



MER Windmolenpark Elzenburg - de Geer te Oss

Bijlage 4
Slagschaduw

projectnummer 0408379.00
definitief
4 september 2017

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Leeswijzer

In dit bijlagerapport zijn de resultaten van de slagschaduwberekeningen in WindPro (Antea Group, 2017) opgenomen:

- Kaart slagschaduwcontouren + tabel met aantal gevoelige objecten binnen contouren (per alternatief);
- Overzicht 10 referentiewoningen;
- Resultaten berekening aantal uur kans op slagschaduw voor 10 referentiewoningen (per alternatief);
- Slagschaduwkalender (grafieken) voor 10 referentiewoningen (per alternatief);
- Overzicht 110 referentiewoningen;
- Voorbeeld slagschaduwkalender (tabel) voor 110 referentiewoningen voor alternatief 1A en 6B.

De resultaten hebben als basis gediend voor de effectbeschrijving in hoofdstuk 7 in het MER.

datum vrijgave
04-9-2017

beschrijving revisie
definitief

goedkeuring
Bastian van Dijk

vrijgave
Johan van de Heijning

MER Windmolenpark Elzenburg - de Geer te Oss

Bijlage 4

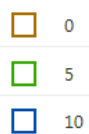
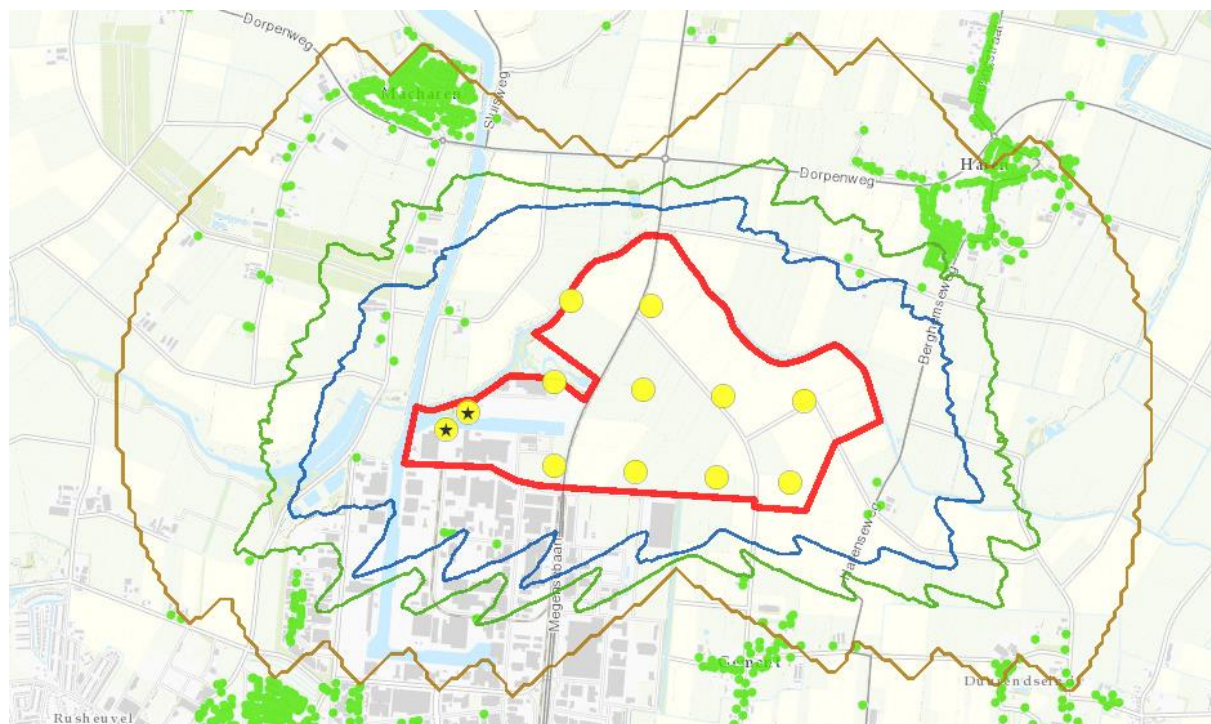
projectnummer 0408379.00

4 september 2017

Gemeente Oss

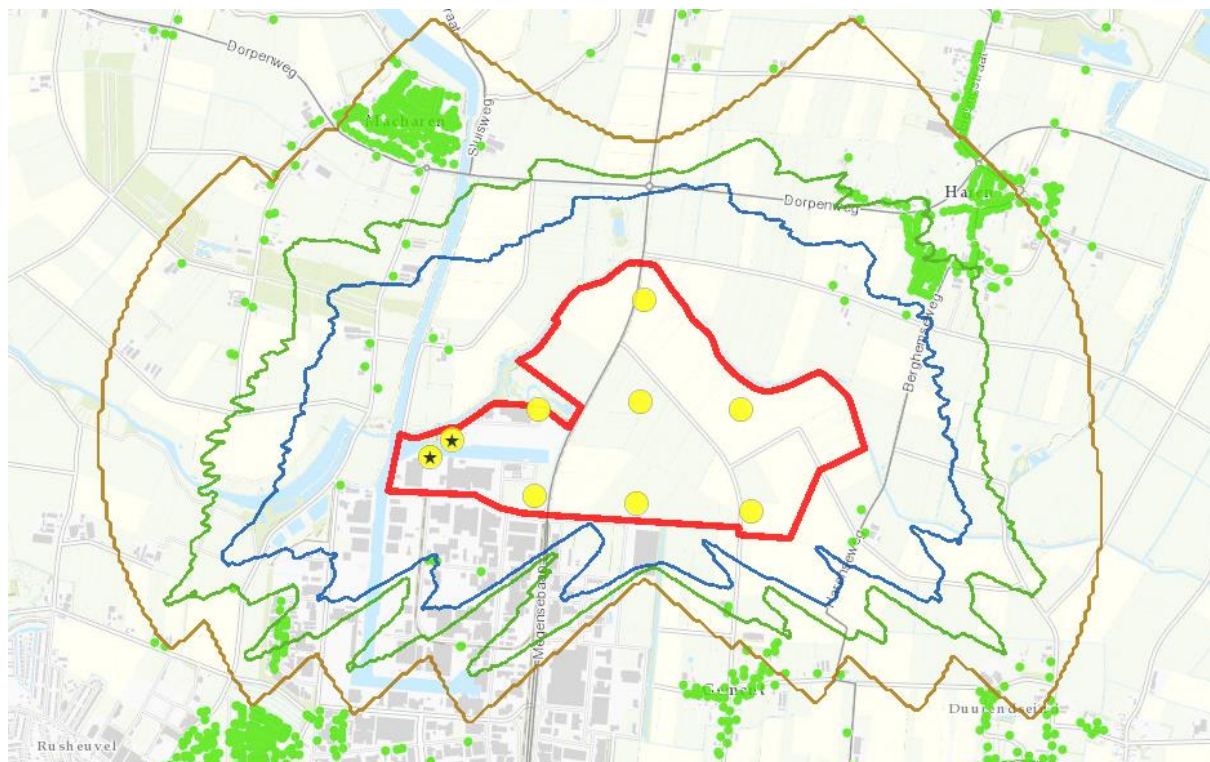


Alternatief 1A



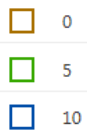
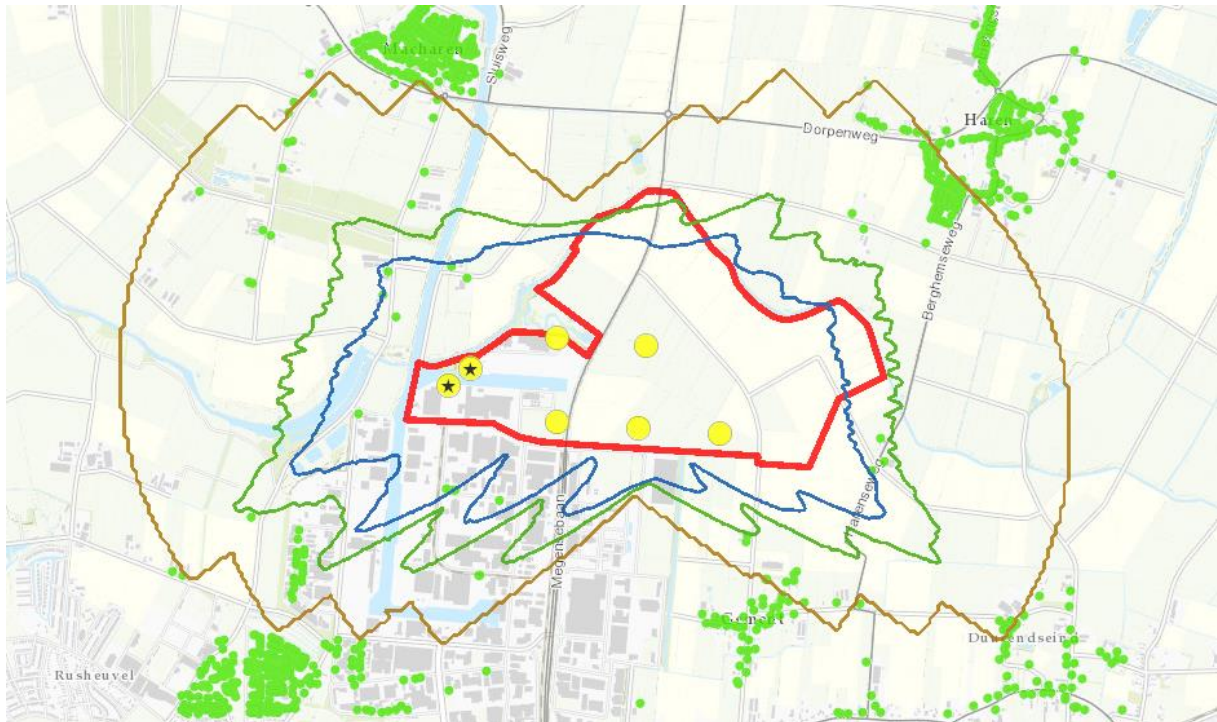
Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	13
5 tot 10 uur per jaar	23
<5 uur per jaar	483

Alternatief 1B



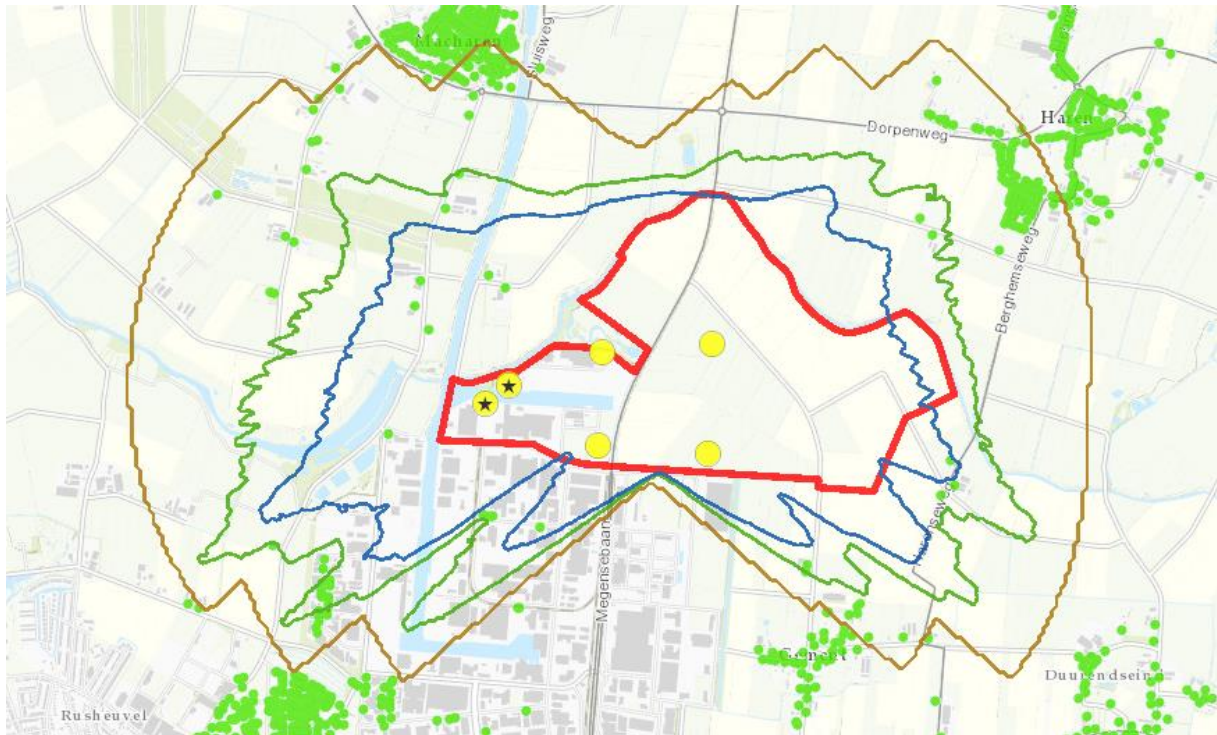
Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	14
5 tot 10 uur per jaar	100
<5 uur per jaar	416

Alternatief 2A



Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	8
5 tot 10 uur per jaar	5
<5 uur per jaar	149

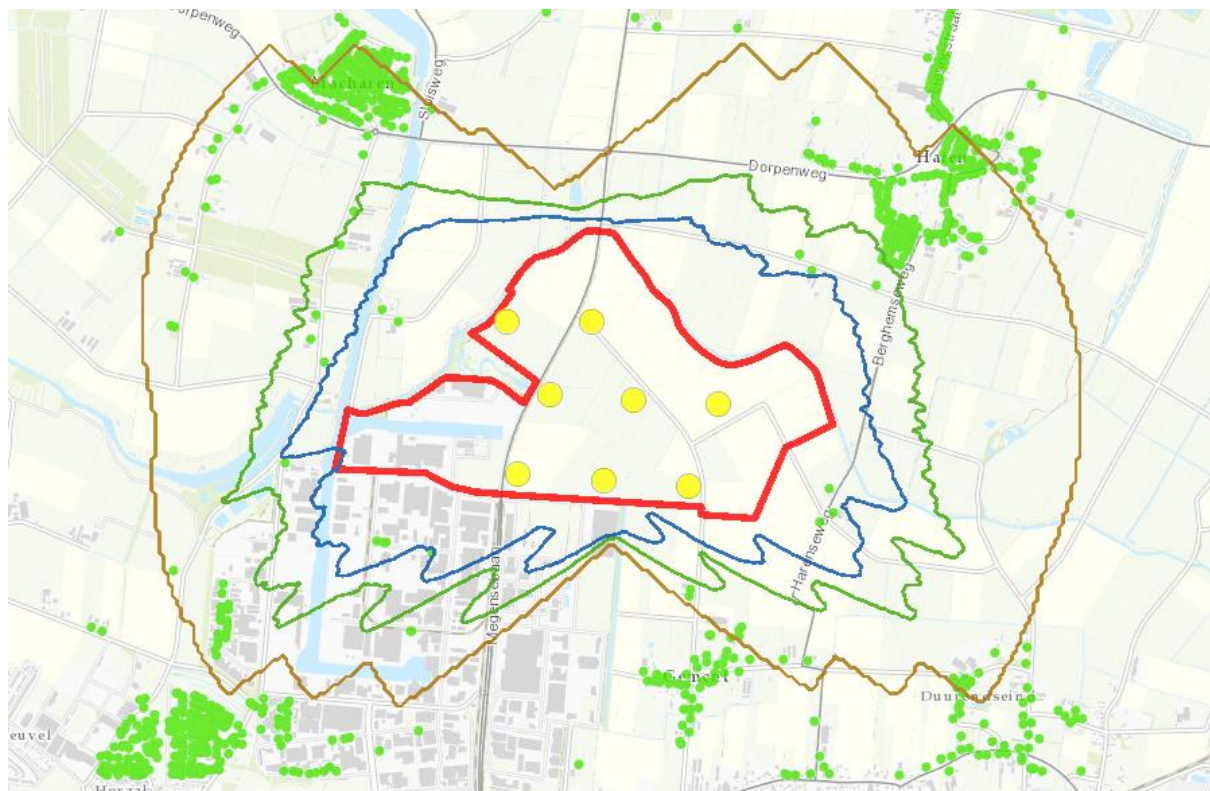
Alternatief 2B



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	8
5 tot 10 uur per jaar	21
<5 uur per jaar	178

Alternatief 3A



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	8
5 tot 10 uur per jaar	11
<5 uur per jaar	442

Alternatief 3B



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	12
5 tot 10 uur per jaar	53
<5 uur per jaar	422

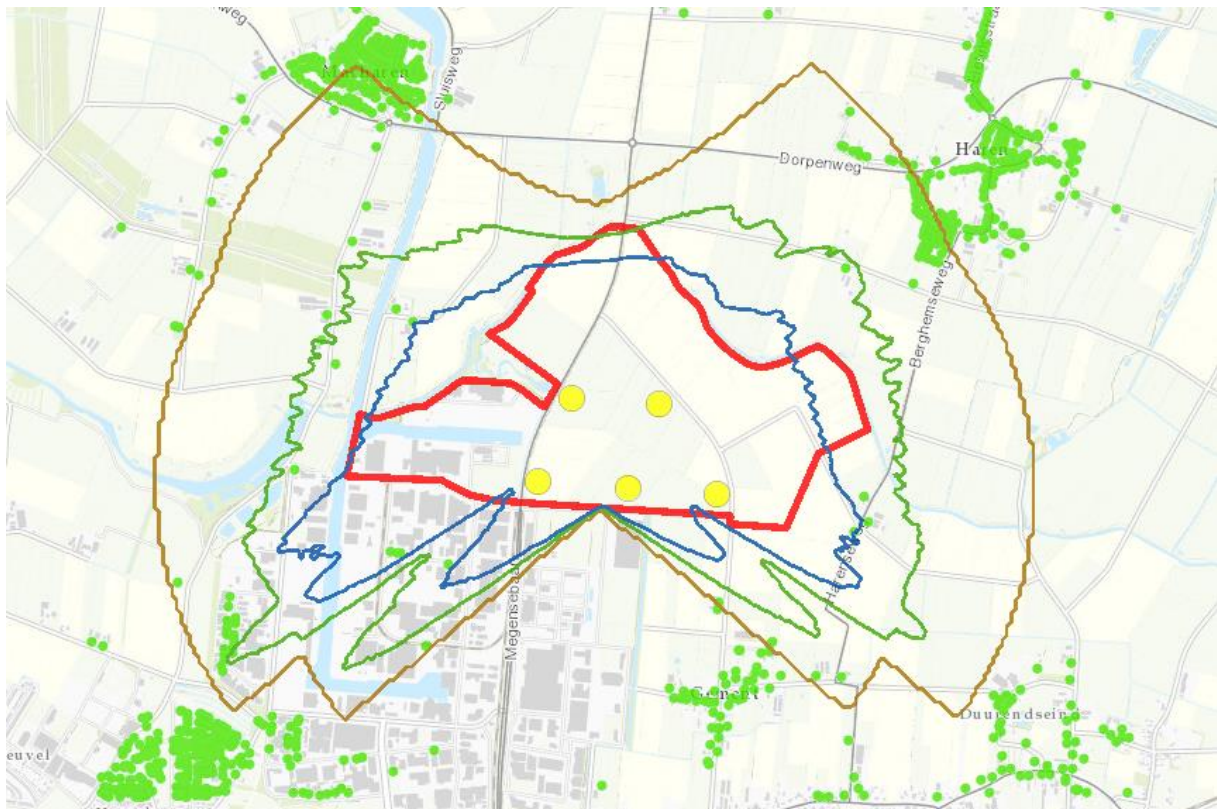
Alternatief 4A



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	6
5 tot 10 uur per jaar	3
<5 uur per jaar	164

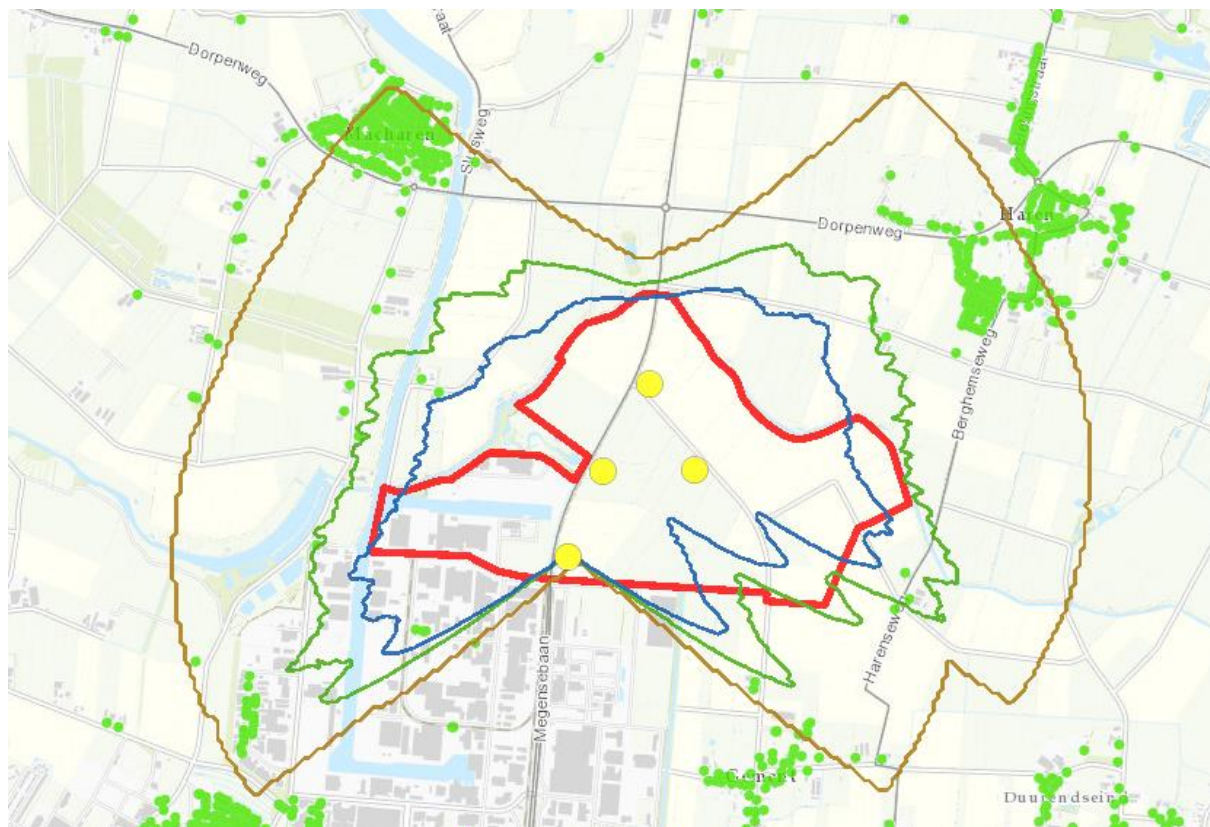
Alternatief 4B



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	4
5 tot 10 uur per jaar	9
<5 uur per jaar	166

