.8
508	1/5	120 WEST 109 STREET	41.5	44.8	43.2
509	2/5	120 WEST 109 STREET	43.8	47.2	45.5
510	3/5	120 WEST 109 STREET	46.4	50.3	48.6
511	4/5	120 WEST 109 STREET	47.3	51.1	49.5
512	5/5	120 WEST 109 STREET	47.9	51.1	49.7
513	1/5	134 WEST 109 STREET	41.0	45.1	44.2
514	**2/5**	**134 WEST 109 STREET**	**52.6**	**56.3**	**54.4**
515	**3/5**	**134 WEST 109 STREET**	**52.5**	**56.4**	**55.0**
516	**4/5**	**134 WEST 109 STREET**	**52.1**	**55.9**	**54.1**
517	**5/5**	**134 WEST 109 STREET**	**51.6**	**55.3**	**53.4**
523	1/5	122 WEST 109 STREET	41.9	45.6	43.4
524	2/5	122 WEST 109 STREET	45.2	49.2	46.8
525	3/5	122 WEST 109 STREET	48.0	52.6	50.3
526	4/5	122 WEST 109 STREET	48.9	53.2	50.8
527	5/5	122 WEST 109 STREET	48.9	53.6	50.7
528	1/5	969 AMSTERDAM AVENUE	35.0	36.1	35.6
529	2/5	969 AMSTERDAM AVENUE	38.1	40.9	39.4
530	3/5	969 AMSTERDAM AVENUE	41.0	44.2	42.7

ID No.[1]	Floor (e.g. 1/5 means first of five floors)	Address[3]	Total Interior Noise Level with Construction L_{10} (dBA)[2]		
			Month 2	Month 7	Month 26
531	4/5	969 AMSTERDAM AVENUE	42.1	46.1	43.7
532	5/5	969 AMSTERDAM AVENUE	43.0	47.1	44.2
533	1/6	965 AMSTERDAM AVENUE	34.7	36.1	35.3
534	2/6	965 AMSTERDAM AVENUE	35.6	38.9	37.0
535	3/6	965 AMSTERDAM AVENUE	37.4	41.9	39.7
536	4/6	965 AMSTERDAM AVENUE	37.6	43.0	40.3
537	5/6	965 AMSTERDAM AVENUE	38.7	44.3	41.0
538	6/6	965 AMSTERDAM AVENUE	39.6	45.0	41.3
544	1/5	975 AMSTERDAM AVENUE	35.3	37.3	36.1
545	2/5	975 AMSTERDAM AVENUE	40.0	43.8	41.6
546	3/5	975 AMSTERDAM AVENUE	44.1	48.8	45.4
547	4/5	975 AMSTERDAM AVENUE	46.0	50.2	46.4
548	5/5	975 AMSTERDAM AVENUE	46.5	50.6	47.9
549	1/5	989 AMSTERDAM AVENUE	38.2	42.9	39.1
550	2/5	989 AMSTERDAM AVENUE	46.6	51.1	47.2
551	3/5	989 AMSTERDAM AVENUE	48.5	53.9	49.3
552	4/5	989 AMSTERDAM AVENUE	48.4	53.5	49.2
553	5/5	989 AMSTERDAM AVENUE	48.1	53.2	49.1
554	1/15	171 WEST 107 STREET	41.2	44.3	43.0
555	2/15	171 WEST 107 STREET	42.3	45.7	44.0
556	3/15	171 WEST 107 STREET	41.4	44.6	42.7
557	4/15	171 WEST 107 STREET	42.0	45.9	43.6
558	5/15	171 WEST 107 STREET	43.0	47.2	44.2
559	6/15	171 WEST 107 STREET	43.7	47.8	44.6
560	7/15	171 WEST 107 STREET	44.3	48.1	44.9
561	8/15	171 WEST 107 STREET	44.5	48.1	45.1
562	9/15	171 WEST 107 STREET	44.5	48.1	45.5
563	10/15	171 WEST 107 STREET	44.5	48.2	46.1
564	11/15	171 WEST 107 STREET	44.4	48.2	46.5
565	12/15	171 WEST 107 STREET	44.4	48.2	46.6
566	13/15	171 WEST 107 STREET	44.5	48.2	46.6
567	14/15	171 WEST 107 STREET	44.6	48.2	46.7
568	15/15	171 WEST 107 STREET	44.7	48.2	46.7

Notes:
[1] Refer to **Figures 12-5a** and **12-5b**
[2] Red highlighted cells denote exceedance of the 45 dBA (L_{10}) criterion (see methodology for basis). **Bold** rows indicate receptors exceeding 45 dBA by ten dBA or more in at least one modeled month. .
[3] Note that some addresses have more than one residential building, in these cases the address may be intentionally listed twice in different areas of the table. In addition, some buildings have receptors on more than one façade. For detailed information on the receptor locations, refer to the receptor ID and the corresponding figures.

