minnesota power

AN ALLETE COMPANY

Attachment J

Shadow Flicker

P: 218.722.2625 | W: www.mnpower.com
30 West Superior Street | Duluth, MN 55802

minnesota power

AN ALLETE COMPANY

Longspur updated the shadow flicker report included in the Wind Project Application at Appendixes B4. The updates do not change the data reported; shadow flicker levels (hour-per-year) remain unchanged. The changes are limited to correcting labeling of receptors.

P: 218.722.2625 | W: www.mnpower.com
30 West Superior Street | Duluth, MN 55802

BURNS McDONNELL

MINNESOTA POWER

Shadow Flicker Analysis

Longspur Wind

PROJECT NO. 154125

REVISION 3

APRIL 30, 2026

Contents

Figures

Tables

List of Abbreviations

Abbreviation	Term/Phrase/Name
Burns & McDonnell	Burns & McDonnell Engineering Company, Inc.
hr	Hour
kg/m3	Kilograms per cubic meter
m	Meter
m/s	Meters per second
Minnesota Power	Minnesota Power, a division of ALLETE, Inc.
MW	Megawatt
Project	Longspur Wind Project
Project Site	Location of Project in Morton County, North Dakota
Study	Shadow Flicker Analysis
yr	Year

Disclaimer

This report may have been prepared under, and only be available to parties that have executed, a Confidentiality Agreement with Minnesota Power. Any party to whom the contents are revealed or may come into possession of this document is required to request of Minnesota Power if such Confidentiality Agreement exists. Any entity in possession of, or that reads or otherwise utilizes information herein, is assumed to have executed or otherwise be responsible and obligated to comply with the contents of such Confidentiality Agreement. Any entity in possession of this document shall hold and protect its contents, information, forecasts, and opinions contained herein in confidence and not share with others without prior written authorization from Minnesota Power.

In preparation of this report, Burns & McDonnell has relied upon information provided by Minnesota Power and other third-party sources. While there is no reason to believe that the information provided is inaccurate or incomplete in any material respect, Burns & McDonnell has not independently verified such information and cannot guarantee or warranty its accuracy or completeness.

Burns & McDonnell's estimates, analyses, and recommendations contained in this report are based on professional experience, qualifications, and judgment. Burns & McDonnell has no control over weather; cost and availability of labor, material, and equipment; labor productivity; energy or commodity pricing; demand or usage; population demographics; market conditions; changes in technology; and other economic or political factors affecting such estimates, analyses, and recommendations. Therefore, Burns & McDonnell makes no guarantee or warranty (actual, expressed, or implied) that actual results will not vary, perhaps significantly, from the estimates, analyses, and recommendations contained herein.

Burns & McDonnell has not been engaged to render legal services. The services Burns & McDonnell provides occasionally require the review of legal documents, statutes, cases, regulatory guides, and related matters. The opinions, analysis, and representations made in this report should not be construed to be legal advice or legal opinion concerning any document produced or reviewed. These documents and the decisions made in reliance of these documents may have serious legal consequences. Legal advice, opinion, and counsel must be sought from a competent and knowledgeable attorney.

This report is for the sole use, possession, and benefit of Minnesota Power for the limited purpose as provided in the agreement between Minnesota Power and Burns & McDonnell. Any use or reliance on the contents, information, conclusions, or opinions expressed herein by any other party or for any other use is strictly prohibited and is at that party's sole risk. Burns & McDonnell assumes no responsibility or liability for any unauthorized use.

1.0 Introduction

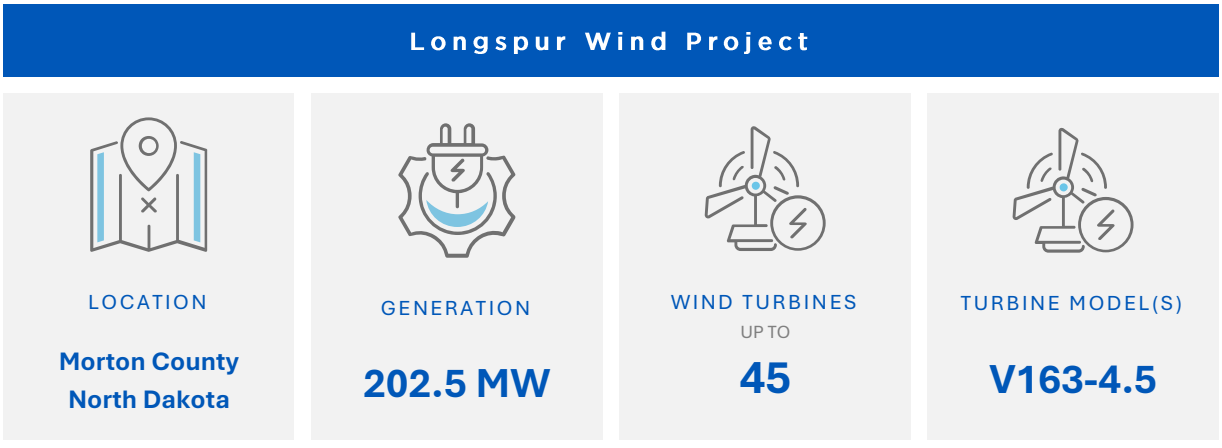
1.1 Study Overview

Burns & McDonnell Engineering Company, Inc. (“Burns & McDonnell”) was retained by Minnesota Power, a division of ALLETE, Inc. (“Minnesota Power”) to conduct a shadow flicker analysis (the “Study”) for the proposed Longspur Wind Project (the “Project”). The objective of the Study was to estimate the annual frequency of shadow flicker on occupied residences caused by Project wind turbines.

1.2 Project Overview

The proposed Project will be located in Morton County, North Dakota, approximately five (5) miles north of the city of Glen Ullin. The Project will include a quantity of up to 45 x Vestas V163-4.5 wind turbine generators at a 113-meter hub height with an aggregate nameplate capacity of approximately 202.5 megawatts (“MW”), as summarized in Section 2.2 below.

For purposes of this Study, a total of 57 turbine positions were evaluated (including 12 alternates), although only up to 45 turbines are expected to be installed. All 12 alternate turbines were modeled as the V163-4.5 turbine model.



1.3 Shadow Flicker Overview

Shadow flicker occurs when wind turbine blades pass in front of the sun to create recurring shadows on an object. Such shadows occur only under very specific conditions, including sun position, wind direction, time of day, and other similar factors.

The intensity of shadow flicker varies significantly with distance, and as separation between a turbine and receptor increases, shadow flicker intensity correspondingly diminishes. Shadow flicker intensity for distances greater than 10 rotor diameters is generally considered imperceptible. At such distances, shadow flicker most commonly occurs at sunrise or sunset, when cast shadows are sufficiently long.

1.4 Applicable Regulations

Shadow flicker impacts are not currently regulated in applicable state or federal law, nor are there requirements in the current Morton County, North Dakota ordinances with regard to limitations on shadow flicker durations. This report identifies those receptors that may experience shadow flicker more than 30 hours per year, although it is noted that this threshold is presented as a typical industry benchmark for similar studies and not as a suggested limitation.

1.5 Site Visit

Burns & McDonnell did not visit the Project Site as part of this Study. The contents of this evaluation are based exclusively upon desktop analysis by Burns & McDonnell.

2.0 Modeling Parameters and Inputs

2.1 Modeling Overview

Shadow flicker was modeled for the Project Site using WindPRO, an industry-leading software package for the design and planning of wind energy projects. This package models the sun's path with respect to every turbine location during every minute over a complete year. Any shadow flicker caused by each turbine is then aggregated for each receptor for the entire year.

The following sections are summaries of the inputs utilized in the WindPRO model for this Study.

2.2 Wind Turbines

The Project will include up to 45 wind turbines when constructed, although for purposes of this Study, a total of 57 turbine positions were evaluated (including 12 alternates) to provide a conservative estimate of estimated flicker durations. A summary of the turbine model and its respective dimensions that were modeled as part of this Study is included Table 2-1.

Table 2-1: Turbine Model Dimensions

Turbine Model	Quantity	Hub Height [m]	Rotor Diameter [m]
V163-4.5	57	113	163

Shadow flicker intensity is partially dependent upon the distance from a receptor to the turbine causing the shadow. The Minnesota Power-provided coordinates of each wind turbine are presented in Appendix A and the location of each wind turbine is presented graphically in Appendix D.

2.3 Receptors

A receptor is used to designate a specific location, such as a residence or public building, where the impact of shadow flicker is assessed. A quantity of 61 receptors were modeled at the Project Site. The Minnesota Power-provided coordinates of each receptor are presented in Appendix C and the location of each receptor is presented graphically in Appendix D. Burns & McDonnell did not provide an independent verification of the location or occupied status of these receptors.

Each receptor was modeled in "green house" mode within the WindPRO model. This approach provides a conservative estimate of the amount of time when shadow flicker could occur by modeling each receptor as

having windows on all sides and effectively causing the home to be susceptible to flicker effects in all directions.

2.4 Terrain

The WindPRO model utilizes topography data to place turbines and receptors at the proper elevations. This information is also used by the model to consider any natural land features between a turbine and a receptor that may block shadows from being seen at a receptor.

Publicly-available terrain data was downloaded from the National Elevation Dataset, a product of the United States Geological Survey. The 10-meter resolution digital elevation model was exported at 10-foot intervals for use in the WindPRO model. The WindPRO model uses the provided elevation data to determine the elevation of each turbine and receptor.

2.5 Obstacles

Obstacles located between a receptor and a turbine, such as trees or buildings, may significantly reduce or eliminate the duration and/or intensity of shadow flicker. However, to provide the most conservative estimate of the amount of time when shadow flicker could occur, no attempt was made to model the presence of potential obstacles.

2.6 Turbine Operation

Shadow flicker is contingent upon the movement of the turbine blades. Shadow flicker can only occur when the turbine is in operation (i.e., when the turbine blades are rotating). Moreover, shadow flicker is generally most notable when a turbine is facing a receptor, as this results in the widest-possible shadow being cast. To more accurately reflect the periods of operation of each Project wind turbine, on-site hub-height wind data was provided by Minnesota Power and used to indicate the periods when the turbines are inactive due to wind speeds below the turbine cut-in speed or above the turbine cut-out speed, at which time the turbine rotor is not in motion and no shadow flicker will occur.

Project Site-specific wind data was also utilized to model the orientation of the turbines relative to each receptor. The Minnesota Power-provided wind data includes data collected by an on-site meteorological mast.

Power curves for the proposed turbines were provided by Minnesota Power. These power curves were added to the WindPRO model to more accurately reflect the turbine's operational characteristics. The assumed cut-in wind speed of the proposed turbines was 3.0 m/s and the assumed cut-out wind speed was 24.0 m/s.

2.7 Flicker Relevance

At distances beyond 10 rotor diameters, shadow flicker effects are generally considered low, as shadows diffuse and become imperceptible. Thus, a distance equal to 10 times the rotor diameter of each turbine (i.e., 1,630 meters) was modeled as the maximum distance at which shadow flicker was considered relevant; receptors greater than this distance from a given turbine were not evaluated. The proximity of this buffer relative to each receptor is presented graphically in Appendix D.

