A. INTRODUCTION

A detailed analysis of noise levels may be appropriate if a Proposed Action would generate any mobile or stationary sources of noise or be located in an area with high ambient noise levels. Under the City *Environmental Quality Review (CEQR) Technical Manual* guidelines, an assessment of noise is typically carried out if the Proposed Action would increase noise levels by 3 dBA or result in exterior noise levels that exceed the Noise Exposure Guidelines for Acceptable General External Exposure. These situations could occur if the Proposed Action would:

- generate or reroute vehicular traffic,
- be located near a heavily trafficked thoroughfare,
- be a receptor within one mile of an existing flight path,
- be within 1,500 feet of existing rail activity and have a direct line of site to that facility,
- result in a playground within 1,500 feet of a stationary source,
- include unenclosed mechanical equipment for manufacturing or building ventilation purposes,
- be located in an area with high ambient noise levels from stationary sources, or
- result in construction equipment operating within 1,500 feet of a sensitive receptor for an extended period of time.

As discussed in Chapter 1, Project Description, the NYPD proposes to construct a new Police Academy to incorporate many of the NYPD's existing training facilities throughout the City into one consolidated campus that would be located on approximately 35 acres of City-owned land. Currently, the Project Site is used as the NYPD's College Point Vehicle Impoundment ("the Tow Pound"). As described in Chapter 1, "Project Description," the Tow Pound consists of a paved asphalt lot. Under No-Build conditions, Tow Pound operations would be relocated to other City-owned sites. Therefore, the proposed Academy site would be vacant in the future without the Proposed Action. The NYPD proposes to redevelop the site with a modern complex that would consolidate the facilities for civilians, recruits, and active police officers that are currently spread across the City. The total development size would consist of approximately 2.4 million gross square feet and would include indoor training facilities, classrooms, and related support space, an indoor pistol training facility, a tactical village, an indoor track, a police museum, a visiting police/lecturer lodging facility and 2,000 parking spaces, including a 1,800-space parking garage. ("proposed development").

The proposed development would be situated on a portion of the block bounded by 28th Avenue to the north, Ulmer Street and the Whitestone Expressway Service Road to the east, 31st Avenue to the South, and College Point Boulevard to the west.

B. 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 dB. Table 14-1 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 responses 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 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 describing the mean energy or intensity level. High noise levels 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 percent 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, and
- public buses = 18 passenger cars.

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.

Table 14-1: Sound Pressure Level and Loudness of Typical Noises in Indoor and Outdoor Environments

Noise Level (dBA)	Subjective Impression	Typical Sources: Outdoor	Typical Sources: Indoor	Relative Loudness (Human Response)
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	Quiet rural area, daytime	Walking on carpet Clock ticking in adjacent room	1/16 as loud
20-30	Very quiet	Quiet rural area, nighttime	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.

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 from the present condition 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.

C. NOISE STANDARDS AND GUIDELINES

In 1983, the New York City Department of Environmental Protection (NYCDEP) adopted the City Environmental Quality Review (CEQR) noise standards for exterior noise levels. These standards are the basis for classifying noise exposure into four categories based on the L_{10} descriptor: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable, as shown in Table 14-2.

Table 14-3 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.

In determining potential impacts to a community from a proposed action, NYCDEP considers a significant impact to be:

- An increase of 3 dBA or more where the no action L_{eq} is 62 dBA or more; or
- An increase of up to 5 dBA where the no action noise L_{eq} is below 62 dBA, providing the total resulting L_{eq} is equal to or less than 65 dBA; or
- A noise level that exceeds the marginally acceptable levels, where the proposed action is a sensitive receptor (see Table 14-2). However, they are applicable only to mobile sources of noise; i.e., tire, wheels, and or engine noise from autos, trucks, rail cars, and aircraft. They are not intended to include emergency sirens on fire trucks and ambulances.

The New York City Noise Control Code defines sound-level standards for motor vehicles, compressors, and pavement breakers; the code requires all exhausts be muffled; and prohibits all unnecessary noise adjacent to schools, hospital, or courts. That code further limits construction activities to weekdays between 7:00 AM and 6:00 PM.

Table 14-2: 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]		$L_{10} \le 55$ dBA	$Ldn \le 60$ dBA						
2. Hospital, Nursing Home		$L_{10} \le 55$ dBA		$55 < L_{10} \le 65$ dBA	$Ldn \le 60$ dBA	$65 < L_{10} \le 80$ dBA	$Ldn \le 60$ dBA	$L_{10} > 80$dBA	$Ldn \le 75$ dBA
3. Residence, residential hotel or motel	7 am to 10 pm	$L_{10} \le 65$dBA		$65 < L_{10} \le 70$dBA		$70 < L_{10} \le 80$ dBA		$L_{10} > 80$dBA	
	10 pm to 7 am	$L10 \le 55$dBA		$55 < L_{10} \le 70$dBA		$70 < L_{10} \le 80$ 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).

Table 14-3: Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
Noise level with proposed action	$65 < L_{10} \le 70$	$70 < L_{10} \le 75$	$75 < L_{10} \le 80$	$80 < L_{10} \le 85$	$85 < L_{10} \le 90$	$90 < L_{10} \le 95$
Attenuation	25 dBA	(I) 30 dBA	(II) 35 dBA	(I) 40 dBA	(II) 45 dBA	(III) 50 dBA

Source: New York City Department of Environmental Protection.

