



December 21, 2023

Prepared For: TPE Development, LLC

Prepared By: Tad Hardy, P.E.
Kimley-Horn

Subject: *Illinois Community Solar - Noise Assessment*

Executive Summary

The purpose of this technical memorandum is to evaluate potential noise levels associated with the operational equipment for a 5MW Community Solar site in Illinois (a “Project”). A Project will consist of solar panels mounted on a racking system spanning 20-40 acres and up to forty (40) string inverters on a single equipment pad within the project area.

Noise Regulations

The Illinois Pollution Control Board (IPCB) noise regulations are based on allowable octave band sound pressure levels during daytime and nighttime hours. According to Title 35 (Environmental Protection), Subtitle H (Noise), Chapter I (Pollution Control Board), Part 901 (Sound Emission Standards and Limitations for Property Line-Noise Sources), a facility operating in an agricultural field (Class C Land) cannot cause an exceedance of sound levels at any point within a residential land use (Class A Land) during daytime hours as shown in **Table 1**.

Table 1: Maximum Allowable Sound Emitted to Class A Land During Daytime Hours

Octave Band Center Frequency (Hertz)	Allowable Octave Band Sound Pressure Levels (dB) of Sound Emitted to any Receiving Class A Land from		
	Class C Land	Class B Land	Class A Land
31.5	75	72	72
63	74	71	71
125	69	65	65
250	64	57	57
500	58	51	51
1000	52	45	45
2000	47	39	39
4000	43	34	34
8000	40	32	32

Since the solar array does not generate power at night, the equipment will not operate at night and will comply with the IPCB nighttime hour limits.

Noise Assessment

Noise levels from anticipated operational equipment likely to be installed at a proposed Project were evaluated to assist with determining a conservative distance that the equipment should be located from the edge of the project boundary.

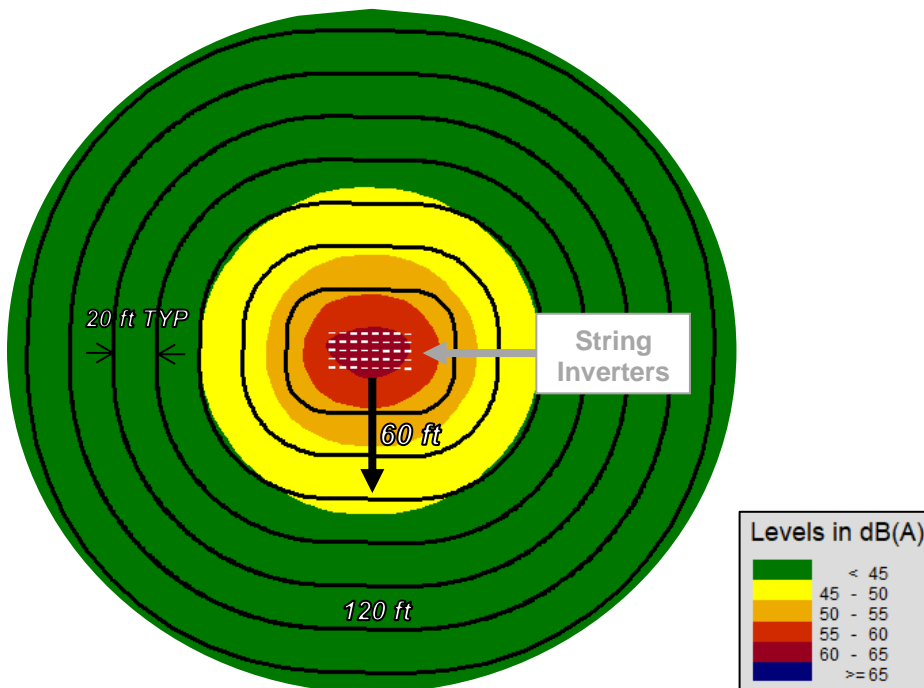
String Inverters

String inverters generate steady, unvarying noise that can create issues when located near noise-sensitive uses. It was assumed that up to forty (40) string inverters would be located on an equipment pad within a proposed solar site. Based on noise emission levels for string inverter equipment, a reference sound level of 65 dB(A) at 1 meter (i.e., 3 feet) for each inverter was used, which is typical for these types of inverters. **Table 2** shows the octave band emission levels for a typical string inverter used for reference. The sound from the simultaneous operation of the string inverters was calculated using SoundPLAN. The anticipated noise level contours from the operation of inverter equipment are shown in **Figure 1**.

Table 2: Sound Emissions for String Inverter

Octave Band Center Frequency	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2kHz	4 kHz	8kHz
Frequency Sound Level	58	57	59	59	66	57	56	56	51

Figure 1: Anticipated Noise Level Contours for String Inverter Operations



Recommendations and Conclusions

Based on the analysis of this memo, if the equipment pad is located greater than 40 feet from the project boundary, operational noise levels are anticipated to be in compliance with the IPCB noise regulations. See **Table 3** below for the SoundPLAN-predicted octave band noise levels at a distance of approximately 40 feet from the string inverter equipment pad.

Table 3: Predicted Octave Band Sound Emissions for String Inverter Operations

Octave Band Center Frequency	31 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2kHz	4 kHz	8kHz
Maximum Octave Band SPLs from Inverters	46.8	45.8	44.6	42.5	49.2	42.0	41.7	41.5	35.8