I. 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 Rheingold Development 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 all projected and potential development sites, specifying the appropriate minimum amount of window/wall attenuation required for each projected development site.

C. NOISE FUNDAMENTALS

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 13-1 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 don't 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:

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

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 then 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, as summarized below from the NYC *CEQR Technical Manual*.

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

Table 13-1:
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	½ 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.

Thus, Passenger Car Equivalents (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 NYC *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:

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

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.

D. NOISE STANDARDS AND GUIDELINES

In 1983, the New York City Department of Environmental Protection (NYCDEP) 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_{10}: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable, as shown in Table 13-2.

Table 13-3 shows the required attenuation for sensitive uses within the last three categories. For example, an L_{10} may approach 80 dBA provided that buildings are constructed of materials that reduce exterior to interior noise levels by at least 35 dBA.

Table 13-3
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				**Clearly Unacceptable**
Noise level with proposed action	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	$80 < L_{10}$
Attenuation[A]	(I) 28 dBA	(II) 31 dBA	(III) 33 dBA	(IV) 35 dBA	$36 + (L_{10} - 80)^B$ dBA

Note: [A]The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5 dBA less in each category. All the above categories require a closed window situation and hence alternate means of ventilation.
[B]Required attenuation values increase by 1 dBA increments for L_{10} values greater than 80 dBA.
Source: New York City Department of Environmental Protection, 2010.

Table 13-2
CEQR 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		Ldn ≤ 60 dBA		Ldn ≤ 60 dBA		Ldn ≤ 75 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-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 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).

E. EXISTING CONDITIONS

Affected Properties

The proposed rezoning area is bounded by Flushing Avenue, Evergreen Avenue, Melrose Avenue, Stanwix Street, Forrest Street, Garden Street, and Beaver Street. It includes approximately 6 blocks, which encompass a total of approximately 623,080 sf. Table 13-4 provides a list of all the blocks and lots included within the proposed rezoning area. The 8 projected and 3 potential development sites are shown in Figure 13-1. The properties to be rezoned consist of Blocks 3138, 3139, 3140, 3141, and 3152, as well as the Flushing Avenue frontage on Block 3137 to a depth of 100 feet.

The majority of the projected development sites are vacant or utilized as vehicle storage. There are 8 businesses located on the projected development sites with a total of 46 employees. These businesses include industrial/warehouse uses, vehicle storage, auto repair, a gas station, and food market. As shown in the table, projected development sites 1-4 are owned by the Applicant.

