A. INTRODUCTION

Noise pollution in an urban area 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, sanitation trucks, construction and maintenance equipment. Other sources, such as train and traffic noise, are essential by products of maintaining the viability of the city as a place for people to live and do business. Although all these noise-producing activities are necessary, the noise they generate is largely undesirable and detracts from the quality of life of the living environment. Furthermore, there is increasing evidence that excessive noise is a threat to the general public health.

This chapter assesses the potential for the Proposed Action to result in significant adverse noise impacts as a result of the proposed West Harlem Rezoning project. In accordance with the City Environmental Quality Review (CEQR) process, ambient noise levels were measured at representative locations within the project study area and where future project generated traffic could have the potential to cause a significant traffic noise impact.

The findings of the study indicate that the Proposed Action would not generate sufficient traffic to have the potential to cause a significant noise impact (i.e. it would not result in a doubling of the noise passenger car equivalents (Noise PCEs) which would be necessary to cause a 3 dBA increase in noise levels). However, ambient noise levels adjacent the projected and potential development sites also must be examined to address building noise attenuation requirements for maintaining interior noise level within CEQR required limits. This assessment is presented below.

B. PRINCIPAL CONCLUSIONS

The analysis concludes that the traffic generated by the Proposed Action would not have the potential to produce significant increases to noise levels at any sensitive receptors within the project study area. Existing and future With-Action noise levels for the majority of the project study area shows little to no change with most noise levels remaining within the CEQR "marginally unacceptable" limits. The largest No-Action to With-Action noise level increase is projected to be less than one-half dBA, thus the Proposed Action would not generate sufficient new traffic noise to cause a significant impact. With the incorporation of the attenuation levels specified below under "Noise Attenuation Measures," noise levels within the proposed buildings would comply with all applicable requirements. As discussed below, to implement the specified attenuation requirements, an (E) designation for noise would be applied to Projected Development Sites 1, 6, and 54, specifying the appropriate minimum amount of window/wall attenuation required for each projected development site building. The details of the noise monitoring survey, Noise PCE calculations and the building attenuation requirements are provided in Appendix F.

C. ACOUSTICAL FUNDAMENTALS

Noise is considered unwanted sound. 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 (a whistle compared with a French horn, for example) 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 (cps). One cycle per second is known as 1 Hertz ("Hz"). People can hear sound over a relatively limited range of frequencies, generally between 20 Hz and 20,000 Hz. Furthermore, the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernable and therefore more intrusive than many of the lower frequencies (e.g., the lower notes on the French horn).

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 hearing range. 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 14-1, 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.

TABLE 14-1
Common Noise Levels

Sound Source	dBA
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Train horn at 30 meters	90
Busy city street, loud shout	80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Background noise in an office	50
Public library	40
Soft whisper at 5 meters	30
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.*
Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.

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.

Combinations of different sources are added logarithmically due to the dBA scale's nature. For example, two noise sources-a vacuum cleaner operating at approximately 72 dBA and a telephone ringing at approximately 58 dBA - do not combine to create a noise level of 130 dBA (the equivalent of a jet airplane or air raid siren as show in Table 14-1). In fact, the noise produced by the telephone ringing would be largely masked by the noise of the vacuum cleaner, and the combination of these two noise sources would yield a total noise level of 72.2 dBA.

Community Response to Changes in Noise Levels

The average ability of an individual to perceive changes in noise levels is well documented (see Table 14-3). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halving) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

It is also possible to characterize the effects of noise on people 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. Table 14-3 outlines 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.

TABLE 14-2
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

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.

TABLE 14-3
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threats of community action
20	Very strong	Vigorous community action

Source: International Standards Organization, Noise Assessment with Respect to Community Responses, ISO/TC 43 (New York: United Nations, November 1969).

