Wood County Solar Project
Pre-Construction Sound Report

Prepared for:
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Abbreviations

AC	Alternating Current
dB	Decibel
dB(A) or dBA	Decibel (A-weighted)
dB(C) or dbC	Decibel (C-weighted)
DC	Direct Current
GA	Ground Attenuation
Hz	Hertz
L_{eq}	Equivalent continuous sound level
MW	Megawatt
OHSA	Occupational Safety and Health Administration
NSA	Noise sensitive area
Project	Wood County Solar, LLC Solar Project
PSC	Public Service Commission of Wisconsin
PV	Photovoltaic
SLM	Sound Level Meter
Wood County	Wood County Solar, LLC

1.0 Executive Summary

Wood County Solar Project, LLC (WCSP) is seeking all approvals and authorizations required to construct, install operate and maintain a solar energy generating facility known as the Wood County Solar Project ("Project") to be in the Town of Saratoga, Wood County, Wisconsin. Proposed Project developments, including ancillary facilities, will consist of solar panels and tracking systems, access roads, a substation, laydown yard, transformers, junction boxes and the collection system. Wood County retained the services of Stantec Consulting Services Inc. (Stantec) to conduct a pre-construction ambient sound survey and assessment for the Project.

On January 27 and 28, 2020, Stantec completed a pre-construction ambient sound survey of the substation and solar array areas for the Project to quantify the existing acoustical environment. Work was completed in accordance with the Public Service Commission of Wisconsin (PSCW) measurement protocols[1].

Sound analyses were completed for both an inverter skid and the transformer based on information provided by the equipment manufacturers. The maximum sound impact at the nearest residence to a solar inverter was calculated to be 28 dBA and a maximum sound impact from the substation transformer was calculated to be 22 dBA. Computer modelling of the maximum overall project impact on a residence was calculated to be 40 dBA, assuming a worst-case condition of no ground attenuation. Sound levels from the proposed Project do not exceed 50 dBA during daytime hours and 45 dBA during nighttime hours, as defined by the PSC Standard. The impacts of the inverters and the substation on the nearby residences will not exceed these levels.

A post-construction sound analysis and report will be completed following construction of the Project and commencement of operations. The purpose of the analysis will be to verify the findings and conclusions of this report.

2.0 Site Description

The proposed Project is in the Town of Saratoga, Wood County, Wisconsin. The project substation will be in a managed forest land (MFL) parcel identified as Wood County Land Records Parcel 1800527, located approximately 6,700 feet (1.25 mile) west of State Highway 13 and 12,800 feet (2.4 miles) south of US Highway 73. No residences are located within 0.5 mile of the project substation in any direction. The nearest residence to the project substation will be approximately 4,060 feet (0.78 mile) south, along Hillcrest Avenue. The Project inverters will be dispersed throughout the Project site. The nearest residences to inverters will be around 830 feet to the north along Rangeline Road. Aerial imagery, land ownership records and field surveys were utilized to identify noise sensitive areas (NSA), including residences, schools, churches, hospitals and other sensitive areas located near the Project.

[1] PSC, *Measurement Protocol for Sound and Vibration Assessment of Proposed and Existing Electric Power Plants*, November 2008 (https://psc.wi.gov/SiteAssets/ConventionalNosieProtocol.pdf)

Based upon the PSCW sound assessment protocols described in Section 3.0 and the identified sensitive areas, Stantec proposed five baseline sound monitoring locations, of which all were selected for analysis. Monitoring points chosen were near the proposed solar array in areas where residences were determined to potentially be most affected by the operation, while providing observations across the entire array. Figure 1 displays the Project components and the monitoring site locations.

Project infrastructure will consist of solar panels producing direct current (DC) voltage which must be changed to alternating current (AC) voltage through a series of inverters. Approximately 68 inverters will be installed throughout the Project area. A manufacture specification sheet of an inverter which is used for the basis of the preliminary Project design is provided in Appendix B. The nearest NSA to an inverter is approximately 830 feet. Per the manufacturer's specifications, the maximum sound level from each inverter skid is 79 decibels (A-weighted) (dBA) at one meter (approximately three feet).

The Project will include a step--up transformer. The transformer is generally expected to run during the times that the solar array will be generating power (daylight hours). The substation load for a solar renewable energy project is considered to be intermediate. The sound specifications of the transformer indicate a sound level of approximately 85 dBA at one meter (approximately three feet).[2] The nearest NSA has been determined to be approximately 4,060 feet from the transformer.

3.0 Sound Level Requirement

Sound is caused by vibrations that generate waves of minute pressure fluctuations in the surrounding air. Sound levels are typically measured using a logarithmic decibel (dB) scale. Human hearing varies in sensitivity for different sound frequencies. The ear is most sensitive to sound frequencies between 800 and 8,000 Hz and is least sensitive to sound frequencies below 400 Hz or above 12,500 Hz. Consequently, several different frequency weighting schemes have been used to approximate the way the human ear responds to sound levels. The decibel (A-weighted) or dBA scale is the most widely used for regulatory requirements, such as the Occupational Safety and Health Administration (OSHA) as it discriminates against low frequencies, like the response of the human ear. The decibel (C-weighted) sound level (dBC) does not discriminate against low frequencies. Unweighted sound levels are generally reported as dB or dBZ.

State and local sound regulations were reviewed. The Town of Saratoga has established an ordinance for the licensing of solar energy systems (Ordinance number 2019-9-18-19). The ordinance establishes a minimum standard for a solar facility to control off-site noise levels to the extent practicable to avoid adverse impacts on neighboring properties, particularly during construction activities. The town has a similar public nuisance ordinance (9-19-18) that restricts noises emanating from a property that substantially interfere with the surrounding landowners' use and enjoyment of their property. No regulations directly applicable to a solar facility were identified for Wood County. In the absence of existing pertinent regulations, and under the guidance of the PSCW, the rules for monitoring followed the PSCW document titled "Measurement

[2] National Electric Manufacturers Association, *NEMA TR 1-2013 Transformers, Step Voltage Regulators and Reactors*

Protocol for Sound and Vibration Assessment of Proposed and Existing Electric Power Plants" (Guidance).

To assess the sound at receptors within the array, guidance for wind energy systems (PSC 128.14) was evaluated. Under this regulation, nighttime hours are the hours beginning at 10:00 p.m. and ending at 6:00 a.m. daily and daytime hours are the hours beginning at 6:00 a.m. and ending at 10:00 p.m. daily. The sound limits apply at the outside wall of a nonparticipating residence or occupied community building. The energy system must be designed so that the sound attributable to the proposed solar energy system does not exceed 50 dBA during daytime hours and 45 dBA during nighttime hours.

Solar energy facilities operate by converting solar radiation into electricity. The Project will only produce electricity between sunrise and sunset. After sunset, the site no longer receives solar radiation and the inverters will not operate and produce sound. The substation transformer will be energized but not producing sound. Sunrise and sunset times on the longest day of the year (June 20) will be approximately 5:15 am to 8:47 pm. The majority of the operation of the solar facility, and therefore the sound production, will occur during the daytime hours as defined by PSC 128.14.

4.0 Measurement Methodology

Ambient sound measurements were made at noise monitoring areas NMA-1, NMA-2, NMA-3, NMA-4, and NMA-5 in the vicinity of residences, which are located nearest the proposed inverter and substation locations in the north, south, and west direction. The nearest residence identified east of the Project was about 3,000 feet from an inverter. Four short-term (10-minute) sound level measurements were conducted at each of the five locations with a sample taken in accordance with the PSC requirement of four specific periods.

1) Morning (6 – 8 a.m.)
2) Midday (12 noon – 2 p.m.)
3) Evening (6 – 8 p.m.)
4) Night (10 p.m. – 12 midnight)

The evening and night samples were collected on Monday, January 27, 2020 by Stantec. The morning and midday samples were collected by Stantec on Tuesday January 28, 2020.

The evening samples were collected from 6:00 p.m. to 7:30 p.m. on January 27. During the monitoring period the local temperature was approximately 30 degrees Fahrenheit. The relative humidity was 74 percent and winds were moderate with speeds from 5 to 7 miles per hour from the north to northwest. No precipitation occurred during the monitoring period. The evening was cloudy. Each of these parameters falls within the suggested ranges for ambient sound measurement.

The night samples were collected from 10:00 p.m. to 11:20 p.m. on January 27. During the monitoring period the local temperature was approximately 29 degrees Fahrenheit. The relative humidity was 78 percent and winds were moderate with speeds of 4 to 7 miles per hour from the

northwest to north-northwest. No precipitation occurred during the monitoring period. The night was cloudy. Each of these parameters falls within the suggested ranges for ambient sound measurement.

The morning samples were collected from 6:00 a.m. to 7:20 a.m. on January 28. During the monitoring period the local temperature was approximately 25 degrees Fahrenheit. The relative humidity was 78 percent and winds were moderate with speeds from 7 to 9 miles per hour from the northwest to north-northwest. No precipitation occurred during the monitoring period. The morning was cloudy. Each of these parameters falls within the suggested ranges for ambient sound measurement.

The midday samples were collected from 12:00 p.m. to 1:20 p.m. on January 28. During the monitoring period the local temperature was approximately 21 to 22 degrees Fahrenheit. The relative humidity was 80 to 81percent and winds were moderate with speeds from 6 to 8 miles per hour from the west-northwest to north. No precipitation occurred during the monitoring period. The day was cloudy. Each of these parameters falls within the suggested ranges for ambient sound measurement.

