

## **Aurora Wind Project Sound and Shadow Flicker Addendum September 6<sup>th</sup>, 2019**

On behalf of Aurora Wind Project, LLC (Aurora), Tradewind Energy, Inc. (Tradewind Energy) conducted a sound and shadow flicker analysis for the proposed Aurora Wind Project (Project) located in Williams County, North Dakota. The analysis presented here is in supplement to the original sound and shadow study submitted, and is specific to the wind turbine array Aurora plans to construct. The array analyzed, referenced as A054, includes 15 Vestas V110-2.0 on 80 meter (m) hub height (HH) and 56 Nordex N149-4.8 on 108m HH. All modeling assumptions for sound and shadow flicker are consistent with the original analysis submitted. In conjunction with the Project wind turbines being modeled, wind turbines from the nearby Lindahl Wind Project located northeast of the Project were modeled to provide a comprehensive analysis.

### **Shadow Flicker Analysis**

Shadow flicker, the effect seen when turbine blades pass between an observer and the sun, is not regulated by Williams County nor the State of North Dakota. While there is no existing permitting threshold with regards to shadow flicker, thirty hours per year of shadow flicker is the standard that has been utilized by the Commission in the past and is the goal of the Project.

A shadow flicker analysis was completed for all known occupied residences within 1.5 miles of any proposed wind turbine locations in array A031 (a total of 61 receptors) using the windPRO software. Array A031 was used as the reference to ensure all receptors presented in the original analysis were also presented within this addendum. Only the primary proposed turbine locations have been modeled, which includes 15 Vestas V110-2.0 on 80m HH and 56 Nordex N149-4.8 on 108m HH. The Lindahl Wind Project wind turbines were also incorporated in the modeling. Each residence was modeled in greenhouse mode, which assumes flicker from any direction is visible up to a distance of 2,000 m (6,562 ft) from a wind turbine, and sunshine probability data was incorporated, along with wind speed and direction information. The statistical reduction on the shadow flicker hours from the worst case scenario (i.e., the wind turbine always facing the sun, always operating, and no cloudy days), referred to as realistic shadow flicker or anticipated shadow flicker, assumes reductions based on probability of the sun shining and the wind turbine operating in a direction to cause flicker at the house.

Table 1 shows results for the six locations with realistic shadow flicker hours above 20 hours per year for array A054. Results for the other 55 modeled receptors fell below this arbitrary threshold.

Table 1: Modeled shadow flicker parameters for homes within 1.5 miles of proposed turbines in A031 and have realistic shadow flicker hours above 20 hours in a year. Location projections are in UTM NAD83 zone 13.

| <b>Receptor - Property Status</b> | <b>Easting</b> | <b>Northing</b> | <b>N149/V110<br/>108/80m HH<br/>(hours/year)</b> |
|-----------------------------------|----------------|-----------------|--|
| 57 - Participating                | 633480         | 5378691         | 22:54  |
| 8 - Non-Participating             | 638435         | 5378666         | 23:26  |
| 45 - Participating                | 633554         | 5377057         | 24:16  |
| 6 - Non-Participating             | 637411         | 5365868         | 24:56  |
| 64 - Participating                | 639268         | 5377996         | 26:22  |
| 10 - Non-Participating            | 643279         | 5372615         | 28:34  |

A detailed map and the windPRO shadow flicker report are included for reference.

## Sound Analysis

The Commission has a wind turbine sound level limit of 50 dBA within 100 feet of an inhabited residence or community building, unless a written waiver is obtained from the owner of the occupied residence or community building. A sound analysis was completed for all known occupied residences and community buildings within 1.5 miles of any proposed wind turbine locations in array A031 (a total of 61 receptors) using the windPRO software. Array A031 was used as the reference to ensure all receptors presented in the original analysis were also presented within this addendum. Each residence was modeled assuming the ISO 9613-2 General sound model with a 0.5 general ground attenuation factor, commonly used and accepted model and settings for wind turbine sound analyses. These model settings simulate typical atmospheric and ground attenuation for sound propagation. Only the primary proposed turbine locations have been modeled, which includes 15 Vestas V110-2.0 on 80m HH and 56 Nordex N149-4.8 on 108m HH. The Lindahl Wind Project wind turbines were also modeled to ensure residences between the two projects would be properly represented.

Table 2 shows results for those receptors modeled as potentially having sound levels above 40 dBA. All other receptors were modeled at levels below the arbitrary 40 dBA threshold.

Table 2: Modeled sound results for homes within 1.5 miles of proposed wind turbines in A031 above 40.0 dBA. Location projections are in UTM NAD83 zone 13.

| <b>Receptor - Property Status</b> | <b>Easting</b> | <b>Northing</b> | <b>N149/V110<br/>108/80 m HH<br/>Sound (dBA)</b> | <b>Distance to 50 dBA<br/>from Receptor<br/>(m/ft)</b> |
|-----------------------------------|----------------|-----------------|--|--|
| 27 - Non-Participating            | 646,754        | 5,372,213       | 40.4   | 778/2,552  |
| 2 - Non-Participating             | 647,930        | 5,371,801       | 40.7   | 889/2,916  |
| 10 - Non-Participating            | 643,279        | 5,372,615       | 40.8   | 527/1,729  |
| 47 - Participating                | 634,615        | 5,381,825       | 40.9   | 681/2,234  |
| 6 - Non-Participating             | 637,411        | 5,365,868       | 41.1   | 538/1,765  |
| 53 - Participating                | 642,413        | 5,373,644       | 41.3   | 535/1,755  |
| 51 - Participating                | 637,621        | 5,371,070       | 41.7   | 657/2,155  |
| 11 - Non-Participating            | 643,282        | 5,373,088       | 41.7   | 450/1,476  |
| 63 - Participating                | 641,300        | 5,368,154       | 42.0   | 696/2,283  |
| 55 - Participating                | 635,760        | 5,381,775       | 42.3   | 685/2,247  |
| 9 - Non-Participating             | 640,413        | 5,369,191       | 42.4   | 449/1,473  |
| 61 - Participating                | 633,645        | 5,373,895       | 42.8   | 403/1,322  |
| 52 - Participating                | 640,276        | 5,365,862       | 43.0   | 339/1,112  |
| 5 - Non-Participating             | 636,328        | 5,376,974       | 43.1   | 621/2,037  |
| 50 - Participating                | 636,416        | 5,382,006       | 43.4   | 425/1,394  |
| 64 - Participating                | 639,268        | 5,377,996       | 43.8   | 301/987  |
| 57 - Participating                | 633,480        | 5,378,691       | 43.9   | 423/1,387  |
| 66 - Participating                | 638,244        | 5,370,747       | 43.9   | 305/1,000  |
| 49 - Participating                | 636,455        | 5,380,259       | 44.2   | 325/1,066  |
| 8 - Non-Participating             | 638,435        | 5,378,666       | 44.3   | 368/1,207  |
| 67 - Participating                | 637,448        | 5,370,698       | 44.7   | 261/856  |
| 45 - Participating                | 633,554        | 5,377,057       | 44.9   | 352/1,154  |
| 48 - Participating                | 634,891        | 5,378,584       | 45.5   | 317/1,040  |

All receptors were modeled at sound levels below the 50 dBA limit within 100 ft, even with the 2 dBA uncertainty factor added to the wind turbine emission.

A detailed map and the windPRO sound report are included for reference.

## Shadow Flicker Map



## **windPRO Shadow Flicker Report**



## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| Row | X(East) | Y(North)  | Z     | Row data/Description                                  | WTG type |                          | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | RPM [RPM] |
|-----|---------|-----------|-------|---|----------|--------------------------|-------------------|--------------------|----------------|-----------|
|     |         |           |       |   | Valid    | Manufact. Type-generator |                   |                    |                |           |
| 27  | 633,243 | 5,377,581 | 731.5 | T-81  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 28  | 631,582 | 5,379,814 | 726.8 | T-98  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 29  | 635,586 | 5,377,640 | 725.5 | T-85  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 30  | 636,542 | 5,378,452 | 715.1 | T-87  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 31  | 640,641 | 5,368,602 | 728.5 | T-23  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 32  | 642,243 | 5,368,015 | 730.6 | T-9   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 33  | 635,270 | 5,379,029 | 725.4 | T-90  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 34  | 634,758 | 5,380,905 | 718.9 | T-107   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 35  | 636,220 | 5,380,785 | 716.3 | T-110   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 36  | 636,276 | 5,382,673 | 710.2 | T-124   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 37  | 637,941 | 5,379,046 | 713.2 | T-89  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 38  | 637,408 | 5,370,185 | 701.0 | T-24  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 39  | 632,509 | 5,376,501 | 722.8 | T-68  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 40  | 637,648 | 5,368,666 | 713.2 | T-20  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 41  | 640,643 | 5,367,238 | 719.3 | T-19  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 42  | 638,242 | 5,367,207 | 710.2 | T-18  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 43  | 634,318 | 5,377,326 | 731.6 | T-83  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 44  | 634,979 | 5,377,549 | 725.3 | T-84  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 45  | 633,206 | 5,382,201 | 722.4 | T-120   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 46  | 632,585 | 5,380,949 | 731.5 | T-105   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 47  | 635,298 | 5,380,049 | 728.5 | T-97  | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 48  | 637,149 | 5,381,224 | 704.1 | T-152   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 49  | 644,833 | 5,373,605 | 713.9 | T-153   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 50  | 645,462 | 5,373,811 | 728.5 | T-154   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 51  | 645,966 | 5,373,838 | 730.1 | T-155   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 52  | 639,890 | 5,366,309 | 710.2 | T-160   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 53  | 639,135 | 5,366,239 | 709.0 | T-161   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 54  | 636,191 | 5,365,609 | 711.4 | T-163   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 55  | 636,640 | 5,366,042 | 710.2 | T-164   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 56  | 636,954 | 5,368,164 | 711.3 | T-165   | Yes      | NORDEX N149-4.8-4,800    | 4,800             | 149.0              | 108.0          | 10.7      |
| 57  | 637,619 | 5,373,512 | 727.5 | T-43  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 58  | 635,764 | 5,372,945 | 724.6 | T-45  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 59  | 636,817 | 5,372,047 | 728.5 | T-35  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 60  | 635,193 | 5,372,473 | 710.2 | T-47  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 61  | 636,346 | 5,374,109 | 734.6 | T-56  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 62  | 635,830 | 5,374,972 | 728.5 | T-55  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 63  | 634,074 | 5,374,798 | 721.2 | T-53  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 64  | 636,640 | 5,375,835 | 734.6 | T-73  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 65  | 636,095 | 5,373,292 | 733.9 | T-46  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 66  | 634,438 | 5,372,432 | 701.0 | T-57  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 67  | 636,056 | 5,371,908 | 719.3 | T-34  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 68  | 636,215 | 5,375,218 | 731.5 | T-74  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 69  | 633,261 | 5,374,418 | 716.3 | T-51  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 70  | 637,234 | 5,372,817 | 719.9 | T-42  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 71  | 634,798 | 5,375,163 | 713.2 | T-54  | Yes      | VESTAS V110-2,000        | 2,000             | 110.0              | 80.0           | 14.9      |
| 72  | 646,913 | 5,375,455 | 745.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 73  | 646,888 | 5,375,080 | 743.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 74  | 648,328 | 5,377,151 | 749.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 75  | 648,570 | 5,377,592 | 749.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 76  | 648,872 | 5,377,853 | 752.9 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 77  | 648,872 | 5,378,572 | 753.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 78  | 649,189 | 5,379,368 | 749.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 79  | 648,868 | 5,380,034 | 743.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 80  | 649,124 | 5,380,328 | 729.4 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 81  | 651,007 | 5,378,868 | 748.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 82  | 651,525 | 5,378,000 | 750.5 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 83  | 651,616 | 5,378,348 | 758.5 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |
| 84  | 651,987 | 5,378,290 | 755.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | Yes      | VESTAS V100-2,000        | 2,000             | 100.0              | 80.0           | 14.9      |

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## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

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|     | X(East) | Y(North)  | Z     | Row data/Description                                  | WTG type |            | Type-generator | Power,<br>rated<br>[kW] | Rotor<br>diameter<br>[m] | Hub<br>height<br>[m] | RPM<br>[RPM] |
|-----|---------|-----------|-------|---|----------|------------|----------------|-------------------------|--------------------------|----------------------|--------------|
|     |         |           |       |   | Valid    | Manufact.  |                |                         |                          |                      |              |
| 85  | 652,436 | 5,378,405 | 749.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 86  | 654,047 | 5,379,834 | 743.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 87  | 654,478 | 5,380,290 | 740.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 88  | 654,876 | 5,380,346 | 731.4 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 89  | 649,468 | 5,369,552 | 735.9 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 90  | 649,403 | 5,370,046 | 745.1 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 91  | 648,989 | 5,370,563 | 740.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 92  | 649,348 | 5,370,846 | 749.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 93  | 649,714 | 5,370,690 | 746.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 94  | 650,635 | 5,370,574 | 746.1 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 95  | 650,667 | 5,370,918 | 744.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 96  | 650,882 | 5,371,340 | 743.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 97  | 649,309 | 5,375,532 | 733.1 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 98  | 649,484 | 5,375,990 | 732.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 99  | 649,889 | 5,375,994 | 741.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 100 | 650,008 | 5,376,322 | 740.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 101 | 650,956 | 5,375,465 | 750.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 102 | 648,982 | 5,374,557 | 737.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 103 | 648,553 | 5,374,643 | 733.0 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 104 | 648,903 | 5,381,054 | 722.4 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 105 | 649,170 | 5,381,363 | 721.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 106 | 649,950 | 5,382,038 | 713.3 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 107 | 650,030 | 5,382,496 | 712.9 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 108 | 650,267 | 5,377,632 | 746.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 109 | 650,119 | 5,376,640 | 740.5 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 110 | 650,663 | 5,383,159 | 707.1 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 111 | 650,947 | 5,375,049 | 753.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 112 | 650,911 | 5,374,694 | 758.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 113 | 650,163 | 5,374,664 | 746.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 114 | 649,378 | 5,374,555 | 741.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 115 | 649,818 | 5,374,694 | 743.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 116 | 650,613 | 5,377,049 | 737.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 117 | 649,406 | 5,372,982 | 725.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 118 | 647,909 | 5,372,903 | 716.3 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 119 | 647,487 | 5,372,910 | 715.5 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 120 | 647,672 | 5,376,428 | 744.3 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 121 | 647,365 | 5,376,192 | 740.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 122 | 649,728 | 5,381,758 | 721.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 123 | 650,599 | 5,377,842 | 746.4 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 124 | 653,143 | 5,380,511 | 713.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 125 | 653,130 | 5,380,927 | 710.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 126 | 653,497 | 5,381,062 | 704.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 127 | 653,850 | 5,381,276 | 700.8 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 128 | 654,022 | 5,381,604 | 696.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 129 | 654,011 | 5,381,966 | 694.9 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 130 | 648,594 | 5,370,523 | 731.5 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 131 | 650,092 | 5,370,737 | 743.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 132 | 647,056 | 5,376,002 | 741.1 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 133 | 654,134 | 5,380,179 | 733.9 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 134 | 648,870 | 5,379,452 | 759.0 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 135 | 649,079 | 5,378,913 | 759.0 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 136 | 649,308 | 5,381,738 | 716.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 137 | 650,346 | 5,383,045 | 709.6 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 138 | 650,021 | 5,382,956 | 710.0 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 139 | 647,090 | 5,373,129 | 713.2 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 140 | 649,061 | 5,372,960 | 722.4 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 141 | 648,724 | 5,372,961 | 720.7 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |
| 142 | 648,383 | 5,372,886 | 719.3 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 13...Yes | VESTAS   | V100-2,000 | 2,000          | 100.0                   | 80.0                     | 14.9                 |              |

To be continued on next page...

## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| Row | data/Description           | X(East) |           | Y(North) |      | Z     | WTG type |           | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | RPM [RPM] |                |
|-----|----------------------------|---------|-----------|----------|------|-------|----------|-----------|-------------------|--------------------|----------------|-----------|----------------|
|     |                            | [m]     | [m]       | [m]      | [m]  |       | Valid    | Manufact. |                   |                    |                |           | Type-generator |
| 143 | VESTAS V100 2000 100.0 !O! | 648,975 | 5,375,560 | 735.2    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |
| 144 | VESTAS V100 2000 100.0 !O! | 648,641 | 5,375,554 | 726.1    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |
| 145 | VESTAS V100 2000 100.0 !O! | 648,297 | 5,375,376 | 728.5    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |
| 146 | VESTAS V100 2000 100.0 !O! | 649,928 | 5,378,956 | 741.8    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |
| 147 | VESTAS V100 2000 100.0 !O! | 650,591 | 5,374,779 | 748.5    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |
| 148 | VESTAS V100 2000 100.0 !O! | 650,301 | 5,376,922 | 735.1    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |
| 149 | VESTAS V100 2000 100.0 !O! | 650,917 | 5,377,197 | 740.0    | 80.0 | 13... | Yes      | VESTAS    | V100-2,000        | 2,000              | 100.0          | 80.0      | 14.9           |

## Shadow receptor-Input

| No.   | Name                | X(East) | Y(North)  | Z     | Width | Height | Height a.g.l. | Degrees from south cw | Slope of window | Direction mode     |
|-------|---------------------|---------|-----------|-------|-------|--------|---------------|-----------------------|-----------------|--------------------|
|       |                     | [m]     | [m]       | [m]   | [m]   | [m]    | [m]           | [°]                   | [°]             |                    |
| A 1   | - Non-Participating | 644,116 | 5,375,554 | 701.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| B 39  | - Participating     | 643,400 | 5,373,971 | 711.5 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| C 2   | - Non-Participating | 647,930 | 5,371,801 | 718.0 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| D 40  | - Participating     | 643,453 | 5,372,099 | 716.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| E 41  | - Participating     | 625,162 | 5,383,364 | 711.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| F 42  | - Participating     | 628,500 | 5,384,644 | 704.1 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| G 43  | - Participating     | 630,148 | 5,374,326 | 691.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| H 44  | - Participating     | 629,997 | 5,384,325 | 711.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| I 3   | - Non-Participating | 630,488 | 5,379,437 | 722.7 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| J 4   | - Non-Participating | 632,031 | 5,373,676 | 696.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| K 45  | - Participating     | 633,554 | 5,377,057 | 735.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| L 46  | - Participating     | 633,395 | 5,383,413 | 715.7 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| M 47  | - Participating     | 634,615 | 5,381,825 | 716.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| N 48  | - Participating     | 634,891 | 5,378,584 | 728.5 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| O 5   | - Non-Participating | 636,328 | 5,376,974 | 731.5 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| P 49  | - Participating     | 636,455 | 5,380,259 | 709.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| Q 50  | - Participating     | 636,416 | 5,382,006 | 707.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| R 51  | - Participating     | 637,621 | 5,371,070 | 716.6 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| S 6   | - Non-Participating | 637,411 | 5,365,868 | 713.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| T 52  | - Participating     | 640,276 | 5,365,862 | 710.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| U 7   | - Non-Participating | 638,615 | 5,371,717 | 720.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| V 8   | - Non-Participating | 638,435 | 5,378,666 | 709.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| W 9   | - Non-Participating | 640,413 | 5,369,191 | 728.5 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| X 10  | - Non-Participating | 643,279 | 5,372,615 | 722.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| Y 11  | - Non-Participating | 643,282 | 5,373,088 | 726.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| Z 53  | - Participating     | 642,413 | 5,373,644 | 734.1 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AA 54 | - Participating     | 643,167 | 5,375,685 | 714.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AB 12 | - Non-Participating | 630,584 | 5,371,240 | 682.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AC 13 | - Non-Participating | 630,347 | 5,380,996 | 717.6 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AD 14 | - Non-Participating | 628,838 | 5,379,465 | 705.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AE 55 | - Participating     | 635,760 | 5,381,775 | 711.0 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AF 15 | - Non-Participating | 637,972 | 5,384,054 | 715.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AG 57 | - Participating     | 633,480 | 5,378,691 | 739.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AH 59 | - Participating     | 643,400 | 5,373,968 | 711.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AI 61 | - Participating     | 633,645 | 5,373,895 | 713.7 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AJ 62 | - Participating     | 643,453 | 5,372,097 | 716.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AK 63 | - Participating     | 641,300 | 5,368,154 | 725.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AL 16 | - Non-Participating | 630,734 | 5,381,835 | 710.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AM 17 | - Non-Participating | 631,989 | 5,373,670 | 695.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AN 18 | - Non-Participating | 637,954 | 5,365,740 | 710.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AO 64 | - Participating     | 639,268 | 5,377,996 | 720.6 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AP 19 | - Non-Participating | 638,331 | 5,381,857 | 701.5 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AQ 20 | - Non-Participating | 639,333 | 5,380,415 | 707.1 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AR 21 | - Non-Participating | 630,142 | 5,375,377 | 701.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |

To be continued on next page...

## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| No.   | Name                | X(East) | Y(North)  | Z     | Width | Height | Height a.g.l. | Degrees from south cw | Slope of window | Direction mode     |
|-------|---------------------|---------|-----------|-------|-------|--------|---------------|-----------------------|-----------------|--------------------|
|       |                     |         |           | [m]   | [m]   | [m]    | [m]           | [°]                   | [°]             |                    |
| AS 22 | - Non-Participating | 644,117 | 5,375,554 | 701.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AT 23 | - Non-Participating | 628,666 | 5,373,611 | 682.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AU 24 | - Non-Participating | 632,030 | 5,373,428 | 696.5 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AV 27 | - Non-Participating | 646,754 | 5,372,213 | 713.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AW 29 | - Non-Participating | 631,486 | 5,386,533 | 696.9 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AX 30 | - Non-Participating | 633,067 | 5,384,963 | 707.0 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AY 31 | - Non-Participating | 633,553 | 5,383,375 | 714.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| AZ 66 | - Participating     | 638,244 | 5,370,747 | 710.8 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BA 67 | - Participating     | 637,448 | 5,370,698 | 712.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BB 68 | - Participating     | 635,378 | 5,369,828 | 692.6 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BC 32 | - Non-Participating | 626,925 | 5,388,203 | 701.4 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BD 33 | - Non-Participating | 627,137 | 5,388,066 | 701.0 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BE 34 | - Non-Participating | 626,921 | 5,387,556 | 704.1 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BF 35 | - Non-Participating | 629,137 | 5,388,039 | 693.3 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BG 36 | - Non-Participating | 632,118 | 5,369,480 | 691.6 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BH 37 | - Non-Participating | 635,531 | 5,367,600 | 699.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |
| BI 38 | - Non-Participating | 629,941 | 5,378,583 | 713.2 | 1.0   | 11.0   | 1.0           | 0.0                   | 90.0            | "Green house mode" |

## Calculation Results

Shadow receptor

| No.   | Name                | Shadow, worst case             |                                  |                                  | Shadow, expected values        |
|-------|---------------------|--------------------------------|----------------------------------|----------------------------------|--------------------------------|
|       |                     | Shadow hours per year [h/year] | Shadow days per year [days/year] | Max shadow hours per day [h/day] | Shadow hours per year [h/year] |
| A 1   | - Non-Participating | 0:00                           | 0                                | 0:00                             | 0:00                           |
| B 39  | - Participating     | 20:31                          | 73                               | 0:27                             | 8:56                           |
| C 2   | - Non-Participating | 4:06                           | 28                               | 0:14                             | 1:25                           |
| D 40  | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| E 41  | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| F 42  | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| G 43  | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| H 44  | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| I 3   | - Non-Participating | 19:10                          | 53                               | 0:32                             | 7:54                           |
| J 4   | - Non-Participating | 14:40                          | 62                               | 0:19                             | 6:04                           |
| K 45  | - Participating     | 61:46                          | 134                              | 0:46                             | 24:16                          |
| L 46  | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| M 47  | - Participating     | 20:10                          | 101                              | 0:24                             | 8:28                           |
| N 48  | - Participating     | 18:40                          | 89                               | 0:20                             | 8:06                           |
| O 5   | - Non-Participating | 49:34                          | 132                              | 0:43                             | 16:02                          |
| P 49  | - Participating     | 42:32                          | 126                              | 0:31                             | 14:58                          |
| Q 50  | - Participating     | 28:04                          | 78                               | 0:34                             | 8:54                           |
| R 51  | - Participating     | 3:42                           | 35                               | 0:10                             | 1:51                           |
| S 6   | - Non-Participating | 56:38                          | 119                              | 0:47                             | 24:56                          |
| T 52  | - Participating     | 17:39                          | 53                               | 0:30                             | 8:25                           |
| U 7   | - Non-Participating | 1:22                           | 14                               | 0:09                             | 0:36                           |
| V 8   | - Non-Participating | 88:28                          | 126                              | 0:59                             | 23:25                          |
| W 9   | - Non-Participating | 15:24                          | 69                               | 0:24                             | 5:18                           |
| X 10  | - Non-Participating | 68:13                          | 96                               | 0:58                             | 28:34                          |
| Y 11  | - Non-Participating | 42:36                          | 95                               | 0:51                             | 17:57                          |
| Z 53  | - Participating     | 3:46                           | 24                               | 0:15                             | 1:19                           |
| AA 54 | - Participating     | 0:00                           | 0                                | 0:00                             | 0:00                           |
| AB 12 | - Non-Participating | 0:00                           | 0                                | 0:00                             | 0:00                           |
| AC 13 | - Non-Participating | 9:38                           | 36                               | 0:19                             | 3:03                           |
| AD 14 | - Non-Participating | 0:00                           | 0                                | 0:00                             | 0:00                           |
| AE 55 | - Participating     | 29:39                          | 110                              | 0:29                             | 8:34                           |
| AF 15 | - Non-Participating | 0:00                           | 0                                | 0:00                             | 0:00                           |
| AG 57 | - Participating     | 48:29                          | 145                              | 0:38                             | 22:54                          |

To be continued on next page...

## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| No.                       | Name  | Shadow, worst case   |                         |                          | Shadow, expected values |                      |
|---------------------------|-------|----------------------|-------------------------|--------------------------|-------------------------|----------------------|
|                           |       | Shadow hours         | Shadow days             | Max shadow               | Shadow hours            | Shadow hours         |
|                           |       | per year<br>[h/year] | per year<br>[days/year] | hours per day<br>[h/day] | per year<br>[h/year]    | per year<br>[h/year] |
| AH 59 - Participating     | 20:35 | 73                   | 0:27                    | 8:59                     |                         |                      |
| AI 61 - Participating     | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AJ 62 - Participating     | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AK 63 - Participating     | 23:34 | 69                   | 0:38                    | 10:14                    |                         |                      |
| AL 16 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AM 17 - Non-Participating | 14:15 | 65                   | 0:19                    | 5:55                     |                         |                      |
| AN 18 - Non-Participating | 30:50 | 102                  | 0:28                    | 13:16                    |                         |                      |
| AO 64 - Participating     | 78:52 | 110                  | 1:06                    | 26:22                    |                         |                      |
| AP 19 - Non-Participating | 10:37 | 38                   | 0:26                    | 3:08                     |                         |                      |
| AQ 20 - Non-Participating | 9:35  | 40                   | 0:17                    | 2:23                     |                         |                      |
| AR 21 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AS 22 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AT 23 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AU 24 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AV 27 - Non-Participating | 14:21 | 81                   | 0:17                    | 5:58                     |                         |                      |
| AW 29 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AX 30 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AY 31 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| AZ 66 - Participating     | 25:46 | 74                   | 0:37                    | 7:12                     |                         |                      |
| BA 67 - Participating     | 34:13 | 84                   | 0:38                    | 11:09                    |                         |                      |
| BB 68 - Participating     | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| BC 32 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| BD 33 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| BE 34 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| BF 35 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| BG 36 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |
| BH 37 - Non-Participating | 10:25 | 40                   | 0:24                    | 4:20                     |                         |                      |
| BI 38 - Non-Participating | 0:00  | 0                    | 0:00                    | 0:00                     |                         |                      |

Total amount of flickering on the shadow receptors caused by each WTG

| No. | Name  | Worst case | Expected |
|-----|-------|------------|----------|
|     |       | [h/year]   | [h/year] |
| 1   | T-41  | 13:50      | 6:27     |
| 2   | T-62  | 0:00       | 0:00     |
| 3   | T-39  | 0:00       | 0:00     |
| 4   | T-37  | 0:00       | 0:00     |
| 5   | T-70  | 0:00       | 0:00     |
| 6   | T-77  | 0:00       | 0:00     |
| 7   | T-66  | 0:00       | 0:00     |
| 8   | T-93  | 39:14      | 19:30    |
| 9   | T-80  | 91:16      | 25:23    |
| 10  | T-58  | 0:00       | 0:00     |
| 11  | T-28  | 103:31     | 43:18    |
| 12  | T-78  | 72:55      | 23:07    |
| 13  | T-59  | 0:00       | 0:00     |
| 14  | T-40  | 0:00       | 0:00     |
| 15  | T-15  | 0:00       | 0:00     |
| 16  | T-16  | 0:00       | 0:00     |
| 17  | T-17  | 0:00       | 0:00     |
| 18  | T-12  | 0:00       | 0:00     |
| 19  | T-13  | 3:34       | 1:26     |
| 20  | T-25  | 29:32      | 9:56     |
| 21  | T-10  | 4:26       | 1:41     |
| 22  | T-95  | 10:45      | 5:21     |
| 23  | T-96  | 0:00       | 0:00     |
| 24  | T-122 | 0:00       | 0:00     |
| 25  | T-72  | 37:14      | 10:15    |

To be continued on next page...

## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| No. | Name   | Worst case<br>[h/year] | Expected<br>[h/year] |
|-----|--|------------------------|----------------------|
| 26  | T-75   | 0:00                   | 0:00                 |
| 27  | T-81   | 3:58                   | 1:05                 |
| 28  | T-98   | 28:48                  | 10:58                |
| 29  | T-85   | 0:00                   | 0:00                 |
| 30  | T-87   | 7:06                   | 3:03                 |
| 31  | T-23   | 9:50                   | 3:21                 |
| 32  | T-9  | 21:08                  | 9:02                 |
| 33  | T-90   | 15:06                  | 4:34                 |
| 34  | T-107  | 33:31                  | 10:25                |
| 35  | T-110  | 4:53                   | 1:42                 |
| 36  | T-124  | 5:50                   | 2:26                 |
| 37  | T-89   | 19:56                  | 5:32                 |
| 38  | T-24   | 30:27                  | 8:25                 |
| 39  | T-68   | 12:44                  | 3:46                 |
| 40  | T-20   | 0:00                   | 0:00                 |
| 41  | T-19   | 0:00                   | 0:00                 |
| 42  | T-18   | 0:00                   | 0:00                 |
| 43  | T-83   | 49:02                  | 20:30                |
| 44  | T-84   | 26:05                  | 11:17                |
| 45  | T-120  | 9:27                   | 4:16                 |
| 46  | T-105  | 0:00                   | 0:00                 |
| 47  | T-97   | 13:53                  | 5:33                 |
| 48  | T-152  | 41:06                  | 13:15                |
| 49  | T-153  | 22:39                  | 9:06                 |
| 50  | T-154  | 0:00                   | 0:00                 |
| 51  | T-155  | 0:00                   | 0:00                 |
| 52  | T-160  | 0:00                   | 0:00                 |
| 53  | T-161  | 38:12                  | 17:06                |
| 54  | T-163  | 14:08                  | 5:33                 |
| 55  | T-164  | 42:10                  | 19:16                |
| 56  | T-165  | 10:25                  | 4:20                 |
| 57  | T-43   | 0:00                   | 0:00                 |
| 58  | T-45   | 0:00                   | 0:00                 |
| 59  | T-35   | 1:22                   | 0:36                 |
| 60  | T-47   | 0:00                   | 0:00                 |
| 61  | T-56   | 0:00                   | 0:00                 |
| 62  | T-55   | 0:00                   | 0:00                 |
| 63  | T-53   | 0:00                   | 0:00                 |
| 64  | T-73   | 0:00                   | 0:00                 |
| 65  | T-46   | 0:00                   | 0:00                 |
| 66  | T-57   | 0:00                   | 0:00                 |
| 67  | T-34   | 3:42                   | 1:51                 |
| 68  | T-74   | 0:00                   | 0:00                 |
| 69  | T-51   | 16:04                  | 6:40                 |
| 70  | T-42   | 0:00                   | 0:00                 |
| 71  | T-54   | 0:00                   | 0:00                 |
| 72  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (1)  | 0:00                   | 0:00                 |
| 73  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (2)  | 0:00                   | 0:00                 |
| 74  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (3)  | 0:00                   | 0:00                 |
| 75  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (4)  | 0:00                   | 0:00                 |
| 76  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (5)  | 0:00                   | 0:00                 |
| 77  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (6)  | 0:00                   | 0:00                 |
| 78  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (7)  | 0:00                   | 0:00                 |
| 79  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (8)  | 0:00                   | 0:00                 |
| 80  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (9)  | 0:00                   | 0:00                 |
| 81  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (10) | 0:00                   | 0:00                 |
| 82  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (11) | 0:00                   | 0:00                 |
| 83  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (12) | 0:00                   | 0:00                 |
| 84  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (13) | 0:00                   | 0:00                 |
| 85  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (14) | 0:00                   | 0:00                 |

To be continued on next page...

## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| No. | Name   | Worst case<br>[h/year] | Expected<br>[h/year] |
|-----|--|------------------------|----------------------|
| 86  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (15) | 0:00                   | 0:00                 |
| 87  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (16) | 0:00                   | 0:00                 |
| 88  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (17) | 0:00                   | 0:00                 |
| 89  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (18) | 0:00                   | 0:00                 |
| 90  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (19) | 0:00                   | 0:00                 |
| 91  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (20) | 0:00                   | 0:00                 |
| 92  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (21) | 4:06                   | 1:25                 |
| 93  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (22) | 0:00                   | 0:00                 |
| 94  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (23) | 0:00                   | 0:00                 |
| 95  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (24) | 0:00                   | 0:00                 |
| 96  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (25) | 0:00                   | 0:00                 |
| 97  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (26) | 0:00                   | 0:00                 |
| 98  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (27) | 0:00                   | 0:00                 |
| 99  | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (28) | 0:00                   | 0:00                 |
| 100 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (29) | 0:00                   | 0:00                 |
| 101 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (30) | 0:00                   | 0:00                 |
| 102 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (31) | 0:00                   | 0:00                 |
| 103 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (32) | 0:00                   | 0:00                 |
| 104 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (33) | 0:00                   | 0:00                 |
| 105 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (34) | 0:00                   | 0:00                 |
| 106 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (35) | 0:00                   | 0:00                 |
| 107 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (36) | 0:00                   | 0:00                 |
| 108 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (37) | 0:00                   | 0:00                 |
| 109 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (38) | 0:00                   | 0:00                 |
| 110 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (39) | 0:00                   | 0:00                 |
| 111 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (40) | 0:00                   | 0:00                 |
| 112 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (41) | 0:00                   | 0:00                 |
| 113 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (42) | 0:00                   | 0:00                 |
| 114 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (43) | 0:00                   | 0:00                 |
| 115 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (44) | 0:00                   | 0:00                 |
| 116 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (45) | 0:00                   | 0:00                 |
| 117 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (46) | 0:00                   | 0:00                 |
| 118 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (47) | 12:37                  | 5:14                 |
| 119 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (48) | 0:00                   | 0:00                 |
| 120 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (49) | 0:00                   | 0:00                 |
| 121 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (50) | 0:00                   | 0:00                 |
| 122 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (51) | 0:00                   | 0:00                 |
| 123 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (52) | 0:00                   | 0:00                 |
| 124 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (53) | 0:00                   | 0:00                 |
| 125 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (54) | 0:00                   | 0:00                 |
| 126 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (55) | 0:00                   | 0:00                 |
| 127 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (56) | 0:00                   | 0:00                 |
| 128 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (57) | 0:00                   | 0:00                 |
| 129 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (58) | 0:00                   | 0:00                 |
| 130 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (59) | 0:00                   | 0:00                 |
| 131 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (60) | 0:00                   | 0:00                 |
| 132 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (61) | 0:00                   | 0:00                 |
| 133 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (62) | 0:00                   | 0:00                 |
| 134 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (63) | 0:00                   | 0:00                 |
| 135 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (64) | 0:00                   | 0:00                 |
| 136 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (65) | 0:00                   | 0:00                 |
| 137 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (66) | 0:00                   | 0:00                 |
| 138 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (67) | 0:00                   | 0:00                 |
| 139 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (68) | 0:00                   | 0:00                 |
| 140 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (69) | 0:00                   | 0:00                 |
| 141 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (70) | 0:00                   | 0:00                 |
| 142 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (71) | 1:44                   | 0:43                 |
| 143 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (72) | 0:00                   | 0:00                 |
| 144 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (73) | 0:00                   | 0:00                 |
| 145 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (74) | 0:00                   | 0:00                 |

To be continued on next page...

Project: Aurora  
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

## SHADOW - Main Result

Calculation: A054 N149/V110 Shadow

...continued from previous page

| No. | Name   | Worst case<br>[h/year] | Expected<br>[h/year] |
|-----|--|------------------------|----------------------|
| 146 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (75) | 0:00                   | 0:00                 |
| 147 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (76) | 0:00                   | 0:00                 |
| 148 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (77) | 0:00                   | 0:00                 |
| 149 | VESTAS V100 2000 100.0 !O! hub: 80.0 m (TOT: 130.0 m) (78) | 0:00                   | 0:00                 |

Project:  
Aurora

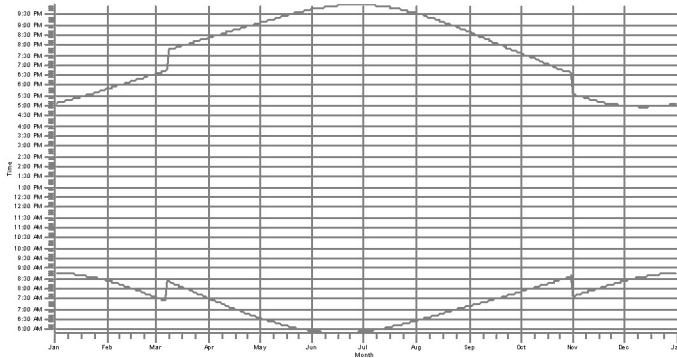
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

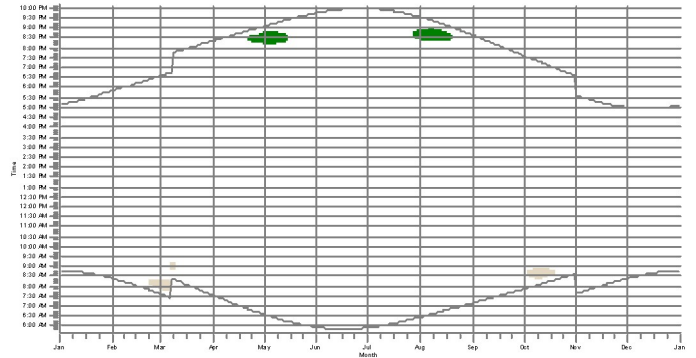
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

