

### **3.9 NOISE**

The principal impacts on community sound levels on certain nearby streets would result from the increased automobile, truck, and bus traffic generated by the proposed school, and by noise from outdoor playground activity.

This section evaluates the potential noise level impact of the school on the surrounding community for a build year of 2010. The noise analysis for the proposed project includes an assessment of existing conditions (background noise) based on monitored noise levels, a screening analysis to determine whether traffic generated by the proposed project would have the potential for resulting in significant noise impacts, an assessment of potential impacts due to playground noise, and a determination of the level of building attenuation necessary to ensure that interior noise levels satisfy applicable interior noise criteria.

#### **3.9.1 Introduction**

Noise is measured in sound pressure level (SPL), which is converted to a decibel scale. The decibel is a relative measure of the sound level pressure with respect to a standardized reference quantity. Decibels on the A-weighted scale are termed “dBA.” The A-weighted scale is used for evaluating the effects of noise in the environment because it most closely approximates the response of the human ear. On this scale, the threshold of discomfort is 120 dB, and the threshold of pain is about 140. **Table 21** shows the range of noise levels for a variety of indoor and outdoor noise levels.

Because the scale is logarithmic, a relative increase of 10 decibels represents a sound pressure level that is 10 times higher. However, humans do not perceive a 10 dBA increase as 10 times or louder; they perceive it as twice as loud. The following is typical of human response to relative changes in noise level:

- dBA change is the threshold of change detectable by the human ear,
- dBA change is readily noticeable, and
- 10 dBA increase is perceived as a doubling of noise level.

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**TABLE 21  
SOUND PRESSURE LEVEL AND LOUDNESS OF TYPICAL NOISES IN  
INDOOR AND OUTDOOR ENVIRONMENTS**

Noise Level (dBA)	Subjective Impression	Typical Sources		Relative Loudness (Human Response)
		Outdoor	Indoor	
120-130	Uncomfortably Loud	Air raid siren at 50 feet (threshold of pain)	Oxygen torch	32 times as loud
110-120	Uncomfortably Loud	Turbo-fan aircraft at take-off power at 200 feet	Riveting machine Rock band	16 times as loud
100-110	Uncomfortably Loud	Jackhammer at 3 feet		8 times as loud
90-100	Very Loud	Gas lawn mower at 3 feet Subway train at 30 feet Train whistle at crossing Wood chipper shredding trees Chain saw cutting trees at 10 feet	Newspaper press	4 times as loud
80-90	Very Loud	Passing freight train at 30 feet Steamroller at 30 feet Leaf blower at 5 feet Power lawn mower at 5 feet	Food blender Milling machine Garbage disposal Crowd noise at sports event	2 times as loud
70-80	Moderately Loud	NJ Turnpike at 50 feet Truck idling at 30 feet Traffic in downtown urban area	Loud stereo Vacuum cleaner Food blender	Reference loudness (70 dBA)
60-70	Moderately Loud	Residential air conditioner at 100 feet Gas lawn mower at 100 feet Waves breaking on beach at 65 feet	Cash register Dishwasher Theater lobby Normal speech at 3 feet	2 as loud
50-60	Quiet	Large transformers at 100 feet Traffic in suburban area	Living room with TV on Classroom Business office Dehumidifier Normal speech at 10 feet	1/4 as loud
40-50	Quiet	Bird calls, Trees rustling, Crickets, Water flowing in brook	Folding clothes Using computer	1/8 as loud
30-40	Very quiet		Walking on carpet Clock ticking in adjacent room	1/16 as loud
20-30	Very quiet		Bedroom at night	1/32 as loud
10-20	Extremely quiet		Broadcast and recording studio	
0-10	Threshold of hearing			

