A. INTRODUCTION

The noise analysis presented in this chapter considers whether the construction of Phase II of the Project by 2035 under the Extended Build-Out Scenario would result in new or different construction noise impacts as compared to the construction of Phase II under a more accelerated schedule as analyzed in the 2006 Final Environmental Impact Statement (FEIS). Specifically, the analysis focuses on whether changes in background conditions during a construction period through 2035 (rather than a construction period through 2016) and construction phasing under the Extended Build-Out Scenario would result in: 1) new or different significant adverse noise impacts at nearby sensitive receptor locations (e.g., residences, open spaces, community facilities, etc.) as a result of construction noise associated with Phase II of the Project; 2) different noise levels at buildings included in Phase II of the Project during construction; and/or 3) different noise levels in the publicly accessible open space during construction. In general, the amount of construction activity occurring at any time under the Extended Build-Out Scenario would be less, however because the overall construction period would be longer, noise associated with construction would be experienced for a longer period of time at certain locations. Noise effects resulting from operation of Phase II of the Project are analyzed and discussed in Chapter 4G, "Operational Noise."

PRINCIPAL CONCLUSIONS

NOISE

Consistent with the findings of the 2006 FEIS, construction of Phase II of the Project under the Extended Build-Out Scenario would have the potential to result in significant adverse impacts with respect to construction noise. This conclusion is based on an analysis of each of the three illustrative construction phasing plans, using a conservative analysis of the construction procedures, including peak hourly noise levels used to represent the entire day of construction, peak monthly levels used to represent the entire year in most years, a maximum amount of construction equipment assumed to be operational on each development site and at locations closest to nearby receptors, and peak hour construction equipment and truck delivery operations occurring simultaneously. Since the results of this analysis reflect peak hourly noise levels during peak months of construction, the noise levels predicted by this analysis would not occur constantly throughout the predicted duration of impact. Construction activities, and consequently the level of noise generated by construction activities, typically fluctuate from hour to hour throughout the construction work day and from day to day throughout the construction period. During hours of the day outside of the peak hour and during times of the year outside of the peak periods of construction, when less equipment would be operating at the project site, noise levels would be lower than those shown in this chapter.

Construction on the proposed building sites would include noise control measures beyond those required by the New York City Noise Control Code, including both path and source controls. With the implementation of these measures, and accounting for the assumptions mentioned above, the results of the detailed construction noise analysis indicates that of the 489 buildings in the study area, elevated noise levels are predicted to occur at one or more floors of approximately 124 buildings under Construction Phasing Plan 1, at one or more floors of approximately 160 buildings under Construction Phasing Plan 2, and at one or more floors of approximately 134 buildings under Construction Phasing Plan 3. This is as compared to the approximately 176 buildings predicted to experience significant adverse noise impacts resulting from construction of Phase II of the Project at one or more floors in the 2006 FEIS. Most of the locations predicted to experience significant adverse construction noise impacts according to this SEIS analysis are the same as those predicted to experience impacts in the 2006 FEIS, but there are 21 buildings under Construction Phasing Plan 1, 30 buildings under Construction Phasing Plan 2, and 24 buildings under Construction Phasing Plan 3 predicted to experience significant adverse construction noise impacts at one or more floors that were not predicted to experience significant adverse construction noise impacts in the 2006 FEIS. Certain buildings predicted to experience significant adverse construction noise impacts in the 2006 FEIS would not be predicted to experience impacts in this SEIS construction noise analysis under the Extended Build-Out Scenario.

The Extended Build-Out Scenario would result in construction occurring over a longer overall period of time, and result in noise level increases occurring over a longer duration. In addition to resulting in significant adverse construction noise impacts at some locations not predicted to experience significant adverse construction noise impacts in the 2006 FEIS, this also would result in longer durations of impact at some locations that were predicted to experience significant adverse construction noise impacts in the 2006 FEIS. At locations with line of sight to several Phase II buildings the increased duration of construction at those buildings would extend the overall duration of construction noise level increases. However, at these receptors predicted to experience significant adverse construction noise impacts in the 2006 FEIS and at which receptor control noise measures were provided by the project sponsors, those measures would continue to partially mitigate the impacts resulting from construction noise.

The elevated noise levels resulting from construction would be reduced at a receptor location as construction activities move out of the line of sight of that receptor location. The construction noise impacts described in this SEIS would not be expected to occur over the entire duration of construction at any noise receptor, because while construction activities are occurring at buildings to which a receptor does not have a direct line of sight, the receptor would tend not to experience the elevated noise levels due to construction. Furthermore, many of the loudest pieces of construction equipment, including excavators, asphalt paving equipment, concrete trowels, concrete trucks, portable cement mixers, etc., are mobile, and move about the site throughout the days and months of construction, resulting in a range of construction noise levels at a particular receptor location.

Affected locations include residential and institutional areas adjacent or with a line of sight to the proposed development sites. However, most affected buildings have receptor noise control measures (i.e., double-glazed windows and air-conditioning) or have previously been offered receptor control noise measures by the project sponsors (in accordance with the mitigation requirements stipulated in the 2006 FEIS and Amended Memorandum of Commitments [MEC]), and would consequently be expected to experience interior $L_{10(1)}$ values less than 45 dBA during most of the construction period, which would be considered an acceptable level according to CEQR criteria. For example, of the up to 160 buildings where significant impacts are predicted to occur at one or more floors during some portion of the construction period (as with Construction Phasing Plan 2), 150 of these receptor buildings already have receptor control measures or previously have been offered receptor control measures by the project sponsors. As such, no additional mitigation would be warranted at these 150 buildings. Overall, there are up to 13 buildings represented by six noise receptors predicted to experience significant adverse noise impacts as a result of construction of Phase II of the Project under one or more of the three Construction Phasing Plans analyzed that do not have and have not previously been offered receptor control measures. These 13 locations may not have sufficient receptor controls to consistently provide interior noise levels during construction considered acceptable according to CEQR criteria. These include one church building whose windows and alternate means of ventilation cannot be confirmed, and 12 residential buildings whose alternate means of ventilation cannot be confirmed. Receptor controls that could be used to partially mitigate these impacts are discussed in Chapter 5, "Mitigation."

Additionally, there is one recently constructed residential building with outdoor balconies predicted to experience significant adverse noise impacts as a result of construction of Phase II of the Project under Construction Phasing Plan 1. At this location, there are no feasible or practicable mitigation to mitigate the construction noise impacts on the balconies.

As mentioned above, fewer buildings in the study area are predicted to experience significant impacts in this SEIS analysis compared to the number of buildings predicted to experience significant adverse impacts the 2006 FEIS construction noise analysis. The refinement of the analysis methodology for the SEIS, specifically using a greater number of receptor locations (instead of representing many buildings on one block by one receptor location, the methodology used in the 2006 FEIS) more precisely indicates which buildings and building façades would experience significant adverse construction noise impacts. Additionally, the refined analysis methodology more precisely calculated background (i.e., non-construction) noise levels at each noise receptor, particularly at the rear façades and upper elevations of buildings. This tended to indicate lower background noise levels at these locations, resulting in higher construction noise level increments at these receptor locations. Construction of the proposed project would not result in any significant adverse noise impacts at existing open spaces within the study area.

At limited times during the construction of Phase II of the Project, P.S. 753 (located at 510 Clermont Avenue), which was not predicted to experience a significant adverse construction noise impact in the 2006 FEIS analysis, would be expected to experience significant adverse noise impacts at one or more floors on the west and south façades under Construction Phasing Plans 1 and 3, and the west, south, and east façades under Construction Phasing Plan 2. The maximum impact duration at the school would be nine years under Construction Phasing Plan 1, seven years under Construction Phasing Plan 2, and eleven years under Construction Phasing Plan 3. The exceedances of CEQR noise impact criteria would occur due to noise generated by on-site construction activities (rather than construction-related traffic). The noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increases in noise levels.

The school building has receptor control measures including double glazed windows and air conditioners. With these receptor control measures, interior L_{10} noise levels in rooms with windows along the east, south, and west façades of the school would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels due to construction are less than 75 dBA). However, during some limited time periods, the school would experience noise levels up to 77.7 dBA at certain floors, which would be in the "marginally unacceptable" category according to *CEQR Technical Manual* criteria. This would result in interior noise levels in the high 40s dBA, which would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for schools. The school is predicted to experience exterior noise levels greater than 75 dBA for no more than two years under Construction Phasing Plan 2 and no more than one year under Construction Phasing Plans 1 and 3.

The combination of background noise levels in the area and on-site construction activities under any of the three analyzed illustrative construction phasing plans would produce $L_{10(1)}$ noise levels at certain Project open space areas up to approximately the low 80s dBA during certain periods of construction. These noise levels would exceed those recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas exceed CEQR recommended values for existing and Future Without Phase II conditions.) While this is not desirable, there is no effective practical mitigation that could be implemented to avoid these levels during construction. Noise levels in many of the city's parks and open space areas that are located near heavily trafficked roadways and/or near construction sites experience comparable and sometimes higher noise levels.

Generally, throughout the study area, the absolute noise levels during construction predicted in this SEIS construction noise analysis are comparable in those predicted in the 2006 FEIS. Absolute noise levels predicted to occur at the analyzed noise receptor locations in the study area would generally be in the mid-50s to -70s dBA. These noise levels are comparable to noise levels throughout residential areas of New York City. At the upper levels of certain buildings immediately adjacent to the construction of one or more Project buildings, during the one or two years of the peak construction activity adjacent to these receptors, noise levels in the low 80s dBA would be expected. These noise levels are comparable to those that occur at receptors adjacent to heavily trafficked multi-lane avenues or roadways in New York City.

VIBRATION

The buildings of most concern with regard to the potential for structural or architectural damage due to vibration are the Swedish Baptist Church and nearby row houses along Dean Street, which are immediately adjacent to the site of Building 15. The 2006 FEIS vibration analysis determined that there would be no potential for significant adverse vibration impacts at these locations, but that a vibration monitoring program should be implemented to ensure that no architectural or structural damage will occur from construction activities. As per the MEC, the vibration monitoring program would continue to be implemented for Phase II of the Project under the Extended Build-Out Scenario.

For limited periods of time due to certain infrequently occurring construction activities, vibration levels will be perceptible in the vicinity of the construction site but would not rise to the level that would have the potential to result in structural or architectural damage and would not be considered significant adverse impacts.

B. SUMMARY OF FINDINGS FROM PREVIOUS ENVIRONMENTAL REVIEWS

NOISE

The 2006 FEIS concluded that significant adverse noise impacts would occur during Project construction at certain locations and at certain times. Therefore, as noted in the 2006 FEIS, the project sponsors were obligated to implement construction noise reduction measures to reduce or avoid noise impacts resulting from Project construction activities. The 2006 FEIS found that after implementation of these measures, there would still be locations where construction activities alone, and construction activities combined with Project-generated traffic, would result in predicted significant adverse noise impacts on adjacent properties.

With respect to Phase II construction, the 2006 FEIS found that significant noise impacts would occur at the exterior of a number of residential locations during some portion of the Phase II construction period. At the time of the 2006 FEIS, the majority of buildings near or adjacent to the project site either had double glazed windows or storm windows. In addition, a large number of residences had some form of alternative ventilation, either window, through-the-wall (sleeve), or central air conditioning. At exterior locations where significant adverse noise impacts were predicted to occur, and where the residences did not contain both double-glazed or storm-windows and alternative ventilation (i.e., air conditioning), the project sponsors were to make these measures available as project mitigation, at no cost for purchase and installation to owners of residences. However, for the properties within the identified zone that did not have double-glazed or storm-windows and alternative ventilation and for which the mitigation measures made available were not accepted, those properties would experience significant adverse impacts from construction noise.

VIBRATION

The 2006 FEIS concluded that vibration levels would be perceptible in the vicinity of the construction site for limited periods of time due to infrequently occurring construction activities, but these levels were not predicted to pose the potential for structural or architectural damage and were not considered to be significant adverse impacts. As noted in the 2006 FEIS, the project sponsors were obligated to implement a monitoring program to ensure that no architectural or structural damage to nearby historic buildings would occur because of vibration from construction activities.

C. NOISE STANDARDS AND CRITERIA

CONSTRUCTION NOISE IMPACT CRITERIA

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur at sensitive receptors that experience elevated construction noise levels "over a long period of time." This has generally been interpreted to mean that such impacts would occur only at sensitive receptors where the activity with the potential to create high noise levels (the "intensity") would occur continuously for approximately two years or longer (the "duration"). The *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No Action (or Future Without Phase II) noise level as the baseline, should be used for assessing construction impacts. As recommended in the *CEQR Technical Manual*, this study uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

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

D. CONSTRUCTION NOISE ANALYSIS METHODOLOGY

Construction activities for Phase II of the Project would be expected to result in increased noise levels as a result of: (1) the operation of construction equipment on-site; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the surrounding roadways. The effect of each of these noise sources was evaluated. The results presented below show the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicle operation) on existing receptor locations and on the buildings and open spaces that would be put into place during the Phase II construction period.

