Chapter 16: Noise

A. INTRODUCTION

Noise pollution in an urban area comes from many sources. Some sources of noise are 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, activities that 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 is 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 noise analysis for the project consisted of three parts:

- A screening analysis to determine whether there are any locations where traffic generated by the proposed project would have the potential to cause significant noise impacts;
- A detailed analysis at any location where traffic generated by the proposed project would have the potential to result in significant adverse noise impacts, to determine the magnitude of the increase in noise level; and
- An analysis to determine the level of building attenuation necessary to ensure that interior noise levels at the project site satisfy applicable interior noise criteria.

PRINCIPAL CONCLUSIONS

In summary, the analysis concludes that project-generated traffic would not be expected to produce significant increases in noise levels at any location. In addition, with the proposed building design measures, noise levels within the proposed buildings—the Farley Complex and either the overbuild or the Development Transfer Site building—would comply with all applicable criteria. Therefore, the proposed project would not result in any significant adverse noise impacts.

NOISE FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Although it is possible to study these effects on people on an average or statistical basis, it must be remembered that all the stated effects of noise on people vary greatly with the individual. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time.

"A"-WEIGHTED SOUND LEVEL (dBA)

Noise is typically measured in units called decibels (dB), which are ten times the logarithm of the ratio of the sound pressure squared to a standard reference pressure squared. Because loudness is important in the assessment of the effects of noise on people, the dependence of loudness on frequency must be taken into account in the noise scale used in environmental assessments. Frequency is the rate at which sound pressures fluctuate in a cycle over a given quantity of time, and is measured in Hertz (Hz), where 1 Hz equals 1 cycle per second. Frequency defines sound in terms of pitch components. In the measurement system, one of the simplified scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network—known as A-weighting—that simulate response of the human ear. For most noise assessments the A-weighted sound pressure level in units of dBA is used in view of its widespread recognition and its close correlation with perception. In this analysis, all measured noise levels are reported in dBA or A-weighted decibels. Common noise levels in dBA are shown in Table 16-1.

Table 16-1
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	
Busy city street, loud shout	80
Busy traffic intersection	
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas or residential areas close to industry	
Background noise in an office	50
Suburban areas with medium density transportation	
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
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

The average ability of an individual to perceive changes in noise levels is well documented (see Table 16-2). 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 halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

Table 16-2
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 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. 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 (see Table 16-3). 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 16-3
Community Response to Increases 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).

NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

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

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

For the purposes of this project, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor used in the *CEQR Technical Manual* for noise impact evaluation, and is used to provide an indication of highest expected sound levels. $L_{10(1)}$ is the noise descriptor used in the *CEQR Technical Manual* for building attenuation. Hourly statistical noise levels (particularly L_{10} and L_{eq} levels) were used to characterize the relevant noise sources and their relative importance at each receptor location.

B. NOISE PREDICTION METHODOLOGY

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

Using this technique, the prediction of future noise levels, where traffic is the dominant noise source, is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine levels in the Future Without the Proposed Action (No Build) and the Future With the Proposed Action (Build). Vehicular traffic volumes are converted into Passenger Car Equivalent (PCE) values, for which one medium-duty truck (having a gross weight between 9,900 and 26,400 pounds) is assumed to generate the noise equivalent of 13 cars, and one heavy-duty truck (having a gross weight of more than 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, and one bus (vehicles designed to carry more than nine passengers) is assumed to generate the noise equivalent of 18 cars. Future noise levels are calculated using the following equation:

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

where:

F NL = Future Noise Level

E NL = Existing Noise Level

F PCE = Future PCEs

E PCE = Existing PCEs

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

This procedure was used at first as a screening tool—i.e., to identify whether there were any locations in the vicinity of the proposed project where project-generated PCE values would have the potential to result in an increase of 3 dBA or more in vehicle-related noise levels from No Build to Build conditions (i.e., locations where there was a doubling of PCEs) and, consequently, where there is the potential for significant noise impacts—and then, at locations where there is the potential for significant impacts, to quantify the magnitude of potential impacts.