D. NOISE MONITORING

Noise monitoring was carried out at four perimeter locations to establish existing noise levels in the vicinity of the proposed Academy site. Shown in Figure 1, "Noise Monitoring Locations," they included:

1) 31st Avenue midblock between College Point Boulevard and Whitestone Service Road West, which is the southern boundary,

2) the intersection of College Point Boulevard and 28th Avenue, which is at the northwest boundary of the grounds,

3) Ulmer Street midblock between 28th Avenue and the Southbound Whitestone Expressway Service Road, which is the eastern boundary of the grounds, and

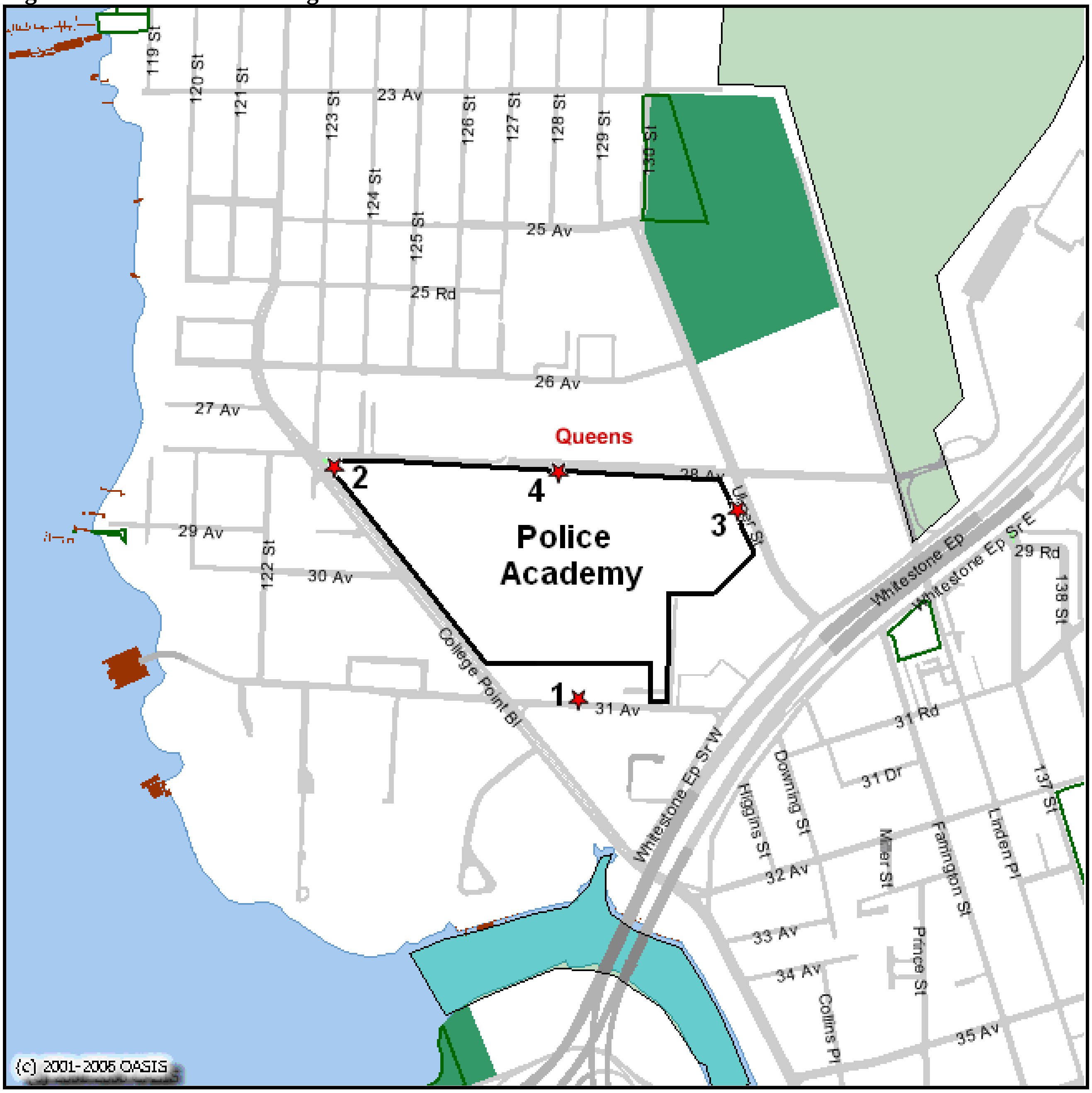
4) 28th Avenue midblock between College Point Boulevard and Ulmer Street, which is the on the site's northern boundary.

Noise monitoring for the peak AM traffic period (7:00 AM – 8:00 AM) was conducted on May 10, 2007 and May 15, 2007. The peak Midday traffic period (12:00 PM – 1:00 PM) and the peak PM traffic period (3:00 PM – 4:00 PM) were monitored on May 10, 2007. Noise monitoring for off-peak periods was carried out as well. The instruments used were a Bruel & Kjaer Sound Level Meter Type 2236 and a Bruel & Kjaer Sound Level Meter Type 2250, which were each mounted on a tripod at a height of 5 feet above the ground. The sound level meters were calibrated before and after use. A wind screen was used for each device during all sound measurements except for calibration. All measurement procedures conformed to the requirements of ANSI Standard S1.13-1971 (R1976) and the NYC *CEQR Technical Manual*. The temperatures were in the mid 70s (°F). The conditions were calm and clear on both days.

