

October 4, 2019

Ms. Tanowa Troupe, Secretary
Ohio Power Siting Board
Docketing Division
180 East Broad Street, 11th Floor
Columbus, Ohio 43215-3797

Re: Case No. 18-1607-EL-BGN - In the Matter of the Application of Firelands Wind, LLC for a Certificate of Environmental Compatibility and Public Need to Construct a Wind-Powered Electric Generation Facility in Huron and Erie Counties, Ohio.

Revised Fourth Supplement to Application – Updated Wind Turbine Models and Maps

Dear Ms. Troupe:

On January 31, 2019, as supplemented on March 18, 2019, April 11, 2019, and July 10, 2019, Firelands Wind, LLC (“Applicant”) filed an application with the Ohio Power Siting Board (“Board”) for a Certificate of Environmental Compatibility and Public Need to Construct a Wind-Powered Electric Generation Facility in Huron and Erie Counties, Ohio (“Application”).

As stated in the Application, as supplemented, the facility will consist of up to 87 wind turbines, each with a nameplate capacity of between 4.2 and 5.7 megawatts (“MW”), depending on the final turbine model selected. The total generating capacity of the facility will not exceed 297.66 MW.

On September 12, 2019, the Applicant filed a proposed Fourth Supplement to the Application. Subsequently, on September 27, 2019, the Applicant withdrew the September 12, 2019 filing. At this time, the Applicant is filing a Revised Fourth Supplement that replaces the proposal submitted on September 12, 2019, that was withdrawn.

As discussed below, the purpose of this Revised Fourth Supplement to the Application is to update the list of turbine models that may be used for this Project to include the addition of two General Electric (“GE”) turbine models, GE158 5.5 MW and GE140 3.0 MW. In addition, through this supplement, the Applicant is noticing that it has decided to eliminate the Nordex N149 4.5 MW turbine model from consideration as a model to be used for this Project.

This Revised Fourth Amendment does not change other documentation provided as part of the Application, including, but not limited to: the general purpose of the facility; the facility description; the site selection process; the location of the turbines; the principal environmental, cultural, and socioeconomic considerations and surveys, including the analysis of ice throw and visuals; the transportation and road use plans; and the Project schedule.

A. Turbine Model List Update

The chart set forth in Attachment 1 to this supplement provides a comparison of the turbine models that were listed in the Application, as supplemented, as models under consideration for the Project, as well as the additional turbine models provided in this Revised Fourth Supplement that are also under consideration.

The Applicant affirms that the Project will not exceed the 297.66 MW total generating capacity requested in the Application. However, by adding the additional turbine models proposed in this supplement to the list of possible turbines that could be utilized for the Project, there is an opportunity to increase the capacity of the turbine models, which would reduce the number of turbines needed for the facility. In addition, by uprating the capacity, the turbine may prove more efficient and cost effective.

B. Sound Analysis Update (to include GE140 3.0 MW turbine model, and GE158 5.5 MW turbine model)

The Applicant's consultant, RSG, conducted a sound assessment for the turbine models listed in the Application, which was included as Exhibit G to the Application. Attached to this Fourth Supplement, as Attachment 2, is a supplement to Exhibit G to the Application. Attachment 2 includes an analysis of the GE140 3.0 MW and GE158 5.5 MW turbines.

As shown in Attachment 2, the assessment by RGS shows that the modeled results for the GE140 3.0 MW turbine model, and the GE158 5.5 MW turbine model are equal to or lower than the required maximum level for all nonparticipating receptors. The maximum sound pressure level at a nonparticipating receptor from the combination GE158 5.5 MW and GE140-3.0MW turbine model layout is 47 dBA.

As stated in the Application, this assessment shows that, in compliance with Ohio Administrative Code Rule ("O.A.C.") 4906-4-09(F), in no event will the facility sound contribution at any nonparticipating sensitive receptor within one mile of the Project boundary exceed the Project area ambient nighttime average sound level by 5 dBA.

C. Shadow Flicker Analysis Update

The Applicant's consultant, Environmental Design & Research ("EDR"), conducted a shadow flicker analysis for the turbine models listed in the Application, as supplemented. EDR's Shadow Flicker Report was included as Exhibit H to the Application. Attachment 3 to this Revised Fourth Supplement provides information that supplements Exhibit H to the Application regarding shadow flicker and the additional GE158 5.5 MW and GE140 3.0 MW turbine models.

The Applicant further notes that, as stated in the Application and the July 10, 2019 Third Supplement, the facility will comply with O.A.C. Rule 4906-4-09(H) such that it will be operated so that shadow flicker levels do not exceed 30 hours per year at any nonparticipating sensitive receptor within 1,000 meters of any turbine without the necessary waivers/participation agreements.

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D. Setback Analysis Update

Throughout the Application, as supplement, the Applicant provided information regarding the analyses done by its consultant, EDR, regarding compliance with the OPSB's setback requirements. In light of the inclusion of the additional turbine models proposed in this Revised Fourth Supplement, EDR reran the setback analyses taking into consideration these additional models. The results of EDR's analysis are set forth in Attachment 4 to this supplement.

In addition, Figure 08-6 included with the Application sets forth the Wind Turbine State Setbacks associated with the Project. Attachment 4 to this Revised Fourth Supplement includes a supplement to Figure 08-6 that reflects the setbacks for the GE140 and GE158 turbine models.

The Applicant notes that it has committed to comply with the rules and regulations for setbacks.

E. Manufacturer Manuals

On September 12, 2019, the Applicant provided copies of the manufacturer's manuals for the GE140 and GE158 models to the Docketing Division of the Board. The manuals were filed under seal and were accompanied by a Motion for Protective Order that was also filed on September 12, 2019.

F. Conclusion

The original of this Revised Fourth Supplement to the Application was filed electronically. In addition, 5 complete paper copies and 10 USBs have been provided to the Docketing Division.

We are available, at your convenience, to answer any questions you may have.

Respectfully submitted,

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CERTIFICATE OF SERVICE

The Ohio Power Siting Board's e-filing system will electronically serve notice of the filing of this document on the parties referenced in the service list of the docket card who have electronically subscribed to these cases. In addition, the undersigned certifies that a copy of the foregoing document is also being served upon the persons below this 4th day of October, 2019.

/s/ Christine M.T. Pirik

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Attachment 1

Turbine Model Comparison Chart

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TURBINE MODEL	Listed in Application 1/31/19			Third Supplement Update 7/10/19				Fourth Supplement Update 10/4/19	
	Vestas V150 4.2 MW	Siemens Gamesa SG 145 4.5 MW	Nordex N149 4.5 MW*	Nordex N149 4.8 MW	Nordex N149 5.5 MW	Nordex N149 5.7 MW	Vestas V150 5.6 MW	GE158 5.5 MW	GE140 3.0 MW
Rotor Diameter	150 meters (492 feet)	145 meters (476 feet)	149 meters (489 feet)	149 meters (489 feet)	149 meters (489 feet)	149 meters (489 feet)	150 meters (492 feet)	158 meters (518 feet)	140 meters (459 feet)
Hub Height	105 meters (344 feet)	107.5 meters (353 feet)	109 meters (358 feet) or 125 meters (410 feet)	109 meters (358 feet) or 125 meters (410 feet)	109 meters (358 feet) or 125 meters (410 feet)	109 meters (358 feet) or 125 meters (410 feet)	105 meters (344 feet)	107.5 meters (353 feet)	110 meters (361 feet)
Maximum Total Height	180 meters (591 feet)	180 meters (591 feet)	183.5 meters (602 feet) or 199.5 meters (655 feet)	183.5 meters (602 feet) or 199.5 meters (655 feet)	183.5 meters (602 feet) or 199.5 meters (655 feet)	183.5 meters (602 feet) or 199.5 meters (655 feet)	180 meters (591 feet)	186.5 meters (612 feet)	180 meters (591 feet)
Maximum Generation	4.2 MW	4.5 MW	4.5 MW	4.8 MW	5.5 MW	5.7 MW	5.6 MW	5.5 MW	3.0 MW
Wind Speed at Cut-In	3 m/s	3 m/s	3 m/s	3 m/s	3 m/s	3 m/s	3 m/s	3m/s	3 m/s
Maximum Sound Power Level	104.9 dB	107.8 dB	106.1 dB	106.1 dB	104.8 dB	105.6 dB	104.9 dB	107.5 dB	108 dB
Number of Turbines Needed	71	66	66	62	54	52	53	54**	71**

*The Applicant is no longer proposing to consider using this this turbine model for the project; thus, per this Fourth Supplement this model is being deleted from the Application.

**The Applicant expects that if a GE turbine model is used, the layout would be a combination of GE158s and GE140s, likely resulting in somewhere between 55-70 turbine locations being utilized to result in a nameplate capacity up to 297.66 MW with the GE158s only used in locations where state setback requirements are met.

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Attachment 2

Sound Analysis By RSG

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MEMO

TO: Nathan Pedder

FROM: Eddie Duncan, INCE Bd. Cert.

DATE: October 3, 2019

SUBJECT: GE 3.0-140 and GE 5.5-158 turbines proposed for the Emerson Creek Wind Farm

Apex Clean Energy is proposing the Emerson Creek Wind Farm project (“Project”) for an area straddling Erie and Huron County, Ohio. A noise assessment was previously published for this Project by RSG (*Emerson Creek Wind – Noise Assessment*, June 25, 2019), assuming an 87-turbine array (though only up to 71 are expected to be constructed). The GE 3.0-140 and the GE 5.5-158 model turbines are now being considered for the Project. The GE 3.0-140 has a hub height of 110 meters and the GE 5.5-158 has a hub height of 107.5 meters.

Using the same model methods discussed in the noise assessment, the Project sound propagation model was updated to include two additional model runs:

1. 87 GE 3.0-140 turbines
2. 22 GE 3.0-140 turbines and 65 GE 5.5-158 turbines.

A summary of the model results for these model runs for across all receptors is provided in Table 1.

TABLE 1: SUMMARY OF SOUND PRESSURE LEVELS FOR EACH GE MODEL RUN

TURBINE MODEL	RECEPTOR CLASSIFICATION			
		All	Participating	Non-Participating
GE 3.0-140	Mean	35	40	34
	Max	54	54	46
	Min	23	27	23
22 GE 3.0-140 and 65 GE 5.5-158	Mean	35	40	35
	Max	54	54	47
	Min	23	27	23

All receptors, except for one, are less than the nighttime sound level limit of 49 dBA, identified in the noise assessment. The highest sound level at a non-participating residence for the GE 3.0-140 is 46 dBA, and for the GE 5.5-158 model run is 47 dBA. The one participating receptor that is over 49 dBA is adjacent to the Project substation and is discussed in the noise assessment.

The results for each receptor for both GE model runs are provided in Table 2.

TABLE 2: MODEL RESULTS FOR ALL RECEPTORS¹

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1	Non-participating	37	37
2	Non-participating	37	37
3	Non-participating	41	42
4	Non-participating	34	35
5	Non-participating	32	32
6	Participating	34	34
7	Non-participating	34	34
8	Non-participating	38	39
9	Non-participating	41	41
10	Non-participating	32	33
11	Participating	38	39
12	Participating	43	43
13	Non-participating	34	35
14	Non-participating	39	40
15	Non-participating	36	37
16	Non-participating	36	36
17	Non-participating	34	35
18	Non-participating	42	42
19	Participating	38	39
20	Non-participating	32	33
21	Non-participating	33	34
22	Non-participating	36	37
23	Non-participating	41	41
24	Non-participating	34	34
25	Non-participating	37	37
26	Non-participating	30	31
27	Participating	41	42
28	Non-participating	43	43
29	Non-participating	36	37
30	Non-participating	40	41
31	Non-participating	40	41
32	Non-participating	41	41
33	Participating	45	45
34	Participating	36	37

¹ Maps of receptor locations and receptor coordinates provided in the noise assessment.



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
35	Non-participating	35	36
36	Non-participating	40	41
37	Non-participating	38	38
38	Non-participating	37	38
39	Non-participating	38	39
40	Non-participating	37	38
41	Non-participating	33	34
42	Non-participating	37	38
43	Non-participating	40	40
44	Non-participating	41	41
45	Non-participating	39	40
46	Non-participating	40	41
47	Non-participating	34	35
48	Participating	38	38
49	Non-participating	37	38
50	Non-participating	37	38
51	Non-participating	34	35
52	Non-participating	30	31
53	Non-participating	34	35
54	Participating	39	40
55	Non-participating	40	41
56	Non-participating	42	42
57	Non-participating	33	34
58	Non-participating	31	32
59	Non-participating	35	36
60	Non-participating	43	44
61	Non-participating	36	36
62	Non-participating	38	38
63	Non-participating	34	35
64	Participating	40	41
65	Non-participating	31	31
66	Non-participating	36	36
67	Non-participating	36	37
68	Non-participating	38	39
69	Non-participating	34	34
70	Non-participating	38	39
71	Non-participating	37	37
72	Non-participating	36	37
73	Non-participating	41	41

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
74	Non-participating	33	34
75	Participating	32	32
76	Non-participating	35	36
77	Participating	38	38
78	Non-participating	34	35
79	Non-participating	40	40
80	Non-participating	38	38
81	Non-participating	41	41
82	Non-participating	34	35
83	Non-participating	35	36
84	Non-participating	37	38
85	Non-participating	41	41
86	Participating	43	44
87	Participating	44	45
88	Non-participating	33	34
89	Non-participating	42	42
90	Non-participating	35	35
91	Participating	39	39
92	Non-participating	43	43
93	Non-participating	40	40
94	Non-participating	44	44
95	Non-participating	36	37
96	Non-participating	39	39
97	Non-participating	32	33
98	Non-participating	32	33
99	Non-participating	35	36
100	Non-participating	39	40
101	Participating	41	41
102	Non-participating	37	38
103	Non-participating	34	35
104	Non-participating	32	33
105	Participating	35	36
106	Non-participating	39	40
107	Non-participating	34	34
108	Non-participating	36	37
109	Non-participating	38	39
110	Non-participating	38	39
111	Non-participating	36	36
112	Participating	28	28



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
113	Participating	42	42
114	Non-participating	34	34
115	Non-participating	36	37
116	Non-participating	38	39
117	Non-participating	37	37
118	Participating	34	35
119	Non-participating	36	37
120	Non-participating	37	38
121	Non-participating	38	39
122	Non-participating	35	35
123	Non-participating	30	31
124	Non-participating	35	36
125	Non-participating	38	38
126	Non-participating	34	35
127	Non-participating	38	39
128	Non-participating	44	45
129	Non-participating	42	42
130	Non-participating	43	43
131	Non-participating	37	38
132	Non-participating	35	35
133	Non-participating	38	38
134	Non-participating	35	36
135	Non-participating	38	39
136	Non-participating	36	37
137	Participating	34	34
138	Non-participating	41	42
139	Non-participating	34	35
140	Non-participating	39	40
141	Non-participating	40	40
142	Non-participating	40	40
143	Participating	35	36
144	Non-participating	35	36
145	Non-participating	37	38
146	Non-participating	36	36
147	Non-participating	34	34
148	Non-participating	37	37
149	Non-participating	32	33
150	Non-participating	33	34
151	Non-participating	34	35

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
152	Non-participating	37	38
153	Participating	41	41
154	Non-participating	37	38
155	Non-participating	37	37
156	Non-participating	40	41
157	Non-participating	33	34
158	Non-participating	38	38
159	Non-participating	33	34
160	Non-participating	35	36
161	Non-participating	36	36
162	Non-participating	39	40
163	Non-participating	39	39
164	Non-participating	43	43
165	Non-participating	35	35
166	Non-participating	33	34
167	Non-participating	36	36
168	Non-participating	42	43
169	Participating	33	33
170	Non-participating	39	40
171	Non-participating	36	37
172	Non-participating	40	41
173	Non-participating	38	38
174	Non-participating	41	41
175	Non-participating	36	37
176	Non-participating	34	34
177	Non-participating	35	35
178	Non-participating	36	37
179	Non-participating	41	41
180	Non-participating	43	43
181	Non-participating	34	35
182	Non-participating	38	39
183	Non-participating	36	37
184	Non-participating	38	38
185	Non-participating	35	36
186	Non-participating	41	41
187	Participating	36	37
188	Non-participating	39	40
189	Non-participating	38	39
190	Non-participating	42	42



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
191	Non-participating	36	36
192	Non-participating	35	36
193	Non-participating	40	40
194	Non-participating	41	41
195	Non-participating	40	40
196	Non-participating	36	37
197	Participating	40	40
198	Non-participating	43	44
199	Non-participating	35	36
200	Non-participating	39	39
201	Non-participating	43	44
202	Non-participating	33	34
203	Non-participating	44	45
204	Non-participating	42	43
205	Non-participating	37	37
206	Non-participating	39	40
207	Participating	40	40
208	Non-participating	44	44
209	Non-participating	44	44
210	Non-participating	41	41
211	Non-participating	38	38
212	Participating	38	38
213	Non-participating	40	40
214	Participating	28	29
215	Non-participating	35	35
216	Non-participating	38	38
217	Non-participating	37	37
218	Non-participating	33	34
219	Non-participating	36	36
220	Non-participating	39	40
221	Non-participating	35	35
222	Participating	29	30
223	Non-participating	37	37
224	Non-participating	32	33
225	Non-participating	37	37
226	Non-participating	37	37
227	Non-participating	40	40
228	Non-participating	41	41
229	Non-participating	31	31

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
230	Non-participating	28	28
231	Non-participating	33	34
232	Non-participating	36	36
233	Non-participating	40	40
234	Non-participating	34	34
235	Non-participating	36	36
236	Non-participating	41	41
237	Non-participating	39	40
238	Non-participating	37	38
239	Non-participating	33	34
240	Non-participating	35	36
241	Participating	33	34
242	Non-participating	36	37
243	Non-participating	36	37
244	Non-participating	41	41
245	Non-participating	38	38
246	Non-participating	33	34
247	Non-participating	41	41
248	Non-participating	39	40
249	Non-participating	36	37
250	Non-participating	40	40
251	Non-participating	39	39
252	Participating	38	38
253	Participating	36	37
254	Non-participating	34	35
255	Non-participating	32	33
256	Non-participating	40	40
257	Non-participating	33	34
258	Non-participating	37	38
259	Participating	36	36
260	Non-participating	32	32
261	Non-participating	39	40
262	Non-participating	36	37
263	Non-participating	37	38
264	Non-participating	33	34
265	Non-participating	37	37
266	Non-participating	43	43
267	Non-participating	32	33
268	Non-participating	34	35



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
269	Non-participating	31	32
270	Non-participating	34	35
271	Non-participating	32	33
272	Non-participating	38	39
273	Non-participating	37	37
274	Participating	35	36
275	Participating	38	38
276	Non-participating	33	34
277	Participating	37	38
278	Non-participating	28	29
279	Participating	44	45
280	Participating	40	41
281	Non-participating	38	38
282	Participating	38	39
283	Non-participating	38	38
284	Non-participating	28	29
285	Non-participating	39	40
286	Non-participating	40	40
287	Non-participating	39	39
288	Participating	42	43
289	Non-participating	37	38
290	Non-participating	39	39
291	Non-participating	41	41
292	Non-participating	36	37
293	Non-participating	36	36
294	Participating	37	38
295	Non-participating	36	36
296	Participating	39	39
297	Non-participating	34	35
298	Participating	35	35
299	Non-participating	41	41
300	Non-participating	37	37
301	Non-participating	36	37
302	Non-participating	42	42
303	Non-participating	37	37
304	Non-participating	34	34
305	Participating	42	42
306	Non-participating	39	40
307	Non-participating	41	41

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
308	Non-participating	37	37
309	Non-participating	38	38
310	Participating	33	34
311	Non-participating	35	36
312	Non-participating	32	32
313	Non-participating	35	36
314	Non-participating	34	35
315	Non-participating	30	31
316	Non-participating	38	38
317	Non-participating	39	40
318	Non-participating	34	34
319	Non-participating	40	41
320	Non-participating	37	37
321	Non-participating	40	41
322	Non-participating	37	37
323	Non-participating	36	37
324	Participating	35	36
325	Participating	41	42
326	Non-participating	37	37
327	Non-participating	28	29
328	Non-participating	36	36
329	Non-participating	39	39
330	Non-participating	40	41
331	Non-participating	42	43
332	Participating	33	34
333	Non-participating	39	39
334	Participating	35	36
335	Non-participating	38	39
336	Participating	33	34
337	Non-participating	38	38
338	Non-participating	38	38
339	Non-participating	33	34
340	Non-participating	44	44
341	Non-participating	37	38
342	Non-participating	37	37
343	Non-participating	41	41
344	Non-participating	40	40
345	Non-participating	38	38
346	Non-participating	37	37



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
347	Non-participating	36	37
348	Non-participating	40	40
349	Non-participating	44	44
350	Participating	33	34
351	Non-participating	38	39
352	Non-participating	33	34
353	Non-participating	34	35
354	Non-participating	30	31
355	Non-participating	33	34
356	Non-participating	39	40
357	Non-participating	41	42
358	Non-participating	40	41
359	Non-participating	31	32
360	Participating	40	41
361	Non-participating	41	41
362	Participating	43	44
363	Non-participating	43	44
364	Non-participating	40	40
365	Participating	37	38
366	Non-participating	42	42
367	Non-participating	42	43
368	Non-participating	37	37
369	Non-participating	31	32
370	Participating	37	37
371	Non-participating	37	37
372	Participating	37	38
373	Non-participating	37	38
374	Non-participating	37	37
375	Non-participating	41	41
376	Non-participating	40	41
377	Participating	38	38
378	Non-participating	37	37
379	Non-participating	29	30
380	Participating	43	43
381	Non-participating	36	37
382	Participating	38	39
383	Non-participating	34	34
384	Non-participating	43	43
385	Non-participating	38	39

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
386	Non-participating	35	35
387	Participating	37	37
388	Non-participating	37	37
389	Non-participating	39	39
390	Participating	38	38
391	Non-participating	37	38
392	Non-participating	40	41
393	Non-participating	36	37
394	Non-participating	35	35
395	Non-participating	35	36
396	Non-participating	32	33
397	Non-participating	43	44
398	Non-participating	40	40
399	Participating	37	37
400	Non-participating	38	38
401	Non-participating	33	34
402	Non-participating	31	31
403	Non-participating	28	28
404	Participating	32	33
405	Non-participating	40	40
406	Non-participating	42	42
407	Non-participating	40	40
408	Participating	42	42
409	Non-participating	37	37
410	Non-participating	34	34
411	Non-participating	36	37
412	Participating	42	42
413	Non-participating	35	35
414	Non-participating	39	40
415	Non-participating	39	40
416	Non-participating	39	39
417	Non-participating	37	38
418	Non-participating	38	38
419	Non-participating	40	40
420	Non-participating	37	37
421	Non-participating	35	35
422	Non-participating	40	40
423	Non-participating	37	38
424	Participating	34	34



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
425	Non-participating	40	41
426	Non-participating	37	37
427	Participating	44	44
428	Non-participating	36	36
429	Non-participating	34	34
430	Participating	34	35
431	Participating	36	37
432	Non-participating	39	39
433	Non-participating	39	39
434	Non-participating	28	29
435	Non-participating	36	36
436	Participating	38	39
437	Participating	35	36
438	Non-participating	39	39
439	Non-participating	37	38
440	Non-participating	39	40
441	Non-participating	37	37
442	Participating	31	31
443	Non-participating	41	42
444	Non-participating	37	38
445	Non-participating	36	36
446	Non-participating	34	34
447	Non-participating	42	43
448	Non-participating	44	45
449	Non-participating	34	34
450	Non-participating	36	36
451	Non-participating	34	35
452	Non-participating	35	36
453	Non-participating	43	43
454	Participating	36	37
455	Participating	30	31
456	Non-participating	37	38
457	Non-participating	35	36
458	Non-participating	41	41
459	Non-participating	43	44
460	Non-participating	33	33
461	Non-participating	38	39
462	Non-participating	40	40
463	Non-participating	36	36

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
464	Non-participating	40	40
465	Non-participating	40	40
466	Non-participating	33	34
467	Non-participating	42	42
468	Non-participating	37	38
469	Non-participating	35	35
470	Non-participating	39	40
471	Non-participating	41	41
472	Non-participating	43	43
473	Non-participating	38	38
474	Non-participating	35	35
475	Non-participating	36	37
476	Non-participating	34	34
477	Non-participating	41	41
478	Non-participating	39	40
479	Participating	34	35
480	Non-participating	40	41
481	Non-participating	33	34
482	Non-participating	38	39
483	Non-participating	37	38
484	Non-participating	32	32
485	Non-participating	42	42
486	Non-participating	35	35
487	Participating	37	37
488	Non-participating	42	42
489	Non-participating	36	37
490	Non-participating	43	44
491	Non-participating	33	34
492	Participating	32	33
493	Non-participating	39	39
494	Non-participating	36	37
495	Non-participating	40	41
496	Participating	34	34
497	Non-participating	37	38
498	Non-participating	38	39
499	Non-participating	36	37
500	Participating	38	38
501	Non-participating	37	38
502	Non-participating	42	42



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
503	Participating	34	35
504	Non-participating	43	44
505	Participating	37	38
506	Non-participating	43	43
507	Non-participating	45	45
508	Non-participating	33	34
509	Non-participating	42	42
510	Participating	41	41
511	Non-participating	28	28
512	Non-participating	38	39
513	Non-participating	38	38
514	Non-participating	33	34
515	Non-participating	39	39
516	Non-participating	34	35
517	Participating	41	41
518	Participating	38	39
519	Participating	40	41
520	Non-participating	35	36
521	Non-participating	37	37
522	Non-participating	35	35
523	Non-participating	36	37
524	Non-participating	30	31
525	Non-participating	41	41
526	Non-participating	40	40
527	Participating	35	35
528	Non-participating	33	34
529	Non-participating	34	35
530	Non-participating	33	34
531	Non-participating	39	39
532	Non-participating	40	41
533	Non-participating	42	42
534	Non-participating	33	34
535	Participating	33	33
536	Non-participating	35	36
537	Non-participating	32	33
538	Non-participating	44	45
539	Non-participating	32	33
540	Non-participating	40	40
541	Non-participating	35	36

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
542	Non-participating	37	38
543	Non-participating	33	33
544	Non-participating	36	37
545	Non-participating	35	36
546	Non-participating	33	34
547	Non-participating	35	36
548	Non-participating	38	38
549	Non-participating	37	38
550	Non-participating	40	41
551	Non-participating	35	36
552	Non-participating	39	40
553	Non-participating	34	34
554	Non-participating	40	40
555	Non-participating	36	37
556	Non-participating	33	34
557	Non-participating	35	36
558	Non-participating	35	36
559	Non-participating	35	36
560	Non-participating	37	37
561	Non-participating	34	35
562	Participating	30	31
563	Participating	30	31
564	Non-participating	32	33
565	Non-participating	34	34
566	Non-participating	37	37
567	Non-participating	37	37
568	Non-participating	40	40
569	Non-participating	37	37
570	Participating	37	37
571	Participating	43	43
572	Non-participating	40	40
573	Non-participating	40	40
574	Non-participating	39	39
575	Non-participating	37	38
576	Non-participating	37	38
577	Non-participating	35	36
578	Non-participating	40	41
579	Non-participating	34	35
580	Participating	44	44



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
581	Participating	36	36
582	Non-participating	38	38
583	Non-participating	44	44
584	Non-participating	36	36
585	Non-participating	36	37
586	Participating	43	44
587	Participating	39	40
588	Non-participating	37	38
589	Non-participating	34	35
590	Non-participating	41	41
591	Participating	38	38
592	Non-participating	32	32
593	Participating	35	36
594	Non-participating	35	36
595	Non-participating	34	35
596	Non-participating	34	35
597	Non-participating	41	42
598	Non-participating	38	39
599	Non-participating	33	34
600	Non-participating	37	38
601	Non-participating	35	36
602	Non-participating	43	44
603	Non-participating	34	35
604	Non-participating	33	34
605	Participating	40	41
606	Non-participating	37	37
607	Non-participating	40	41
608	Participating	40	41
609	Non-participating	35	35
610	Non-participating	40	40
611	Non-participating	37	38
612	Participating	38	39
613	Non-participating	31	32
614	Participating	40	41
615	Non-participating	35	36
616	Non-participating	29	30
617	Participating	37	37
618	Non-participating	36	37
619	Non-participating	42	42

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
620	Participating	41	42
621	Non-participating	35	35
622	Participating	39	40
623	Non-participating	43	43
624	Participating	38	39
625	Non-participating	34	35
626	Non-participating	36	37
627	Non-participating	39	40
628	Participating	40	41
629	Non-participating	37	37
630	Participating	36	37
631	Participating	33	34
632	Non-participating	33	34
633	Non-participating	41	42
634	Non-participating	40	41
635	Non-participating	34	34
636	Non-participating	33	34
637	Non-participating	39	40
638	Non-participating	41	42
639	Non-participating	32	33
640	Non-participating	37	38
641	Non-participating	33	33
642	Non-participating	34	34
643	Non-participating	39	40
644	Non-participating	45	46
645	Non-participating	36	36
646	Non-participating	41	41
647	Non-participating	31	32
648	Participating	34	34
649	Non-participating	34	34
650	Participating	41	41
651	Non-participating	40	40
652	Participating	37	37
653	Participating	40	40
654	Non-participating	35	36
655	Non-participating	36	37
656	Non-participating	36	37
657	Participating	34	34
658	Non-participating	45	45



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
659	Participating	38	39
660	Non-participating	30	31
661	Non-participating	37	38
662	Non-participating	28	28
663	Non-participating	42	43
664	Non-participating	39	40
665	Participating	41	41
666	Non-participating	34	35
667	Non-participating	41	41
668	Non-participating	39	40
669	Non-participating	33	34
670	Non-participating	33	33
671	Non-participating	35	36
672	Participating	42	42
673	Non-participating	35	35
674	Non-participating	37	37
675	Non-participating	33	34
676	Non-participating	38	39
677	Non-participating	39	39
678	Non-participating	40	40
679	Non-participating	38	39
680	Non-participating	35	35
681	Non-participating	39	40
682	Non-participating	37	38
683	Participating	36	37
684	Non-participating	38	38
685	Non-participating	39	40
686	Non-participating	38	39
687	Non-participating	40	40
688	Participating	33	34
689	Non-participating	41	41
690	Non-participating	36	37
691	Non-participating	42	42
692	Non-participating	36	37
693	Non-participating	41	41
694	Non-participating	45	45
695	Non-participating	35	36
696	Non-participating	34	35
697	Non-participating	38	38

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
698	Non-participating	38	38
699	Non-participating	42	42
700	Participating	33	34
701	Non-participating	42	43
702	Non-participating	35	36
703	Non-participating	33	34
704	Non-participating	38	39
705	Non-participating	44	45
706	Participating	30	31
707	Non-participating	37	37
708	Non-participating	39	39
709	Non-participating	34	35
710	Participating	38	39
711	Non-participating	39	40
712	Non-participating	42	42
713	Non-participating	41	41
714	Non-participating	36	36
715	Non-participating	40	40
716	Non-participating	37	37
717	Non-participating	37	38
718	Non-participating	35	35
719	Non-participating	40	40
720	Participating	40	40
721	Non-participating	45	45
722	Non-participating	34	34
723	Non-participating	44	45
724	Non-participating	35	36
725	Non-participating	33	34
726	Non-participating	42	43
727	Participating	38	39
728	Participating	39	40
729	Non-participating	42	42
730	Non-participating	39	39
731	Non-participating	32	32
732	Non-participating	39	40
733	Participating	42	43
734	Non-participating	44	44
735	Non-participating	36	36
736	Non-participating	34	35



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
737	Non-participating	32	33
738	Non-participating	40	41
739	Non-participating	34	35
740	Non-participating	43	44
741	Non-participating	38	39
742	Non-participating	44	45
743	Non-participating	38	38
744	Non-participating	34	34
745	Non-participating	41	41
746	Non-participating	35	36
747	Non-participating	40	40
748	Non-participating	34	34
749	Non-participating	36	37
750	Non-participating	33	34
751	Non-participating	35	36
752	Participating	41	41
753	Participating	40	40
754	Non-participating	39	39
755	Non-participating	39	39
756	Non-participating	44	44
757	Non-participating	37	38
758	Non-participating	40	40
759	Non-participating	34	35
760	Non-participating	40	41
761	Participating	36	37
762	Participating	37	38
763	Non-participating	35	36
764	Non-participating	29	29
765	Non-participating	37	38
766	Participating	42	43
767	Non-participating	38	38
768	Participating	34	35
769	Non-participating	38	38
770	Non-participating	33	34
771	Non-participating	35	36
772	Non-participating	38	39
773	Non-participating	37	38
774	Non-participating	34	35
775	Non-participating	38	38

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
776	Non-participating	41	41
777	Non-participating	37	37
778	Non-participating	36	37
779	Participating	40	41
780	Non-participating	44	45
781	Participating	38	38
782	Non-participating	39	40
783	Non-participating	36	37
784	Non-participating	40	40
785	Participating	36	37
786	Non-participating	34	34
787	Non-participating	35	36
788	Participating	33	33
789	Non-participating	38	39
790	Non-participating	35	35
791	Non-participating	38	39
792	Non-participating	39	40
793	Participating	41	41
794	Non-participating	40	41
795	Non-participating	35	36
796	Non-participating	38	39
797	Non-participating	37	38
798	Non-participating	42	43
799	Non-participating	35	36
800	Non-participating	33	34
801	Participating	35	36
802	Non-participating	37	38
803	Non-participating	34	34
804	Non-participating	37	37
805	Non-participating	35	35
806	Non-participating	40	41
807	Non-participating	39	40
808	Non-participating	42	43
809	Non-participating	36	37
810	Non-participating	42	42
811	Non-participating	40	40
812	Non-participating	39	39
813	Non-participating	39	39
814	Non-participating	40	40



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
815	Non-participating	40	40
816	Non-participating	44	44
817	Non-participating	38	39
818	Non-participating	37	37
819	Non-participating	36	37
820	Non-participating	37	37
821	Non-participating	43	43
822	Non-participating	38	38
823	Participating	36	37
824	Non-participating	35	35
825	Non-participating	32	33
826	Non-participating	37	38
827	Non-participating	41	41
828	Non-participating	39	39
829	Non-participating	36	37
830	Non-participating	30	31
831	Non-participating	34	34
832	Non-participating	33	34
833	Non-participating	40	40
834	Non-participating	38	39
835	Non-participating	40	41
836	Non-participating	33	34
837	Non-participating	28	28
838	Non-participating	42	43
839	Non-participating	42	43
840	Non-participating	41	41
841	Non-participating	34	35
842	Non-participating	35	36
843	Non-participating	41	41
844	Non-participating	44	44
845	Non-participating	41	41
846	Non-participating	40	41
847	Non-participating	37	37
848	Non-participating	41	42
849	Non-participating	38	39
850	Participating	38	39
851	Non-participating	38	39
852	Non-participating	39	39
853	Non-participating	41	41

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
854	Non-participating	30	31
855	Non-participating	34	35
856	Non-participating	35	35
857	Non-participating	40	40
858	Non-participating	39	40
859	Non-participating	41	42
860	Participating	37	38
861	Non-participating	42	42
862	Non-participating	33	34
863	Non-participating	37	38
864	Non-participating	29	30
865	Non-participating	32	33
866	Participating	35	36
867	Non-participating	38	38
868	Non-participating	37	38
869	Non-participating	40	41
870	Non-participating	40	41
871	Participating	34	35
872	Non-participating	39	39
873	Participating	40	41
874	Non-participating	34	34
875	Non-participating	35	36
876	Non-participating	43	43
877	Non-participating	37	38
878	Participating	33	33
879	Participating	43	43
880	Non-participating	34	34
881	Non-participating	38	38
882	Non-participating	42	42
883	Non-participating	42	42
884	Non-participating	30	31
885	Non-participating	33	34
886	Non-participating	38	39
887	Non-participating	41	41
888	Non-participating	44	44
889	Participating	34	34
890	Non-participating	36	37
891	Non-participating	44	44
892	Non-participating	41	42



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
893	Non-participating	35	36
894	Non-participating	34	35
895	Non-participating	36	37
896	Non-participating	33	33
897	Non-participating	39	40
898	Non-participating	38	39
899	Non-participating	42	42
900	Non-participating	33	33
901	Non-participating	34	34
902	Non-participating	30	31
903	Participating	40	41
904	Non-participating	39	40
905	Non-participating	37	38
906	Non-participating	41	41
907	Non-participating	38	39
908	Non-participating	39	39
909	Non-participating	33	34
910	Non-participating	36	37
911	Participating	37	38
912	Non-participating	34	35
913	Non-participating	36	36
914	Participating	35	35
915	Non-participating	43	43
916	Non-participating	37	37
917	Non-participating	38	38
918	Non-participating	38	39
919	Non-participating	44	44
920	Participating	31	32
921	Non-participating	40	40
922	Non-participating	34	35
923	Participating	39	39
924	Non-participating	35	36
925	Non-participating	40	40
926	Participating	39	39
927	Non-participating	43	44
928	Non-participating	41	42
929	Non-participating	44	44
930	Non-participating	38	38
931	Non-participating	43	43

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
932	Participating	38	39
933	Non-participating	34	35
934	Non-participating	37	37
935	Non-participating	41	42
936	Non-participating	38	38
937	Non-participating	34	35
938	Participating	42	43
939	Non-participating	42	42
940	Participating	41	41
941	Participating	36	37
942	Non-participating	32	33
943	Participating	32	32
944	Non-participating	36	37
945	Non-participating	40	41
946	Non-participating	37	37
947	Non-participating	39	40
948	Participating	35	36
949	Non-participating	33	34
950	Non-participating	39	40
951	Non-participating	36	37
952	Non-participating	37	38
953	Non-participating	36	36
954	Non-participating	36	37
955	Non-participating	44	44
956	Participating	43	44
957	Participating	33	33
958	Participating	39	39
959	Non-participating	38	39
960	Non-participating	36	37
961	Participating	34	35
962	Participating	44	45
963	Non-participating	38	38
964	Non-participating	35	36
965	Non-participating	41	42
966	Non-participating	35	36
967	Non-participating	43	44
968	Non-participating	40	41
969	Non-participating	34	35
970	Non-participating	39	39



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
971	Participating	36	37
972	Non-participating	40	41
973	Non-participating	42	43
974	Non-participating	35	36
975	Non-participating	44	45
976	Non-participating	31	31
977	Non-participating	34	35
978	Non-participating	36	36
979	Non-participating	28	28
980	Non-participating	40	41
981	Non-participating	32	32
982	Non-participating	38	38
983	Non-participating	37	38
984	Non-participating	34	34
985	Non-participating	34	35
986	Non-participating	44	44
987	Non-participating	41	41
988	Non-participating	40	41
989	Non-participating	44	44
990	Non-participating	38	38
991	Non-participating	34	35
992	Non-participating	42	43
993	Non-participating	36	37
994	Non-participating	46	47
995	Non-participating	34	34
996	Non-participating	39	39
997	Non-participating	34	35
998	Participating	34	35
999	Non-participating	41	41
1000	Non-participating	40	41
1001	Non-participating	34	34
1002	Non-participating	39	40
1003	Non-participating	38	38
1004	Non-participating	41	41
1005	Non-participating	40	40
1006	Non-participating	33	34
1007	Non-participating	40	40
1008	Non-participating	37	37
1009	Non-participating	40	40

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1010	Non-participating	38	39
1011	Non-participating	39	40
1012	Non-participating	34	34
1013	Participating	36	37
1014	Non-participating	35	35
1015	Non-participating	35	36
1016	Non-participating	43	44
1017	Non-participating	44	45
1018	Non-participating	34	35
1019	Non-participating	35	36
1020	Non-participating	34	34
1021	Non-participating	34	35
1022	Non-participating	33	34
1023	Non-participating	40	41
1024	Participating	37	38
1025	Non-participating	33	34
1026	Non-participating	33	34
1027	Non-participating	39	40
1028	Non-participating	31	31
1029	Non-participating	35	35
1030	Participating	40	41
1031	Non-participating	40	40
1032	Non-participating	35	36
1033	Non-participating	37	38
1034	Non-participating	29	30
1035	Non-participating	33	34
1036	Non-participating	41	41
1037	Non-participating	37	38
1038	Participating	33	34
1039	Non-participating	36	37
1040	Non-participating	33	34
1041	Non-participating	36	37
1042	Non-participating	39	40
1043	Participating	42	43
1044	Non-participating	42	43
1045	Participating	32	33
1046	Non-participating	38	39
1047	Non-participating	35	36
1048	Non-participating	31	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1049	Non-participating	38	39
1050	Non-participating	37	37
1051	Non-participating	34	35
1052	Non-participating	32	33
1053	Non-participating	38	38
1054	Participating	41	41
1055	Non-participating	33	34
1056	Participating	33	34
1057	Non-participating	39	39
1058	Non-participating	36	37
1059	Non-participating	38	38
1060	Non-participating	40	41
1061	Non-participating	35	35
1062	Non-participating	36	37
1063	Non-participating	42	42
1064	Non-participating	41	41
1065	Non-participating	39	39
1066	Non-participating	37	37
1067	Participating	36	36
1068	Non-participating	44	44
1069	Non-participating	36	36
1070	Non-participating	37	38
1071	Non-participating	34	34
1072	Non-participating	33	34
1073	Non-participating	39	40
1074	Non-participating	40	41
1075	Non-participating	37	38
1076	Non-participating	38	39
1077	Non-participating	38	38
1078	Non-participating	41	42
1079	Non-participating	40	40
1080	Participating	34	35
1081	Non-participating	37	37
1082	Participating	37	37
1083	Non-participating	39	40
1084	Non-participating	31	32
1085	Participating	33	34
1086	Non-participating	36	36
1087	Non-participating	33	33

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1088	Non-participating	36	37
1089	Non-participating	40	41
1090	Non-participating	35	36
1091	Non-participating	42	42
1092	Participating	44	44
1093	Non-participating	35	36
1094	Non-participating	40	41
1095	Non-participating	43	43
1096	Participating	40	41
1097	Non-participating	36	36
1098	Participating	39	39
1099	Non-participating	37	38
1100	Participating	43	44
1101	Non-participating	40	40
1102	Non-participating	33	34
1103	Non-participating	39	40
1104	Participating	37	37
1105	Non-participating	42	42
1106	Non-participating	34	35
1107	Non-participating	38	38
1108	Participating	36	36
1109	Non-participating	36	37
1110	Non-participating	38	39
1111	Participating	33	34
1112	Non-participating	32	32
1113	Non-participating	37	38
1114	Non-participating	39	40
1115	Non-participating	35	36
1116	Non-participating	32	32
1117	Non-participating	40	40
1118	Non-participating	37	38
1119	Non-participating	33	34
1120	Non-participating	34	34
1121	Non-participating	38	38
1122	Non-participating	37	37
1123	Non-participating	34	35
1124	Participating	41	42
1125	Non-participating	31	31
1126	Non-participating	42	42



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1127	Non-participating	42	42
1128	Non-participating	36	36
1129	Non-participating	34	34
1130	Non-participating	35	35
1131	Participating	39	39
1132	Non-participating	44	44
1133	Non-participating	36	37
1134	Non-participating	36	37
1135	Non-participating	38	39
1136	Non-participating	42	42
1137	Non-participating	41	41
1138	Non-participating	35	36
1139	Non-participating	41	42
1140	Non-participating	36	37
1141	Non-participating	39	39
1142	Non-participating	39	39
1143	Non-participating	44	44
1144	Non-participating	36	36
1145	Non-participating	45	45
1146	Non-participating	30	30
1147	Non-participating	44	45
1148	Non-participating	33	34
1149	Non-participating	34	35
1150	Non-participating	34	35
1151	Participating	34	35
1152	Participating	44	44
1153	Non-participating	41	41
1154	Non-participating	36	36
1155	Non-participating	46	47
1156	Non-participating	34	35
1157	Non-participating	43	43
1158	Non-participating	34	35
1159	Non-participating	37	37
1160	Non-participating	42	42
1161	Non-participating	35	36
1162	Participating	28	29
1163	Non-participating	39	40
1164	Non-participating	40	40
1165	Non-participating	43	44

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1166	Non-participating	39	39
1167	Non-participating	34	34
1168	Non-participating	43	43
1169	Participating	39	39
1170	Non-participating	33	34
1171	Non-participating	31	32
1172	Non-participating	35	36
1173	Non-participating	41	41
1174	Non-participating	43	43
1175	Non-participating	36	36
1176	Non-participating	35	36
1177	Non-participating	36	37
1178	Non-participating	38	38
1179	Non-participating	34	34
1180	Non-participating	34	35
1181	Non-participating	37	38
1182	Non-participating	35	36
1183	Participating	34	34
1184	Non-participating	39	39
1185	Non-participating	42	42
1186	Non-participating	41	41
1187	Non-participating	35	36
1188	Non-participating	36	37
1189	Non-participating	38	38
1190	Non-participating	34	35
1191	Non-participating	35	35
1192	Non-participating	41	42
1193	Non-participating	31	31
1194	Non-participating	37	37
1195	Non-participating	43	43
1196	Non-participating	37	38
1197	Non-participating	39	39
1198	Participating	42	42
1199	Non-participating	33	34
1200	Non-participating	38	39
1201	Non-participating	35	36
1202	Non-participating	42	42
1203	Non-participating	35	35
1204	Non-participating	39	40



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1205	Non-participating	41	41
1206	Non-participating	38	39
1207	Non-participating	39	40
1208	Non-participating	42	42
1209	Non-participating	37	37
1210	Non-participating	32	33
1211	Participating	35	35
1212	Non-participating	36	37
1213	Non-participating	42	42
1214	Non-participating	30	31
1215	Non-participating	33	34
1216	Non-participating	37	38
1217	Non-participating	34	34
1218	Non-participating	38	39
1219	Non-participating	35	36
1220	Non-participating	34	35
1221	Non-participating	39	39
1222	Non-participating	44	44
1223	Non-participating	39	39
1224	Non-participating	42	42
1225	Non-participating	40	41
1226	Participating	38	39
1227	Non-participating	42	42
1228	Participating	40	41
1229	Participating	41	41
1230	Non-participating	29	30
1231	Participating	33	34
1232	Non-participating	37	37
1233	Participating	38	39
1234	Participating	34	35
1235	Non-participating	41	42
1236	Participating	46	46
1237	Participating	34	34
1238	Non-participating	36	36
1239	Non-participating	35	36
1240	Participating	37	38
1241	Participating	30	31
1242	Non-participating	36	36
1243	Non-participating	35	35