Two analysis years were examined: 2010 and 2015. The 2010 Build analysis assumes completion of Phase I of the proposed project at the Farley Complex (located on the block between Eighth and Ninth Avenues from West 31st to West 33rd Streets) and under Phase II, the completion of an approximately 1.1 million-gross-square-foot primarily residential or mixed use building on the Development Transfer Site (located on the western portion of the block between Seventh and Eighth Avenues from West 33rd to West 34th Streets). The 2015 Build analysis assumes the completion of Phase I of the proposed project, and under Phase II the completion of an approximately 1 million-gross-square-foot commercial building over the Western Annex of the Farley Complex. As described in Chapter 1, “Project Description,” Phase II of the proposed project includes either the construction of the overbuild or the Development Transfer Site building; the construction of one of the Phase II development options precludes construction of the other development option.

Analyses were conducted for four time periods—weekday AM, weekday midday (MD), weekday PM, and Saturday midday (MD) peak hour. These time periods are the hours when the project has its maximum traffic generation and, therefore, the hours when the Build conditions are most likely to result in maximum noise impacts.

APPLICABLE NOISE CODES AND IMPACT CRITERIA

NEW YORK CITY NOISE CODE

In December 2005 the New York City Noise Control Code was amended. The amended noise code contains: prohibitions regarding unreasonable noise; requirements for noise due to construction activities (including noise limits from specific pieces of construction equipment, noise limits on total construction noise, limits on hours of construction [weekdays between 7 AM and 6 PM], and requirements for adopting and implementing noise mitigation plans for each construction site prior to the start of construction); the New York City Noise Code specifies noise standards, including plainly audible criteria, for specific noise sources (i.e., refuse collection vehicles, air compressors, circulation devises, exhausts, paving breakers, commercial music, personal audio devises, sound reproduction devices, animals, motor vehicles including motorcycles and trucks, sound signal devises, burglar alarms, emergency signal devises, lawn care devises, snow blowers, etc.).

NEW YORK CEQR NOISE STANDARDS

The New York City Department of Environmental Protection (NYCDEP) has set external noise exposure standards. These standards are shown in Table 16-4 and 16-5. Noise Exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The standards shown are based on maintaining an interior noise level for the worst-case hour L_{10} less than or equal to 45 dBA. Attenuation requirements are shown in Table 16-5.

In addition, the *CEQR Technical Manual* uses the following criteria to determine whether a proposed project would result in a significant adverse noise impact. The impact assessments compare the project's Build condition $L_{eq(1)}$ noise levels to those calculated for the No Build condition, for receptors potentially affected by the proposed actions. If the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or less than 65 dBA. If the No Build noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR standards as being between 10 PM and 7 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$. (If the No Build noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

C. EXISTING CONDITIONS

PROJECT SITE DESCRIPTION

The Farley Complex is located in West Midtown, within the recently created Special Hudson Yards District. The Farley Complex occupies a superblock over the Pennsylvania Station (Penn Station) rail yard between Eighth and Ninth Avenues from West 31st to West 33rd Streets. The project site also includes the Development Transfer Site, which is located on the western portion of the block between Seventh and Eighth Avenues from West 33rd to 34th Streets.

Table 16-4
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	---------- $Ldn \leq 60$ dBA ----------						
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	---------- $60 < Ldn \leq 65$ dBA ----------	$65 < L_{10} \leq 80$ dBA	(1) $65 < Ldn \leq 70$ dBA, (II) $70 \leq Ldn$	$L_{10} > 80$ dBA	---------- $Ldn \leq 75$ 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 16-5
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 dB(A) 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

The underlying zoning district for both the Farley Complex and the Development Transfer Site is C6-4. The eastern portion of the Development Transfer Site superblock is currently occupied by the 2 Penn Plaza development which is currently zoned C6-6.

The proposed project is located in an area with predominantly commercial uses, with high traffic volumes. Many of the streets are feeder streets to and from the Lincoln Tunnel.

