CHAPTER 21: NOISE

A. INTRODUCTION

Noise pollution in an urban environment comes from many sources. Some sources are activities essential to the health, safety, and welfare of the city's inhabitants, such as noise from emergency vehicle sirens, garbage collection operations, and construction and maintenance equipment. Other sources, such as traffic, stem from the movement of people and goods, are essential to the viability of the city as a place to live and do business. Although these and other noise-producing activities are necessary to a city, the noise they produce may be considered undesirable. Urban noise detracts from the quality of the living environment and there is increasing evidence that excessive noise represents a threat to public health.

The *CEQR Technical Manual* sets forth procedures for noise impact evaluation, intending to minimize or prevent negative effects on the community as a result of noise. These procedures formed the basis for an analysis of the noise implications of the Proposed Action. In addition, as certain development sites within the Project Area may receive federal funding from the U.S. Department of Housing and Urban Development (HUD), relevant HUD noise regulations and guidelines were used for analysis. This analysis is provided in a separate section at the end of this chapter entitled "NEPA Considerations".

B. OVERVIEW

The Proposed Action would alter vehicular traffic flow patterns and introduce noise sensitive receptors near stationary sources associated with existing manufacturing uses within the Project Area. As described in Chapter 1, "Project Description," the Project Area is located within 1,500 feet of the elevated New York City Transit (NYCT) J, M, and Z subway lines. As a result, it is anticipated that most of the existing and future noise sensitive receptors would have a direct line-of-sight to the elevated NYCT tracks and therefore may also be potentially impacted by noise generated from the existing subway operations. This chapter assesses the potential effects of the existing and project-generated mobile and stationary noise sources (as described above) have on existing and future noise sensitive receptors identified in the Project Area.

The noise analysis for the Proposed Action and future related actions consisted of the following:

- A screening analysis to determine locations where traffic generated by the Proposed Project and future related actions would have the potential to cause significant noise impacts;

- An analysis to determine if there will be significant mobile and stationary-source noise impacts at the projected and potential development sites within the Project Area;

- An examination of the predicted future noise levels in the Project Area to assess where window-wall attenuation would be required and the level of attenuation needed to ensure that interior noise levels within the Project Area satisfy applicable interior noise criteria.

The Project Area currently experiences moderate to high ambient noise levels that are typical of an urban environment. The results of the noise monitoring conducted for the analysis show that the existing ambient noise levels in the Project Area ranged from a L_{eq} of 59.1 to 72.5 dBA during the daytime, as shown in Table 21.6. The analysis concludes that ambient noise levels in the Project Area would not change significantly because the predicted noise contributions from project-generated mobile and

stationary sources would be minimal when compared to the ambient noise levels for the existing conditions or in the future without the Proposed Action. In addition, with the recommended window-wall attenuation design measures described in Section F, "Future Condition with the Proposed Action," the interior noise levels for any of the buildings constructed at the projected and potential development sites would comply with all applicable requirements. Therefore, the Proposed Action is not expected to result in significant adverse noise impacts.

NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Noise sources that may be typically encountered in an urban environment like New York City are from mobile (i.e. moving) and stationary (i.e. fixed) sources; including motor vehicles (e.g., cars, trucks, buses, etc.) traveling on roadways, airplanes, trains, mechanical equipment associated with industrial or manufacturing operations, or building heating, ventilation, and air conditioning systems. The basic measure of sound is commonly expressed as a logarithmic unit called a decibel (dB).

Generally, the ambient environment contains an assortment of sounds at various frequencies. While the human ear can detect sound pressures ranging from 20 to 20 million micropascals, it only perceives as sound air pressure variations occurring within a frequency range of 20 and 20,000 Hertz (Hz), or cycles per second. However, since humans are most sensitive to frequencies between 200 and 10,000 Hz, atmospheric sound pressure level (SPL) measurements are often adjusted to account for human perception and sensitivities. When such an adjustment is made, the resulting value is called an "A-weighted" sound level. Hence, sound levels measurements recorded in the "A-weighted" scale are expressed as a dBA.

Because the SPL is quantified in a logarithmic scale, noise levels cannot be added or subtracted by ordinary arithmetic means. For example, if two independent sources that generate a noise level of 50 dBA apiece are added together, the resultant noise level is equal to 53 dBA, not 100 dBA. Table 21.1 provides a listing of typical noise levels for some common sources.

Table 21-1:
Noise Levels of Common Sources

Sound Source	Noise Levels in 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: Cowan, James P., Handbook of Environmental Acoustics. Van Nostrand, Reinhold. New York, 1994.
Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

COMMUNITY RESPONSE TO CHANGES IN NOISE LEVELS

Noise may have adverse effects on the human population in a variety of ways. Noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. At a physiological level, noise may also cause annoyance, hearing damage, and other health related problems. The degree of disturbance from unwanted sound depends essentially on three factors:

- The amount and nature of the intruding noise;
- The relationship between background noise and the intruding noise; and
- The type of activity occurring where the noise is heard.

In considering the first of these factors (i.e., amount and nature of the intruding noise), it is important to note that individuals have different sensitivities to noise as it relates to loudness, pitch, and the frequency of occurrence. Loud noises may bother some people more than others; and the frequency at which the noise occurs may also affect someone's perception of whether or not it's offensive. With regard to the second factor (i.e., the relationship between background noise and the intruding noise), individuals tend to judge the annoyance of noise in terms of its relationship to the ambient background levels. For instance, the blowing of a car horn during the late night sleeping hours (e.g. 2 A.M. to 6 A.M.) when background noise levels are typically low would generally be more objectionable than the blowing of a car horn during the daytime when background noise levels are likely to be high (e.g. above 60 dBA). The third factor (i.e., the type of activity occurring where the noise is heard) is related to the interference of noise with the activities of individuals. For instance, normal work activities requiring high levels of concentration may be interrupted by loud noises, while activities requiring minimal effort or concentration may not be interrupted to the same degree.

The average ability of an individual to perceive changes in noise levels is well documented. Studies have shown that a 3-dBA change in noise levels is barely perceptible to the human ear, whereas a change of 5 dBA is readily perceptible. Furthermore, a relative increase of 10 dBA in noise level is not perceived by humans as 10 times louder; rather, they perceive it as twice as loud (see Table 21-2).

Table 21-2:
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Neuman, Inc., Fundamentals and Abatement of Highway Traffic Noise, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

It is also possible to characterize the effects of noise by studying the aggregate response of people in communities. The rating method used for this purpose is based on a statistical analysis of the fluctuations in noise levels in a community, and integrates the fluctuating sound energy over a known period of time, most typically during 1 hour or 24 hours. Various government and research institutions have proposed criteria that attempt to relate changes in noise levels to community response. One commonly applied

criterion for estimating this response is incorporated into the community response scale proposed by the International Standards Organization ("ISO") of the United Nations. This scale relates changes in noise level to the degree of community response and permits direct estimation of the probable response of a community to a predicted change in noise level.

NOISE DESCRIPTORS USED IN ENVIRONMENTAL IMPACT ASSESSMENT

The SPL that humans experience typically varies from moment to moment. Therefore, a variety of descriptors are used to evaluate noise levels over time. Some typical noise descriptors are defined below:

- **L_{eq}** is the continuous equivalent sound level. It is determined by averaging the sound energy from fluctuating SPLs over time to create a single number that describes the mean energy or intensity level. A one-hour duration of the measurement would be shown as $L_{eq(1)}$; a 24-hour measurement would be shown as $L_{eq(24)}$. Since L_{eq} values are logarithms, they cannot be added, subtracted, or compared as a ratio unless the L_{eq} value is converted to its root arithmetic form.

