

SHADOW - Main Result

Calculation: Shadow Flicker Analysis 125m

Assumptions for shadow calculations

Maximum distance for influence

Calculate only when more than 20 % of sun is covered by the blade

Please look in WTG table

Minimum sun height over horizon for influence

3 °

Day step for calculation

1 days

Time step for calculation

1 minutes

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

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: Elevation data 20km

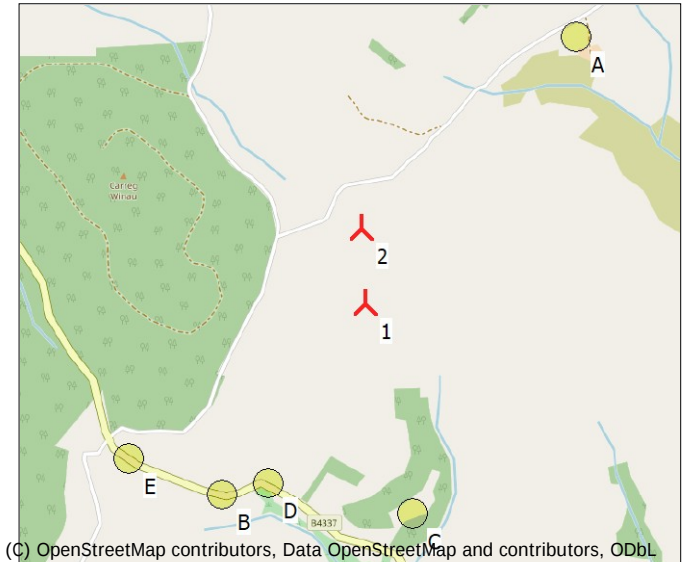
Obstacles used in calculation

Eye height for map: 1.5 m

Grid resolution: 1.0 m

All coordinates are in

British TM-OSGB36/Airy (GB/IE)



(C) OpenStreetMap contributors, Data OpenStreetMap and contributors, ODbL

Scale 1:25,000

New WTG

Shadow receptor

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.				Calculation distance [m]	RPM [RPM]
1	256,960	241,001	346.1	SENVION MM100 2000 100.0 !O! hub...	Yes	SENVION	2,000	100.0	75.0	1,565	13.9
2	256,950	241,248	346.3	SENVION MM100 2000 100.0 !O! hub...	Yes	SENVION	2,000	100.0	75.0	1,565	13.9

Shadow receptor-Input

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]
A	257,678	241,860	326.1	1.0	1.0	1.0	90.0	"Green house mode"	2.0
B	256,463	240,383	282.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
C	257,096	240,300	267.7	1.0	1.0	1.0	90.0	"Green house mode"	2.0
D	256,617	240,415	269.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0
E	256,158	240,512	286.5	1.0	1.0	1.0	90.0	"Green house mode"	2.0

Calculation Results

Shadow receptor

Shadow, worst case

No.	Shadow hours per year [h/year]	Shadow days per year [days/year]	Max shadow hours per day [h/day]
A	27:44	90	0:26
B	0:00	0	0:00
C	0:00	0	0:00
D	0:00	0	0:00
E	2:12	16	0:11

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

No.	Name	Worst case [h/year]
1	SENVION MM100 2000 100.0 !O! hub: 75.0 m (TOT: 125.0 m) (1)	12:53
2	SENVION MM100 2000 100.0 !O! hub: 75.0 m (TOT: 125.0 m) (2)	17:03

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.

Project:

Pencarreg2020_WindPro

Licensed user:

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 Calculated:
 01/02/2021 12:22/3.3.294

SHADOW - Calendar

Calculation: Shadow Flicker Analysis 125mShadow receptor: A - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (1)
 Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:25 16:15 18	15:01 (1) 17:03 18	07:58 15:48 (2) 17:55	07:05 06:54 19:49	05:49 05:03 21:27	05:00 05:00 21:41	05:37 05:37 21:08	06:27 06:27 20:06	07:16 07:16 18:56	07:10 07:10 16:50		08:02 15:26 (2)
2	08:25 16:16 17	15:02 (1) 17:05 16	07:57 15:49 (2) 17:57	07:03 06:51 19:51	05:47 05:02 21:28	05:01 05:01 21:40	05:38 05:38 21:07	06:29 06:29 20:04	07:18 07:18 18:54	07:12 07:12 16:48		08:03 15:27 (2)
3	08:25 16:17 16	15:02 (1) 17:05 11	07:55 15:51 (2) 17:59	07:00 06:49 19:53	05:45 05:02 21:29	05:02 05:02 21:40	05:02 05:02 21:05	06:30 06:30 20:02	07:20 07:20 18:52	07:14 07:14 16:46		08:04 15:34 (2)
4	08:25 16:18 16	15:03 (1) 17:09 1	07:54 15:57 (2) 18:00	06:47 06:38 19:54	05:43 05:01 21:30	05:02 05:02 21:39	05:02 05:02 21:03	06:32 06:32 19:59	07:21 07:21 18:49	07:16 07:16 16:44		08:06 15:35 (2)
5	08:25 16:20 15	15:04 (1) 17:11 15	07:52 15:58 (2) 18:02	06:45 06:36 19:56	05:41 05:00 21:31	05:03 05:03 21:39	05:03 05:03 21:02	06:33 06:33 19:57	07:23 07:23 18:47	07:18 07:18 16:43		08:07 15:36 (2)
6	08:24 16:21 13	15:05 (1) 17:12 13	07:50 15:59 (2) 18:04	06:42 06:33 19:58	05:39 05:00 21:32	04:59 05:04 21:38	05:04 05:04 21:00	06:35 06:35 19:55	07:25 07:25 18:45	07:19 07:19 16:41		08:08 15:37 (2)
7	08:24 16:22 12	15:07 (1) 17:14 12	07:48 15:58 (2) 18:06	06:40 06:30 19:56	05:38 05:00 21:33	04:59 05:05 21:38	05:05 05:05 20:58	06:37 06:37 19:52	07:26 07:26 18:43	07:21 07:21 16:39	15:26 (2)	08:10 15:38 (2)
8	08:24 16:23 12	15:08 (1) 17:16 12	07:47 15:59 (2) 18:08	06:38 06:29 19:58	05:36 05:01 21:34	04:58 05:06 21:37	05:06 05:06 20:56	06:38 06:38 19:50	07:28 07:28 18:40	07:23 07:23 16:38	15:27 (2)	08:11 15:39 (2)
9	08:23 16:25 12	15:09 (1) 17:18 12	07:45 15:52 (2) 18:09	06:35 06:26 19:59	05:34 05:01 21:35	04:58 05:07 21:36	05:09 05:09 20:54	06:40 06:40 19:48	07:30 07:30 18:38	07:25 07:25 16:36	15:28 (2)	08:12 15:40 (2)
10	08:23 16:26 11	15:45 (2) 17:20 11	07:43 15:52 (2) 18:11	06:33 06:24 19:59	05:32 05:05 21:36	04:57 05:09 21:36	05:08 05:08 20:52	06:42 06:42 19:45	07:31 07:31 18:36	07:27 07:27 16:34	15:29 (2)	08:13 15:41 (2)
11	08:22 16:28 10	15:44 (2) 17:22 10	07:41 15:54 (2) 18:13	06:31 06:22 20:06	05:31 05:06 21:37	04:57 05:09 21:36	05:09 05:09 20:50	06:43 06:43 19:43	07:33 07:33 18:34	07:28 07:28 16:33	15:30 (2)	08:14 15:42 (2)
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18	08:16 16:38 23	15:42 (2) 17:35 23	07:28 15:54 (2) 18:25	06:16 06:07 20:18	05:20 05:09 21:40	04:56 05:17 21:28	05:06 05:06 20:36	06:55 06:55 19:27	07:45 07:45 18:18	07:41 07:41 16:23	15:37 (2)	08:21 15:49 (2)
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22	08:12 16:45 25	15:42 (2) 17:42 25	07:20 15:59 (2) 18:32	06:07 06:00 20:25	05:14 05:14 21:41	04:56 05:22 21:23	05:11 05:11 20:28	07:01 07:01 19:17	07:52 07:52 18:10	07:47 07:47 16:18	15:41 (2)	08:25 15:53 (2)
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27	08:06 16:54 24	15:44 (2) 17:51 24	07:09 15:59 (2) 18:41	06:00 06:00 20:34	05:08 05:20 21:41	04:58 05:29 21:16	05:17 05:17 20:17	07:10 07:10 19:06	07:01 07:01 17:00	07:55 07:55 16:13	15:46 (2)	08:30 15:58 (2)
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Potential sun hours	258	277	367	416	486	500	503	454	381	331	266	243
Total, worst case	587	46	367	416	486	500	503	454	381	331	266	243

