

18 October 2024

WRV Nurseries South Brunswick Owner, LLC
c/o Mr. Diogo Santos
570 Commerce Boulevard
Carlstadt, New Jersey 07072
dsantos@russodevelopment.com

Re: Acoustical Evaluation of Proposed Data Center
Princeton Nurseries DC-1
South Brunswick, New Jersey
LSG&A File 2024033

Dear Mr. Santos:

As you requested, Lewis S. Goodfriend & Associates (LSG&A) has conducted an updated acoustical evaluation of the proposed generators, load bank, rooftop mechanical equipment, substation transformers, and loading area for the proposed data center in South Brunswick, New Jersey. LSG&A understands that there are concerns regarding the potential acoustical impact on the adjacent residential properties. This letter summarizes LSG&A's acoustical measurements, evaluation, and noise control recommendations for the application. The results indicate that by implementing the proposed noise control recommendations, the sound levels due to the proposed equipment are expected to meet the applicable limits of the noise regulation at the adjacent properties.

1.0 SITE LAYOUT

The site is located within the Princeton Nurseries redevelopment in South Brunswick, New Jersey. The new data center building will be located on the east side of the redevelopment site, and will include internal emergency generators, an outdoor load bank on the west side of the building, and rooftop mechanical equipment. The generator rooms will receive intake air from the west side of the building, and the discharge air and combustion exhaust will be routed through the roof. In addition, a loading area will be located on the east side of the building. The new substation will be located to the north of the data center, and will include two transformers. Hotel properties are located to the east of the site, which have the same noise limits as residential properties for the purposes of the acoustical evaluation. Residential properties are also located to the north of the site. The site and adjacent areas are shown in Figure 1, at the end of this letter.

2.0 REQUIREMENTS OF THE NJDEP NOISE REGULATION

The New Jersey Department of Environmental Protection (NJDEP) noise regulation limits the A-weighted¹ sound levels produced by a commercial or industrial facility, when measured at or within a residential property line, to the following sound levels:

Daytime	(7:00 A.M. -to- 10:00 P.M.)	–	65 dB(A)
Nighttime	(10:00 P.M. -to- 7:00 A.M.)	–	50 dB(A)

When the sound from the source is constant in level and in character, the NJDEP regulation also provides limits for sound pressure levels in the preferred octave bands with center frequencies between 31.5 and 8000 Hz, as summarized in Table 1.

Table 1 – Daytime and Nighttime Sound Pressure Level Limits [dB re: 20μPa] of the NJDEP Noise Regulation for Residential Property Receivers (NJAC 7:29)									
	Octave Band Center Frequency, Hz								
	31.5	63	125	250	500	1000	2000	4000	8000
Daytime Limits	96	82	74	67	63	60	57	55	53
Nighttime Limits	86	71	61	53	48	45	42	40	38

The NJDEP regulation also limits the sound pressure levels for commercial receiving properties. These limits are equivalent to the daytime limits described above, but are imposed 24 hours a day. The NJDEP regulation does not prescribe limits for industrial receiving properties.

The NJDEP noise regulation specifically exempts “emergency electricity generators at an industrial, commercial, or community service facility in use during an electrical outage.”² Therefore, the sound emissions due to the emergency operation of the generators would be exempt from the limits of the regulation. However, the planned periodic testing of the generators is *not* exempt from these limits.

¹A-weighting, noted as dB(A), is a standardized sound level meter setting having a frequency characteristic similar to the human ear/brain frequency sensitivity.

²N.J.A.C. 7:29, Section 1.5.a.14

3.0 BASELINE MEASUREMENTS

3.1 Measurements

On Monday, 25 March 2024, Jack Zybura of LSG&A visited the site to set up two 24-hour monitors to measure the baseline sound pressure levels toward the north and east sides of the site. Figure 1, at the end of this letter, shows an aerial view of the site with the baseline measurement location identified. The L_{eq} ³, L_{10} ⁴, and L_{90} ⁵ results of the monitoring period are shown in Figures 2 and 3, at the end of this letter.

The hourly A-weighted sound pressure levels were measured over a period of 24 hours, beginning at 1:00 P.M. on 25 March 2024. Sound sources that contributed to the ambient sound pressure levels during the measurement included traffic, wildlife, and aircraft. The meteorological conditions during the measurement period included a temperature range of approximately 35-52 degrees Fahrenheit, a relative humidity range of 20-63 percent, and variable wind with speeds of 0 to 12 mph.