- **L_{dn}** is the day-night equivalent sound level. It is similar to an $L_{eq(24)}$, but with 10 dB added to all SPL measurements taken between 10 P.M. and 7 A.M. to account for the greater sensitivity of human hearing during the nighttime.

- **L_{max}** is the highest SPL measured during a given period of time. It is useful in evaluating L_{eq} for time periods that have an especially wide range of noise levels.

- **L_{10}** is the SPL that is exceeded 10 percent of the time during the measurement period. Other statistical noise descriptors or L_x, such as L_{01}, L_{50}, L_{90} are commonly used in environmental impact assessments to indicate noise levels that are exceeded 1, 50, and 90 percent of the time, respectively.

For the purposes of this analysis, the $L_{eq(1)}$, $L_{10(1)}$, and L_{dn} noise descriptors were used to evaluate the impacts of the Proposed Project. The relationship between the L_{eq} and the levels of exceedance depends on the character of the noise. In community noise measurements, the L_{eq} generally lies between the L_{10} and L_{50}, but when fluctuating traffic noise is the dominant source of noise, the L_{eq} is generally closer to the L_{10}. If the noise level exhibits minimum fluctuation, the L_{eq} would be very near to the L_{50} value. The L_{dn} constitutes the basic form of reference for assessing impacts associated with aircraft or rail noise.

C. METHODOLOGY

The Proposed Action would result in potential increased vehicular-traffic volumes from future development within the 9-block Project Area and locate noise sensitive receptors near existing manufacturing zones and elevated train lines. To evaluate the potential impacts of these mobile and stationary sources, a comprehensive noise analysis was conducted using methodologies described in the *CEQR Technical Manual*. Land use maps were reviewed in conjunction with field observations, to identify residential or other noise sensitive receptors within the Project Area. Following the identification of the noise sensitive uses within the Project Area, the existing ambient noise levels were monitored at six analysis sites.

As shown in Figure 21-1, the analysis sites were selected to provide a geographic representation of the noise sensitive receptors that would exist as a result of the Proposed Action. In accordance with *CEQR Technical Manual* guidelines, noise contours from airports in the vicinity of the Project Area were also reviewed to evaluate the potential effects of aircraft noise at the analysis sites.

Whenever necessary, noise mitigation measures, such as the installation of window-wall attenuation assembly units to minimize the effects on future residential occupants were recommended when the future predicted noise levels exceeded the acceptable interior noise level criteria. The level of sound attenuation recommended was defined to mitigate the highest noise level predicted from the analysis.

MOBILE SOURCES

VEHICULAR TRAFFIC

In accordance with *CEQR Technical Manual* guidelines, a proportional modeling technique using the passenger car equivalence (PCE) concept was employed to determine if the anticipated changes in the vehicular-traffic volumes would result in significant mobile source noise impacts. Traffic volume and vehicle classification data obtained from the traffic analysis in Chapter 18, "Traffic and Parking," was converted into an aggregate PCE value using a proportional weighting which assigns a value of 1 PCE for automobiles, light trucks, or sports utility vehicles, 13 PCEs for medium trucks, 18 PCEs for buses, and 47 PCEs for heavy trucks. The computed PCE value was then used to predict future noise levels based on the proportional change in traffic volume between existing and future conditions using the following equation:

Future Noise Level (dBA) = Existing Noise Level (dBA) + 10* LOG_{10} (Future PCEs/Existing PCEs)

The PCE noise screening analysis was conducted at all six (6) analysis sites for the following traffic peak-hour periods: Weekday morning (AM); Weekday midday (MD); Weekday evening (PM); and Saturday MD. If the results of the PCE noise screening analysis showed that the future noise levels would not increase by 3 dBA or more when compared to the existing conditions, no further analysis was needed to conclude that the Proposed Action would not result in significant mobile source impacts from on-street vehicular traffic, based on the 3-dBA incremental change threshold criteria provided in the *CEQR Technical Manual*.

SUBWAY TRAIN TRAFFIC

Additional noise measurements were collected during the daytime and nighttime periods at analysis site No. 3 to monitor ambient levels in the vicinity of the elevated tracks for the J, M and Z subway lines. The measured noise levels were then used to derive an L_{dn} value using the following equation provided in the Federal Transit Administration's *Transit Noise and Vibration Impact Assessment* guidance document:

$L_{dn} = 10 * LOG [(15) * 10^{(Leq\text{-}day/10)} + 9 * 10^{((Leq\text{-}night + 10/10))}] – 13.8$; whereby

$L_{eq\text{-}day}$ is equal to a weighted average of the $L_{eq(1)}$ values measured during the AM, MD, and PM peak periods, and

$L_{eq\text{-}night}$ is equal to one hourly $L_{eq(1)}$ value measured during the nighttime period.

To assess the effects of noise generated solely by the operation of subway trains on the elevated tracks, the SoundPLAN, Version 6.5 noise model was used to compute the L_{dn} and peak hour L_{eq} values. The measured noise level for a single train pass-by event was used to calibrate the train noise prediction model. Input parameters for the model included: (1) the configuration of the elevated tracks; (2) train schedule; (3) average train speed (4) maximum level for a train pass-by; (5) footprint of buildings in the Project Area and their respective heights; and (6) shielding effects from walls, structures, or barriers.

Noise contours representative of the future potential and projected development sites were provided as model output.

STATIONARY SOURCES

A qualitative assessment was conducted of potential impacts resulting from new stationary sources that may be introduced by the Proposed Action, such as rooftop heating ventilation and air conditioning (HVAC) units, mechanical equipment, or boiler exhausts. In addition, potential noise impacts were assessed from existing industrial uses expected to continue in the Future with the Proposed Action. Noise measurements were taken along Wallabout and Walton Streets to establish the noise levels generated by the unloading and loading activities at or near a existing commercial buildings that are expected to remain in operation in the Future with the Proposed Action.

CONSTRUCTION SOURCES

Potential construction-phase noise and vibration impacts were qualitatively assessed in accordance with *CEQR Technical Manual* guidelines. In addition, preventive measures to ensure compliance with the New York City Department of Environmental Protection (NYCDEP) construction guidelines and the New York City Noise Control Code are identified (see Chapter 22, "Construction Impacts," for more details).

NOISE ATTENUATION REQUIREMENTS

Noise attenuation requirements to satisfy NYCDEP's noise exposure guidelines are recommended based upon the results of the CEQR impact analysis. The PCE noise screening analysis indicated that the incremental change in noise levels as a result of vehicular traffic would be minimal (less than 3 dBA) and would not exceed impact screening thresholds. Potential cumulative effects of vehicular and train traffic noise sources were assessed by using the Traffic Noise Model (TNM) module of SoundPLAN Noise contours for the predicted cumulative noise levels were provided as output representative of the ambient noise levels expected at the future potential and projected development sites.

APPLICABLE NOISE CODES, STANDARDS AND IMPACT CRITERIA

NEW YORK CITY NOISE CONTROL CODE

The New York City Noise Control Code, as amended in December 2005, establishes noise standards for refuse collection vehicles, air compressors, circulation devices, paving breakers, and other devices; requires that all exhausts be muffled; establishes octave band noise level limits for noise sources associated with any commercial or business enterprise; and prohibits all unnecessary noise adjacent to schools, hospitals, and courts. The code also establishes requirements for construction activity, including limiting the hours of construction activities to weekdays between 7:00 A.M. and 6:00 P.M., unless the responsible party obtains after hours work authorization. Table 21-3 provides the maximum octave band noise levels specified in the New York City Noise Control Code.