A Larson Davis SoundAdvisor 831C Sound Level Meter (SLM) was used to measure the octave band and broadband ambient sound pressure levels in the selected locations. The meter was set to A-scale (dBA), slow response with a 3-dB exchange rate for the octave band readings, with concurrent L_{eq} measurements made in both flat scale (dB or dBZ), and in C-scale (dBC). The following procedures were used during the sound measurements at the locations:

- Calibrate SLM;
- Fit SLM with windscreen and mount on a tripod with the microphone oriented toward proposed substation or solar array at a height of approximately four feet above the ground surface;
- Program the SLM to acquire at least 10 one-minute scans of ambient sound;
- Acquire sample, which is digitally recorded in the SLM's integral data logger by downloading data to a spreadsheet using Larson Davis software.

5.0 Monitoring Results and Observations

Sound level monitoring results are reported as energy-equivalent (L_{eq}) sound levels, where the L_{eq} is the level of steady sound with the same total energy as the time-varying sound energy averaged over a given period or as percentile levels (L_n), where L_n is the sound level exceeded for n% of the measurements.

Tables 5.1 and 5.2 summarize the results of the sound measurement readings near the solar array inverters at monitoring location NMA-1.

TABLE 5.1 AMBIENT SOUND PRESSURE LEVEL MEASUREMENTS SUMMARY AT NMA-1

Sound Levels	dBA				dBC			
	Morning	Midday	Evening	Night	Morning	Midday	Evening	Night
L_{eq}	52.4	51.9	34.8	44.0	57.1	62.3	41.2	50.9
L_{10}	50.2	49.4	34.8	40.1	51.0	51.4	39.8	41.7
L_{50}	31.5	31.2	27.0	24.2	36.5	37.2	34.0	31.9
L_{90}	21.4	25.8	23.5	20.3	33.0	33.9	31.0	29.4

TABLE 5.2 UNWEIGHTED OCTAVE-BAND ANALYSIS SUMMARY AT NMA-1

dBZ	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Morning	44.5	46.2	54.8	43.9	43.2	45.4	50.4	44.2	32.4	25.7
Midday	51.1	44.9	54.2	61.1	43.6	43.7	48.6	44.4	32.3	24.8
Evening	43.8	36.8	29.5	29.4	28.0	28.8	29.3	27.9	26.9	23.1
Night	41.7	43.1	49.0	39.0	37.3	38.4	41.4	35.8	27.6	21.4

The predominant sound sources at the site were distant vehicle traffic, with an occasional passing car. Vehicular traffic was primarily during the morning and midday periods. Additional sounds that were recorded included wind in the trees, a dog howling and other animal sounds, such as birds.

Tables 5.3 and 5.4 summarize the results of the sound measurement readings near the solar array inverters at monitoring location NMA-2.

TABLE 5.3 AMBIENT SOUND PRESSURE LEVEL MEASUREMENTS SUMMARY AT NMA-2

Sound Levels	dBA				dBC			
	Morning	Midday	Evening	Night	Morning	Midday	Evening	Night
L_{eq}	37.7	34.2	32.7	34.9	43.2	41.7	41.0	43.3
L_{10}	37.5	37.1	34.0	38.1	42.9	42.6	42.6	41.5
L_{50}	30.2	30.2	25.9	29.0	38.4	38.0	38.3	36.3
L_{90}	27.6	26.0	22.3	22.1	36.3	35.2	34.2	33.4

TABLE 5.4 UNWEIGHTED OCTAVE-BAND ANALYSIS SUMMARY AT NMA-2

dBZ	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Morning	45.8	37.4	36.7	30.7	29.0	28.3	27.6	31.8	32.1	28.3
Midday	43.3	38.6	36.7	30.5	26.2	26.5	25.8	27.4	28.3	25.9
Evening	39.8	39.8	34.4	31.9	29.8	26.1	25.3	26.7	24.7	21.4
Night	47.3	38.3	34.3	30.4	25.9	24.6	25.4	28.6	29.4	26.6

The predominant sound sources at the site were distant traffic, birds, and rustling of trees.

Tables 5.5 and 5.6 summarize the results of the sound measurement readings near the solar array inverters and the proposed transformer at monitoring location NMA-3.

TABLE 5.5 AMBIENT SOUND PRESSURE LEVEL MEASUREMENTS SUMMARY AT NMA-3

Sound Levels	dBA				dBC			
	Morning	Midday	Evening	Night	Morning	Midday	Evening	Night
L_{eq}	47.7	50.5	42.3	30.1	55.6	55.1	51.4	43.2
L_{10}	40.6	50.1	41.5	29.4	45.7	51.2	48.1	40.4
L_{50}	28.4	32.0	28.4	24.5	40.1	38.8	36.9	35.0
L_{90}	25.2	25.3	26.3	21.8	38.5	36.4	34.3	31.2

TABLE 5.6 UNWEIGHTED OCTAVE-BAND ANALYSIS SUMMARY AT NMA-3

dBZ	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Morning	47.0	48.9	52.1	50.5	38.2	39.2	44.3	41.7	33.0	23.5
Midday	50.3	46.6	51.5	46.4	40.0	42.2	47.0	45.0	36.0	26.9
Evening	55.4	48.5	39.8	34.0	33.2	33.9	37.4	37.7	30.6	24.3
Night	47.1	37.1	33.5	28.3	26.0	26.2	23.0	22.3	22.5	19.4

The predominant sound sources at the site were distant traffic, birds, and rustling of trees.

Tables 5.7 and 5.8 summarize the results of the sound measurement readings near the proposed substation and the eastern solar array at monitoring location NMA-4.

TABLE 5.7 AMBIENT SOUND PRESSURE LEVEL MEASUREMENTS SUMMARY AT NMA-4

Sound Levels	dBA				dBC			
	Morning	Midday	Evening	Night	Morning	Midday	Evening	Night
L_{eq}	39.1	35.2	34.4	36.9	45.2	46.6	41.0	39.1
L_{10}	41.1	34.1	36.9	32.7	45.4	43.3	40.2	36.4
L_{50}	30.2	29.2	29.8	22.1	41.2	38.9	35.5	31.3
L_{90}	27.6	27.5	25.9	19.8	39.2	37.1	33.0	29.1

TABLE 5.8 UNWEIGHTED OCTAVE-BAND ANALYSIS SUMMARY AT NMA-4

dBZ	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Morning	48.2	39.0	39.4	35.9	30.8	30.0	34.6	34.2	25.9	19.4
Midday	52.4	40.1	36.1	32.2	29.2	31.1	29.7	29.0	25.5	20.6
Evening	45.9	33.5	31.0	30.3	27.9	29.7	30.0	27.6	24.2	20.1
Night	38.1	32.3	28.1	25.7	27.2	30.1	33.6	30.3	26.1	21.2

The predominant sound sources at the site were distant traffic, birds, and rustling of trees.

Tables 5.9 and 5.10 summarize the results of the sound measurement readings near the proposed substation at monitoring location NMA-5.

TABLE 5.9 AMBIENT SOUND PRESSURE LEVEL MEASUREMENTS SUMMARY AT NMA-5

Sound Levels	dBA				dBC			
	Morning	Midday	Evening	Night	Morning	Midday	Evening	Night
L_{eq}	31.1	32.8	47.5	29.1	42.7	41.9	65.2	35.8
L_{10}	31.2	31.5	42.3	25.2	38.7	39.7	46.0	34.2
L_{50}	23.7	23.2	27.1	20.7	34.9	36.1	32.4	30.7
L_{90}	21.3	21.0	22.2	19.2	32.9	34.3	29.7	28.9

TABLE 5.10 UNWEIGHTED OCTAVE-BAND ANALYSIS SUMMARY AT NMA-5

dBZ	16 Hz	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Morning	46.4	37.6	31.5	23.7	25.5	25.9	24.3	24.3	23.6	20.7
Midday	46.0	37.2	35.1	25.0	25.8	28.5	27.2	25.6	24.0	20.7
Evening	41.2	45.6	61.4	63.1	42.7	38.2	39.6	35.8	31.2	25.1
Night	37.5	32.9	27.2	20.4	22.0	22.9	22.7	22.0	22.4	19.2

The predominant sound sources at the site were distant traffic, rustling trees, birds (midday), and dog barking (midday).

6.0 Assessment of Sound Impacts during Operation

Approximately 68 inverters will be installed within the Project area. The nearest residence to an inverter is approximately 830 feet. Per the manufacturer's specifications, the maximum sound pressure level from each inverter is less than 79 dBA at a distance of one meter (approximately three feet). For this analysis a sound power level of 87 dBA was utilized. A tonal penalty of 5 dBA was added to each octave band resulting in an overall sound pressure level of 92 dBA at three feet for each inverter, to be conservative. The inverters will only operate when the sun is shining, therefore most of the operation will occur during daytime hours.

To assess the sound at receptors within the array, guidance for wind energy systems (PSC 128.14) was adopted (Standard). Under this regulation, nighttime hours are the hours beginning at 10:00

p.m. and ending at 6:00 a.m. daily and daytime hours are the hours beginning at 6:00 a.m. and ending at 10:00 p.m. daily. The sound limits apply at the outside wall of a nonparticipating residence or occupied community building. The energy system must be designed so that the sound attributable to the proposed system does not exceed 50 dBA during daytime hours and 45 dBA during nighttime hours.