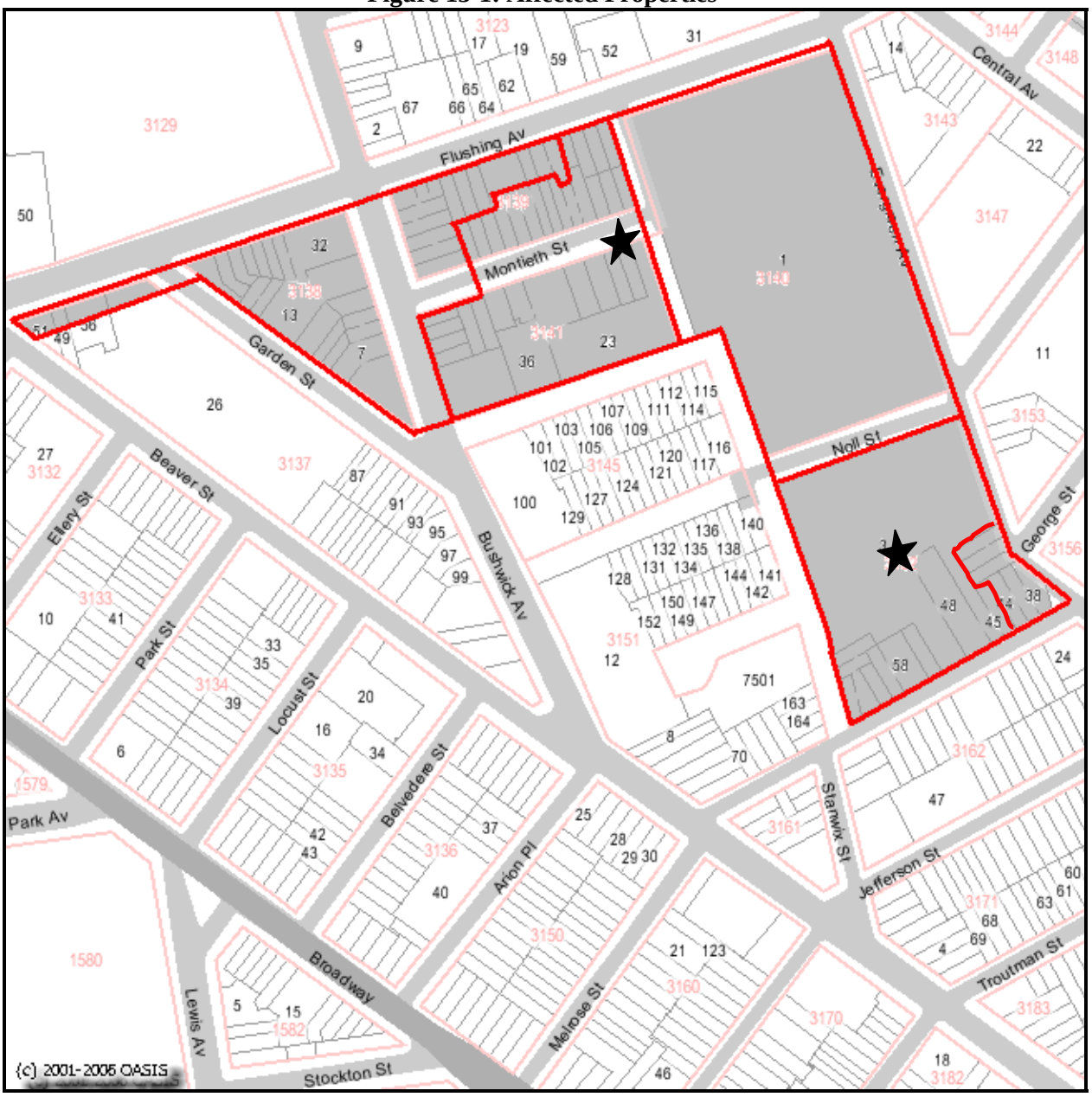
Table 13-4: Affected Properties

Block	Lots
3137	26 (portion), 49 (portion), 51, 56
3138	1, 7, 9-11, 13, 17, 18, 20, 22-25, 27, 32, 36,38, 40, 41
3139	1-12, 15-17, 18*, 19*, 20*, 21*, 23*, 24*, 25*, 26*, 27*, 28*, 29*, 30*, 31*, 32*, 33*, 34*, 35*, 36*
3140	1, 50
3141	1, 5-8, 10-12, 14, 15, 18, 20-23, 36
3152	1*, 2*, 3*, 35-38, 41, 43, 44, 45*, 48*, 56*, 58*, 62*, 63*, 64*, 66*, 100

**Lots owned by the applicant*

Besides the projected and potential development sites and the large warehouse occupying Block 3140, the remainder of the proposed rezoning area includes mostly 3 to 5 story apartment buildings, some with ground floor retail. It also contains a school playground and a few restaurant establishments in a concentration of 1-story buildings on Block 3137 adjacent to the C-town market on Flushing Avenue. The neighborhood has been undergoing a transformation in recent years, and many former industrial and commercial properties have been redeveloped with residential uses.

