Sound Measurements and Impact Review

Proposed KSH Warehouse Facility
Village of Montgomery, New York

April *2023*

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1.0 EXISTING CONDITION

1.1 **Purpose of Study**

B. Laing Associates, Inc. is an environmental consultant firm providing sound/noise analyses services for the proposed KSH Facility (herein referred to as the Project) located in the Village of Montgomery, Orange County, New York. The Project site is currently a vacant, largely wooded use. The site consists of one parcel which lies northwest of and "fronts" on NY State Route 211 (east of Route 416), 0.3 miles east-northeast of Orange County Airport (an active, general aviation facility) and one mile north of Interstate I-84. The proposed Facility will be general warehouse and distribution operation for the medical products the company produces. The site is composed of 33.9 acres. It will include four buildings, with two each being 60,000 and 80,000 square feet. Space will be provided for up to 266 cars and 96 trucks (loading bays).

The purpose of this analysis is to evaluate sound levels that may occur as a result of the Project and compare them to the Village of Montgomery's Noise Code.

1.2 **General Sound Characteristics**

Sound is created when changes of pressure (waves) are produced in the air. These pressure changes are created at many frequencies (i.e., spacing of the waves). Sound is received and perceived when the human ear reacts to these pressure changes. The pressure changes are expressed as decibels (dB) depending upon the power of the source as expressed in watts of power (with a reference of 1 picowatt or 10^{-12} watts). Frequency varies depending upon the rate at which sound pressures fluctuate in a cycle over time. It is measured in Hertz (Hz). One Hz equals 1 cycle per second. Frequency determines the perceived pitch of the sound. The average person's ear can detect sounds ranging from 20 to more than 10,000 hertz (Hz). Each frequency is detectable at different pressure levels and so, the system for sound measurement which mimics the human ear is an A-weighted decibel system or dB(A)'s. The human ear can barely detect a 3 dB(A) change in sound levels. A 6 dB(A) increase results in a generally audible change. A 10 dB(a) change in sound levels is approximately a doubling of sound wave pressure[1]. As a point of reference, human conversations at a distance of two to three feet occurs at a sound pressure level (SPL) of 60 dB(A) with a calm voice to 75 dB(A) with a raised voice (USEPA's Community Noise, 1971).

1.3 **Sound Monitoring**

Sound measurements around the project site were made using a Cirrus Research plc CR:831C noise meter, which was set to measure A-weighted decibel levels as a mimic of the average human ear. Daytime and nighttime ambient noise levels were measured from three locations on and immediately adjacent to the project site as described below. Figure 1 Noise Sampling and Analysis Locations (at the rear of the text) represents the mapped measured locations on the proposed concept plan.

With regard to the methodology of the ambient noise analysis, there is no specific mathematical methodology that was applied to ambient noise measurements. The readings are straight forward, taken in 10 to 15 minute durations and were monitored at the listed locations for existing ambient conditions. The measurements occurred on Wednesday, April 12, 2023, during the PM peak (4:00 to 6:00) and post-PM (after 9:00 PM) plus Thursday, April 13, 2023 post-peak/mid-day AM (9:00 to 10:00). Measurements occurred in sunny conditions, with winds between 15 and 20 miles per hour and a high temperature of 80 degrees (F). Nighttime measurements occurred on Wednesday, April 12, 2023, during the nighttime post-peak (9:00 to 10:00 PM). Measurements occurred in clear conditions, with winds between 1 and 3 miles per hour and a high temperature of 71 degrees (F). The monitored sound levels are presented in Appendix A.

[1] The human acoustical system perceives sound in logarithmic manner rather than as a straight line, mathematical function.

The measured levels were generally dominated by vehicle noise at locations measured along NYS Route 211. Route 211 also carries significant traffic with substantial inputs from Route 416 in day and night conditions. Sound measurements were recorded largely during times when existing sound/noise sources were expected to create an increase in the dominant average and peak sound/noise values. This was anticipated at "mid"-day and "rush hour" period in the PM, respectively.[2] In addition, as the proposed facility will be operating during evening and night hours, a second set of sound measurements were recorded after 9 PM (the Villages' definition of nighttime begins at this hour).

Sound levels, in the existing condition, were measured at three locations/points. Sampling Point A is at toward the site's easternmost end of the property along NYS Route 211. Noise measurements from the proposed project's emergency entrance showed an $L_{(eq)}$ of 75.5 dB(A) in the PM peak. Noise measurements at this location showed a daytime off-peak level of 72.0 dB(A). Noise measurements at this location showed a nighttime off-peak level of 69.3 dB(A). The sound levels at this location for both day time and nighttime result from the existing traffic on NYS Route 211[3].

Sampling Point B is located in the site's interior wetlands north of NYS Route 211. Noise measurements from the proposed Project's interior showed an $L_{(eq)}$ of 55.1 dB(A) in the PM peak. Noise measurements at this location showed an off-peak level of 50.4 dB(A). Noise measurements from the proposed project's interior showed an $L_{(eq)}$ of 53.2 dB(A) in the nighttime ambient. These measurements did not vary significantly as the existing sound environment is dominated by continuous traffic on NYS Route 211.

Sampling Point C is on Weaver Street. Noise measurements from Point C showed an $L_{(eq)}$ of 51.3 in the PM. Daytime, off peak sound levels were 53.5 dB(A). In the nighttime ambient, noise measurements from the Sampling Point C showed an $L_{(eq)}$ of 50.9 dB(A). This receptor has an existing sound level typical of a more a residential setting with peaks due to traffic on NYS Route 211 and local traffic/SERVICE VEHICLES..

There are no "sensitive" noise receptors (e.g., hospitals, libraries, etc.) in the immediate vicinity of the site. To the extent receptors of any kind (residential buildings, etc.) occur long NYS Route 211 (Union Street), they are already "impacted" to a significant degree as described/measured above by noise/sound levels from NYS Route 211[4]. However, there are residences in the vicinity along on Weaver Street which will be discussed below. Further, an elementary school property does occur approximately 0.45 mile northeast of the subject site on Route 211. It does not abut the property.

TABLE 1
Noise Sampling Locations

Monitoring ID	Location	Description
Sample Location A	NYS Route 211	"Main" proposed entry location
Sample Location B	Interior of Site	Wooded wetland
Sample Location C	Weaver Street	Mid north

[2] A value referred to as the "equivalent sound level," L_{eq}, averages were computed/determined from the data.
[3] It should be noted that the Orange County Airport occurs in proximity to the site and is approximately 1,500 feet to the east of same. The 08/26 runway is closest to the site. Its approach extends approximately over the southern end of the Village of Montgomery. Stewart Airport is also nearby. Two specific measurements of a takeoffs was recorded on site with ambient levels rising from 55 to 60's dB(A) during PM Peak (a jet) and daytime (a helicopter). However, general aviation aircraft generate sound levels above 80 decibels at a considerable distance when taking off at full power.
[4] IBID.

TABLE 2a Noise Monitoring Results (Existing Condition)					
Monitoring ID	***Location***	***Date***	***Time***	***Meteorological Conditions***	***L_{eq} dB(A)***
Sample Location A	NYS Route 211	4/12/2023	04:57 PM	15 kt wind 0% cloud 80 degrees (F)	75.5
		4/12/2023	08:57 PM	1 kt wind 0% cloud 70 degrees (F)	69.3
		4/13/2023	10:25 AM-Midday	<5 kt wind 0% cloud coverage 72 degrees (F)	72.0
Sample Location B	Interior of Site	4/12/2023	04:16 PM	15 kt wind 0% cloud 80 degrees (F)	55.1
		4/12/2023	09:16 PM	1 kt wind 0% cloud 70 degrees (F)	53.2
		4/13/2023	10:43 AM-Midday	<5 kt wind 0% cloud coverage 78 degrees (F)	50.4
Sample Location C	Weaver Street	4/12/2023	04:38 PM	15 kt wind 0% cloud 80 degrees (F)	51.3
		4/12/2023	09:35 PM	1 kt wind 0% cloud 70 degrees (F)	50.9
			11:05 AM-Midday	<5 kt wind 0% cloud coverage 78 degrees (F)	53.5

2.0 NOISE REGULATION

2.1 Department of Environmental Conservation Criteria

The New York State Department of Environmental Conservation (NYSDEC) published, *Assessing and Mitigating Noise Impacts* (October 6, 2000 revised February 2, 2001). This document states that sound level increases of 0 to 5 dB(A) have no appreciable effect on receptors, increases of 5 to 10 dB(A) may have the potential for adverse impact but only in cases where the most sensitive receptors are present. Increases of more than 10 dB(A) may require a closer analysis of impact potential depending on existing noise levels and surrounding land uses, and an increase of 10 dB(A) or more suggests consideration of mitigation measures. It also states that the addition of operational noise sources, in a "non-industrial" setting, should not raise the ambient noise level above a maximum of 65 dB(A). Ambient noise levels in industrial or commercial areas may exceed 65 dB(A) but should not exceed 79 dB(A). Construction noise levels are not specifically addressed by this guidance.

2.2 Federal Highway Administration Criteria

The U.S. Department of Transportation Federal Highway Administration provides noise abatement criteria depicting noise levels for varying land use categories that are used to determine if and where traffic noise impacts occur, as defined in 23 CFR 772.5. Table 3 below depicts each criteria.

TABLE 3

Noise Abatement Criteria (NAC) Hourly A Weighted Sound Level in Decibels (dB(A))

(Source: 23 CFR Part 772, Table 1)

Activity Category	L_{eq}	L_{10}	Analysis Location	Description of Activity Category
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[3]	67	70	Exterior	Residential.
C[3]	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D (Table 3, Con't)	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or

				nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72	75	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F				Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G				Undeveloped lands that are not permitted.