The construction noise analysis computed the level of noise produced by construction activities and combined it with the Future Without Phase II noise level to determine the total noise level during construction in each analyzed year for each of the three construction phasing plans. This total noise level is referred to as the "absolute noise level." The increase in noise level was determined by subtracting the Future Without Phase II noise level from the absolute noise level. The noise level increase is also referred to as the "noise level increment" for each analyzed condition.

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

- The noise emission level of the equipment;
- A usage factor[1], which accounts for the percentage of time the equipment is operating at full power;
- The distance between the piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.

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

[1] Usage factors for each piece of equipment were based on values shown in Section 28-109 of New York City Department of Environmental Protection's Rules for Citywide Construction Noise Mitigation document or, for equipment not listed in Section 28-109, field observations of equipment usage.

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

CONSTRUCTION NOISE MODELING

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

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

ANALYSIS TIME PERIOD SELECTION

As described in Chapter 3A, "Construction Overview," the Phase II construction activities would occur over the period from 2018 to 2035 under the Extended Build-Out Scenario. In the Extended Build-Out Scenario, weekend work would not be scheduled regularly but may occur from time to time to make up for weather delays, unforeseen circumstances, or special activities such as erecting or dismantling tower crane and some instances of work on the platform over the LIRR tracks on Block 1120 and 1121. . Therefore, construction noise analyses were performed only for the weekday AM time period, which would be expected to experience the greatest amount of construction-related truck activity (although the baseline non-construction noise level was taken as the quietest hourly noise level during the construction workday as described above).

The three illustrative construction phasing plans described in Chapter 3A illustrate how the timing of the construction of certain project components may vary and provide for a reasonably conservative analysis of the range of environmental effects associated with a delayed build-out of Phase II. The three illustrative construction phasing plans serve as the basis of analysis in this chapter because they provide a range of potential impacts within the envelope of the reasonable worst-case construction schedule under the Extended Build-Out Scenario. For each construction phasing plan, an analysis was performed based on an assumed construction schedule (using projections of the number of workers, types and number of pieces of equipment, and number of construction vehicles assumed to be operating during each month of the construction period) to determine the months during the construction period (i.e., 2018–2035) when the maximum potential for significant noise impacts would occur. For most years of construction, this analysis conservatively assumed that the worst-case month of each year would represent the entire year, and the year during each phasing plan was modeled according to the year's peak month. However, for some years where the level of construction activity would fluctuate widely, two months within the year were modeled to determine the range of noise levels that would occur during that year.

Using the worst-case month of the year to represent the entire year for most years of construction is a very conservative method of evaluating construction noise, because the conditions of the worst-case month generally do not occur throughout the entire year. For example, under Construction Phasing Plan 1, in 2021 the overlap of construction of Buildings 12, 13, and 14 would occur for only the second quarter of the year. During the rest of this year, when only two of the three buildings are under construction, there would be less construction equipment and activity on the project site, and consequently less construction noise generated. However, the construction noise analysis represents this entire year based on the noise levels predicted to occur only in this peak quarter of construction. Thus, the noise level increments predicted by this SEIS analysis may not actually occur for the entire year in which they are predicted to occur.

NOISE REDUCTION MEASURES

Consistent with the MEC, the project sponsors will develop a Construction Noise Mitigation Plan for the construction of Phase II (in accordance with the NYC Noise Code) to include certain noise reduction measures, including those required by the New York City Noise Control Code[1] (NYC Noise Code) and those that exceed Code requirements, but the implementation of which is deemed feasible and practicable to minimize construction noise and reduce potential noise impacts. Some of the measures set forth in the 2006 FEIS have been updated or modified for this SEIS analysis to account for changes in equipment/technology since the 2006 FEIS, practical experience gained since the 2006 FEIS regarding the effectiveness of some noise control measures, and changes in the construction logistics with the phasing plans analyzed here as compared to the construction logistics plan considered in the 2006 FEIS.

The noise control measures include:

- Source controls;
- Path controls; and
- Receptor controls.

[1] New York City Noise Control Code (i.e., Local Law 113). Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007.

In terms of **source controls** (e.g., reducing noise levels at the source or during most sensitive time periods), the following measures were examined and would be implemented:

- The project sponsors have committed to utilizing equipment that meets the sound level standards for equipment (specified in Subchapter 5 of the new NYC Noise Code) from the start of construction activities and using a wide range of equipment, including construction hoists, that produce lower noise levels than typical construction equipment (**Table 3J-1** shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of Phase II of the Project);
- Where feasible, the project sponsors would use quiet construction procedures, and equipment (such as generators, hydraulic lift vehicles, trucks, and tractor trailers) quieter than that required by the New York City Noise Control Code;
- Where practicable and feasible, construction sites would be configured to minimize back-up alarm noise. In addition, trucks would not be allowed to idle more than three minutes at the construction site based upon New York City Local Law;
- As early in the construction period as practicable, diesel-powered equipment would be replaced with electrical-powered equipment, such as electric scissor lifts and electric articulating boom lifts (i.e., early electrification)[1]; and
- The project sponsors would require all contractors and subcontractors to properly maintain their equipment and have quality mufflers installed.

[1] While the MEC requires the project sponsors to arrange for electrification of the site as early as practicable and use electric equipment where practicable, the construction noise analysis conservatively assumes diesel for large noisy equipment including tower cranes and construction hoists.

Table 3J-1
Construction Equipment Noise Emission Levels (dBA)

Atlantic Yards Equipment	DEP/FTA/Typical L_{max} Noise Level at 50 feet[1]	Atlantic Yards Analysis Noise Level (dBA) at 50 feet
Backhoe	80	80
Bar Bender	80	80
Boom Trucks/MTL Deliveries	85	85
Bulldozer	82	82
Chain Saws	85	85
Cherry Picker 35-55 ton	85	85
Compactor	80	80
Compressors	80	58[2]
Concrete Pumps	82	82
Concrete Trucks (10Cy)	85	80[7]
Crane (mobile)	85	80[3]
Crane (tower)	85	75[3]
Diamond Saws	76	76
Drill Rigs	84	84
Dump Trucks	84	80[7]
Dumpster/Rubbish Removal (30Cy)	78	78
Excavators	85	85
Generators (>25kVA)	82	82
Generators (<25kVA)	70	70
Hoist	75	75[5]
Hydraulic Break Ram	90	90
Hydraulic Grippers	80	80
Hydraulic Lift Vehicle (Gasoline)	85	63
Impact Wrenches	85	85
Jack Hammers	85	71[2]
Lift Booms/Scissor Lifts (Elect)	85	63
Loader	80	80
Paver	85	85
Pick-Up Trucks	55	55
Powder Actuated Hammers	85	82[6]
Roller	74	74
Tractor Trailers	84	84
Water Pumps	77	77
Welders (480V)	73	73

Note:
1. Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, May 2006.
2. NYC Noise Control Code required level.
3. 10 dB reduction is estimated for path controls (p17-18 on Chapter 28 "Citywide Construction Noise Mitigation").
4. 5 dB reduction is conservatively estimated for path controls.
5. Typical Level at 50 feet for Electric Hoist.
6. Field measurement of typical equipment.
7. Project-specific quieter equipment as described in the 2006 FEIS and required where feasible and practicable by the MEC.

In terms of **path controls** (e.g., placement of equipment, implementation of barriers between equipment and sensitive receptors), three types of measures were examined and would be implemented:

- Where practicable and feasible, noisy equipment, such as generators, cranes, tractor trailers, concrete pumps, concrete trucks and dump trucks, would be located at locations which are away from sensitive receptor locations and are shielded from sensitive receptor locations. In addition, delivery trucks would operate behind noise barriers;

- Noise barriers would be utilized to provide shielding. The construction sites would have a minimum 8-foot barrier, with—where practicable and feasible—a 16-foot barrier adjacent to sensitive locations.[1]
- Where it is not practicable and feasible to provide 16-foot barriers adjacent to sensitive receptors, the project sponsors will install the best feasible and practicable additional path controls, which may include noise curtains or other barriers within the site between the noise sources and sensitive receptors, angled/cantilevered fences, and/or other practicable pathway controls.
- Where practicable and feasible, truck deliveries would take place behind site perimeter noise barriers once building foundations are completed;
- Where practicable and feasible, noise curtains and equipment enclosures would be utilized to provide shielding to sensitive receptor locations[2].

As discussed below and in Chapter 5, "Mitigation", in terms of **receptor controls** (e.g., measures at sensitive receptors to reduce sound levels at these locations), at residences, where the source and path controls listed above are not sufficient to prevent significant adverse noise impacts from occurring, and where the residences do not contain both double-glazed or storm-windows and alternative ventilation (e.g., air conditioning), the project sponsors would make these mitigation measures available to the building owners.

NOISE RECEPTOR SITES

Twenty-two (22) noise measurement locations (i.e., sites R1 to R22) were selected to determine the baseline noise levels, and one hundred thirty-two (132) receptor locations (i.e., sites 1 to 127 and Phase I Buildings 1-4 and Site 5) close to the project area were selected as discrete noise receptor sites for the construction noise analysis. This is a greater number of receptor locations than were used in the 2006 FEIS, although they cover approximately the same area. The larger number of receptor locations results in a more refined identification of the location of noise increases in the study area. These receptors were either located directly adjacent to the project site or streets where a substantial number of construction trucks would pass. Each receptor site was the location of a residence or other noise-sensitive use. At some buildings, multiple building façades were analyzed. At all buildings, noise receptors were selected at multiple elevations. At open space locations, receptors were selected at street level. **Figure 3J-1** shows the locations of the 127 noise receptor sites, and **Table 3J-2** lists the noise receptor sites and the associated land use at each site. The receptor sites selected for detailed analysis are representative of one or more buildings or sensitive open space areas in the immediate project area and are the locations where maximum project impacts due to construction noise would be expected.

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[1] To account for the possibility that 16-foot barriers may not be practicable and feasible along Atlantic Avenue between 6th Avenue and Clermont Avenue, along 6th Avenue, and along Pacific Street, the noise analysis accounts for 8-foot barriers along these streets and 16-foot barriers only along Vanderbilt Avenue, Dean Street, the northern portion of the east boundary of the Building 15 work area, and in between Phase II buildings only when construction would occur immediately adjacent to an occupied building.

[2] Although temporary noise curtains and barriers would be employed where feasible and practical, no credits where taken for the attenuation provided by this measure in terms of the noise analysis.

Table 3J-2
Construction Noise Receptor Locations

Receptor	Location	Associated Land Use
R1	Pacific Street between Flatbush and 4th Avenues	Residential
R2	Flatbush Avenue at Dean Street	Residential/Retail
R3	Dean Street between Flatbush and 6th Avenues	Residential
R4	Pacific Street between Carlton and 6th Avenues	Residential
R5	Dean Street between Vanderbilt and Carlton Avenues	Residential
R6	Vanderbilt Avenue between Pacific and Dean Streets	Residential
R7	Atlantic Avenue between Clermont and Carlton Avenues	School/Residential
R8	4th Avenue between Atlantic Avenue and Pacific Street	Residential/Church
R9	Dean Street between 4th and 5th Avenues	Residential
R10	6th Avenue between Pacific and Dean Streets	Residential
R11	Bergen Street between Carlton and 6th Avenues	Residential/Playground
R12	Carlton Avenue between Pacific and Dean Streets	Residential
R13	Dean Street between Carlton and 6th Avenues	Open Space/Playground
R14	Atlantic Avenue between South Oxford and Cumberland Streets	Residential
R15	South Elliott Place at South Portland Avenue	Residential
R16	Hanson Place between South Oxford and Cumberland Streets	Residential/Open Space
R17	Vanderbilt Avenue between Fulton Street and Atlantic Avenue	Residential/Institutional
R18	Vanderbilt Avenue between Fulton Street and Atlantic Avenue	Residential/Institutional
R19	Pacific Street at Flatbush Avenue	Residential/Retail
R20	6th Avenue between Dean and Bergen Streets	Residential/Institutional
R21	Carlton Avenue between Dean and Bergen Streets	Residential
R22	Bergen Street between Carlton and Vanderbilt Avenues	Residential
1 to 3	700 Pacific Street	Mixed Residential & Commercial
4 to 8	516-534 Carlton Avenue	Residential
9	565 Dean Street	Residential
10 to 14	547-501 Dean Street	Residential
15 to 16	856-860 Atlantic Avenue	Mixed Residential & Commercial
17 to 21	849-899 Pacific Street	Residential
22 to 23	190-218 Flatbush Avenue	Mixed Residential & Commercial
24	474-478 Dean Street	Residential
25 to 26	46-60 6th Avenue	Residential
27 to 28	473-479 Bergen Street	Mixed Residential & Commercial
29 to 30	227-243 Flatbush Avenue	Mixed Residential & Commercial
31 to 32	486-560 Dean Street	Residential/Commercial/Institutional
33 to 35	538-560 Carlton Avenue	Residential
36	531-549 Bergen Street	Residential
37	51-55 6th Avenue	Institutional
38	555-559 Carlton Avenue	Residential
39 to 43	586-660 Dean Street	Residential
44 to 46	552-570 Vanderbilt Avenue	Mixed Residential & Commercial
47	573-585 Bergen Street	Residential
48 to 49	561-575 Carlton Avenue	Residential
50 to 52	854-878 Pacific Street	Residential/ Institutional
53 to 54	683-727 Dean Street	Residential
55 to 57	565-583 Vanderbilt Avenue	Mixed Residential & Commercial
58 to 60	678-742 Dean Street	Residential
61 to 63	585-601 Vanderbilt Avenue	Mixed Residential & Commercial
64 to 66	603-623 Vanderbilt Avenue	Mixed Residential & Commercial
67	578-594 Vanderbilt Avenue	Mixed Residential & Commercial
68 to 72	562-638 Bergen Street	Residential
73	577-593 Carlton Avenue	Residential
74	137 St. Marks Avenue	Residential