As discussed in detail below, the maximum interior noise levels at residential receptors along the rear of buildings on West 109th Street and Amsterdam Avenue would exceed the 45 dBA building interior impact criterion by up to seven dBA, 16 dBA, and 14 dBA during initial site preparation, the building construction phase (represented by Month 7), and exterior finishing (represented by Month 26), respectively. Construction noise levels would be substantially less and would not exceed 45 dBA criterion at the ground level of the buildings shielded by the construction noise barrier.

For the following buildings, the predicted exceedance of the 45 dBA interior criterion would last less than the full duration of construction (e.g. 28 months) and/or would involve exceedances of 45 dBA of less than ten dBA: 110, 114, 118, 120, and 122 West 109th Street; 165 and 171 West 107th Street; and 965, 969, 971, 975, 989, and 991 Amsterdam Avenue. Considering the magnitude and duration of the exceedance of the 45 dBA criterion, these exceedances are not considered significant adverse impacts.

For at least one floor of the following buildings, the predicted exceedances of the 45 dBA interior criterion would last the full duration of construction (28 months[11]), and would involve exceedance of 45 dBA by ten dBA (indicating interior noise of 55 dBA or higher) or more during the peak 16 months of construction activity (represented by Month 7): 124, 126, 132, 134, 136, 138, 140, 142, 144, 170, and 172 West 109th Street and 973, 981, 983, 985, and 987 Amsterdam Avenue. Even with the incorporation of construction noise mitigation measures, the magnitude and duration of construction noise at these locations is considered a significant adverse impact. Interior noise levels would be likely to cause annoyance during those intermittent periods of intense construction equipment activity. (Refer to Chapter 13, "Mitigation," for a discussion of mitigation considered for these significant adverse impacts.) In general, the ground floor of these buildings would not exceed 45 dBA by more than three dBA due to the construction noise barrier, and, as such, would not experience significant adverse construction noise impacts. The highest construction noise impact for these locations would be at the third story. As discussed in Chapter 10, "Public Health," while the noise levels predicted to occur during construction at these sensitive receptors would exceed the construction noise impact thresholds, these noise levels are below the level that would constitute significant adverse public health impacts.

School

The minimum exterior to interior noise attenuation of a masonry or brick building with double-pane windows in a closed position is approximately 28 dBA.[12] This means that under existing conditions Booker T. Washington Middle School meets the 45 dBA CEQR standard (as existing noise levels range from approximately 59 to 67 dBA (L_{eq})). The school does not have central AC, although window AC units are present throughout the building, except for the gymnasium. As such, the gymnasium was assessed with windows open (ten dBA exterior to interior attenuation), while the remainder of the school spaces (with AC units) were analyzed with 28 dBA of exterior to interior attenuation.

Table 12-11 summarizes the Building 1 construction noise impact analysis results for the school. The highest noise levels would occur in the gymnasium (on the northern façade of the building), with construction noise levels ranging from the mid to high 50s of dBA. (the gymnasium lacks air conditioning and was assumed to have windows open for purposes of estimating interior noise levels). Noise would lower at the windows closest to ground level (which is where gym users would be located) due to the shielding provided by the construction noise barrier. Noise would be 18 dBA lower during the winter when the windows of gymnasium would be closed; therefore, the higher predicted noise levels would occur during warm weather only. Considering the active recreation uses occurring in the gym (which themselves generate substantial sound levels) and that noise levels would be lower at the ground level occupied by users and higher at the upper portions of the gym facility, the construction noise level would not be disruptive and is not considered a significant adverse impact.

[11] It should also be noted that, while the representative construction equipment mix for each modeled month was conservatively used to estimate the overall duration of impacts, by its very nature, construction noise varies substantially day to day depending on the specific work activities being undertaken. The predicted elevated noise levels due to construction would occur intermittently during the construction period.

[12] Personal communication with DEP, August 6, 2017.