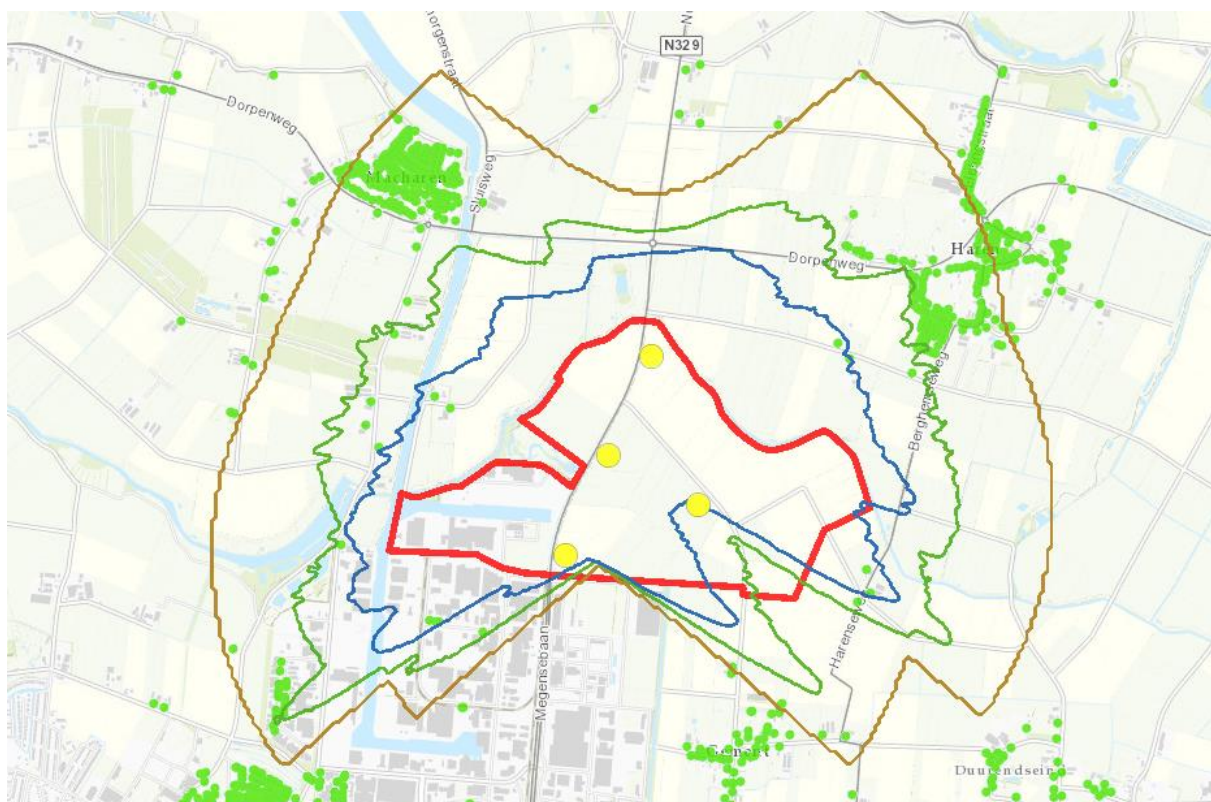
Alternatief 5A



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	3
5 tot 10 uur per jaar	4
<5 uur per jaar	387

Alternatief 5B



- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	9
5 tot 10 uur per jaar	16
<5 uur per jaar	430

Alternatief 6A






- 0
- 5
- 10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	3
5 tot 10 uur per jaar	2
<5 uur per jaar	379

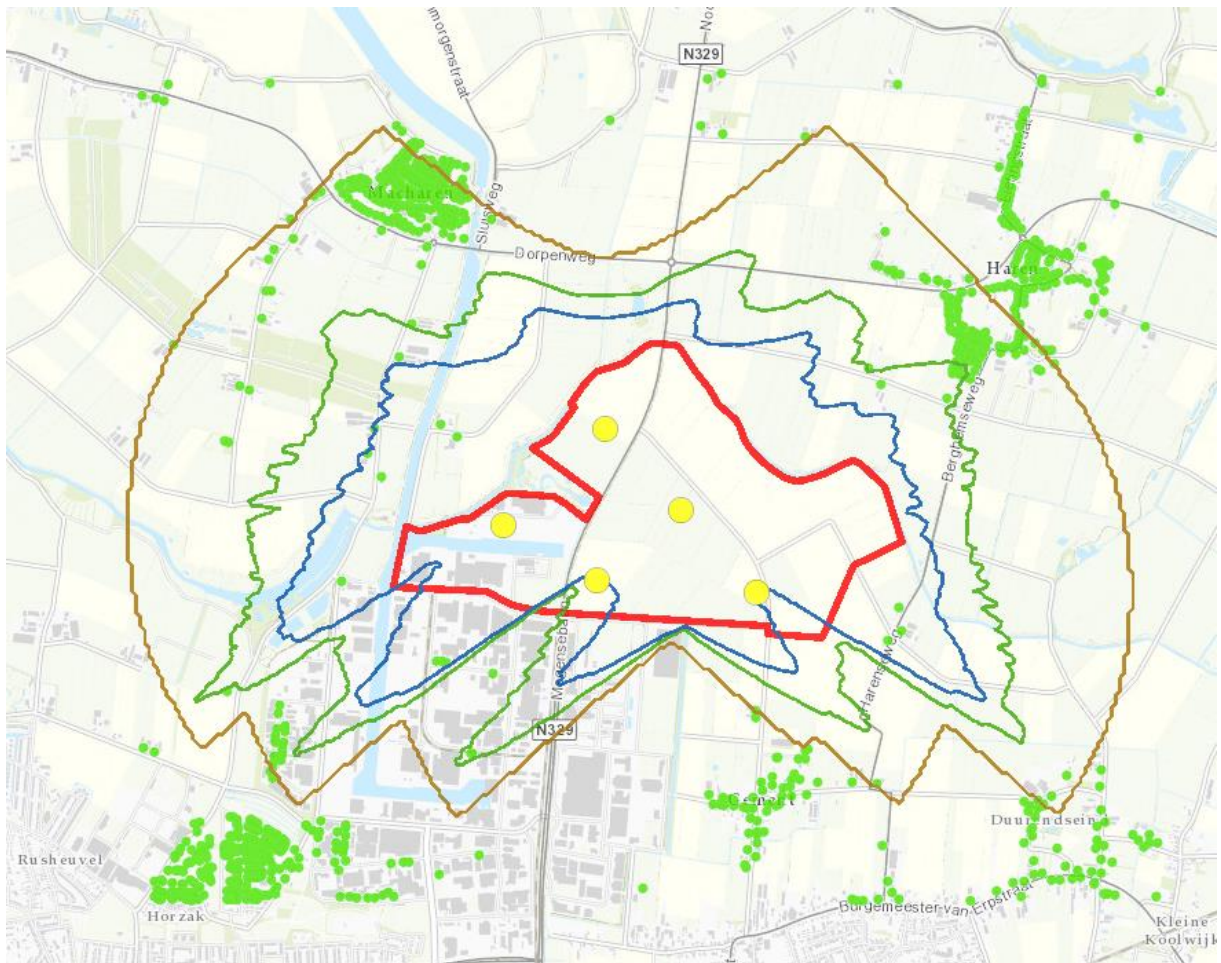
Alternatief 6B



-  0
-  5
-  10

Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	3
5 tot 10 uur per jaar	14
<5 uur per jaar	437

VKA 1a



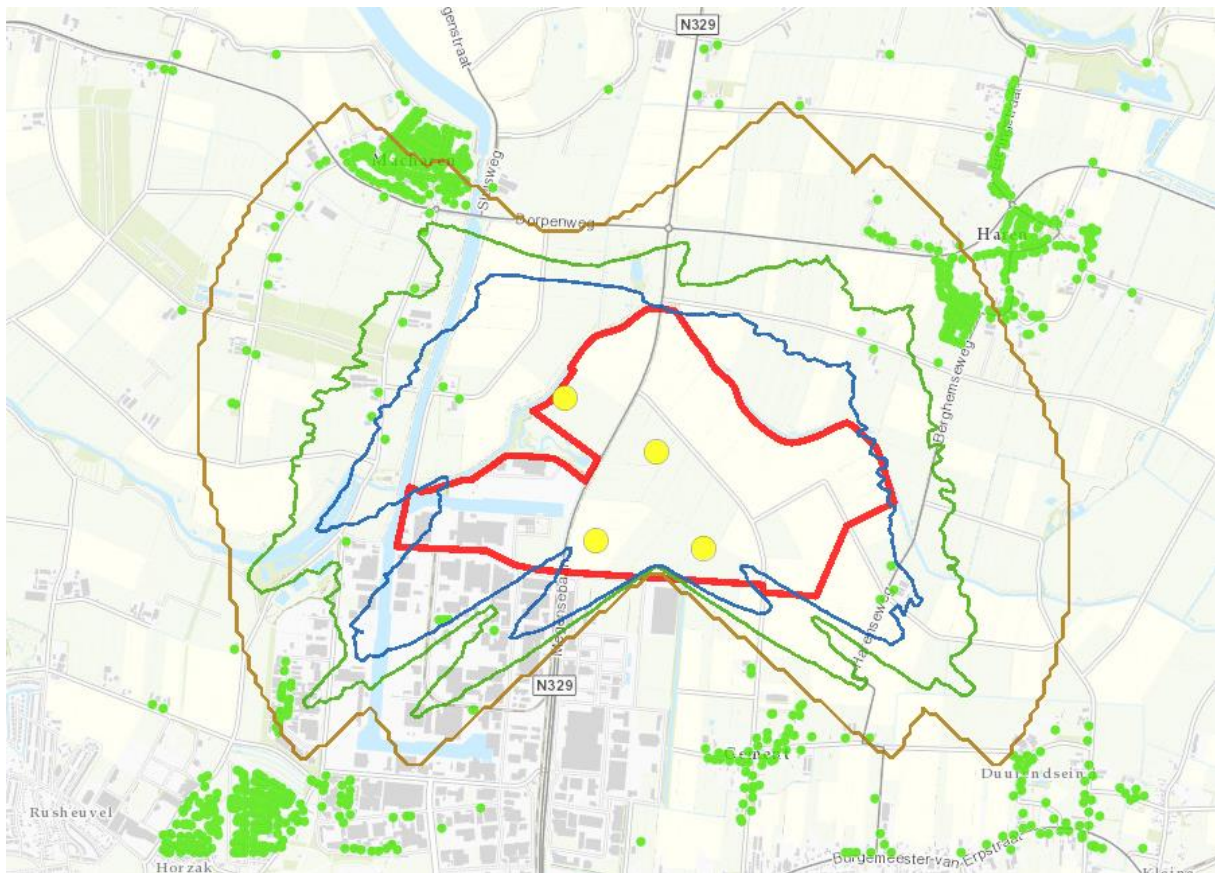
Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	11
5 tot 10 uur per jaar	15
<5 uur per jaar	386

VKA 2a



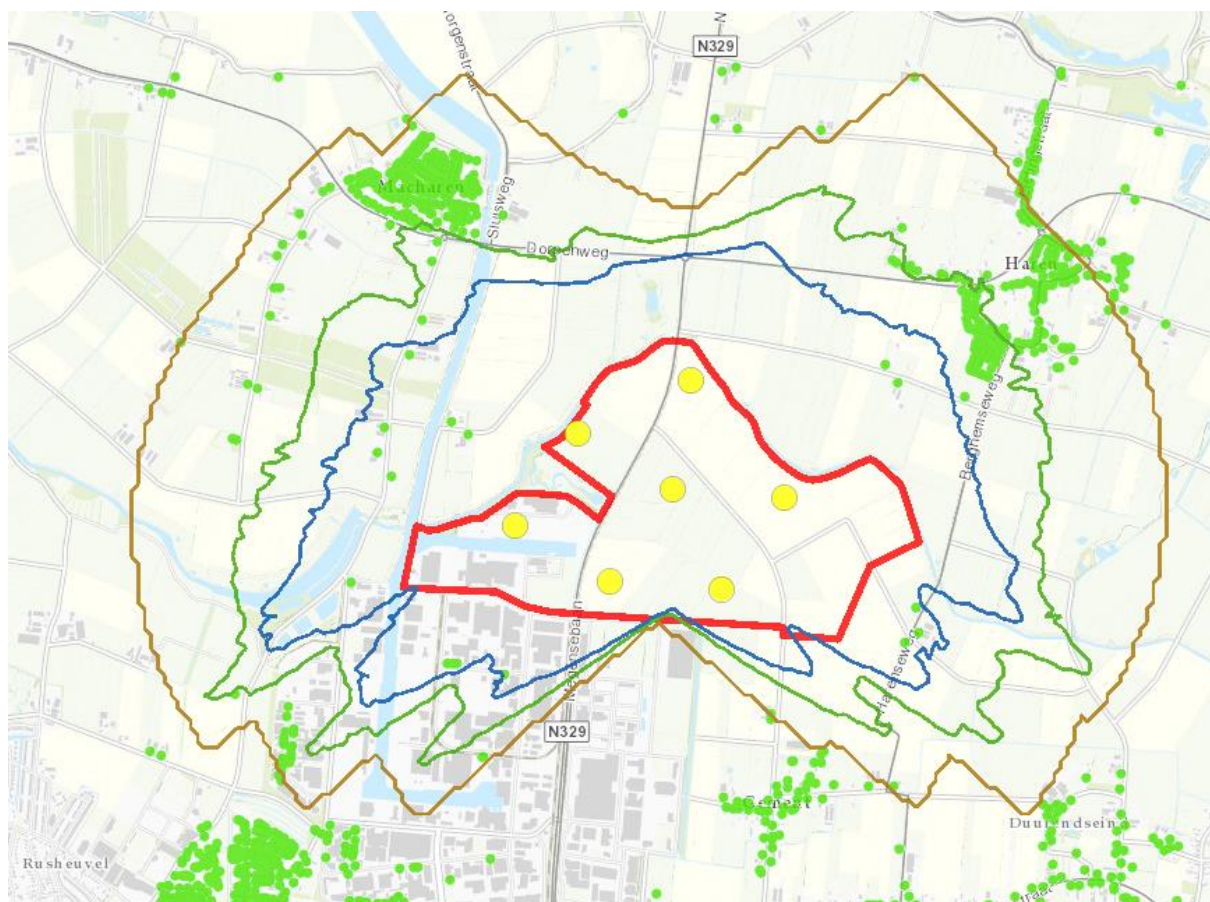
Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	12
5 tot 10 uur per jaar	17
<5 uur per jaar	292

VKA 2b



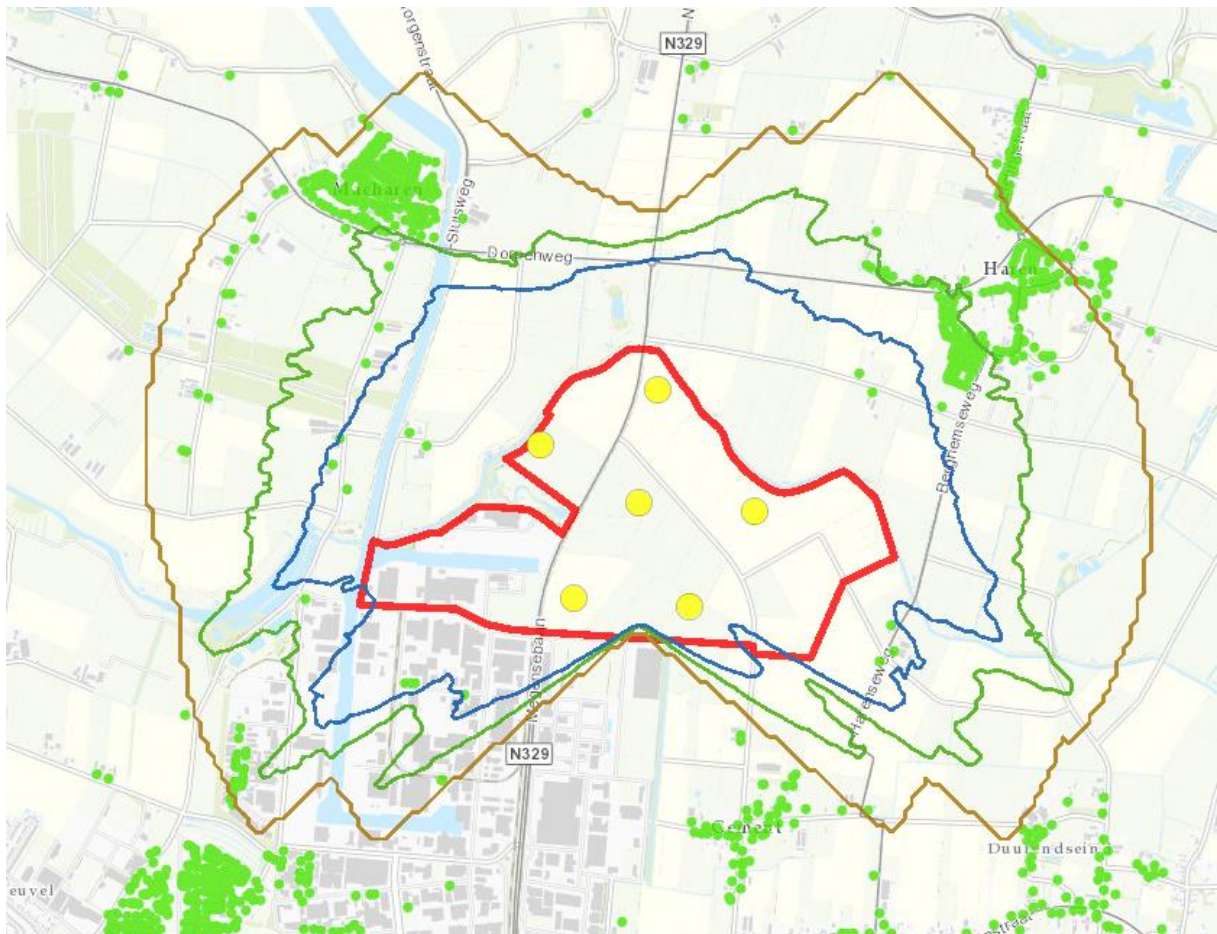
Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	9
5 tot 10 uur per jaar	17
<5 uur per jaar	290

OA a



Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	16
5 tot 10 uur per jaar	110
<5 uur per jaar	528

OA b



Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	14
5 tot 10 uur per jaar	110
<5 uur per jaar	526

OA c



Schaduwcontour	Aantal gevoelige objecten
> 10 uur per jaar	13
5 tot 10 uur per jaar	27
<5 uur per jaar	491

Referentiewoningen (10) voor eerste inschatting mitigatie door stilstand



SHADOW - Main Result

Calculation: 1A Elz Hoed en Schil Vestas Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:
 Site data: WASP (4)

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Shadow data				
				Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.467	422.656	4,9 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
2	166.040	422.510	4,1 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
3	166.950	423.029	4,6 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
4	167.697	422.565	4,3 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
5	166.462	422.245	8,0 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
6	167.295	422.585	4,9 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
7	166.548	423.059	4,3 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
8	167.267	422.183	3,8 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
9	167.628	422.161	5,3 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
10	166.865	422.215	7,5 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
11	166.903	422.616	2,8 VESTAS V112-3.45 3450 112.0 !O! hu...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

SHADOW - Main Result

Calculation: 1A Elz Hoed en Schil Vestas Receptors

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]
A	16:50	72	0:24	1:41
B	52:32	147	0:40	7:05
C	56:18	164	0:44	7:28
D	55:27	175	0:32	8:22
E	217:23	267	1:27	35:50
F	129:02	158	1:17	28:52
G	69:20	142	0:53	17:35
H	8:54	60	0:20	2:20
I	19:12	59	0:27	4:06
J	6:16	37	0:16	1:24

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (1)	78:02	10:50
2	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (20)	60:58	7:52
3	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (21)	44:16	7:33
4	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (22)	48:05	6:07
5	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (23)	43:43	8:01
6	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (24)	64:41	11:28
7	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (25)	79:24	18:00
8	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (26)	45:04	8:43
9	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (27)	109:19	24:37
10	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (28)	81:41	16:04
11	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (29)	37:05	6:40

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.