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		

SHADOW - Calendar

Calculation: Shadow Flicker Analysis 125mShadow receptor: B - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (2)
 Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:25	07:58	07:05	06:54	05:49	05:03	05:00	05:37	06:27	07:16	07:10	08:02
	16:15	17:03	17:55	19:49	20:40	21:27	21:41	21:08	20:06	18:56	16:50	16:09
2	08:25	07:57	07:03	06:52	05:47	05:02	05:01	05:39	06:29	07:18	07:12	08:03
	16:16	17:05	17:57	19:51	20:42	21:28	21:40	21:07	20:04	18:54	16:48	16:09
3	08:25	07:55	07:00	06:49	05:45	05:02	05:02	05:40	06:30	07:20	07:14	08:04
	16:17	17:07	17:59	19:53	20:44	21:29	21:40	21:05	20:02	18:52	16:46	16:08
4	08:25	07:54	06:58	06:47	05:43	05:01	05:02	05:42	06:32	07:21	07:16	08:06
	16:18	17:09	18:00	19:54	20:46	21:30	21:39	21:03	19:59	18:49	16:45	16:08
5	08:25	07:52	06:56	06:45	05:41	05:00	05:03	05:43	06:34	07:23	07:18	08:07
	16:20	17:11	18:02	19:56	20:47	21:31	21:39	21:02	19:57	18:47	16:43	16:07
6	08:24	07:50	06:54	06:42	05:39	05:00	05:04	05:45	06:35	07:25	07:19	08:08
	16:21	17:12	18:04	19:58	20:49	21:32	21:38	21:00	19:55	18:45	16:41	16:07
7	08:24	07:49	06:51	06:40	05:38	04:59	05:05	05:46	06:37	07:26	07:21	08:10
	16:22	17:14	18:06	20:00	20:50	21:33	21:38	20:58	19:52	18:43	16:39	16:06
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	16:26	17:20	18:11	20:05	20:55	21:35	21:36	20:52	19:45	18:36	16:34	16:05
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12	08:21	07:39	06:40	06:29	05:29	04:57	05:10	05:54	06:45	07:35	07:30	08:15
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13	08:21	07:38	06:38	06:27	05:27	04:57	05:11	05:56	06:47	07:37	07:32	08:16
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	16:37	17:33	18:23	20:17	21:06	21:39	21:29	20:39	19:29	18:20	16:24	16:05
18	08:16	07:28	06:26	06:16	05:20	04:56	05:17	06:04	06:55	07:45	07:41	08:21
	16:39	17:35	18:25	20:18	21:08	21:40	21:28	20:37	19:27	18:18	16:23	16:06
19	08:15	07:26	06:24	06:13	05:18	04:56	05:18	06:06	06:56	07:47	07:42	08:21
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20	08:14	07:24	06:22	06:11	05:17	04:56	05:20	06:07	06:58	07:49	07:44	08:22
	16:42	17:39	18:29	20:22	21:11	21:41	21:26	20:32	19:22	18:14	16:20	16:06
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23	08:11	07:18	06:15	06:05	05:13	04:57	05:24	06:12	07:03	07:54	07:49	08:24
	16:47	17:44	18:34	20:27	21:15	21:41	21:22	20:26	19:15	18:08	16:17	16:08
24	08:10	07:15	06:12	06:03	05:12	04:57	05:25	06:14	07:05	07:56	07:51	08:24
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	16:50	17:48	18:37	20:30	21:18	21:41	21:19	20:22	19:10	17:04	16:15	16:09
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	16:52	17:50	18:39	20:32	21:19	21:41	21:18	20:19	19:08	17:02	16:14	16:10
27	08:06	07:09	06:05	05:57	05:08	04:58	05:30	06:19	07:10	07:01	07:56	08:25
	16:54	17:51	18:41	20:34	21:20	21:41	21:16	20:17	19:06	17:00	16:13	16:10
28	08:04	07:07	06:03	05:55	05:07	04:59	05:31	06:20	07:11	07:03	07:57	08:25
	16:56	17:53	18:42	20:35	21:22	21:41	21:15	20:15	19:03	16:58	16:12	16:11
29	08:03		07:01	05:53	05:06	04:59	05:32	06:22	07:13	07:05	07:59	08:25
	16:58		19:44	20:37	21:23	21:41	21:13	20:13	19:01	16:56	16:11	16:12
30	08:01		06:58	05:51	05:05	05:00	05:34	06:24	07:15	07:07	08:00	08:25
	17:00		19:46	20:39	21:24	21:41	21:12	20:11	18:59	16:54	16:10	16:13
31	08:00		06:56		05:04		05:36	06:25		07:09		08:25
	17:01		19:48		21:25		21:10	20:08		16:52		16:14
Potential sun hours	258	277	367	416	486	499	503	454	381	331	266	243
Total, worst case												