Figure 13-1: Affected Properties



= Site Location
= Rezoning Area

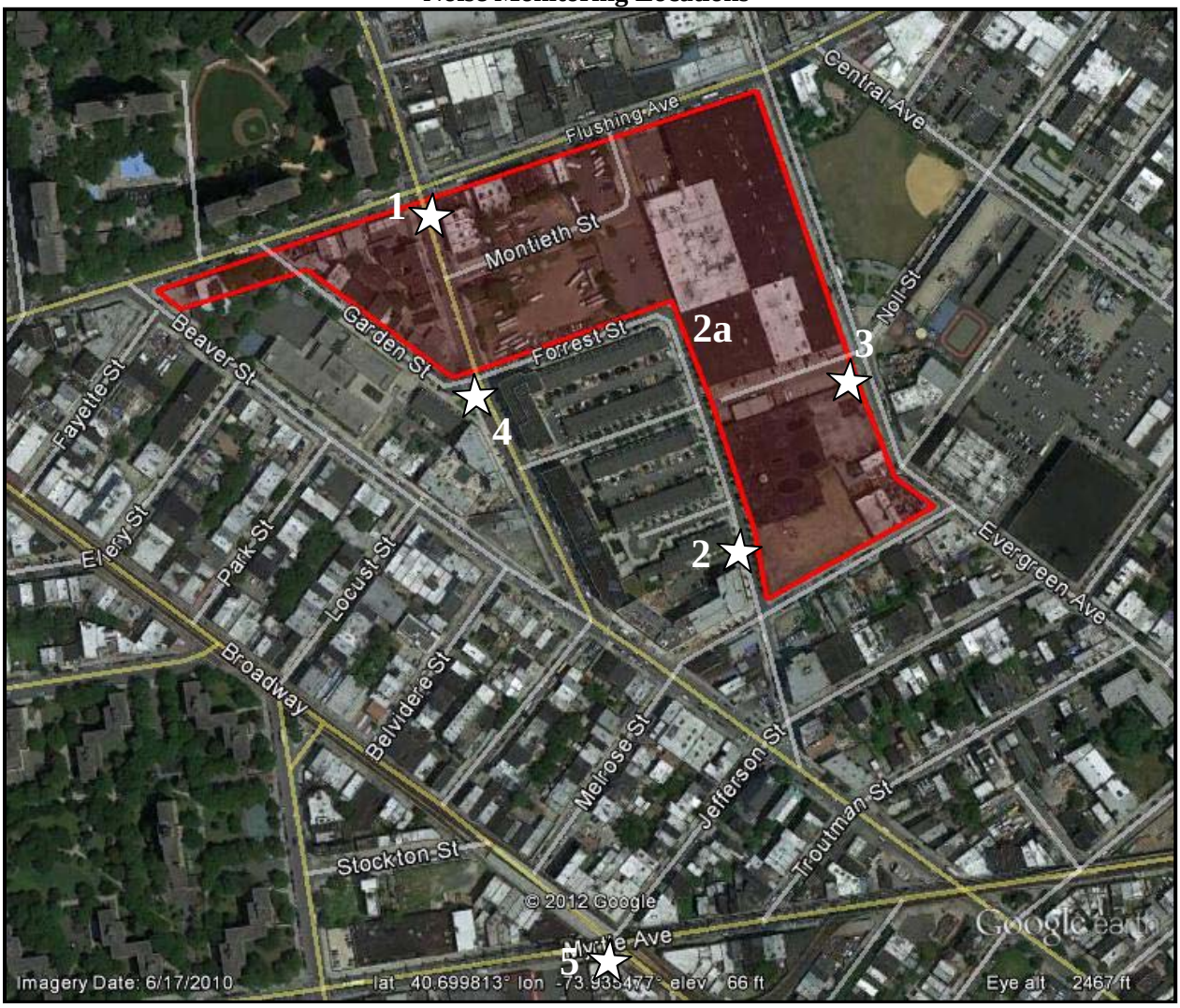
Noise Monitoring

Noise monitoring was carried out at four locations near the project site. These locations were chosen to establish existing noise levels in the vicinity of the project site. In addition to the four sites above, noise measurements were made at the northern corner of Myrtle Avenue and Broadway to determine noise levels near a station for the elevated subway line. Figure 13-2 shows the noise monitoring locations. The four locations are:

1. the southeastern corner of the intersection of Flushing Avenue and Bushwick Avenue,
2. the northeastern corner of the intersection of Melrose Street and Stanwix Street,
2a. the southwestern corner of the intersection of Forrest Street and Stanwix Street,
3. along the western sidewalk of the intersection of Evergreen Street and Noll Street, and
4. the southwestern corner of the intersection of Bushwick Avenue and Garden Street.

These locations were chosen to establish existing noise levels in the vicinity of the project site. Site 2a was selected as an alternative to Site 2 due to noise from a scaffolding company and guard dogs barking at Site 2.

Figure 13-2
Noise Monitoring Locations



☆ = Noise Monitoring Locations.