*Sources: Noise Assessment Guidelines Technical Background, by Theodore J. Schultz, Bolt Beranek and Newman, Inc., prepared for the US Department of Housing and Urban Development, Office of Research and Technology, Washington, D.C., undated; Sandstone Environmental Associates, Inc.; Highway Noise Fundamentals, prepared by the Federal Highway Administration, US Department of Transportation, September 1980; Handbook of Environmental Acoustics, by James P. Cowan, Van Nostrand Reinhold, 1994.*

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

- $L_{eq}$  is the continuous equivalent sound level. The sound energy from the fluctuating sound pressure levels is averaged over time to create a single number to describe the mean energy or intensity level. High noise levels during a monitoring period will have greater effect on the  $L_{eq}$  than low noise levels. The  $L_{eq}$  has an advantage over other descriptors because  $L_{eq}$  values from different noise sources can be added and subtracted to determine cumulative noise levels.
- $L_{max}$  is the highest SPL measured during a given period of time. It is useful in evaluating  $L_{eq}$ s for time periods that have an especially wide range of noise levels.
- $L_{10}$  is the SPL exceeded 10% of the time. Similar descriptors are the  $L_{50}$ ,  $L_{01}$ , and  $L_{90}$ .

Vehicular traffic volumes can be 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, one bus (capable of carrying more than nine passengers) is assumed to generate the noise equivalent of 18 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, as summarized below from the *CEQR Technical Manual*:

- autos and light trucks = 1 passenger car
- medium trucks = 13 passenger cars
- heavy trucks = 47 passenger cars
- public buses = 18 passenger cars

Thus, PCEs are the numbers of autos that would generate the same noise level as the observed vehicular mix of autos, medium trucks, and heavy trucks. PCEs are useful for comparing the effects of traffic noise on different roadways or for different future scenarios.

Where traffic volumes are projected to change, proportional modeling techniques, as described in the *CEQR Technical Manual*, typically are used to project incremental changes in traffic noise levels. This technique uses the relative changes in traffic volumes

to project changes between (e.g.) No-Build and Build noise levels. The change in future noise levels is calculated using the following equation:

$$\text{FNL} = \text{ENL} + 10 * \log_{10} (\text{FPCE}/\text{EPCE}),$$

where:

FNL= Future Noise Level  
ENL= Existing Noise Level  
FPCE= Future PCEs  
EPCE= Existing PCEs

Because sound levels use a logarithmic scale, this model proportions logarithmically with traffic change ratios. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 PCEs, and if the future traffic volume were increased by 50 PCEs to a total of 150 PCEs, the noise level would increase by 1.8 dBA. If the future traffic were increased by 100 PCEs, (i.e., doubled to a total of 200 PCEs), the noise level would increase by 3.0 dBA.

### **3.9.2 Noise Standards and Guidelines**

In 1983, the DEP adopted the City Environmental Protection Order-City Environmental Quality Review (CEPO-CEQR) noise standards for exterior noise levels. These standards are the basis for classifying noise exposure into four categories based on the L<sub>10</sub>: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable, as shown in **Table 22**.

In 1994, based on research conducted by Allee King Rosen & Fleming, Inc., the NYCSCA set an increase of 5 dBA as the impact criterion for noise from project-generated traffic and playgrounds. The level of 5.0 dBA was selected because it is an increase that is readily noticeable by residents and is the relative change at which sporadic complaints may be generated. It is a somewhat conservative criterion, given the fact that most state agencies in the metropolitan area have higher threshold criteria ranging from 6.0 dBA (New York State DOT) to 15 dBA (Connecticut DOT). Only New York City, with a variable threshold generally ranging from 3.0 to 5.0 dBA, has a lower criterion. For the purpose of determining potential project impacts, the NYCSCA criterion of 5.0 dBA will be used.

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**TABLE 22  
CITY ENVIRONMENTAL IMPACT REVIEW <sup>1</sup>**

Receptor Type	Time Period	Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Unacceptable General External Exposure	Airport <sup>3</sup> Exposure	Clearly Unacceptable General External Exposure	Airport <sup>3</sup> Exposure
1. Outdoor area requiring serenity and quiet <sup>2</sup>		$L_{10} \leq 55$ dBA	$L_{dn} \leq 60$ dBA		$L_{dn} \leq 60$ dBA		$L_{dn} \leq 60$ dBA		$L_{dn} \leq 60$ dBA
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ 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-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM –11 PM)		Same as Residential Day (7 AM-11 PM)	
6. Industrial, public areas only <sup>4</sup>	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 nursing 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).