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		

SHADOW - Calendar

Calculation: Shadow Flicker Analysis 125mShadow receptor: C - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (3)
 Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:25	07:58	07:05	06:54	05:49	05:03	05:00	05:37	06:27	07:16	07:10	08:01
	16:15	17:03	17:55	19:49	20:40	21:26	21:40	21:08	20:06	18:56	16:50	16:09
2	08:25	07:57	07:03	06:52	05:47	05:02	05:01	05:39	06:29	07:18	07:12	08:03
	16:16	17:05	17:57	19:51	20:42	21:28	21:40	21:07	20:04	18:54	16:48	16:09
3	08:25	07:55	07:00	06:49	05:45	05:02	05:02	05:40	06:30	07:20	07:14	08:04
	16:17	17:07	17:59	19:53	20:44	21:29	21:40	21:05	20:02	18:52	16:46	16:08
4	08:25	07:54	06:58	06:47	05:43	05:01	05:02	05:42	06:32	07:21	07:16	08:06
	16:18	17:09	18:00	19:54	20:45	21:30	21:39	21:03	19:59	18:49	16:45	16:08
5	08:25	07:52	06:56	06:45	05:41	05:00	05:03	05:43	06:34	07:23	07:18	08:07
	16:20	17:11	18:02	19:56	20:47	21:31	21:39	21:02	19:57	18:47	16:43	16:07
6	08:24	07:50	06:54	06:42	05:39	05:00	05:04	05:45	06:35	07:25	07:19	08:08
	16:21	17:12	18:04	19:58	20:49	21:32	21:38	21:00	19:55	18:45	16:41	16:07
7	08:24	07:48	06:51	06:40	05:38	04:59	05:05	05:46	06:37	07:26	07:21	08:10
	16:22	17:14	18:06	20:00	20:50	21:33	21:38	20:58	19:52	18:43	16:39	16:06
8	08:24	07:47	06:49	06:38	05:36	04:58	05:06	05:48	06:38	07:28	07:23	08:11
	16:23	17:16	18:08	20:01	20:52	21:34	21:37	20:56	19:50	18:40	16:38	16:06
9	08:23	07:45	06:47	06:36	05:34	04:58	05:07	05:50	06:40	07:30	07:25	08:12
	16:25	17:18	18:09	20:03	20:54	21:34	21:36	20:54	19:48	18:38	16:36	16:06
10	08:23	07:43	06:45	06:33	05:32	04:58	05:08	05:51	06:42	07:31	07:27	08:13
	16:26	17:20	18:11	20:05	20:55	21:35	21:36	20:52	19:45	18:36	16:34	16:05
11	08:22	07:41	06:42	06:31	05:31	04:57	05:09	05:53	06:43	07:33	07:28	08:14
	16:28	17:22	18:13	20:06	20:57	21:36	21:35	20:50	19:43	18:34	16:33	16:05
12	08:21	07:39	06:40	06:29	05:29	04:57	05:10	05:54	06:45	07:35	07:30	08:15
	16:29	17:24	18:15	20:08	20:59	21:37	21:34	20:49	19:41	18:31	16:31	16:05
13	08:21	07:38	06:38	06:27	05:27	04:57	05:11	05:56	06:47	07:37	07:32	08:16
	16:31	17:26	18:16	20:10	21:00	21:37	21:33	20:47	19:38	18:29	16:30	16:05
14	08:20	07:36	06:36	06:24	05:26	04:56	05:12	05:58	06:48	07:38	07:34	08:17
	16:32	17:27	18:18	20:12	21:02	21:38	21:32	20:45	19:36	18:27	16:28	16:05
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16	08:18	07:32	06:31	06:20	05:23	04:56	05:15	06:01	06:51	07:42	07:37	08:19
	16:35	17:31	18:22	20:15	21:05	21:39	21:30	20:41	19:31	18:23	16:25	16:05
17	08:17	07:30	06:29	06:18	05:21	04:56	05:16	06:02	06:53	07:44	07:39	08:20
	16:37	17:33	18:23	20:17	21:06	21:39	21:29	20:39	19:29	18:20	16:24	16:05
18	08:16	07:28	06:26	06:16	05:20	04:56	05:17	06:04	06:55	07:45	07:41	08:21
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	16:40	17:37	18:27	20:20	21:09	21:40	21:27	20:34	19:24	18:16	16:21	16:06
20	08:14	07:24	06:22	06:11	05:17	04:56	05:20	06:07	06:58	07:49	07:44	08:22
	16:42	17:39	18:29	20:22	21:11	21:41	21:26	20:32	19:22	18:14	16:20	16:06
21	08:13	07:22	06:19	06:09	05:15	04:56	05:21	06:09	07:00	07:51	07:46	08:22
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22	08:12	07:20	06:17	06:07	05:14	04:56	05:22	06:11	07:01	07:52	07:47	08:23
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Total, worst case												

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	Sun set (hh:mm)	Last time (hh:mm) with flicker	(WTG causing flicker last time)
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SHADOW - Calendar

Calculation: Shadow Flicker Analysis 125mShadow receptor: D - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (4)
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The WTG is always operating

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	16:16	17:05	17:57	19:51	20:42	21:28	21:40	21:07	20:04	18:54	16:48	16:09
3	08:25	07:55	07:00	06:49	05:45	05:02	05:02	05:40	06:30	07:20	07:14	08:04
	16:17	17:07	17:59	19:53	20:44	21:29	21:40	21:05	20:02	18:52	16:46	16:08
4	08:25	07:54	06:58	06:47	05:43	05:01	05:02	05:42	06:32	07:21	07:16	08:06
	16:18	17:09	18:00	19:54	20:46	21:30	21:39	21:03	19:59	18:49	16:45	16:08
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	16:20	17:11	18:02	19:56	20:47	21:31	21:39	21:02	19:57	18:47	16:43	16:07
6	08:24	07:50	06:54	06:42	05:39	05:00	05:04	05:45	06:35	07:25	07:19	08:08
	16:21	17:12	18:04	19:58	20:49	21:32	21:38	21:00	19:55	18:45	16:41	16:07
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SHADOW - Calendar

Calculation: Shadow Flicker Analysis 125mShadow receptor: E - Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (5)
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The calculated times are "worst case" given by the following assumptions:

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7	08:24	07:49	06:51	06:40	05:38	04:59		05:05	05:46	06:37	07:26	07:21	08:10
	16:22	17:14	18:06	20:00	20:51	21:33		21:38	20:58	19:52	18:43	16:39	16:06
8	08:24	07:47	06:49	06:38	05:36	04:59		05:06	05:48	06:38	07:28	07:23	08:11
	16:24	17:16	18:08	20:01	20:52	21:34		21:37	20:56	19:50	18:40	16:38	16:06
9	08:23	07:45	06:47	06:36	05:34	04:58		05:07	05:50	06:40	07:30	07:25	08:12
	16:25	17:18	18:09	20:03	20:54	21:34		21:36	20:54	19:48	18:38	16:36	16:06
10	08:23	07:43	06:45	06:33	05:32	04:58		05:08	05:51	06:42	07:32	07:27	08:13
	16:26	17:20	18:11	20:05	20:55	21:35		21:36	20:52	19:46	18:36	16:34	16:05
11	08:22	07:41	06:42	06:31	05:31	04:57		05:09	05:53	06:43	07:33	07:28	08:14
	16:28	17:22	18:13	20:06	20:57	21:36		21:35	20:51	19:43	18:34	16:33	16:05
12	08:21	07:40	06:40	06:29	05:29	04:57		05:10	05:54	06:45	07:35	07:30	08:15
	16:29	17:24	18:15	20:08	20:59	21:37		21:34	20:49	19:41	18:31	16:31	16:05
13	08:21	07:38	06:38	06:27	05:27	04:57		05:11	05:56	06:47	07:37	07:32	08:16
	16:31	17:26	18:16	20:10	21:00	21:37		21:33	20:47	19:39	18:29	16:30	16:05
14	08:20	07:36	06:36	06:24	05:26	04:56	5	05:45 (1)	05:12	05:58	06:48	07:38	08:17
	16:32	17:27	18:18	20:12	21:02	21:38		05:50 (1)	05:13	06:45	07:35	08:17	16:05
15	08:19	07:34	06:33	06:22	05:24	04:56		05:43 (1)	05:13	05:59	06:50	07:40	08:18
	16:34	17:29	18:20	20:13	21:03	21:39	7	05:50 (1)	05:13	06:43	07:34	08:17	16:05
16	08:18	07:32	06:31	06:20	05:23	04:56		05:43 (1)	05:15	06:01	06:52	07:42	08:19
	16:35	17:31	18:22	20:15	21:05	21:39	8	05:51 (1)	05:13	06:01	06:52	07:42	08:19
17	08:17	07:30	06:29	06:18	05:21	04:56		05:43 (1)	05:16	06:03	06:53	07:44	08:20
	16:37	17:33	18:23	20:17	21:06	21:39	9	05:52 (1)	05:17	06:04	06:55	07:45	08:21
18	08:16	07:28	06:26	06:16	05:20	04:56		05:43 (1)	05:17	06:04	06:55	07:45	08:21
	16:39	17:35	18:25	20:18	21:08	21:40	9	05:52 (1)	05:18	06:05	06:56	07:46	08:22
19	08:15	07:26	06:24	06:13	05:18	04:56		05:43 (1)	05:18	06:06	06:56	07:47	08:21
	16:40	17:37	18:27	20:20	21:09	21:40	10	05:53 (1)	05:19	06:07	06:57	07:48	08:22
20	08:14	07:24	06:22	06:11	05:17	04:56		05:43 (1)	05:20	06:07	06:58	07:49	08:22
	16:42	17:39	18:29	20:22	21:11	21:41	11	05:54 (1)	05:21	06:08	06:59	07:50	08:23
21	08:13	07:22	06:19	06:09	05:16	04:56		05:43 (1)	05:21	06:09	07:00	07:51	08:23
	16:44	17:40	18:30	20:24	21:12	21:41	11	05:54 (1)	05:22	06:10	07:01	07:52	08:23
22	08:12	07:20	06:17	06:07	05:14	04:56		05:43 (1)	05:22	06:11	07:02	07:53	08:24
	16:45	17:42	18:32	20:25	21:14	21:41	11	05:54 (1)	05:23	06:12	07:03	07:54	08:24
23	08:11	07:18	06:15	06:05	05:13	04:57		05:43 (1)	05:24	06:12	07:03	07:54	08:24
	16:47	17:44	18:34	20:27	21:15	21:41	10	05:53 (1)	05:22	06:11	07:02	07:53	08:23
24	08:10	07:15	06:12	06:03	05:12	04:57		05:45 (1)	05:25	06:14	07:05	07:56	08:24
	16:49	17:46	18:36	20:29	21:16	21:41	9	05:54 (1)	05:21	06:14	07:04	07:55	08:24
25	08:08	07:13	06:10	06:01	05:11	04:57		05:45 (1)	05:27	06:16	07:06	07:57	08:24
	16:51	17:48	18:37	20:30	21:18	21:41	9	05:54 (1)	05:28	06:17	07:07	07:58	08:25
26	08:07	07:11	06:08	05:59	05:09	04:58		05:45 (1)	05:28	06:17	07:08	07:59	08:25
	16:52	17:50	18:39	20:32	21:19	21:41	8	05:53 (1)	05:30	06:18	07:09	07:59	08:25
27	08:06	07:09	06:05	05:57	05:08	04:58		05:46 (1)	05:30	06:19	07:10	07:59	08:25
	16:54	17:51	18:41	20:34	21:20	21:41	7	05:53 (1)	05:31	06:20	07:11	07:59	08:25
28	08:04	07:07	06:03	05:55	05:07	04:59		05:47 (1)	05:31	06:21	07:12	07:59	08:25
	16:56	17:53	18:42	20:35	21:22	21:41	5	05:52 (1)	05:32	06:22	07:13	07:59	08:25
29	08:03		07:01	05:53	05:06	04:59		05:49 (1)	05:32	06:22	07:13	07:59	08:25
	16:58		19:44	20:37	21:23	21:41	3	05:52 (1)	05:33	06:23	07:14	07:59	08:25
30	08:01		06:58	05:51	05:05	05:00			05:34	06:24	07:15	07:59	08:25
	17:00		19:46	20:39	21:24	21:41			05:36	06:26	07:17	07:59	08:25
31	08:00		06:56		05:04				05:36	06:26	07:17	07:59	08:25
	17:01		19:48		21:25				05:36	06:26	07:17	07:59	08:25
Potential sun hours	258	277	367	416	486	499		503	454	381	331	266	243
Total, worst case							132						

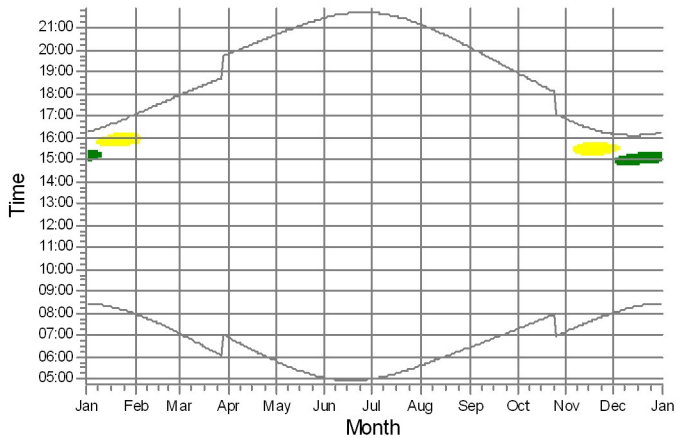
Table layout: For each day in each month the following matrix apply