SELECTION OF NOISE RECEPTOR LOCATIONS

Based upon a screening analysis, twelve noise receptor locations were chosen on the streets adjacent to the project site. Site 1 was located on West 33rd Street between Eighth Avenue and Ninth Avenue, Site 2 was located on Ninth Avenue between West 31st Street and West 33rd Street, Site 3 was located on West 31st Street between Eighth Avenue and Ninth Avenue, Site 4 was located on West 33rd Street between Ninth Avenue and Tenth Avenue, Site 5 was located on the median of the Lincoln Tunnel access roadway between West 31st Street and West 33rd Street, Site 6 was located on 31st Street between Ninth Avenue and Tenth Avenue, Site 7 was located on Eighth Avenue between West 31st Street and West 33rd Street, Site 8 was located on West 33rd Street between Seventh Avenue and Eighth Avenue, Site 9 was located on Seventh Avenue between West 31st Street and West 33rd Street, Site 10 was located on West 31st Street between Seventh Avenue and Eighth Avenue, Site 11 was located on Eighth Avenue between West 33rd Street and West 34th Street, and Site 12 was located on West 34th Street between Seventh Avenue and Eighth Avenue (see Figure 16-1). These sites are representative of other locations in the immediate area, and are generally the locations where maximum project impacts would be expected. These sites were used to assess the potential impacts due to project-generated traffic noise.

NOISE MONITORING

At each receptor site existing noise levels were determined for each of the four noise analysis time periods by field measurements. Weekday noise monitoring at the Sites 1 through 3 was performed on November 26, 2002, weekday noise monitoring at Sites 4 through 6 was performed on January 30, 2003, weekday noise monitoring at Site 7 and Site 9 was performed on April 14, 2005, weekday noise monitoring at Site 8 and Sites 10 through 12 was performed on September 14, 2005, Saturday midday noise monitoring at Sites 1 through 7 and Site 9 was performed on May 14, 2005, and Saturday midday noise monitoring at Site 8 and Sites 10 through 12 was performed on September 17, 2005. At each of these sites, 20-minute spot measurements were taken during the three weekday periods and one weekend period that reflect peak hours of trip generation: AM weekday (8 AM to 9 AM), midday (MD) weekday (12 Noon to 1:30 PM), PM weekday (5 PM to 6:30 PM) and midday (MD) weekend (11:30 AM to 2:30 PM).

EQUIPMENT USED DURING NOISE MONITORING

The instrumentation used for the 20-minute noise measurements was a Brüel & Kjær Type 4176 ½-inch microphone connected to a Brüel & Kjær Model 2260 Type 1 (according to ANSI Standard S1.4-1983) sound level meter. This assembly was mounted at a height of 5 feet above the ground surface on a tripod and at least 6 feet away from any large sound-reflecting surface to avoid major interference with sound propagation. The meter was calibrated before and after readings with a Brüel & Kjær Type 4231 sound-level calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. Only traffic related noise was measured; noise from other sources (e.g. emergency sirens, aircraft flyovers, etc.) was excluded from the measured noise levels. Weather conditions were noted to ensure a true reading as follows: wind speed under 12 mph; relative humidity under 90 percent; and temperature above 14^{o}F and below 122^{o}F. All measurement procedures conformed with the requirements of ANSI Standard S1.13-1971 (R1976).

EXISTING NOISE LEVELS AT NOISE RECEPTOR LOCATIONS

MEASURED NOISE LEVELS

Noise monitoring results for the twelve receptor locations are summarized in Table 16-6. Traffic was the dominant noise source at all twelve sites, and the values shown in the Table 16-6 reflect the level of vehicular activity on the adjacent streets. Noise levels are generally relatively high, and reflect the high level of traffic in the area.