Effects of Distance on Sound

Sound varies with distance. For example, highway traffic 50 feet away from a person listening to the traffic noise (considered a receptor) typically produces sound levels of approximately 70 dBA. The same highway noise would be measured as 66 dBA at a distance of 100 feet, assuming “soft” ground conditions. Soft ground conditions are those surfaces consisting of grass or short vegetation and hard surfaces are typically those comprised of concrete pavements. Soft ground surfaces absorb more of the sound as you move further away from the noise source. The decrease of sound with distance is known as “drop-off” rate. The outdoor drop-off rate for line sources, such as traffic, is a decrease of approximately 4.5 dBA (for soft ground) for every doubling of distance between the noise source and receiver. Whereas

the drop-off rate for line sources under hard ground conditions is 3 dBA for every doubling of distance. Sound sources not moving are referred to as stationary noise sources. Assuming soft ground, for point sources, such as amplified rock music, the outdoor drop-off rate is a decrease of approximately 7.5 dBA for every doubling of distance between the noise source and receiver (for hard ground the outdoor drop-off rate is 6 dBA for point sources).

Sound Level Descriptors

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 that fluctuates over extended periods have been developed. One way is to describe the fluctuating sound 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 by $L_{eq(24)}$, 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. Discrete event peak levels are given as L_1 levels.

The relationship between L_{eq} and exceedance percentile noise levels is worth noting. Because L_{eq} is defined as sound energy rather than straight numerical statistical 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 generated noise fluctuates broadly, the L_{eq} will be approximately equal to the L_{10} value. If extreme fluctuations are present, the $L_{eq(1)}$ will exceed the L_{90} or the background level by 10 or more decibels. Thus the relationship between $L_{eq(1)}$ and the percentile levels of exceedance will depend on the character of the generated noise. In community noise measurements, it has been observed in general that the L_{eq} is generally between L_{10} and L_{50}.

D. NOISE STANDARDS AND CRITERIA

New York CEQR Noise Standards

The 2012 *CEQR Technical Manual* contains noise exposure guidelines for use in New York City environmental impact review, and required attenuation values to achieve acceptable interior noise levels. These values are shown in Tables 14-4 and 14-5. Noise exposure is classified into four categories: "acceptable," "marginally acceptable," "marginally unacceptable," and "clearly unacceptable." The 2012 *CEQR Technical Manual* criteria are based on maintaining an interior noise level for the worst-case hour L_{10} or less than or equal to 45 A-weighted decibels (dBA).

Impact Definition

- An increase of 5 dBA or more, in With-Action $L_{eq(1)}$ noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries and houses of worship) over those calculated for the No-Action condition, if the No-Action levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 4 dBA or more, in With-Action $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No-Action condition, if the No-Action levels are 61 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.

TABLE 14-4:
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 ----	NA	NA	NA	(1) 65 < Ldn ≤ 70 dBA, (II) 70 ≤ Ldn	NA	---- Ldn ≤ 75 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		$L_{10} > 80$ 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	

Source: New York City Department of Environmental Protection (adopted policy 1983)
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).

TABLE14-5
Required Attenuation Values To Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Noise Levels With Proposed Action	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Attenuation[A]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	$36 + (L_{10} - 80)^{B}$ dB(A)

Source: New York City Department of Environmental Protection
Note: [A] The above composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
[B] Required attenuation values increase by 1 dB(A) increments for L_{10} values greater than 80 dBA.

- An increase of 3 dBA or more, in With-Action $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No-Action condition, if the No-Action levels are 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 3 dBA or more, in With-Action $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No-Action condition, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* criteria as being between 10 PM and 7 AM).

E. NOISE PREDICTION METHODOLOGY

A noise screening analysis was completed at each of the representative noise monitoring locations using the Passenger Car Equivalent (PCE) methodology as described in Chapter 19 of the 2012 *CEQR Technical Manual* for estimating future noise levels from mobile source noise. Using this technique, peak hour existing, future No-Action and With-Action traffic volumes are converted into Noise PCE values. Incremental changes in future noise levels are computed based on the logarithmic ratio of Noise PCE values. These incremental noise level changes are calculated between existing and No-Action traffic scenarios and between No-Action and With-Action traffic scenarios. The projected incremental noise level changes are then added to the measured existing noise levels to approximate future No-Action and With-Action noise levels. The Noise PCE calculation assumes that one medium-duty truck generates the noise equivalent of 13 cars, and one heavy-duty truck is assumed to generate the noise equivalent of 47 cars, and one bus is assumed to generate the noise equivalent of 18 cars.