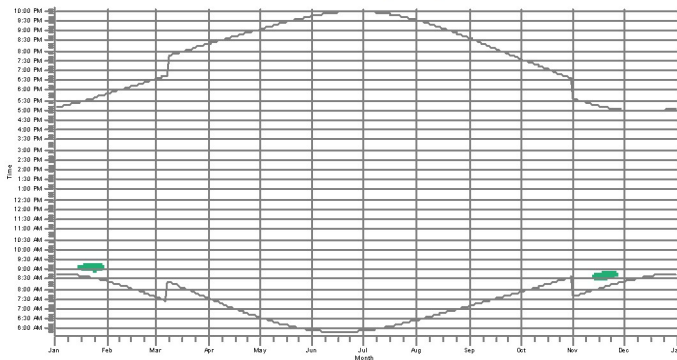
A: 1 - Non-Participating



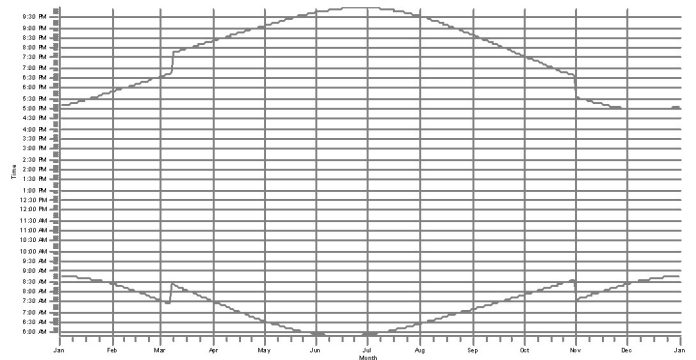
B: 39 - Participating



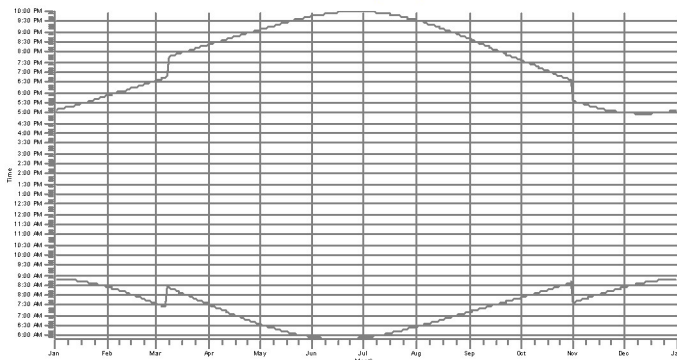
C: 2 - Non-Participating



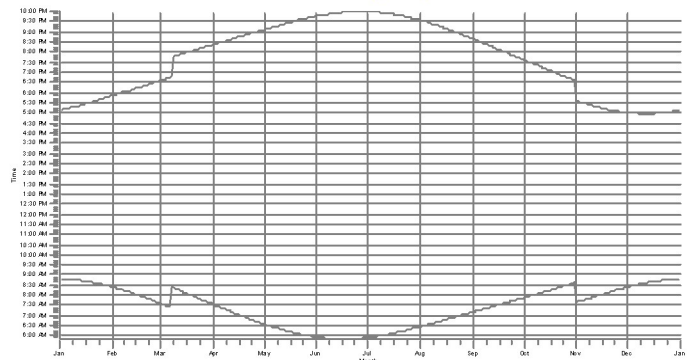
D: 40 - Participating



E: 41 - Participating



F: 42 - Participating



WFO: 1: T-41 49: T-153 92: VESTAS V100 2000 100-0 ICH hub: 80.0 m (TOT: 130.0 m) (2)

Project:  
Aurora

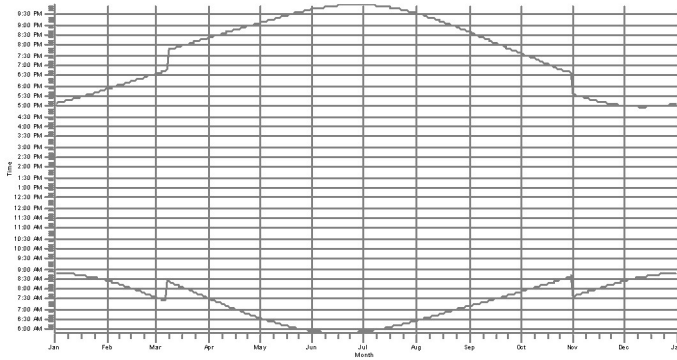
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

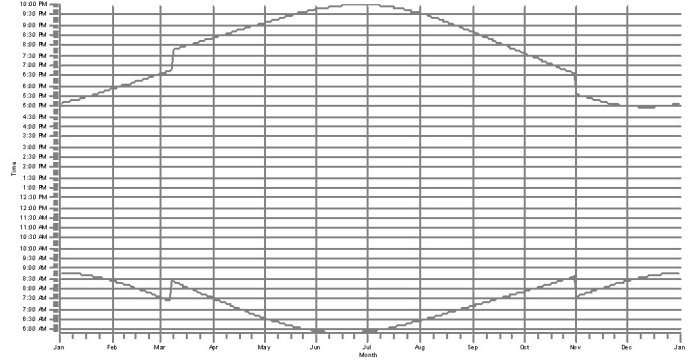
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

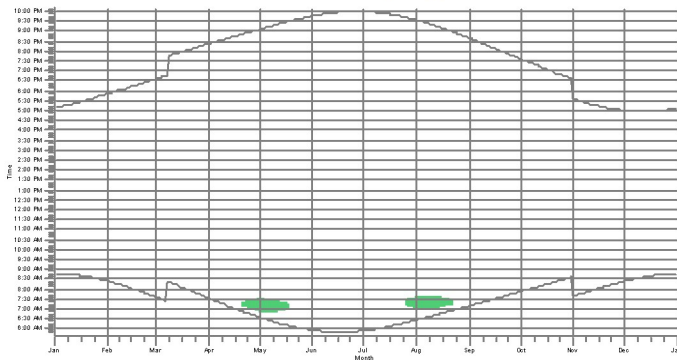
G: 43 - Participating



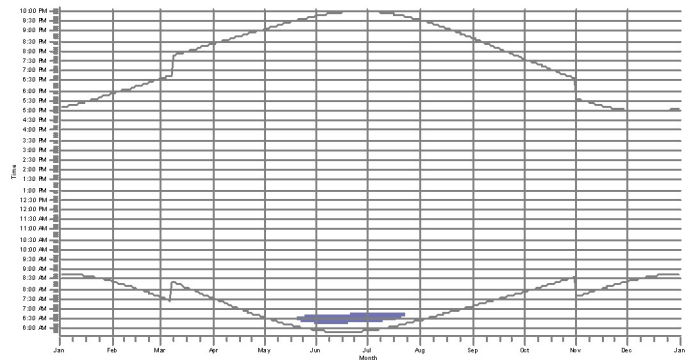
H: 44 - Participating



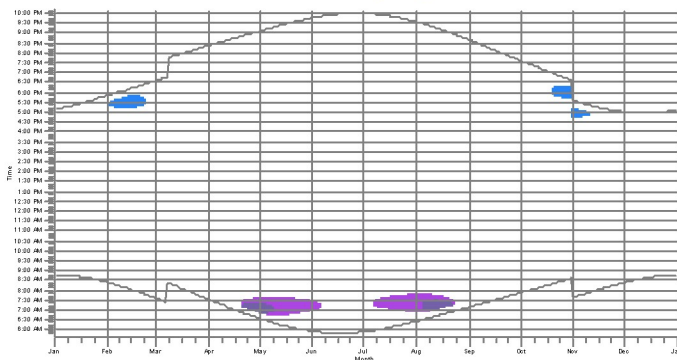
I: 3 - Non-Participating



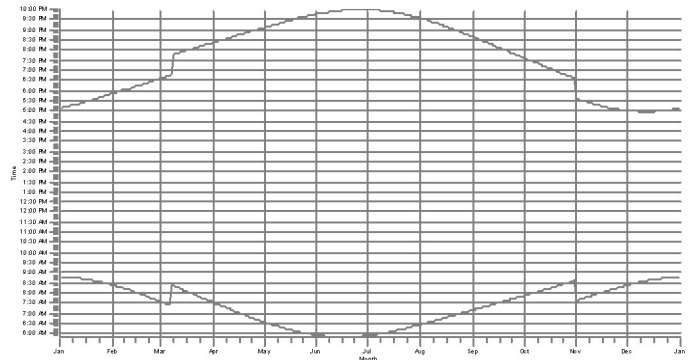
J: 4 - Non-Participating



K: 45 - Participating



L: 46 - Participating



WFO  
28 T:00

39 T:48

43 T:83

44 T:84

46 T:51

Project:  
Aurora

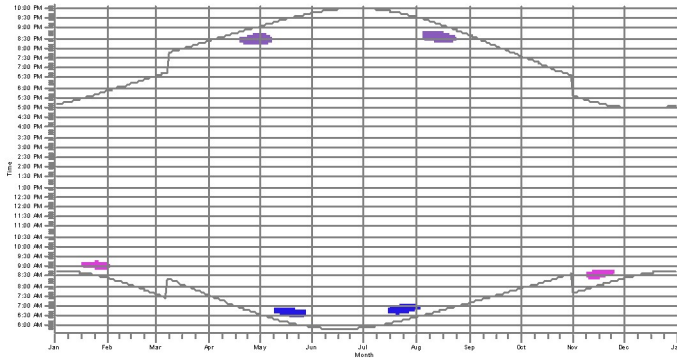
Description:

Licensed user:  
TradeWind Energy, Inc  
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US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

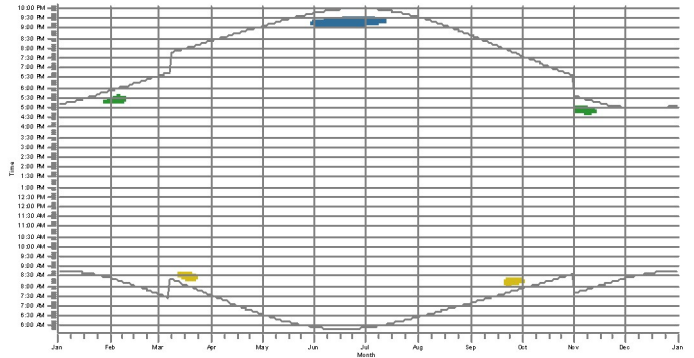
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

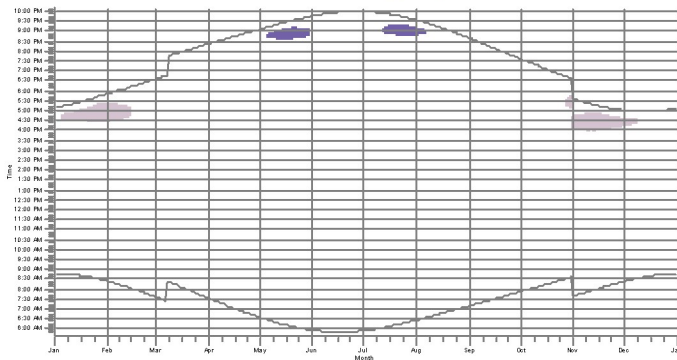
M: 47 - Participating



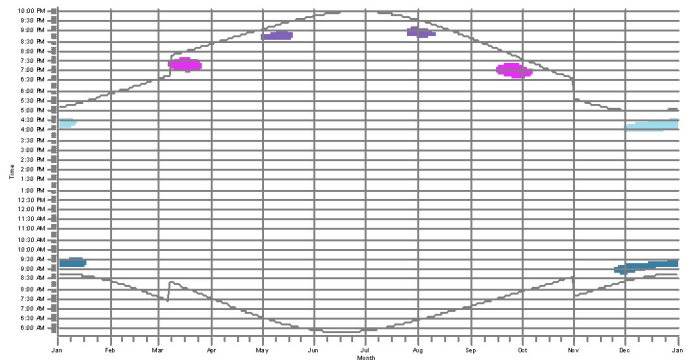
N: 48 - Participating



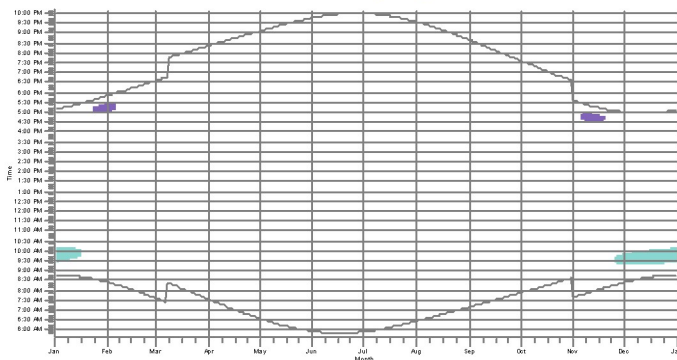
O: 5 - Non-Participating



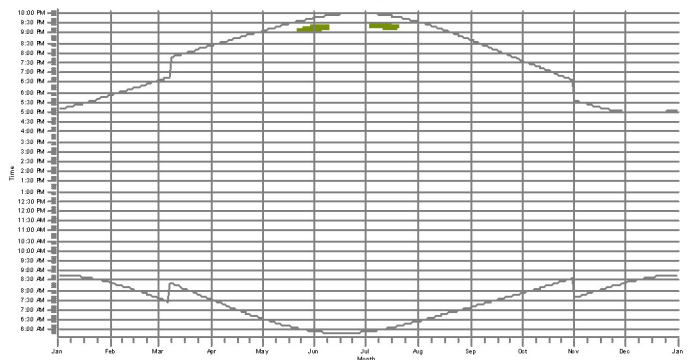
P: 49 - Participating



Q: 50 - Participating



R: 51 - Participating



Project:  
Aurora

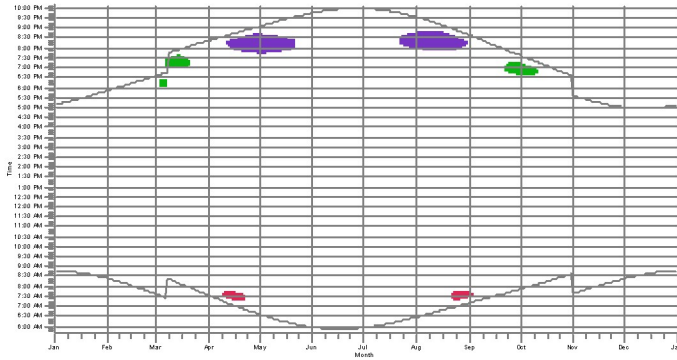
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

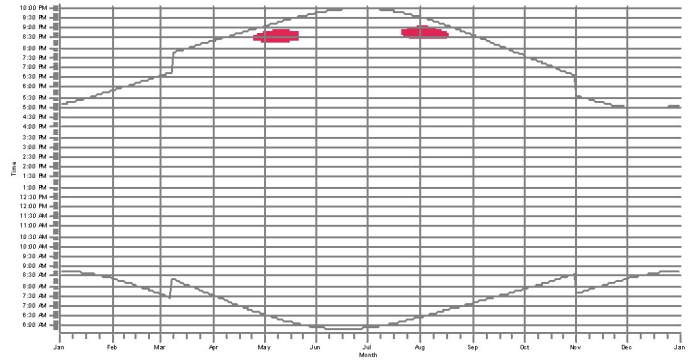
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

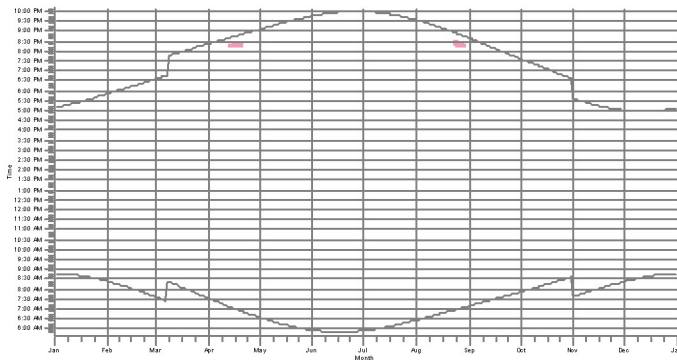
S: 6 - Non-Participating



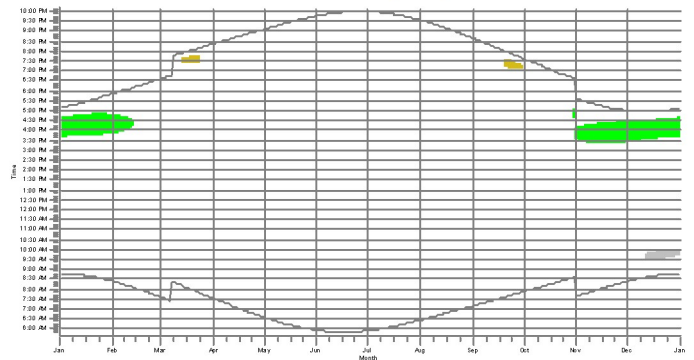
T: 52 - Participating



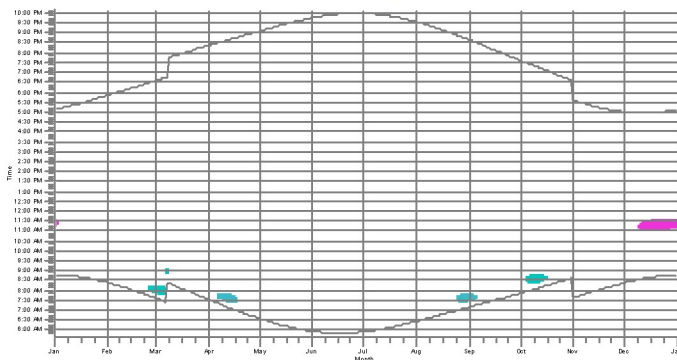
U: 7 - Non-Participating



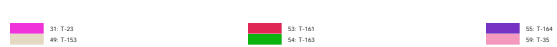
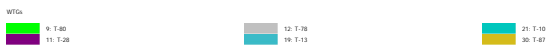
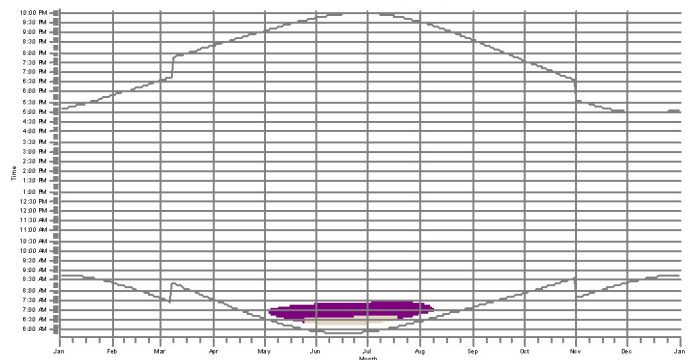
V: 8 - Non-Participating



W: 9 - Non-Participating



X: 10 - Non-Participating



Project:  
Aurora

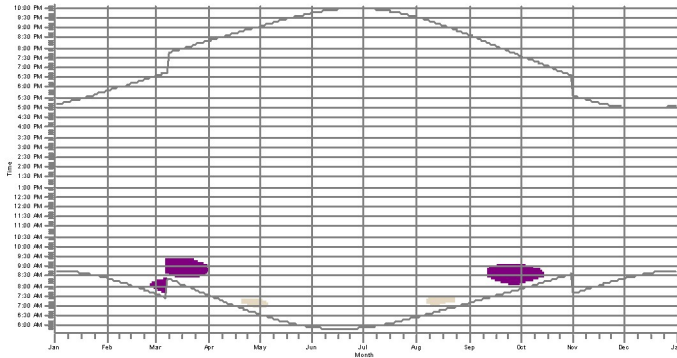
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

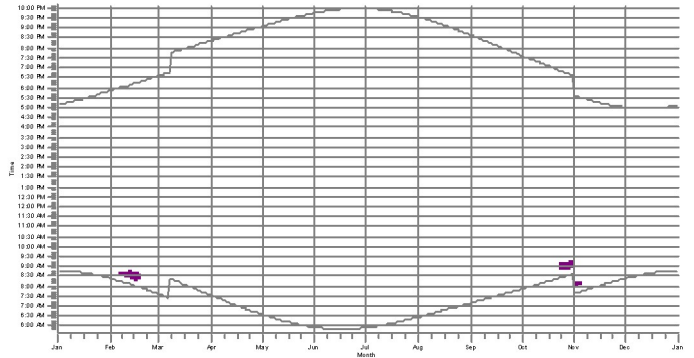
# SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