A sound analysis was completed for the invertor skids operating at full load. An analysis of the impacts from a single inverter skid is provided in Appendix B and contour maps showing the overall expected sound levels from the total solar array for 0.0 ground attenuation (GA) and 0.5 GA are provided as Figures 2 and 3. Estimated sound levels from the proposed facility in dBA and dBC at various distances from an inverter are shown in Table 6.1.

TABLE 6.1 ESTIMATED SOUND LEVEL DUE TO WOOD COUNTY SOLAR PROJECT INVERTERS

Source	Noise Source Description	Sound Pressure Level in dB per Octave-Band Frequency									L_{eq} (dBA)	L_{eq} (dBC)
		31.5	63	125	250	500	1000	2000	4000	8000		
A	Inverter Sound Power Level	76	81	89	86	83	80	78	79	72	87	93
	Inverter Sound Pressure Level w/ 5 db penalty	81	86	94	91	88	85	83	84	77	92	98
	Inverter Sound Pressure Level at 3 feet	68	73	81	78	75	72	70	71	64	79	85
	Sound Level Contribution Solar Panel Inverters											
	@ 50 feet	43	48	57	54	51	47	45	47	38	54	60
	@ 100 feet	37	42	51	48	45	41	39	40	31	48	54
	@ 200 feet	31	36	45	42	39	35	33	33	22	42	48
	@ 500 feet	23	28	37	34	31	27	24	23	5	33	40
	@Nearest NSA - 830 feet	19	24	32	29	26	22	19	16	0	28	35
	@ 1000 feet	17	22	31	28	24	20	16	13	0	26	34
	@ 2000 feet	11	16	25	21	17	13	8	0	0	19	27

The receptor expected to receive the most increase in sound due to the Project is located approximately 830 feet from an inverter. The maximum sound level that would be expected at the outside wall of this receptor would be approximately 28 dBA. The actual impact will be less, as a 5-dBA tonal penalty is included to create a worst-case situation. This value is less than the PSC daytime impact Standard of 50 dBA at the wall of the residence. The projected values are at or very near the background ambient sound levels detailed in the Section 5.0 and as indicated in Table 6.2 below, except during the quietest periods represented by the L_{90} values.

The data above was utilized to determine the impact of the inverter sources on the existing environment. Table 6.2 presents the expected changes to existing sound levels for L_{eq}, L_{10}, L_{50}, and L_{90}, in dBA and dBC at the closest residence, using the background monitoring data for sample point NMA-3.

TABLE 6.2 ESTIMATED MAXIMUM SOUND IMPACT CHANGES DUE TO INVERTERS[3]

Measured Sound Levels at NMA-3 (dBA)

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	48	51	42	30
L_{10}	41	50	42	29
L_{50}	28	32	28	25
L_{90}	25	25	26	22

Measured Sound Levels at NMA-3 (dBC)

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	56	55	51	43
L_{10}	46	51	48	40
L_{50}	40	39	37	35
L_{90}	39	36	34	31

Expected Sound Levels at NSA with Inverter Operating

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	48	51	42	30
L_{10}	41	50	42	29
L_{50}	31	33	31	25
L_{90}	30	30	30	22

Expected Sound Levels at NSA with Inverter Operating

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	56	55	52	43
L_{10}	46	51	48	40
L_{50}	41	40	39	35
L_{90}	40	39	38	31

Expected Change in Sound Levels in dBA

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	3	1	3	0
L_{90}	5	5	4	0

Expected Change in Sound Levels in dBC

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	1	2	2	0
L_{90}	2	3	4	0

The impacts of the inverters on the nearby residences will comply with the state standard by remaining below 50 dBA during daytime hours and 45 dBA during nighttime hours.

A sound analysis was completed for the transformer to determine the maximum sound level that would be indicated at the nearest NSA. The substation transformer will have a sound level of approximately 85 dBA at one meter (approximately three feet). The substation will be set back from the nearest residence by approximately 4,060 feet. An analysis of the impacts from the transformer is provided in Appendix C and contour maps showing the overall expected sound levels from the project at 0.0 GA and 0.5 GA are provided as Figures 2 and 3. Estimated sound levels from the proposed facility in dBA and dBC at various distances feet from a substation are shown in Table 6.3.

[3] Changes shown in the bottom tables may not match the results in the top two tables due to rounding significant figures.

TABLE 6.3 ESTIMATED SOUND LEVEL DUE TO WOOD COUNTYSOLAR PROJECT TRANSFORMER

Source	Noise Source Description	Sound Pressure Level in dB per Octave-Band Frequency									L_{eq} (dBA)	L_{eq} (dBC)
		31.5	63	125	250	500	1000	2000	4000	8000		
B	Substation	69.8	69.8	81.9	84.4	89.8	87	83.2	78	68.9	91	93
	Substation w/ 5 dB tonal penalty	74.8	74.8	86.9	89.4	94.8	92	88.2	83	73.9	96	98
	Sound Level Contribution Substation											
	@ 500 feet	23	23	35	38	43	40	35	27	8	44	46
	@ 750 feet	20	20	32	34	39	36	31	22	0	40	42
	@ 1000 feet	17	17	29	31	36	33	28	17	0	37	40
	@ Nearest NSA - 4060 feet	5	5	17	18	22	17	8	0	0	22	25
	@ 5000 feet	3	3	15	16	20	14	3	0	0	19	23
	@ 7500 feet	0	0	11	12	14	7	0	0	0	14	18

The maximum sound level that would be indicated at the outside wall of the nearest NSA, 4,060 feet, would be 22 dBA. This value is less than the PSC nighttime impact Standard of 45 dBA and the PSC daytime impact standard of 50 dBA at the wall of a nonparticipating residence. This maximum sound value from the substation at all residences is also at or very near the background ambient sound levels detailed in the Section 5.0 and detailed in Table 6.4 below.

The data above was utilized to determine the impact of the project transformer on the existing environment. Table 6.4 presents the expected changes to existing sound levels for L_{eq}, L_{10}, L_{50}, and L_{90}, in dBA and dBC at the nearest residence, using the background monitoring data for sample point NMA-5.

TABLE 6.4 ESTIMATED MAXIMUM SOUND IMPACT CHANGES DUE TO TRANSFORMER[4]

Measured Sound Levels at NMA-5 (dBA)

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	31	33	48	29
L_{10}	31	32	42	25
L_{50}	24	23	27	21
L_{90}	21	21	22	19

Measured Sound Levels at NMA-5 (dBC)

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	43	42	65	36
L_{10}	39	40	46	34
L_{50}	35	36	32	31
L_{90}	33	34	30	29

Expected Sound Levels at Nearest NSA with Substation Operating

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	32	33	48	29
L_{10}	32	32	42	25
L_{50}	26	26	28	21
L_{90}	25	24	25	19

Expected Sound Levels at Nearest NSA with Substation Operating

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	43	42	65	36
L_{10}	39	40	46	34
L_{50}	35	36	33	31
L_{90}	34	35	31	29

Expected Change in Sound Levels in dBA

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	2	2	1	0
L_{90}	3	3	3	0

Expected Change in Sound Levels in dBC

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	0	0	1	0
L_{90}	1	1	1	0

The impacts of the substation on the nearby residences will comply with the state standard by remaining below 50 dBA during daytime hours and 45 dBA during nighttime hours.

Table 6.4 indicates that the sound levels will not be discernable at the residences surrounding the transformer.

To further substantiate the calculations shown above, computer modeling of the solar farm was completed. Sound contours were calculated using the Decibel Module of WindPro Modelling software by EMD International, which utilizes conservative ISO 9613-2 algorithms to estimate sound propagation and atmospheric absorption. The parameters and assumptions made in developing the estimates include the following:

- all inverters and substation were running at all times;
- substation sound power level was conservatively estimated at 93.4 dBA and an inverter sound power level of 97.3 dBA was used;

[4] Changes shown in the bottom tables may not match the results in the top two tables due to rounding significant figures.

- ground attenuation scenarios of 0.0 and 0.5 (on a scale of 0.0 representing hard ground to 1.0 representing porous ground) was modelled;
- meteorological conditions were conducive to sound propagation (10 degrees Celsius and 70 percent relative humidity);
- receptors were represented as a centerpoint on the residence (a total of 346 receptors were identified in the model);
- topography (elevations) were considered and estimated using USGS National Elevation Data.

The sound contour map generated by the modeling is presented in Figure 2. The model input and output files are included in Appendix C. The maximum modeled sound impact from the solar array at any residence is 40.1 dBA, which substantiates the information presented earlier in this section (Table 6.1 and 6.3).

7.0 Sound Mitigation Measures

Sound resulting from the operation of the solar facility is anticipated to have minimal impact on nearby residences. No additional mitigation measures are required above complying with the equipment specifications used for this analysis.

8.0 Summary

On January 27 and 28, 2020, Stantec completed a pre-construction ambient sound survey of the substation and solar array areas for the Wood County Solar Project to quantify the existing acoustical environment.