Table 21-3:
Maximum Sound Pressure Levels for Receiving Properties

Octave Band Frequency (Hertz)	Maximum Sound Pressure Levels in dB, Measured Within Receiving Property as Specified Below	
	Residential receiving property for mixed use building and residential buildings (as measured within any room of the residential portion of the building with windows open, if possible	*Commercial receiving property (as measured within any room containing offices within the building with windows open, if possible*
31.5	70	74
63	61	64
125	53	56
250	46	50
500	40	45
1000	36	41
2000	34	39
4000	33	38
8000	32	37

Source: Section 24-232 of the Administrative Code of the City of New York, as amended December 2005.

NEW YORK CEQR NOISE GUIDELINES AND IMPACT CRITERIA

The New York City Department of Environmental Protection (NYCDEP) has established external noise exposure guidelines for Proposed Actions that introduce noise sensitive receptors as shown in Table 21-4. Noise Exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The guidelines shown are based on maintaining an interior noise level for the worst-case hour L_{10} equal to or less than 45 dBA. Attenuation requirements are shown in Table 21-5.

Additional noise impact criteria established in the *CEQR Technical Manual* compare build condition $L_{eq(1)}$ noise levels to those calculated for the no build conditions at noise sensitive receptors that would be potentially affected by the Proposed Action. The criteria are as follows:

- An increase of 5 dBA or more in the future build $L_{eq(1)}$ noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries, and houses of worship) over those calculated for the future no build conditions, if the future no build $L_{eq(1)}$ noise levels are less than 60 dBA and the analysis period is not a nighttime period.

- An increase of 4 dBA or more in the future build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the future no build conditions, if the future no build $L_{eq(1)}$ noise level is equal to 61 dBA and the analysis period is not a nighttime period.

- An increase of 3 dBA or more in the future build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the future no build conditions, if the future no build $L_{eq(1)}$ noise levels are equal to or greater than 62 dBA and the analysis period is not a nighttime period.

- An increase of 3 dBA or more in the future build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the future no build conditions, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* as being the time period between 10:00 P.M. and 7:00 A.M.).

Table 21-4
Noise Exposure Guidelines
For Use in City Environmental Impact Review[1]

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
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	---------- Ldn ≤ 60 dBA ----------						
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	---------- 60 < Ldn ≤ 65 dBA ----------	$65 < L_{10} \leq 80$ dBA	(1) 65 < Ldn ≤ 70 dBA, (II) 70 ≤ Ldn	$L_{10} > 80$ dBA	---------- Ldn ≤ 75 dBA ----------
3. 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	
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient 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)	
5. 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-10 PM)	
6. 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;

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. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and old-age homes.
3. One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved 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 (adopted policy 1983).

Table 21-5
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
Noise Level with Proposed Action	$65 < L_{10} \leq 70$	$70 < L_{10} \leq 75$	$75 < L_{10} \leq 80$	$80 < L_{10} \leq 85$	$85 < L_{10} \leq 90$	$90 < L_{10} \leq 95$
Attenuation*	25 dB(A)	(I) 30 dB(A)	(II) 35 dB(A)	(I) 40 dB(A)	(II) 45 dB(A)	(III) 50 dB(A)

Note: ***The above composite window-wall attenuation values are for residential dwellings. 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.

Source: New York City Department of Environmental Protection.

D. EXISTING CONDITIONS

PROJECT AREA

Land uses within and surrounding the Project Area include light industrial, manufacturing, commercial, transportation, parking, institutional, open space, mixed uses and residential. Figure 21-1 depicts the location of the six analysis sites that were analyzed. The noise measurement sites selected are representative of the noise-sensitive uses within the Project Area.

NOISE MONITORING INSTRUMENTATION

A Rion NL-22 Precision Sound Level Meter (SLM) was used to obtain field measurements. The SLM meets or exceeds the requirements set forth in the ANSI SI.4-1983 Standards for Type II quality and accuracy. The SLM was set on the A-weighting network in the slow-response mode. The SLM was mounted on a tripod approximately five feet above the ground, equipped with a porous windscreen. This height is generally considered representative of the ear level of an average person. A Brüel & Kjaer 4230 acoustical calibrator was used to calibrate the SLM before each measurement. Additionally, a Dwyer wind meter was used to measure localized wind speeds at each site. No measurements were taken when the ground pavement was wet or when the wind speeds exceeded 12 miles per hour. The SLM recorded the L_{eq}, L_{10}, L_{50}, L_{90}, L_{max}, and L_{min}. Unusual noise events, such as a nearby car alarm or emergency vehicle sirens were avoided during the measurements.

NOISE MONITORING RESULTS

Noise levels for the existing conditions were measured on December 9 and 18; 2008 during the project's weekday peak traffic periods: AM (7:30 A.M. - 9:30 A.M.); Midday (12:00 A.M. - 2:00 P.M.); and PM (4:30 P.M. - 6:30 P.M.). A separate noise measurement was conducted during the nighttime period between 10:00 P.M. and 7:00 A.M. to compute an L_{dn} value at Site 3. Site 3 is located in the middle of the Project Area and has a direct line-of-sight to the elevated train station. Short-term measurements were conducted for at least a 20-minute period to record the $L_{eq(1)}$. Data obtained at these six analysis sites represent the existing noise levels in the vicinity of the Project Area. The measured noise levels are presented in Table 21-6.

Overall, the Project Area exhibited moderate-to-high noise levels associated with vehicular traffic and other localized activities, including pedestrians, kids playing in parks, and overhead aircrafts, which are

common in urban areas. In addition, train noise generated from the elevated NYCT subway lines (J, M, and Z) is a major contributor to the ambient noise levels in the Project Area. The highest daytime noise level recorded was a L_{eq} of 72.5 dBA, which was recorded at Site 1 during the PM peak period. The lowest daytime noise level recorded was a L_{eq} of 59.1 dBA, which was observed at Site 5 during PM peak period. An L_{dn} of 72.1 dB was estimated at Site 3 using the FTA equation that relates noise level data measured during the daytime and nighttime as described in Section C.

In terms of the NYCDEP noise exposure guidelines, noise monitoring Sites 2 and 4 are in the "marginally acceptable" category; while Sites 1, 3, and 6 are in the "marginally unacceptable" category based on the L_{10} descriptor. The L_{10} noise levels at Site 5 are all below 65 dBA; and therefore, are in the "acceptable" category. A brief description of the noise conditions observed at each analysis site is provided below. Field logs that include site diagrams and photos are included in Appendix H.

Table 21-6: Existing Conditions Noise Levels

Noise Monitoring Site	Location	Monitoring Date	Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{max}	L_{min}
1	242-246 Lynch Street	12/9/2008	AM	70.1	72.2	62.1	57.4	85.1	54.0
			MD	71.1	73.3	61.0	56.4	85.7	52.6
			PM	72.5	76.3	63.5	59.2	86.9	55.5
2	159 Lorimer Street	12/9/2008	AM	65.9	69.5	59.9	55.4	80.9	52.8
			MD	64.6	67.4	57.4	53.3	84.1	51.3
			PM	65.0	68.4	59.6	55.4	83.0	53.0
3	62 Throop Avenue	12/18/2009	AM	70.3	73.0	65.2	58.6	90.2	54.9
			MD	70.7	71.7	65.4	58.2	89.1	51.7
			PM	66.9	69.9	63.0	55.9	81.9	50.7
			Night	64.2	67.1	57.8	53.8	80.0	51.2
4	Walton Street (between Union Ave and Harrison Ave)	12/9/2008	AM	62.9	66.3	59.6	55.3	75.7	52.8
			MD	60.0	62.7	57.1	53.8	72.6	51.5
			PM	63.5	65.0	59.7	56.3	83.9	52.1
5	47 Bartlett Street	12/18/2009	AM	61.7	63.5	58.6	56.1	80.1	53.7
			MD	59.9	62.9	54.2	50.7	74.9	48.9
			PM	59.1	61.6	55.3	51.7	74.3	48.9
6	2 Whipple Street	12/18/2009	AM	64.8	68.2	61.2	56.0	80.2	52.7
			MD	66.6	69.8	64.0	59.7	77.7	52.0
			PM	68.4	70.7	65.3	60.8	86.1	54.4

Notes:
1. AM (7:30 A.M. - 9:30 A.M.)
2. MD (12:00 P.M. - 2:00 P.M.)
3. PM (4:30 P.M. - 6:30 P.M.)
4. Night (10:00 P.M. - 7:00 A.M.)

