III.G

Noise

1. Existing Conditions and Capacity

This section of the DEIS summarizes the Evaluation of Site Sound Emissions (see **Appendix M**). The evaluation documents major sources of noise and the existing ambient noise levels in the vicinity of the Project Site and provides a discussion of noise impacts generated by trucks and the HVAC systems of the proposed buildings. Finally, it provides mitigation measures that would meet project noise goals.

Methodology

An independent acoustical consulting firm, Ostergaard Acoustical Associates (OAA), evaluated potential sound emissions from the Project. For the full Evaluation of Site Sound Emissions report, see **Appendix M**. An ambient sound level survey was carried out to document existing sound in the area. OAA staff deployed two monitors on the afternoon of 16 March 2022 and retrieved them on the morning of 22 March. OAA uses ANSI S12.9 "Quantities and Procedures for Description and Measurement of Environmental Sound" as a guideline for all outdoor sound surveys; all measurements conform to this standard to the extent feasible. Location 1 was selected near the southern boundary of the site, set back from major roadways. Location 2 was selected in the southeast corner of the site, along Hemion Road, to document the intensity of local traffic in the area. For each Location, a Rion NL-52 sound level meter was placed within a weather enclosure with the microphone attached to an adjacent tripod. A windscreen was used on the microphone. Monitors were instructed to record detailed octave band time history data at one-second intervals and hourly statistics for the duration of the survey. Monitors recorded data until memory was full, or batteries were depleted. In the end, just over four days of sound data were recorded from 12:00 p.m. on 16 March through 7:00 a.m. on 21 March. All sound levels meters were calibrated before and after deployment using a Bruel and Kjaer Model 4231 sound level calibrator, which is calibrated by an outside calibration service annually. It was observed upon deployment and retrieval of the monitors that the acoustical environment was dominated by steady distant traffic flow including both automobiles and heavy trucks. Intermittent fauna noise was present at both measurement locations.

To model the expected sound emissions, acoustical modelling software, specifically CadnaA, was used to create and analyze site sound emissions for the site. The model takes into account relevant parameters between the noise source and receptor positions of interest to predict how sound will

propagate. In addition to distance attenuation, the model accounts for the effects of terrain, various types of ground cover, shielding by structures, and reflections from buildings. Upper-story vantage points were evaluated for all receptors of interest.

A discussion of general results without the sound barrier are provided in **Appendix M, Page 17**, second paragraph. Without the sound barrier maximum sound levels would approach 61 dB(A). Proposed sound barriers are included in all models and are shown in light blue in all models. Barrier identification color is discussed in **Appendix M**, pages 10 and 19.

Further, decibel levels are not mapped over time because this is challenging to accurately replicate. Truck activity varies over time because the trucks are mobile and because the events themselves are dynamic. The approach of the Sound Study is to look at the maximum sound levels that occur over time, and model those to evaluate a worst-case scenario. (**Appendix M, Figure 3**). Looking at the sound level over time was provided as a hourly average sound level in **Appendix M, Figure 4**). Truck positions were evaluated closest to receptors; locations further away would result in lower sound levels than what is presented in the Sound Study.

Sensitive Receptors

Old Mill Road and Interstate-287 (a six lane Thruway and associated improvements including a sound wall) are located immediately to the north of the Project Site. Beyond I-287 to the north, there are multi-family residential uses. However, there is a substantial concrete highway noise barrier between the residents to the north and I-287. The residences are also located about 2,000 feet away from the Project Site and are at enough of a distance, along with the concrete noise barrier, so as not to be an acoustical concern. A railroad right-of-way occurs to the south. Hemion Road is located to the east. A vacant quarry and industrial uses are located to the west of the Project Site. The quarry is currently filled with a large body of water. Vacant wooded land occurs in the eastern portion of the Project Site in the portion that overlaps with the Village of Montebello. A variety of other logistics facilities also occur farther east. A school is located to the northeast in Montebello. South of the facilities are multi-family residences and commercial uses, a library, and a religious facility fronting Lafayette Avenue. A hospital, college, and single-family neighborhoods are located further south of Lafayette Avenue. (see **Figure III.G-1** which can also be found in **Appendix M** and **Figure III.G-2**).