3.2 Data Acquisition and Analysis

Measurements of the airborne sound pressure levels were performed using two Rion Type NL-52 precision sound level meters, each equipped with a Rion Type UC-59 microphone. Each analyzer automatically recorded statistical A-weighted and one-third octave band sound pressure levels and stored the results in memory for later retrieval. Each microphone was mounted on a tripod at a height of approximately 5 feet above grade, and equipped with a windscreen for the duration of measurements. Each system's calibration was verified in the field before and after the measurements using a Brüel & Kjær Type 4231 acoustical calibrator. The stored data was later downloaded and transferred to a spreadsheet for evaluation. Copies of the NIST traceable calibration certificates for the sound level measurement equipment are available upon request.

³ The L_{eq} represents the energy-averaged sound pressure level during the measurement period.

⁴ The L_{10} is the sound pressure level exceeded 10 percent of the time, and represents the transient sound pressure levels during the measurement period.

⁵ The L_{90} is the sound pressure level exceeded 90 percent of the time, and represents the background sound pressure levels during the measurement period.

4.0 ACOUSTICAL EVALUATION & RECOMMENDATIONS

In order to calculate the sound levels due to the proposed equipment, LSG&A developed a model of the site with SoundPLAN 3D acoustical modeling software, using ISO Standard 9613-2 methodology for the calculations. The acoustical model considered the propagation of sound over distance, the shielding and reflection of sound due to buildings and barriers, the effect of topography, and the effect of air absorption. The following sound sources were incorporated into the analysis:

- (24) Rooftop Air-Cooled Chillers
- (19) Rooftop Air Handling and
- (16) Rooftop Condensing Units
- (8) Rooftop Exhaust Fans
- (2) Substation Transformers
- (20) Indoor Emergency Generators
- (1) Outdoor Load Bank
- (2) Trucks in Loading Area with a Backup Alarm

The following considerations and recommendations were incorporated into the model.

4.1 Generators

LSG&A understands that the generators will only be operated for routine testing during daytime hours. Two testing scenarios were evaluated: Simultaneous testing of one generator at 100% capacity with the load bank, and simultaneous testing of all generators at 50% capacity with building load. In order to meet the daytime limits of the noise regulation, the following noise control treatments are recommended for the generators.

4.1.1 Silencers

Table 2, below, provides the recommended dynamic insertion loss values for the silencers to be installed in the air intake and discharge paths of the generator rooms.

Table 2 – Recommended Dynamic Insertion Loss (DIL) for the Generator Intake and Discharge Silencers, Princeton Nurseries DC-1, South Brunswick, New Jersey.								
	Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Intake & Discharge Silencer DIL, dB	11	23	27	35	44	39	42	41

The following silencer, by IMI Acoustics, can achieve these insertion loss values:

- Model MVA 1420-180
- Model MVA 2224-180
- Model 10 B5A Silencer

Table 3, below, provides the recommended dynamic insertion loss values for each generator combustion exhaust muffler.

Table 3 – Recommended Dynamic Insertion Loss (DIL) for the Generator Combustion Exhaust Mufflers, Princeton Nurseries DC-1, South Brunswick, New Jersey.								
	Octave Band Center Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Exhaust Muffler DIL, dB	30	40	47	48	48	47	47	46

The following mufflers, by Maxim, can achieve these insertion loss values:

- Maxim MR62 Extreme Thin Line
- Maxim M72 Cylindrical

4.1.2 Generator Room Treatment

In order to reduce the reverberant sound energy inside the generator room, LSG&A recommends treating the ceilings with an acoustically absorptive material, such as 2 inch thick mineral wool or glass fiber panels. The Owens Corning Type 703 semi-rigid insulation boards would be acceptable for this application.

4.2 **Load Bank**

LSG&A understands that the load bank will only be operated for routine maintenance and testing during daytime hours. LSG&A recommends that the load bank be provided with a sound attenuated package with a sound pressure level rating of 76 dB(A) at 25 feet.