Ambient sound measurements were made at noise monitoring areas NMA-1, NMA-2, NMA-3, NMA-4, and NMA-5 in the vicinity of residences, which are located nearest the proposed inverter and substation locations in the north, south, and west direction. No homes have been identified east of the Project, within 3,000 feet of the nearest inverter. Four short-term (10-minute) sound level measurements were conducted at each of the five locations. The evening and night samples were collected on Monday, January 27, 2020 by Stantec. The morning and midday samples were collected by Stantec on Tuesday January 28, 2020. Based upon the L_{eq} values, the background sound levels varied from 29 to 52 dBA for the varying sample locations and sample periods. The predominant sound source during the sampling was vehicular traffic, along with animal noises and wind rustling in the trees.

Sound analyses were completed for both an inverter skid and the transformer based on information provided by the equipment manufacturers. The maximum sound impact at the nearest residence to a solar inverter was calculated to be 28 dBA and a maximum sound impact from the transformer was calculated to be 22 dBA. The sound criteria for monitoring followed the PSC's guidance on power plant siting. Sound levels from the proposed Project do not exceed 50 dBA during daytime hours and 45 dBA during nighttime hours, as defined by the PSCW Standard. The impacts of the inverters and the substation on the nearby residences will not exceed these levels. This finding was further substantiated by computer modeling of the entire solar array.

A post-construction sound analysis and report will be completed following construction of the Project and commencement of operations. The purpose of the analysis will be to verify the findings and conclusions of this report.

Figures

Figure 1

Noise Measuring Areas

Figure No.
1

Title
Noise Measuring Areas

Client/Project
Wood County Solar Project, LLC
Wood County Solar Project

Project Location
T. of Saratoga,
Wood County, WI

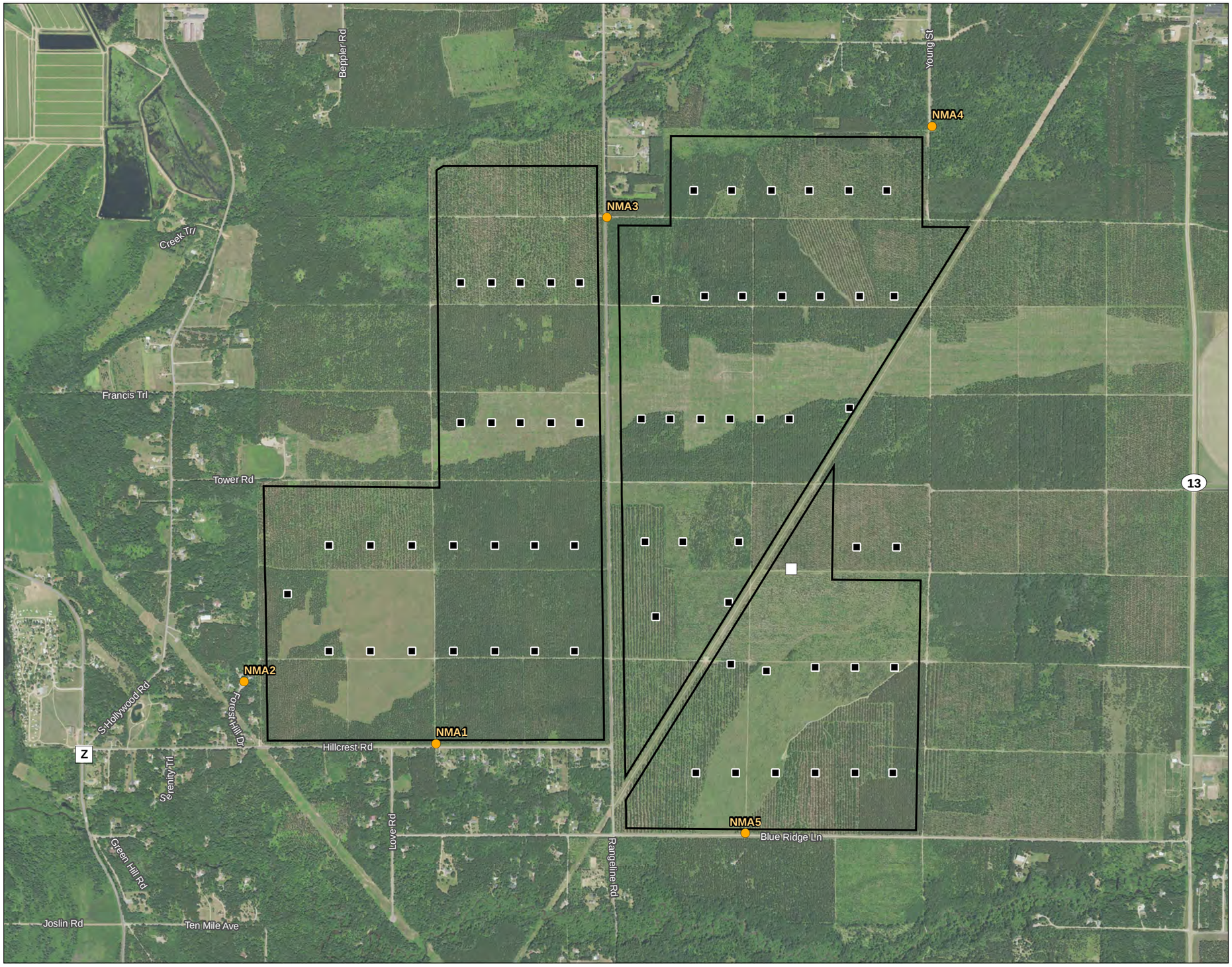
193706930

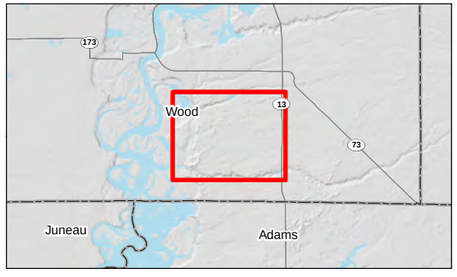
Prepared by CP on 2020-02-20
Technical Review by JB on 2020-02-20
Independent Review by DB on 2020-02-20

0 750 1,500 Feet
1:18,000 (At original document size of 11x17)

N

Legend
- Noise Measuring Area
- Approximate Project Boundary
- Substation
- Inverter Station





Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet
2. Data Sources Include: Stantec, Wood County Solar, LLC, WDNR, WisDOT
3. Orthophotography: 2017 NAIP