SHADOW - Main Result

Calculation: 1B Elz Hoed en Schil Nordex Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 479 759 620 1.061 1.287 854 609 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

No.	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.467	422.656	4,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	166.036	422.509	4,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.986	423.194	3,3	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	167.509	422.155	6,3	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5	166.446	422.236	7,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
6	167.460	422.659	5,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
7	166.967	422.696	3,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
8	166.946	422.194	4,5	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group

Beneluxweg 125 Postbus 40

NL-4900 AA OOSTERHOUT

0513 634045

Koen Wilmer / koen.wilmer@anteagroup.com

Calculated:

7-2-2017 15:00/3.1.597

SHADOW - Main Result

Calculation: 1B Elz Hoed en Schil Nordex Receptors

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]
A	28:45	87	0:28	3:23
B	50:20	143	0:32	8:25
C	75:39	166	0:48	9:37
D	91:16	177	0:45	15:23
E	284:12	236	1:58	41:20
F	117:08	158	1:02	26:50
G	78:36	121	1:01	19:56
H	16:48	67	0:25	4:26
I	23:55	55	0:33	5:08
J	11:43	49	0:20	2:38

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (12)	90:45	14:02
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (13)	145:42	19:11
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (14)	71:02	14:43
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (15)	124:19	26:55
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (16)	84:56	14:09
6	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (17)	86:52	15:22
7	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (18)	82:36	14:41
8	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (19)	109:57	21:23

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.

SHADOW - Main Result

Calculation: 2A Elz Hoed Vestas Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 546 683 671 437 477 752 615 1.050 1.274 847 605 448 8.405
 Idle start wind speed: Cut in wind speed from power curve

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:
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 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type					Shadow data		
				Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.469	422.660	4,8 VESTAS V112-3.45 3450 112.0 !O! hub:...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
2	166.039	422.505	3,9 VESTAS V112-3.45 3450 112.0 !O! hub:...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
3	166.462	422.250	8,0 VESTAS V112-3.45 3450 112.0 !O! hub:...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
4	167.266	422.188	4,2 VESTAS V112-3.45 3450 112.0 !O! hub:...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
5	166.865	422.219	7,5 VESTAS V112-3.45 3450 112.0 !O! hub:...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
6	166.910	422.617	2,4 VESTAS V112-3.45 3450 112.0 !O! hub:...	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 7-2-2017 15:07/3.1.597

SHADOW - Main Result

Calculation: 2A Elz Hoed Vestas Receptors

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]
A	0:00	0	0:00	0:00
B	15:08	73	0:19	1:57
C	32:54	110	0:30	3:34
D	16:24	82	0:22	2:37
E	142:52	153	1:27	18:26
F	28:58	95	0:34	6:34
G	53:38	119	0:38	13:39
H	8:45	59	0:20	2:18
I	18:10	58	0:27	3:52
J	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]
1	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (35)	77:03	10:47
2	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (36)	58:08	7:33
3	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (37)	43:54	7:55
4	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (38)	45:27	8:48
5	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (39)	80:41	15:52
6	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (40)	37:04	6:41

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.

SHADOW - Main Result

Calculation: 2B Elz Hoed Nordex Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 551 690 677 440 480 758 621 1.061 1.287 854 608 451 8.478
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

Eye height: 1,5 m

Grid resolution: 10,0 m

Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator				Calculation distance [m]	RPM
1	166.462	422.657	5,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	166.038	422.508	4,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.446	422.233	8,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	166.967	422.692	3,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5	166.946	422.195	4,5 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 7-2-2017 15:18/3.1.597

SHADOW - Main Result

Calculation: 2B Elz Hoed Nordex Receptors

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]
A	11:52	40	0:21	1:07
B	8:08	29	0:22	1:32
C	64:54	133	0:48	7:32
D	37:21	107	0:43	5:57
E	249:14	183	1:57	33:35
F	40:10	108	0:28	8:55
G	50:41	86	0:40	12:55
H	16:10	63	0:25	4:16
I	24:38	55	0:34	5:17
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (30)	91:25	14:05
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (31)	144:48	19:02
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (32)	84:34	14:08
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (33)	82:44	14:45
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (34)	109:48	21:21

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.

SHADOW - Main Result

Calculation: 3A Hoed en Schil Vestas Receptors

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 548 685 671 437 475 753 614 1.053 1.275 846 604 448 8.409
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type				Shadow data			
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.940	422.954	5,6	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
2	167.527	422.560	5,1	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
3	167.131	422.584	3,9	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
4	166.538	422.954	2,1	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
5	166.992	422.204	2,3	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
6	167.396	422.174	6,0	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
7	166.589	422.234	5,4	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
8	166.742	422.606	7,0	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8



Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

SHADOW - Main Result

Calculation: 3A Hoed en Schil Vestas Receptors

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]
A	17:58	60	0:23	1:41
B	39:21	153	0:35	5:33
C	39:39	139	0:39	5:41
D	74:12	161	0:53	10:20
E	117:01	230	0:53	19:42
F	62:26	158	0:40	14:01
G	37:47	114	0:42	9:48
H	4:50	27	0:17	1:16
I	6:17	37	0:15	1:19
J	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]
1	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (41)	46:59	7:22
2	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (42)	60:42	8:21
3	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (43)	55:23	10:18
4	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (44)	68:22	14:16
5	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (45)	65:06	12:12
6	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (46)	47:21	9:51
7	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (47)	42:33	6:11
8	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (48)	42:09	6:59

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.

SHADOW - Main Result

Calculation: 3B Hoed en Schil Nordex Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 554 692 678 440 479 760 619 1.062 1.286 853 609 452 8.483
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type					Shadow data		
				Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	167.010	423.209	3,2 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	167.591	422.163	5,1 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.591	422.231	5,5 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	167.348	422.681	4,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5	166.802	422.723	3,1 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
6	167.091	422.198	3,9 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG
 Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

SHADOW - Main Result

Calculation: 3B Hoed en Schil Nordex Receptors

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]
A	19:14	64	0:28	2:33
B	50:34	168	0:29	8:27
C	45:42	128	0:36	6:36
D	91:07	195	0:53	15:19
E	110:22	212	0:56	17:07
F	149:28	156	1:27	33:42
G	47:54	135	0:34	12:18
H	10:45	38	0:22	2:52
I	0:00	0	0:00	0:00
J	18:02	77	0:21	3:59

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

No.	Name	Worst case [h/year]	Expected [h/year]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (49)	70:22	14:49
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (50)	145:14	31:58
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (51)	69:47	10:09
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (52)	65:38	11:46
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (53)	77:24	14:20
6	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (54)	101:39	19:14

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.

SHADOW - Main Result

Calculation: 4A Hoed Vestas Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 548 685 672 437 475 753 614 1.053 1.274 844 604 448 8.409
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	167.134	422.585	4,0	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
2	166.989	422.204	2,4	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
3	167.397	422.179	5,9	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
4	166.591	422.234	5,5	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
5	166.737	422.611	7,1	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 8-2-2017 9:13/3.1.597

SHADOW - Main Result

Calculation: 4A Hoed Vestas Receptors

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]
A	0:00	0	0:00	0:00
B	19:07	102	0:20	2:43
C	19:10	100	0:23	2:19
D	30:16	126	0:27	4:17
E	65:24	153	0:49	8:23
F	63:11	158	0:40	14:11
G	33:48	113	0:33	8:44
H	4:48	27	0:17	1:16
I	6:02	36	0:14	1:16
J	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]
1	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (56)	55:36	10:21
2	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (57)	65:37	12:19
3	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (58)	47:53	9:57
4	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (59)	42:25	6:09
5	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (60)	42:28	7:02

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.

SHADOW - Main Result

Calculation: 4B Hoed Nordex Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 441 479 760 620 1.063 1.285 852 609 452 8.482
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

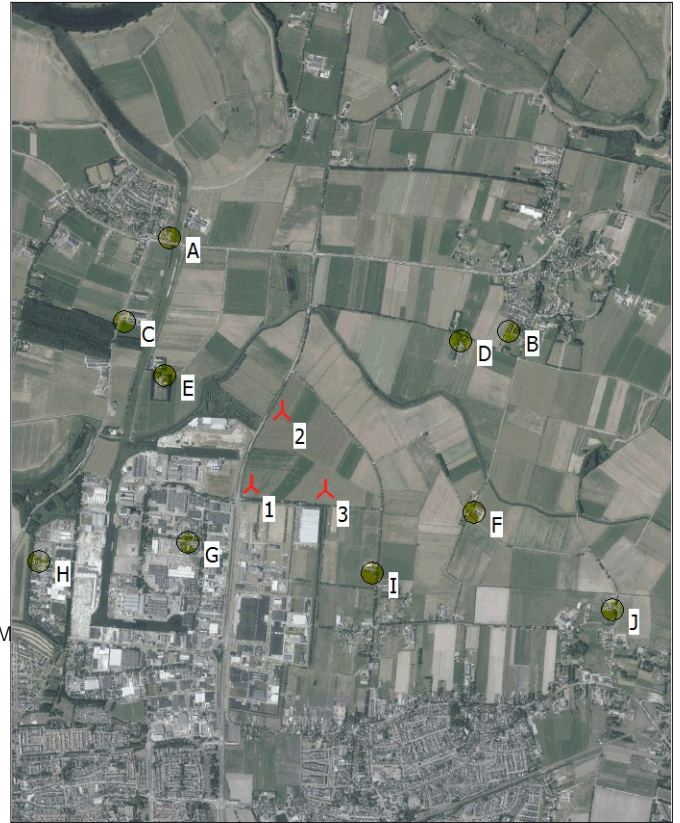
All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type				Shadow data			
				Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.597	422.231	6,1 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	166.802	422.722	3,1 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	167.091	422.198	3,9 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 8-2-2017 10:06/3.1.597

SHADOW - Main Result

Calculation: 4B Hoed Nordex Receptors

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]
A	3:31	20	0:13	0:20
B	17:10	70	0:21	2:35
C	30:34	88	0:27	3:45
D	43:20	133	0:26	6:10
E	81:36	159	0:41	10:28
F	44:47	134	0:32	10:05
G	33:29	80	0:34	8:43
H	10:44	38	0:22	2:51
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (61)	70:13	10:13
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (62)	77:24	14:20
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (63)	101:39	19:14

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:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 8-2-2017 9:31/3.1.597

SHADOW - Main Result

Calculation: 5A Omgeving Vestas Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

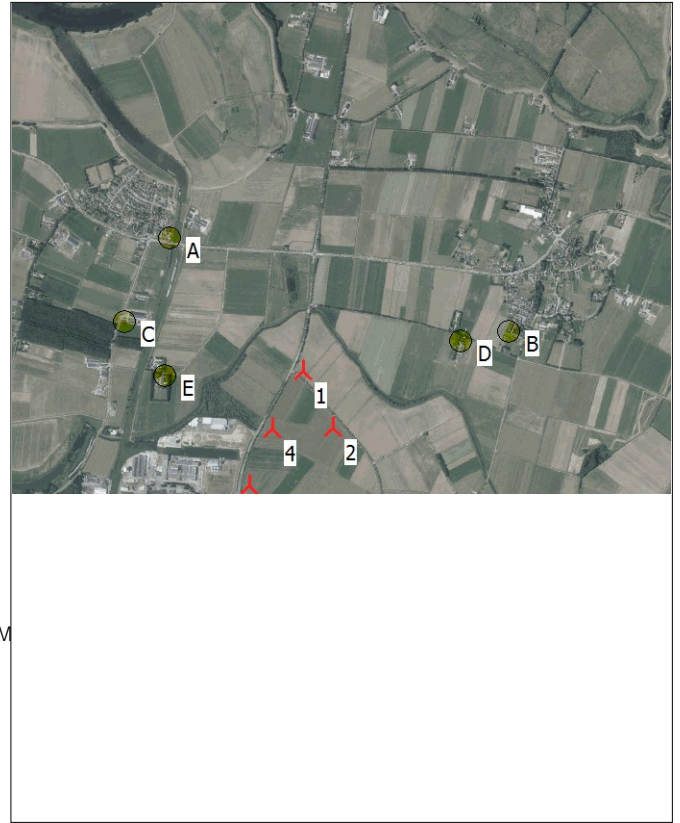
N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 548 685 672 436 474 753 614 1.054 1.277 847 603 447 8.410
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.943	422.989	5,2	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
2	167.143	422.614	4,6	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
3	166.588	422.233	5,2	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
4	166.737	422.606	7,0	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8



Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

SHADOW - Main Result

Calculation: 5A Omgeving Vestas Receptors

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]
A	20:13	66	0:23	1:56
B	12:36	64	0:20	2:20
C	19:34	89	0:24	2:48
D	26:59	93	0:28	4:44
E	66:17	153	0:43	9:51
F	32:07	116	0:27	7:00
G	0:00	0	0:00	0:00
H	4:50	28	0:17	1:16
I	6:41	38	0:15	1:24
J	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]
1	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (64)	46:21	7:30
2	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (65)	55:53	10:06
3	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (66)	42:19	6:11
4	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (67)	42:17	6:59

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.

SHADOW - Main Result

Calculation: 5B Omgeving Nordex Receptors

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
553	691	677	440	478	760	619	1.062	1.287	855	609	452	8.482

Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type				Shadow data			
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.592	422.238	5,8	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	167.231	422.479	5,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.797	422.723	3,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	167.005	423.209	3,2	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"



Scale 1:50.000
 New WTG Shadow receptor

SHADOW - Main Result

Calculation: 5B Omgeving Nordex Receptors

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]
A	19:10	63	0:28	2:33
B	28:50	96	0:25	5:15
C	42:16	124	0:27	5:57
D	61:02	142	0:48	10:37
E	99:14	207	0:39	15:33
F	51:37	106	0:39	11:22
G	23:21	59	0:28	5:56
H	10:50	39	0:22	2:53
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (69)	70:39	10:16
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (70)	116:54	22:26
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (71)	77:31	14:21
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (72)	70:38	14:52

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.

SHADOW - Main Result

Calculation: 6A 3 x langs N329 Vestas Receptors

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 686 671 436 474 753 615 1.054 1.277 846 603 447 8.409
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

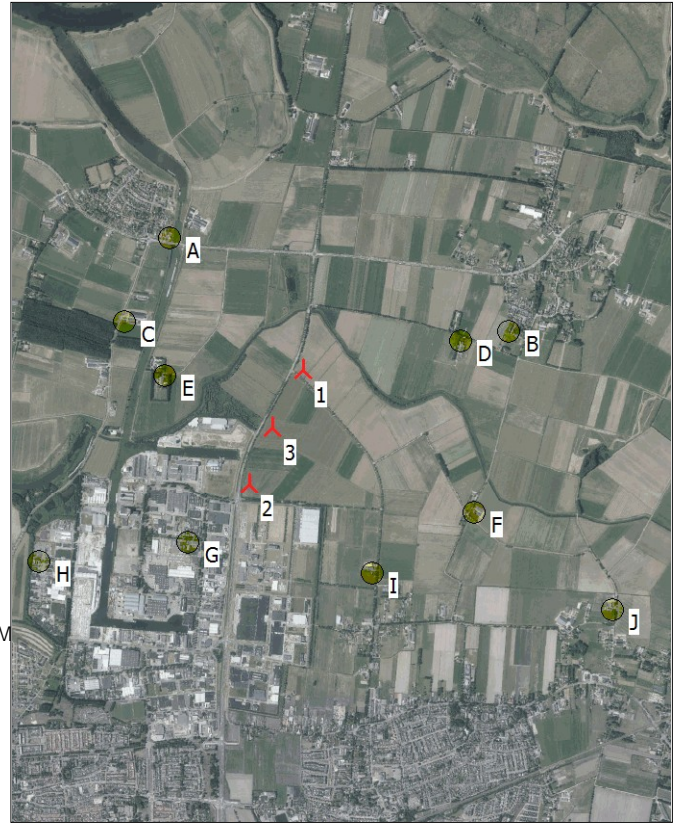
All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type				Shadow data			
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM
1	166.945	422.992	5,2	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
2	166.589	422.234	5,4	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8
3	166.737	422.609	7,0	VESTAS V112-3.45 3450 112.0 !O! hub:...Yes	Yes	VESTAS	V112-3.45-3.450	3.450	112,0	94,0	1.711	13,8

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
Beneluxweg 125 Postbus 40
NL-4900 AA OOSTERHOUT
0513 634045
Koen Wilmer / koen.wilmer@anteagroup.com
Calculated:
8-2-2017 9:41/3.1.597

SHADOW - Main Result

Calculation: 6A 3 x langs N329 Vestas Receptors

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]
A	17:22	66	0:24	1:40
B	6:34	40	0:18	1:15
C	16:37	73	0:23	2:18
D	16:46	79	0:25	3:06
E	59:33	144	0:35	8:42
F	9:03	51	0:17	2:02
G	0:00	0	0:00	0:00
H	4:50	27	0:17	1:16
I	6:17	37	0:15	1:19
J	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]
1	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (73)	46:18	7:31
2	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (74)	42:33	6:11
3	VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (75)	42:25	7:00

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.

SHADOW - Main Result

Calculation: 6B 3 x langs N329 Nordex Receptors
 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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 478 759 620 1.062 1.287 856 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m
 Topographic shadow included in calculation

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	166.589	422.236	5,4 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	166.797	422.720	3,2 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	167.005	423.209	3,2 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9

Shadow receptor-Input

No.	X (east)	Y (north)	Z [m]	Width [m]	Height [m]	Height a.g.l. [m]	Degrees from south cw [°]	Slope of window [°]	Direction mode
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
Beneluxweg 125 Postbus 40
NL-4900 AA OOSTERHOUT
0513 634045
Koen Wilmer / koen.wilmer@anteagroup.com
Calculated:
8-2-2017 9:46/3.1.597

SHADOW - Main Result

Calculation: 6B 3 x langs N329 Nordex Receptors

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]
A	18:46	62	0:28	2:31
B	16:07	57	0:24	3:15
C	40:58	120	0:27	5:47
D	35:32	106	0:32	7:10
E	90:44	185	0:39	14:09
F	30:47	108	0:24	6:50
G	0:00	0	0:00	0:00
H	10:51	39	0:22	2:53
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (76)	70:21	10:14
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (77)	76:53	14:15
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (78)	70:38	14:52

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.

SHADOW - Main Result

Calculation: VKA 1A

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time
 N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 678 440 479 759 620 1.061 1.288 854 609 451 8.481
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)
 Area object(s) used in calculation:
 Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)
 Obstacles used in calculation
 Eye height: 1,5 m
 Grid resolution: 10,0 m

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1 166.667	422.287	6,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2 166.233	422.541	5,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3 166.702	422.989	3,7	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4 167.051	422.612	4,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5 167.401	422.235	5,5	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG
 Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 20-6-2017 12:18/3.1.597

SHADOW - Main Result

Calculation: VKA 1A

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]
A	31:27	64	0:37	3:05
B	39:13	123	0:25	5:48
C	84:16	137	1:02	10:05
D	45:12	131	0:29	7:18
E	216:59	231	1:44	31:38
F	109:40	146	1:04	24:22
G	13:49	42	0:26	3:36
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (206)	72:08	10:33
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (207)	142:56	17:08
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (208)	102:37	18:56
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (209)	86:04	15:31
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (210)	124:18	23:41

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.

SHADOW - Main Result

Calculation: VKA 1B

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 553 691 678 441 479 760 619 1.062 1.287 854 609 452 8.483
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

Eye height: 1,5 m

Grid resolution: 10,0 m

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	166.667	422.287	6,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	166.702	422.989	3,7	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	167.051	422.612	4,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	167.401	422.235	5,5	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG
 Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
Beneluxweg 125 Postbus 40
NL-4900 AA OOSTERHOUT
0513 634045
Koen Wilmer / koen.wilmer@anteagroup.com
Calculated:
20-6-2017 12:04/3.1.597

SHADOW - Main Result

Calculation: VKA 1B

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]
A	31:27	64	0:37	3:05
B	39:13	123	0:25	5:49
C	48:50	135	0:32	6:26
D	45:11	131	0:29	7:18
E	96:52	212	0:47	16:43
F	109:39	146	1:04	24:22
G	13:49	42	0:26	3:36
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (202)	72:13	10:34
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (203)	102:37	18:56
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (204)	86:04	15:32
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (205)	124:18	23:42

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.

SHADOW - Main Result

Calculation: **VKA 2a**

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 551 691 677 440 479 759 621 1.062 1.287 854 608 451 8.480
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

Eye height: 1,5 m

Grid resolution: 10,0 m

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

No.	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
1	166.667	422.287	6,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	167.177	422.251	4,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.955	422.704	3,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	166.519	422.958	2,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5	166.233	422.541	5,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 30-5-2017 14:32/3.1.597

SHADOW - Main Result

Calculation: **VKA 2A**

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]
A	23:02	42	0:46	2:13
B	21:07	77	0:23	3:11
C	87:33	128	1:02	10:37
D	56:43	165	0:28	8:39
E	261:15	265	1:51	41:51
F	54:10	133	0:35	12:13
G	27:18	71	0:31	7:09
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (193)	72:13	10:33
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (194)	104:18	19:36
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (195)	82:35	14:41
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (196)	118:28	25:13
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (197)	142:56	17:08

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.

SHADOW - Main Result

Calculation: **VKA 2B**

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 479 760 620 1.063 1.286 854 609 452 8.482
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

Eye height: 1,5 m

Grid resolution: 10,0 m

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Shadow data				
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Calculation distance [m]	RPM [RPM]
1	166.667	422.287	6,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	167.177	422.251	4,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.955	422.704	3,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	166.519	422.958	2,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 30-5-2017 14:38/3.1.597

SHADOW - Main Result

Calculation: **VKA 2B**

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]
A	23:02	42	0:46	2:14
B	21:07	77	0:23	3:11
C	52:01	126	0:37	6:57
D	56:43	165	0:28	8:39
E	141:04	240	1:03	26:57
F	54:10	133	0:35	12:13
G	27:18	71	0:31	7:09
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (198)	72:13	10:34
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (199)	104:18	19:36
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (200)	82:35	14:41
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (201)	118:28	25:13

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.