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Figure III.G-1: Aerial Photograph

vhb

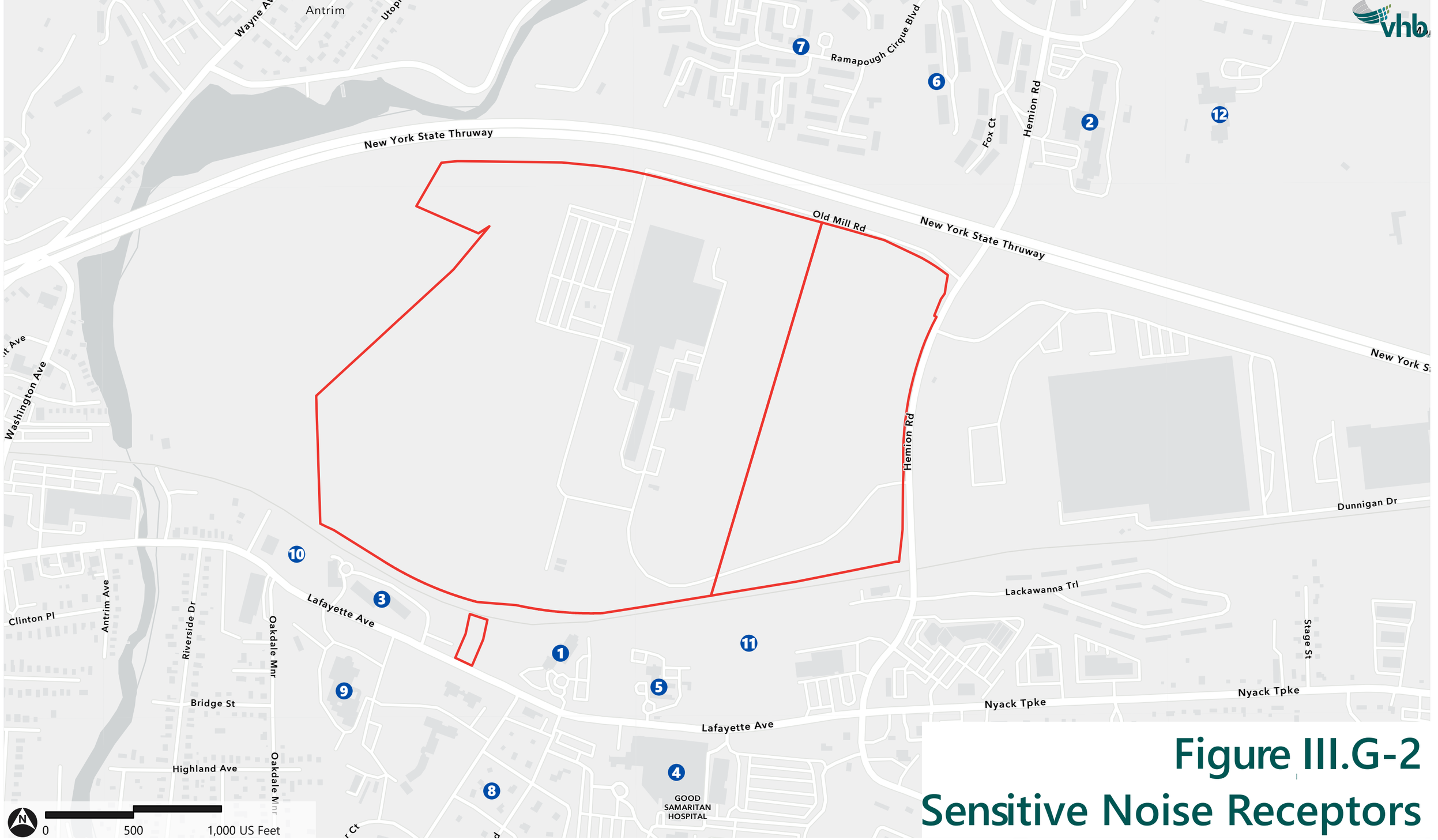

Figure III.G-2
Sensitive Noise Receptors

Project Site

Sensitive Noise Receptors

1. Suffern Free Library
2. Suffern Middle School
3. Esther Gitlow Towers
4. Good Samaritan Hospital
5. Tagaste Monastery
6. Ramapo Cirque
7. Knolls at Ramapough
8. Residential Neighborhood Along Hillcrest Road
9. Salvation Army College for Officer Training
10. New Antrim Pointe
11. Montebello Crossings

