

Three Corners Solar Project

MDEP Site Location of Development Act Permit Application

SECTION 5: NOISE

5.0 NOISE

5.1 NOISE STANDARDS

The anticipated sound levels associated with the Project were evaluated in accordance with the No Adverse Environmental Effect Standards of the Site Law 06-096 CMR 375.10 (Control of Noise) and the Performance Standards (Section 421) of the Benton Land Use Code. Sound level limits for new development in Maine are regulated by the MDEP under 06-096 CMR 375.10, with sound level limits provided for both daytime and nighttime hours. The specific sound level limits are based on zoning, proximity of protected locations, and existing sound levels in the environment.

As described in 06-096 CMR 375.10(C)(1)(v), the most restrictive limits of sound during operation of the development for protected locations are 55 A-weighted decibels (dBA) during daytime hours (7 am to 7 pm) and 45 dBA during nighttime hours (7 pm to 7 am). These limits apply “when a proposed development is to be located in an area where the daytime pre-development ambient hourly sound level at a protected location is equal to or less than 45 dBA and/or the nighttime pre-development ambient hourly sound level at a protected locations is equal to or less than 35 dBA.” If the abutting property is considered an unprotected location, the sound level limit is 75 dBA at the property line.

When a development is located in a municipality that has a duly enacted quantifiable noise standard that contains limits that are not higher than the applicable MDEP limits by more than 5 dBA and that address the types of sounds regulated by the MDEP, then the local standard is applied rather than the MDEP standard. No noise standards are described within the Town of Clinton land use ordinances, and Unity Twp, like all unorganized townships in Maine, has no local land use ordinances. Noise standards for the Town of Benton follow those described in 06-096 CMR 375.10; therefore, the noise provisions of the MDEP were evaluated in the sound level assessment for the Project.

Construction during daytime or daylight hours, whichever is longer, is exempt from MDEP sound limits by Maine statute (ref. 38 MRSA 484). Construction is anticipated to only occur in daytime hours and, therefore, is exempt from MDEP sound limits for nighttime hours.

5.2 SOUND ASSESSMENT

A sound assessment of potential noise impacts from operation of the proposed Project was conducted by Reuter Associates, LLC (Reuter; Exhibit 5-1). The anticipated sound level of the Project is based on operation of the following components: 39 paired HEM FS3430M central inverters/transformers (up to 3,430 kilo-volt-ampere [kVA]) one 34.5/115 kV step-up transformer at the collection substation off Bessey Lane; Nextracker motors; and one Generac QT100 backup generator at the proposed O&M building and collection substation. Based on the manufacturer provided sound level data, it is unknown whether emissions from any of these devices falls under the MDEP definition of tonal noise. The assessment predicted sound levels for the Project at full rated sound output and compared them to the MDEP sound level limits. Although these devices only generate noise when the sun is up and sound levels are proportional to load, to be conservative the nighttime property line limit of 45 dBA was used for this analysis.

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The sound level assessment conservatively demonstrates that full operation of the Project will meet all applicable MDEP sound level limits. Compliance for the 34.5/115 kV step-up transformer was achieved through a 15-ft-high sound barrier wall construction on the west, south, and east sides of the transformer to reduce sound levels. The maximum sound level expected at the combined Project property lines is less than 55 dBA during peak load (i.e., daytime) and also less than the 45 dBA nighttime standard. Additional sound level data and information is available in the Noise Impact Assessment (Exhibit 5-1).

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Exhibit 5-1

Noise Impact Assessment

January 24, 2022

Eben Baker
Stantec
30 Park Drive
Topsham ME 04086-1737

SUBJECT: Three Corners Solar – Noise Study

Dear Eben,

At your request, I have conducted a study of noise impacts from Longroad Energy's proposed Three Corners Solar project. This project will include components in the towns of Benton, Clinton, and Unity Township, Maine.

Sound Level Limits

Maine DEP

Sound level limits for new developments in the State of Maine are regulated by the Maine Department of Environmental Protection (MDEP) Rules, Chapter 375.10. Sound level limits are provided for both daytime and nighttime. The specific limits are based on zoning, proximity of protected locations, and existing sound levels in the environment.

The full definition of "protected location" is provided in 375.10(G)(16). The most common protected location is a parcel of land containing a residence.

Per 375.10(C)(1)(v), the most restrictive limits at protected locations are:

55 dBA between 7:00 a.m. and 7:00 p.m.
(the "daytime hourly limit"), and
45 dBA between 7:00 p.m. and 7:00 a.m.
(the "nighttime hourly limit").

These limits apply "When a proposed development is to be located in an area where the daytime pre-development ambient hourly sound level at a protected location is equal to or less than 45 dBA and/or the nighttime pre-development ambient hourly sound level at a protected location is equal to or less than 35 dBA."

It is assumed that ambient hourly sound levels in this area are below these daytime and nighttime thresholds. Therefore, the most restrictive MDEP limits at protected locations would apply.