Table 3J-2 (cont'd)
Construction Noise Receptor Locations

Receptor	Location	Associated Land Use
75 to 76	562-580 Carlton Avenue	Residential
77	135 St. Marks Avenue	Residential
78	524-542 Bergen Street	Residential
79	65-69 6th Avenue	Mixed Residential & Commercial
80 to 81	173 South Elliott Place	Residential
82	212 South Oxford Street	Mixed Residential & Commercial
83 to 85	173-203 South Portland Avenue	Residential
86 to 88	172-208 South Oxford Street	Residential
89 to 91	205-213 South Oxford Street	Residential
92 to 94	408-424 Cumberland Street	Residential
95 to 98	373-425 Cumberland Street	Residential
99 to 102	432-478 Carlton Avenue	Residential
103 to 104	761 Atlantic Avenue	Residential
105 to 108	475 Carlton Avenue	Residential
109	510 Clermont Avenue	Institutional
110 to 112	503-525 Vanderbilt Avenue	Residential
113 to 115	498-540 Clinton Avenue	Residential/Institutional
116 to 118	503-537 Clinton Avenue	Residential
119	849-853 Atlantic Avenue	Mixed Residential & Commercial
120 to 121	564-602 Pacific Street	Residential
122 to 123	404-430 Dean Street	Residential/Institutional
124 to 125	665-703 Bergen Street	Residential
126	662-672 Bergen Street	Residential
127	80 Underhill Avenue	Institutional
B1	Phase I of the Project, Building 1	Residential
B2	Phase I of the Project, Building 2	Residential
B3	Phase I of the Project, Building 3	Residential
B4	Phase I of the Project, Building 4	Residential
S5	Phase I of the Project, Site 5	Residential
Note: Noise measurements were taken at receptor sites R1 through R22.		

E. EXISTING AND FUTURE WITHOUT PHASE II CONDITIONS

Noise generated by construction activities is added to noise generated by non-construction traffic on adjacent roadways in order to determine the total noise levels at each receptor location. No-Action (or Future Without Phase II) noise levels were used as the baseline noise levels for determining construction-generated noise level increases. Existing and Future Without Phase II noise levels are shown in **Appendix B**.

DETERMINATION OF EXISTING NOISE LEVELS

Existing noise levels at the analysis receptors were determined by:

- Performing noise measurements at various at-grade locations at various times during the construction workday;
- Determining adjustment factors between the AM peak hour and the quietest measurement time period at each of the measurement locations;
- Calculating at-grade noise levels at the measurement locations using the Traffic Noise Model (TNM, see Chapter 4G, "Operational Noise" for more details on the TNM) with existing site geometry and existing traffic on adjacent roadways as inputs;

- Calculating noise levels at the receptor sites and measurement locations (including elevated receptor locations) using the CadnaA model with existing site geometry and existing traffic on adjacent roadways as inputs; and
- Determining adjustment factors based on the difference between the measured and calculated existing noise levels at the measurement locations.

DETERMINATION OF FUTURE WITHOUT PHASE II NOISE LEVELS

Future Without Phase II noise levels at the analysis receptors were determined by:

- Calculating noise levels at the measurement locations using TNM with No-Action site geometry and No-Action traffic on adjacent roadways as inputs;
- Determining an increment between existing and No-Action noise levels at each of the measurement locations;
- Applying each of the adjustment factors to the CadnaA-calculated existing noise levels at the construction noise receptors to determine the minimum No-Action noise level at that location over the course of the construction workday.

F. FUTURE WITH PHASE II CONSTRUCTION ACTIVITIES

Using the methodology described above, and considering the noise reduction measures for source and path controls specified above, noise analyses were performed to determine maximum one-hour equivalent ($L_{eq(1)}$) noise levels that would be expected to occur during each year of construction under each of the three illustrative construction phasing plans. The full noise analysis results are shown for each construction phasing plan in **Appendix B**.

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

In addition, as discussed above, the construction noise analysis was performed for most years of construction using the month of each year in each illustrative construction phasing plan that is anticipated to result in the maximum construction noise levels. The analysis conservatively assumes that this worst-case month would represent construction noise levels throughout the entire year. For years in which construction activity would fluctuate widely, two months were selected for modeling to determine the range of construction noise levels. During times of less intense construction activity than in the months selected for modeling, construction noise levels are anticipated to be less. For instance, rock excavation using hydraulic break rams at any particular building site would be expected to last only three to eight months depending on the building, and even shorter durations for excavation area within the building site. Consequently, an individual receptor location would experience hydraulic break ram noise for only a limited period of time out of the construction period. Furthermore, many of the loudest pieces of construction equipment, including excavators, asphalt paving equipment, concrete trowels, concrete trucks, portable cement mixers, etc., are mobile, and move about the site throughout the days and months of construction. The construction analysis considers a reasonable worst-case scenario with all mobile equipment in the locations that would tend to generate the most noise at the adjacent receptors. Such a scenario, and the high noise levels associated with it, as have been examined in this construction noise analysis, would be likely to occur only during limited times throughout the construction period, and thus represent a highly conservative analysis.

The discussion below of construction noise under each of the three analyzed illustrative construction phasing plans includes calculated absolute noise levels at the noise receptor locations within the study area, and for interior receptor locations, a discussion of interior noise levels based on window/wall attenuation at the receptors. As a result of the significant adverse impacts predicted to result from construction of the Project in the 2006 FEIS, the project sponsors have offered receptor control measures including storm windows and air conditioners to properties that did not have them and were predicted to experience a significant adverse construction noise impact. The measures were offered at no cost to the owners or residents of the impacted receptor locations for materials or installation. At the locations where the offer of receptor noise control measures were accepted and installed, buildings with these measures would be expected to provide 25–30 dBA of window/wall attenuation.

CONSTRUCTION PHASING PLAN 1

The noise analysis results show that under Construction Phasing Plan 1, predicted noise levels would exceed the CEQR impact criteria at one or more floors of approximately 124 buildings in the study area, including 21 buildings not identified as having a significant impact in the 2006 FEIS. Overall, this is fewer buildings than were identified in the 2006 FEIS as having a significant impact[1]. **Figure 3J-2** shows the locations and **Table 3J-3** summarizes analysis results at locations where predicted noise level increases exceed the CEQR impact criteria at one or more floors. In **Figure 3J-2**, locations predicted to experience significant adverse construction noise impacts under the Extended Build-Out Scenario at one or more floors at the same locations identified in the 2006 FEIS analysis are shown in red. Locations predicted to experience significant adverse construction noise impacts at one or more floors that were not identified in the 2006 FEIS analysis, and that already have receptor control measures (i.e., double glazed windows and an alternate means of ventilation) are shown in green. Locations predicted to experience significant adverse construction noise impacts at one or more floors that were not identified in the 2006 FEIS analysis that do not have receptor control measures are shown in pink. Tabular year-by-years noise levels for each of the one-hundred and thirty-two (132) receptor sites are shown in **Appendix B**.

At the locations predicted to experience an exceedance of the CEQR impact criteria, the exceedances would be due to noise generated by on-site construction activities (rather than construction-related traffic). As previously discussed, this noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increases in noise levels.

Since the results of this analysis reflect peak hourly noise levels during peak months of construction, it should be noted that at locations predicted to experience significant adverse impacts, the noise levels predicted by this analysis would not occur constantly throughout the predicted duration of impact. Construction activities, and consequently the level of noise generated by construction activities, typically fluctuate from hour to hour throughout the construction work day and from day to day throughout the construction period. During hours of the day outside of the peak hour and during times of the year outside of the peak periods of construction, when less equipment would be operating at the project site, noise levels would be lower than those shown in **Table 3J-3**.

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[1] See Section G, "Comparison of SEIS Findings and Previous Findings in the 2006 FEIS."

Table 3J-3
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 1

Building/Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
700 Pacific Street	Mixed Residential & Commercial	4	North	1A	All	3.1-16.5	12
			West	1C	2 to top	3.3-13.6	7
700 Pacific Street	Mixed Residential & Commercial	10	North	2A	All	3.1-16.5	10
			South	2C	8 to Top	3.1-7.0	4
			West	2D	All	3.3-12.6	8
700 Pacific Street	Mixed Residential & Commercial	3	North	3A	All	3.8-18.5	15
			East (northern-most section)	3B	2 to top	3.5-12.7	4
516-518 Carlton Avenue	Residential	4	East	4A	All	3.3-19.4	11
			West	4B	All	3.2-16.5	6
			North	4C	All	3.4-16.6	17
520-522 Carlton Avenue	Residential	4	East	5A	All	3.5-19.4	10
			West	5C	3 to top	3.2-13.6	4
524-526 Carlton Avenue	Residential	4	East	6B	All	3.1-19.4	10
			West	6C	Top	4.5-10.7	4
528-530 Carlton Avenue	Residential	4	East	7B	All	3.1-18.4	4
532-534 Carlton Avenue	Residential	4	East	8B	All	3.1-18.4	4
565 Dean Street	Residential	4	East	9B	All	3.2-17.4	4
			South	9C	2 to top	3.5-9.1	4
507-515 Dean Street	Residential	5		13B	Top	3.0-5.4	2
			North	13C	All	3.5-17.0	5
497-501 Dean Street	Residential	5	South	14A	2 to top	4.7-14.3	4
			West	14B	All	3.0-24.9	2
			North	14C	All	3.1-25.9	7
849 Pacific Street	Residential	2	South	17C	All	3.1-8.5	3
849 Pacific Street	Residential	3	South	18C	Top	3.5-7.6	2
474-478 Dean Street	Residential	5	North	24C	All	3.9-9.5	4
			East	24D	2 to top	3.2-12.8	4
46-50 6th Avenue	Residential	4	East	25A	All	4.0-13.1	4
			West	25C	3 to top	4.0-5.8	2
			North	25D	All	4.0-14.0	4
52-60 6th Avenue	Residential	4	East	26B	All	4.0-7.0	4
479 Bergen Street	Mixed Residential/Commercial	4	East	27A	3 to top	4.0-5.5	4
486-492 Dean Street	Residential/Commercial /Institutional	5	North	31A	All	4.7-16.2	4
			West	31C	All	3.0-10.6	4
546-560 Dean Street	Residential/Commercial /Institutional	5	North	32D	Top	3.1-6.0	2
538-542 Carlton Avenue	Residential	5	East	33A	All	4.0-15.5	5
			South	33B	Top	4.0-5.0	2
			West	33C	Top	4.0-6.6	3
			North	33D	All	4.0-14.5	5
544-554 Carlton Avenue	Residential	3	East	34A	All	4.0-8.1	3