Applicable Noise Codes

Code of the Village of Suffern

The Code of the Village of Suffern as stated in Chapter 175, "Noise" per Section 175-3 (Prohibited Noises) does not establish specific thresholds for noise impact but provides guidance on site sound emissions as a means of promoting comfort and repose to residences. The Noise Code provides the following guidelines:

- Noise disturbances are prohibited from a variety of activities such as nighttime construction activity, loading and unloading, and using horns for an unreasonable period of time.
- Heavy construction equipment operations that create a noise disturbance are prohibited except between 7:00 a.m. and 10:00 p.m. on weekdays. Construction activity that causes noise disturbances is prohibited except between 8:00 a.m. and 8:00 p.m. on weekdays and 10:00 a.m. and 8:00 p.m. on Saturdays.
- Sound limits provided under Village performance standards do not apply to noises not directly under the control of the property user, daytime construction activities, noises of safety or warning devices, or transient noises of moving sources such as automobiles, trucks, airplanes, and railroads. Thus, the New York State Department of Environmental Conservation (DEC) guidelines were used as discussed below.

For quarrying and blasting operations, Chapter 209, "Quarrying and Blasting" of the Code of the Village of Suffern provides allowable hours, requires notification to the Village 24 hours in advance, and limits blasting sound to not exceeding 120 dB(A) at nearby receptors.

Code of the Village of Montebello

The Code of the Village of Montebello as stated in Chapter 118, "Noise" per Section 118-4 (Prohibited Noises) was also consulted, which provided guidance in a descriptive manner similar to the Village of Suffern. Ultimately, no applicable noise code limits were referenced for use on this project, hence DEC guidelines were used as discussed below.

New York State Noise Guidelines

The DEC has a policy "Assessing and Mitigating Noise Impacts" that provides guidance for analyzing and minimizing the acoustical impact applicable to the environmental review. Guidelines compare the average ambient sound level to proposed site sound emissions to determine the extent of any potential acoustical impact. The DEC states that an increase in ambient sound level by 0-3 dB should have no appreciable effect on receptors and an increase of 3-6 dB is tolerable but may have potential for an adverse noise impact only in cases where the most noise sensitive of receptors are present. OAA interprets the phrase "where the most noise sensitive of receptors are present" to mean that changes of this magnitude are acceptable for the majority of receptors; it may result in an adverse reaction for a small percent of the upper tier of noise sensitive people. OAA is not aware of published demographics of noise sensitive people, but online data suggest approximately 20-to-30% of the population could be noise-sensitive. Given this range, OAA estimates that the upper-tier, or 5-to-10% of the population, would fall into the highly sensitive category that is referenced by the NYSDEC Guidelines. DEC continues by stating that increases of more than 6 dB require closer scrutiny while increases of 10 dB deserve consideration of avoidance and mitigation measures in most cases.

Ambient Noise Assessment

A noise evaluation was conducted of the ambient noise levels in the vicinity of the Project Site. One noise meter each was placed on the southern portion of the Project Site to capture ambient noise levels of the residential areas to the south (Location 1) and another noise meter was placed on the eastern portion of the Project Site off of Hemion Road to measure traffic noise levels along the roadway (Location 2). Because the concrete highway noise barrier along I-287 acts as a buffer to the residential developments to the north of the Project Site, an additional meter was not placed in this area. Ambient survey Location 1 (**Appendix M, Page 3, Figure 1 and discussed Page 6**) was used to develop project goals for all nearby receptors (**Appendix M, Page 9**). As the two major noise sources in the area are the busy roads north and south of the site, that travel parallel with the site, Location 1 is considered representative of the existing sound levels along the rear of all properties fronting on Route 59. Based on professional experience, an additional survey location further west would result in sound levels about the same as those documented at Location 1. It is noted that locations west of Location 1 would also be slightly closer to U.S. Route 59 and as a result, could result in sound levels somewhat higher than those measured at Location 1. For these reasons, the approach taken is considered acceptable and conservative.