**3.9.3 Noise Monitoring**

Noise monitoring was carried out to establish existing noise levels in the vicinity of the project site, to determine the local vehicular mix, and to provide data for calibrating the FHWA’s Traffic Noise Model (TNM). Because homes at 69<sup>th</sup> Avenue and Sybilla Street would be closest to the site, this intersection was selected for noise monitoring. Noise levels also were monitored at the intersection of Sybilla Street and 70<sup>th</sup> Road to see whether residences at this intersection would receive noise impacts from vehicles on the school site. **Figure 12** shows the noise monitoring locations.

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Noise monitoring was carried out during the peak PM period (3 - 4 pm) on October 28, 2004 according to the procedures outlined in the *CEQR Technical Manual*. Noise levels were monitored with a Bruel & Kjaer Noise Level Meter Type 2236, which was mounted on a tripod at a height of 5 feet above the ground. The noise monitor was calibrated before and after use. A windscreen was used during all sound measurements except for calibration. All measurement procedures conformed to the requirements of ANSI Standard S1.13-1971 (R1976). The noise monitoring results are summarized in **Table 23**.

At Sybilla Street and 69<sup>th</sup> Avenue, the sources of noise included aircraft flyovers, local traffic, an idling heavy truck at the NYCDOT garage, birds and squirrels, a distant car alarm, and distant loading operations. Traffic noise from Metropolitan Avenue was not audible, and it was not visible due to parked vehicles and vegetation along the sides of the roadway. Passing traffic during the 20-minute monitoring period included 14 autos, but no trucks. Based on the L<sub>10</sub> of 55.5 dBA, the site at Sybilla Street and 69<sup>th</sup> Avenue would be in NYCDEP's Marginally Acceptable category of external noise exposure.