[1]Either L_{eq} or L_{10}(but not both) may be used on a project.
[2]Either L_{eq} and L_{10} Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.
[3]Includes undeveloped lands permitted for this activity category.

In this case, the receptors fall in the industrial and residential categories. However, receptors along NYS Route 211/Union Street to the north) already have higher sound levels due to the roadway and, intermittently the Orange County Airport.

The FHWA 1995 Highway Traffic Noise Guidance specifies a level of 67 dB(A) or less at most exterior locations for public use such as parks, *residences*, hotels, churches, libraries, etc. A level of 72 dB(A) or less for other developed uses.

2.3 Village of Montgomery Noise Ordinance

The Village of Montgomery regulates standard noise/sound pressure levels in Chapter 77 of their Village Code "*Noise*." Per 77-5, "No person in a residential zone shall emit noise beyond the boundaries of his/her premises exceeding the levels stated herein and applicable to adjacent residential, business, and industrial zones:

TABLE 4
Village of Montgomery Code, Chapter 77-5

	Receptor's Zone			
Emitter's Zone (dBA)	**Industrial (dBA)**	**Business (dBA)**	**Residential (day) (dBA)**	**Residential (night) (dBA)**
Residential	62	55	55	45
Business	62	62	55	45
Industrial	70	66	61	51

Chapter 77 states that nighttime hours extend from 9 p.m. to 8 a.m. Monday to Saturday and from 9 p.m. to 9 a.m. Saturday into Sunday morning. Daytime hours are all other hours.

Per the Village, construction in daytime hours is exempt from the above levels in Table 4. Construction or demolition related activities may occur during nighttime hours after 9 p.m. to 8 a.m. Monday to Saturday and from 9 p.m. to 9 a.m., **if** that operation of construction equipment during nighttime hours does not exceed the maximum noise levels as specified in § 77-5B.

Finally, warning devices required by the Occupational Safety and Health Administration or other state or federal safety regulations are specifically exempted from the Code.

3.0 PROPOSED ACTION ANALYSIS

3.1 Operational Sound Analysis[5]

The proposed Warehouse Facility Project site, consists of one parcel totaling 33.9 acres which fronts along NYS Route 211, east of Route 416 and one mile north of north of Interstate I-84. While currently unused and wooded, the sound environment has an ambient level somewhat above that typical for such a use (see Section 1.0 above) as it is significantly influenced by traffic on NYS Route 211. NYS Route 211 is a major, arterial collector roadway. Route 211 carried 6984 vehicle trips per day including some 532 trucks in 2019 (actual counts per NYSDOT-TDV). As such, residences adjacent to it experience higher sound levels in the existing condition than those fronting on a "typical" residential roadway, with sound levels averaging 53.5 in the daytime and 50.9 after 9 PM.

The proposed Warehouse Facility will be a distribution operation facility center for the products that multiple, smaller to mid-sized leasing companies wholesale to contractors and manufacturers. The proposed site plan includes four general warehouse buildings with two each being 60,000 and 80,000 square feet. Space will be provided for up to 266 cars and 96 trucks loading bays.

Several items of note will result from the proposed action:

1. The applicant and project team's early design choices will provide some basic sound/noise mitigation.
2. The Project development has been moved away from the northern and eastern property boundaries and wooded wetlands and other factors have resulted in substantial distance between the adjacent residences.
3. The eastern accessway to NYS Route 211 will be used as emergency-only.
4. The western access to NYS Route 211 will be used for two-way, day to day traffic and so, will keep the entry and exiting vehicles within the Village's industrial zone.
5. The western access to NYS Route 211 will have a very flat slope. This allows trucks and other vehicles to accelerate at lower engine power levels.
6. Parking for Project personnel is arranged along the "outer" sides (north and south sides) of the buildings. These vehicles will operate at much lower sound levels than the warehouse trucks.
7. 96 truck loading bays will occur on the in the center of the four buildings. Signage will be posted to direct these vehicles to the site's center only. No warehouse truck traffic will be allowed around the "outer" vehicle parking areas.
8. The buildings themselves (two to the north and two to the south) will then act as a very effective sound barrier for receptors to the northeast and southwest for the truck bays.
9. Additionally, a 14 foot high sound wall or overlapping walls will be installed between the two, 60,000 square foot buildings proposed of the site's north-central area to provide sound mitigation (i.e., eliminate sound flanking) for Analysis Point 1.
10. The general warehouse buildings will have HVAC units mounted on the roof sufficient to cool the office spaces only and these will be surrounded by a 4 foot high solid material fence. The resulting mitigation is predicted as approximately 7 dB(A)[6].
11. The facility may operate up to 24 hours a day.

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[5] Michael P. Bontje of B. Laing Associates, Inc. is the principal author of this report. He has been practicing environmental science since 1980 (43 years) and sound/noise analysis for 35 years. His resume is attached. The basic methodology of sound/noise analysis includes determining highest potential sound source levels (and knowing the distance from the source of the initial measurements), then calculating its dissipation over distance (declining 6 dB(A) per doubling of distances – i.e., a Log_{10} dissipation of power) and adjusting this loss due to ground conditions, intervening structures (buildings mitigating barriers, etc.), off-angle dissipation, etc. Sound sources which at 10 d(A) or more in power levels (i.e., a 10-fold difference in power as stand-alone or sufficiently separated) are not additive to the higher level. These factors are built into B. Laing Associates, Inc's Excel calculation spreadsheet developed over 30 plus years of real-world experiences.

[6] The release height for these HVAC units has been assumed to be 2.5 feet. The fence/barrier height will be 4 feet and/or a minimum of 1 foot above the release height.

12. Concrete "pads" will be added at ground level along the buildings near the truck loading bays for emergency generator use. Their use will not be for day-to-day operations but for emergencies accompanied by a power outage[7].

In many cases of sound analysis, "natural" methods of sound mitigation include distance, soil s, landscaping, etc. However, every doubling of the distance from a sound source will result in a noticeable, 6 dB(A) reduction in the resultant sound level. On a smaller residential or commercial lot, this impact is often not very significant. In this case, however, the distances within the site are substantial (measured in hundreds of feet) relative to the typical locations where sound source strengths are measured (3.28 to 50 feet from the source). Thus, in this case, the distance these sounds will have to travel to approach Analysis Points 1, 2a, 2b (i.e., the residential receptors) accounts for significant reductions in the resultant, sound impacts.

Operational sounds were subjected to an analysis as provided in the spreadsheet presented in Table 5[8]. In general, any need for sound reduction with the current site plan beyond the careful placement of proposed Project facilities will be fulfilled by construction of a fences and a sound wall as shown on the Site plan by Engineering and Surveying Properties, PC.

Sound Analysis Point 1 is a lot line for a home fronting on Weaver Street. This lot has a font yard which is in the residential zone but a backyard which extends some 125 feet into the Industrial Zone. It was used as it represents a definite "worst-case" analysis point for all the residences fronting on Weaver Street (i.e., if this location attains the Village's Noise standards all the others will as well). Analysis Point 1 will have direct line-of-sight to the northern buildings and the ground has (will have) a "soft" acoustical surface. A 6-foot high fence/sound barrier will be installed at the north edge of vehicle parking for the two northern buildings and it will extend west to east along its entire northern side plus the outer edge of the internal passenger vehicle circulation roadway. The combination of the fence/sound barrier, distance to the property line and intervening wetlands will reduce sound levels from this activity to 48 dB(A). This will be well below the Village's residential daytime standard of 61 dB(A) and below the residential nighttime standard of 51 dB(A).

The truck loading bays and generators will be located in the site's interior, outside spaces and the buildings themselves (the two northern buildings) will then act as a very effective sound barrier for receptors to the northeast resulting in lower decibel levels Analysis Point 1 for those sources. A 14-foot-high sound wall or overlapping walls will be installed between the two, 60,000 square foot buildings proposed of the site's north-central area to provide sound mitigation (i.e., eliminate sound flanking) for Analysis Point 1.

Analysis Point 2a, is the western residential lot line of the closest residence along NYS Route 211. Analysis Point 2a will have direct line-of-sight to the internal entry/truck circulation roadway and the southern buildings. The intervening ground has (will have) a "soft" acoustical surface. A 6-foot high fence/sound barrier will be installed at the eastern edge of the internal entry/truck circulation roadway. The fence, since it will be

[7] Since the generators will be on an as-needed basis, their exact specification cannot be provided at present. So, B. Laing Associates, Inc. has utilized a C32 Caterpillar generator configuration capable of powering the entire facility and enclosed in a metal container with 4" of rockwool insulation. See Appendix C.

[8]

ADDITION OF SOUND SOURCE LEVELS	
Difference Between Two Sound Levels	Add to the Higher of the Two Sound Levels
1 dB or less	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0 dB
(USEPA, Protective Noise Levels, 1978 as cited by NYSDEC, 2001)	

elevated above the eastward ground surface, will also act as a partial screen, interrupting direct line of sight, for portions of all four buildings. It will extend north to south along the internal entry circulation roadway's entire northern side. The combination of the fence/sound barrier, distance to the eastern, residential property line and intervening wetlands will reduce sound levels from this activity to 45 dB(A). This will be well below the Village's residential daytime standard of 61 dB(A) and below the residential nighttime standard of 51 dB(A).

Analysis Point 2b, is the western residential lot line of the closest residence along NYS Route 211. Analysis Point 2b will be well north from (i.e., 340 feet from) and have direct line-of-sight to the Project's south/western, entry/exit drive. The ground will have a "soft" acoustical surface. No fence/sound barrier will be installed at the northern edge of entry/exit drive. The sound levels from this activity will be 51 dB(A) as a result of truck traffic on the entry/exit drive. This will be below the Village's residential daytime standard of 61 dB(A) and at the residential nighttime standard of 51 dB(A)[9].