2.8 Sun Angle

The sun's path with respect to each turbine location is calculated by the WindPRO model to determine the cast shadow paths during every minute over a complete year. However, at very low sun angles, the light must pass through more atmosphere and becomes too diffused to form a coherent shadow. Thus, a value of three (3) degrees or less was utilized for the height at which the sun would not cause noticeable flicker.

2.9 Sunshine Probability

Shadow flicker is only caused when the sun is shining. Sunshine probability data was obtained by Burns & McDonnell, as shown in Appendix B. This data represents the percentage of hours each month that the sun is expected to be shining during daylight hours, with consideration given for cloud cover, rainy days, fog, or other similar occurrences that may diminish the potential occurrence or severity of shadow flicker. In WindPRO, calculations initially consider a worst-case scenario for shadow flicker, assuming continuous sunshine and wind, which is then statistically reduced by accounting for factors such as the probability of sunshine.

3.0 Results

Using the inputs and parameters defined in Section 2.0, the WindPRO model was used to calculate shadow flicker for the identified receptors at the Project Site. Table 3-1 presents a summary of these results, while detailed tables are included within Appendix C that present shadow flicker durations by receptor, including estimated hours per year. Additionally, maps are provided in Appendix D that illustrate the shadow flicker vectors (in hours per year) caused by each Project turbine.

Table 3-1: Summary of Results

Turbine Layout	No. of Turbines	No. of Receptors	No. of Receptors, Flicker ≥ 30 hr/yr	No. of Receptors, Flicker ≥ 30 hr/yr After Mitigation
V163-4.5	57	61	4	0, See Bullet Below

The following is a set of key observations from the results of the Study:

- With the current layout, 4 of the 61 known receptors exceed 30 hours per year of shadow flicker for estimated sunshine conditions. However, mitigation techniques will be utilized to reduce the shadow flicker on the residences with more than 30 hours per year, indicated with the asterisk in Appendix C. Common techniques include planting vegetation, awning installation, and/or reduced turbine operation via curtailment. For a participating residence, a landowner may also sign an acknowledgement letter for the exceedance. Refer to Appendix C for a complete listing of results.
- The mitigation strategies ensure the Project would be able to meet the shadow flicker limits. However, mitigation may not be necessary for the final layout based on which turbines are ultimately selected to be built. A final shadow flicker model will be completed to demonstrate compliance for the final layout.
- The majority of observed shadow flicker on each receptor occurs during early morning and/or late afternoon and evening hours, as shown in Appendix E.
- For purposes of this Study, a total of 57 turbine positions were evaluated, although Burns & McDonnell understands that only up to 45 turbines are expected to be installed. Depending on the turbine location(s) that are eliminated, flicker durations at impacted receptors are likely to decrease from those presented herein.
- The Study was performed using a conservative modeling approach with Project Site-specific conditions. For example, the Study modeled each receptor as a “green house”, meaning each

receptor was modeled as having windows on all sides and effectively causing the home to be susceptible to flicker effects in all directions. Further, the Project Site was modeled as if no obstacles were present, including trees or buildings, which may significantly reduce or eliminate the duration and/or intensity of shadow flicker at a receptor. Due to the conservative approach of the Study, the actual duration and intensity of shadow flicker experienced at each receptor is expected to be less than those reported in the Study.

Appendix A – Wind Turbine Coordinates

Table A-1: Wind Turbine Coordinates

Turbine ID	Easting [m]	Northing [m]	Wind Turbine Model
T01	282,280	5,201,201	V163-4.5MW
T03	282,778	5,202,380	V163-4.5MW
T05	283,721	5,201,891	V163-4.5MW
T06	284,869	5,201,373	V163-4.5MW
T07	283,847	5,199,451	V163-4.5MW
T08	284,179	5,199,783	V163-4.5MW
T10	285,150	5,200,270	V163-4.5MW
T12	286,330	5,200,266	V163-4.5MW
T13	284,706	5,198,029	V163-4.5MW
T15	285,933	5,197,930	V163-4.5MW
T16	286,289	5,198,396	V163-4.5MW
T17	285,559	5,196,447	V163-4.5MW
T18	285,996	5,196,220	V163-4.5MW
T19	286,662	5,196,365	V163-4.5MW
T20	289,796	5,206,205	V163-4.5MW
T21	290,669	5,205,874	V163-4.5MW
T22	291,173	5,205,835	V163-4.5MW
T23	292,983	5,206,023	V163-4.5MW
T24	292,810	5,205,256	V163-4.5MW
T25	294,107	5,204,243	V163-4.5MW
T26	294,579	5,204,418	V163-4.5MW
T27	295,086	5,204,403	V163-4.5MW
T28	287,971	5,203,815	V163-4.5MW
T29	289,655	5,204,342	V163-4.5MW
T30	289,409	5,203,489	V163-4.5MW
T31	290,456	5,203,777	V163-4.5MW
T33	292,205	5,203,672	V163-4.5MW
T34	292,711	5,203,764	V163-4.5MW
T36	290,963	5,202,336	V163-4.5MW
T37	291,442	5,202,449	V163-4.5MW
T38	292,061	5,202,185	V163-4.5MW
T39	292,590	5,202,695	V163-4.5MW
T40	293,772	5,201,961	V163-4.5MW
T43	287,986	5,202,215	V163-4.5MW
T44	289,412	5,201,972	V163-4.5MW
T45	287,241	5,201,756	V163-4.5MW
T46	287,811	5,201,445	V163-4.5MW

Turbine ID	Easting [m]	Northing [m]	Wind Turbine Model
T47	288,561	5,201,425	V163-4.5MW
T48	289,304	5,200,329	V163-4.5MW
T50	290,497	5,200,333	V163-4.5MW
T51	292,117	5,200,162	V163-4.5MW
T52	292,610	5,200,219	V163-4.5MW
T53	293,390	5,200,156	V163-4.5MW
T56	292,525	5,198,543	V163-4.5MW
T57	293,471	5,198,801	V163-4.5MW
T58	294,128	5,199,304	V163-4.5MW
T59	294,724	5,198,883	V163-4.5MW
T61	295,633	5,198,559	V163-4.5MW
T62	296,133	5,198,457	V163-4.5MW
T63	293,705	5,197,990	V163-4.5MW
T64	295,374	5,197,952	V163-4.5MW
T65	294,643	5,197,324	V163-4.5MW
T66	296,125	5,197,132	V163-4.5MW
T67	297,014	5,197,230	V163-4.5MW
T68	298,056	5,197,006	V163-4.5MW
T69	295,539	5,196,447	V163-4.5MW
T70	295,029	5,195,483	V163-4.5MW

Notes:
[1] Coordinates presented in UTM NAD83 Zone 14 (meters)
[2] Coordinates via "*Longspur_MNPower_L013_202p5MW_45xV163-4p5_113mHH_20250922_WithAlt*"

Appendix B – Modeling Inputs

Table B-1: Monthly Sunshine Probability for Bismarck, North Dakota

Month	Sunshine Probability
January	54%
February	52%
March	61%
April	58%
May	64%
June	67%
July	75%
August	72%
September	67%
October	53%
November	42%
December	45%

Notes:
[1] Data source: NOAA 11-2024 - Sunshine Probability Hours by City
[2] Data location: Bismarck, North Dakota

Appendix C – Flicker Results by Receptor

Table C-1: Flicker Results by Receptor

Receptor ID	Easting [m]	Northing [m]	Participating Status	Flicker Duration [hours/year]	Mitigated Flicker Duration
REC-001	299,548	5,198,403	Non Participating	0.00	-
REC-002	298,328	5,198,450	Non Participating	0.00	-
REC-003	298,817	5,200,869	Non Participating	0.00	-
REC-004	298,346	5,201,009	Non Participating	0.00	-
REC-005	283,255	5,200,102	Non Participating	31.22	30.00*
REC-006	280,525	5,200,317	Non Participating	0.00	-
REC-007	282,053	5,200,445	Non Participating	0.00	-
REC-008	280,615	5,202,703	Non Participating	0.00	-
REC-009	280,257	5,202,726	Non Participating	0.00	-
REC-010	280,612	5,202,784	Non Participating	0.00	-
REC-011	280,543	5,202,808	Non Participating	0.00	-
REC-012	280,411	5,203,201	Non Participating	0.00	-
REC-013	285,089	5,203,522	Non Participating	0.00	-
REC-014	279,487	5,203,743	Non Participating	0.00	-
REC-015	280,378	5,203,755	Non Participating	0.00	-
REC-016	293,514	5,196,773	Participating	12.25	-
REC-017	286,391	5,197,343	Participating	3.20	-
REC-018	287,953	5,198,053	Non Participating	0.00	-
REC-019	287,904	5,198,066	Non Participating	0.00	-
REC-020	296,751	5,198,091	Participating	35.37	30.00*
REC-021	289,246	5,198,642	Participating	0.00	-
REC-022	286,413	5,199,204	Participating	0.00	-
REC-023	288,121	5,199,785	Non Participating	13.12	-
REC-024	294,990	5,200,386	Non Participating	3.08	-
REC-025	285,777	5,200,835	Participating	56.90	30.00*
REC-026	287,689	5,200,972	Participating	14.03	-
REC-027	289,028	5,200,932	Non Participating	24.77	-
REC-028	288,957	5,200,970	Participating	23.65	-
REC-029	288,926	5,201,017	Participating	19.65	-
REC-030	294,020	5,201,020	Participating	2.70	-
REC-031	296,115	5,201,008	Non Participating	0.00	-
REC-032	289,764	5,201,336	Participating	6.75	-
REC-033	289,758	5,201,432	Non Participating	6.68	-
REC-034	295,942	5,202,178	Non Participating	0.00	-
REC-035	294,429	5,203,374	Non Participating	0.00	-
REC-036	294,431	5,203,404	Non Participating	0.00	-

Receptor ID	Easting [m]	Northing [m]	Participating Status	Flicker Duration [hours/year]	Mitigated Flicker Duration
REC-037	290,927	5,192,186	Non Participating	0.00	-
REC-038	293,570	5,193,278	Non Participating	0.00	-
REC-039	285,734	5,194,712	Non Participating	0.00	-
REC-040	285,749	5,194,731	Non Participating	0.00	-
REC-041	292,757	5,194,503	Non Participating	0.00	-
REC-042	297,438	5,194,987	Non Participating	0.00	-
REC-043	289,886	5,195,439	Non Participating	0.00	-
REC-044	289,728	5,195,460	Non Participating	0.00	-
REC-045	297,201	5,195,350	Non Participating	0.00	-
REC-046	297,277	5,195,400	Non Participating	0.00	-
REC-047	293,296	5,196,108	Participating	0.00	-
REC-048	285,462	5,205,985	Non Participating	0.00	-
REC-049	293,442	5,204,835	Non Participating	36.12	30.00*
REC-050	288,924	5,205,147	Participating	9.53	-
REC-051	288,909	5,205,254	Participating	2.65	-
REC-052	288,354	5,205,907	Participating	3.67	-
REC-053	291,663	5,206,405	Participating	25.52	-
REC-054	291,777	5,206,426	Participating	21.68	-
REC-055	291,592	5,206,798	Non Participating	4.47	-
REC-056	290,965	5,204,916	Participating	3.28	-
REC-057	280,409	5,203,718	Non Participating	0.00	-
REC-058	280,572	5,202,698	Non Participating	0.00	-
REC-059	280,509	5,202,548	Non Participating	0.00	-
REC-060	291,869	5,191,101	Non Participating	0.00	-
REC-061	295,820	5,192,415	Non Participating	0.00	-