The primary sources of noise along 28th Avenue were vehicular traffic and aircraft flyovers to nearby LaGuardia Airport, which is located west of the site. For noise monitoring locations along Ulmer Street and 31st Avenue, the primary sources of noise were auto traffic, aircraft flyovers, and distant noise from the Whitestone Expressway, approximately 650 feet away. Of all the monitored sites, the intersection of 28th Avenue and College Point Boulevard had the largest number of aircraft flyovers.

Table 14-4 displays the noise monitoring results. Noise levels at each site were substantially similar throughout the day. The worst-case L_{10} value was 79.5 dBA at 31st Avenue between College Point Boulevard and Whitestone Service Road West during the peak AM period.

Figure 14-1: Noise Monitoring Locations



Source: Sandstone Environmental Associates, Inc.

★ = Noise Monitoring Locations.

Table 14-4: Monitored Noise Levels (dBA)

ID	Location	Time of Day	L_{eq}	L_{10}	MinL	MaxL	L_{01}	L_{90}
1	31st Ave. bet. College Point Blvd. & Service Rd.	7:25-7:45 AM	76.4	79.5	57.5	95.1	87.5	61.5
		11:35-11:55 AM	73.6	76.0	56.7	89.5	85.0	61.5
		12:30-12:50 PM	76.0	78.5	57.4	92.6	87.5	62.0
		3:03-3:23 PM	71.8	75.5	58.8	89.8	81.5	62.0
2	College Point Blvd. & 28th Ave.	7:34-7:54 AM	73.5	76.0	61.1	91.1	83.3	64.7
		11:05-11:25 AM	74.3	78.0	57.3	88.2	84.5	63.5
		12:00-12:20 PM	78.0	79.0	62.7	94.3	90.5	65.5
		3:35-3:55 PM	73.6	75.5	59.8	92.7	84.0	64.0
3	Ulmer Street bet. 28th Ave & Service Rd.	7:40-8:00 AM	71.6	75.1	58.3	88.2	81.2	61.5
		11:37-11:57 AM	69.4	72.6	56.2	83.8	79.5	59.7
		12:03-12:23 PM	71.4	73.7	56.0	87.1	82.9	59.5
		3:06-3:26 PM	72.4	74.6	58.3	90.6	83.2	61.7
4	28th Ave. bet. College Point Blvd & Ulmer St.	7:05-7:25 AM	72.8	76.1	58.0	88.3	83.8	61.3
		11:07-11:27 AM	71.6	74.6	51.1	90.9	82.9	56.1
		12:29-12:49 PM	72.4	76.0	54.5	87.3	83.1	57.5
		3:35-3:55 PM	72.6	76.1	53.5	91.1	82.3	58.8

Source: Sandstone Environmental Associates, Inc.

E. EXISTING CONDITIONS

The monitored noise levels were adjusted to reflect the traffic volumes developed for 2008 Existing Conditions. PCEs for projected 2008 Existing traffic volumes were calculated using both the vehicular mix observed during the monitoring periods and the traffic movement totals provided for Existing Conditions. The proportionality equation was used to compare PCEs for traffic observed during the monitoring periods with traffic volumes for Existing Conditions[1]. The field volumes generally corresponded well with the volumes documented in the Existing Conditions, and the adjustments, all below 2 dBA, were considered minor. Only the peak AM and PM periods are of interest because these are the only periods which would experience increased traffic due to the Proposed Action.

Table 14-5 shows the resulting noise levels for the monitored sites under Existing Conditions. Based on Table 14-5, the southern perimeter of the site is in the Clearly Unacceptable CEQR category and the remaining boundaries are in the Marginally Unacceptable II category. The resulting L_{10} values range from 75.4 dBA to 80.3 dBA. Currently, the site is partially vacant (the slender strip of land along College Point Boulevard), though a majority of the proposed Academy site is utilized as the NYPD's College Point Tow Pound. Aircraft flyovers were a substantial contributor to the noise levels.

[1] In some cases, the observed traffic volumes during noise monitoring may be slightly higher than those used for the traffic study, but these differences usually are not significant and the resulting noise levels are substantially similar to those monitored.

Table 14-5: Existing Noise Levels (dBA)

ID	Site	Peak Period	Field Volumes	Existing Volumes	Noise Adjust-ment	Observed Noise Levels		Existing Noise Levels	
						L_{eq}	L_{10}	L_{eq}	L_{10}
1	31st Ave. bet. College Point Blvd. & Service Rd.	AM	318	383	0.8	76.4	79.5	77.2	80.3
		PM	354	342	-0.1	71.8	75.5	71.7	75.4
2	College Point Blvd. & 28th Ave.	AM	1,128	1,248	0.4	73.5	76.0	73.9	76.4
		PM	1,125	1,542	1.4	73.6	75.5	75.0	76.9
3	Ulmer Street bet. 28th Ave & Service Rd.	AM	801	975	0.9	71.6	75.1	72.5	76.0
		PM	885	1,066	0.8	72.4	74.6	73.2	75.4
4	28th Ave. bet. College Point Blvd & Ulmer St.	AM	312	464	1.7	72.8	76.1	74.5	77.8
		PM	489	523	0.3	72.6	76.1	72.9	76.4

Source: Philip Habib & Associates, Sandstone Environmental Associates, Inc.

F. FUTURE WITHOUT THE PROPOSED ACTION (NO-BUILD CONDITION)

In the absence of the Proposed Action, the NYPD would continue to utilize their existing training facilities. The NYPD is expected to relocate their current Tow Pound operations to other City-owned property. No other on-site development is expected in the future without the Proposed Action.