SHADOW - Main Result

Calculation: **OA a**

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 478 759 619 1.062 1.287 855 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

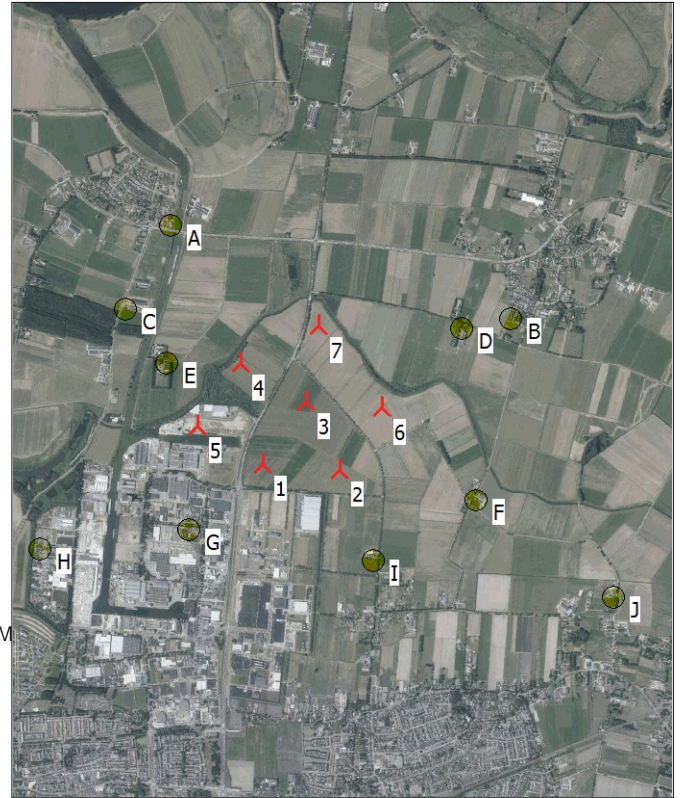
Eye height: 1,5 m

Grid resolution: 10,0 m

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1 166.667	422.287	6,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2 167.177	422.251	4,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3 166.955	422.704	3,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4 166.519	422.958	2,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5 166.233	422.541	5,1	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
6 167.458	422.667	5,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
7 167.033	423.202	3,4	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 ▲ New WTG ● Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

SHADOW - Main Result

Calculation: **OA b**

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]
A	37:58	84	0:46	4:22
B	50:18	142	0:32	8:39
C	97:32	159	1:02	12:33
D	111:55	217	1:03	18:33
E	286:35	265	1:51	47:50
F	54:10	133	0:35	12:13
G	43:36	100	0:33	11:17
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (169)	72:13	10:34
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (170)	104:18	19:36
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (171)	82:35	14:41
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (172)	118:28	25:13
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (175)	142:56	17:08
6	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (176)	84:51	15:05
7	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (177)	68:59	14:29

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.

SHADOW - Main Result

Calculation: **OA b**

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 553 691 677 440 478 760 619 1.062 1.287 855 608 452 8.482
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

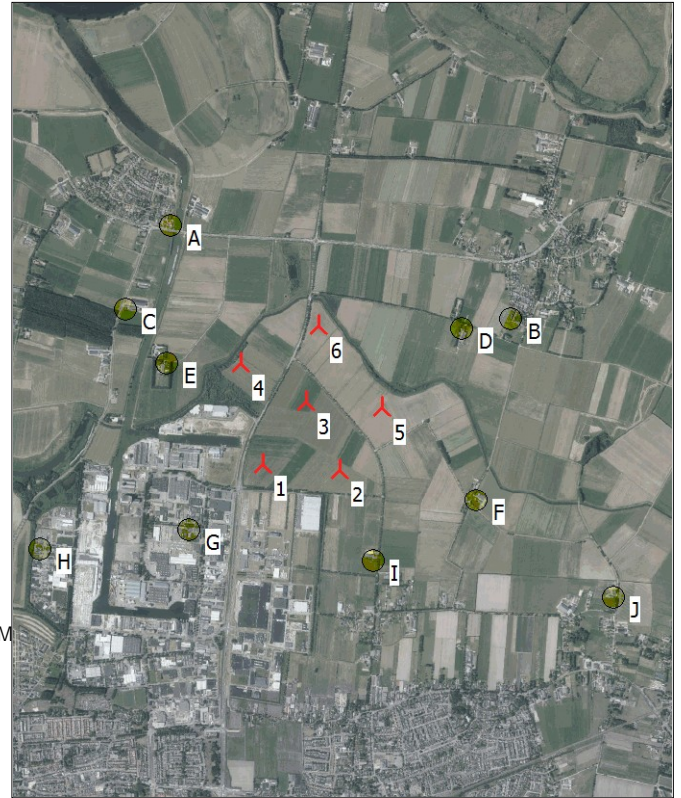
Eye height: 1,5 m

Grid resolution: 10,0 m

All coordinates are in
 Dutch Stereo-RD/NAP 2008

WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
				Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	166.667	422.287	6,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	167.177	422.251	4,9 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.955	422.704	3,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	166.519	422.958	2,9 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5	167.458	422.667	5,0 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
6	167.033	423.202	3,4 NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 30-5-2017 14:23/3.1.597

SHADOW - Main Result

Calculation: **OA b**

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]
A	37:58	84	0:46	4:22
B	50:18	142	0:32	8:39
C	62:00	157	0:37	8:54
D	111:55	217	1:03	18:33
E	166:24	240	1:33	32:58
F	54:10	133	0:35	12:13
G	43:36	100	0:33	11:17
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	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]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (178)	72:13	10:34
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (179)	104:18	19:36
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (180)	82:35	14:41
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (181)	118:28	25:14
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (182)	84:51	15:05
6	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (183)	68:59	14:29

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.

SHADOW - Main Result

Calculation: **OA c**

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

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational hours are calculated from WTGs in calculation and wind distribution:

Site data: WASP (4)

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 678 440 478 759 619 1.062 1.287 855 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

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: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM)

Area object(s) used in calculation:

Project Wizard Roughness Areas (Corine land cover 2006 - 100 m grid)

Obstacles used in calculation

Eye height: 1,5 m

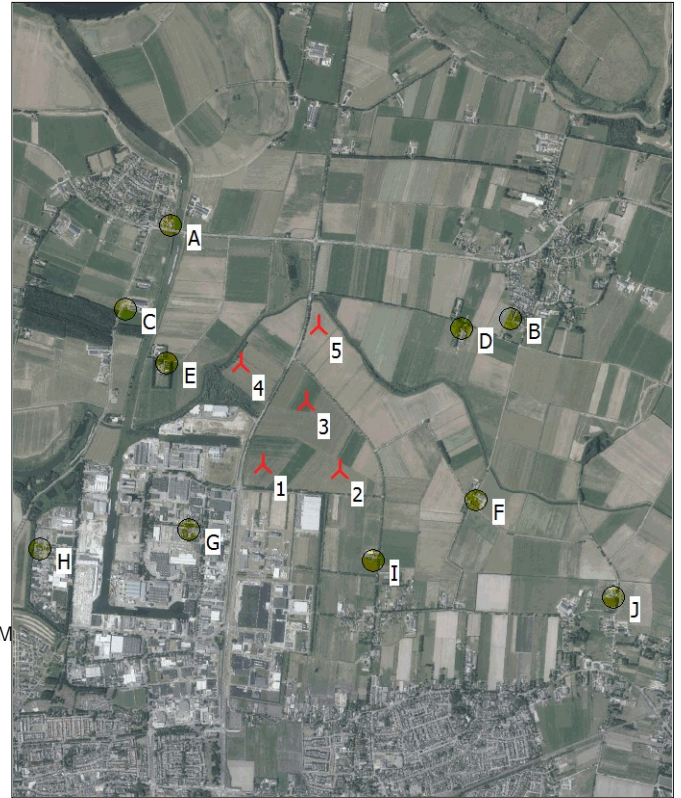
Grid resolution: 10,0 m

All coordinates are in

Dutch Stereo-RD/NAP 2008

WTGs

	X (east)	Y (north)	Z [m]	Row data/Description	WTG type			Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Shadow data	
					Valid	Manufact.	Type-generator				Calculation distance [m]	RPM [RPM]
1	166.667	422.287	6,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
2	167.177	422.251	4,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
3	166.955	422.704	3,0	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
4	166.519	422.958	2,9	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9
5	167.033	423.202	3,4	NORDEX N131/3300 DE 3300 131....	Yes	NORDEX	N131/3300 DE-3.300	3.300	131,0	144,0	1.721	10,9



Scale 1:50.000
 New WTG
 Shadow receptor

Shadow receptor-Input

No.	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
	[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A	166.052	423.864	5,5	5,0	5,0	1,0	0,0	90,0	"Green house mode"
B	168.305	423.254	5,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
C	165.755	423.310	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
D	167.984	423.188	7,2	5,0	5,0	1,0	0,0	90,0	"Green house mode"
E	166.028	422.954	5,4	5,0	5,0	1,0	0,0	90,0	"Green house mode"
F	168.081	422.049	6,8	5,0	5,0	1,0	0,0	90,0	"Green house mode"
G	166.178	421.850	7,3	5,0	5,0	1,0	0,0	90,0	"Green house mode"
H	165.193	421.718	5,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
I	167.404	421.650	6,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"
J	168.996	421.413	7,9	5,0	5,0	1,0	0,0	90,0	"Green house mode"

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
 Beneluxweg 125 Postbus 40
 NL-4900 AA OOSTERHOUT
 0513 634045
 Koen Wilmer / koen.wilmer@anteagroup.com
 Calculated:
 30-5-2017 14:27/3.1.597

SHADOW - Main Result

Calculation: **OA c**

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]
A	37:58	84	0:46	4:22
B	31:21	109	0:25	5:21
C	62:00	157	0:37	8:53
D	75:34	209	0:33	12:59
E	161:10	240	1:33	31:59
F	54:10	133	0:35	12:13
G	27:18	71	0:31	7:09
H	9:35	37	0:21	2:34
I	0:00	0	0:00	0:00
J	0:00	0	0:00	0:00

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

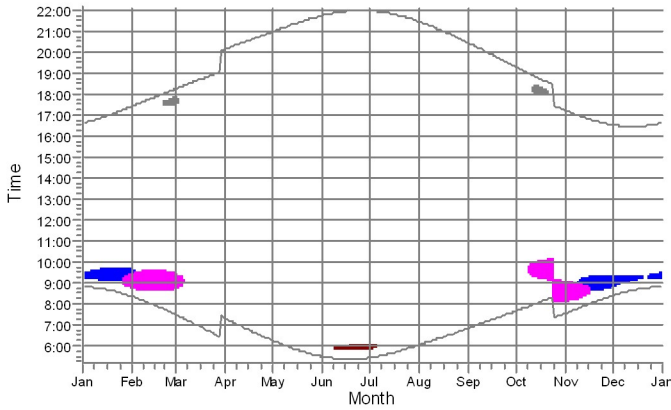
No.	Name	Worst case [h/year]	Expected [h/year]
1	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (184)	72:13	10:34
2	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (185)	104:18	19:36
3	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (186)	82:35	14:41
4	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (187)	118:28	25:14
5	NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (188)	68:59	14:29

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.

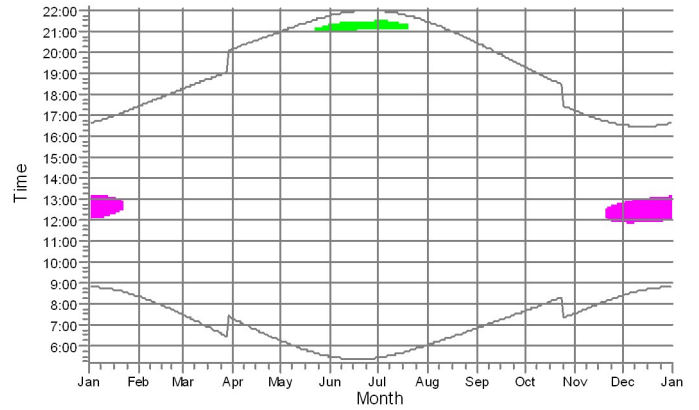
SHADOW - Calendar per WTG, graphical

Calculation: 1A Elz Hoed en Schil Vestas Receptors

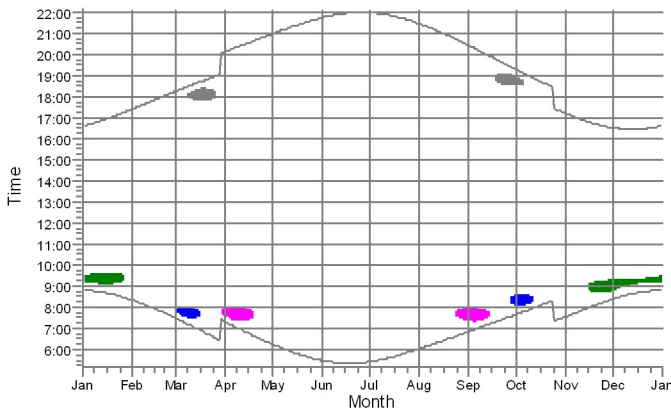
1: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (1)



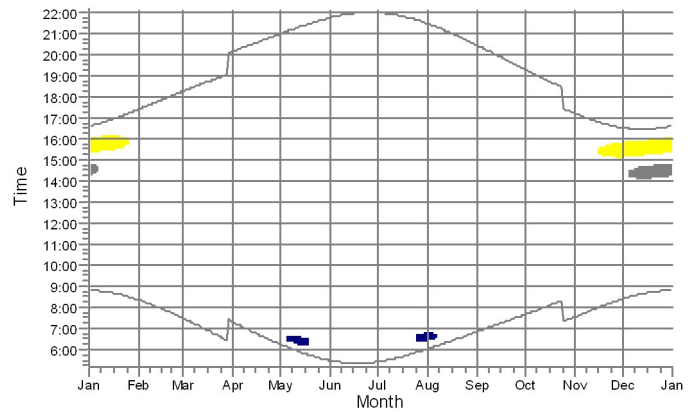
2: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (20)



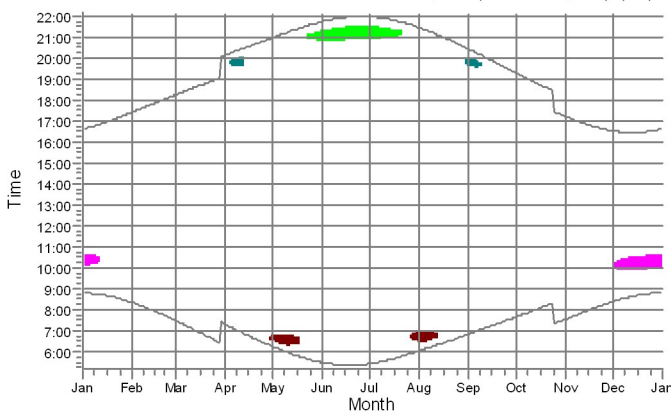
3: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (21)



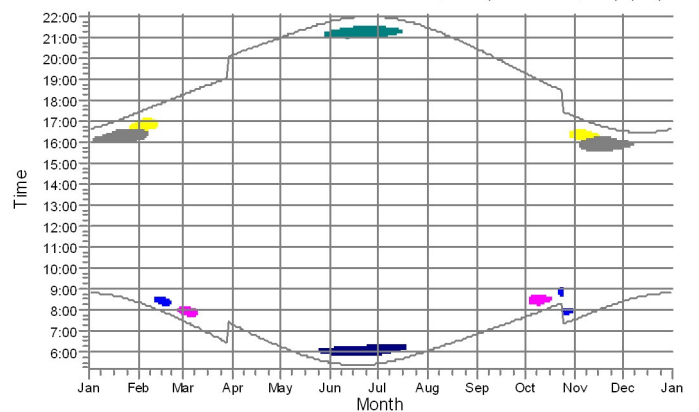
4: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (22)












5: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (23)



6: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (24)



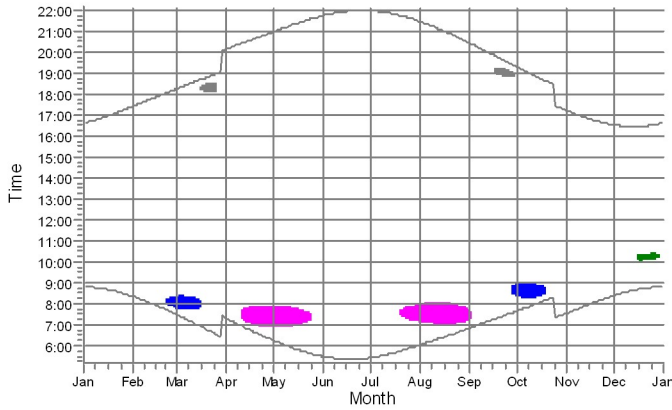
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11) |
|  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) | | |

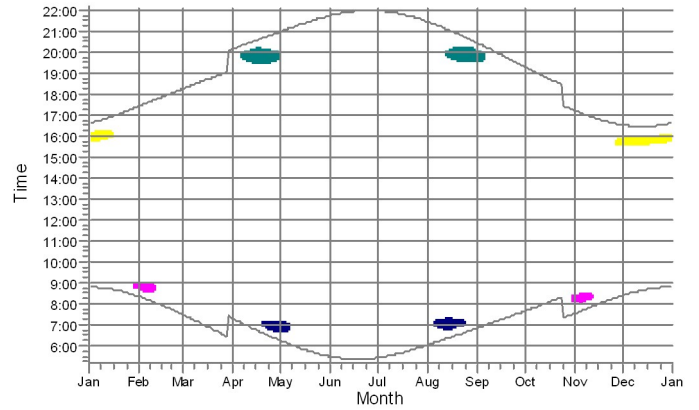
SHADOW - Calendar per WTG, graphical

Calculation: 1A Elz Hoed en Schil Vestas Receptors

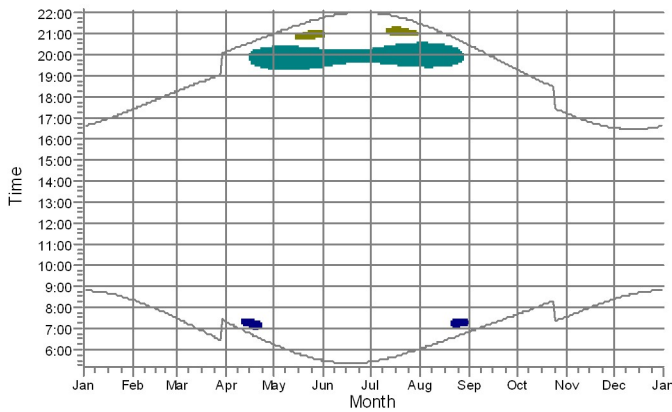
7: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (25)



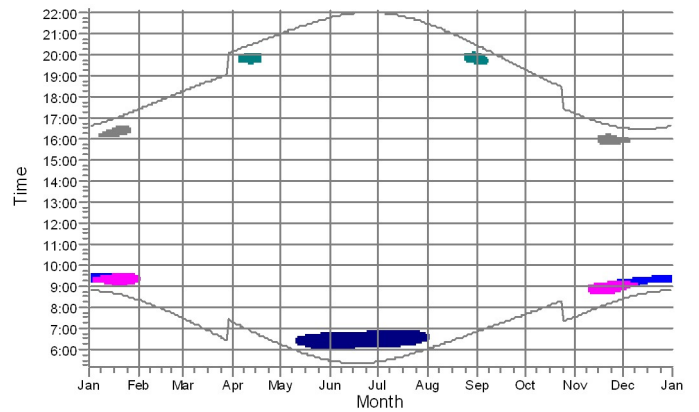
8: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (26)



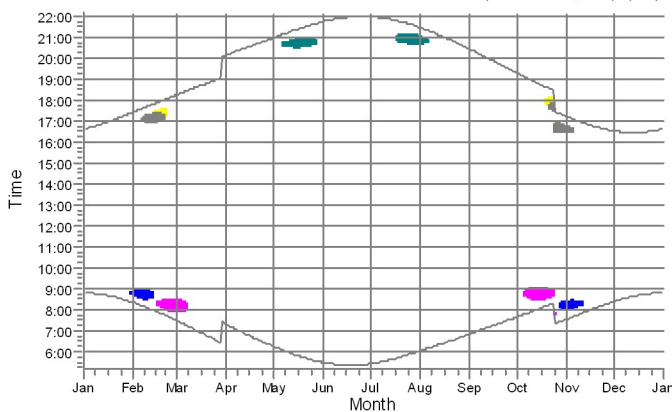
9: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (27)











10: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (28)



11: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (29)



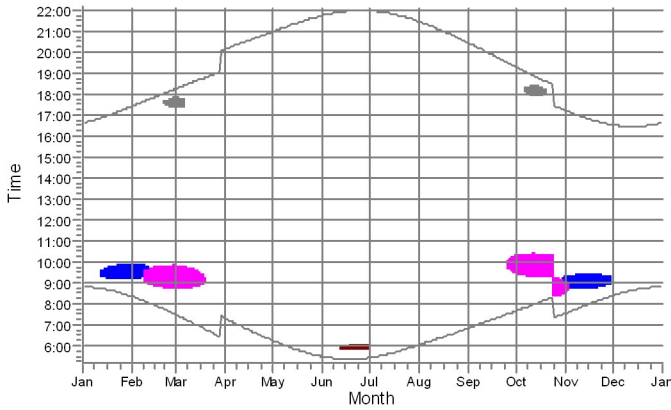
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | J: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (12) |