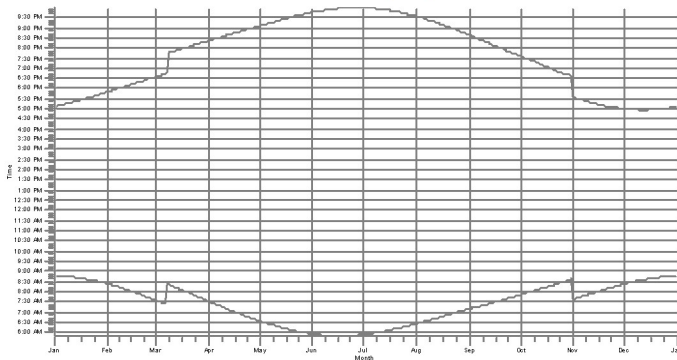
Y: 11 - Non-Participating



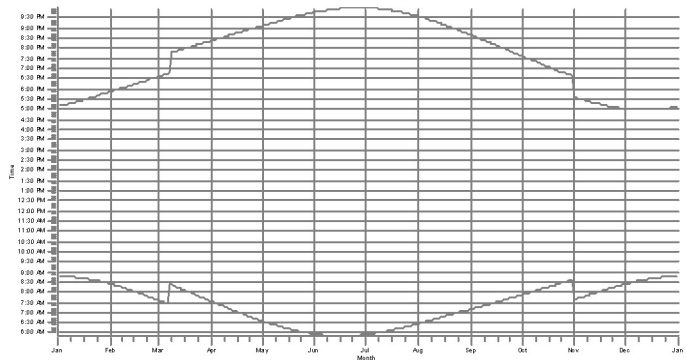
Z: 53 - Participating



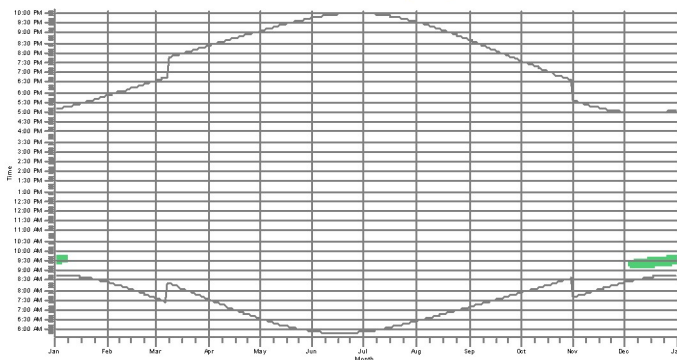
AA: 54 - Participating



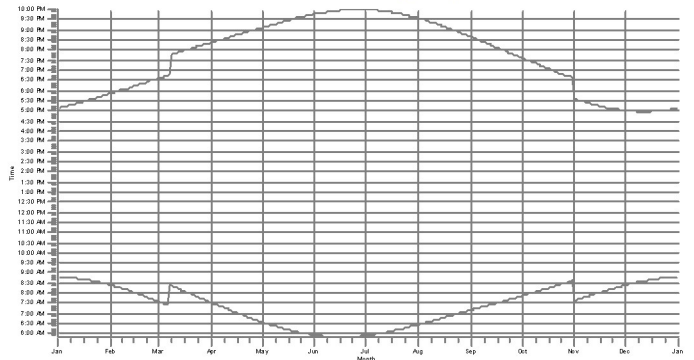
AB: 12 - Non-Participating



AC: 13 - Non-Participating



AD: 14 - Non-Participating



WfG: 11: T:28

28: T:08

49: T:153

Project:  
Aurora

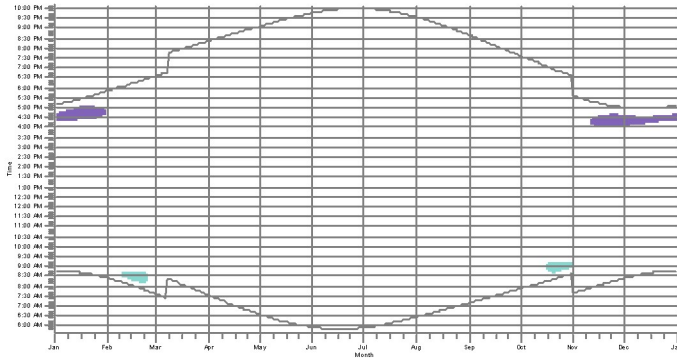
Description:

Licensed user:  
TradeWind Energy, Inc  
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+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

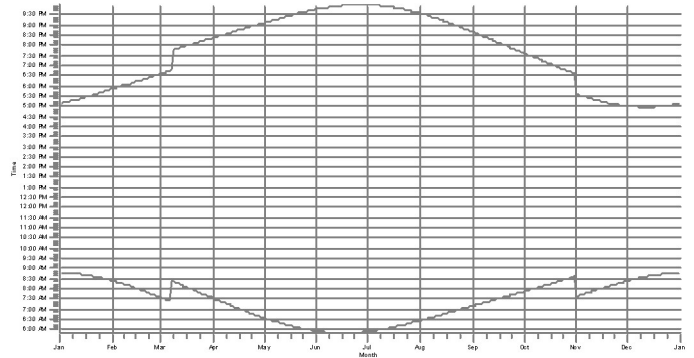
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

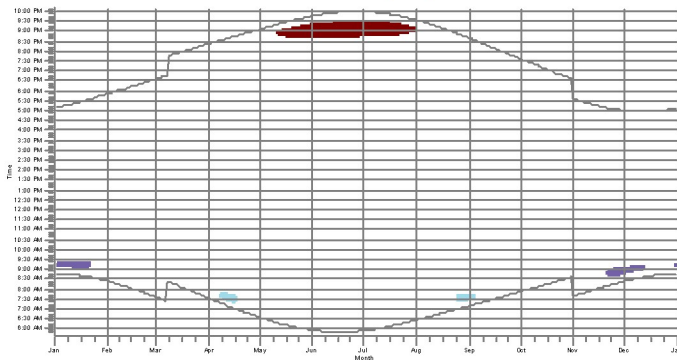
AE: 55 - Participating



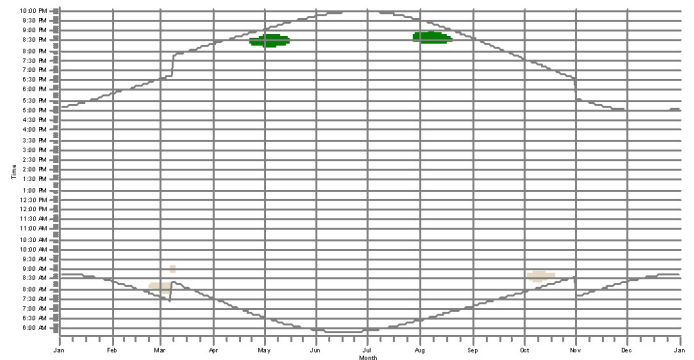
AF: 15 - Non-Participating



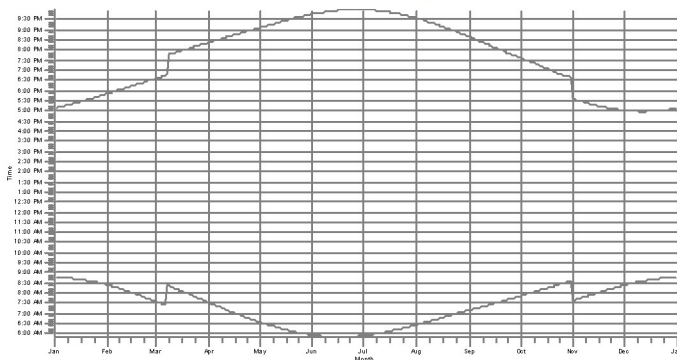
AG: 57 - Participating



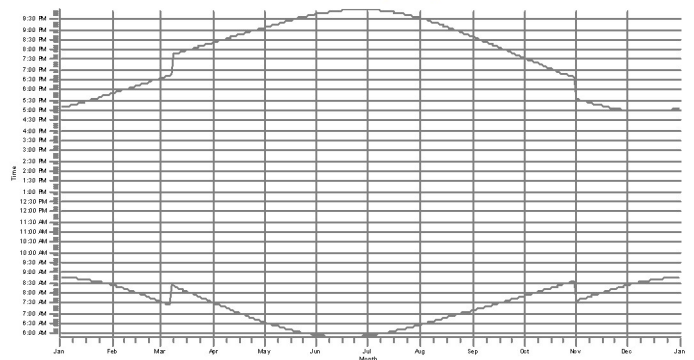
AH: 59 - Participating



AI: 61 - Participating



AJ: 62 - Participating



Project:  
Aurora

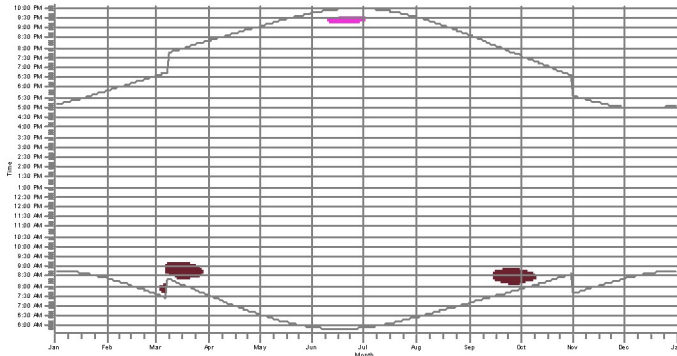
Description:

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Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

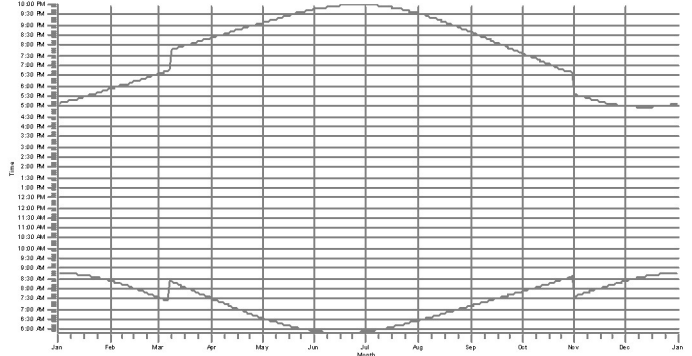
# SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

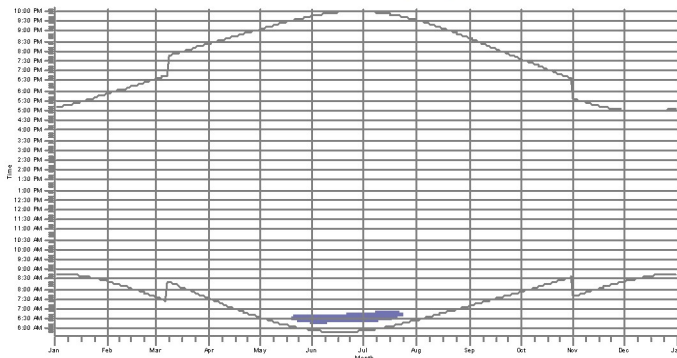
AK: 63 - Participating



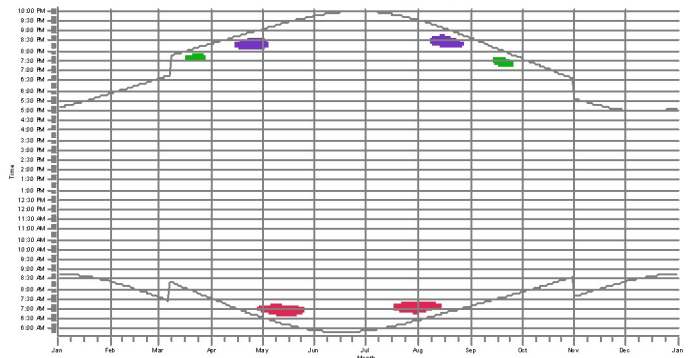
AL: 16 - Non-Participating



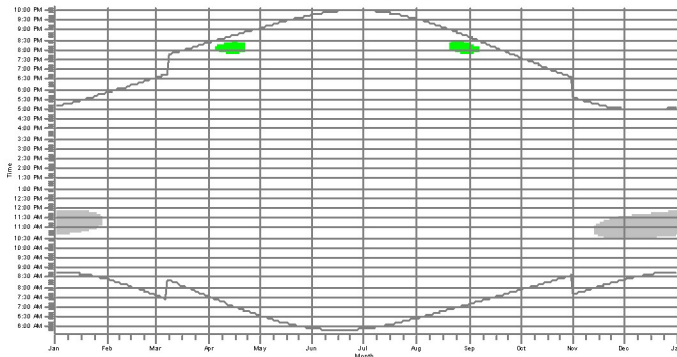
AM: 17 - Non-Participating



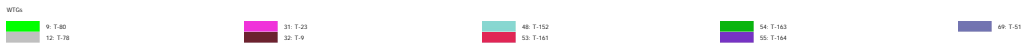
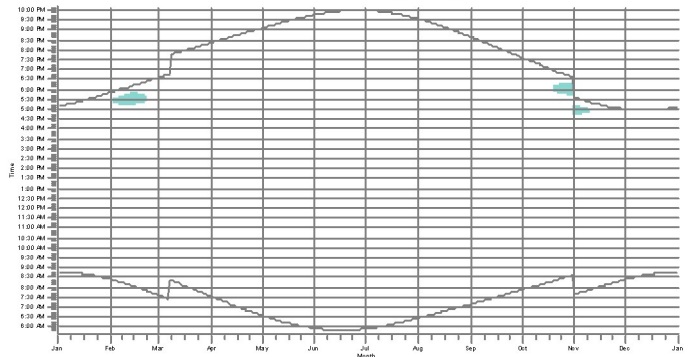
AN: 18 - Non-Participating



AO: 64 - Participating



AP: 19 - Non-Participating



Project:  
Aurora

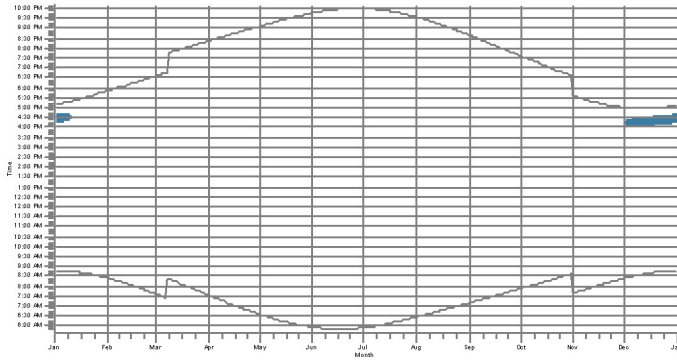
Description:

Licensed user:  
TradeWind Energy, Inc  
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US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

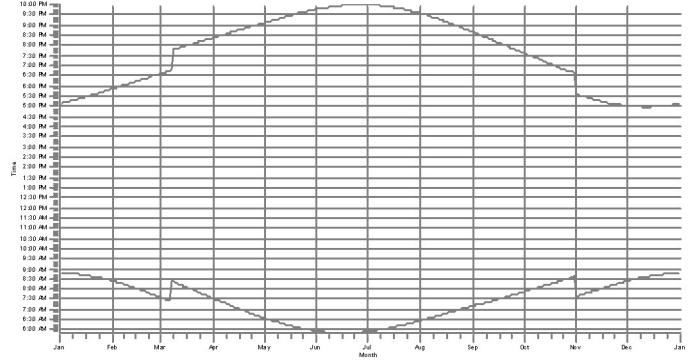
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

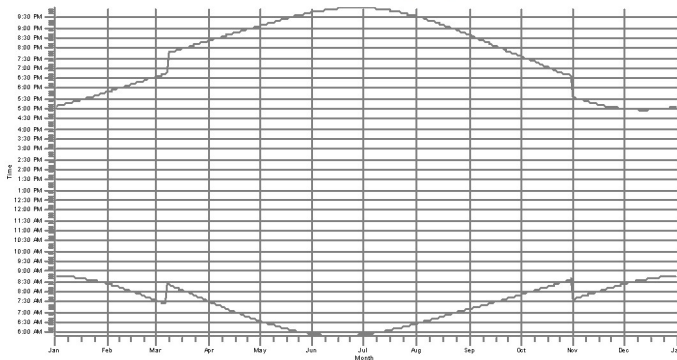
AQ: 20 - Non-Participating



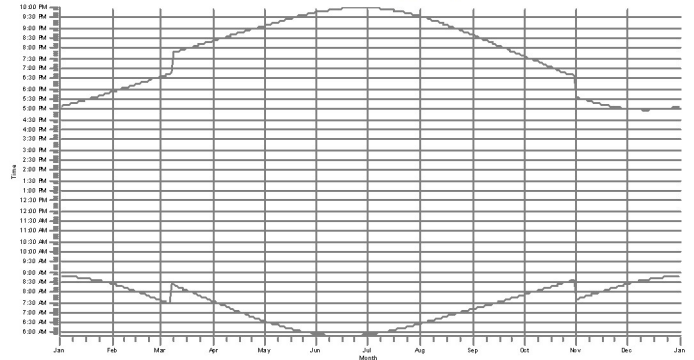
AR: 21 - Non-Participating



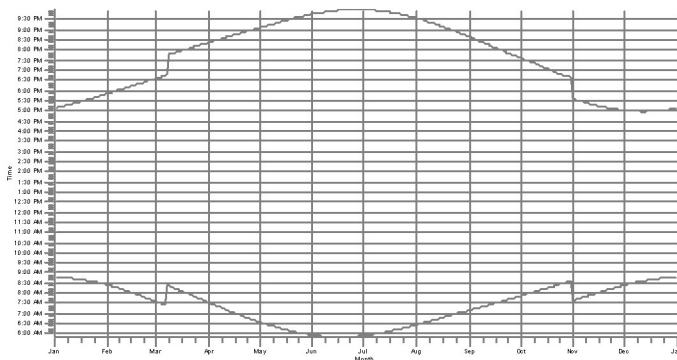
AS: 22 - Non-Participating



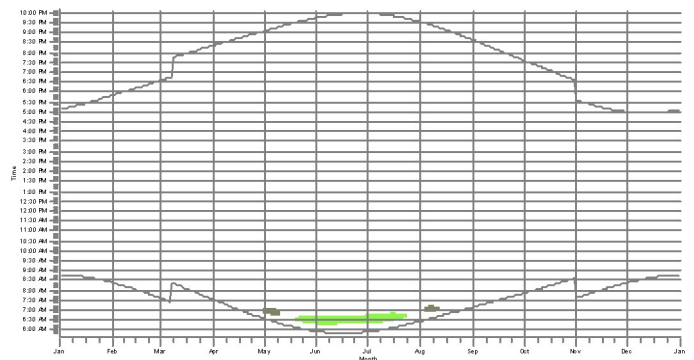
AT: 23 - Non-Participating



AU: 24 - Non-Participating



AV: 27 - Non-Participating



WTG: 37: 1.69  
118: VESTAS V100 2000 100.0 ICH hub: 80.0 m (TOT: 130.0 m) (47)  
142: VESTAS V100 2000 100.0 ICH hub: 80.0 m (TOT: 130.0 m) (71)

Project:  
Aurora

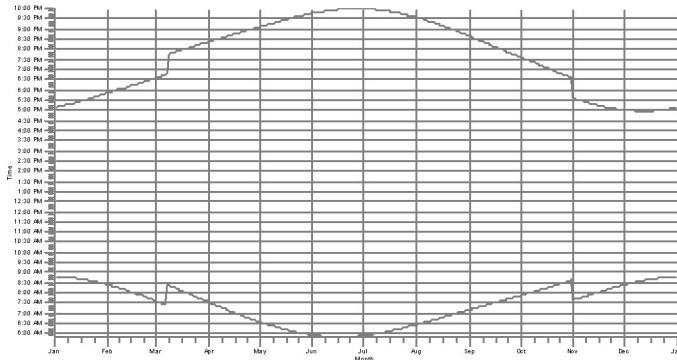
Description:

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Calculated:  
9/5/2019 5:05 PM/3.0.654

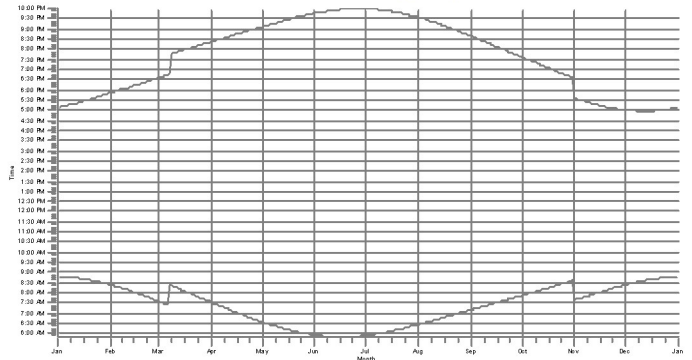
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