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1244	Participating	37	38
1245	Non-participating	39	40
1246	Non-participating	41	41
1247	Non-participating	33	34
1248	Non-participating	40	40
1249	Non-participating	33	34
1250	Non-participating	31	32
1251	Non-participating	39	39
1252	Non-participating	39	40
1253	Non-participating	41	41
1254	Participating	43	44
1255	Non-participating	36	36
1256	Non-participating	43	44
1257	Non-participating	35	35
1258	Non-participating	35	35
1259	Non-participating	34	34
1260	Non-participating	33	34
1261	Participating	32	33
1262	Non-participating	41	41
1263	Non-participating	44	45
1264	Non-participating	29	30
1265	Participating	44	44
1266	Non-participating	36	37
1267	Non-participating	42	42
1268	Non-participating	42	43
1269	Participating	35	36
1270	Non-participating	34	34
1271	Non-participating	31	32
1272	Non-participating	34	35
1273	Non-participating	43	44
1274	Non-participating	33	34
1275	Non-participating	36	36
1276	Non-participating	34	35
1277	Non-participating	33	34
1278	Non-participating	37	38
1279	Non-participating	40	40
1280	Non-participating	37	38
1281	Participating	41	42
1282	Non-participating	37	37



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1283	Non-participating	41	42
1284	Participating	34	35
1285	Participating	40	40
1286	Participating	38	39
1287	Non-participating	37	37
1288	Non-participating	34	35
1289	Non-participating	34	35
1290	Non-participating	39	40
1291	Non-participating	39	39
1292	Participating	44	44
1293	Non-participating	40	40
1294	Participating	38	38
1295	Participating	33	34
1296	Participating	40	41
1297	Non-participating	39	39
1298	Non-participating	34	34
1299	Non-participating	39	40
1300	Participating	38	39
1301	Participating	42	42
1302	Non-participating	37	38
1303	Participating	34	35
1304	Non-participating	35	36
1305	Non-participating	35	36
1306	Non-participating	36	37
1307	Non-participating	38	39
1308	Non-participating	33	33
1309	Non-participating	34	34
1310	Non-participating	40	40
1311	Non-participating	31	32
1312	Non-participating	39	39
1313	Non-participating	31	32
1314	Non-participating	35	36
1315	Non-participating	36	37
1316	Non-participating	36	37
1317	Non-participating	35	36
1318	Non-participating	37	38
1319	Non-participating	34	34
1320	Non-participating	42	43
1321	Non-participating	35	36

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1322	Non-participating	40	40
1323	Non-participating	38	39
1324	Participating	38	38
1325	Non-participating	40	41
1326	Non-participating	31	32
1327	Non-participating	34	35
1328	Non-participating	44	45
1329	Participating	35	36
1330	Non-participating	43	44
1331	Participating	40	41
1332	Non-participating	42	42
1333	Non-participating	39	40
1334	Non-participating	36	37
1335	Non-participating	36	36
1336	Non-participating	44	45
1337	Non-participating	42	42
1338	Non-participating	37	38
1339	Non-participating	38	39
1340	Non-participating	40	40
1341	Non-participating	34	35
1342	Non-participating	35	36
1343	Non-participating	36	37
1344	Non-participating	32	32
1345	Non-participating	39	39
1346	Non-participating	45	45
1347	Non-participating	33	34
1348	Non-participating	35	35
1349	Participating	41	41
1350	Non-participating	45	46
1351	Non-participating	33	34
1352	Non-participating	36	37
1353	Non-participating	36	37
1354	Participating	35	36
1355	Non-participating	39	39
1356	Non-participating	42	42
1357	Non-participating	36	37
1358	Non-participating	38	39
1359	Non-participating	38	38
1360	Non-participating	40	41



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1361	Non-participating	37	37
1362	Non-participating	42	42
1363	Non-participating	35	36
1364	Non-participating	42	43
1365	Non-participating	40	41
1366	Non-participating	38	38
1367	Non-participating	34	35
1368	Non-participating	37	38
1369	Non-participating	37	38
1370	Non-participating	40	41
1371	Non-participating	35	36
1372	Non-participating	42	42
1373	Participating	33	34
1374	Non-participating	34	35
1375	Non-participating	37	38
1376	Non-participating	38	38
1377	Non-participating	40	41
1378	Non-participating	38	38
1379	Non-participating	38	39
1380	Non-participating	35	36
1381	Non-participating	41	41
1382	Non-participating	34	34
1383	Non-participating	34	34
1384	Non-participating	36	36
1385	Non-participating	43	43
1386	Participating	35	36
1387	Non-participating	38	38
1388	Non-participating	38	39
1389	Non-participating	38	39
1390	Non-participating	36	37
1391	Non-participating	33	33
1392	Participating	40	40
1393	Non-participating	35	36
1394	Non-participating	33	34
1395	Non-participating	34	35
1396	Non-participating	35	36
1397	Non-participating	40	41
1398	Non-participating	40	41
1399	Non-participating	35	36

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1400	Non-participating	31	32
1401	Non-participating	33	34
1402	Non-participating	34	35
1403	Participating	40	40
1404	Non-participating	39	39
1405	Non-participating	42	42
1406	Participating	29	29
1407	Non-participating	32	33
1408	Non-participating	29	30
1409	Participating	35	36
1410	Non-participating	31	32
1411	Non-participating	29	30
1412	Non-participating	26	27
1413	Participating	31	31
1414	Non-participating	33	34
1415	Non-participating	33	33
1416	Non-participating	31	32
1417	Non-participating	31	31
1418	Non-participating	32	33
1419	Non-participating	30	30
1420	Participating	29	29
1421	Non-participating	33	34
1422	Non-participating	28	29
1423	Non-participating	31	32
1424	Participating	31	32
1425	Non-participating	30	31
1426	Non-participating	27	28
1427	Non-participating	32	33
1428	Non-participating	35	36
1429	Non-participating	33	34
1430	Non-participating	23	24
1431	Participating	27	28
1432	Non-participating	30	30
1433	Non-participating	33	34
1434	Non-participating	24	25
1435	Non-participating	33	34
1436	Participating	32	32
1437	Non-participating	32	33
1438	Non-participating	30	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1439	Non-participating	33	33
1440	Non-participating	30	31
1441	Participating	30	31
1442	Participating	31	32
1443	Non-participating	28	29
1444	Non-participating	32	33
1445	Participating	30	31
1446	Non-participating	34	35
1447	Non-participating	29	30
1448	Non-participating	32	33
1449	Non-participating	32	33
1450	Non-participating	30	30
1451	Non-participating	31	31
1452	Participating	27	28
1453	Non-participating	31	32
1454	Non-participating	29	30
1455	Non-participating	32	32
1456	Non-participating	30	30
1457	Non-participating	32	32
1458	Non-participating	28	29
1459	Non-participating	31	32
1460	Non-participating	30	30
1461	Non-participating	34	35
1462	Non-participating	29	30
1463	Non-participating	27	28
1464	Non-participating	36	37
1465	Non-participating	31	31
1466	Non-participating	32	33
1467	Non-participating	32	33
1468	Participating	28	28
1469	Non-participating	31	32
1470	Non-participating	33	34
1471	Participating	29	30
1472	Participating	30	31
1473	Non-participating	31	31
1474	Non-participating	32	32
1475	Non-participating	31	32
1476	Non-participating	31	32
1477	Non-participating	30	30

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1478	Participating	33	34
1479	Non-participating	34	35
1480	Non-participating	30	31
1481	Non-participating	31	32
1482	Non-participating	32	33
1483	Non-participating	33	34
1484	Non-participating	34	35
1485	Non-participating	31	32
1486	Non-participating	33	34
1487	Non-participating	29	29
1488	Participating	31	32
1489	Non-participating	33	34
1490	Non-participating	35	35
1491	Non-participating	31	32
1492	Non-participating	32	32
1493	Non-participating	30	30
1494	Participating	29	30
1495	Participating	36	36
1496	Non-participating	32	33
1497	Non-participating	30	31
1498	Non-participating	31	31
1499	Non-participating	31	32
1500	Non-participating	30	30
1501	Participating	31	32
1502	Non-participating	31	32
1503	Non-participating	27	28
1504	Non-participating	33	34
1505	Non-participating	30	31
1506	Non-participating	33	34
1507	Non-participating	28	28
1508	Non-participating	27	28
1509	Non-participating	31	32
1510	Non-participating	33	34
1511	Non-participating	34	34
1512	Non-participating	32	33
1513	Non-participating	31	32
1514	Non-participating	29	30
1515	Non-participating	33	33
1516	Non-participating	30	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1517	Participating	30	31
1518	Participating	31	32
1519	Participating	30	30
1520	Non-participating	30	30
1521	Non-participating	32	32
1522	Non-participating	27	28
1523	Non-participating	33	34
1524	Non-participating	33	34
1525	Non-participating	30	30
1526	Participating	30	31
1527	Non-participating	29	30
1528	Non-participating	30	31
1529	Non-participating	32	33
1530	Non-participating	34	34
1531	Participating	32	33
1532	Participating	33	34
1533	Non-participating	32	33
1534	Non-participating	23	23
1535	Non-participating	31	31
1536	Non-participating	33	34
1537	Non-participating	30	31
1538	Participating	26	27
1539	Non-participating	27	28
1540	Non-participating	32	32
1541	Non-participating	36	36
1542	Non-participating	29	30
1543	Non-participating	32	33
1544	Non-participating	29	29
1545	Non-participating	34	35
1546	Non-participating	30	31
1547	Non-participating	28	29
1548	Non-participating	32	33
1549	Participating	29	30
1550	Non-participating	32	33
1551	Non-participating	28	29
1552	Participating	29	30
1553	Non-participating	35	36
1554	Participating	29	30
1555	Non-participating	32	32

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1556	Non-participating	29	30
1557	Non-participating	33	33
1558	Non-participating	31	31
1559	Non-participating	30	30
1560	Non-participating	30	30
1561	Non-participating	32	33
1562	Non-participating	34	35
1563	Non-participating	35	35
1564	Non-participating	29	30
1565	Non-participating	29	30
1566	Non-participating	31	32
1567	Participating	31	32
1568	Participating	31	31
1569	Non-participating	28	28
1570	Participating	27	28
1571	Non-participating	34	35
1572	Non-participating	34	35
1573	Non-participating	31	32
1574	Non-participating	29	30
1575	Non-participating	30	31
1576	Non-participating	35	36
1577	Non-participating	29	30
1578	Non-participating	31	31
1579	Non-participating	32	33
1580	Non-participating	34	35
1581	Non-participating	32	32
1582	Non-participating	33	34
1583	Non-participating	31	31
1584	Non-participating	30	31
1585	Non-participating	31	31
1586	Non-participating	30	30
1587	Non-participating	35	35
1588	Non-participating	33	33
1589	Non-participating	26	27
1590	Non-participating	28	29
1591	Non-participating	25	25
1592	Non-participating	31	32
1593	Non-participating	32	32
1594	Non-participating	29	30



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1595	Non-participating	32	33
1596	Non-participating	32	33
1597	Non-participating	30	31
1598	Non-participating	32	32
1599	Participating	34	35
1600	Non-participating	31	32
1601	Non-participating	29	29
1602	Non-participating	29	30
1603	Participating	30	30
1604	Non-participating	28	29
1605	Non-participating	30	31
1606	Non-participating	35	36
1607	Non-participating	31	32
1608	Non-participating	27	28
1609	Non-participating	33	34
1610	Non-participating	28	28
1611	Participating	30	30
1612	Non-participating	32	32
1613	Non-participating	31	32
1614	Non-participating	32	33
1615	Non-participating	33	34
1616	Non-participating	33	33
1617	Non-participating	32	33
1618	Non-participating	32	33
1619	Non-participating	32	33
1620	Non-participating	33	34
1621	Non-participating	31	32
1622	Non-participating	29	30
1623	Participating	30	31
1624	Non-participating	31	31
1625	Non-participating	30	31
1626	Non-participating	32	33
1627	Non-participating	32	32
1628	Non-participating	30	31
1629	Non-participating	30	31
1630	Non-participating	32	33
1631	Non-participating	30	31
1632	Non-participating	26	27
1633	Non-participating	31	32

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1634	Non-participating	30	30
1635	Participating	30	30
1636	Non-participating	32	33
1637	Non-participating	30	30
1638	Non-participating	30	30
1639	Participating	30	31
1640	Participating	33	34
1641	Non-participating	30	31
1642	Non-participating	31	31
1643	Non-participating	34	35
1644	Participating	32	32
1645	Non-participating	31	31
1646	Non-participating	32	33
1647	Non-participating	26	26
1648	Non-participating	30	30
1649	Non-participating	30	31
1650	Non-participating	25	25
1651	Non-participating	30	31
1652	Non-participating	34	34
1653	Participating	35	36
1654	Non-participating	31	32
1655	Non-participating	25	26
1656	Non-participating	26	27
1657	Non-participating	29	30
1658	Non-participating	29	29
1659	Non-participating	28	29
1660	Non-participating	34	35
1661	Non-participating	25	26
1662	Participating	27	28
1663	Participating	29	30
1664	Participating	31	31
1665	Non-participating	34	34
1666	Participating	33	34
1667	Non-participating	33	34
1668	Non-participating	33	33
1669	Non-participating	32	32
1670	Non-participating	33	33
1671	Non-participating	33	34
1672	Participating	30	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1673	Non-participating	30	31
1674	Non-participating	28	29
1675	Participating	27	28
1676	Participating	30	30
1677	Participating	28	29
1678	Participating	30	31
1679	Participating	35	36
1680	Participating	34	35
1681	Participating	31	32
1682	Participating	30	31
1683	Participating	29	30
1684	Participating	28	28
1685	Participating	34	34
1686	Participating	30	30
1687	Participating	32	33
1688	Participating	30	31
1689	Participating	31	31
1690	Participating	27	28
1691	Participating	30	31
1692	Participating	31	32
1693	Participating	33	34
1694	Participating	30	31
1695	Participating	30	31
1696	Participating	32	32
1697	Participating	33	34
1698	Participating	33	33
1699	Participating	30	31
1700	Participating	29	30
1701	Participating	30	31
1702	Participating	30	31
1703	Participating	32	33
1704	Participating	31	32
1705	Participating	33	34
1706	Non-participating	30	31
1707	Non-participating	31	31
1708	Non-participating	29	30
1709	Non-participating	34	34
1710	Non-participating	30	30
1711	Non-participating	31	32

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1712	Non-participating	29	30
1713	Non-participating	34	35
1714	Non-participating	34	35
1715	Non-participating	28	29
1716	Non-participating	34	35
1717	Non-participating	31	32
1718	Non-participating	32	33
1719	Non-participating	30	31
1720	Non-participating	31	31
1721	Non-participating	24	25
1722	Non-participating	33	34
1723	Non-participating	32	33
1724	Non-participating	30	31
1725	Non-participating	33	33
1726	Non-participating	30	31
1727	Non-participating	25	26
1728	Non-participating	31	32
1729	Non-participating	31	32
1730	Non-participating	32	32
1731	Non-participating	26	27
1732	Non-participating	34	34
1733	Non-participating	34	34
1734	Non-participating	34	35
1735	Non-participating	29	30
1736	Non-participating	29	29
1737	Non-participating	30	31
1738	Non-participating	24	25
1739	Non-participating	33	33
1740	Non-participating	32	33
1741	Non-participating	35	36
1742	Non-participating	25	26
1743	Non-participating	31	31
1744	Non-participating	30	31
1745	Non-participating	30	30
1746	Non-participating	29	30
1747	Non-participating	32	33
1748	Non-participating	31	31
1749	Non-participating	35	36
1750	Non-participating	25	26



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1751	Non-participating	29	30
1752	Non-participating	30	30
1753	Non-participating	36	37
1754	Non-participating	31	32
1755	Non-participating	32	32
1756	Non-participating	29	30
1757	Non-participating	29	29
1758	Non-participating	31	32
1759	Non-participating	25	26
1760	Non-participating	33	33
1761	Non-participating	24	24
1762	Non-participating	31	31
1763	Non-participating	28	29
1764	Non-participating	31	31
1765	Non-participating	32	33
1766	Non-participating	32	33
1767	Non-participating	33	33
1768	Non-participating	33	34
1769	Non-participating	33	34
1770	Non-participating	28	29
1771	Non-participating	31	31
1772	Non-participating	31	32
1773	Non-participating	24	25
1774	Non-participating	32	33
1775	Non-participating	32	33
1776	Non-participating	29	29
1777	Non-participating	32	33
1778	Non-participating	30	30
1779	Non-participating	30	30
1780	Non-participating	31	32
1781	Non-participating	29	30
1782	Non-participating	29	30
1783	Non-participating	29	30
1784	Non-participating	30	30
1785	Non-participating	29	30
1786	Non-participating	33	34
1787	Non-participating	31	31
1788	Non-participating	25	25
1789	Non-participating	30	31

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1790	Non-participating	35	36
1791	Non-participating	32	33
1792	Non-participating	32	33
1793	Non-participating	34	35
1794	Non-participating	29	30
1795	Non-participating	27	27
1796	Non-participating	30	30
1797	Non-participating	32	33
1798	Non-participating	33	34
1799	Non-participating	31	32
1800	Non-participating	31	32
1801	Non-participating	30	31
1802	Non-participating	32	32
1803	Non-participating	34	35
1804	Non-participating	35	36
1805	Non-participating	30	31
1806	Non-participating	25	25
1807	Non-participating	35	36
1808	Non-participating	32	33
1809	Non-participating	32	33
1810	Non-participating	30	31
1811	Non-participating	31	31
1812	Non-participating	30	31
1813	Non-participating	30	31
1814	Non-participating	26	26
1815	Non-participating	30	30
1816	Non-participating	31	32
1817	Non-participating	31	31
1818	Non-participating	34	35
1819	Non-participating	30	31
1820	Non-participating	28	29
1821	Non-participating	31	32
1822	Non-participating	34	35
1823	Non-participating	33	34
1824	Non-participating	25	25
1825	Non-participating	30	31
1826	Non-participating	32	33
1827	Non-participating	29	30
1828	Non-participating	25	26



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1829	Non-participating	34	35
1830	Non-participating	33	34
1831	Non-participating	30	31
1832	Non-participating	32	32
1833	Non-participating	28	29
1834	Non-participating	27	28
1835	Non-participating	31	31
1836	Non-participating	31	31
1837	Non-participating	30	31
1838	Non-participating	34	34
1839	Non-participating	30	30
1840	Non-participating	30	31
1841	Non-participating	26	27
1842	Non-participating	30	31
1843	Non-participating	30	31
1844	Non-participating	30	31
1845	Non-participating	27	28
1846	Non-participating	31	32
1847	Non-participating	35	35
1848	Non-participating	32	33
1849	Non-participating	31	32
1850	Non-participating	33	33
1851	Non-participating	30	31
1852	Non-participating	31	31
1853	Non-participating	23	24
1854	Non-participating	28	29
1855	Non-participating	27	28
1856	Non-participating	30	31
1857	Non-participating	33	33
1858	Non-participating	33	34
1859	Non-participating	33	33
1860	Non-participating	33	34
1861	Non-participating	30	31
1862	Non-participating	34	35
1863	Non-participating	31	32
1864	Non-participating	30	30
1865	Non-participating	32	32
1866	Non-participating	28	29
1867	Non-participating	34	35

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1868	Non-participating	32	33
1869	Non-participating	30	31
1870	Non-participating	32	33
1871	Non-participating	35	36
1872	Non-participating	35	36
1873	Non-participating	31	31
1874	Non-participating	30	31
1875	Non-participating	35	35
1876	Non-participating	30	31
1877	Non-participating	29	30
1878	Non-participating	30	31
1879	Non-participating	32	32
1880	Non-participating	32	33
1881	Non-participating	31	32
1882	Non-participating	32	32
1883	Non-participating	32	33
1884	Non-participating	28	29
1885	Non-participating	30	31
1886	Non-participating	32	33
1887	Non-participating	31	31
1888	Non-participating	31	31
1889	Non-participating	29	30
1890	Non-participating	33	34
1891	Non-participating	31	32
1892	Non-participating	24	25
1893	Non-participating	32	33
1894	Non-participating	33	34
1895	Non-participating	30	31
1896	Non-participating	32	33
1897	Non-participating	30	31
1898	Non-participating	28	29
1899	Non-participating	28	29
1900	Non-participating	34	35
1901	Non-participating	31	31
1902	Non-participating	27	28
1903	Non-participating	32	33
1904	Non-participating	28	29
1905	Non-participating	29	30
1906	Non-participating	29	30



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1907	Non-participating	31	32
1908	Non-participating	34	35
1909	Non-participating	31	32
1910	Non-participating	29	30
1911	Non-participating	31	31
1912	Non-participating	31	32
1913	Non-participating	35	36
1914	Non-participating	31	32
1915	Non-participating	31	31
1916	Non-participating	32	32
1917	Non-participating	31	32
1918	Non-participating	30	30
1919	Non-participating	33	34
1920	Non-participating	35	36
1921	Non-participating	30	31
1922	Non-participating	29	30
1923	Non-participating	31	31
1924	Non-participating	27	28
1925	Non-participating	33	34
1926	Non-participating	29	29
1927	Non-participating	30	30
1928	Non-participating	33	34
1929	Non-participating	33	33
1930	Non-participating	33	34
1931	Non-participating	28	28
1932	Non-participating	31	32
1933	Non-participating	27	28
1934	Non-participating	32	32
1935	Non-participating	32	33
1936	Non-participating	32	33
1937	Non-participating	33	34
1938	Non-participating	27	27
1939	Non-participating	32	32
1940	Non-participating	30	31
1941	Non-participating	33	34
1942	Non-participating	32	33
1943	Non-participating	32	32
1944	Non-participating	30	30
1945	Non-participating	30	31

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1946	Non-participating	28	29
1947	Non-participating	24	25
1948	Non-participating	24	25
1949	Non-participating	31	31
1950	Non-participating	32	33
1951	Non-participating	31	31
1952	Non-participating	35	35
1953	Non-participating	30	31
1954	Non-participating	28	28
1955	Non-participating	31	32
1956	Non-participating	31	32
1957	Non-participating	27	28
1958	Non-participating	30	31
1959	Non-participating	27	28
1960	Non-participating	32	33
1961	Non-participating	34	34
1962	Non-participating	34	35
1963	Non-participating	34	34
1964	Non-participating	32	33
1965	Non-participating	31	32
1966	Non-participating	30	31
1967	Non-participating	32	33
1968	Non-participating	31	32
1969	Non-participating	31	32
1970	Non-participating	30	31
1971	Non-participating	29	29
1972	Non-participating	30	30
1973	Non-participating	30	30
1974	Non-participating	26	27
1975	Non-participating	29	29
1976	Non-participating	31	32
1977	Non-participating	28	28
1978	Non-participating	34	35
1979	Non-participating	30	31
1980	Non-participating	32	33
1981	Non-participating	31	32
1982	Non-participating	31	32
1983	Non-participating	30	30
1984	Non-participating	30	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
1985	Non-participating	29	30
1986	Non-participating	30	31
1987	Non-participating	30	30
1988	Non-participating	29	30
1989	Non-participating	33	33
1990	Non-participating	30	31
1991	Non-participating	32	33
1992	Non-participating	31	32
1993	Non-participating	31	32
1994	Non-participating	29	30
1995	Non-participating	24	25
1996	Non-participating	31	32
1997	Non-participating	31	32
1998	Non-participating	31	32
1999	Non-participating	30	31
2000	Non-participating	34	34
2001	Non-participating	34	34
2002	Non-participating	36	36
2003	Non-participating	35	36
2004	Non-participating	30	30
2005	Non-participating	23	24
2006	Non-participating	32	33
2007	Non-participating	30	31
2008	Non-participating	35	36
2009	Non-participating	31	32
2010	Non-participating	34	35
2011	Non-participating	33	34
2012	Non-participating	30	30
2013	Non-participating	29	30
2014	Non-participating	32	33
2015	Non-participating	31	31
2016	Non-participating	29	30
2017	Non-participating	28	29
2018	Non-participating	30	30
2019	Non-participating	33	33
2020	Non-participating	32	32
2021	Non-participating	29	29
2022	Non-participating	32	32
2023	Non-participating	27	28

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2024	Non-participating	29	30
2025	Non-participating	25	26
2026	Non-participating	31	31
2027	Non-participating	31	31
2028	Non-participating	30	31
2029	Non-participating	30	31
2030	Non-participating	32	33
2031	Non-participating	29	30
2032	Non-participating	32	33
2033	Non-participating	30	31
2034	Non-participating	31	32
2035	Non-participating	34	34
2036	Non-participating	32	33
2037	Non-participating	33	34
2038	Non-participating	32	33
2039	Non-participating	28	28
2040	Non-participating	31	32
2041	Non-participating	31	31
2042	Non-participating	26	27
2043	Non-participating	28	28
2044	Non-participating	30	31
2045	Non-participating	36	36
2046	Non-participating	34	35
2047	Non-participating	29	29
2048	Non-participating	31	31
2049	Non-participating	31	32
2050	Non-participating	30	31
2051	Non-participating	31	32
2052	Non-participating	27	27
2053	Non-participating	35	36
2054	Non-participating	30	31
2055	Non-participating	31	32
2056	Non-participating	31	31
2057	Non-participating	29	30
2058	Non-participating	27	27
2059	Non-participating	32	33
2060	Non-participating	28	29
2061	Non-participating	31	32
2062	Non-participating	28	29



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2063	Non-participating	29	30
2064	Non-participating	31	31
2065	Non-participating	29	30
2066	Non-participating	30	31
2067	Non-participating	28	28
2068	Non-participating	34	35
2069	Non-participating	23	24
2070	Non-participating	30	31
2071	Non-participating	34	35
2072	Non-participating	32	32
2073	Non-participating	30	31
2074	Non-participating	30	31
2075	Non-participating	30	30
2076	Non-participating	30	31
2077	Non-participating	26	27
2078	Non-participating	30	31
2079	Non-participating	29	30
2080	Non-participating	33	33
2081	Non-participating	32	32
2082	Non-participating	33	34
2083	Non-participating	32	33
2084	Non-participating	31	31
2085	Non-participating	29	30
2086	Non-participating	32	32
2087	Non-participating	30	31
2088	Non-participating	35	36
2089	Non-participating	31	31
2090	Non-participating	34	34
2091	Non-participating	30	31
2092	Non-participating	35	36
2093	Non-participating	34	35
2094	Non-participating	31	32
2095	Non-participating	30	31
2096	Non-participating	28	29
2097	Non-participating	29	29
2098	Non-participating	28	29
2099	Non-participating	30	31
2100	Non-participating	31	32
2101	Non-participating	30	31

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2102	Non-participating	30	30
2103	Non-participating	29	30
2104	Non-participating	31	32
2105	Non-participating	31	31
2106	Non-participating	30	31
2107	Non-participating	34	35
2108	Non-participating	26	27
2109	Non-participating	33	33
2110	Non-participating	31	32
2111	Non-participating	32	33
2112	Non-participating	26	26
2113	Non-participating	33	34
2114	Non-participating	30	30
2115	Non-participating	30	31
2116	Non-participating	31	32
2117	Non-participating	29	30
2118	Non-participating	32	33
2119	Non-participating	33	34
2120	Non-participating	33	34
2121	Non-participating	31	31
2122	Non-participating	33	33
2123	Non-participating	26	27
2124	Non-participating	30	31
2125	Non-participating	30	31
2126	Non-participating	31	32
2127	Non-participating	30	31
2128	Non-participating	30	31
2129	Non-participating	25	26
2130	Non-participating	30	30
2131	Non-participating	29	29
2132	Non-participating	34	34
2133	Non-participating	30	30
2134	Non-participating	32	33
2135	Non-participating	30	31
2136	Non-participating	30	31
2137	Non-participating	30	31
2138	Non-participating	34	35
2139	Non-participating	33	34
2140	Non-participating	32	32



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2141	Non-participating	29	30
2142	Non-participating	30	30
2143	Non-participating	31	32
2144	Non-participating	29	30
2145	Non-participating	31	31
2146	Non-participating	31	32
2147	Non-participating	31	32
2148	Non-participating	30	31
2149	Non-participating	34	35
2150	Non-participating	25	26
2151	Non-participating	31	32
2152	Non-participating	35	36
2153	Non-participating	30	30
2154	Non-participating	30	31
2155	Non-participating	32	32
2156	Non-participating	31	32
2157	Non-participating	31	32
2158	Non-participating	30	31
2159	Non-participating	30	30
2160	Non-participating	35	35
2161	Non-participating	30	30
2162	Non-participating	30	31
2163	Non-participating	33	34
2164	Non-participating	28	28
2165	Non-participating	30	31
2166	Non-participating	27	28
2167	Non-participating	29	30
2168	Non-participating	31	32
2169	Non-participating	30	31
2170	Non-participating	33	34
2171	Non-participating	37	37
2172	Non-participating	31	31
2173	Non-participating	30	30
2174	Non-participating	33	33
2175	Non-participating	32	33
2176	Non-participating	29	30
2177	Non-participating	30	31
2178	Non-participating	29	29
2179	Non-participating	32	32

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2180	Non-participating	34	35
2181	Non-participating	31	32
2182	Non-participating	32	33
2183	Non-participating	30	30
2184	Non-participating	29	29
2185	Non-participating	28	29
2186	Non-participating	28	28
2187	Non-participating	27	28
2188	Non-participating	33	33
2189	Non-participating	29	30
2190	Non-participating	29	29
2191	Non-participating	31	31
2192	Non-participating	34	34
2193	Non-participating	29	30
2194	Non-participating	32	33
2195	Non-participating	35	36
2196	Non-participating	30	30
2197	Non-participating	32	33
2198	Non-participating	33	34
2199	Non-participating	32	33
2200	Non-participating	31	32
2201	Non-participating	29	29
2202	Non-participating	30	31
2203	Non-participating	26	27
2204	Non-participating	30	31
2205	Non-participating	26	27
2206	Non-participating	34	34
2207	Non-participating	31	32
2208	Non-participating	31	32
2209	Non-participating	31	32
2210	Non-participating	28	28
2211	Non-participating	31	31
2212	Non-participating	32	33
2213	Non-participating	29	30
2214	Non-participating	29	29
2215	Non-participating	34	34
2216	Non-participating	35	36
2217	Non-participating	30	30
2218	Non-participating	31	32



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2219	Non-participating	30	31
2220	Non-participating	28	29
2221	Non-participating	29	30
2222	Non-participating	32	33
2223	Non-participating	32	33
2224	Non-participating	31	32
2225	Non-participating	34	35
2226	Non-participating	32	33
2227	Non-participating	32	32
2228	Non-participating	30	30
2229	Non-participating	29	29
2230	Non-participating	29	30
2231	Non-participating	33	34
2232	Non-participating	29	30
2233	Non-participating	31	31
2234	Non-participating	28	28
2235	Non-participating	32	33
2236	Non-participating	30	31
2237	Non-participating	32	33
2238	Non-participating	32	32
2239	Non-participating	33	33
2240	Non-participating	32	33
2241	Non-participating	31	31
2242	Non-participating	26	27
2243	Non-participating	32	33
2244	Non-participating	34	35
2245	Non-participating	30	30
2246	Non-participating	31	32
2247	Non-participating	29	30
2248	Non-participating	26	27
2249	Non-participating	30	30
2250	Non-participating	35	35
2251	Non-participating	32	33
2252	Non-participating	25	26
2253	Non-participating	26	26
2254	Non-participating	37	37
2255	Non-participating	31	31
2256	Non-participating	35	36
2257	Non-participating	32	33

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2258	Non-participating	31	31
2259	Non-participating	27	28
2260	Non-participating	32	33
2261	Non-participating	35	36
2262	Non-participating	29	30
2263	Non-participating	30	30
2264	Non-participating	32	33
2265	Non-participating	33	33
2266	Non-participating	30	31
2267	Non-participating	32	32
2268	Non-participating	30	30
2269	Non-participating	32	33
2270	Non-participating	29	30
2271	Non-participating	33	34
2272	Non-participating	32	32
2273	Non-participating	30	31
2274	Non-participating	31	31
2275	Non-participating	32	33
2276	Non-participating	32	33
2277	Non-participating	31	31
2278	Non-participating	33	34
2279	Non-participating	31	32
2280	Non-participating	34	35
2281	Non-participating	32	33
2282	Non-participating	25	26
2283	Non-participating	29	30
2284	Non-participating	34	35
2285	Non-participating	28	29
2286	Non-participating	34	35
2287	Non-participating	29	29
2288	Non-participating	33	34
2289	Non-participating	32	33
2290	Non-participating	33	34
2291	Non-participating	31	32
2292	Non-participating	23	24
2293	Non-participating	31	32
2294	Non-participating	32	33
2295	Non-participating	31	32
2296	Non-participating	32	33



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2297	Non-participating	32	32
2298	Non-participating	25	26
2299	Non-participating	29	29
2300	Non-participating	34	35
2301	Non-participating	34	35
2302	Non-participating	28	29
2303	Non-participating	33	34
2304	Non-participating	31	32
2305	Non-participating	28	28
2306	Non-participating	35	35
2307	Non-participating	33	34
2308	Non-participating	32	33
2309	Non-participating	29	29
2310	Non-participating	30	31
2311	Non-participating	29	30
2312	Non-participating	35	36
2313	Non-participating	30	31
2314	Non-participating	32	33
2315	Non-participating	30	30
2316	Non-participating	33	34
2317	Non-participating	29	30
2318	Non-participating	26	27
2319	Non-participating	35	36
2320	Non-participating	34	34
2321	Non-participating	30	31
2322	Non-participating	31	32
2323	Non-participating	34	35
2324	Non-participating	30	30
2325	Non-participating	34	34
2326	Non-participating	33	34
2327	Non-participating	30	31
2328	Non-participating	31	31
2329	Non-participating	29	30
2330	Non-participating	30	31
2331	Non-participating	30	31
2332	Non-participating	33	33
2333	Non-participating	30	30
2334	Non-participating	26	27
2335	Non-participating	32	32

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2336	Non-participating	29	30
2337	Non-participating	31	31
2338	Non-participating	29	29
2339	Non-participating	34	35
2340	Non-participating	29	30
2341	Non-participating	26	27
2342	Non-participating	23	24
2343	Non-participating	28	28
2344	Non-participating	32	33
2345	Non-participating	34	34
2346	Non-participating	30	30
2347	Non-participating	34	35
2348	Non-participating	32	33
2349	Non-participating	29	29
2350	Non-participating	30	31
2351	Non-participating	26	27
2352	Non-participating	30	31
2353	Non-participating	30	30
2354	Non-participating	31	32
2355	Non-participating	30	30
2356	Non-participating	27	28
2357	Non-participating	29	30
2358	Non-participating	31	31
2359	Non-participating	35	36
2360	Non-participating	31	31
2361	Non-participating	30	31
2362	Non-participating	32	32
2363	Non-participating	30	31
2364	Non-participating	28	29
2365	Non-participating	30	30
2366	Non-participating	33	34
2367	Non-participating	27	28
2368	Non-participating	30	31
2369	Non-participating	29	29
2370	Non-participating	28	29
2371	Non-participating	31	32
2372	Non-participating	33	34
2373	Non-participating	34	35
2374	Non-participating	32	32



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2375	Non-participating	33	33
2376	Non-participating	31	31
2377	Non-participating	27	28
2378	Non-participating	30	31
2379	Non-participating	30	31
2380	Non-participating	26	26
2381	Non-participating	33	34
2382	Non-participating	28	29
2383	Non-participating	32	33
2384	Non-participating	32	32
2385	Non-participating	30	30
2386	Non-participating	31	31
2387	Non-participating	33	34
2388	Non-participating	29	30
2389	Non-participating	33	34
2390	Non-participating	34	35
2391	Non-participating	33	34
2392	Non-participating	32	33
2393	Non-participating	27	27
2394	Non-participating	34	35
2395	Non-participating	32	33
2396	Non-participating	30	31
2397	Non-participating	25	25
2398	Non-participating	31	31
2399	Non-participating	33	34
2400	Non-participating	32	33
2401	Non-participating	30	30
2402	Non-participating	28	29
2403	Non-participating	31	32
2404	Non-participating	33	34
2405	Non-participating	31	32
2406	Non-participating	34	35
2407	Non-participating	29	30
2408	Non-participating	33	34
2409	Non-participating	31	31
2410	Non-participating	30	30
2411	Non-participating	31	31
2412	Non-participating	30	31
2413	Non-participating	31	31

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2414	Non-participating	35	35
2415	Non-participating	32	33
2416	Non-participating	34	35
2417	Non-participating	35	35
2418	Non-participating	30	30
2419	Non-participating	34	35
2420	Non-participating	31	32
2421	Non-participating	28	28
2422	Non-participating	31	32
2423	Non-participating	32	33
2424	Non-participating	28	29
2425	Non-participating	30	30
2426	Non-participating	31	32
2427	Non-participating	25	26
2428	Non-participating	33	34
2429	Non-participating	29	29
2430	Non-participating	34	35
2431	Non-participating	32	33
2432	Non-participating	25	25
2433	Non-participating	27	27
2434	Non-participating	32	33
2435	Non-participating	33	34
2436	Non-participating	33	33
2437	Non-participating	32	33
2438	Non-participating	30	31
2439	Non-participating	26	27
2440	Non-participating	32	33
2441	Non-participating	32	33
2442	Non-participating	31	32
2443	Non-participating	33	33
2444	Non-participating	31	31
2445	Non-participating	32	33
2446	Non-participating	30	31
2447	Non-participating	33	34
2448	Non-participating	30	30
2449	Non-participating	31	32
2450	Non-participating	31	31
2451	Non-participating	30	30
2452	Non-participating	30	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2453	Non-participating	34	35
2454	Non-participating	26	27
2455	Non-participating	31	32
2456	Non-participating	34	35
2457	Non-participating	32	33
2458	Non-participating	34	35
2459	Non-participating	35	35
2460	Non-participating	29	30
2461	Non-participating	34	35
2462	Non-participating	28	28
2463	Non-participating	34	35
2464	Non-participating	30	31
2465	Non-participating	33	34
2466	Non-participating	30	30
2467	Non-participating	31	32
2468	Non-participating	26	27
2469	Non-participating	33	33
2470	Non-participating	31	32
2471	Non-participating	32	33
2472	Non-participating	32	33
2473	Non-participating	32	33
2474	Non-participating	27	28
2475	Non-participating	29	30
2476	Non-participating	32	32
2477	Non-participating	34	34
2478	Non-participating	34	34
2479	Non-participating	34	34
2480	Non-participating	32	32
2481	Non-participating	31	32
2482	Non-participating	30	30
2483	Non-participating	33	33
2484	Non-participating	29	29
2485	Non-participating	27	28
2486	Non-participating	29	29
2487	Non-participating	28	29
2488	Non-participating	33	33
2489	Non-participating	34	34
2490	Non-participating	31	31
2491	Non-participating	29	30

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2492	Non-participating	30	30
2493	Non-participating	24	25
2494	Non-participating	29	30
2495	Non-participating	31	32
2496	Non-participating	27	28
2497	Non-participating	30	30
2498	Non-participating	27	28
2499	Non-participating	33	34
2500	Non-participating	32	33
2501	Non-participating	32	33
2502	Non-participating	30	31
2503	Non-participating	30	31
2504	Non-participating	26	27
2505	Non-participating	30	31
2506	Non-participating	30	31
2507	Non-participating	32	32
2508	Non-participating	28	29
2509	Non-participating	34	34
2510	Non-participating	33	34
2511	Non-participating	32	32
2512	Non-participating	27	28
2513	Non-participating	28	29
2514	Non-participating	30	30
2515	Non-participating	30	31
2516	Non-participating	28	29
2517	Non-participating	36	37
2518	Non-participating	28	28
2519	Non-participating	29	29
2520	Non-participating	36	37
2521	Non-participating	26	27
2522	Non-participating	30	30
2523	Non-participating	30	31
2524	Non-participating	27	28
2525	Non-participating	31	31
2526	Non-participating	34	34
2527	Non-participating	30	31
2528	Non-participating	34	35
2529	Non-participating	27	28
2530	Non-participating	30	30



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2531	Non-participating	29	30
2532	Non-participating	29	29
2533	Non-participating	29	30
2534	Non-participating	34	35
2535	Non-participating	34	35
2536	Non-participating	30	31
2537	Non-participating	27	28
2538	Non-participating	31	32
2539	Non-participating	30	31
2540	Non-participating	28	29
2541	Non-participating	29	30
2542	Non-participating	31	32
2543	Non-participating	31	31
2544	Non-participating	35	36
2545	Non-participating	33	34
2546	Non-participating	29	30
2547	Non-participating	30	31
2548	Non-participating	34	35
2549	Non-participating	31	31
2550	Non-participating	35	36
2551	Non-participating	32	32
2552	Non-participating	27	28
2553	Non-participating	28	29
2554	Non-participating	28	29
2555	Non-participating	31	32
2556	Non-participating	31	31
2557	Non-participating	34	35
2558	Non-participating	31	32
2559	Non-participating	27	28
2560	Non-participating	34	35
2561	Non-participating	33	34
2562	Non-participating	33	34
2563	Non-participating	33	34
2564	Non-participating	31	32
2565	Non-participating	33	34
2566	Non-participating	30	31
2567	Non-participating	27	28
2568	Non-participating	32	33
2569	Non-participating	31	32

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2570	Non-participating	30	31
2571	Non-participating	26	27
2572	Non-participating	28	29
2573	Non-participating	31	31
2574	Non-participating	32	32
2575	Non-participating	30	31
2576	Non-participating	32	33
2577	Non-participating	35	36
2578	Non-participating	31	31
2579	Non-participating	31	31
2580	Non-participating	36	36
2581	Non-participating	30	31
2582	Non-participating	30	31
2583	Non-participating	31	31
2584	Non-participating	31	32
2585	Non-participating	30	30
2586	Non-participating	31	32
2587	Non-participating	27	28
2588	Non-participating	30	30
2589	Non-participating	31	31
2590	Non-participating	35	36
2591	Non-participating	34	34
2592	Non-participating	31	32
2593	Non-participating	30	31
2594	Non-participating	32	32
2595	Non-participating	30	30
2596	Non-participating	29	30
2597	Non-participating	34	34
2598	Non-participating	30	31
2599	Non-participating	35	36
2600	Non-participating	27	27
2601	Non-participating	24	24
2602	Non-participating	33	33
2603	Non-participating	29	30
2604	Non-participating	27	28
2605	Non-participating	30	31
2606	Non-participating	31	32
2607	Non-participating	29	30
2608	Non-participating	30	31



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2609	Non-participating	30	31
2610	Non-participating	32	33
2611	Non-participating	31	32
2612	Non-participating	30	30
2613	Non-participating	30	31
2614	Non-participating	33	33
2615	Non-participating	32	33
2616	Non-participating	31	32
2617	Non-participating	30	31
2618	Non-participating	30	31
2619	Non-participating	34	35
2620	Non-participating	32	32
2621	Non-participating	29	30
2622	Non-participating	31	32
2623	Non-participating	34	35
2624	Non-participating	33	33
2625	Non-participating	28	29
2626	Non-participating	32	33
2627	Non-participating	25	25
2628	Non-participating	23	23
2629	Non-participating	31	32
2630	Non-participating	30	30
2631	Non-participating	30	31
2632	Non-participating	30	30
2633	Non-participating	33	34
2634	Non-participating	31	31
2635	Non-participating	31	32
2636	Non-participating	32	33
2637	Non-participating	30	30
2638	Non-participating	34	35
2639	Non-participating	30	30
2640	Non-participating	31	31
2641	Non-participating	32	32
2642	Non-participating	30	31
2643	Non-participating	32	33
2644	Non-participating	30	30
2645	Non-participating	34	35
2646	Non-participating	29	30
2647	Non-participating	32	33

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2648	Non-participating	31	32
2649	Non-participating	30	31
2650	Non-participating	33	33
2651	Non-participating	33	33
2652	Non-participating	30	31
2653	Non-participating	30	31
2654	Non-participating	34	35
2655	Non-participating	31	31
2656	Non-participating	31	31
2657	Non-participating	30	30
2658	Non-participating	34	35
2659	Non-participating	30	31
2660	Non-participating	30	30
2661	Non-participating	34	35
2662	Non-participating	35	35
2663	Non-participating	31	32
2664	Non-participating	33	34
2665	Non-participating	30	31
2666	Non-participating	30	30
2667	Non-participating	31	31
2668	Non-participating	34	35
2669	Non-participating	34	35
2670	Non-participating	31	32
2671	Non-participating	31	32
2672	Non-participating	35	36
2673	Non-participating	31	31
2674	Non-participating	36	37
2675	Non-participating	33	34
2676	Non-participating	32	33
2677	Non-participating	30	31
2678	Non-participating	32	33
2679	Non-participating	27	28
2680	Non-participating	34	34
2681	Non-participating	27	27
2682	Non-participating	32	33
2683	Non-participating	30	31
2684	Non-participating	31	32
2685	Non-participating	30	31
2686	Non-participating	28	28



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2687	Non-participating	27	27
2688	Non-participating	31	32
2689	Non-participating	34	35
2690	Non-participating	33	34
2691	Non-participating	27	28
2692	Non-participating	34	35
2693	Non-participating	28	29
2694	Non-participating	30	31
2695	Non-participating	30	30
2696	Non-participating	30	30
2697	Non-participating	33	34
2698	Non-participating	33	34
2699	Non-participating	26	27
2700	Non-participating	27	28
2701	Non-participating	26	27
2702	Non-participating	31	32
2703	Non-participating	31	32
2704	Non-participating	28	29
2705	Non-participating	34	35
2706	Non-participating	29	30
2707	Non-participating	34	35
2708	Non-participating	31	32
2709	Non-participating	30	31
2710	Non-participating	26	27
2711	Non-participating	32	32
2712	Non-participating	30	31
2713	Non-participating	33	34
2714	Non-participating	32	33
2715	Non-participating	30	31
2716	Non-participating	30	31
2717	Non-participating	30	30
2718	Non-participating	30	30
2719	Non-participating	30	31
2720	Non-participating	34	35
2721	Non-participating	35	35
2722	Non-participating	35	35
2723	Non-participating	29	29
2724	Non-participating	29	30
2725	Non-participating	28	29