Table 14-6 shows the No-Build traffic volumes for the peak AM and PM periods at the monitored sites with the resulting noise level increases in comparison to the Existing Conditions for the monitored locations. The analysis assumes that the relative mix of vehicular types (i.e., autos, medium trucks, heavy trucks) would be the same for both Existing and No-Build Conditions. Table 14-7 shows the results based on the proportionality equation for the PCEs for Existing and No-Build Conditions. The noise levels are similar to Existing Conditions and the relative changes would not be perceptible. All four sites would be in the same CEPO-CEQR categories as for Existing Conditions except for the peak PM period at Ulmer Street, where the projected reduction in traffic volume would place the site in the Marginally Unacceptable I category instead of the Marginally Unacceptable II category.

Table 14-6: No-Build Noise Levels (dBA)

ID	Site	Peak Period	Existing Volumes	No Build Volumes	Noise Increase	Existing Noise Levels		No Build Noise Levels	
						L_{eq}	L_{10}	L_{eq}	L_{10}
1	31st Ave. bet. College Point Blvd. & Service Rd.	AM	383	451	0.7	77.2	80.3	77.9	81.0
		PM	342	371	0.4	71.7	75.4	72.0	75.7
2	College Point Blvd. & 28th Ave.	AM	1,248	1,324	0.3	73.9	76.4	74.2	76.7
		PM	1,542	1,606	0.2	75.0	76.9	75.1	77.0
3	Ulmer Street bet. 28th Ave & Service Rd.	AM	975	899	-0.4	72.5	76.0	72.1	75.6
		PM	1,066	921	-0.6	73.2	75.4	72.6	74.8
4	28th Ave. bet. College Point Blvd & Ulmer St.	AM	464	485	0.2	74.5	77.8	74.7	78.0
		PM	523	545	0.2	72.9	76.4	73.1	76.6

Source: Philip Habib & Associates, Sandstone Environmental Associates, Inc.

G. FUTURE WITH THE PROPOSED ACTION (BUILD CONDITION)

The new NYPD Police Academy would incorporate many of the NYPD's existing training facilities throughout New York City into one consolidated campus in College Point, Queens. The total size of the proposed development is approximately 2.4 million gross square feet, consisting of both academic and indoor/outdoor physical and tactical training facilities, a police museum, drivers training, visiting police/lecturer housing facility and accessory parking garage. Sources of potential concern include adverse effects of noise levels from increased traffic near residential neighborhoods, on-site noise levels experienced by personnel in office and classroom areas, potential noise from the indoor shooting range, and noise during active sessions on the EVOC (driver's training) course.

Traffic Noise

To assess the potential for vehicular traffic to cause a noise impact at intersections within the study area, a preliminary evaluation of key intersections was carried out. Based on the NYC *CEQR Technical Manual* and subsequent revisions to its procedures, if the Proposed Action would increase traffic volumes by 100 percent or more, resulting in an increase of 3 dBA or more, then the affected intersections may warrant further analysis.

Table 14-7 compares the No-Build and Build volumes at each intersection. As shown in Table 14-7, no intersection would experience a 100 percent increase in traffic volume due to the project-generated vehicles. Therefore, none of the intersections would require additional study. The remaining analysis will instead focus on the noise levels at the site as experienced by nearby sensitive receptors.

Table 14-8 shows the PCEs and noise levels for Build Conditions at the monitored sites. Based on the projected noise levels for No-Build Conditions, an impact would occur if noise levels were to increase by 3.0 dBA. All of the project-generated vehicles would be passenger cars. The relative increases in noise level are low. In comparison to No-Build Conditions, the noise levels at the monitored sites range from 0.0 dBA to 0.3 dBA. These increases would not be perceptible. In addition, the sites would fall into the same CEPO-CEQR noise categories as for No-Build Conditions. Thus no noise impacts due to increased traffic are anticipated.

Table 14-9 presents a comparison between No-Build and Build noise levels.

Table 14-7: Traffic Volume Screening Analysis for Noise Increments

Intersection	Period	No-Build	Build	Percent Increase
Whitestone Exp. NB Service Rd @ Linden Pl	AM	1,935	1,951	0.8%
	PM	2,776	2,928	5.2%
Whitestone Exp. SB Service Rd @ Linden Pl	AM	1,787	1,926	7.2%
	PM	2,081	2,119	1.8%
28th Ave @ Ulmer St	AM	1,496	1,533	2.4%
	PM	1,449	1,807	19.8%
28th Ave / College Point Blvd / 123rd	AM	1,324	1,371	3.4%
	PM	1,606	1,974	18.6%
30th Ave @ College Point Blvd	AM	998	1,502	33.6%
	PM	1,162	1,708	32.0%
31st Ave @ College Point Blvd	AM	1,792	2,259	20.7%
	PM	1,803	2,010	10.3%
31st Ave @ Whitestone Exp., SB Service Rd	AM	604	1,007	40.0%
	PM	659	679	2.9%
Whitestone Exp. SB Service Rd @ Ulmer St	AM	2,747	3,165	13.2%
	PM	2,616	3,285	20.4%
Whitestone Exp. SB Service Rd @ College Point Blvd	AM	1,573	1,639	4.0%
	PM	1,632	1,825	10.6%
Whitestone Exp. NB Service Rd / 32nd Ave @ College Point Blvd	AM	1,752	1,818	3.6%
	PM	1,987	2,180	8.9%
Roosevelt Ave @ College Point Blvd	AM	2,082	2,140	2.7%
	PM	2,870	2,935	2.2%
20th Ave @ Whitestone Exp. SB Service Rd	AM	3,336	3,356	0.6%
	PM	3,665	3,675	0.3%
20th Ave @ Whitestone Exp. NB Service Rd	AM	2,316	2,316	0.0%
	PM	2,786	2,805	0.7%

Source: Sandstone Environmental Associates, Inc.