Stantec

Figure 2

Sound Study Results – 0.0 Ground Attenuation

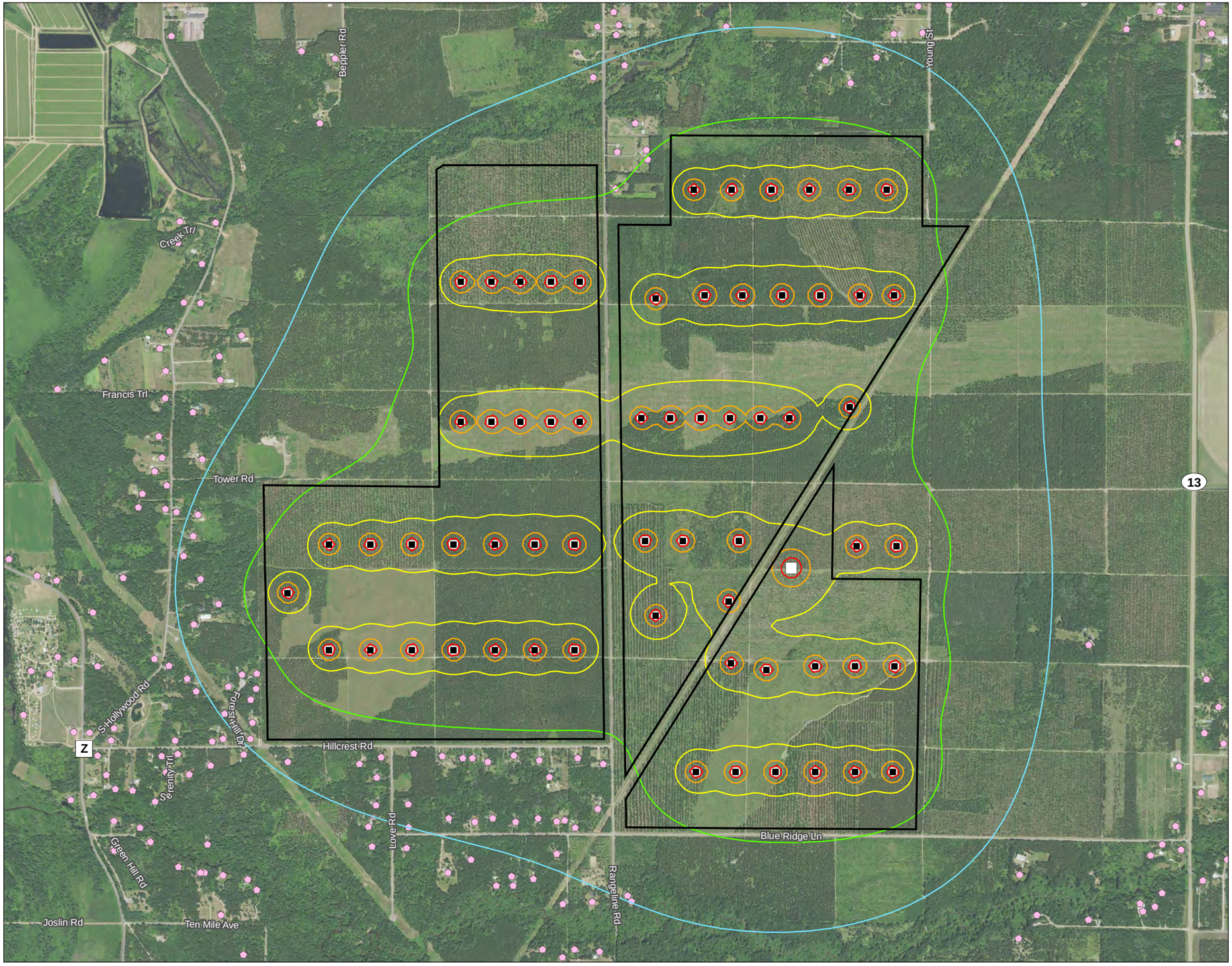


Figure No.
2

Title
Sound Study Results - 0.0 Ground Attenuation
Inverters and Substation

Client/Project
Wood County Solar Project, LLC
Wood County Solar Project

Project Location
T. of Saratoga,
Wood County, WI

193706930

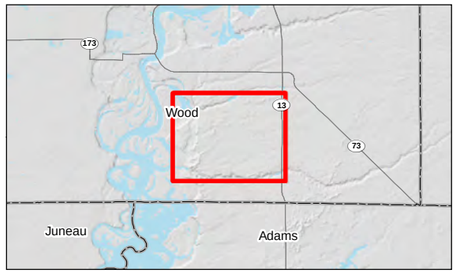
Prepared by CP on 2020-02-20
Technical Review by JB on 2020-02-20
Independent Review by DB on 2020-02-20

0 750 1,500 Feet
1:18,000 (At original document size of 11x17)

N

Legend
- Approximate Project Boundary
- Substation
- Inverter Station
- Sensitive Receptor

Sound (dBA) - 0.0 GA
- 35
- 40
- 45
- 50
- 55



Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet
2. Data Sources Include: Stantec, Wood County Solar, LLC, WDNR, WisDOT
3. Orthophotography: 2017 NAIP

Stantec

Figure 3

Sound Study Results – 0.5 Ground Attenuation

Figure No.
3

Title
Sound Study Results - 0.5 Ground Attenuation
Inverters and Substation

Client/Project
Wood County Solar Project, LLC
Wood County Solar Project

Project Location
T. of Saratoga,
Wood County, WI

193706930

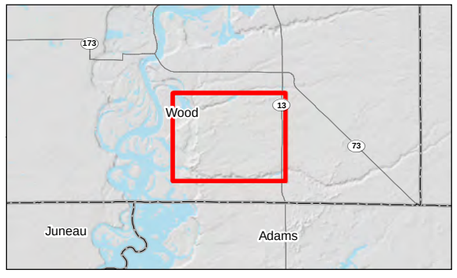
Prepared by CP on 2020-02-20
Technical Review by JB on 2020-02-20
Independent Review by DB on 2020-02-20

0 750 1,500 Feet
1:18,000 (At original document size of 11x17)

N

Legend
- Approximate Project Boundary
- Substation
- Inverter Station
- Sensitive Receptor

Sound (dBA) - 0.5 GA
- 35
- 40
- 45
- 50
- 55



Notes
1. Coordinate System: NAD 1983 StatePlane Wisconsin Central FIPS 4802 Feet
2. Data Sources Include: Stantec, Wood County Solar, LLC, WDNR, WisDOT
3. Orthophotography: 2017 NAIP

Stantec

Appendix A

Acoustic Sound Specifications – Inverters

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Noise Test Report

TYPE TEST SHEET

This Type Test sheet shall be used to record the results of the type testing of Generating Unit				
Type Tested reference number			SG3150U	
Generating Unit technology			Grid-connected PV Inverter	
System supplier name			Sungrow Power Supply Co., Ltd.	
Address			No.1699 Xiyou Rd., New & High Technology Industrial Development Zone, Hefei, P.R. China	
Tel	+86 551 65327834		Fax	+86 551 6532 7800
E:mail	info@sungrow.cn		Web site	www.sungrowpower.com
Maximum export capacity, use separate sheet if more than one connection option.		N/A	kW single phase, single, split or three phase system	
			kW three phase	
		N/A	kW two phases in three phase system	
		N/A	kW two phases split phase system	
Compiled by			On behalf of	Sungrow Power Supply Co., Ltd.
			Test Date	2019-5-13
Note that testing can be done by the manufacturer of an individual component, by an external test house, or by the supplier of the complete system, or any combination of them as appropriate. Where parts of the testing are carried out by persons or organisations other than the supplier then the supplier shall keep copies of all test records and results supplied to them to verify that the testing has been carried out by people with sufficient technical competency to carry out the tests.				

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

The aim of this test is to determine the noise level when the PV Grid inverter in rated working condition

Used settings of the measurement device for Noise measurement

Measurement device	Date of measurement
AWA6228	2019-5-13

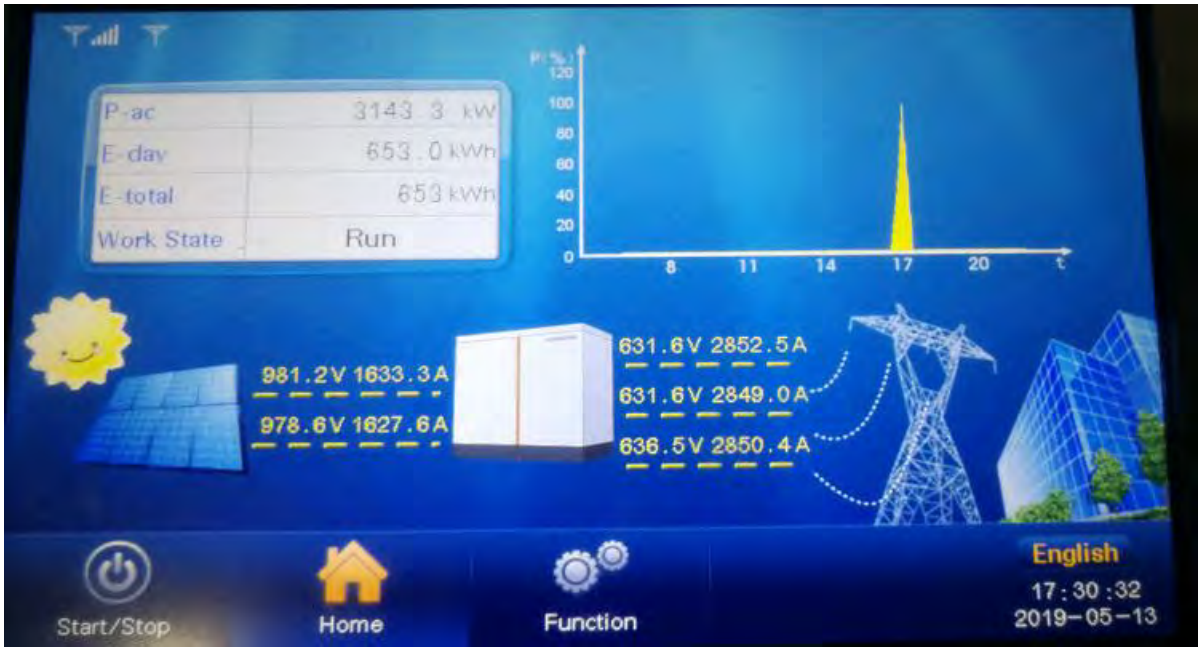
The condition s during testing are specified below:

PGU operation mode	Rated Working Condition
Voltage range	800-1300V
Grid frequency range	50Hz/ 45-55Hz
Distance	1m
Date	2019-5-13

The system noise level please check the table below.

Orientation	Noise (dB)
Front	77.2
Behind	77.5
Left	78.1
Right	79

Photo:
Operation Condition:



Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Front Test :

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	53.9	1k	68.7
31.5	56.3	2k	66.6
63	69.3	4k	71.8
125	80.7	8k	59.6
250	76.8	16k	42.4
500	71.8	**W_A**	**77.2**

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
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Website: www.sungrowpower.com

Behind:

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	55.9	1k	70.6
31.5	64.8	2k	68.3
63	69.5	4k	69.7
125	77.6	8k	59.6
250	77.4	16k	43.1
500	74.4	**W_A**	**77.5**

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Left:

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	56.3	1k	70.7
31.5	67.7	2k	68.4
63	69.7	4k	71.3
125	78.6	8k	62.5
250	78.8	16k	52.9
500	73.1	**W_A**	**78.1**

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Right:

Test Record			
Frequency(Hz)	Noise(dB)	Frequency(Hz)	Noise(dB)
16	57.1	1k	71.7
31.5	67.9	2k	69.6
63	72.7	4k	71.4
125	81.4	8k	63.9
250	78.4	16k	53.2
500	75.4	**W_A**	**79.0**

Sungrow Power Supply Co., Ltd.
Add: No. 1699 Xiyou Road, Hefei, China
Tel: +86 551 6532 7834
Email: info@sungrow.cn
Website: www.sungrowpower.com

Additional comments

Appendix B

Project Equipment Sound Analysis

Pre-Construction Noise Survey Report
Western Mustang Solar Project

Operational Noise Analysis of Substation

Distance From Substation	
250 feet	
500 feet	
750 feet	
1,000 feet	
4,060 feet	Distance to Nearest NSA (R019)
5,000 feet	
7,500 feet	