Notes:

[1] Coordinates presented in UTM NAD83 Zone 14 (meters)

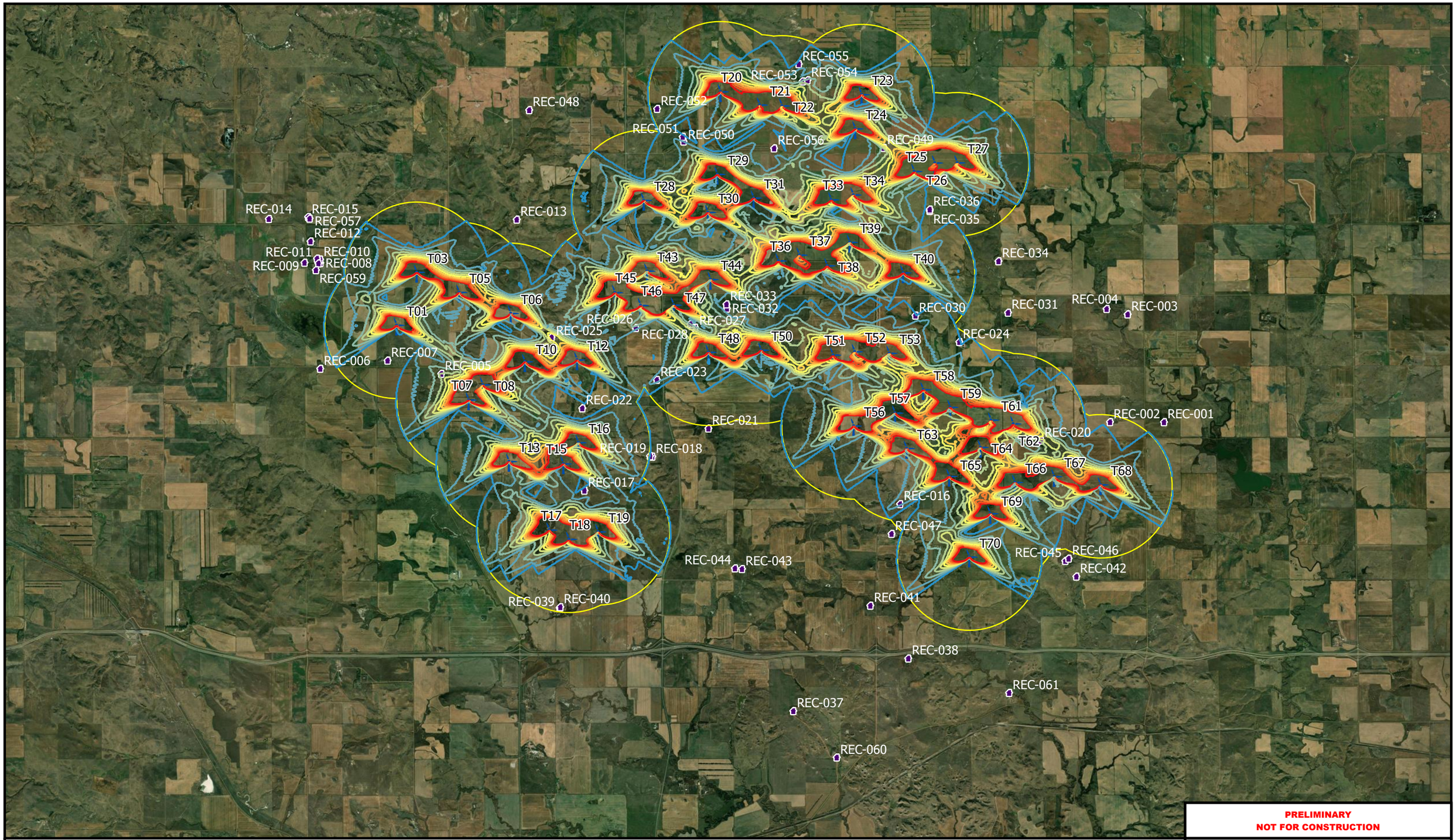
[2] Receptor coordinates provided by Client via "*Longspur_Wind_Receptor_Survey_Results - MB confirmed.xlsx*" on October 20, 2025

[3] Participating status provided by Client via "*Residence Status_ARL.shp*" on April 28, 2026.

[4] Results based on turbine layout in Table A-1

[5] Mitigation techniques will be utilized to reduce the shadow flicker on residences with more than 30 hours per year, indicated with the asterisk. Common techniques include planting vegetation, awning installation, and/or reduced turbine operation via curtailment. The mitigation strategies ensure the Project would be able to meet the shadow flicker limits. However, mitigation may not be necessary for the final layout based on which turbines are ultimately selected to be built. A final shadow flicker model will be completed to demonstrate compliance for the final layout.

Appendix D – Shadow Flicker Duration Map



LEGEND

- Turbine Buffer (10 x RD - 1630m)
- Turbines
- Receptors

Shadow Flicker Vectors [hours per year]

0 10 20 30 40 50 60 70 80 90 100

REFERENCE

0 1 2 MILES

0 1 2 KILOMETERS

N

SK MB ND MT MN SD WY

PRELIMINARY
NOT FOR CONSTRUCTION

LONGSPUR WIND
Shadow Flicker Duration [Hr/Yr]

LOCATION:	MORTON COUNTY, NORTH DAKOTA
CLIENT:	MINNESOTA POWER
PROJ. NO.:	154125
CREATED:	11/05/2025

BURNS McDONNELL
www.burnsmcd.com

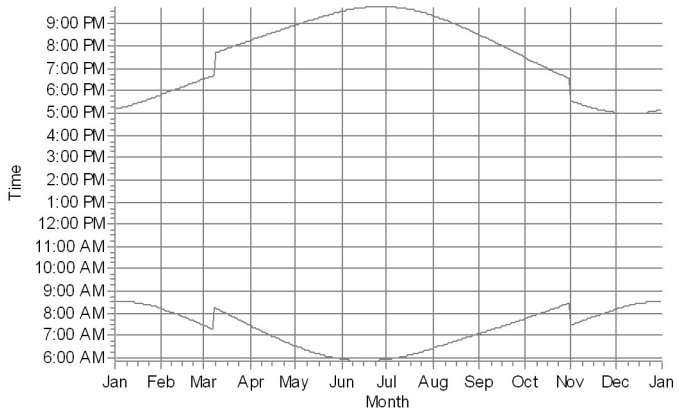
Appendix E – Shadow Flicker Calendar

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

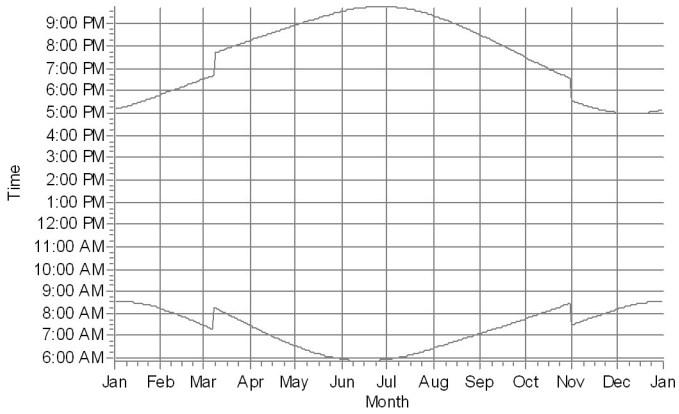
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