Source: The Louis Berger Group, Inc., 2009.

Source: City of New York Department of City Planning; MapPLUTO Release 07C.1.

** This figure has been modified for the FEIS to reflect the revised boundaries of Projected Development Sites 15 and 16.*

SITE 1: 242-246 LYNCH STREET

Site 1 is situated in front of the projected development site on 242-246 Lynch Street. It is currently a vacant lot located midblock of Lynch Street between Union Avenue and Broadway. The surrounding land uses include transportation and utility towards the north (BP gas station across the street) and industrial/manufacturing land uses toward the west. Broadway is a two-lane roadway with vehicles traveling in northbound and southbound directions; Lynch Street is a one-lane roadway with vehicles traveling eastbound; and Union Avenue is a two-lane roadway with vehicles traveling in northbound and southbound directions. An elevated subway track runs north-south along Broadway, approximately 50 feet from Site 1.The noise level measured during the AM peak period was 70.1 dBA and increased to 72.5 dBA during the PM peak period. During the measurement period, intermittent spikes of noise could be heard from the approach and departure of the subway trains running on the elevated track along Broadway. An L_{max} of 85.1 dBA and 86.9 dBA was recorded during the AM and PM peak periods; respectively. The major noise source in this area is primarily vehicular traffic on Broadway, Union Avenue and Lynch Streets. The vehicular traffic noise was found to be momentarily masked at times when subway trains passed by on the elevated tracks. Other noise sources heard in the area, though not prevalent, include overhead aircraft and pedestrians.

SITE 2: 159 LORIMER STREET

Site 2 is situated in front of the projected development site on 159 Lorimer Street. It is currently a residence that has an outdoor garage, located midblock of Lorimer Street between Harrison Avenue and Throop Avenue. The surrounding land uses include residential, commercial, industrial/manufacturing, and vacant land on the north side of Lorimer Street and public facilities and institutions (i.e., Intermediate School 318 and the De Hostos Playground) on the south side of Lorimer Street. Lorimer Street is a two-lane roadway with vehicles traveling in eastbound and westbound directions; Harrison Avenue is a one-lane roadway with vehicles traveling southbound; and Throop Avenue is a one-lane roadway with vehicles traveling northbound. The highest L_{eq} noise level (i.e., 65.9 dBA) was measured during the AM peak period and the lowest L_{eq} noise level (i.e., 64.6 dBA) was recorded during the Midday peak period. The major noise source in this area is vehicular traffic on Lorimer Street (buses), Harrison Avenue (trucks) and Throop Avenue. Other noise sources heard in the area, though not prevalent, are pedestrians and children in the nearby playground.

SITE 3: 62 THROOP AVENUE

Site 3 is situated in front of the projected development site located at the corner of 62 Throop Avenue. It is currently an industrial/manufacturing building. The surrounding land uses are for commercial and industrial/manufacturing purposes toward the north and west, multi-family residential towards the east and a vacant lot towards the south. Wallabout Street is a one-lane roadway with westbound traffic; while Throop Avenue is a one-lane roadway with northbound traffic. The highest L_{eq} noise level (i.e., 70.7 dBA) was measured during the AM peak period and the lowest L_{eq} noise level (i.e., 64.2 dBA) during the nighttime period (i.e., 6: A.M. to 7 A.M.). The major noise sources in this area are vehicular traffic on Throop Avenue and Wallabout Street (school buses) and train traffic on the elevated tracks. Noise from overhead aircraft was also heard during the measurement period.

SITE 4: WALTON STREET BETWEEN UNION AVENUE AND HARRISON AVENUE

Site 4 is situated in front of the projected development site located on a vacant lot on Walton Street between Union Avenue and Harrison Avenue. The site is surrounded by De Hostos Playground towards the east and transportation/parking uses towards the south and west. Walton Street is a one-lane roadway with eastbound traffic, Harrison Avenue is a one-lane roadway with southbound traffic, and Union

Avenue is a two-lane roadway with northbound and southbound traffic. The highest L_{eq} noise level (i.e., 63.5 dBA) was measured during the PM peak period. The major noise source in the area is vehicular traffic on Harrison Avenue, Walton Street, and Union Avenue (heavy trucks). Other noise sources heard in the area, though not prevalent, are pedestrians and children in the nearby playground.

SITE 5 – 47 BARTLETT STREET

Site 5 is situated in front of the projected development site near 47 Bartlett Street, which is currently a vacant lot. This site is located on a block containing some vacant lots, as well as, industrial/manufacturing and residential buildings. On the south side of Bartlett Street, land uses include transportation/parking, industrial/manufacturing, open space (i.e., Bartlett Playground) and a community facility, a school. Bartlett Street is a one-lane roadway with eastbound traffic, Harrison Avenue is a southbound one-lane roadway, and Throop Avenue is a northbound one-lane roadway. The elevated subway track runs north-south along Broadway, approximately 700 feet from Site 5. The L_{eq} noise levels during the AM and PM peak periods were 61.7 dBA and 59.1 dBA; respectively. The major noise source in this area is vehicular traffic (heavy trucks) on Bartlett Street, Harrison Avenue, and Throop Avenue. Faint noise can be heard from the trains traveling along the elevated track, activities at an auto body shop, and pedestrians.

SITE 6 – 2 WHIPPLE STREET

Site 6 is situated in front of the projected development site on 2 Whipple Street (intersection of Whipple Street and Flushing Avenue). This site is surrounded by industrial/manufacturing land uses towards the north and south of Whipple Street; and public facility/institution (i.e., Bartlett Playground) land uses northeast of the block. Flushing Avenue is a two-lane roadway oriented in the eastbound and westbound directions. Whipple Street has one wide lane which facilitates traffic flow in the eastbound and westbound directions. The highest L_{eq} noise level (i.e., 68.4 dBA) was measured during PM peak period and the lowest L_{eq} noise level (i.e., 64.8 dBA) during the AM peak period. The major noise sources in this area are vehicular traffic on Whipple Street and Flushing Avenue and train traffic on the elevated tracks. Other noise sources heard in the area, though not prevalent, are pedestrians and school children.

E. FUTURE CONDITION WITHOUT THE PROPOSED ACTION

In the future without the Proposed Action, the Project Area is not expected to experience substantial changes other than traffic growth associated with No-Build development projects in the vicinity of the Project Area and a nominal traffic growth adjustment over a ten-year period. To account for the anticipated changes in vehicular traffic, a PCE noise screening analysis was conducted using methodologies described in Section C. Train activities for the NYCT subway lines (J, M, and Z) are not expected to change in the year 2018; therefore, the noise contributions from trains operating on the elevated tracks would remain the same.

Table 21-7 presents the results of the existing PCEs compared to the No-Build PCEs. As shown in Table 21-7, 2018 No-Build traffic volumes would increase by 2.4 to 14.1 percent over the existing traffic volumes. The incremental change in noise levels would be less than 1 dBA at all of the analysis sites. Such an increase in the ambient noise levels would not be noticeable and therefore would not result in significant adverse impacts based on CEQR criteria.