Table 14-8: Traffic Noise Increments at Site Boundaries, Build Conditions

ID	Site	Peak	Passenger Car Equivalents			Noise Increment (dBA)
			No-Build	Build	Project Increment	
1	31st Ave. bet. College Point Blvd. & Service Rd.	AM	5,225	5,627	402	0.3
		PM	1,720	1,737	17	0.0
2	College Point Blvd. & 28th Ave.	AM	3,198	3,245	47	0.1
		PM	13,573	13,941	368	0.1
3	Ulmer Street bet. 28th Ave & Service Rd.	AM	4,820	4,894	74	0.1
		PM	6,174	6,358	184	0.1
4	28th Ave. bet. College Point Blvd & Ulmer St.	AM	1,695	1,698	3	0.0
		PM	3,140	3,203	63	0.1

Source: Sandstone Environmental Associates, Inc.

Table 14-9: Traffic No-Build / Build Noise Levels (dBA)

ID	Site	Peak	No-Build Noise Levels		Build Noise Levels	
			L_{eq}	L_{10}	L_{eq}	L_{10}
1	31st Ave. bet. College Point Blvd. & Service Rd.	AM	77.9	81.0	78.2	81.3
		PM	72.0	75.7	72.0	75.7
2	College Point Blvd. & 28th Ave.	AM	74.2	76.7	74.3	76.8
		PM	75.1	77.0	75.3	77.2
3	Ulmer Street bet. 28th Ave & Service Rd.	AM	72.1	75.6	72.2	75.7
		PM	72.6	74.8	72.7	74.9
4	28th Ave. bet. College Point Blvd & Ulmer St.	AM	74.7	78.0	74.7	78.0
		PM	73.1	76.6	73.2	76.7

Source: Sandstone Environmental Associates, Inc.

On-Site Activities

Emergency Vehicles Operators Course (EVOC)

EVOC training is intended to prepare students with basic emergency vehicle driver training. The driving courses typically include emergency vehicle driving, accident avoidance, proper driving techniques, backing up procedures, proper stopping procedures, radius driving and advance backing, pursuit driving, and cone and flare placement. At the current site on Floyd Bennett Field in Brooklyn, individual exercises are carried out twice a week between 9:00 AM and 9:30 PM. The number of training vehicles typically ranges between eight and nine per drill with sirens engaged in consecutive fashion for 1.5 minutes per vehicle. For the Proposed Action, the primary sources of noise during the EVOC training would be squealing tires during vehicular maneuvers and siren noise. Since the exercises in Brooklyn occur during a half-hour morning period, the proposed action is assumed to follow a similar schedule.

The Firearms and Tactics facility would be located along 28th Avenue near the northwest portion of the site, as shown in Figure 14-2. This segment of the building would rise to approximately 115 feet above ground elevation. The EVOC driver-training track would cover eight acres on a rooftop behind (to the south of) the Firearms and Tactics facility and it would rise to approximately 47 feet above ground elevation. Therefore the Firearms and Tactics facility, which rises nearly 70 feet above the level of the EVOC track, would act as a barrier between the anticipated EVOC noise source and the residential neighborhoods to the north and northwest. However, no walls or buildings would shield noise to the south and west.

Sensitive receptors in the vicinity of the proposed EVOC course would include residences to the north and northwest. Five residential areas, shown in Figure 14-3, "Residential Uses in Proximity to EVOC Site," may experience noise from the EVOC activities. Representative residential buildings in these areas are listed below. Their distances from the EVOC training range from 480 to 575 feet (see Figure 14-3).

R1) 120-35 28th Avenue,
R2) 27-20 College Point Boulevard,
R3) 26-12 123rd Street,
R4) 123-14 26th Avenue, and
R5) 124-02 26 Avenue.

Sensitive receptors to the south of the site include the All Nations Church at 26-25 123rd Street. In addition to Sunday services, the church may have funerals and other activities during the daytime, and it also runs the Full Gospel Christian School for Kindergarten through 8th grade. The rear of the church, which is the nearest building, is at least 550 feet southeast of the EVOC activities.

The Fairfield Inn is a sensitive receptor west of the site. It is located at the corner of College Point Boulevard and 30th Avenue, which is across from the EVOC site. At this location, the building design provides minimal protection to the inn from the EVOC noise levels. The inn is about 100 feet from the EVOC activities.

East of the EVOC activities, the heights of the Tactical Village and Fieldhouse would shield the dining halls, academic building, and student support services from noise.

Tire squeal. Squealing tires during EVOC activities can create noise level spikes above ambient noise levels. Tire squeal is usually created when the frictional forces that maintain the interaction between the tire tread and road surface (an interface known as the contact patch) are overcome by accelerational and decelerational forces put on the wheels by the engine and transmission. A change in the frictional coefficient of either surface, such as the pavement becoming wet or tire treads wearing off during operation, also can contribute to the characteristics of the noise.