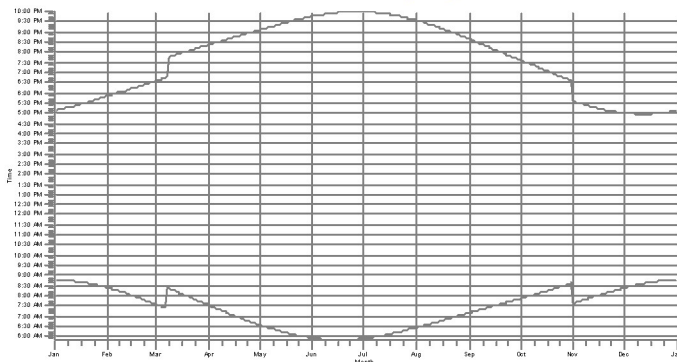
AW: 29 - Non-Participating



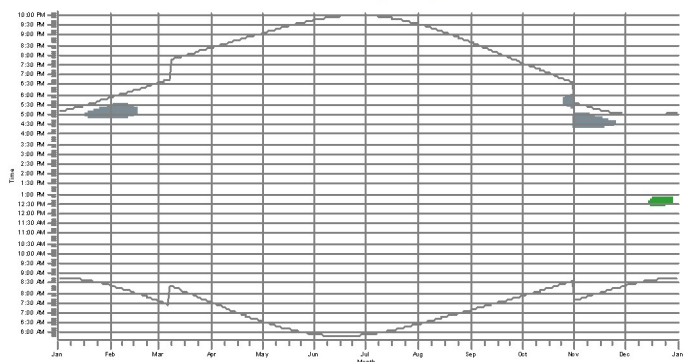
AX: 30 - Non-Participating



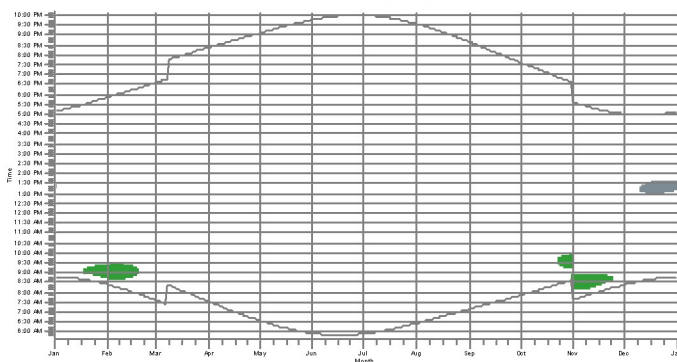
AY: 31 - Non-Participating



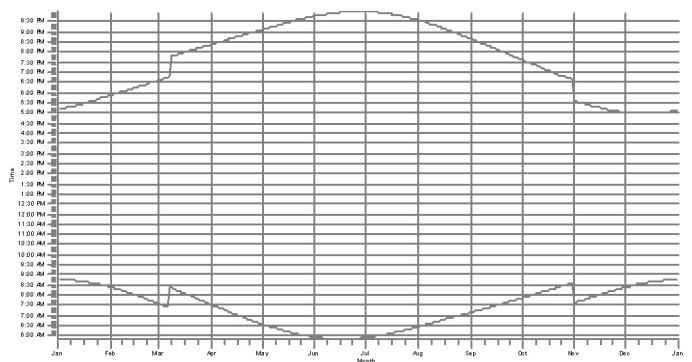
AZ: 66 - Participating



BA: 67 - Participating



BB: 68 - Participating



WfG: 20 T:25 38 T:24

Project:  
Aurora

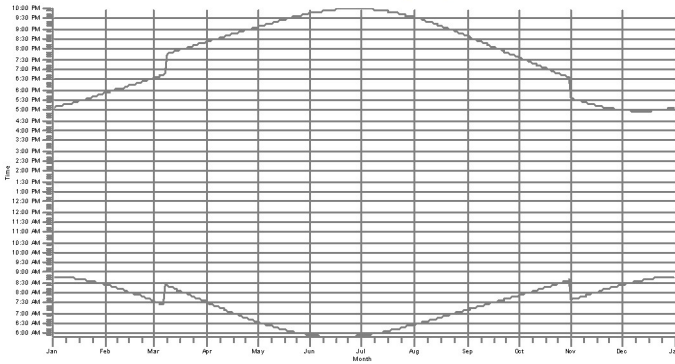
Description:

Licensed user:  
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Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

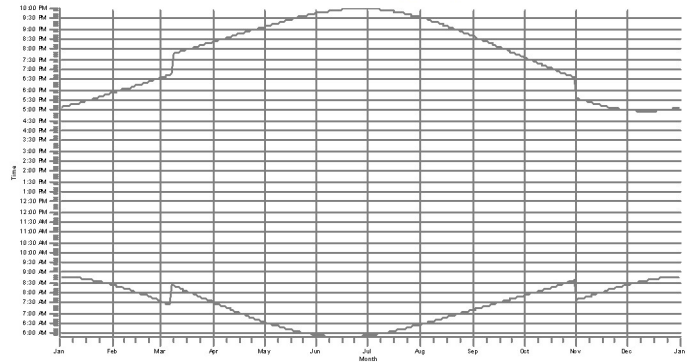
## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

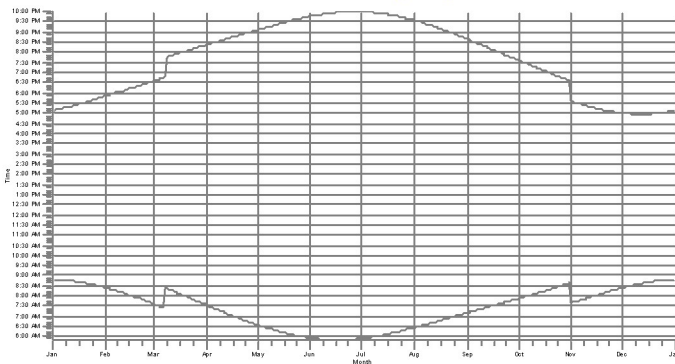
BC: 32 - Non-Participating



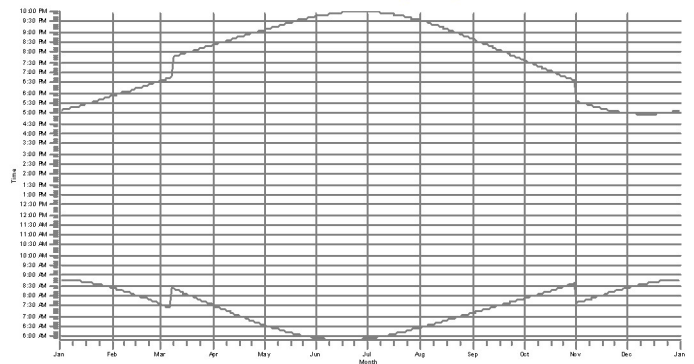
BD: 33 - Non-Participating



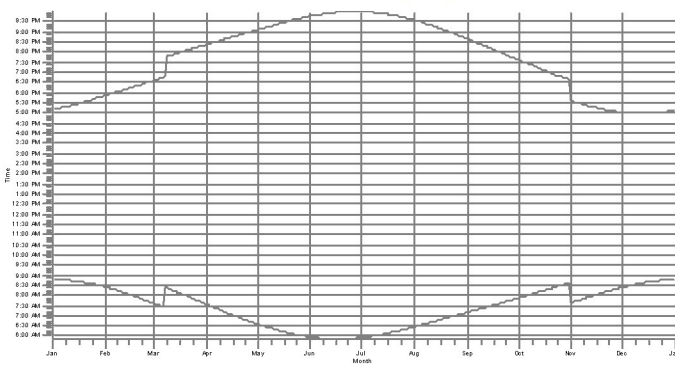
BE: 34 - Non-Participating



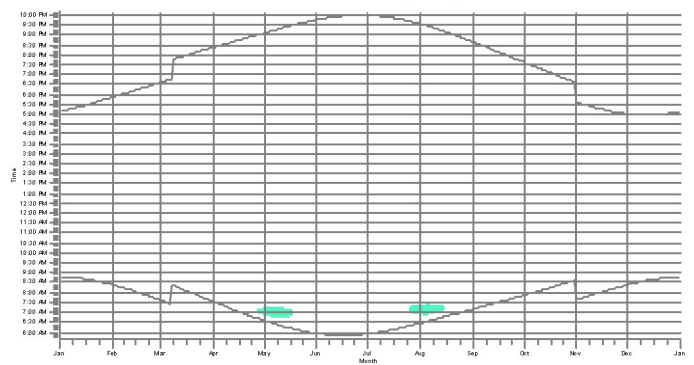
BF: 35 - Non-Participating



BG: 36 - Non-Participating



BH: 37 - Non-Participating



WEG  
56: T-165

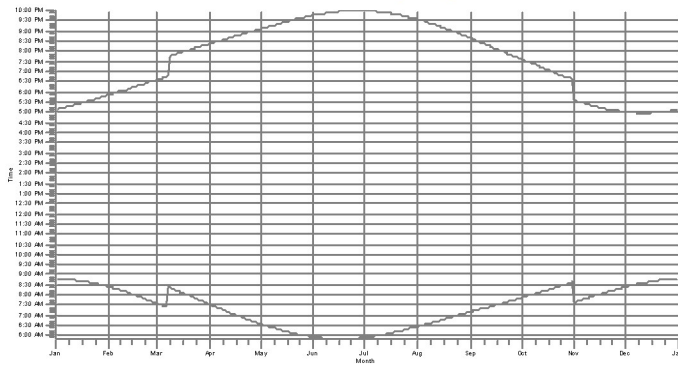
Project: Aurora  
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
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+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 5:05 PM/3.0.654

## SHADOW - Calendar, graphical

Calculation: A054 N149/V110 Shadow

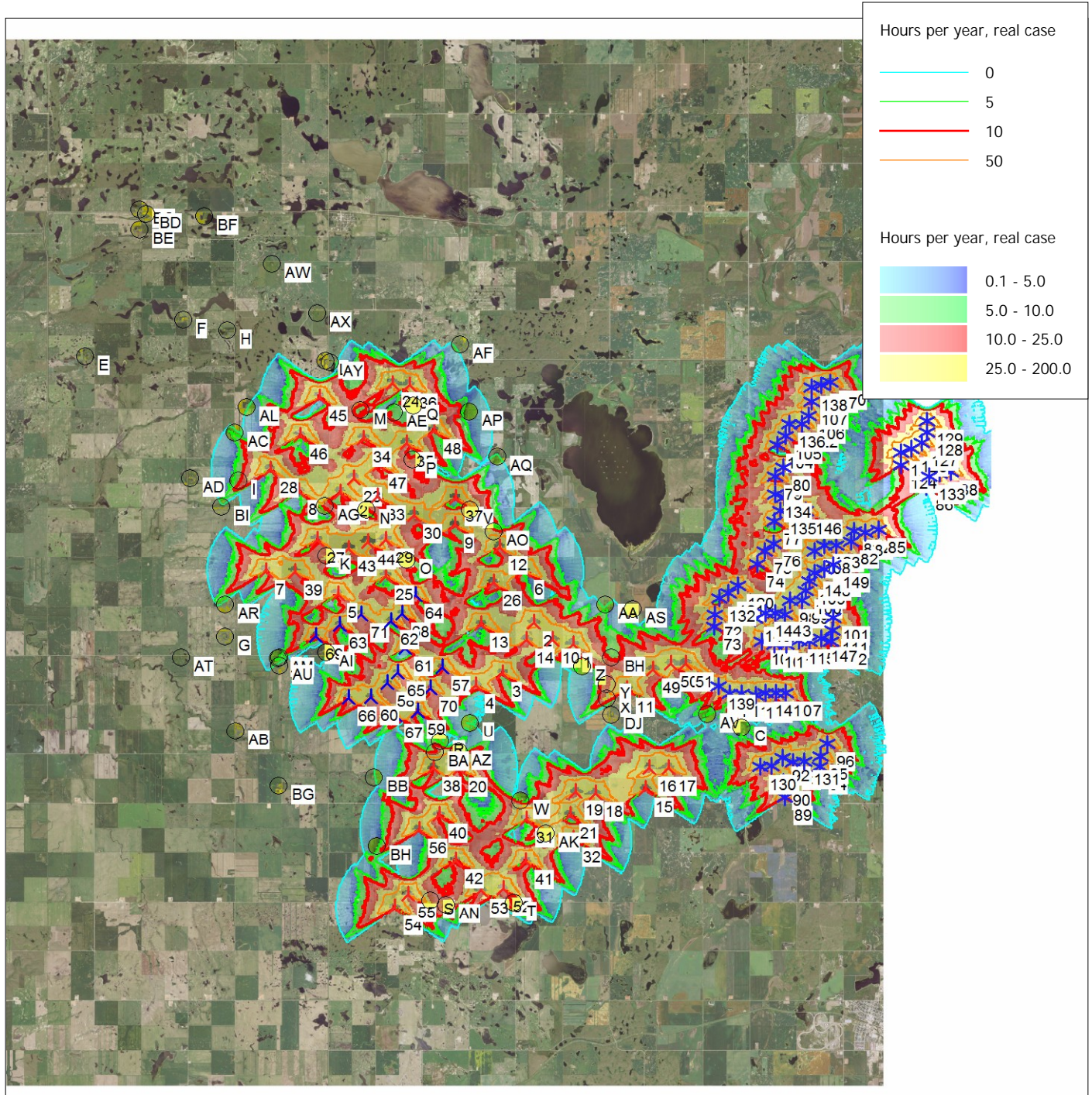
BI: 38 - Non-Participating



wfca

## SHADOW - Map

Calculation: A054 N149/V110 Shadow



Map: US Naval Research Laboratory , Print scale 1:200,000, Map center UTM WGS84 Zone: 13 East: 640,676 North: 5,375,910

▲ New WTG

\* Existing WTG

● Shadow receptor

Flicker map level: Height Contours: 150921\_TWE\_LindahlWest\_10ftHCLsfrom10mNED.wpo (3)

## Sound Map

# Aurora Wind Project - Anticipated Maximum Sound Levels

## N149 4.8 108m HH/V110 2.0 80m HH



### Legend

- Aurora
- Lindahl Wind Project Turbine

#### Aurora Wind Project Turbine (A054)

- N149-4.8 108m HH
- V110-2.0 80m HH

#### Sound Receptor (Non-Participating)

Sound Level (dBA)

- Below 39.99
- 40.00-45.00
- 45.01+

#### Sound Receptor (Participating)

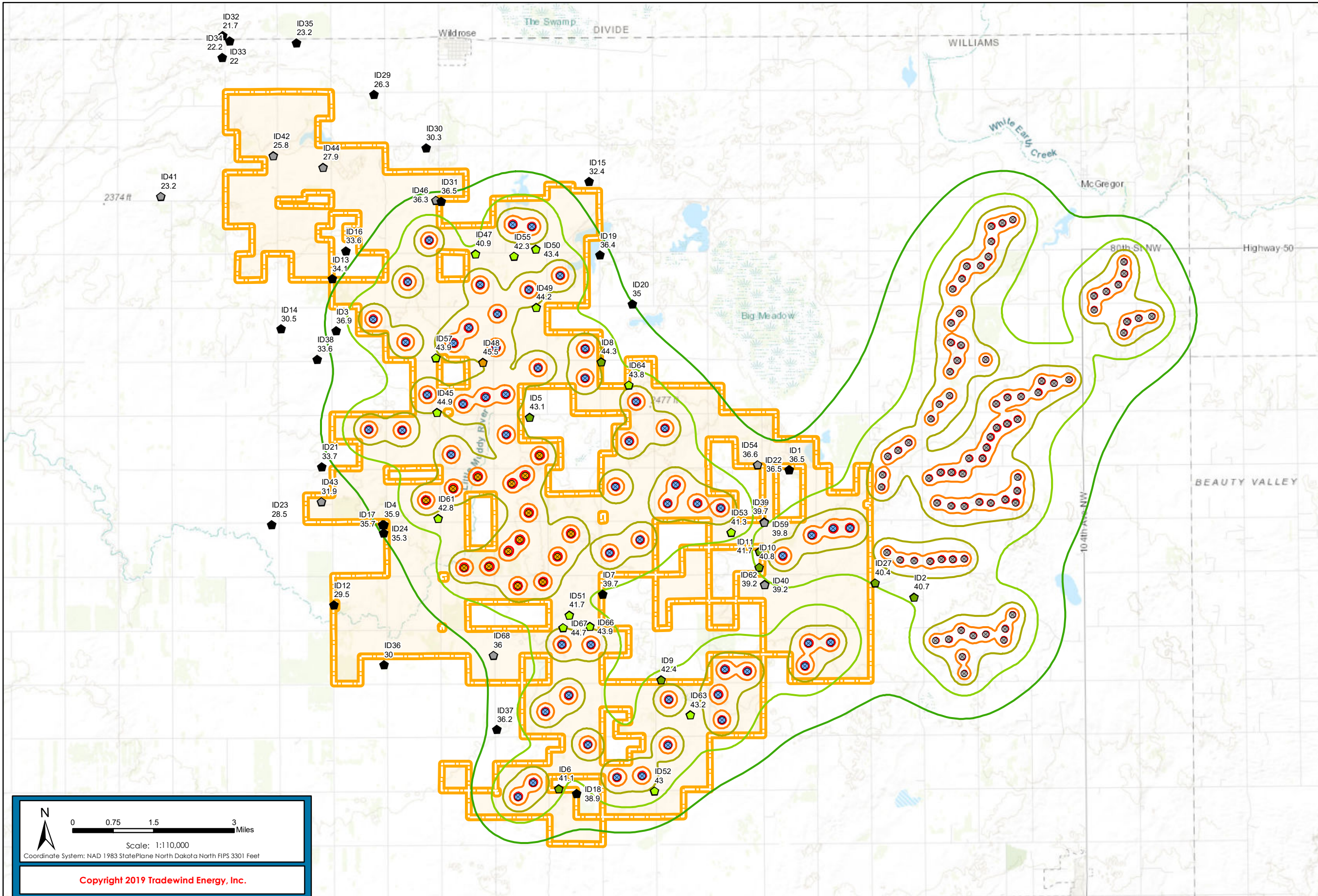
Sound Level (dBA)

- Below 39.99
- 40.00-45.00
- 45.01+

#### Sound Isolines

Sound Level (dBA)

- 35
- 40
- 45
- 50
- 55



Scale: 1:110,000  
 Coordinate System: NAD 1983 StatePlane North Dakota North FIPS 3301 Feet  
 Copyright 2019 Tradewind Energy, Inc.

The following companies and organizations provided data that contributed to the production of this map.

- U.S. Geological Survey (USGS)
- Environmental Systems Research Institute (ESRI)
- U.S. Department of Agriculture (USDA)
- U.S. Federal Aviation Administration (FAA)
- WhiteStar Corporation
- CoreLogic
- Ventix Inc. 29

## windPRO Sound Report

Project: Aurora  
Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 4:05 PM/3.0.654

## DECIBEL - Main Result

Calculation: A054 N149/V110

Noise calculation model:  
ISO 9613-2 General

Wind speed:  
95% rated power

Ground attenuation:  
General, fixed, Ground factor: 0.5

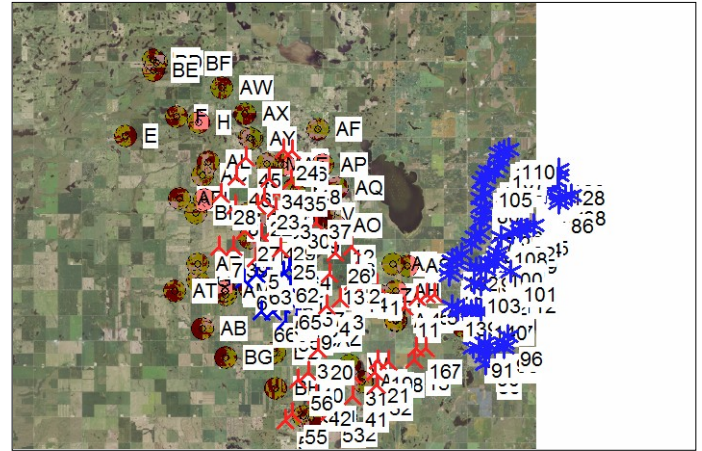
Meteorological coefficient, CO:  
0.0 dB

Type of demand in calculation:  
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

Noise values in calculation:  
All noise values are mean values (Lwa) (Normal)

Pure tones:  
Pure and Impulse tone penalty are added to WTG source noise  
Height above ground level, when no value in NSA object:  
1.5 m Don't allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive,  
positive is less restrictive.:  
0.0 dB(A)