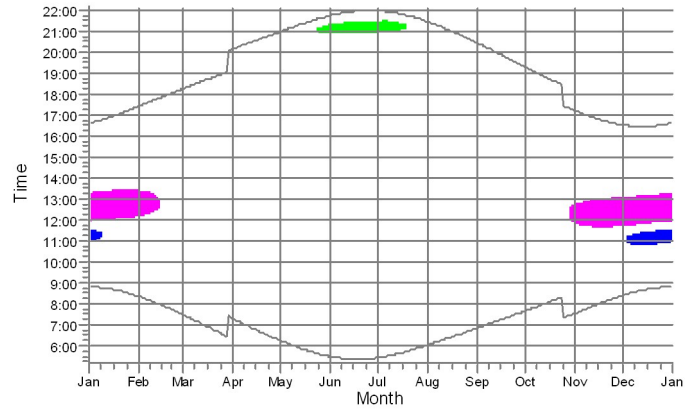
SHADOW - Calendar per WTG, graphical

Calculation: 1B Elz Hoed en Schil Nordex Receptors

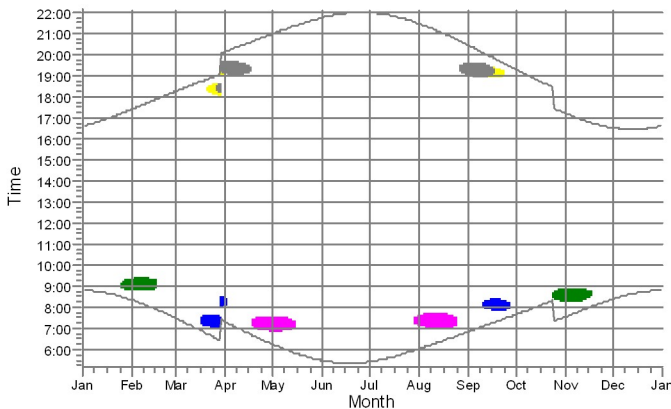
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (12)



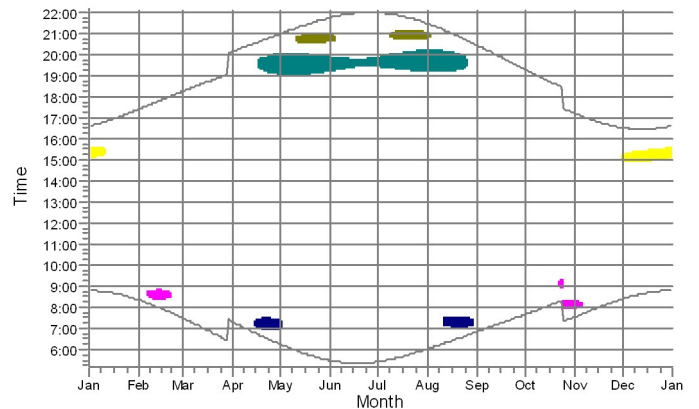
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (13)



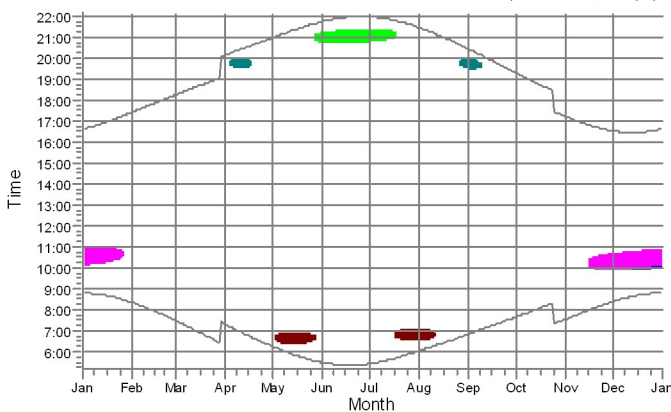
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (14)



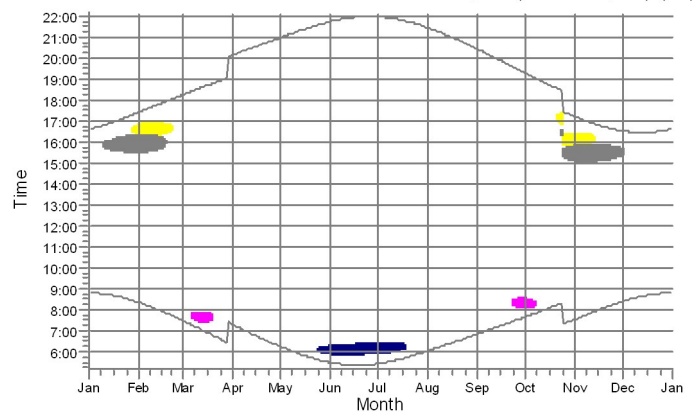
4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (15)













5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (16)



6: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



Shadow receptors

	A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)		F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
	B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)		G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
	C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)		H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
	D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)		I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)
	E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)		J: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (12)

Project:

Windpark Oss (Elzenburg)

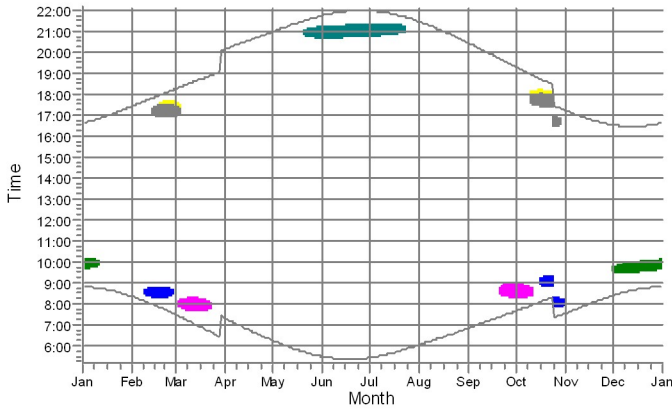
Licensed user:

Antea Group
Beneluxweg 125 Postbus 40
NL-4900 AA OOSTERHOUT
0513 634045
Koen Wilmer / koen.wilmer@anteagroup.com
Calculated:
7-2-2017 15:00/3.1.597

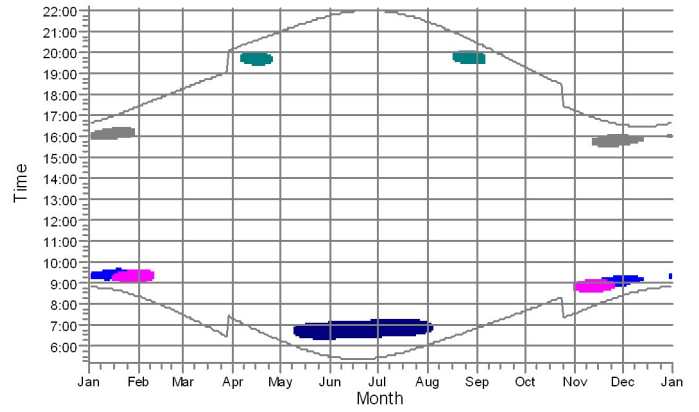
SHADOW - Calendar per WTG, graphical

Calculation: 1B Elz Hoed en Schil Nordex Receptors

7: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18



8: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19



Shadow receptors

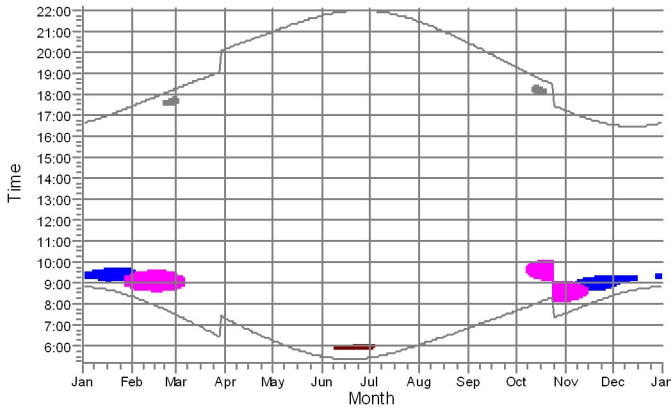
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)

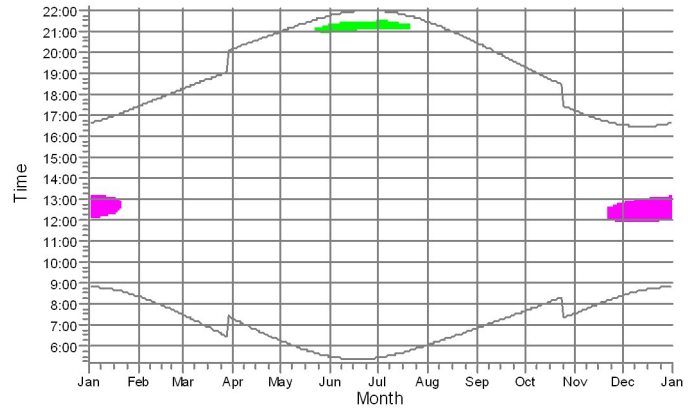
SHADOW - Calendar per WTG, graphical

Calculation: 2A Elz Hoed Vestas Receptors

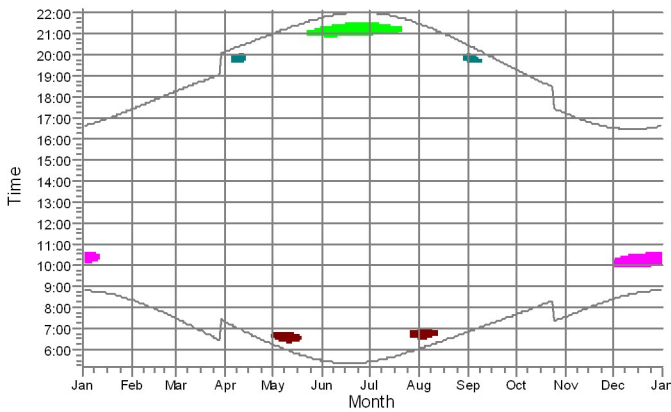
1: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (35)



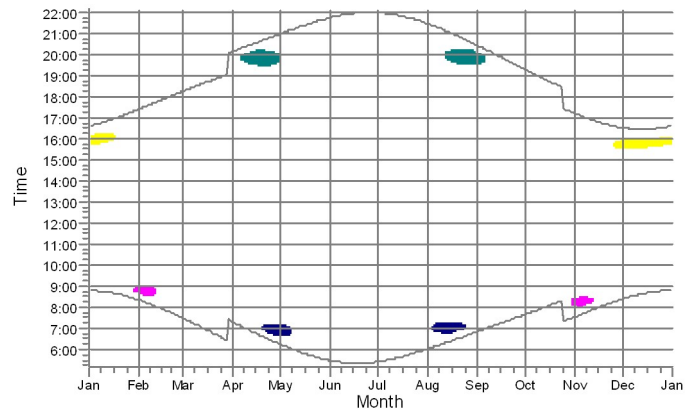
2: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (36)



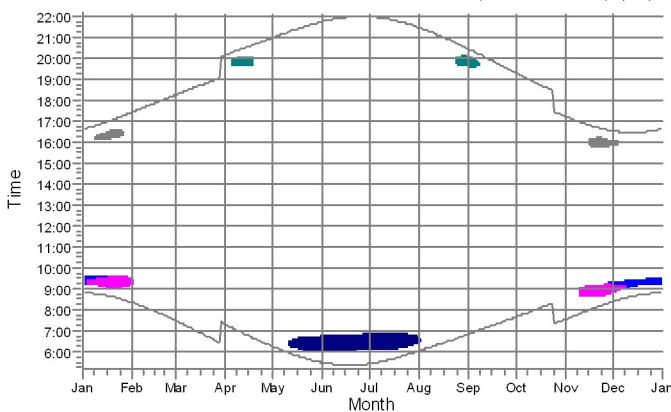
3: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (37)



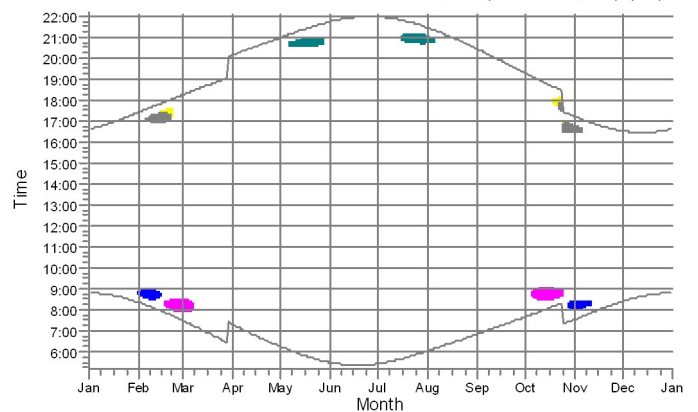
4: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (38)



5: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (39)



6: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (40)



Shadow receptors

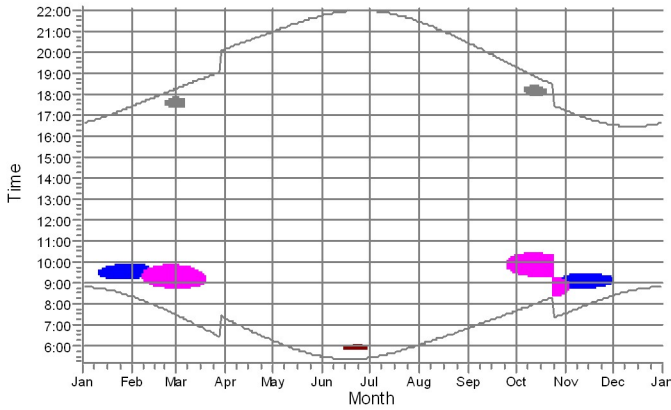
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)
- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)

- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
- I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)

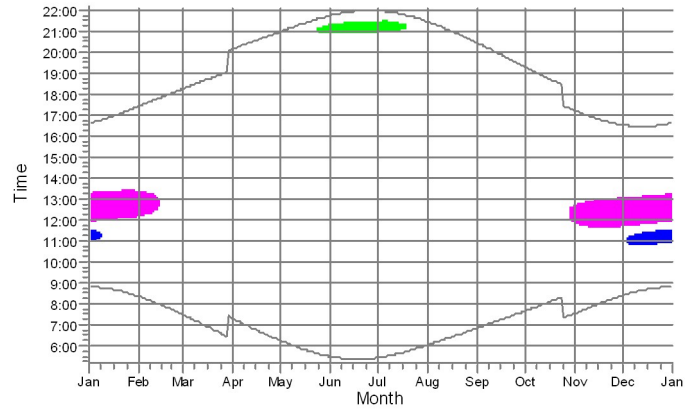
SHADOW - Calendar per WTG, graphical

Calculation: 2B Elz Hoed Nordex Receptors

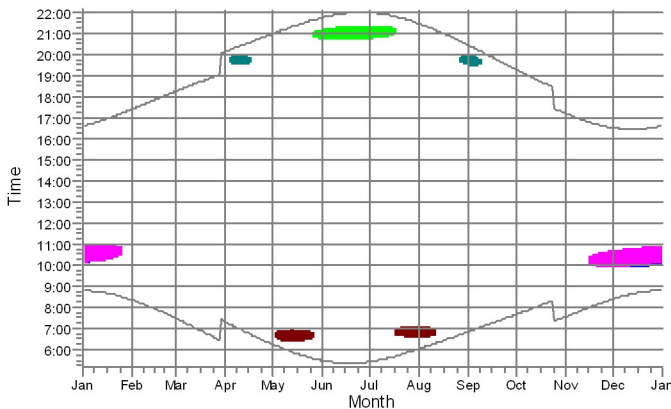
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (30)



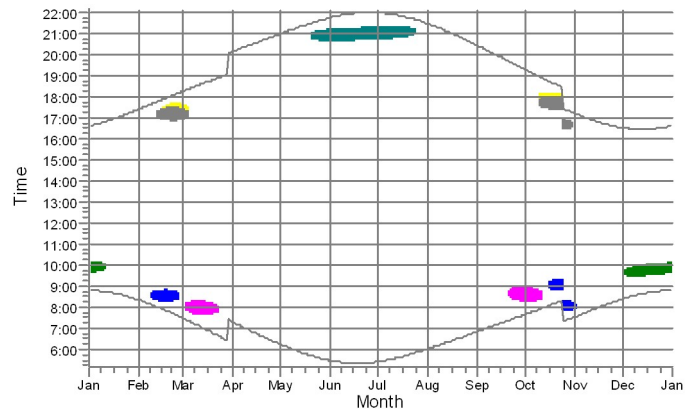
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (31)



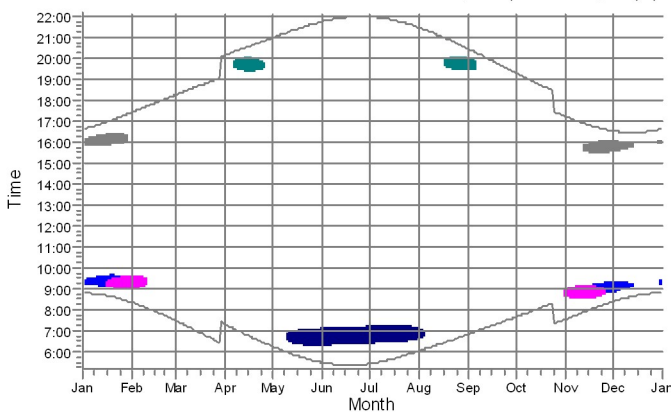
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (32)



4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (33)



5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (34)



Shadow receptors

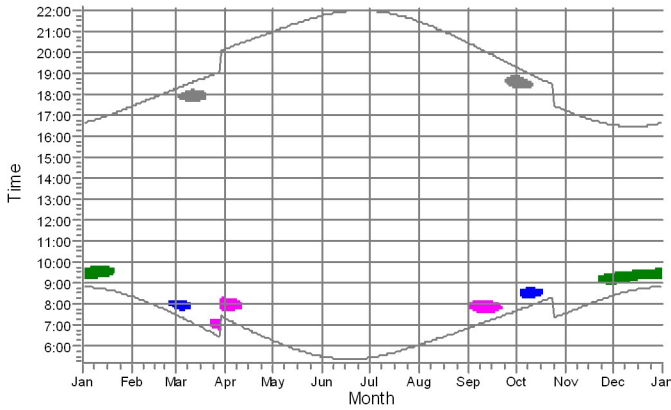
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)
- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)

- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
- I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)

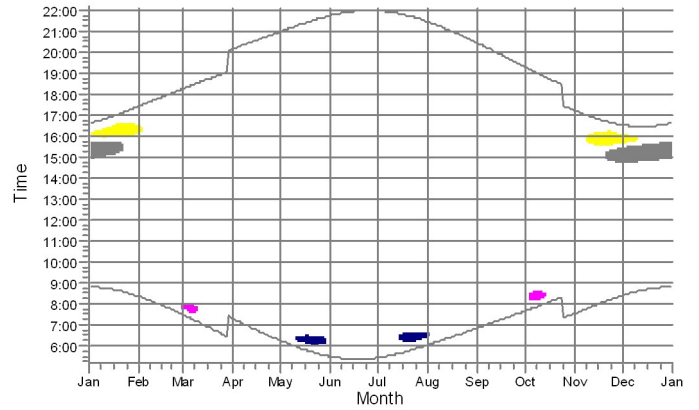
SHADOW - Calendar per WTG, graphical

Calculation: 3A Hoed en Schil Vestas Receptors

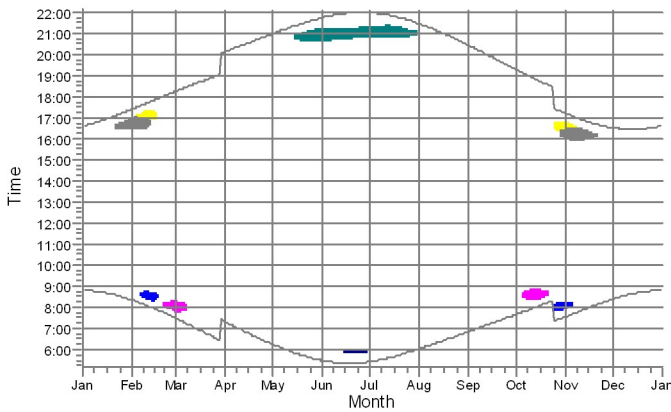
1: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (41)



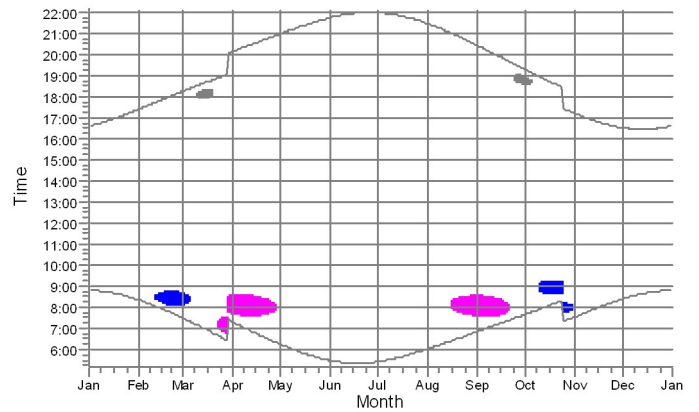
2: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (42)



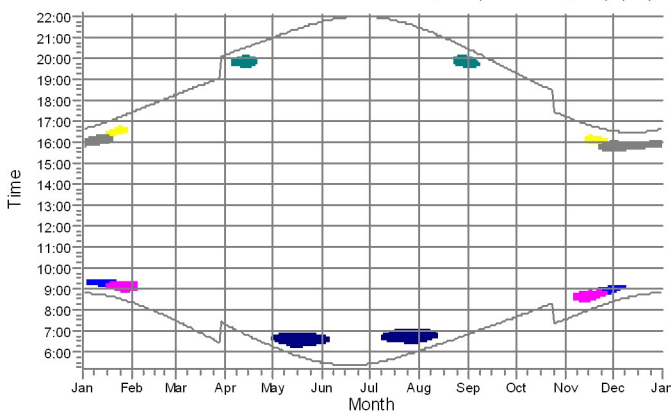
3: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (43)



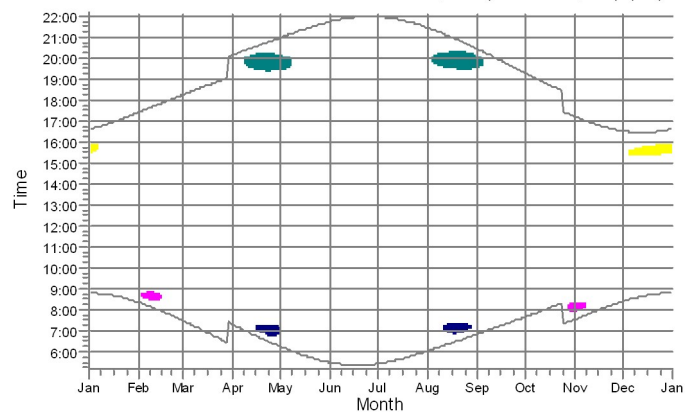
4: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (44)