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		

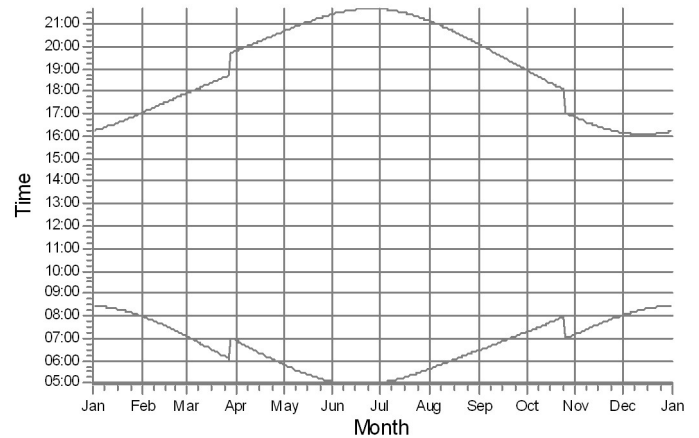
SHADOW - Calendar, graphical

Calculation: Shadow Flicker Analysis 125m

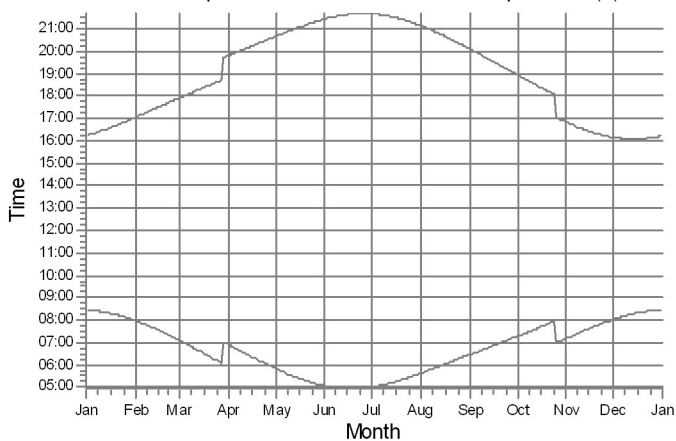
A: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (1)



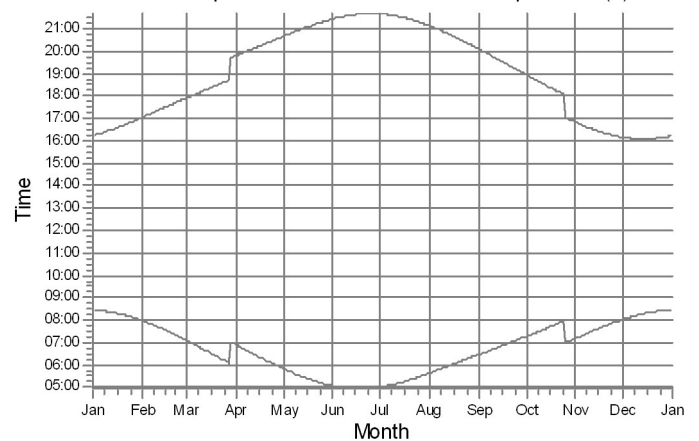
B: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (2)



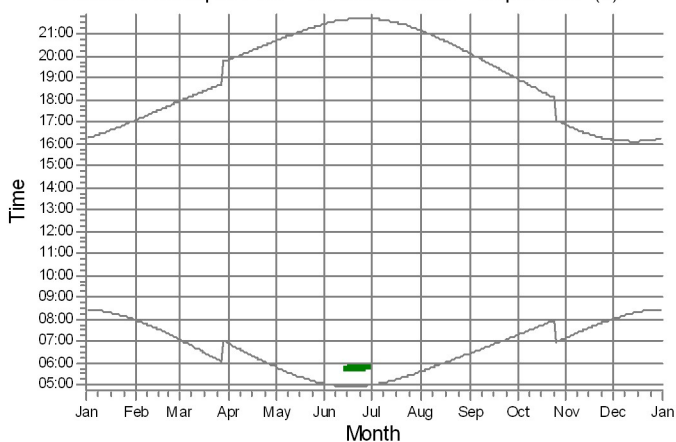
C: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (3)



D: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (4)



E: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (5)



WTGs



1: SENVION MM100 2000 100.0 !O! hub: 75.0 m (TOT: 125.0 m) (1)

2: SENVION MM100 2000 100.0 !O! hub: 75.0 m (TOT: 125.0 m) (2)

SHADOW - Calendar per WTG

Calculation: Shadow Flicker Analysis 125mWTG: 1 - SENVION MM100 2000 100.0 !O! hub: 75.0 m (TOT: 125.0 m) (1)
 Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