Table 16-6
Existing Noise Levels at Sites 1 through 12
(in dBA)

Site	Measurement Location	Day	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	West 33rd Street between Eighth and Ninth Avenues	Weekday	AM	72.9	83.7	76.5	68.7	63.1
		Weekday	MD	69.8	80.3	71.7	66.3	62.7
		Weekday	PM	69.4	80.7	71.7	65.3	60.7
		Weekend	MD	64.1	70.0	66.4	62.8	60.0
2	Ninth Avenue between West 31st and West 33rd Streets	Weekday	AM	76.0	83.5	79.9	73.1	68.3
		Weekday	MD	73.5	81.3	76.9	71.3	64.5
		Weekday	PM	73.5	82.7	76.3	70.3	64.5
		Weekend	MD	69.8	78.6	73.8	66.0	62.6
3	West 31st Street between Eighth and Ninth Avenues	Weekday	AM	75.2	83.3	77.3	73.5	70.7
		Weekday	MD	71.3	80.9	73.5	67.3	64.1
		Weekday	PM	70.8	80.9	73.5	67.3	64.1
		Weekend	MD	65.5	73.4	67.6	64.2	60.6
4	West 33rd Street between Ninth and Tenth Avenues	Weekday	AM	68.8	80.0	71.0	65.0	62.0
		Weekday	MD	67.5	75.5	69.5	66.0	63.5
		Weekday	PM	68.4	76.0	71.5	66.0	63.5
		Weekend	MD	67.1	75.0	68.2	65.6	64.0
5	Tunnel access roadway (Medium of roadway) between West 31st and West 33rd Streets	Weekday	AM	76.1	82.5	79.0	74.5	70.5
		Weekday	MD	76.6	84.5	80.5	73.5	67.0
		Weekday	PM	82.6	90.0	86.0	80.5	72.0
		Weekend	MD	76.9	82.8	79.8	76.0	68.8
6	West 31st Street between Ninth and Tenth Avenues	Weekday	AM	71.4	81.5	73.5	69.5	66.0
		Weekday	MD	68.4	75.5	71.5	66.5	64.5
		Weekday	PM	69.3	77.5	71.5	66.5	64.0
		Weekend	MD	70.0	76.0	72.4	67.8	66.6
7	Eighth Avenue between West 31st and West 33rd Streets	Weekday	AM	71.7	79.0	75.2	68.6	65.4
		Weekday	MD	72.4	81.2	74.0	68.4	63.8
		Weekday	PM	70.7	78.4	73.4	68.4	65.6
		Weekend	MD	69.1	78.0	71.2	66.4	63.2

Table 16-6 (cont'd)
Existing Noise Levels at Sites 1 through 12
(in dBA)

Site	Measurement Location	Day	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
8	West 33rd Street between Seventh and Eighth Avenues	Weekday	AM	66.9	74.0	68.8	65.4	64.0
		Weekday	MD	66.9	73.4	68.6	65.8	64.6
		Weekday	PM	68.8	79.6	68.6	66.0	64.2
		Weekend	MD	66.0	72.2	67.4	64.0	62.6
9	Seventh Avenue between West 31st and West 33rd Streets	Weekday	AM	71.2	78.4	73.0	69.6	67.2
		Weekday	MD	70.8	79.4	72.6	69.2	66.8
		Weekday	PM	71.5	77.8	73.4	70.6	68.4
		Weekend	MD	70.1	77.0	72.2	68.8	65.6
10	West 31st Street between Seventh and Eighth Avenues	Weekday	AM	68.4	74.2	69.6	67.0	66.2
		Weekday	MD	68.2	74.8	69.6	67.0	65.8
		Weekday	PM	68.3	73.2	69.8	67.4	66.0
		Weekend	MD	67.4	72.0	68.6	66.8	65.8
11	Eight Avenue between West 33rd and West 34th Streets	Weekday	AM	72.5	79.2	75.6	70.6	66.8
		Weekday	MD	73.3	79.6	76.4	71.8	68.4
		Weekday	PM	72.8	79.6	75.8	70.6	67.4
		Weekend	MD	72.5	79.6	75.4	70.8	67.2
12	West 34th Street between Seventh and Eighth Avenues	Weekday	AM	75.1	84.8	77.8	71.2	65.8
		Weekday	MD	72.3	81.2	75.6	69.4	66.6
		Weekday	PM	74.9	85.4	76.8	71.4	68.2
		Weekend	MD	69.0	75.2	71.4	67.6	65.6

Note: Field measurements were performed by AKRF, Inc. on November 26, 2002, January 30, 2003, April 14, 2005, May 14, 2005, September 14, 2005, and September 17th, 2005.

