A. INTRODUCTION AND SUMMARY OF FINDINGS

This chapter considers the potential for the Proposed Project to result in significant adverse noise impacts. A noise analysis was performed to examine the potential impacts of the Proposed Project on sensitive noise receptors and on the interior noise levels of the proposed residential uses.

The analysis concludes that the Proposed Project would not result in significant adverse impacts at nearby residential receptors according to the NYSDEC noise guidance document, *Assessing and Mitigating Noise Impacts* (DEP-00-1, February 2, 2001).[1] Additionally, the analysis concludes that future interior noise levels of the proposed buildings would be acceptable for residential use according to the NYSDEC guidance document.

B. NOISE FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called "decibels" (dB). The particular character of the sound that we hear is determined by the speed, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz (Hz). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernible and therefore more intrusive than many of the lower frequencies (e.g., a diesel truck engine).

B.1. "A"-WEIGHTED SOUND LEVEL (DBA)

In order to establish a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and it is the descriptor of noise levels most often used for noise impact analysis. As shown in **Table 14-1**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA.

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[1] http://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf.

Table 14-1
Common Noise Levels

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

Note: A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.
Sources: Cowan, James P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable.

B.2. NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

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

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

For the purposes of the noise analysis, the maximum one-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the mobile source noise impact evaluation. $L_{eq(1)}$ is the noise descriptor used by most governmental agencies, including NYSDEC for noise impact evaluation, and is used to provide an indication of highest expected sound levels.

B.3. NOISE STANDARDS AND IMPACT CRITERIA

B.3.a. Town of Yorktown Noise Ordinance

Section 216-2 of the Code of the Town of Yorktown prohibits unnecessary, unreasonable, or excessive noise. The Code does not include quantitative noise level limits applicable to noise sources associated with the Proposed Project.

B.3.b. New York State Department of Environmental Conservation

NYSDEC has published a policy and guidance document, *Assessing and Mitigating Noise Impacts* (DEP-00-1, February 2, 2001), which presents noise impact assessment methods, identifies thresholds for significant impacts, and discusses potential avoidance and mitigative measures to reduce or eliminate noise impacts.[2]

NYSDEC's guidance document sets forth thresholds that can be used in determining whether a noise increase due to a project may constitute a significant adverse impact, noting that these thresholds should be viewed as guidelines subject to adjustment as appropriate for the specific circumstances. According to DEP-00-1:

- Increases in noise ranging from 0 to 3 dBA should have no appreciable effect on receptors;
- Increases of 3 to 6 dBA may have the potential for adverse impacts only in cases where the most sensitive of receptors (e.g., hospital or school) are present;
- Increases of more than 6 dBA may require a closer analysis of impact potential depending on existing noise levels and the character of surrounding land use and receptors; and
- Increases of 10 dBA or greater deserve consideration of avoidance and mitigation measures in most cases.

The guidance document also sets forth noise thresholds that can be used in identifying whether a noise level due to a project should be considered a significant adverse impact. According to the guidance, the addition of any noise source in a non-industrial setting should not raise the ambient noise level above a maximum of 65 dBA, and ambient noise levels in industrial or commercial areas may exceed 65 dBA with a high end of approximately 79 dBA. As set forth in the guidance, projects that exceed these levels should explore the feasibility of implementing mitigation.

[2] http://www.dec.ny.gov/docs/permits_ej_operations_pdf/noise2000.pdf.

B.4. PROPOSED PROJECT IMPACT CRITERIA

For purposes of the noise analysis, consistent with NYSDEC guidance and Town noise regulations, operations of the mobile and stationary sources associated with the Proposed Project that would result in an increase in ambient noise levels of more than 6 dBA at receptor sites or produce ambient noise levels of more than 65 dBA at residences or 79 dBA at an industrial or commercial area would be considered a significant adverse noise impact.

C. METHODOLOGY

Future noise levels (in the "Build" condition and the "No Build" condition) were calculated using a proportional modeling technique, which was used as a screening tool to estimate changes in noise levels. The proportional modeling technique is an analysis methodology commonly used for projection of noise resulting from vehicular traffic. The noise analysis examined the weekday AM and PM peak periods identified in Chapter 12, "Traffic and Transportation," at all receptor locations, which therefore result in the maximum potential for significant adverse noise impacts. The proportional modeling used for the noise analysis is described below.

