



EXHIBIT 07 – NOISE IMPACT STUDY

Tanner Road Solar Project

Kane County, Illinois

1.0 Executive Summary

This Noise Impact Analysis evaluates potential operational sound levels associated with the proposed Tanner Road Solar Project in Kane County, Illinois. The purpose of this analysis is to demonstrate compliance with applicable Kane County and Illinois Pollution Control Board (IPCB) noise regulations for commercial solar energy facilities. Kane County requires commercial solar energy facilities to comply with IPCB regulations, including octave-band limits and discrete tone requirements.

The proposed project will include solar photovoltaic arrays, inverter equipment, transformers, and associated electrical infrastructure. The principal operational noise sources will be from ten (10) Chint Power Systems (“CPS”) 350kVA inverters distributed near the solar arrays and one (1) Virginia Transformer Corporation (“VTC”) 3500 kVA transformer located on the project equipment pad. This equipment has the following environmental audible noise ratings:

VTC 800V:12.47kV 3500kVA transformer: ≤ 52 dBA at 1m and 25°C

CPS SCH350KTL-DO/US-800 inverter: ≤ 82 dBA at 1m and 77°F (25°C)

Based on conservative source assumptions and standard outdoor sound attenuation principles, the Tanner Road Solar Project is expected to operate in compliance with applicable IPCB noise limits at nearby nonparticipating properties and structures. The distances from this equipment to the nearest nonparticipating property line or structures are as follows:

- **542 feet** from the transformer to the nearest nonparticipating Class A property
- **587 feet** from an inverter to the nearest nonparticipating Class A property

Consistent with Kane County precedent and industry-standard noise analyses, this evaluation applies conservative assumptions including comparison to applicable IPCB daytime limits and consideration of all noise-sensitive receptors within one-quarter mile of the project boundary. Based on these conservative criteria, the Project is expected to comply with applicable noise regulations.

2.0 Project Description

The Tanner Road Solar Project is a proposed ground-mounted photovoltaic solar facility to be located on agricultural land in Kane County, Illinois.

The project is expected to include:

- Solar photovoltaic arrays
- Inverters
- Transformers
- Electrical collection facilities
- One or more equipment pads



Solar panels themselves do not generate meaningful noise during operation. The primary project sound sources are expected to be the inverter and transformer equipment. Similar Kane County solar noise studies identify inverters and transformers as the principal sound-producing equipment for solar facilities.

3.0 Regulatory Setting

Noise from commercial solar facilities in Kane County is governed by Kane County Code §25-5-4-9, which requires compliance with Illinois Pollution Control Board regulations contained in Title 35, Subtitle H, Chapter I, Part 901 of the Illinois Administrative Code.

For purposes of a conservative analysis:

- The project site is treated as **Class C land**
- Nearby residences and other noise-sensitive land uses (Class A land under the Illinois Pollution Control Board regulations) are treated as **Class A receptors** for purposes of this analysis.

Under the IPCB regulations, the applicable Class C to Class A octave-band sound limits are:

Octave Band Center Frequency	Daytime Limit (dB)	Nighttime Limit (dB)
31.5 Hz	75	69
63 Hz	74	67
125 Hz	69	62
250 Hz	64	54
500 Hz	58	47
1000 Hz	52	41
2000 Hz	47	36
4000 Hz	43	32
8000 Hz	40	32

The IPCB regulations also prohibit prominent discrete tones, unless the one-third octave band sound level is at least 10 dB below the corresponding allowable octave-band limit.

4.0 Noise Sources and Assumptions

Transformer: There is one acoustic tier of a VTC 3500kVA (ONAN) transformer:

1. Magnetostriction (dominant energy)

- Primary Octave: 125 Hz, 250 Hz and 500 Hz.



- Cause: The fundamental vibration frequency of the transformer. In a 60 Hz grid system, magnetostriction causes the core to contract and expand twice per cycle, generating a fundamental acoustic tone at 120 Hz. The prominent second harmonic is 250 Hz. The 500 Hz octave band contains the higher-order harmonics including approximately 360 Hz and 480 Hz. While these higher frequencies carry less energy, they create the sharper, metallic "buzz" component of the sound.
- Mitigation: VTC utilizes specialized damping pads, stepped core geometries, and extra-secure coil clamping that can reduce sound levels up to 12 dB compared to conventional transformer designs.
- Sound: The 120 Hz transformer hum carries the most significant portion of the total 52 dBA sound profile.