Table 21-7
2018 No-Build Noise Levels Increment Over Existing Conditions

Noise Monitoring Site	Location	Existing Land Use	Time	Existing L_{eq}	No-Build L_{eq}	Percent Increase over Existing	No-Build L_{10}
1	242-246 Lynch Street	Vacant Lot	AM	70.1	70.5	9.7%	72.6
			MD	71.1	71.6	11.5%	73.8
			PM	72.5	72.9	10.3%	76.7
			SAT	-	-	10.0%	-
2	159 Lorimer Street	Residential	AM	65.9	66.2	8.2%	69.8
			MD	64.6	64.8	4.1%	67.6
			PM	65.0	65.5	11.8%	68.9
			SAT	-	-	3.6%	-
3	62 Throop Avenue	Commercial	AM	70.3	70.5	4.1%	73.2
			MD	70.7	71.3	14.1%	72.3
			PM	66.9	67.3	9.6%	70.3
			SAT		-	12.6%	-
4	Walton Street (midblock)	Vacant Lot	AM	62.9	63.1	5.7%	66.5
			MD	60.0	60.4	8.6%	63.1
			PM	63.5	63.8	6.8%	65.3
			SAT		-	6.2%	-
5	47 Bartlett Street	Residential	AM	61.7	61.8	2.4%	63.6
			MD	59.9	60.4	11.1%	63.4
			PM	59.1	59.2	2.4%	61.7
			SAT	-	-	6.9%	-
6	2 Whipple Street	Industrial	AM	64.8	65.2	10.4%	68.6
			MD	66.6	67.1	11.7%	70.3
			PM	68.4	68.9	10.9%	71.2
			SAT	-	-	12.0%	-

Source: The Louis Berger Group, Inc., 2009.

F. FUTURE CONDITION WITH THE PROPOSED ACTION

The predicted 2018 Build noise levels were compared to the existing and No-Build conditions to determine if the incremental changes in noise levels that are attributable to the future with the Proposed Action condition would be significant (a change of 3 dBA or more). The results of the noise analysis are presented below.

MOBILE SOURCES

The incremental change in noise levels attributable to vehicular traffic during the AM, MD, PM, and Saturday MD peak periods are presented in Table 21-8. As shown on Table 21-8, the predicted incremental change in noise levels with the Proposed Action would be less than 1 dBA at all of the analysis sites and therefore would not result in significant adverse impacts.

In terms of the NYCDEP noise exposure guidelines, all noise monitoring sites would remain in the same acceptability categories as under the existing conditions. Sites 2 and 4 remain in the “marginally acceptable” category; while Sites 1, 3, and 6 remain in the “marginally unacceptable” category. Site 5

would remain in the "acceptable" category. As a result, a variation of noise attenuation measures would be required for future development around these sites, as outlined in Table 21-5.

Table 21-8: Incremental Change in Noise Levels from Vehicular Traffic

Noise Monitoring Site	Location	Projected and Potential Land Use	Time	Existing L_{eq}	No-Build L_{eq}	No-Build Increment	Build L_{eq}	Build Increment	Build L_{10}	Exceeds CEQR Significant Impact Threshold <Yes/No>
1	242-246 Lynch Street	Residential & Retail	AM	70.1	70.5	0.4	70.7	*0.2*	*72.8*	**No**
			MD	71.1	71.6	0.5	71.9	*0.3*	*74.1*	
			PM	72.5	72.9	0.4	73.2	*0.3*	*77.0*	
			SAT	-	-	0.4	-	*0.2*	-	
2	159 Lorimer Street	Residential	AM	65.9	66.2	0.3	66.2	*0.0*	*69.8*	**No**
			MD	64.6	64.8	0.2	64.9	*0.1*	*67.7*	
			PM	65.0	65.5	0.5	65.1	*-0.4*	*68.5*	
			SAT	-	-	0.2	-	*0.0*	-	
3	62 Throop Avenue	Residential & Retail	AM	70.3	70.5	0.2	70.7	*0.2*	*73.4*	**No**
			MD	70.7	71.3	0.6	71.7	*0.4*	*72.7*	
			PM	66.9	67.3	0.4	68.0	*0.7*	*71.0*	
			SAT	-		0.5	-	*0.4*	-	
4	Walton Street (midblock)	Residential & Retail	AM	62.9	63.1	0.2	63.2	*0.1*	*66.6*	**No**
			MD	60.0	60.4	0.4	60.6	*0.2*	*63.3*	
			PM	63.5	63.8	0.3	63.9	*0.1*	*65.4*	
			SAT	-	-	0.3	-	*0.1*	-	
5	47 Bartlett Street	Residential	AM	61.7	61.8	0.1	62.4	*0.6*	*64.2*	**No**
			MD	59.9	60.4	0.5	61.2	*0.8*	*64.2*	
			PM	59.1	59.2	0.1	59.4	*0.2*	*61.9*	
			SAT	-	-	0.3	-	*0.6*	-	
6	2 Whipple Street	Commercial & Retail	AM	64.8	65.2	0.4	65.3	*0.1*	*68.7*	**No**
			MD	66.6	67.1	0.5	67.2	*0.1*	*70.4*	
			PM	68.4	68.9	0.5	69.1	*0.2*	*71.4*	
			SAT	-	-	0.5	-	*0.1*	-	

Source: The Louis Berger Group, Inc., 2009.

STATIONARY SOURCES

Existing stationary noise sources within the Project Area include rooftop HVAC systems, truck loading and unloading activities. In the future with the Proposed Action, the future occupants of the residential and commercial development sites may be subjected to noise impacts from existing or newly introduced stationary sources. As described in Section C, "Methodology," noise measurements were taken on January 13, 2009 (a typical weekday) along Wallabout and Walton Streets to monitor noise generated by unloading and loading activities or other noise-producing outdoor activity at the following two existing commercial/manufacturing sites:

- Projected Development Site 25: 54 Throop Avenue; and
- Potential Development Site 28: 297 Wallabout Street.

Results of the short-term measurements show that the unloading and loading activities generate a L_{eq} noise level of approximately 70 dBA. Considering the intensity of the noise levels recorded, infrequent occurrence of such activity, and the high background noise levels in the area; mostly due to a varied mix of cars, trucks, and buses traveling along the local roadways, noise contributions from the unloading and loading activity would not be noticeable. Noise level results are presented in Table 21-9.

In addition, pursuant to the New York City Noise Control Code, any existing or future commercial or business enterprise operating in the city must comply with the octave band noise level limits listed in Table 21-3 for receiving properties. As such, appropriate measures must be taken to shield or attenuate any noise that may be emitted from existing outdoor or newly introduced stationary sources. Therefore, the existing or newly introduced stationary sources would not significantly impact noise sensitive receptors resulting from the Proposed Actions.

Table 21-9: Existing Noise Levels from Stationary Sources

Projected and Potential Site ID	Location	Date	Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{max}	L_{min}
25	54 Throop Avenue	1/13/2009	11:09 AM	**69.6**	71.5	67.0	65.2	85.3	63.5
28	297 Wallabout Street	1/13/2009	10:51 AM	**67.9**	69.0	67.6	66.6	70.7	65.1
			10:59 AM	**67.2**	69.2	66.8	64.4	73.6	62.5

Source: The Louis Berger Group, Inc., 2009.

MOBILE AND STATIONARY NOISE SOURCES CUMULATIVE EFFECTS

The SoundPLAN model predicted that the L_{dn} noise level generated solely from subway operations on the elevated tracks would be 58.5 dB at Site 3 (based on publicly available train schedule information from NYCT). A daily total of 372 daytime and 86 nighttime train pass-by events for the J, M and Z subway lines was used as model input. The model-predicted L_{dn} noise level (i.e., 58.5 dB) from the subway trains operating on the elevated tracks was much lower than the L_{dn} noise level (i.e., 72.1 dB) measured at Site 3 during the noise monitoring program. It was therefore concluded that both train and vehicular traffic are major contributors to the ambient noise levels in the Project Area. Based on the previous analysis described above for stationary noise sources, the noise generated by existing or newly introduced stationary sources in the Project Area was considered to be negligible and therefore was not added as input to the model.