D. THE FUTURE WITHOUT THE PROPOSED ACTION: 2010

Using the methodology previously described, future noise levels without the project (i.e., No Build conditions) for the four analysis periods in the year 2010 were calculated for the twelve receptor sites (see Table 16-7). Changes between the No Build and Existing noise levels range from 0.1 to 3.9 dBA. Based on CEQR criteria, changes of less than 3 dBA are not significant, and changes of 3 dBA or more are significant. Site 6 during the weekday AM period is the only location where a significant change between Existing and No Build levels (3.9 dBA) is predicted to occur. This significant increase in noise levels (comparing No Build to Existing noise levels) is due to a large increase in No Build traffic predicted to occur between 2005 and 2010 and described in Chapter 13, "Traffic and Parking."

E. THE FUTURE WITH THE PROPOSED ACTION: 2010

Using the methodology previous described, noise levels with the project (i.e., Build conditions) in the year 2010 were determined for the four peak analysis periods. Table 16-8 presents future noise levels with the project at the twelve receptor locations in the year 2010. The increase in noise levels at all 12 receptor sites (comparing Build to Existing noise levels) would be less than 2.2 dBA. Increases of this magnitude would be barely perceptible, and would not be significant based upon CEQR impact criteria.

Table 16-7
Future No Build Noise Levels
(in dBA)

Site	Day	Time	Existing $L_{eq(1)}$	2010 No Build $L_{eq(1)}$	Change
1	Weekday	AM	72.9	74.9	2.0
	Weekday	MD	69.8	71.6	1.8
	Weekday	PM	69.4	71.0	1.6
	Weekend	MD	64.1	65.5	1.4
2	Weekday	AM	76.0	77.1	1.1
	Weekday	MD	73.5	74.6	1.1
	Weekday	PM	73.5	74.6	1.1
	Weekend	MD	69.8	70.6	0.8
3	Weekday	AM	75.2	77.7	2.5
	Weekday	MD	71.3	72.9	1.6
	Weekday	PM	70.8	71.7	0.9
	Weekend	MD	65.5	66.5	1.0
4	Weekday	AM	68.8	70.3	1.5
	Weekday	MD	67.5	68.6	1.1
	Weekday	PM	68.4	69.7	1.3
	Weekend	MD	67.1	68.2	1.1
5	Weekday	AM	76.1	76.3	0.2
	Weekday	MD	76.6	76.9	0.3
	Weekday	PM	82.6	82.9	0.3
	Weekend	MD	76.9	77.0	0.1
6	Weekday	AM	71.4	75.3	3.9
	Weekday	MD	68.4	70.1	1.7
	Weekday	PM	69.3	71.4	2.1
	Weekend	MD	70.0	71.8	1.8
7	Weekday	AM	71.7	72.9	1.2
	Weekday	MD	72.4	73.3	0.9
	Weekday	PM	70.7	71.8	1.1
	Weekend	MD	69.1	69.8	0.7
8	Weekday	AM	66.9	67.9	1.0
	Weekday	MD	66.9	67.8	0.9
	Weekday	PM	68.8	69.7	0.9
	Weekend	MD	66.0	67.0	1.0
9	Weekday	AM	71.2	73.1	1.9
	Weekday	MD	70.8	72.6	1.8
	Weekday	PM	71.5	72.8	1.3
	Weekend	MD	70.1	71.1	1.0
10	Weekday	AM	68.4	70.2	1.8
	Weekday	MD	68.2	69.6	1.4
	Weekday	PM	68.3	69.7	1.4
	Weekend	MD	67.4	68.1	0.7

Table 16-7 (cont'd)
Future No Build Noise Levels
(in dBA)

Site	Day	Time	Existing $L_{eq(1)}$	2010 No Build $L_{eq(1)}$	Change
11	Weekday	AM	72.5	73.5	1.0
	Weekday	MD	73.3	74.2	0.9
	Weekday	PM	72.8	73.8	1.0
	Weekend	MD	72.5	73.1	0.6
12	Weekday	AM	75.1	76.2	1.1
	Weekday	MD	72.3	73.0	0.7
	Weekday	PM	74.9	76.2	1.3
	Weekend	MD	69.0	69.6	0.6