For purposes of a conservative screening analysis, the transformer's entire published sound level of 52 dBA at 1 meter was assumed to occur within the 500 Hz octave band, which corresponds to the most restrictive applicable IPCB daytime limit among the transformer's dominant octave bands. Manufacturer octave-band sound data were not available for the equipment evaluated. Accordingly, the published overall A-weighted sound level was conservatively assigned to a single octave band for compliance screening purposes. This approach is expected to overestimate actual octave-band sound levels and therefore provides a conservative assessment of compliance.

The transformer manufacturer specifies an overall sound level not exceeding 52 dBA at 1 meter. This sound level is substantially lower than the published inverter sound level and, given the transformer's separation distance from nearby Class A properties, the transformer is not expected to be the dominant source of operational noise at any evaluated receptor.

The transformer sound contours were modeled conservatively without credit for shielding from the nearby 80-foot by 120-foot metal pole building. The building is located approximately 54 feet from the transformer and may provide localized attenuation in the acoustic shadow zone; however, no attenuation credit was applied in the contour analysis.

The nearest Class A properties are located beyond the modeled transformer sound contours. Predicted transformer sound levels at these receptors are expected to be below typical ambient environmental sound levels and would not be expected to result in a significant noise impact.



Figure 1
Daytime Noise Contour Map of the 3,500 kVA Transformer

Tanner Road Solar Project
Kane County, Illinois



Inverter: There are three acoustic tiers of a CPS 350kVA Inverter:

1. Cooling fan (dominant energy)

- Primary octave bands: 1000 Hz (covers 707–1414 Hz) and 2000 Hz (covers 1414–2828 Hz).
- Cause: High-speed, variable-speed intelligent cooling fans to sustain full power output at high ambient temperatures.
- Sound: This creates a broadband, rushing-air noise that carries the most significant portion of the total 82 dBA sound profile.

2. Internal reactor hum (low end)

- Primary octave bands: 250 Hz and 500 Hz.
- Cause: Internal inductive components (AC/DC filtering reactors) vibrate due to magnetic forces, much like a classic transformer.
- Sound: Rather than the deep 120 Hz drone of a substation transformer, this registers as a mid-range harmonic purr or drone.

3. IGBT Switching Frequency (high-pitch ring)



- Primary octave bands: 8000 Hz and 16000 Hz.
- Cause: Insulated-gate bipolar transistors (IGBTs) invert DC to AC power by rapidly switching on and off. This switching frequency typically operates between 8 kHz and 16 kHz.
- Sound: This contains much less total physical energy than the fan noise.

The dominant energy of the A-weighted sound level of 82 dBA at 1 meter occurs in the primary octave bands of 1000 Hz and 2000 Hz when the inverter is at maximum performance. CPS does not provide octave-band acoustic model information for this inverter. Therefore, a conservative approach was taken by assuming the total 82 dBA sound profile occurs in the 2000 Hz octave band and the applicable daytime limits were applied when engineering the placement of each inverter.

5.0 Noise Propagation Methodology

Sound propagation estimates were calculated using standard acoustical engineering methods based on inverse-square-law attenuation for point sound sources and logarithmic summation of independent sound sources, consistent with ISO 9613-2 and generally accepted acoustical engineering practice. The following equations were used:

$$L_n = L_s - 20 \times \log_{10} \left(\frac{dist}{3.28} \right), \text{ (1 meter is approximately 3.28 feet)}$$

$$L_{total} = 10 \times \log_{10} (10^{(L_1/10)} + 10^{(L_2/10)} + \dots + 10^{(L_{10}/10)})$$

L_n - sound level calculated at a given receptor from a single source.

L_s - sound level as measured at 1 meter from a single source.

$dist$ - distance in feet from a single source to a given receptor.

L_1 thru L_{10} - the sound level from each of the ten inverters as calculated from a given receptor.

L_{total} - logarithmic sum of the sound levels of all ten inverters heard from a given receptor.

From these equations, a sound contour map of the site was created with sound contour rings in 1 dBA increments from each of the ten (10) inverter sources at 82 dBA to the 47 dBA screening contour corresponding to the applicable IPCB daytime limit at the 2000 Hz octave-band center frequency. The 47 dBA contour ring is shown in red on the noise contour map. Additional sound contour rings in 2 dBA increments from 48 dBA to 40 dBA were developed for context. Inverters were specifically located such that the modeled 47 dBA screening contour does not intersect any nonparticipating Class A property lines. Nighttime limits were not mapped because the solar modules are not expected to generate power during nighttime hours and the inverters are therefore expected to be largely silent.