Sound calculations to Analysis Point 3 is a dual, Industrial Zone lot line for an agricultural property fronting on NYS Route 211. Analysis Point 3 will have direct line-of-sight to the southern buildings and the ground will have a "hard" acoustical surface. No fence/sound barrier will be installed at the southern edge of vehicle parking for the two southern buildings as the adjacent lot is also Industrially Zoned. The sound levels from this activity will be up to 63 dB(A). This will be well below the Village's industrial daytime and nighttime standard of 70 dB(A).

The truck loading bays and generators will be located in the site's interior, outside spaces and the buildings themselves (the two southern buildings) will then act as a very effective sound barrier for receptors to the northeast resulting in lower decibel levels Analysis Point 3 for those sources.

Sound calculations to Analysis Point 4 is also a dual, Industrial Zone lot line for an agricultural property fronting on NYS Route 211. Analysis Point 4 will be immediately adjacent to (i.e., 12 feet from) and have direct line-of-sight to the Project's south/western, entry/exit drive. The ground will have a "hard" acoustical surface. A 6-foot high fence/sound barrier will be installed at the southern edge of entry/exit drive to partially mitigate for vehicles and trucks. The sound levels from this activity will be 69 dB(A) as a result of truck traffic. This will be below the Village's industrial daytime and nighttime standard of 70 dB(A)[10].

In winter, all trucks that are being readied to leave the facility are to be plugged in to electrical outlets to keep the engines warm overnight. The engines are turned on and idled for up to 5 minutes. Each truck cannot idle for more than 5 minutes. This is due to (a) the trucks are usually equipped with an idling timer that can be set to turn off at the five-minute mark, (b) the trucks are all plugged in and kept warm in winter conditions, and (c) New York State regulations prohibit truck idling for more than 5 minutes (Title, 6 NYCRR, Subpart 217-3).

As a result of the above with the project mitigation as proposed, the resultant sound levels will be well below the DEC's and FHWA's residential receptor standards of 65 and 67 dB(A), respectively.

[9] It should be noted that the commercial and residential properties along Rt 211 are already experiencing 69.3 dB(A) along the frontage and 53.2 dB(A) on their rear yards in the nighttime condition. Both values already exceed the Village's Noise Code.

[10] IBID

TABLE 5 - Warehouse Facility Sound Propagation – NYS Route 211, Montgomery, NY

PROPOSED WAREHOUSE FACILITY - ROUTE 211, VILLAGE OF MONTGOMERY, NY

SOUND PROPAGATION - IMPACT SCREENING

(rev. 04-11-2023)

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SOURCE															
	Distance (feet):	50	100	100	200	400	800	1600							
Passenger Vehicles/Vans	Level(dB(A)):	63	57	48	42	36	30	24							
				Sound Wall		45	39	(without barrier)							
				Loss-min. 9 dB(A)											
	Distance (feet):	32	64	100	128	256	512	1024							
Trucks - Forward/level at grade	Level(dB(A)):	72	66	47	41	35	29	23							
				Building Insertion											
				Loss-19 dB(A)											
	Distance (feet):	32	64	100	128	256	512	1024							
Trucks - Forward/level at grade	Level(dB(A)):	72	66	57	51	45	39	33							
				Sound Wall		54	48	(without barrier)							
				Loss-9dB(A)											
	Distance (feet):	23	46	92	184	368	736	1472							
Generators	Level(dB(A)):	75	69	44	38	32	26	20							
				Building Insertion											
				Loss-25dB(A)											
	Distance (feet):	10	20	40	80	160	320	640	1280						
Rooftop HVAC (Office Only)	Level(dB(A)):	75	62	56	50	44	38	32	26						
		Rooftop	Sound Wall												
			Loss-min. 7 dB(A)												

RESULTS WITH SOUND ATTENUATION															
					Moving Trucks**		Pass Veh/Vans		Rooftop HVAC		Generators**			Standards - VILLAGE	Standards -
APPLICABLE LEVEL			Existing			Delta	****	Delta		Delta		Delta		Day/Night	DEC-FHWA
Point #1 North Residential Lot (ext.)	Residential		58		31	-27	45	-13	40	-18	30	-28		61/51	65 -67
Point #2a Residential Lot (Rt 211)	Residential		52	***	48	-4	41	-11	35	-17	48	-4		61/51	65 -67
Point #2b Residential Lot (Rt 211 entry)	Residential		47		51	4	38	-9	Not Applicable		Not Applicable			61/51	65 -67
Point #3 Industrial Lot (souht)	Industrial		56		32	-24	63	7	47	-9	32	-24		70/70	79 -72
Point #4 Industrial Lot (Rt 211 entry)	Industrial		48	***	69	21	59	11	Not Applicable		Not Applicable			70/70	79 -72

Notes: Distances in feet. Sound levels in decibels- A-weighted (dB(A), sources rounded up to next integer.

* Truck measurements from Oakland, NJ - Proximate to I 287. ** Located between buildings. Generators Anticipated to operate only during emergencies.

*** Roadway-edge fence/barrier or equivilent wall - 6 feet high (9.0 dB(A) loss). **** A negative vlue does not imply that the sound levels will drop. Rather, the Project result will be lower than the ambient.

Results are calculated at the prpoerty line per Village Code Chapter 77. No exceedances of Village, NYSDEC and FHW Standards will occur (with mitigation as proscribed by B. Laing Aspociates, Inc.)

3.2 Traffic Sound Analysis

As provided above, the Project site's eastern boundaries along NYS Route 211 experience daytime sound $L_{(eq)}$ levels ranging from 69.3 [Nighttime] to 75.5 dB(A) [Peak PM]. The existing, ambient sound level somewhat exceeds the criteria of 67 dB(A) as set forth by the U.S. Department of Transportation Federal Highway Administration suitable for the exterior of hotels, motels, offices, restaurants, and other developed lands, properties or activities. The Project site's ambient sound level, when substantially northwest of NYS Route 211, currently ranges from 51.3 to 50.9 dB(A). At night, the ambient levels in the area were recorded from the low to middle 50's (on-site – Sampling Point B and Weaver Street Sampling Point C) decibel level.

Sound levels associated with vehicular traffic are a function mainly of traffic speed, vehicle mix (automobiles, medium trucks, heavy trucks) and volume. Posted vehicle traffic speeds will not be affected by the Proposed Action. Vehicle mixes are also anticipated to be very similar to the existing condition following construction at the Site. Therefore, any changes in traffic related sound will be a function of the change in volume. A doubling of traffic volume (assuming speeds and vehicle mixes do not change) equates to an increase in sound of 3 dB(A). The project will cause an increase in traffic volumes of much less than a doubling. Thus, sound levels due to that traffic will increase one or two decibels at most. A 3 dBA increase is unnoticed to tolerable according to the NYSDEC noise evaluation guidelines in "Assessing and Mitigating Noise Impacts."

As provided in the existing conditions section above, there are no "sensitive" noise receptors in the immediate vicinity of the site. At the elementary school, 0.45 miles east of the site's ingress/egress, traffic generation along NYS Route 211 as a result of the proposed Project will not, as described above, materially add to these sound levels.

3.3 Construction Sound Analysis

During construction, noise levels will be (1) temporary and (2) will occur at two distinctly different levels. First, the temporary component results from the transient nature of the construction process. The U.S. EPA reports sound levels **at** construction projects range from a high of 88 dB(A) to a low of 75 dB(A) from grading through finishing operations (U.S. EPA, Construction Noise Control Technology Initiatives, Table 2.2**-as measured at 50 feet**).

The approximate location of the proposed construction occurs along Route 211. The noise generated during construction is due mainly from diesel engines that run the equipment. Exhaust is typically the predominant source of diesel engine noise, which is the reason that maintaining mufflers on all equipment is imperative. Noise measurements from some common equipment used in construction can be found in *Assessing and Mitigating Noise Impacts* (October 6, 2000 revised February 2, 2001). See Tables 6a and 6b below.

TABLE 6a
CONSTRUCTION SOUND LEVELS

Sound Source	Measurements	1,000 feet	2,000 feet	3,000 feet
Hitachi 501 shovel loading	92 dB(A) at 50 ft	66.0 dB(A)	60.0 dB(A)	56.5 dB(A)
Euclid R-50 pit truck loaded	90 dB(A) at 50ft	64.0 dB(A)	58.0 dB(A)	54.4 dB(A)
Caterpillar 988 loader	80 dB(A) at 300 ft	69.5 dB(A)	63.5 dB(A)	60.0 dB(A)

(The Aggregate Handbook, 1991)

TABLE 6b CONSTRUCTION EQUIPMENT SOUND LEVELS		
Equipment	Decibel Level	Distance in feet
Augered earth drill	80	50
Backhoe	83-86	50
Cement mixer	63-71	50
Chain saw cutting trees	75-81	50
Compressor	67	50
Wood Chipper	89	50
Bulldozer	80	50
Grader	85	50
Truck	91	50
Generator	78	50
Rock drill	98	50
(Excerpt and derived from Cowan, 1994)		

No sensitive receptors are within the immediate vicinity of this project. The noise created by the initial phase of the construction process *during daytime hours only*, with levels ranging from 75 to 88 dB(A) on site will decrease as a function of distance. Given initial noise measurement standardized at 50 feet from the sound source, every doubled distance will decrease the noise level by approximately 6 dB(A). Thus, at a distance of 250 feet to the average residential lot line and a sound level of 75 to 88 dB(A) at the northern building edge, the noise generated by the "heavy" construction at the construction site, will be *decreased* by approximately 12 dB(A) or approximately 63 to 76 dB(A). NYS Route 211 recorded L(eq) measurements yielded between 75.5 and 69.3 dB(A) during peak and off-peak times. Thus, the ambient sound levels at this point will be approximately the same and will be audible during the heavy construction phase of the site.