5: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (45)



6: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (46)



Shadow receptors

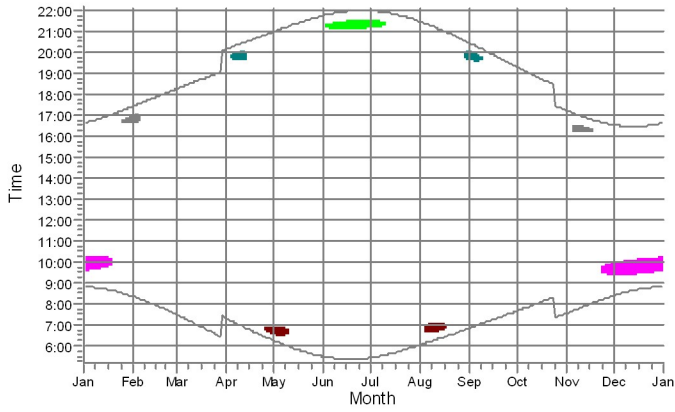
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)

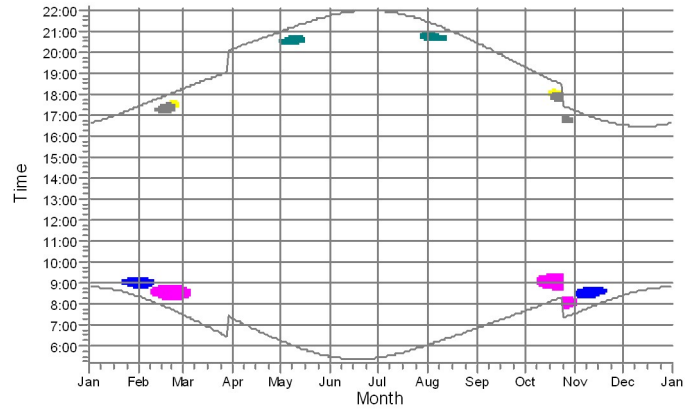
SHADOW - Calendar per WTG, graphical

Calculation: 3A Hoed en Schil Vestas Receptors

7: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (47)



8: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (48)



Shadow receptors

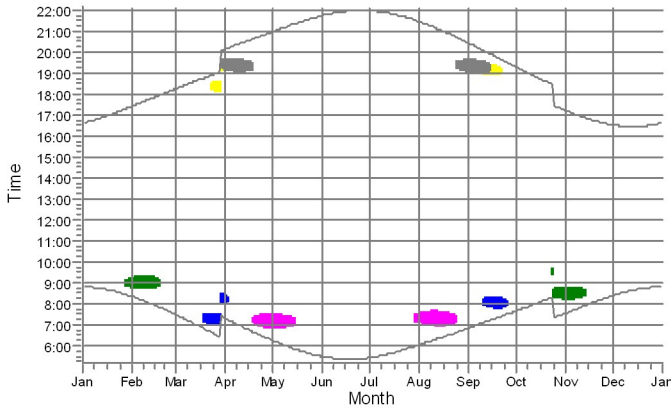
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)
- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)

- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
- I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)

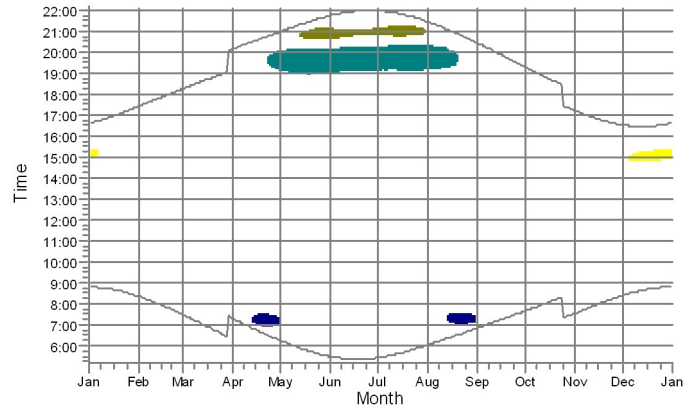
SHADOW - Calendar per WTG, graphical

Calculation: 3B Hoed en Schil Nordex Receptors

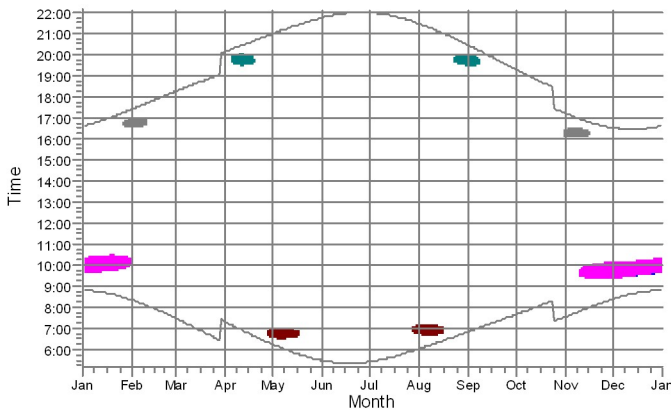
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (49)



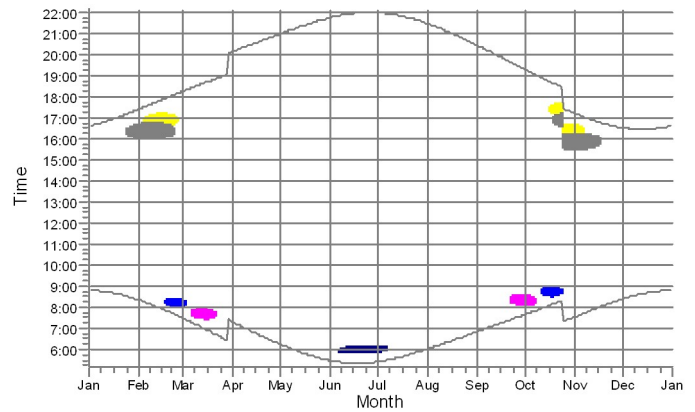
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (50)



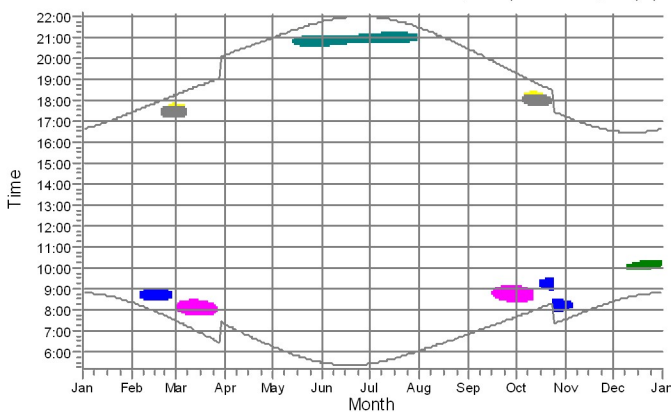
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (51)



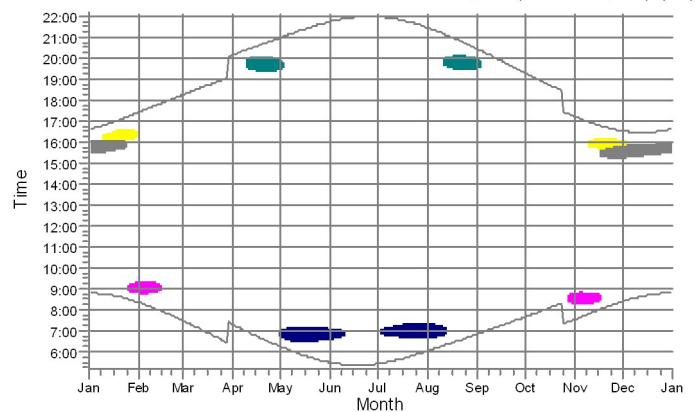
4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (52)












5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (53)



6: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (54)



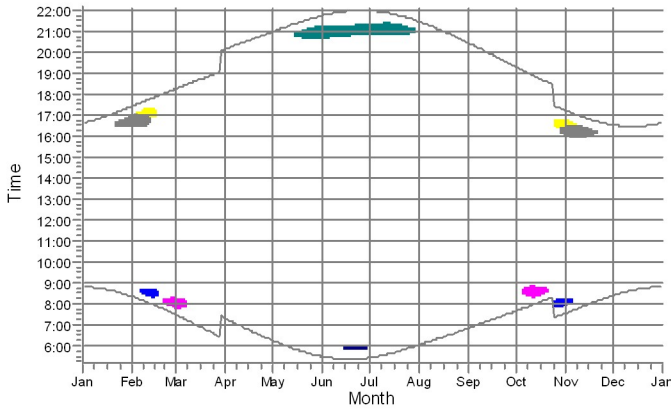
Shadow receptors

	A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)		F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
	B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)		G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
	C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)		H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
	D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)		J: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (12)
	E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)		

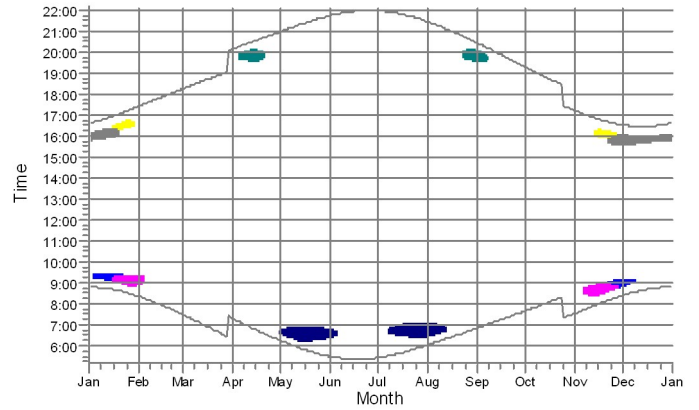
SHADOW - Calendar per WTG, graphical

Calculation: 4A Hoed Vestas Receptors

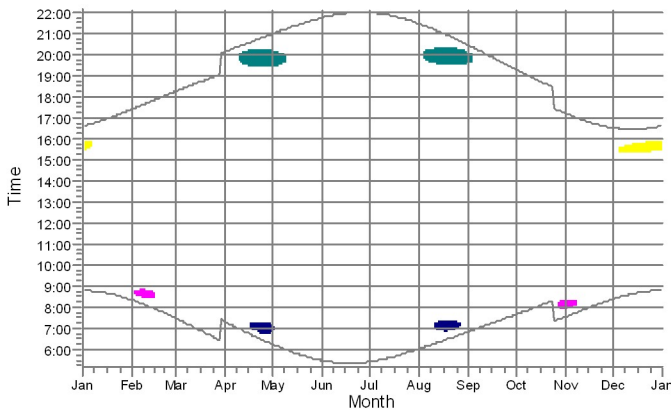
1: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (56)



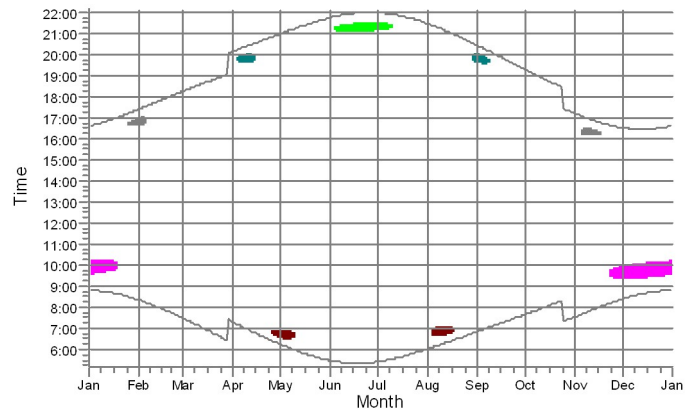
2: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (57)



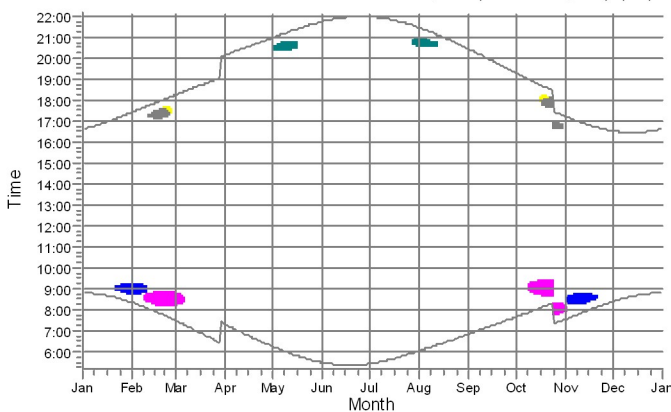
3: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (58)



4: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (59)



5: VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (60)



Shadow receptors

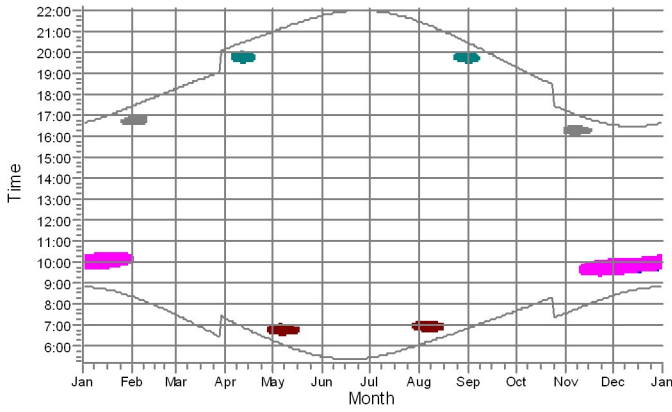
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)
- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)

- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
- I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)

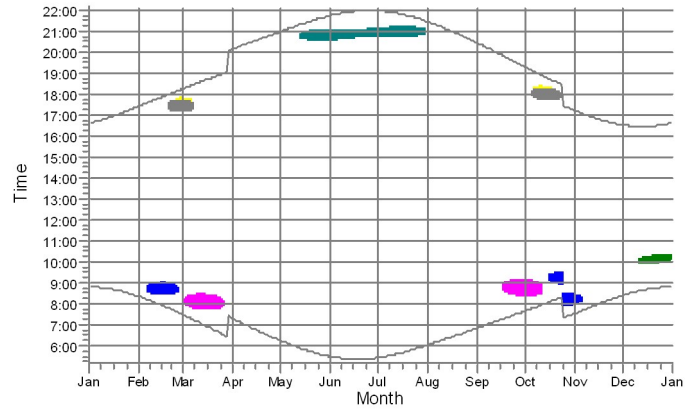
SHADOW - Calendar per WTG, graphical

Calculation: 4B Hoed Nordex Receptors

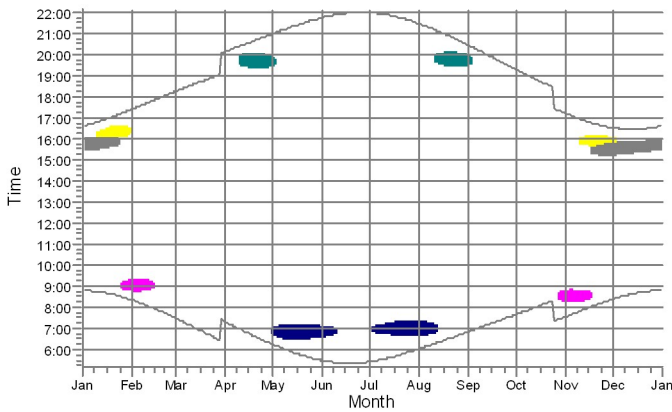
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (61)



2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (62)



3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (63)



Shadow receptors

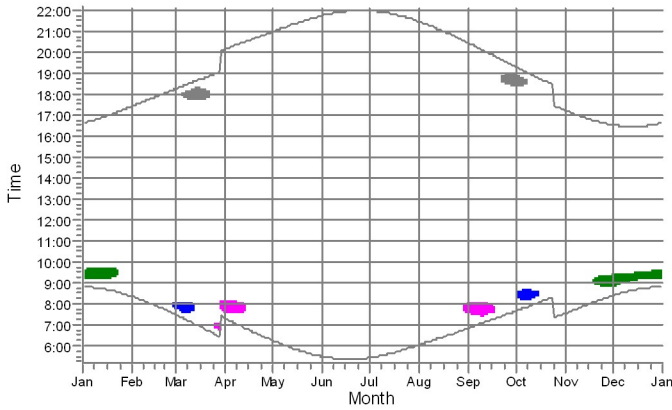
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)

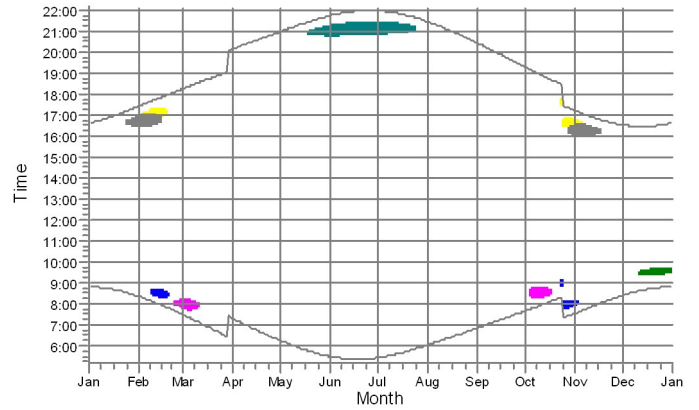
SHADOW - Calendar per WTG, graphical

Calculation: 5A Omgeving Vestas Receptors

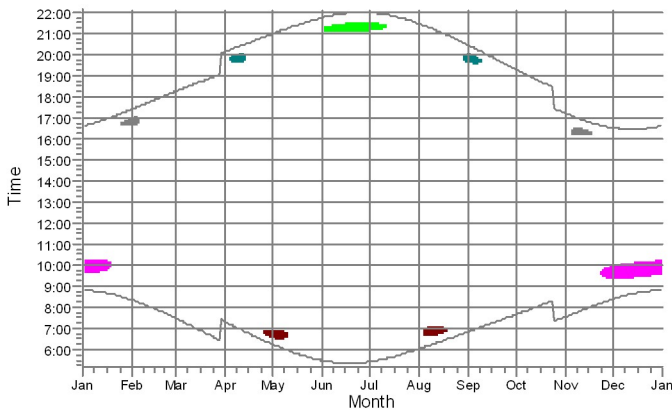
1: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (64)



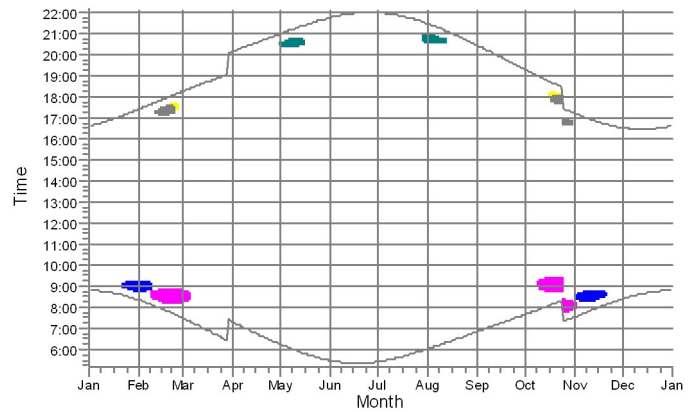
2: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (65)



3: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (66)



4: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (67)



Shadow receptors

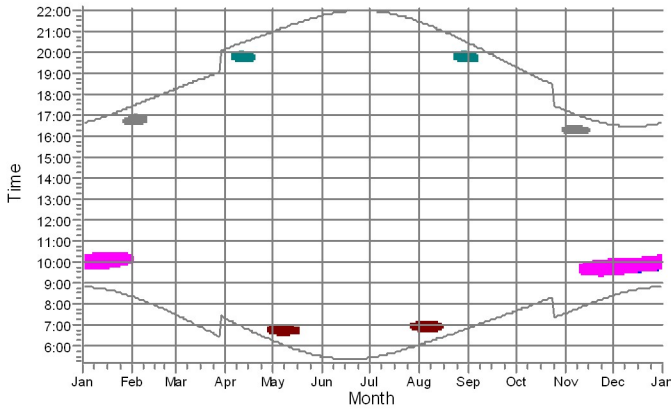
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
- I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)

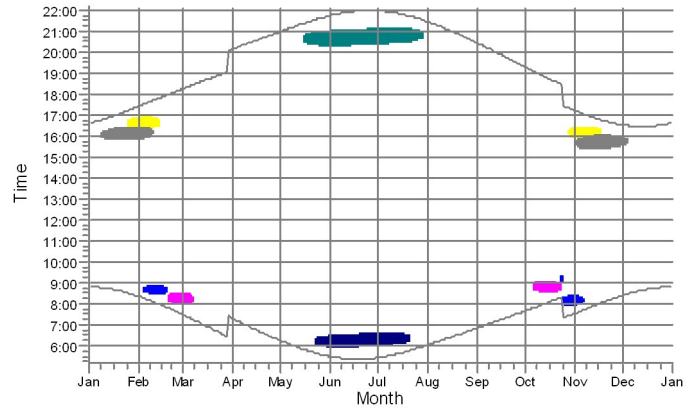
SHADOW - Calendar per WTG, graphical

Calculation: 5B Omgeving Nordex Receptors

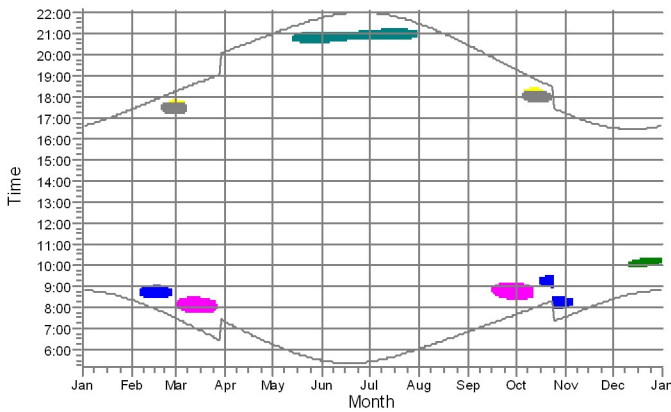
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (69)