TABLE 12-11
School Construction Noise Impact Analysis Results: Building 1

ID No.[1]	Receptor	Representative Uses	L_{10} Interior- Windows Closed (except for gymnasium)		
			Month 2	Month 7	Month 26
0a	Middle School - North Facade - Middle Receptor - 1/3	Auditorium	37.7	39.8	39.0
1a	Middle School - North Facade - Middle Receptor - 2/3	Auditorium	38.5	40.8	40.0
2a	Middle School - North Facade - Middle Receptor - 3/3	Auditorium	38.9	41.7	39.8
0b	Middle School - North Facade - Middle Receptor - 1/3	Gymnasium (no AC, windows open)	55.7	57.8	57
1b	Middle School - North Facade - Middle Receptor - 2/3	Gymnasium (no AC, windows open)	56.5	58.8	58
2b	Middle School - North Facade - Middle Receptor - 3/3	Gymnasium (no AC, windows open)	56.9	59.7	57.8
617	Middle School - West Facade - North Receptor - 1/3	Classroom or office	40.5	42.8	42.0
618	Middle School - West Facade - North Receptor - 2/3	Classroom or office	42.1	44.4	43.6
619	Middle School - West Facade - North Receptor - 3/3	Classroom or office	43.7	46.8	45.0
620	Middle School - West Facade - Middle Receptor - 1/3	Classroom or office	39.0	41.5	40.2
621	Middle School - West Facade - Middle Receptor - 2/3	Classroom or office	40.1	42.7	41.3
622	Middle School - West Facade - Middle Receptor - 3/3	Classroom or office	40.9	44.1	42.4
623	Middle School - West Facade - South Receptor - 1/3	Classroom or office	38.1	40.5	39.1
624	Middle School - West Facade - South Receptor - 2/3	Classroom or office	38.8	41.4	40.0
625	Middle School - West Facade - South Receptor - 3/3	Classroom or office	39.3	42.2	40.8
626	Middle School - South Facade - West Receptor - 1/3	Classroom or office	35.7	37.5	36.1
627	Middle School - South Facade - West Receptor - 2/3	Classroom or office	36.0	38.0	36.4
628	Middle School - South Facade - West Receptor - 3/3	Classroom or office	37.5	40.0	38.2
629	Middle School - South Facade - Middle Receptor - 1/3	Classroom or office	34.6	35.7	34.9
630	Middle School - South Facade - Middle Receptor - 2/3	Classroom or office	34.7	35.9	35.0
631	Middle School - South Facade - Middle Receptor - 3/3	Classroom or office	35.4	37.0	36.0
632	Middle School - South Facade - East Receptor - 1/3	Classroom or office	34.3	34.6	34.4
633	Middle School - South Facade - East Receptor - 2/3	Classroom or office	34.5	34.9	34.6
634	Middle School - South Facade - East Receptor - 3/3	Classroom or office	35.0	36.1	35.4
635	Middle School - East Facade - South Receptor - 1/3	Classroom or office	34.1	34.2	34.2
636	Middle School - East Facade - South Receptor - 2/3	Classroom or office	34.2	34.3	34.2
637	Middle School - East Facade - South Receptor - 3/3	Classroom or office	34.4	34.9	34.6
638	Middle School - East Facade - Middle Receptor - 1/3	Classroom or office	34.2	34.3	34.2
639	Middle School - East Facade - Middle Receptor - 2/3	Classroom or office	34.2	34.3	34.3
640	Middle School - East Facade - Middle Receptor - 3/3	Classroom or office	34.5	35.0	34.7
641	Middle School - East Facade - North Receptor - 1/3	Classroom or office	34.7	35.5	35.1
642	Middle School - East Facade - North Receptor - 2/3	Classroom or office	34.7	35.5	35.1
643	Middle School - East Facade - North Receptor - 3/3	Classroom or office	35.1	36.2	35.5
644	Middle School - North Facade - Roof Receptor - 1/6	Classroom or office	37.3	39.3	38.4
645	Middle School - North Facade - Roof Receptor - 2/6	Classroom or office	37.7	40.2	38.9
646	Middle School - North Facade - Roof Receptor - 3/6	Classroom or office	38.7	41.2	39.9
647	Middle School - North Facade - Roof Receptor - 4/6	Classroom or office	36.3	37.6	37.5
648	Middle School - North Facade - Roof Receptor - 5/6	Classroom or office	36.6	39.0	37.5
649	Middle School - North Facade - Roof Receptor - 6/6	Classroom or office	36.5	39.1	37.1

Notes:
[1] Refer to **Figures 12-5a** and **12-5b**.

The 45 dBA impact criterion would be exceeded by less than two dBA at a single third-story classroom receptor on the northern end of the western (façade facing Building 1; receptor ID 619) during Month 7. Given the low magnitude of the exceedance and the limited duration, the exceedance is not considered a significant adverse impact. Other than the gym and classroom, discussed above, interior noise levels in the remainder of the school would not exceed 45 dBA. It should also be noted that the project sponsor has committed to work with Booker T. Washington Middle School to coordinate the timing of more intensive construction activities, so that they do not interfere with critical testing or school dates.

Open Space

As shown in **Table 12-12**, the maximum predicted noise level at an open space resource during Building 1's construction would be 70 dBA (L_{eq}) during Month 7 at Anibal Aviles Playground. The maximum predicted noise level at the Booker T. Washington Playground would be slightly lower (69 dBA) during Month 7. Noise levels would generally be lower during Months 2 and 26, as compared to the peak in Month 7.

