Chapter 17: Noise

A. INTRODUCTION

As described in Chapter 1, "Project Description," the Applicant is seeking discretionary approvals (the "Proposed Actions") to facilitate the development of the Western Rail Yard with new mixed use buildings containing residential, commercial, and community facility space and a hotel resort with gaming, as well as new public open space (the "Proposed Project"). The Western Rail Yard Site (the "WRY Site" or the "Development Site") comprises Block 676, Lots 1 and 5 in the Hudson Yards neighborhood of Manhattan, Community District 4. It occupies the entire area bounded by West 30th and West 33rd Streets and Eleventh and Twelfth Avenues and comprises the western portion of the John D. Caemmerer West Side Yard, an active rail yard where the Long Island Rail Road (LIRR) stores commuter trains.

There is a state process underway to designate locations for downstate gaming licenses; therefore, the Applicant is also presenting for environmental analysis purposes an Alternative Scenario that reflects a similar density and the same open space configuration as the Proposed Project but includes residential, commercial, and hotel buildings without gaming. The scenario that would result in the more conservative analysis is analyzed for each technical area. The analysis provided below considers both "With Action" scenarios.

This chapter assesses the potential for the Proposed Actions to result in significant adverse noise impacts. The analysis determines whether the Proposed Actions would result in increases in noise levels that could have a significant adverse impact on nearby sensitive receptors and also considers noise exposure at noise receptors introduced by the Proposed Actions.

PRINCIPAL CONCLUSIONS

A noise assessment was undertaken to determine the levels of noise attenuation that may be needed to achieve interior noise levels within the new buildings on the Development Site that are acceptable and in accordance with the 2021 *City Environmental Quality Review (CEQR) Technical Manual* guidance. If the dominant noise source is traffic, the *CEQR Technical Manual* has noise attenuation values for buildings based on exterior $L_{10(1)}$ noise levels for the purposes of achieving interior noise levels of 45 dBA or lower for residential, hotel guestroom, or community facility uses and 50 dBA or lower for commercial office uses. The With Action condition $L_{10(1)}$ noise levels were determined by adjusting the existing noise measurements to account for increases in traffic in the future with the Proposed Actions based on the Noise Passenger Car Equivalent proportional analysis results, including the noise contribution from vehicular traffic on adjacent roadways, and by calculating the cumulative noise level in the future condition based on the future vehicular traffic noise on adjacent roadways, helicopter overflights, proposed pool and play areas, and the proposed LIRR electrical facility. No

significant increases in noise levels were predicted to occur at any noise-sensitive receptors as a result of the Proposed Actions.

Based on the projected noise levels for the With Action condition, up to 39 dBA window/wall attenuation would be required to achieve acceptable interior noise levels in the Development Site buildings, per the *CEQR Technical Manual* noise exposure guideline for residential, hotel guestroom, or community facility uses.

To implement the attenuation requirements, Restrictive Declaration (R-230), would be amended to specify the appropriate window/wall attenuation. By meeting the design guidelines specified in the Restrictive Declaration, buildings developed as a result of the Proposed Actions would provide sufficient attenuation to achieve the *CEQR Technical Manual* interior noise level guidelines.

B. ACOUSTICAL FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called "decibels" (dB). The particular character of the sound that we hear is determined by the speed, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 "Hertz" (Hz). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernible and therefore more intrusive than many of the lower frequencies (e.g., diesel truck engine).

"A"-WEIGHTED SOUND LEVEL (DBA)

In order to establish a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and it is the descriptor of noise levels most often used for community noise. As shown in **Table 17-1**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA.

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable.

Table 17-1
Noise Levels of Common Sources

Sound Source	SPL (dBA)
Air Raid Siren at 50 feet	120
Maximum Levels at Rock Concerts (Rear Seats)	110
On Platform by Passing Subway Train	100
On Sidewalk by Passing Heavy Truck or Bus	90
On Sidewalk by Typical Highway	80
On Sidewalk by Passing Automobiles with Mufflers	70
Typical Urban Area	60–70
Typical Suburban Area	50–60
Quiet Suburban Area at Night	40–50
Typical Rural Area at Night	30–40
Isolated Broadcast Studio	20
Audiometric (Hearing Testing) Booth	10
Threshold of Hearing	0
Source: 2021 *CEQR Technical Manual*	

NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by 10 or more decibels. Thus, the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}.

For purposes of analysis of the Proposed Actions, the L_{eq} descriptor has been selected as the noise descriptor to be used in this noise impact evaluation and the L_{10} descriptor has been selected for noise exposure evaluation. The L_{10} descriptor is specified in the *CEQR Technical Manual* noise exposure guidelines when vehicular traffic is the dominant source of noise, as is the case at the Development Site.

C. NOISE STANDARDS AND CRITERIA

NEW YORK *CEQR TECHNICAL MANUAL* NOISE STANDARDS

The *CEQR Technical Manual* sets external noise exposure standards; these standards are shown in **Table 17-2**. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable.