4.3 **HVAC**

LSG&A recommends that the rooftop air handling units be selected for a maximum sound power level of 85 dB(A). LSG&A understands that the rooftop air cooled chillers will have a sound power level rating of 96 dB(A) at 100% capacity, and that only two of every three chillers will operate at a time. To meet the nighttime limits of the noise regulation, LSG&A recommends implementing the BRD Standard SC compressor cover treatment on all chillers.

4.4 Transformers

LSG&A understands that the transformers for the proposed substation will have a NEMA sound level rating of 73 dB(A) and will have a blast wall on the east side of each transformer. This has been considered in the acoustical model.

4.5 Loading Dock

To reduce truck and backup alarm sound from the loading area, LSG&A recommends installing a sound barrier along the east property line as shown by the red line in the sketch below. The barrier should have a minimum height of 12 feet with no gaps between the bottom of the barrier and grade. The barrier should be constructed using minimum 4 inch thick masonry or a panelized sound barrier system with a minimum rating of STC 28 such as the Carsonite AcoustaShield.



Sketch1 – Loading Area Sound Barrier

4.6 Product Representatives

BRD Noise and Vibration Control (<https://hushcore.net/>)

Dan Burley

BRD Noise and Vibration Control, Inc.

(610) 863-6300

dan.burley@brd-nonoise.com

Carsonite (<https://www.carsonite.com/>)

Valmont Composite Structures

(803) 321-1185

IMI Acoustics (<http://www.imiac.com/>)

Keavon Anbardan

IMI Acoustics Corporation

(909) 796-6200

kanbardan@swdp.com

Maxim Silencers (<http://www.maximsilencers.com/>)

David Fortner

Advanced Power Technology Inc.

(631) 751-6160

aptddf@aol.com

5.0 RESULTS AND DISCUSSION

Table 4, below, shows the expected sound levels at the nearest properties due to the proposed equipment in various operating conditions. The results are compared to the applicable limits of the noise regulation. The sound levels were calculated at the property line as well each story of the buildings, and the loudest result is reported below.

Table 4 – Expected Sound Levels due to Proposed Equipment at Nearest Residential Properties with Noise Control Recommendations, Princeton Nurseries DC-1, South Brunswick, New Jersey.			
Operation	Sound Level, dB(A)		
	Expected		Limit
	North	East	
One Gen, Load Bank, Trucks, HVAC, Transformers	53	61	65
All Gens, Trucks, HVAC, Transformers	57	62	65
One Gen, Load Bank, HVAC, Transformers	53	53	65
All Gens, HVAC, Transformers	57	56	65
Trucks, HVAC, Transformers	44	61	65
HVAC, Transformers	44	49	50

Table 5, below, shows the expected sound levels specifically at Lot 8.031 Block 99 due to the proposed equipment in various operating conditions. The results are compared to the applicable limits of the noise regulation. The sound levels were calculated at the property line as well each story of the building, and the loudest result is reported below.

Table 5 – Expected Sound Levels at Lot 8.031 Block 99 due to Proposed Equipment with Noise Control Recommendations, Princeton Nurseries DC-1, South Brunswick, New Jersey.		
Operation	Sound Level, dB(A)	
	Expected	Limit
One Gen, Load Bank, Trucks, HVAC, Transformers	54	65
All Gens, Trucks, HVAC, Transformers	58	65
One Gen, Load Bank, HVAC, Transformers	54	65
All Gens, HVAC, Transformers	58	65
Trucks, HVAC, Transformers	43	65
HVAC, Transformers	43	50

The results indicate that the proposed equipment and operations with the recommended noise control measures are also expected to meet the applicable limits of the noise regulation at the nearest residential properties, as well as at Lot 8.031 Block 99. It should be noted that the truck noise is not expected to have an appreciable effect on the north residences, as the data center building itself provides shielding of the loading area. When the generators are not being operated, the typical daytime sound levels due to the data center are expected to be 43-44 dB(A) at the north residences.

Please note that all recommendations included in this report are acoustical in nature and should be reviewed by the appropriate licensed design professionals. Alternative products should be submitted to LSG&A for review. I trust that this information is sufficient for your present needs. Please call if you have any questions regarding this report.