Table 3J-3 (cont'd)
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 1

Building/Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
556-560 Carlton Ave	Residential	2	East	35B	Top	4.0-5.1	2
51-55 6th Avenue	Institutional	8	North	37A	6 to top	4.0-12.4	4
			East	37B	6 to Top	4.0-9.6	2
			West	37D	5 to Top	4.0-4.8	4
555-559 Carlton Avenue	Residential	4	East	38A	All	4.0-17.4	5
			West	38C	3 to top	4.0-11.7	3
			North	38D	All	4.0-17.4	5
586-590 Dean Street	Residential	3	North	39A	All	3.9-15.5	5
610-618 Dean Street	Residential	5	North	40A	All	3.3-17.5	6
636 Dean Street	Residential	3	North	41A	All	3.9-14.6	7
648-652 Dean Street	Residential	4	North	42A	All	3.9-18.5	7
656-660 Dean Street	Residential	3	North	43A	All	3.4-13.6	4
552-556 Vanderbilt Avenue	Mixed Residential & Commercial	4	West	44C	2 to top	3.3-14.6	4
			North	44D	All	3.4-15.5	4
573-585 Bergen Street	Residential	3	North	47A	Top	4.0-6.1	2
571-575 Carlton Avenue	Residential	5	North	48A	4 to top	4.0-8.9	4
			East	48B	Top	4.0-8.1	3
561-569 Carlton Avenue	Residential	3	East	49B	2 to top	4.0-8.9	3
854 Pacific Street	Residential/Institutional	6	North	50A	Top	3.6-7.7	2
			South	50B	Top	3.2-5.8	2
			West	50C	Top	3.3-8.2	2
565-569 Vanderbilt Avenue	Mixed Residential & Commercial	4	West	57A	Top	3.0-6.1	4
			North	57B	3 to top	3.0-6.1	2
678-690 Dean Street	Residential	4	North	60A	3 to top	3.4-7.6	4
212 South Oxford Street	Mixed Residential & Commercial	10	East	82B	3 to top	4.0-10.1	5
212 South Oxford St	Mixed Residential & Commercial	10	South	82C	All	3.0-11.9	8
			West	82D	4 to top	3.1-5.4	7
213 South Oxford Street	Residential	3	West	89A	All	3.4-8.3	3
		3	East	89B	All	4.0-9.2	5
		3	South	89C	All	3.4-7.5	4
211-207 South Oxford Street	Residential	3	East	90A	All	3.5-8.3	2
			West	90C	All	3.4-7.5	5
205 South Oxford Street	Residential	2	East	91A	All	3.5-6.8	2
424 Cumberland Street	Residential	3	West	92A	All	4.0-9.2	4
			East	92B	Top	3.3-3.9	2
			South	92C	All	3.4-7.5	5
414-422 Cumberland Street	Residential	3	West	93C	All	3.0-9.2	4
425 Cumberland Street	Residential	7	East	95A	2 to top	3.0-8.4	8
			South	95B	All	3.0-10.1	6
			West	95C	2 to top	3.4-7.5	4

Table 3J-3 (cont'd)
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 1

Building/Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
472-478 Carlton Avenue	Residential	2	West	99A	All	3.5-8.4	6
				99C	All	3.4-6.0	4
			South	99D	All	3.4-7.5	4
761 Atlantic Avenue	Residential	30	East	103B	4 to top	3.4-9.3	7
			South	103C	All	3.4-10.1	16
			West	103D	3 to top	3.0-9.2	12
761 Atlantic Avenue	Residential	24	South	104B	4 to top	4.0-10.9	12
			West	104C	4 to top	4.0-10.0	12
475 Carlton Avenue	Residential	14	South	105A	7 to top	4.0-8.3	6
			West	105B	5 to top	4.0-8.3	6
			East	105D	Top	4.0-5.1	2
475 Carlton Avenue	Residential	13	South	106C	7 to top	4.0-6.6	6
			West	106D	12 to top	4.0-5.9	2
510 Clermont Avenue	Institutional	4	South (western-most section)	109A	All	3.0-6.9	9
			West (northern-most section)	109B	3 to top	3.1-6.9	6
			West (southern-most section)	109F	All	3.0-8.6	9
536-540 Clinton Avenue	Residential/ Institutional	4	West	113C	Top	4.0-9.7	2
525 Clinton Avenue	Residential	13	Southwest	117E	Top	4.0-7.3	2
Phase I Building 2	Residential	28	East	B2F	17 to top	3.0-5.4	4
Phase I Building 3	Residential	19	East	B3B	All	3.1-19.8	8
			North (eastern-most section)	B3C	13 to top	3.5-13.9	8
			South	B3G	4 to top	3.1-14.9	4
Phase I Building 4	Residential	45	North	B4B	2 to top	3.1-8.4	3
			East	B4D	All	3.1-15.8	7
			South	B4E	All	3.1-15.9	7

Notes: Each receptor represents one or multiple buildings in the study area.
*Numbers in this column reflect the total duration of the significant adverse construction noise impact over the construction period. This duration may include intermittent years of no significant adverse impact.

All of the buildings shown in **Table 3J-3** have double-glazed windows or were previously offered storm windows by the project sponsors in accordance with the mitigation requirements stipulated in the 2006 FEIS and MEC. With the exception of six buildings represented by four receptor locations (discussed further below), all of the buildings shown in **Table 3J-3** have an alternate means of ventilation or were offered air conditioners by the project sponsors. For buildings with double-glazed windows/storm windows and an alternate means of ventilation, interior noise levels would be approximately 25 to 30 dBA less than exterior noise levels. The typical attenuation provided by the windows and alternate ventilation outlined above would be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). At the residences at which significant adverse construction noise impacts are predicted to occur, with these receptor control measures, interior L_{10} noise levels would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels at the receptor locations due to construction are less than 75 dBA, as shown in **Appendix B**). However, during some limited time periods the construction noise analysis predicts that construction activities would result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for these uses.

Table 3J-4 identifies the five buildings not predicted to experience significant adverse construction noise impacts in the 2006 FEIS where significant noise impacts are predicted to occur due to construction under Construction Phasing Plan 1 and where an alternate means of ventilation cannot be confirmed, and the one building with outdoor balcony spaces. These locations were not previously offered receptor noise control measures, because they were not predicted to experience significant adverse construction noise impacts in the 2006 FEIS analysis. The outdoor balconies are part of a newly constructed residential building at 525 Clinton Avenue. The other locations are residential buildings with double-glazed windows but at which the presence of an alternate means of ventilation cannot be confirmed. These locations are shown in **Figure 3J-2** highlighted in pink.

Table 3J-4
Summary of SEIS Impact Locations Without Receptor Controls
Construction Phasing Plan 1

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Maximum Increase in dBA During Significant Impact Period	Window Type	Alternate Means of Ventilation
849 Pacific Street	Residential	2	South	17C	all	3.1-8.5	Double-Glazed	None Visible
854 Pacific Street	Residential/ Institutional	6	North	50A	top	3.0-7.7	Double-Glazed	None Visible
			South	50B	top	3.2-5.8	Double-Glazed	None Visible
			West	50C	5 to top	3.3-8.2	Double-Glazed	None Visible
536-540 Clinton Avenue	Residential/ Institutional	4	West	113C	top	4.0-9.7	Double-Glazed	None Visible
525 Clinton Avenue (Outdoor Balconies)	Residential	13	Southwest	117E	12 to top	4.0-7.3	n/a	n/a

At the outdoor balconies of the newly constructed residential building at 525 Clinton Avenue predicted to experience significant impacts under Construction Phasing Plan 1, there would be no feasible or practicable mitigation to mitigate the construction noise impacts. Consequently, if construction occurs according to Construction Phasing Plan 1, the balconies on the floors identified would experience unmitigated significant adverse noise impacts resulting from construction during some limited portions of the construction period. However, it should be noted that even during the portions of the construction period that would generate the most noise at these balconies, the balconies could still be enjoyed without the effects of construction noise outside of the hours that construction would occur, e.g., during night-time and on weekends.

At the other five residential buildings where significant impacts are predicted to occur with Construction Phasing Plan 1 and where the presence of an alternate means of ventilation cannot be confirmed and no offer of alternate means of ventilation has been made, if they do not have an alternate means of ventilation, the typical attenuation would be 5 dBA for an open window condition. This level of attenuation would not be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). Consequently, if construction is conducted according to Construction Phasing Plan 1, these residential buildings would experience significant adverse noise impacts warranting mitigation as a result of construction. Potential receptor controls that could be used to mitigate the impacts at these residential locations, i.e., provision of an alternate means of ventilation, are discussed in Chapter 5, “Mitigation.”

Existing open space locations in the vicinity of Project construction, as represented by the noise receptor locations described above, would not be expected to experience significant adverse noise impacts resulting from Project construction under Construction Phasing Plan 1.

CONSTRUCTION NOISE LEVELS AT PHASE II BUILDINGS

Proposed Phase II buildings that would be completed and occupied before construction is completed at other Phase II building sites according to Construction Phasing Plan 1 would also experience elevated exterior noise levels due to construction activities. Buildings 5, 6, 8, 9, 10 and 12 would be expected to experience maximum $L_{10(1)}$ noise levels in the mid-60s to high 70s dBA for an extended period during Construction Phasing Plan 1. Buildings 11, 13, 14, and 15 would be expected to experience maximum $L_{10(1)}$ noise levels in the mid-60s to low 80s dBA for an extended period during Construction Phasing Plan 1. These predicted noise levels are based on modeling the worst-case hour of the worst-case month of each year of construction, based on a schedule of equipment and activity provided by the project sponsors’ construction consultant.

As stipulated in the 2006 FEIS, Buildings 12, 13, and 14 are required to provide at least 30 dBA of window/wall attenuation as well as an alternate means of ventilation (i.e., air conditioners). Buildings 5, 6, 8, 9, 10, 11, and 15 are required to provide at least 35 dBA of window/wall attenuation as well as an alternate means of ventilation (i.e., air conditioners). Based on these predicted noise construction noise levels and building attenuation requirements, it would be expected that interior noise levels at Buildings 5, 6, 8, 9, and 10 would be less than the 45 dBA recommended by CEQR interior noise level guidance for residential use even during the loudest periods of construction. At Buildings 11, 12, 13, 14, and 15, with the above-described receptor control measures, interior L_{10} noise levels would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels due to construction are less than 80 dBA at Buildings 11 and 15, and less than 75 dBA at Buildings 12, 13, and 14, as shown in **Appendix B**). However, during some limited time periods the construction noise analysis predicts that construction activities would result in interior noise levels in residential units with windows on certain façades of Buildings 11, 12, 13, 14, and 15 up to the low 50s dBA, which would be greater than the 45 dBA recommended by CEQR interior noise level guidance for residential during some limited periods of construction according to Construction Phasing Plan 1. Such exceedances may be intrusive, but would be only temporary and of limited duration. Consequently, they would not result in any significant impacts.

CONSTRUCTION PHASING PLAN 2

The noise analysis results show that under Construction Phasing Plan 2, predicted noise levels would exceed the CEQR impact criteria at one or more floors of approximately 160 buildings in the study area, including 30 buildings not identified as having a significant impact in the 2006 FEIS. Overall, this is fewer buildings than were identified in the 2006 FEIS as having a significant impact[1]. **Figure 3J-3** shows the locations and **Table 3J-5** summarizes analysis results at locations where predicted noise level increases exceed the CEQR impact criteria at one or more floors. In **Figure 3J-3**, locations predicted to experience significant adverse construction noise impacts under the Extended Build-Out Scenario at one or more floors at the same locations identified in the 2006 FEIS analysis are shown in red. Locations predicted to experience significant adverse construction noise impacts at one or more floors that were not identified in the 2006 FEIS analysis, and that already have receptor control measures (i.e., double glazed windows and an alternate means of ventilation) are shown in green. Locations predicted to experience significant adverse construction noise impacts at one or more floors that were not identified in the 2006 FEIS analysis that do not have receptor control measures are shown in pink. Tabular year-by-years noise levels for each of the one-hundred and thirty-two (132) receptor sites are shown in **Appendix B**.

At the locations predicted to experience exceedance of the CEQR impact criteria, the exceedances would be due to noise generated by on-site construction activities (rather than construction-related traffic). As previously discussed, this noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increases in noise levels.

Since the results of this analysis reflect peak hourly noise levels during peak months of construction, it should be noted that at locations predicted to experience significant adverse impacts, the noise levels predicted by this analysis would not occur constantly throughout the predicted duration of impact. Construction activities, and consequently the level of noise generated by construction activities, typically fluctuate from hour to hour throughout the construction work day and from day to day throughout the construction period. During hours of the day outside of the peak hour and during times of the year outside of the peak periods of construction, when less equipment would be operating at the project site, noise levels would be lower than those shown in **Table 3J-5**.

With the exception of one building represented by one receptor (discussed further below), all of the buildings shown in **Table 3J-5** have double-glazed windows or were previously offered storm windows by the project sponsors in accordance with the mitigation requirements stipulated in the 2006 FEIS and MEC. With the exception of ten buildings represented by five receptors (discussed further below), all of the buildings shown in **Table 3J-**5 have an alternate means of ventilation or were previously offered air conditioners by the project sponsors in accordance with the mitigation requirements stipulated in the 2006 FEIS and MEC. For buildings with double-glazed windows/storm windows and an alternate means of ventilation, interior noise levels would be approximately 25 to 30 dBA less than exterior noise levels, . The typical attenuation provided by the windows and alternate ventilation outlined above would be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). At the residences at which significant adverse construction noise impacts are predicted to occur, with these receptor control measures, interior L_{10} noise levels would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels at the receptor locations due to construction are less than 75 dBA, as shown in **Appendix B**). However, during some limited time periods the construction noise analysis predicts that construction activities would result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for these uses.

[1] See Section G, "Comparison of SEIS Findings and Previous Findings in the 2006 FEIS."