Table 17-2
Noise Exposure Guidelines for Use in City Environmental Impact Review

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	DNL ≤ 60 dBA	**NA**	60 < DNL ≤ 65 dBA	**NA**	(i) 65 < DNL ≤ 75 dBA	**NA**	DNL > 75 dBA
Hospital, nursing home		$L_{10} \leq 55$ dBA		55 < $L_{10} \leq$ 65 dBA		65 < $L_{10} \leq$ 80 dBA		$L_{10} > 80$ dBA	
Residence, residential hotel, or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		65 < $L_{10} \leq$ 70 dBA		70 < $L_{10} \leq$ 80 dBA		$L_{10} > 80$ dBA	
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		55 < $L_{10} \leq$ 70 dBA		70 < $L_{10} \leq$ 80 dBA		$L_{10} > 80$ dBA	
School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, outpatient public health facility		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)	
Commercial or office		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10 PM)		Same as Residential Day (7 AM–10PM)	
Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:
(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more.
(ii) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards; the noise category for train noise is found by taking the L_{dn} value for such train noise to be an $L_{\text{¥}n}$ (L_{dn} contour) value.
[1] Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.
[2] Tracts of land where serenity and quiet are extraordinarily important and serve an important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks, or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet.
[3] One may use Federal Aviation Administration (FAA)-approved L_{dn} contours supplied by the Port Authority of New York and New Jersey, or the noise contours may be computed from the federally approved Integrated Noise Model (INM) Computer Model using flight data supplied by the Port Authority of New York and New Jersey.
[4] External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).
Source: New York City Department of Environmental Protection (DEP) (adopted policy 1983).

The *CEQR Technical Manual* defines attenuation requirements for buildings based on exterior noise level (see **Table 17-3**).

Table 17-3
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Vehicular Traffic	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	$80 < L_{10}$
Aircraft[A]	$65 < DNL \leq 68$	$68 < DNL \leq 71$	$71 < DNL \leq 73$	$73 < DNL \leq 75$	$75 < DNL$
Train	$65 < L_{dn} \leq 68$	$68 < L_{dn} \leq 71$	$71 < L_{dn} \leq 73$	$73 < L_{dn} \leq 75$	$75 < L_{dn}$
Attenuation[B]	(I) 28 dBA	(II) 31 dBA	(III) 33 dBA	(IV) 35 dBA	See note [C]

Notes: [A] DNL descriptor based on average values of L_{dn} over a year period.
[B] The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5 dBA less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
[C] The required attenuation value is the difference between L_{build} and $L_{interior}$, using the appropriate noise descriptor
Where:
L_{build} is the projected noise level under the build condition rounded up to the whole number
$L_{interior}$ is the designed interior noise level (45 dBA for vehicular noise, 40 dBA for aircraft and train noise)
Source: DEP.

IMPACT SIGNIFICANCE CRITERIA

The determination of significant adverse noise impacts in this analysis is informed by the use of both absolute noise level limits and relative impact criteria. According to the *CEQR Technical Manual*, for the purposes of determining a significant impact during daytime hours, it is reasonable to consider a L_{eq} noise level of 65 dBA as an absolute noise level that should not be significantly exceeded. Therefore, a significant noise impact would occur at a sensitive noise receptor (i.e., residences, play areas, parks, schools, libraries, and houses of worship) during daytime hours under the following circumstances:

- A noise increase of 3 dBA or greater is predicted in the future as a result of the proposed action (the With Action condition), when the future noise levels without the proposed action (the No Action condition) is at 62 dBA or greater; or
- When the No Action noise level is below 62 dBA, a predicted noise increase with the proposed action exceeds the difference between 65 dBA and the No Action noise level. For example, if the No Action noise level is 61 dBA, then the maximum noise increment with the proposed action would be 4 dBA, since an increase higher than 4 dBA would result in a noise level that exceeds the 65 dBA L_{eq} significant impact threshold.
- Additionally, an increase of With Action noise levels by 5 dBA over a No Action noise level that is at or below 60 dBA would be considered significant.

D. EXISTING CONDITIONS

SELECTION OF NOISE RECEPTOR LOCATIONS

A total of five receptor locations in and around the Development Site were selected for measurements to determine existing noise levels, for the evaluation of future noise levels with and without the Proposed Actions, and to determine noise attenuation requirements. The proposed noise receptor locations were selected based on the location of the Development Site and existing neighborhood characteristics (e.g., along major road

corridors, adjacent to heliport, etc.). These receptors, due to their proximity to the Development Site, provide an effective and conservative representation of existing ambient noise levels at the Development Site. Three additional noise receptor locations (2a, 3a, and 3b) were also evaluated because each is proximate to a non-traffic noise source included in the Proposed Actions and represents a worst-case condition for evaluation of that noise source. These locations are detailed below in **Table 17-4** and shown in **Figure 17-1**.

Table 17-4
Noise Receptor Locations

Noise Receptor	Location
1	West 33rd Street between Eleventh Avenue and Twelfth Avenue
2	Eleventh Avenue between West 30th Street and West 33rd Street
2a	Southeast Corner of West 33rd Street and Eleventh Avenue (across Eleventh Avenue from louvers associated with LIRR electrical facility)
3	West 30th Street between Eleventh Avenue and Twelfth Avenue
3a	Proposed Project Site A East Façade (adjacent to proposed rooftop play area)
3b	Proposed Project Site B West Façade (adjacent to proposed rooftop play area)
4	Twelfth Avenue between West 30th Street and West 33rd Street
5	The High Line above the intersection of West 30th Street and Twelfth Avenue