The noise data obtained across the entire survey were reviewed statistically to derive patterns and establish noise goals from the data. These include: the average sound level (Leq), the L10 which evaluates intermittent sound in the area, the median sound level (L50), and the background sound level (L90) which evaluates continuous noise sources such as project HVAC sound. Because the L1 statistic is not typically analyzed in noise measurements, the L5 which is a similar value was provided to be consistent with the DEIS Scoping Outline. Average statistics across the entire survey are shown in **Table III.G-1**.

Table III.G-1 Ambient Noise Assessment Results

Location	L_{max}	L_5	L_{10}	L_{eq}	L_{50}	L_{90}	L_{min}
1	61	51	50	48	47	45	43
2	83	70	67	63	58	53	46

Source: OAA

The results of the noise assessment revealed the following:

- Average sound levels (Leq) at Location 1 saw that hourly average sound levels were typically in the mid-to-upper 40s on an A-weighted scale. At Location 2, average hourly sound levels were higher given its proximity to the roadways, between 55 dB(A) during the nighttime and above 60 dB(A) during the daytime. The average sound level across the entire survey period was 48 dB(A) at Location 1 which was used to develop DEC project goals.
- The lowest hourly background sound levels (L90) generally occurred briefly in a one-hour period each night between 1:00 a.m. and 4:00 a.m. at around 40 dB(A) at both. Average background sound levels of 45 dB(A) or above indicated the presence of distant Interstate traffic throughout the day and night.
- The L10 at Location 1 saw average intermittent sounds around 50 dB(A) and did not vary much whereas, Location 2 saw variable changes in intermittent sound levels from 70 dB(A) during the

day to 60 dB(A) during the night. For both Locations, L10 sound levels were just a few decibels higher than documented average sound levels, indicating that high level events in the area occur regularly.

› Hourly maximum sound levels documented at Location 1 frequently exceeded 60 dB(A), even during the night hours. For Location 2, maximum sound levels never dropped below 70 dB(A).

2. Potential Impacts

The results of the noise assessment revealed that ambient noise levels are not unusual given the Project Site's proximity to the Interstate and local roadways. The higher noise levels of 60-70 dB(A) are due to the traffic along the roadways and similar noise levels were also observed during the nighttime. Following NYSDEC guidelines, project criteria were developed from the ambient survey to ensure no long-term noise impacts occur. Based on the existing average sound level of 48 dB(A) that was documented at Location 1, future sound with the project included should not exceed average sound levels of 54 dB(A) to avoid any negative impact. Acoustical models of stationary and mobile noise sources were developed to compare site sound emissions to these criteria. Results are discussed below and show that long-term noise impacts from the proposed development are not anticipated.

Stationary Source Noise Impact Assessment

The project made conservative assumptions for expected HVAC equipment serving the buildings. In all, fifty-four 25-ton rooftop units were distributed across the whole project. Each unit was modelled with a sound power level of 93 dB(A), based on . Acoustical modelling results show that, with all rooftop units operating, HVAC sound levels at off-site receptors ranges from 38-to-49 dB(A) at nearby receptors of interest. HVAC sound at all receptors meets the project noise goal and is aligned with the existing average sound levels at Location 1, which is remote from active roadways.

This analysis shows that there is little concern about HVAC sound. HVAC sound is sufficiently controlled via distance and roof shielding effects so that noise meets the nighttime code limit at all residential receptors. Note that for these model results to be realized, acoustical performance of HVAC equipment must be aligned with what was modelled.