TABLE 12-12
Open Space Construction Noise Impact Analysis Results: Building 1

ID No.[1]	Receptor	Total Noise Level with Construction $L_{eq(1h)}$ (dBA)		
		Month 2	Month 7	Month 26
611	Anibal Aviles Playground - 1 of 4	66.0	70.1	67.5
612	Anibal Aviles Playground - 2 of 4	63.2	65.5	64.6
613	Anibal Aviles Playground - 3 of 4	67.4	69.1	68.4
614	Anibal Aviles Playground - 4 of 4	63.2	65.6	64.6
9	Booker T. Washington Playground - 1 of 5	66.2	68.7	67.9
133	Booker T. Washington Playground - 2 of 5	65.7	68.0	67.2
134	Booker T. Washington Playground - 3 of 5	63.1	65.3	64.1
135	Booker T. Washington Playground - 4 of 5	63.0	65.5	64.1
136	Booker T. Washington Playground - 5 of 5	66.6	69.0	68.3

Notes:
[1] Refer to **Figures 12-5a** and **12-5b**.

While construction of Building 1 would be noticeable at these open space resources, noise levels would not substantially interfere with the usability of these areas for active recreation. Since all the playground receptors are at ground level, the 15-foot-high construction site perimeter noise barrier would serve to substantially reduce noise levels. Taking into account the magnitude and duration of the construction noise, Building 1 would not result in significant adverse noise impacts on area open spaces.

BUILDING 2

Residential Buildings

Table 12-13 shows the results for the residential buildings with interior construction noise levels of 45 dBA or greater on one or more floor for at least one modeled month for Building 2. The table shows the results by floor of each building; these results reflect locations where noise is reduced by the noise barrier. (Note that in some cases, some addresses pertain to large apartment building with multiple receptors on each floor.) The receptor IDs in the table correspond to **Figures 12-5a** and **12-5b**. For a complete listing of results for all modeled receptors (including those with no impacts), refer to Appendix IV.

TABLE 12-13
Residential Building Construction Noise Results: Building 2 (Buildings with Exceedance on at Least One Floor Shown)

ID No.[1]	Floor (e.g. 1/5 means first floor)	Address[3]	Total Interior Noise Level with Construction $L_{10(1h)}$ (dBA)[2]		
			Month 2	Month 7	Month 21
350	1/5	980 COLUMBUS AVENUE	40.3	44.2	41.9
351	2/5	980 COLUMBUS AVENUE	42.9	47.0	44.4
352	3/5	980 COLUMBUS AVENUE	45.6	50.0	47.7
353	4/5	980 COLUMBUS AVENUE	46.8	51.1	48.7
354	5/5	980 COLUMBUS AVENUE	46.9	51.3	48.7
355	1/5	114 WEST 109 STREET	37.6	41.7	37.6
356	2/5	114 WEST 109 STREET	48.0	53.7	47.2
357	3/5	114 WEST 109 STREET	48.1	53.7	47.6
358	4/5	114 WEST 109 STREET	48.0	53.5	47.6
359	5/5	114 WEST 109 STREET	47.6	53.1	47.5
360	1/5	110 WEST 109 STREET	39.9	44.7	39.8
361	**2/5**	**110 WEST 109 STREET**	**50.5**	**56.0**	**49.8**
362	**3/5**	**110 WEST 109 STREET**	**50.4**	**55.6**	**49.9**
363	**4/5**	**110 WEST 109 STREET**	**50.2**	**55.2**	**49.9**
364	**5/5**	**110 WEST 109 STREET**	**49.7**	**54.7**	**49.5**
365	1/5	126 WEST 109 STREET	37.4	41.2	38.1
366	2/5	126 WEST 109 STREET	39.1	43.3	40.0
367	3/5	126 WEST 109 STREET	41.0	45.3	41.9
368	4/5	126 WEST 109 STREET	42.1	46.9	43.2
369	5/5	126 WEST 109 STREET	42.1	47.1	43.3
393	1/5	126 WEST 109 STREET	37.7	41.6	38.2
394	2/5	126 WEST 109 STREET	39.8	44.2	40.4
395	3/5	126 WEST 109 STREET	42.2	46.7	42.9
396	4/5	126 WEST 109 STREET	42.8	47.9	43.7
397	5/5	126 WEST 109 STREET	42.9	48.0	43.9
398	1/5	114 WEST 109 STREET	38.8	43.5	38.6
399	**2/5**	**114 WEST 109 STREET**	**49.4**	**55.2**	**48.5**
400	**3/5**	**114 WEST 109 STREET**	**49.3**	**54.9**	**48.7**
401	**4/5**	**114 WEST 109 STREET**	**49.1**	**54.5**	**48.7**
402	5/5	114 WEST 109 STREET	48.8	53.9	48.5
433	1/5	118 WEST 109 STREET	35.9	39.1	36.0
434	2/5	118 WEST 109 STREET	45.9	51.7	45.7
435	3/5	118 WEST 109 STREET	46.0	52.0	46.0
436	4/5	118 WEST 109 STREET	46.0	51.8	46.2
437	5/5	118 WEST 109 STREET	45.7	51.4	46.1
443	1/5	124 WEST 109 STREET	37.8	42.0	38.2
444	2/5	124 WEST 109 STREET	40.4	45.2	41.1
445	3/5	124 WEST 109 STREET	43.5	48.6	44.2
446	4/5	124 WEST 109 STREET	43.7	49.0	44.5
447	5/5	124 WEST 109 STREET	43.9	48.9	44.6
448	1/5	102 WEST 109 STREET	47.7	52.5	56.7
449	**2/5**	**102 WEST 109 STREET**	**49.8**	**54.7**	**58.1**
450	**3/5**	**102 WEST 109 STREET**	**49.9**	**54.9**	**57.0**
451	**4/5**	**102 WEST 109 STREET**	**49.8**	**54.7**	**55.3**
452	**5/5**	**102 WEST 109 STREET**	**49.6**	**54.5**	**53.8**
463	1/5	106 WEST 109 STREET	39.6	43.8	46.5
464	**2/5**	**106 WEST 109 STREET**	**50.3**	**55.3**	**57.7**