To determine the cumulative effects of the subway train operations and the anticipated vehicular traffic in the Project Area, a second model run was conducted using the NYCT scheduled train pass-by events and the 2018 Build traffic volume and vehicle classification data for both the AM and PM peak hour (this represents a worst-case analysis). The worst-case L_{eq} noise contours predicted by the SoundPLAN model for both the AM and PM peak hour at all six analysis sites were used to evaluate how vehicular and rail traffic noise would propagate over the Project Area with buildings at the development sites in the Future Condition with the Proposed Action.

CEQR NOISE ATTENUATION REQUIREMENTS

The recommended noise attenuation level required to reduce to the acceptable interior L_{10} noise level of 45 dBA or less are presented in Table 21-10 for each of the six noise monitoring sites. Sites 3 and 6 would be required to include at least 30 dBA noise attenuation in the building design. At Sites 2 and 4,

the building design should include measures to provide at least 25 dBA attenuation. Site 1 would be required to provide 35-dBA attenuation in the building design. Since the future noise level at Site 5 was predicted to be below 65 dBA (classified as being "acceptable" as per the NYCDEP exposure guidelines), no level of attenuation would be required. For commercial sites, the required level of attenuation would be reduced by 5 dBA. To achieve the required levels of attenuation, the use of closed or inoperable windows is recommended.

Table 21-10:
CEQR Recommended Noise Attenuation Requirements

Noise Monitoring Site	Location	Projected Land Use	Attenuation Level
1	242-246 Lynch Street	Residential & Retail	35 dBA
2	159 Lorimer Street	Residential	25 dBA
3	62 Throop Avenue	Residential & Retail	30 dBA
4	Walton Street (midblock)	Residential & Retail	25 dBA
5	47 Bartlett Street	Residential	None
6	2 Whipple Street	Residential, Commercial & Retail	30 dBA

Source: The Louis Berger Group, Inc., 2009.

(E) DESIGNATIONS

To avoid the potential for noise impacts, it is recommended that (E) designations for noise be placed on the New York City Zoning Map for the non-publicly owned parcels requiring different levels of attenuation, based on the *CEQR Technical Manual*. Tables 21-11 and 21-12 present the projected and potential development sites along with their block and lot numbers and the level of attenuation needed to comply with the CEQR criteria for interior noise levels.

Although these tables display all tax lots that make up the projected and potential development sites, only those that are privately owned will be mapped with an (E) designation on the zoning map, as indicated in the table. For publicly-owned properties, (E) designations are not recommended. Since development of publicly owned sites would occur through disposition by HPD to a private entity, similar window-wall attenuation measures would be required through the Land Disposition Agreement (LDA) between HPD and a private entity. The provisions would be similar to an (E) designation and would ensure that adequate window-wall attenuation is provided with any future construction, utilizing the noise analysis results presented in this chapter as guidance.

In order to maintain an interior noise level of 45 dB in a closed-window condition, an alternate means of ventilation must also be provided for any development requiring window-wall attenuation above 25 dB/dBA. Alternate means of ventilation includes, but is not limited to, central air conditioning or through the wall air conditioning sleeves fitted with an air conditioner.

Prior to development on the privately owned sites that require noise attenuating measures to meet CEQR interior noise level criteria, the New York City Department of Buildings must receive a report from the Mayor's Office of Environmental Remediation stating that the environmental requirements related to the (E) designation have been met. Therefore, with the placement of (E) designations for noise on the parcels

Table 21-11
Minimum Required Noise Attenuation
For Projected Development Sites in Project Area

Proj Dev Site	Block	Lot	Address	Proposed Zoning	Governing Noise Analysis Site[a]	CEQR Max. Build L_{10}	HUD Max. Build L_{dn}	CEQR Required Attenuation Level[b]	HUD Required Attenuation Level[b]	Implementing Mechanism
1	2274	16	134 Throop Avenue	C4-3 (R6)	6	71.4	73	**30 dBA**	30 dB	(E) designation
2	2274	1	2 Whipple Street	C4-3 (R6)	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2274	5	16 Whipple Street	C4-3 (R6)	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2274	6	Whipple Street	C4-3 (R6)	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2274	24	687 Flushing Avenue	C4-3 (R6)	6	71.4	73	**30 dBA**	30 dB	(E) designation
3	2272	3	207 Harrison Avenue	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
4	2272	6	24 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
5	2272	9	30 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2272	11*	36 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
6	2272	45	11 Whipple Street	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	46	9 Whipple Street	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	147	5 Whipple Street	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	49	669 Flushing Avenue	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	51	665 Flushing Avenue	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	52	665 Flushing Avenue	R7A/C2-4	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	53	663 Flushing Avenue	R7A/C2-4	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	108	Bartlett Street	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
7	2272	54	661 Flushing Avenue	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
	2272	55	659 Flushing Avenue	R7A	6	71.4	73	**30 dBA**	30 dB	(E) designation
8	2269	52*	31 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
9	2269	1	58 Gerry Street	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
10	2269	14*	68 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	16*	72 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	17*	74 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	18*	76 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	19	78 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	p/o 40	84 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	23*	86 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	24*	88 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
11	2269	25	90 Gerry Street	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	27*	84 Throop Avenue	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	28*	86 Throop Avenue	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	29*	88 Throop Avenue	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	30*	90 Throop Avenue	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	31*	90 Throop Avenue	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	33*	69 Bartlett Street	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	35*	65 Bartlett Street	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
	2269	36*	63 Bartlett Street	R7A/C2-4	5	64.2	66	NONE	25 dB	N/A
12	2269	39	57 Bartlett Street	R7A	5	64.2	66	NONE	**25 dB**	N/A

Proj Dev Site	Block	Lot	Address	Proposed Zoning	Governing Noise Analysis Site[a]	CEQR Max. Build L_{10}	HUD Max. Build L_{dn}	CEQR Required Attenuation Level[b]	HUD Required Attenuation Level[b]	Implementing Mechanism
	2269	p/o 40	55 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	41*	53 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	42	51 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
13	2269	43	49 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	44	47 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	45*	43 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	47*	41 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	48*	39 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	49*	37 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2269	50*	35 Bartlett Street	R7A	5	64.2	66	NONE	25 dB	N/A
14	2266	1	Harrison Avenue	R7A/C2-4	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2266	9	366 Wallabout Street	R7A/C2-4	4	66.6	71	25 dBA	**30 dB**	(E) designation
15	2266	14	376 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2266	15	378 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2266	16	380 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2266	17	382 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	~~2266~~	~~18*~~	~~384 Wallabout Street~~	~~R7A~~	~~4~~	~~66.6~~	~~71~~	~~25 dBA~~	~~**30 dB**~~	~~LDA~~
16	2266	18*	384 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	LDA
	2266	19	386 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	20	388 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	21	390 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	22	392 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	23	394 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	24	396 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	25	398 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
17	2266	29	72 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	30	74 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
18	2266	31	76 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	32	78 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2266	34	82 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
19	2266	37	97 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2266	38	95 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
20	2266	39	93 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2266	40	91 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
	2266	41	89 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
21	2266	46	75 Gerry Street	R7A	5	64.2	66	NONE	25 dB	N/A
22	2250	4	161 Harrison Avenue	R7A/C2-4	4	66.6	71	25 dBA	**30 dB**	(E) designation
23	2250	10	86 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2250	11	88 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2250	12	90 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
24	2250	14	94 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2250	46	291 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation

Proj Dev Site	Block	Lot	Address	Proposed Zoning	Governing Noise Analysis Site[a]	CEQR Max. Build L_{10}	HUD Max. Build L_{dn}	CEQR Required Attenuation Level[b]	HUD Required Attenuation Level[b]	Implementing Mechanism
	2250	48	289 Wallabout Street	R7A	4	66.6	71	25 dBA	**30 dB**	(E) designation
26	2250	129	56 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	32	62 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	33	66 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
27	2250	36	313 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	37	311 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
29	2242	2	131 Harrison Avenue	R6A/C2-4	2	69.8	68	25 dBA	25 dB	N/A
	2242	3	100 Harrison Avenue	R6A/C2-4	2	69.8	68	25 dBA	25 dB	N/A
30	2242	53	153 Lorimer Street	R6A	2	69.8	68	25 dBA	25 dB	N/A
	2242	54	151 Lorimer Street	R6A	2	69.8	68	25 dBA	25 dB	N/A
31	2242	45	165 Lorimer Street	R6A	2	69.8	68	25 dBA	25 dB	N/A
	2242	46	167 Lorimer Street	R6A	2	69.8	68	25 dBA	25 dB	N/A
	2242	47	165 Lorimer Street	R6A	2	69.8	68	25 dBA	25 dB	N/A
32	2242	22	196 Middleton Street	R6A	2	69.8	68	25 dBA	25 dB	N/A
33	2238	49	120 Union Avenue	R6A/C2-4	2	69.8	68	25 dBA	25 dB	N/A
34	2238	27	240 Lynch Street	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
35	2238	41	221 Middleton Street	R6A	1	77.0	73	**35 dBA**	30 dB	(E) designation
36	2245	136	Harrison Avenue	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	149	Walton Street	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	35	Union Avenue	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	40	148 Harrison Avenue	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	42	152 Harrison Avenue	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	43	154 Harrison Avenue	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	44	Harrison Avenue	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	47	79 Walton Street	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation
	2245	48	77 Walton Street	R6A/C2-4	1	77.0	73	**35 dBA**	30 dB	(E) designation

Source: Louis Berger Group, Inc., 2009

* indicates publicly owned tax lot - all others are privately owned.

a) To supplement the maximum Build L_{10} and L_{dn} values shown above for the six analysis sites, the L_{eq} noise contours provided by the SoundPLAN model run for the 2018 Build conditions (as described in Section F, under "*Mobile and Stationary Sources Cumulative Effects*") were used to more accurately represent the level of attenuation that would be required at the projected development sites within the Project Area. These SoundPLAN maps are available for reference in Appendix H.

b) Minimum required attenuation levels are shown in bold and highlighted. The higher requirement of the two analyses (CEQR and HUD) has been conservatively applied to the tax lot. Minimum required attenuation levels are shown for residential uses; commercial uses would require approximately 5 dBA less attenuation.

c) Sites listed as N/A under "Implementing Mechanism" were determined to be in the 65-70 dB "marginally acceptable" category according to CEQR, not requiring an (E)-designation. However, should new construction projects on these sites utilized HUD funding, they would be within the "normally unacceptable" category according to HUD noise guidelines, requiring the appropriate level of attenuation indicated in the table.

Table 21-12
Minimum Required Noise Attenuation
For Potential Development Sites in Project Area

Pot. Dev Site	Block	Lot	Address	Proposed Zoning	Governing Noise Analysis Site[a]	CEQR Max. Build L_{10}	HUD Max. Build L_{dn}	CEQR Required Attenuation Level[b]	HUD Required Attenuation Level[b]	Implementing Mechanism
25	2250	27	52 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	28	56 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	29	56 Throop Avenue	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	25	116 Walton Street	R7A/C2-4	3	73.4	75	**30 dBA**	30 dB	(E) designation
28	2250	38	307 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	40	305 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
	2250	41	295 Wallabout Street	R7A	3	73.4	75	**30 dBA**	30 dB	(E) designation
37	2250	6	159 Harrison Avenue	R7A/C2-4	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2250	7	157 Harrison Avenue	R7A-C2-4	4	66.6	71	25 dBA	**30 dB**	(E) designation
	2250	8	155 Harrison Avenue	R7A-C2-4	4	66.6	71	25 dBA	**30 dB**	(E) designation

Source: Louis Berger Group, Inc., 2009

a) To supplement the maximum Build L_{10} and L_{dn} values shown above for the six analysis sites, the L_{eq} noise contours provided by the SoundPLAN model run for the 2018 Build conditions (as described in Section F, under "*Mobile and Stationary Sources Cumulative Effects*") were used to more accurately represent the level of attenuation that would be required at the projected development sites within the Project Area. These SoundPLAN maps are available for reference in Appendix H.

b) Minimum required attenuation levels are shown in bold and highlighted. The higher requirement of the two analyses (CEQR and HUD) has been conservatively applied to the tax lot. Minimum required attenuation levels are shown for residential uses; commercial uses would require approximately 5 dBA less attenuation.

listed in Tables 21-11 and 21-12, no impacts related to noise are expected and no further analysis is warranted.

A noise analysis pursuant to the HUD noise guidance was also conducted for the Proposed Action due to the anticipated use of federal funds for future development in the Project Area. This analysis is presented in section H – "NEPA Considerations". The analysis revealed that the CEQR and HUD noise attenuation requirements for the Proposed Action are generally the same, with the exception of noise monitoring sites 1, 4, and 5. The CEQR and HUD attenuation requirements are both presented in tables 21-11 and 21-12 for informational purposes. The higher noise attenuation requirement of the two analyses (shown in bold and highlighted in both tables) has been conservatively applied to the development sites as the minimum required attenuation level. The "Implementing Mechanism" column shows whether the attenuation will be required through the placement of an (E) designation on the zoning map for privately owned sites, or through the provisions to be included in the LDA between HPD and private entities for publicly owned sites.

G. CONCLUSIONS

The results of the CEQR noise analysis presented above and the HUD analysis that follows show that noise impacts attributable to mobile or stationary sources associated with the Proposed Action would be minimal. However, due to the existing high ambient noise levels in the community, any commercial or residential buildings that are constructed in the Project Area would be required to include appropriate window-wall attenuation measures to achieve an interior noise environment of 45 dB. As discussed above, the provision for providing sufficient attenuation would be mandated by placing an (E) designation on City Zoning Map for the privately owned tax lots needing attenuation based on the *CEQR Technical Manual*. Stationary source noise associated with existing commercial and manufacturing uses which are expected to remain in the future with the Proposed Action has been considered and addressed under the attenuation requirements presented in tables 21-11 and 21-12. Therefore, the Proposed Action would not result in significant adverse noise impacts from mobile and stationary sources.

H. NEPA CONSIDERATIONS

As concluded in the CEQR analysis above, the Proposed Action would not result in significant adverse noise impacts from mobile and stationary sources. Sites whose development would be funded by HUD would need to incorporate appropriate window-wall attenuation measures to maintain appropriate interior noise levels in accordance with HUD criteria. Pursuant to HUD and the National Environmental Policy Act (NEPA) requirements, an additional noise impact analysis was conducted for all six noise analysis sites using the L_{dn} noise descriptor and the work charts in Chapter 5 of the HUD Noise Guidebook. The analysis revealed that the CEQR and HUD noise attenuation requirements for the Proposed Action are generally the same, with the exception of noise monitoring sites 1, 4, and 5. The CEQR and HUD attenuation requirements are both presented in tables 21-11 and 21-12 for informational purposes. The higher noise attenuation requirement of the two analyses (shown in bold and highlighted in both tables) has been conservatively applied to the development sites as the minimum required attenuation level. The "Implementing Mechanism" column shows whether the attenuation will be required through the placement of an (E) designation on the zoning map for privately owned sites, or through the provisions to be included in the LDA between HPD and private entities for publicly owned sites.