Table 3J-5
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 2

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
700 Pacific Street	Mixed Residential & Commercial	4	North	1A	All	3.1-16.5	11
			West	1C	All	3.1-16.4	4
700 Pacific Street	Mixed Residential & Commercial	10	North	2A	All	3.1-16.5	11
			South	2C	7 to top	3.1-7.8	3
			West	2D	All	3.3-12.6	8
700 Pacific Street	Mixed Residential & Commercial	3	North	3A	All	3.8-18.5	14
			East (northern-most section)	3B	2 to top	3.2-12.7	6
516-518 Carlton Avenue	Residential	4	East	4A	All	3.2-19.4	12
			West	4B	All	3.2-16.5	8
			North	4C	All	3.2-15.7	15
520-522 Carlton Avenue	Residential	4	East	5A	All	3.1-19.4	9
			West	5C	All	3.2-14.5	6
524-526 Carlton Avenue	Residential	4	East	6B	All	3.2-19.4	8
			West	6C	All	3.3-12.6	4
528-530 516-565 Carlton Avenue	Residential	4	East	7B	All	3.1-19.4	7
			West	7C	All	3.3-10.7	4
532-534 Carlton Avenue	Residential	4	East	8B	All	3.5-18.4	7
			West	8D	All	3.2-10.7	4
565 Dean Street	Residential	4	East	9B	All	3.5-18.4	7
			South	9C	2 to top	3.2-9.1	3
			West	9D	All	3.2-7.4	3
541-547 Dean Street	Residential	4	North	10C	2 to top	3.0-7.7	3
			East	10D	All	3.4-7.8	4
521-523 Dean Street	Residential	6	North	12A	Top	3.0-12.2	3
			West	12D	Top	4.8-13.1	3
507-515 Dean Street	Residential	5	South	13A	Top	5.9-8.1	2
			West	13B	Top	3.5-14.1	3
			North	13C	All	3.1-17.0	7
			East	13D	4 to top	3.6-8.6	2
497-501 Dean Street	Residential	5	South	14A	All	3.3-17.2	3
			West	14B	All	3.0-25.9	3
			North	14C	All	3.5-25.9	8
860 Atlantic Avenue	Mixed Residential & Commercial	5	South	15C	4 to top	3.1-7.1	2
856 Atlantic Avenue	Mixed Residential & Commercial	3	South	16C	Top	3.1-10.5	2
			West	16D	Top	3.2-7.8	2
849 Pacific Street	Residential	2	North	17A	All	3.1-11.2	2
			South	17C	All	3.1-11.7	2
849 Pacific Street	Residential	3	North	18A	All	3.2-12.7	2
			South	18C	All	3.5-7.6	5
851-869 Pacific Street	Residential	3	North	19A	All	3.3-11.7	4
			South	19C	All	3.4-6.1	2
474-478 Dean Street	Residential	5	North	24C	All	3.9-10.3	3
			East	24D	2 to top	6.7-13.7	3
46-50 6th Avenue	Residential	4	East	25A	All	3.6-14.0	3
			North	25D	All	3.6-14.0	3
52-60 6th Avenue	Residential	4	East	26B	All	3.6-9.4	3
479 Bergen Street	Mixed Residential & Commercial	3	East	27A	All	3.6-6.9	3
486-492 Dean Street	Residential / Commercial / Institutional	5	North	31A	All	3.7-17.2	3
			West	31C	All	4.0-11.5	3
546-560 Dean Street	Residential/Commercial /Institutional	5	North	32D	Top	3.1-9.0	2
538-542 Carlton Avenue	Residential	5	East	33A	2 to top	3.6-16.4	7
			West	33C	3 to top	3.6-7.4	3
			North	33D	All	3.6-15.5	8

Table 3J-5 (cont'd)
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 2

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
531-549 Bergen Street	Residential	5	West	36C	Top	3.6-8.6	2
			North	36D	Top	3.6-8.6	2
51-55 6th Avenue	Institutional	8	North	37A	3 to top	3.6-13.4	3
			East	37B	5 to top	3.6-10.5	2
			West	37D	4 to top	3.6-4.8	3
555-559 Carlton Avenue	Residential	4	East	38A	2 to top	3.6-17.4	6
			West	38C	All	3.6-13.6	6
			North	38D	All	3.6-18.4	6
586-590 Dean Street	Residential	3	North	39A	All	3.9-15.5	10
610-618 Dean Street	Residential	5	North	40A	All	3.4-19.5	10
636 Dean Street	Residential	3	North	41A	All	3.4-17.5	8
648-652 Dean Street	Residential	4	North	42A	All	3.3-19.5	9
656-660Dean Street	Residential	3	North	43A	All	3.4-17.5	9
			East	43B	2 to top	3.2-10.8	2
552-556 Vanderbilt Avenue	Mixed Residential & Commercial	4	East	44A	Top	5.2-9.2	2
			West	44C	All	3.3-18.5	9
			North	44D	All	3.4-18.5	8
558-564 Vanderbilt Ave	Mixed Residential/Commercial	4	North	45A	Top	3.2-9.0	2
			West	45D	Top	3.2-10.8	2
561-569 Carlton Avenue	Residential	3	West	49C	1	3.6-6.5	2
854 Pacific Street	Residential/Institutional	6	North	50A	5 to top	3.0-8.5	7
			South	50B	5 to top	3.2-11.7	3
			West	50C	4 to top	3.3-13.6	6
856 Pacific Street	Residential/Institutional	3	West	51C	Top	3.3-8.2	2
579-583 Vanderbilt Ave	Mixed Residential & Commercial	4	South	55C	Top	3.4-6.1	3
			West	55D	All	3.4-10.2	6
573-577 Vanderbilt Ave	Mixed Residential & Commercial	3	West	56B	All	3.5-9.3	4
565-569Vanderbilt Avenue	Mixed Residential & Commercial	4	West	57A	All	3.0-10.3	8
			North	57B	All	3.0-7.7	8
678-690 Dean Street	Residential	4	North	60A	All	3.4-11.1	8
585-589 Vanderbilt Avenue	Mixed Residential & Commercial	3	North	61B	All	3.4-8.5	6
212 South Oxford Street	Mixed Residential & Commercial	10	East	82B	All	3.4-10.1	6
			South	82C	All	3.0-11.9	8
			West	82D	3 to top	3.0-7.6	4
202-208 South Oxford Street	Residential	3	East	86B	2 to top	3.6-7.9	4
213 South Oxford Street	Residential	3	West	89A	All	3.4-9.2	7
			East	89B	All	3.5-11.0	6
			South	89C	All	3.4-6.7	6
207-211 South Oxford Street	Residential	3	East	90A	All	3.5-11.1	5
			West	90C	All	3.4-10.1	6
205 South Oxford Street	Residential	2	East	91A	All	3.0-10.2	5
			West	91B	All	3.9-9.2	3
424 Cumberland Street	Residential	3	West	92A	All	4.6-9.2	6
			East	92B	1 & top	3.3-4.5	4
			South	92C	All	3.4-9.2	8
414-422 Cumberland Street	Residential	3	East	93C	All	4.0-10.2	6
408-412 Cumberland Street	Residential	2	East	94C	All	4.0-10.2	3
425 Cumberland Street	Residential	7	East	95A	All	3.0-9.2	5
			South	95B	All	3.0-10.1	8
			West	95C	All	3.4-7.5	6
397-403 Cumberland Street	Residential	3	West	96A	Top	3.3-4.5	2
472-478 Carlton Avenue	Residential	2	West	99A	All	3.0-10.2	5
			East	99B	All	3.4-4.5	2

Table 3J-5 (cont'd)
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 2

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
			South (eastern-most section)	99C	All	3.4-7.5	7
			South (western-most section)	99D	All	3.4-9.2	7
458-470 Carlton Avenue	Residential	3	West	100C	All	3.6-6.6	4
761 Atlantic Avenue	Residential	30	East	103B	All	3.4-10.2	4
			South	103C	All	3.0-11.0	11
			West	103D	3 to top	3.0-11.0	10
761 Atlantic Avenue	Residential	24	South	104B	3 to top	3.6-11.9	11
			West	104C	All	3.6-10.9	11
475 Carlton Avenue	Residential	14	South	105A	All	3.6-9.1	9
			West	105B	All	3.6-10.0	8
			West	105D	11 to top	3.6-5.8	3
475 Carlton Avenue	Residential	13	South	106C	5 to top	3.6-8.3	9
			West	106D	10 to top	3.6-8.2	7
510 Clermont Avenue	Institutional	4	South (western-most section)	109A	All	3.0-10.3	7
			West (northern-most section)	109B	All	3.1-9.5	5
			East	109D	2 to top	3.5-6.9	2
			West (southern-most section)	109F	All	3.0-10.3	7
Phase I Building 2	Residential	28	North (western-most section)	B2C	27 to top	3.9-5.9	3
			East	B2F	17 to top	3.0-6.9	3
Phase I Building 3	Residential	19	East	B3B	All	3.1-20.8	8
			North (eastern-most section)	B3C	12 to top	3.1-14.9	8
			South	B3G	4 to top	5.0-15.9	3
Phase I Building 4	Residential	45	North	B4B	3 to 37	3.1-7.6	6
			East	B4D	All	3.1-18.9	4
			South	B4E	All	3.1-16.8	4

Notes: Each receptor represents one or multiple buildings in the study area.
*Numbers in this column reflect the total duration of the significant adverse construction noise impact over the construction period. This duration may include intermittent years of no significant adverse impact.

Table 3J-6 identifies the ten buildings not predicted to experience significant adverse construction noise impacts in the 2006 FEIS where significant noise impacts are predicted to occur due to construction under Construction Phasing Plan 2 and the presence of receptor noise control measures cannot be confirmed. These buildings were not previously offered receptor noise control measures, because they were not predicted to experience significant adverse construction noise impacts in the 2006 FEIS analysis. One of the buildings is a church whose windows and alternate means of ventilation cannot be identified, and the others are residential buildings with double-glazed windows but at which the presence of an alternate means of ventilation cannot be confirmed and no offer of alternate means of ventilation has been made. These locations are mapped in **Figure 3J-3** highlighted in pink.

Table 3J 6
Summary of Impact Locations Without Receptor Controls
Construction Phasing Plan 2

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Maximum Increase in dBA During Significant Impact Period	Window Type	Alternate Means of Ventilation
856Atlantic Avenue	Mixed Residential & Commercial	5	South	16C	top	3.1-10.5	Double-Glazed	None Visible
849 Pacific Street	Residential	2	North	17A	All	3.1-11.2	Double-Glazed	None Visible
			South	17C	All	3.1-11.7	Double-Glazed	None Visible
854 Pacific Street	Residential/ Institutional	6	North	50A	5 to top	3.0-8.5	Double-Glazed	None Visible
			South	50B	5 to top	3.2-11.7	Double-Glazed	None Visible
			West	50C	4 to top	3.3-13.6	Double-Glazed	None Visible
856 Pacific Street	Residential/ Institutional	3	West	51C	Top	3.3-8.2	Unknown	None Visible
678-690 Dean Street	Residential	4	North	60A	All	3.4-11.1	Double-Glazed	None Visible

At the church building where windows and alternate means of ventilation cannot be identified that is predicted to experience significant impacts for some portion of the construction period under Construction Phasing Plan 2, interior noise levels would depend on what the status of these items are. Typical attenuation provided by single-paned windows would range from 5 dBA for an open window condition (i.e., no alternate means of ventilation) to 20 dBA (i.e., with an alternate means of ventilation/closed-window condition). At the other nine residential buildings where significant impacts are predicted to occur with Construction Phasing Plan 2 and where the presence of an alternate means of ventilation cannot be confirmed and no offer of alternate means of ventilation has been made, if they do not have an alternate means of ventilation, the typical attenuation would be 5 dBA for an open window condition. These levels of attenuation would not be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). Consequently, if construction is conducted according to Phasing Plan 2, these locations would experience significant adverse noise impacts warranting mitigation as a result of construction. Potential receptor controls that could be used to mitigate the impacts at these locations, i.e., provision of an alternate means of ventilation, are discussed in Chapter 5, “Mitigation.”

Existing open space locations in the vicinity of Project construction, as represented by the noise receptor locations described above, would not be expected to experience significant adverse noise impacts resulting from Project construction under Construction Phasing Plan 2.

Construction Noise Levels at Phase II BuildingsProposed Phase II buildings that would be completed and occupied before construction is completed at other Phase II building sites according to Construction Phasing Plan 2 would also experience elevated exterior noise levels due to construction activities. Buildings 5, 6, 8, 9, 10 and 12 would be expected to experience maximum $L_{10(1)}$ noise levels in the mid-60s to high 70s dBA for an extended period during Construction Phasing Plan 2. Buildings 11, 13, 14, and 15 would be expected to experience maximum $L_{10(1)}$ noise levels in the mid-60s to low 80s dBA for an extended period during Construction Phasing Plan 2. These predicted noise levels are based on modeling the worst-case hour of the worst-case month of each year of construction, based on a schedule of equipment and activity provided by the project sponsors’ construction consultant.