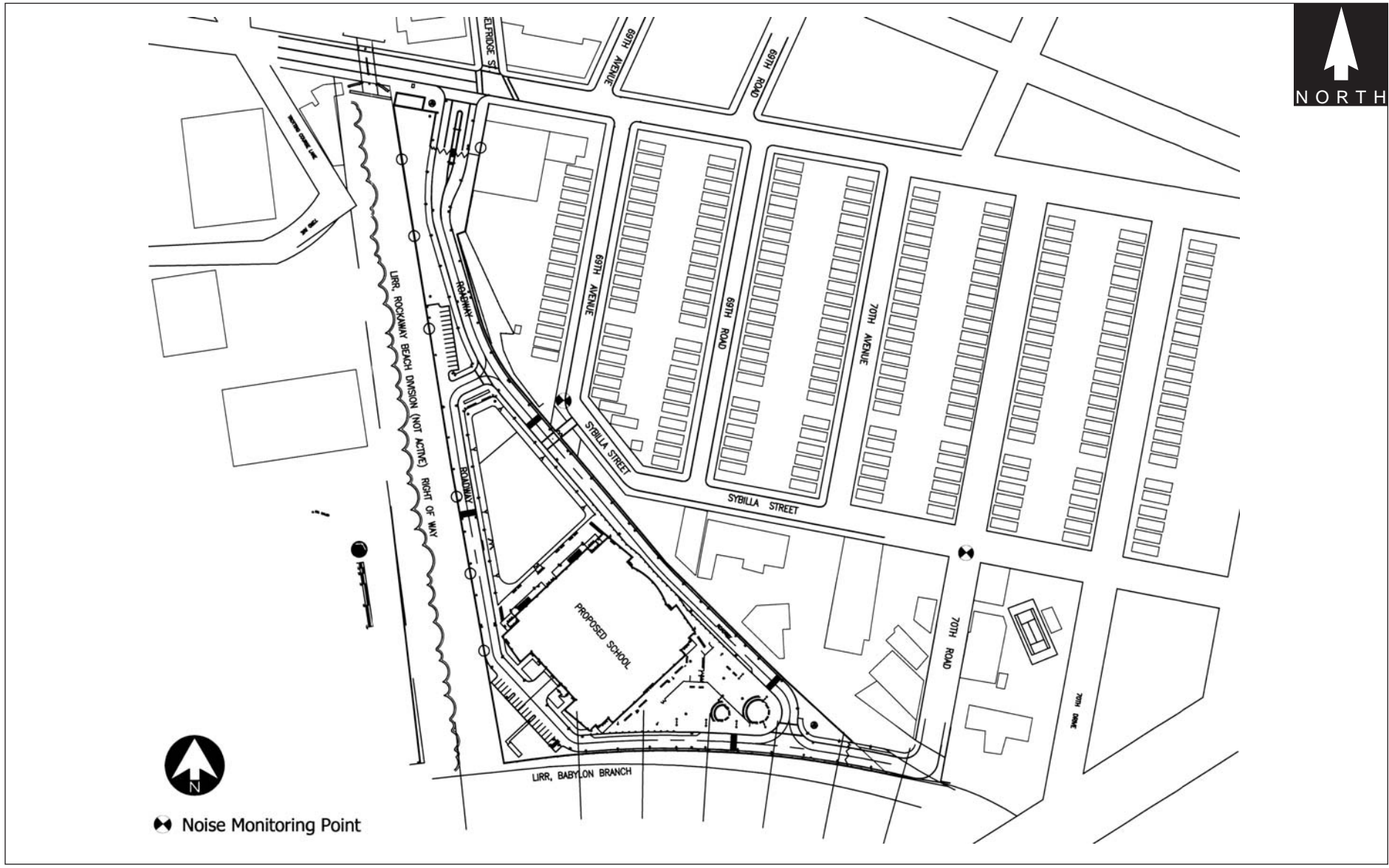
At Sybilla Street and 70<sup>th</sup> Road, local traffic was more substantial. A fire truck passed by the site twice. Forty-five autos, four medium trucks, and one heavy truck also passed by. Other sources of noise included aircraft flyovers, pedestrian voices, and the noise from horses' hooves on the pavement. Noise from Metropolitan Avenue traffic was not audible except for an occasional auto horn. Although the Babylon rail line is active, no rail passbys occurred during the monitoring periods between 3 and 4 pm. The L<sub>10</sub> of 65.5 dBA at Sybilla Street and 70<sup>th</sup> Road would place that site in NYCDEP's Marginally Unacceptable category.

**TABLE 23  
MONITORED NOISE LEVELS (DBA)**

Site	Location	Period	Noise Descriptors					
			L <sub>eq</sub>	L <sub>01</sub>	L <sub>10</sub>	L <sub>90</sub>	L <sub>min</sub>	L <sub>max</sub>
1	Sybilla Street and 69 <sup>th</sup> Avenue	3:07-3:27 pm	52.0	30.0	55.5	44.0	42.6	67.9
2	Sybilla Street and 70 <sup>th</sup> Road	3:40-4:00 pm	63.9	76.0	65.5	48.0	45.2	82.8

*Source: Sandstone Environmental Associates, Inc.*

As shown above, the monitored noise level at Sybilla Street and 70<sup>th</sup> Road is 11.9 dBA louder than the noise level at Sybilla Street and 69<sup>th</sup> Avenue. This is due primarily to the differences in traffic volume and mix during the noise monitoring period. Based on logarithmic equations for comparing the noise levels for two different traffic volumes, this difference in PCEs accounts for 11 dBA of the 11.9 dBA difference between the two sites. The remaining 0.9 dBA of the difference can be attributed to differences in background noise.