NOISE MONITORING

At each receptor location, existing noise levels were determined by field measurements. Noise monitoring was conducted on May 22nd, May 30th, and June 8th, 2024. At receptor Locations 1 through 4, 1-hour spot noise measurements were conducted during the typical weekday AM (7:00 AM–9:00 AM), midday (12:00 PM–2:00 PM), PM (4:00 PM–6:00 PM), and Saturday midday (12:00 PM–2:00 PM) peak period, approximately 5 feet above grade to document at-grade noise levels due to traffic on adjacent roadways as well as helicopter noise experienced at-grade at the receptor location. At receptor Location 5, a 13-hour continuous noise measurement (7:00 AM to 8:00 PM) was conducted on a weekday and a 1-hour noise measurement was conducted during the Saturday midday peak period on the High Line to document noise levels due to traffic on adjacent roadways as well as helicopter noise associated with the West 30th Street Heliport experienced at the receptor location. The period of 7AM to 8PM represents the operating hours of BLADE, the flight service that operates most flights to/from the West 30th Street Heliport. At all noise measurement locations, the microphones were mounted at a height of approximately five feet above grade on a tripod and approximately six feet or more away from any large sound-reflecting surface to avoid major interference with sound propagation.

EQUIPMENT USED DURING NOISE MONITORING

Spot measurements at the first 4 receptors were performed using Brüel & Kjær Type 2250 and Nti Audio XL2 and XL3 Sound Level Meters (SLMs), Brüel & Kjær Type 4189 and Nti Audio M2340 microphones, and Brüel & Kjær Type 4231 and Larson Davis CAL200 Sound Level Calibrators. The SLMs are Class 1 instruments according to ANSI Standard S1.4-1983 (R2006). The SLMs had laboratory calibration dates within the past one year at the time of use. The SLMs were calibrated before and after readings with a Sound Level Calibrators using the appropriate adaptor. The data were digitally recorded

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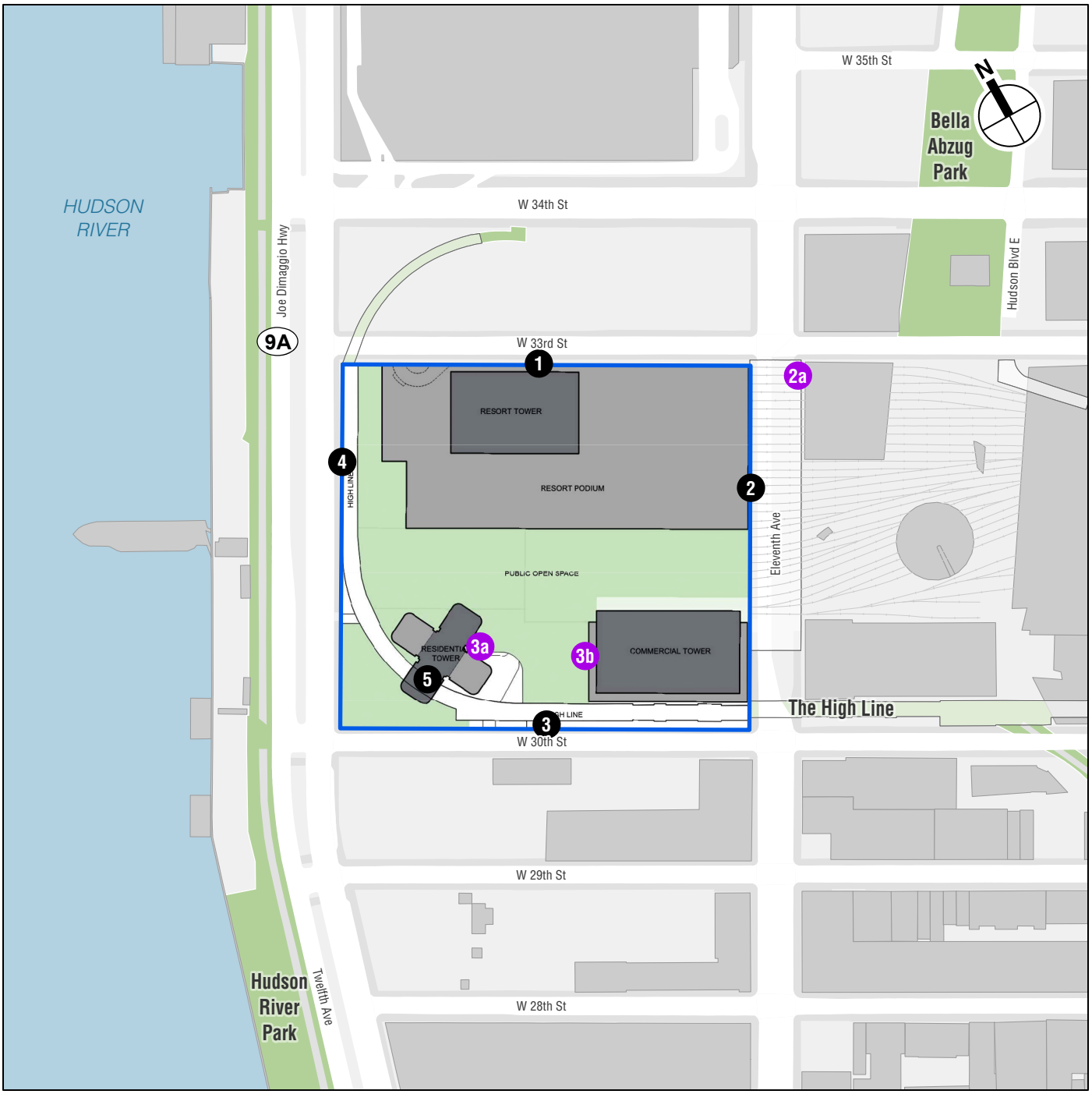