Scale 1:500,000

New WTG  
Noise sensitive area

Existing WTG

## WTGs

|    | X(East) | Y(North)  | Z     | Row data/Description | WTG type |           |                |                   | Noise data         |                | Wind speed [m/s] | LwA_ref [dB(A)]  | Pure tones |         |      |
|----|---------|-----------|-------|----------------------|----------|-----------|----------------|-------------------|--------------------|----------------|------------------|--|------------|---------|------|
|    |         |           |       |                      | Valid    | Manufact. | Type-generator | Power, rated [kW] | Rotor diameter [m] | Hub height [m] |                  |  |            | Creator | Name |
| 1  | 642,085 | 5,374,363 | 728.5 | T-41                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 2  | 640,729 | 5,375,038 | 740.7 | T-62                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 3  | 639,692 | 5,373,363 | 740.7 | T-39                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 4  | 638,790 | 5,372,951 | 734.6 | T-37                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 5  | 633,988 | 5,375,810 | 737.6 | T-70                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 6  | 640,372 | 5,376,713 | 738.1 | T-77                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 7  | 631,510 | 5,376,507 | 731.5 | T-66                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 8  | 632,563 | 5,379,145 | 737.6 | T-93                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 9  | 637,951 | 5,378,169 | 715.2 | T-80                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 10 | 641,389 | 5,374,486 | 743.7 | T-58                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 11 | 643,972 | 5,372,967 | 712.3 | T-28                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 12 | 639,495 | 5,377,499 | 738.7 | T-78                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 13 | 638,928 | 5,374,941 | 737.6 | T-59                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 14 | 640,492 | 5,374,466 | 743.6 | T-40                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 15 | 644,695 | 5,369,685 | 736.0 | T-15                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 16 | 644,792 | 5,370,371 | 743.7 | T-16                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 17 | 645,456 | 5,370,405 | 735.1 | T-17                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 18 | 642,975 | 5,369,494 | 737.6 | T-12                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 19 | 642,303 | 5,369,536 | 734.9 | T-13                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 20 | 638,282 | 5,370,192 | 712.5 | T-25                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 21 | 642,122 | 5,368,780 | 734.6 | T-10                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 22 | 634,001 | 5,379,136 | 737.6 | T-95                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 23 | 634,443 | 5,379,605 | 731.5 | T-96                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 24 | 635,699 | 5,382,724 | 710.2 | T-122                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 25 | 635,628 | 5,376,434 | 728.5 | T-72                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 26 | 639,307 | 5,376,310 | 731.5 | T-75                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 27 | 633,243 | 5,377,581 | 731.5 | T-81                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 28 | 631,582 | 5,379,814 | 726.8 | T-98                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 29 | 635,586 | 5,377,640 | 725.5 | T-85                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 30 | 636,542 | 5,378,452 | 715.1 | T-87                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 31 | 640,641 | 5,368,602 | 728.5 | T-23                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 32 | 642,243 | 5,368,015 | 730.6 | T-9                  | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 33 | 635,270 | 5,379,029 | 725.4 | T-90                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 34 | 634,758 | 5,380,905 | 718.9 | T-107                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 35 | 636,220 | 5,380,785 | 716.3 | T-110                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 36 | 636,276 | 5,382,673 | 710.2 | T-124                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 37 | 637,941 | 5,379,046 | 713.2 | T-89                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 38 | 637,408 | 5,370,185 | 701.0 | T-24                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 39 | 632,509 | 5,376,501 | 722.8 | T-68                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 40 | 637,648 | 5,368,666 | 713.2 | T-20                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 41 | 640,643 | 5,367,238 | 719.3 | T-19                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 42 | 638,242 | 5,367,207 | 710.2 | T-18                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 43 | 634,318 | 5,377,326 | 731.6 | T-83                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 44 | 634,979 | 5,377,549 | 725.3 | T-84                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 45 | 633,206 | 5,382,201 | 722.4 | T-120                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 46 | 632,585 | 5,380,949 | 731.5 | T-105                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 47 | 635,298 | 5,380,049 | 728.5 | T-97                 | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 48 | 637,149 | 5,381,224 | 704.1 | T-152                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 49 | 644,833 | 5,373,605 | 713.9 | T-153                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 50 | 645,462 | 5,373,811 | 728.5 | T-154                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 51 | 645,966 | 5,373,838 | 730.1 | T-155                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) + 2dB (110.1) - octave - all hub heights 95% rated | (95%)      | 110.1   | No   |
| 52 | 639,890 | 5,366,309 | 710.2 | T-160                | Yes      | NORDEX    | N149-4.8-4,800 | 4,800             | 149.0              | 108.0          | USER             | Mode 00 - 108.1 dB(A) +  |            |         |      |

Project: Description:

Aurora

Licensed user:

TradeWind Energy, Inc
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Calculated:
9/5/2019 4:05 PM/3.0.654

DECIBEL - Main Result

Calculation: A054 N149/V110

...continued from previous page

Table with columns: X(East), Y(North), Z, Row data/Description, WTG type (Valid, Manufact., Type-generator), Power, Rotor diameter, Hub height, Noise data (Creator, Name), Wind speed, LwA\_ref, Pure tones. Contains 149 rows of data for various wind turbine configurations.

Calculation Results

## DECIBEL - Main Result

Calculation: A054 N149/V110

### Sound Level

| Noise sensitive area |                     |         |           | Demands |                 |         | Sound Level |                          | Demands fulfilled ? |     |
|----------------------|---------------------|---------|-----------|---------|-----------------|---------|-------------|--------------------------|---------------------|-----|
| No.                  | Name                | X(East) | Y(North)  | Z       | Imission height | Noise   | From WTGs   | Distance to noise demand | Noise               |     |
|                      |                     |         |           | [m]     | [m]             | [dB(A)] | [dB(A)]     | [m]                      |                     |     |
| A 1                  | - Non-Participating | 644,116 | 5,375,554 | 701.3   | 1.5             | 50.0    | 36.5        | 1,815                    |                     | Yes |
| B 39                 | - Participating     | 643,400 | 5,373,971 | 711.5   | 1.5             | 50.0    | 39.7        | 907                      |                     | Yes |
| C 2                  | - Non-Participating | 647,930 | 5,371,801 | 718.0   | 1.5             | 50.0    | 40.7        | 889                      |                     | Yes |
| D 40                 | - Participating     | 643,453 | 5,372,099 | 716.3   | 1.5             | 50.0    | 39.2        | 763                      |                     | Yes |
| E 41                 | - Participating     | 625,162 | 5,383,364 | 711.9   | 1.5             | 50.0    | 23.2        | 7,095                    |                     | Yes |
| F 42                 | - Participating     | 628,500 | 5,384,644 | 704.1   | 1.5             | 50.0    | 25.8        | 5,059                    |                     | Yes |
| G 43                 | - Participating     | 630,148 | 5,374,327 | 691.9   | 1.5             | 50.0    | 31.9        | 2,328                    |                     | Yes |
| H 44                 | - Participating     | 629,997 | 5,384,325 | 711.4   | 1.5             | 50.0    | 27.9        | 3,606                    |                     | Yes |
| I 3                  | - Non-Participating | 630,488 | 5,379,437 | 722.7   | 1.5             | 50.0    | 36.9        | 914                      |                     | Yes |
| J 4                  | - Non-Participating | 632,031 | 5,373,676 | 696.3   | 1.5             | 50.0    | 35.9        | 1,196                    |                     | Yes |
| K 45                 | - Participating     | 633,554 | 5,377,057 | 735.4   | 1.5             | 50.0    | 44.9        | 352                      |                     | Yes |
| L 46                 | - Participating     | 633,395 | 5,383,413 | 715.7   | 1.5             | 50.0    | 36.3        | 983                      |                     | Yes |
| M 47                 | - Participating     | 634,615 | 5,381,825 | 716.9   | 1.5             | 50.0    | 40.9        | 681                      |                     | Yes |
| N 48                 | - Participating     | 634,891 | 5,378,584 | 728.5   | 1.5             | 50.0    | 45.5        | 317                      |                     | Yes |
| O 5                  | - Non-Participating | 636,328 | 5,376,974 | 731.5   | 1.5             | 50.0    | 43.1        | 621                      |                     | Yes |
| P 49                 | - Participating     | 636,455 | 5,380,259 | 709.9   | 1.5             | 50.0    | 44.2        | 325                      |                     | Yes |
| Q 50                 | - Participating     | 636,416 | 5,382,006 | 707.4   | 1.5             | 50.0    | 43.4        | 425                      |                     | Yes |
| R 51                 | - Participating     | 637,621 | 5,371,070 | 716.6   | 1.5             | 50.0    | 41.7        | 657                      |                     | Yes |
| S 6                  | - Non-Participating | 637,411 | 5,365,868 | 713.2   | 1.5             | 50.0    | 41.1        | 538                      |                     | Yes |
| T 52                 | - Participating     | 640,276 | 5,365,862 | 710.2   | 1.5             | 50.0    | 43.0        | 339                      |                     | Yes |
| U 7                  | - Non-Participating | 638,615 | 5,371,717 | 720.3   | 1.5             | 50.0    | 39.7        | 995                      |                     | Yes |
| V 8                  | - Non-Participating | 638,435 | 5,378,666 | 709.4   | 1.5             | 50.0    | 44.3        | 368                      |                     | Yes |
| W 9                  | - Non-Participating | 640,413 | 5,369,191 | 728.5   | 1.5             | 50.0    | 42.4        | 383                      |                     | Yes |
| X 10                 | - Non-Participating | 643,279 | 5,372,615 | 722.4   | 1.5             | 50.0    | 40.8        | 527                      |                     | Yes |
| Y 11                 | - Non-Participating | 643,282 | 5,373,088 | 726.9   | 1.5             | 50.0    | 41.7        | 450                      |                     | Yes |
| Z 53                 | - Participating     | 642,413 | 5,373,644 | 734.1   | 1.5             | 50.0    | 41.3        | 535                      |                     | Yes |
| AA 54                | - Participating     | 643,167 | 5,375,685 | 714.9   | 1.5             | 50.0    | 36.6        | 1,459                    |                     | Yes |
| AB 12                | - Non-Participating | 630,584 | 5,371,240 | 682.8   | 1.5             | 50.0    | 29.5        | 3,792                    |                     | Yes |
| AC 13                | - Non-Participating | 630,347 | 5,380,996 | 717.6   | 1.5             | 50.0    | 34.1        | 1,469                    |                     | Yes |
| AD 14                | - Non-Participating | 628,838 | 5,379,465 | 705.2   | 1.5             | 50.0    | 30.5        | 2,523                    |                     | Yes |
| AE 55                | - Participating     | 635,760 | 5,381,775 | 711.0   | 1.5             | 50.0    | 42.3        | 685                      |                     | Yes |
| AF 15                | - Non-Participating | 637,972 | 5,384,054 | 715.8   | 1.5             | 50.0    | 32.4        | 1,935                    |                     | Yes |
| AG 57                | - Participating     | 633,480 | 5,378,691 | 739.8   | 1.5             | 50.0    | 43.9        | 423                      |                     | Yes |
| AH 59                | - Participating     | 643,400 | 5,373,968 | 711.4   | 1.5             | 50.0    | 39.8        | 904                      |                     | Yes |
| AI 61                | - Participating     | 633,645 | 5,373,895 | 713.7   | 1.5             | 50.0    | 42.8        | 403                      |                     | Yes |
| AJ 62                | - Participating     | 643,453 | 5,372,097 | 716.3   | 1.5             | 50.0    | 39.2        | 764                      |                     | Yes |
| AK 63                | - Participating     | 641,300 | 5,368,154 | 725.4   | 1.5             | 50.0    | 43.2        | 548                      |                     | Yes |
| AL 16                | - Non-Participating | 630,734 | 5,381,835 | 710.2   | 1.5             | 50.0    | 33.6        | 1,809                    |                     | Yes |
| AM 17                | - Non-Participating | 631,989 | 5,373,670 | 695.8   | 1.5             | 50.0    | 35.7        | 1,235                    |                     | Yes |
| AN 18                | - Non-Participating | 637,954 | 5,365,740 | 710.2   | 1.5             | 50.0    | 38.9        | 1,032                    |                     | Yes |
| AO 64                | - Participating     | 639,268 | 5,377,996 | 720.6   | 1.5             | 50.0    | 43.8        | 301                      |                     | Yes |
| AP 19                | - Non-Participating | 638,331 | 5,381,857 | 701.5   | 1.5             | 50.0    | 36.4        | 1,095                    |                     | Yes |
| AQ 20                | - Non-Participating | 639,333 | 5,380,415 | 707.1   | 1.5             | 50.0    | 35.0        | 1,705                    |                     | Yes |
| AR 21                | - Non-Participating | 630,142 | 5,375,377 | 701.9   | 1.5             | 50.0    | 33.7        | 1,532                    |                     | Yes |
| AS 22                | - Non-Participating | 644,117 | 5,375,554 | 701.3   | 1.5             | 50.0    | 36.5        | 1,814                    |                     | Yes |
| AT 23                | - Non-Participating | 628,666 | 5,373,611 | 682.8   | 1.5             | 50.0    | 28.5        | 3,817                    |                     | Yes |
| AU 24                | - Non-Participating | 632,030 | 5,373,428 | 696.5   | 1.5             | 50.0    | 35.3        | 1,341                    |                     | Yes |
| AV 27                | - Non-Participating | 646,754 | 5,372,213 | 713.2   | 1.5             | 50.0    | 40.4        | 778                      |                     | Yes |
| AW 29                | - Non-Participating | 631,486 | 5,386,533 | 696.9   | 1.5             | 50.0    | 26.3        | 4,419                    |                     | Yes |
| AX 30                | - Non-Participating | 633,067 | 5,384,963 | 707.0   | 1.5             | 50.0    | 30.3        | 2,523                    |                     | Yes |
| AY 31                | - Non-Participating | 633,553 | 5,383,375 | 714.8   | 1.5             | 50.0    | 36.5        | 982                      |                     | Yes |
| AZ 66                | - Participating     | 638,244 | 5,370,747 | 710.8   | 1.5             | 50.0    | 43.9        | 305                      |                     | Yes |
| BA 67                | - Participating     | 637,448 | 5,370,698 | 712.2   | 1.5             | 50.0    | 44.7        | 262                      |                     | Yes |
| BB 68                | - Participating     | 635,378 | 5,369,828 | 692.6   | 1.5             | 50.0    | 36.0        | 1,811                    |                     | Yes |
| BC 32                | - Non-Participating | 626,925 | 5,388,203 | 701.4   | 1.5             | 50.0    | 21.7        | 8,446                    |                     | Yes |
| BD 33                | - Non-Participating | 627,137 | 5,388,066 | 701.0   | 1.5             | 50.0    | 22.0        | 8,198                    |                     | Yes |
| BE 34                | - Non-Participating | 626,921 | 5,387,556 | 704.1   | 1.5             | 50.0    | 22.2        | 8,015                    |                     | Yes |
| BF 35                | - Non-Participating | 629,137 | 5,388,039 | 693.3   | 1.5             | 50.0    | 23.2        | 6,874                    |                     | Yes |

To be continued on next page...

Project: Aurora

Description:

Licensed user:

TradeWind Energy, Inc  
 16105 W. 113th Street, Suite 105  
 US-LENEXA, KS 66219  
 +1 913 424 5308  
 Kevin Walter / kwalter@tradewindenergy.com  
 Calculated:  
 9/5/2019 4:05 PM/3.0.654

## DECIBEL - Main Result

Calculation: A054 N149/V110

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| No.                       | Name    | X(East)   | Y(North) | Z<br>[m] | Emission height<br>[m] | Demands          |                      |                                 | Sound Level |  | Demands fulfilled ?<br>Noise |
|---------------------------|---------|-----------|----------|----------|------------------------|------------------|----------------------|---------------------------------|-------------|--|------------------------------|
|                           |         |           |          |          |                        | Noise<br>[dB(A)] | From WTGs<br>[dB(A)] | Distance to noise demand<br>[m] | Noise       |  |                              |
| BG 36 - Non-Participating | 632,118 | 5,369,480 | 691.6    | 1.5      | 50.0                   | 30.0             | 3,511                | Yes                             |             |  |                              |
| BH 37 - Non-Participating | 635,531 | 5,367,600 | 699.2    | 1.5      | 50.0                   | 36.2             | 1,285                | Yes                             |             |  |                              |
| BI 38 - Non-Participating | 629,941 | 5,378,583 | 713.2    | 1.5      | 50.0                   | 33.6             | 1,808                | Yes                             |             |  |                              |