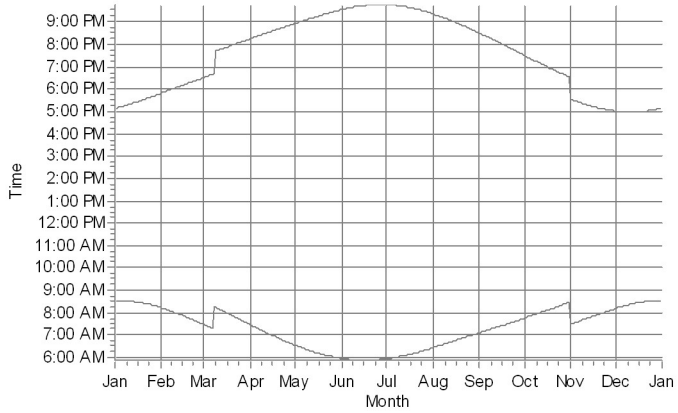
REC-001: Occupied



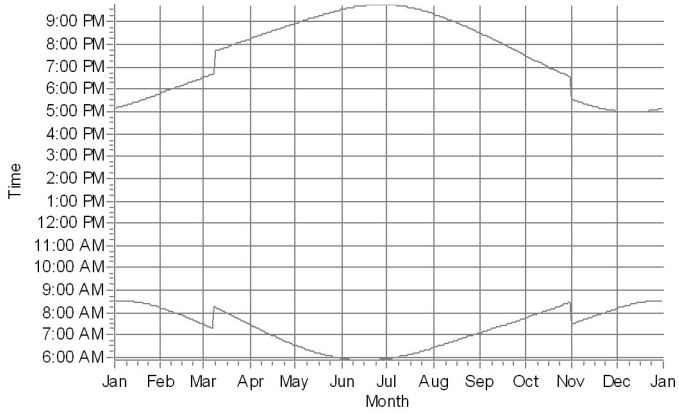
REC-002: Occupied



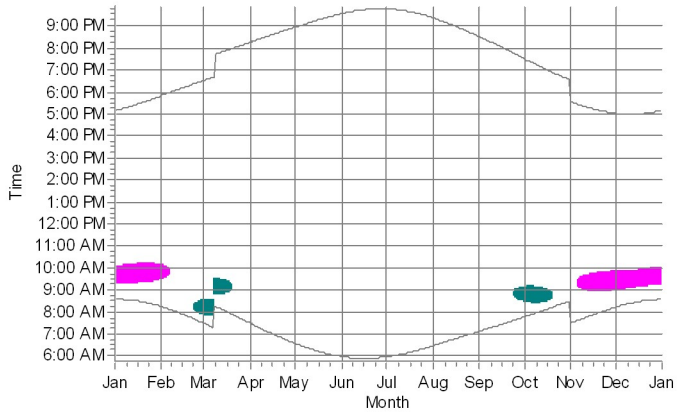
REC-003: Occupied



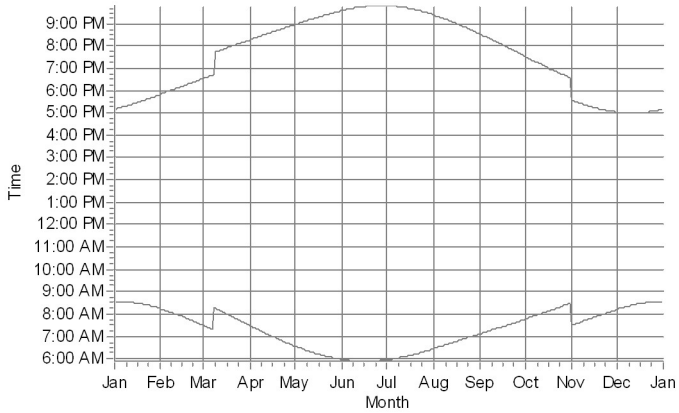
REC-004: Occupied



REC-005: Occupied



REC-006: Occupied



WTGs

T07: Primary

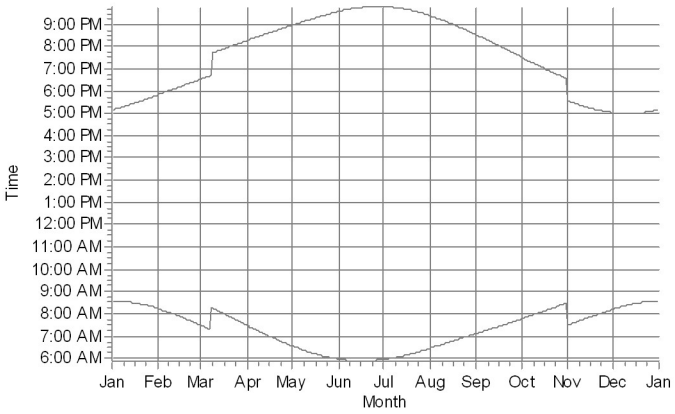
T08: Primary

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

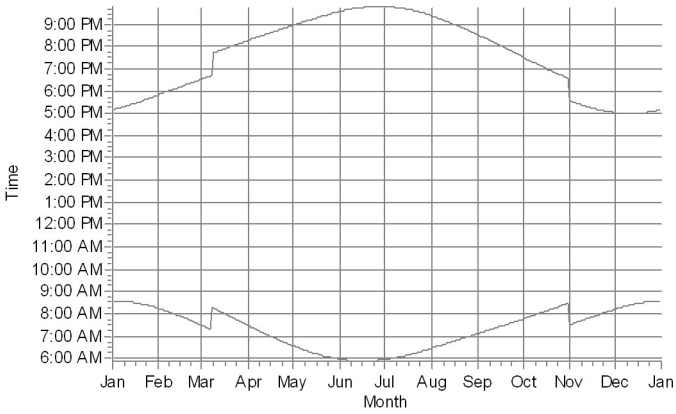
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

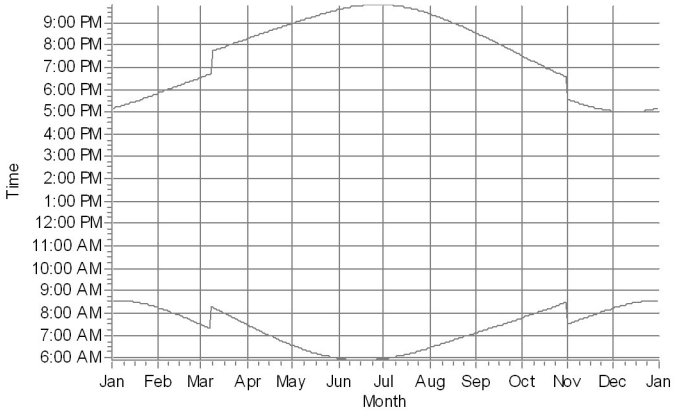
REC-007: Occupied



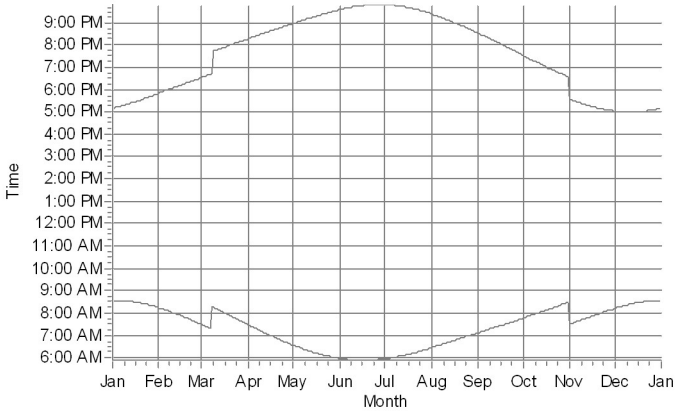
REC-008: Occupied



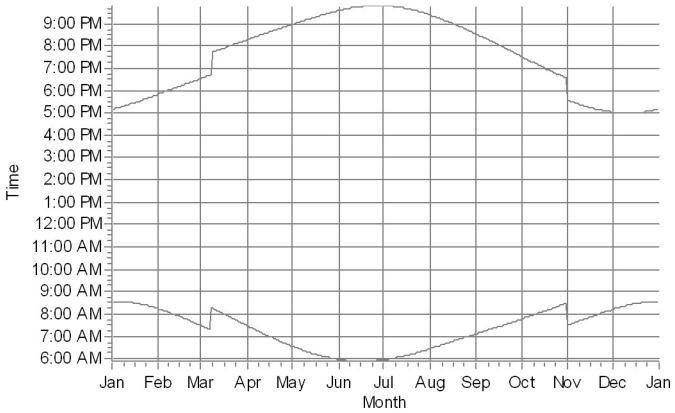
REC-009: Occupied



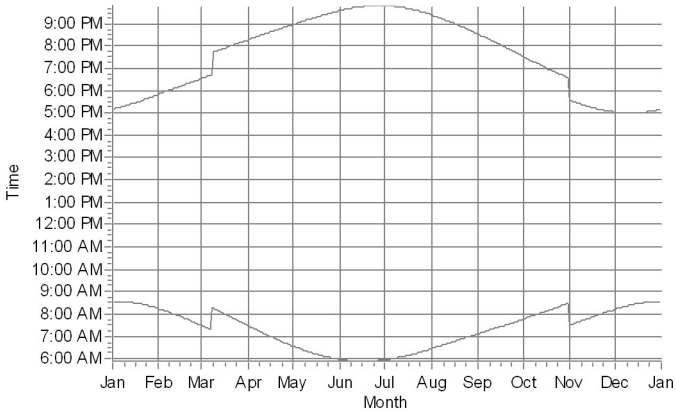
REC-010: Occupied



REC-011: Occupied



REC-012: Occupied



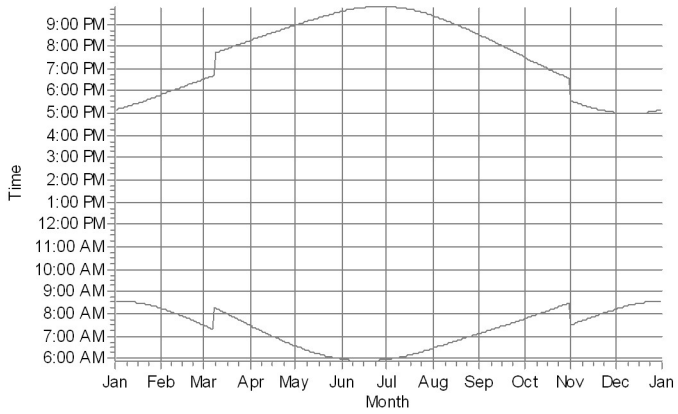
WTGs

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

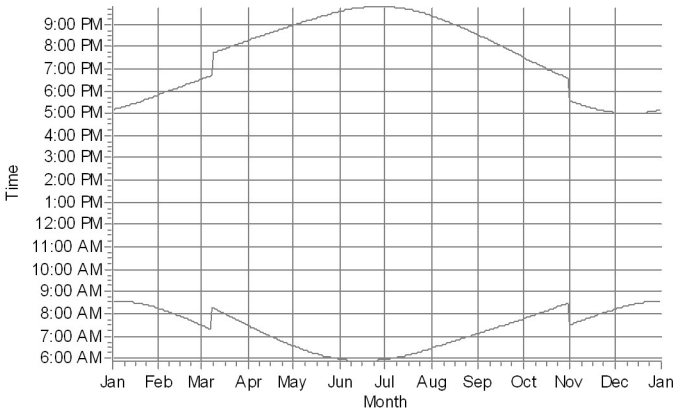
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