Source	Noise Source Description	Sound Pressure Level in dB per Octave-Band Frequency									L_{eq} (dBA)	L_{eq} (dBC)
		31.5	63	125	250	500	1000	2000	4000	8000		
B	Substation	69.8	69.8	81.9	84.4	89.8	87	83.2	78	68.9	91	93
	Substation w/ 5 dB tonal penalty	74.8	74.8	86.9	89.4	94.8	92	88.2	83	73.9	96	98
	Reduction of Sound Levels due to Hemispherical Propogation											
	@ Site Boundary 250 feet (min)	46	46	46	46	46	46	46	46	46		
	@ 500 feet	52	52	52	52	52	52	52	52	52		
	@ 750 feet	55	55	55	55	55	55	55	55	55		
	@ 1000 feet	58	58	58	58	58	58	58	58	58		
	@ Nearest NSA - 4060 feet	70	70	70	70	70	70	70	70	70		
	@ 5000 feet	72	72	72	72	72	72	72	72	72		
	@ 7500 feet	75	75	75	75	75	75	75	75	75		
	Reduction due to Air Absorption (@70% R.H. and 15^{o}C)											
	@ Site Boundary 250 feet (min)	0	0	0	0	0	0	1	2	7		
	@ 500 feet	0	0	0	0	0	1	1	4	14		
	@ 750 feet	0	0	0	0	1	1	2	6	21		
	@ 1000 feet	0	0	0	0	1	1	3	8	29		
	@ Nearest NSA - 4060 feet	0	0	0	1	3	5	11	33	116		
	@ 5000 feet	0	0	1	2	4	6	13	40	143		
	@ 7500 feet	0	0	1	3	5	9	20	60	214		
	Sound Level Contribution Substation											
	@ Site Boundary 250 feet (min)	29	29	41	44	49	46	42	35	21	50	52
	@ Site Boundary - 350 feet	26	26	38	41	46	43	39	32	15	47	49
	@ 500 feet	23	23	35	38	43	40	35	27	8	44	46
	@ 750 feet	20	20	32	34	39	36	31	22	0	40	42
	@ 1000 feet	17	17	29	31	36	33	28	17	0	37	40
	@ Nearest NSA - 4060 feet	5	5	17	18	22	17	8	0	0	22	25
	@ 5000 feet	3	3	15	16	20	14	3	0	0	19	23
	@ 7500 feet	0	0	11	12	14	7	0	0	0	14	18

Note 1: Sound or Noise Impacts reduce in relation to the distance from the source in accordance with the following equation: Reduction (db) = 20 x log (r_1) - 2.3 db, where r_1 = distance from the source

Note 2: Sound Impacts are reduced due to absorption in the, calculations performed in accordance with *American National Standard: Methods for Calculation of the Absorpotion of Sound by the Atmosphere; ANSI/ASA S1.26-2014* dated August 28, 2014

Pre-Construction Noise Survey Report
Western Mustang Solar Project

Operational Noise Analysis of Substation

Distance From Substation

250 feet
500 feet
750 feet
1,000 feet
4,060 feet
5,000 feet
7,500 feet

Distance to Nearest NSA (R019)

Measured Sound Levels at NMA-5 (dBA)

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	31	33	48	29
L_{10}	31	32	42	25
L_{50}	24	23	27	21
L_{90}	21	21	22	19

Measured Sound Levels at NMA-5 (dBC)

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	43	42	65	36
L_{10}	39	40	46	34
L_{50}	35	36	32	31
L_{90}	33	34	30	29

Expected Sound Levels at Nearest NSA with Substation Operating

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	32	33	48	29
L_{10}	32	32	42	25
L_{50}	26	26	28	21
L_{90}	25	24	25	19

Expected Sound Levels at Nearest NSA with Substation Operating

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	43	42	65	36
L_{10}	39	40	46	34
L_{50}	35	36	33	31
L_{90}	34	35	31	29

Expected Change in Sound Levels in dBA

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	2	2	1	0
L_{90}	3	3	3	0

Expected Change in Sound Levels in dBC

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	0	0	1	0
L_{90}	1	1	1	0

Pre-Construction Noise Survey Report
Wood County LLC Solar Project

Operational Noise Analysis of Inverters

Distance From Inverter	
50 feet	
100 feet	
200 feet	
500 feet	
830 feet	Nearest NSA to an inverter (R008)
1,000 feet	
2,000 feet	

Source	Noise Source Description	Sound Pressure Level in dB per Octave-Band Frequency									L_{eq} (dBA)	L_{eq} (dBC)
		31.5	63	125	250	500	1000	2000	4000	8000		
A	Inverter Sound Power Level	76	81	89	86	83	80	78	79	72	87	93
	Inverter Sound Pressure Level w/ 5 db penalty	81	86	94	91	88	85	83	84	77	92	98
	Inverter Sound Pressure Level at 3 feet	68	73	81	78	75	72	70	71	64	79	85
	Reduction of Sound Levels due to Hemispherical Propogation											
	@ 50 feet	24	24	24	24	24	24	24	24	24		
	@ 100 feet	30	30	30	30	30	30	30	30	30		
	@ 200 feet	36	36	36	36	36	36	36	36	36		
	@ 500 feet	44	44	44	44	44	44	44	44	44		
	@Nearest NSA - 830 feet	49	49	49	49	49	49	49	49	49		
	@ 1000 feet	50	50	50	50	50	50	50	50	50		
	@ 2000 feet	56	56	56	56	56	56	56	56	56		
	Reduction due to Air Absorption (@70% R.H. and 15^{o}C)											
	@ 50 feet	0	0	0	0	0	0	0	0	1		
	@ 100 feet	0	0	0	0	0	0	0	1	3		
	@ 200 feet	0	0	0	0	0	0	1	2	6		
	@ 500 feet	0	0	0	0	0	1	1	4	14		
	@Nearest NSA - 830 feet	0	0	0	0	1	1	2	7	24		
	@ 1000 feet	0	0	0	0	1	1	3	8	29		
	@ 2000 feet	0	0	0	1	1	2	5	16	57		
	Sound Level Contribution Solar Panel Inverters											
	@ 50 feet	43	48	57	54	51	47	45	47	38	54	60
	@ 100 feet	37	42	51	48	45	41	39	40	31	48	54
	@ 200 feet	31	36	45	42	39	35	33	33	22	42	48
	@ 500 feet	23	28	37	34	31	27	24	23	5	33	40
	@Nearest NSA - 830 feet	19	24	32	29	26	22	19	16	0	28	35
	@ 1000 feet	17	22	31	28	24	20	16	13	0	26	34
	@ 2000 feet	11	16	25	21	17	13	8	0	0	19	27

Note 1: Sound or Noise Impacts reduce in relation to the distance from the source in accordance with the following equation: Reduction (db) = 20 x log (r_1/r_2) db, where r_1 = distance from the source, and r_2 = 3 feet

Note 2: Sound Impacts are reduced due to absorption in the, calculations performed in accordance with *American National Standard: Methods for Calculation of the Absorpotion of Sound by the Atmosphere; ANSI/ASA S1.26-2014* dated August 28, 2014

Pre-Construction Noise Survey Report
Wood County LLC Solar Project

Operational Noise Analysis of Inverters

Distance From Inverter

50 feet
100 feet
200 feet
500 feet
830 feet
1,000 feet
2,000 feet

Nearest NSA to an inverter (R008)

Measured Sound Levels at NMA-3 (dBA)

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	48	51	42	30
L_{10}	41	50	42	29
L_{50}	28	32	28	25
L_{90}	25	25	26	22

Measured Sound Levels at NMA-3 (dBC)

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	56	55	51	43
L_{10}	46	51	48	40
L_{50}	40	39	37	35
L_{90}	39	36	34	31

Expected Sound Levels at NSA with Inverter Operating

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	48	51	42	30
L_{10}	41	50	42	29
L_{50}	31	33	31	25
L_{90}	30	30	30	22

Expected Sound Levels at NSA with Inverter Operating

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	56	55	52	43
L_{10}	46	51	48	40
L_{50}	41	40	39	35
L_{90}	40	39	38	31

Expected Change in Sound Levels in dBA

Sound Levels	dBA			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	3	1	3	0
L_{90}	5	5	4	0

Expected Change in Sound Levels in dBC

Sound Levels	dBC			
	Morning	Midday	Evening	Night
L_{eq}	0	0	0	0
L_{10}	0	0	0	0
L_{50}	1	2	2	0
L_{90}	2	3	4	0