Table 16-8
Future Build Noise Levels, Scenario 2
(in dBA)

Site	Day	Time	2010 No Build $L_{eq(1)}$	2010 Build $L_{eq(1)}$	Change
1	Weekday	AM	74.9	76.5	1.6
	Weekday	MD	71.6	72.7	1.1
	Weekday	PM	71.0	72.0	1.1
	Weekend	MD	65.5	67.6	2.1
2	Weekday	AM	77.1	77.4	0.4
	Weekday	MD	74.6	75.0	0.4
	Weekday	PM	74.6	74.8	0.2
	Weekend	MD	70.6	71.0	0.4
3	Weekday	AM	77.7	79.0	1.3
	Weekday	MD	72.9	74.6	1.8
	Weekday	PM	71.7	72.1	0.3
	Weekend	MD	66.5	67.1	0.6
4	Weekday	AM	70.3	70.8	0.5
	Weekday	MD	68.6	69.2	0.7
	Weekday	PM	69.7	70.1	0.4
	Weekend	MD	68.2	69.7	1.5
5	Weekday	AM	76.3	76.7	0.4
	Weekday	MD	76.9	77.2	0.4
	Weekday	PM	82.9	83.0	0.1
	Weekend	MD	77.0	77.2	0.2
6	Weekday	AM	75.3	76.6	1.2
	Weekday	MD	70.1	71.9	1.9
	Weekday	PM	71.4	71.7	0.3
	Weekend	MD	71.8	72.4	0.7

Table 16-8 (cont'd)
Future Build Noise Levels, Scenario 2
(in dBA)

Site	Day	Time	2010 No Build $L_{eq(1)}$	2010 Build $L_{eq(1)}$	Change
7	Weekday	AM	72.9	73.0	0.1
	Weekday	MD	73.3	73.5	0.2
	Weekday	PM	71.8	71.9	0.1
	Weekend	MD	69.8	70.1	0.3
8	Weekday	AM	67.9	69.9	2.0
	Weekday	MD	67.8	69.5	1.7
	Weekday	PM	69.7	71.0	1.3
	Weekend	MD	67.0	68.7	1.7
9	Weekday	AM	73.1	73.1	0.0
	Weekday	MD	72.6	72.6	0.0
	Weekday	PM	72.8	72.9	0.0
	Weekend	MD	71.1	71.1	0.0
10	Weekday	AM	70.2	70.4	0.2
	Weekday	MD	69.6	70.1	0.5
	Weekday	PM	69.7	69.8	0.1
	Weekend	MD	68.1	68.5	0.4
11	Weekday	AM	73.5	73.7	0.2
	Weekday	MD	74.2	74.5	0.3
	Weekday	PM	73.8	73.9	0.2
	Weekend	MD	73.1	73.4	0.2
12	Weekday	AM	76.2	76.5	0.3
	Weekday	MD	73.0	73.6	0.5
	Weekday	PM	76.2	76.4	0.2
	Weekend	MD	69.6	69.9	0.3

F. THE FUTURE WITHOUT THE PROPOSED ACTION: 2015

Using the methodology previously described, future noise levels without the project (i.e., No Build conditions) for the four analysis periods in the year 2015 were calculated for the twelve receptor sites (see Table 16-9). Changes between the No Build and Existing noise levels range from 0.2 to 4.5 dBA. Based on CEQR criteria, changes of less than 3 dBA are not significant, and changes of 3 dBA or more are significant. Sites 3, 4, 6, during the weekday AM period, are the only locations where significant changes between Existing and No Build levels are predicted to occur. These significant increases in noise levels (comparing No Build to Existing noise levels) are due to large increases in No Build traffic predicted to occur between 2005 and 2015 and described in Chapter 13, "Traffic and Parking."