The prediction of future "No Build" condition and "Build" condition noise levels is based on a calculation using measured existing noise levels and predicted changes in traffic volumes on the roadway segment that is the dominant source of noise for a given receptor. Vehicular traffic volumes are converted into Passenger Car Equivalent (PCE) values, for which one medium-duty truck (having a gross weight between 9,900 and 26,400 pounds) is assumed to generate the noise equivalent of 13 cars, one heavy-duty truck (having a gross weight of more than 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, and one bus (vehicles designed to carry more than nine passengers) is assumed to generate the noise equivalent of 18 cars. Future noise levels are calculated using the following equation:

$$\text{FB NL} - \text{EX NL} = 10 * \log10 (\text{FB PCE} / \text{EX PCE})$$

where:

FB NL = Future Build Noise Level

EX NL = Existing Noise Level

FB PCE = Future Build PCEs

EX PCE = Existing PCEs

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

D. EXISTING CONDITIONS

D.1. SELECTION OF NOISE RECEPTOR LOCATIONS

A total of three receptor locations were selected for evaluation of existing and future noise levels. These locations are detailed below in **Table 14-2** and are shown in **Figure 14-1**.

The receptor locations were selected to represent noise-sensitive uses (e.g., residences) near the Project Site as well as representing the Project Site itself.

D.2. NOISE MONITORING

At each receptor location, existing noise levels were determined by field measurements. Noise monitoring was performed on August 22, 2023. At all receptor locations, 20-minute noise measurements were conducted at grade level during the weekday AM (7:00 AM–9:00 AM) and PM (4:00 PM–6:00 PM) peak periods. At all noise measurement locations, the microphone was mounted at a height of approximately five feet above the ground surface on a tripod and approximately six feet or more away from any large sound-reflecting surface to avoid major interference with sound propagation.

Where traffic noise is a primary contributing or dominant source of noise, 20-minute noise measurements are a statistical representation of the hourly equivalent noise level, allowing sufficient time for L_{eq} values, as well as other statistical noise descriptors, to stabilize and not fluctuate based on individual noise events (e.g., vehicle passbys). A 20-minute noise measurement will include several cycles of nearby traffic lights and the traffic cycles associated with those light cycles, as well as any other natural short-term traffic cycles that would manifest themselves within a single hour. Since the 20 minutes of traffic accounted for by the 20-minute noise measurement would be comparable to a full hour of traffic at the same location, and traffic is the dominant source of noise at the location, the 20-minute noise measurement provides a representation of the 1-hour noise level, generally within 1–3 dBA.

Table 14-2
Noise Measurement Locations

Noise Receptor	Location
1	Old Route 6 between East Main Street and Project Site
2	Southwest Corner of Project Site
3	Approximate Center of Project Site

D.3. EQUIPMENT USED DURING NOISE MONITORING

Measurements were performed using a Brüel & Kjær Type 2270 Sound Level Meter (SLM), Brüel & Kjær Type 4189 1/2-inch microphone, and Brüel & Kjær Type 4231 Sound Level Calibrator. The Brüel & Kjær SLM is a Class 1 instrument according to ANSI Standard S1.4-1983 (R2006). The SLM had a laboratory calibration date within the past one year at the time of use. The SLM was calibrated before and after readings with a Brüel & Kjær Type 4231 Calibrator using the appropriate adaptor. The data were digitally recorded by the SLM and displayed at the end of the measurement period in units of dBA. Measured quantities included the L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. Windscreens were used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

D.4. EXISTING NOISE LEVELS AT NOISE RECEPTOR LOCATIONS

The results of the measurements of existing noise levels are summarized in **Table 14-3**. Roadway traffic on Old Route 6 and U.S. Route 6 was the dominant noise source at Site 1, and roadway traffic on the Taconic State Parkway was the dominant noise source at

Sites 2 and 3. Noise levels along adjacent roadways in the Noise Study Area are moderate to relatively high, reflecting the proximity to the roadway and the level of vehicular activity present. The measured existing L_{eq} values at Site 1 exceed the 65 dBA threshold considered acceptable for a non-industrial setting according to NYSDEC noise evaluation guidelines.