If a doubling of Noise PCE levels is found to occur from the noise screening analysis then a significant noise impact from the project is found to occur and a refinement in the noise analysis is completed using the Federal Highway Traffic Model (TNM 2.5). For the West Harlem Rezoning Project, no doubling of Noise PCE levels was found to occur based on the results of the screening evaluation. Since the Proposed Action would not generate sufficient new traffic to cause a significant noise impact no TNM mobile source noise analysis is required.

F. EXISTING NOISE LEVELS

Selection of Noise Receptor Locations

A total of 7 receptor sites within the proposed rezoning area were selected for evaluation of noise attenuation requirements. These locations are described below and depicted in Figure 14-1. The existing land use adjacent to each site is provided in Table 14-6. Representative noise monitoring locations were chosen based on the following criteria:

- Locations where the highest noise levels are likely to occur based upon the consideration of existing land use patterns (e.g., locations near rail lines, near major commercial roadways;
- Near projected and potential development sites;
- To provide a comprehensive geographic coverage throughout the proposed rezoning area to get an accurate depiction of the overall ambient noise environment.

The noise measurement locations were collected at the following locations:

- Site 1; West 126th Street between Amsterdam and Morningside Avenues
- Site 2: West 127th Street between West 126th Street and Morningside Avenue

- Site 3: Amsterdam Avenue between West 127th and West 128th Streets
- Site 4: Southeast corner of Convent Avenue and West 129th Street
- Site 5: Southwest corner of West 145th Street and Broadway
- Site 6: West 145th Street between St Nicholas and Edgecombe Avenues
- Site 7: Southeast corner of St Nicholas Place and West 155th Street.

TABLE 14-6:
Noise Receptor Locations

Site	Location	Existing Use
1	160 West 26th Street	Residential
2	409 West 127th Street	Residential
3	1361 Amsterdam Avenue	Mixed Use
4	36 Convent Avenue	Mixed Use
5	145th Street at Broadway	Mixed Use
6	231 Edgecombe Avenue	Mixed Use
7	94th St. Nicholas Pl.	Mixed Use

Noise Monitoring

At each receptor site existing noise levels were measured and recorded for each of the three noise analysis time periods by using laboratory certified sound sampling equipment. Existing noise levels at each receptor site were collected for 20-minute duration sampling time during the three weekday peak periods-AM (7:00 - 9:00 AM), midday (MD) (12:00- 2:00PM) and PM (4:00- 6:00PM).

Noise Monitoring Equipment

Ambient noise measurements were performed using two Brüel & Kjær (B&K) Sound Level Meters (SLM) Model Type 2231 (serial #1178130 and serial #1624603) each outfitted with a B&K Type 4189 ½-inch microphone (serial #2643127 and serial #1703339). The SLM was calibrated before and after noise measurement using a Brüel & Kjær Type 4231 sound-level calibrators (serial numbers #2170008 and #2412378). The Brüel & Kjær SLM Model 2231 is a Type 1 precision instrument satisfies ANSI Standard S1.4-1983 (R2006) requirements for precision measurement and sampling accuracy. The SLM's have laboratory calibration dates of June 25, 2010 which is valid through June 25, 2011.

Each SLM assembly was mounted at a height of 5 feet above the ground surface on a tripod and placed at least six feet away from any large sound-reflecting surface to avoid major interference with sound propagation. All noise measurements were recorded on the A-scale (dBA). The data were digitally recorded by the SLMs and displayed at the end of the measurement period in units of dBA. Measured quantities included Leq, 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 Receptor Locations

The noise measurement locations are shown on Figure 14-1 and a summary of the measured noise levels is provided in Table 14-7. At all monitoring sites, vehicular traffic was the dominant noise source. Measured noise levels are moderate to relatively high and reflect the level of vehicular activity on the