Noise monitoring for the peak AM (8:00 a.m. - 9:00 a.m.), Midday (12:00 p.m. - 1:00 p.m.) and PM peak periods (5:00 p.m. - 6:00 p.m.) was carried out on Wednesday, October 17, 2012 for Sites 1, 3, and 4 and on Thursday, October 18, 2012 for Site 5. Sites 2 and 2a were monitored on Tuesday, January 29, 2013.

Field recordings were conducted in 20-minute intervals within each peak period. The noise levels were monitored according to the procedures outlined in the NYC *CEQR Technical Manual*. The instrument used was a Brüel & Kjær Sound Level Meter Type 2250, which was mounted on a tripod at a height of 5 feet above the ground and six feet away from any reflecting surface. The noise monitor was calibrated before and after use. A wind screen was used during all sound measurements except for calibration. All measurement procedures conformed to the requirements of ANSI Standard S1.13-2005. The temperatures were in the lower 50s to the upper 60s (°F) for the October dates and conditions were calm and clear during the morning measurements. The January measurement date featured temperatures in the mid 40s and an overcast sky with surface wind speeds below 10 mph.

Table 13-5 shows the noise monitoring results, and Table 13-6 summarizes the existing traffic volumes for the 1-hour period. The highest L_{10} values were 79.8 dBA at Flushing Avenue (Site 1), 73.1 dBA at Melrose Street (Site 2), 74.4 dBA at Evergreen Avenue and Noll Street (Site 3), and 74.0 dBA at the corner of Bushwick Avenue and Garden Street (Site 4). The worst-case measured L_{10} for the intersection of Broadway and Myrtle Avenue, which is the site of the Myrtle Avenue subway station, was 84.8 dBA.

Table 13-5
Monitored Noise Levels (dBA)

ID	Site	Time of Day	L_{eq}	L_{10}	L_{Min}	L_{Max}	L_{01}	L_{50}	L_{90}
1	Flushing Ave. / Bushwick Ave.	**8:28 a.m. - 8:48 a.m.**	**77.0**	**79.8**	**62.6**	**95.2**	**86.2**	**72.8**	**68.4**
		12:24 p.m. - 12:44 p.m.	76.8	78.1	57.5	99.2	88.1	70.8	65.7
		5:16 p.m. - 5:36 p.m.	74.8	77.8	61.7	88.9	85.5	70.9	66.7
2	Melrose St. / Stanwix St.	**8:21 a.m. - 8:41 a.m.***	**70.1**	**73.1**	**54.7**	**96.5**	**79.3**	**59.2**	**56.2**
2a	Stanwix St. / Forrest St.	12:16 p.m. - 12:36 p.m.	65.8	67.4	49.8	85.4	77.5	55.7	52.0
		5:00 p.m. - 5:20 p.m.	59.6	63.5	48.7	74.9	70.2	53.1	49.3
3	Evergreen St. / Noll St.	8:00 a.m. - 8:20 a.m.	64.2	65.8	49.9	84.8	75.9	56.6	52.8
		11:52 p.m. - 12:12 p.m.	**73.0**	**74.4**	**61.6**	**93.8**	**82.7**	**66.4**	**62.5**
		5:46 p.m. - 6:06 p.m.	66.7	68.3	51.5	83.5	78.4	59.6	54.3
4	Bushwick Ave. / Garden St.	8:01 a.m. - 8:21 a.m.	70.2	74.4	55.7	83.8	77.3	67.0	60.2
		12:52 p.m. - 1:12 p.m.	**71.0**	**74.0**	**58.3**	**87.2**	**78.9**	**68.0**	**61.7**
		4:51 p.m. - 5:11 p.m.	69.9	73.8	52.7	81.1	78.8	66.8	60.3
5	Broadway / Myrtle Ave.	**8:42 a.m. - 9:02 a.m.**	**83.9**	**84.8**	**66.2**	**102.8**	**96.7**	**77.5**	**72.0**
		12:00 p.m. - 12:20 p.m.	80.4	83.6	66.6	95.2	88.5	78.1	71.9
		4:52 p.m. - 5:12 p.m.	81.6	84.6	66.3	99.0	92.3	76.0	71.0

Note: Numbers in bold type show the highest results for that site.
**Peak AM reading had an Leq that was higher than the L_{10}. Per recommendation from NYCDCP, the L_{eq} was then calculated as 3 dBA higher than the L_{eq}.*