If the abutting property is not a protected location, the sound level limit is 75 dBA at the property line.

Several abutters to this site contain residences and are thus protected locations.

Local Ordinances

This project spans the towns of Benton, Clinton, and Unity Township. Of these, only Benton has local noise criteria, contained in the Land Use Ordinance, Part E. The limits for districts other than industrial are 55 dBA (daytime) and 45 dBA (nighttime) at any property line.

These sound level limits are identical to the Maine DEP limits. However, Benton defines daytime as 7:00 a.m. to 8 p.m. rather than the MDEP definition of 7:00 a.m. to 7 p.m., and does not distinguish between protected and non-protected locations.

The Project is partially located in Unity Township, an unorganized territory under the Land Use Planning Commissions (LUPC) jurisdiction. While the LUPC has noise standards detailed in Chapter 10.25,F, the MDEP will consider the Projects compliance with MDEP noise standards during the Site Location of Development Act permit review. This is based on LUPC guidance (Guidance Document on site Law Certification, Land Use Standards), adopted on December 8, 2021.

Proposed Equipment

This installation will include the following equipment that will generate noise:

1. HEM FS3430M Inverter with co-located transformer (quantity 39)
2. 34.5/115 kV Transformer (quantity 1)
3. 100 kW Standby Generator (quantity 1)

Modeling

Modeling was conducted with SoundPLAN, an industry-standard software application for prediction of sound propagation outdoors. Calculations were based on ISO 9613-2 *Attenuation of Sound During Propagation Outdoors*.

A model of the site was constructed in SoundPLAN, including topography, ground condition, and atmospheric effects. The model is conservative, as it does not include any foliage or the proposed solar panels, both of which will provide attenuation.

A-weighted and/or octave-band sound level data have been assessed to determine compliance with the A-weighted limits. One-third-octave data are not available for any of the noise sources. Therefore, it cannot be determined whether any will meet the MDEP definition of tonal sound.

Inverters

The manufacturer of the inverters has indicated that the maximum sound pressure level is 79 dBA at 1 meter. The sound pressure level provided was used to estimate sound power level for modeling.

Noise from the inverters is dependent on solar load. Sound levels are expected to be negligible at night. Therefore, the daytime limit of 55 dBA at the property line applies. The attached Figure 1 presents the estimated sound levels from the 39 inverters. The 55-dBA contour, shown in red, for each inverter is within the boundaries of the combined project parcels. No further noise control is required.

Transformer

Field measurement data from several representative transformers were reviewed to estimate the sound emissions from the 34.5/110 kV substation transformer. A NEMA sound pressure level of 80 dBA was used. This is the worst-case level and believed to be conservative. Additional field measurements are planned to refine the modeling.

Sound power level was calculated in accordance with the method provided by IEEE in Volume 1, 2nd Edition, of the Electric Power Plant Environmental Noise Guide (1984). A representative octave-band spectrum was applied.

The transformer will be connected to the power grid and has the potential to make noise at night, though sound levels are expected to be greatest during daytime hours. The limit at protected locations is therefore 45 dBA. The property line directly south of the transformer is a protected location.

Based on the assumptions above, a sound barrier on three sides of the transformer will provide the required insertion loss to meet the 45-dBA limit at the property line. The barrier modeled is 15 ft tall.

Figure 2, attached, presents the estimated sound levels from the transformer with the barrier in place. The 45-dBA is within the boundaries of the combined project parcels.

Generator

The standby generator will be operated approximately once each month for maintenance and during grid power outages to maintain electrical power to computer and control equipment at the site. The required capacity is 100 kW.

Though a specific model has not been selected, generators of this capacity are commonly available with sound-attenuating enclosures from the manufacturer. A Generac SD100 in Level 2 sound-attenuating enclosure was used for modeling. Octave-band data were supplied by Generac.

The generator might operate at night during a power outage, so the 45-dBA limit applies.

The attached Figure 3 presents the estimated sound levels from the generator. The 45-dBA is within the boundaries of the combined project parcels.

Summary

The proposed equipment will comply with the Benton Land Use Ordinance, Part E *Noise* and with the most restrictive of the Maine DEP noise level limits. Only the substation transformer is expected to require additional noise control.