Once "rough grading" has been finalized and foundations have been poured then, peak upper sound levels will decline in duration as the construction uses tools which are (1) smaller, (2) less continuous in use and (3) begin to move "indoors." During the subsequent phase of construction, heavy equipment is generally replaced by internal work and hand-equipment on external work. Consequently, it is expected that sound levels at the point of generation will further be reduced to 53 to 67 dB(A) *during daytime, construction hours only*. This level of intermittent noise (up to several hours per day) is expected to occur for approximately one year for each phase of the project.

Construction in daytime hours is exempt from Village Code Chapter 77 levels presented in Table 4. Construction or demolition related activities may occur during nighttime hours after 9 p.m. to 8 a.m. Monday to Saturday and from 9 p.m. to 9 a.m., if that operation of construction equipment during nighttime hours does not exceed the maximum noise levels as specified in § 77-5B. However, the applicant has agreed to limit their construction activity to *daytime hours only*.

KSH WAREHOUSE CLOSE

Write a description for your map.

NORTH

SITE (APPROX.)

ANALYSIS SITE #1

ANALYSIS SITE #2A

ANALYSIS SITE #2B

ANALYSIS SITE #3

ANALYSIS SITE #4

SAMPLE SITE A

SAMPLE SITE B

SAMPLE SITE C

ORANGE COUNTY AIRPORT

INTERSTATE 84 (1.0 MILE

Weaver St

Weaver St

Luna Ln

211

211 Auto Body

D Williams Supeior Asphalt

Blue Jay Ln

Oriole Dr

Blackbird Ln

Freda St

Google Earth

800 ft

N

FIGURE 1:

PROPOSED KSH WAREHOUSES

NYS ROUTE 211

VILLAGE OF MONTGOMERY, NEW YORK

SOUND/NOISE ANALYSIS

B. LAING ASSOCIATES, INC.

APRIL 2023

APPENDIX A

Existing Condition Measurement Reports

Cirrus Research plc

Measurement Summary Report

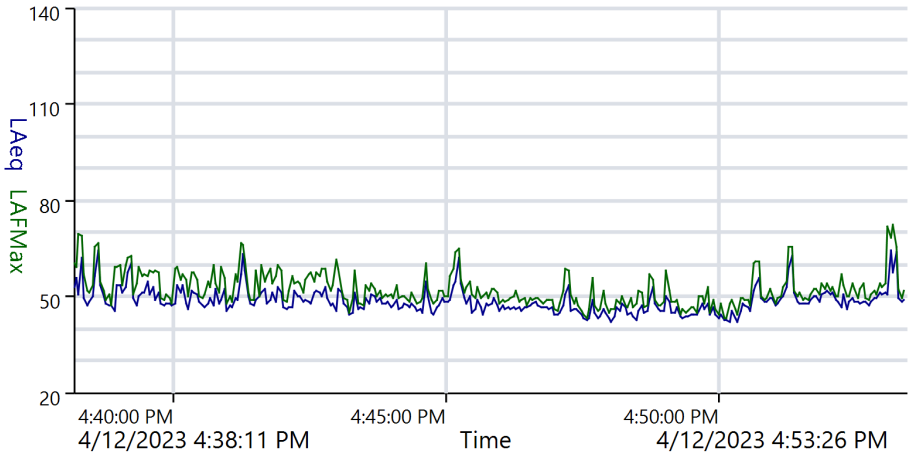
Name	WEAVER STREET PM PEAK			
Time	4/12/2023 4:38:11 PM	**Person**	**Place**	**Project**
Duration	00:15:15		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

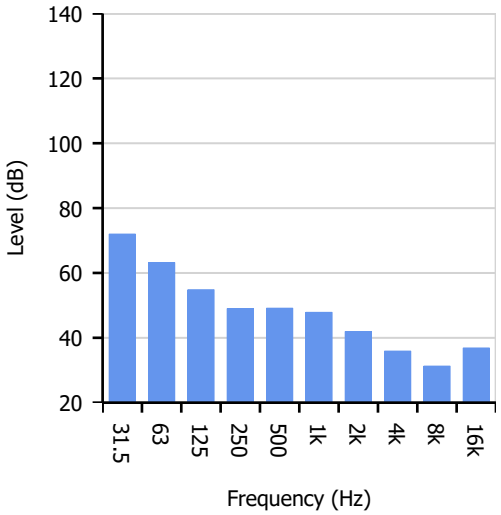
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	51.3 dB
LAE	80.9 dB
LAFMax	72.3 dB

Statistical Levels (Ln)	
LAF1	62.4 dB
LAF5	55.8 dB
LAF10	52.8 dB
LAF50	47.3 dB
LAF90	43.4 dB
LAF95	42.5 dB
LAF99	40.3 dB





Notes

WEAVER STREET
80 F, 15-20 WEST, SUNNY

ReportId

Cirrus Research plc

Measurement Summary Report

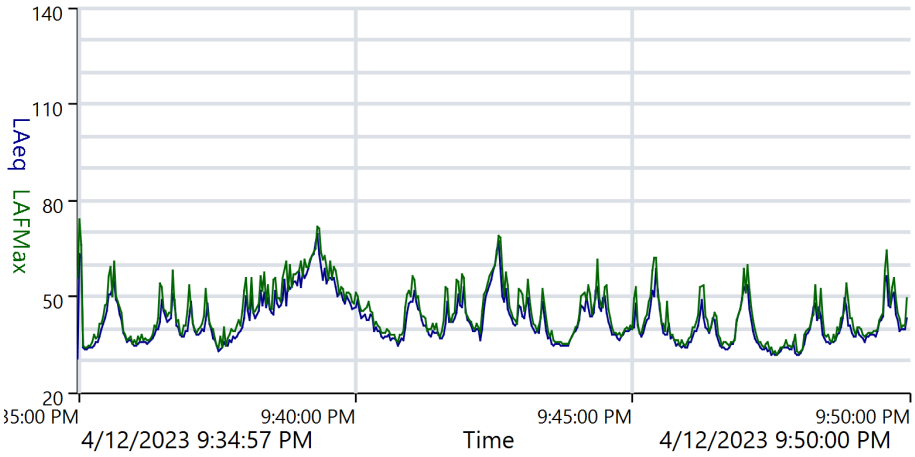
Name	WEAVER STREET NIGHTITME			
Time	4/12/2023 9:34:57 PM	**Person**	**Place**	**Project**
Duration	00:15:03		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

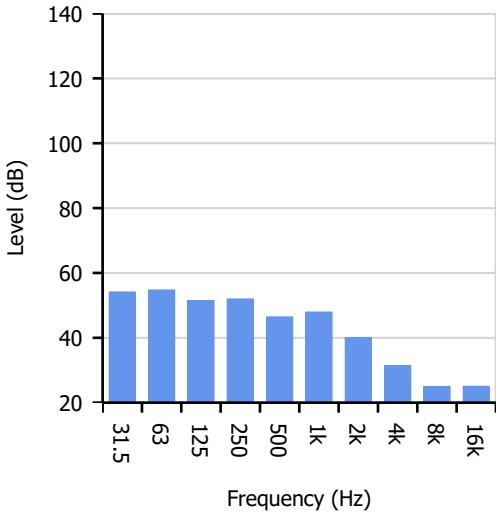
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	50.9 dB
LAE	80.5 dB
LAFMax	73.9 dB

Statistical Levels (Ln)	
LAF1	63.2 dB
LAF5	55.9 dB
LAF10	51.8 dB
LAF50	40.1 dB
LAF90	34.3 dB
LAF95	33.5 dB
LAF99	31.7 dB





Notes

WEAVER ST NIGHTTIME
72 F NO WIND
72 F NO WIND

ReportId

Cirrus Research plc

Measurement Summary Report

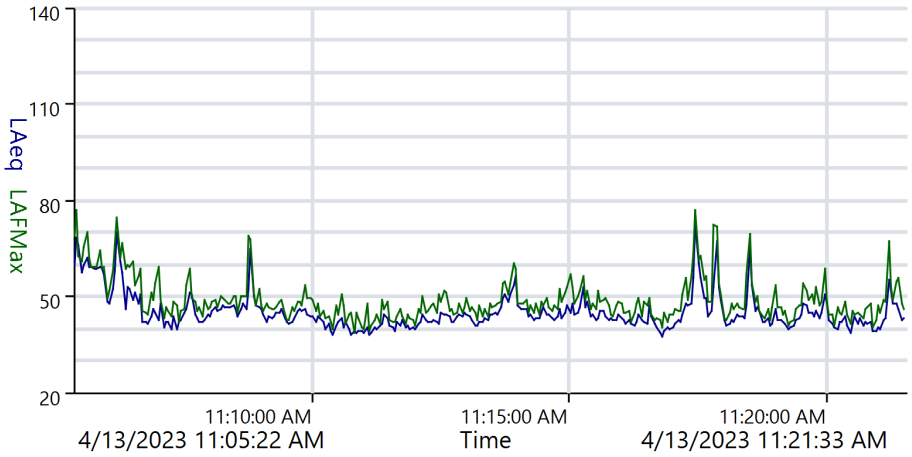
Name	WEAVER ST DAYTIME			
Time	4/13/2023 11:05:22 AM	**Person**	**Place**	**Project**
Duration	00:16:11		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

