



## NOISE ANALYSIS

### I. Introduction

To determine the acoustic impact of the proposed equipment, Lodestar first determined the property line sound pressure levels from the inverters. All proposed inverters are designed to be installed on a single equipment pad at the northwest edge of the southern array. The equipment pad's closest proximity to a property line is 258' to the southwestern boundary as shown in Figure 1. In order to comply with Regulations of Connecticut State Agencies Sec. 22a-69-3.5, the inverter noise levels at the property line must comply with the residential requirements of 55 DBA.

*Figure 1: Inverter location*



## II. Analysis

The proposed Project design includes the installation of (16) Sungrow SG125HV 125 kW inverters. According to the equipment specification sheet, an individual inverter has an acoustic noise output of 53.7 dBA at 1 meter (3.28 ft) from the unit. To quantify the noise output of all inverters, a logarithmic formula is required to accurately determine amplification of sound. To quantify the reduction in sound from the point of origin to the closest property boundary (20 feet away), the formula utilizes the inverse square law for sound intensity. This formula states that the reduction in sound pressure is relative to the distance from the source. The formula is set forth below in equation 1 and applied to the instant case in which proposed site conditions are calculated:

*Equation 1.*

$$L = 10 \text{Log}_{10} \left( \sum_{i=1}^n 10^{(L_i / 10)} \right)$$

Calculation

$$L = 10 \text{Log}_{10} (10^{5.37})^{16} = 66.3\text{dBA}$$

*Equation 2. DL = L<sub>P2</sub> - L<sub>P1</sub>*

Calculation

$$DL = 10 \log \log (R_2/R_1)^2$$

$$DL = 20 \log (R_2/R_1)$$

$$DL = 20 \log(258/3.28)$$

$$DL = 87.30 \text{ dBA}$$

$$66.3 \text{ dBA} - 87.30 \text{ dBA} = -21 \text{ dBA} = 0 \text{ dBA}$$

Variables:

DL = difference in sound pressure (dBA)

L<sub>P1</sub> = Sound pressure level at location 1

L<sub>P2</sub> = Sound pressure level at location 2

R<sub>1</sub> = distance from source to location 1

R<sub>2</sub> = distance from source to location 2

## III. Conclusion

In conclusion, taking into account the closest property line at 20' from the inverter pad (point of origin of noise emanation), the noise levels emitted from the inverters will be 0 dBA at the property line. Therefore, the proposed Project and its components comply with the applicable regulations.