Development Site

Noise Measurement/Analysis Location

Noise Analysis Location

Noise Receptor Locations

WESTERN RAIL YARD MODIFICATIONS

Figure 17-1

by the SLM and displayed at the end of the measurement period in units of dBA. Measured quantities included the L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

EXISTING NOISE LEVELS AT NOISE RECEPTOR LOCATIONS

MEASURED NOISE LEVELS

The results of the measurements of existing noise levels are summarized in **Table 17-5**. Roadway traffic was the dominant noise source for all receptor locations. In terms of *CEQR Technical Manual* criteria, noise levels measured at receptor Location 1 is categorized as "acceptable," and noise levels measured at receptor Locations 2, 3, and 5 were categorized as "marginally unacceptable," and noise levels measured during certain hours at receptor Locations 4 was categorized as "clearly unacceptable."

Table 17-5
Measured Noise Levels (in dBA)

Receptor	Measurement Location	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	West 33rd Street between Eleventh Avenue and Twelfth Avenue	AM	60.8	70.5	61.9	58.8	56.2
		MD	63.1	69.4	64.3	62.1	61.3
		PM	61.9	68.7	63.8	60.5	58.7
		Sat	62.2	69.0	64.8	60.4	58.7
2	Eleventh Avenue between West 30th Street and West 33rd Street	AM	72.6	78.5	75.1	71.7	68.4
		MD	72.1	78.1	74.0	71.0	68.7
		Sat	69.8	76.4	72.1	68.2	66.4
		PM	71.5	77.7	74.1	69.9	67.8
3	West 30th Street between Eleventh Avenue and Twelfth Avenue	AM	70.5	81.7	71.8	65.5	62.5
		MD	69.7	79.1	71.9	66.5	62.2
		PM	70.0	79.2	73.2	67.2	62.7
		Sat	71.3	83.5	72.7	66.2	60.5
4	Twelfth Avenue between West 30th Street and West 33rd Street	AM	78.3	86.9	82.3	73.8	65.5
		MD	76.6	87.1	78.9	71.9	68.3
		PM	76.5	85.6	78.0	71.9	67.7
		Sat	75.5	83.1	80.1	70.7	62.1
5	The High Line above the intersection of West 30th Street and Twelfth Avenue	7 AM	75.1	86.9	75.4	71.8	64.4
		8 AM	71.7	80.4	74.4	69.9	65.1
		9 AM	72.4	82.3	76.7	70.3	64.7
		10 AM	73.7	81.6	77.3	72.3	68.7
		11 AM	71.7	81.8	74.7	69.2	66.2
		12 PM	70.4	80.6	73.0	68.8	65.2
		1 PM	72.3	82.6	74.9	70.2	65.7
		2 PM	70.9	80.4	74.9	68.4	66.2
		3 PM	72.0	82.3	75.4	68.0	65.4
		4 PM	71.2	81.2	74.0	67.8	64.8
		5 PM	71.6	81.1	75.4	68.5	64.9
		6 PM	71.4	83.2	74.0	67.8	63.5
		7 PM	74.1	86.3	76.4	70.8	63.5
		Sat 12PM	67.7	73.5	70.8	66.9	59.7

Note: Field measurements were performed by AKRF, Inc. on May 22nd, May 30th, and June 8th, 2024.

E. NOISE ANALYSIS METHODOLOGY

GENERAL METHODOLOGY

Future noise levels associated with vehicular traffic (including in the future without the Proposed Actions [the No Action condition] and the future with the Proposed Actions [the With Action condition]) were calculated using a proportional modeling technique for each of the receptor locations. The proportional modeling technique is an analysis methodology recommended for analysis purposes in the *CEQR Technical Manual*. The noise analysis examined the weekday AM, midday (MD), PM, and weekend midday peak hours at all receptor locations. The selected time periods are when the Proposed Actions would be expected to result in the maximum traffic generation (based on the traffic studies presented in Chapter 14, "Transportation"), and therefore result in the maximum potential for significant adverse noise impacts. The proportional modeling used for the noise analysis is described below. Additionally, noise associated with the potential play area and rooftop pool and the LIRR electrical facility to be included in the Proposed Project and/or Alternative Scenario were estimated to determine the total projected noise levels in the future With Action condition. Further, since the Development Site is proximate to the West 30th Street Heliport, the proposed development may also experience noise from helicopter activity, so the measured noise levels (including helicopter activity) were also compared to a previous study of helicopter noise (the 2008 *Downtown Heliport at Pier 6 EAS*) to ensure that measured levels would not understate the level of helicopter noise exposure.

PROPORTIONAL MODELING

Proportional modeling was used to determine locations with the potential for having significant noise impacts. Proportional modeling is one of the techniques recommended in the *CEQR Technical Manual* for mobile source analysis.