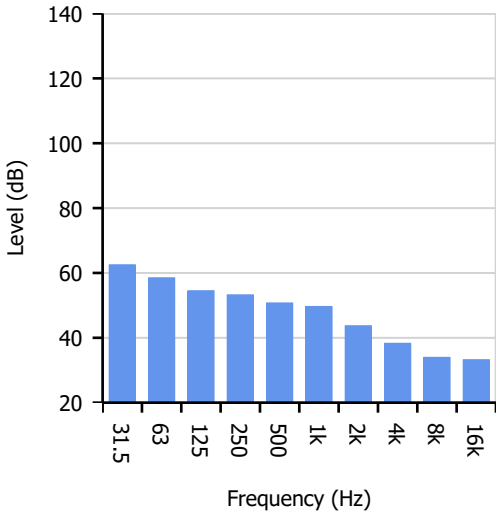
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	53.5 dB
LAE	83.4 dB
LAFMax	77.0 dB

Statistical Levels (Ln)	
LAF1	65.6 dB
LAF5	58.2 dB
LAF10	51.5 dB
LAF50	43.1 dB
LAF90	39.7 dB
LAF95	38.7 dB
LAF99	37.5 dB





Notes

WEAVER ST DAYTIME
80 F, 10-15 W, SUNNY

ReportId

Cirrus Research plc

Measurement Summary Report

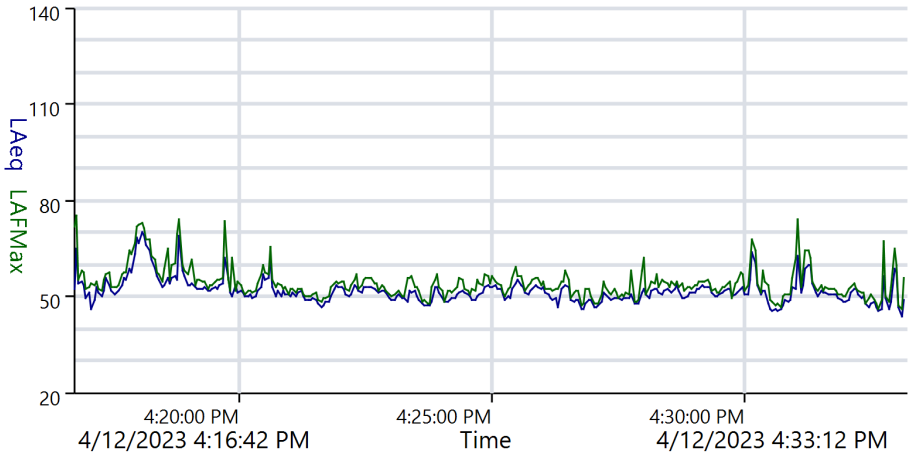
Name	SITE SOUTH PM PEAK			
Time	4/12/2023 4:16:42 PM	**Person**	**Place**	**Project**
Duration	00:16:30		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

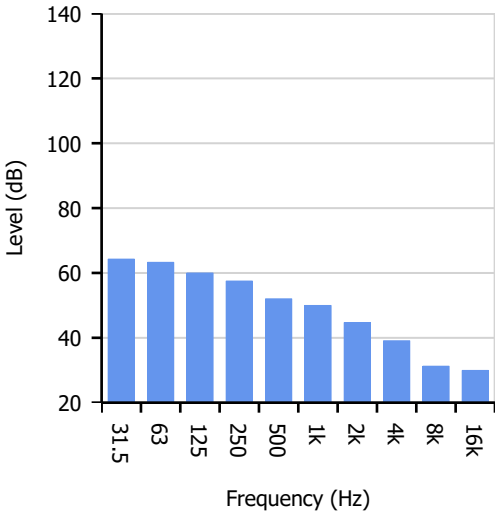
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	55.1 dB
LAE	85.1 dB
LAFMax	75.4 dB

Statistical Levels (Ln)	
LAF1	67.4 dB
LAF5	58.2 dB
LAF10	55.0 dB
LAF50	50.8 dB
LAF90	47.4 dB
LAF95	46.3 dB
LAF99	44.9 dB





Notes

SITE - SOUTHERN SIDE PM PEAK
80 F, 15-20 MPH WEST, SUNNY

ReportId

Cirrus Research plc

Measurement Summary Report

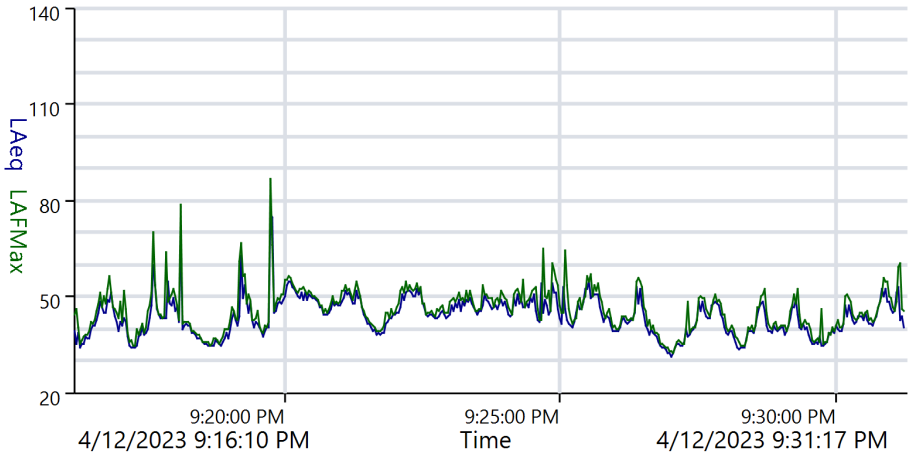
Name	SITE SOUTH NIGHTTIME			
Time	4/12/2023 9:16:10 PM	**Person**	**Place**	**Project**
Duration	00:15:07		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

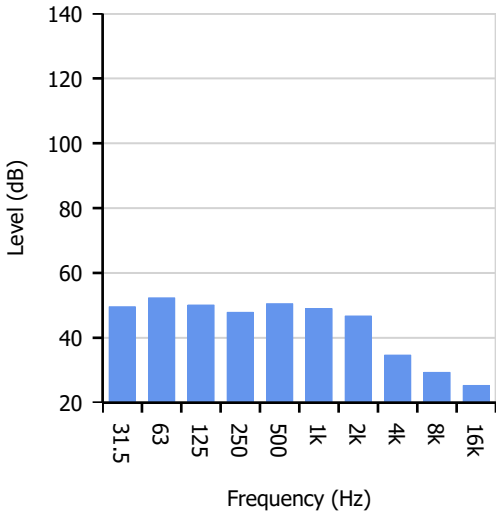
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	53.2 dB
LAE	82.8 dB
LAFMax	86.4 dB

Statistical Levels (Ln)	
LAF1	55.3 dB
LAF5	51.7 dB
LAF10	50.0 dB
LAF50	43.5 dB
LAF90	35.6 dB
LAF95	34.4 dB
LAF99	33.0 dB





Notes

NIGHTTIME SITE SOUTH SIDE

ReportId

Cirrus Research plc

Measurement Summary Report

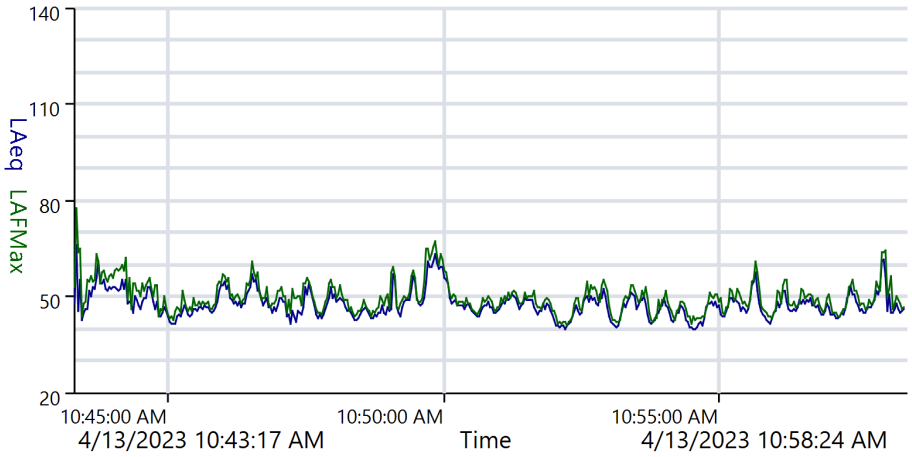
Name	KSH SITE SOUTH DAYTIME			
Time	4/13/2023 10:43:17 AM	**Person**	**Place**	**Project**
Duration	00:15:07		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

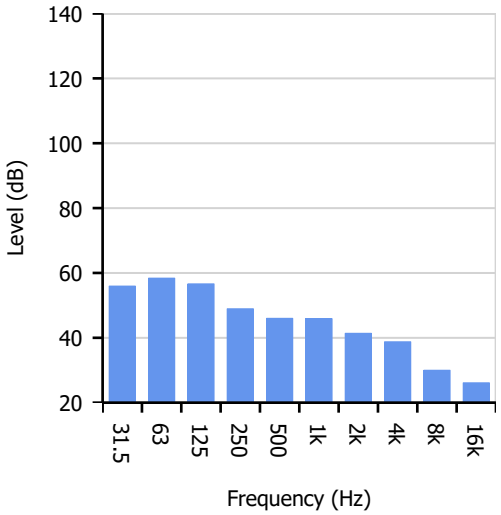
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	50.4 dB
LAE	80.0 dB
LAFMax	77.5 dB

Statistical Levels (Ln)	
LAF1	60.9 dB
LAF5	55.3 dB
LAF10	52.5 dB
LAF50	46.7 dB
LAF90	42.6 dB
LAF95	41.4 dB
LAF99	39.8 dB