As stipulated in the 2006 FEIS, Buildings 12, 13, and 14 are required to provide at least 30 dBA of window/wall attenuation as well as an alternate means of ventilation (i.e., air conditioners). Buildings 5, 6, 8, 9, 10, 11, and 15 are required to provide at least 35 dBA of window/wall attenuation as well as an alternate means of ventilation (i.e., air conditioners). Based on these predicted noise construction noise levels and building attenuation requirements, it would be expected that interior noise levels at Buildings 5, 6, 8, 9, and 10 would be less than the 45 dBA recommended by CEQR interior noise level guidance for residential use even during the loudest periods of construction. At Buildings 11, 12, 13, 14, and 15, with the above-described receptor control measures, interior L_{10} noise levels would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels due to construction are less than 80 dBA at Buildings 11 and 15, and less than 75 dBA at Buildings 12, 13, and 14, as shown in **Appendix B**). However, during some limited time periods the construction noise analysis predicts that construction activities would result in interior noise levels in residential units with windows on certain façades of Buildings 11, 12, 13, 14, and 15 up to the low 50s dBA, which would be greater than the 45 dBA recommended by CEQR interior noise level guidance for residential during some limited periods of construction according to Construction Phasing Plan 2. Such exceedances may be intrusive, but would be only temporary and of limited duration. Consequently, they would not result in any significant impacts.

CONSTRUCTION PHASING PLAN 3

The noise analysis results show that under Construction Phasing Plan 3, predicted noise levels would exceed the CEQR impact criteria at one or more floors of approximately 134 buildings in the study area, including 24 buildings not identified as having a significant impact in the 2006 FEIS. Overall, this is fewer buildings than were identified in the 2006 FEIS as having a significant impact[1]. **Figure 3J-4** shows the locations and **Table 3J-7** summarizes analysis results at locations where predicted noise level increases exceed the CEQR impact criteria at one or more floors. In **Figure 3J-4**, locations predicted to experience significant adverse construction noise impacts under the Extended Build-Out Scenario at one or more floors in the 2006 FEIS analysis are shown in red. Locations predicted to experience significant adverse construction noise impacts at one or more floors that were not identified in the 2006 FEIS analysis and that already have receptor control measures (i.e., double glazed windows and an alternate means of ventilation) are shown in green. Locations predicted to experience significant adverse construction noise impacts at one or more floors that were not identified in the 2006 FEIS analysis that do not have receptor control measures are shown in pink. Tabular year-by-years noise levels for each of the one-hundred and thirty-two (132) receptor sites are shown in **Appendix B**.

[1] See Section G, "Comparison of SEIS Findings and Previous Findings in the 2006 FEIS."

Table 3J-7
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 3

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
700 Pacific Street	Mixed Residential & Commercial	4	North	1A	All	3.5-16.6	15
			West	1C	2 to top	3.2-14.6	5
700 Pacific Street	Mixed Residential & Commercial	10	North	2A	All	3.4-15.6	9
			South	2C	Top	5.5-6.2	2
			West	2D	5 to top	3.2-11.7	6
700 Pacific Street	Mixed Residential & Commercial	3	North	3A	All	5.2-18.5	15
			East (northern-most section)	3B	2 to top	3.1-12.7	3
516-518 Carlton Avenue	Residential	4	East	4A	All	4.4-19.5	13
			West	4B	2 to top	3.1-16.5	6
			North	4C	All	4.0-16.6	15
520-522 Carlton Avenue	Residential	4	East	5A	All	3.3-19.4	10
			West	5C	2 to top	3.1-13.6	3
524-526 Carlton Avenue	Residential	4	East	6B	All	3.3-19.4	7
			West	6C	3 to top	4.4-10.8	3
528-530 Carlton Avenue	Residential	4	East	7B	All	3.1-18.4	7
			West	7C	Top	5.1-9.0	3
532-534 Carlton Avenue	Residential	4	East	8B	All	3.1-18.4	4
565 Dean Street	Residential	4	East	9B	All	3.1-17.4	4
			South	9C	All	3.1-9.3	4
507-515 Dean Street	Residential	5	North	13C	2 to top	3.2-14.2	3
497-501 Dean Street	Residential	5	South	14A	2 to top	5.0-12.5	3
			North	14C	All	3.1-22.0	5
849 Pacific Street	Residential	5	South	17C	All	3.2-9.4	3
849 Pacific Street	Residential	3	South	18C	2 to top	3.0-6.9	3
474-478 Dean Street	Residential	5	North	24C	All	3.1-9.5	3
			East	24D	4 to top	5.4-9.2	3
46-50 6th Avenue	Residential	4	East	25A	All	3.5-12.2	3
			North	25D	All	3.5-13.1	3
52-60 6th Avenue	Residential	4	East	26B	All	3.5-6.3	3
479 Bergen Street	Mixed Residential & Commercial	3	North	27A	Top	3.5-3.9	3
486-492Dean Street	Residential/Commercial /Institutional	5	North	31A	All	5.0-14.3	3
			West	31C	2 to top	4.7-10.6	3
546- 560 Dean Street	Residential/Commercial /Institutional	5	North	32D	Top	3.1-6.1	2
538-542Carlton Avenue	Residential	5	East	33A	All	3.5-15.5	7
			South	33B	Top	3.5-5.0	2
			West	33C	Top	3.5-6.7	2
			North	33D	All	3.5-14.6	7
544-554 Carlton Avenue	Residential	3	East	34A	All	3.5-8.1	2
556-560 Carlton Avenue	Residential	4	East	35B	Top	3.5-5.1	2

Table 3J-7 (cont'd)
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 3

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
51-55 6th Avenue	Institutional	8	North	37A	7 to top	3.5-7.2	3
			West	37D	4, 6 to top	3.0-4.3	2
555-559 Carlton Avenue	Residential	4	East	38A	All	3.5-17.4	7
			West	38C	3 to top	3.5-11.7	4
			North	38D	All	3.5-17.4	7
586-590 Dean Street	Residential	3	North	39A	All	3.4-15.6	7
610-618 Dean Street	Residential	5	North	40A	All	3.4-17.5	8
636 Dean Street	Residential	3	North	41A	All	3.4-14.6	6
648-652 Dean Street	Residential	4	North	42A	All	3.4-16.5	7
656- 660 Dean Street	Residential	3	North	43A	All	3.4-13.6	5
			East	43B	Top	5.1-9.0	3
552-556 Vanderbilt Avenue	Mixed Residential & Commercial	4	East	44A	Top	5.2-7.5	2
			West	44C	All	3.3-12.7	5
			North	44D	All	3.4-17.5	5
573-585 Bergen Street	Residential	3	North	47A	Top	3.5-6.1	2
571-575 Carlton Avenue	Residential	5	East	48B	Top	3.5-8.1	2
561-569 Carlton Avenue	Residential	3	East	49B	2 to top	3.5-8.9	2
854 Pacific Street	Residential/ Institutional	6	South	50B	Top	3.2-8.1	3
			West	50C	5 to top	3.4-9.0	3
579-583 Vanderbilt Avenue	Mixed Residential & Commercial	4	South	55C	Top	4.0-5.3	2
			West	55D	Top	3.5-6.8	3
565-569 Vanderbilt Avenue	Mixed Residential & Commercial	4	West	57A	3 to top	3.0-7.7	3
			North	57B	3 to top	3.1-5.4	3
678-690 Dean Street	Residential	4	North	60A	3 to top	3.4-7.6	3
585-589 Vanderbilt Avenue	Mixed Residential & Commercial	3	North	61B	Top	4.0-5.3	2
173 South Elliott Place	Residential	14	South	81C	13 to top	3.5-6.4	2
212 South Oxford Street	Mixed Residential & Commercial	10	East	82B	All	3.1-9.2	4
			South	82C	All	3.1-11.9	6
			West	82D	5 to top	3.2-6.9	4
213 South Oxford Street	Residential	3	West	89A	All	3.5-6.7	3
			South	89B	All	3.0-8.4	4
			East	89C	All	3.5-6.0	4
207-211 South Oxford Street	Residential	3	East	90A	All	3.1-7.5	3
			West	90C	All	4.0-6.7	2
205 South Oxford Street	Residential	2	East	91A	All	6.0-6.8	3
424Cumberl and Street	Residential	3	West	92A	All	4.0-7.6	4
			South	92C	All	3.0-6.8	4
414-422 Cumberland Street	Residential	3	West	93C	All	3.1-7.6	4

Table 3J-7 (cont'd)
Summary of Locations Exceeding Construction Noise Impact Criteria
Construction Phasing Plan 3

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Increases in dBA During Significant Impact Period	Significant Impact Duration (Years)*
408-412 Cumberland Street	Residential	2	West	94C	All	4.1-6.1	2
425 Cumberland Street	Residential	7	East	95A	4 to top	3.0-7.5	8
			South	95B	2 to top	3.1-10.1	7
			West	95C	2 to top	3.4-6.7	4
472-478 Carlton Avenue	Residential	2	West	99A	All	3.5-8.4	5
	Residential	2	South	99C	All	3.4-6.0	3
	Residential	2	East	99D	All	3.4-6.7	3
761 Atlantic Avenue	Residential	30	East	103B	4, 5, 7 to top	3.4-9.3	5
			South	103C	All	3.0-11.0	15
			West	103D	3 to top	3.0-10.1	11
761 Atlantic Avenue	Residential	24	South	104B	4 to top	3.510.9	11
			West	104C	4 to top	3.5-10.1	11
475 Carlton Avenue	Residential	14	South	105A	7 to top	3.5-9.1	8
			West	105B	6 to top	3.5-8.3	8
			East	105D	Top	3.5-5.8	2
475 Carlton Avenue	Residential	13	South	106C	7 to top	3.5-7.4	5
			West	106D	12 to top	3.5-6.6	2
510 Clermont Avenue	Institutional	4	South (western-most section)	109A	All	3.1-7.0	11
			West (northern most section)	109B	1, 3 to top	3.1-7.0	5
			West (southern-most section)	109F	All	3.1-7.8	11
536-540 Clinton Avenue	Residential	4	West	113C	3 to top	3.5-8.9	4
525 Clinton Avenue	Mixed Residential & Commercial	13	South	117E	11 to top	3.5-7.3	2
Phase I Building 2	Residential	28	North (western-most section)	B2C	27 to top	3.3-6.6	2
			East	B2F	17 to top	3.1-6.2	4
Phase I Building 3	Residential	19	East	B3B	All	3.0-18.8	6
			North (easternmost section)	B3C	12 to top	3.1-14.9	6
			South	B3G	4 to top	4.6-14.9	3
Phase I Building 4	Residential	45	North	B4B	2 to 40, 42 to top	3.0-7.7	4
			East	B4D	All	3.0-18.9	15
			South	B4E	All	3.1-15.9	5

Notes: Each receptor represents one or multiple buildings in the study area.
*Numbers in this column reflect the total duration of the significant adverse construction noise impact over the construction period. This duration may include intermittent years of no significant adverse impact.

At the locations predicted to experience an exceedance of the CEQR impact criteria, the exceedances would be due to noise generated by on-site construction activities (rather than construction-related traffic). As previously discussed, this noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increases in noise levels.

Since the results of this analysis reflect peak hourly noise levels during peak months of construction, it should be noted that at locations predicted to experience significant adverse impacts, the noise levels predicted by this analysis would not occur constantly throughout the predicted duration of impact. Construction activities, and consequently the level of noise generated by construction activities, typically fluctuate from hour to hour throughout the construction work day and from day to day throughout the construction period. During hours of the day outside of the peak hour and during times of the year outside of the peak periods of construction, when less equipment would be operating at the project site, noise levels would be lower than those shown in **Table 3J-7**.

All of the buildings shown in **Table 3J-7** have double-glazed windows or were previously offered storm windows by the project sponsors in accordance with the mitigation requirements stipulated in the 2006 FEIS and MEC. With the exception of eleven buildings represented by four receptor sites (discussed further below), all of the locations shown in **Table 3J-7** have an alternate means of ventilation or were offered air conditioners by the project sponsors. For buildings with double-glazed windows/storm windows and an alternate means of ventilation, interior noise levels would be approximately 25 to 30 dBA less than exterior noise levels. The typical attenuation provided by the windows and alternate ventilation outlined above would be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). At the residences at which significant adverse construction noise impacts are predicted to occur, with these receptor control measures, interior L_{10} noise levels would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels at the receptor locations due to construction are less than 75 dBA, as shown in **Appendix B**). However, during some limited time periods the construction noise analysis predicts that construction activities would result in interior noise levels that would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for these uses.