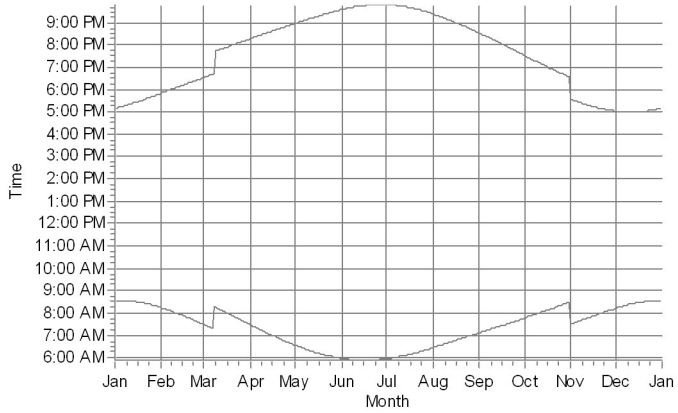
REC-013: Occupied



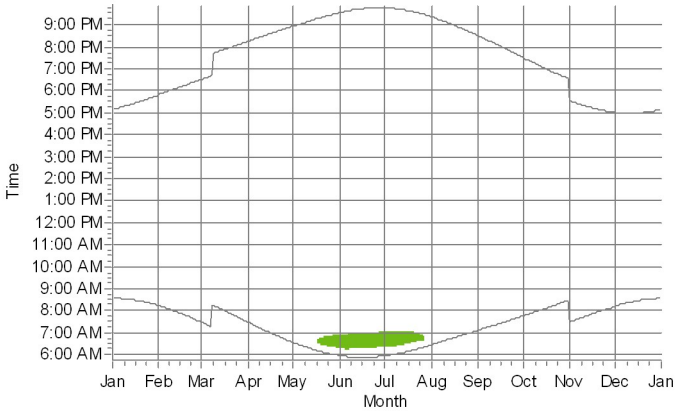
REC-014: Occupied



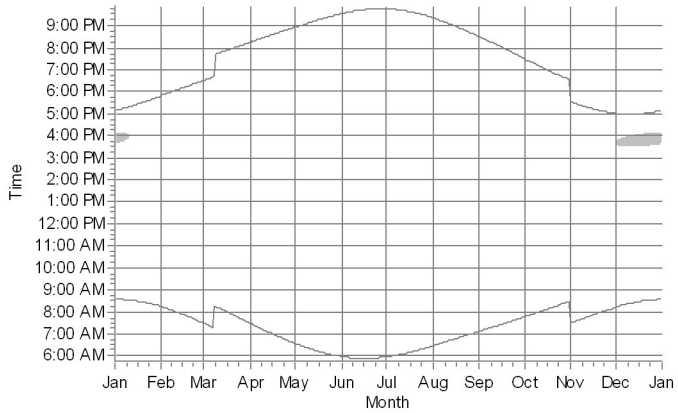
REC-015: Occupied



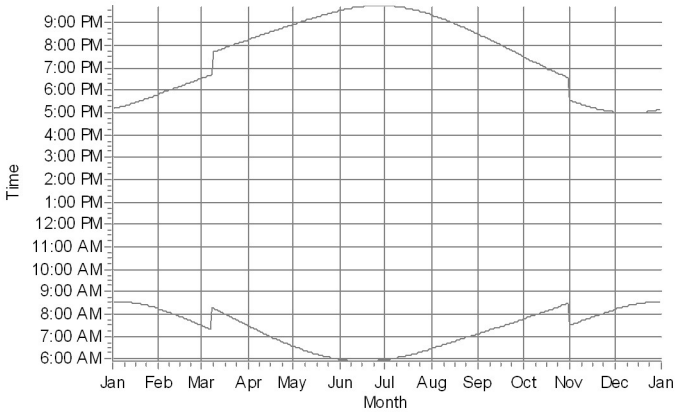
REC-016: Occupied



REC-017: Occupied



REC-018: Occupied



WTGs

T17: Primary

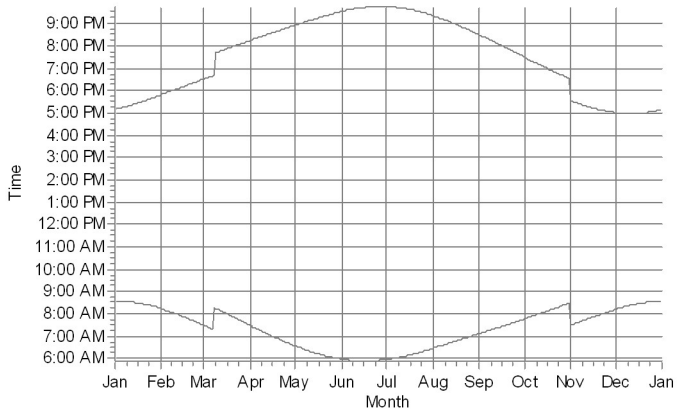
T65: Primary

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

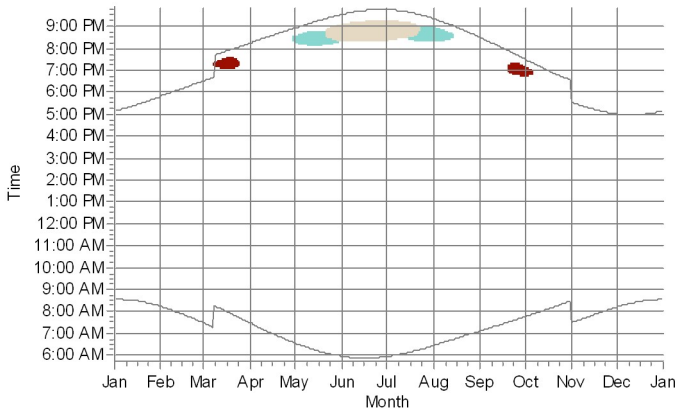
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

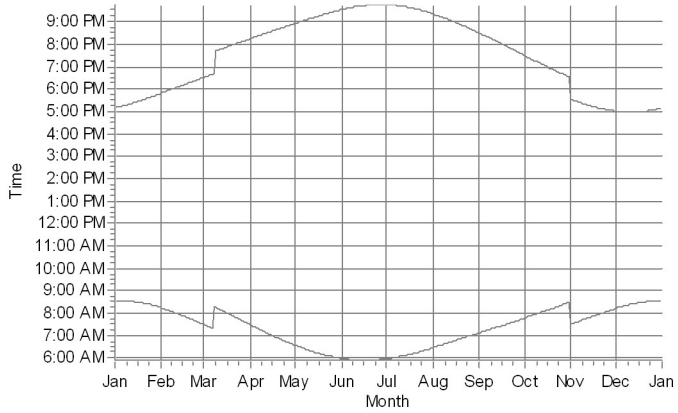
REC-019: Occupied



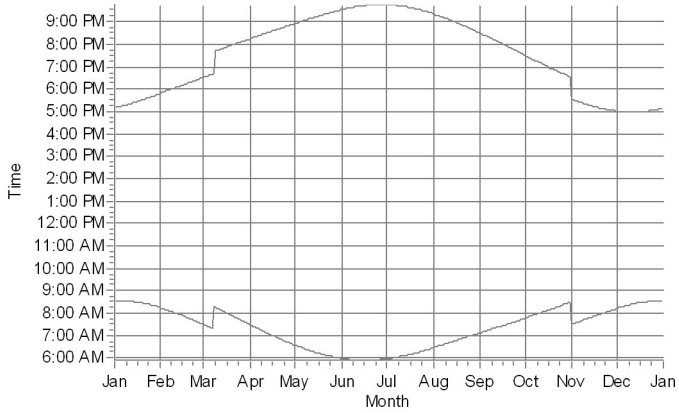
REC-020: Occupied



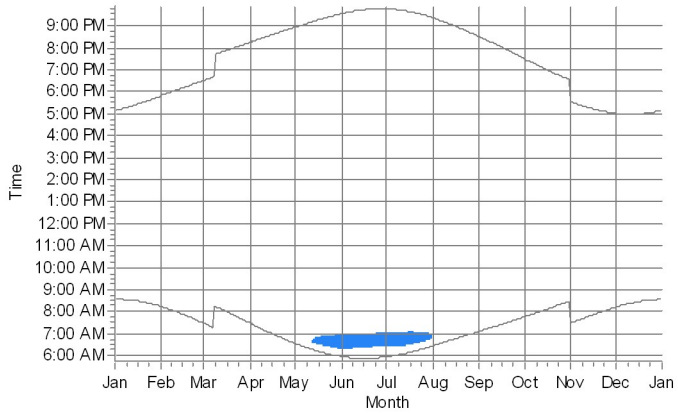
REC-021: Occupied



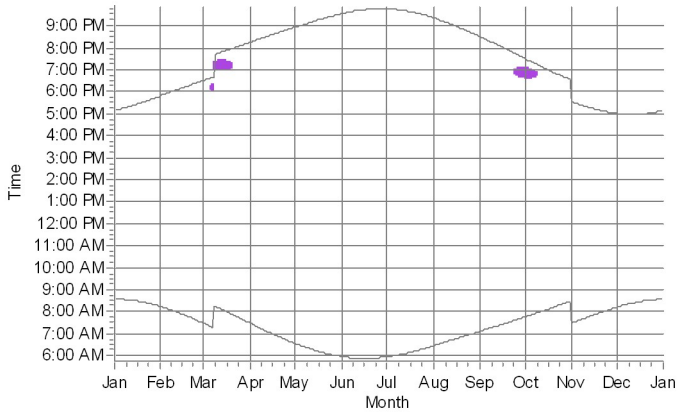
REC-022: Occupied



REC-023: Occupied



REC-024: Occupied



WTGs

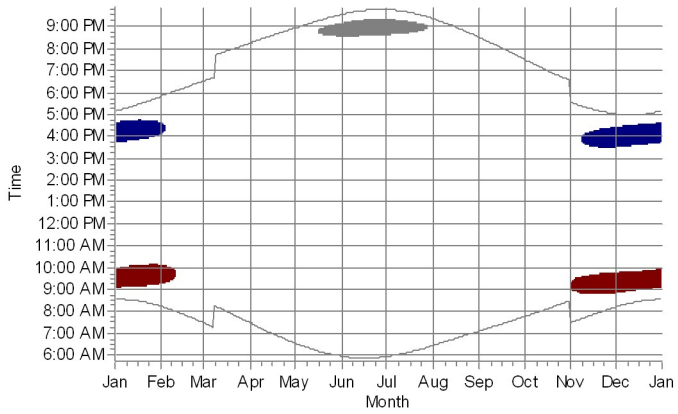
T48: Primary
T53: Primary
T61: Primary
T62: Primary
T64: Alternate

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

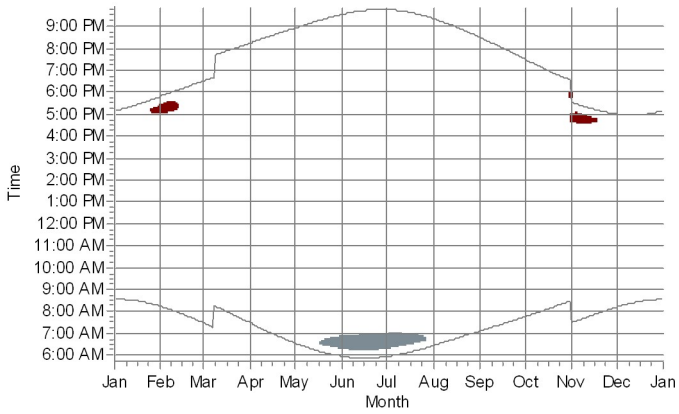
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