HUD ANALYSIS METHODOLOGY

The HUD analysis considered any aircraft, vehicle traffic on roadways and railway (i.e., NYCT elevated subway train lines) noise sources that would contribute to the future ambient noise levels in the Project Area. In accordance with HUD's *Noise Assessment Guidelines* military/civilian airports within 15 miles of the Project Area; as well as, significant roads within 1,000 feet and railroads or trains within 3,000 feet of the Project Area were considered.

In January 2009, HUD developed the "Day-Night Noise Level Assessment Tool", which is a web-based application of the Noise Assessment Guidelines that calculates the L_{dn} from both roadway and railway traffic. Using the web-based assessment tool, the noise levels from each source affecting the sensitive receptor site were combined to derive an overall L_{dn} for the existing, 2018 No-build and 2018 Build conditions of the Proposed Action. The L_{dn} predicted for the 2018 Build conditions were compared to HUD's Site Acceptability Standards listed in Table 21-11.

AIRPORT NOISE

The 2003 L_{dn} contours were obtained for La Guardia Airport, John F. Kennedy International Airport, and Newark Liberty International Airport. The Project Area was not located within any of the 65 dB L_{dn} contours of these airports.

ROADWAY NOISE

Data parameters used to calculate an overall L_{dn} value for roadway noise include: (1) relative distance from noise sensitive receptors to roadways; (2) relative distance from noise sensitive receptors to stop signs; (3) roadway gradient,; (4) average speed; (5) averaged daily traffic (ADT) volumes and vehicle classifications for each roadway; and (6) percentage of nighttime traffic (i.e., 10 P.M. to 7 A.M). For the purposes of the HUD analysis, buses that are capable of carrying more than 15 passengers are considered heavy trucks; otherwise, they are considered as a medium truck.

RAILWAY NOISE

Data parameters used to calculate an overall L_{dn} value for the elevated train noise include: (1) relative distance from the noise sensitive receptors to the center of the elevated train's track; (2) daily number of train pass-bys; (3) percentage of trains operating during nighttime; (4) average number of subway cars per train; (5) average train speed; and (6) type of track system (e.g. bolted or welded tracks).

HUD RESIDENTIAL CRITERIA

To ensure a suitable living environment, HUD has a noise abatement and control policy that is codified in Title 24 of the Code of Federal Regulations (24 CFR) Part 51. The policy provides noise standards, criteria and guidelines for determining project acceptability and necessary mitigation measures for federally assisted housing projects. As shown in Table 21-13, the HUD Site Acceptability Standards consider an L_{dn} of 65 dB or less to be acceptable because it is assumed that standard construction would provide an average attenuation of 20 dB. However, an additional noise level attenuation of 5 dB would be required for sites with an L_{dn} above 65 dB, but not exceeding 70 dB. Given the 20-dB reduction expected from standard building construction practices, an additional noise level attenuation of 10 dB would be required for sites with an L_{dn} above 70 dB but not exceeding 75 dB. An L_{dn} above 75 dB would not be considered acceptable.

Table 21-13
U.S. Housing and Urban Development Site Acceptability Standards

	Exterior Day-Night Average Noise Level (L_{dn})	Special Approvals and Requirements
Acceptable	Not exceeding 65 dB	None
Normally Unacceptable	Above 65 dB but not exceeding 75 dB	Special Approvals Environmental Review Attenuation[1]
Unacceptable	Above 75 dB	Special Approvals Environmental Review Attenuation[2]

Notes:
1. 5 dB additional attenuation is required for sites above 65 dB but not exceeding 70 dB and 10 dB additional attenuation is required for sites above 70 dB but not exceeding 75 dB.
2. Attenuation measures are to be submitted to the U.S. Housing and Urban Development (HUD) for approval on a case-by-case basis.

Source: Title 24, Code of Federal Regulations, Part 51.103, Criteria and Standards.

HUD ANALYSIS RESULTS

The L_{dn} for roadway and railway noise was computed using HUD's web-based noise assessment tool. A comparison of the L_{dn} noise levels associated with the existing, No-Build, and Build conditions show that the L_{dn} noise level in the Project Area would remain the same at Sites 2, 3, and 4; and would increase by no more than 2 dB at Sites 1, 5, and 6. In terms of HUD's site acceptability standards, Sites 1 through 6 would fall in the "normally unacceptable" category (see Table 21-14).

HUD NOISE ATTENUATION REQUIREMENTS

According to HUD guidance a 20-dB reduction in noise levels is realized when standard building construction practices are adhered to for sites in "new development zones." Accordingly, Sites 2 and 5 would need to provide an additional 5 dB attenuation (25 dB attenuation, in total) to achieve the acceptable interior L_{dn} noise level of 45 dB or less. Sites 1, 3 and 4 would need an additional 10 dB attenuation (30 dB attenuation, in total) to achieve the acceptable interior L_{dn} noise level of 45 dB or less.

NOISE ATTENUATION DESIGN CONSIDERATIONS

Reduction of noise levels may occur at the noise source, along the path of the noise, or at receiver locations. Reduction of noise levels occurs in varying degrees: (1) as sound propagates from the source over terrain surfaces due to scattering effects and ground attenuation; (2) as the distance between the source and receiver increases due to dispersion; and (3) when intervening structures, walls or windows intersect the path of the noise source to the receiver by means of diffraction, reflection, and absorption.

For the interior space of the proposed residential or commercial uses, it is important to consider the noise reduction ratings of building materials used during construction. The building materials, such as wall panels, windows, doors, etc., should be specifically designed to achieve the desired noise level reduction. Acoustical windows and doors with significant sound-reducing capabilities could also be utilized. Based on information provided in the FHWA publication, *Insulation of Buildings against Highway Noise*, a double-glazed window with ¼-inch glass panels and 2¼-inch airspace in the middle would be necessary to obtain a 35 dBA reduction in noise levels. A solid core door of 1¾-inch wood with a drop seal

threshold also would be necessary to achieve a 35 dBA reduction. To achieve 30 dBA reduction, a double-glazed window with 1/8-inch glass panels and 2¼ -inch airspace in the middle would be required.

Table 21-14:
HUD Predicted L_{dn} Noise Levels in dB

Site	Location	Projected And Potential Land Use	2008 Existing L_{dn}	2018 No-Build L_{dn}	2018 Build L_{dn}	HUD Acceptability Standards For 2018 Build L_{dn}			
						Acceptable	Normally Unacceptable		Unacceptable
						< 65 dB	65 - 70 dB	70 - 75 dB	> 75 dB
1	242-246 Lynch Street	Residential & Retail	73	74	73			X	
2	159 Lorimer Street	Residential	68	68	68		X		
3	62 Throop Avenue	Residential & Retail	75	75	75			X	
4	Walton Street (midblock)	Residential & Retail	71	71	71			X	
5	47 Bartlett Street	Residential	67	68	66		X		
6	2 Whipple Street	Commercial & Retail	72	73	73			X	

Note: Attenuation for Normally Unacceptable Noise levels – 65 dB to 75 dB

65 dB - 70 dB = 5 dB additional attenuation and special environmental clearance

70 dB - 75 dB = 10 dB additional attenuation and special environmental clearance

Source: The Louis Berger Group, Inc., 2009

It is assumed that only HVAC systems characterized by low noise emissions would be utilized for development associated with the Proposed Action. In general, the noise levels introduced by the proposed ventilation system should be at least 10 dBA below the non-ventilated level, in order to avoid a significant increase in the building's total noise level. Basic HVAC units would be installed on building rooftops, as far away from the interior space as possible; ventilation air then would be ducted to the desired location. In order to reduce the noise generated by fans, the air ducts may need to be lined with fiberglass insulation.

THIS PAGE INTENTIONALLY LEFT BLANK