Notes

SITE - SOUTH
76 F, 5-10 W

ReportId

Cirrus Research plc

Measurement Summary Report

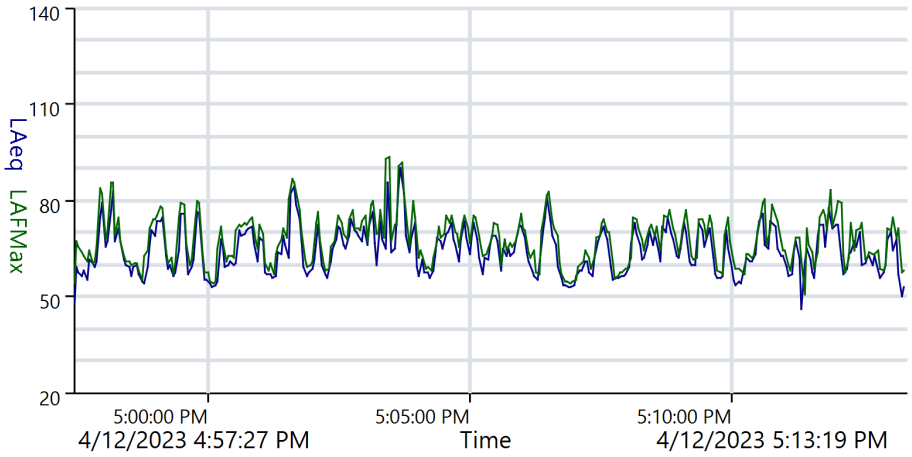
Name	RT 211 PM PEAK			
Time	4/12/2023 4:57:27 PM	**Person**	**Place**	**Project**
Duration	00:15:52		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

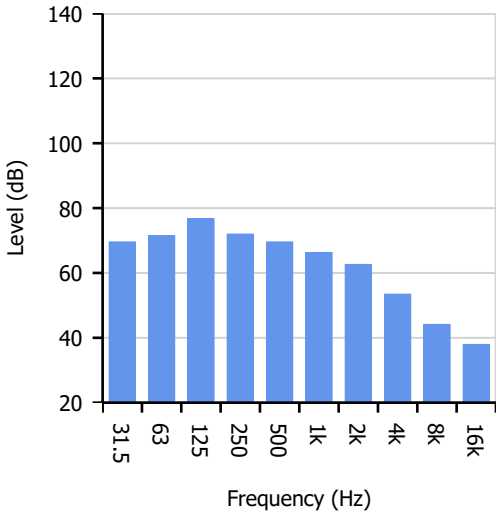
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	75.5 dB
LAE	101.3 dB
LAFMax	93.3 dB

Statistical Levels (Ln)	
LAF1	83.4 dB
LAF5	75.2 dB
LAF10	72.8 dB
LAF50	63.0 dB
LAF90	55.2 dB
LAF95	53.8 dB
LAF99	49.0 dB





Notes

RT211 PM PEAK

80 f, 15-20 WEST

ReportId

Cirrus Research plc

Measurement Summary Report

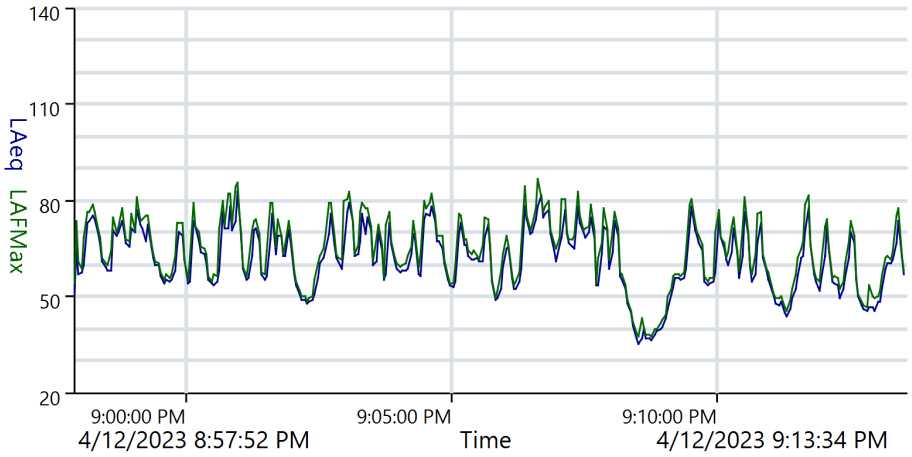
Name	RT 211 NIGHTTIME			
Time	4/12/2023 8:57:52 PM	**Person**	**Place**	**Project**
Duration	00:15:42		VILLAGE OF	KSH WAREHOUSE
Instrument	G304264, CR:171A			

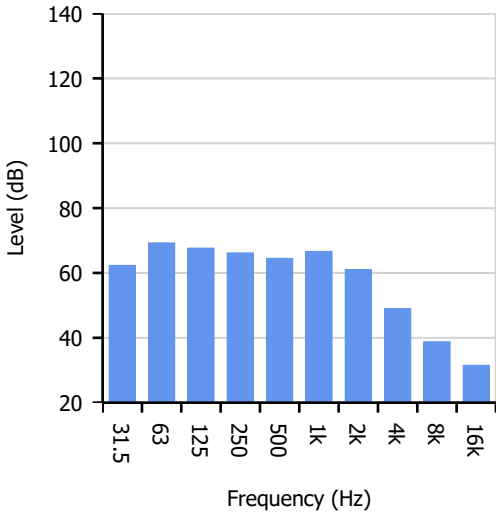
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	69.3 dB
LAE	98.9 dB
LAFMax	86.6 dB

Statistical Levels (Ln)	
LAF1	79.9 dB
LAF5	75.9 dB
LAF10	73.4 dB
LAF50	60.8 dB
LAF90	48.3 dB
LAF95	44.5 dB
LAF99	36.6 dB





ReportId

Cirrus Research plc

Measurement Summary Report

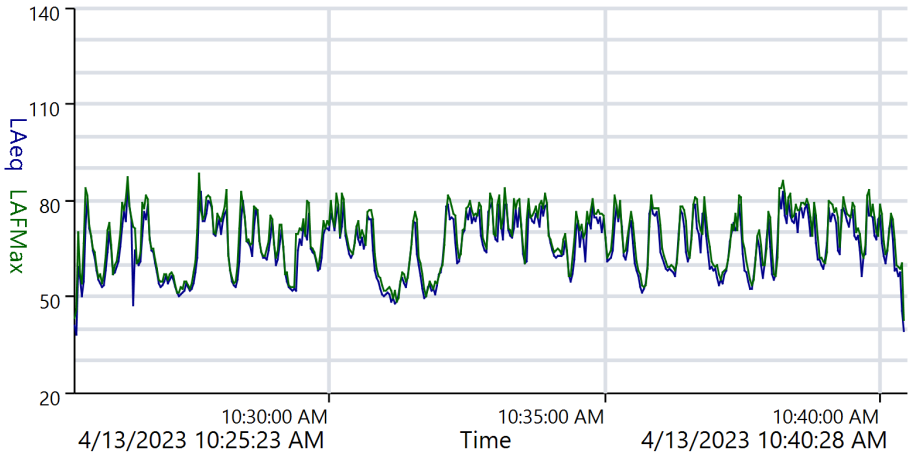
Name	RT 211 DAYTIME			
Time	4/13/2023 10:25:23 AM	**Person**	**Place**	**Project**
Duration	00:15:05		VILLAGE OF	
Instrument	G304264, CR:171A			

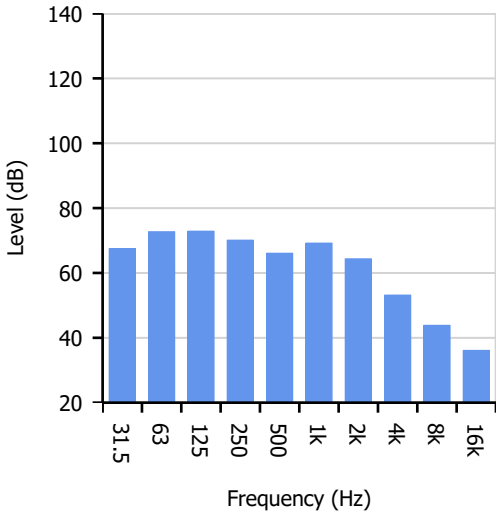
Calibration

Before	Offset	**After**	Offset

Basic Values	
LAeq	72.0 dB
LAE	101.5 dB
LAFMax	88.4 dB

Statistical Levels (Ln)	
LAF1	81.3 dB
LAF5	78.4 dB
LAF10	76.4 dB
LAF50	65.3 dB
LAF90	52.8 dB
LAF95	51.1 dB
LAF99	47.1 dB





Notes

RT 211 MID-DAY
75 F, 10 W

ReportId

APPENDIX B
Sound Barrier Insertion Losses

NOISE Barrier Insertion Loss Estimate						4/5/2023		MONTGOMERY-Res N			
PROJECT	MONTGOMERY, NY, 1000 Hz				Hz	Frequency:	1,000	Speed Sound		1126	ft/sec
				VALUE							
SOURCE				Ground A		Diagnl A		Diagnl A			
	Vehc, Vans/Box trucks					Squared					
Distance to Barrier:				40	ft.	1609		40.11234			
Height				3	ft.						
RECIEVER				Ground B		Diagnl B		Diagnl B			
						Squared					
Distance fromBarrier:				150	ft.	22501		150.0033			
Height				5	ft.						
				Ground C							
Ditsance TOTAL:				190	ft.						
Barrier height: Wall/Fence at Grade				6	ft.						
						N=	0.205463				
ATTENUATION:*				LOG N	tanH		Sq. Rt.	2PieN			
	A =	5		1.087387	1.133364	0.5656037	0.641035	0.410926			
		A =	6.087387		Absorbtive Effect		0	Ground/Other		3.0	
		TOTAL:	9.1					Treed Wetland			