Table 3J-8 identifies the locations not predicted to experience significant adverse construction noise impacts in the 2006 FEIS where significant noise impacts are predicted to occur due to construction under Construction Phasing Plan 3 and the presence of receptor control measures cannot be confirmed. These locations were not previously offered receptor noise control measures, because they were not predicted to experience significant adverse construction noise impacts in the 2006 FEIS analysis. These locations are residential buildings with double-glazed windows but at which the presence of an alternate means of ventilation cannot be confirmed and no offer of alternate means of ventilation has been made. These locations are mapped in **Figure 3J-4** highlighted in pink.

Table 3J-8
Summary of SEIS Impact Locations Without Receptor Controls
Construction Phasing Plan 3

Building/ Location	Associated Land Use	Maximum Number of Stories	Façade	Associated Receptor(s)	Impacted Floor(s)	Range of Maximum Increase in dBA During Significant Impact Period	Window Type	Alternate Means of Ventilation
849 Pacific Street	Residential	5	South	17C	All	3.2-9.4	Single-Paned	Window AC
854 Pacific Street	Residential/ Institutional	6	South	50B	Top	3.2-8.1	Double-Glazed	None Visible
			West	50C	5 to top	3.4-9.0	Double-Glazed	None Visible
678-690 Dean Street	Residential	4	North	60A	3 to top	3.4-7.6	Double-Glazed	None Visible
536-540 Clinton Avenue	Residential	4	West	113C	3 to top	3.5-8.9	Double-Glazed	None Visible

At the eleven buildings where significant impacts are predicted to occur for some portion of the construction period under Construction Phasing Plan 3 and where the presence of an alternate means of ventilation cannot be confirmed and no offer of alternate means of ventilation has been made, if they do not have an alternate means of ventilation, the typical attenuation would be 5 dBA for an open window condition. This level of attenuation would not be expected to result in interior noise levels during most of the time that are below 45 dBA $L_{10(1)}$ (the CEQR acceptable interior noise level criteria). Consequently, if construction is conducted according to Construction Phasing Plan 3, these residential buildings would experience significant adverse noise impacts warranting mitigation as a result of construction. Potential receptor controls that could be used to mitigate the impacts at these residential locations, i.e., provision of an alternate means of ventilation, are discussed in Chapter 5, “Mitigation.”

Existing open space locations in the vicinity of Project construction, as represented by the noise receptor locations described above, would not be expected to experience significant adverse noise impacts resulting from Project construction under Construction Phasing Plan 3.

CONSTRUCTION NOISE LEVELS AT PHASE II BUILDINGS

Proposed Phase II buildings that would be completed and occupied before construction is completed at other Phase II building sites according to Construction Phasing Plan 3 would also experience elevated exterior noise levels due to construction activities. Buildings 5, 8, 9, and 10 would be expected to experience maximum $L_{10(1)}$ noise levels in the mid-60s to high 70s dBA for an extended period during Construction Phasing Plan 3. Buildings 6, 11, 12, 13, 14, and 15 would be expected to experience maximum $L_{10(1)}$ noise levels in the mid-60s to low 80s dBA for an extended period during Construction Phasing Plan 3. These predicted noise levels are based on modeling the worst-case hour of the worst-case month of each year of construction, based on a schedule of equipment and activity provided by the project sponsors’ construction consultant.

As stipulated in the 2006 FEIS, Buildings 12, 13, and 14 are required to provide at least 30 dBA of window/wall attenuation as well as an alternate means of ventilation (i.e., air conditioners). Buildings 5, 6, 8, 9, 10, 11, and 15 are required to provide at least 35 dBA of window/wall attenuation as well as an alternate means of ventilation (i.e., air conditioners). Based on these predicted noise construction noise levels and building attenuation requirements, it would be expected that interior noise levels at Buildings 5, 8, 9, 10, and 15 would be less than the 45 dBA recommended by CEQR interior noise level guidance for residential use even during the loudest periods of construction. At Buildings 6, 11, 12, 13, and 14, with the above-described receptor control measures, interior L_{10} noise levels would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels due to construction are less than 80 dBA at Buildings 11 and 15, and less than 75 dBA at Buildings 12, 13, and 14, as shown in **Appendix B**). However, during some limited time periods the construction noise analysis predicts that construction activities would result in interior noise levels in residential units with windows on certain façades of Buildings 6, 11, 12, 13, and 14 up to the low 50s dBA, which would be greater than the 45 dBA recommended by CEQR interior noise level guidance for residential during some limited periods of construction according to Construction Phasing Plan 3. Such exceedances may be intrusive, but would be only temporary and of limited duration. Consequently, they would not result in any significant impacts.

NOISE LEVELS AT PROJECT OPEN SPACE

On-site construction activities under any of the three analyzed illustrative construction phasing plans would produce $L_{10(1)}$ noise levels at Project open space areas up to approximately the low 80s dBA, which would exceed the levels recommended by CEQR for passive open spaces (55 dBA L_{10}). (Noise levels in these areas exceed CEQR recommended values for existing and Future Without Phase II conditions.) While this is not desirable, there is no effective practical mitigation that could be implemented to avoid these levels during construction. Noise levels in many of the city's parks and open space areas that are located near heavily trafficked roadways and/or near construction sites experience comparable and sometimes higher noise levels.

SURFACE PARKING ON BLOCK 1129

Currently, Block 1129 includes a surface parking lot used primarily by Arena patrons during events there, and also by construction workers associated with Phase I construction. The surface parking lot use would remain on Block 1129 for an extended duration in the Extended Build-Out Scenario. Noise associated with the existing surface parking lot is one of the components included in measured noise levels during the AM and Pre-Game time periods (the primary times of use of the surface parking) at operational noise receptor sites 5, 6, and 12 shown in Chapter 4G, "Operational Noise," along with traffic on adjacent roadways. Additionally, the Future Without Phase II noise levels at those receptors during those times include the contribution of the traffic associated with all completed Phase I buildings that would travel to and from the parking lot during those times. These noise levels, as shown in Table 4G-6, range from the mid-60s to low 70s dBA, which would be comparable to existing and Future Without Phase II noise levels throughout the study area. These noise levels would also be comparable to noise levels adjacent to Block 1129 in the Future With Phase II, which would not include the existing surface parking use. The noise levels discussed above indicate that the dominant noise source during peak traffic hours would be vehicular traffic on roadways adjacent to the surface parking lot rather than use of the parking lot itself. Consequently, the existing surface parking lot is not expected to contribute substantially to noise levels at nearby receptor locations, and the longer duration of the noise generated by the surface parking lot use on Block 1129 would not constitute a significant adverse noise impact at any nearby sensitive receptors according to *CEQR Technical Manual* noise impact criteria.

G. COMPARISON OF SEIS FINDINGS AND PREVIOUS FINDINGS IN THE 2006 FEIS

The construction noise analysis presented in this SEIS reflects several refinements/changes that have occurred since the construction noise analysis was prepared for the 2006 FEIS. The changes include the following:

(1) The density of analysis receptors has substantially increased for this SEIS. The larger number of analysis receptors used in this SEIS analysis, while covering only slightly more analysis area than that used in the 2006 FEIS, allows for a more refined identification of the locations of potential impacts.

(2) The methodology for calculating Future Without Phase II noise levels has been refined. The CadnaA model has been used in addition to the TNM (the model used in the 2006 FEIS) to calculate Future Without Phase II noise levels at receptor locations on rear or side façades and upper elevations for this SEIS. This refinement in methodology generally resulted in lower Future Without Phase II noise levels at elevated receptor

locations, which had the effect of maximizing construction increments (i.e., the difference in noise levels with construction versus Future Without Phase II noise levels) and increasing the number of identified significant adverse impact locations.

(3) The credit taken for certain noise control measures was reduced, based on recent field experience.

(4) The Phase I construction was assumed to be completed prior to the start of Phase II construction. Only Phase II construction is included in the analysis, and Phase I buildings are included as receptor locations that could experience significant adverse impacts due to Phase II construction.

(5) Phase II construction was modeled based on the three analyzed Construction Phasing Plans, which assume primarily one-shift, construction schedules. These Construction Phasing Plans assume no regular night-time or weekend work and less overlap of construction between buildings. These extended build-out scenarios would occur over a longer overall time period as compared to the construction schedule analyzed in the 2006 FEIS, and would extend the duration of noise level increases, which in some cases brings the duration of the increases to more than 24 consecutive months and thus constitutes a significant adverse impact.

Generally, where the results of this SEIS construction noise analysis differ from those of the 2006 FEIS construction noise analysis, it is due to a combination of the extended construction schedule under each of the three illustrative construction phasing plans, and the refined analysis methodology. The differences in the results between this SEIS analysis and the 2006 FEIS analysis include differences in the location of predicted significant adverse impacts, the duration of predicted significant adverse impacts, and the magnitude of predicted significant adverse impacts.

LOCATION OF IMPACTS

As a result of the analysis changes described above, this SEIS construction noise analysis predicts significant adverse construction noise impacts at a limited number of locations that are different than those predicted in the 2006 FEIS. In **Figures 3J-2, 3J-3, and 3J-4**, locations that were predicted to experience significant adverse impacts in the 2006 FEIS and in analysis of the three illustrative construction phasing plans are highlighted in red. These locations do not cover the entire area predicted to experience significant adverse impacts in the 2006 FEIS as a result of construction. Locations that were not predicted to experience significant adverse construction noise impacts in the 2006 FEIS, but are predicted to experience significant adverse impacts as a result of construction noise under at least one of the three illustrative construction phasing plans are shown in green or pink (depending on whether they already have double-glazed windows and air-conditioning or not). While the number of receptor locations where significant noise impacts are predicted to occur is greater in this SEIS than in the 2006 FEIS, as mentioned above, the area predicted to experience significant impacts in this SEIS is actually smaller compared to the 2006 FEIS, and there are fewer buildings where significant noise impacts are predicted to occur in this SEIS than in the 2006 FEIS. The refinement of the analysis methodology for the SEIS, specifically using a greater number of receptor locations, when compared to the methodology used in the 2006 FEIS of representing many buildings on one block by one receptor location, more precisely indicates which buildings and building façades would experience significant adverse construction noise impacts. Therefore, since each receptor in this

SEIS analysis represents fewer buildings or only one building, the area predicted to experience significant impact is smaller.

At limited times during the construction of Phase II of the Project, P.S. 753 (located at 510 Clermont Avenue and represented by receptor 109), which was not predicted to experience a significant adverse construction noise impact in the 2006 FEIS analysis, would be expected to experience significant adverse noise impacts at one or more floors on the west and south façades under Construction Phasing Plans 1 and 3, and the west, south and east façades under Construction Phasing Plan 2. The maximum impact duration at the school would be nine years under Construction Phasing Plan 1 (see **Table 3J-3**), seven years under Construction Phasing Plan 2 (see **Table 3J-5**), and eleven years under Construction Phasing Plan 3 (see **Table 3J-7**).

The exceedances of CEQR noise impact criteria would occur due to noise generated by on-site construction activities (rather than construction-related traffic). The noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increases in noise levels.

The school building has receptor control measures including double glazed windows and air conditioners. With these receptor control measures, interior L_{10} noise levels in rooms with windows along the east, south, and west façades of the school would be below the CEQR 45 dBA L_{10} recommended level during most periods of time (i.e., the periods during which exterior $L_{10(1)}$ noise levels due to construction are less than 75 dBA, as shown in **Appendix B**). However, during some limited time periods, the school would experience noise levels up to 77.7 dBA at certain floors, which would be in the “marginally unacceptable” category according to *CEQR Technical Manual* criteria. This would result in interior noise levels in the high 40s dBA, which would be above the 45 dBA $L_{10(1)}$ noise level recommended by CEQR for schools. The school is predicted to experience exterior noise levels greater than 75 dBA for no more than two years under Construction Phasing Plan 2 and no more than one year under Construction Phasing Plans 1 and 3.

The predicted noise levels described above (and presented in the tables in this chapter) are based on the assumption of 8-foot site-perimeter noise barriers along Atlantic Avenue because 16-foot barriers may not be feasible and practicable in that location. However, an additional analysis was performed assuming 16-foot site-perimeter noise barriers along Atlantic Avenue, the full results of which are shown in Appendix B. The project sponsors have committed to providing 16-foot site-perimeter noise barriers adjacent to sensitive receptors, including along Atlantic Avenue, if practicable and feasible. With 16-foot noise barriers along Atlantic Avenue during the construction of Buildings 8 and 9, noise levels would be lower at the school building, particularly at the upper elevations of the school. With these 16-foot noise barriers, one or more floors along the east, south, and west facades of the school building would still be expected to experience noise level increments exceeding CEQR impact criteria of an increment in exterior noise levels of 3 to 5 dBA, for a period of five to seven years (see **Appendix B**). However, interior L_{10} noise levels throughout the school during the construction period with these 16-foot noise barriers and the receptor control measures described above would be below the CEQR 45 dBA L_{10} recommended level for schools throughout the entire construction period under each of the three construction phasing plans.

DURATION AND MAGNITUDE OF IMPACTS

As mentioned above, the Extended Build-Out Scenario would result in construction occurring over a longer overall period of time, and result in noise level increases occurring over a longer duration.