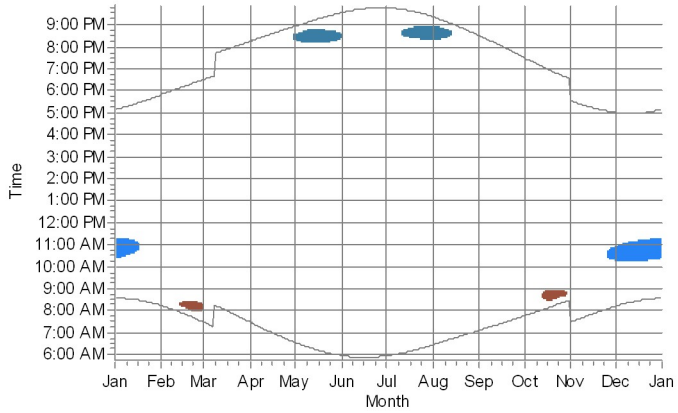
REC-025: Occupied



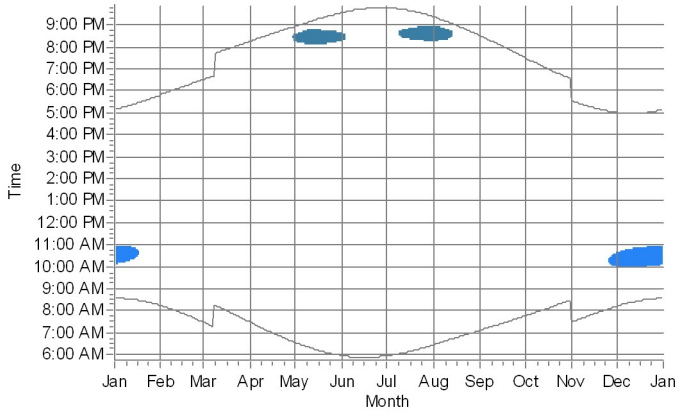
REC-026: Occupied



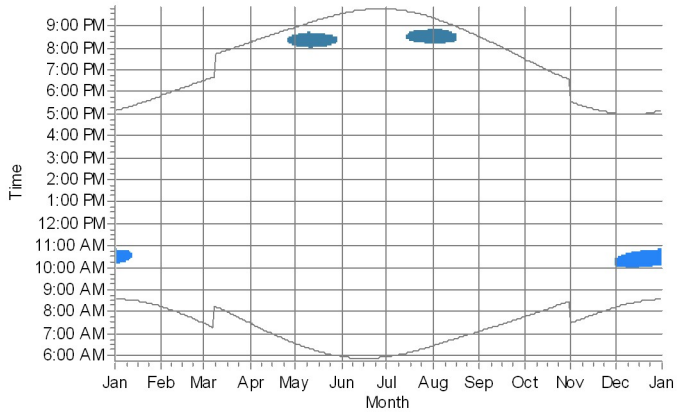
REC-027: Occupied



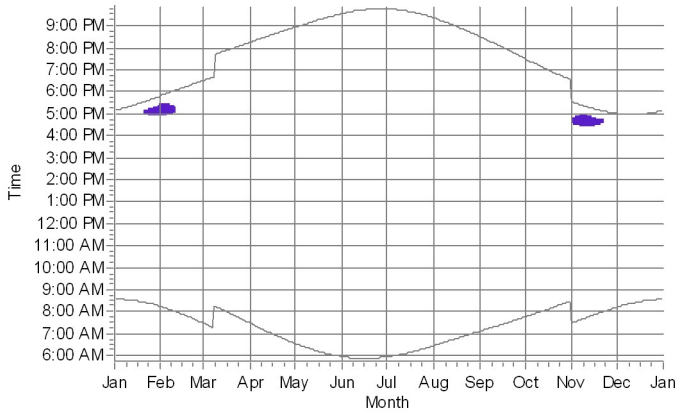
REC-028: Occupied



REC-029: Occupied



REC-030: Occupied



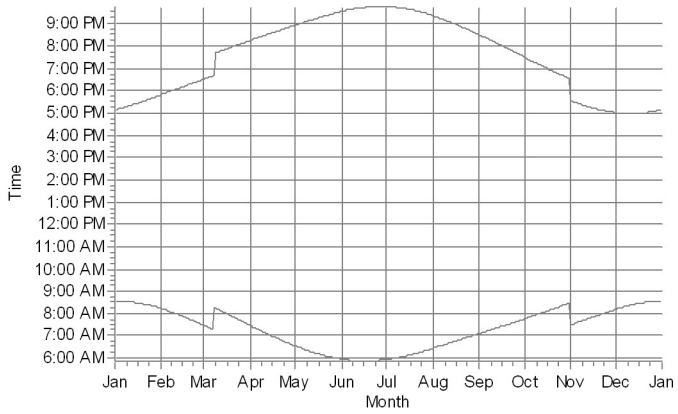
WTGs

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

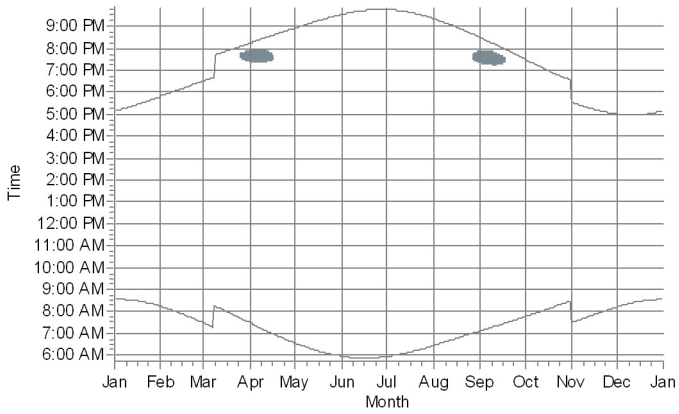
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

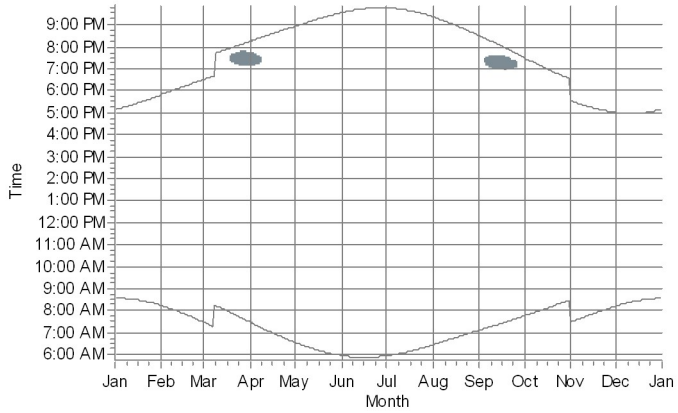
REC-031: Occupied



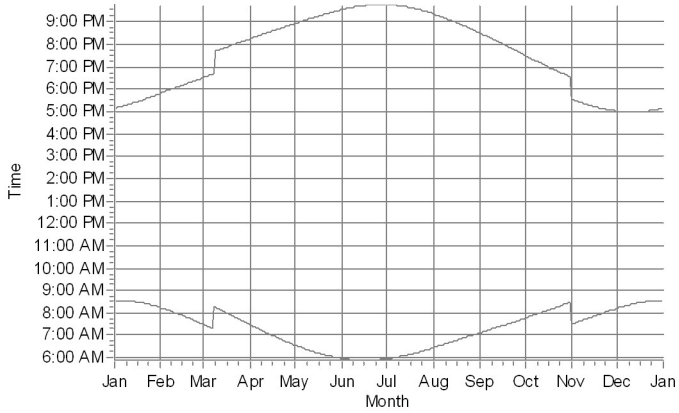
REC-032: Occupied



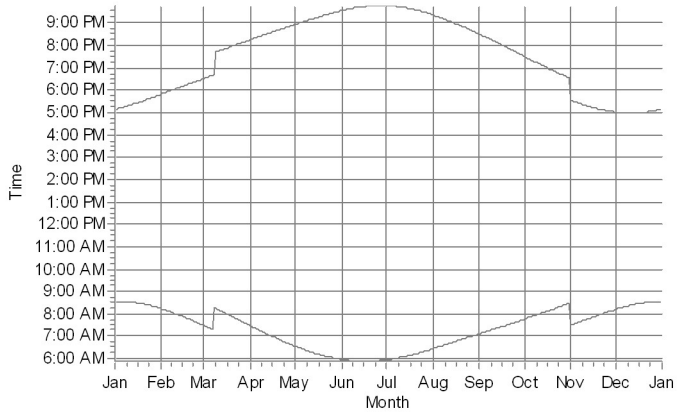
REC-033: Occupied



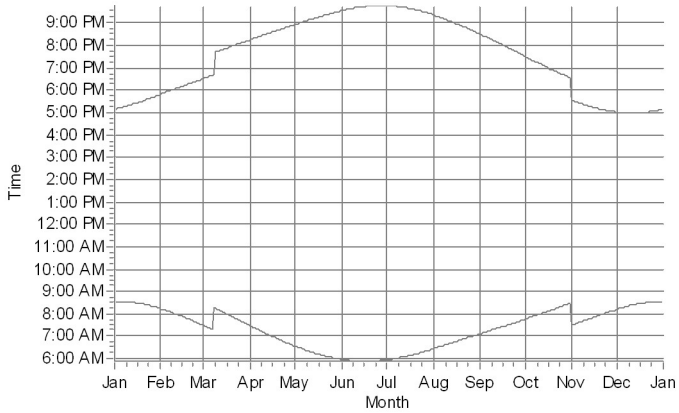
REC-034: Occupied



REC-035: Occupied



REC-036: Occupied



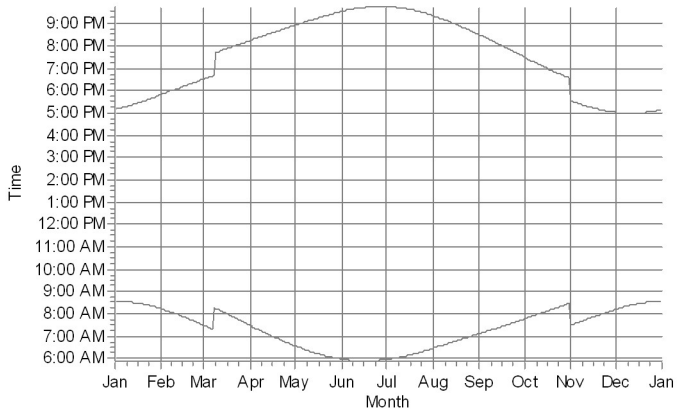
WTGs

T47: Primary

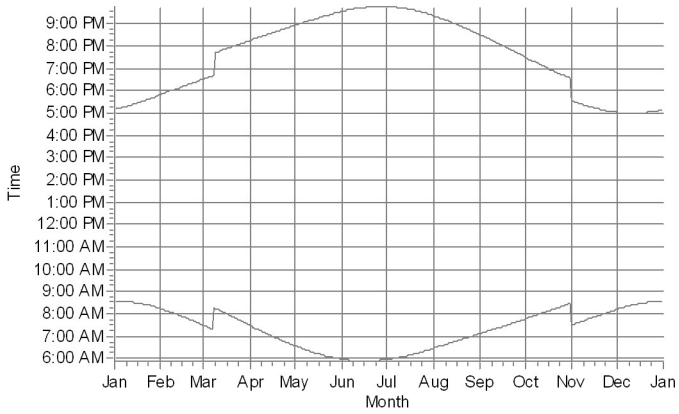
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