## Distances (m)

| WTG | A     | B     | C     | D     | E     | F     | G       | H     | I     | J     | K     | L     | M     | N     | O     | P     | Q     | R     | S     | T     | U     | V     |
|-----|-------|-------|-------|-------|-------|-------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1   | 2355  | 1372  | 6382  | 2645  | 19168 | 17037 | 11937   | 15664 | 12659 | 10077 | 8946  | 12547 | 10558 | 8341  | 6322  | 8153  | 9516  | 5546  | 9696  | 8691  | 4363  | 5643  |
| 2   | 3426  | 2876  | 7896  | 4008  | 17654 | 15551 | 10605   | 14192 | 11146 | 8804  | 7453  | 11132 | 9134  | 6830  | 4808  | 6747  | 8195  | 5040  | 9752  | 9188  | 3937  | 4293  |
| 3   | 4937  | 3758  | 8385  | 3968  | 17639 | 15891 | 9592    | 14634 | 11028 | 7667  | 7164  | 11860 | 9868  | 7093  | 4935  | 7618  | 9243  | 3089  | 7834  | 7524  | 1967  | 5450  |
| 4   | 5928  | 4721  | 9212  | 4740  | 17151 | 15577 | 8751    | 14377 | 10536 | 6798  | 6654  | 11771 | 9807  | 6851  | 4717  | 7673  | 9362  | 2214  | 7216  | 7243  | 1246  | 5727  |
| 5   | 10131 | 9590  | 14507 | 10166 | 11618 | 10400 | 4117    | 9404  | 5041  | 2896  | 1320  | 7626  | 6047  | 2917  | 2613  | 5087  | 6655  | 5972  | 10515 | 11769 | 6178  | 5285  |
| 6   | 3919  | 4084  | 9014  | 5548  | 16601 | 14278 | 10499   | 12869 | 10253 | 8877  | 6827  | 9673  | 7699  | 5792  | 4053  | 5284  | 6609  | 6278  | 11242 | 10852 | 5296  | 2752  |
| 7   | 12642 | 12158 | 17082 | 12731 | 9344  | 8676  | 2570    | 7963  | 3104  | 2878  | 2118  | 7159  | 6159  | 3969  | 4841  | 6208  | 7370  | 8180  | 12166 | 13790 | 8569  | 7254  |
| 8   | 12098 | 12009 | 17033 | 12971 | 8519  | 6837  | 5389    | 5781  | 2095  | 5495  | 2311  | 4349  | 3376  | 2395  | 4346  | 4049  | 4800  | 9529  | 14134 | 15360 | 9582  | 5892  |
| 9   | 6696  | 6878  | 11838 | 8193  | 13804 | 11457 | 8699    | 10058 | 7570  | 7433  | 4536  | 6946  | 4949  | 3088  | 2016  | 2570  | 4133  | 7107  | 12313 | 12526 | 6487  | 693   |
| 10  | 2928  | 2075  | 7071  | 3156  | 18497 | 16411 | 11243   | 15053 | 11973 | 9394  | 8246  | 11983 | 9987  | 7683  | 5640  | 7595  | 9016  | 5086  | 9492  | 8696  | 3920  | 5119  |
| 11  | 2591  | 1156  | 4127  | 1011  | 21493 | 19385 | 13891   | 18009 | 14956 | 11962 | 11192 | 14866 | 12885 | 10678 | 8631  | 10473 | 11782 | 6628  | 9666  | 8009  | 5501  | 7947  |
| 12  | 5014  | 5263  | 10180 | 6696  | 15486 | 13113 | 9871    | 11696 | 9213  | 8386  | 5957  | 8496  | 6521  | 4730  | 3210  | 4106  | 5458  | 6697  | 11816 | 11664 | 5849  | 1577  |
| 13  | 5224  | 4576  | 9535  | 5344  | 16138 | 14244 | 8801    | 12955 | 9563  | 7012  | 5775  | 10119 | 8123  | 5438  | 3301  | 5865  | 7499  | 4085  | 9198  | 9179  | 3239  | 3758  |
| 14  | 3784  | 2950  | 7902  | 3791  | 17725 | 15729 | 10345   | 14400 | 11171 | 8498  | 7406  | 11420 | 9417  | 6952  | 4861  | 7061  | 8571  | 4447  | 9133  | 8607  | 3329  | 4677  |
| 15  | 5898  | 4478  | 3866  | 2715  | 23847 | 22047 | 15270   | 20746 | 17232 | 13278 | 13359 | 17781 | 15779 | 13241 | 11097 | 13406 | 14845 | 7208  | 8224  | 5844  | 6410  | 10948 |
| 16  | 5227  | 3860  | 3449  | 2186  | 23541 | 21660 | 15169   | 20337 | 16935 | 13182 | 13076 | 17320 | 15322 | 12864 | 10735 | 12933 | 14336 | 7204  | 8646  | 6382  | 6322  | 10451 |
| 17  | 5321  | 4117  | 2841  | 2623  | 24079 | 22142 | 15802   | 20803 | 17482 | 13818 | 13635 | 17739 | 15746 | 13361 | 11246 | 13346 | 14708 | 7863  | 9236  | 6890  | 6965  | 10842 |
| 18  | 6166  | 4497  | 5466  | 2648  | 22576 | 20954 | 13707   | 19708 | 15962 | 11716 | 12081 | 16897 | 14898 | 12165 | 10007 | 12586 | 14127 | 5581  | 6642  | 4526  | 4894  | 10234 |
| 19  | 6285  | 4569  | 6066  | 2809  | 22024 | 20465 | 13066   | 19240 | 15416 | 11075 | 11538 | 16490 | 14496 | 11697 | 9541  | 12214 | 13790 | 4927  | 6115  | 4197  | 4285  | 9916  |
| 20  | 7923  | 6362  | 9781  | 5511  | 18592 | 17452 | 9125    | 16383 | 12092 | 7157  | 8336  | 14095 | 12197 | 9051  | 7058  | 10232 | 11961 | 1099  | 4411  | 4767  | 1561  | 8476  |
| 21  | 7061  | 5346  | 6547  | 3576  | 22368 | 20910 | 13196   | 19714 | 15777 | 11216 | 11913 | 17037 | 15050 | 12182 | 10035 | 12802 | 14404 | 5049  | 5539  | 3453  | 4574  | 10551 |
| 22  | 10730 | 10724 | 15743 | 11784 | 9798  | 7785  | 6163    | 6554  | 3526  | 5805  | 2127  | 4319  | 2758  | 1047  | 3176  | 2699  | 3751  | 8841  | 13699 | 14683 | 8737  | 4458  |
| 23  | 10487 | 10582 | 15583 | 11727 | 10013 | 7792  | 6805    | 6484  | 3958  | 6401  | 2698  | 3949  | 2227  | 1115  | 3237  | 2116  | 3108  | 9108  | 14054 | 14930 | 8924  | 4101  |
| 24  | 11057 | 11658 | 16399 | 13154 | 10556 | 7451  | 10066   | 5923  | 6161  | 9763  | 6059  | 2405  | 1408  | 4218  | 5784  | 2578  | 1015  | 11811 | 16943 | 17472 | 11387 | 4894  |
| 25  | 8534  | 8153  | 13146 | 8946  | 12552 | 10873 | 5871    | 9694  | 5953  | 4532  | 2165  | 7327  | 5485  | 2273  | 884   | 3914  | 5628  | 5722  | 10715 | 11549 | 5584  | 3586  |
| 26  | 4868  | 4714  | 9731  | 5909  | 15807 | 13648 | 9371    | 12285 | 9357  | 7738  | 5801  | 9242  | 7241  | 4967  | 3052  | 4872  | 6388  | 5504  | 10612 | 10493 | 4645  | 2513  |
| 27  | 11060 | 10780 | 15784 | 11589 | 9937  | 8508  | 4491    | 7484  | 3322  | 4089  | 610   | 5834  | 4460  | 1930  | 3144  | 4182  | 5784  | 7846  | 12432 | 13668 | 7953  | 5304  |
| 28  | 13238 | 13184 | 18207 | 14158 | 7336  | 5729  | 5672    | 4781  | 1157  | 6155  | 3390  | 4029  | 3639  | 3531  | 5531  | 4894  | 5308  | 10627 | 15115 | 16440 | 10726 | 6949  |
| 29  | 8781  | 8632  | 13656 | 9622  | 11892 | 9964  | 6369    | 8714  | 5406  | 5325  | 2114  | 6174  | 4296  | 1172  | 997   | 2759  | 4444  | 6878  | 11913 | 12678 | 6653  | 3027  |
| 30  | 8110  | 8192  | 13189 | 9388  | 12395 | 10150 | 7609    | 8794  | 6133  | 6569  | 3297  | 5875  | 3884  | 1656  | 1493  | 1810  | 3557  | 7460  | 12614 | 13132 | 7047  | 1905  |
| 31  | 7773  | 6037  | 7961  | 4488  | 21390 | 20119 | 11953   | 18987 | 14849 | 9994  | 11032 | 16488 | 14531 | 11520 | 9418  | 12386 | 14055 | 3900  | 4231  | 2764  | 3715  | 10303 |
| 32  | 7769  | 6068  | 6832  | 4260  | 22965 | 21574 | 13643   | 20396 | 16391 | 11677 | 12541 | 17760 | 15777 | 12875 | 10736 | 13544 | 15157 | 5540  | 5288  | 2916  | 5183  | 11312 |
| 33  | 9504  | 9575  | 14579 | 10723 | 10999 | 8796  | 6953    | 7474  | 4799  | 6257  | 2614  | 4768  | 2871  | 584   | 2311  | 1708  | 3190  | 8299  | 13334 | 14087 | 8041  | 3185  |
| 34  | 10779 | 11079 | 16012 | 12375 | 9906  | 7291  | 8033    | 5863  | 4515  | 7727  | 4032  | 2854  | 931   | 2325  | 4233  | 1816  | 1990  | 10243 | 15269 | 16023 | 9965  | 4304  |
| 35  | 9471  | 9898  | 14760 | 11303 | 11355 | 8631  | 8865    | 7160  | 5888  | 8251  | 4583  | 3859  | 1912  | 2571  | 3812  | 576   | 1237  | 9815  | 14964 | 15465 | 9379  | 3065  |
| 36  | 10590 | 11246 | 15939 | 12780 | 11135 | 8022  | 10355   | 6493  | 6631  | 9949  | 6241  | 2974  | 1865  | 4317  | 5700  | 2421  | 682   | 11681 | 16844 | 17281 | 11204 | 4552  |
| 37  | 7094  | 7454  | 12341 | 8869  | 13488 | 10976 | 9110    | 9538  | 7463  | 7985  | 4816  | 6303  | 4334  | 3084  | 2626  | 1918  | 3330  | 7982  | 13189 | 13390 | 7360  | 623   |
| 38  | 8592  | 7088  | 10646 | 6341  | 17991 | 16983 | 8358    | 15965 | 11554 | 6411  | 7879  | 13823 | 11970 | 8769  | 6875  | 10120 | 11863 | 911   | 4317  | 5188  | 1951  | 8543  |
| 39  | 11646 | 11181 | 16122 | 11796 | 10054 | 9076  | 3210    | 8217  | 3564  | 2866  | 1184  | 6968  | 5725  | 3165  | 3848  | 5449  | 6750  | 7459  | 11709 | 13173 | 7758  | 6309  |
| 40  | 9448  | 7825  | 10749 | 6744  | 19286 | 18412 | 9397    | 17428 | 12934 | 7527  | 9337  | 15348 | 13504 | 10294 | 8412  | 11655 | 13397 | 2404  | 2808  | 3843  | 3200  | 10031 |
| 41  | 9012  | 7276  | 8598  | 5615  | 22355 | 21224 | 12665   | 20133 | 15873 | 10753 | 12111 | 17725 | 15784 | 12722 | 10650 | 13679 | 15362 | 4881  | 3511  | 1424  | 4917  | 11640 |
| 42  | 10207 | 8507  | 10723 | 7148  | 20788 | 19974 | 10779   | 19000 | 14481 | 8968  | 10909 | 16915 | 15061 | 11861 | 9953  | 13174 | 14912 | 3913  | 1576  | 2439  | 4525  | 11461 |
| 43  | 9957  | 9682  | 14692 | 10525 | 10967 | 9349  | 5137    | 8225  | 4373  | 4307  | 809   | 6156  | 4509  | 1383  | 2041  | 3630  | 5129  | 7075  | 11868 | 12920 | 7067  | 4330  |
| 44  | 9352  | 9149  | 14170 | 10075 | 11410 | 9609  | 5807    | 8411  | 4872  | 4867  | 1507  | 6074  | 4292  | 1039  | 1466  | 3086  | 4683  | 6997  | 11931 | 12831 | 6873  | 3632  |
| 45  | 12776 | 13102 | 18028 | 14390 | 8127  | 5302  | 8448    | 3848  | 3876  | 8606  | 5156  | 1226  | 1459  | 3991  | 6089  | 3786  | 3216  | 11975 | 16866 | 17804 | 11798 | 6312  |
| 46  | 12730 | 12870 | 17865 | 14015 | 7806  | 5509  | 7057    | 4254  | 2585  | 7294  | 4011  | 2594  | 2211  | 3303  | 5460  | 3931  | 3974  | 11089 | 15834 | 16934 | 11027 | 6279  |
| 47  | 9898  | 10129 | 15088 | 11390 | 10664 | 8205  | 7699    | 6810  | 4848  | 7162  | 3463  | 3864  | 1902  | 1521  | 3244  | 1176  | 2254  | 9275  | 14338 | 15036 | 8969  | 3429  |
| 48  | 8983  | 9575  | 14319 | 11091 | 12177 | 9301  | 9828    | 7796  | 6896  | 9120  | 5503  | 4345  | 2604  | 3474  | 4329  | 1188  | 1072  | 10165 | 15358 | 15678 | 9620  | 2863  |
| 49  | 2077  | 1479  | 3584  | 2043  | 21959 | 19714 | 14703   | 18304 | 15485 | 12802 | 11795 | 15067 | 13114 | 11119 | 9148  | 10699 | 11892 | 7644  | 10722 | 8985  | 6498  | 8158  |
| 50  | 2202  | 2069  | 3183  | 2640  | 22436 | 20127 | 15323   | 18701 | 15996 | 13432 | 12343 | 15421 | 13486 | 11599 | 9667  | 11077 | 12206 | 8306  | 11310 | 9492  | 7160  | 8542  |
| 51  | 2524  | 2570  | 2830  | 3057  | 22882 | 20539 | 15826   | 19105 | 16460 | 13936 | 12823 | 15802 | 13879 | 12049 | 10136 | 11476 | 12567 | 8792  | 11693 | 9798  | 7651  | 8946  |
| 52  | 10165 | 8428  | 9737  | 6798  | 22535 | 21586 | 12617</ |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |

DECIBEL - Main Result

Calculation: A054 N149/V110

...continued from previous page

Table with columns WTG, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V. It contains a grid of numerical data points representing decibel values for various wind turbine weights and directions.

To be continued on next page...

DECIBEL - Main Result

Calculation: A054 N149/V110

...continued from previous page

Table with columns WTG, A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V. Rows 128-149.

Table with columns WTG, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR. Rows 1-45.

To be continued on next page...

DECIBEL - Main Result

Calculation: A054 N149/V110

...continued from previous page

Table with columns WTG, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR. Contains numerical data for each row and column.

To be continued on next page...

DECIBEL - Main Result

Calculation: A054 N149/V110

...continued from previous page

Table with columns WTG, W, X, Y, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK, AL, AM, AN, AO, AP, AQ, AR. Rows 115-149.

Table with columns WTG, AS, AT, AU, AV, AW, AX, AY, AZ, BA, BB, BC, BD, BE, BF, BG, BH, BI. Rows 1-28.

To be continued on next page...

### DECIBEL - Main Result

Calculation: A054 N149/V110

...continued from previous page

| WTG | AS    | AT    | AU    | AV    | AW    | AX    | AY    | AZ    | BA    | BB    | BC    | BD    | BE    | BF    | BG    | BH    | BI    |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 29  | 8783  | 8008  | 5513  | 12417 | 9793  | 7744  | 6085  | 7388  | 7188  | 7815  | 13660 | 13420 | 13169 | 12237 | 8867  | 10040 | 5724  |
| 30  | 8111  | 9245  | 6752  | 11968 | 9533  | 7381  | 5760  | 7891  | 7807  | 8702  | 13696 | 13449 | 13246 | 12114 | 10003 | 10899 | 6602  |
| 31  | 7773  | 12980 | 9871  | 7100  | 20133 | 18030 | 16386 | 3216  | 3819  | 5403  | 23924 | 23690 | 23399 | 22587 | 8568  | 5207  | 14633 |
| 32  | 7769  | 14685 | 11559 | 6162  | 21417 | 19274 | 17649 | 4843  | 5494  | 7100  | 25343 | 25105 | 24833 | 23933 | 10230 | 6725  | 16219 |
| 33  | 9506  | 8543  | 6471  | 13355 | 8405  | 6330  | 4674  | 8800  | 8611  | 9202  | 12402 | 12158 | 11934 | 10900 | 10056 | 11432 | 5348  |
| 34  | 10781 | 9504  | 7959  | 14814 | 6511  | 4397  | 2749  | 10739 | 10556 | 11094 | 10707 | 10458 | 10280 | 9083  | 11726 | 13327 | 5348  |
| 35  | 9473  | 10418 | 8467  | 13581 | 7447  | 5235  | 3719  | 10240 | 10162 | 10989 | 11893 | 11641 | 11504 | 10139 | 12026 | 13203 | 6655  |
| 36  | 10592 | 11834 | 10174 | 14806 | 6152  | 3942  | 2812  | 12088 | 12033 | 12877 | 10864 | 10611 | 10553 | 8931  | 13833 | 15092 | 7541  |
| 37  | 7096  | 10750 | 8155  | 11152 | 9886  | 7666  | 6164  | 8305  | 8363  | 9567  | 14325 | 14074 | 13924 | 12585 | 11199 | 11697 | 8013  |
| 38  | 8593  | 9389  | 6280  | 9564  | 17388 | 15403 | 13743 | 1008  | 515   | 2061  | 20846 | 20621 | 20292 | 19678 | 5336  | 3194  | 11238 |
| 39  | 11647 | 4809  | 3110  | 14877 | 10084 | 8480  | 6953  | 8124  | 7621  | 7264  | 12966 | 12751 | 12387 | 12021 | 7032  | 9400  | 3306  |
| 40  | 9449  | 10254 | 7365  | 9772  | 18900 | 16929 | 15269 | 2165  | 2041  | 2550  | 22287 | 22065 | 21724 | 21161 | 5590  | 2371  | 12560 |
| 41  | 9013  | 13567 | 10607 | 7880  | 21359 | 19277 | 17627 | 4251  | 4710  | 5868  | 25055 | 24824 | 24519 | 23772 | 8815  | 5125  | 15597 |
| 42  | 10208 | 11520 | 8791  | 9875  | 20473 | 18495 | 16835 | 3540  | 3580  | 3882  | 23852 | 23631 | 23287 | 22735 | 6532  | 2739  | 14083 |
| 43  | 9959  | 6764  | 4520  | 13447 | 9633  | 7739  | 6098  | 7662  | 7331  | 7573  | 13152 | 12919 | 12624 | 11900 | 8149  | 9801  | 4554  |
| 44  | 9354  | 7441  | 5067  | 12928 | 9640  | 7657  | 5999  | 7545  | 7283  | 7731  | 13356 | 13119 | 12849 | 12008 | 8561  | 9964  | 5144  |
| 45  | 12777 | 9717  | 8852  | 16833 | 4661  | 2765  | 1224  | 12514 | 12261 | 12563 | 8688  | 8439  | 8257  | 7116  | 12768 | 14785 | 4874  |
| 46  | 12732 | 8319  | 7541  | 16646 | 5692  | 4043  | 2612  | 11666 | 11346 | 11466 | 9201  | 8963  | 8703  | 7885  | 11479 | 13670 | 3548  |
| 47  | 9900  | 9244  | 7384  | 13880 | 7521  | 5397  | 3756  | 9758  | 9596  | 10222 | 11687 | 11439 | 11249 | 10089 | 11038 | 12452 | 5554  |
| 48  | 8984  | 11399 | 9327  | 13171 | 7763  | 5536  | 4191  | 10534 | 10531 | 11533 | 12379 | 12127 | 12030 | 10519 | 12777 | 13720 | 7677  |
| 49  | 2076  | 16167 | 12805 | 2372  | 18582 | 16354 | 14924 | 7182  | 7937  | 10182 | 23105 | 22853 | 22705 | 21325 | 13368 | 11072 | 15703 |
| 50  | 2201  | 16798 | 13438 | 2055  | 18900 | 16674 | 15275 | 7842  | 8598  | 10843 | 23469 | 23217 | 23081 | 21656 | 14030 | 11714 | 16239 |
| 51  | 2522  | 17302 | 13943 | 1806  | 19258 | 17035 | 15655 | 8318  | 9079  | 11322 | 23853 | 23600 | 23472 | 22021 | 14518 | 12158 | 16714 |
| 52  | 10166 | 13391 | 10605 | 9054  | 21902 | 19864 | 18206 | 4734  | 5023  | 5722  | 25446 | 25220 | 24893 | 24246 | 8394  | 4547  | 15801 |
| 53  | 10564 | 12804 | 10107 | 9682  | 21688 | 19683 | 18023 | 4595  | 4767  | 5195  | 25130 | 24907 | 24569 | 23984 | 7729  | 3852  | 15392 |
| 54  | 12717 | 10984 | 8857  | 12457 | 21447 | 19605 | 17962 | 5533  | 5242  | 4297  | 24421 | 24214 | 23825 | 23514 | 5619  | 2098  | 14401 |
| 55  | 12099 | 10994 | 8707  | 11848 | 21130 | 19256 | 17607 | 4971  | 4725  | 3991  | 24197 | 23987 | 23608 | 23242 | 5680  | 1912  | 14218 |
| 56  | 10293 | 9918  | 7208  | 10604 | 19167 | 17244 | 15588 | 2888  | 2582  | 2292  | 22409 | 22192 | 21835 | 21358 | 5012  | 1530  | 12560 |
| 57  | 6812  | 8954  | 5590  | 9227  | 14393 | 12323 | 10669 | 2835  | 2820  | 4312  | 18171 | 17936 | 17655 | 16822 | 6821  | 6270  | 9202  |
| 58  | 8752  | 7129  | 3765  | 11015 | 14246 | 12318 | 10663 | 3314  | 2808  | 3140  | 17634 | 17409 | 17079 | 16485 | 5029  | 5349  | 8106  |
| 59  | 8100  | 8299  | 4982  | 9939  | 15436 | 13450 | 11789 | 1931  | 1490  | 2644  | 18944 | 18716 | 18398 | 17741 | 5354  | 4629  | 9487  |
| 60  | 9441  | 6625  | 3304  | 11564 | 14541 | 12670 | 11025 | 3506  | 2871  | 2652  | 17771 | 17551 | 17203 | 16703 | 4291  | 4885  | 8057  |
| 61  | 7905  | 7697  | 4370  | 10579 | 13341 | 11339 | 9678  | 3861  | 3585  | 4389  | 16953 | 16721 | 16422 | 15685 | 6270  | 6560  | 7813  |
| 62  | 8308  | 7292  | 4102  | 11267 | 12351 | 10366 | 8707  | 4866  | 4571  | 5164  | 15949 | 15717 | 15419 | 14682 | 6629  | 7378  | 6908  |
| 63  | 10072 | 5537  | 2461  | 12941 | 12017 | 10215 | 8593  | 5814  | 5311  | 5139  | 15192 | 14972 | 14627 | 14132 | 5667  | 7344  | 5605  |
| 64  | 7482  | 8279  | 5201  | 10743 | 11876 | 9803  | 8149  | 5334  | 5200  | 6138  | 15728 | 15489 | 15227 | 14327 | 7800  | 8309  | 7242  |
| 65  | 8336  | 7436  | 4067  | 10714 | 14021 | 12058 | 10399 | 3331  | 2926  | 3537  | 17505 | 17278 | 16960 | 16307 | 5508  | 5719  | 8116  |
| 66  | 10170 | 5892  | 2606  | 12318 | 14407 | 12606 | 10979 | 4162  | 3474  | 2768  | 17469 | 17255 | 16890 | 16483 | 3755  | 4954  | 7620  |
| 67  | 8847  | 7584  | 4304  | 10702 | 15323 | 13393 | 11738 | 2477  | 1845  | 2188  | 18680 | 18457 | 18120 | 17553 | 4626  | 4340  | 9053  |
| 68  | 7910  | 7718  | 4552  | 10959 | 12264 | 10241 | 8581  | 4910  | 4686  | 5454  | 15966 | 15732 | 15447 | 14646 | 7050  | 7649  | 7120  |
| 69  | 10916 | 4666  | 1580  | 13672 | 12245 | 10547 | 8962  | 6189  | 5601  | 5055  | 15172 | 14959 | 14588 | 14232 | 5069  | 7186  | 5327  |
| 70  | 7408  | 8604  | 5239  | 9540  | 14872 | 12842 | 11182 | 2303  | 2130  | 3518  | 18521 | 18289 | 17989 | 17242 | 6107  | 5487  | 9297  |
| 71  | 9328  | 6326  | 3267  | 12314 | 11843 | 9952  | 8307  | 5601  | 5192  | 5366  | 15233 | 15006 | 14685 | 14066 | 6283  | 7598  | 5941  |
| 72  | 2797  | 18340 | 15021 | 3246  | 18993 | 16797 | 15532 | 9865  | 10593 | 12834 | 23708 | 23455 | 23370 | 21780 | 15956 | 13829 | 17259 |
| 73  | 2811  | 18281 | 14950 | 2870  | 19194 | 16992 | 15705 | 9669  | 10407 | 12652 | 23891 | 23638 | 23545 | 21979 | 15796 | 13599 | 17306 |
| 74  | 4503  | 19979 | 16718 | 5183  | 19280 | 17145 | 16033 | 11946 | 12650 | 14877 | 24089 | 23837 | 23803 | 22065 | 17934 | 15969 | 18444 |
| 75  | 4897  | 20299 | 17057 | 5678  | 19283 | 17167 | 16093 | 12389 | 13085 | 15307 | 24107 | 23856 | 23833 | 22064 | 18343 | 16428 | 18656 |
| 76  | 5281  | 20647 | 17414 | 6025  | 19434 | 17332 | 16285 | 12785 | 13480 | 15700 | 24266 | 24016 | 24001 | 22210 | 18730 | 16826 | 18946 |
| 77  | 5632  | 20807 | 17611 | 6703  | 19123 | 17049 | 16055 | 13198 | 13875 | 16080 | 23968 | 23719 | 23719 | 21889 | 19062 | 17274 | 18932 |
| 78  | 6346  | 21316 | 18159 | 7559  | 19099 | 17066 | 16142 | 13933 | 14595 | 16786 | 23954 | 23706 | 23727 | 21847 | 19728 | 18029 | 19265 |
| 79  | 6530  | 21199 | 18088 | 8102  | 18558 | 16553 | 15676 | 14111 | 14750 | 16916 | 23415 | 23168 | 23201 | 21294 | 19798 | 18234 | 18983 |
| 80  | 6918  | 21533 | 18434 | 8454  | 18698 | 16713 | 15867 | 14497 | 15135 | 17297 | 23555 | 23309 | 23351 | 21424 | 20171 | 18622 | 19263 |
| 81  | 7268  | 22744 | 19490 | 7077  | 21359 | 19293 | 18303 | 14615 | 15338 | 17576 | 26207 | 25958 | 25963 | 24121 | 20668 | 18573 | 21079 |
| 82  | 7801  | 23277 | 20024 | 7501  | 21781 | 19728 | 18759 | 15133 | 15858 | 18097 | 26633 | 26384 | 26395 | 24536 | 21195 | 19079 | 21593 |
| 83  | 8002  | 23434 | 20195 | 7828  | 21731 | 19694 | 18750 | 15381 | 16101 | 18337 | 26586 | 26338 | 26357 | 24480 | 21420 | 19346 | 21677 |
| 84  | 8332  | 23787 | 20541 | 8020  | 22097 | 20064 | 19124 | 15677 | 16402 | 18641 | 26953 | 26705 | 26725 | 24844 | 21735 | 19624 | 22049 |
| 85  | 8794  | 24249 | 21005 | 8405  | 22473 | 20450 | 19527 | 16127 | 16854 | 19093 | 27329 | 27082 | 27108 | 25213 | 22192 | 20064 | 22497 |
| 86  | 10813 | 26134 | 22931 | 10549 | 23536 | 21599 | 20799 | 18230 | 18948 | 21182 | 28385 | 28142 | 28205 | 26228 | 24251 | 22193 | 24140 |
| 87  | 11393 | 26663 | 23474 | 11177 | 23826 | 21917 | 21153 | 18832 | 19546 | 21778 | 28668 | 28426 | 28500 | 26501 | 24837 | 22805 | 24598 |
| 88  | 11778 | 27063 | 23871 | 11495 | 24196 | 22294 | 21538 | 19204 | 19921 | 22155 | 29036 | 28794 | 28871 | 26865 | 25220 | 23167 | 24999 |
| 89  | 8041  | 21195 | 17864 | 3801  | 24734 | 22507 | 21081 | 11288 | 12075 | 14093 | 29259 | 29008 | 28855 | 27481 | 17351 | 14074 | 21515 |