Very truly yours,

LEWIS S. GOODFRIEND & ASSOCIATES

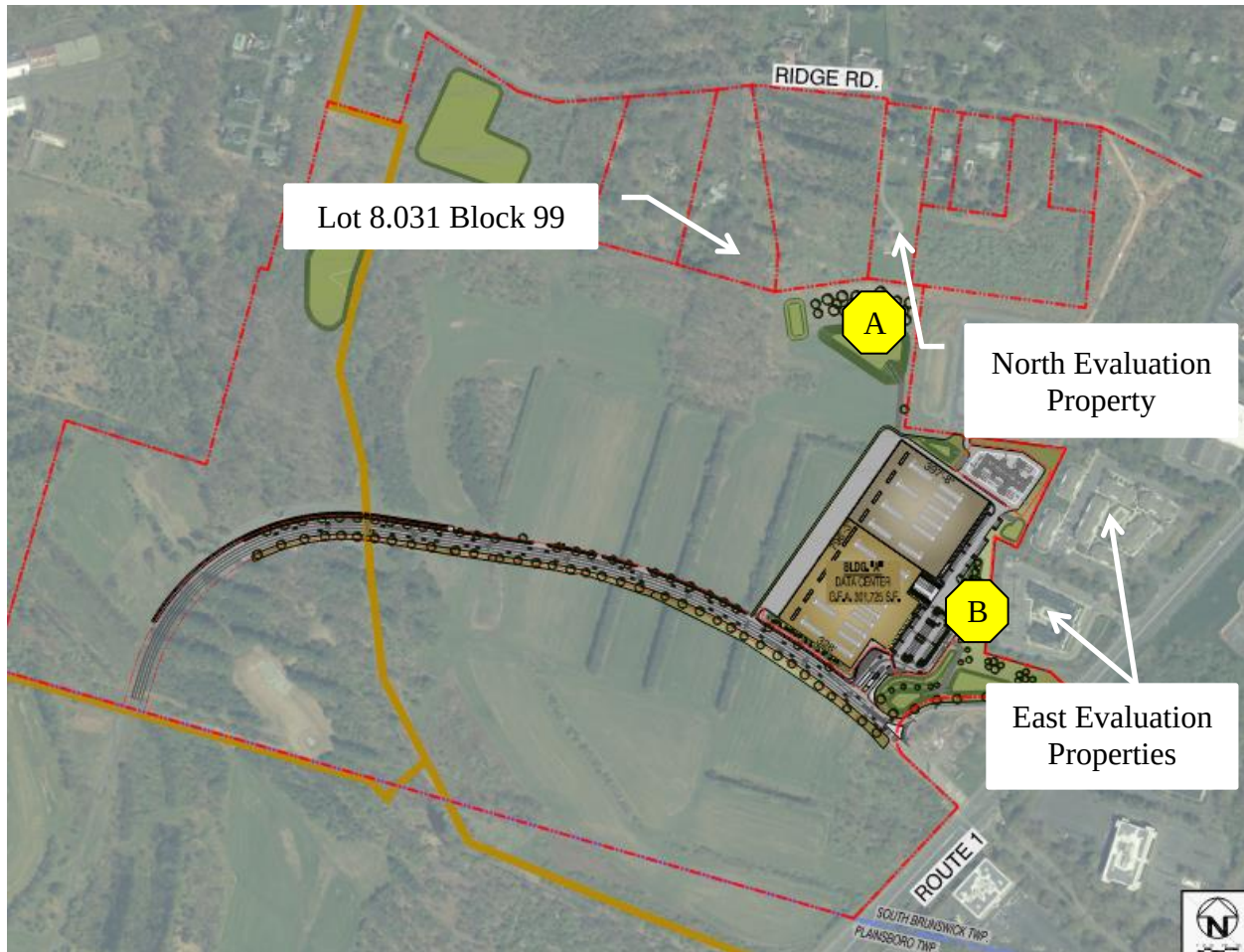
A handwritten signature in blue ink, appearing to read "Jack A. Zybur".

Jack A. Zybur, P.E., INCE Bd. Cert.
Associate Principal

JAZ:jaz
Enclosures

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Figure 1 – Aerial View showing the Baseline Sound Level Measurement Locations and Evaluation Areas, Princeton Nurseries DC-1, South Brunswick, New Jersey.