Using this technique, the prediction of future noise levels where traffic is the dominant noise source is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine No Action condition and With Action condition noise levels. Vehicular traffic volumes are converted into Noise PCE values, for which one medium-duty truck (having a gross weight between 9,900 and 26,400 pounds) is assumed to generate the noise equivalent of 13 cars, and one heavy-duty truck (having a gross weight of more than 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, and one bus (vehicles designed to carry more than nine passengers) is assumed to generate the noise equivalent of 18 cars. Future noise levels are calculated using the following equation:

$F\ NL - E\ NL = 10 * \log_{10} (F\ PCE / E\ PCE)$

where:

F NL = Future Noise Level

E NL = Existing Noise Level

F PCE = Future Noise PCEs

E PCE = Existing Noise PCEs

Sound levels are measured in decibels and therefore increase logarithmically with sound source strength. In this case, the sound source is traffic volumes measured in Noise PCEs. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 PCE and if the future traffic volume were increased by 50 PCE to a total of 150 PCE, the noise level would increase by 1.8 dBA. Similarly, if the future traffic were increased by 100 PCE, or doubled to a total of 200 PCE, the noise level would increase by 3.0 dBA.

PLAYGROUND NOISE

The potential play area and rooftop pool included in the Proposed Project and Alternative Scenario would have the potential to contribute noise exposure at residential units to be created on the Development Site. Estimated play area noise levels projected at the adjacent building façade were used to determine a total level of noise exposure. **Table 17-6** shows measured maximum hourly playground boundary noise levels. These values are based upon measurements made at a series of New York City school playgrounds for the New York City School Construction Authority (SCA).[1]

Table 17-6
Playground Boundary Noise $L_{eq(1)}$ Noise Levels (dBA)

Early Childhood	Elementary Schools	Intermediate Schools	High Schools
71.5	71.4	71.0	68.2
Source: 2021 *New York City Environmental Quality Review (CEQR) Technical Manual.*			

Geometric spreading and the consequent dissipation of sound energy with increasing distance from the playground decreases noise levels at varying distances from the playground boundary. Based upon measurements and acoustical principles, hourly noise levels are assumed to decrease by the following values at the specified distances from the playground boundary: 4.8 dBA at 20 feet, 6.8 dBA at 30 feet, and 9.1 dBA at 40 feet. For all distances between 40 and 300 feet, a 4.5-dBA drop-off per doubling of distances from the playground boundary is assumed.

Noise associated with the play areas were estimated using the Early Childhood playground boundary noise level (to conservatively represent children of any age using the play area) and the noise level reductions with distances as described above.

LIRR ELECTRICAL FACILITY NOISE

The noise level resulting from operation of the LIRR electrical facility associated with the Western Rail Yard was determined and added to the future noise levels with and without the Proposed Actions. The methodology for determining noise from the electrical facility is based on guidance from the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA Report No. 0123, September 2018), which was the methodology used for the 2021 *Western Rail Yards Infrastructure FEIS* (2021 Infrastructure FEIS) electrical facility noise analysis. The FTA guidance specifies a sound exposure level for electrical facilities of 99 dBA, along with formulae to convert to $L_{eq(1h)}$ or L_{dn} and project the noise to the distance of a given receptor. As electrical facility

[1] SCA Playground Noise Study, AKRF, Inc., October 23, 1992.

equipment operation is intermittent, it is conservatively assumed that it will operate continuously 24 hours per day.

HELICOPTER NOISE EXPOSURE

Noise from air traffic was not omitted during the noise measurements. As DNL contour maps are not available for the West 30th Street Heliport and there is no regular night-time use of the heliport, noise measurements were conducted at measurement location 5 to capture noise exposure at the Development Site from aircraft.

To ensure that measured noise levels at the Development Site did not understate noise levels that could be generated by helicopters, the 2008 *Downtown Heliport at Pier 6 EAS* (CEQR# 08BS008M) served as a point of comparison. In the *Downtown Heliport at Pier 6 EAS*, Receptor Site 1 represents the open space associated with the East River Esplanade approximately 280 feet south of the Heliport, and Receptor Site 3 represents the open space associated with 55 Water Street, which is located at an elevated location 600 feet away across the FDR Drive from the Heliport (whereas the Development Site is located approximately 200 feet away from the West 30th Street Heliport). Accordingly, these locations are a comparable representation for the Development Site with respect to helicopter noise from the West 30th Street Heliport. Table 1 of Appendix A of the *Downtown Heliport at Pier 6 EAS* indicates a maximum helicopter noise $L_{eq(1)}$ of approximately 76 dBA at Receptors 1 and 3. Since, as described above, the maximum measured $L_{eq(1)}$ at receptor Location 5 of 75.4 dBA was comparable to the noise level of 76 dBA from the *Downtown Heliport at Pier 6 EAS*, the measured levels at receptor Location 5 serve to represent helicopter noise exposure at the Development Site.

F. THE FUTURE WITHOUT THE PROPOSED ACTIONS

Using the methodology previously described, No Action condition noise levels were calculated at the five mobile source noise analysis receptors for the 2031 analysis year. These No Action values are shown in **Table 17-7**.

By 2031, the maximum increase in $L_{eq(1)}$ noise levels for the No Action condition would be 1.9 dBA or less at the mobile source noise analysis receptors other than receptor Location 1. Changes of this magnitude would be considered barely perceptible and not significant according to *CEQR Technical Manual* noise impact criteria. At receptor Location 1, the change to two-way traffic and additional No Action trips would result in substantial increases in noise levels.

In terms of CEQR noise exposure guidelines, noise levels at receptor Locations 1, 2, 2a, 3, 3a, 3b, and 5 would be in the “marginally unacceptable” category and noise levels at receptor Location 4 would remain in the “clearly unacceptable” category.