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2726	Non-participating	33	33
2727	Non-participating	29	29
2728	Non-participating	34	34
2729	Non-participating	27	28
2730	Non-participating	27	28
2731	Non-participating	29	29
2732	Non-participating	31	31
2733	Non-participating	30	31
2734	Non-participating	28	29
2735	Non-participating	30	30
2736	Non-participating	28	29
2737	Non-participating	35	35
2738	Non-participating	27	28
2739	Non-participating	29	30
2740	Non-participating	23	23
2741	Non-participating	31	31
2742	Non-participating	32	33
2743	Non-participating	32	33
2744	Non-participating	32	33
2745	Non-participating	30	31
2746	Non-participating	30	30
2747	Non-participating	29	30
2748	Non-participating	28	29
2749	Non-participating	31	32
2750	Non-participating	28	29
2751	Non-participating	28	28
2752	Non-participating	29	30
2753	Non-participating	29	30
2754	Non-participating	35	35
2755	Non-participating	35	35
2756	Non-participating	35	35
2757	Non-participating	35	35
2758	Non-participating	35	35
2759	Non-participating	35	35
2760	Non-participating	35	36
2761	Non-participating	35	36
2762	Non-participating	35	36
2763	Non-participating	35	36
2764	Non-participating	35	36



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2765	Non-participating	35	35
2766	Non-participating	35	35
2767	Non-participating	35	36
2768	Non-participating	35	35
2769	Non-participating	35	35
2770	Non-participating	35	35
2771	Non-participating	35	35
2772	Non-participating	36	36
2773	Non-participating	35	36
2774	Non-participating	35	35
2775	Non-participating	35	35
2776	Non-participating	35	35
2777	Non-participating	35	35
2778	Non-participating	34	35
2779	Non-participating	34	35
2780	Non-participating	34	35
2781	Non-participating	35	35
2782	Non-participating	35	35
2783	Non-participating	35	35
2784	Non-participating	35	35
2785	Non-participating	35	35
2786	Non-participating	35	35
2787	Non-participating	34	34
2788	Non-participating	34	34
2789	Non-participating	34	34
2790	Non-participating	34	34
2791	Non-participating	34	34
2792	Non-participating	34	34
2793	Non-participating	33	34
2794	Non-participating	33	34
2795	Non-participating	33	34
2796	Non-participating	34	34
2797	Non-participating	37	37
2798	Non-participating	36	37
2799	Non-participating	35	36
2800	Non-participating	36	37
2801	Non-participating	36	37
2802	Non-participating	36	37
2803	Non-participating	36	36

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2804	Non-participating	36	36
2805	Non-participating	35	36
2806	Non-participating	33	34
2807	Non-participating	33	34
2808	Non-participating	33	34
2809	Non-participating	33	34
2810	Non-participating	33	34
2811	Non-participating	33	34
2812	Non-participating	33	34
2813	Non-participating	33	33
2814	Non-participating	32	33
2815	Non-participating	32	33
2816	Non-participating	32	33
2817	Non-participating	32	33
2818	Non-participating	33	33
2819	Non-participating	36	36
2820	Non-participating	36	37
2821	Non-participating	35	35
2822	Non-participating	35	35
2823	Non-participating	34	35
2824	Non-participating	34	35
2825	Non-participating	34	35
2826	Non-participating	34	35
2827	Non-participating	34	35
2828	Non-participating	33	34
2829	Non-participating	33	34
2830	Non-participating	33	34
2831	Non-participating	33	34
2832	Non-participating	33	34
2833	Non-participating	33	34
2834	Non-participating	38	39
2835	Non-participating	37	38
2836	Non-participating	36	37
2837	Non-participating	36	37
2838	Non-participating	36	36
2839	Non-participating	35	36
2840	Non-participating	33	34
2841	Non-participating	33	34
2842	Non-participating	33	34



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2843	Non-participating	40	41
2844	Non-participating	36	36
2845	Non-participating	35	35
2846	Non-participating	35	36
2847	Non-participating	35	36
2848	Non-participating	35	35
2849	Non-participating	34	35
2850	Non-participating	34	35
2851	Non-participating	40	41
2852	Non-participating	40	41
2853	Non-participating	34	35
2854	Non-participating	34	35
2855	Non-participating	34	35
2856	Non-participating	35	35
2857	Non-participating	35	36
2858	Non-participating	35	36
2859	Non-participating	35	36
2860	Non-participating	36	36
2861	Non-participating	35	36
2862	Non-participating	35	36
2863	Non-participating	35	36
2864	Non-participating	36	36
2865	Non-participating	36	36
2866	Non-participating	36	36
2867	Non-participating	39	40
2868	Non-participating	35	36
2869	Non-participating	36	37
2870	Non-participating	34	35
2871	Non-participating	32	33
2872	Non-participating	32	32
2873	Non-participating	34	34
2874	Non-participating	33	34
2875	Non-participating	32	33
2876	Non-participating	34	35
2877	Non-participating	34	35
2878	Non-participating	35	36
2879	Non-participating	39	40
2880	Non-participating	39	39
2881	Non-participating	37	38

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2882	Non-participating	38	39
2883	Non-participating	38	38
2884	Non-participating	37	38
2885	Non-participating	36	36
2886	Non-participating	35	36
2887	Non-participating	35	36
2888	Non-participating	36	37
2889	Non-participating	36	36
2890	Non-participating	36	37
2891	Non-participating	35	36
2892	Non-participating	36	36
2893	Non-participating	32	33
2894	Non-participating	35	36
2895	Non-participating	36	36
2896	Non-participating	35	36
2897	Non-participating	35	36
2898	Non-participating	34	35
2899	Non-participating	35	36
2900	Non-participating	35	35
2901	Non-participating	35	36
2902	Non-participating	36	36
2903	Non-participating	36	37
2904	Non-participating	35	36
2905	Non-participating	33	34
2906	Non-participating	34	34
2907	Non-participating	34	35
2908	Non-participating	34	35
2909	Non-participating	34	35
2910	Non-participating	33	34
2911	Non-participating	33	34
2912	Non-participating	34	34
2913	Non-participating	34	35
2914	Non-participating	33	34
2915	Non-participating	34	35
2916	Non-participating	36	36
2917	Non-participating	34	35
2918	Non-participating	35	36
2919	Non-participating	43	43
2920	Non-participating	37	37



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2921	Non-participating	38	39
2922	Non-participating	38	39
2923	Non-participating	36	37
2924	Non-participating	38	38
2925	Non-participating	45	45
2926	Non-participating	44	44
2927	Non-participating	38	38
2928	Non-participating	41	41
2929	Non-participating	40	40
2930	Non-participating	41	42
2931	Non-participating	39	40
2932	Non-participating	35	35
2933	Non-participating	44	44
2934	Non-participating	44	45
2935	Non-participating	37	38
2936	Non-participating	47	47
2937	Non-participating	38	39
2938	Non-participating	45	45
2939	Non-participating	44	44
2940	Non-participating	34	35
2941	Non-participating	35	35
2942	Non-participating	36	37
2943	Non-participating	42	43
2944	Non-participating	37	37
2945	Non-participating	43	44
2946	Non-participating	46	46
2947	Non-participating	44	44
2948	Non-participating	39	40
2949	Non-participating	36	37
2950	Non-participating	48	49
2951	Non-participating	43	43
2952	Non-participating	40	41
2953	Non-participating	41	42
2954	Non-participating	43	44
2955	Non-participating	38	38
2956	Non-participating	40	41
2957	Non-participating	36	36
2958	Non-participating	34	35
2959	Non-participating	33	34

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2960	Non-participating	45	45
2961	Non-participating	45	45
2962	Non-participating	43	44
2963	Non-participating	47	47
2964	Non-participating	35	36
2965	Non-participating	43	43
2966	Non-participating	39	39
2967	Non-participating	32	33
2968	Non-participating	42	42
2969	Non-participating	41	41
2970	Non-participating	39	40
2971	Non-participating	38	38
2972	Non-participating	39	40
2973	Non-participating	42	42
2974	Non-participating	37	37
2975	Non-participating	43	43
2976	Non-participating	42	42
2977	Non-participating	46	46
2978	Non-participating	40	40
2979	Non-participating	39	40
2980	Non-participating	43	44
2981	Non-participating	41	41
2982	Non-participating	38	39
2983	Non-participating	39	40
2984	Non-participating	45	46
2985	Non-participating	40	40
2986	Non-participating	45	45
2987	Non-participating	44	44
2988	Non-participating	47	47
2989	Non-participating	43	43
2990	Non-participating	40	40
2991	Non-participating	42	42
2992	Non-participating	47	48
2993	Non-participating	38	38
2994	Non-participating	35	36
2995	Non-participating	35	36
2996	Non-participating	41	41
2997	Non-participating	40	40
2998	Non-participating	39	39



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
2999	Non-participating	33	34
3000	Non-participating	43	43
3001	Non-participating	45	46
3002	Non-participating	43	43
3003	Non-participating	41	41
3004	Non-participating	44	45
3005	Non-participating	41	41
3006	Non-participating	34	35
3007	Non-participating	45	46
3008	Non-participating	40	40
3009	Non-participating	43	43
3010	Non-participating	44	44
3011	Non-participating	37	38
3012	Non-participating	37	37
3013	Non-participating	47	47
3014	Non-participating	40	41
3015	Non-participating	42	43
3016	Non-participating	42	42
3017	Non-participating	47	47
3018	Non-participating	44	44
3019	Non-participating	39	40
3020	Non-participating	29	30
3021	Non-participating	39	40
3022	Non-participating	38	38
3023	Non-participating	43	43
3024	Non-participating	43	44
3025	Non-participating	37	37
3026	Non-participating	43	43
3027	Non-participating	44	45
3028	Non-participating	38	38
3029	Non-participating	38	39
3030	Non-participating	38	39
3031	Non-participating	44	45
3032	Non-participating	43	43
3033	Non-participating	43	43
3034	Non-participating	44	44
3035	Non-participating	41	41
3036	Non-participating	44	45
3037	Non-participating	41	42

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
3038	Non-participating	41	42
3039	Non-participating	42	43
3040	Non-participating	43	43
3041	Non-participating	29	30
3042	Non-participating	42	43
3043	Non-participating	44	45
3044	Non-participating	35	36
3045	Non-participating	39	39
3046	Non-participating	42	42
3047	Non-participating	35	35
3048	Non-participating	37	38
3049	Non-participating	44	44
3050	Non-participating	40	41
3051	Non-participating	44	45
3052	Non-participating	36	37
3053	Non-participating	35	36
3054	Non-Participating	38	39
3055	Non-Participating	36	37
3056	Non-Participating	35	36
3057	Non-Participating	42	43
3058	Non-Participating	37	37
3059	Non-Participating	44	45
3060	Non-Participating	37	38
3061	Non-Participating	41	41
3062	Non-Participating	36	36
3063	Non-Participating	43	44
3064	Non-Participating	37	38
3065	Non-Participating	44	45
3066	Non-Participating	36	37
3067	Non-Participating	43	44
3068	Non-Participating	39	40
3069	Non-Participating	35	36
3070	Non-Participating	44	45
3071	Non-Participating	36	37
3072	Non-Participating	41	42
3073	Non-Participating	41	41
3074	Non-Participating	44	45
3075	Non-Participating	35	36
3076	Non-Participating	44	44



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
3077	Non-Participating	38	38
3078	Non-Participating	43	44
3079	Non-Participating	43	44
3080	Non-Participating	46	46
3081	Non-Participating	45	46
3082	Non-Participating	38	38
3083	Non-Participating	44	44
3084	Non-Participating	43	44
3085	Non-Participating	32	33
3086	Non-Participating	39	39
3087	Non-Participating	37	37
3088	Non-Participating	42	43
3089	Non-Participating	38	39
3090	Non-Participating	46	47
3091	Non-Participating	46	47
3092	Non-Participating	40	40
3093	Non-Participating	45	45
3094	Non-Participating	41	42
3095	Non-Participating	47	47
3096	Non-Participating	44	45
3097	Church	38	39
3098	Non-Participating	47	47
3099	Church	44	44
3100	Non-Participating	37	37
3101	Non-Participating	43	44
3102	Non-Participating	43	44
3103	Non-Participating	35	35
3104	Non-Participating	46	46
3105	Non-Participating	44	44
3106	Non-Participating	35	36
3107	Non-Participating	46	46
3108	Non-Participating	39	39
3109	Non-Participating	39	39
3110	Non-Participating	38	39
3111	Non-Participating	45	46
3112	Non-Participating	45	45
3113	Non-Participating	35	36
3114	Non-Participating	40	40
3115	Non-Participating	43	43

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
3116	Non-Participating	43	43
3117	Non-Participating	37	37
3118	Non-Participating	43	43
3119	Non-Participating	35	35
3120	Non-Participating	46	46
3121	School	42	43
3122	Non-Participating	45	46
3123	Non-Participating	35	35
3124	Non-Participating	39	39
3125	Non-Participating	45	45
3126	Non-Participating	44	45
3127	Non-Participating	45	45
3128	Non-Participating	38	39
3129	Non-Participating	37	38
3130	Non-Participating	38	39
3131	Non-Participating	34	34
3132	Non-Participating	43	44
3133	Non-Participating	44	44
3134	Non-Participating	36	36
3135	Non-Participating	39	40
3136	Non-Participating	42	42
3137	Non-Participating	37	38
3138	Non-Participating	37	38
3139	Non-Participating	36	36
3140	Non-Participating	36	37
3141	Non-Participating	35	35
3142	Non-Participating	43	43
3143	Non-Participating	45	46
3144	Non-Participating	39	39
3145	Non-Participating	41	41
3146	Church	44	44
3147	Non-Participating	46	46
3148	Church	35	35
3149	Non-Participating	37	37
3150	Church	34	35
3151	Non-participating	37	37
3152	Non-participating	36	37
3153	Non-participating	35	36
3154	Non-participating	45	46



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
3155	Non-participating	37	38
3156	Non-participating	35	36
3157	Non-participating	40	40
3158	Non-participating	38	38
3159	Church	44	45
3160	Non-participating	38	39
3161	Non-participating	41	41
3162	Participating	42	43
3163	Non-participating	46	47
3164	Non-participating	40	40
3165	Non-participating	43	44
3166	Non-participating	54	54
3167	Non-participating	43	44
3168	Non-participating	43	44
3169	Non-participating	41	42
3170	Non-participating	38	38
3171	Non-participating	46	46
3172	Non-participating	45	45
3173	Non-participating	38	39
3174	Non-participating	44	44
3175	Participating	40	40
3176	Participating	45	46
3177	Non-participating	43	43
3178	Non-participating	44	44
3179	Non-participating	46	47
3180	Non-participating	46	46
3181	Non-participating	45	45
3182	Non-participating	42	42
3183	Non-participating	44	44
3184	Non-participating	43	43
3185	Non-participating	43	43
3186	Non-participating	36	37
3187	Non-participating	44	44
3188	Non-participating	35	36
3189	Non-participating	33	34
3190	Non-participating	38	39
3191	Non-participating	40	41
3192	Non-participating	37	38
3193	Non-participating	29	30

ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
3194	Non-participating	46	47
3195	Non-participating	40	41
3196	Non-participating	39	39
3197	Non-participating	34	34
3198	Non-participating	43	44
3199	Non-participating	43	43
3200	Non-participating	30	31
3201	Non-participating	33	34
3202	Non-participating	31	32
3203	Non-participating	28	29
3204	Non-participating	33	34
3205	Non-participating	30	31
3206	Non-participating	30	30
3207	Non-participating	32	33
3208	Non-participating	29	29
3209	Non-participating	28	29
3210	Non-participating	35	36
3211	Non-participating	30	31
3212	Participating	34	34
3213	Non-participating	32	32
3214	Non-participating	33	34
3215	Non-participating	29	30
3216	Non-participating	27	28
3217	Non-participating	34	34
3218	Non-participating	35	35
3219	Non-participating	32	32
3220	Non-participating	34	35
3221	Non-participating	31	31
3222	Non-participating	31	32
3223	Non-participating	31	32
3224	Non-participating	28	29
3225	Non-participating	30	30
3226	Non-participating	30	31
3227	Non-participating	32	33
3228	Non-participating	33	34
3229	Non-participating	27	27
3230	Non-participating	33	34
3231	Non-participating	34	35
3232	Non-participating	43	44



ID	Receiver Status	GE 3.0-140	22 GE 3.0-140 & 65 GE 5.5-158
3233	Non-participating	45	45
3234	Participating	36	36
3235	Non-participating	42	42
3236	Non-participating	31	32

Firelands Wind, LLC
Case No. 18-1607-EL-BGN
Revised Fourth Supplement to Application
October 4, 2019

Attachment 3

Shadow Flicker Analysis Update By Environmental Design & Research

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To: Nate Pedder
From: Lindsay Donahoe
Date: September 9, 2019
Reference: Emerson Creek Wind Farm
Updated Shadow Flicker Analysis

EDR Project No: 17119

Introduction

This memorandum report presents the findings of an updated shadow flicker analysis for the Emerson Creek Wind Farm (the Project). The layout evaluated in this analysis includes 87 wind turbines. Several new wind turbine generators are being considered for this Project. The new turbine models under consideration, and their associated dimensions, are listed in Table 1. The shadow flicker impact was evaluated for a layout that consisted of 64 GE158 turbines at 107.5 meter hub height and 23 GE140 turbines at 110 meter hub height at 1,627 receptors within 10 rotor diameters (1,580 meters) of the wind turbines.

Table 1. Approximate Turbine Dimensions by Model

Turbine Model	Hub Height	Rotor Diameter	Maximum Total Height
GE158	107.5 meters	158 meters	186.5 meters
GE140	110 meters	140 meters	180 meters

Shadow flicker refers to the shadows that a wind turbine casts over structures and observers at times of the day when the sun is directly behind the turbine rotor from an observer's position. During intervals of sunshine, operating wind turbine generators will cast a shadow on surrounding areas as the rotor blades pass in front of the sun, causing a flickering effect while the rotor is in motion. Shadow flicker is most pronounced in northern latitudes during winter months because of the lower angle of the sun in the winter sky. However, it is possible to encounter shadow flicker anywhere for brief periods after sunrise and before sunset (U.S. Department of the Interior, 2005). Shadow flicker does not occur when fog or clouds obscure the sun, or when turbines are not operating. Obstacles such as terrain, vegetation, and/or buildings occurring between residences and wind turbines can significantly reduce or eliminate shadow flicker effects.

The location and duration of shadow flicker can be predicted quite accurately using computer modeling programs and input data regarding turbine locations, turbine dimensions, receptor locations, local topography, and sunshine frequency. A conservative assumption that the turbines are in continuous operation is also applied. Shadow flicker effects predicted by the modeling exercise are expressed in terms of frequency (hours per year) at each receptor location.

Methods

This updated shadow flicker analysis evaluated the potential impact 64 GE158 turbines, each with a rotor diameter of 158 meters and a hub height of 107.5 meters and 23 GE140 turbines, each with a rotor diameter of 140 meters and a hub height of 107.5 meters. Consistent with the Emerson Creek Wind Farm Shadow Flicker Report (EDR, 2019) a study area of 10 rotor diameters was used for analysis of shadow flicker effects. Each turbine was buffered by an area ten times the rotor diameter (1,580 meters; Figure 1).

As described in Section 3.3 of the Emerson Creek Wind Farm Shadow Flicker Report (EDR, 2019), Rule 4906-4-09(E)(1) of the Ohio Administrative Code (OAC) requires that, *"The Facility shall be designed to avoid unreasonable*

adverse shadow flicker effect at any non-participating sensitive receptor within 1,000 meters of any turbine. At a minimum, the facility shall be operated so that shadow flicker levels do not exceed thirty hours per year at any such receptor." The OPSB has used this threshold of acceptability (i.e., 30 annual hours of shadow flicker) in certifying all commercial wind power projects to date in Ohio (OPSB, 2011a, 2011b, 2012, 2013, 2014).

WindPRO 3.2.737 software and the associated Shadow module was used to conduct the shadow flicker analysis. *WindPRO* is a widely accepted modeling software package developed specifically for the design and evaluation of wind power projects. Input variables and assumptions used for shadow flicker modeling calculations for the proposed Project include:

- The latitude and longitude coordinates of 87 proposed wind turbine sites (provided by the Applicant).
- The latitude and longitude coordinates for 1,627 potential receptors located within the 1,580-meter Study Area (provided by the Applicant).
- USGS 1:24,000 topographic mapping and USGS digital elevation model (DEM) data.
- The rotor diameter (158 meters) and hub height (107.5 meters) for the GE158 turbine.
- The rotor diameter (140 meters) and hub height (110 meters) for the GE140 turbine.
- Annual wind rose data (provided by the Applicant) to determine the approximate directional frequency of rotor orientation throughout the year (Table A1 of Attachment A).
- To account for the occurrence of cloudy conditions, the average monthly percent of available sunshine for the nearest National Oceanic and Atmospheric Administration (NOAA) weather station in Cleveland, Ohio was used (Table A2 of Attachment A). Data were obtained from NOAA's "Comparative Climatic Data for the United States through 2015" (<http://www.ncdc.noaa.gov>).
- No allowance was made for wind being below or above generation speeds. Blades are assumed to be moving during all daylight hours when the sun's elevation is more than 3 degrees above the horizon. Shadow flicker is generally considered imperceptible when the sun is less than 3 degrees above the horizon due to the scattering effect of the atmosphere on low angle sunlight (States Committee for Pollution Control, 2002).
- The possible screening effect of trees and buildings adjacent to the receptors was not taken into consideration in the modeling. In addition, the number and/or orientation of windows in residential receptors were not considered in the analysis.

Based on these variables and assumptions, *WindPRO* was used to calculate the theoretical number of hours per year that shadow flicker would occur at any given location in the vicinity of the Project.

The model calculations include the cumulative sum of shadow hours for all turbines. This omni-directional approach reports total shadow flicker results at a receptor regardless of the presence or orientation of windows at the receptor residence (i.e., it assumes shadows from all directions can be perceived at a residence, which may or may not be true). A receptor in the model is defined as a one square meter area, one meter above ground level; the actual dimensions of the house or window locations are not taken into consideration.

Because the proposed Project is located adjacent to the proposed Republic Wind Farm, there exists the potential for cumulative shadow flicker impacts at certain receptors (i.e., those receptors located within a 10-rotor diameter distance of Emerson Creek Wind Farm turbines that are also within a 10-rotor diameter distance of proposed Republic Wind turbines). To evaluate the potential for cumulative shadow flicker impacts from the Project and proposed Republic wind farm, additional shadow flicker analyses were run for selected turbines and receptors.

To determine receptors that would potentially be affected by turbines from both projects, a 10-rotor diameter buffer was applied to the proposed Republic turbines (1,500 meters) and to the proposed Emerson Creek turbines. Sixty receptors

are located within the area where the Republic Wind turbine buffer overlaps with the Study Area for the proposed Emerson Creek GE turbines. Therefore, these receptors have the potential for cumulative impacts. The cumulative shadow flicker analysis was run using the methods described above.

Results

Output from the model includes the following information:

- Calculated shadow flicker time (specific days, maximum hours per day, and total hours per year when shadow flicker is expected) at each of the receptors located in the Study Areas.
- Tabulated and plotted time of day that structures are predicted to receive shadow flicker (Attachment B).
- Shadow isolines, which are used to create maps showing turbine locations, receptors, and projected shadow flicker duration (hours per year) without taking into consideration the effect of screening provided by vegetation and structures (Figure 2).

A summary of the projected shadow flicker at each of the 1,627 receptors in the Study Area is presented below:

- 706 (43%) of the receptors are not expected to experience any shadow flicker,
- 27 (2%) of the receptors may be affected 0-1 hour/year,
- 493 (30%) of the receptors may be affected 1-10 hours/year,
- 207 (13%) of the receptors may be affected 10-20 hours/year,
- 87 (5%) of the receptors may be affected 20-30 hours/year,
- 107 (7%) of the receptors may be affected for more than 30 hours/year.

As these results indicate, 93% of the receptors are predicted to receive less than 30 hours of shadow flicker per year, with the majority of the receptors (75%) predicted to receive less than 10 hours of shadow flicker per year. While 107 receptors were predicted to receive more than 30 hours of shadow flicker per year, 57 are Project participants. At most receptor locations shadow flicker will occur primarily in the early morning or late afternoon and will generally last less than 1 hour per day. The maximum daily duration of shadow flicker is at 2 hours and 24 minutes (at receptor 360, see Attachment B). These initial calculations are conservative in their assumption that all turbine locations will be built; with a maximum nameplate capacity of 297.66 MW, using the GE turbines, it is likely somewhere around a total of 55 to 70 turbines would be built. Fewer turbines will lead to reduced shadow flicker impacts, likely both by number of homes receiving shadow flicker and the amount of shadow flicker received at many homes. The Project's final design will limit shadow flicker at any non-participant to 30 hours per year through either turbine location selection or through curtailment as necessary. This will be determined and discussed in the final pre-construction shadow flicker analysis for compliance filing prior to construction.

Table 2 provides the results of the predicted shadow flicker at each structure calculated to experience more than 30 hours of shadow flicker per year. The times of day and duration of shadow flicker experienced by each structure will vary throughout the calendar year based on the position of the sun in the sky and the direction of prevailing winds. See Attachment B for detailed calendars that illustrate the specific times of year and day that shadow flicker may occur.

Table 2. Summary of Receptors Predicted to Experience Shadow Flicker > 30 hours/year

Receptor ID	Project Status	Receptor Type	Predicted Annual Shadow Flicker (hh:mm/year)
1505	Non-Participant	House	30:12
641	Non-Participant	House	30:15

Receptor ID	Project Status	Receptor Type	Predicted Annual Shadow Flicker (hh:mm/year)
986	Non-Participant	House	30:31
255	Non-Participant	House	30:41
228	Non-Participant	House	31:42
576	Non-Participant	House	31:49
951	Non-Participant	House	31:54
477	Non-Participant	House	32:24
1022	Non-Participant	House	32:54
344	Non-Participant	House	32:59
1620	Non-Participant	House	33:13
869	Non-Participant	House	33:14
611	Non-Participant	House	33:18
693	Non-Participant	House	33:42
1461	Non-Participant	House	33:52
1146	Non-Participant	House	33:52
385	Non-Participant	House	34:00
145	Non-Participant	House	34:05
1551	Non-Participant	House	34:18
1438	Non-Participant	House	34:23
569	Non-Participant	House	34:44
1174	Non-Participant	House	35:00
1040	Non-Participant	House	35:04
1583	Non-Participant	House	35:11
1204	Non-Participant	House	35:42
1106	Non-Participant	House	35:57
834	Non-Participant	Business	36:18
740	Non-Participant	House	36:48
1314	Non-Participant	House	36:58
855	Non-Participant	House	37:16
7	Non-Participant	House	39:11
328	Non-Participant	House	39:28
1158	Non-Participant	House	40:21

Receptor ID	Project Status	Receptor Type	Predicted Annual Shadow Flicker (hh:mm/year)
319	Non-Participant	House	40:43
423	Non-Participant	House	41:09
880	Non-Participant	House	41:33
1493	Non-Participant	House	41:44
718	Non-Participant	House	42:11
596	Non-Participant	House	42:39
422	Non-Participant	House	42:57
501	Non-Participant	House	43:40
1136	Non-Participant	House	45:24
857	Non-Participant	House	47:06
1473	Non-Participant	House	50:46
770	Non-Participant	House	53:09
104	Non-Participant	House	53:47
232	Non-Participant	House	55:50
870	Non-Participant	House	59:56
827	Non-Participant	House	65:29
1375	Non-Participant	House	96:24
1179	Non-Participant	House	99:40
580	Participant	House	28:01
614	Participant	House	28:14
1264	Participant	House	28:59
1518	Participant	House	30:15
1445	Participant	House	30:47
1568	Participant	House	31:01
1085	Participant	House	31:42
653	Participant	House	33:15
1067	Participant	House	33:49
64	Participant	House	33:58
332	Participant	House	34:20
1603	Participant	House	34:52
860	Participant	House	35:18

Receptor ID	Project Status	Receptor Type	Predicted Annual Shadow Flicker (hh:mm/year)
956	Participant	House	36:11
938	Participant	House	36:12
779	Participant	House	37:39
1526	Participant	House	38:36
91	Participant	House	39:13
1468	Participant	House	39:14
275	Participant	House	39:16
1237	Participant	House	39:44
570	Participant	House	39:54
688	Participant	House	40:04
1236	Participant	House	40:18
728	Participant	House	40:49
137	Participant	House	41:31
932	Participant	House	42:01
87	Participant	House	42:25
752	Participant	House	44:44
941	Participant	House	45:02
923	Participant	House	46:12
1030	Participant	House	47:01
940	Participant	House	47:35
1552	Participant	House	48:01
54	Participant	House	48:11
879	Participant	House	48:30
1472	Participant	House	49:27
518	Participant	House	50:06
382	Participant	House	50:28
500	Participant	House	51:29
1269	Participant	House	52:00
1666	Participant	House	52:39
785	Participant	House	53:02
399	Participant	House	53:07

Receptor ID	Project Status	Receptor Type	Predicted Annual Shadow Flicker (hh:mm/year)
1431	Participant	House	53:26
1151	Participant	House	58:30
1531	Participant	House	59:10
1495	Participant	House	60:47
1549	Participant	House	64:40
948	Participant	House	65:18
390	Participant	House	67:22
998	Participant	House	67:29
427	Participant	House	71:22
277	Participant	House	72:47
510	Participant	House	74:42
1056	Participant	House	75:08
360	Participant	House	81:47
404	Participant	House	83:15
1043	Participant	House	86:45
197	Participant	House	92:10

The cumulative shadow flicker analysis was also performed using the methods described in Section 3.2 of the Emerson Creek Wind Farm Shadow Flicker Analysis (EDR, 2019). The cumulative shadow flicker analysis evaluated the cumulative shadow flicker impact at receptors that were within 10 rotor diameters of both the Emerson Creek turbines and turbines from the proposed Republic Wind Farm (Figure 3). Sixty receptors were located in the cumulative impact area. Table 2 below, presents the cumulative shadow flicker impacts with the “predicted” columns representing shadow flicker from the Project only, and the “cumulative predicted” columns representing the combined shadow flicker impacts from both the proposed Emerson Creek and Republic Wind Farms. Only receptors that were originally predicted to have shadow flicker from the Emerson Creek Wind Farm are included in Table 3. Results from the cumulative shadow flicker analysis at each receptor in the cumulative impact area are included in Attachment C.

Table 3. Structures with Potential Cumulative Shadow Flicker

Receptor ID	Project Status	Predicted Annual Shadow Flicker – Emerson Creek Only (hh:mm/day)	Cumulative Predicted Annual Shadow Flicker (hh:mm/day)
872	Non-Participant	0:06	12:50
254	Non-Participant	0:37	14:07
467	Non-Participant	2:52	18:43
909	Non-Participant	2:56	37:07
489	Non-Participant	3:03	38:31
1127	Non-Participant	5:21	39:03
476	Non-Participant	5:26	38:40
198	Non-Participant	5:35	5:35
1224	Non-Participant	6:42	26:09
1592	Non-Participant	7:21	20:14
743	Non-Participant	8:56	20:14
15	Non-Participant	8:58	23:21
1309	Non-Participant	9:30	15:46
908	Non-Participant	9:38	17:37
1119	Non-Participant	10:09	31:11
968	Non-Participant	10:29	25:12
451	Non-Participant	10:42	20:21
95	Non-Participant	12:17	21:00
1190	Non-Participant	12:44	30:44
1395	Non-Participant	12:48	30:17
1586	Non-Participant	13:06	21:40
418	Non-Participant	13:32	20:54
1362	Non-Participant	13:45	21:25
199	Non-Participant	13:47	36:50
826	Non-Participant	14:29	22:04
1091	Non-Participant	15:07	21:33
94	Non-Participant	15:30	23:11
772	Non-Participant	15:44	23:27
114	Non-Participant	15:58	24:06

Receptor ID	Project Status	Predicted Annual Shadow Flicker – Emerson Creek Only (hh:mm/day)	Cumulative Predicted Annual Shadow Flicker (hh:mm/day)
1105	Non-Participant	16:47	25:43
864	Non-Participant	17:28	29:35
1319	Non-Participant	19:16	41:11
1191	Non-Participant	20:10	40:31
127	Non-Participant	20:48	33:31
999	Non-Participant	21:14	29:03
626	Non-Participant	21:22	39:55
1177	Non-Participant	21:23	33:54
447	Non-Participant	21:27	32:10
304	Non-Participant	26:24	39:21
1137	Non-Participant	27:02	38:56
665	Participant	9:41	16:57
1013	Participant	12:01	14:30
275	Participant	39:16	47:40
923	Participant	46:12	54:31

Sixteen of the receptors for the were originally predicted to receive no shadow flicker from Emerson Creek turbines (and hence, will not experience cumulative impacts and are not included in Table 3). One receptor (Receptor ID 198) was predicted to receive no additional shadow flicker from the proposed Republic turbines; this receptors also will not experience cumulative shadow flicker impacts from the proposed Project. As indicated in Table 3, the cumulative shadow flicker analysis results indicate that a total of 43 receptors will experience cumulative shadow flicker from Emerson Creek turbines and the proposed Republic wind turbines. Sixteen non-participating receptors are predicted to receive over 30 hours of shadow flicker due to the cumulative impact from the existing turbines (Table 3).

Conclusion

In summary, as a result of modeling the proposed 87 turbine locations, WindPRO predicted that 50 non-participating receptors will receive more than 30 hours of shadow flicker per year. The cumulative shadow flicker analysis predicted that 16 non-participating receptors would experience over 30 hours per year of shadow flicker due to cumulative effects of the Project and the proposed Republic Wind Farm.

Although shadow flicker at these receptors are currently modeled to exceed the 30-hour per year threshold, these calculations do not take into account the actual location and orientation of windows; the screening effects associated with existing, site-specific conditions and obstacles such as trees and/or buildings; or the reduced number of turbines to be constructed (55-70) compared to this analysis (87). Further, this analysis assumes turbine rotors are continuously in motion. Given these assumptions, the predicted shadow flicker frequency represents a conservative scenario, and overstates the actual frequency of shadow flicker that would be experienced at any given receptor location. Once the

final turbine model is selected, the Applicant will conduct the final pre-construction shadow flicker analysis for compliance filing, and ultimately, the Applicant is committing to operating the Facility such that no non-participating receptors are modeled to receive more than 30 hours of shadow flicker per year. It is anticipated that this will be accomplished through the pursuit of neighbor agreements, turbine operational measures, and/or other mitigation measures.

References

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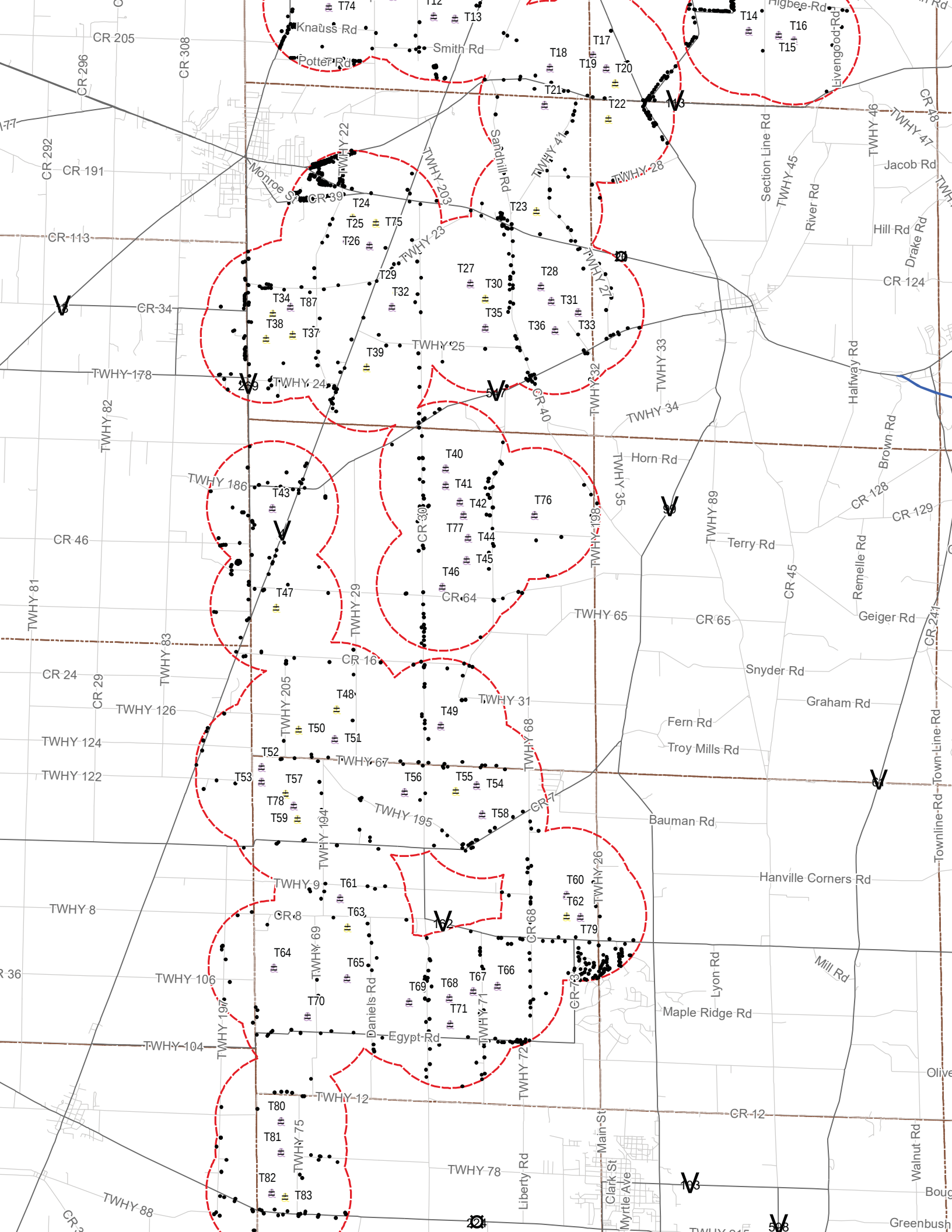
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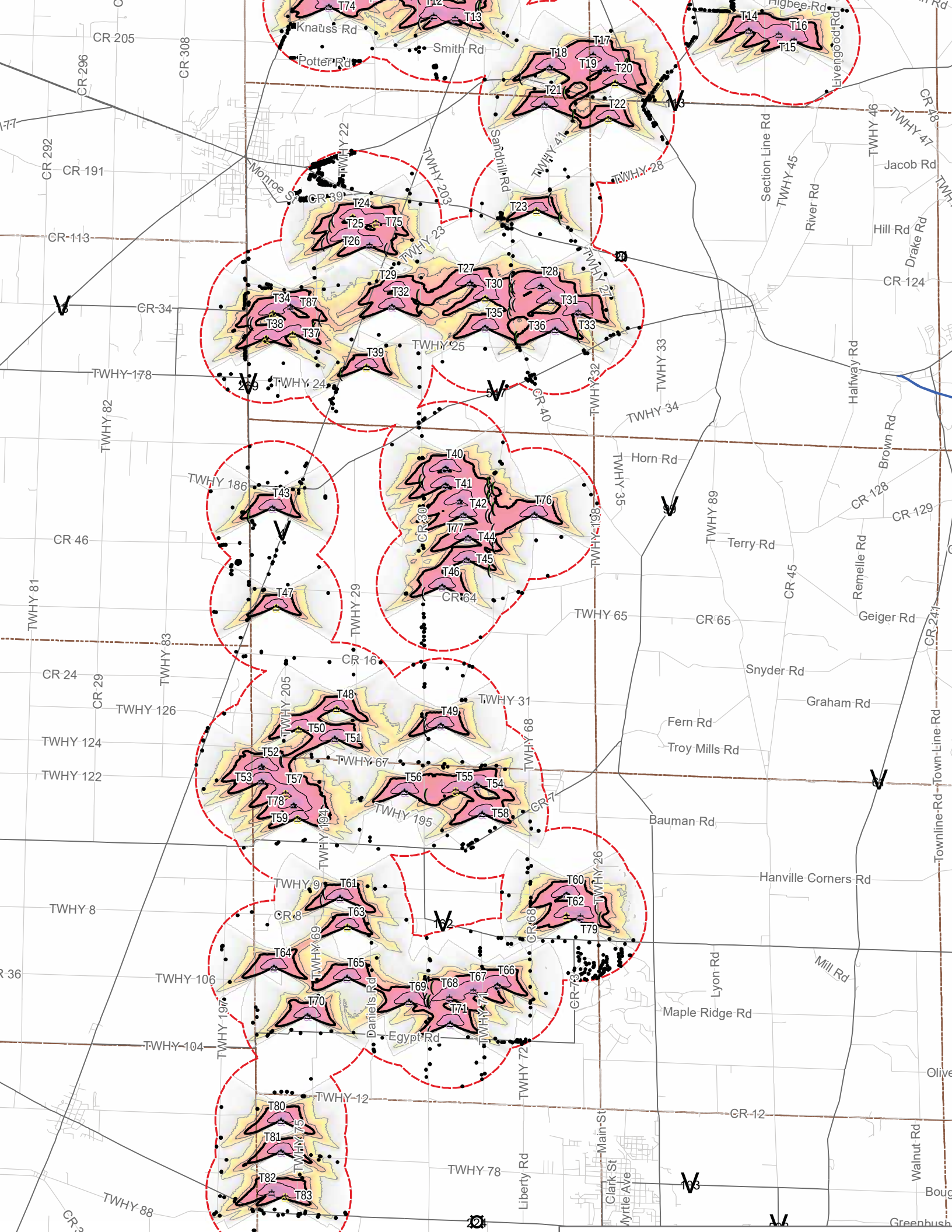
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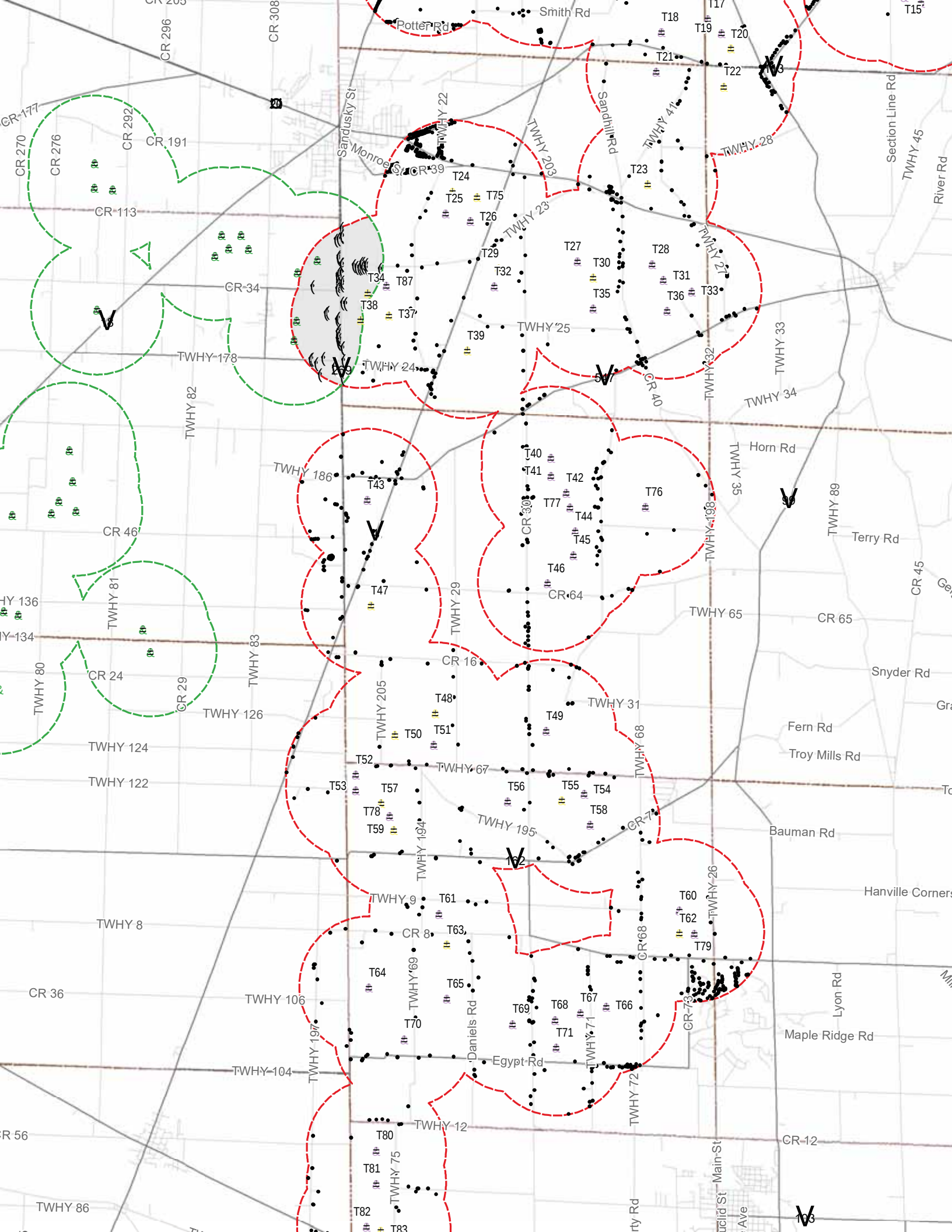
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Figures







Attachment A

Wind Rose and Sunshine Data

Table A1. Wind Rose Data

SECTOR	N	NNE	NE	ENE	E	ESE	SE	SSE
Frequency	3.43	3.44	6.36	7.66	3.71	3.36	3.02	4.22
Hours of Operation	300	301	557	671	325	294	265	370

SECTOR	S	SSW	SW	WSW	W	WNW	NW	NNW
Frequency	5.65	12.21	12.78	12.18	8.42	6.36	4.20	3.01
Hours of Operation	495	1,070	1,120	1,067	738	557	368	264

Source: Wind rose data provided by Apex Clean Energy, Inc.

Table A2. Sunshine Probability Data¹

Month	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Sunshine Probability ²	0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

¹Source: NOAA Comparative Climatic Data for the United States through 2015 – Cleveland, Ohio Weather Station.

²Defined by NOAA as the total time that sunshine reaches the surface of the earth, expressed as the percentage of the maximum amount possible from sunrise to sunset with clear sky conditions.