**Figure 12 - Noise Monitoring Locations**

*Metropolitan Avenue Campus Schools - Forest Hills, Queens*

*New York City School Construction Authority*



Prepared by Urbitran Associates

### **3.9.4 The Future Without the Project (No-Build)**

Future traffic within the study area is expected to grow by approximately 1 to 4 percent per year from 2007 through 2010. Based on logarithmic equations described under Section 3.9.2, the project generated growth in traffic volume at intersections analyzed within the study area would result in a potential increase of 0.0 to 0.7 dBA. These noise level increases, shown in **Table 24**, are below the impact criterion of a 5 dBA increase.

However, because the construction of an on-campus roadway for the school would generate noise from a new source (traffic and school buses), a more detailed analysis using the FHWA's Traffic Noise Model (TNM) was used to determine the noise levels at homes along local roads near the two monitored sites for both No-Build and Build Conditions.

The TNM, Version 2.5, computes a predicted noise level through a series of adjustments to a reference sound level. In the TNM, the reference level is the Vehicle Noise Emission Level, which refers to the maximum sound level emitted by a vehicle pass-by at a reference distance of 15 meters (50 feet). Adjustments are then made to the emission level to account for traffic flow, distance, and shielding. The TNM incorporates an entirely new database of vehicle noise emission levels, based on measurements conducted throughout the U.S. in 1994 and 1995. Components of those data include:

- Slow-speed and accelerating vehicles
- Bus and motorcycle data
- Vehicles on grade
- Vehicles on different pavement types

Other aspects of the noise emission data include energy apportioned to two source heights: one at the pavement level and one at 1.5 meters (5 feet) above the pavement, except for heavy trucks, where the upper height is 3.66 meters (12 feet) above the pavement.

The effects of traffic control devices are included in the model, and the TNM computes vehicle speeds and noise levels accordingly. Such devices include traffic signals, stop signs, toll booths, and on-ramp start points. State-of-the-art sound propagation and shielding algorithms include ground of different types, atmospheric absorption, and the shielding effects of barriers, berms, ground, buildings, and trees. The TNM assumes neutral atmospheric conditions and does not account for atmospheric effects such as varying wind speed or direction or temperature gradients.

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**TABLE 24  
PROJECTED CHANGES IN NOISE LEVELS (dBA) WITH PROPOSED  
PROJECT AT KEY INTERSECTIONS**

Intersection	No-Build		Build		Difference		
	Volume	PCEs	Volume	PCEs	Volume	PCEs	+/- dBA
<b>2010 Peak AM Period</b>							
Metropolitan Ave./Woodhaven Blvd.	4,942	19,084	5,123	19,357	181	273	0.1
Metropolitan Ave./Trotting Course La.	1,320	4,770	1,500	5,042	180	272	0.2
Metropolitan Ave./Selfridge St.	1,271	4,691	1,858	5,564	587	873	0.7
Metropolitan Ave./69 <sup>th</sup> Ave.	1,271	5,067	1,644	5,464	373	397	0.3
Metropolitan Ave./69 <sup>th</sup> Rd.	1,245	4,848	1,5695	5,206	324	358	0.3
Metropolitan Ave./70 <sup>th</sup> Ave. South	1,185	4,997	1,509	5,355	324	358	0.3
Metropolitan Ave./70 <sup>th</sup> Ave. North	1,186	4,915	1,510	5,273	324	358	0.3
Metropolitan Ave./70 <sup>th</sup> Rd.	1,196	4,675	1,471	4,984	275	309	0.3
Metropolitan Ave./Continental Ave.	1,555	6,243	1,783	6,5858	228	342	0.2
Metropolitan Ave./Ascan Ave.	1,425	5,829	1,604	6,115	159	222	0.2
71st Ave. /Union Turnpike.	1,556	4,973	1,2840	5,127	28	154	0.1
Woodhaven Blvd./Union Turnpike	4,519	14,361	4,475	14,667	226	306	0.1
<b>2010 Peak PM Period</b>							
Metropolitan Ave./Woodhaven Blvd.	5,036	17,810	5,194	18,002	158	192	0.0
Metropolitan Ave./Trotting Course La.	1,720	4,827	1,880	5,021	160	194	0.2
Metropolitan Ave./Selfridge St.	1,432	4,456	1,997	5,094	565	638	0.6
Metropolitan Ave./69 <sup>th</sup> Ave.	1,481	4,821	1,858	5,198	377	377	0.3
Metropolitan Ave./69 <sup>th</sup> Rd.	1,380	4,5940	1,710	4,924	330	330	0.3
Metropolitan Ave./70 <sup>th</sup> Ave. South	1,335	4,394	1,665	4,724	330	330	0.3
Metropolitan Ave./70 <sup>th</sup> Ave. North	1,382	4,543	1,711	4,701	329	158	0.1
Metropolitan Ave./70 <sup>th</sup> Rd.	1,413	4,545	1,695	4,827	282	282	0.3
Metropolitan Ave./Continental Ave.	1,764	5,683	2,046	6,016	282	333	0.2
Metropolitan Ave./Ascan Ave.	1,386	4,537	1,540	4,708	154	171	0.2
71st Ave. /Union Turnpike.	1,586	4,179	1,630	4,240	44	61	0.1
Woodhaven Blvd./Union Turnpike	5,696	16,924	5,898	17,126	202	202	0.1