ID No.[1]	Floor (e.g. 1/5 means first floor)	Address[3]	Total Interior Noise Level with Construction $L_{10(1h)}$ (dBA)[2]		
			Month 2	Month 7	Month 21
465	**3/5**	**106 WEST 109 STREET**	**50.4**	**55.3**	**56.0**
466	**4/5**	**106 WEST 109 STREET**	**50.1**	**54.9**	**54.3**
467	**5/5**	**106 WEST 109 STREET**	**49.7**	**54.5**	**53.0**
473	1/5	110 WEST 109 STREET	39.6	43.8	39.8
474	**2/5**	**110 WEST 109 STREET**	**50.9**	**55.7**	**51.0**
475	**3/5**	**110 WEST 109 STREET**	**50.8**	**55.7**	**51.1**
476	**4/5**	**110 WEST 109 STREET**	**50.6**	**55.4**	**50.9**
477	**5/5**	**110 WEST 109 STREET**	**50.1**	**55.0**	**50.5**
483	1/5	126 WEST 109 STREET	36.6	40.0	37.3
484	2/5	126 WEST 109 STREET	37.7	41.5	38.5
485	3/5	126 WEST 109 STREET	38.9	42.9	39.7
486	4/5	126 WEST 109 STREET	40.1	44.6	41.2
487	5/5	126 WEST 109 STREET	40.3	45.0	41.3
493	1/5	102 WEST 109 STREET	47.1	51.7	52.2
494	2/5	102 WEST 109 STREET	48.9	53.6	53.5
495	3/5	102 WEST 109 STREET	49.4	54.2	54.0
496	4/5	102 WEST 109 STREET	49.3	54.1	53.5
497	5/5	102 WEST 109 STREET	49.1	53.8	52.7
498	**1/5**	**980 COLUMBUS AVENUE**	**54.4**	**59.3**	**55.1**
499	**2/5**	**980 COLUMBUS AVENUE**	**55.0**	**59.9**	**55.8**
500	**3/5**	**980 COLUMBUS AVENUE**	**55.6**	**60.3**	**56.5**
501	**4/5**	**980 COLUMBUS AVENUE**	**54.8**	**59.4**	**55.9**
502	**5/5**	**980 COLUMBUS AVENUE**	**53.9**	**58.4**	**55.2**
508	1/5	120 WEST 109 STREET	37.5	41.9	37.6
509	2/5	120 WEST 109 STREET	43.1	48.2	43.3
510	3/5	120 WEST 109 STREET	45.9	51.6	46.1
511	4/5	120 WEST 109 STREET	45.9	51.5	46.3
512	5/5	120 WEST 109 STREET	45.9	51.3	46.3
518	1/5	106 WEST 109 STREET	40.1	44.5	43.5
519	**2/5**	**106 WEST 109 STREET**	**50.7**	**55.7**	**54.0**
520	**3/5**	**106 WEST 109 STREET**	**50.7**	**55.6**	**53.7**
521	**4/5**	**106 WEST 109 STREET**	**50.4**	**55.4**	**53.0**
522	**5/5**	**106 WEST 109 STREET**	**50.0**	**55.0**	**52.3**
523	1/5	122 WEST 109 STREET	38.2	42.6	38.3
524	2/5	122 WEST 109 STREET	41.6	46.6	41.9
525	3/5	122 WEST 109 STREET	45.0	50.3	45.2
526	4/5	122 WEST 109 STREET	45.1	50.5	45.5
527	5/5	122 WEST 109 STREET	45.2	50.4	45.5

Notes:

[1] Refer to **Figures 12-5a** and **12-5b**.