In addition to resulting in significant adverse construction noise impacts at some locations not predicted to experience significant adverse construction noise impacts in the 2006 FEIS, this also would result in longer durations of impact at some locations that were predicted to experience significant adverse construction noise impacts in the 2006 FEIS. At locations with line of sight to several Phase II buildings the increased duration of construction at those buildings would extend the overall duration of construction noise level increases. Consequently, with the construction schedule extended, the duration of the significant adverse construction noise impacts would be extended as well in some locations. However, at those receptors predicted to experience significant adverse construction noise impacts in the 2006 FEIS and at which receptor control noise measures were provided by the project sponsors, those measures would continue to partially mitigate the impacts resulting from construction noise.

The duration of predicted significant adverse construction noise impacts at some locations that were predicted to experience significant adverse construction noise impacts in the 2006 FEIS, but are predicted to experience longer impact durations with the Extended Build-Out Scenario, are discussed below. These locations, under at least one of the three analyzed construction phasing plans, are predicted to experience significant adverse construction noise impacts for 8 or more years, i.e., longer than the entire Phase II construction duration analyzed in the 2006 FEIS.

The residential buildings at 700 Pacific Street were represented by receptor Site 4 in the 2006 FEIS construction noise analysis, and were predicted to experience significant adverse construction noise impacts for the entire seven years of Phase II construction. These buildings are represented by receptors Sites 1, 2, and 3 in the construction noise analysis of this SEIS, and are predicted to experience impact durations of up to 15 years (consisting of up to three separate periods of impact lasting up to seven, two, and six years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 1, 14 years (consisting of up to two separate periods of impact lasting up to twelve and two years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 2, and 15 years (consisting of up to two separate periods of impact lasting up to four and eleven years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 3. These buildings have direct lines of sight to Buildings 5, 6, 7, 8, and 14 as well as platform construction. The increased duration of impacts at these receptors would be a result of the longer aggregate duration of construction of these buildings. Comparing the magnitude of impacts at these locations, the noise level increments resulting from construction predicted in the 2006 FEIS ranged from 3.0 to 13.8 dBA, while the more refined analysis in this SEIS predicted noise level increments that ranging from 3.1 to 18.5 dBA during the period of significant adverse impact. This is primarily a result of lower predicted Future Without Phase II baseline (i.e., non-construction) noise levels at some of the additional receptor sites included in the refined analysis methodology, particularly those at higher elevations and rear façades that experience less traffic noise. The predicted maximum absolute noise levels at these locations were comparable between the 2006 FEIS analysis and this SEIS analysis, with maximum $L_{10(1h)}$ noise levels during construction being in the mid-70s dBA.

The residential buildings at 516-522 Carlton Avenue were represented by receptor Sites 4 (north facing façades) and 14 (east facing façades) in the 2006 FEIS construction noise analysis, and were predicted to experience significant adverse construction noise impacts for 7 (north facing façades) or 4 (east facing façades) years. These buildings are represented by receptors Sites 4 and 5 in the construction noise analysis of this SEIS, and are predicted to experience maximum impact durations of 17 years (consisting of up to two separate periods of impact lasting up to eight and nine years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 1, 15 years (consisting of up to two separate periods of impact lasting up to four and eleven years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 2, and 15 years under Construction Phasing Plan 3. These buildings have direct lines of sight to Buildings 6, 7, 8, and 14 as well as platform construction. The increased duration of impacts at these receptors would be a result of the longer aggregate duration of construction of these buildings. Comparing the magnitude of impacts at these locations, the noise level increments resulting from construction predicted in the 2006 FEIS ranged from 3.0 dBA to 15.3 dBA, while the more refined construction noise analysis in this SEIS predicts noise level increments ranging from 3.1 dBA 19.5 dBA during the period of significant adverse impact. This is primarily a result of lower Future Without Phase II baseline (i.e., non-construction) noise levels at some of the receptor sites included in the refined analysis methodology. The predicted maximum absolute noise levels at these locations were comparable between the 2006 FEIS analysis and this SEIS analysis, with maximum $L_{10(1h)}$ noise levels during construction being in the low 80s dBA.

The residential buildings at 636-660 Dean Street and 552 Vanderbilt Avenue (north façade) were represented by receptor Site 5 in the 2006 FEIS construction noise analysis, and were predicted to experience significant adverse construction noise impacts for 6 years. These buildings are represented by receptors Sites 41, 42, 43, and 44 in the construction noise analysis of this SEIS, and are predicted to experience maximum impact durations of 7 years under Construction Phasing Plan 1, 9 years under Construction Phasing Plan 2, and 7 years under Construction Phasing Plan 3. These buildings have direct lines of sight to Buildings 11, 12, 13, and 14. The increased duration of impacts at these receptors would be a result of the longer aggregate duration of construction of these buildings. Comparing the magnitude of impacts at these locations, the noise level increments resulting from construction predicted in the 2006 FEIS ranged from 3.5 to 7.8 dBA, while the more refined construction noise analysis in this SEIS predicts noise level increments ranging from 3.2 to 19.5 dBA during the period of significant adverse impact. This is primarily a result of lower Future Without Phase II baseline (i.e., non-construction) noise levels at some of the receptor sites included in the refined analysis methodology. The predicted maximum absolute noise levels at these locations were comparable between the 2006 FEIS analysis and this SEIS analysis. Based on the 2006 FEIS analysis, maximum $L_{10(1h)}$ noise levels during construction at this location would be in the high 70s dBA. Based on this SEIS analysis, maximum $L_{10(1h)}$ noise levels during construction at this location would be in the low 80s dBA with Construction Phasing Plan 2, or in the high 70s dBA with Construction Phasing Plans 1 and 3.

The residential buildings at 761 Atlantic Avenue were represented by receptor Site 10a in the 2006 FEIS construction noise analysis, and were predicted to experience significant adverse construction noise impacts for the entire 7 years of Phase II construction. These buildings are represented by receptors Sites 103 and 104 in the construction noise analysis of the extended build-out scenarios, and are predicted to experience maximum impact durations of 16 years (consisting of up to two separate periods of impact lasting up to seven and nine years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 1, 11 years under Construction Phasing Plan 2, and 15 years (consisting of up to two separate periods of impact lasting up to four and eleven years each, with at least one year in between in which noise levels do not exceed *CEQR Technical Manual* criteria) under Construction Phasing Plan 3. These buildings have direct lines of sight to Buildings 5, 6, 7, 8, 9 and 10 as well as platform construction. The increased duration of impacts at these receptors would be a result of the longer aggregate duration of construction of these buildings. Comparing the magnitude of impacts at these locations, the noise level increments resulting from construction predicted in the 2006 FEIS ranged from 3.5 to 8.9 dBA, and the more refined construction noise analysis in this SEIS predicts comparable noise level increments ranging from 3.0 to 11.9 dBA during the period of significant adverse impact. The higher increment is primarily a result of lower Future Without Phase II baseline (i.e., non-construction) noise levels at some of the receptor sites included in the refined analysis methodology. The predicted maximum absolute noise levels at these locations were comparable between the 2006 FEIS analysis and this SEIS analysis, with maximum $L_{10(1h)}$ noise levels during construction being in the mid-70s dBA.

Generally, throughout the study area, the absolute noise levels during construction predicted in this SEIS construction noise analysis are comparable in those predicted in the 2006 FEIS. The maximum $L_{10(1)}$ noise levels predicted in the 2006 FEIS ranged from the mid-60s to low 80s dBA, while this SEIS analysis predicts the same range of absolute noise levels, except at one location. At 497 Dean Street, which is represented in this SEIS analysis by receptor Site 14, this SEIS analysis predicts $L_{10(1)}$ noise levels up to 86.8 dBA on the rear and side façades during the construction of the immediately adjacent Building 15. This residential building was represented by Sites 3 and 17 in the 2006 FEIS construction noise analysis, which are across Dean Street. The greater receptor density in the refined SEIS construction noise analysis methodology resulted in a somewhat higher predicted noise level at this building than in the 2006 FEIS construction noise analysis, because it included receptors immediately adjacent to construction. However, this is the only building at which this occurs, since Building 15 is the only building included in the Project that would be constructed on the same block as another existing building. These noise levels are characteristic of those that occur whenever a high-rise apartment building is constructed immediately adjacent to an existing receptor location on the same block in New York City.

Absolute noise levels predicted to occur at the exterior façades of analyzed noise receptor locations in the study area would generally be in the mid-50s to 70s dBA. These noise levels are comparable to noise levels throughout residential areas of New York City. At the upper levels of buildings immediately adjacent to the construction of one or more Project buildings, during the one or two years of the peak construction activity immediately adjacent to these receptors, noise levels in the low 80s dBA would be expected at the exterior façades of these receptors. These noise levels are comparable to those that occur on heavily trafficked multi-lane avenues in New York City. Only at the rear and side façades of 497 Dean Street during the peak periods of construction of Building 15, as described above, would noise levels reach the mid-80s dBA.

In the Extended Build-Out Scenario, the construction of Phase II of the Project would result in significant adverse noise impacts during the construction period at the locations described above. Potential mitigation measures to address these significant adverse noise impacts are addressed in Chapter 5, "Mitigation."

H. VIBRATION

INTRODUCTION

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

Prior to the start of Phase I construction activities a Construction Protection Plan (CPP) was prepared for structures within 90 feet of project construction that would be considered historic. The protection measures specified by this plan included a not-to-exceed threshold for construction-related vibration at the structures, and a program of vibration monitoring to ensure that the threshold was not reached. Vibration monitoring at these sensitive resources commenced in 2008. Since the 2006 FEIS, the Prospect Heights Historic District has been designated by the New York City Landmarks Preservation Commission, which defined the boundaries slightly differently than those analyzed in the 2006 FEIS. As a result, the CPP has been amended to include additional historic resources within the expanded boundaries of the Prospect Heights Historic District that are within 90 feet of the project site where construction activity associated with the Project has or will occur. As described in Chapter 3A, “Construction Overview,” ESD retained a technical consultant, HDR, in the role of an independent mitigation monitor, to coordinate with the project sponsors’ On-site Environmental Monitoring team (OEM) and monitor compliance with the MEC. According to reports from the independent mitigation monitor, during Phase I construction, construction activities have resulted in no vibration threshold exceedances at the monitoring locations, and only very few warning-level vibration events.

An assessment has been prepared to quantify potential vibration impacts of Phase II construction activities on structures and residences near the project site.

CONSTRUCTION VIBRATION IMPACT CRITERIA

For purposes of assessing potential structural or architectural damage, the determination of a significant impact is based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second. For non-fragile buildings, vibration levels below 0.60 inches/second would not be expected to result in any structural or architectural damage.

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

Analysis Methodology

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

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

where: PPV_{equip} is the peak particle velocity in in/sec of the equipment at the receiver location;

PPV_{ref} is the reference vibration level in in/sec at 25 feet; and
D is the distance from the equipment to the received location in feet.

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

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

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

Table 3J-9 shows vibration source levels for typical construction equipment.

Table 3J-9
Vibration Source Levels for Construction Equipment

Equipment	PPV_{ref} (in/sec)	Approximate L_v (ref) (VdB)
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58
Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.		

CONSTRUCTION VIBRATION ANALYSIS RESULTS

The buildings of most concern with regard to the potential for structural or architectural damage due to vibration are the Swedish Baptist Church and nearby row houses along Dean Street, which are immediately adjacent to the Site of Building 15. Consistent with the construction practices at the project site since the 2006 FEIS, vibration levels at buildings within this area will continue to be kept below the 0.50 inches/second PPV limit under the Extended Build-Out Scenario. In addition, the existing monitoring program will continue to ensure that this limit is not exceeded, and that no architectural or structural damage will occur. At all other locations, the distance between construction equipment and receiving building is sufficiently large to avoid vibration levels that would result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are excavators with hydraulic break rams (hoe rams). They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 135 feet. However, the operation would only occur for limited periods of time at a particular location and, therefore, vibration resulting from construction of the Phase II of the Project under the Extended Build-Out Scenario would not rise to the level that would result in any significant adverse impacts. In no case are significant adverse impacts from vibrations expected to occur.

COMPARISON OF SEIS FINDINGS AND PREVIOUS FINDINGS

The conclusions of this SEIS construction vibration analysis are unchanged from those of the Phase II construction vibration analysis in the 2006 FEIS. The analysis concludes that vibration levels would be perceptible in the vicinity of the construction site for limited periods of time due to infrequently occurring construction activities, but these levels were not predicted to pose the potential for structural or architectural damage and were not considered to be significant adverse impacts. As per the 2006 FEIS and MEC the project sponsors are obligated to implement a monitoring program to ensure that no architectural or structural damage to nearby historic buildings would occur because of vibration from construction activities.

In the Extended Build-Out Scenario, the construction of Phase II of the Project would not result in significant adverse vibration impacts during the construction period. ✷