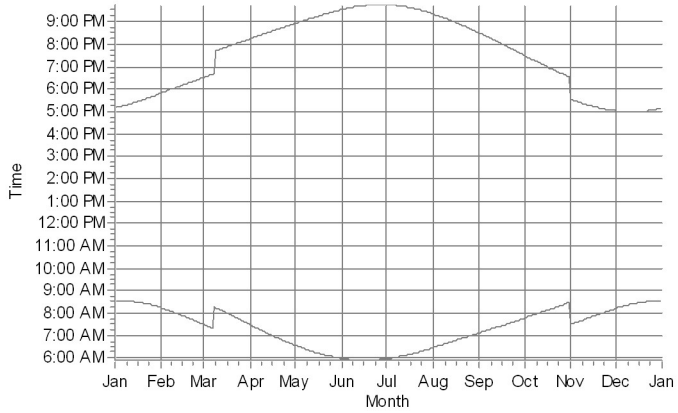
REC-037: Occupied



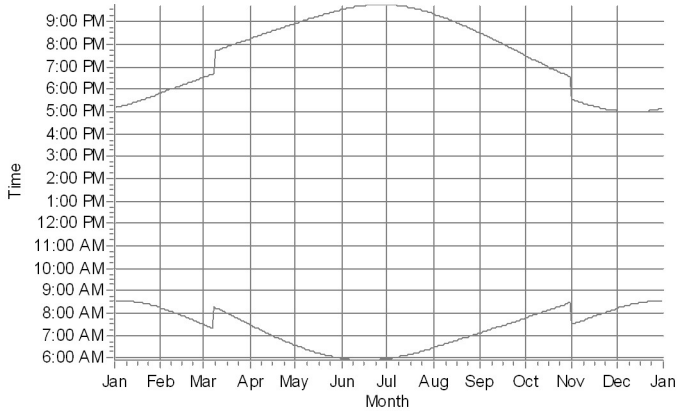
REC-038: Occupied



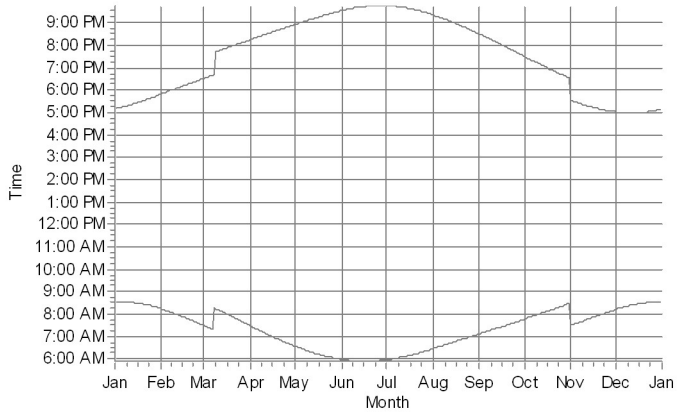
REC-039: Occupied



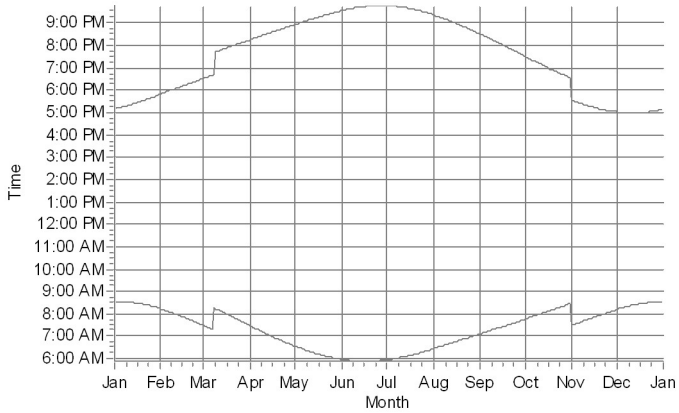
REC-040: Occupied



REC-041: Occupied



REC-042: Occupied



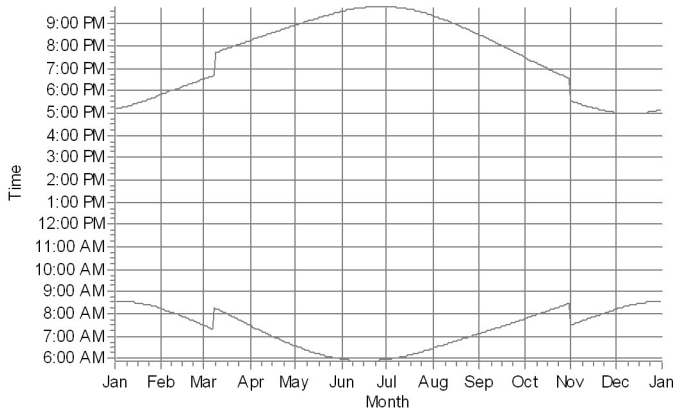
WTGs

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

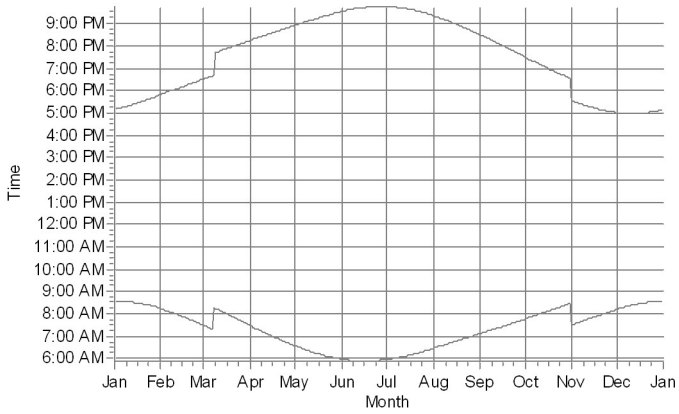
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

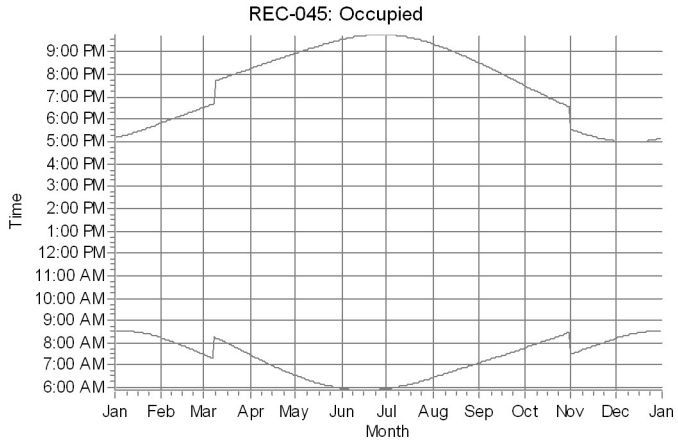
REC-043: Occupied



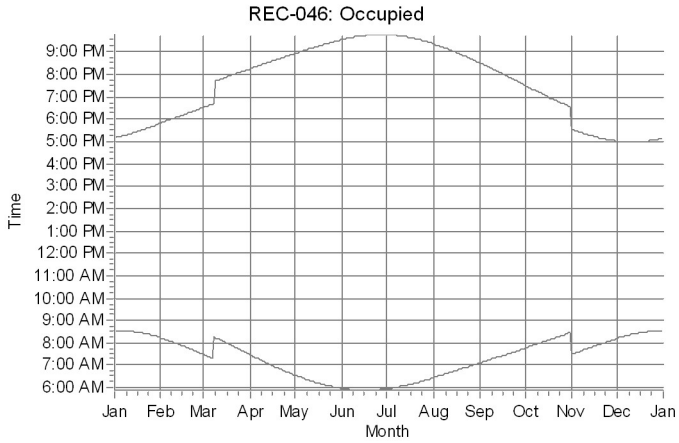
REC-044: Occupied



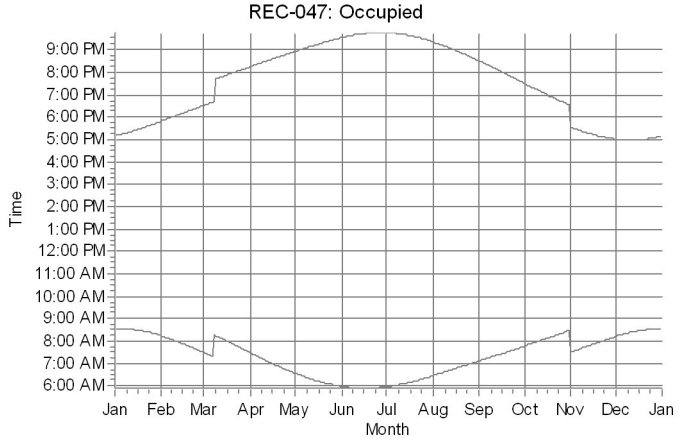
REC-045: Occupied



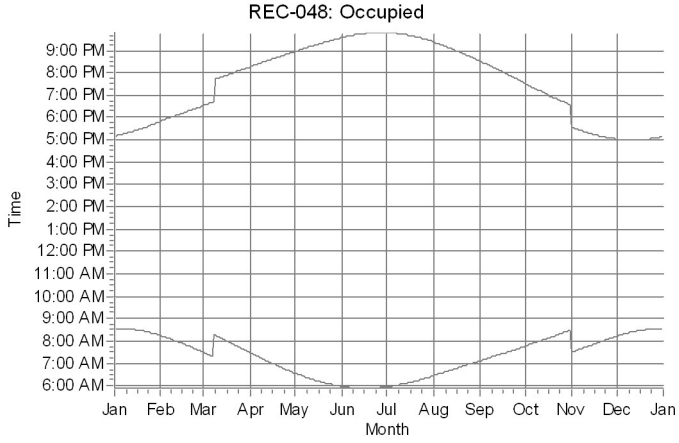
REC-046: Occupied



REC-047: Occupied



REC-048: Occupied



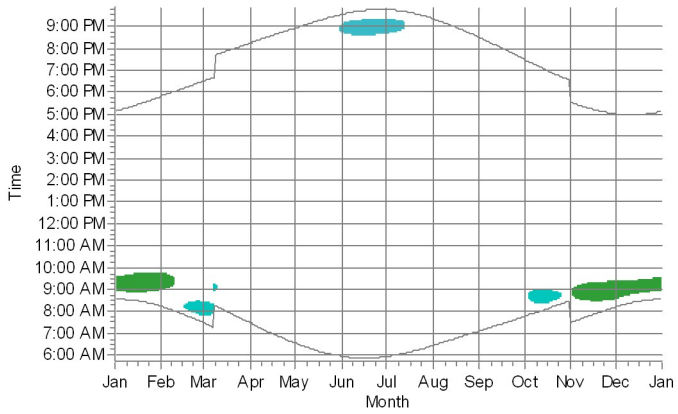
WTGs

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

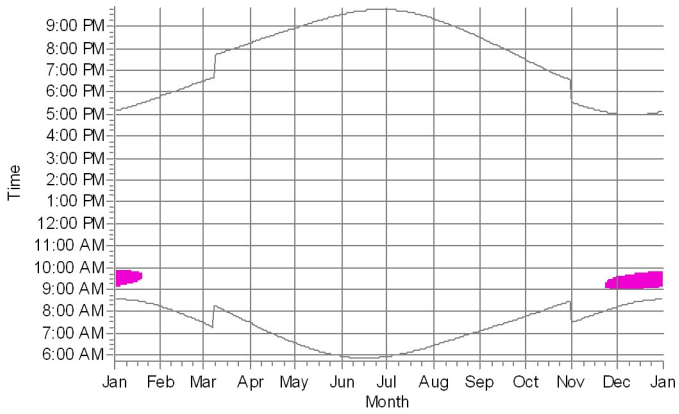
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