Observed tire squeal noise levels can vary due to factors such as the type of vehicle used, the travel speed, the direction of movement, and the location of the observer. For deceleration exercises on road courses, SPL values can average 84 dBA. Rapid vehicle acceleration could create noise levels in the 77-to 81-dBA range. As a conservative approach, the maximum noise level of 84 dBA was assumed to occur at the northwest corner of the EVOC rooftop. This is a conservative assumption because most exercises, for safety reasons, would occur towards the center of the course and would avoid the periphery. Based on the locations of the residential units, and their relationship to the EVOC course, noise would attenuate in a manner similar to a point source (6 dBA). Without any intervening barriers, the tire noise at a distance of 480 feet, which is the distance to the nearest home to the north, would be 64.4 dBA. The wall of the Firearms and Tactics facility, however, would create an approximate 70-foot high barrier and is estimated to reduce noise levels by at least 20 dBA, resulting in a noise level of 44.4 dBA at 480 feet.

To analyze noise levels at the Fairfield Inn and the church/school site, the maximum tire noise levels were placed in the center of the EVOC site. Without any barriers to mitigate the noise, the Inn would experience a noise level of 74.8 dBA, and the rear of the church would experience a noise level of 63.2 dBA.

Sirens. Sirens would be used for some exercises to simulate real-world situations. Variables include operating uses, siren characteristics, and timing of the procedures. Typical SPL values for vehicle sirens range from 90 dBA to 100 dBA at a distance of 50 feet, depending on which siren option is used in the vehicle. Considering a vehicle with its siren on as a point source, a constant L_{eq} of approximately 95 dBA at a distance of 50 feet was assumed for analysis purposes. As a conservative assumption for analyzing noise levels in residential neighborhoods, the siren origin was located at the northwest corner of the EVOC course, which is the location closest to a residence. At a home 480 feet away, for example, the siren noise would be approximately 75.4 dBA with no barrier. The height of the Firearms and Tactics facility would be expected to reduce the noise levels by at least 20 dBA, resulting in a noise level of 55.4 dBA at this nearest home.

To analyze noise levels at the Fairfield Inn and the church/school site, the maximum siren noise levels were placed in the center of the EVOC site. Without any barriers to mitigate the noise, the Inn could experience a noise level of 85.8 dBA, and the rear of the church could experience a noise level of 74.2 dBA.

Shooting Range. The shooting range would be indoors, and noise mitigation measures would be incorporated into the design and construction so that the activities would not interfere with on-site office and classroom uses. Therefore, no noise from the shooting range would be audible at nearby residences.

Total EVOC Noise Levels. Table 14-10 depicts the total noise levels calculated for nearby sensitive receptors during EVOC activities. Noise levels from the EVOC training include the barrier effect of the wall for the Firearms and Tactics facility. Resulting noise levels range from 54.1 to 86.1 dBA. As mentioned previously, the EVOC activities would occur for a brief period of approximately ½ hour during the weekday mornings.

Table 14-10: Total Leq Noise Levels (dBA), EVOC Training

Location	Distance (ft) from EVOC	EVOC Training		
		Tire Squeal	Sirens	Total
R1 – 120-35 28th Avenue	530	43.5	54.5	54.8
R2 – 27-20 College Point Blvd.	480	44.4	55.4	55.7
R3 – 26-12 123rd Street	575	42.8	53.8	54.1
R4 – 26-12 123rd Street	530	43.5	54.5	54.8
R5 – 12-14 26th Avenue	485	44.3	55.3	55.6
Fairfield Inn	146	74.8	85.8	86.1
Rear of All Nations Church	550	63.2	74.2	74.5

Source: Sandstone Environmental Associates, Inc.

Airport Noise

The site is approximately 0.6 miles east of Runway 13-31 at LaGuardia Airport. Arriving aircraft typically approach this runway from the south, and most departing aircraft turn towards the south after taking off. Based on this pattern for annual average aircraft flight paths, which is evident in the available airport contours for 2003, the western edge of the project site is approximately 0.1 miles east of the 65 DNL contour. Aircraft flyovers were observed during noise monitoring and are included in the noise levels for Existing, No-Build, and Build Conditions. However, aircraft flyovers can vary considerably from day to day or throughout the day. The projected noise levels for this study cannot account for all possible variations in noise level due to aircraft from LaGuardia Airport.

Total Noise Levels for Build Conditions

The EVOC noise levels were added to the traffic noise levels, and the total noise was compared with noise levels for No-Build Conditions. Table 14-11 shows a comparison of No-Build and Build noise levels for the peak AM and PM periods at nearby sensitive receptors. No EVOC noise was included for the peak PM period because the activities would not occur during that time. Total L_{10} noise levels range from 63.0 to 75.6 dBA under No-Build Conditions and from 63.1 to 88.9 dBA under Build Conditions. The noise level increments would not cause the residential units to be classified into a higher CEQR noise exposure category. All increases in noise levels are below 3.0 dBA except for the Fairfield Inn and the rear wall of All Nations Church. The potential noise level increments of 12.2 and 9.8, respectively, would represent impacts temporarily during the EVOC activities approximately ½ hour per day. These noise level increments are conservatively high, as the 78-foot height of the tactical village building would shield the church from some of the EVOC noise. Therefore, no significant adverse impacts are projected for the Proposed Action.