B. LAING ASSOCIATES
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103 Fort Salonga Road - Suite 5 Fort Salonga, NY 11768
(631) 261-7170, Fax: (631) 261-7454

NOISE Barrier Insertion Loss Estimate						4/4/2023				
	HVAC - ROOFTOP									
PROJECT	MONTGOMERY, NY, 1000 Hz				Hz	Frequency	1,000	Speed Sound		1126
				VALUE						
SOURCE	**HV/AC Rooftop to NW**			Ground A		Diagnl A		Diagnl A		
						Squared				
Distance to Barrier:				5	ft.	27.25		5.220153		
Height				2.5	ft.					
RECIEVER				Ground B		Diagnl B		Diagnl B		
						Squared				
Distance fromBarrier:				470	ft.	220900		470		
Height				4	ft.					
				Ground C						
Ditsance TOTAL:				475	ft.					
Barrier height:				4	ft.					
						N=	0.391036			
ATTENUATION:*				LOG N	tanH		Sq. Rt.	2PieN		
	A =	5		1.924554	1.248038	0.708591	0.884348	0.782072		
		A =	6.924554		Absorbtive Effect		0	0	none	
		TOTAL:	6.924554							

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NOISE Barrier Insertion Loss Estimate						4/5/2023		Building(s) Insertion Loss to Property Line			
PROJECT	MANTGOMERY, NY, 1000 Hz				Hz	Frequency	1,000	Speed Sound		1126	ft/sec
				VALUE							
SOURCE	**Generator(s)**			Ground A		Diagnl A		Diagnl A			
						Squared					
Distance to Barrier:				20.0	ft.	1241		35.22783			
Height				6.0	ft.						
RECIEVER				Ground B		Diagnl B		Diagnl B			
						Squared					
Distance from Barrier:				435.0	ft.	190095.3		435.9991			
Height				5.5	ft.						
				Ground C							
Ditsance TOTAL:				455.0	ft.						
Barrier height:				35.0	ft.						
						N=	28.82233				
ATTENUATION:*				LOG N	tanH		Sq. Rt.	2PieN			
	A =	5		17.60759	7.592411	0.999999	7.592408	57.64465			
		A =	22.60759		Absorbtive Effect		0.0	Ground/Other		3.0	
		TOTAL:	25.6					Treed Wetland			
ANDMTG01											

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NOISE Barrier Insertion Loss Estimate						4/5/2023		Building(s) Insertion Loss to Property Line			
PROJECT	MANTGOMERY, NY, 1000 Hz				Hz	Frequency	1,000	Speed Sound		1126	ft/sec
				VALUE							
SOURCE	**Trucks - Mid Aisle**			Ground A		Diagnl A		Diagnl A			
						Squared					
Distance to Barrier:				110.0	ft.	12629		112.3788			
Height				12.0	ft.						
RECIEVER				Ground B		Diagnl B		Diagnl B			
						Squared					
Distance from Barrier:				435.0	ft.	190095.3		435.9991			
Height				5.5	ft.						
				Ground C							
Ditsance TOTAL:				545.0	ft.						
Barrier height:				35.0	ft.						
						N=	5.999935				
ATTENUATION:*				LOG N	tanH		Sq. Rt.	2PieN			
	A =	5		10.80879	3.470878	0.998042	3.464083	11.99987			
		A =	15.80879		Absorbtive Effect		0.0	Ground/Other		3.0	
		TOTAL:	18.8					Treed Wetland			
ANDMTG01											

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NOISE Barrier Insertion Loss Estimate						4/5/2023		West Entry Insertion Loss to Property Line			
PROJECT	MANTGOMERY, NY, 1000 Hz				Hz	Frequency	1,000	Speed Sound		1126	ft/sec
				VALUE							
SOURCE	**Trucks - Entry Lane**			Ground A		Diagnl A		Diagnl A			
						Squared					
Distance to Barrier:				24.0	ft.	612		24.73863			
Height				12.0	ft.						
RECIEVER				Ground B		Diagnl B		Diagnl B			
						Squared					
Distance from Barrier:				12.0	ft.	144.25		12.01041			
Height				5.5	ft.						
				Ground C							
Ditsance TOTAL:				36.0	ft.						
Barrier height:				6.0	ft.						
						N=	1.330455				
ATTENUATION:*				LOG N	tanH		Sq. Rt.	2PieN			
	A =	1		4.915863	1.761137	0.926236	1.631229	2.660909			
		A =	5.915863		Absorbtive Effect		0.0	Ground/Other		0.0	
		TOTAL:	5.9					Treed Wetland			
ANDMTG01											

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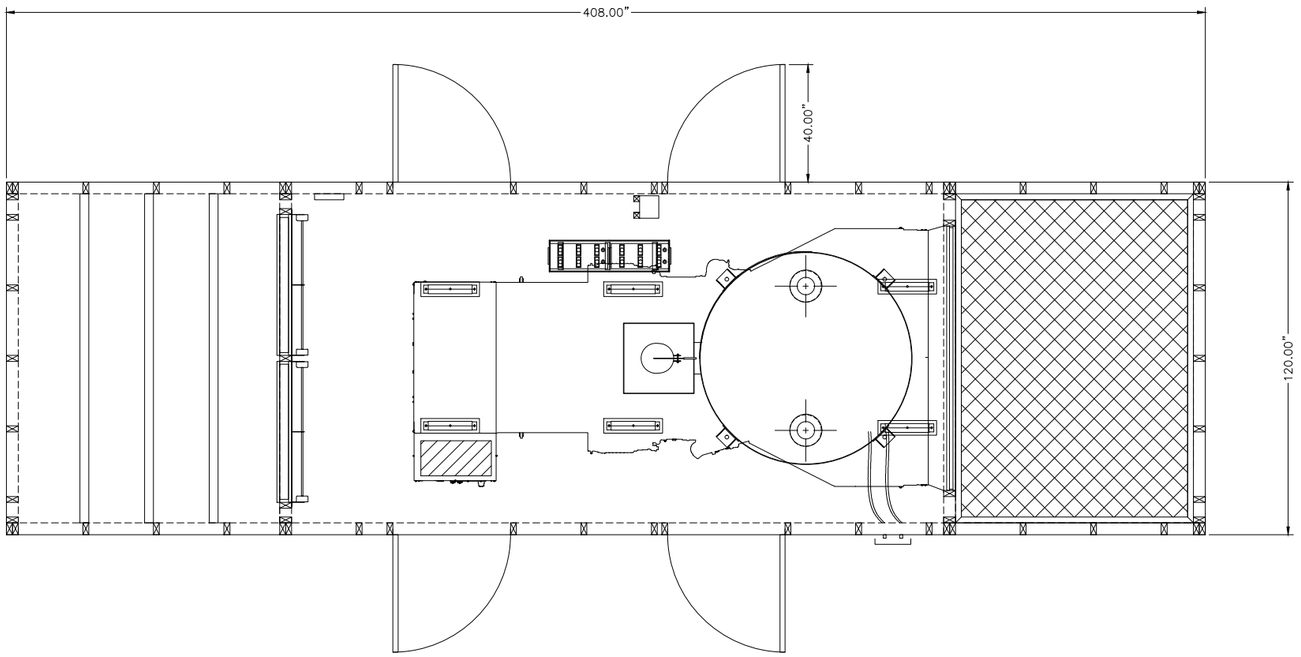
APPENDIX C
Generator Sound Specifications

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APP'D
ALL	A	SALES CONCEPT	11/6/2017	AEG



TOP VIEW

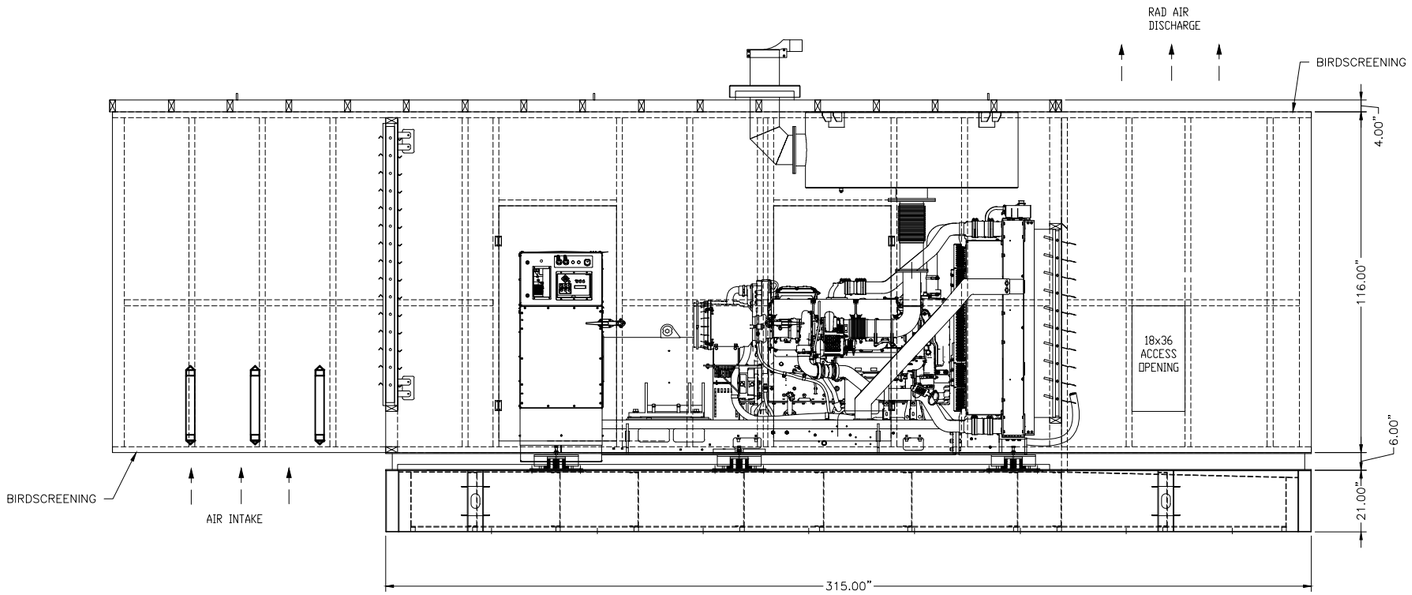
SALES DRAWING
NOT FOR CONSTRUCTION PURPOSES.