Sound contour mapping was developed using the project coordinate system based on ESRI:102671 - NAD 1983 StatePlane Illinois East FIPS 1201 (US Survey Feet). Equipment locations were derived directly from the project site plan.



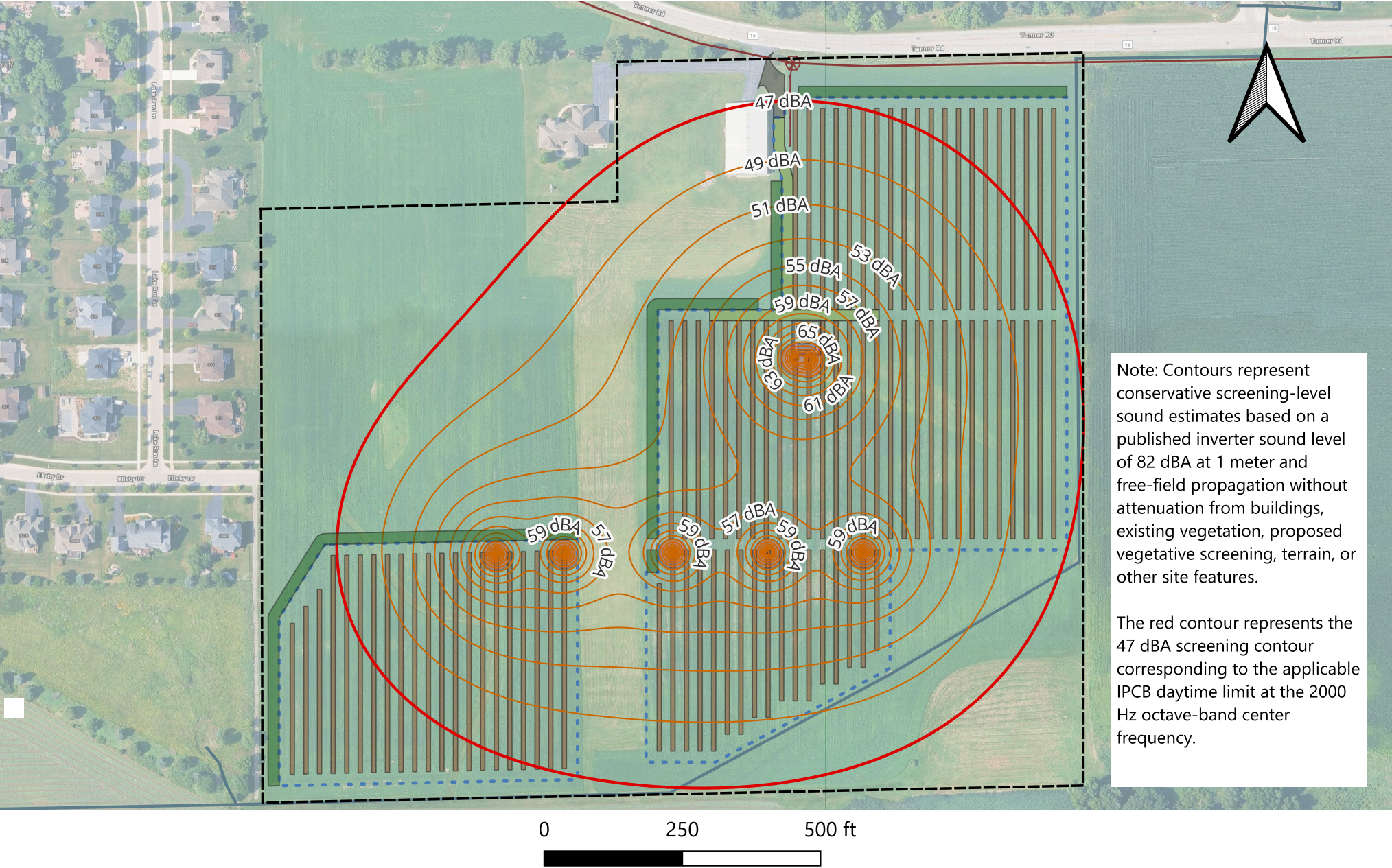
These values are conservative screening-level estimates and indicate substantial attenuation before sound reaches the nearest nonparticipating property line or structure. This approach is consistent with accepted acoustic screening methodologies and provides a conservative estimate of expected operational sound levels.

The project utilizes ten CPS SCH350KTL-DO/US-800 inverters that are distributed throughout the solar facility rather than concentrated at a single location. Five inverters are located within the middle array area and five are distributed among the southern array fields. This configuration increases separation distances from nearby residences and reduces the cumulative sound levels that would occur if all inverter equipment were concentrated in one location.