Table 14-11: Comparison of Total Noise Levels With and Without the Proposed Action

Location	No-Build		Build		Build – No-Build
	L_{eq}	L_{10}	L_{eq}	L_{10}	
Peak AM Period					
R1 – 120-35 28th Avenue	63.9	66.4	64.5	67.0	0.6
R2 – 27-20 College Point Blvd.	65.7	68.2	66.2	68.7	0.5
R3 – 26-12 123rd Street	62.1	64.6	62.8	65.3	0.7
R4 – 26-12 123rd Street	61.9	64.4	62.7	65.2	0.8
R5 – 12-14 26th Avenue	60.8	63.3	62.0	64.5	1.2
Fairfield Inn	73.1	75.6	86.3	88.9	13.2
All Nations Church (rear)	65.3	68.4	75.1	78.2	9.8
Peak PM Period					
R1 – 120-35 28th Avenue	64.8	66.7	64.9	66.8	0.1
R2 – 27-20 College Point Blvd.	66.7	68.5	66.8	68.7	0.1
R3 – 26-12 123rd Street	63.1	64.9	63.2	65.0	0.1
R4 – 26-12 123rd Street	62.9	64.7	63.0	64.8	0.1
R5 – 12-14 26th Avenue	61.8	63.6	61.9	63.7	0.1
Fairfield Inn	73.4	75.3	73.5	75.4	0.1
All Nations Church (rear)	59.3	63.0	59.4	63.1	0.0

Source: Sandstone Environmental Associates, Inc.

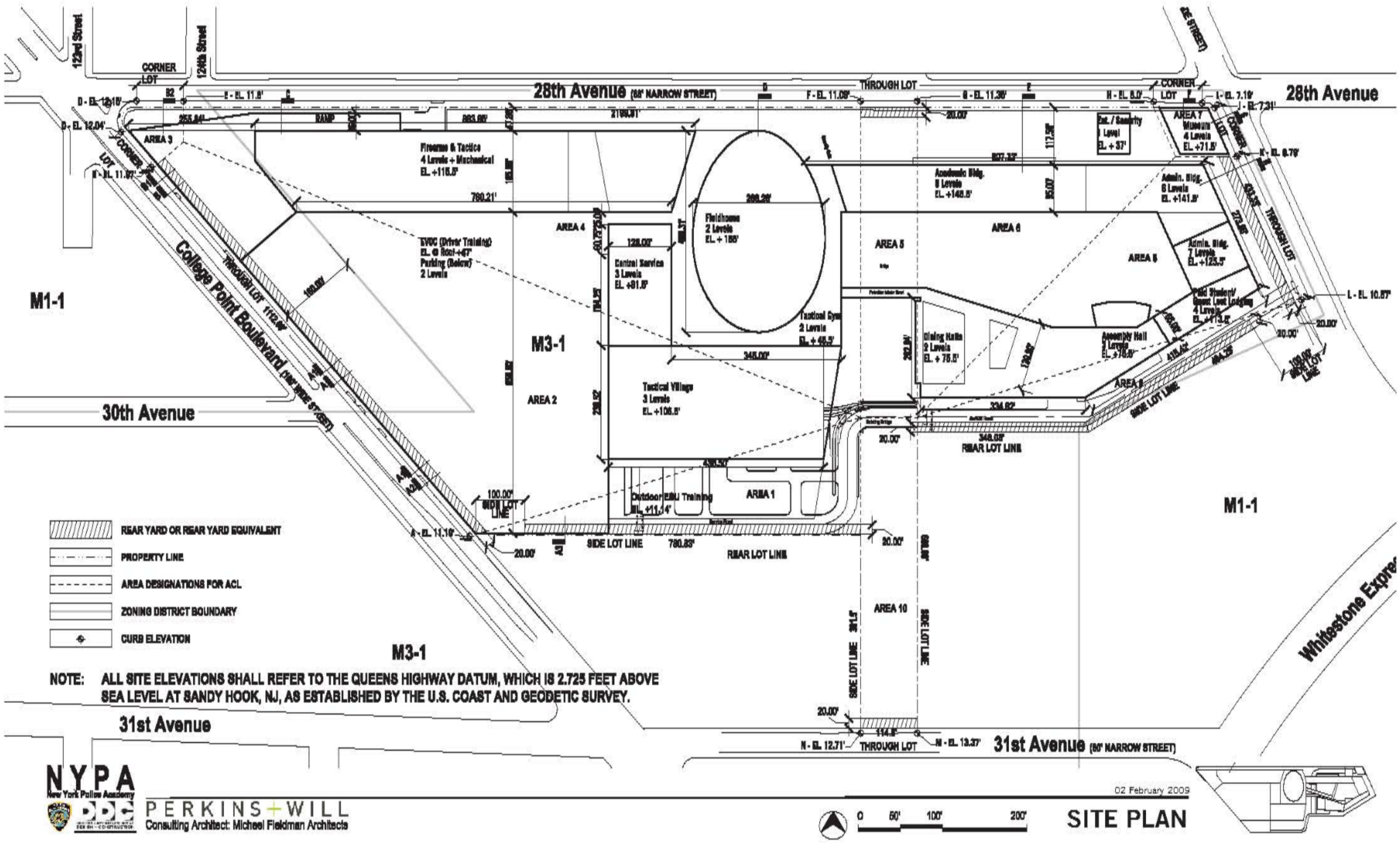
H. CONCLUSION

Based on the foregoing analyses, the Proposed Action would not create a significant noise level impact to residential areas to the north. Significant adverse impacts are projected for the Fairfield Inn west of the site and the All Nations Church and Christian Gospel School southeast of the site. These impacts are solely due to the brief periods of up to half an hour when EVOC activities would be in progress. During these periods, noise level increases would range from 9.8 dBA at the church/school to 13.2 dBA for the Fairfield Inn. These projections of impacts are conservative, as the walls along the EVOC area on the roof of the parking area would provide partial shielding.