Table 13-6
1-Hour Equivalent Observed Traffic Volumes and PCEs

ID	Site	Peak Period	Autos	Med. Trucks	Heavy Trucks	Buses	Motor-cycles	Total	PCEs
1	Flushing Ave. / Bushwick Ave.	AM	2,079	184	61	26	0	2,351	7,834
		MD	1,707	143	68	15	0	1,933	7,017
		PM	2,071	76	34	34	0	2,216	5,292
2	Melrose St. / Stanwix St.	AM	169	7	0	0	0	176	260
2a	Stanwix St. / Forrest St.	MD	56	13	0	0	3	72	260
		PM	91	7	0	0	0	98	176
3	Evergreen St. / Noll St.	AM	352	22	0	0	0	374	638
		MD	215	19	9	0	0	243	897
		PM	257	18	0	0	0	275	487
4	Bushwick Ave. / Garden St.	AM	1,713	0	0	0	0	1,713	1,713
		MD	1,179	0	0	0	0	1,179	1,179
		PM	1,757	0	0	0	0	1,757	1,757
5	Broadway / Myrtle Ave.	AM	732	48	9	51	0	840	2,697
		MD	687	39	9	21	0	756	1,995
		PM	864	12	3	36	0	915	1,809

F. FUTURE WITHOUT THE PROPOSED ACTION

In the 2016 future without the Proposed Action, the project site and the proposed rezoning area would remain the same. No new development is expected to occur within the proposed rezoning area in the absence of the proposed action, and the existing uses would remain unchanged.

PCEs for the future traffic were calculated using the vehicular mix observed during the monitoring periods. Traffic volumes were used from the traffic analysis report for each intersection. The proportionality equation was then used to compare PCEs for Existing Conditions with projected No-Build traffic. Table 13-7 shows the projected traffic and Table 13-8 shows the resulting noise levels. The highest projected No-Build L_{10} increase is 0.9 dBA, which would occur at intersection of Flushing and Bushwick Avenues. The worst-case L_{10} is at the intersection of Flushing Avenue and Bushwick Avenue with a value of 79.9 dBA.

G. FUTURE WITH THE PROPOSED ACTION

Traffic Noise

Incremental traffic caused by the proposed action was added to the future without the Proposed Action to determine the total PCEs for the condition with the proposed action in place. Table 13-9 shows the resulting traffic and PCEs projected under this scenario.

Table 13-10 shows the noise levels at the site under the proposed action based on the proportionality equation. Incremental changes in noise would range from -0.1 to 0.5 dBA. Peak projected L_{10} values would be 79.9 dBA for proposed building frontages along Flushing Avenue and Bushwick Avenue (Site 1), 73.6 dBA for building frontages along Melrose Street (Site 2), 74.4 dBA for building frontages on Evergreen Avenue and Noll Street (Site 3), and 74.5 dBA for building frontages along Garden Street (Site 4). Since site-generated traffic would not cause a doubling of PCEs, no noise level impacts due to traffic are anticipated.

Table 13-7
2016 No-Build Traffic and PCEs

ID	Site	Peak Period	Autos	Med. Trucks	Heavy Trucks	Buses	Motor-cycles	Total	PCEs
1	Flushing Ave. / Bushwick Ave.	AM	2,121	188	63	27	0	2,398	7,990
		MD	1,742	146	69	15	0	1,972	7,159
		PM	2,544	93	42	42	0	2,722	6,501
2	Melrose St. /Stanwix St.	AM	172	7	0	0	0	179	265
2a	Stanwix St. / Forrest St.	MD	57	13	0	0	3	73	263
		PM	93	7	0	0	0	100	180
3	Evergreen St. /Noll St.	AM	359	22	0	0	0	381	650
		MD	219	19	10	0	0	247	912
		PM	263	18	0	0	0	281	497
4	Bushwick Ave. / Garden St.	AM	1,749	0	0	0	0	1,749	1,749
		MD	1,202	0	0	0	0	1,202	1,202
		PM	1,791	0	0	0	0	1,791	1,791

Table 13-8
2016 No-Build Noise Levels (dBA)