Attachment B
WindPRO results and Calendars

2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 7 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7693)
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

		Operational time																Sum			
		N		NE		E		SE		S		SW		W		WNW			NNW		
		300	351	401	451	501	551	601	651	701	751	801	851	901	951	1,001	1,051	1,101	1,151	1,201	
		January		February		March		April		May		June									
1	05:57	07:43	07:07																		
2	05:57	07:43	07:07																		
3	05:57	07:43	07:07																		
4	05:57	07:43	07:07																		
5	05:57	07:43	07:07																		
6	05:57	07:43	07:07																		
7	05:57	07:43	07:07																		
8	05:57	07:43	07:07																		
9	05:57	07:43	07:07																		
10	05:57	07:43	07:07																		
11	05:57	07:43	07:07																		
12	05:57	07:43	07:07																		
13	05:57	07:43	07:07																		
14	05:57	07:43	07:07																		
15	05:57	07:43	07:07																		
16	05:57	07:43	07:07																		
17	05:57	07:43	07:07																		
18	05:57	07:43	07:07																		
19	05:57	07:43	07:07																		
20	05:57	07:43	07:07																		
21	05:57	07:43	07:07																		
22	05:57	07:43	07:07																		
23	05:57	07:43	07:07																		
24	05:57	07:43	07:07																		
25	05:57	07:43	07:07																		
26	05:57	07:43	07:07																		
27	05:57	07:43	07:07																		
28	05:57	07:43	07:07																		

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1	06:00	18:00	120	06:00		18:00	
2	06:00	18:00	120	06:00		18:00	
3	06:00	18:00	120	06:00		18:00	
4	06:00	18:00	120	06:00		18:00	
5	06:00	18:00	120	06:00		18:00	
6	06:00	18:00	120	06:00		18:00	
7	06:00	18:00	120	06:00		18:00	
8	06:00	18:00	120	06:00		18:00	
9	06:00	18:00	120	06:00		18:00	
10	06:00	18:00	120	06:00		18:00	
11	06:00	18:00	120	06:00		18:00	
12	06:00	18:00	120	06:00		18:00	
13	06:00	18:00	120	06:00		18:00	
14	06:00	18:00	120	06:00		18:00	
15	06:00	18:00	120	06:00		18:00	
16	06:00	18:00	120	06:00		18:00	
17	06:00	18:00	120	06:00		18:00	
18	06:00	18:00	120	06:00		18:00	
19	06:00	18:00	120	06:00		18:00	
20	06:00	18:00	120	06:00		18:00	
21	06:00	18:00	120	06:00		18:00	
22	06:00	18:00	120	06:00		18:00	
23	06:00	18:00	120	06:00		18:00	
24	06:00	18:00	120	06:00		18:00	
25	06:00	18:00	120	06:00		18:00	
26	06:00	18:00	120	06:00		18:00	
27	06:00	18:00	120	06:00		18:00	
28	06:00	18:00	120	06:00		18:00	
29	06:00	18:00	120	06:00		18:00	
30	06:00	18:00	120	06:00		18:00	
31	06:00	18:00	120	06:00		18:00	

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windPRO

2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 7 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7693)
Assumptions for shadow calculations: Sunshine probability S/50 (Sun hours/Possible sun hours) (%)

Assumptions for shadow calculations

Operational time												
N NNE NE ENE E ESE SE SSE S SSW SW WSW W WWW NN NNW Sum 300 351 357 671 325 294 265 370 495 1,070 1,118 1,067 738 557 366 294 1,760												
July	August			September			October			November/December		
1	06:03	20:14 (75:7)	06:27	19:31 (77:8)	06:58		07:28	18:03 (79:9)	07:52	07:37		
2	21:08	29:45 (77:8)	06:27	19:31 (77:8)	06:57		07:46	18:04 (79:9)	07:52	07:38		
3	20:03	20:15 (75:7)	06:28	19:31 (77:8)	06:59		07:29	18:03 (79:9)	07:53	07:37		
4	20:08	20:48 (77:8)	06:28	19:31 (77:8)	06:59		07:45	18:04 (79:9)	07:53	07:38		
5	06:04	20:15 (75:7)	06:29	19:30 (77:8)	07:00		07:30	18:05 (79:9)	07:54	07:39		
6	21:08	29:45 (77:8)	06:29	19:31 (77:8)	06:59		07:43	18:04 (79:9)	07:54	07:39		
7	06:04	20:16 (75:7)	06:30	19:30 (77:8)	07:01		07:31	18:05 (79:9)	07:56	07:40		
8	21:08	27:40 (75:7)	06:31	19:30 (77:8)	07:02		07:25	18:06 (79:9)	07:57	07:41		
9	21:08	27:40 (75:7)	06:31	19:30 (77:8)	07:02		07:25	18:06 (79:9)	07:57	07:41		
10	21:08	27:40 (75:7)	06:31	19:30 (77:8)	07:02		07:25	18:06 (79:9)	07:57	07:41		
11	06:05	20:16 (75:7)	06:32	19:29 (77:8)	07:03		07:33	18:07 (79:9)	07:58	07:42		
12	21:08	26:40 (75:7)	06:32	19:29 (77:8)	07:04		07:37	18:04 (79:9)	07:58	07:42		
13	21:08	26:40 (75:7)	06:32	19:29 (77:8)	07:04		07:37	18:04 (79:9)	07:58	07:42		
14	21:07	25:41 (75:7)	06:34	19:27 (77:8)	07:05		07:35	18:05 (79:9)	07:59	07:43		
15	21:07	26:16 (75:7)	06:34	19:29 (77:8)	07:05		07:35	18:05 (79:9)	07:59	07:43		
16	21:07	26:40 (75:7)	06:34	19:27 (77:8)	07:05		07:35	18:05 (79:9)	07:59	07:43		
17	21:07	26:40 (75:7)	06:34	19:27 (77:8)	07:05		07:35	18:05 (79:9)	07:59	07:43		
18	21:07	26:40 (75:7)	06:34	19:27 (77:8)	07:05		07:35	18:05 (79:9)	07:59	07:43		
19	21:07	25:42 (75:7)	06:35	19:29 (77:8)	07:06		07:37	18:12 (79:9)	07:59	07:43		
20	21:08	24:41 (75:7)	06:35	19:29 (77:8)	07:06		07:37	18:12 (79:9)	07:59	07:43		
21	06:09	19:49 (77:8)	06:36	19:29 (77:8)	07:07		07:38	18:15 (79:9)	07:54	07:46		
22	06:08	19:41 (77:8)	06:37	19:29 (77:8)	07:08		07:36	18:13 (79:9)	07:57	07:43		
23	12:09	19:47 (77:8)	06:37	19:30 (77:8)	07:09		07:39	18:26 (79:9)	07:59	07:45		
24	06:05	20:40 (77:8)	06:38	19:29 (77:8)	07:10	16	16:47 (79:9)	18:57	07:59	07:46		
25	13:10	19:44 (77:8)	06:38	19:30 (77:8)	07:09		07:39	18:26 (79:9)	07:40	07:46		
26	06:05	20:40 (77:8)	06:38	19:29 (77:8)	07:10		07:39	18:26 (79:9)	07:40	07:46		
27	06:11	19:43 (77:8)	06:39	19:30 (77:8)	07:10		07:39	18:26 (79:9)	07:40	07:46		
28	21:04	20:39 (75:7)	06:39	19:30 (77:8)	07:11		07:37	18:27 (79:9)	07:40	07:46		
29	06:12	19:42 (77:8)	06:41	19:31 (77:8)	07:11		07:38	18:15 (79:9)	07:44	07:46		
30	21:04	20:39 (75:7)	06:41	19:30 (77:8)	07:12		07:38	18:15 (79:9)	07:44	07:46		
31												

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

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windPRO

Project: **2019-09-04_Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 54 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7736)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) ☐

Assumptions for shadow calculations

Operational time																															
		N		NN		NE		ENE		E		ESE		SSE		SSW		SW		WSW		W		WNW		NNW		NW		Sum	
		300		301		557		671		1070		1118		1060		910		1,067		788		557		368		284		1,760			
January		February		March		April		May		June		July		August		September		October		November		December									
1	05:57	07:43	07:07	17:00	17:09	18:31	19:56	20:27	21:56	21:58	20:59	19:59	18:59	17:59	16:59	15:59	14:59	13:59	12:59	11:59	10:59	9:59	8:59	7:59	6:59	5:59	4:59	3:59	2:59	1:59	0:59
2	17:13	17:48	18:22	22:15:21	19:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56	20:27	21:56
3	05:57	07:42	07:06	17:00	17:09	18:31	19:56	20:27	21:56	21:58	20:59	19:59	18:59	17:59	16:59	15:59	14:59	13:59	12:59	11:59	10:59	9:59	8:59	7:59	6:59	5:59	4:59	3:59	2:59	1:59	0:59
4	17:13	17:49	18:23	22:15:21	19:57	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56	20:28	21:56
5	05:57	07:43	07:07	17:00	17:09	18:31	19:56	20:27	21:56	21:58	20:59	19:59	18:59	17:59	16:59	15:59	14:59	13:59	12:59	11:59	10:59	9:59	8:59	7:59	6:59	5:59	4:59	3:59	2:59	1:59	0:59
6	17:13	17:50	18:24	22:15:21	19:58	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56	20:29	21:56
7	05:57	07:40	07:03	16:59	17:09	18:31	19:56	20:27	21:56	21:58	20:59	19:59	18:59	17:59	16:59	15:59	14:59	13:59	12:59	11:59	10:59	9:59	8:59	7:59	6:59	5:59	4:59	3:59	2:59	1:59	0:59
8	17:16	17:52	18:25	22:15:21	19:59	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56	20:30	21:56
9	05:57	07:29	07:01	16:58	17:09	18:31	19:56	20:27	21:56	21:58	20:59	19:59	18:59	17:59	16:59	15:59	14:59	13:59	12:59	11:59	10:59	9:59	8:59	7:59	6:59	5:59	4:59	3:59	2:59	1:59	0:59
10	17:13	17:53	18:25	22:15:21	20:00	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56	20:31	21:56
11	05:57	07:28																													

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
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27				
28				
29				
30				
31				

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Project: **2019-09-04_Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 54 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (7736
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Operational time																									
		N		NE		E		SE		S		SW		WSW		W		WNW		NW		NNW		Sum	
		300		330		375		450		510		585		675		780		885		1005		1167		738	
[July	[August	[September		[October		[November		December																	
1	06:03	20:05	(757)	06:27	19:20	(778)	06:58	19:40	(778)	07:28	18:41	17:40	(759)	08:02	17:37	17:04									
2	21:08	20:34	(757)	20:50	41	20:01	(778)	20:07	24	19:44	(778)	18:15	18:24	(759)	17:28	17:04									
3	21:08	20:34	(757)	20:50	41	20:01	(778)	20:07	24	19:44	(778)	18:15	18:24	(759)	17:28	17:04									
4	21:08	20:34	(757)	20:50	41	20:01	(778)	20:06	19	19:47	(778)	18:15	18:24	(759)	17:27	17:04									
5	21:08	20:34	(757)	20:50	41	20:01	(778)	20:06	19	19:47	(778)	18:15	18:24	(759)	17:27	17:04									
6	21:08	20:34	(757)	20:50	41	20:01	(778)	20:04	11	19:38	(778)	18:12	18:24	(759)	17:26	17:04									
7	06:04	20:06	(757)	06:20	45	20:22	(778)	07:01				07:31	17:28	(759)	17:06	17:04									
8	21:08	20:34	(757)	20:50	47	20:03	(778)	20:02				07:31	17:28	(759)	17:05	17:03									
9	06:05	20:06	(757)	06:21	50	20:16	(778)	07:02				07:32	17:27	(759)	17:07	17:04									
10	21:08	20:34	(757)	20:50	47	20:03	(778)	20:02				07:31	17:28	(759)	17:05	17:03									
11	06:05	20:06	(757)	06:22	50	20:16	(778)	07:03				07:32	17:28	(759)	17:08	17:04									
12	21:08	20:34	(757)	20:50	47	20:04	(778)	20:07				07:30	18:24	(759)	17:07	17:04									
13	06:06	20:06	(757)	06:23	50	20:18	(778)	15:56				07:34	17:28	(759)	17:08	17:04									
14	06:07	20:06	(757)	06:24	50	20:18	(778)	15:54				07:35	17:28	(759)	17:10	17:04									
15	21:08	20:34	(757)	20:50	47	20:04	(778)	20:06				07:34	17:28	(759)	17:07	17:04									
16	06:07	20:07	(757)	06:25	52	20:19	(778)	15:52				07:36	17:28	(759)	17:12	17:04									
17	06:07	20:07	(757)	06:25	52	20:19	(778)	15:52				07:36	17:28	(759)	17:12	17:04									
18	21:08	20:34	(757)	20:50	47	20:04	(778)	20:06				07:34	17:28	(759)	17:07	17:04									
19	06:08	20:07	(757)	06:26	52	20:20	(778)	15:51				07:37	17:28	(759)	17:13	17:04									
20	06:08	20:07	(757)	06:26	52	20:20	(778)	15:51				07:37	17:28	(759											

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 64 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7743)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.66 0.61 0.59 0.48 0.30 0.22

		Operational time																Sum							
		N		NE		E		SE		S		SW		WSW		W			WNW		NNW		NW		
		300	301	357	451	471	475	485	495	505	515	525	535	545	555	565	575	585	595	605	615	625	635	645	655
(January	(February	(March	(April	(May	(June																				
1:05:07	08:20 (777) 0743	08:04 (724) 0707	07:16	07:40 (743) 0630	06:01																				
1:12:13	08:20 (777) 1748	20 08:24 (724) 1822	06:46	08:06 (743) 1822	20:07																				
1:18:57	08:20 (777) 0743	08:03 (724) 0706	07:15	07:40 (743) 0629	06:01																				
1:25:19	08:20 (777) 1748	22 08:25 (724) 1823	06:47	08:06 (743) 1822	20:07																				
3:05:07	08:20 (777) 0742	08:02 (724) 0704	07:13	07:40 (743) 0628	06:01																				
3:12:15	08:20 (777) 1748	24 08:26 (724) 1824	06:48	08:06 (743) 1824	20:08																				
4:05:08	08:20 (777) 0740	08:01 (724) 0703	07:11	07:39 (743) 0626	06:00																				
17:16	08:20 (777) 1751	26 08:27 (724) 1825	19:59	06:48 (743) 1820	20:59																				
17:28	08:20 (777) 1751	26 08:27 (724) 1825	19:59	06:48 (743) 1820	20:59																				
17:30	08:20 (777) 1753	28 08:28 (724) 1826	20:00	06:48 (743) 1821	21:00																				
17:32	08:20 (777) 1753	28 08:28 (724) 1826	20:00	06:48 (743) 1821	21:00																				
17:38	08:20 (777) 0742	07:58 (724) 0639	20:00	06:48 (743) 0624	06:00																				
17:38	08:20 (777) 1754	29 08:28 (724) 1828	20:00	06:48 (743) 1822	21:01																				
17:40	08:20 (777) 0742	07:57 (724) 0638	20:00	06:48 (743) 0624	06:00																				
17:41	08:20 (777) 1755	31 08:28 (724) 1829	20:01	06:48 (743) 1823	21:01																				
17:42	08:20 (777) 1755	31 08:28 (724) 1829	20:01	06:48 (743) 1823	21:01																				
17:43	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:44	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:45	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:46	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:47	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:48	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:49	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:50	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:51	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:52	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:53	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:54	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:55	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:56	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:57	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:58	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
17:59	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
18:00	08:20 (777) 1756	32 08:29 (724) 1830	20:02	06:48 (743) 1824	21:02																				
18:01	08:20 (777) 1756																								

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
1	06:00 18:00	120	06:00 18:00	
2	06:00 18:00	120	06:00 18:00	
3	06:00 18:00	120	06:00 18:00	
4	06:00 18:00	120	06:00 18:00	
5	06:00 18:00	120	06:00 18:00	
6	06:00 18:00	120	06:00 18:00	
7	06:00 18:00	120	06:00 18:00	
8	06:00 18:00	120	06:00 18:00	
9	06:00 18:00	120	06:00 18:00	
10	06:00 18:00	120	06:00 18:00	
11	06:00 18:00	120	06:00 18:00	
12	06:00 18:00	120	06:00 18:00	
13	06:00 18:00	120	06:00 18:00	
14	06:00 18:00	120	06:00 18:00	
15	06:00 18:00	120	06:00 18:00	
16	06:00 18:00	120	06:00 18:00	
17	06:00 18:00	120	06:00 18:00	
18	06:00 18:00	120	06:00 18:00	
19	06:00 18:00	120	06:00 18:00	
20	06:00 18:00	120	06:00 18:00	
21	06:00 18:00	120	06:00 18:00	
22	06:00 18:00	120	06:00 18:00	
23	06:00 18:00	120	06:00 18:00	
24	06:00 18:00	120	06:00 18:00	
25	06:00 18:00	120	06:00 18:00	
26	06:00 18:00	120	06:00 18:00	
27	06:00 18:00	120	06:00 18:00	
28	06:00 18:00	120	06:00 18:00	
29	06:00 18:00	120	06:00 18:00	
30	06:00 18:00	120	06:00 18:00	
31	06:00 18:00	120	06:00 18:00	

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 64 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7743)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

		Operational time																Sum																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
		N				NNE				ENE				E					ESE				SE				SSE				SSW				SW				WSW				W				WNW				NNW																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
		300				301				357				071				325				294				265				370				495				1108				1,067				738				557				368				284				8,760																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
		July				August				September				October				November				December																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 87 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7760)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

[illegible]

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1	06:00	18:00	120	06:00		18:00	
2	06:01	18:01	120	06:01		18:01	
3	06:02	18:02	120	06:02		18:02	
4	06:03	18:03	120	06:03		18:03	
5	06:04	18:04	120	06:04		18:04	
6	06:05	18:05	120	06:05		18:05	
7	06:06	18:06	120	06:06		18:06	
8	06:07	18:07	120	06:07		18:07	
9	06:08	18:08	120	06:08		18:08	
10	06:09	18:09	120	06:09		18:09	
11	06:10	18:10	120	06:10		18:10	
12	06:11	18:11	120	06:11		18:11	
13	06:12	18:12	120	06:12		18:12	
14	06:13	18:13	120	06:13		18:13	
15	06:14	18:14	120	06:14		18:14	
16	06:15	18:15	120	06:15		18:15	
17	06:16	18:16	120	06:16		18:16	
18	06:17	18:17	120	06:17		18:17	
19	06:18	18:18	120	06:18		18:18	
20	06:19	18:19	120	06:19		18:19	
21	06:20	18:20	120	06:20		18:20	
22	06:21	18:21	120	06:21		18:21	
23	06:22	18:22	120	06:22		18:22	
24	06:23	18:23	120	06:23		18:23	
25	06:24	18:24	120	06:24		18:24	
26	06:25	18:25	120	06:25		18:25	
27	06:26	18:26	120	06:26		18:26	
28	06:27	18:27	120	06:27		18:27	
29	06:28	18:28	120	06:28		18:28	
30	06:29	18:29	120	06:29		18:29	
31	06:30	18:30	120	06:30		18:30	

Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 87 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7760 Sunshine probability S/50 (Sun hours/Possible sun hours) [])

Assumptions for shadow calculations

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

[illegible]

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 91 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7764)

Assumptions for shadow calculations

Sunshine probability S/S ₀ (Sun hours/Possible sun hours) []											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

[illegible]

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
1	06:00 18:00	120	06:00 18:00	
2	06:00 18:00	120	06:00 18:00	
3	06:00 18:00	120	06:00 18:00	
4	06:00 18:00	120	06:00 18:00	
5	06:00 18:00	120	06:00 18:00	
6	06:00 18:00	120	06:00 18:00	
7	06:00 18:00	120	06:00 18:00	
8	06:00 18:00	120	06:00 18:00	
9	06:00 18:00	120	06:00 18:00	
10	06:00 18:00	120	06:00 18:00	
11	06:00 18:00	120	06:00 18:00	
12	06:00 18:00	120	06:00 18:00	
13	06:00 18:00	120	06:00 18:00	
14	06:00 18:00	120	06:00 18:00	
15	06:00 18:00	120	06:00 18:00	
16	06:00 18:00	120	06:00 18:00	
17	06:00 18:00	120	06:00 18:00	
18	06:00 18:00	120	06:00 18:00	
19	06:00 18:00	120	06:00 18:00	
20	06:00 18:00	120	06:00 18:00	
21	06:00 18:00	120	06:00 18:00	
22	06:00 18:00	120	06:00 18:00	
23	06:00 18:00	120	06:00 18:00	
24	06:00 18:00	120	06:00 18:00	
25	06:00 18:00	120	06:00 18:00	
26	06:00 18:00	120	06:00 18:00	
27	06:00 18:00	120	06:00 18:00	
28	06:00 18:00	120	06:00 18:00	
29	06:00 18:00	120	06:00 18:00	
30	06:00 18:00	120	06:00 18:00	
31	06:00 18:00	120	06:00 18:00	

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2019-09-04_Emerison GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04 Emerson GE Turbines **Shadow receptor:** 104 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7774)

Assumptions for shadow calculations

Sunshine probability S/50 (Sun hours/Possible sun hours) []											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time												
N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NN NNW Sum												
January	February	March	April	May	June	July	August	September	October	November	December	
11:57	15:54	17:33	07:47	08:54	10:33	06:32	06:53	01:13	06:53	01:13	06:53	01:13
12:13	16:46	17:03	17:47	19	16:47	17:03	18:22	19:06	20:27	32	07:27	23:13
12:27	15:35	17:03	07:43	08:50	10:33	07:06	07:14	06:28	06:56	01:13	06:51	01:13
12:43	16:46	17:03	17:47	19	16:46	17:03	18:22	19:07	20:28	30	07:27	23:13
12:58	15:35	17:03	07:41	08:50	10:33	07:04	07:13	06:28	06:56	01:13	06:50	01:13
13:15	16:47	17:03	17:47	19	16:44	17:03	18:24	19:08	20:29	30	07:27	23:13
13:28	15:36	17:03	07:40	08:52	10:36	07:02	07:11	06:28	06:57	01:13	06:50	01:13
13:45	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	27	04:13	20:39
14:07	15:36	17:03	07:39	08:50	10:36	07:01	07:09	06:25	06:56	01:13	06:50	01:13
14:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
15:07	15:37	17:03	07:38	08:50	10:36	07:01	07:08	06:25	06:56	01:13	06:50	01:13
15:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
16:07	15:37	17:03	07:37	08:50	10:36	07:01	07:06	06:25	06:56	01:13	06:50	01:13
16:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
17:07	15:37	17:03	07:36	08:50	10:36	07:01	07:05	06:25	06:56	01:13	06:50	01:13
17:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
18:07	15:37	17:03	07:35	08:50	10:36	07:01	07:03	06:25	06:56	01:13	06:50	01:13
18:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
19:07	15:37	17:03	07:34	08:50	10:36	07:01	07:02	06:25	06:56	01:13	06:50	01:13
19:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
20:07	15:38	17:03	07:34	08:52	10:36	07:01	07:03	06:25	06:56	01:13	06:50	01:13
20:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
21:07	15:38	17:03	07:32	08:52	10:36	07:01	07:00	06:25	06:56	01:13	06:50	01:13
21:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
22:07	15:38	17:03	07:31	08:50	10:36	07:01	06:58	06:25	06:56	01:13	06:50	01:13
22:22	16:48	17:03	17:53	19	16:42	17:03	18:25	19:09	20:30	26	04:13	20:39
23:07	16:51	17:03	18:01	20	16:48	17:03	19:04	20:07	2	07:13	21:23	20:39
23:22	15:39	17:03	07:29	08:50	10:36	07:01	06:56	06:25	06:56	01:13	06:50	01:13

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

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2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 91 - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7764)

Assumptions for shadow calculations

Sunshine probability S/S ₀ (Sun hours/Possible sun hours) []											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time													
		N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum				N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum							
		300 301 557 611 325 294 285 275 370 495 1,070 1,118 1,067 738 557 368 294 8,760											
				November						December			
[July]	[August]	[September]		[October]									
1	06:02	06:26	06:57	07:30	07:28	07:27	07:52	06:05	07:30	07:37			
2	01:09	20:50	07:01	07:28	07:27	19:15	19:17	06:04	07:30	07:34	06:54	07:30	07:34
3	06:22	06:27	06:58	07:28	07:28	07:29	07:57	06:03	06:06	07:30	07:38		
4	01:08	20:49	07:01	07:31	07:31	19:17	19:17	06:03	06:07	07:30	07:33	06:55	07:33
5	06:03	06:28	06:59	07:28	07:28	07:30	07:54	06:04	06:05	07:30	07:39		
6	01:08	20:48	07:00	07:32	07:32	19:15	19:15	06:03	06:06	07:30	07:33	06:54	07:33
7	06:04	06:29	07:00	07:27	07:27	07:31	07:56	06:05	06:05	07:30	07:40		
8	01:08	20:47	07:02	07:34	07:34	19:17	19:17	06:04	06:04	07:30	07:33	06:54	07:33
9	06:30	06:30	07:01	07:27	07:27	07:32	07:57	06:05	06:05	07:30	07:41		
10	01:08	20:46	07:01	07:31	07:31	19:08	19:08	06:03	06:03	07:30	07:33	06:53	07:33
11	06:05	06:31	07:02	07:28	07:28	07:33	07:53	06:04	06:06	07:30	07:42		
12	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
13	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
14	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
15	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
16	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
17	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
18	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
19	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
20	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
21	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
22	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
23	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
24	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
25	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
26	01:08	20:45	07:03	07:34	07:34	19:06	19:06	06:04	06:04	07:30	07:33	06:54	07:33
27	06:05	06:31	07:02	07:28	07:28	07:34	07:53	06:04	06:06	07:30	07:42		
28	01:08												

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

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2019-09-04 Emerson GE Scenario

SHADOW - Calen

Calculation: 2019-09-04 Emerson GE Turbines **Shadow receptor:** 104 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7774)

Assumptions for shadow calculations

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time																											
		N		NE		ENE		E		ESE		SSE		SSW		WSW		WNW		NNW		NW		NNW		Sum	
		300		350		400		450		500		550		600		650		700		750		800		850		900	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	
		1		2		3		4		5		6		7		8		9		10		11		12		13	

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
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24			
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26			
27			
28			
29			
30			
31			

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Calculation: 2019-09-04_E

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 197 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7850)

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

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01/01/2010 11:33 PM 23.7337

Calculation: 2019-09-04_E
Assumptions for shadow

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 228 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7878)
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) 1

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Calculation: 2019-09-04_1

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 228 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7878)

Assumptions for shadow calculation

Table layout: For each day in each month the following matrix applies

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Calculated:
0.5/2010.11.22.04/2.3.333

Calculation: 2019-09-04_1
Assumptions for shaded

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 232 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (7882
Assumptions for shadow calculations: Sunshine probability S/50 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculation

Table layout: For each day in each month the following matrix applies

Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 399 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8021)

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

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Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 404 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8026)
Assumptions for shadow calculations
Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Assumptions for shadow calculations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table 1. Inputs. For each day in each month the following matrix applies:

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Calculation: 2019-09-04 Emerson GE Turbines **Shadow receptor:** 404 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8026)

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

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Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 422 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8041
Assumptions for shadow calculations
Sunshine probability S/S0 (Sun hours/Possible sun hours) []

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22	

Table layout: For each day in each month the following matrix must

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2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 427 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8046)
Sunshine probability: 6/50 (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Operational time																																	
		N		NE		ENE		E		ESE		SSE		SSW		SW		WSW		W		WNW		NNW		NW		Sum					
		300		351		357		451		325		294		265		370		495		1,078		1,118		1,067		735		364		294		1,760	
		July		August		September		October		November		December																					
1	06:02		06:24	07:18	06:26		06:58	07:10		06:57		18:34	07:11	07:28				07:02			18	07:13	07:37				08:01	07:38					
2	06:02	07:18	07:19	07:43	06:27		06:59	07:07		06:57		18:38	07:11	07:28				07:02			18	07:13	07:37				08:01	07:38					
3	06:02	06:25	06:27	06:28	06:28		06:58	07:10		06:58		18:31	07:11	07:29				07:03			07	07:16	07:13				08:02	07:38					
4	06:02	07:18	07:19	07:43	06:27		06:59	07:07		06:57		18:38	07:11	07:28				07:02			22	06:58	07:12				08:01	07:37					
5	06:03	06:25	06:28	06:28	06:28		06:58	07:10		06:57		18:31	07:11	07:30				07:05			07	07:14	07:13				08:03	07:38					
6	06:03	07:18	07:19	07:43	06:27		06:59	07:07		06:57		18:38	07:11	07:28				07:05			25	06:59	07:13				08:04	07:37					
7	06:03	06:26	06:28	06:29	06:28		06:58	07:10		07:00		18:31	07:11	07:31				07:06			07	07:13	07:10				08:04	07:38					
8	06:04	07:19	07:20	07:44	06:29		07:00	07:10		07:02		18:26	07:11	07:30				07:07			27	08:10	07:13	17:01			51	08:05	07:38				
9	06:04	06:27	06:28	06:29	06:28		06:58	07:10		07:01		18:27	07:11	07:32				07:08			29	08:12	07:13	17:01			50	08:06	07:38				
10	06:04	07:19	07:20	07:44	06:29		07:00	07:10		07:02		18:26	07:11	07:30				07:07			07	07:13	07:10				08:04	07:38					
11	06:04	06:27	06:28	06:29	06:28		06:58	07:10		07:01		18:27	07:11	07:32				07:08			07	07:13	07:10				08:04	07:38					
12	06:04	07:19	07:20	07:44	06:29		07:00	07:10		07:02		18:26	07:11	07:30				07:07			29	08:12	07:13	17:01			50	08:06	07:38				
13	06:04	06:27	06:28	06:29	06:28		06:58	07:10		07:01		18:27	07:11	07:32				07:08			07	07:13	07:10				08:04	07:38					
14	06:04	07:19	07:20	07:44	06:29		07:00	07:10		07:02		18:26	07:11	07:30				07:07			29	08:12	07:13	17:01			50	08:06	07:38				
15	06:04	06:27	06:28	06:29	06:28		06:58	07:10		07:01		18:27	07:11	07:32				07:08	</														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

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EDR
217 Montgomery Ct., Suite 100

azimuth: 0.0° Slope: 0.0° (8046)
sun hour) [1]

	Sep	Oct	Nov	Dec
1	0.59	0.48	0.30	0.22

[illegible]

/2019 9:02 AM / 45

2019-09-04_Emerson GE Scenario

SHADOW - Calenda

Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 477 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8085
Sunshine probability S/(S0) (Sun hours/Possible sun hours) [%]

Assumptions for shadow calculations

		Operational time												Sum															
		N NNE		NE ENE		E ESE		SE SSE		SSW		WSW			W WNW		NNW												
		300		351		557		671		325		294		265		370		1410		1,067		7357		368		204		8,76	
January	February	March	April	May	June																								
1	0757	1552 (770)	0742	0813 (770)	0707	1210 (742)	0716	1913 (743)	0630									0601											
2	1213	1624 (770)	1747	35	1223 (742)	0722	23	1232 (743)	0627	1834 (743)	0630							0607							20				
2	0757	0820 (770)	0742	0813 (770)	0706	1212 (742)	0714	1913 (743)	0630									0601							20				
3	0757	0820 (770)	0742	0813 (770)	0706	18	1226 (742)	0715	25	1935 (743)	0630							0607							20				
3	0757	0820 (770)	0741	0815 (770)	0704	1216 (742)	0713	1913 (743)	0628									0601							20				
4	0757	0820 (770)	0741	0815 (770)	0704	6	1224 (742)	0714	1913 (743)	0628								0607							20				
4	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
5	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
5	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
6	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
6	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
7	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
7	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
8	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
8	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
9	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
9	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
10	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
10	0757	0820 (770)	0740	0816 (770)	0702		1711	1913 (743)	0626									0600							20				
11	0757	0820 (770)	0740	0816 (770)	0702		1711																						

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

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Project: **2019-09-04 Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 477 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8085)

Assumptions for shadow calculations

[illegible]

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Licensed user:
EDR

3/3/2019 11:52 AM 3.1.139

azimuth: 0.0° Slope: 0.0° (8085)

	Sep	Oct	Nov	Dec
1	0.59	0.48	0.30	0.22

[illegible]

[2019-9-02 AM / 5]

2019-09-04 Emerson GE Scenario

SHADOW - Calenda

Calculation: 2019-09-04 Emerson GE Turbines **Shadow receptor:** 500 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8106)

Assumptions for shadow calculations

		Operational time																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		N				N NE				NE				E				ESE				SE				SSE				SSW				SW				WSW				W				WNW				NW				NNW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW				SSW							

Table layout: For each day in each month the following matrix appl

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:01	18:01	120	06:01	18:01		
3	06:02	18:02	120	06:02	18:02		
4	06:03	18:03	120	06:03	18:03		
5	06:04	18:04	120	06:04	18:04		
6	06:05	18:05	120	06:05	18:05		
7	06:06	18:06	120	06:06	18:06		
8	06:07	18:07	120	06:07	18:07		
9	06:08	18:08	120	06:08	18:08		
10	06:09	18:09	120	06:09	18:09		
11	06:10	18:10	120	06:10	18:10		
12	06:11	18:11	120	06:11	18:11		
13	06:12	18:12	120	06:12	18:12		
14	06:13	18:13	120	06:13	18:13		
15	06:14	18:14	120	06:14	18:14		
16	06:15	18:15	120	06:15	18:15		
17	06:16	18:16	120	06:16	18:16		
18	06:17	18:17	120	06:17	18:17		
19	06:18	18:18	120	06:18	18:18		
20	06:19	18:19	120	06:19	18:19		
21	06:20	18:20	120	06:20	18:20		
22	06:21	18:21	120	06:21	18:21		
23	06:22	18:22	120	06:22	18:22		
24	06:23	18:23	120	06:23	18:23		
25	06:24	18:24	120	06:24	18:24		
26	06:25	18:25	120	06:25	18:25		
27	06:26	18:26	120	06:26	18:26		
28	06:27	18:27	120	06:27	18:27		
29	06:28	18:28	120	06:28	18:28		
30	06:29	18:29	120	06:29	18:29		
31	06:30	18:30	120	06:30	18:30		

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 510 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8114)
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix applies

Jun 96 (min:min) Minutes with ticks Last time (min:min) with ticks (WFO causing ticks last time)

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 518 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8120
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Table layout: For each day in each month the following matrix applies

[illegible]

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 569 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8166)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix applies

Sun set (hh:mm) Minutes with flicker Last time (hh:mm) with flicker (WFG causing flicker last time)

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windPRO 

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 570 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8167)
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix appl

Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)
18:00	10	18:00	WTG 1
18:05	10	18:05	WTG 1
18:10	10	18:10	WTG 1
18:15	10	18:15	WTG 1
18:20	10	18:20	WTG 1
18:25	10	18:25	WTG 1
18:30	10	18:30	WTG 1
18:35	10	18:35	WTG 1
18:40	10	18:40	WTG 1
18:45	10	18:45	WTG 1
18:50	10	18:50	WTG 1
18:55	10	18:55	WTG 1
19:00	10	18:55	WTG 1
19:05	10	18:55	WTG 1
19:10	10	18:55	WTG 1
19:15	10	18:55	WTG 1
19:20	10	18:55	WTG 1
19:25	10	18:55	WTG 1
19:30	10	18:55	WTG 1
19:35	10	18:55	WTG 1
19:40	10	18:55	WTG 1
19:45	10	18:55	WTG 1
19:50	10	18:55	WTG 1
19:55	10	18:55	WTG 1
20:00	10	18:55	WTG 1
20:05	10	18:55	WTG 1
20:10	10	18:55	WTG 1
20:15	10	18:55	WTG 1
20:20	10	18:55	WTG 1
20:25	10	18:55	WTG 1
20:30	10	18:55	WTG 1
20:35	10	18:55	WTG 1
20:40	10	18:55	WTG 1
20:45	10	18:55	WTG 1
20:50	10	18:55	WTG 1
20:55	10	18:55	WTG 1
21:00	10	18:55	WTG 1
21:05	10	18:55	WTG 1
21:10	10	18:55	WTG 1
21:15	10	18:55	WTG 1
21:20	10	18:55	WTG 1
21:25	10	18:55	WTG 1
21:30	10	18:55	WTG 1
21:35	10	18:55	WTG 1
21:40	10	18:55	WTG 1
21:45	10	18:55	WTG 1
21:50	10	18:55	WTG 1
21:55	10	18:55	WTG 1
22:00	10	18:55	WTG 1
22:05	10	18:55	WTG 1
22:10	10	18:55	WTG 1
22:15	10	18:55	WTG 1
22:20	10	18:55	WTG 1
22:25	10	18:55	WTG 1
22:30	10	18:55	WTG 1
22:35	10	18:55	WTG 1
22:40	10	18:55	WTG 1
22:45	10	18:55	WTG 1
22:50	10	18:55	WTG 1
22:55	10	18:55	WTG 1
23:00	10	18:55	WTG 1
23:05	10	18:55	WTG 1
23:10	10	18:55	WTG 1
23:15	10	18:55	WTG 1
23:20	10	18:55	WTG 1
23:25	10	18:55	WTG 1
23:30	10	18:55	WTG 1
23:35	10	18:55	WTG 1
23:40	10	18:55	WTG 1
23:45	10	18:55	WTG 1
23:50	10	18:55	WTG 1
23:55	10	18:55	WTG 1
00:00	10	18:55	WTG 1
00:05	10	18:55	WTG 1
00:10	10	18:55	WTG 1
00:15	10	18:55	WTG 1
00:20	10	18:55	WTG 1
00:25	10	18:55	WTG 1
00:30	10	18:55	WTG 1
00:35	10	18:55	WTG 1
00:40	10	18:55	WTG 1
00:45	10	18:55	WTG 1
00:50	10	18:55	WTG 1
00:55	10	18:55	WTG 1
01:00	10	18:55	WTG 1
01:05	10	18:55	WTG 1

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 596 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8191)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix apply

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 611 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8204
Sunshine probability S/S0 (Sun hours/Possible sun hours) []
Assumptions for shadow calculations

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix applies

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 641 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8228)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

windPRO 3.3 777 by EMD International A/S. Tel. +45 66 35 44 44. www.emd.dk windpro@emd.dk 06/2010 9:02 AM / 67

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 641 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8228
Sunshine probability S/S0 (Sun hours/Possible sun hours) []
Assumptions for shadow calculations

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix applies

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2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 693 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8267)
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:01	18:01	120	06:01	18:01		
3	06:02	18:02	120	06:02	18:02		
4	06:03	18:03	120	06:03	18:03		
5	06:04	18:04	120	06:04	18:04		
6	06:05	18:05	120	06:05	18:05		
7	06:06	18:06	120	06:06	18:06		
8	06:07	18:07	120	06:07	18:07		
9	06:08	18:08	120	06:08	18:08		
10	06:09	18:09	120	06:09	18:09		
11	06:10	18:10	120	06:10	18:10		
12	06:11	18:11	120	06:11	18:11		
13	06:12	18:12	120	06:12	18:12		
14	06:13	18:13	120	06:13	18:13		
15	06:14	18:14	120	06:14	18:14		
16	06:15	18:15	120	06:15	18:15		
17	06:16	18:16	120	06:16	18:16		
18	06:17	18:17	120	06:17	18:17		
19	06:18	18:18	120	06:18	18:18		
20	06:19	18:19	120	06:19	18:19		
21	06:20	18:20	120	06:20	18:20		
22	06:21	18:21	120	06:21	18:21		
23	06:22	18:22	120	06:22	18:22		
24	06:23	18:23	120	06:23	18:23		
25	06:24	18:24	120	06:24	18:24		
26	06:25	18:25	120	06:25	18:25		
27	06:26	18:26	120	06:26	18:26		
28	06:27	18:27	120	06:27	18:27		
29	06:28	18:28	120	06:28	18:28		
30	06:29	18:29	120	06:29	18:29		
31	06:30	18:30	120	06:30	18:30		

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2019-09-04_Emerson GE Scenario

SHADOW - Calenda

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 693 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8267
Sunshine probability S/SH (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:01	18:01	120	06:01	18:01		
3	06:02	18:02	120	06:02	18:02		
4	06:03	18:03	120	06:03	18:03		
5	06:04	18:04	120	06:04	18:04		
6	06:05	18:05	120	06:05	18:05		
7	06:06	18:06	120	06:06	18:06		
8	06:07	18:07	120	06:07	18:07		
9	06:08	18:08	120	06:08	18:08		
10	06:09	18:09	120	06:09	18:09		
11	06:10	18:10	120	06:10	18:10		
12	06:11	18:11	120	06:11	18:11		
13	06:12	18:12	120	06:12	18:12		
14	06:13	18:13	120	06:13	18:13		
15	06:14	18:14	120	06:14	18:14		
16	06:15	18:15	120	06:15	18:15		
17	06:16	18:16	120	06:16	18:16		
18	06:17	18:17	120	06:17	18:17		
19	06:18	18:18	120	06:18	18:18		
20	06:19	18:19	120	06:19	18:19		
21	06:20	18:20	120	06:20	18:20		
22	06:21	18:21	120	06:21	18:21		
23	06:22	18:22	120	06:22	18:22		
24	06:23	18:23	120	06:23	18:23		
25	06:24	18:24	120	06:24	18:24		
26	06:25	18:25	120	06:25	18:25		
27	06:26	18:26	120	06:26	18:26		
28	06:27	18:27	120	06:27	18:27		
29	06:28	18:28	120	06:28	18:28		
30	06:29	18:29	120	06:29	18:29		
31	06:30	18:30	120	06:30	18:30		

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Project: **2019-09-04_Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 718 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8286)

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

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windPRO

2019-09-04_Emerison GE Scenario

SHADOW - Calenda

Calculation: 2019-09-04, Emerson GE Turbines **Shadow receptor:** 718 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8286
Sunshine probability S/P50 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:01	18:01	120	06:01	18:01		
3	06:02	18:02	120	06:02	18:02		
4	06:03	18:03	120	06:03	18:03		
5	06:04	18:04	120	06:04	18:04		
6	06:05	18:05	120	06:05	18:05		
7	06:06	18:06	120	06:06	18:06		
8	06:07	18:07	120	06:07	18:07		
9	06:08	18:08	120	06:08	18:08		
10	06:09	18:09	120	06:09	18:09		
11	06:10	18:10	120	06:10	18:10		
12	06:11	18:11	120	06:11	18:11		
13	06:12	18:12	120	06:12	18:12		
14	06:13	18:13	120	06:13	18:13		
15	06:14	18:14	120	06:14	18:14		
16	06:15	18:15	120	06:15	18:15		
17	06:16	18:16	120	06:16	18:16		
18	06:17	18:17	120	06:17	18:17		
19	06:18	18:18	120	06:18	18:18		
20	06:19	18:19	120	06:19	18:19		
21	06:20	18:20	120	06:20	18:20		
22	06:21	18:21	120	06:21	18:21		
23	06:22	18:22	120	06:22	18:22		
24	06:23	18:23	120	06:23	18:23		
25	06:24	18:24	120	06:24	18:24		
26	06:25	18:25	120	06:25	18:25		
27	06:26	18:26	120	06:26	18:26		
28	06:27	18:27	120	06:27	18:27		
29	06:28	18:28	120	06:28	18:28		
30	06:29	18:29	120	06:29	18:29		
31	06:30	18:30	120	06:30	18:30		

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 728 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8295)
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix apply

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 728 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8295
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Table layout: For each day in each month the following matrix applies

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 740 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8305)
Assumptions for shadow calculations
 Sunshine probability S/S0 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix apply

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 752 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8315)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix applies

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2019-09-04_Emerson GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 779 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8336)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix apply

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 785 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8342)
Assumptions for shadow calculations
 Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

windPRO 3.2.737 by EMD International A/S, Tel. +45 96 35 44

2019-09-04_Emerson GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 785 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8342)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 827 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8377)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

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2019-09-04_Elliott GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 827 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8377)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time

[illegible]

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:01	18:01	120	06:01	18:01		
3	06:02	18:02	120	06:02	18:02		
4	06:03	18:03	120	06:03	18:03		
5	06:04	18:04	120	06:04	18:04		
6	06:05	18:05	120	06:05	18:05		
7	06:06	18:06	120	06:06	18:06		
8	06:07	18:07	120	06:07	18:07		
9	06:08	18:08	120	06:08	18:08		
10	06:09	18:09	120	06:09	18:09		
11	06:10	18:10	120	06:10	18:10		
12	06:11	18:11	120	06:11	18:11		
13	06:12	18:12	120	06:12	18:12		
14	06:13	18:13	120	06:13	18:13		
15	06:14	18:14	120	06:14	18:14		
16	06:15	18:15	120	06:15	18:15		
17	06:16	18:16	120	06:16	18:16		
18	06:17	18:17	120	06:17	18:17		
19	06:18	18:18	120	06:18	18:18		
20	06:19	18:19	120	06:19	18:19		
21	06:20	18:20	120	06:20	18:20		
22	06:21	18:21	120	06:21	18:21		
23	06:22	18:22	120	06:22	18:22		
24	06:23	18:23	120	06:23	18:23		
25	06:24	18:24	120	06:24	18:24		
26	06:25	18:25	120	06:25	18:25		
27	06:26	18:26	120	06:26	18:26		
28	06:27	18:27	120	06:27	18:27		
29	06:28	18:28	120	06:28	18:28		
30	06:29	18:29	120	06:29	18:29		
31	06:30	18:30	120	06:30	18:30		