Appendix C

Project Equipment Sound Modeling Analysis

Appendix C Wood County Solar Project - Receptor Locations

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-006	751,924	4,909,270	33.1	38.0
R-007	751,979	4,909,151	35.1	39.6
R-008	751,986	4,909,110	35.8	40.1
R-009	751,846	4,909,137	33.9	38.6
R-010	751,844	4,908,970	35.3	40.0
R-011	750,224	4,906,692	32.6	37.3
R-012	750,290	4,906,702	33.7	38.2
R-013	750,290	4,906,633	32.9	37.6
R-014	750,163	4,906,637	31.4	36.2
R-015	750,267	4,906,581	32.1	36.9
R-016	750,151	4,906,513	30.2	35.3
R-017	754,076	4,906,969	28.3	33.6
R-018	754,618	4,906,834	24.4	30.1
R-019	751,883	4,906,346	34.3	39.1
R-020	751,767	4,906,369	34.1	38.9
R-021	751,593	4,906,354	33.7	38.6
R-022	751,641	4,906,277	33.0	38.0
R-023	751,476	4,906,371	33.9	38.7
R-024	751,358	4,906,336	33.4	38.3
R-025	751,287	4,906,351	33.6	38.4
R-026	751,243	4,906,350	33.5	38.4
R-027	751,149	4,906,356	33.5	38.3
R-028	751,020	4,906,361	33.5	38.2
R-029	750,855	4,906,248	31.7	36.7
R-030	750,871	4,906,340	32.9	37.7
R-031	750,774	4,906,307	32.2	37.1
R-032	750,272	4,906,403	30.4	35.4
R-033	750,279	4,906,475	31.2	36.1
R-034	750,245	4,906,329	29.5	34.6
R-035	753,800	4,905,911	27.8	33.1
R-036	751,868	4,906,142	32.7	37.6
R-054	750,798	4,910,181	22.9	28.8
R-060	751,453	4,910,450	23.0	28.9
R-061	751,544	4,910,197	24.6	30.4
R-065	751,674	4,910,572	22.7	28.6
R-066	751,527	4,910,490	22.9	28.8
R-067	751,596	4,910,459	23.2	29.1
R-068	751,685	4,910,351	24.0	29.8
R-069	751,682	4,910,284	24.4	30.1
R-070	751,585	4,910,361	23.8	29.6

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-072	752,186	4,910,207	25.5	31.2
R-076	752,140	4,910,655	22.7	28.6
R-082	753,886	4,905,730	26.2	31.7
R-083	753,804	4,905,622	26.1	31.5
R-084	754,121	4,905,717	24.8	30.4
R-085	754,438	4,905,343	21.7	27.6
R-086	754,327	4,905,335	22.2	28.0
R-087	754,142	4,905,512	23.8	29.5
R-088	754,079	4,905,329	23.2	29.0
R-089	753,953	4,905,360	23.9	29.6
R-090	753,859	4,905,411	24.6	30.2
R-091	749,888	4,905,316	21.9	27.9
R-092	750,277	4,905,418	23.6	29.4
R-093	750,710	4,905,381	24.6	30.4
R-094	751,638	4,905,492	27.1	32.6
R-095	751,658	4,905,342	26.2	31.8
R-096	750,566	4,905,107	22.8	28.7
R-104	754,678	4,906,709	23.9	29.7
R-105	754,617	4,906,586	24.1	29.8
R-106	754,706	4,906,544	23.6	29.3
R-107	754,613	4,906,315	23.7	29.4
R-108	754,742	4,906,016	22.4	28.2
R-109	754,857	4,906,031	21.8	27.7
R-110	754,635	4,905,914	22.6	28.5
R-161	752,265	4,904,711	23.1	28.9
R-162	752,614	4,905,008	24.9	30.6
R-163	752,624	4,905,033	25.1	30.7
R-164	752,895	4,905,191	26.1	31.6
R-165	752,672	4,905,175	26.1	31.6
R-166	752,418	4,905,373	27.6	33.0
R-167	752,264	4,905,351	27.3	32.7
R-168	752,434	4,904,941	24.5	30.2
R-169	752,437	4,905,186	26.2	31.7
R-170	752,023	4,905,124	25.4	31.0
R-171	751,921	4,905,278	26.3	31.8
R-172	751,818	4,905,275	26.1	31.7
R-173	751,799	4,905,296	26.2	31.8
R-174	751,797	4,905,366	26.6	32.2
R-175	751,892	4,905,394	27.0	32.5
R-176	751,730	4,905,459	27.1	32.6

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-177	751,784	4,905,495	27.4	32.9
R-178	751,899	4,905,491	27.7	33.1
R-179	754,508	4,906,432	24.6	30.2
R-180	754,502	4,906,159	24.0	29.7
R-181	754,530	4,906,053	23.6	29.3
R-182	754,393	4,906,021	24.3	29.9
R-183	754,444	4,906,073	24.1	29.8
R-184	754,451	4,905,851	23.4	29.2
R-185	754,421	4,905,789	23.4	29.1
R-186	754,352	4,905,801	23.8	29.5
R-187	754,368	4,905,765	23.6	29.3
R-188	752,036	4,905,726	29.9	35.1
R-189	752,018	4,905,750	30.0	35.2
R-190	751,723	4,905,700	28.7	34.1
R-191	751,857	4,905,716	29.2	34.5
R-192	751,687	4,905,930	30.3	35.5
R-193	751,766	4,906,052	31.5	36.6
R-194	751,681	4,906,077	31.4	36.5
R-195	751,718	4,906,082	31.6	36.7
R-196	750,099	4,906,385	28.8	34.0
R-197	750,147	4,906,398	29.3	34.4
R-198	750,856	4,906,122	30.4	35.5
R-199	750,825	4,906,021	29.3	34.6
R-200	750,845	4,905,933	28.7	34.0
R-201	750,171	4,905,778	25.2	30.9
R-202	750,284	4,905,762	25.6	31.2
R-203	750,327	4,905,715	25.5	31.1
R-204	751,584	4,905,811	29.2	34.5
R-205	751,495	4,905,776	28.7	34.1
R-206	751,485	4,905,820	29.0	34.4
R-207	751,418	4,905,774	28.6	34.0
R-208	751,298	4,905,890	29.2	34.5
R-209	751,195	4,905,826	28.5	33.9
R-210	751,003	4,905,931	29.0	34.3
R-211	751,595	4,906,088	31.3	36.4
R-212	751,494	4,906,068	30.9	36.1
R-213	751,390	4,906,080	30.9	36.0
R-214	751,309	4,906,061	30.6	35.8
R-215	751,189	4,906,072	30.5	35.7
R-216	751,008	4,906,026	29.8	35.0

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-217	751,003	4,906,131	30.8	35.9
R-218	749,464	4,906,094	23.3	29.1
R-219	749,466	4,906,405	24.3	30.0
R-220	749,534	4,906,952	26.1	31.6
R-221	749,381	4,906,744	24.6	30.3
R-222	749,262	4,906,675	23.7	29.4
R-223	749,346	4,906,663	24.2	29.9
R-224	749,235	4,906,474	23.1	28.9
R-225	749,458	4,906,732	25.1	30.7
R-226	749,565	4,906,708	25.9	31.4
R-227	749,538	4,906,404	24.8	30.4
R-228	749,649	4,906,428	25.6	31.2
R-229	749,637	4,906,372	25.3	30.9
R-230	750,167	4,905,596	24.2	30.0
R-235	749,865	4,908,747	25.0	30.7
R-236	750,027	4,908,747	25.9	31.5
R-237	749,860	4,908,649	25.2	30.9
R-238	749,973	4,908,559	26.1	31.8
R-239	749,335	4,907,963	23.9	29.7
R-240	749,545	4,908,100	24.8	30.6
R-241	749,827	4,907,942	27.0	32.5
R-242	749,955	4,907,880	28.1	33.5
R-243	750,076	4,908,033	28.4	33.8
R-244	750,067	4,908,140	28.0	33.4
R-245	749,826	4,908,063	26.7	32.2
R-246	749,795	4,908,165	26.2	31.8
R-247	749,836	4,908,247	26.2	31.8
R-248	750,166	4,908,239	28.3	33.7
R-249	749,973	4,908,378	26.7	32.2
R-250	749,897	4,908,380	26.2	31.8
R-251	749,929	4,906,381	27.5	32.8
R-252	750,017	4,906,610	29.6	34.7
R-253	749,974	4,906,665	29.5	34.6
R-254	749,579	4,906,300	24.7	30.3
R-255	749,621	4,906,212	24.6	30.3
R-256	749,568	4,906,119	23.9	29.7
R-257	749,665	4,906,152	24.6	30.3
R-258	749,664	4,906,005	24.0	29.7
R-259	749,784	4,905,979	24.5	30.2
R-260	749,849	4,906,101	25.4	31.0

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-261	749,671	4,905,870	23.5	29.2
R-262	749,833	4,905,915	24.4	30.1
R-263	750,095	4,905,913	25.7	31.3
R-264	749,966	4,905,806	24.5	30.2
R-265	750,086	4,905,784	24.9	30.6
R-266	750,067	4,905,785	24.9	30.5
R-267	749,745	4,906,147	25.1	30.7
R-268	749,872	4,906,308	26.7	32.1
R-269	749,894	4,906,236	26.4	31.9
R-270	749,945	4,906,320	27.2	32.6
R-271	749,999	4,906,230	27.1	32.5
R-272	750,096	4,906,273	28.0	33.3
R-273	748,861	4,907,445	21.7	27.7
R-274	749,017	4,907,295	22.6	28.5
R-275	749,143	4,907,181	23.4	29.2
R-276	749,274	4,907,110	24.3	30.0
R-277	749,364	4,907,092	24.9	30.5
R-278	749,822	4,906,751	28.3	33.5
R-279	749,890	4,906,722	28.8	34.0
R-280	749,805	4,907,766	27.4	32.8
R-281	749,824	4,907,668	27.8	33.2
R-282	749,793	4,907,605	27.8	33.2
R-283	749,739	4,907,502	27.6	33.0
R-284	749,849	4,907,542	28.5	33.7
R-285	749,723	4,907,437	27.6	33.0
R-286	749,848	4,907,435	28.8	34.0
R-287	749,666	4,907,115	27.4	32.7
R-288	749,995	4,906,913	30.9	35.8
R-289	750,105	4,907,011	33.1	37.6
R-290	750,018	4,907,123	31.6	36.4
R-291	749,937	4,907,224	30.3	35.3
R-292	749,978	4,907,317	30.6	35.5
R-293	749,996	4,907,416	30.4	35.4
R-294	749,898	4,907,424	29.3	34.5
R-295	750,006	4,907,667	29.4	34.6
R-296	751,463	4,910,057	25.3	31.0
R-299	750,441	4,910,093	22.3	28.2
R-300	750,481	4,910,034	22.7	28.6
R-301	750,523	4,909,955	23.2	29.0
R-302	750,392	4,909,543	24.6	30.3