[2] Red highlighted cells denote exceedance of 45 dBA (L_{10}) criterion (see methodology for basis). **Bold** rows indicate receptors exceeding 45 dBA by ten dBA or more in at least one modeled month.

[3] Note that some addresses have more than one residential building, in these cases the address may be intentionally listed twice in different areas of the table. In addition, some buildings have receptors on more than one façade. For detailed information on the receptor locations, refer to the receptor ID and the corresponding Figures.

As discussed in detail below, the maximum interior noise levels at residential receptors along the rear of buildings on West 109th Street and Columbus Avenue would exceed the 45 dBA building interior impact criterion by approximately ten dBA, 15 dBA, and 13 dBA during initial site preparation, the building construction phase (represented by Month 7), and exterior finishing (represented by Month 21), respectively. Construction noise levels would be substantially less and would not exceed 45 dBA criterion at the ground level of the buildings shielded by the construction noise barrier.

For the following buildings, the predicted exceedance of the 45 dBA interior criterion would last less than the full duration of construction (e.g. 22 months) and/or would involve exceedances of 45 dBA of less than ten dBA: 114, 118, 120, 122, 124, and 126 West 109th Street. Considering the magnitude and duration of the exceedance of the 45 dBA criterion, these exceedances are not considered significant adverse impacts.

For at least one floor of the following buildings, the predicted exceedances of the 45 dBA interior criterion would last the full duration of construction (22 months[13]), and would involve exceedance of 45 dBA by ten dBA (indicating interior noise of 55 dBA or higher) or more during the peak months of construction activity (represented by Month 7): 102, 106, 110, and 114 West 109th Street and 980 Columbus Avenue. Even with the incorporation of construction noise mitigation measures, the magnitude and duration of construction noise at these locations is considered a significant adverse impact. Interior noise levels would be likely to cause annoyance during those intermittent periods of intense construction equipment activity. (Refer to Chapter 13, "Mitigation," for a discussion of mitigation considered for these significant adverse impacts.) In general, the ground floor of these buildings would not exceed 45 dBA by more than three dBA due to the construction noise barrier and, as such, would not experience significant adverse construction noise impacts. The highest construction noise impact for these locations would be at the third story. As discussed in Chapter 10, "Public Health," while the noise levels predicted to occur during construction at these sensitive receptors would exceed the construction noise impact thresholds, these noise levels are below the level that would constitute significant adverse public health impacts.

During the exterior finishing work for Building 2 (represented by modeling of Month 21), fewer buildings and floors have noise levels above the 45 dBA threshold, and the interior noise levels are generally lower. Month 21 conservatively represents seven months of construction activity. Note that no shielding credit was taken for the proposed building potentially blocking line of sight to equipment; therefore, actual noise levels during this phase would be less.

School

Table 12-14 summarizes the construction noise impact results for the school during the construction of Building 2. The highest interior noise levels would occur in the gymnasium (on the north façade of the school), with construction noise levels ranging from 61 to 71 dBA. The daytime use of the gymnasium in particular involves active recreation, which would generate substantially greater noise levels than the construction noise. Noise would lower at the windows closest to ground level (which is where gym users would be located) due to the shielding provided by the construction noise barrier. For the ground level receptor, the interior noise level is predicted to be 61 dBA for Month 2 (representing three months), 66 dBA for Month 7 (representing 11 months), and 63 dBA for Month 21 (representing seven months). The maximum impact modeled during representative Month 7 would last approximately 11 months, the noise level during the remainder of construction would three to five dBA less than this peak. Noise would be 18 dBA lower during the winter when the windows of gymnasium would be closed, the impact would therefore occur during warm weather only. Considering the type of use affected and that noise levels would be lower at the ground level occupied by users and higher at the upper portions of the gym facility, construction noise level would not be disruptive and is not considered a significant adverse impact.

[13] It should also be noted that, while the representative construction equipment mix for each modeled month was conservatively used to estimate the overall duration of impacts, by its very nature, construction noise varies substantially day to day depending on the specific work activities being undertaken. The predicted elevated noise levels due to construction would occur intermittently during the construction period.