All Locations Approximate
Not to Scale
Not for Construction

 Baseline Measurement Location

Figure 2 – Measured Ambient Sound Levels at Location A, Princeton Nurseries DC-1, South Brunswick, New Jersey.
25-26 March 2024.

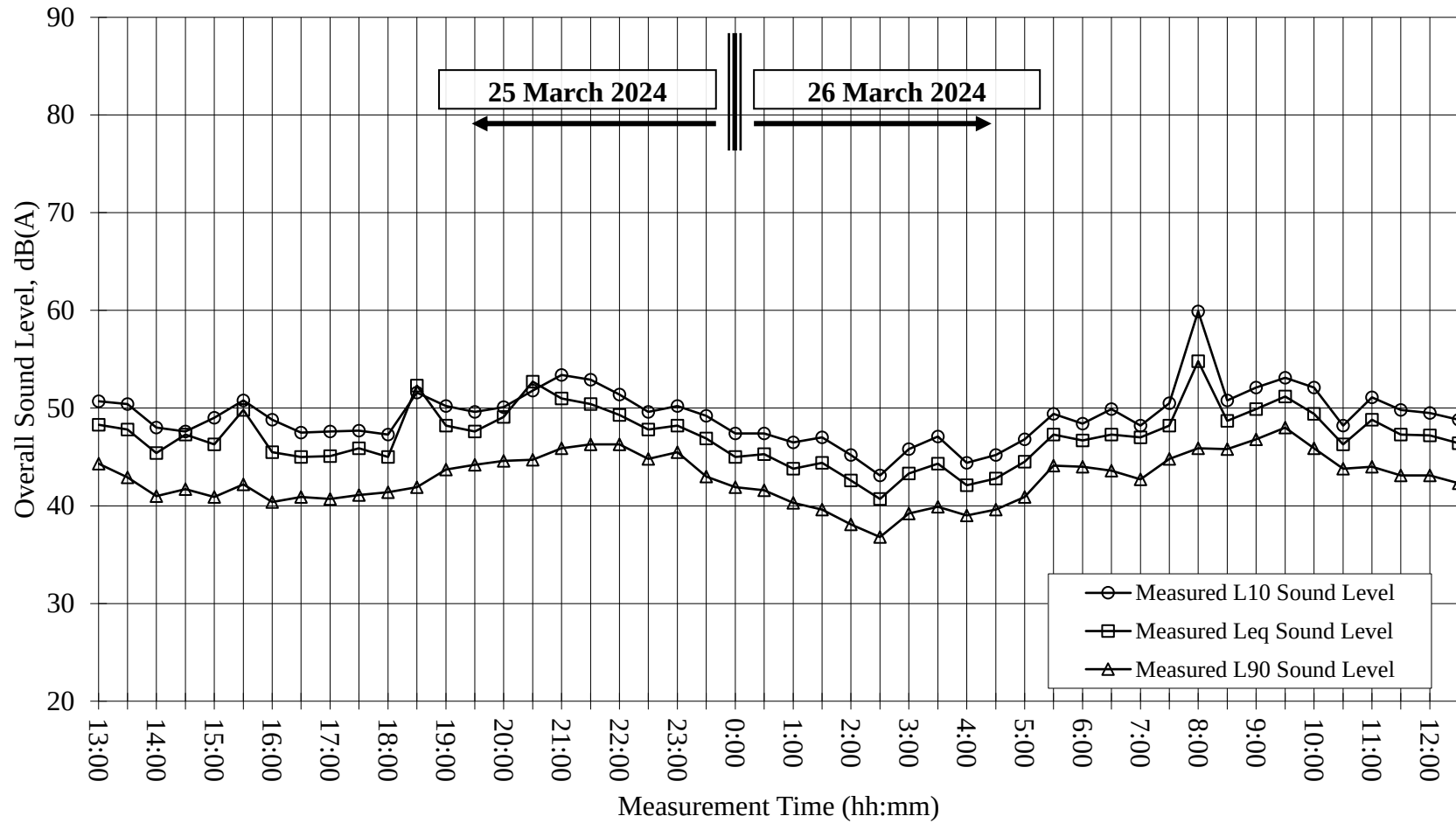


Figure 3 – Measured Ambient Sound Levels at Location B, Princeton Nurseries DC-1, South Brunswick, New Jersey.
25-26 March 2024.