Mobile Source Noise Impact Assessment

Evaluation of truck noise is complex given the intermittency and dynamic nature of the types of truck activity that may occur on site. Events include driving, backup alarms, coupling/decoupling, and air brakes. Each event has different frequency characteristics and details. In general, maximum sound levels from a truck court are in the range of 74-to-79 dB(A) when measured 50 feet from the source. These details were input into an acoustical model to evaluate maximum and average sound levels contributed off-site. Refrigerated trucks or trailers were not evaluated as none of the buildings will be refrigerated or used for cold storage. Acoustical modelling results show that intermittent maximum on-site heavy truck sound emissions will be in the range of 41-to-57dB(A) at off-site receptors For the majority of receptors, maximum off-site sound levels are not much higher in level than proposed steady HVAC sound emissions from the site discussed above. Levels of this magnitude are well below existing maximum sound levels that occur in the area, including those at night. A review of the Trip Generation Manual from the Institute of Transportation Engineers (ITE), which is the same resource

that traffic studies are done with, indicates that warehouse uses traditionally see their greatest number of trucks during the daytime hours. This number is substantially lower during the nighttime hours. This information supports that during the night hours, these intermittent maximum sound levels will occur infrequently which will allow site sound to further blend in with existing ambient sound in the area. In addition, on-site truck maximum sound level are shown to be well below existing maximum sound levels that occur in the area, including those at night. The Sound Study utilized ITE Land Use 150 Warehouse for all analyses. The alternative evaluation in the Traffic Study also looked at ITE Land Use 130 Industrial Park and concluded that this development proposal was not conducive to this use. Hence the sound study did not evaluate this scenario. Hourly distribution data for trucks is not available for ITE 130, but review of data for ITE 110 General Light Industrial show almost no nighttime truck activity for this type of use. From this aspect, using ITE 150 is more conservative.

To align with the protocol of the DEC guidelines, the average site sound was also evaluated. An additional analysis was done to evaluate the presence of 22 trucks per hour, which is the average hourly number of trucks expected per the traffic Study. Off-site sound emissions were in the range of 44-to-53 dB(A) at nearby receptors. Adding the existing average ambient sound level of 48 dB(A) to forecast project contributions results in future average sound levels of 49-to-54 dB(A), an increase of 1-to-6 dB. A breakdown of expected increase for each specific receptor is given in Table 2 of the Evaluation of Site Sound Emissions report in **Appendix M.** Based on these results, DEC guidelines conclude no negative acoustical impact from this project.

Figure 4 in the Sound Study shows the average sound level for 22 trucks driving around the site across an hour period. This number is derived by taking the total daily trucks, 532, and calculating the average number of trucks per hour. (**Appendix M, Page 14**) This number aligns with values shown in the hourly truck distribution table in the Traffic Study, which shows that nighttime truck counts total between 0 and 23 trucks across the nighttime hours. Higher truck counts will occur during the day when ambient sound is naturally higher in level; similarly lower truck counts occur at night when ambient sound lulls occur. Using the average metric is favored as it looks at the entire site and is the metric that directly relates to the effects of sound on people, per NYSDEC guidelines. The Sound Study also considered maximum sound levels as shown in Figure 3 of the Sound Study (**Appendix M)**.

It should be noted that the Sound Study acknowledges there will be multiple trucks operating across the three buildings. It contends that the maximum sound produced by any of these activities, will not simultaneously occur with other maximum sound levels due to the short duration of these events. (**Appendix M, bottom of Page 13 and top of Page 14**) As these buildings are speculative, the sound study is utilizing all available data to best approximate how this site will be used. All analyses attempt to portray a realistic, yet conservative evaluation. Data from ITE support that are a wide variety of warehouse uses have similar truck flow patterns. The highest truck counts are seen during the daytime hours which coincides with times when ambient sound levels are also the highest. Similarly, truck counts during the night reduce to single digits across most nighttime hours. The Traffic Study provides this distribution for trucks and shows between 0 and 23 truck trips (or up to 12 trucks) are expected during a nighttime hour. The effect of 22 truck trips (which is the average hourly truck trop count, was modelled and shown in **Appendix M, Figure 4**. Conservatively assuming upwards of 20 total trucks active on site during the same nighttime hour, we find that modelling 5 trucks at the same time (**Appendix M, Figure 3**), or 25% of that activity, is appropriate and conservative. Given these assumptions, OAA does not find that this project will have any negative acoustical impact on the area.