TABLE 12-14
School Construction Noise Impact Analysis Results: Building 2

ID No.	Receptor	Representative Use	L_{10} Interior- Windows Closed (except for gymnasium)		
			Month 2	Month 7	Month 21
0a	Middle School - North Facade - Middle Receptor - 1/3	Auditorium	43.3	47.7	44.7
1a	Middle School - North Facade - Middle Receptor - 2/3	Auditorium	46.1	50.7	47.4
2a	Middle School - North Facade - Middle Receptor - 3/3	Auditorium	48.6	53.1	49.5
0b	Middle School - North Facade - Middle Receptor - 1/3	Gymnasium (no air conditioning, windows open)	61.3	65.7	62.7
1b	Middle School - North Facade - Middle Receptor - 2/3	Gymnasium (no air conditioning, windows open)	64.1	68.7	65.4
2b	Middle School - North Facade - Middle Receptor - 3/3	Gymnasium (no air conditioning, windows open)	66.6	71.1	67.5
617	Middle School - West Facade - North Receptor - 1/3	Classroom or office	36.2	39.3	34.4
618	Middle School - West Facade - North Receptor - 2/3	Classroom or office	37.6	42.3	36.0
619	Middle School - West Facade - North Receptor - 3/3	Classroom or office	40.0	44.7	37.8
620	Middle School - West Facade - Middle Receptor - 1/3	Classroom or office	34.2	34.6	34.3
621	Middle School - West Facade - Middle Receptor - 2/3	Classroom or office	34.5	35.6	34.4
622	Middle School - West Facade - Middle Receptor - 3/3	Classroom or office	35.4	37.7	35.6
623	Middle School - West Facade - South Receptor - 1/3	Classroom or office	34.2	34.6	34.3
624	Middle School - West Facade - South Receptor - 2/3	Classroom or office	34.4	35.2	34.4
625	Middle School - West Facade - South Receptor - 3/3	Classroom or office	35.5	37.7	35.6
626	Middle School - South Facade - West Receptor - 1/3	Classroom or office	34.3	34.7	34.4
627	Middle School - South Facade - West Receptor - 2/3	Classroom or office	34.4	35.1	34.5
628	Middle School - South Facade - West Receptor - 3/3	Classroom or office	35.5	37.9	35.5
629	Middle School - South Facade - Middle Receptor - 1/3	Classroom or office	34.4	34.8	34.4
630	Middle School - South Facade - Middle Receptor - 2/3	Classroom or office	34.5	35.1	34.6
631	Middle School - South Facade - Middle Receptor - 3/3	Classroom or office	35.3	37.1	35.4
632	Middle School - South Facade - East Receptor - 1/3	Classroom or office	34.2	34.4	34.2
633	Middle School - South Facade - East Receptor - 2/3	Classroom or office	34.2	34.5	34.3
634	Middle School - South Facade - East Receptor - 3/3	Classroom or office	34.7	35.6	34.9
635	Middle School - East Facade - South Receptor - 1/3	Classroom or office	34.3	34.8	34.4
636	Middle School - East Facade - South Receptor - 2/3	Classroom or office	34.4	35.2	34.5
637	Middle School - East Facade - South Receptor - 3/3	Classroom or office	34.8	36.1	35.0
638	Middle School - East Facade - Middle Receptor - 1/3	Classroom or office	34.4	34.8	34.4
639	Middle School - East Facade - Middle Receptor - 2/3	Classroom or office	34.5	35.2	34.6
640	Middle School - East Facade - Middle Receptor - 3/3	Classroom or office	35.0	36.3	35.3
641	Middle School - East Facade - North Receptor - 1/3	Classroom or office	35.7	37.6	36.2
642	Middle School - East Facade - North Receptor - 2/3	Classroom or office	36.3	39.2	37.0
643	Middle School - East Facade - North Receptor - 3/3	Classroom or office	37.3	40.7	38.0
644	Middle School - North Facade - Roof Receptor - 1/6	Classroom or office	42.9	47.6	43.7
645	Middle School - North Facade - Roof Receptor - 2/6	Classroom or office	40.0	44.2	40.8
646	Middle School - North Facade - Roof Receptor - 3/6	Classroom or office	38.9	45.0	39.6
647	Middle School - North Facade - Roof Receptor - 4/6	Classroom or office	41.4	45.1	42.1
648	Middle School - North Facade - Roof Receptor - 5/6	Classroom or office	41.6	45.5	42.5
649	Middle School - North Facade - Roof Receptor - 6/6	Classroom or office	42.8	47.0	43.8

Notes:
[1] Refer to **Figures 12-5a** and **12-5b**.