Table 14-3
Existing Noise Levels (in dBA)

Receptor	Measurement Location	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	Old Route 6 between East Main Street and Project Site	AM	66.3	74.5	69.3	64.5	58.5
		PM	67.7	78.1	68.9	64.7	60.0
2	Southwest Corner of Project Site	AM	64.9	68.9	66.9	64.5	62.0
		PM	63.5	67.3	65.4	63.3	60.0
3	Approximate Center of Project Site	AM	50.9	56.2	52.6	50.2	48.1
		PM	53.5	66.2	52.3	49.9	48.1

Note: Field measurements were performed by AKRF, Inc. on August 22, 2023

E. THE FUTURE WITHOUT THE PROPOSED PROJECT

Using the methodology previously described and based on the increases in traffic that are anticipated to occur in the No Build condition, noise levels for the No Build condition were calculated at receptor locations 1 through 3. The No Build condition noise levels are shown in **Table 14-4**. Due to relatively small changes in the volume of vehicular traffic on roadways near the Project Site, noise levels in the future without the Proposed Project would increase by up to approximately 0.4 dBA, which would not be perceptible. No change in noise levels would occur at Sites 2 and 3, because the dominant noise source at these Sites is the Taconic State Parkway, and the volume of vehicular traffic on this roadway is not expected to substantially change in the future without the Proposed Project.

Table 14-4
Future Noise Levels without the Proposed Project (in dBA)

Site	Time	Existing $L_{eq(1)}$	Future No Build $L_{eq(1)}$	No Build Increment
1	AM	66.6	69.7	0.3
	PM	68.1	69.4	0.4
2	AM	64.9	64.9	0.0
	PM	63.5	63.5	0.0
3	AM	50.9	50.9	0.0
	PM	53.5	53.5	0.0

Note: Noise levels at Site 1 were calculated by using proportional modeling.

F. THE FUTURE WITH THE PROPOSED PROJECT

F.1. MOBILE SOURCES OF NOISE (TRAFFIC)

Using the methodology previously described and based on the increases in traffic that are anticipated to occur in the Build condition, noise levels for the Build condition were calculated at receptor locations 1 through 3. The Build condition noise levels are shown in **Table 14-5**. Due to relatively small changes in the volume of vehicular traffic on roadways near the Project Site as a result of Project-generated traffic, noise levels in the future with the Proposed Project would increase, by approximately 0.2 dBA at Site 1 as compared to existing noise levels. This increase would not be perceptible. No change in noise levels would occur at Sites 2 and 3 because the dominant noise source at these Sites is the Taconic State Parkway, and the volume of vehicular traffic on this roadway is not expected to substantially change in the future with the Proposed Project.

Table 14-5
Future Noise Levels with the Proposed Project (in dBA)

Site	Time	No Build $L_{eq(1)}$	Future Build $L_{eq(1)}$	Build Increment
1	AM	66.6	66.8	0.2
	PM	68.1	68.3	0.2
2	AM	64.9	64.9	0.0
	PM	63.5	63.5	0.0
3	AM	50.9	50.9	0.0
	PM	53.5	53.5	0.0
Note: Noise levels at Site 1 were calculated by using proportional modeling.				

F.2. STATIONARY SOURCES OF NOISE

The Proposed Project would include amenity features such as an outdoor event space and tennis courts that would be expected to generate noise. However, noise generated from an age-restricted residential development would not be anticipated to be more noticeable than the noise generated from traffic on the Taconic State Parkway. In addition, the outdoor amenity spaces would be located at least 500 feet away from the nearest existing receptors (i.e., residences along Old Route 6 or Donald J. Trump State Park) and would not operate during night-time hours when residences would be most sensitive to noise. Consequently, the amenity features of the Proposed Project would not have the potential to result in significant adverse noise impacts to proximate off-site receptors.

The Proposed Project would also include building mechanical systems that would have the potential to generate noise. The building mechanical systems would be located and designed to avoid producing significant noise level increments at nearby receptors and would therefore not have the potential to result in significant adverse noise impacts. The final design of these systems would be reviewed during the site plan review process.

F.3. NOISE EXPOSURE AT PROPOSED USES

Maximum measured and predicted noise levels from all sources throughout the Project Site (as represented by Sites 2 and 3) would not exceed the 65 dBA criteria recommended by NYSDEC guidelines for residential use. Consequently, the predicted noise exposure at the proposed residential uses would not constitute a significant adverse impact.