Lastly, off-site truck routes were reviewed to evaluate their potential for acoustical impact. All trucks will use Lafayette Avenue to access the site via Hemion Road, and most trucks will come from the east where Interstate access is available. These roadways are heavily travelled and thus, receptors along these off-site routes are accustomed to occasional short duration high sound levels from motor vehicle passbys. Across the survey period, average sound levels were routinely above 60 dB(A) and maximum sound levels each hour exceeded 70 dB(A) even during the night. Given the above, the project truck traffic will blend in with existing traffic flow noise in the area and no negative acoustical impact is expected from off-site truck routes.

Construction Noise Impacts

While construction noise impacts are short duration such activities can provide high sound levels. The Village of Suffern's Noise Code established applicable ordinances which limit construction to daytime hours when ambient is high in level and sensitivity is low. The Developer will follow all applicable construction noise codes and mitigation measures are provided below to offset any potential short-term impacts. Blasting operations are not anticipated during construction of the proposed development. Given the temporary nature of construction, provided all codes are complied with, no long-term noise impacts are expected.

3. Mitigation Measures

To ensure that the project goal is met to the south, two sound barriers will be constructed. These sound barriers provide a reduction of up to 8 dB for nearby receptors. All receptors were evaluated at upper stories to ensure that sound barrier would provide adequate attenuation. Receptor heights are shown in the Evaluation of Site Sound Emissions report (**Appendix M** page 10, Table, as well as in the title of Figures 2, 3, and 4). The locations of the proposed sound barriers are shown on Figure 1-2 Overall Site Plan and shown on figures throughout the Evaluation of Site Sound Emissions report (**Appendix M**). Both barriers, shown will be carried to 15 feet above the paved truck court. The sound barrier for Building 2 should be approximately 130 feet in length; the sound barrier for Building 3 should be approximately 375 feet in length. Specifically, the noise barrier would be constructed as follows:

- The barrier will be solid, without openings, and be of sufficient surface weight of 7 lbs/ft$_2$;
- Will be 5/8-inch-thick sheet steel piling, precast or poured-in-place concrete, treated wood/engineered lumber, acoustical metal panels, or other hybrid system; and
- Will be designed to resist wind load and would require engineered footings, for which the design will be overseen by structural professionals.

To minimize any potential complaints from back-up alarms, trucks owned and controlled by the site will be equipped with smart, ambient sensing, multi-frequency back-up alarms. This is especially effective on on-site terminal tractors/yard jockeys as these trucks are responsible for the majority of back-up movements at sites like this. Acceptable back-up alarms are available from a variety of manufacturers, such as Ecco, specifically Model EA9724. These devices reduce annoyance generated from constant level, pure tone back-up alarms. The reduction in annoyance is accomplished in two ways:

- A broadband sound is less intrusive and annoying than a pure tone sound since, at a distance, it can blend in easier with other ambient sounds.

› The smart, ambient-sensing feature allows back-up alarms to operate safely and effectively at far lower sound levels than typical brute-force, constant level devices. The smart alarms sample ambient noise and adjust the warning signal to be 5-to-10 dB higher than the ambient, therefore reducing levels nearby and off-site.

Construction

Based on the noise assessment undertaken for this Project, the following measures are recommended to mitigate noise impacts during construction:

› It is anticipated that the Project Site would contain on-site terminal tractors which would be responsible for the majority of back-up movements. Therefore, onsite trucks will be equipped with smart, ambient sensing, multi-frequency back-up alarms (Ecco Model EA9724) to address the potential risk of noise complaints from back-up alarms;

› Stationary equipment such as generators, compressors, and office trailers will be placed away from potentially noise sensitive receptors;

› Heavy equipment will operate during non-noise-sensitive daytime hours and will follow allowable Village construction hours as applicable;

› Whenever possible, the number of equipment operating near one receptor at a given time will be limited;

› Exposing any one receptor to high sound levels for an extended period of time will be avoided;

› Construction parking or laydown areas will be located away from residential areas and sensitive noise receptors; and

› Should blasting need to occur, applicable code directive will be followed

Based on the mitigation measures discussed above, significant adverse impacts on noise from construction activities are not anticipated.