The 45 dBA impact criterion would be exceeded by up to eight dBA in the auditorium on the northern façade of the school during Month 7; however, impacts at the ground level of the auditorium would only exceed 45 dBA by 2.7 dBA due to the shielding provided by the construction noise barrier. Construction noise would be noticeable when the auditorium is quiet, but the noise would not substantially interfere with the typical uses of the auditorium, such as school-wide events, performances, or rehearsals. An interior noise level of 48 to 53 dBA would still be below the typical speech levels (57 dBA average for normal voice level, 64 dBA average for raised voice level).[14] Due the limitation of construction noise to the daytime hours, there would be no impact on the nighttime use of the auditorium. Considering the type of uses affected, duration, and magnitude, the exceedance is not considered a significant adverse impact.

The 45 dBA impact criterion would also be exceeded by up to 2.6 dBA at classroom receptors on the third floor of the north façade of the school above the auditorium and gymnasium, set back from the edge of the building (receptor IDs 644 and 647-649). The exceedances would occur during Month 7 only (representing 11 months of construction activity). Given the low magnitude of the exceedance and the limited duration, the exceedance is not considered a significant adverse impact.

Other than the auditorium, gymnasium, and classrooms discussed above, interior noise levels in the remainder of the school would not exceed 45 dBA. It should also be noted that the project sponsor has committed to work with Booker T. Washington Middle School to coordinate the timing of more intensive construction activities, so that they do not interfere with critical testing or school dates.

Open Space

Table 12-15 summarizes the Building 2 construction noise analysis results for nearby open space resources. At Anibal Aviles Playground, the exterior noise criterion of 80 dBA would not be exceeded during the construction. Specifically, the maximum predicted noise level would be 66 dBA during Month 7 of Building 2's construction; the maximum noise level in Months 2 and 21 would be 62 and 63 dBA, respectively. While construction would be noticeable at Anibal Aviles Playground, noise levels would not substantially interfere with the usability of this area for active recreation.

TABLE 12-15
Open Space Construction Noise Impact Analysis Results: Building 2

ID No.[1]	Receptor	Total Exterior Noise Level with Construction $L_{eq(1h)}$ (dBA)		
		Month 2	Month 7	Month 21
611	Anibal Aviles Playground - 1 of 2	62.3	66.3	62.4
613	Anibal Aviles Playground - 2 of 2	62.2	66.2	62.7
9	Booker T. Washington Playground - 1 of 5	61.0	63.5	61.3
133	Booker T. Washington Playground - 2 of 5	62.1	65.6	62.4
134	Booker T. Washington Playground - 3 of 5	60.2	62.5	60.3
135	Booker T. Washington Playground - 4 of 5	59.4	61.1	59.3
136	Booker T. Washington Playground - 5 of 5	60.8	63.1	61.1

Notes:
[1] Refer to **Figures 12-5a** and **12-5b**.

[14] US EPA. 1977. Speech Levels in Various Noise Environments.

Similarly, at Booker T. Washington Playground, the exterior noise criterion of 80 dBA would not be exceeded during the construction of Building 2. Specifically, the maximum predicted noise level would be 66 dBA during Month 7 of construction; the maximum noise level in Months 2 and 21 would be 61 and 62 dBA, respectively. While construction would be noticeable at Booker T. Washington Playground, noise levels would not substantially interfere with the usability of this area for active recreation. Therefore, there would be no significant adverse impact on open space resources during the construction of Building 2.

Project-on-Project

As shown in **Table 12-16,** project-on-project impacts were examined by modeling receptors on the completed Building 1 during the construction of Building 2. Exterior to interior attenuation of 30 dBA was assumed to estimate interior noise levels. The maximum predicted interior noise levels would occur during Month 7 and would be 45.5 dBA, just exceeding the 45 dBA impact criterion. The exceedance would be limited to floors four through eight on the eastern facade of the building (facing Building 2). Given the very small magnitude of the exceedance of 45 dBA and limited duration (11 months represented by Month 7), this impact is not considered significant.

TABLE 12-16
Project-on-Project Results During Construction of Building 2

ID No.[1]	Receptor	Total Exterior Noise Level with Construction $L_{10(1h)}$ (dBA)		
		Month 2	Month 7	Month 21
600	Building 1- Floor 1/11	35.1	38.8	35.5
601	Building 1- Floor - 2/11	36.9	41.2	37.3
602	Building 1- Floor 3/11	38.2	42.7	38.8
603	Building 1- Floor - 4/11	40.1	45.2	40.7
604	Building 1- Floor - 5/11	40.1	45.5	40.9
605	Building 1- Floor - 6/11	40.3	45.5	40.9
606	Building 1- Floor - 7/11	40.1	45.3	40.7
607	Building 1- Floor - 8/11	40.1	45.1	40.6
608	Building 1- Floor - 9/11	40.0	44.9	40.4
609	Building 1- Floor - 10/11	39.9	44.7	40.3
610	Building 1- Floor - 11/11	39.7	44.6	40.2

Notes:
[1] Refer to **Figures 12-5a** and **12-5b**.