	January	February	March	April	May	June	July	August	September	October	November	December
1	08:25 15:01-15:19/18	07:58 17:03	07:05 17:55	06:54 19:49	05:49 20:40	05:03 21:27	05:00 21:41	05:37 21:08	06:27 20:06	07:16 18:56	07:10 16:50	08:02 16:09
2	08:25 15:02-15:19/17	07:57 17:03	07:03 17:55	06:52 19:49	05:47 20:40	05:02 21:27	05:01 21:41	05:39 21:08	06:29 20:06	07:18 18:56	07:12 16:50	08:03 16:09
3	08:25 15:02-15:18/16	07:55 17:05	07:00 17:57	06:49 19:51	05:45 20:42	05:02 21:28	05:02 21:40	05:40 21:07	06:30 20:04	07:20 18:54	07:14 16:48	08:04 16:09
4	08:25 15:03-15:19/16	07:54 17:07	06:58 17:59	06:47 19:53	05:43 20:44	05:01 21:29	05:02 21:40	05:42 21:05	06:32 20:02	07:21 18:52	07:16 16:46	08:06 16:08
5	08:25 15:04-15:19/15	07:52 17:09	06:56 18:00	06:45 19:54	05:41 20:46	05:00 21:30	05:03 21:39	05:43 21:03	06:34 19:59	07:23 18:49	07:18 16:44	08:07 16:08
6	08:24 15:05-15:18/13	07:50 17:11	06:54 18:02	06:42 19:56	05:39 20:47	05:00 21:31	05:04 21:39	05:45 21:02	06:35 19:57	07:25 18:47	07:19 16:43	08:08 16:07
7	08:24 15:07-15:19/12	07:49 17:12	06:51 18:04	06:40 19:58	05:38 20:49	04:59 21:32	05:05 21:38	05:46 21:00	06:37 19:55	07:26 18:45	07:21 16:41	08:10 16:07
8	08:24 15:08-15:18/10	07:47 17:14	06:49 18:06	06:38 20:00	05:36 20:50	04:58 21:33	05:06 21:38	05:48 20:58	06:38 19:52	07:28 18:43	07:23 16:39	08:11 16:06
9	08:23 15:09-15:16/7	07:45 17:16	06:47 18:08	06:36 20:01	05:34 20:52	04:58 21:34	05:07 21:37	05:50 20:56	06:40 19:50	07:30 18:40	07:25 16:38	08:12 16:06
10	08:23 16:25	07:43 17:18	06:45 18:09	06:33 20:03	05:32 20:54	04:58 21:34	05:08 21:36	05:51 20:54	06:42 19:48	07:31 18:38	07:27 16:36	08:13 16:06
11	08:22 16:26	07:41 17:20	06:42 18:11	06:31 20:05	05:31 20:55	04:57 21:35	05:09 21:36	05:53 20:52	06:43 19:45	07:33 18:36	07:28 16:34	08:14 16:05
12	08:21 16:29	07:39 17:22	06:40 18:13	06:29 20:06	05:29 20:57	04:57 21:36	05:10 21:35	05:54 20:50	06:45 19:43	07:35 18:34	07:30 16:33	08:15 16:05
13	08:21 16:31	07:38 17:24	06:38 18:15	06:27 20:08	05:27 20:59	04:56 21:37	05:11 21:34	05:56 20:49	06:47 19:41	07:37 18:31	07:32 16:31	08:16 16:05
14	08:20 16:32	07:36 17:26	06:36 18:16	06:24 20:10	05:26 21:00	04:56 21:37	05:12 21:33	05:58 20:47	06:48 19:38	07:38 18:29	07:34 16:30	08:17 16:05
15	08:19 16:34	07:34 17:27	06:33 18:18	06:22 20:12	05:24 21:02	04:56 21:38	05:13 21:32	05:59 20:45	06:50 19:36	07:40 18:27	07:35 16:28	08:18 16:05
16	08:18 16:35	07:32 17:31	06:31 18:22	06:20 20:15	05:23 21:05	04:56 21:39	05:15 21:31	06:01 20:43	06:51 19:34	07:42 18:25	07:37 16:27	08:19 16:05
17	08:17 16:37	07:30 17:33	06:29 18:23	06:18 20:17	05:21 21:06	04:56 21:39	05:16 21:29	06:02 20:39	06:53 19:29	07:44 18:20	07:39 16:24	08:20 16:05
18	08:16 16:38	07:28 17:35	06:26 18:25	06:16 20:18	05:20 21:08	04:56 21:40	05:17 21:28	06:04 20:37	06:55 19:27	07:45 18:18	07:41 16:23	08:21 16:06
19	08:15 16:40	07:26 17:37	06:24 18:27	06:13 20:20	05:18 21:09	04:56 21:40	05:18 21:27	06:06 20:34	06:56 19:24	07:47 18:16	07:42 16:21	08:22 16:06
20	08:14 16:42	07:24 17:39	06:22 18:29	06:11 20:22	05:17 21:11	04:56 21:41	05:20 21:26	06:07 20:32	06:58 19:22	07:49 18:14	07:44 16:20	08:23 16:06
21	08:13 16:43	07:22 17:40	06:19 18:30	06:09 20:24	05:15 21:12	04:56 21:41	05:21 21:25	06:09 20:30	07:00 19:20	07:51 18:12	07:46 16:19	08:24 16:07
22	08:12 16:45	07:20 17:42	06:17 18:32	06:07 20:25	05:14 21:14	04:56 21:41	05:22 21:23	06:11 20:28	07:01 19:17	07:52 18:10	07:47 16:18	08:25 16:07
23	08:11 16:47	07:18 17:44	06:15 18:34	06:05 20:27	05:13 21:15	04:57 21:41	05:24 21:22	06:12 20:26	07:03 19:15	07:54 18:08	07:49 16:17	08:26 16:08
24	08:10 16:49	07:15 17:46	06:12 18:36	06:03 20:29	05:12 21:16	04:57 21:41	05:25 21:21	06:14 20:24	07:05 19:13	07:56 18:06	07:51 16:16	08:27 16:08
25	08:08 16:50	07:13 17:48	06:10 18:37	06:01 20:30	05:10 21:18	04:57 21:41	05:27 21:19	06:16 20:22	07:06 19:10	07:58 18:04	07:52 16:15	08:28 16:09
26	08:07 16:52	07:11 17:50	06:08 18:39	05:59 20:32	05:09 21:19	04:58 21:41	05:28 21:18	06:17 20:19	07:08 19:08	07:59 18:02	07:54 16:14	08:29 16:10
27	08:06 16:54	07:09 17:51	06:05 18:41	05:57 20:34	05:08 21:20	04:58 21:41	05:29 21:16	06:19 20:17	07:10 19:06	07:55 18:00	07:55 16:13	08:30 16:10
28	08:04 16:56	07:07 17:53	06:03 18:42	05:55 20:35	05:07 21:22	04:58 21:41	05:31 21:15	06:20 20:15	07:11 19:03	07:56 18:03	07:57 16:12	08:31 16:11
29	08:03 16:58	07:01 17:44	06:01 18:34	05:53 20:27	05:06 21:15	04:59 21:41	05:32 21:13	06:22 20:13	07:13 19:01	07:57 18:01	07:59 16:11	08:32 16:12
30	08:01 16:59	07:00 17:46	06:00 18:36	05:51 20:29	05:05 21:17	05:00 21:41	05:34 21:12	06:24 20:11	07:15 19:00	07:57 18:00	07:57 16:10	08:33 16:13
31	08:00 17:01	07:00 17:48	06:00 18:36	05:51 20:29	05:05 21:17	05:00 21:41	05:34 21:12	06:24 20:11	07:15 19:00	07:57 18:00	07:57 16:10	08:33 16:13
Potential sun hours	258	277	367	416	486	499	503	454	381	331	266	243
Sum of minutes with flicker	124	0	0	0	0	132	0	0	0	0	0	517

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	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG

Calculation: Shadow Flicker Analysis 125mWTG: 2 - SENVION MM100 2000 100.0 !O! hub: 75.0 m (TOT: 125.0 m) (2)
 Assumptions for shadow calculations

The calculated times are "worst case" given by the following assumptions:

The sun is shining all the day, from sunrise to sunset

The rotor plane is always perpendicular to the line from the WTG to the sun

The WTG is always operating

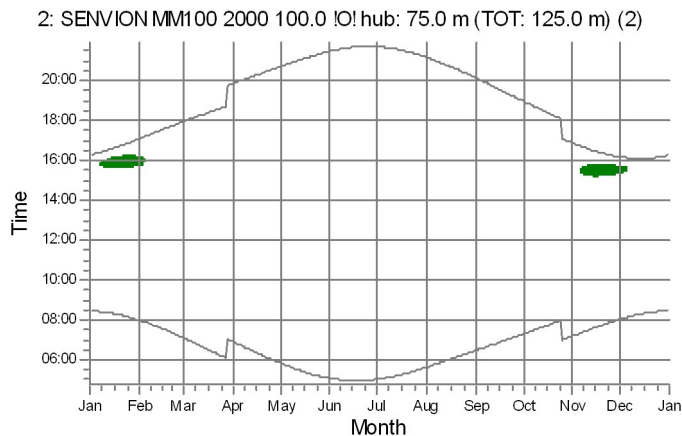
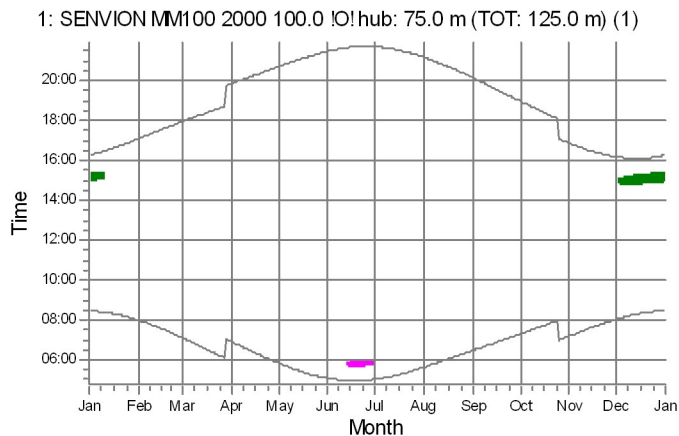
	January	February	March	April	May	June	July	August	September	October	November	December
1	08:25	07:58 15:48-16:06/18	07:05	06:54	05:49	05:03	05:00	05:37	06:27	07:16	07:10	08:02 15:26-15:36/10
	16:15	17:03	17:55	19:49	20:40	21:27	21:41	21:08	20:06	18:56	16:50	16:09
2	08:25	07:57 15:49-16:05/16	07:03	06:52	05:47	05:02	05:01	05:39	06:29	07:18	07:12	08:03 15:27-15:35/8
	16:16	17:05	17:57	19:51	20:42	21:28	21:40	21:07	20:04	18:54	16:48	16:09
3	08:25	07:55 15:51-16:02/11	07:00	06:49	05:45	05:02	05:02	05:40	06:30	07:20	07:14	08:04 15:29-15:34/5
	16:17	17:07	17:59	19:53	20:44	21:29	21:40	21:05	20:02	18:52	16:46	16:08
4	08:25	07:54 15:57-15:58/1	06:58	06:47	05:43	05:01	05:02	05:42	06:32	07:21	07:16	08:06 15:31-15:33/2
	16:18	17:09	18:00	19:54	20:46	21:30	21:39	21:03	19:59	18:49	16:44	16:08
5	08:25	07:52	06:56	06:45	05:41	05:00	05:03	05:43	06:34	07:23	07:18	08:07
	16:20	17:11	18:02	19:56	20:47	21:31	21:39	21:02	19:57	18:47	16:43	16:07
6	08:24	07:50	06:54	06:42	05:39	05:00	05:04	05:45	06:35	07:25	07:19	08:08
	16:21	17:12	18:04	19:58	20:49	21:32	21:38	21:00	19:55	18:45	16:41	16:07
7	08:24	07:49	06:51	06:40	05:38	04:59	05:05	05:46	06:37	07:26	07:21 15:26-15:30/4	08:10
	16:22	17:14	18:06	20:00	20:50	21:33	21:38	20:58	19:52	18:43	16:39	16:06
8	08:24 15:47-15:49/2	07:47	06:49	06:38	05:36	04:58	05:06	05:48	06:38	07:28	07:23 15:22-15:33/11	08:11
	16:23	17:16	18:08	20:01	20:52	21:34	21:37	20:56	19:50	18:40	16:38	16:06
9	08:23 15:45-15:50/5	07:45	06:47	06:36	05:34	04:58	05:07	05:50	06:40	07:30	07:25 15:20-15:35/15	08:12
	16:25	17:18	18:09	20:03	20:54	21:34	21:36	20:54	19:48	18:38	16:36	16:06
10	08:23 15:45-15:52/7	07:43	06:45	06:33	05:32	04:57	05:08	05:51	06:42	07:31	07:27 15:19-15:37/18	08:13
	16:26	17:20	18:11	20:05	20:55	21:35	21:36	20:52	19:45	18:36	16:34	16:05
11	08:22 15:44-15:54/10	07:41	06:42	06:31	05:31	04:57	05:09	05:53	06:43	07:33	07:28 15:18-15:38/20	08:14
	16:28	17:22	18:13	20:06	20:57	21:36	21:35	20:51	19:43	18:34	16:33	16:05
12	08:21 15:43-15:55/12	07:39	06:40	06:29	05:29	04:57	05:10	05:54	06:45	07:35	07:30 15:17-15:39/22	08:15
	16:29	17:24	18:15	20:08	20:59	21:37	21:34	20:49	19:41	18:31	16:31	16:05
13	08:21 15:43-15:57/14	07:38	06:38	06:27	05:27	04:56	05:11	05:56	06:47	07:37	07:32 15:17-15:40/23	08:16
	16:31	17:26	18:16	20:10	21:00	21:37	21:33	20:47	19:38	18:29	16:30	16:05
14	08:20 15:42-15:58/16	07:36	06:36	06:24	05:26	04:56	05:12	05:58	06:48	07:38	07:34 15:17-15:41/24	08:17
	16:32	17:27	18:18	20:12	21:02	21:38	21:32	20:45	19:36	18:27	16:28	16:05
15	08:19 15:42-16:00/18	07:34	06:33	06:22	05:24	04:56	05:13	05:59	06:50	07:40	07:35 15:15-15:40/25	08:18
	16:34	17:29	18:20	20:13	21:03	21:39	21:31	20:43	19:34	18:25	16:27	16:05
16	08:18 15:42-16:02/20	07:32	06:31	06:20	05:23	04:56	05:15	06:01	06:51	07:42	07:37 15:15-15:41/26	08:19
	16:35	17:31	18:22	20:15	21:05	21:39	21:30	20:41	19:31	18:23	16:25	16:05
17	08:17 15:42-16:04/22	07:30	06:29	06:18	05:21	04:56	05:16	06:02	06:53	07:44	07:39 15:16-15:41/25	08:20
	16:37	17:33	18:23	20:17	21:06	21:39	21:29	20:39	19:29	18:20	16:24	16:05
18	08:16 15:42-16:05/23	07:28	06:26	06:16	05:20	04:56	05:17	06:04	06:55	07:45	07:41 15:16-15:42/26	08:21
	16:38	17:35	18:25	20:18	21:08	21:40	21:28	20:37	19:27	18:18	16:23	16:06
19	08:15 15:42-16:06/24	07:26	06:24	06:13	05:18	04:56	05:18	06:06	06:56	07:47	07:42 15:16-15:42/26	08:21
	16:40	17:37	18:27	20:20	21:09	21:40	21:27	20:34	19:24	18:16	16:21	16:06
20	08:14 15:42-16:07/25	07:24	06:22	06:11	05:17	04:56	05:20	06:07	06:58	07:49	07:44 15:17-15:42/25	08:22
	16:42	17:39	18:29	20:22	21:11	21:41	21:26	20:32	19:22	18:14	16:20	16:06
21	08:13 15:41-16:06/25	07:22	06:19	06:09	05:15	04:56	05:21	06:09	07:00	07:51	07:46 15:17-15:42/25	08:23
	16:43	17:40	18:30	20:24	21:12	21:41	21:25	20:30	19:20	18:12	16:19	16:07
22	08:12 15:42-16:07/25	07:20	06:17	06:07	05:14	04:56	05:22	06:11	07:01	07:52	07:47 15:18-15:43/25	08:23
	16:45	17:42	18:32	20:25	21:14	21:41	21:23	20:28	19:17	18:10	16:18	16:07
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	16:47	17:44	18:34	20:27	21:15	21:41	21:22	20:26	19:15	18:08	16:17	16:08
24	08:10 15:42-16:08/26	07:15	06:12	06:03	05:12	04:57	05:25	06:14	07:05	07:56	07:51 15:19-15:42/23	08:24
	16:49	17:46	18:36	20:29	21:16	21:41	21:21	20:24	19:13	18:06	16:16	16:08
25	08:08 15:43-16:08/25	07:13	06:10	06:01	05:10	04:57	05:27	06:16	07:06	07:58	07:52 15:20-15:42/22	08:24
	16:50	17:48	18:37	20:30	21:18	21:41	21:19	20:22	19:10	17:04	16:15	16:09
26	08:07 15:43-16:08/25	07:11	06:08	05:59	05:09	04:58	05:28	06:17	07:08	07:00	07:54 15:21-15:41/20	08:25
	16:52	17:50	18:39	20:32	21:19	21:41	21:18	20:19	19:08	17:02	16:14	16:10
27	08:06 15:44-16:08/24	07:09	06:05	05:57	05:08	04:58	05:29	06:19	07:10	07:01	07:56 15:21-15:39/18	08:25
	16:54	17:51	18:41	20:34	21:20	21:41	21:16	20:17	19:06	17:00	16:13	16:10
28	08:04 15:44-16:08/24	07:07	06:03	05:55	05:07	04:58	05:31	06:20	07:11	07:03	07:57 15:22-15:38/16	08:25
	16:56	17:53	18:42	20:35	21:22	21:41	21:15	20:15	19:03	16:58	16:12	16:11
29	08:03 15:45-16:08/23		07:01	05:53	05:06	04:59	05:32	06:22	07:13	07:05	07:59 15:24-15:38/14	08:25
	16:58		19:44	20:37	21:23	21:41	21:13	20:13	19:01	16:56	16:11	16:12
30	08:01 15:45-16:07/22		06:58	05:51	05:05	05:00	05:34	06:24	07:15	07:07	08:00 15:24-15:36/12	08:25
	16:59		19:46	20:39	21:24	21:41	21:12	20:11	18:59	16:54	16:10	16:13
31	08:00 15:46-16:06/20		06:56		05:04		05:35	06:25		07:09		08:25
	17:01		19:48		21:25		21:10	20:08		16:52		16:14
Potential sun hours	258	277	367	416	486	499	503	454	381	331	266	243
Sum of minutes with flicker	463	46	0	0	0	0	0	0	0	0	489	25