Table 17-7
2031 No Action Condition Noise Levels (in dBA)

Receptor	Measurement Location	Time	Existing $L_{eq(1)}$	Electrical Facility $L_{eq(1)}$	No Action $L_{eq(1)}$	$L_{eq(1)}$ Change	No Action $L_{10(1)}$
1[2]	West 33rd Street between Eleventh Avenue and Twelfth Avenue	AM	60.8	65.3	71.7	10.9	72.8
		MD	63.1	65.3	75.4	12.3	76.6
		PM	61.9	65.3	70.5	8.6	72.4
		Sat	62.2	65.3	71.6	9.4	74.2
2	Eleventh Avenue between West 30th Street and West 33rd Street	AM	72.6	0.0	74.3	1.7	76.8
		MD	72.1	0.0	73.7	1.6	75.6
		Sat	69.8	0.0	71.6	1.8	73.9
		PM	71.5	0.0	72.7	1.2	75.3
2a	Eleventh Avenue between West 30th Street and West 33rd Street	AM	72.6	55.9	74.4	1.8	76.9
		MD	72.1	55.9	73.8	1.7	75.7
		Sat	69.8	55.9	71.7	1.9	74.0
		PM	71.5	55.9	72.8	1.3	75.4
3	West 30th Street between Eleventh Avenue and Twelfth Avenue	AM	70.5	0.0	72.4	1.9	73.7
		MD	69.7	0.0	71.4	1.7	73.6
		PM	70.0	0.0	71.8	1.8	75.0
		Sat	71.3	0.0	73.0	1.7	74.4
3a[2]	West 30th Street between Eleventh Avenue and Twelfth Avenue	AM	70.5	0.0	72.4	1.9	73.7
		MD	69.7	0.0	71.4	1.7	73.6
		PM	70.0	0.0	71.8	1.8	75.0
		Sat	71.3	0.0	73.0	1.7	74.4
3b[2]	West 30th Street between Eleventh Avenue and Twelfth Avenue	AM	70.5	0.0	72.4	1.9	73.7
		MD	69.7	0.0	71.4	1.7	73.6
		PM	70.0	0.0	71.8	1.8	75.0
		Sat	71.3	0.0	73.0	1.7	74.4
4	Twelfth Avenue between West 30th Street and West 33rd Street	AM	78.3	0.0	79.4	1.1	83.4
		MD	76.6	0.0	77.5	0.9	79.8
		PM	76.5	0.0	77.2	0.7	78.7
		Sat	75.5	0.0	76.1	0.6	80.7
5	The High Line above the intersection of West 30th Street and Twelfth Avenue	AM	75.1	0.0	75.1	0.0	75.4
		MD[1]	73.7	0.0	73.7	0.0	77.3
		PM	74.1	0.0	74.1	0.0	76.4
		Sat	67.7	0.0	67.7	0.0	70.8

Note:
[1] 10 AM hour used to represent MD time period at site 5 since the maximum L_{10} level was measured during this hour.
[2] Receptors 1, 3a, 3b, and 5 were included only for building attenuation analysis as they do not represent any existing noise-sensitive uses.

G. THE FUTURE WITH THE PROPOSED ACTIONS

Using the methodology previously described, noise levels were calculated for each of the noise analysis receptors for the 2031 analysis year with the Proposed Actions. These With Action values are shown in **Table 17-8** (Proposed Project) and **Table 17-9** (Alternative Scenario).

Table 17-8
With Action Condition Noise Levels – Proposed Project (in dBA)

Receptor	Time	No Action $L_{eq(1)}$	Traffic-Only With Action $L_{eq(1)}$	Playground/ Pool $L_{eq(1)}$	Electrical Facility $L_{eq(1)}$	With Action $L_{eq(1)}$	$L_{eq(1)}$ Change	With Action $L_{10(1)}$
1[2]	AM	71.7	69.3	55.8	65.3	70.9	-0.8	72.0
	MD	75.4	74.8	55.8	65.3	75.3	-0.1	76.5
	PM	70.5	72.4	55.8	65.3	73.3	2.8	75.2
	Sat MD	71.6	74.0	55.8	65.3	74.6	3.0	77.2
2	AM	74.3	74.2	0.0	0.0	74.2	-0.1	76.7
	MD	73.7	74.2	0.0	0.0	74.2	0.5	76.1
	PM	71.6	72.3	0.0	0.0	72.3	0.7	74.6
	Sat MD	72.7	73.8	0.0	0.0	73.8	1.1	76.4
2a	AM	74.4	74.2	0.0	55.9	74.3	-0.1	76.8
	MD	73.8	74.2	0.0	55.9	74.3	0.5	76.2
	PM	71.7	72.3	0.0	55.9	72.4	0.7	74.7
	Sat MD	72.8	73.8	0.0	55.9	73.9	1.1	76.5
3	AM	72.4	74.7	64.7	0.0	75.1	2.7	76.4
	MD	71.4	73.4	64.7	0.0	73.9	2.5	76.1
	PM	71.8	72.7	64.7	0.0	73.3	1.5	76.5
	Sat MD	73.0	73.3	64.7	0.0	73.9	0.9	75.3
3a[2]	AM	72.4	74.7	57.3	0.0	74.8	2.4	76.1
	MD	71.4	73.4	57.3	0.0	73.5	2.1	75.7
	PM	71.8	72.7	57.3	0.0	72.8	1.0	76.0
	Sat MD	73.0	73.3	57.3	0.0	73.4	0.4	74.8
3b[2]	AM	72.4	74.7	69.6	0.0	75.9	3.5	77.2
	MD	71.4	73.4	69.6	0.0	74.9	3.5	77.1
	PM	71.8	72.7	69.6	0.0	74.4	2.6	77.6
	Sat MD	73.0	73.3	69.6	0.0	74.8	1.8	76.2
4	AM	79.4	79.5	0.0	0.0	79.5	0.1	83.5
	MD	77.5	77.8	0.0	0.0	77.8	0.3	80.1
	PM	77.2	77.3	0.0	0.0	77.3	0.1	78.8
	Sat MD	76.1	76.4	0.0	0.0	76.4	0.3	81.0
5	AM	75.1	75.1	0.0	0.0	75.1	0.0	75.4
	MD[1]	73.7	73.7	0.0	0.0	73.7	0.0	77.3
	PM	74.1	74.1	0.0	0.0	74.1	0.0	76.4
	Sat	67.7	67.7	0.0	0.0	67.7	0.0	70.8