*Sources: Sandstone Environmental Associates, Inc., and Urbitran Associates, Inc.*

Other characteristics of the propagation algorithms include:

- Ground location and type;
- Berms;
- Rows-of-buildings attenuation with user definable height and percentage of area blocked relative to the source roadway(s);
- Large buildings modeled as barriers;
- Acoustic barriers of varying heights and lengths; and
- Tree zones defined using the ISO standard for attenuation by dense foliage [ISO 1996].

To ensure that the modeled results accurately reflect the site conditions, the TNM model typically is calibrated by using the traffic counted concurrently during the noise

monitoring as input. The TNM model was calibrated for the two monitored sites by using the traffic counts from the monitoring periods to ensure that the model would generate noise levels similar to the monitored noise levels. Where roadways contributed audible traffic noise but were not visible to the field personnel (e.g., Metropolitan Avenue), the available traffic for 2004 Existing Conditions, analyzed in the Draft Environmental Impact Statement, was used for the calibration. Although the year for existing conditions is now 2007, the calibration carried out for an earlier year for a previous version of the study is still valid. The resulting modeled noise levels for the two monitored sites were 0.4 dBA higher at Sybilla Street and 69<sup>th</sup> Avenue and 1.6 dBA higher for Sybilla Street & 70<sup>th</sup> Road. These over-predictions are within 2 dBA of the monitored noise levels, which is considered acceptable for modeling and analysis purposes.

Future traffic for 2010 No-Build conditions was used with the TNM model for the peak AM period. Since the AM peak represents the worst case for project-generated volume, modeling of the PM period was not necessary to determine worst-case potential impacts. Preliminary modeling showed that the back yards of five residences on 69<sup>th</sup> Avenue would experience the highest noise levels. The monitored sites, which were used for calibrating the model, were not included in the analysis of noise levels at sensitive receptors. **Table 25** shows the modeled No-Build noise levels for the five residences. Only the Leq is shown because the model does not calculate an L<sub>10</sub>.