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	Last time (hh:mm) with flicker	Minutes with flicker
	Sun set (hh:mm)	First time (hh:mm) with flicker	Last time (hh:mm) with flicker	Minutes with flicker

SHADOW - Calendar per WTG, graphical

Calculation: Shadow Flicker Analysis 125m



Shadow receptors

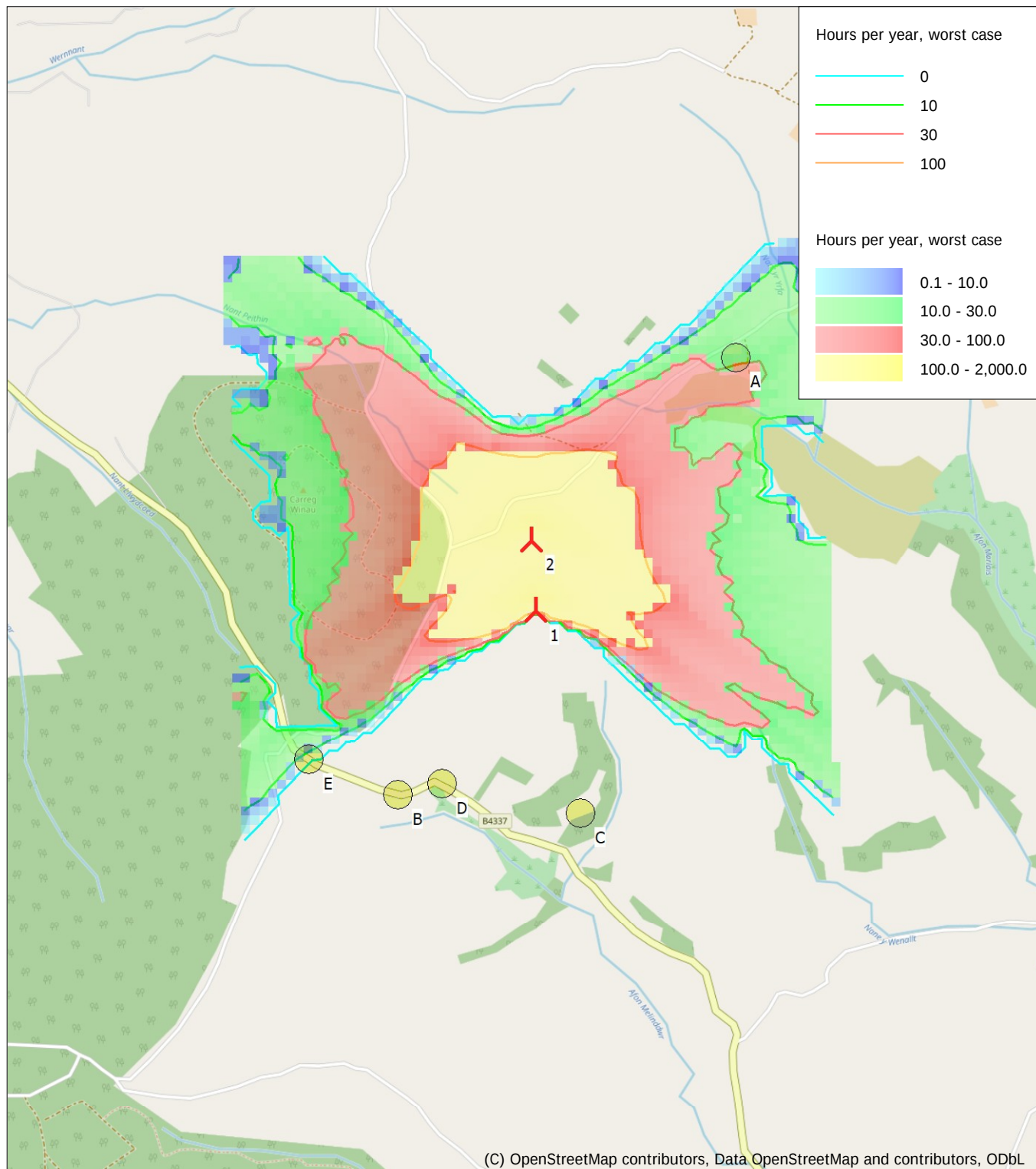


A: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (1)

E: Shadow Receptor: 1.0 × 1.0 Azimuth: 0.0° Slope: 90.0° (5)

SHADOW - Map

Calculation: Shadow Flicker Analysis 125m



0 250 500 750 1000m

Map: EMD OpenStreetMap , Print scale 1:20,000, Map center British TM-OSGB36/Airy (GB/IE) East: 256,950 North: 241,110



New WTG



Shadow receptor

Flicker map level: Elevation data 20km