Sincerely,



Eric L. Reuter, FASA, INCE Bd. Cert.
Principal

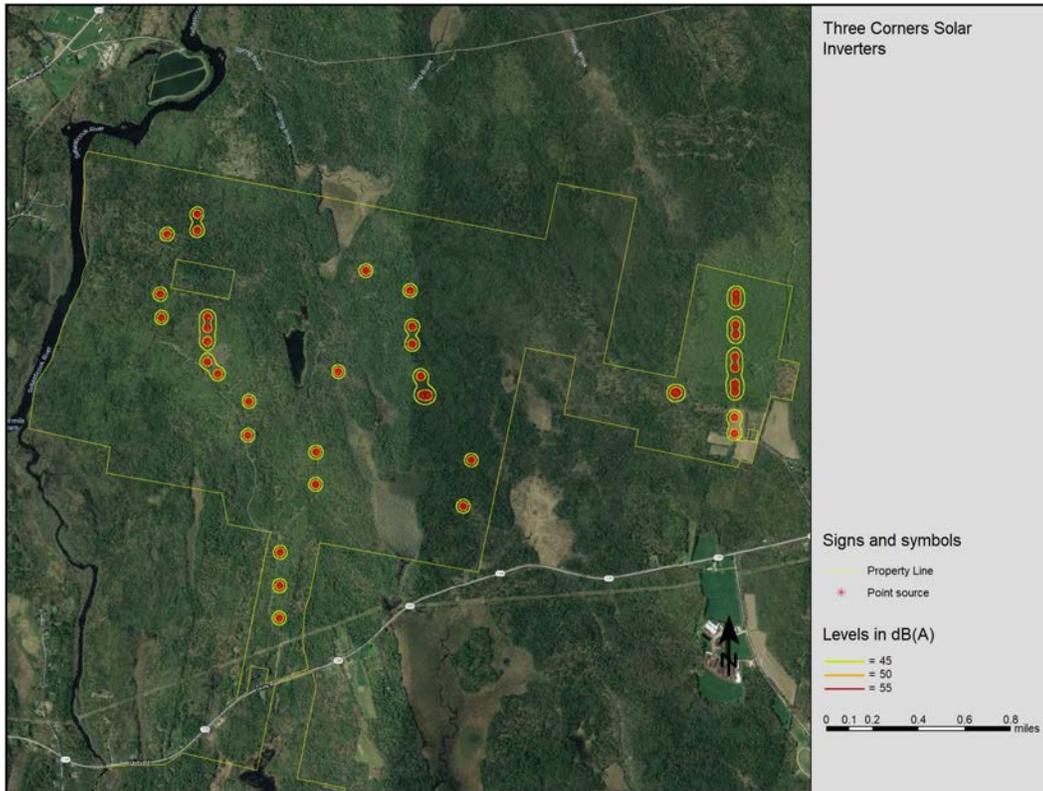


Figure 1 – Inverter Sound Levels

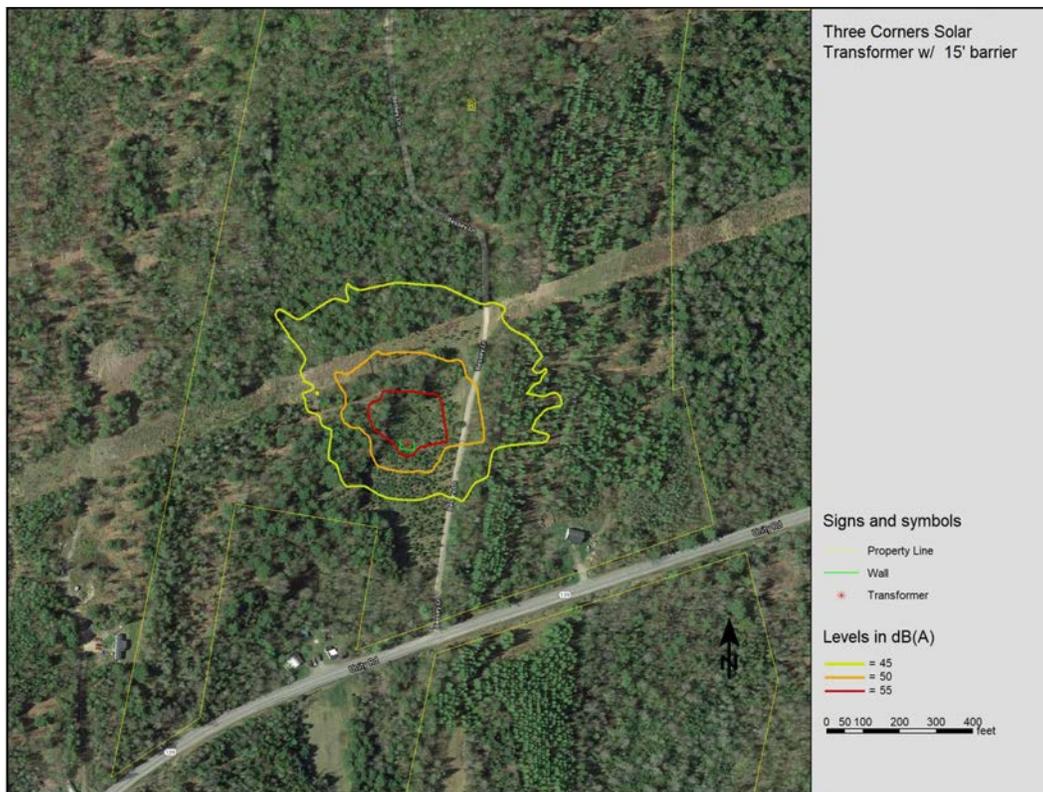


Figure 2 – Transformer Sound Levels



Figure 3 – Generator Sound Levels