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217 Montgomery St., Suite 1000
US-SYRACUSE, NY 13202

azimuth: 0.0° Slope: 0.0° (8377)
 (sun hours) ☐

Sep	Oct	Nov	Dec
0.59	0.48	0.30	0.22

		December			
07-24 (JUN)	07-24 (JUN)	44	36(2)	75	68
09-05 (JUN)	09-05 (JUN)	14	10(2)	20	16
09-05 (JUN)	09-05 (JUN)	13	9(2)	19	15
07-26 (JUN)	07-26 (JUN)	20	15(2)	28	22
09-06 (JUN)	09-06 (JUN)	10	7(2)	14	11
07-27 (JUN)	07-27 (JUN)	10	7(2)	14	11
09-07 (JUN)	09-07 (JUN)	11	8(2)	15	12
07-29 (JUN)	07-29 (JUN)	16	12(2)	21	17
09-08 (JUN)	09-08 (JUN)	9	6(2)	13	10
07-30 (JUN)	07-30 (JUN)	10	8(2)	15	12
09-09 (JUN)	09-09 (JUN)	10	7(2)	14	11
07-31 (JUN)	07-31 (JUN)	10	7(2)	14	11
09-10 (JUN)	09-10 (JUN)	10	7(2)	14	11
07-31 (JUN)	07-31 (JUN)	17	12(2)	21	17
09-11 (JUN)	09-11 (JUN)	16	12(2)	21	17
07-01 (JUL)	07-01 (JUL)	17	13(2)	22	18
09-12 (JUL)	09-12 (JUL)	16	12(2)	21	17
07-02 (JUL)	07-02 (JUL)	15	11(2)	20	16
09-13 (JUL)	09-13 (JUL)	16	12(2)	21	17
07-03 (JUL)	07-03 (JUL)	16	12(2)	21	17
09-14 (JUL)	09-14 (JUL)	15	11(2)	20	16
07-04 (JUL)	07-04 (JUL)	15	11(2)	20	16
09-15 (JUL)	09-15 (JUL)	14	10(2)	19	15
07-05 (JUL)	07-05 (JUL)	14	10(2)	19	15
09-16 (JUL)	09-16 (JUL)	13	9(2)	18	14
07-06 (JUL)	07-06 (JUL)	13	9(2)	18	14
09-17 (JUL)	09-17 (JUL)	13	9(2)	18	14
07-07 (JUL)	07-07 (JUL)	13	9(2)	18	14
09-18 (JUL)	09-18 (JUL)	12	8(2)	17	13
07-08 (JUL)	07-08 (JUL)	12	8(2)	17	13
09-19 (JUL)	09-19 (JUL)	11	7(2)	16	12
07-09 (JUL)	07-09 (JUL)	11	7(2)	16	12
09-20 (JUL)	09-20 (JUL)	10	6(2)	15	11
07-10 (JUL)	07-10 (JUL)	10	6(2)	15	11
09-21 (JUL)	09-21 (JUL)	9	5(2)	14	10
07-11 (JUL)	07-11 (JUL)	9	5(2)	14	10
09-22 (JUL)	09-22 (JUL)	8	4(2)	13	9
07-12 (JUL)	07-12 (JUL)	8	4(2)	13	9
09-23 (JUL)	09-23 (JUL)	7	3(2)	12	8
07-13 (JUL)	07-13 (JUL)	7	3(2)	12	8
09-24 (JUL)	09-24 (JUL)	6	2(2)	11	7
07-14 (JUL)	07-14 (JUL)	6	2(2)	11	7
09-25 (JUL)	09-25 (JUL)	5	1(2)	10	6
07-15 (JUL)	07-15 (JUL)	5	1(2)	10	6
09-26 (JUL)	09-26 (JUL)	4	0(2)	9	5
07-16 (JUL)	07-16 (JUL)	4	0(2)	9	5
09-27 (JUL)	09-27 (JUL)	3	0(2)	8	4
07-17 (JUL)	07-17 (JUL)	3	0(2)	8	4
09-28 (JUL)	09-28 (JUL)	2	0(2)	7	3
07-18 (JUL)	07-18 (JUL)	2	0(2)	7	3
09-29 (JUL)	09-29 (JUL)	1	0(2)	6	2
07-19 (JUL)	07-19 (JUL)	1	0(2)	6	2
09-30 (JUL)	09-30 (JUL)	0	0(2)	5	1
07-20 (JUL)	07-20 (JUL)	0	0(2)	5	1
09-31 (JUL)	09-31 (JUL)	0	0(2)	4	0
07-21 (JUL)	07-21 (JUL)	0	0(2)	4	0
09-32 (JUL)					

019 9:02 AM / 89 windPRO

2019-07-04_Emerison GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 834 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8383)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time

		N NNE NE ESE SSE S SW WSW W WNW NNW NW NNW											
		10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100											
		101112131415161718192021222324252627282930313233343536373839404142434445464748495051525354555657585960											
[January	February	[March	[April	[May	[June	[July	[August	[September	[October	[November	[December		
1 0757	0743	0804 (24)	0707	0716	0735 (777)	0626		0602	0644	0623 (24)			
1 1713	1748	0823 (24)	1822	1956	34 0809 (777)	2027		2057	44 0707 (24)				
1 1742	1742	0823 (24)	1822	1956	34 0809 (777)	2027		2057	44 0707 (24)				
1 1714	1749	25 0820 (24)	1823	1957	36 0809 (777)	2028		2058	44 0707 (24)				
3 0357	0741	0824 (24)	1823	1957	36 0809 (777)	2028		2058	44 0707 (24)				
1 1715	1752	27 0820 (24)	1824	1958	38 0810 (777)	2029		2059	44 0707 (24)				
4 0757	0740	0824 (24)	1823	1957	36 0809 (777)	2028		2058	44 0707 (24)				
1 1751	1751	28 0820 (24)	1825	1959	39 0809 (777)	2029		2059	44 0707 (24)				
5 0757	0739	0830 (24)	1701	2020	40 0809 (777)	2101		2101	45 0707 (24)				
5 1217	1739	29 0820 (24)	1826	2000	42 0809 (777)	2102		2102	45 0707 (24)				
6 0357	0738	0758 (24)	0659	2008	43 0728 (777)	2024		2024	46 0600 (24)				
7 0757	0737	0757 (24)	0658	2007	42 0728 (777)	2023		2023	45 0600 (24)				
7 0757	0737	0757 (24)	0658	2007	42 0728 (777)	2023		2023	45 0600 (24)				
7 0757	0737	0757 (24)	0658	2007	42 0728 (777)	2023		2023	45 0600 (24)				
8 0757	0737	0757 (24)	0658	2007	42 0728 (777)	2023		2023	45 0600 (24)				
8 0757	0737	0757 (24)	0658	2007	42 0728 (777)	2023		2023	45 0600 (24)				
9 0757	0735	0756 (24)	0756	2005	40 0728 (777)	2022		2022	44 0600 (24)				
10 0757	0735	0756 (24)	0756	2005	40 0728 (777)	2022		2022	44 0600 (24)				
11 0757	0735	0756 (24)	0756	2005	40 0728 (777)	2022		2022	44 0600 (24)				
12 0757	0735	0756 (24)	0756	2005	40 0728 (777)	2022		2022	44 0600 (24)				
1 1721	1758	32 0824 (24)	1931	2004	47 0808 (777)	2235	11	2235	47 0708 (24)				
2 1722	1759	33 0824 (24)	1931	2004	47 0808 (777)	2235	11	2235	47 0708 (24)				
2 1722	1759	33 0824 (24)	1931	2004	47 0808 (777)	2235	11	2235	47 0708 (24)				
3 1722	1759	33 0824 (24)	1931	2004	47 0808 (777)	2235	11	2235	47 0708 (24)				
4 1723	1800	29 0827 (24)	1933	2006	48 0809 (777)	2238	17	2238	48 0708 (24)				
5 1726	1806	30 0827 (24)	1933	2006	48 0809 (777)	2238	17	2238	48 0708 (24)				
1 1724	1801	28 0827 (24)	1933	2006	48 0809 (777)	2238	17	2238	48 0708 (24)				
2 1724	1801	28 0827 (24)	1933	2006	48 0809 (777)	2238	17	2238	48 0708 (24)				
3 1724	1801	28 0827 (24)	1933	2006	48 0809 (777)	2238	17	2238	48 0708 (24)				
4 1724	1801	28 0827 (24)	1933	2006	48 0809 (777)	2238	17	2238	48 0708 (24)				
5 1725	1803	26 0826 (24)	1935	2008									

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

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2025-09-01 Emerson CE Session

Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 834 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8383)
Assumptions for shadow calculations
 Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Operational time

[illegible]

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker (WTG causing flicker first time)	Last time (hh:mm) with flicker (WTG causing flicker last time)
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

wind@50 1 2 737 by EMD International d/S Tel: +45 96 35 44 44 www.emd.dk wind@emnd.dk

217 Montgomery St., Suite 100
US-SYRACUSE, NY 13202

azimuth: 0.0° Slope: 0.0° (8383)
e sun hours) []

	Aug	Sep	Oct	Nov	Dec
1	0.59	0.48	0.30	0.22	

	Time	
0.0000	06:23:03	
0.0005	44	07:07:03
0.0010	44	07:07:03
0.0015	44	07:07:03
0.0020	44	07:07:03
0.0025	44	07:07:03
0.0030	44	07:07:03
0.0035	44	07:07:03
0.0040	44	07:07:03
0.0045	44	07:07:03
0.0050	44	07:07:03
0.0055	44	07:07:03
0.0060	44	07:07:03
0.0065	44	07:07:03
0.0070	44	07:07:03
0.0075	44	07:07:03
0.0080	44	07:07:03
0.0085	44	07:07:03
0.0090	44	07:07:03
0.0095	44	07:07:03
0.0100	44	07:07:03
0.0105	44	07:07:03
0.0110	44	07:07:03
0.0115	44	07:07:03
0.0120	44	07:07:03
0.0125	44	07:07:03
0.0130	44	07:07:03
0.0135	44	07:07:03
0.0140	44	07:07:03
0.0145	44	07:07:03
0.0150	44	07:07:03
0.0155	44	07:07:03
0.0160	44	07:07:03
0.0165	44	07:07:03
0.0170	44	07:07:03
0.0175	44	07:07:03
0.0180	44	07:07:03
0.0185	44	07:07:03
0.0190	44	07:07:03
0.0195	44	07:07:03
0.0200	44	07:07:03
0.0205	44	07:07:03
0.0210	44	07:07:03
0.0215	44	07:07:03
0.0220	44	07:07:03
0.0225	44	07:07:03
0.0230	44	07:07:03
0.0235	44	07:07:03
0.0240	44	07:07:03
0.0245	44	07:07:03
0.0250	44	07:07:03
0.0255	44	07:07:03
0.0260	44	07:07:03
0.0265	44	07:07:03
0.0270	44	07:07:03
0.0275	44	07:07:03
0.0280	44	07:07:03
0.0285	44	07:07:03
0.0290	44	07:07:03
0.0295	44	07:07:03
0.0300	44	07:07:03
0.0305	44	07:07:03
0.0310	44	07:07:03
0.0315	44	07:07:03
0.0320	44	07:07:03
0.0325	44	07:07:03
0.0330	44	07:07:03
0.0335	44	07:07:03
0.0340	44	07:07:03
0.0345	44	07:07:03
0.0350	44	07:07:03
0.0355	44	07:07:03
0.0360	44	07:07:03
0.0365	44	07:07:03
0.0370	44	07:07:03
0.0375	44	07:07:03
0.0380	44	07:07:03
0.0385	44	07:07:03
0.0390	44	07:07:03
0.0395	44	07:07:03
0.0400	44	07:07:03
0.0405	44	07:07:03
0.0410	44	07:07:03
0.0415	44	07:07:03
0.0420	44	07:07:03
0.0425	44	07:07:03
0.0430	44	07:07:03
0.0435	44	07:07:03
0.0440	44	07:07:03
0.0445	44	07:07:03
0.0450	44	07:07:03
0.0455	44	07:07:03
0.0460	44	07:07:03
0.0465	44	07:07:03
0.0470	44	07:07:03
0.0475	44	07:07:03
0.0480	44	07:07:03
0.0485	44	07:07:03
0.0490	44	07:07:03
0.0495	44	07:07:03
0.0500	44	07:07:03
0.0505	44	07:07:03
0.0510	44	07:07:03
0.0515	44	07:07:03
0.0520	44	07:07:03
0.0525	44	07:07:03
0.0530	44	07:07:03
0.0535	44	07:07:03
0.0540	44	07:07:03
0.0545	44	07:07:03
0.0550	44	07:07:03
0.0555	44	07:07:03
0.0560	44	07:07:03</

4/2019 9:02 AM / 90 windPRO

2019-01-01 10:00:00

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 855 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8401)
Sunshine probability S/50 (Sun hours/Possible sun hours) []

Operational time

		N NNE NE E ESE SE SSE S SSW SW WSW W WNW NN NNW Sum													
		300 301 357 671 825 294 250 375 490 1,118 1,067 738 360 264 8,760													
[January / February		[March		[April		[May		[June							
21	07:57	43	07:57	171	07:16	38	18:17	06:30		19	19:17	06:01			
22	17:47	49	18:00	17:51	15:56	38	18:17	06:30	42	20:31	17:07	05:57			
23	07:57	43	07:56	17:09	17:14	38	18:12	06:29		19	18:17	06:01			
24	17:48	49	18:01	17:51	15:57	38	18:14	06:30	42	20:30	17:07	05:58			
25	07:58	44	07:57	17:07	17:13	37	18:15	06:29		19	18:17	06:01			
26	17:49	49	18:02	17:51	15:58	37	18:16	06:29	41	20:30	17:07	05:59			
27	07:58	40	07:52	17:07	17:11	38	18:18	06:28		19	18:17	06:00			
28	17:51	49	18:25	17:56	15:59	38	18:20	06:29	40	19:59	17:07	05:59			
29	07:58	39	07:51	17:08	17:09	37	18:20	06:29		19	18:17	06:01			
30	17:52	48	18:26	17:59	15:58	7	18:21	06:29	40	19:59	17:07	05:59			
1	07:58	38	06:59	17:05	17:09	37			44	19:20	17:07	05:58			
2	17:17	17:53	17:22	18:20	17:59	16:00			20:22	38	19:58	17:07	21:01		
3	17:09	06:37	17:24	17:59	17:56	16:02			20:22	37	19:20	17:07	21:01		
4	17:18	17:55	17:28	18:26	17:58	16:01			20:23	37	19:57	17:07	21:01		
5	17:07	07:36	17:29	18:01	17:57	16:02			20:23	37	19:20	17:07	21:01		
6	17:19	17:56	17:30	18:30	17:59	16:02			20:24	35	19:56	17:07	21:02		
7	17:20	17:57	18:01	18:01	17:59	16:02			20:24	35	19:56	17:07	21:02		
8	17:20	17:57	18:11	18:30	17:59	16:03			20:25	33	19:55	17:07	21:03		
9	17:20	17:57	18:11	18:30	17:59	16:03			20:25	33	19:56	17:07	21:03		
10	17:21	17:58	18:12	18:31	17:59	16:03			20:26	31	19:54	17:07	21:03		
11	17:21	17:58	18:12	18:31	17:59	16:03			20:26	31	19:54	17:07	21:03		
12	17:22	18:00	18:33	18:35	17:59	16:06			20:28	29	19:53	17:07	21:04		
13	17:22	18:00	18:33	18:35	17:59	16:06			20:28	29	19:53	17:07	21:04		
14	17:23	18:01	18:34	18:36	17:59	16:07			20:29	27	19:52	17:07	21:04		
15	07:56	30	07:48	18:00	17:59	16:56			19:16	17:17	06:15	19:27	17:07	05:58	
16	17:24	18:02	18:36	19:00	17:59	16:56			19:16	17:17	06:15	19:27	17:07	05:58	
17	07:56	29	07:46	18:00	17:59	16:56			19:17	17:17	06:16	19:28	17:07	05:58	
18	17:25	18:03	18:37	19:00	17:59	16:57	15		19:17	17:17	06:15	19:28	17:07	05:58	
19	07:55	27:27	07:44	18:00	17:59	16:53			19:20	17:17					

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1							
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31							

win@emf 3 3 777 by EMD International A/S. Tel. +45 96 35 44 44. www.emf.dk. win@emf@emf.dk

2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 855 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8401)
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

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2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 857 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8402)
Assumptions for shadow calculations: Sunshine probability S/50 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

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2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 857 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8402)
Assumptions for shadow calculations: Sunshine probability S/50 (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

windPRO 3.2.737 by EMD International A/S, Tel. +45 96 35 44 44, www.emd.dk, windpro@emd.dk

Project: **2019-09-04_Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 860 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8403)
Assumptions for shadow calculations: Sunshine probability 5/50 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 923 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8456)
Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Sunshine probability S/S0 (Sun hours/Possible sun hours) []											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
1	06:00 18:00	120	06:00 18:00	06:00 18:00
2	06:00 18:00	120	06:00 18:00	06:00 18:00
3	06:00 18:00	120	06:00 18:00	06:00 18:00
4	06:00 18:00	120	06:00 18:00	06:00 18:00
5	06:00 18:00	120	06:00 18:00	06:00 18:00
6	06:00 18:00	120	06:00 18:00	06:00 18:00
7	06:00 18:00	120	06:00 18:00	06:00 18:00
8	06:00 18:00	120	06:00 18:00	06:00 18:00
9	06:00 18:00	120	06:00 18:00	06:00 18:00
10	06:00 18:00	120	06:00 18:00	06:00 18:00
11	06:00 18:00	120	06:00 18:00	06:00 18:00
12	06:00 18:00	120	06:00 18:00	06:00 18:00
13	06:00 18:00	120	06:00 18:00	06:00 18:00
14	06:00 18:00	120	06:00 18:00	06:00 18:00
15	06:00 18:00	120	06:00 18:00	06:00 18:00
16	06:00 18:00	120	06:00 18:00	06:00 18:00
17	06:00 18:00	120	06:00 18:00	06:00 18:00
18	06:00 18:00	120	06:00 18:00	06:00 18:00
19	06:00 18:00	120	06:00 18:00	06:00 18:00
20	06:00 18:00	120	06:00 18:00	06:00 18:00
21	06:00 18:00	120	06:00 18:00	06:00 18:00
22	06:00 18:00	120	06:00 18:00	06:00 18:00
23	06:00 18:00	120	06:00 18:00	06:00 18:00
24	06:00 18:00	120	06:00 18:00	06:00 18:00
25	06:00 18:00	120	06:00 18:00	06:00 18:00
26	06:00 18:00	120	06:00 18:00	06:00 18:00
27	06:00 18:00	120	06:00 18:00	06:00 18:00
28	06:00 18:00	120	06:00 18:00	06:00 18:00
29	06:00 18:00	120	06:00 18:00	06:00 18:00
30	06:00 18:00	120	06:00 18:00	06:00 18:00
31	06:00 18:00	120	06:00 18:00	06:00 18:00

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 923 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8456
Sunshine probability S/SH (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 932 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8465)

Assumptions for shadow calculations

Sunshine probability S/S_0 (Sun hours/Possible sun hours)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)	
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1				
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SHADOW - Calendar

Calculation: 2019-09-04, Emerson GE Turbines **Shadow receptor:** 932 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8465
Sunshine probability S/P50 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 938 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8471)
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
1	06:00 18:00	120	06:00 18:00	06:00 18:00
2	06:00 18:00	120	06:00 18:00	06:00 18:00
3	06:00 18:00	120	06:00 18:00	06:00 18:00
4	06:00 18:00	120	06:00 18:00	06:00 18:00
5	06:00 18:00	120	06:00 18:00	06:00 18:00
6	06:00 18:00	120	06:00 18:00	06:00 18:00
7	06:00 18:00	120	06:00 18:00	06:00 18:00
8	06:00 18:00	120	06:00 18:00	06:00 18:00
9	06:00 18:00	120	06:00 18:00	06:00 18:00
10	06:00 18:00	120	06:00 18:00	06:00 18:00
11	06:00 18:00	120	06:00 18:00	06:00 18:00
12	06:00 18:00	120	06:00 18:00	06:00 18:00
13	06:00 18:00	120	06:00 18:00	06:00 18:00
14	06:00 18:00	120	06:00 18:00	06:00 18:00
15	06:00 18:00	120	06:00 18:00	06:00 18:00
16	06:00 18:00	120	06:00 18:00	06:00 18:00
17	06:00 18:00	120	06:00 18:00	06:00 18:00
18	06:00 18:00	120	06:00 18:00	06:00 18:00
19	06:00 18:00	120	06:00 18:00	06:00 18:00
20	06:00 18:00	120	06:00 18:00	06:00 18:00
21	06:00 18:00	120	06:00 18:00	06:00 18:00
22	06:00 18:00	120	06:00 18:00	06:00 18:00
23	06:00 18:00	120	06:00 18:00	06:00 18:00
24	06:00 18:00	120	06:00 18:00	06:00 18:00
25	06:00 18:00	120	06:00 18:00	06:00 18:00
26	06:00 18:00	120	06:00 18:00	06:00 18:00
27	06:00 18:00	120	06:00 18:00	06:00 18:00
28	06:00 18:00	120	06:00 18:00	06:00 18:00
29	06:00 18:00	120	06:00 18:00	06:00 18:00
30	06:00 18:00	120	06:00 18:00	06:00 18:00
31	06:00 18:00	120	06:00 18:00	06:00 18:00

SHADOW - Calenda

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 938 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8471
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 940 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8472)
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
1	06:00 18:00	120	06:00 18:00	
2	06:00 18:00	120	06:00 18:00	
3	06:00 18:00	120	06:00 18:00	
4	06:00 18:00	120	06:00 18:00	
5	06:00 18:00	120	06:00 18:00	
6	06:00 18:00	120	06:00 18:00	
7	06:00 18:00	120	06:00 18:00	
8	06:00 18:00	120	06:00 18:00	
9	06:00 18:00	120	06:00 18:00	
10	06:00 18:00	120	06:00 18:00	
11	06:00 18:00	120	06:00 18:00	
12	06:00 18:00	120	06:00 18:00	
13	06:00 18:00	120	06:00 18:00	
14	06:00 18:00	120	06:00 18:00	
15	06:00 18:00	120	06:00 18:00	
16	06:00 18:00	120	06:00 18:00	
17	06:00 18:00	120	06:00 18:00	
18	06:00 18:00	120	06:00 18:00	
19	06:00 18:00	120	06:00 18:00	
20	06:00 18:00	120	06:00 18:00	
21	06:00 18:00	120	06:00 18:00	
22	06:00 18:00	120	06:00 18:00	
23	06:00 18:00	120	06:00 18:00	
24	06:00 18:00	120	06:00 18:00	
25	06:00 18:00	120	06:00 18:00	
26	06:00 18:00	120	06:00 18:00	
27	06:00 18:00	120	06:00 18:00	
28	06:00 18:00	120	06:00 18:00	
29	06:00 18:00	120	06:00 18:00	
30	06:00 18:00	120	06:00 18:00	
31	06:00 18:00	120	06:00 18:00	

SHADOW - Calenda

Calculation: 2019-09-04_Emerson GE Turbines **Shadow receptor:** 940 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8472
Assumptions for shadow calculations: Sunshine probability S/S0 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applied

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1			
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2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 941 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8473)
Assumptions for shadow calculations Sunline probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.63	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1	06:00	18:00	120	06:00		18:00	
2	06:00	18:00	120	06:00		18:00	
3	06:00	18:00	120	06:00		18:00	
4	06:00	18:00	120	06:00		18:00	
5	06:00	18:00	120	06:00		18:00	
6	06:00	18:00	120	06:00		18:00	
7	06:00	18:00	120	06:00		18:00	
8	06:00	18:00	120	06:00		18:00	
9	06:00	18:00	120	06:00		18:00	
10	06:00	18:00	120	06:00		18:00	
11	06:00	18:00	120	06:00		18:00	
12	06:00	18:00	120	06:00		18:00	
13	06:00	18:00	120	06:00		18:00	
14	06:00	18:00	120	06:00		18:00	
15	06:00	18:00	120	06:00		18:00	
16	06:00	18:00	120	06:00		18:00	
17	06:00	18:00	120	06:00		18:00	
18	06:00	18:00	120	06:00		18:00	
19	06:00	18:00	120	06:00		18:00	
20	06:00	18:00	120	06:00		18:00	
21	06:00	18:00	120	06:00		18:00	
22	06:00	18:00	120	06:00		18:00	
23	06:00	18:00	120	06:00		18:00	
24	06:00	18:00	120	06:00		18:00	
25	06:00	18:00	120	06:00		18:00	
26	06:00	18:00	120	06:00		18:00	
27	06:00	18:00	120	06:00		18:00	
28	06:00	18:00	120	06:00		18:00	
29	06:00	18:00	120	06:00		18:00	
30	06:00	18:00	120	06:00		18:00	
31	06:00	18:00	120	06:00		18:00	



2019-09-04_Emerson GE Scenario

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 941 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8473)
Assumptions for shadow calculations
 Sunshine probability S/50 (Sun hours/Possible sun hours) [°]

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		



Project: **2019-09-04_Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 948 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8479)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.63	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1	06:00	18:00	120	06:00		18:00	
2	06:01	18:01	120	06:01		18:01	
3	06:02	18:02	120	06:02		18:02	
4	06:03	18:03	120	06:03		18:03	
5	06:04	18:04	120	06:04		18:04	
6	06:05	18:05	120	06:05		18:05	
7	06:06	18:06	120	06:06		18:06	
8	06:07	18:07	120	06:07		18:07	
9	06:08	18:08	120	06:08		18:08	
10	06:09	18:09	120	06:09		18:09	
11	06:10	18:10	120	06:10		18:10	
12	06:11	18:11	120	06:11		18:11	
13	06:12	18:12	120	06:12		18:12	
14	06:13	18:13	120	06:13		18:13	
15	06:14	18:14	120	06:14		18:14	
16	06:15	18:15	120	06:15		18:15	
17	06:16	18:16	120	06:16		18:16	
18	06:17	18:17	120	06:17		18:17	
19	06:18	18:18	120	06:18		18:18	
20	06:19	18:19	120	06:19		18:19	
21	06:20	18:20	120	06:20		18:20	
22	06:21	18:21	120	06:21		18:21	
23	06:22	18:22	120	06:22		18:22	
24	06:23	18:23	120	06:23		18:23	
25	06:24	18:24	120	06:24		18:24	
26	06:25	18:25	120	06:25		18:25	
27	06:26	18:26	120	06:26		18:26	
28	06:27	18:27	120	06:27		18:27	
29	06:28	18:28	120	06:28		18:28	
30	06:29	18:29	120	06:29		18:29	
31	06:30	18:30	120	06:30		18:30	



Project: **2019-09-04_Emerson GE Scenario**

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE TurbinesShadow receptor: 948 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8479)
Assumptions for shadow calculations
 Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)



Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 1030 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8550)
Assumptions for shadow calculations: Sunshine probability 5/50 (Sun hours/Possible sun hours) [1]

Assumptions for shadow calculations

Assumptions for shadow calculations

Sunshine probability S/50 (Sun hours/Possible sun hours) []											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time																
N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum
300	301	557	671	325	294	265	370	495	1,070	1,118	1,067	738	557	368	264	8,760

Table layout: For each day in each month the following matrix apply

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1030 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8550)
Assumptions for shadow calculations: Sunshine probability 5/50 (Sun hours/Possible sun hours) (%)

Assumptions for shadow calculations

Assumptions for shadow calculations

Operational time																
N	NNE	NE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum	
300	301	557	671	325	294	265	370	495	1,070	1,118	1,067	738	557	368	264	8,766

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1040 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8559)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) ☐

Assumptions for shadow calculations

Assumptions for shadow calculations

Sunshine probability S/S0 (Sun hours/Possible sun hours) []											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time																
N	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum	
300	301	557	671	325	294	265	370	495	1,070	1,118	1,067	738	557	368	264	8,760

Table layout: For each day in each month the following matrix apply

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1040 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8559)
Assumptions for shadow calculations
Sunshine probability S/50 (Sun hours/Possible sun hours) []

Assumptions for shadow calculations

Assumptions for shadow calculations

Operational time																
N	NNE	NE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Sum	
300	301	557	671	325	294	265	370	495	1,070	1,118	1,067	738	557	368	264	8,766

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1043 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8562)

Assumptions for shadow calculations

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 1043 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8562)

Assumptions for shadow calculations

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 1056 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8573)

Assumptions for shadow calculations

Assumptions for shadow calculations											
Sunshine probability 5/50 (Sun hours/Possible sun hours) (%)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) (Sun set (hh:mm))	First time (hh:mm) with flicker (Last time (hh:mm)) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines **Shadow receptor:** 1056 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8573)

Assumptions for shadow calculations

Assumptions for shadow calculations											
Sunshine probability 5/50 (Sun hours/possible sun hours) (%)											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minimum with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)
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Assumptions for shadow calculations

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

Assumptions for shadow calculations												
Sunshine probability S/50 (Sun hours/Possible sun hours) []												
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22	

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	(WTG causing flicker first time)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	06:00	18:00	18:00
2	06:00	18:00	120	06:00	06:00	18:00	18:00
3	06:00	18:00	120	06:00	06:00	18:00	18:00
4	06:00	18:00	120	06:00	06:00	18:00	18:00
5	06:00	18:00	120	06:00	06:00	18:00	18:00
6	06:00	18:00	120	06:00	06:00	18:00	18:00
7	06:00	18:00	120	06:00	06:00	18:00	18:00
8	06:00	18:00	120	06:00	06:00	18:00	18:00
9	06:00	18:00	120	06:00	06:00	18:00	18:00
10	06:00	18:00	120	06:00	06:00	18:00	18:00
11	06:00	18:00	120	06:00	06:00	18:00	18:00
12	06:00	18:00	120	06:00	06:00	18:00	18:00
13	06:00	18:00	120	06:00	06:00	18:00	18:00
14	06:00	18:00	120	06:00	06:00	18:00	18:00
15	06:00	18:00	120	06:00	06:00	18:00	18:00
16	06:00	18:00	120	06:00	06:00	18:00	18:00
17	06:00	18:00	120	06:00	06:00	18:00	18:00
18	06:00	18:00	120	06:00	06:00	18:00	18:00
19	06:00	18:00	120	06:00	06:00	18:00	18:00
20	06:00	18:00	120	06:00	06:00	18:00	18:00
21	06:00	18:00	120	06:00	06:00	18:00	18:00
22	06:00	18:00	120	06:00	06:00	18:00	18:00
23	06:00	18:00	120	06:00	06:00	18:00	18:00
24	06:00	18:00	120	06:00	06:00	18:00	18:00
25	06:00	18:00	120	06:00	06:00	18:00	18:00
26	06:00	18:00	120	06:00	06:00	18:00	18:00
27	06:00	18:00	120	06:00	06:00	18:00	18:00
28	06:00	18:00	120	06:00	06:00	18:00	18:00
29	06:00	18:00	120	06:00	06:00	18:00	18:00
30	06:00	18:00	120	06:00	06:00	18:00	18:00
31	06:00	18:00	120	06:00	06:00	18:00	18:00

Assumptions for shadow calculations

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Assumptions for shadow calculations

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calendar
Calculation: 2019-09-04_Emerison GE TurbinesShadow receptor:
Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

SHADOW - Calendar
Calculation: 2019-09-04_Emerison GE TurbinesShadow receptor
Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
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23			
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26			
27			
28			
29			
30			
31			

SHADOW - Calendar
Calculation: 2019-09-04_Emerison GE TurbinesShadow receptor:
Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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SHADOW - Calendar
Calculation: 2019-09-04_Emerison GE TurbinesShadow receptor
Assumptions for shadow calculations

Table layout: For each day in each month the following matrix appl

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutor with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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2019-09-04_Emerson GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1174 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8675)
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

1 January	1 February	1 March	1 April	1 May	1 June	1 July	1 August	1 September	1 October	1 November	1 December
1 January	1 February	1 March	1 April	1 May	1 June	1 July	1 August	1 September	1 October	1 November	1 December

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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2019-09-04_Emerson GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1174 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8675)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

	July	August	September	October	November	December
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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2019-09-04_Emerson GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1179 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8679)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

[illegible]

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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2019-09-04_Emerson GE Scenario

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1179 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8679)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

[illegible]

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1314 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8792)
Assumptions for shadow calculations Sunshine probability S/P0 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix apply

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1314 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8792)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix applies

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1375 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8838)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Table layout: For each day in each month the following matrix apply

SHADOW - Calendar

Calculation: 2019-09-04, Emerson GE Turbines**Shadow receptor:** 1375 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8838)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker
			(WTG causing flicker last time)

SHADOW - Calenda

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1445 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8896)

Assumptions for shadow calculations

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: 2019-09-04_Emerson GE Turbines**Shadow receptor:** 1445 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8896)

Assumptions for shadow calculations

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
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SHADOW - Calenda

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1461 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8909)

Assumptions for shadow calculations

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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SHADOW - Calendar

Calculation: 2019-09-04 Emerson GE Turbines **Shadow receptor:** 1461 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8909)

Assumptions for shadow calculations

Table layout: For each day in each month the following matrix applies

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
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Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1468 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8914)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Operational time																
N NNE NE ENE E ESE SE SSE S SSW SW WSW W WNW NW NNW Sum																
300 301 357 671 325 294 265 370 495 1700 1,118 1,007 738 357 268 264 8,760																
			January			August			November			December				
January	February	March	April	May	June	July	August	September	October	November	December	January	February	March		
1	0157	0174	0187	0176	0161	1580		0648 (771)	0657	0628	0619	0648	0721	0728	0731	
2	1713	1748	1822	1956	2027	2057	66	0729 (72)	2108	0737 (72)	2108	0737 (72)	2057	1915	1728	1704
3	0157	0174	0186	0175	0160	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
4	1713	1749	1823	1956	2027	2057	67	0731 (72)	2108	0737 (72)	2108	0737 (72)	2057	1915	1727	1704
5	0157	0174	0187	0176	0161	1580		0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
6	1715	1750	1824	1958	2029	2058	67	0730 (771)	2108	0737 (771)	2108	0737 (771)	2048	1911	1726	1704
7	0157	0174	0186	0175	0160	1581	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
8	1716	1752	1825	1959	2030	2059	67	0730 (771)	2108	0737 (771)	2108	0737 (771)	2047	1910	1725	1703
9	0157	0174	0187	0176	0161	1581	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
10	1717	1753	1826	2000	2031	2059	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2045	1910	1726	1703
11	0157	0174	0186	0175	0160	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
12	1718	1754	1828	2001	2032	2060	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2046	1911	1727	1704
13	0157	0175	0187	0176	0161	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
14	1719	1755	1829	2002	2033	2061	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2046	1911	1728	1705
15	0157	0175	0187	0176	0161	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
16	1720	1756	1830	2003	2034	2062	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2046	1912	1729	1706
17	0157	0175	0187	0176	0161	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
18	1721	1757	1831	2004	2035	2063	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2046	1912	1730	1707
19	0157	0175	0187	0176	0161	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
20	1722	1758	1832	2005	2036	2064	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2046	1913	1731	1708
21	0157	0175	0187	0176	0161	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
22	1723	1759	1833	2006	2037	2065	67	0731 (771)	2108	0737 (771)	2108	0737 (771)	2046	1913	1732	1709
23	0157	0175	0187	0176	0161	1582	20	0629 (771)	0628	0629 (771)	0658	0627	0628	0629	0628	0629
24	1724	1800</														

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	(WTG causing flicker first time)	(WTG causing flicker last time)
1	06:00	18:00	120	06:00	18:00		
2	06:00	18:00	120	06:00	18:00		
3	06:00	18:00	120	06:00	18:00		
4	06:00	18:00	120	06:00	18:00		
5	06:00	18:00	120	06:00	18:00		
6	06:00	18:00	120	06:00	18:00		
7	06:00	18:00	120	06:00	18:00		
8	06:00	18:00	120	06:00	18:00		
9	06:00	18:00	120	06:00	18:00		
10	06:00	18:00	120	06:00	18:00		
11	06:00	18:00	120	06:00	18:00		
12	06:00	18:00	120	06:00	18:00		
13	06:00	18:00	120	06:00	18:00		
14	06:00	18:00	120	06:00	18:00		
15	06:00	18:00	120	06:00	18:00		
16	06:00	18:00	120	06:00	18:00		
17	06:00	18:00	120	06:00	18:00		
18	06:00	18:00	120	06:00	18:00		
19	06:00	18:00	120	06:00	18:00		
20	06:00	18:00	120	06:00	18:00		
21	06:00	18:00	120	06:00	18:00		
22	06:00	18:00	120	06:00	18:00		
23	06:00	18:00	120	06:00	18:00		
24	06:00	18:00	120	06:00	18:00		
25	06:00	18:00	120	06:00	18:00		
26	06:00	18:00	120	06:00	18:00		
27	06:00	18:00	120	06:00	18:00		
28	06:00	18:00	120	06:00	18:00		
29	06:00	18:00	120	06:00	18:00		
30	06:00	18:00	120	06:00	18:00		
31	06:00	18:00	120	06:00	18:00		

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1472 - Shadow Receptor: 1.0×1.0 Azimuth: 0.0° Slope: 0.0° (8918)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

[illegible]

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1472 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8918)
Assumptions for shadow calculations Sunshine probability S/S0 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Operational time																					
					N	NN	NE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NNW	NNW	Sun	
					300	315	330	345	360	375	390	405	420	435	450	465	480	495	510	525	540
1:00		August	September/October	November																	
1:00	54	19:32 (T4)	06:26	49	19:36 (T4)	06:57	20:27			10:02	16:14 (T4)	07:37									
2:10	54	20:27 (T4)	06:50	49	20:25 (T4)	06:57	19:15			17:28	50	17:04 (T4)	17:04								
3:20	54	20:27 (T4)	06:50	49	20:25 (T4)	06:57	19:15			17:28	50	17:04 (T4)	17:04							16:15 (T4)	
4:30	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
5:40	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
6:50	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
8:00	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
9:10	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
10:20	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
11:30	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
12:40	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
13:50	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
15:00	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
16:10	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
17:20	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
18:30	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
19:40	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
20:50	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49	17:04 (T4)	17:03							7:16 (22) (T4)	
22:00	54	20:27 (T4)	06:50	49	20:25 (T4)	06:56	19:13			17:27	49										

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1473 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8919)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Operational time																															
		N		NN		NE		ENE		E		ESE		SSE		SSW		SW		WSW		W		WNW		NNW		NW		Sum	
		301		302		303		304		305		306		307		308		309		310		311		312		313		314		315	
		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
		16		17		18		19		20		21		22		23		24		25		26		27		28		29		30	
		31		32		33		34		35		36		37		38		39		40		41		42		43		44		45	
		46		47		48		49		50		51		52		53		54		55		56		57		58		59		60	
		61		62		63		64		65		66		67		68		69		70		71		72		73		74		75	
		76		77		78		79		80		81		82		83		84		85		86		87		88		89		90	
		91		92		93		94		95		96		97		98		99		100		101		102		103		104		105	
		106		107		108		109		110		111		112		113		114		115		116		117		118		119		120	
		121		122		123		124		125		126		127		128		129		130		131		132		133		134		135	
		136		137		138		139		140		141		142		143		144		145		146		147		148		149		150	
		151		152		153		154		155		156		157		158		159		160		161		162		163		164		165	
		166		167		168		169		170		171		172		173		174		175		176		177		178		179		180	
		181		182		183		184		185		186		187		188		189		190		191		192		193		194		195	
		196		197		198		199		200		201		202		203		204		205		206		207		208		209		210	
		211		212		213		214		215		216		217		218		219		220		221		222		223		224		225	
		226		227		228		229		230		231		232		233		234		235		236		237		238		239		240	
		241		242		243		244		245		246		247		248		249		250		251		252		253		254		255	
		256		257		258		259		260		261		262		263		264		265		266		267		268		269		270	
		271		272		273		274		275		276		277		278		279		280		281		282		283		284		285	
		286		287		288		289		290		291		292		293		294		295		296		297		298		299		300	
Potential sum hours		10		297		69		2049		399		1013		2536		1469		1166		499		453		19							
Total, work case		1.46		0.69		2.09		0.82		0.33		1.166		0.59		0.64		1.00		0.64		0.19		0.64		0.19		0.64		0.19	
Turn reduction		0.42		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Oper. time, rest.		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73		0.73	
Total reduction		1.00		0.27		0.30		0.33		0.33		0.33		0.33		0.33		0.33		0.33		0.33		0.33		0.33		0.33		0.33	
Total, rest.		0.69		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19		0.19	

Table layout: For each day in each month the following matrix apply

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
	Minutes with flicker		

Assumptions for shadow calculations

		A N N E N E S D E I E S E S S S S S W S V W Y W W N W N W N W S S				300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320															
		August				September				October				November				December			
1	06:02					19-19	17-17	06:57		18-18	17-17	07:27		17-10	17-17	07:02	07:37				
2	12:19					20-20	19-19	07:17		18-18	17-17	07:27		16-09	17-17	07:02	17:02				
3	20:02					19-19	17-17	06:58		18-16	17-17	07:28		17-10	17-17	07:03	07:38				
4	06:02					20-19	17-17	07:05		18-19	17-17	07:33		16-08	17-17	07:06	17:06				
5	20:02					19-19	17-17	06:59		18-16	17-17	07:28		17-10	17-17	07:04	07:38				
6	12:19					20-20	19-19	07:17		18-15	17-17	07:31		16-07	17-17	07:05	17:05				
7	20:02					19-19	17-17	06:58		18-16	17-17	07:29		17-10	17-17	07:06	07:40				
8	06:02					20-19	17-17	07:04		18-15	17-17	07:31		16-08	17-17	07:05	17:05				
9	20:02					19-19	17-17	06:57		18-16	17-17	07:28		17-10	17-17	07:04	07:37				
10	12:19					20-20	19-19	07:17		18-15	17-17	07:32		17-14	17-17	07:07	07:41				
11	20:02					19-19	17-17	06:58		18-16	17-17	07:29		16-07	17-17	07:06	07:40				
12	06:02					20-19	17-17	07:05		18-15	17-17	07:33		17-13	17-17	07:08	07:42				
13	20:02					19-19	17-17	06:56		18-15	17-17	07:30		17-13	17-17	07:09	07:43				
14	12:19					20-20	19-19	07:17		18-16	17-17	07:34		17-14	17-17	07:10	07:44				
15	20:02					19-19	17-17	06:57		18-16	17-17	07:29		17-13	17-17	07:11	07:45				
16	06:02					20-19	17-17	07:04		18-15	17-17	07:32		17-10	17-17	07:12	07:46				
17	20:02					19-19	17-17	06:58		18-16	17-17	07:30		17-13	17-17	07:13	07:47				
18	12:19					20-20	19-19	07:17		18-15	17-17	07:33		17-13	17-17	07:14	07:48				
19	20:02					19-19	17-17	06:56		18-15	17-17	07:31		17-13	17-17	07:15	07:49				
20	06:02					20-19	17-17	07:05		18-16	17-17	07:34		17-14	17-17	07:16	07:50				
21	20:02					19-19	17-17	06:57		18-16	17-17	07:30		17-13	17-17	07:17	07:51				
22	12:19					20-20	19-19	07:17		18-15	17-17	07:32		17-10	17-17	07:18	07:52				
23	20:02					19-19	17-17	06:58		18-16	17-17	07:29		17-13	17-17	07:19	07:53				
24	06:02					20-19	17-17	07:04		18-15	17-17	07:33		17-13	17-17	07:20	07:54				
25	20:02					19-19	17-17	06:57		18-16	17-17	07:30		17-13	17-17	07:21	07:55				
26	12:19		</																		

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Assumptions for shadow calculations

[illegible]

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)

Assumptions for shadow calculations

[illegible]

Day in month	Sun rise (hh:mm)	First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker (WTG causing flicker last time)

Assumptions for shadow calculations

Operational hours of the fleet																													
		N		NE		E		ESE		SE		S		SSW		SW		WSW		W		WNW		NW		NNW		N	
		000		045		090		135		180		225		270		315		360		045		090		135		180		225	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		410		465		520		575		630		685		740		795		850		905		960		1015	
		300		355		41																							

Day in month	Sun rise (hh:mm)		First time (hh:mm) with flicker	(WTG causing flicker first time)
	Sun set (hh:mm)	Minutes with flicker	Last time (hh:mm) with flicker	(WTG causing flicker last time)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

Table layout: For each day in each month the following matrix apply

Table layout: For each day in each month the following matrix apply

Table layout: For each day in each month the following matrix apply

Table layout: For each day in each month the following matrix applies

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1531 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8965)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

[illegible]

Table layout: For each day in each month the following matrix appl

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
1	06:00 18:00	120	06:00 18:00	
2	06:00 18:00	120	06:00 18:00	
3	06:00 18:00	120	06:00 18:00	
4	06:00 18:00	120	06:00 18:00	
5	06:00 18:00	120	06:00 18:00	
6	06:00 18:00	120	06:00 18:00	
7	06:00 18:00	120	06:00 18:00	
8	06:00 18:00	120	06:00 18:00	
9	06:00 18:00	120	06:00 18:00	
10	06:00 18:00	120	06:00 18:00	
11	06:00 18:00	120	06:00 18:00	
12	06:00 18:00	120	06:00 18:00	
13	06:00 18:00	120	06:00 18:00	
14	06:00 18:00	120	06:00 18:00	
15	06:00 18:00	120	06:00 18:00	
16	06:00 18:00	120	06:00 18:00	
17	06:00 18:00	120	06:00 18:00	
18	06:00 18:00	120	06:00 18:00	
19	06:00 18:00	120	06:00 18:00	
20	06:00 18:00	120	06:00 18:00	
21	06:00 18:00	120	06:00 18:00	
22	06:00 18:00	120	06:00 18:00	
23	06:00 18:00	120	06:00 18:00	
24	06:00 18:00	120	06:00 18:00	
25	06:00 18:00	120	06:00 18:00	
26	06:00 18:00	120	06:00 18:00	
27	06:00 18:00	120	06:00 18:00	
28	06:00 18:00	120	06:00 18:00	
29	06:00 18:00	120	06:00 18:00	
30	06:00 18:00	120	06:00 18:00	
31	06:00 18:00	120	06:00 18:00	

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1549 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8980)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.40 0.44 0.52 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix app

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
--------------	-------------------------------------	----------------------	---	---

SHADOW - Calendar

Calculation: 2019-09-04, Emerson GE Turbines **Shadow receptor:** 1549 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8980)
Assumptions for shadow calculations
 Sunline probability 5/50 (Sun hours/Possible sun hours)
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 0.31 0.48 0.57 0.57 0.64 0.66 0.61 0.59 0.48 0.30 0.22

Table layout: For each day in each month the following matrix appl

SHADOW - Calendar

Calculation: 2019-09-04_Emerison GE Turbines**Shadow receptor:** 1551 - Shadow Receptor: 1.0 x 1.0 Azimuth: 0.0° Slope: 0.0° (8982)
Assumptions for shadow calculations Sunshine probability S/50 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.50	0.48	0.30	0.22

Table layout: For each day in each month the following matrix app

Day in month	Sun rise (hh:mm) Sun set (hh:mm)	Minutes with flicker	First time (hh:mm) with flicker Last time (hh:mm) with flicker	(WTG causing flicker first time) (WTG causing flicker last time)
--------------	-------------------------------------	----------------------	---	---

Table layout: For each day in each month the following matrix applies:

Azimuth: 0.0° Slope: 0.0° (8982)
 (Total sun hours) []

Aug	Sep	Oct	Nov	Dec
0.61	0.59	0.48	0.30	0.22

www.elsevier.com/locate/jlpp

Table layout: For each day in each month the following matrix appears:

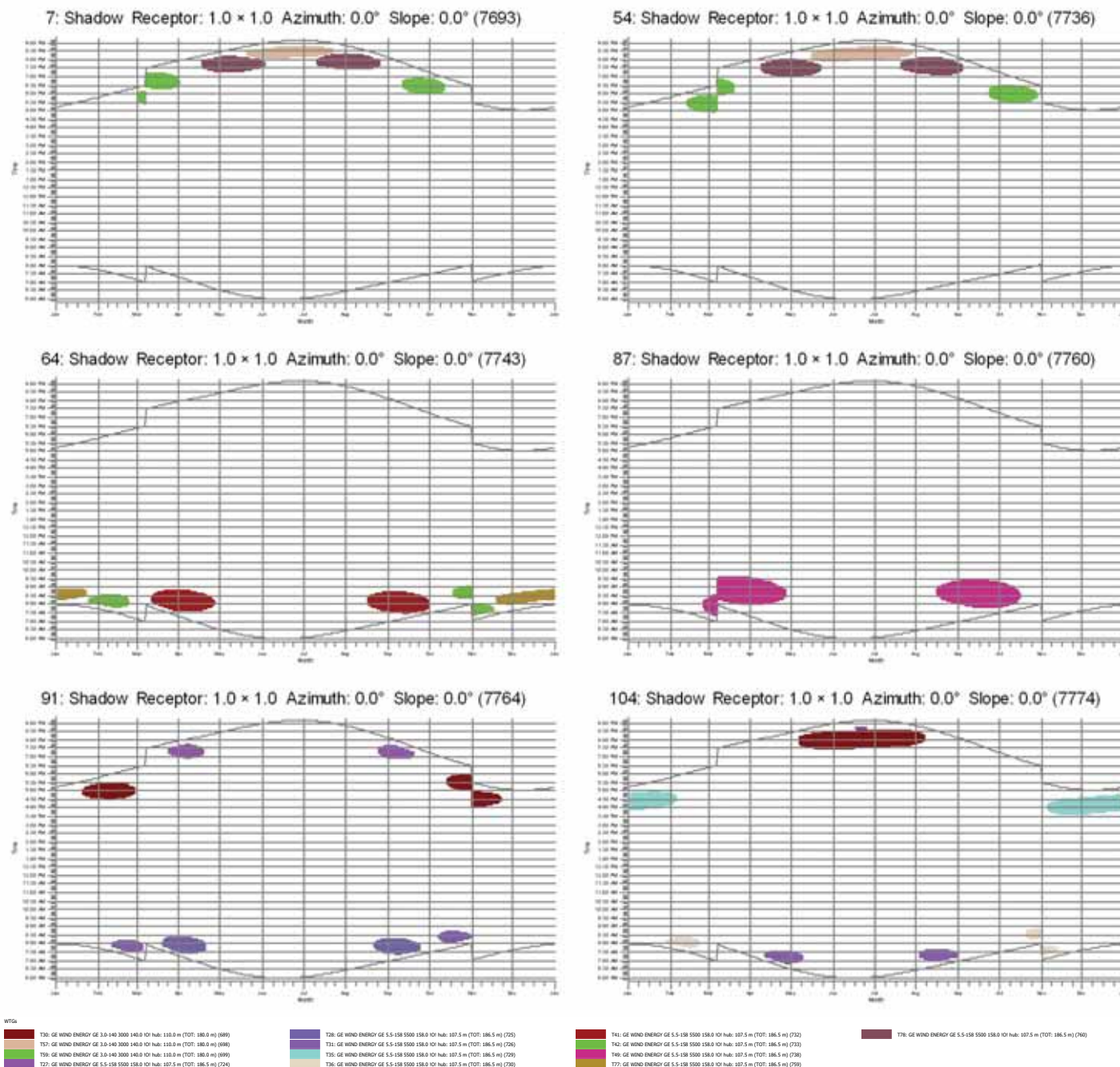
Day in month	Sun rise (hh:mm)	First time
--------------	------------------	------------

Azimuth: 0.0° Slope: 0.0° (8983)
 (the sun hours) []
 Aug Sep Oct Nov Dec
 1 0.59 0.48 0.30 0.22



SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerson GE Turbines



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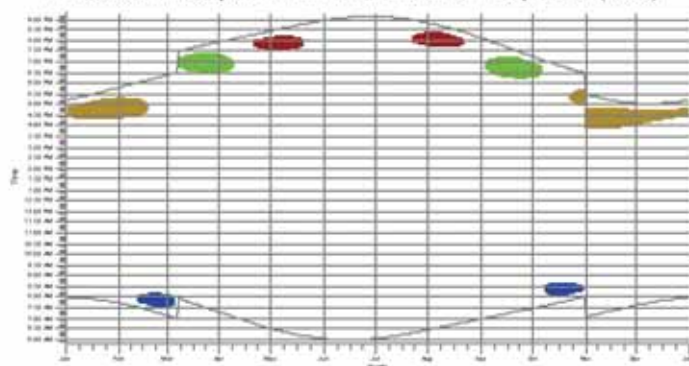
Calculated:

9/5/2019 11:32 PM/3.2.737

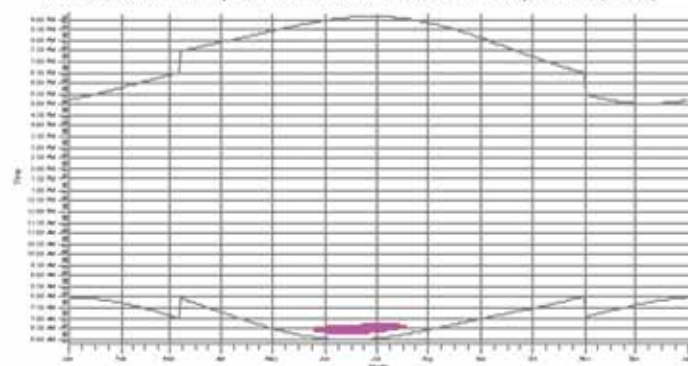
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

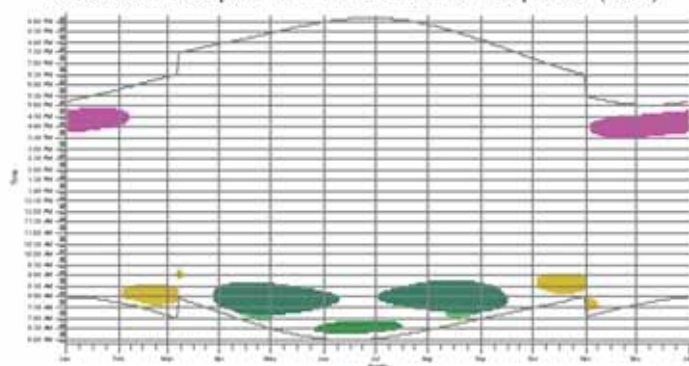
137: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7798)



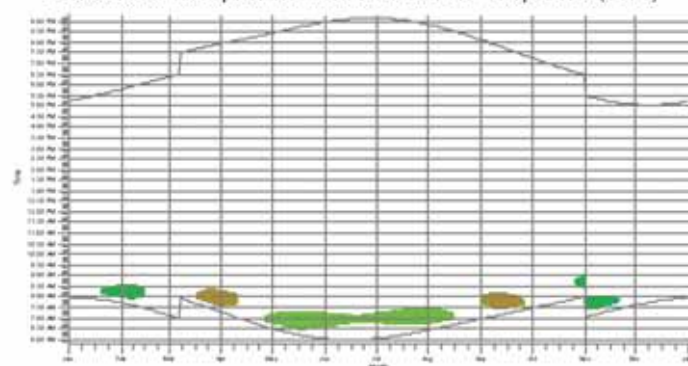
144: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7804)



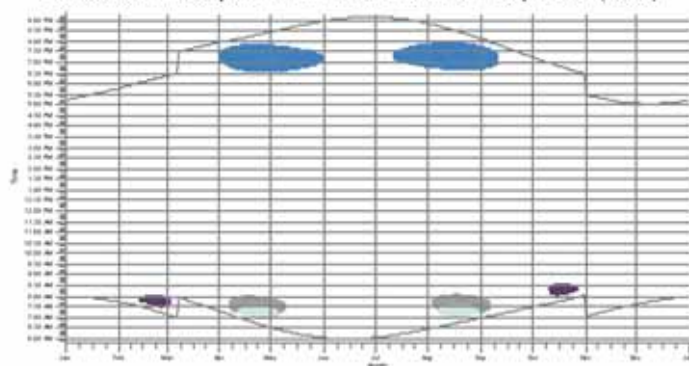
197: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7850)



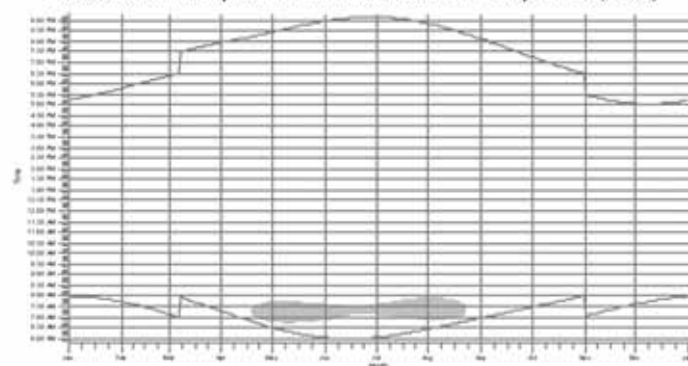
228: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7878)



232: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7882)



255: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7903)



WTG:			
T19: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (693)	T10: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (710)	T42: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (733)	T58: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (744)
T55: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (697)	T11: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (711)	T44: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (735)	T76: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T7: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (708)	T41: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (732)	T54: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (742)	T77: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (759)
T8: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (709)	T43: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (734)	T56: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (743)	

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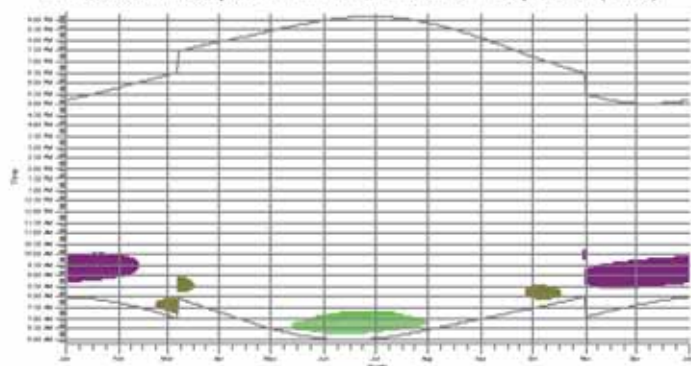
Calculated:

9/5/2019 11:32 PM/3.2.737

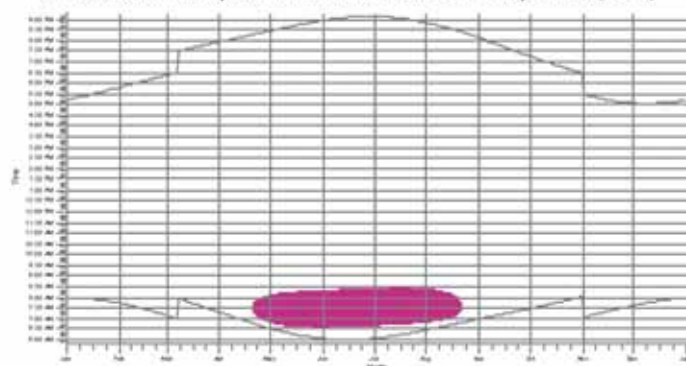
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

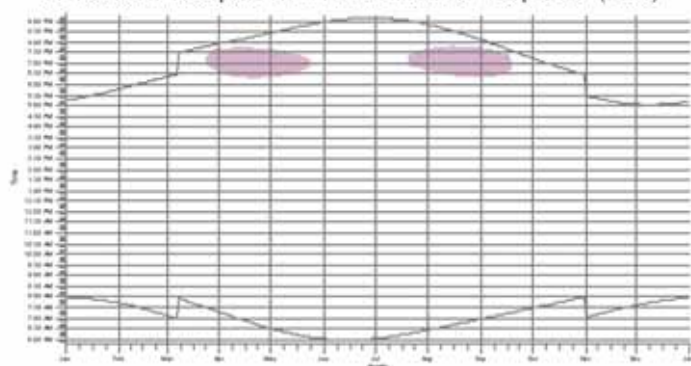
275: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7918)



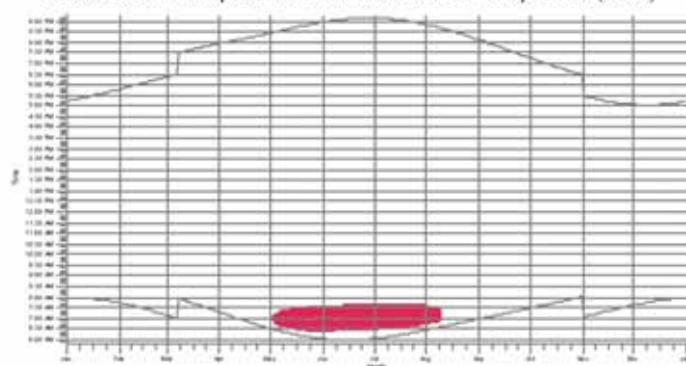
277: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7919)



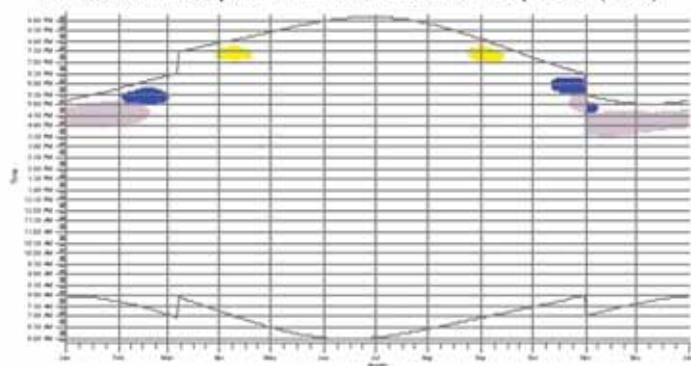
319: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7948)



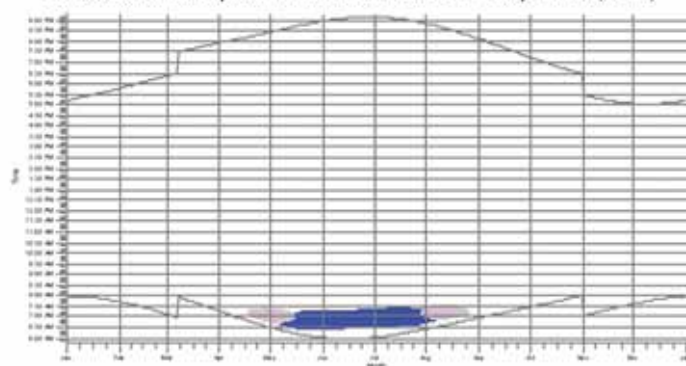
328: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7956)



332: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7960)



344: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7972)



WTG	T3: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 180.0 m) (683)	T37: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 180.0 m) (691)	T5: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (796)	T79: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (761)
	T4: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 180.0 m) (684)	T38: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 180.0 m) (692)	T43: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (794)	T87: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (746)
	T34: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 180.0 m) (690)	T62: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 180.0 m) (700)	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (798)	

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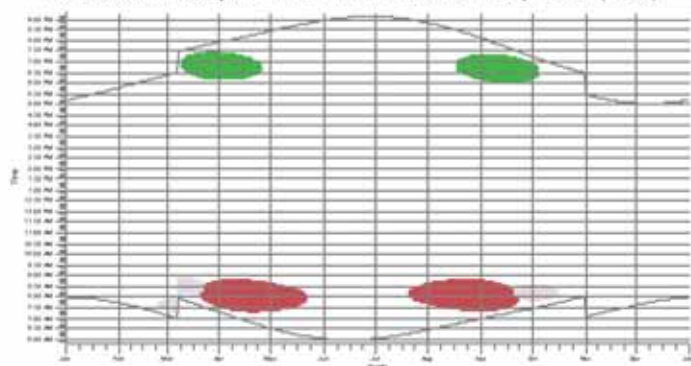
Calculated:

9/5/2019 11:32 PM/3.2.737

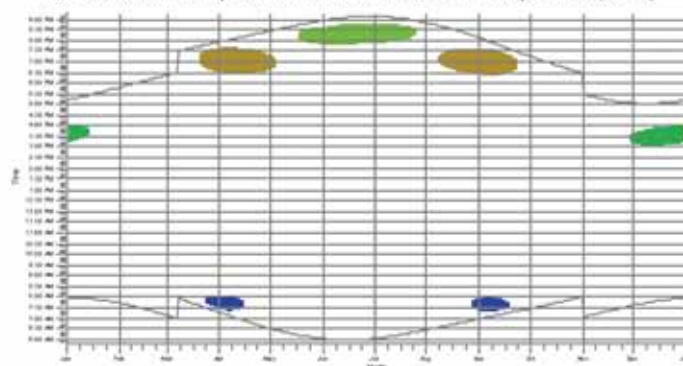
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

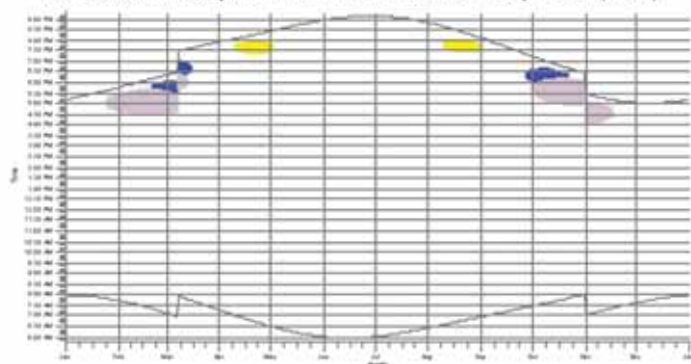
360: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (7986)



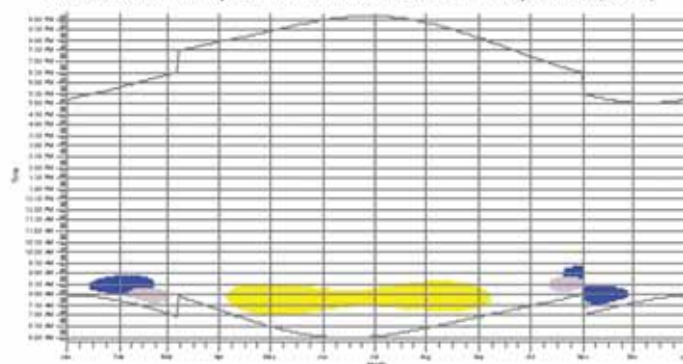
382: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8004)



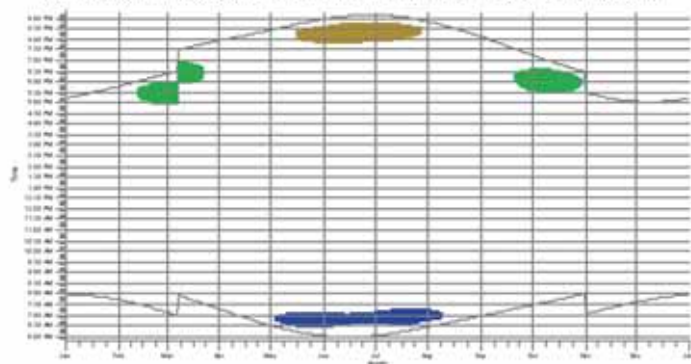
385: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8007)



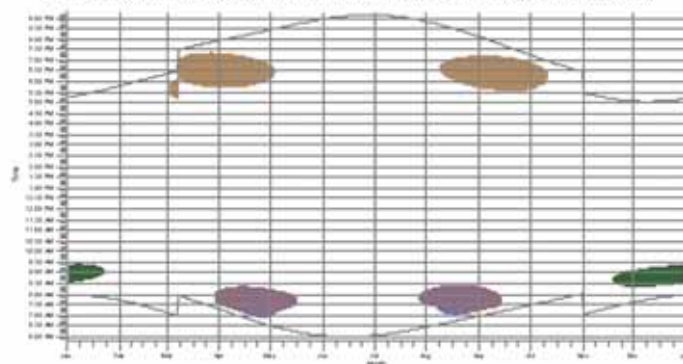
390: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8012)



399: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8021)



404: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8026)



WTG	T3: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 186.0 m) (683)	T4: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (750)	T7: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (754)	T8: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (751)	T9: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (752)	T5: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (756)	T6: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (757)
	T4: GE WIND ENERGY GE 3.0-140 3000 140.0 ICI hub: 110.0 m (TOT: 186.0 m) (684)	T5: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (750)	T6: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (751)	T7: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (752)	T8: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (753)	T9: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (754)	T10: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (755)
	T5: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (756)	T6: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (757)	T7: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (758)	T8: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (759)	T9: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (760)	T10: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (761)	T11: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (762)
	T6: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (763)	T7: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (764)	T8: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (765)	T9: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (766)	T10: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (767)	T11: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (768)	T12: GE WIND ENERGY GE 5.5-158 5500 158.0 ICI hub: 107.5 m (TOT: 186.5 m) (769)

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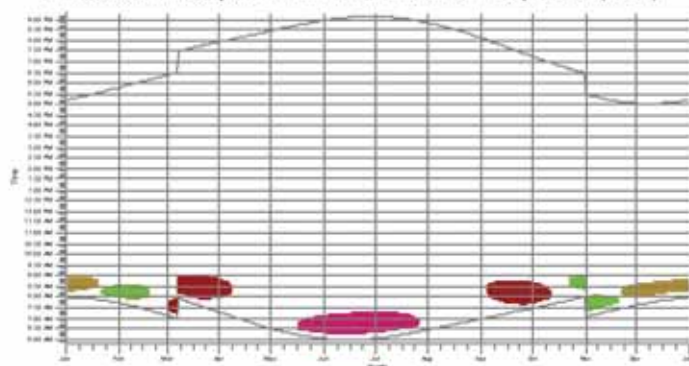
Calculated:

9/5/2019 11:32 PM/3.2.737

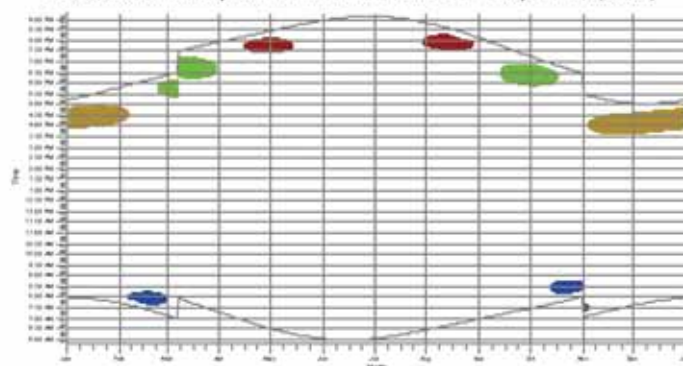
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

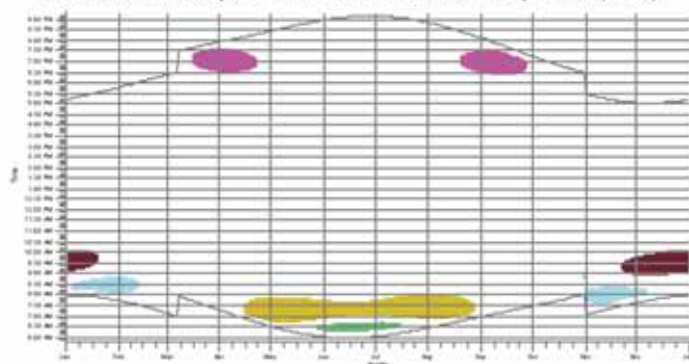
422: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8041)



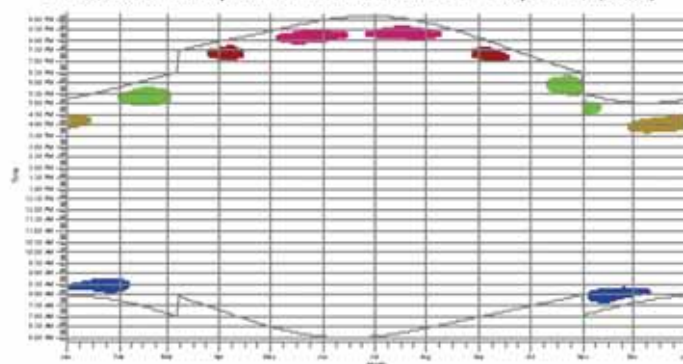
423: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8042)



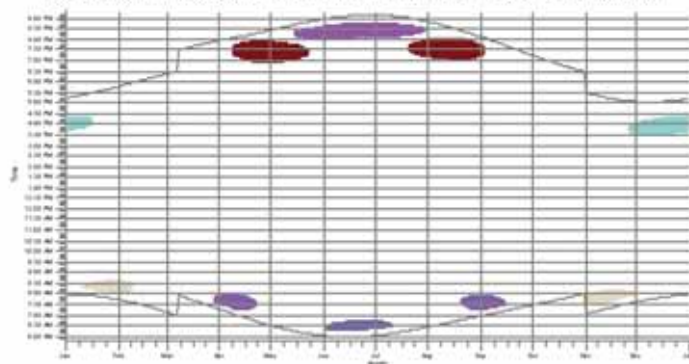
427: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8046)



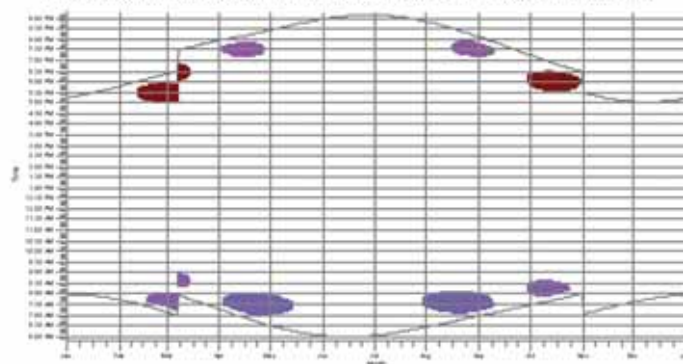
477: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8085)



500: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8106)



501: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8107)



WTG:

T20: GE WIND ENERGY GE 3.0-140 3000 140.0 101 hub: 110.0 m (TOT: 180.0 m) (809)
T6: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (709)
T10: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (711)
T11: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (712)

T12: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (713)
T13: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (714)
T22: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (724)
T26: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (725)

T31: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (736)
T35: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (739)
T36: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (738)
T40: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (731)

T41: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (732)
T42: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (733)
T76: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (758)
T77: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (759)

Project:

2019-09-04_Emerison GE Scenario

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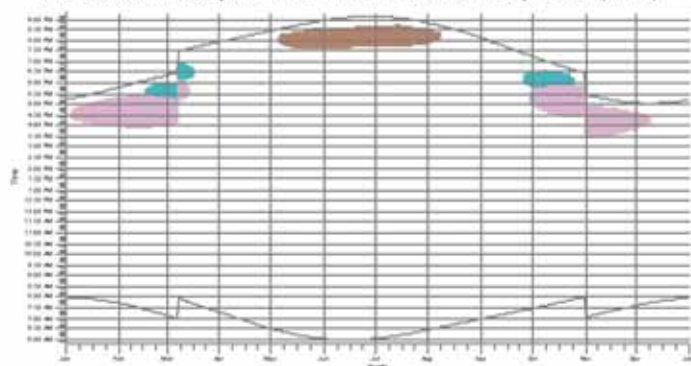
Calculated:

9/5/2019 11:32 PM/3.2.737

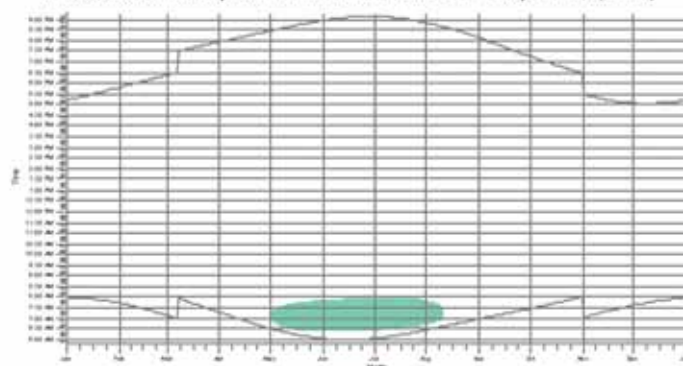
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

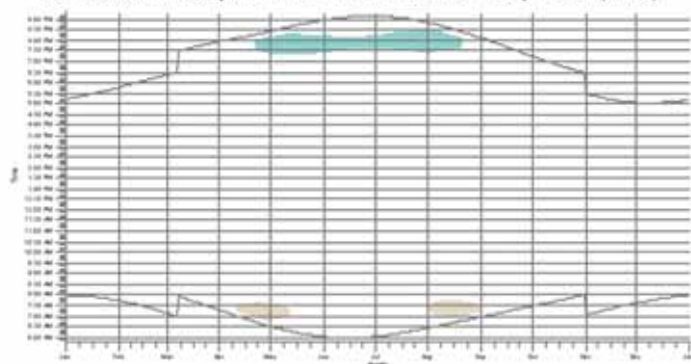
510: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8114)



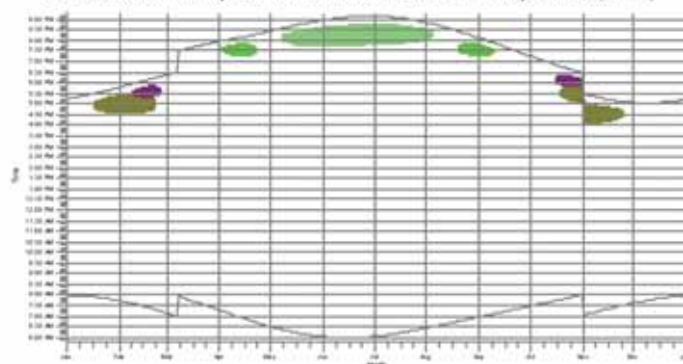
518: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8120)



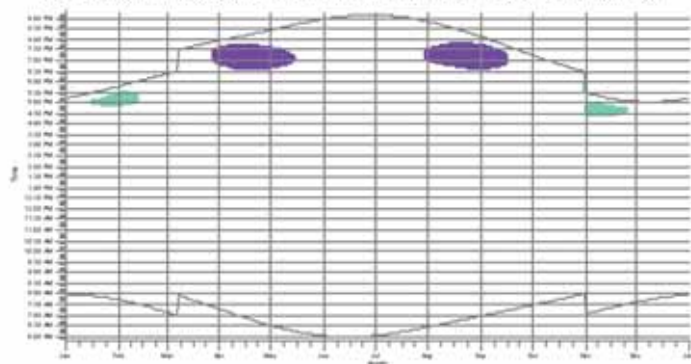
569: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8166)



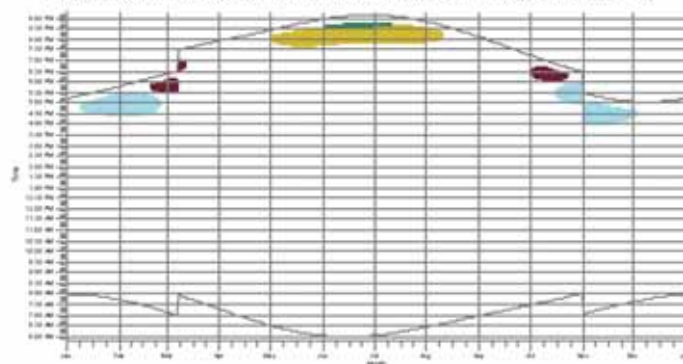
570: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8167)



576: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8173)



596: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8191)



WTG	T14: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (690)	T9: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (710)	T35: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (730)	T60: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (740)
	T37: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (691)	T10: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (711)	T36: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (731)	T39: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (741)
	T38: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (692)	T12: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (713)	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (732)	T67: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (742)
	T62: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (700)	T13: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (714)		

2019-09-04 Emerson GE Scenario

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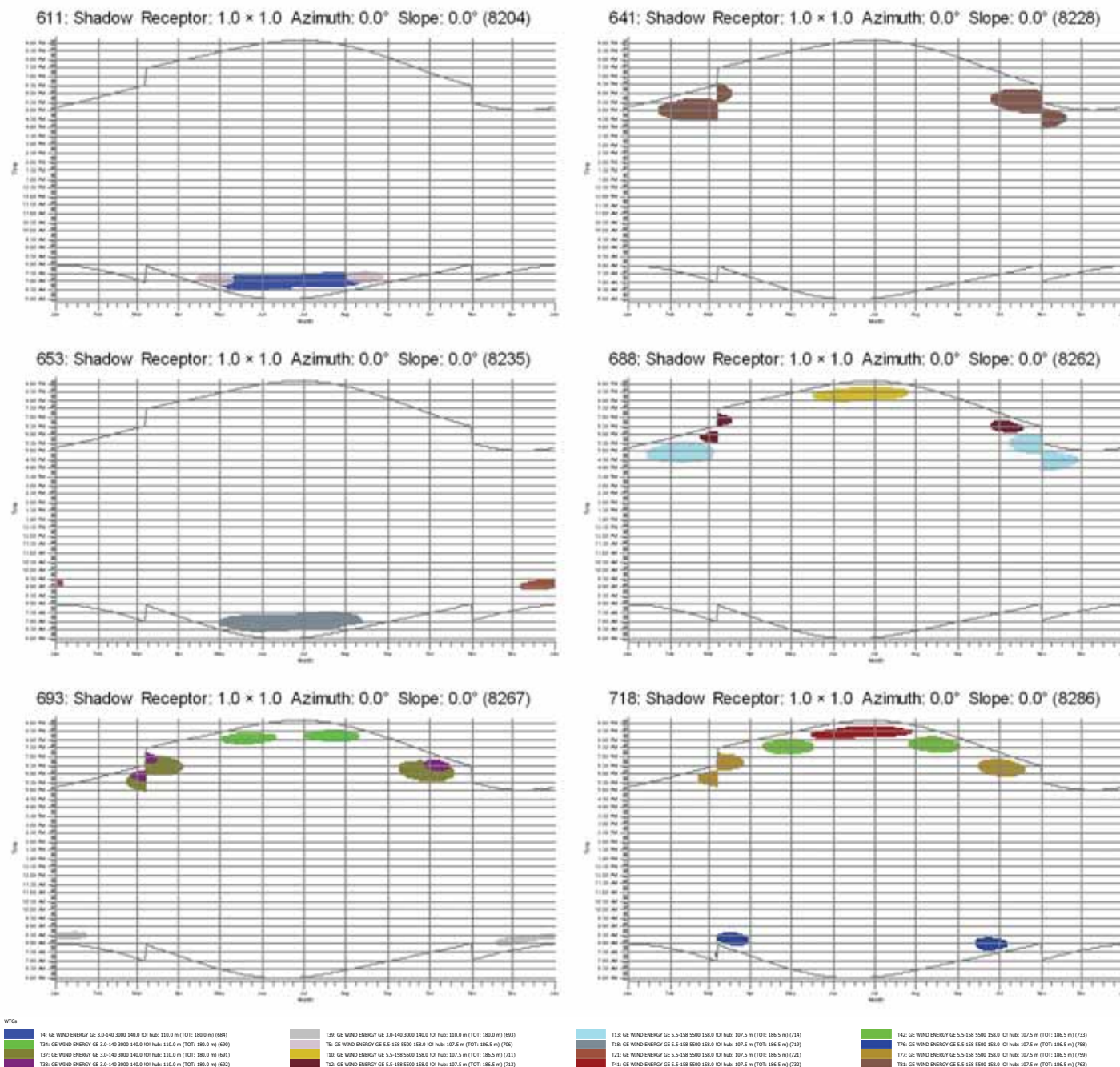
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SHADOW - Calendar, graphical

Calculation: 2019-09-04 Emerson GE Turbines



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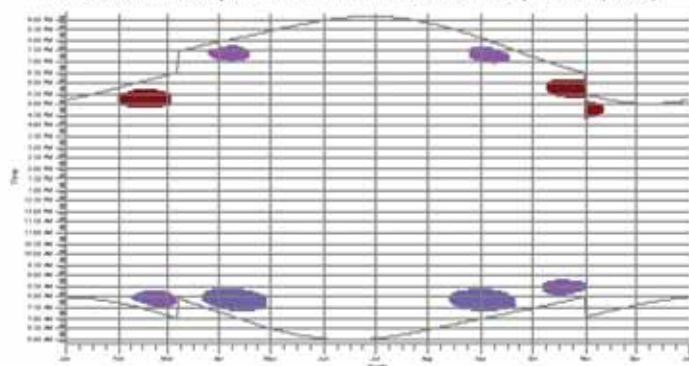
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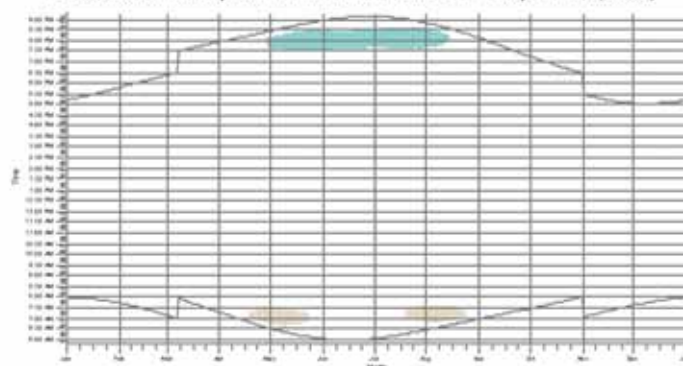
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

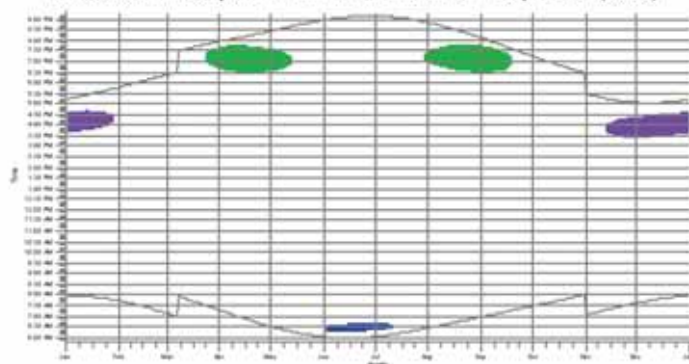
728: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8295)



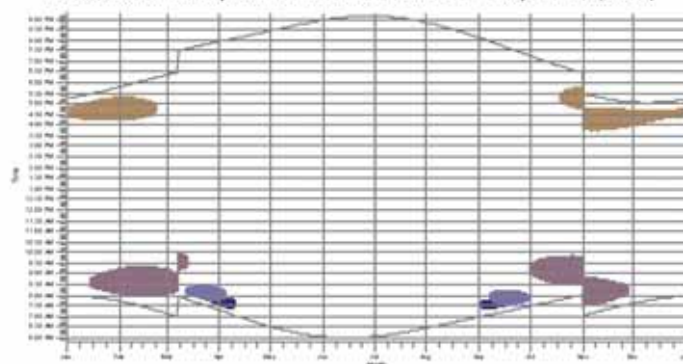
740: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8305)



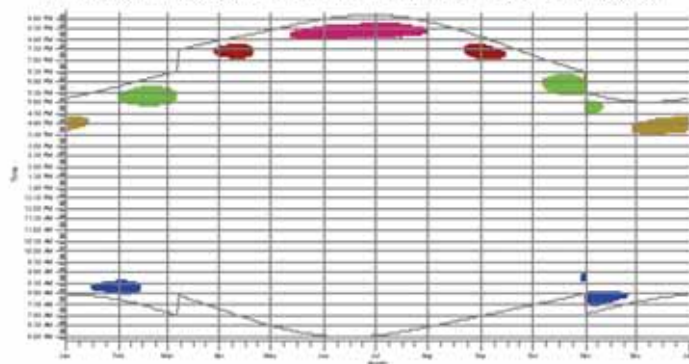
752: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8315)



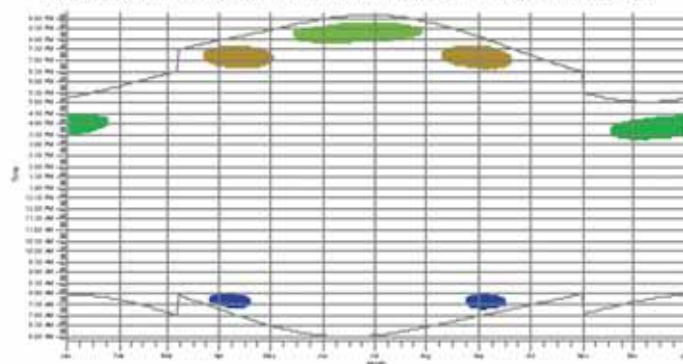
770: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8329)



779: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8336)



785: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8342)



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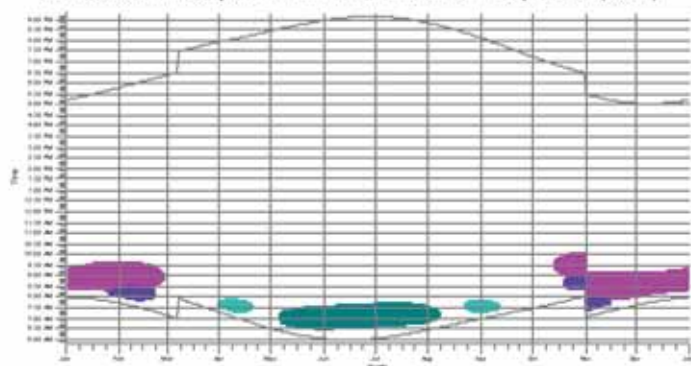
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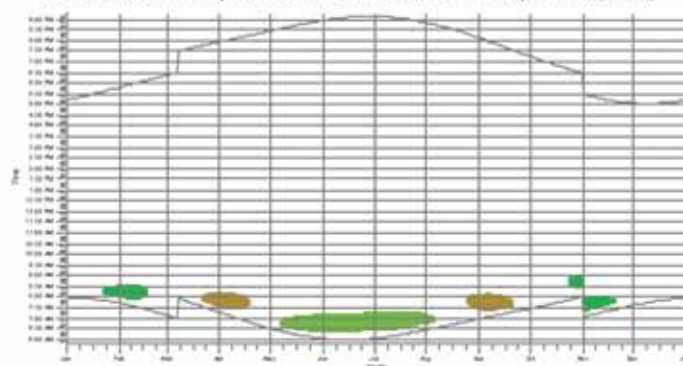
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

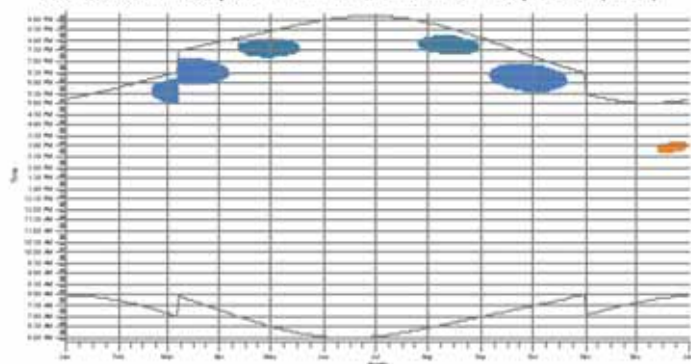
827: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8377)



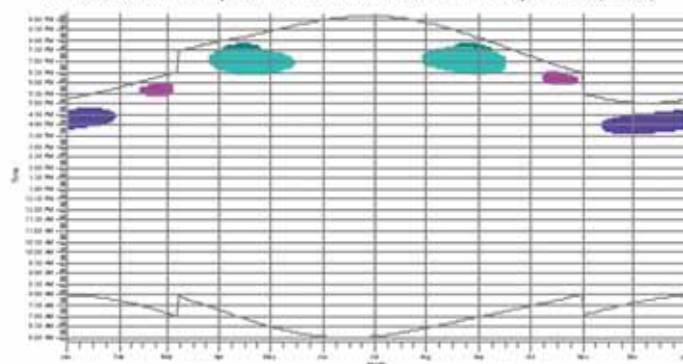
834: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8383)



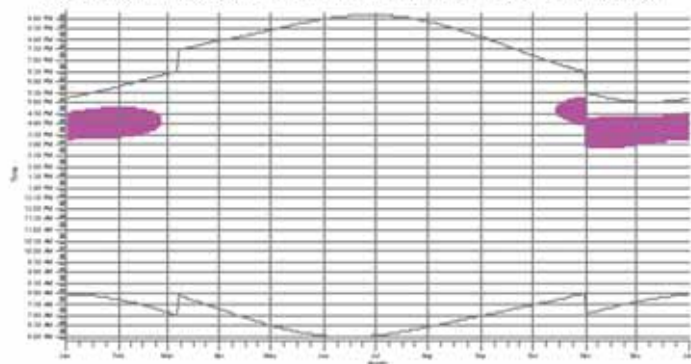
855: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8401)



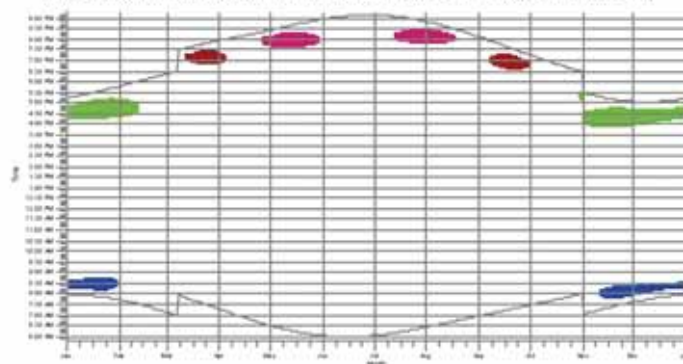
857: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8402)



860: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8403)



869: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8411)



WTG:

T23: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (749)
T24: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (749)
T25: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (749)
T26: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (749)

T27: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T28: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T29: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T30: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)

T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T41: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T42: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T43: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)

T76: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
T77: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)

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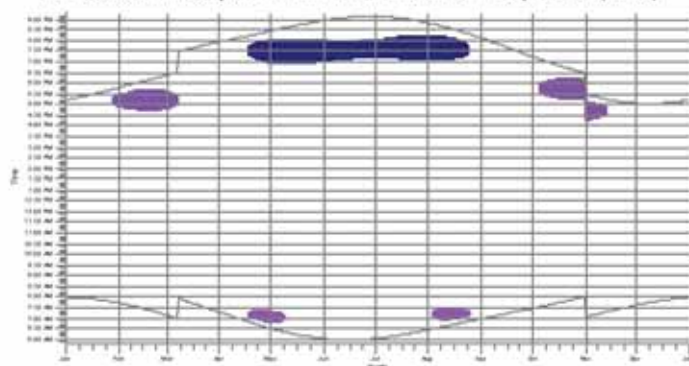
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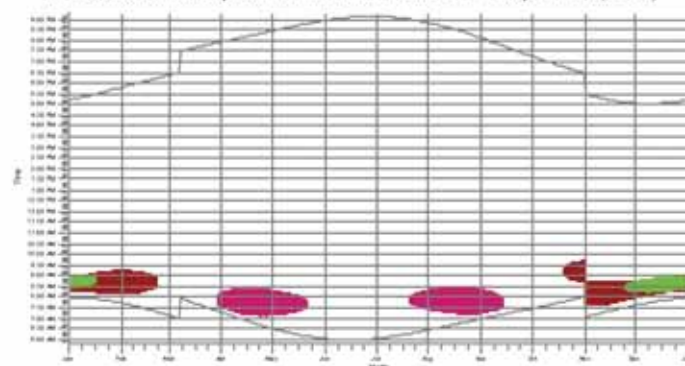
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