Combined inverter sound contours were developed using the inverter locations shown in Figure 2 and the manufacturer's published sound level of 82 dBA at 1 meter. Conservative free-field propagation was assumed without attenuation from buildings, vegetation, terrain, or other site features.

Figure 2
Daytime Noise Contour Map - Ten 350kW Inverters

Tanner Road Solar Project
Kane County, Illinois



Note: Contours represent conservative screening-level sound estimates based on a published inverter sound level of 82 dBA at 1 meter and free-field propagation without attenuation from buildings, existing vegetation, proposed vegetative screening, terrain, or other site features.

The red contour represents the 47 dBA screening contour corresponding to the applicable IPCB daytime limit at the 2000 Hz octave-band center frequency.



5.1 Conservatism of Analysis

The sound contour map reflects the cumulative logarithmic contribution of all ten inverters operating simultaneously at their maximum published sound level. This analysis incorporates several conservative assumptions, including:

- Use of upper-range inverter sound levels
- Free-field sound propagation without shielding effects
- Evaluation against IPCB daytime limits
- Consideration of receptors within one-quarter mile

These assumptions result in predicted sound levels that are likely higher than actual operational conditions.

6.0 Project-Specific Receptor Review

Consistent with other Kane County solar noise assessments, all noise-sensitive receptors within one-quarter mile of the project boundary were considered in this evaluation.

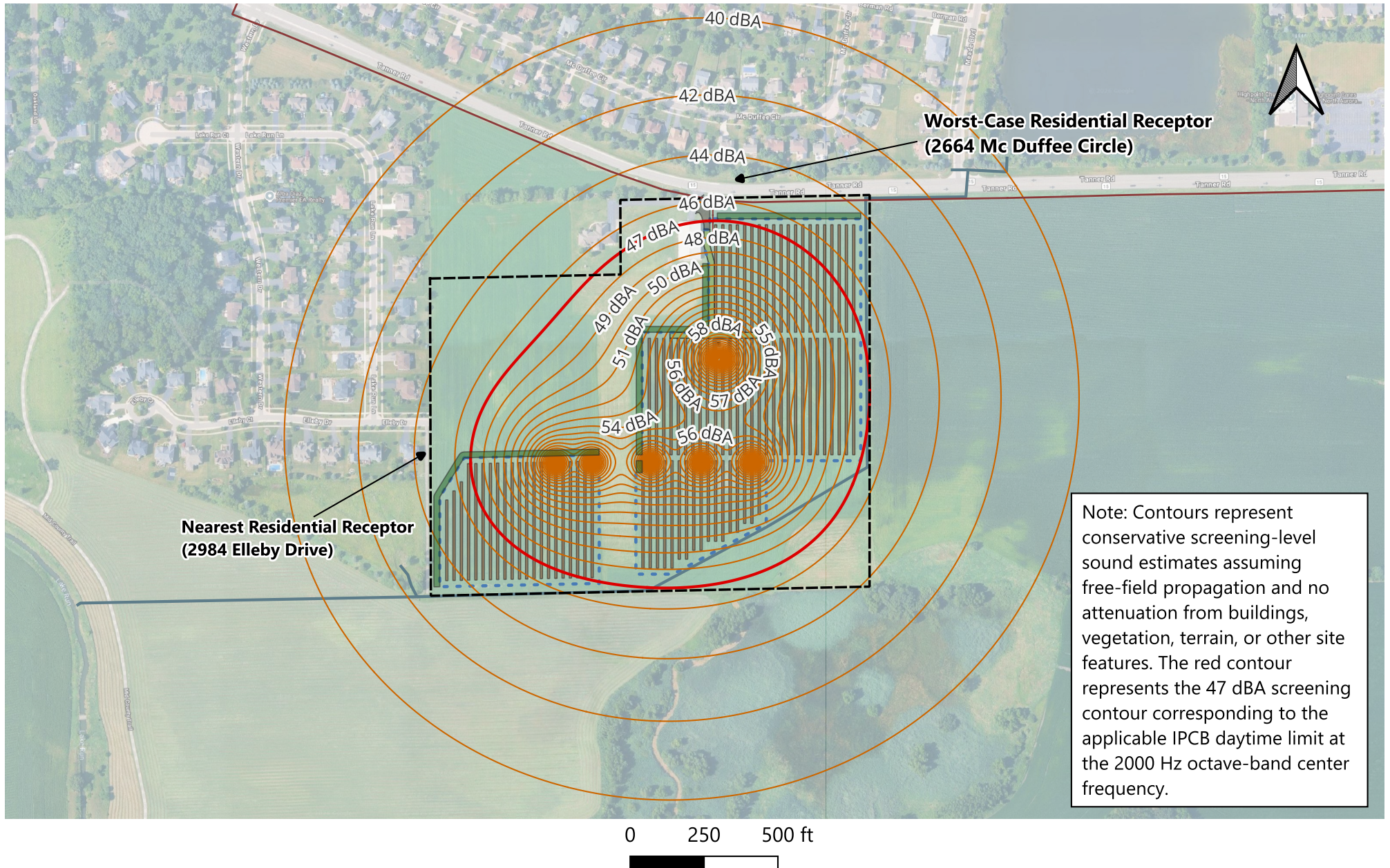
For the Tanner Road Solar Project:

- Distance from an inverter to closest **nonparticipating property line: 440 feet**
- Highest cumulative sound level at a nonparticipating Class A property line occurs at a receptor located approximately **606 feet** from the cluster of five distributed inverters.

Using the conservative propagation assumptions above, the greatest expected operational sound level at a Class A nonparticipating property line is approximately **44.9 dBA**, and occurs at the southern property line of 2664 Mc Duffee Circle, North Aurora, IL which is approximately 606 feet from the cluster of five distributed inverters. The closest Class A nonparticipating property line to an inverter is the west property line of 2984 Elleby Drive, North Aurora, IL and is expected to have a maximum operational sound level of **44.5 dBA**.

This estimated maximum level is below the IPCB Class C to Class A octave-band daytime limits used in Kane County solar noise assessments. Receptor locations for screening purposes are based on publicly available aerial imagery and parcel data, consistent with typical early-stage solar noise assessments in Kane County.

Figure 3
Project Receptor Evaluation and Combined Inverter Noise Contours
Tanner Road Solar Project
Kane County, Illinois





7.0 Compliance Assessment

Noise levels were compared to the IPCB daytime limits which govern compliance. Based on conservative source assumptions, standard sound attenuation principles, and comparison to IPCB daytime limits, operational noise from the Tanner Road Solar Project is expected to comply with Kane County and IPCB requirements.

This conclusion is supported by the following:

- The project's principal sound-producing equipment is strategically distributed throughout the site.
- Sound decreases materially with distance.
- The nearest nonparticipating residential property line is approximately 444 feet from a distributed inverter.
- Vegetative screening, topographical features, stormwater BMPs, and the existing earthen noise berm along Tanner Road are expected to provide additional sound attenuation but were intentionally not factored into this conservative analysis.
- Screening-level sound estimates at those locations remain below applicable IPCB limits.

Similar Kane County solar assessments have utilized comparable methodologies and have demonstrated compliance where modeled project sound levels remained below the applicable octave-band limits and no prominent discrete tones were identified.

If required by Kane County, a more detailed noise model consistent with ISO 9613-2 methodology (as implemented in industry-standard software such as CadnaA or SoundPLAN) can be provided.

This analysis is intended as a conservative screening-level evaluation of operational noise and demonstrates a high likelihood of compliance with applicable standards based on established Kane County solar project precedent.

8.0 Conclusions

Based on this screening-level noise impact analysis, the Tanner Road Solar Project is expected to operate in compliance with applicable Kane County and IPCB noise requirements.

The estimated operational sound level from all ten distributed inverters is approximately:

- **44.5 dBA at the nearest nonparticipating Class A residential property line (440 feet)**
- **44.9 dBA at the greatest sound level of a nonparticipating Class A residential property line (606 feet)**

Although the nearest nonparticipating property line is approximately 440 feet from an inverter, the highest modeled sound level occurs at a different receptor location approximately 606 feet



from the cluster of five distributed inverters. This result reflects the cumulative logarithmic contribution of multiple sound sources rather than proximity to any single inverter.

The maximum predicted inverter sound level at this receptor is 44.9 dBA, which remains below the applicable IPCB daytime octave-band limit used for this analysis. Vegetative screening, stormwater BMPs, and topographical features including an earthen berm noise barrier along Tanner Road, all of which were not factored into these calculations, are expected to further attenuate inverter and transformer sound levels.

Because the analysis assumes free-field sound propagation without attenuation from buildings, vegetation, terrain, or the existing earthen berm, actual operational sound levels are expected to be lower than those predicted in this screening-level analysis.

Accordingly, operational noise from the project is not expected to create a significant adverse impact on nearby nonparticipating properties and is expected to remain in compliance with applicable Illinois Pollution Control Board noise regulations, as required by Kane County Code §25-5-4-9.