Due to the configuration of building heights and segments, the office, academic, and lodging components of the Proposed Action would be protected from the EVOC noise levels. This is due to their distances of at least 100 feet from the EVOC location as well as the barrier effects of the Central Service and Tactical Village structures that would be higher than the EVOC rooftop by approximately 34 to 60 feet.

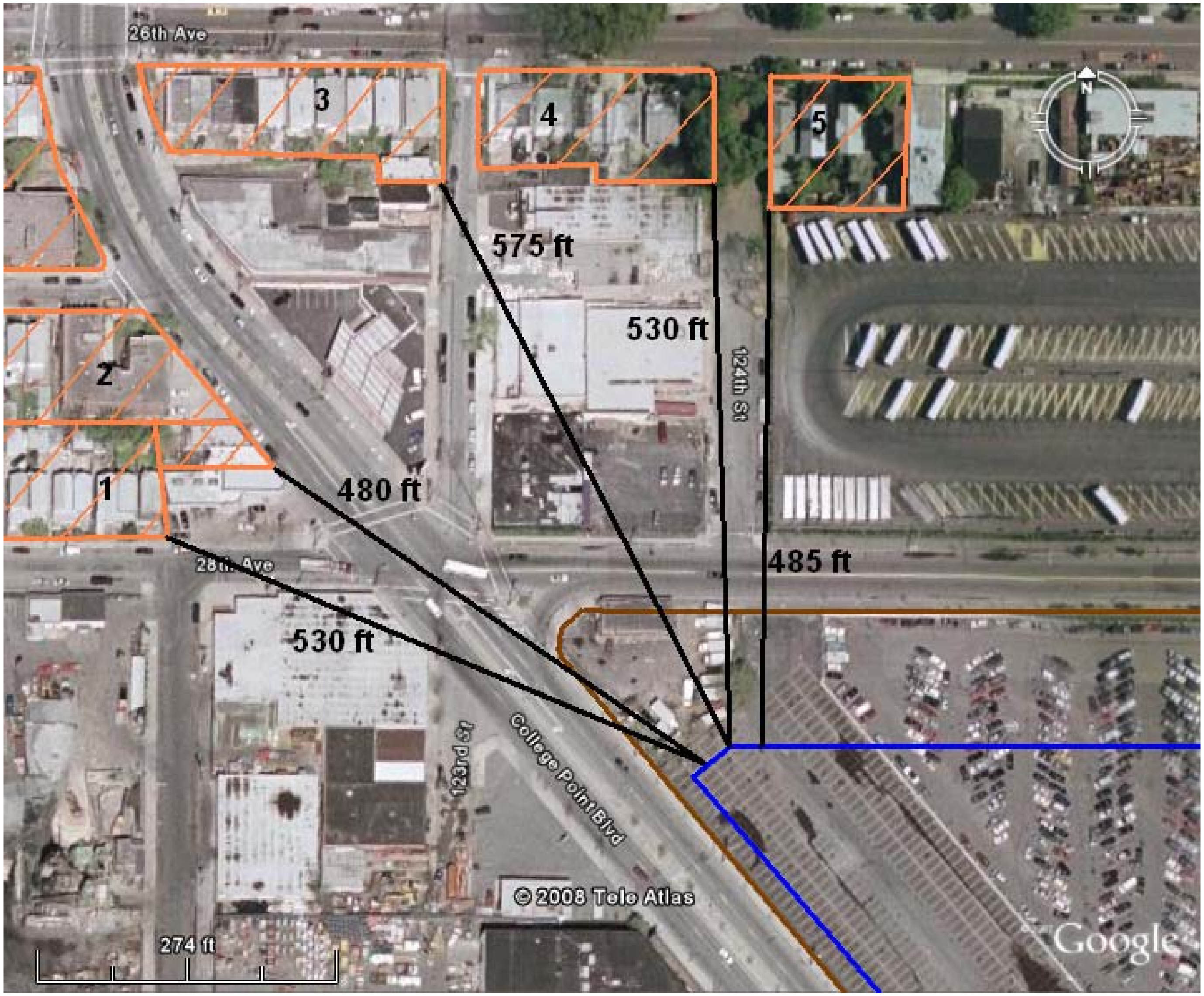
As shown in Table 14-9, L_{10} noise levels on the streets around the site would range from 74.9 dBA on Ulmer Street to 81.3 dBA on 31st Avenue. Since the site buildings would be approximately 400 feet from 31st Avenue, the traffic noise levels on the southern side of the site would be lower and similar to noise levels for the rear of the All Nations Church as shown in Table 14-11. Based on this information, noise levels at the exterior of the project buildings would generally fall into the 75.0 to 80.0 dBA range, which would place them in the Marginally Unacceptable II CEQR category. The recommended building attenuation would be 35 dBA as shown in Table 14-3. This attenuation can be achieved through installing double-glazed windows on a heavy frame in masonry structures or windows consisting of laminated glass. The *NYC CEQR Technical Manual* states that when maximum L_{10} levels are greater than 70 dBA, alternate means of ventilation should be incorporated into building, and building attenuation is required. Since some of the buildings would be used for office purposes, more refined analyses during final design may indicate that a lower building attenuation value of 30 dBA may be suitable.

Figure 14-2: EVOC Training Area



Source: PERKINS+WILL

Figure 14-3: Residential Uses in Proximity to EVOC Site (R Locations)



Source: Sandstone Environmental Associates, Inc