**TABLE 25  
2010 MODELED NO-BUILD NOISE LEVELS (dBA)**

Location	Peak AM Leq (dBA)
87-09 69 <sup>th</sup> Avenue (back yard) (House 1)	49.1
87-15 69 <sup>th</sup> Avenue (back yard) (House 2)	49.4
87-19 69 <sup>th</sup> Avenue (back yard) (House 3)	49.8
87-23 69 <sup>th</sup> Avenue (back yard) (House 4)	49.9
87-31 69 <sup>th</sup> Avenue (back yard) (House 5)	50.9

*Source: Sandstone Environmental Associates, Inc.*

### **3.9.5 Probable Impacts of the Proposed Project (Build)**

As stated in Section 3.9.4, PCEs were calculated for key intersections and compared with No-Build conditions to determine whether the proposed project would result in an increase of 5 dBA or more in vehicle-related noise levels. Under NYCSCA guidelines, an increase of more than 5 dBA would constitute an impact. **Table 24** showed the projected increases in noise at key intersections under Build conditions. The PCEs were calculated by adding the PCEs from project-generated autos and buses to the PCEs calculated for the No-Build alternative. Section 3.9.2 explained that a 3-dBA increase would be generated by a doubling of traffic volume or a substantial increase in truck traffic. Along arterial roads, the project-generated increases in noise level are much lower

than this, ranging from 0.0 dBA to 0.7 dBA. These potential increases are well below 5 dBA and the changes would not be perceptible.

For the residential locations closest to the school site, the TNM model was used to determine future noise levels with the proposed project (see **Table 26** for results). For the peak AM period, the back yard of the nearest home (87-09 69<sup>th</sup> Avenue) would experience a noise impact of 2.4 dBA above the threshold criterion of 5.0 dBA, and the home at 87-15 69<sup>th</sup> Avenue would experience a noise impact 0.7 dBA above the threshold criterion. Potential impacts are shown in bold type in **Table 26**.

**TABLE 26  
2010 BUILD NOISE L<sub>EQS</sub> (dBA) AT HOMES ADJACENT TO SITE**

<b>Location</b>	<b>Peak AM No-Build</b>	<b>Peak AM Build</b>	<b>Difference</b>
87-09 69 <sup>th</sup> Ave. (back yard) (House 1)	49.1	56.5	<b>7.4</b>
87-15 69 <sup>th</sup> Ave. (back yard) (House 2)	49.4	55.1	<b>5.7</b>
87-19 69 <sup>th</sup> Ave. (back yard) (House 3)	49.8	54.5	4.7
87-23 69 <sup>th</sup> Ave. (back yard) (House 4)	49.9	54.1	4.2
87-31 69 <sup>th</sup> Ave. (back yard) (House 5)	50.9	54.0	3.1

*Note: Numbers in bold type represent potential noise level impacts.  
Source: Sandstone Environmental Associates, Inc.*

### **3.9.7 Playground Noise**

Estimates of playground noise associated with schools are based on research carried out in 1992 by James Cowan and Stephen Holley. The study showed that noise levels at the boundary of a playground would peak during the period from 11 a.m. to 1 p.m. with a L<sub>eq</sub> of:

- 71.4 dBA for an elementary school,
- 71.0 dBA for an intermediate school, and
- 68.2 dBA for a high school.

According to the site plan, playing fields for the students would be on the north side of the school, about 120 feet from the nearest home (Sybilla Street and 69<sup>th</sup> Avenue). Based on the Cowan and Holley study, the peak L<sub>eq</sub> noise level of 68.2 dBA at the boundary of a high school playing field would attenuate to 59.1 dBA at a distance of 40 feet. Noise levels would continue to attenuate with distance at a rate of 6 dBA with each doubling of distance. Thus, the L<sub>eq</sub> at the nearest residential receptor point, 120 feet from the playing field, would be approximately 49.6 dBA.

The school is not expected to generate off-peak traffic. Therefore, traffic volume in the vicinity of the site during off-peak periods under Build Conditions would be somewhat

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similar to No-Build Conditions. To approximate total noise when the high school playing field is in use during morning and afternoon periods, the playground noise was added to traffic noise for the No-Build peak AM period at the corner of Sybilla Street and 69<sup>th</sup> Avenue. Adding the playground noise level of 49.6 dBA to the No-Build traffic  $L_{eq}$  of 50.3 dBA for the morning period would result in total noise levels of 53.0 dBA for that location. The incremental noise level increase of 2.7 is below the 5 dBA impact criterion.