Table 16-9
Future No Build Noise Levels
(in dBA)

Site	Day	Time	Existing $L_{eq(1)}$	2015 No Build $L_{eq(1)}$	Change
1	Weekday	AM	72.9	75.8	2.9
	Weekday	MD	69.8	72.0	2.2
	Weekday	PM	69.4	71.5	2.1
	Weekend	MD	64.1	65.8	1.7
2	Weekday	AM	76.0	77.3	1.3
	Weekday	MD	73.5	74.8	1.3
	Weekday	PM	73.5	75.1	1.6
	Weekend	MD	69.8	70.9	1.1
3	Weekday	AM	75.2	78.2	3.0
	Weekday	MD	71.3	73.1	1.8
	Weekday	PM	70.8	72.0	1.2
	Weekend	MD	65.5	66.7	1.2
4	Weekday	AM	68.8	72.1	3.3
	Weekday	MD	67.5	69.7	2.2
	Weekday	PM	68.4	71.1	2.7
	Weekend	MD	67.1	69.3	2.2
5	Weekday	AM	76.1	76.6	0.5
	Weekday	MD	76.6	77.1	0.5
	Weekday	PM	82.6	83.2	0.6
	Weekend	MD	76.9	77.1	0.2
6	Weekday	AM	71.4	75.9	4.5
	Weekday	MD	68.4	70.6	2.2
	Weekday	PM	69.3	71.8	2.5
	Weekend	MD	70.0	71.9	1.9
7	Weekday	AM	71.7	73.1	1.4
	Weekday	MD	72.4	73.5	1.1
	Weekday	PM	70.7	72.0	1.3
	Weekend	MD	69.1	70.0	0.9
8	Weekday	AM	66.9	68.7	1.8
	Weekday	MD	66.9	68.4	1.5
	Weekday	PM	68.8	70.2	1.4
	Weekend	MD	66.0	67.3	1.3
9	Weekday	AM	71.2	73.2	2.0
	Weekday	MD	70.8	72.7	1.9
	Weekday	PM	71.5	73.1	1.6
	Weekend	MD	70.1	71.2	1.1
10	Weekday	AM	68.4	70.5	2.1
	Weekday	MD	68.2	70.0	1.8
	Weekday	PM	68.3	70.0	1.7
	Weekend	MD	67.4	68.3	0.9

Table 16-9 (cont'd)
Future No Build Noise Levels
(in dBA)

Site	Day	Time	Existing $L_{eq(1)}$	2015 No Build $L_{eq(1)}$	Change
11	Weekday	AM	72.5	73.7	1.2
	Weekday	MD	73.3	74.6	1.3
	Weekday	PM	72.8	74.0	1.2
	Weekend	MD	72.5	73.3	0.8
12	Weekday	AM	75.1	76.6	1.5
	Weekday	MD	72.3	73.3	1.0
	Weekday	PM	74.9	76.6	1.7
	Weekend	MD	69.0	69.9	0.9

G. THE FUTURE WITH THE PROPOSED ACTION: 2015

Using the methodology previous described, noise levels with the project (i.e., Build conditions) in the year 2015 were determined for the four peak analysis periods. Table 16-10 presents future noise levels with the project at the twelve receptor locations in the year 2015. The increase in noise levels at all 12 receptor sites (comparing Build to Existing noise levels) would be less than 2.4 dBA. Increases of this magnitude would be barely perceptible, and would not be significant based upon CEQR impact criteria.

Table 16-10
Future Build Noise Levels, Scenario 1
(in dBA)

Site	Day	Time	2015 No Build $L_{eq(1)}$	2015 Build $L_{eq(1)}$	Change
1	Weekday	AM	75.8	77.0	1.2
	Weekday	MD	72.0	72.8	0.8
	Weekday	PM	71.5	72.5	1.1
	Weekend	MD	65.8	67.5	1.7
2	Weekday	AM	77.3	77.7	0.4
	Weekday	MD	74.8	75.3	0.5
	Weekday	PM	75.1	75.3	0.2
	Weekend	MD	70.9	71.2	0.3
3	Weekday	AM	78.2	79.8	1.7
	Weekday	MD	73.1	75.4	2.3
	Weekday	PM	72.0	72.5	0.5
	Weekend	MD	66.7	67.2	0.5
4	Weekday	AM	72.1	72.4	0.3
	Weekday	MD	69.7	70.1	0.5
	Weekday	PM	71.1	71.4	0.3
	Weekend	MD	69.3	70.4	1.1