G. MITIGATION MEASURES

The Proposed Project would not result in a significant adverse impact from noise. Therefore, no mitigation measures are required. ✷

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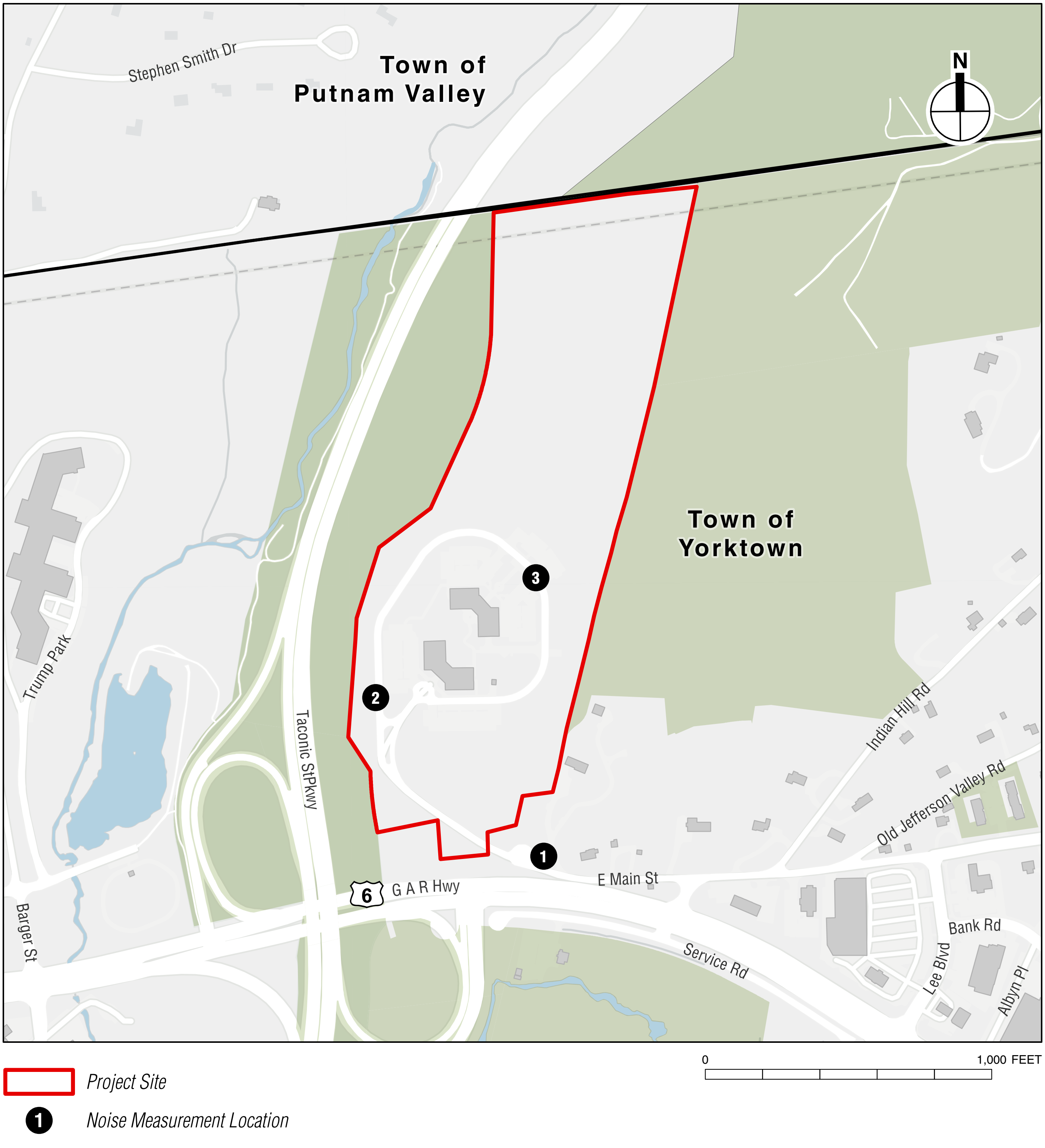

800 EAST MAIN STREET

Noise Measurement Locations

Figure 14-1