Notes:

[1] 10 AM hour used to represent MD time period at site 5 since the maximum L_{10} level was measured during this hour.

[2] Receptors 1, 3a, 3b, and 5 were included only for building attenuation analysis as they do not represent any existing noise-sensitive uses.

Table 17-9
With Action Condition Noise Levels – Alternative Scenario (in dBA)

Receptor	Time	No Action $L_{eq(1)}$	Traffic-Only With Action $L_{eq(1)}$	Playground/ Pool $L_{eq(1)}$	Electrical Facility $L_{eq(1)}$	With Action $L_{eq(1)}$	$L_{eq(1)}$ Change	With Action $L_{10(1)}$
1[2]	AM	71.7	70.8	55.8	65.3	72.0	0.3	73.1
	MD	75.4	75.1	55.8	65.3	75.6	0.2	76.8
	PM	70.5	72.4	55.8	65.3	73.3	2.8	75.2
	Sat MD	71.6	71.7	55.8	65.3	72.7	1.1	75.3
2	AM	74.3	74.4	0.0	0.0	74.4	0.1	76.9
	MD	73.7	74.1	0.0	0.0	74.1	0.4	76.0
	PM	71.6	72.1	0.0	0.0	72.1	0.5	74.4
	Sat MD	72.7	72.9	0.0	0.0	72.9	0.2	75.5
2a	AM	74.4	74.4	0.0	55.9	74.5	0.1	77.0
	MD	73.8	74.1	0.0	55.9	74.2	0.4	76.1
	PM	71.7	72.1	0.0	55.9	72.2	0.5	74.5
	Sat MD	72.8	72.9	0.0	55.9	73.0	0.2	75.6
3	AM	72.4	74.7	64.7	0.0	75.1	2.7	76.4
	MD	71.4	73.4	64.7	0.0	73.9	2.5	76.1
	PM	71.8	72.7	64.7	0.0	73.3	1.5	76.5
	Sat MD	73.0	73.3	64.7	0.0	73.9	0.9	75.3
3a[2]	AM	72.4	74.7	57.3	0.0	74.8	2.4	76.1
	MD	71.4	73.4	57.3	0.0	73.5	2.1	75.7
	PM	71.8	72.7	57.3	0.0	72.8	1.0	76.0
	Sat MD	73.0	73.3	57.3	0.0	73.4	0.4	74.8
3b[2]	AM	72.4	74.7	69.6	0.0	75.9	3.5	77.2
	MD	71.4	73.4	69.6	0.0	74.9	3.5	77.1
	PM	71.8	72.7	69.6	0.0	74.4	2.6	77.6
	Sat MD	73.0	73.3	69.6	0.0	74.8	1.8	76.2
4	AM	79.4	79.7	0.0	0.0	79.7	0.3	83.7
	MD	77.5	78.0	0.0	0.0	78.0	0.5	80.3
	PM	77.2	77.3	0.0	0.0	77.3	0.1	78.8
	Sat MD	76.1	76.1	0.0	0.0	76.1	0.0	80.7
5	AM	75.1	75.1	0.0	0.0	75.1	0.0	75.4
	MD[1]	73.7	73.7	0.0	0.0	73.7	0.0	77.3
	PM	74.1	74.1	0.0	0.0	74.1	0.0	76.4
	Sat	67.7	67.7	0.0	0.0	67.7	0.0	70.8

Notes:
[1] 10 AM hour used to represent MD time period at site 5 since the maximum L_{10} level was measured during this hour.
[2] Receptors 1, 3a, 3b, and 5 were included only for building attenuation analysis as they do not represent any existing noise-sensitive uses

By 2031, the maximum increase in $L_{eq(1)}$ noise levels with the Proposed Actions (Proposed Project or Alternative Scenario) would be no greater than 3 dBA at all noise analysis receptors except for receptor Location 3b. Changes of this magnitude would be considered imperceptible and not significant according to *CEQR Technical Manual* noise impact criteria.

The maximum predicted noise level increment at receptor Location 1 of 3 dBA would be considered readily noticeable according to *CEQR Technical Manual* guidance, but it would not represent a significant adverse noise impact since there are no existing noise-sensitive land uses along West 33rd Street where this receptor is located (i.e., within 40

feet of the louvers associated with the proposed LIRR electrical facility). Similarly, the maximum predicted noise level increment at receptor Location 3b of 3.5 dBA would be considered just noticeable according to *CEQR Technical Manual* guidance, but it would not represent a significant adverse noise impact since there are no existing noise-sensitive land uses within the railyard footprint. Noise exposure at receptors that would be introduced as a result of the Proposed Actions are discussed below in the "Noise Attenuation Measures" section.