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-303	750,545	4,909,516	25.4	31.0
R-304	750,486	4,909,219	26.6	32.2
R-382	753,972	4,910,523	20.9	26.9
R-383	753,971	4,910,483	21.1	27.1
R-384	753,984	4,910,437	21.2	27.2
R-385	753,989	4,910,390	21.4	27.4
R-386	753,993	4,910,351	21.6	27.5
R-387	753,983	4,910,305	21.8	27.8
R-388	753,989	4,910,265	22.0	27.9
R-389	753,989	4,910,225	22.2	28.1
R-390	754,083	4,910,204	21.9	27.8
R-391	753,990	4,910,196	22.3	28.2
R-392	753,981	4,910,159	22.5	28.4
R-393	753,952	4,910,153	22.6	28.5
R-394	753,916	4,910,172	22.7	28.5
R-395	753,916	4,910,211	22.5	28.4
R-396	753,925	4,910,246	22.3	28.2
R-397	753,915	4,910,289	22.1	28.0
R-398	753,919	4,910,341	21.9	27.8
R-399	754,168	4,910,396	20.8	26.9
R-400	753,925	4,910,379	21.7	27.6
R-401	753,922	4,910,409	21.6	27.5
R-402	753,906	4,910,500	21.2	27.2
R-403	753,907	4,910,548	21.0	27.0
R-406	753,748	4,910,589	21.2	27.2
R-407	753,550	4,910,367	22.9	28.7
R-408	753,413	4,910,378	23.2	29.0
R-409	753,311	4,910,268	24.1	29.8
R-410	753,334	4,910,254	24.2	29.9
R-411	753,311	4,910,185	24.7	30.3
R-412	753,821	4,910,211	22.8	28.7
R-413	753,819	4,910,260	22.6	28.5
R-414	753,700	4,910,229	23.2	29.0
R-417	753,162	4,910,595	22.5	28.4
R-418	753,049	4,910,482	23.4	29.2
R-419	753,105	4,910,483	23.3	29.1
R-420	753,107	4,910,460	23.4	29.2
R-421	753,202	4,910,399	23.6	29.4
R-422	753,200	4,910,345	23.9	29.7
R-423	753,189	4,910,301	24.2	29.9

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-424	753,047	4,910,266	24.7	30.4
R-425	753,257	4,910,447	23.2	29.0
R-426	753,242	4,910,537	22.7	28.6
R-427	753,247	4,910,599	22.3	28.2
R-428	753,233	4,910,695	21.8	27.8
R-429	753,346	4,910,676	21.7	27.7
R-444	751,660	4,910,185	24.9	30.6
R-445	752,542	4,910,398	24.4	30.1
R-447	752,698	4,910,695	22.5	28.4
R-448	752,765	4,910,643	22.7	28.6
R-449	752,776	4,910,520	23.5	29.3
R-450	752,767	4,910,454	23.9	29.6
R-451	752,671	4,910,345	24.7	30.3
R-452	752,746	4,910,319	24.8	30.5
R-453	752,623	4,910,316	24.9	30.6
R-455	752,825	4,910,751	22.1	28.0
R-456	752,866	4,910,470	23.7	29.5
R-457	752,885	4,910,463	23.7	29.5
R-458	752,849	4,910,409	24.1	29.8
R-459	752,852	4,910,324	24.6	30.3
R-460	752,910	4,910,260	25.0	30.6
R-461	752,961	4,910,262	24.9	30.6
R-465	749,795	4,909,590	21.9	27.9
R-469	754,495	4,909,976	21.2	27.2
R-470	754,514	4,909,922	21.3	27.3
R-472	754,493	4,909,823	21.7	27.6
R-473	754,533	4,909,773	21.7	27.6
R-474	754,776	4,909,512	21.3	27.3
R-475	754,657	4,909,404	22.1	28.1
R-476	753,019	4,910,208	25.2	30.8
R-477	753,088	4,910,198	25.1	30.7
R-478	753,200	4,910,169	25.1	30.7
R-479	753,201	4,910,218	24.7	30.4
R-480	753,117	4,910,109	25.7	31.3
R-481	753,054	4,909,998	26.7	32.1
R-482	753,209	4,910,014	26.1	31.7
R-483	753,193	4,909,851	27.5	32.8
R-484	753,086	4,909,722	29.0	34.2
R-485	753,218	4,909,731	28.4	33.7
R-486	753,011	4,909,612	30.5	35.5

Appendix C Wood County Solar Project - Receptor Locations

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-487	753,332	4,909,867	26.8	32.3
R-488	753,299	4,909,945	26.4	31.8
R-489	753,367	4,909,934	26.2	31.7
R-490	753,459	4,909,949	25.7	31.3
R-491	753,549	4,909,954	25.3	30.9
R-492	753,475	4,910,048	25.0	30.6
R-493	753,381	4,910,027	25.5	31.1
R-494	753,306	4,910,023	25.8	31.3
R-495	753,560	4,910,071	24.6	30.2
R-496	753,652	4,910,043	24.4	30.1
R-497	753,733	4,910,043	24.0	29.8
R-498	753,813	4,910,044	23.7	29.5
R-499	753,889	4,910,037	23.4	29.2
R-500	753,991	4,910,037	23.0	28.8
R-501	753,992	4,909,950	23.4	29.2
R-502	753,906	4,909,956	23.8	29.5
R-503	753,870	4,909,920	24.1	29.8
R-504	753,812	4,909,957	24.2	29.9
R-505	753,709	4,909,962	24.6	30.3
R-506	753,641	4,909,952	24.9	30.6
R-507	754,137	4,910,049	22.4	28.2
R-508	754,088	4,910,000	22.8	28.6
R-509	754,311	4,910,090	21.5	27.5
R-510	754,265	4,910,046	21.9	27.8
R-511	754,217	4,910,051	22.0	27.9
R-512	754,268	4,909,994	22.0	28.0
R-513	754,293	4,909,867	22.4	28.3
R-514	754,388	4,909,891	21.9	27.8
R-515	754,146	4,909,782	23.4	29.2
R-516	754,397	4,909,272	23.8	29.6
R-517	752,780	4,909,588	31.4	36.3
R-518	752,898	4,909,490	32.5	37.2
R-519	752,322	4,909,726	29.7	34.9
R-520	752,869	4,909,868	28.2	33.5
R-521	753,012	4,909,995	26.8	32.3
R-522	752,803	4,910,215	25.5	31.1
R-523	752,890	4,910,136	25.9	31.5
R-524	752,734	4,910,239	25.4	31.0
R-525	752,628	4,910,230	25.5	31.1
R-526	752,481	4,910,170	26.0	31.5

Appendix C Wood County Solar Project - Receptor Locations

Receptor Identification	X (UTM 16)	Y (UTM 16)	Expected Sound Impact (dBA) 0.5 GA	Expected Sound Impact (dBA) 0.0 GA
R-526	752,481	4,910,170	26.0	31.5
R-527	752,378	4,910,114	26.4	31.9
R-528	752,333	4,909,963	27.5	32.9
R-529	752,256	4,909,976	27.3	32.8
R-530	752,162	4,910,017	26.9	32.4
R-531	752,014	4,909,955	27.1	32.6
R-532	751,901	4,909,942	27.0	32.5
R-533	751,813	4,909,927	26.9	32.4
R-534	751,779	4,909,975	26.5	32.1
R-535	751,779	4,909,999	26.4	31.9
R-536	751,777	4,910,029	26.2	31.7
R-537	751,729	4,910,010	26.2	31.8
R-538	751,703	4,910,111	25.5	31.1
R-539	751,725	4,909,991	26.3	31.9
R-540	751,730	4,909,930	26.7	32.3
R-541	751,696	4,909,885	26.9	32.5
R-542	751,735	4,909,705	28.4	33.7
R-543	751,724	4,909,474	30.2	35.4
R-544	751,806	4,909,840	27.5	33.0
R-545	751,806	4,909,775	28.0	33.4
R-546	751,937	4,909,850	27.8	33.2
R-547	752,090	4,909,852	28.1	33.5
R-548	752,240	4,909,863	28.3	33.6
R-549	751,832	4,909,716	28.6	33.9
R-550	751,822	4,909,671	28.9	34.2
R-551	751,865	4,909,534	30.2	35.4
R-694	750,447	4,906,304	30.7	35.7