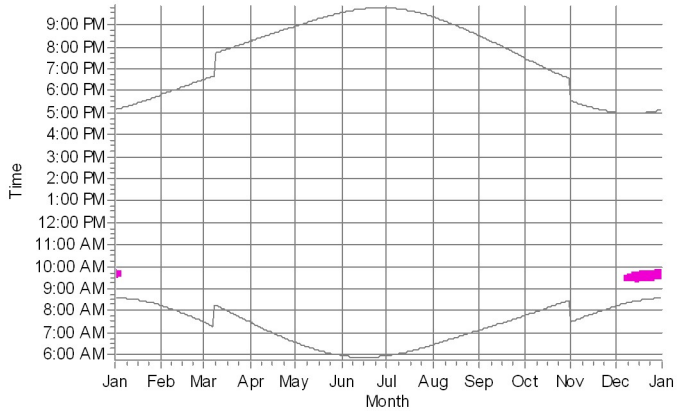
REC-049: Occupied



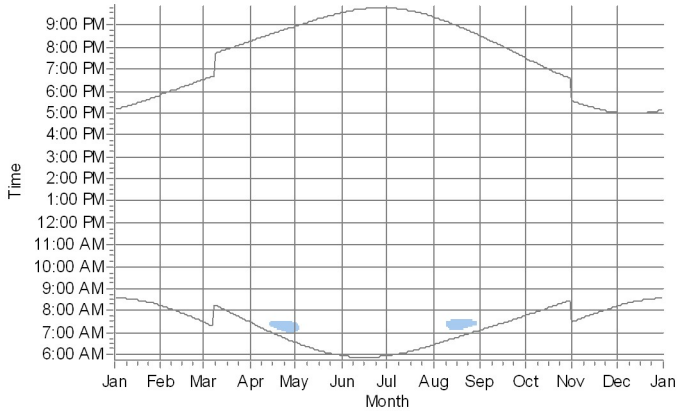
REC-050: Occupied



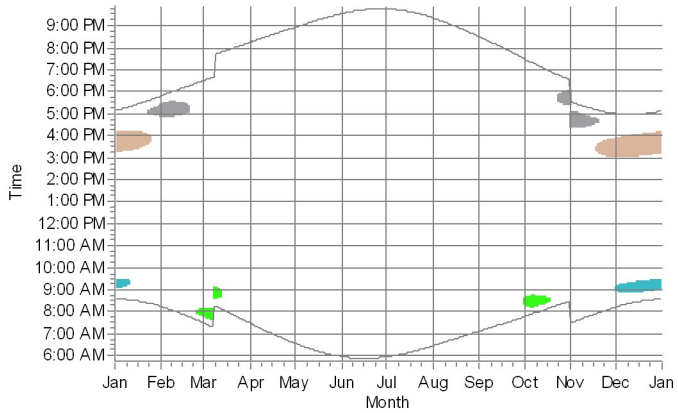
REC-051: Occupied



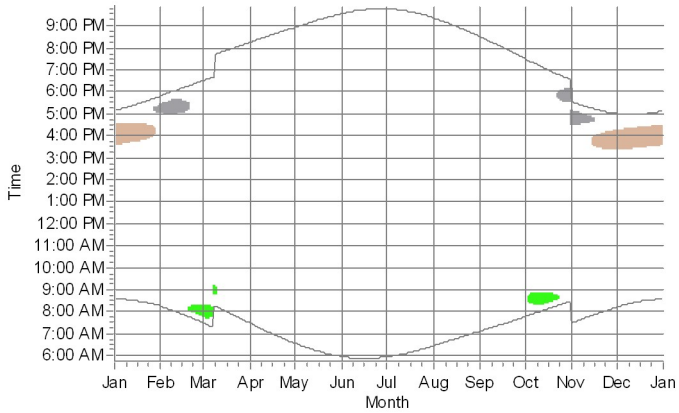
REC-052: Occupied



REC-053: Occupied



REC-054: Occupied



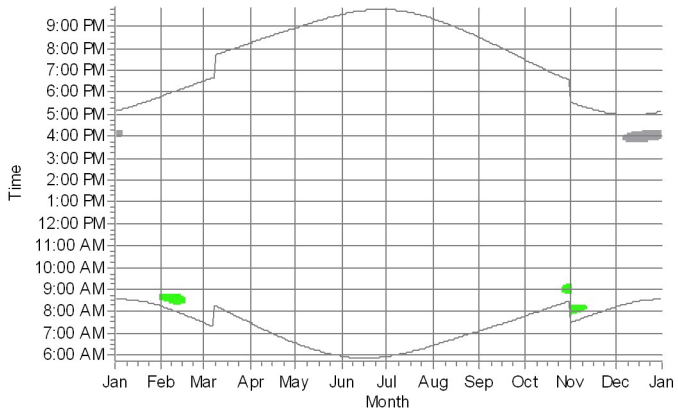
WTGs

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

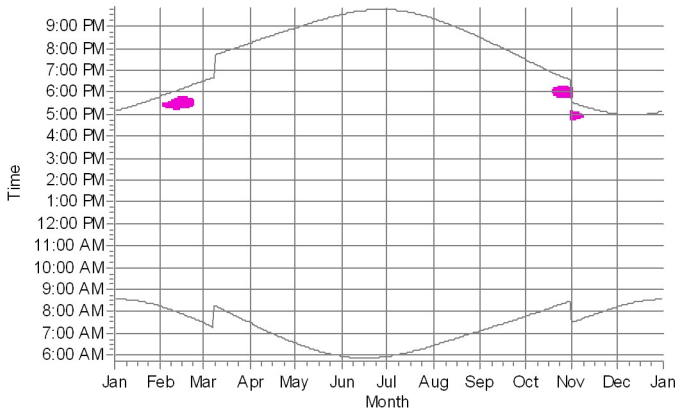
SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc

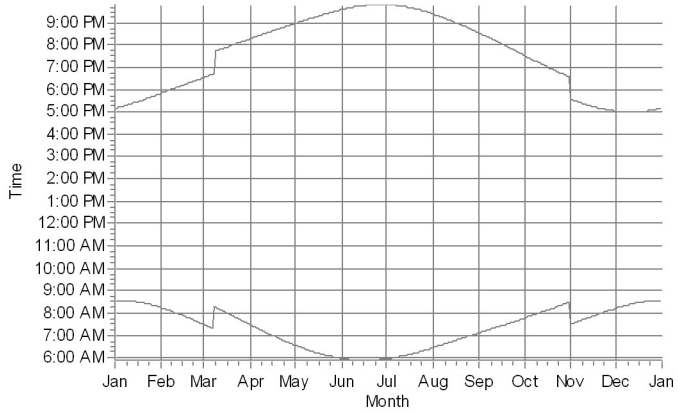
REC-055: Occupied



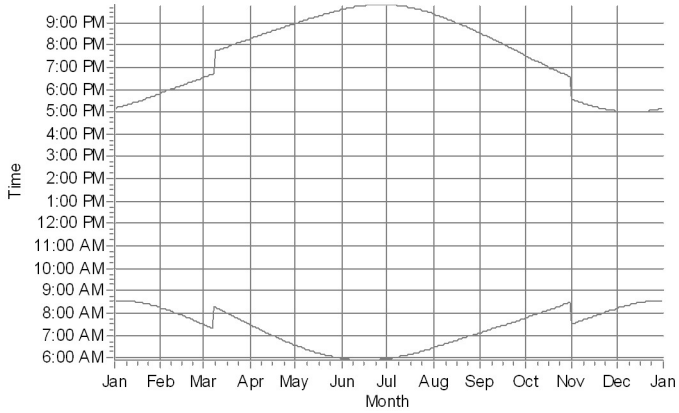
REC-056: Occupied



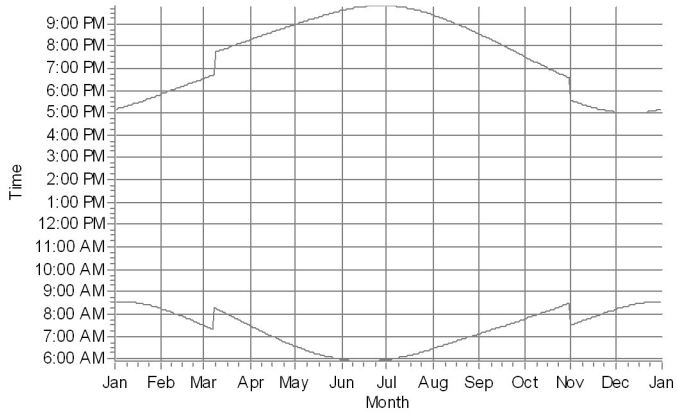
REC-057: Occupied



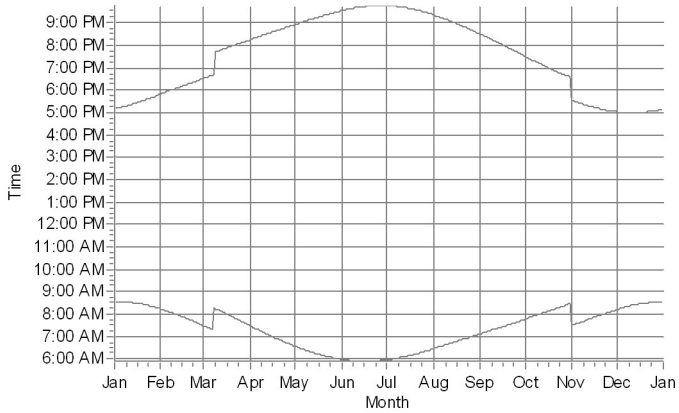
REC-058: Occupied



REC-059: Occupied



REC-060: Occupied



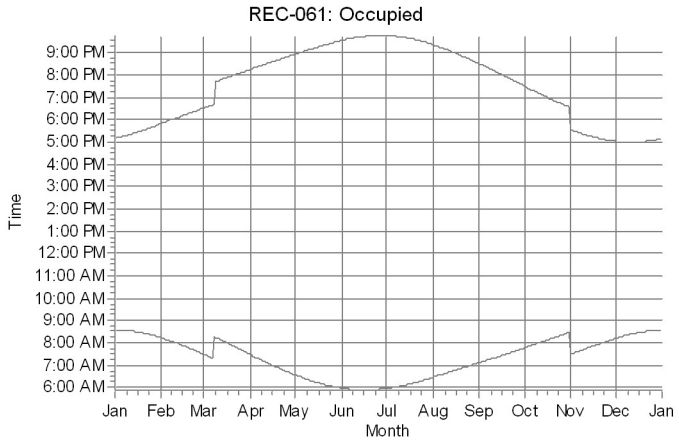
WTGs

T21: Primary
T23: Primary
T29: Overbuild / Alternate

Licensed user:
1898 & Co., Part of Burns & McDonnell
9400 Ward Parkway
US-KANSAS CITY, MO 64114
816 448 7338
Tirthesh / tmshah@burnsmcd.com

SHADOW - Calendar, graphical

Calculation: Client Freq data_ShadowFlicker_Analysis_L013_Layout_57loc



WTGs


BURNS
McDONNELL