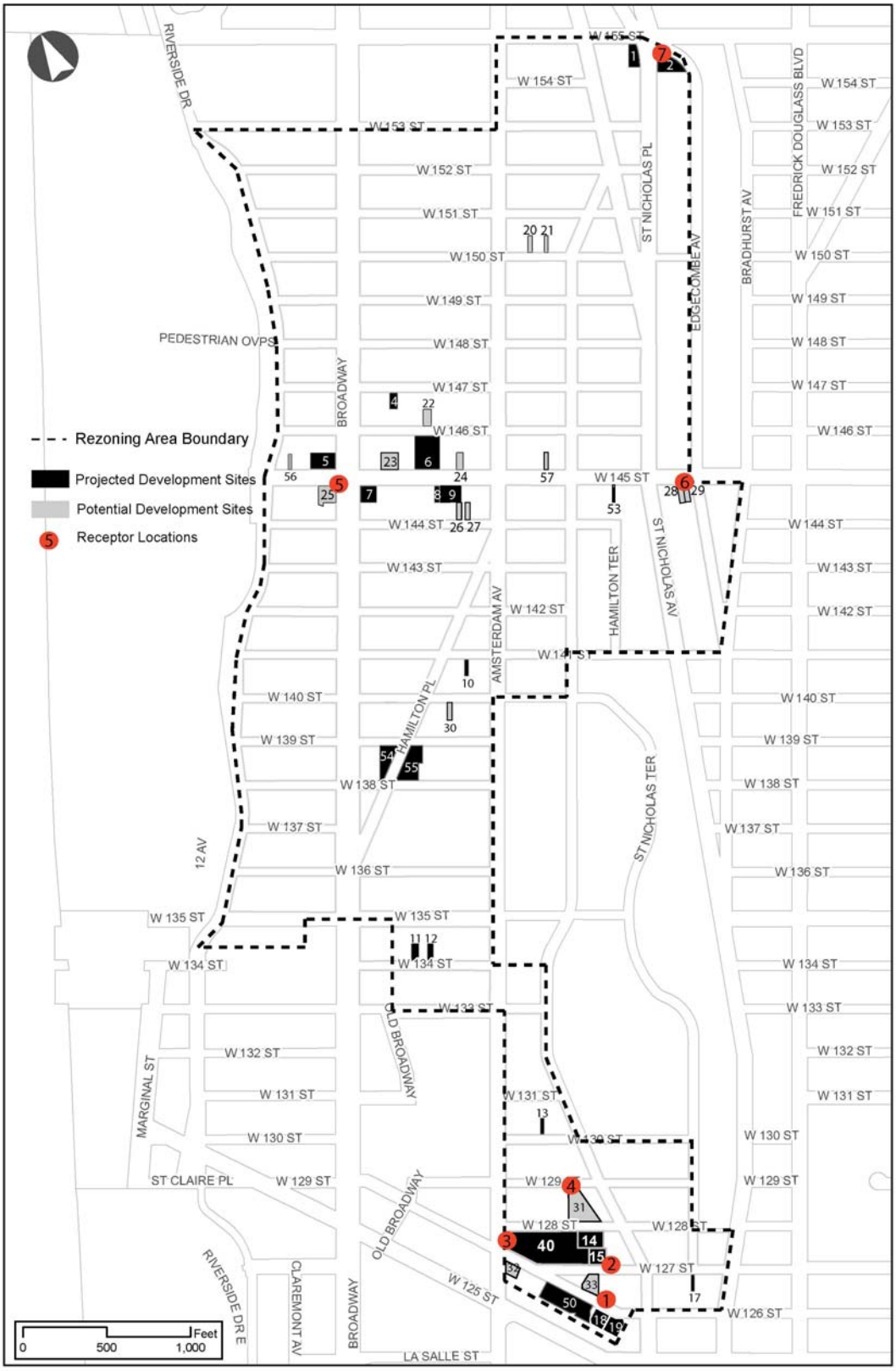
adjacent streets. In terms of the CEQR noise exposure criteria (Table 14-4), the existing peak L_{10} noise levels at Sites 1 and 2 would be in the "marginally acceptable" category and existing peak L_{10} noise levels at Sites 3 through 7 would be in the "marginally unacceptable" category.

TABLE 14-7:
Existing Noise Levels (dBA)