In terms of CEQR noise exposure guidelines, noise levels under either With Action at receptor Locations 1, 2, 2a, 3, 3a, 3b and 5 would be in the "marginally unacceptable" category and noise levels at receptor Location 4 would remain in the "clearly unacceptable" category.

In addition, the Proposed Actions would result in increased noise levels at the High Line as well as the newly introduced open space on the Development Site. While the total noise would exceed the 55 dBA $L_{10(1)}$ noise level prescribed by CEQR criteria for outdoor areas requiring serenity and quiet, such levels would be comparable to both existing noise levels in the Development Site as well as to other open spaces in New York City.

H. NOISE ATTENUATION MEASURES

As shown in **Table 17-3**, the *CEQR Technical Manual* has set noise attenuation values for buildings based on exterior noise levels.

Table 17-10 shows the minimum window/wall attenuation necessary to meet the *CEQR Technical Manual* requirements for internal noise levels at each of the noise measurement locations and the additional noise receptor locations representing noise receptors newly introduced by the Proposed Actions. The projected future $L_{10(1)}$ noise levels include the noise contribution from vehicular traffic on adjacent roadways, noise associated with pools and playgrounds, noise associated with the proposed LIRR electrical facility, and helicopter noise.

Based on the values shown in **Table 17-10**, required attenuation levels to provide an interior noise level of 45 dBA for residential, hotel guestroom, or community facility uses and 50 dBA for commercial office uses were determined for the Proposed Actions. These values are shown in **Table 17-11**.

Table 17-10
CEQR-Required Attenuation at Noise Measurement Locations (in dBA)

Receptor	Location	Highest With Action $L_{10(1)}$ Value	Minimum Required Attenuation[1]
1	West 33rd Street between Eleventh Avenue and Twelfth Avenue	77.2	33
2	Eleventh Avenue between West 30th Street and West 33rd Street	76.9	33
2a	Eleventh Avenue between West 30th Street and West 33rd Street	77.0	33
3	West 30th Street between Eleventh Avenue and Twelfth Avenue	76.5	33
3a	Building A East Façade (adjacent to proposed rooftop play area)	76.1	33
3b	Building B West Façade (adjacent to proposed rooftop play area)	77.6	33
4	Twelfth Avenue between West 30th Street and West 33rd Street	83.7	39
5	The High Line above the intersection of West 30th Street and Twelfth Avenue	77.3	33

Note:
[1] Attenuation values are shown for residential, hotel guestroom, or community facility uses; commercial office uses would require 5 dBA less attenuation.

Table 17-11
Minimum Required Attenuation at Development Site (in dBA)

Location	Block	Lots	Façade(s)[3]	Associated Noise Measurement Site(s)	Required Attenuation[1,2]
Development Site	676	1, 5	Below level of High Line and within 50 feet of Twelfth Avenue	4	39
			All Other Façades	5	33

Notes:
[1] Attenuation values are shown for residential, hotel guestroom, or community facility uses; commercial office uses would require 5 dBA less attenuation.
[2] "N/A" indicates that the highest calculated L_{10} is below 70 dBA. The *CEQR Technical Manual* does not specify minimum attenuation guidance for exterior $L_{10(1)}$ values below this level.

To require attenuation at the Development Site, the following measure would be incorporated into Restrictive Declaration (R-230), which would be amended as part of the Proposed Actions. The requirement would be as follows:

> **Block 676, Lots 1 and 5 (Development Site): To ensure an acceptable interior noise environment, future residential/hotel guestroom/community facility/commercial office uses must provide a closed-window condition with a minimum of 39 dBA window/wall attenuation on façades that are both below the level of the High Line and within 50 feet of Twelfth Avenue and 33 dBA window/wall attenuation on all other façades to maintain an interior L_{10} noise level not greater than 45 dBA for residential, hotel guestroom, or community facility uses or not greater than 50 dBA for commercial office uses. To maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation includes, but is not limited to, air conditioning.**

The noise analysis and façade attenuation requirements will be refined between the Draft and Final EIS. The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. Normally, a building façade is composed of the wall, glazing, and any vents or

louvers for HVAC systems in various ratios of area. Buildings proposed to be located on the Development Site would be designed to provide composite window/wall attenuation greater than or equal to the attenuation requirements listed in **Table 17-11**.

By adhering to the window-wall attenuation requirement described above, development under the Proposed Actions would provide sufficient attenuation to achieve acceptable interior noise levels according to *CEQR Technical Manual* interior noise level guidelines. Therefore, the Proposed Actions would not result in any significant adverse noise impacts.

I. MECHANICAL EQUIPMENT

It is assumed that the building mechanical systems (i.e., HVAC systems) associated with the Proposed Actions as well as mechanical equipment associated with the Western Rail Yard, including the LIRR ventilation system, would be designed to meet all applicable noise regulations (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code and the New York City Department of Buildings Code) according to a commitment in the 2021 Infrastructure FEIS, and producing levels that would result in any significant increase in ambient noise levels. Therefore, the Proposed Actions would not result in any significant adverse noise impacts related to building mechanical equipment. ✷