To be continued on next page...

Project:  
Aurora

Description:

Licensed user:  
TradeWind Energy, Inc  
16105 W. 113th Street, Suite 105  
US-LENEXA, KS 66219  
+1 913 424 5308  
Kevin Walter / kwalter@tradewindenergy.com  
Calculated:  
9/5/2019 4:05 PM/3.0.654

## DECIBEL - Main Result

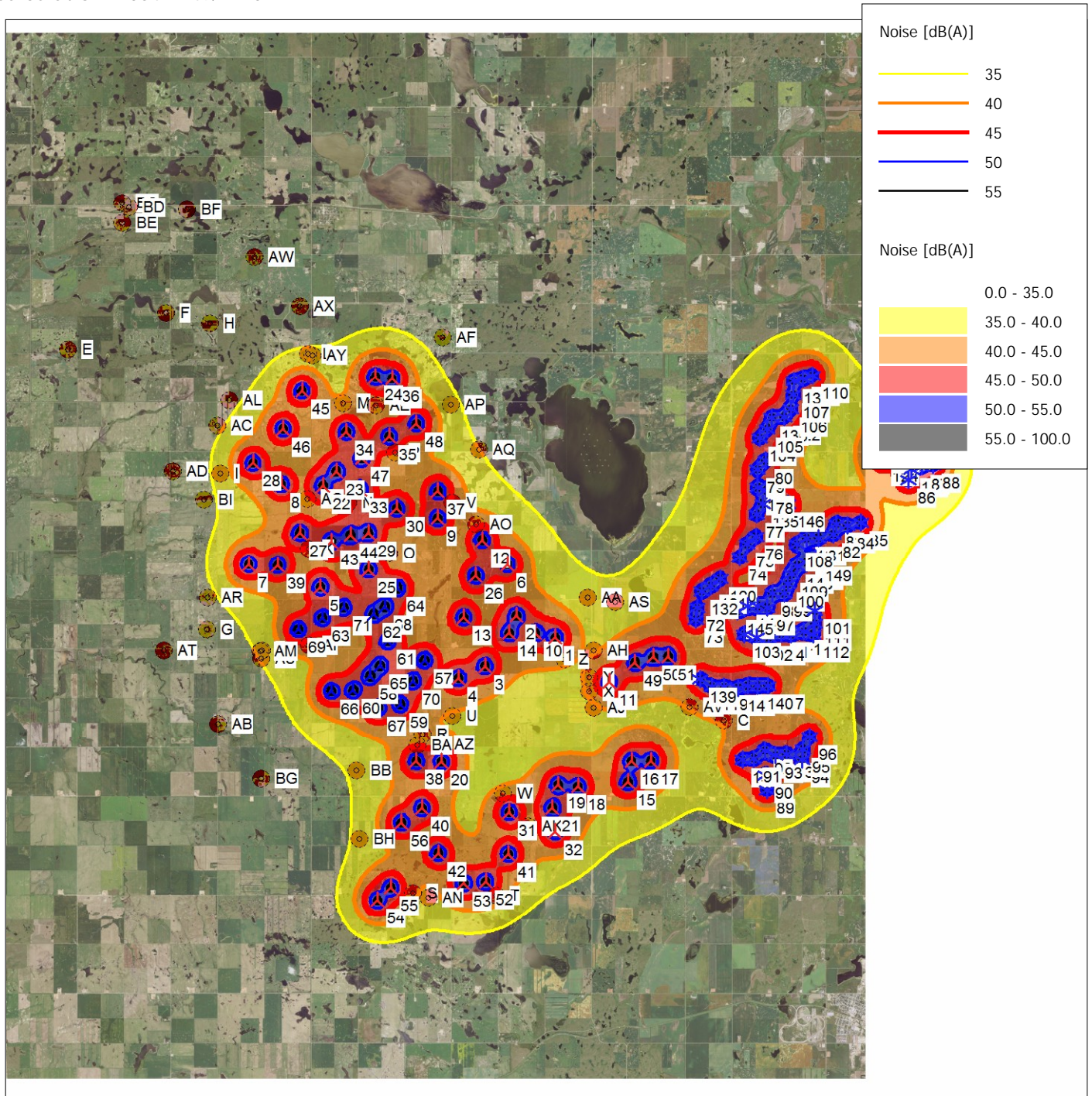
Calculation: A054 N149/V110

...continued from previous page

| WTG | AS    | AT    | AU    | AV    | AW    | AX    | AY    | AZ    | BA    | BB    | BC    | BD    | BE    | BF    | BG    | BH    | BI    |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 90  | 7634  | 21042 | 17700 | 3423  | 24349 | 22123 | 20711 | 11182 | 11973 | 14027 | 28896 | 28645 | 28498 | 27102 | 17295 | 14087 | 21253 |
| 91  | 6974  | 20551 | 17200 | 2778  | 23695 | 21469 | 20062 | 10747 | 11542 | 13631 | 28250 | 27998 | 27853 | 26449 | 16906 | 13781 | 20668 |
| 92  | 7037  | 20866 | 17510 | 2932  | 23773 | 21550 | 20162 | 11104 | 11901 | 14007 | 28357 | 28105 | 27969 | 26535 | 17284 | 14194 | 20893 |
| 93  | 7415  | 21251 | 17895 | 3329  | 24152 | 21929 | 20546 | 11471 | 12266 | 14362 | 28742 | 28490 | 28356 | 26916 | 17638 | 14517 | 21291 |
| 94  | 8202  | 22178 | 18823 | 4213  | 24928 | 22709 | 21347 | 12392 | 13188 | 15276 | 29547 | 29294 | 29169 | 27699 | 18550 | 15395 | 22191 |
| 95  | 8024  | 22165 | 18805 | 4122  | 24734 | 22518 | 21168 | 12424 | 13220 | 15328 | 29368 | 29116 | 28996 | 27508 | 18604 | 15495 | 22098 |
| 96  | 7970  | 22332 | 18968 | 4220  | 24639 | 22428 | 21100 | 12652 | 13449 | 15578 | 29298 | 29045 | 28934 | 27418 | 18856 | 15800 | 22159 |
| 97  | 5191  | 20732 | 17407 | 4189  | 20945 | 18782 | 17601 | 12055 | 12808 | 15053 | 25722 | 25469 | 25413 | 23735 | 18225 | 15898 | 19607 |
| 98  | 5384  | 20954 | 17641 | 4661  | 20860 | 18710 | 17561 | 12403 | 13148 | 15393 | 25654 | 25402 | 25356 | 23648 | 18546 | 16282 | 19715 |
| 99  | 5789  | 21357 | 18043 | 4912  | 21208 | 19065 | 17927 | 12772 | 13521 | 15767 | 26009 | 25757 | 25715 | 23996 | 18927 | 16632 | 20116 |
| 100 | 5940  | 21514 | 18210 | 5242  | 21151 | 19019 | 17904 | 13018 | 13761 | 16006 | 25962 | 25711 | 25676 | 23936 | 19154 | 16901 | 20195 |
| 101 | 6840  | 22368 | 19036 | 5314  | 22397 | 20255 | 19118 | 13560 | 14325 | 16567 | 27200 | 26948 | 26906 | 25184 | 19767 | 17315 | 21246 |
| 102 | 4966  | 20339 | 16990 | 3234  | 21204 | 19016 | 17773 | 11394 | 12163 | 14403 | 25938 | 25685 | 25607 | 23993 | 17612 | 15144 | 19463 |
| 103 | 4528  | 19914 | 16568 | 3024  | 20801 | 18610 | 17357 | 11020 | 11785 | 14027 | 25528 | 25275 | 25193 | 23589 | 17227 | 14805 | 19025 |
| 104 | 7291  | 21563 | 18516 | 9099  | 18259 | 16312 | 15525 | 14827 | 15442 | 17577 | 23112 | 22868 | 22924 | 20965 | 20388 | 18969 | 19123 |
| 105 | 7699  | 21921 | 18888 | 9464  | 18425 | 16501 | 15747 | 15234 | 15848 | 17980 | 23273 | 23030 | 23096 | 21117 | 20784 | 19376 | 19429 |
| 106 | 8722  | 22892 | 19882 | 10332 | 19004 | 17135 | 16452 | 16264 | 16879 | 19011 | 23837 | 23596 | 23682 | 21662 | 21810 | 20405 | 20306 |
| 107 | 9119  | 23138 | 20155 | 10793 | 18979 | 17142 | 16501 | 16642 | 17248 | 19369 | 23800 | 23561 | 23657 | 21616 | 22142 | 20788 | 20467 |
| 108 | 6492  | 21973 | 18716 | 6459  | 20784 | 18698 | 17674 | 13855 | 14574 | 16811 | 25625 | 25375 | 25369 | 23554 | 19896 | 17827 | 20349 |
| 109 | 6099  | 21666 | 18372 | 5561  | 21097 | 18976 | 17884 | 13256 | 13995 | 16239 | 25917 | 25666 | 25639 | 23879 | 19372 | 17162 | 20272 |
| 110 | 10035 | 23981 | 21022 | 11624 | 19473 | 17689 | 17112 | 17559 | 18164 | 20282 | 24269 | 24033 | 24147 | 22073 | 23045 | 21705 | 21222 |
| 111 | 6848  | 22328 | 18986 | 5062  | 22597 | 20445 | 19285 | 13411 | 14183 | 16421 | 27388 | 27136 | 27087 | 25386 | 19635 | 17121 | 21302 |
| 112 | 6848  | 22272 | 18924 | 4842  | 22749 | 20589 | 19409 | 13268 | 14044 | 16278 | 27529 | 27277 | 27221 | 25539 | 19503 | 16938 | 21329 |
| 113 | 6110  | 21523 | 18175 | 4199  | 22130 | 19959 | 18756 | 12546 | 13319 | 15556 | 26895 | 26642 | 26579 | 24920 | 18775 | 16248 | 20599 |
| 114 | 5355  | 20734 | 17385 | 3518  | 21532 | 19350 | 18118 | 11767 | 12538 | 14777 | 26277 | 26024 | 25950 | 24322 | 17991 | 15496 | 19851 |
| 115 | 5765  | 21180 | 17833 | 3943  | 21823 | 19649 | 18438 | 12229 | 12999 | 15238 | 26582 | 26330 | 26263 | 24614 | 18452 | 15952 | 20255 |
| 116 | 6666  | 22215 | 18933 | 6188  | 21350 | 19249 | 18196 | 13882 | 14617 | 16860 | 26184 | 25933 | 25918 | 24126 | 19984 | 17798 | 20730 |
| 117 | 5881  | 20750 | 17382 | 2762  | 22468 | 20262 | 18958 | 11384 | 12174 | 14379 | 27150 | 26898 | 26797 | 25251 | 17640 | 14883 | 20256 |
| 118 | 4627  | 19257 | 15888 | 1346  | 21343 | 19125 | 17771 | 9903  | 10691 | 12903 | 25971 | 25718 | 25598 | 24115 | 16158 | 13467 | 18846 |
| 119 | 4283  | 18835 | 15466 | 1012  | 21015 | 18795 | 17427 | 9493  | 10280 | 12495 | 25626 | 25374 | 25249 | 23783 | 15747 | 13083 | 18441 |
| 120 | 3660  | 19214 | 15927 | 4314  | 19082 | 16917 | 15737 | 11007 | 11720 | 13953 | 23857 | 23604 | 23548 | 21872 | 17035 | 15011 | 17862 |
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| 122 | 8365  | 22584 | 19561 | 9999  | 18857 | 16967 | 16256 | 15910 | 16527 | 18662 | 23697 | 23455 | 23533 | 21528 | 21468 | 20051 | 20041 |
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| 125 | 10493 | 25535 | 22393 | 10798 | 22359 | 20466 | 19730 | 18034 | 18723 | 20936 | 27197 | 26956 | 27035 | 25026 | 23928 | 22076 | 23308 |
| 126 | 10877 | 25925 | 22784 | 11126 | 22681 | 20800 | 20078 | 18413 | 19105 | 21319 | 27515 | 27275 | 27359 | 25340 | 24315 | 22450 | 23687 |
| 127 | 11290 | 26325 | 23189 | 11511 | 22974 | 21108 | 20406 | 18826 | 19517 | 21732 | 27802 | 27563 | 27652 | 25622 | 24727 | 22861 | 24061 |
| 128 | 11607 | 26587 | 23464 | 11876 | 23070 | 21224 | 20547 | 19153 | 19841 | 22052 | 27891 | 27652 | 27749 | 25705 | 25036 | 23196 | 24271 |
| 129 | 11790 | 26687 | 23581 | 12157 | 22984 | 21158 | 20507 | 19351 | 20032 | 22238 | 27796 | 27558 | 27662 | 25605 | 25203 | 23407 | 24307 |
| 130 | 6734  | 20166 | 16817 | 2498  | 23431 | 21204 | 19785 | 10352 | 11147 | 13234 | 27967 | 27716 | 27566 | 26180 | 16509 | 13387 | 20321 |
| 131 | 7675  | 21618 | 18262 | 3650  | 24408 | 22187 | 20816 | 11848 | 12644 | 14742 | 29014 | 28762 | 28633 | 27176 | 18018 | 14895 | 21625 |
| 132 | 2973  | 18545 | 15245 | 3801  | 18798 | 16614 | 15386 | 10260 | 10975 | 13209 | 23541 | 23288 | 23216 | 21588 | 16300 | 14263 | 17309 |
| 133 | 11033 | 26302 | 23112 | 10860 | 23523 | 21604 | 20829 | 18479 | 19192 | 21423 | 28368 | 28126 | 28196 | 26205 | 24478 | 22457 | 24247 |
| 134 | 6147  | 21032 | 17886 | 7542  | 18772 | 16738 | 15813 | 13737 | 14391 | 16573 | 23627 | 23379 | 23399 | 21522 | 19496 | 17844 | 18950 |
| 135 | 5992  | 21091 | 17910 | 7092  | 19173 | 17118 | 16155 | 13568 | 14240 | 16439 | 24024 | 23775 | 23785 | 21932 | 19408 | 17650 | 19142 |
| 136 | 8074  | 22185 | 19173 | 9862  | 18457 | 16559 | 15841 | 15596 | 16204 | 18328 | 23299 | 23057 | 23132 | 21133 | 21114 | 19741 | 19623 |
| 137 | 9743  | 23645 | 20688 | 11413 | 19181 | 17386 | 16797 | 17254 | 17856 | 19969 | 23983 | 23747 | 23857 | 21790 | 22722 | 21402 | 20888 |
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| 139 | 3836  | 18431 | 15063 | 976   | 20572 | 18350 | 16979 | 9161  | 9944  | 12168 | 25177 | 24925 | 24799 | 23338 | 15410 | 12814 | 17996 |
| 140 | 5582  | 20406 | 17038 | 2425  | 22206 | 19997 | 18681 | 11041 | 11831 | 14037 | 26877 | 26624 | 26519 | 24987 | 17297 | 14553 | 19930 |
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| 144 | 4524  | 20070 | 16747 | 3837  | 20368 | 18197 | 16996 | 11454 | 12201 | 14446 | 25132 | 24880 | 24817 | 23159 | 17604 | 15334 | 18945 |
| 145 | 4184  | 19711 | 16384 | 3520  | 20178 | 17997 | 16775 | 11068 | 11815 | 14060 | 24927 | 24674 | 24604 | 22968 | 17220 | 14948 | 18635 |
| 146 | 6733  | 21924 | 18732 | 7453  | 19938 | 17900 | 16961 | 14279 | 14965 | 17176 | 24792 | 24544 | 24562 | 22689 | 20174 | 18337 | 19991 |
| 147 | 6520  | 21956 | 18610 | 4616  | 22432 | 20269 | 19085 | 12988 | 13762 | 15998 | 27209 | 26956 | 26899 | 25222 | 19218 | 16684 | 20998 |
| 148 | 6333  | 21888 | 18603 | 5896  | 21129 | 19019 | 17950 | 13546 | 14281 | 16523 | 25957 | 25706 | 25686 | 23907 | 19647 | 17466 | 20429 |
| 149 | 6996  | 22539 | 19260 | 6494  | 21559 | 19467 | 18432 | 14220 | 14955 | 17198 | 26397 | 26147 | 26138 | 24331 | 20322 | 18134 | 21023 |

### DECIBEL - Map 95% rated power

Calculation: A054 N149/V110



Map: US Naval Research Laboratory , Print scale 1:200,000, Map center UTM WGS84 Zone: 13 East: 641,269 North: 5,375,656  
 \* New WTG      \* Existing WTG      \* Noise sensitive area  
 Noise calculation model: ISO 9613-2 General. Wind speed: 95% rated power  
 Height above sea level from active line object