ID	Site	Period	L_{eq}	L_{10}	Existing-No Build Diff. (dBA)	CEQR Noise Abatement Category
1	Flushing Ave. / Bushwick Ave.	AM	77.1	79.9	0.1	Marginally Unacceptable IV
		MD	76.9	78.2	0.1	
		PM	75.7	78.7	0.9	
2	Melrose St. /Stanwix St.	AM	70.2	73.2	0.1	Marginally Unacceptable II
2a	Stanwix St. / Forrest St.	MD	65.9	67.5	0.1	Marginally Acceptable
		PM	59.7	63.6	0.1	
3	Evergreen St. /Noll St.	AM	64.3	65.9	0.1	Marginally Unacceptable II
		MD	73.1	74.5	0.1	
		PM	66.8	68.4	0.1	
4	Bushwick Ave. / Garden St.	AM	70.3	74.5	0.1	Marginally Unacceptable II
		MD	71.1	74.1	0.0	
		PM	70.0	73.9	0.1	

Table 13-9
2016 Traffic and PCEs with the Proposed Action

ID	Site	Peak Period	Autos	Med. Trucks	Heavy Trucks	Buses	Motor-cycles	Total	PCEs
1	Flushing Ave. / Bushwick Ave.	AM	2,130	188	63	27	0	2,407	7,999
		MD	1,748	146	69	15	0	1,978	7,165
		PM	2,561	93	42	42	0	2,739	6,518
2	Melrose St. /Stanwix St.	AM	201	7	0	0	0	208	294
		MD	59	13	0	0	3	75	266
		PM	113	7	0	0	0	120	200
3	Evergreen St. /Noll St.	AM	350	22	0	0	0	372	641
		MD	208	19	10	0	0	236	901
		PM	267	18	0	0	0	285	501
4	Bushwick Ave. / Garden St.	AM	1,738	0	0	0	0	1,738	1,738
		MD	1,204	0	0	0	0	1,204	1,204
		PM	1,782	0	0	0	0	1,782	1,782

Table 13-10
2016 Noise Levels (dBA), Future with the Proposed Action

ID	Site	Period	L_{eq}	L_{10}	Change from No Action	CEQR Noise Abatement Category
1	Flushing Ave. / Bushwick Ave.	AM	**77.1**	**79.9**	**0.0**	Marginally Unacceptable IV
		MD	76.9	78.2	0.0	
		PM	75.7	78.7	0.0	
2	Melrose St. /Stanwix St.	AM	**70.6**	**73.6**	**0.5**	Marginally Unacceptable II
		MD	65.9	67.5	0.0	
		PM	60.1	64.0	0.5	
3	Evergreen St. /Noll St.	AM	64.2	65.8	-0.1	Marginally Unacceptable II
		MD	**73.0**	**74.4**	**-0.1**	
		PM	66.8	68.4	0.0	
4	Bushwick Ave. / Garden St.	AM	**70.3**	**74.5**	**0.0**	Marginally Unacceptable II
		MD	71.1	74.1	0.0	
		PM	70.0	73.9	0.0	

Note: Numbers in bold type show highest noise levels

Window/Wall Attenuation

Peak L_{10} values for each monitoring location are used to determine which the indoor-outdoor noise attenuation required for each building frontage. The results are shown in Table 13-11.