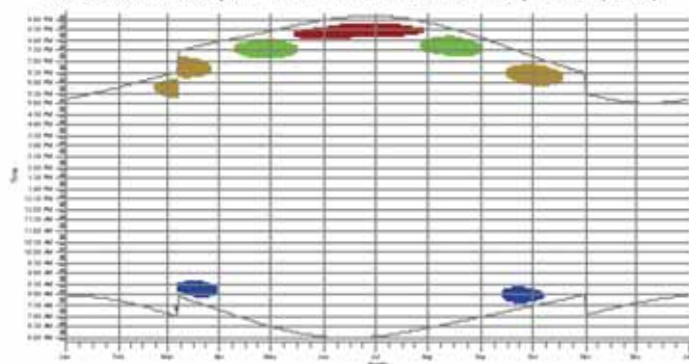
870: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8412)



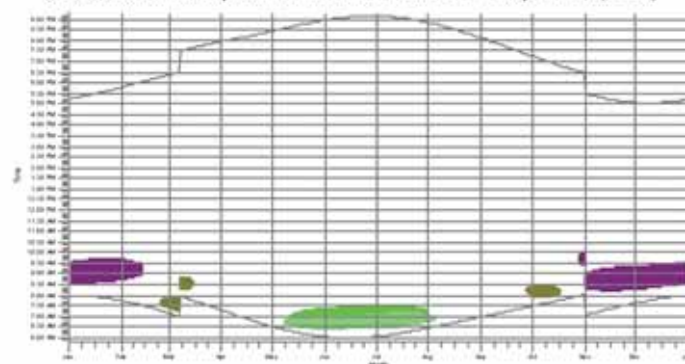
879: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8421)



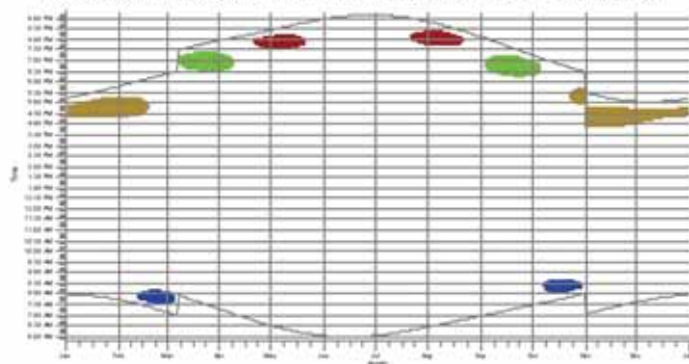
880: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8422)



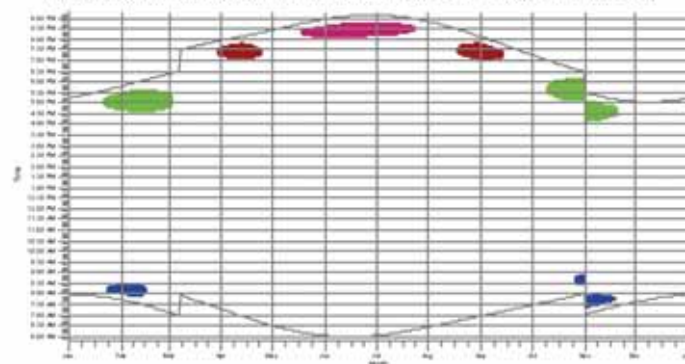
923: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8456)



932: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8465)



938: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8471)



WTG			
T29: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (688)	T36: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (682)	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (731)	T76: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (758)
T34: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (690)	T27: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (724)	T41: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (732)	T77: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (759)
T37: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (691)	T32: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (727)	T42: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (733)	T87: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (780)

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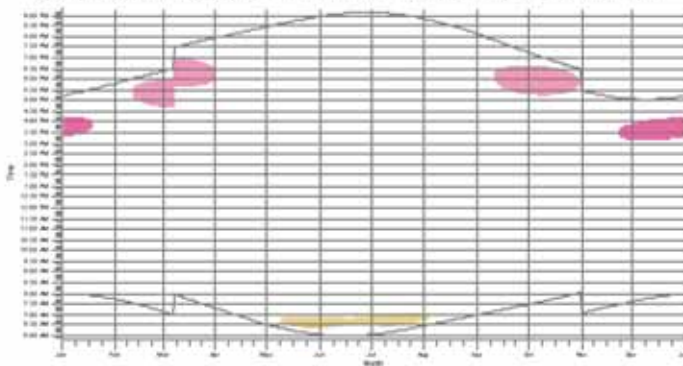
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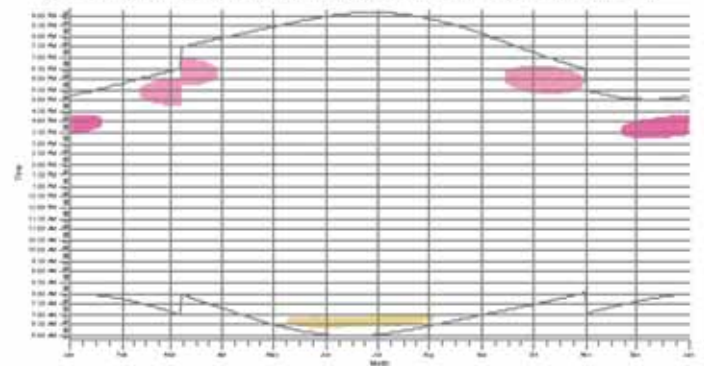
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

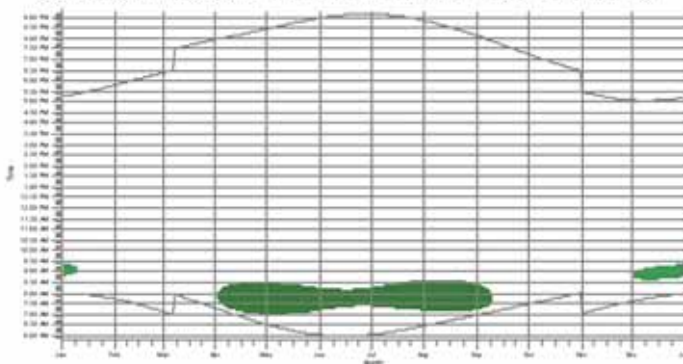
940: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8472)



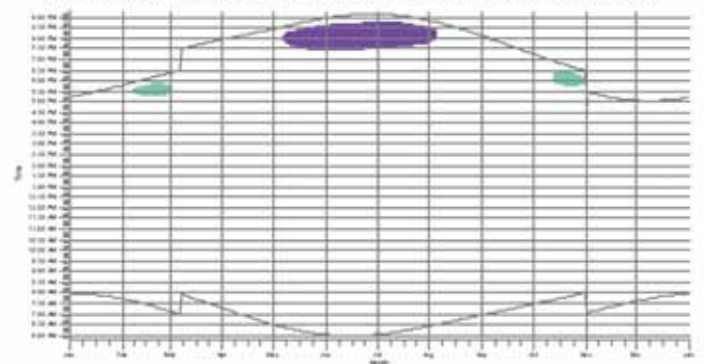
941: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8473)



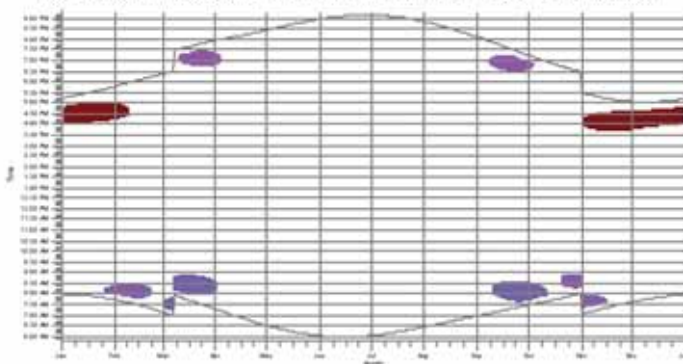
948: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8479)



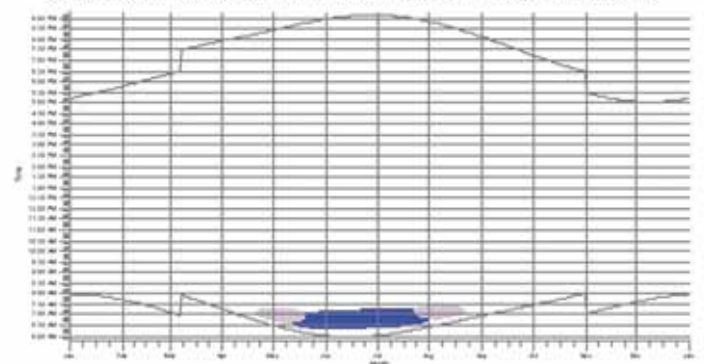
951: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8482)



956: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8486)



986: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8514)



WTG:	T21: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (274)	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (276)
T41: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (684)	T42: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (275)	T43: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (273)
T43: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (689)	T44: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (272)	T44: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (274)
T45: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (701)	T45: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (276)	T45: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (275)
T45: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (706)		

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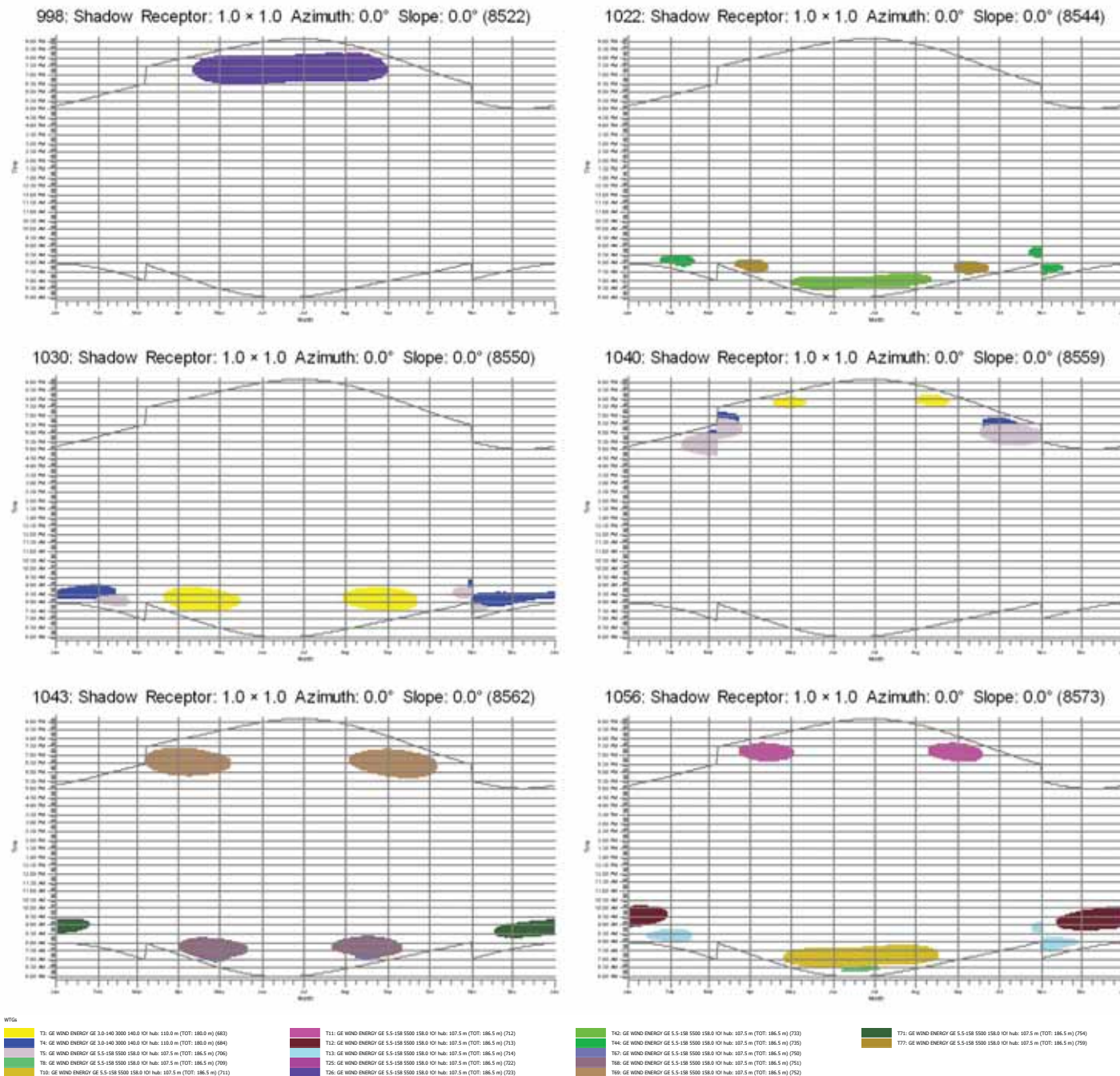
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SHADOW - Calendar, graphical

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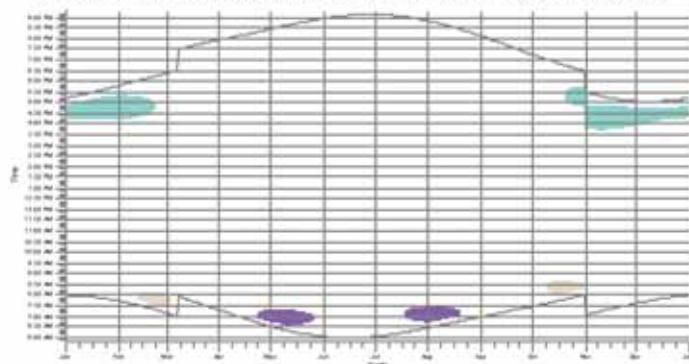
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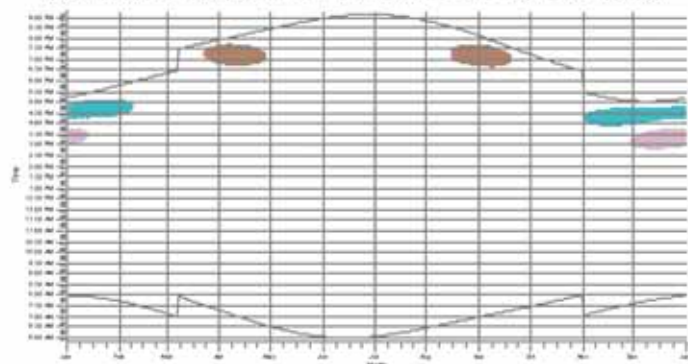
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

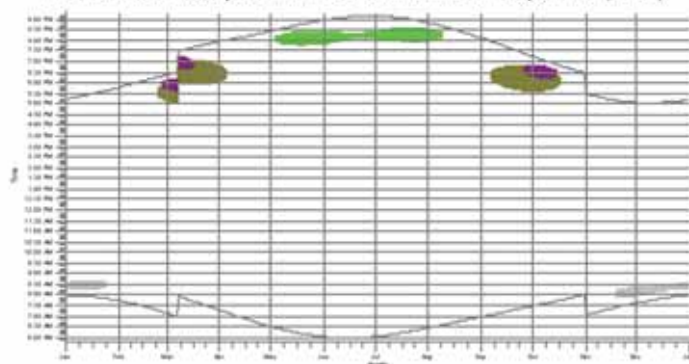
1067: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8582)



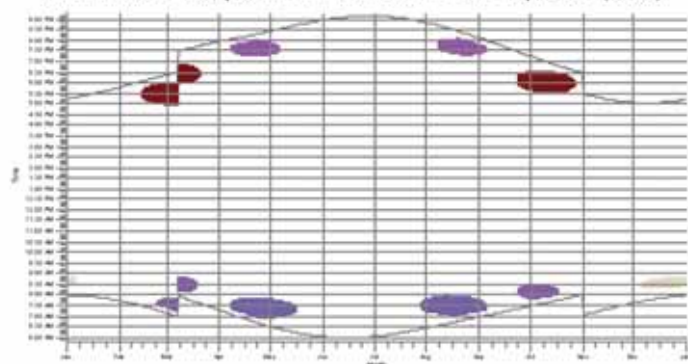
1085: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8598)



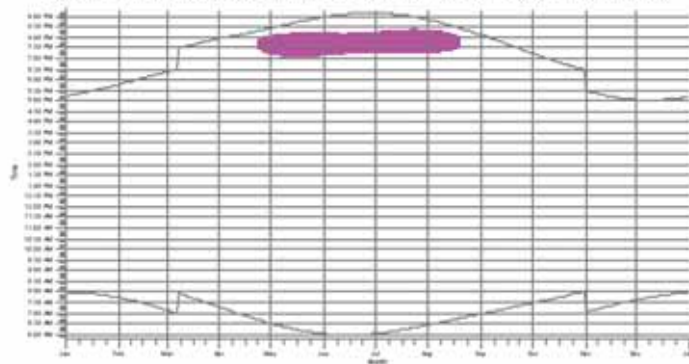
1106: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8618)



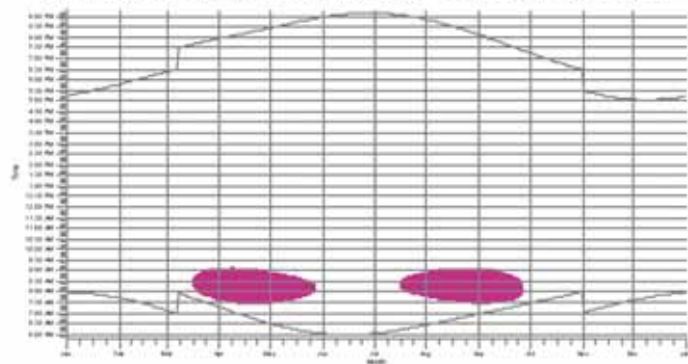
1136: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8645)



1146: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8653)



1151: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8657)



WTG:			
T23: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (690)	T26: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (692)	T28: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (720)	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (730)
T30: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (699)	T29: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (693)	T31: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (720)	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (740)
T34: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (690)	T62: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (700)	T35: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (720)	T79: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (740)
T37: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 180.0 m) (691)	T27: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (724)	T36: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (720)	

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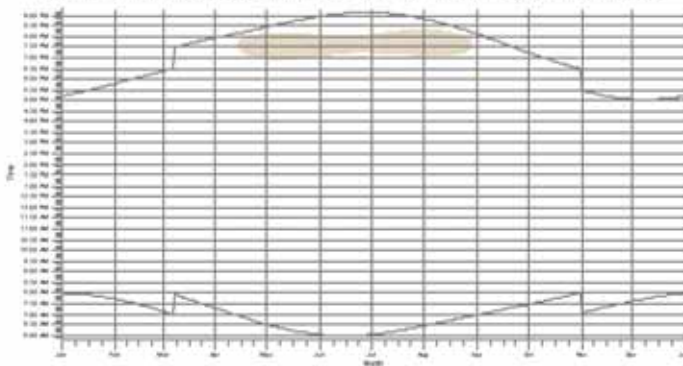
Calculated:

9/5/2019 11:32 PM/3.2.737

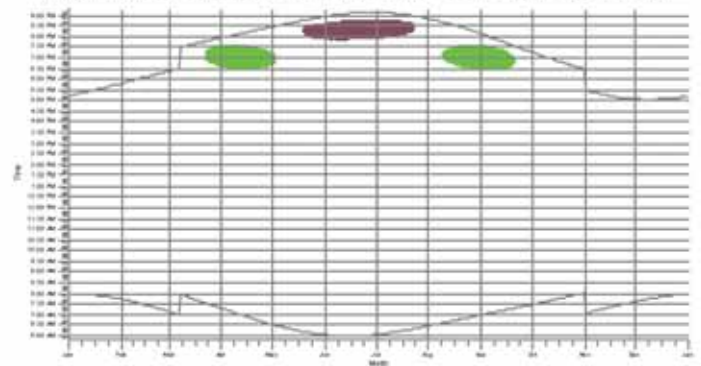
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

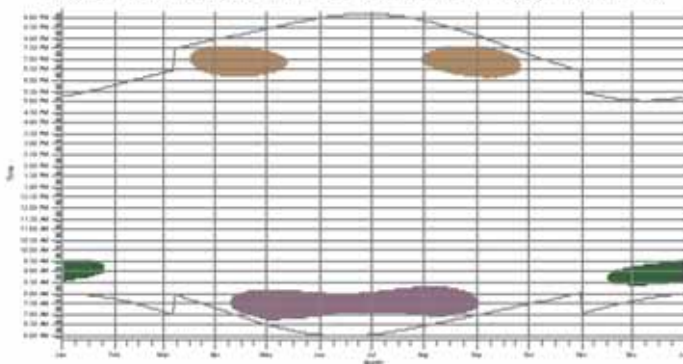
1158: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8662)



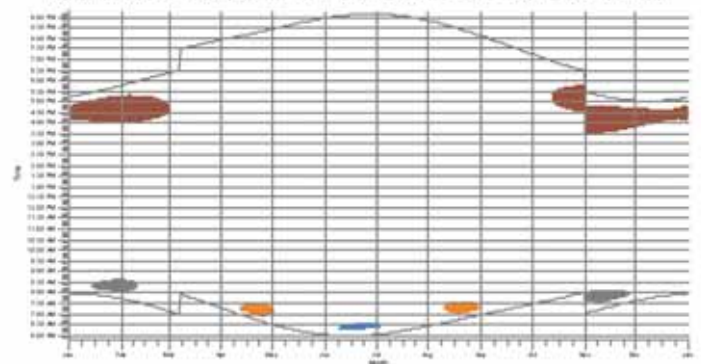
1174: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8675)



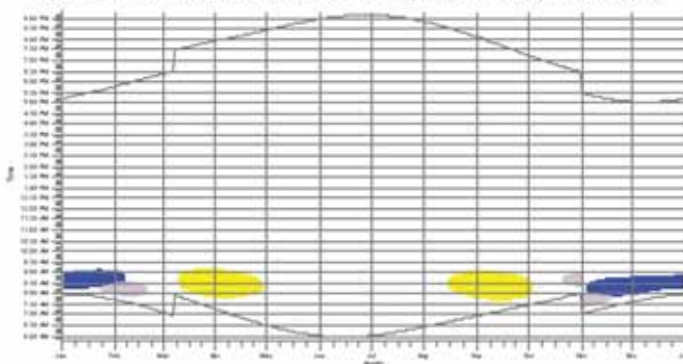
1179: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8679)



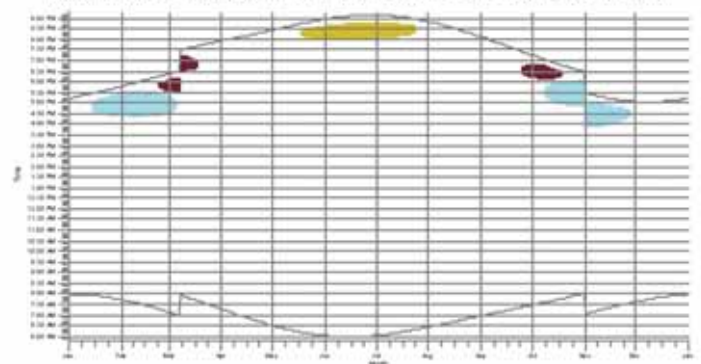
1204: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8702)



1236: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8726)



1237: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8727)



Project:

2019-09-04_Emerison GE Scenario

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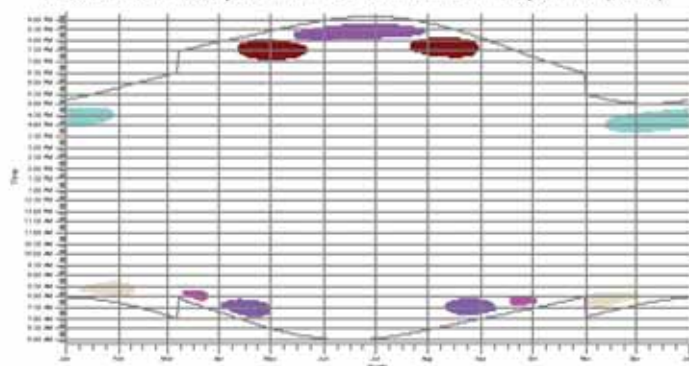
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9/5/2019 11:32 PM/3.2.737

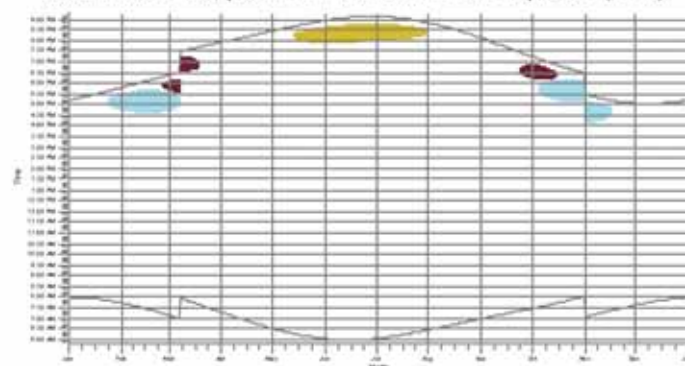
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines

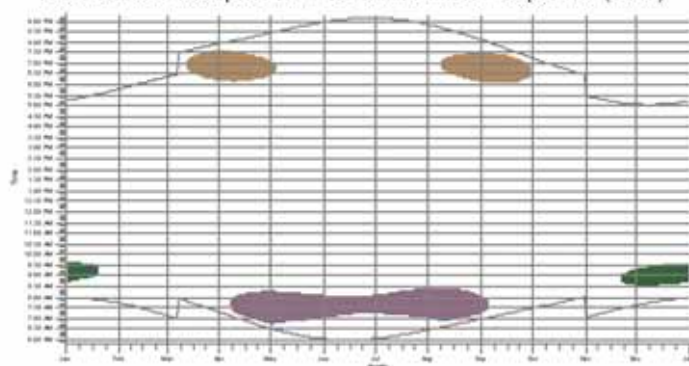
1269: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8753)



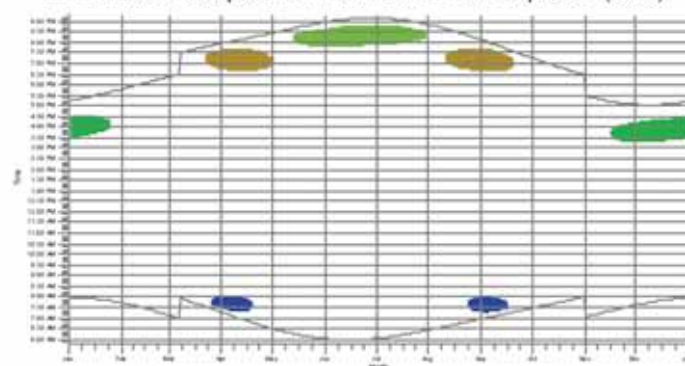
1314: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8792)



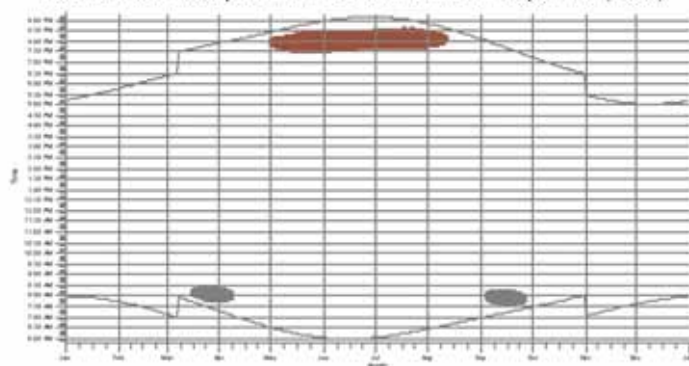
1375: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8838)



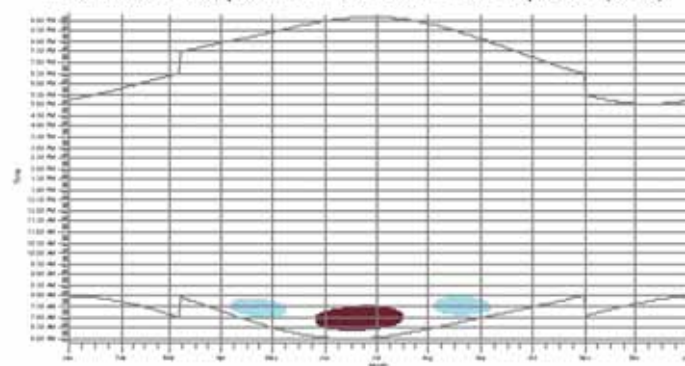
1431: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8883)



1438: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8890)



1445: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8896)



WTG:

T22: GE WIND ENERGY GE 3.0-140 3000 140.0 101 hub: 110.0 m (TOT: 180.5 m) (699)
T30: GE WIND ENERGY GE 3.0-140 3000 140.0 101 hub: 110.0 m (TOT: 180.5 m) (699)
T10: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (711)
T12: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (713)
T13: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (714)

T21: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (721)
T27: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (724)
T31: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (726)
T33: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (728)
T35: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (729)

T36: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (730)
T42: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (733)
T44: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (735)
T67: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (750)
T68: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (751)

T69: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (752)
T71: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (754)
T76: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (758)
T77: GE WIND ENERGY GE 5.5-158 5500 158.0 101 hub: 107.5 m (TOT: 186.5 m) (759)

Project:

2019-09-04_Emerison GE Scenario

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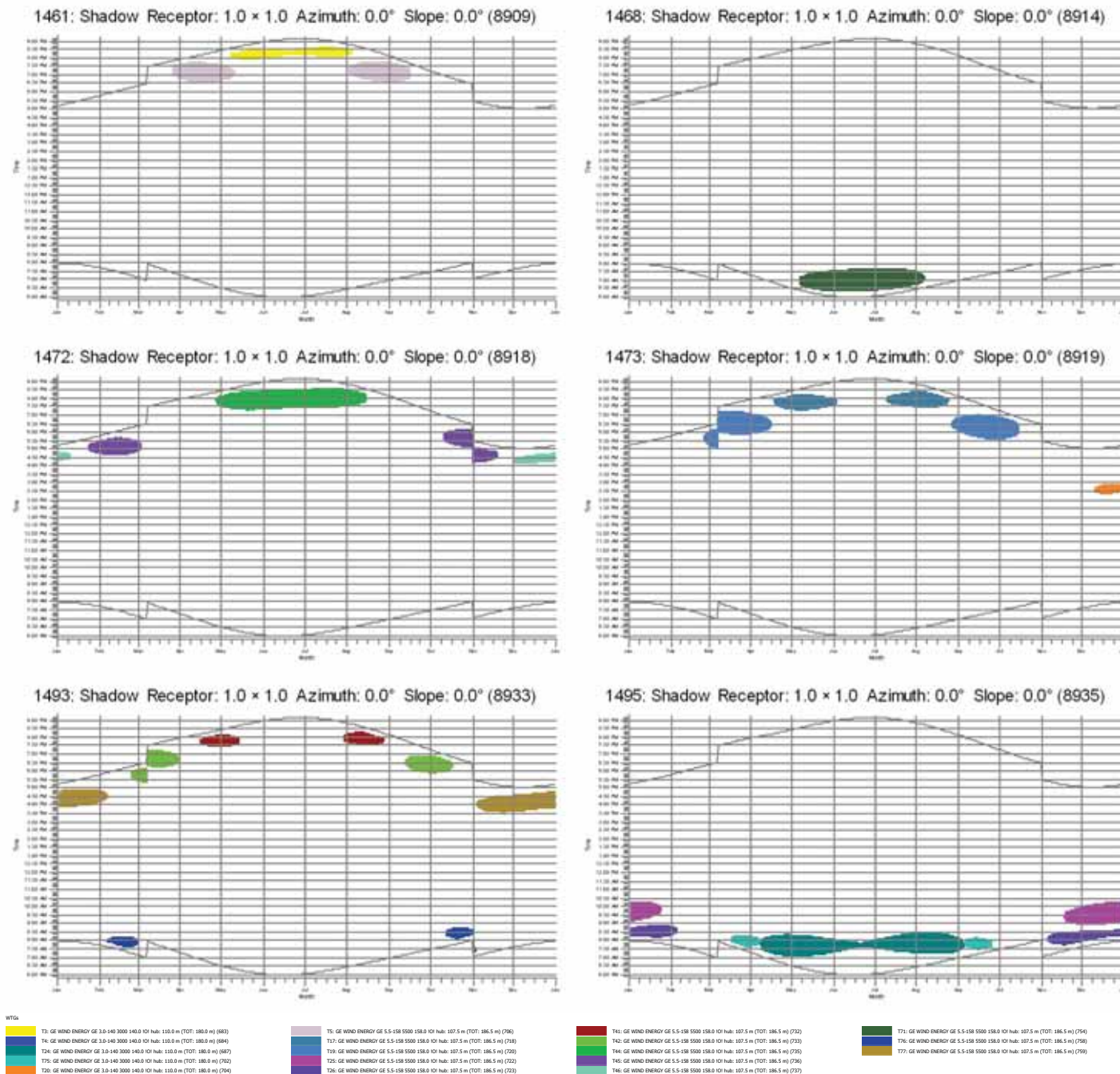
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Calculated:

9/5/2019 11:32 PM/3.2.737

SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerison GE Turbines



Project:

2019-09-04_Emerson GE Scenario

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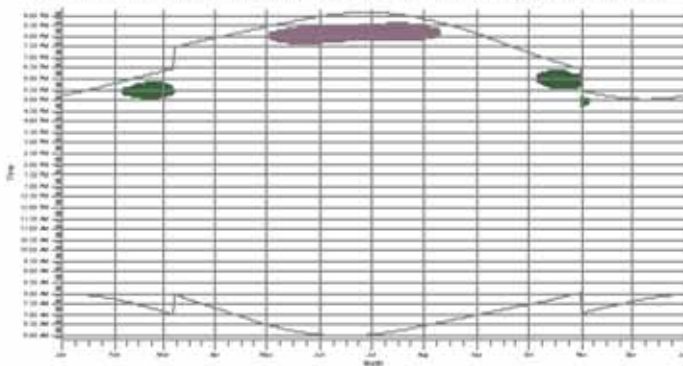
Calculated:

9/5/2019 11:32 PM/3.2.737

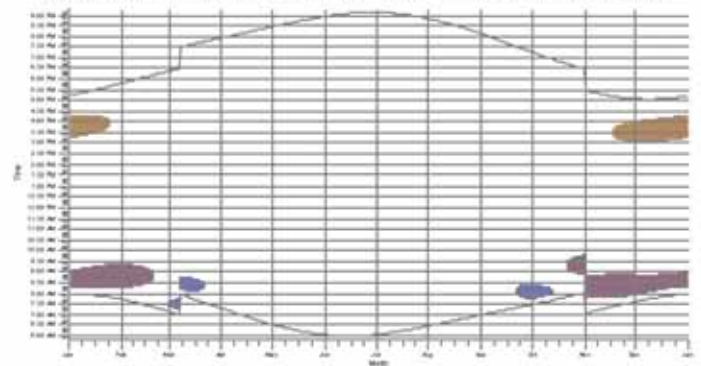
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerson GE Turbines

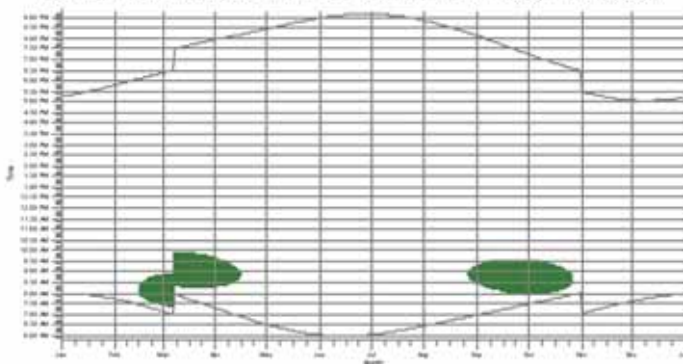
1505: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8943)



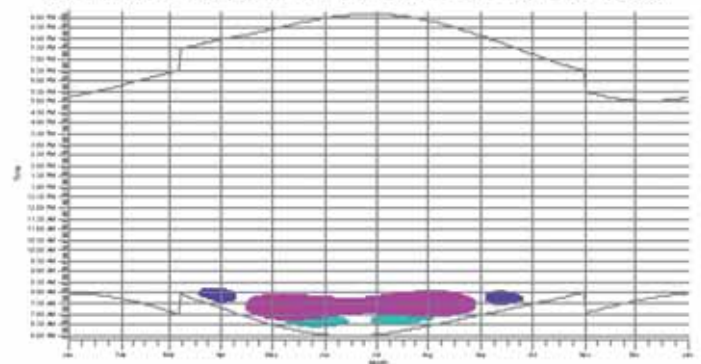
1518: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8953)



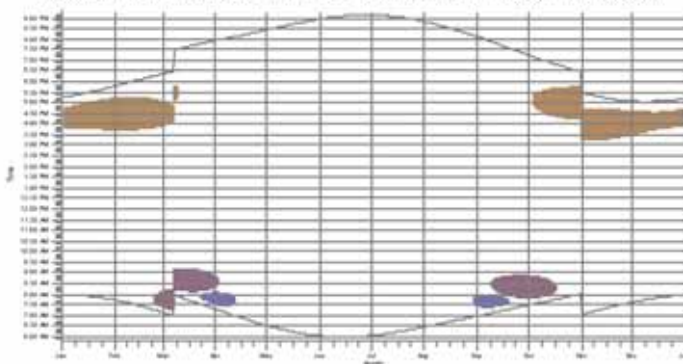
1526: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8960)



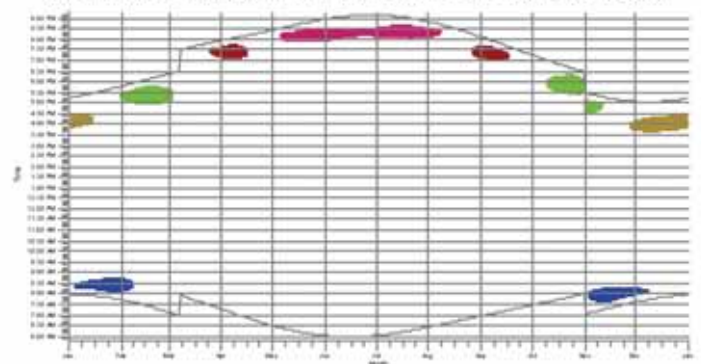
1531: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8965)



1549: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8980)



1551: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8982)



WTG	T75: GE WIND ENERGY GE 3.0-140 3000 140.0 ICF hub: 110.0 m (TOT: 186.5 m) (732)	T41: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (732)	T68: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (751)	T77: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)
	T35: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (732)	T42: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (733)	T69: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (752)	
	T36: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (733)	T61: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (746)	T71: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (754)	
	T40: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (731)	T67: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (750)	T76: GE WIND ENERGY GE 5.5-158 5500 158.0 ICF hub: 107.5 m (TOT: 186.5 m) (756)	

Project:

2019-09-04_Emerson GE Scenario

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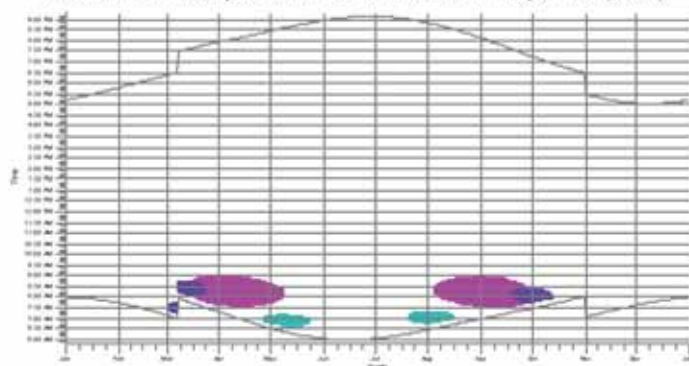
Calculated:

9/5/2019 11:32 PM/3.2.737

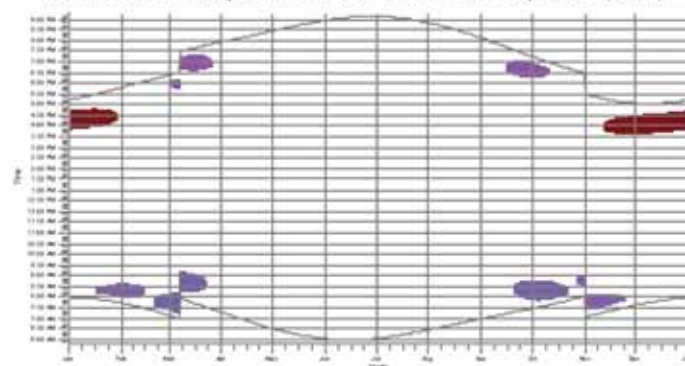
SHADOW - Calendar, graphical

Calculation: 2019-09-04_Emerson GE Turbines

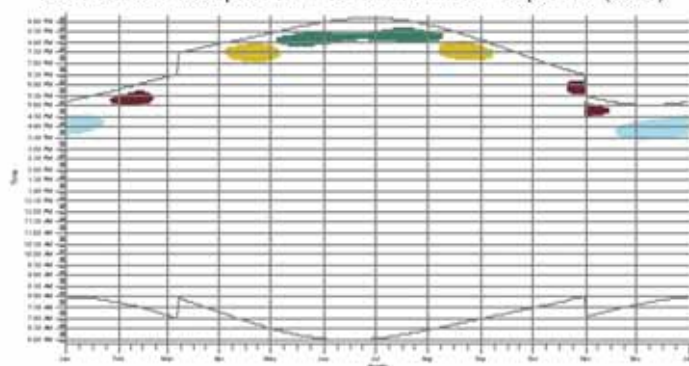
1552: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8983)



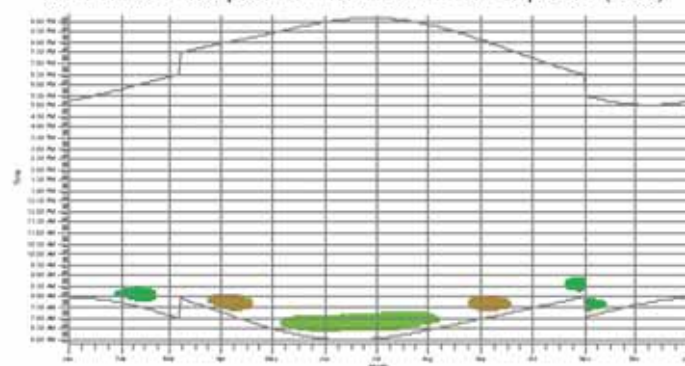
1568: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (8991)



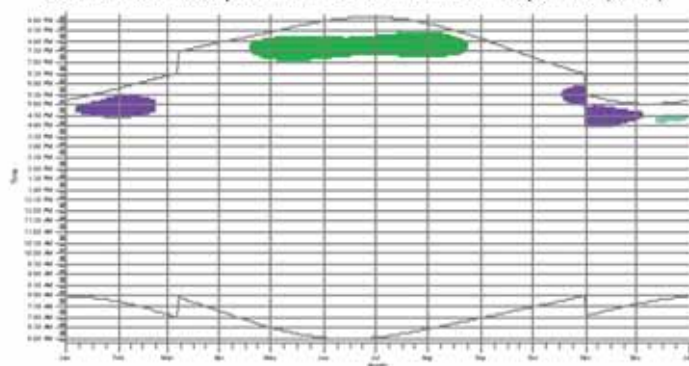
1603: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (9023)



1620: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (9038)



1666: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 0.0° (9078)



Attachment C

Cumulative Shadow Flicker Results

SHADOW - Main Result

Calculation: 2019-09-06_Cumulative Emerson SFA_GE Scenario**Assumptions for shadow calculations**

Maximum distance for influence 1,580 m
 Minimum sun height over horizon for influence 3 °
 Day step for calculation 1 days
 Time step for calculation 1 minutes

Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0.31	0.40	0.44	0.52	0.57	0.64	0.66	0.61	0.59	0.48	0.30	0.22

Operational time

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW
300	301	557	671	325	294	265	370	495	1,070	1,118	1,067

W	WNW	NW	NNW	Sum
738	557	368	264	8,760

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:

Height contours used: Height Contours: CONTOURLINE_2018-10-16_Emerson SFA_2.wpo (5)

Obstacles not used in calculation

Eye height for map: 1.5 m

Grid resolution: 10.0 m

All coordinates are in

UTM (north)-NAD83 (US+CA) Zone: 17

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	RPM [RPM]
					Valid	Manufact.					
			[m]								
T25	348,244	4,568,858	238.0	GE WIND ENERGY GE 4.8-158 4800 158.0 !O! hub: 10...	Yes	GE WIND ENERGY	GE 4.8-158-4,800	4,800	158.0	107.5	0.0
T34	346,474	4,567,059	239.4	GE WIND ENERGY GE 3.0-140 3000 140.0 !O! hub: 11...	Yes	GE WIND ENERGY	GE 3.0-140-3,000	3,000	140.0	110.0	0.0
T37	346,951	4,566,553	241.9	GE WIND ENERGY GE 3.0-140 3000 140.0 !O! hub: 11...	Yes	GE WIND ENERGY	GE 3.0-140-3,000	3,000	140.0	110.0	0.0
T38	346,312	4,566,449	244.1	GE WIND ENERGY GE 3.0-140 3000 140.0 !O! hub: 11...	Yes	GE WIND ENERGY	GE 3.0-140-3,000	3,000	140.0	110.0	0.0
T42	343,005	4,567,906	236.4	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T43	343,157	4,568,376	236.0	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T44	343,321	4,568,070	235.1	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T45	343,604	4,568,382	231.1	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T46	343,770	4,568,055	235.1	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T47	344,804	4,565,988	243.9	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T48	344,861	4,566,427	244.0	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T49	344,878	4,567,522	240.0	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T50	345,325	4,567,813	239.0	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: ...	Yes	VESTAS	V150-4.2-4,200	4,200	150.0	105.0	10.4
T87	346,898	4,567,229	238.0	GE WIND ENERGY GE 4.8-158 4800 158.0 !O! hub: 10...	Yes	GE WIND ENERGY	GE 4.8-158-4,800	4,800	158.0	107.5	0.0

Shadow receptor-Input

No.	Easting	Northing	Z	Width	Height	Elevation	Slope of	Direction mode	Eye height
						a.g.l.	window		(ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
15	345,797	4,566,154	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
94	345,801	4,567,370	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
95	346,311	4,567,623	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
114	345,801	4,567,317	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
127	345,817	4,566,194	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
198	345,218	4,567,181	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
199	345,881	4,567,518	238.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
246	345,882	4,568,507	237.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
254	345,816	4,565,902	244.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
275	345,961	4,566,804	241.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
304	345,777	4,566,429	242.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
338	345,885	4,568,343	236.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
367	345,301	4,565,438	246.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
418	345,797	4,567,453	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
447	345,885	4,567,227	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0

To be continued on next page...