ALL SPECIFICATIONS SUBJECT TO CHANGE
PENDING APPROVED SUBMITTALS.

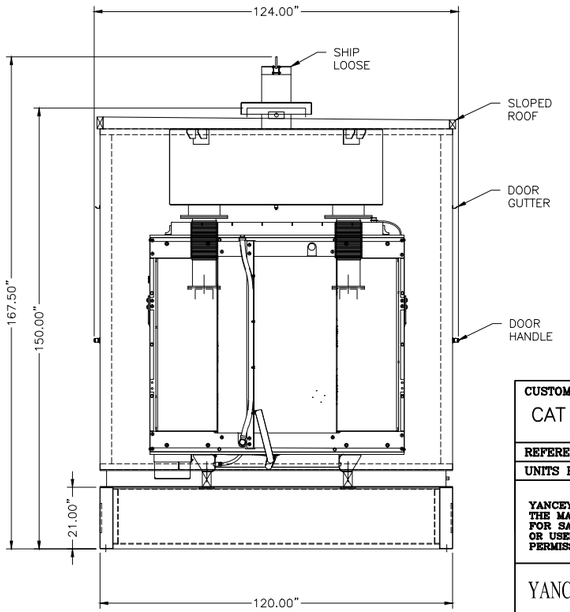
YANCEY ENGINEERED SOLUTIONS

NOTE:

1) C32 (1250KW) CAT GENSET.
2) ENCLOSURE: 2"x4"x0.125" ALUMINUM TUBE FRAME COVERED IN 0.080" ALUMINUM SKIN. LEVEL 2, WALK-IN DESIGN, 100MPH WIND RATING.
3) SILENCER: Ø72X26, HOSPITAL GRADE, INTERNALLY INSULATED, DISC-TYPE.
4) SOUND ATTENUATION: 75dBA@23FT AVERAGE FREE FIELD. 4" ROCKWOOL COVERED IN PERFORATED SHEETING THROUGHOUT INTERIOR OF ENCLOSURE.
5) 2,100 GALLON (24 HR) SUBBASE TANK: UL-142 LISTED, DOUBLE WALL, 3/16" STEEL CONSTRUCTION, PAINTED BLACK.
6) PACKAGE LENGTH: 408"
PACKAGE WIDTH: 120"
PACKAGE HEIGHT: 150"
PACKAGE WEIGHT: 45,000LBS



RIGHT SIDE VIEW



FRONT VIEW

DIMENSIONS ARE
IN INCHES.
ALL INFORMATION ON
THIS DRAWING IS FOR
REFERENCE ONLY

CUSTOMER: CAT DEALER	THIRD-ANGLE PROJECTION
REFERENCE: ALUMINUM 0.080" SKIN ON ALUMINUM 2x4 TUBING	
UNITS REQ'D: 1	DO NOT SCALE
YANCEY POWER PACKAGING CLAIMS PROPRIETARY RIGHT IN THE MATERIAL DISCLOSED HEREON. THIS DRAWING IS ISSUED FOR SALES INFORMATION ONLY AND MAY NOT BE REPRODUCED OR USED TO MANUFACTURE ANYTHING SHOWN HEREON WITHOUT PERMISSION FROM YANCEY POWER PACKAGING TO THE USER.	REVISION A
YANCEY ENGINEERED SOLUTIONS — 96 ETHRIDGE MILL IND PARK, GRIFFIN, GA30224	DATE 11/6/2017
C32 1250KW LEVEL 2 SAE PACKAGE SALES CONCEPT ELEVATION VIEWS	
DRW. AEG / CHK. X / APP. X / APP. X	JOB SERIAL NO. Q17-0000
	SCALE: NTS — SHEET 1 OF 1

created using AutoCAD

APPENDIX D

Qualifications

EDUCATION State University of New York, College of Environmental Sciences and Forestry, B.S. (Magna cum Laude), 1979
State University of New York at Stony Brook, Graduate Meteorological Courses
Bruel & Kjaer Courses

REGISTRATION Hazardous Waste Handling (NUS/EPA) Certified
CPESC #5347
U. S. Patentee

EXPERIENCE

1990-1999 **Adjunct Instructor, Adelphi University**. Instructor for graduate-level waste management, remediation and wetlands courses.

1987-Present **B.LAING ASSOCIATES, Inc. President (Emeritus)**

General B. Laing Associates, Inc. and its principal, Michael P. Bontje have provided air quality emission dispersion and noise analyses for point and non-point sources for 43 years. Projects have ranged from queuing for municipal bus terminals to residential subdivisions and 1,800,000 square foot malls (i.e., Palisades Center in West Nyack, New York). Our clients have included private business owners for industrial or commercial projects plus municipalities constructing or improving various public works or examining proposed projects. We have conducted air quality and noise analyses at more than one hundred locations and many more individual scenarios for both point and non-point sources throughout the Hudson Valley. Those analyses conducted for the New York Metro area add many hundred more projects and scenarios.

Noise analyses: 35 years of field-based data and mathematical modeling via proprietary spreadsheets. TNM, Stamina and optima computer modeling of mobile and point sources of noise. Noise monitoring for nonpoint sources and compliance to local and federal requirements. Noise analyses, monitoring and mitigation plans for outdoor sources. Conducted for residential and commercial developments and municipal reviews pursuant to SEQR. These include multi-hundred unit attached housing projects, college expansion, assisted living facility, commercial retail/shipping.

locations, motor vehicle maintenance facilities, car wash facilities, recreational vehicle use, recreational ball fields, landscaping/chipping yards, etc. Monitored, modeled and mitigation interior noise levels for tenant, building code and FHWA compliance. Mitigation design and construction supervision.

Mobile source air pollution analyses: 43 years of Hot Spot MOBILE/CAL3QHC/ AERMOD/HIWAY/IMM/ MOVES, etc.) for Palisades Center, Poughkeepsie Galleria, Holyoke (MA), Taunton (MA), Cross Gates, Aviation, and Carousel Center malls (all 0.750 to 1.2 million square feet), Pepsi

bottling plant, Pilot centers, Chestnut Ridge, Nassau County Bus Terminal, Stewart, Plaza, Reckson Associates Office Complex, Huntington Housing Authority, St. Francis Hospital, White Plains car washes, Wappingers Center, Syracuse Center, Casperkill Country Club, ICC Associates Commercial Complex, DestiNY mixed use (2.0 million square feet plus City of Syracuse/private redevelopment), Albany and Buffalo locations, Haverstraw Waterfront Redevelopment, etc.

1987-Present

Point source air pollution modeling (PTPLU, PMPT, ISC and AERMOD) for Waywayanda power plant, Anthony Jewelers/re-smelter, Islip landfill gas generators, the Village of Great Neck Plaza, the Rodolitz Organization coal test facility, Heraeus and Revere smelters, St. Francis Hospital, DestiNY mixed use, variuos materials production and handling facilities, etc.

Hartz Mountain Harmon Meadow, Secaucus, New Jersey. Project manager for including 100 percent design, construction inspection, federal and state regulatory coordination and approvals, pre/post project environmental monitoring and coordination of public presentations for Air Quality analyses of non-point and point source sites. These projects included one million plus square feet of commercial space and 4,000 plus residential units.

Oxford Energy. Environmental evaluation of tires-to-energy plant site and 7 mile transmission line ROW. Construction inspection of mitigation measures.

1984-1988 TAMS CONSULTANTS, INC.

Virginia Department of Transportation - Environmental Services (statewide). Analysis of impacts for the Virginia Department of Transportation/FHWA Environmental Assessments for I64, Springfield Bypass, etc. .

U.S. Navy Northeast Surface Action Group Homeport, Massachusetts, New York, and Rhode Island. Technical Director for utilities, air quality/safety arc analyses of a 100-acre Staten Island housing site and alternate sites at Stapleton/Fort Wadsworth, NY the Quonset Naval Base, RI and Boston Army Base, MA.

Lakhra Coal Mine and Power Generation Project, Pakistan. Design, procurement installation training of water and air quality monitoring stations in the Sind Province of Pakistan for a 700 megawatt coal-fed mine-mouth power plant.

1980-1984 HOLZMACHER, MCLENDON AND MURRELL, P.C.

Solid Waste and Air Quality Analysis. Experience included managing air, surface water and groundwater monitoring programs at Brookfield/Fresh Kills Landfill, Southampton Landfill and Oyster Bay Landfill, NY. Management of a four-station meteorological, SO2, NO2, TSP and Pb monitoring network and PSD air modeling for the Multi-Town Resource Recovery Facility; discovery of explosive gas levels and fires and implementation of remedial actions at the Southold Landfill and commercial landfills on Long Island and upstate

New York; monitoring and modeling landfill gas plumes in ambient environments at Oyster Bay's Old Bethpage Landfill; ISC modeling of emissions from a reclamation plant in Orange County, N.Y.

1976-1980 **Nature Center Director, Laboratory Analyst**.

1975-Present **Eagle Scout, Boy Scouts of America**

2006-Present **Patent, Retractable Dock, #7,144,199 B2**