Site	Measurement Location	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	160 West 26th Street	AM	65.9	76.0	67.0	61.4	56.9
		MD	67.3	75.0	69.4	67.0	58.2
		PM	68.0	80.3	67.4	60.8	57.5
2	409 West 127th Street	AM	66.1	77.7	68.0	61.5	57.6
		MD	65.8	73.7	69.2	63.4	57.2
		PM	63.4	71.2	65.5	61.5	59.9
3	1361 Amsterdam Avenue	AM	74.5	83.7	77.1	65.1	65.1
		MD	73.4	84.2	76.2	63.1	63.1
		PM	75.6	82.9	77.5	65.2	65.2
4	36 Convent Avenue	AM	68.8	78.4	72.2	65.5	59.6
		MD	66.8	76.7	70.4	63.6	56.6
		PM	69.9	80.4	72.7	64.9	58.8
5	145th Street at Broadway	AM	70.7	79.2	73.4	68.4	64.9
		MD	71.3	80.3	72.3	66.4	63.2
		PM	72.3	81.6	75.9	68.4	64.6
6	231 Edgecombe Avenue	AM	69.9	80.9	72.8	65.1	60.7
		MD	72.8	82.3	73.2	66.1	60.9
		PM	71.3	81.4	74.4	67.9	62.3
7	94th St. Nicholas Pl.	AM	72.1	84.3	73.4	67.3	62.9
		MD	69.3	78.6	71.7	66.6	62.8
		PM	73.6	85.6	71.4	65.8	62.8

Note: Field measurements performed by Parsons Brinckerhoff on June 14 and 15 2011.

Figure 14-1
Noise Receptor Locations



Source: NYC Department of City Planning

G. THE FUTURE WITHOUT THE PROPOSED ACTION (NO-ACTION)

Using the Noise PCE methodology previously described future noise levels without the Proposed Action (No-Action conditions) were calculated for the three analysis periods in the year 2021 at representative noise sensitive receptor locations identified within the West Harlem Rezoning study area. Table 14-8 provides a summary of the calculated noise levels.

In the future without the Proposed Action, noise levels at and adjacent to the project area would be generally comparable to those in the existing conditions. The largest estimated increase in noise level from existing conditions is projected to occur at receptor 1 located at West 126th Street between Amsterdam and Morningside Avenues where peak hour AM noise levels are projected to increase by 0.6 dBA. Peak hour noise levels at other representative locations within the project study area show similar but smaller increases in noise levels. Increases of this magnitude would not be perceptible and based on the CEQR criteria would be considered insignificant.

TABLE 14-8
2021 No Build Noise Levels

Receptor	Location	Date	Time	Existing Noise Levels (dBA)		2021 No-Action Noise Levels dBA		
				L_{eq}	L_{10}	L_{eq}	L_{10}	Change
1	160 W 126th Street	Weekday	AM	65.9	67.0	66.5	67.6	0.6
			MD	67.3	69.4	67.8	69.9	0.5
			PM	68.0	67.4	68.3	67.7	0.3
2	409 W 127th Street	Weekday	AM	66.1	68.0	66.5	68.4	0.4
			MD	65.8	69.2	66.0	69.4	0.2
			PM	63.4	65.5	63.6	65.7	0.2
3	1361 Amsterdam Ave	Weekday	AM	74.5	77.1	74.6	77.2	0.1
			MD	73.4	76.2	73.4	76.2	0.0
			PM	75.6	77.5	75.6	77.5	0.0
4	36 Convent Ave	Weekday	AM	68.8	72.2	68.9	72.3	0.1
			MD	66.8	70.4	66.8	70.4	0.0
			PM	69.9	72.7	70.0	72.8	0.1
5	145th St & Broadway	Weekday	AM	70.7	73.4	70.8	73.5	0.1
			MD	71.3	72.3	71.4	72.4	0.1
			PM	72.3	75.9	72.4	76.0	0.1
6	231 Edgecombe Ave	Weekday	AM	69.9	72.8	70.0	72.9	0.1
			MD	72.8	73.2	72.9	73.3	0.1
			PM	71.3	74.4	71.4	74.5	0.1
7	94 St Nicholas Pl	Weekday	AM	72.1	73.4	72.2	73.5	0.1
			MD	69.3	71.7	69.4	71.8	0.1
			PM	73.6	71.4	73.7	71.5	0.1

H. THE FUTURE WITH THE PROPOSED ACTION (WITH-ACTION)

Using the Noise PCE methodology previously described future noise levels with the Proposed Action (With-Action conditions) were calculated for the three analysis periods in the year 2021 at representative noise sensitive receptor locations identified within the West Harlem Rezoning study area. Table 14-9 provides a summary of the calculated noise levels.