SHADOW - Main Result

Calculation: 2019-09-06_Cumulative Emerson SFA_GE Scenario

...continued from previous page

No.	Easting	Northing	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
			[m]	[m]	[m]	[m]	[°]		[m]
451	346,278	4,567,619	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
467	345,810	4,565,930	244.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
476	345,887	4,567,695	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
489	345,814	4,567,816	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
533	345,465	4,565,556	246.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
544	345,907	4,565,791	245.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
548	345,388	4,565,187	246.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
626	345,557	4,566,604	241.9	1.0	1.0	1.0	90.0	"Green house mode"	2.0
639	345,728	4,565,326	245.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
665	346,372	4,567,707	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
743	346,219	4,567,625	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
772	345,803	4,567,357	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
826	345,797	4,567,414	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
852	345,721	4,565,328	245.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
864	345,799	4,567,218	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
872	345,753	4,568,254	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
908	346,325	4,567,718	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
909	345,809	4,567,858	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
923	345,895	4,566,816	240.4	1.0	1.0	1.0	90.0	"Green house mode"	2.0
959	345,203	4,565,546	245.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
968	345,811	4,566,113	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
999	345,898	4,567,282	239.8	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1013	346,750	4,567,586	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1061	345,713	4,565,364	245.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1091	346,439	4,567,620	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1105	345,804	4,567,260	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1119	345,792	4,566,007	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1127	345,882	4,567,698	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1137	345,804	4,566,473	242.3	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1177	345,821	4,566,197	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1190	345,804	4,566,058	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1191	345,520	4,566,585	242.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1224	345,826	4,565,981	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1309	346,437	4,567,694	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1318	345,917	4,565,508	246.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1319	345,782	4,567,136	240.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1362	346,362	4,567,630	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1374	345,885	4,568,329	236.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1395	345,808	4,566,059	244.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1496	345,809	4,568,267	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1574	345,179	4,565,533	245.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1586	345,822	4,567,489	239.6	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1592	346,159	4,567,667	238.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0
1595	345,904	4,565,792	245.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
3164	345,904	4,565,110	246.0	1.0	1.0	1.0	90.0	"Green house mode"	2.0

Calculation Results

Shadow receptor

No.	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]	
15	64:39	143	0:53	23:21	
94	94:11	228	0:44	23:11	
95	103:03	199	0:53	21:00	
114	91:27	224	0:45	24:06	
127	86:29	177	0:48	33:31	
198	27:46	104	0:26	5:35	
199	149:11	256	0:54	36:50	
246	0:00	0	0:00	0:00	
254	40:50	107	0:34	14:07	
275	201:10	248	1:33	47:40	
304	114:23	161	1:27	39:21	
338	41:29	58	0:57	7:45	

To be continued on next page...

SHADOW - Main Result

Calculation: 2019-09-06_Cumulative Emerson SFA_GE Scenario

...continued from previous page

No.	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]
367	0:00	0	0:00	0:00
418	92:59	216	0:43	20:54
447	119:38	251	0:52	32:10
451	90:44	184	0:52	20:21
467	52:27	114	0:45	18:43
476	129:13	233	1:01	38:40
489	121:15	188	1:09	38:31
533	2:43	17	0:11	0:53
544	21:43	83	0:30	7:13
548	0:00	0	0:00	0:00
626	129:19	219	1:24	39:55
639	0:00	0	0:00	0:00
665	91:01	158	0:56	16:57
743	82:18	173	0:48	20:14
772	94:02	230	0:44	23:27
826	93:50	221	0:43	22:04
852	0:00	0	0:00	0:00
864	103:34	241	0:46	29:35
872	67:04	70	1:21	12:50
908	92:31	163	0:52	17:37
909	119:18	185	1:09	37:07
923	210:34	257	1:21	54:31
959	0:00	0	0:00	0:00
968	68:01	149	0:52	25:12
999	115:24	244	0:52	29:03
1013	88:00	102	1:25	14:30
1061	0:00	0	0:00	0:00
1091	120:37	176	1:04	21:33
1105	91:58	213	0:46	25:43
1119	83:19	136	0:58	31:11
1127	130:15	235	1:02	39:03
1137	117:50	152	1:35	38:56
1177	87:13	177	0:47	33:54
1190	81:04	150	0:55	30:44
1191	130:49	217	1:25	40:31
1224	71:02	131	0:52	26:09
1309	87:10	148	1:00	15:46
1318	25:06	80	0:29	8:38
1319	134:31	276	0:53	41:11
1362	113:06	189	0:57	21:25
1374	47:28	64	0:58	9:00
1395	79:49	150	0:54	30:17
1496	65:49	74	1:08	12:49
1574	0:00	0	0:00	0:00
1586	99:08	223	0:43	21:40
1592	80:08	173	0:44	20:14
1595	21:47	83	0:30	7:14
3164	0:00	0	0:00	0:00

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

No.	Name	Worst case [h/year]	Expected [h/year]
T25	GE WIND ENERGY GE 4.8-158 4800 158.0 !O! hub: 107.5 m (TOT: 186.5 m) (515)	0:00	0:00
T34	GE WIND ENERGY GE 3.0-140 3000 140.0 !O! hub: 110.0 m (TOT: 180.0 m) (512)	278:12	76:50
T37	GE WIND ENERGY GE 3.0-140 3000 140.0 !O! hub: 110.0 m (TOT: 180.0 m) (513)	140:41	42:48
T38	GE WIND ENERGY GE 3.0-140 3000 140.0 !O! hub: 110.0 m (TOT: 180.0 m) (514)	295:23	75:56
T42	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (35)	0:00	0:00
T43	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (36)	0:00	0:00
T44	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (37)	0:00	0:00
T45	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (38)	0:00	0:00
T46	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (39)	0:00	0:00
T47	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (40)	164:02	46:31
T48	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (41)	195:26	60:56

To be continued on next page...

SHADOW - Main Result

Calculation: 2019-09-06_Cumulative Emerson SFA_GE Scenario

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No.	Name	Worst case [h/year]	Expected [h/year]
T49	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (42)	181:24	56:59
T50	VESTAS V150-4.2 4200 150.0 !O! hub: 105.0 m (TOT: 180.0 m) (43)	309:28	95:00
T87	GE WIND ENERGY GE 4.8-158 4800 158.0 !O! hub: 107.5 m (TOT: 186.5 m) (516)	355:48	79:47

Total times in Receptor wise and WTG wise tables can differ, as a WTG can lead to flicker at 2 or more receptors simultaneously and/or receptors may receive flicker from 2 or more WTGs simultaneously.

Firelands Wind, LLC
Case No. 18-1607-EL-BGN
Revised Fourth Supplement to Application
October 4, 2019

Attachment 4

Setback Analysis Update By Environmental Design & Research

1. Supplement to Figure 08-6 of the Application - Setbacks for GE140 and GE158 Turbine Models.

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memorandum

To: Apex Clean Energy EDR Project No: 17119
From: Lindsay Donahoe
Date: September 30, 2019
Reference: Updated Setbacks

Comments:

The setbacks evaluated in the Emerson Creek Wind Farm (the Facility) Certificate Application submitted to the Ohio Power Siting Board (OPSB) on January 31, 2019 (Case No. 18-1607-EL-BGN) were calculated based on the largest potential setback from all turbine models under consideration. Since the submittal of the Certificate Application to the OPSB, the Applicant is considering additional turbine models and dimensions (Table 1).

Table 1. Approximate Turbine Dimensions by Model

Turbine Model	Hub Height	Rotor Diameter	Maximum Total Height
GE158	107.5 meters (353 feet)	158 meters (518 feet)	186.5 meters (612 feet)
GE140	110 meters (361 feet)	140 meters (459 feet)	180 meters (591 feet)

The new turbine models and turbine dimensions now under consideration for the Facility include the GE158 and GE140. With these models, the GE158 turbine with a hub height of 353 feet (107.5 meters) and a maximum blade tip height of 612 feet (186.5 meters) at 64 of the proposed locations. The remaining 23 sites would use the GE140 turbine with a hub height of 361 feet (110 meters) and a maximum blade tip height of 590.5 feet (180 meters).

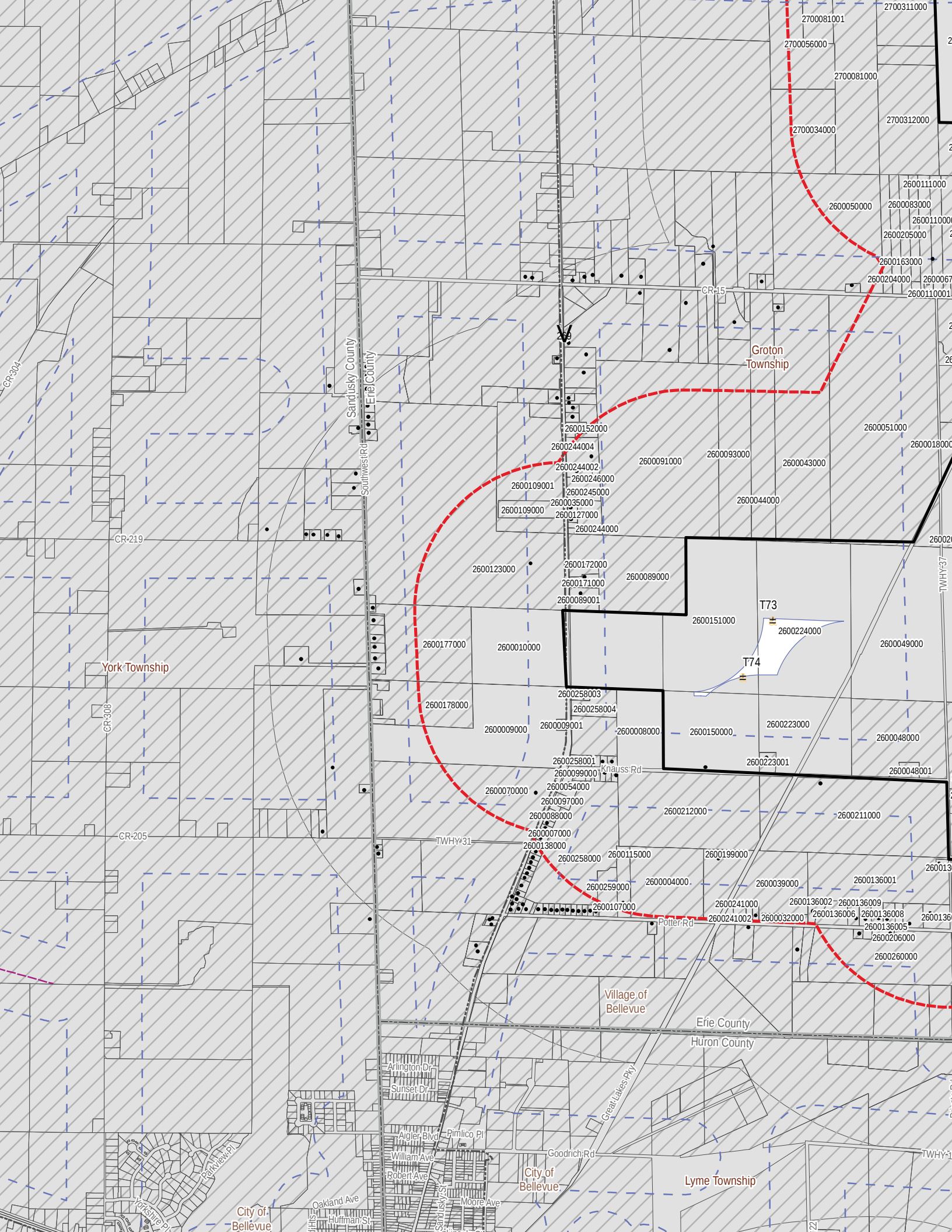
EDR has re-evaluated the setbacks presented in the Certificate Application based on these new turbine models and dimensions for both scenarios listed above. An updated setback map for the GE Scenario is attached. A comparison of the setbacks presented in the Certificate Application with the updated setbacks for the two potential permitting scenarios is provided below.

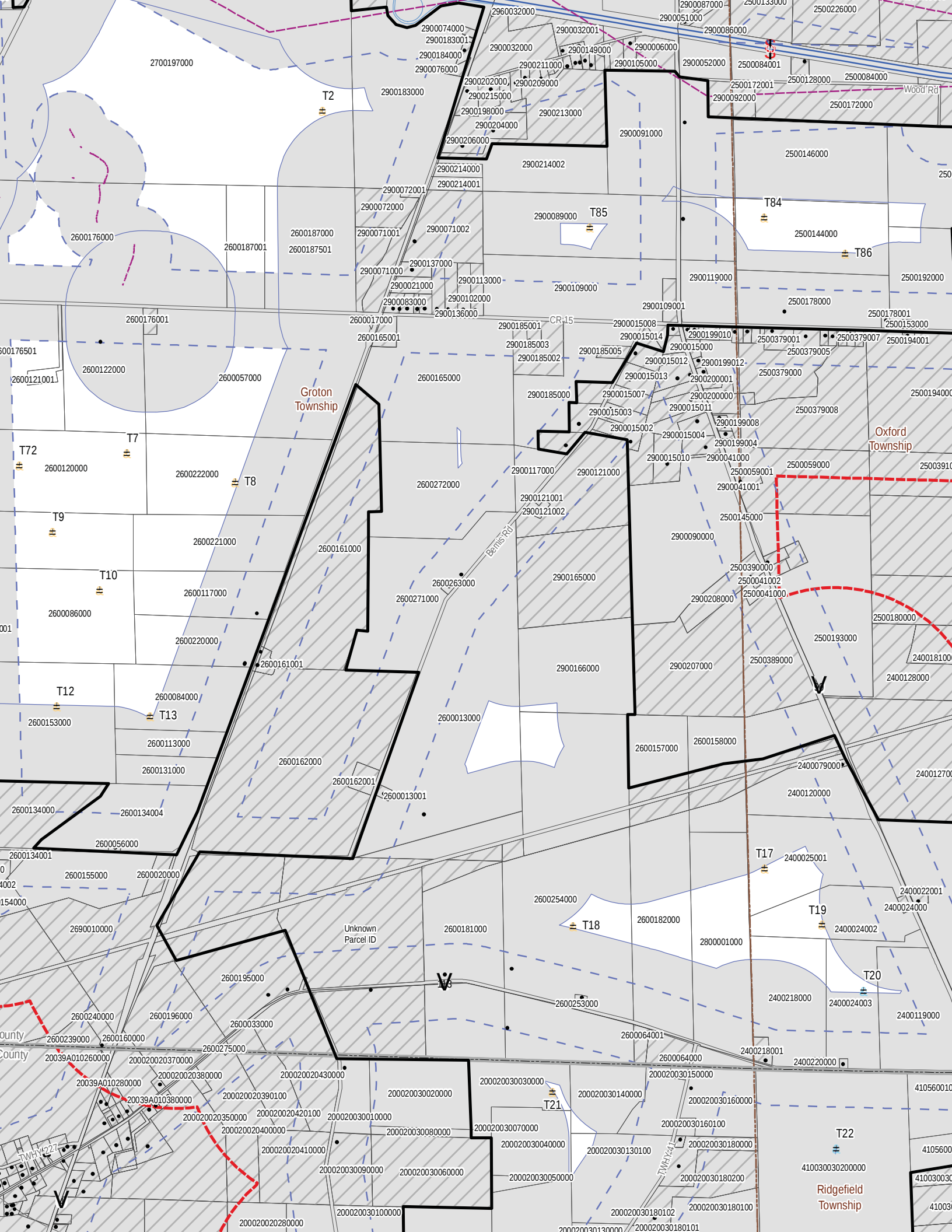
Setbacks to Wind Farm Property Line, Transmission Line, Pipelines, and Public Roads

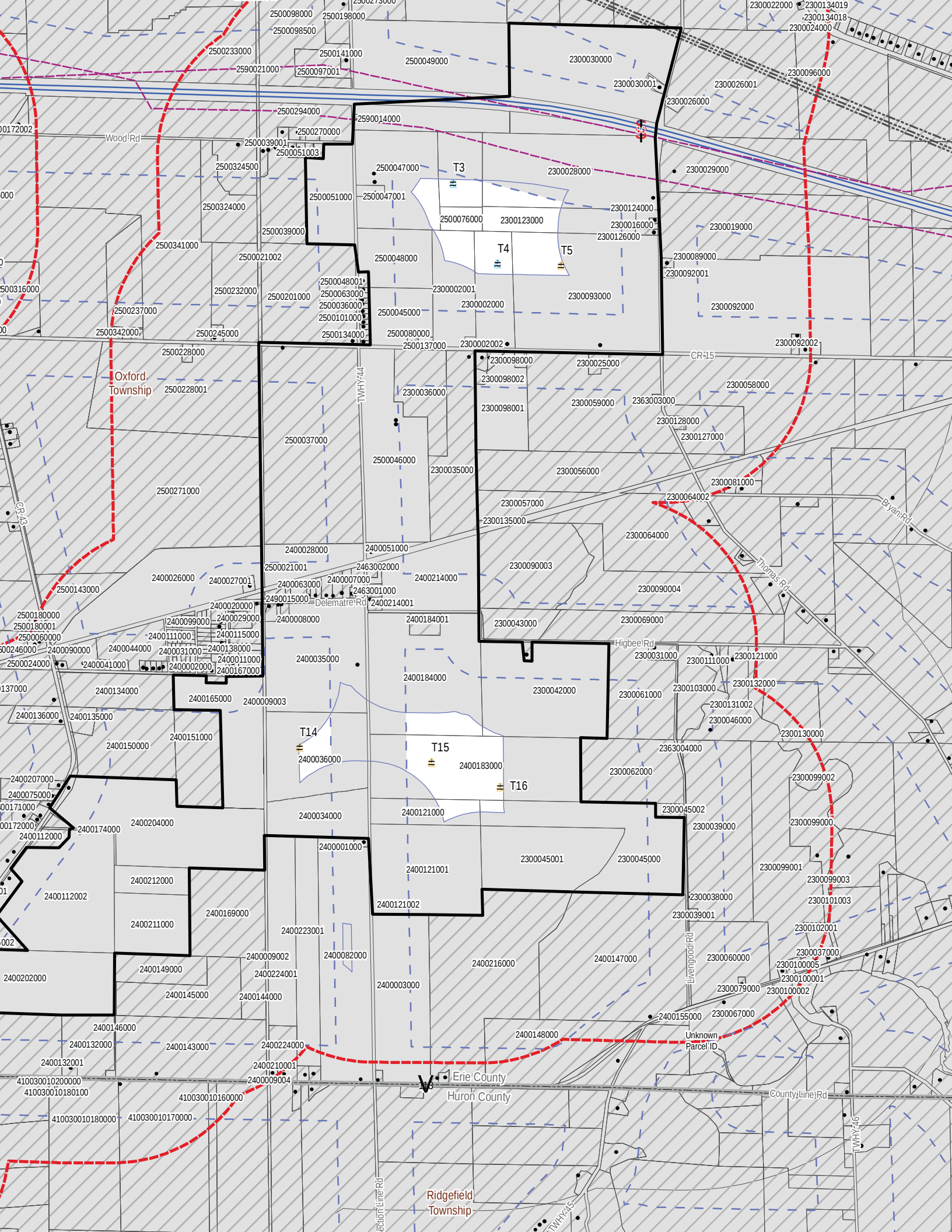
The distance from a wind turbine base to the property line of the wind farm property, electric transmission line, gas pipeline, gas distribution line, hazardous liquid pipeline, or public road must be at least one and one-tenth times the total height of the turbine structure as measured from its tower's base to the tip of a blade at its highest point. The maximum total height of the tallest turbine model under consideration at the time of the Certificate Application submittal was 655 feet. Therefore, the turbine setback to the wind farm property was calculated to be 720.5 feet. Based on the new turbine models under consideration, the setback associated with the GE158 is 673 feet. All turbine locations meet this requirement (see attached Figure).

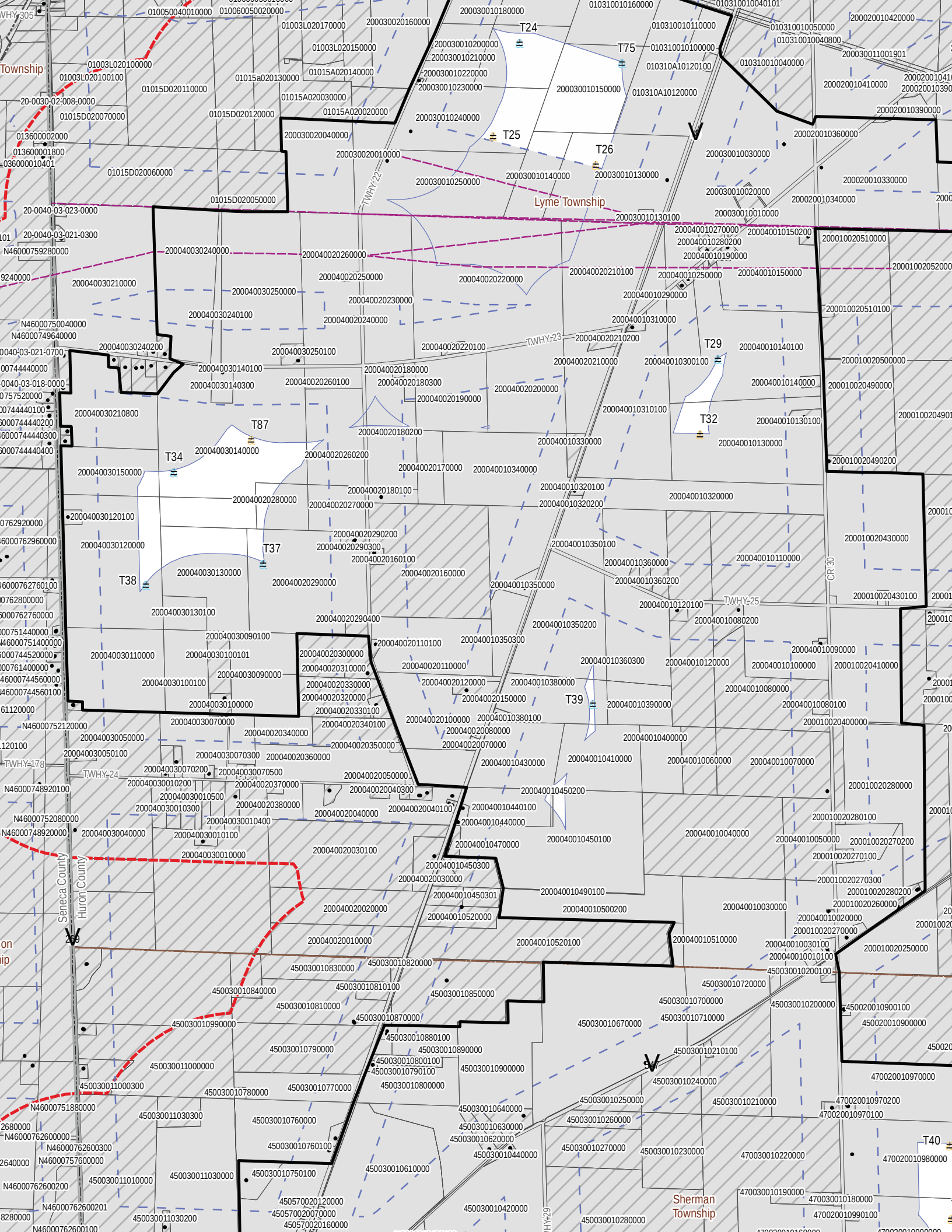
Setback to Property Line of Nearest Adjacent Property, including State or Federal Highway

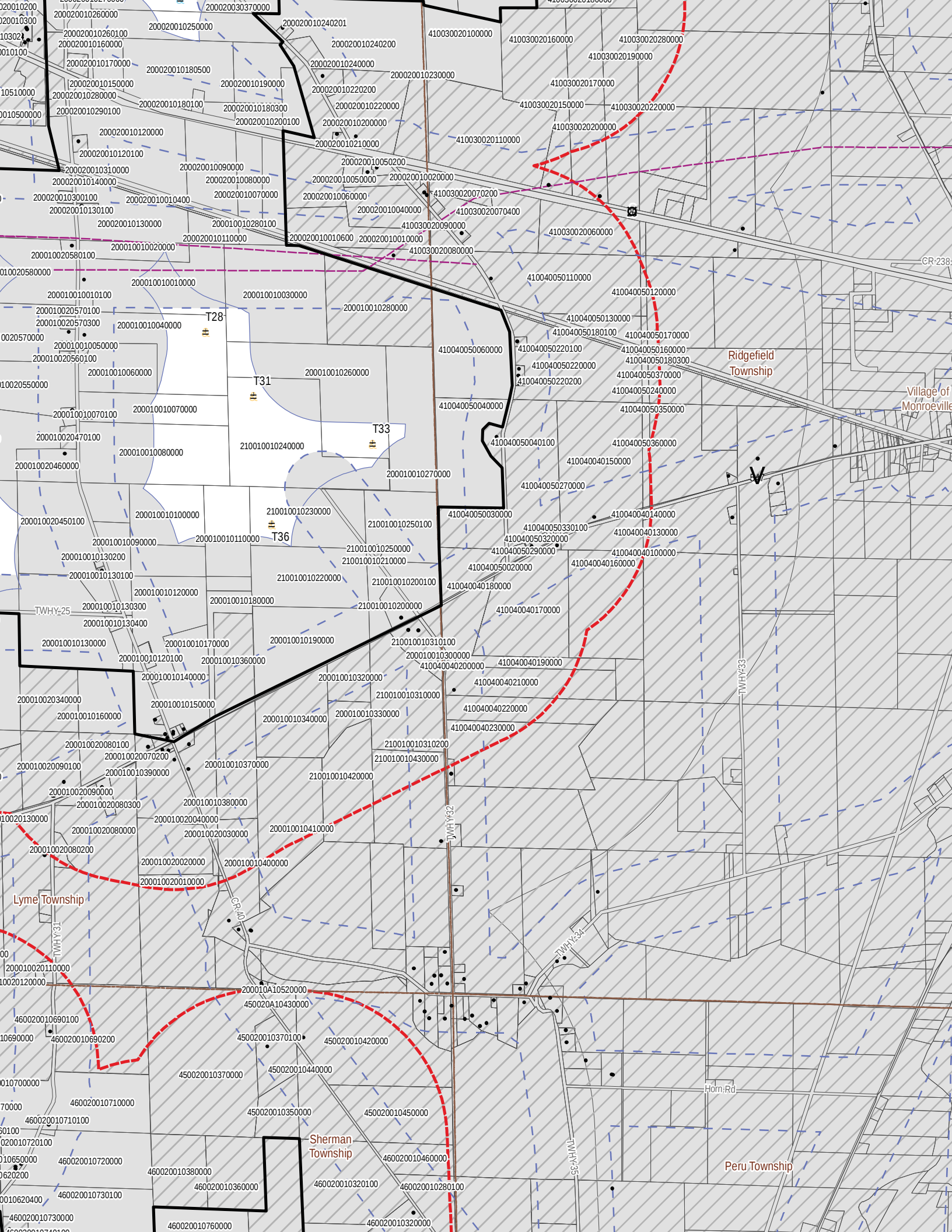
The wind turbine must be at least 1,125 feet in horizontal distance from the tip of the turbine's nearest blade at ninety degrees to the property line of the nearest adjacent property and state or federal highway at the time of the Certificate Application. As presented in the Certificate Application, the maximum rotor diameter was 492 feet (based on the V150 turbine), resulting in a setback to the nearest adjacent property line of 1,371 feet. For the GE turbine models, the maximum rotor diameter is 518 feet, resulting in an updated setback of 1,384 feet. All 64 of the proposed GE158 proposed locations meet this setback (see attached Figure). Locations that did not meet that setback are proposed to use the GE140 turbine model, which would result in a setback of 1,355 feet.

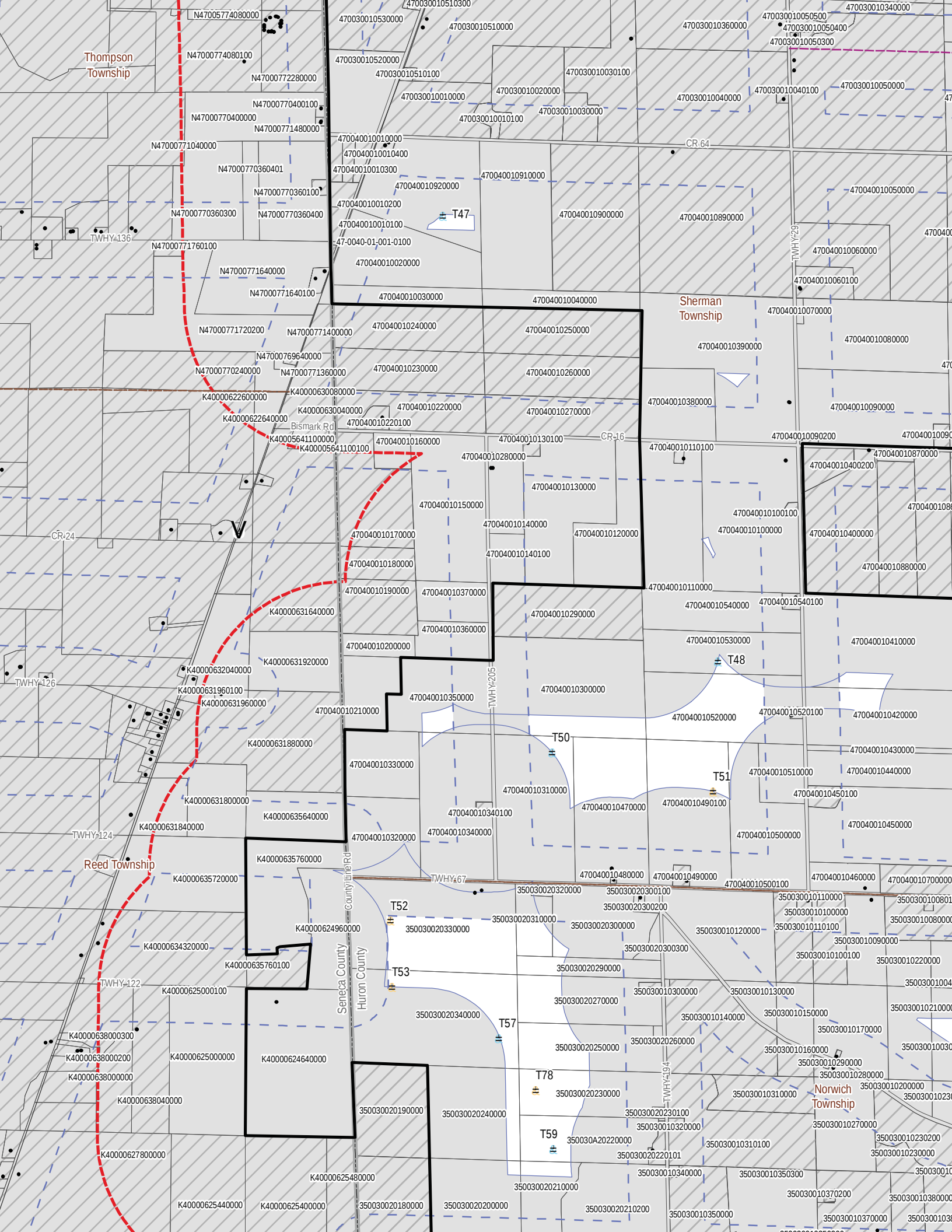


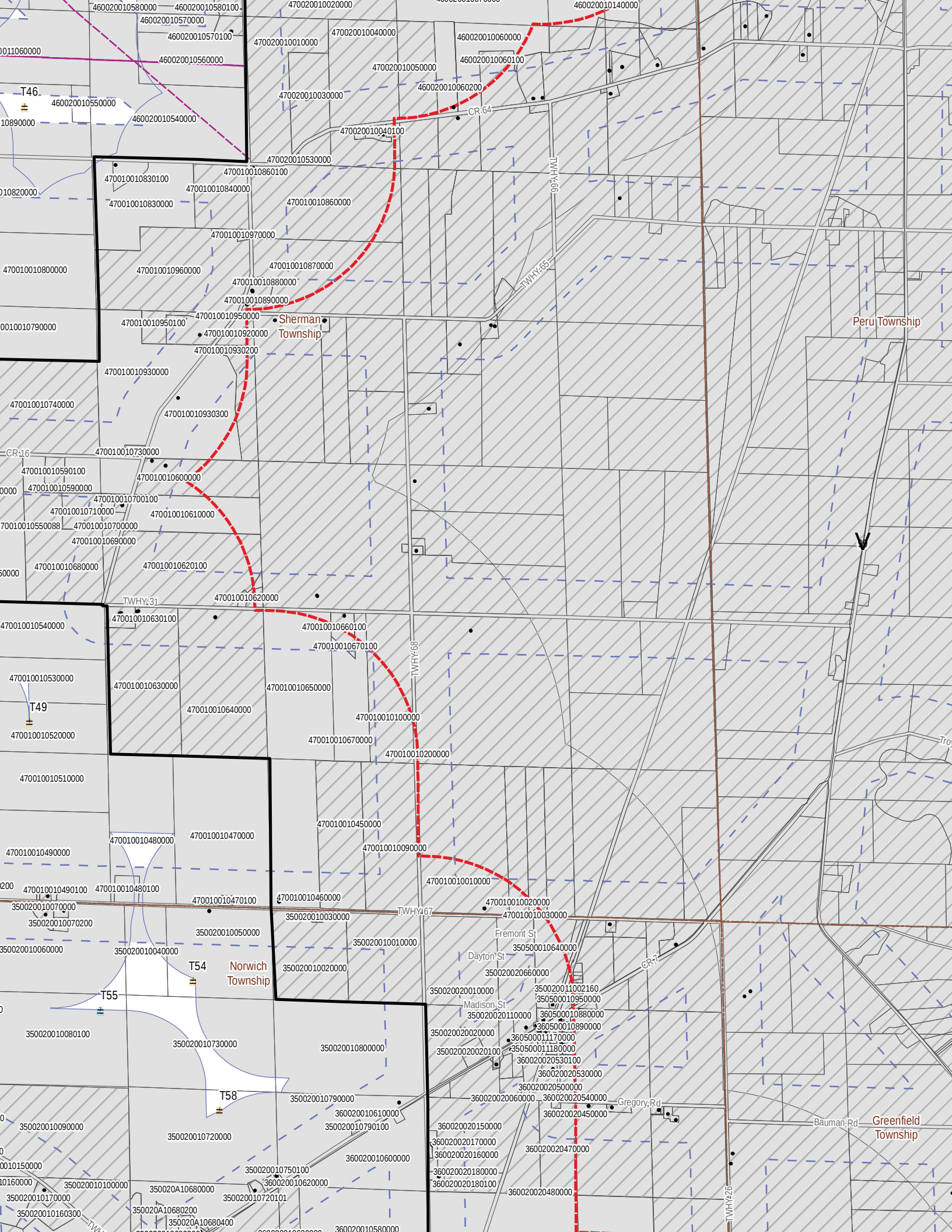


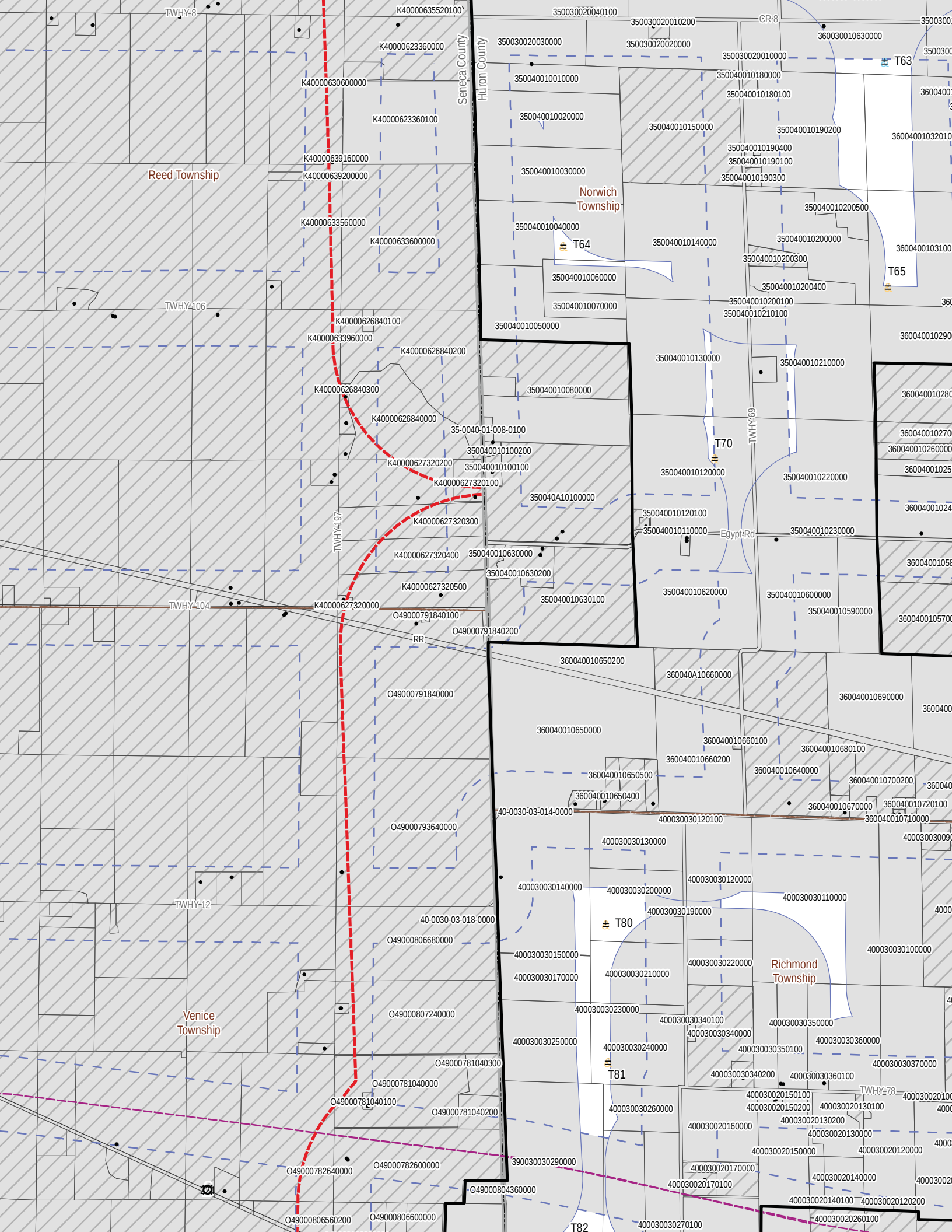


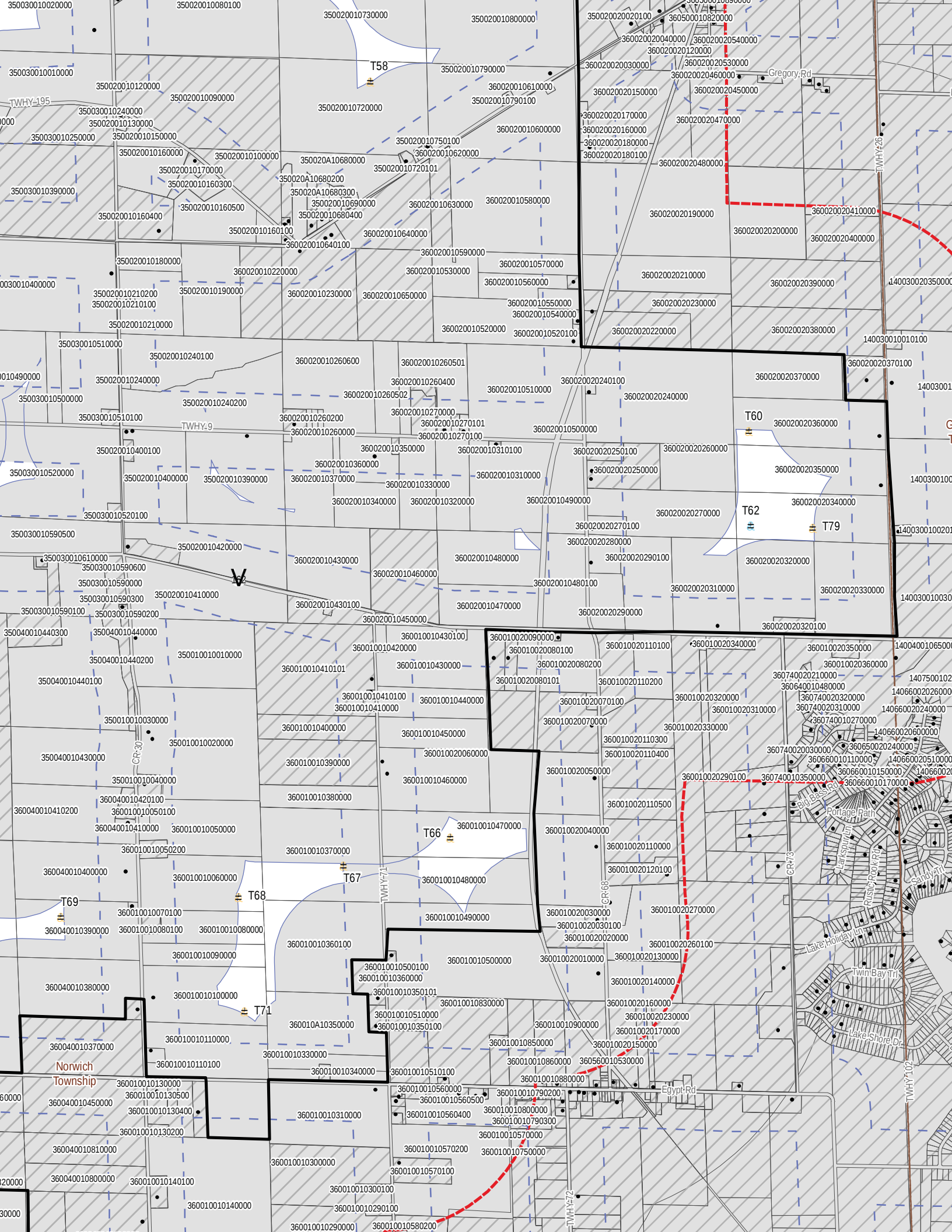


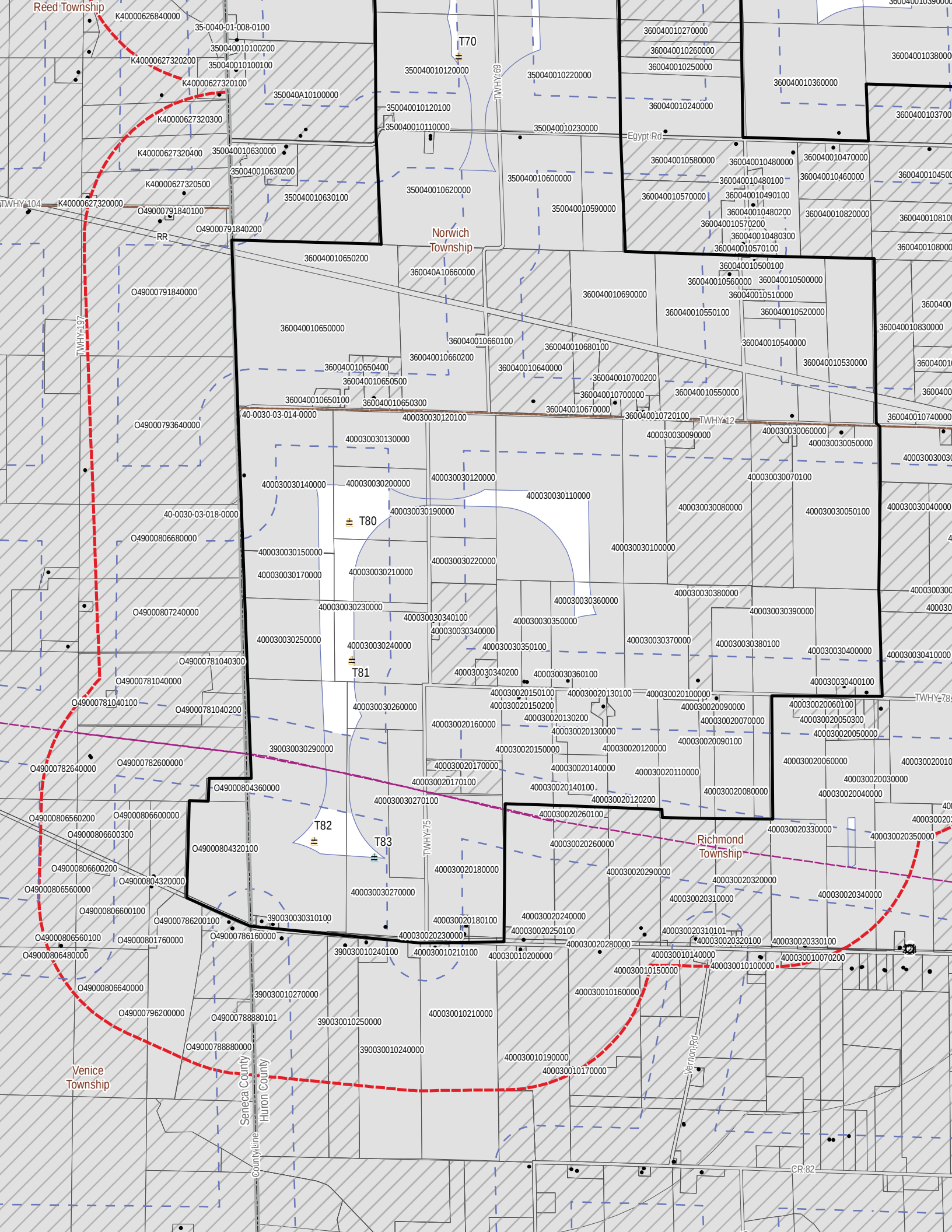












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Case No(s). 18-1607-EL-BGN

Summary: Notice of Revised 4th Supplement to Application electronically filed by Christine M. T. Pirik on behalf of Firelands Wind, LLC