Table 16-10 (cont'd)
Future Build Noise Levels, Scenario 1
(in dBA)

Site	Day	Time	2015 No Build $L_{eq(1)}$	2015 Build $L_{eq(1)}$	Change
5	Weekday	AM	76.6	76.9	0.4
	Weekday	MD	77.1	77.5	0.4
	Weekday	PM	83.2	83.2	0.1
	Weekend	MD	77.1	77.3	0.2
6	Weekday	AM	75.9	77.3	1.4
	Weekday	MD	70.6	72.8	2.2
	Weekday	PM	71.8	72.1	0.4
	Weekend	MD	71.9	72.5	0.6
7	Weekday	AM	73.1	73.3	0.1
	Weekday	MD	73.5	73.7	0.2
	Weekday	PM	72.0	72.2	0.1
	Weekend	MD	70.0	70.3	0.3
8	Weekday	AM	68.7	70.0	1.3
	Weekday	MD	68.4	69.3	1.0
	Weekday	PM	70.2	71.4	1.2
	Weekend	MD	67.3	68.6	1.3
9	Weekday	AM	73.2	73.3	0.0
	Weekday	MD	72.7	72.7	0.0
	Weekday	PM	73.1	73.1	0.0
	Weekend	MD	71.2	71.2	0.0
10	Weekday	AM	70.5	70.8	0.3
	Weekday	MD	70.0	70.5	0.5
	Weekday	PM	70.0	70.3	0.3
	Weekend	MD	68.3	68.6	0.3
11	Weekday	AM	73.7	73.7	0.1
	Weekday	MD	74.6	74.7	0.2
	Weekday	PM	74.0	74.2	0.2
	Weekend	MD	73.3	73.5	0.2
12	Weekday	AM	76.6	77.0	0.4
	Weekday	MD	73.3	73.9	0.5
	Weekday	PM	76.6	76.9	0.2
	Weekend	MD	69.9	70.1	0.2

H. OTHER NOISE CONCERNS

MECHANICAL EQUIPMENT

No detailed designs of the mechanical systems (i.e., heating, ventilation, and air conditioning systems) for the proposed project are available at this time. However, those systems for the redeveloped Farley Complex and for either the commercial overbuild or the Development Transfer Site building will be designed to meet all applicable noise regulations and requirements, and would be designed to produce noise levels which would not result in any significant increases in ambient noise levels.

EMERGENCY VENTILATION EQUIPMENT

For the new Moynihan Station, the Farley Complex will contain a number of pieces of ventilation equipment that would be used in an emergency to ventilate the train shed. Except for monthly testing, the fans would only run in an emergency. For test purposes the fan would be run approximately ½ hour per month, to ensure that the equipment is operating properly. The exact location and size of this equipment has not been finalized. It is anticipated that there will be four fan rooms located below grade on the periphery of the building. The fan would exhaust through grates either in the moats or in the sidewalk. The fans will be tested sequentially. The fan design would include the use of sound attenuation measures so that noise levels produced by the fans satisfy all applicable rules and requirements and do not significantly increase ambient noise levels during test conditions. With these measures no significant adverse noise impacts would be expected.

ATTENUATION REQUIREMENTS

As shown in Table 16-5, the *CEQR Technical Manual* has set noise attenuation criteria for buildings, based on exterior L_{10} noise levels. Recommended noise attenuation values for residential buildings are designed to maintain interior noise levels of 45 dBA or lower, and recommended noise attenuation values for commercial buildings are designed to maintain slightly higher interior noise levels. The potential commercial overbuild proposed for the Farley Complex would require a maximum of 35 dBA to achieve CEQR compliance. The potential primarily residential building proposed for the Development Transfer Site would also require a maximum of 35 dBA to achieve CEQR compliance. Whichever building is constructed—commercial overbuild or primarily residential Development Transfer Site building—would be designed with well-sealed, double-glazed windows and central air conditioning (i.e., alternate means of ventilation). With these measures, interior noise levels within either the overbuild or the Development Transfer Site building would comply with CEQR requirements. ✷