In the future with the Proposed Action, noise levels at and adjacent to the project area would be generally comparable to those under the future No-Action conditions. The largest estimated increase in noise level from existing conditions is projected to occur at receptor 1 located at West 126th Street between Amsterdam and Morningside Avenues where peak hour AM noise levels are projected to increase by 0.5 dBA. Peak hour noise levels at other representative locations within the project study area show similar but smaller increases in noise levels. Increases of this magnitude would not be perceptible and based on the CEQR criteria would be considered insignificant. The details of the Noise PCE screening at each of the representative noise monitoring locations and at all projected and potential development sites is provided in Appendix F.

TABLE 14-9
2021 Build Noise Levels

Receptor	Location	Date	Time	No Build Noise Levels		Build Noise Levels		
				L_{eq}	L_{10}	L_{eq}	L_{10}	Change
1	160 W 126th Street	Weekday	AM	66.5	67.6	66.9	68.0	0.5
			MD	67.8	69.9	68.2	70.3	0.4
			PM	68.3	67.7	68.6	68.0	0.2
2	409 W 127th Street	Weekday	AM	66.5	68.4	66.8	68.7	0.3
			MD	66.0	69.4	66.4	69.8	0.4
			PM	63.6	65.7	63.9	66.0	0.2
3	1361 Amsterdam Ave	Weekday	AM	74.6	77.2	74.7	77.3	0.1
			MD	73.4	76.2	73.7	76.5	0.3
			PM	75.6	77.5	75.8	77.7	0.2
4	36 Convent Ave	Weekday	AM	68.9	72.3	68.9	72.3	0.1
			MD	66.8	70.4	66.9	70.5	0.0
			PM	70.0	72.8	70.0	72.8	0.0
5	145th St & Broadway	Weekday	AM	70.8	73.5	70.8	73.5	0.1
			MD	71.4	72.4	71.5	72.5	0.1
			PM	72.4	76.0	72.4	76.0	0.0
6	231 Edgecombe Ave	Weekday	AM	70.0	72.9	70.0	72.9	0.0
			MD	72.9	73.3	72.9	73.3	0.1
			PM	71.4	74.5	71.4	74.5	0.0
7	94 St Nicholas Pl	Weekday	AM	72.2	73.5	72.2	73.5	0.0
			MD	69.4	71.8	69.4	71.8	0.0
			PM	73.7	71.5	73.7	71.5	0.0

In terms the CEQR noise exposure criteria, noise levels are projected to show very little change from the future build to build condition. Noise levels at receptors 1 would change from, "marginally acceptable" to "marginally unacceptable" category, noise levels at receptor 2 would see no change remaining in the "marginally acceptable" category and receptors 3 to 7 would see no change remaining within the "marginally unacceptable" condition.

Noise Attenuation Measures

As shown in Table 14-5, the *CEQR Technical Manual* has set noise attenuation quantities for buildings based on exterior L_{10} noise levels. Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for residential uses and 50 dBA or lower for retail and office uses. Table 14-5 describes the window/wall attenuation requirements necessary to meet the NYC CEQR noise levels in the interior space of buildings for exterior L_{10} noise exposure levels.

The estimated minimum building window/wall attenuation requirements at each of the 7 representative monitoring locations is provided in Table 14-10. Future With-Action L_{10} noise levels below 70 dBA are considered within the "Marginally Acceptable" range. Within the West Harlem Rezoning study area most of the locations were found to be within the "Marginally Unacceptable" range resulting in minimum noise attenuation requirements of greater than 30 dBA. The required noise attenuation was also determined for each of the projected and potential development sites. Traffic data for establishing future Noise PCE levels was limited to the extreme southern end of the study area. Future L_{10} noise levels and associated window/wall attenuation requirements were established based on the peak hour noise measurements. These minimum attenuation values are shown in Tables F-1 and F-2 in Appendix F. To implement the specified attenuation requirements, an (E) designation for noise would be required for Projected Development Sites 1, 6, and 54, specifying the appropriate minimum amount of window/wall attenuation required for each projected site building (refer to Table 14-11 below).