Table 13-11
Minimum CEQR Attenuation Requirements for the Proposed Development

Site	Façade Facing	Worst Case Build L_{10} (dBA)	Based on Monitoring Site ID	CEQR Noise Abatement Category	Minimum Required Attenuation (dBA)
1	Flushing Avenue	79.9	1	Marginally Unacceptable IV	35
	Bushwick Avenue	79.9	1	Marginally Unacceptable IV	35
	Montieth Avenue	74.5	4	Marginally Unacceptable II	31
	Stanwix Street	79.9	1	Marginally Unacceptable IV	35
2	Montieth Street	74.5	4	Marginally Unacceptable II	31
	Bushwick Avenue	74.5	4	Marginally Unacceptable II	31
	Forrest Street	74.5	4	Marginally Unacceptable II	31
	Stanwix Street	74.5	4	Marginally Unacceptable II	31
3	Noll Street	74.4	3	Marginally Unacceptable II	31
	Stanwix Street	73.6	2	Marginally Unacceptable II	31
	Melrose Street	73.6	2	Marginally Unacceptable II	31
	Evergreen Avenue	74.4	3	Marginally Unacceptable II	31
4	Noll Street	73.6	2	Marginally Unacceptable II	31
	Stanwix Street	73.6	2	Marginally Unacceptable II	31
	Melrose Street	73.6	2	Marginally Unacceptable II	31
	Evergreen Avenue	73.6	2	Marginally Unacceptable II	31
5	Noll Street	73.6	2	Marginally Unacceptable II	31
	Stanwix Street	73.6	2	Marginally Unacceptable II	31
	Melrose Street	73.6	2	Marginally Unacceptable II	31
	Evergreen Avenue	74.4	3	Marginally Unacceptable II	31
6	Flushing Avenue	79.9	1	Marginally Unacceptable IV	35
	Garden Street	79.9	1	Marginally Unacceptable IV	35
	Bushwick Avenue	79.9	1	Marginally Unacceptable IV	35
7	Flushing Avenue	79.9	1	Marginally Unacceptable IV	35
	Garden Street	79.9	1	Marginally Unacceptable IV	35
	Bushwick Avenue	79.9	1	Marginally Unacceptable IV	35
8	Flushing Avenue	79.9	1	Marginally Unacceptable IV	35
	Flushing Avenue/Beaver Street	79.9	1	Marginally Unacceptable IV	35
	Beaver Street	74.5	4	Marginally Unacceptable II	31
	Garden Street	79.9	1	Marginally Unacceptable IV	35
9	Noll Street	73.6	2	Marginally Unacceptable II	31
	Stanwix Street	73.6	2	Marginally Unacceptable II	31
	Melrose Street	73.6	2	Marginally Unacceptable II	31
	Evergreen Avenue	74.4	3	Marginally Unacceptable II	31
10	Flushing Avenue	74.5	4	Marginally Unacceptable II	31
	Garden Street	74.5	4	Marginally Unacceptable II	31
	BushwickAvenue	74.5	4	Marginally Unacceptable II	31
11	Flushing Avenue	79.9	1	Marginally Unacceptable IV	35
	Beaver Street	79.9	1	Marginally Unacceptable IV	35
	Garden Street	79.9	1	Marginally Unacceptable IV	35

Entries in bold type are in Clearly Unacceptable category.

Figure 13-4 shows the levels of facade attenuation necessary at each development site to comply with CEQR requirements.

H. NOISE ATTENUATION MEASURES

The relative increases in noise level due to increased traffic would fall below the impact criterion of 3.0 dBA. Therefore no noise impacts to the surrounding community are projected.

Required window/wall attenuation for the buildings was shown in Table 13-11. Mitigation should be based on OITC ratings. The provisions of the (E) designations would mandate the required attenuation levels to ensure that interior noise levels would be at 45 dBA or less for residential uses. Where the proposed use is for commercial uses, the required attenuation could be 5 dBA lower in order to achieve an interior L_{10} of 50 dBA or less.

In addition, all facades with an L_{10} of 70 dBA or greater must also provide an alternate means of ventilation (AMV) permitting a closed window condition during warm weather. This can be achieved by installing double-glazed windows on a heavy frame for masonry structures or windows consisting of laminated glass, along with AMV such as central air conditioning or packaged terminal air conditioning (ptac) units. Where the required window/wall attenuation is above 40 dBA, special design features may be necessary that go beyond the normal double-glazed window and air conditioning. These may include specially designed windows (e.g., windows with small sizes, windows with air gaps, windows with thicker glazing, etc.) and additional building insulation.

There are two levels of required noise attenuation shown in Table 13-11. Depending on the ambient noise levels at each location, attenuation of 31or 35 dBA would be required.

For locations requiring 31 dBA of attenuation, the text for the (E) designation is as follows:

> "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 to maintain an interior noise level of 45 dBA. To maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation includes, but is not limited to, air conditioning."

For locations requiring 35 dBA of attenuation, the text for the (E) designation is as follows:

> "To ensure an acceptable interior noise environment, future residential/commercial uses must provide a closed-window condition with a minimum of 35 dBA window/wall attenuation to maintain an interior noise level of 45 dBA. To maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation includes, but is not limited to, air conditioning."

Based on the projected noise levels, these design measures would provide sufficient attenuation to satisfy CEQR requirements. With the specified attenuation measures, the Proposed Action would not have any significant adverse noise impacts and would comply with all CEQR noise requirements.