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 and louvers for the HVAC systems in various ratios of building surface area. The design for all buildings proposed to be located on the (E)-designated projected or potential development sites would be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating greater than or equal to the attenuation requirements listed in Tables F-1 and F-2 listed in Appendix F. The OITC classification is defined by the American Society of Testing and Materials (ASTM E1332-90, Re-approved 2003) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing and the combination thereof. The OITC rating is designed to evaluate building elements by their ability to reduce noise the overall loudness of ground and air transportation noise. Proposed development with an OITC rating of 30 or greater would require incorporating the following minimum building design elements to achieve these rating levels:

- To achieve a composite OITC rating of 30, a building façade would likely include well sealed insulating glass, as well as alternate means of ventilation such as well sealed through-the-wall air conditioning, package-terminal air conditioners (PTACs), or central air conditioning.
- To achieve a composite OITC rating of 35, a building façade would likely include a well sealed laminated insulating glass, as well as alternate means of ventilation such as central air conditioning.
- To achieve a composite OITC rating of 40, a building façade would likely include special design features, such as specially designed windows (i.e., windows with small sizes, windows with large air gaps, windows with thicker glazing, windows with several layers of laminate, etc.) and alternate means of ventilation such as central air conditioning.

By using these design guidelines and adhering to the (E) designations described in Appendix F, the buildings on projected and potential development sites will be designed to provide sufficient attenuation to achieve the CEQR interior noise level guidelines of 45 dBA L_{10} for residential uses and 50 dBA L_{10} for commercial uses.

Based on a noise analysis, it was determined that to avoid any potential ambient noise impacts associated with the proposed rezoning, certain sites would require (E) designations specifying certain noise attenuation requirements. All of the development sites in the vicinity of receptor locations 1, 2, and 3 would be within the proposed Special Mixed Use District (MX15) being mapped as part of the Proposed Action. The zoning text for this district, similar to all mixed-use districts, would specify that all residential uses will comply with the 35 dBA of window/wall attenuation requirements. Thus, for sites within the proposed MX zoning district (projected development sites 14, 15, 18, 19, 40, and 50 and potential development sites 31, 32 and 33) [OA1]the noise attenuation requirements under the proposed MX zoning would satisfy the attenuation levels recommended by this analysis.

For sites that are not within the proposed MX district, the Special Mixed Use District specifications regarding window/wall attenuation do not apply. As indicated in the 2012 *CEQR Technical Manual*, (E) designations are needed for sites that (a) are not included within the MX district and (b) where new sensitive receptors would be introduced near a heavily trafficked thoroughfare (Projected Development Sites 1, 6 and 54).

The text for the (E) designation for sites requiring 31 dBA attenuation is as follows:

> **In order to ensure an acceptable interior noise environment, future residential/ commercial uses must provide a closed-window condition with a minimum of 31 dBA window-wall attenuation in all façades in order to maintain an interior noise level of 45 dBA. In order to maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation include, but are not limited to, central air conditioning or air conditioning sleeves containing air conditioners.**

TABLE 14-10
Minimum Attenuation Requirements for Receptor Sites

Receptor Site #	Location	Maximum With-Action Condition L_{10} (dBA)	Minimum Attenuation Required[1] (dBA)
1	North Façade facing W126th	70.4	28
2	South Façade facing W127th	69.8	25
3	West Façade facing Amsterdam Ave	77.7	33
4	East Façade facing Morningside Ave	72.7[2]	28
5	East Façade facing Broadway	75.9[2]	31
6	North Façade facing W145th	74.4[2]	31
7	West Façade facing Saint Nicholas Place	73.4[2]	31

Notes:
[1]Attenuation values are shown for residential uses; commercial uses would be 5 dBA less.
[2]Measured maximum L_{10} noise level.

TABLE 14-11
Building Attenuation Requirements for Projected Development Sites Requiring (E) Designations

Site	Block	Lot(s)	Proposed Zoning	Projected Use	Nearest Noise Measurement Location	Minimum Required Building Attenuation
Projected Development Sites						
1	2069	20	R8A/C2-4	Mix Use	7	31
6a (85% CF in Build)	2077	14	R8A IH/C2-4/R7A	Mix Use	5	31
6b (Remove deed rest. In Build)	2077	14	R8A IH/C2-4/R7A	Mix Use	5	31
54	2070	8	R7A / C1-4	Mix Use	5	31

I. MECHANICAL EQUIPMENT

It is assumed that building mechanical systems, including emergency generators associated with the proposed development projects, would be designed with enclosures where necessary 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) and to avoid producing noise levels that would result in a significant increase in ambient noise levels. Therefore the Proposed Action would not result in any significant increase in ambient noise levels.