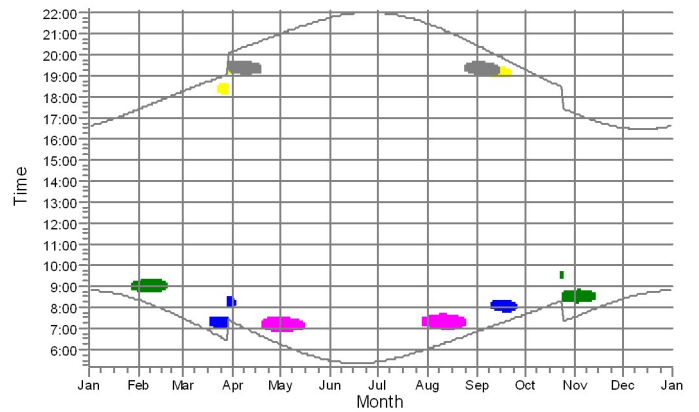
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (70)



3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (71)



4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (72)



Shadow receptors

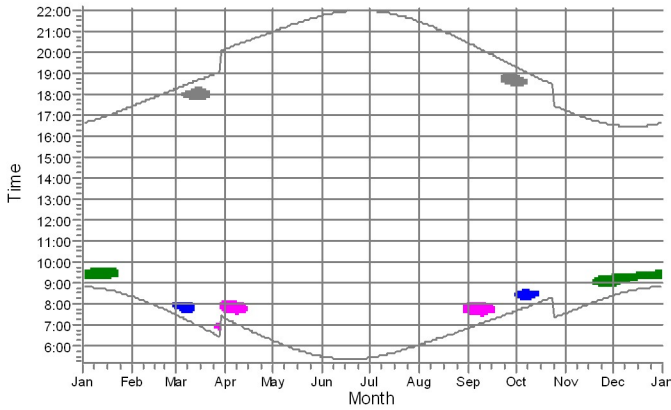
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)

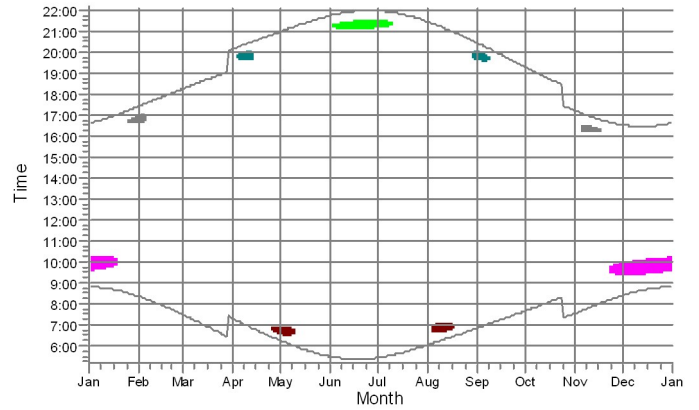
SHADOW - Calendar per WTG, graphical

Calculation: 6A 3 x langs N329 Vestas Receptors

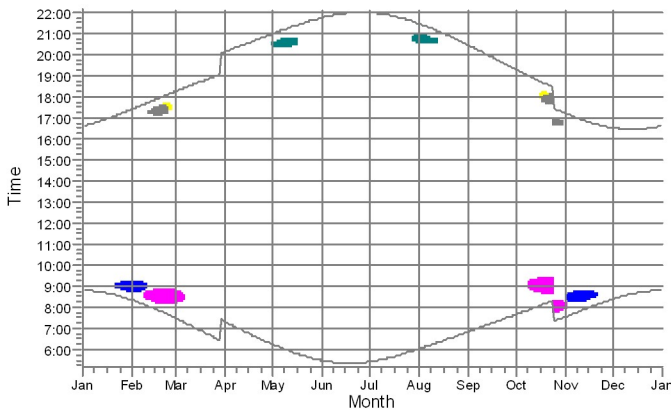
1: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (73)



2: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (74)



3: VESTAS V112-3.45 3450 112.0 IO! hub: 94,0 m (TOT: 150,0 m) (75)



Shadow receptors

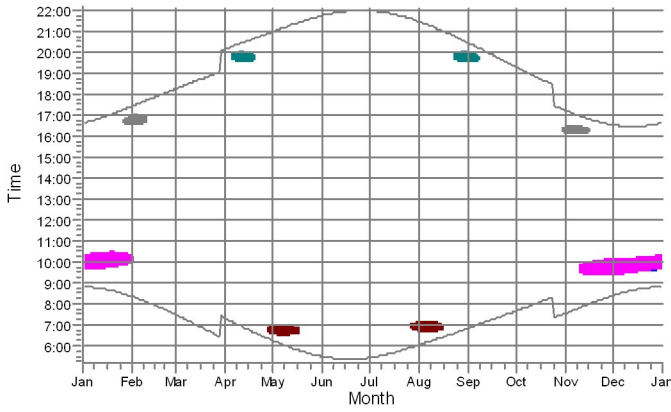
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)
- I: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (11)

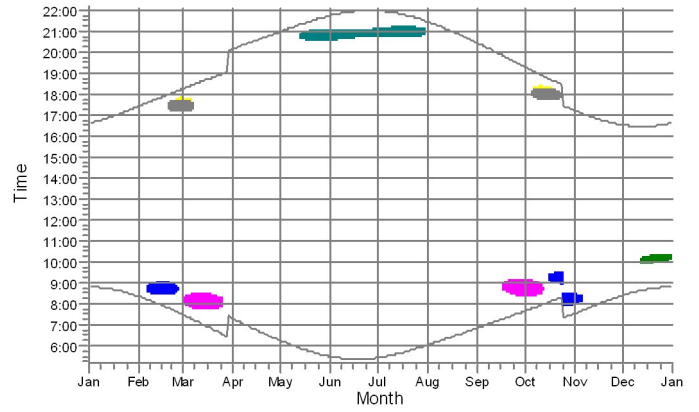
SHADOW - Calendar per WTG, graphical

Calculation: 6B 3 x langs N329 Nordex Receptors

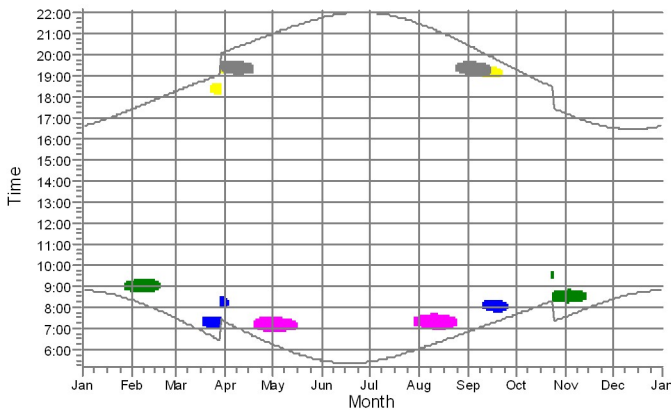
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (76)



2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (77)



3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (78)



Shadow receptors

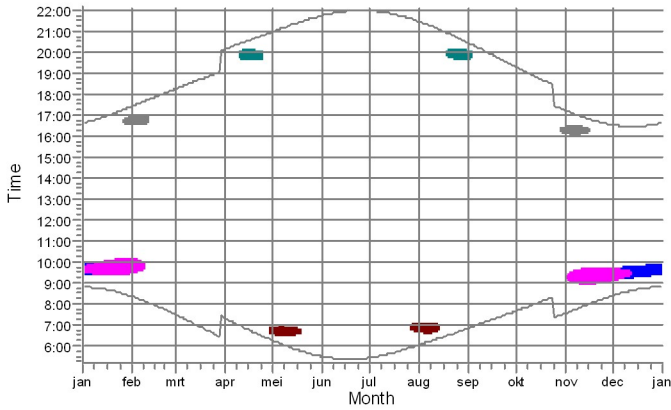
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)

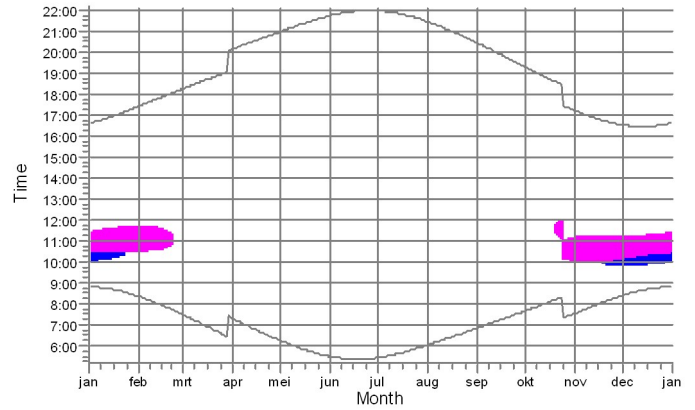
SHADOW - Calendar per WTG, graphical

Calculation: VKA 1a

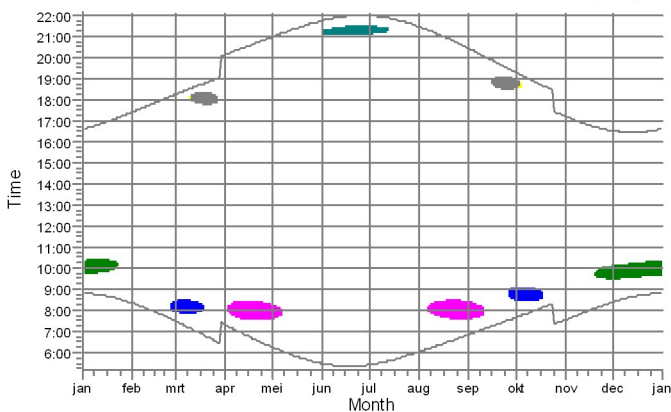
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20)



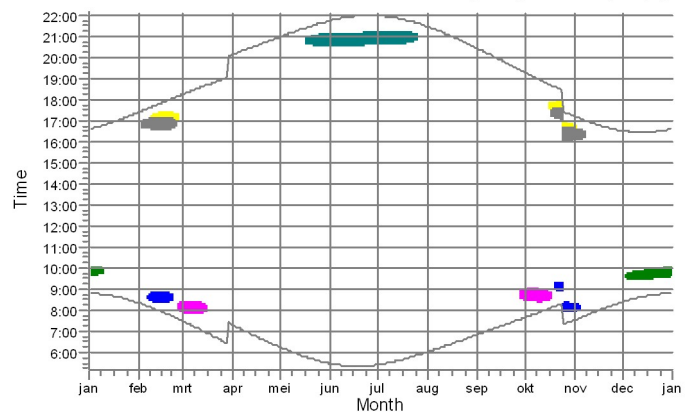
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20)



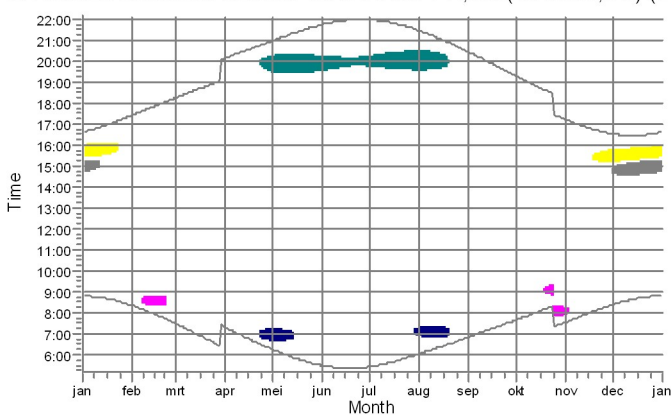
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20)











4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20)



5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (21)



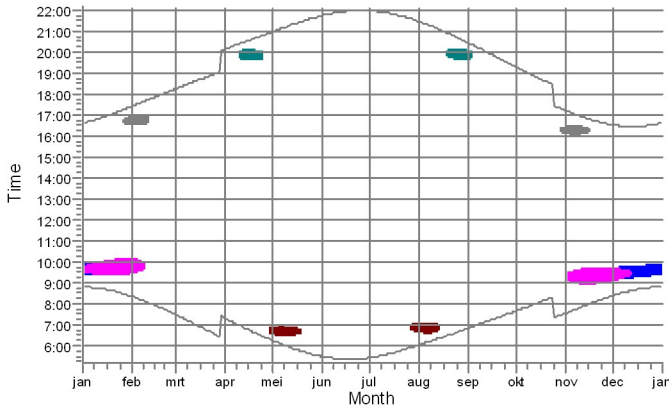
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |

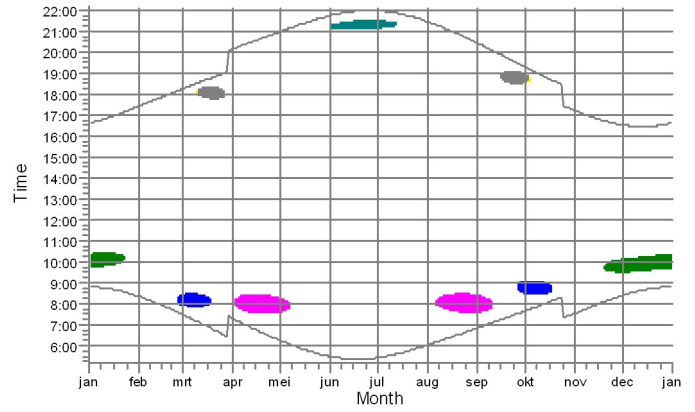
SHADOW - Calendar per WTG, graphical

Calculation: VKA 1b

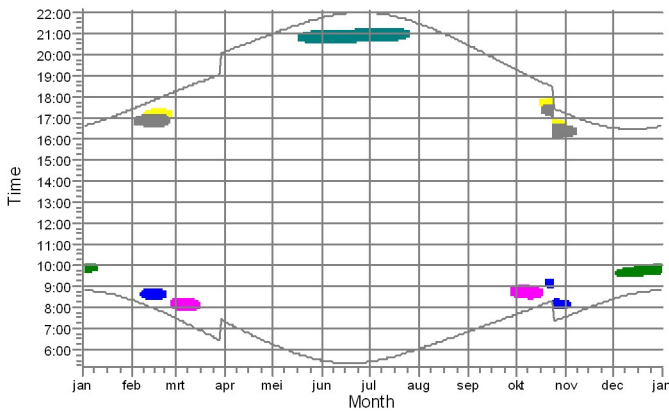
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20



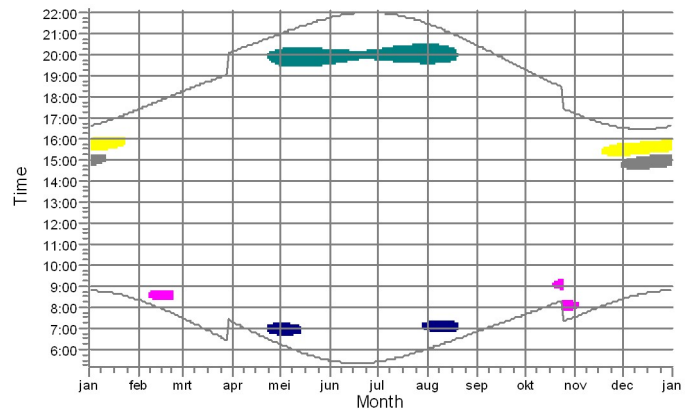
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20











3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20



4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20



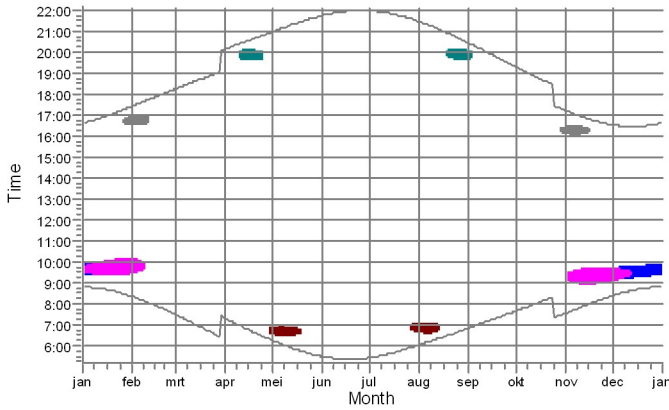
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |

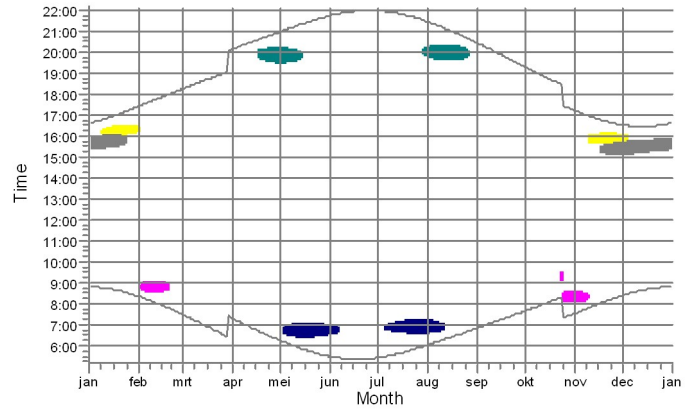
SHADOW - Calendar per WTG, graphical

Calculation: **VKA 2a**

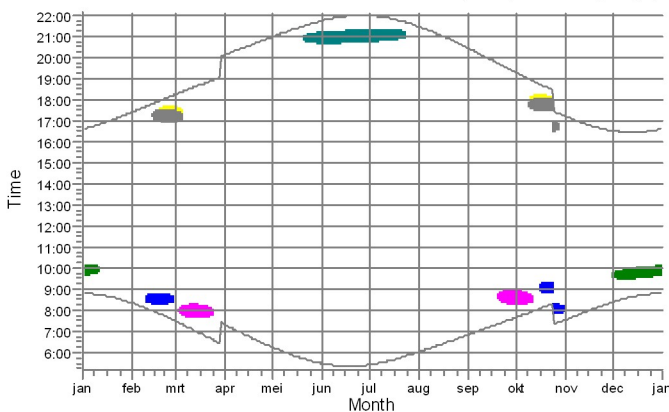
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19



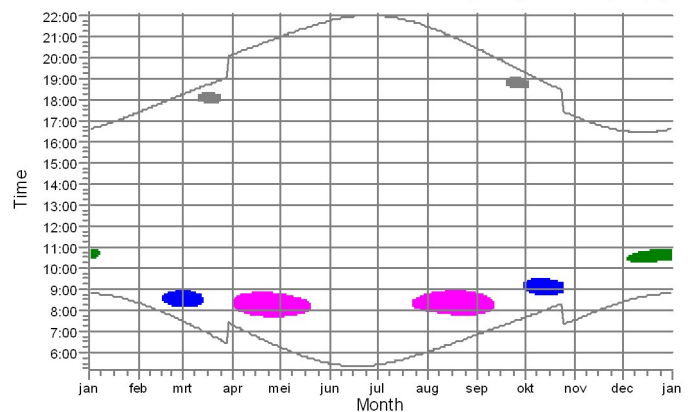
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19



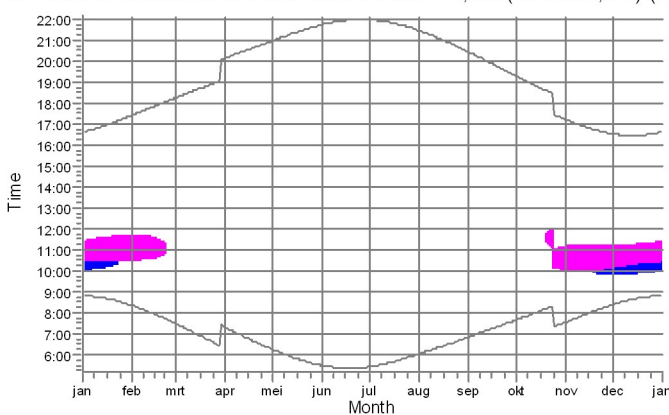
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19











4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19



5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19



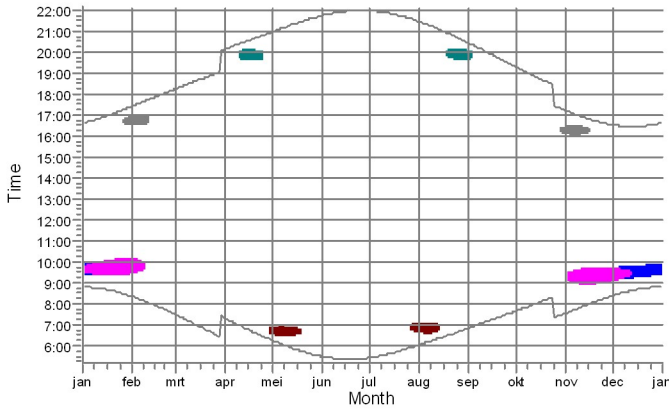
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |

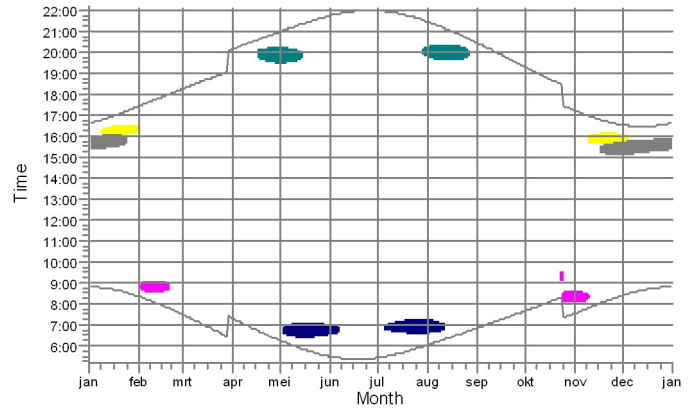
SHADOW - Calendar per WTG, graphical

Calculation: **VKA 2b**

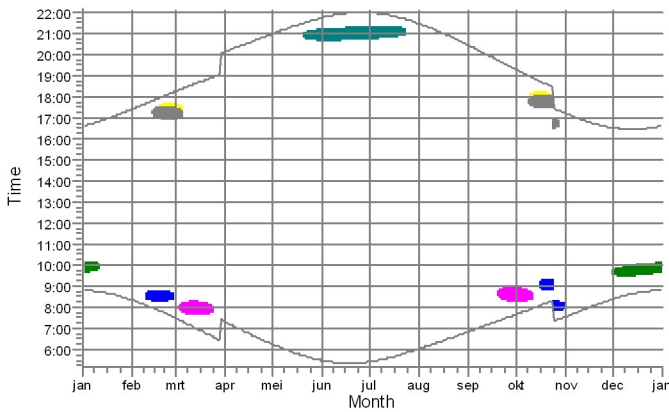
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19)



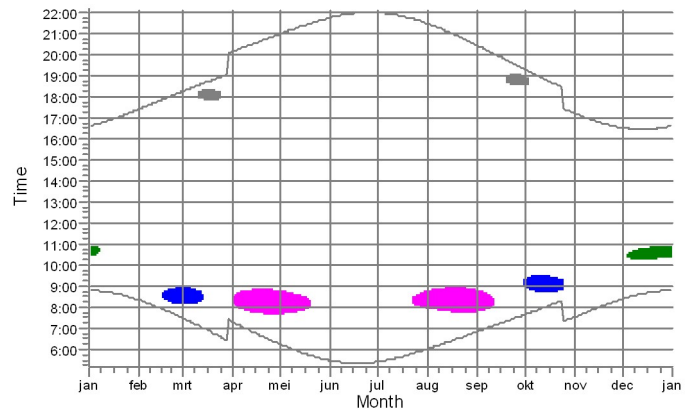
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (19)



3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20)



4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (20)



Shadow receptors

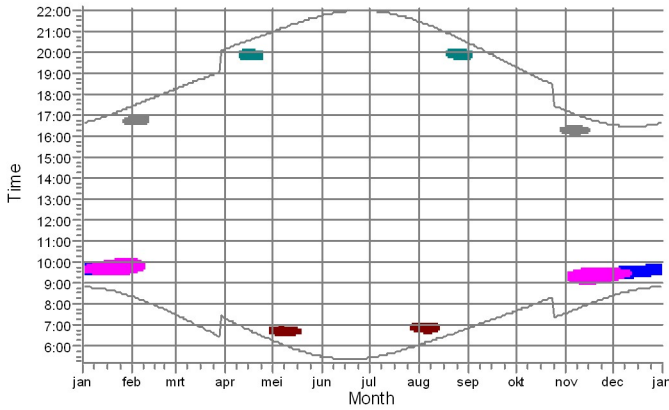
- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)
- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)

- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)
- F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8)
- G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9)
- H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10)

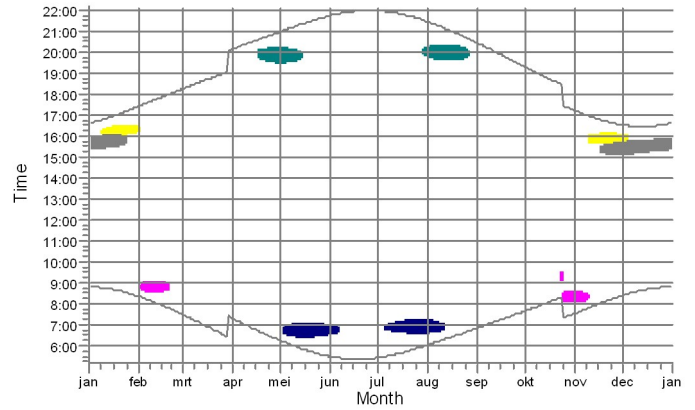
SHADOW - Calendar per WTG, graphical

Calculation: **OA a**

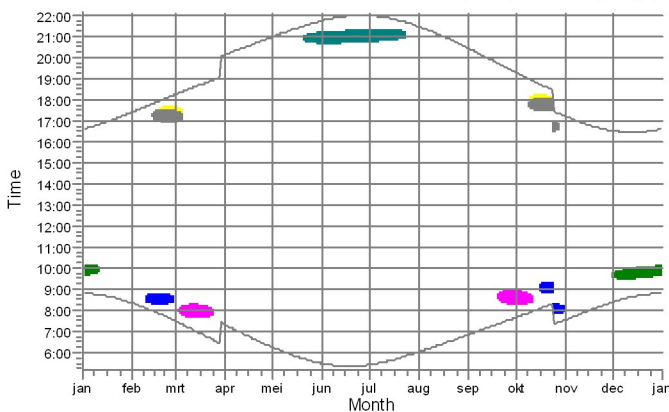
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (16)



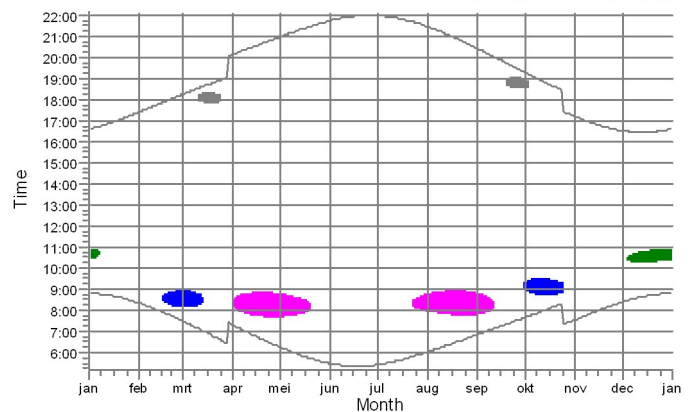
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



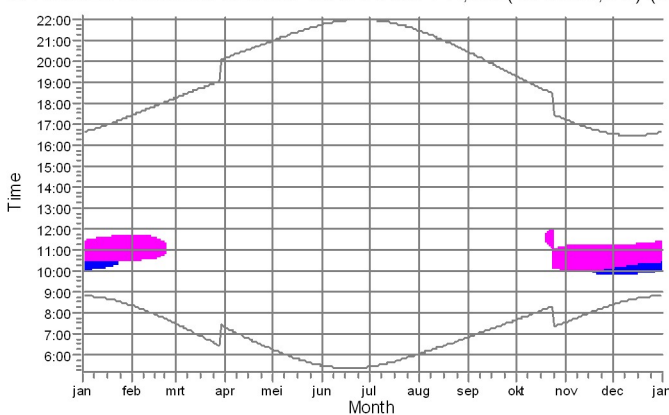
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



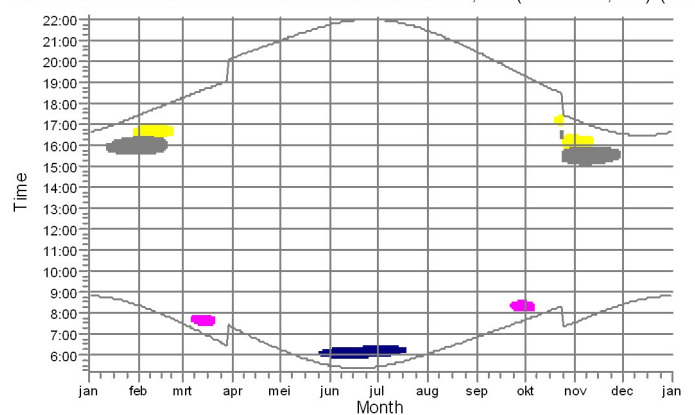
4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)











5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



6: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



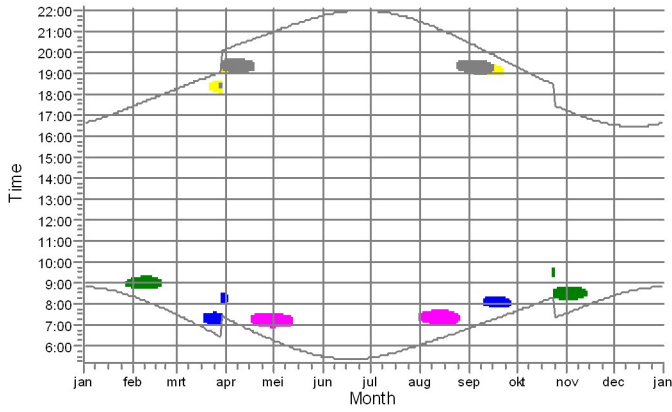
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |

SHADOW - Calendar per WTG, graphical

Calculation: **OA a**

7: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17



Shadow receptors



- A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1)
- B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3)
- C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4)

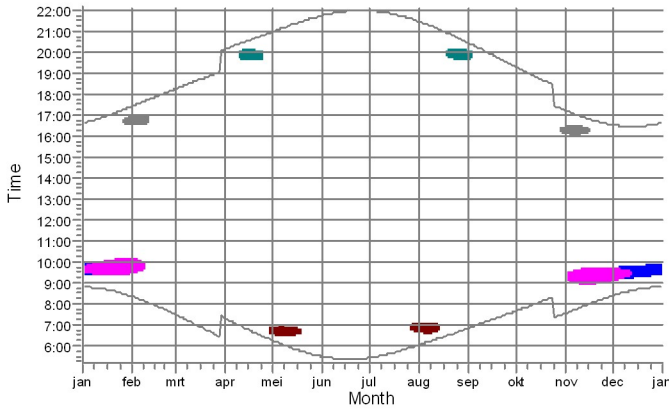


- D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5)
- E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6)

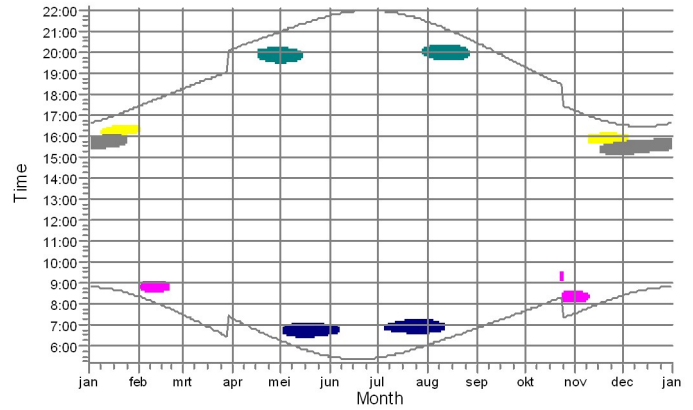
SHADOW - Calendar per WTG, graphical

Calculation: **OA b**

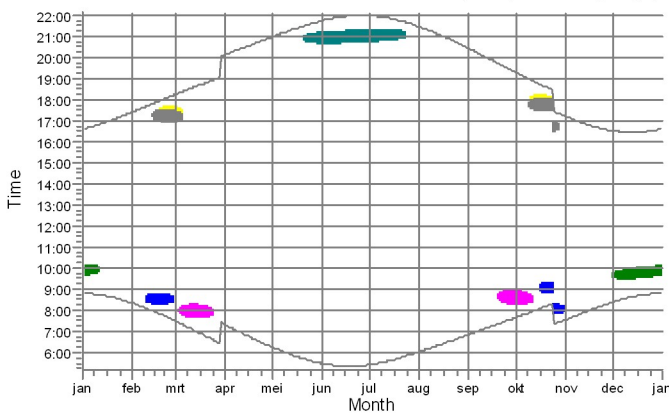
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



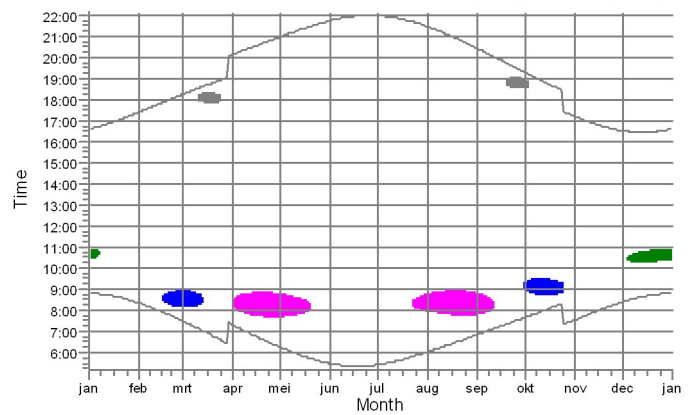
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (17)



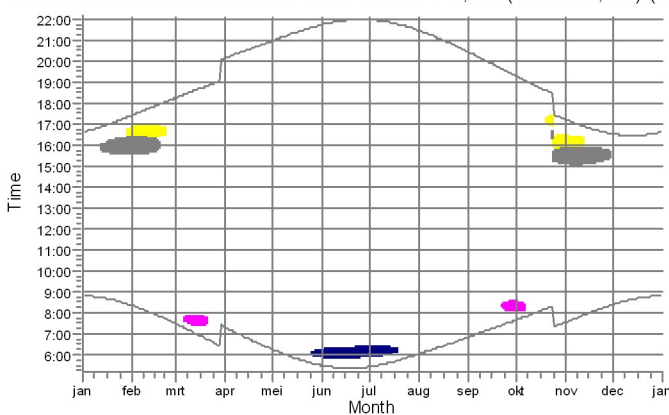
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



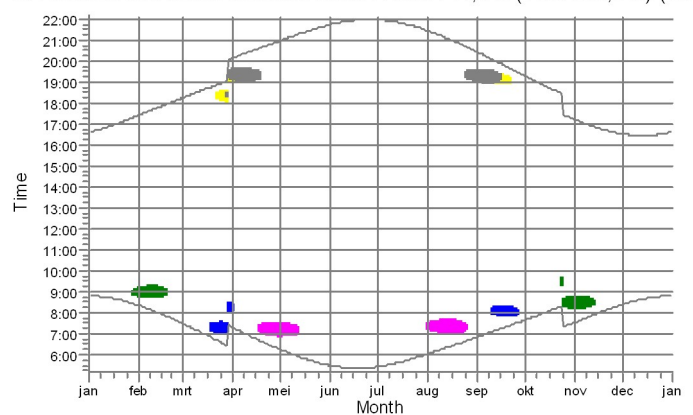
4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)











5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



6: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



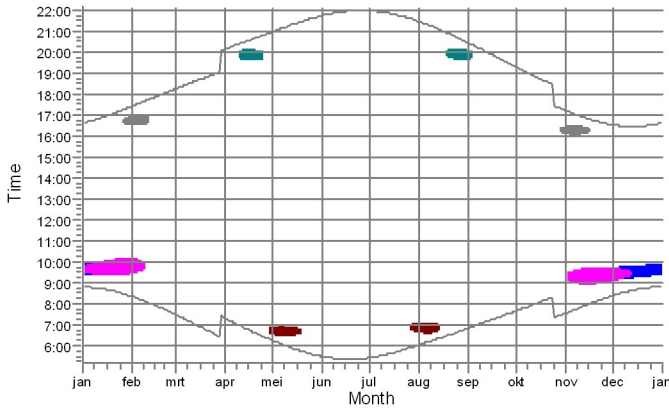
Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |

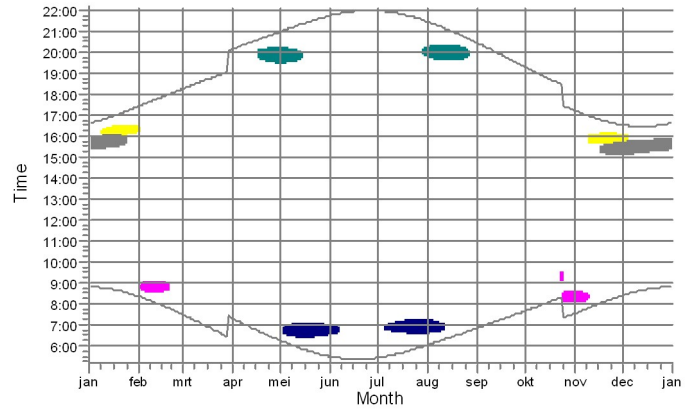
SHADOW - Calendar per WTG, graphical

Calculation: **OA c**

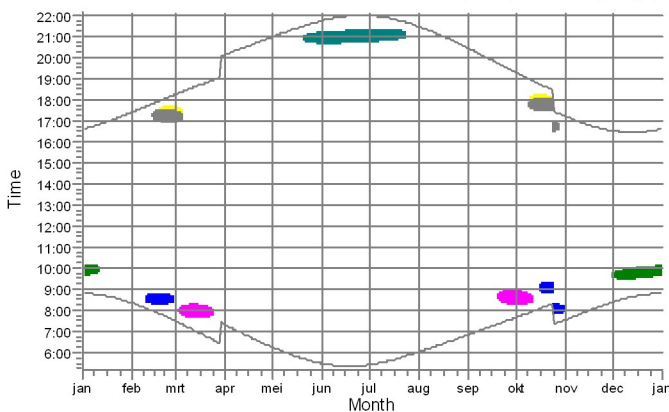
1: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



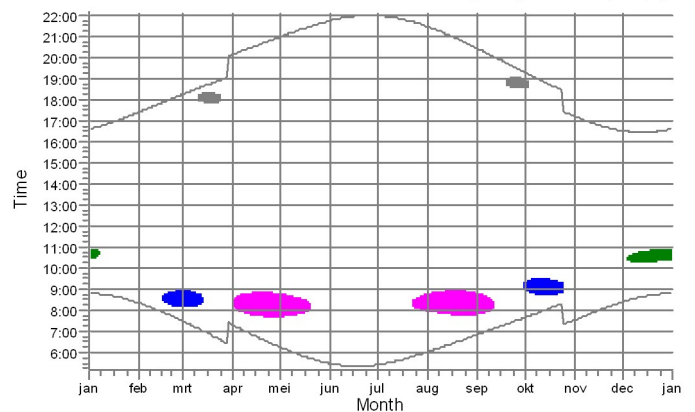
2: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



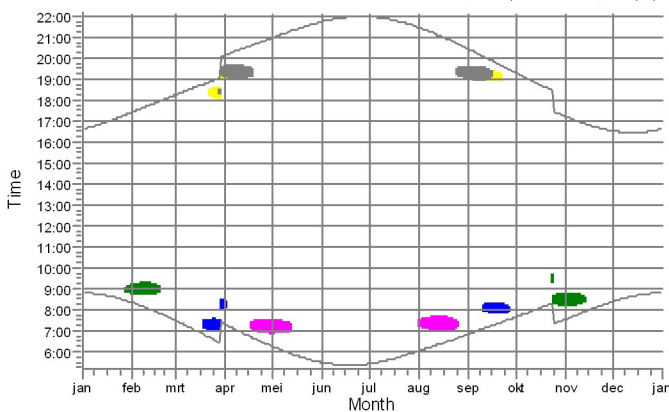
3: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)











4: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



5: NORDEX N131/3300 DE 3300 131.0 !hub: 144,0 m (TOT: 209,5 m) (18)



Shadow receptors

- | | | | |
|---|--|---|---|
|  | A: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (1) |  | E: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (6) |
|  | B: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (3) |  | F: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (8) |
|  | C: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (4) |  | G: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (9) |
|  | D: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (5) |  | H: Shadow Receptor: 5,0 × 5,0 Azimuth: 0,0° Slope: 90,0° (10) |

Referentiewoningen (110) voor detaillering inschatting mitigatie door stilstand

49 woningen > 5 uur slagschaduw per jaar

SHADOW - Map

Calculation: 1B Elz Hoed en Schil Nordex Receptors meer dan 5 uur



0 250 500 750 1000m

Map: Luchtfoto, Print scale 1:25.000, Map center Dutch Stereo-RD/NAP 2008 East: 167.091 North: 422.540

▲ New WTG

● Shadow receptor

Flicker map level: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM 1 arc-second)

61 woningen < 5 uur slagschaduw per jaar

SHADOW - Map

Calculation: 1B Elz Hoed en Schil Nordex Receptoren minder dan 5 uur



Map: Luchtfoto , Print scale 1:40.000, Map center Dutch Stereo-RD/NAP 2008 East: 166.851 North: 422.734
New WTG Shadow receptor
Flicker map level: Project Wizard Elevation Data Grid (SRTM: Shuttle DTM 1 arc-second)

windPRO 3.1.597 by EMD International A/S, Tel. +45 96 35 44 44, www.emd.dk, windpro@emd.dk

17-2-2017 11:22 / 1



SHADOW - Calendar per WTG

Calculation: 1A Elz Hoed en Schil Vestas ReceptorsWTG: 1 - VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (1)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 09:17-09:24/7 16:38	08:19 08:48-09:32/44 17:25	07:26 08:47-09:20/33 18:17 17:36-17:47/11	07:16 20:10	06:11 21:01	05:26 21:47
2	08:46 09:17-09:25/8 16:39	08:17 08:47-09:29/42 17:27	07:24 08:49-09:17/28 18:19 17:39-17:44/5	07:13 20:12	06:09 21:03	05:25 21:48
3	08:45 09:16-09:25/9 16:40	08:16 08:46-09:24/38 17:29	07:22 08:51-09:15/24 18:20	07:11 20:14	06:07 21:04	05:24 21:49
4	08:45 09:16-09:27/11 16:41	08:14 08:45-09:25/40 17:31	07:19 08:54-09:12/18 18:22	07:09 20:16	06:05 21:06	05:24 21:50
5	08:45 09:16-09:28/12 16:42	08:13 08:44-09:26/42 17:33	07:17 09:01-09:03/2 18:24	07:06 20:17	06:04 21:08	05:23 21:51
6	08:45 09:15-09:28/13 16:44	08:11 08:43-09:26/43 17:35	07:15 18:26	07:04 20:19	06:02 21:09	05:22 21:52
7	08:44 09:15-09:30/15 16:45	08:09 08:43-09:28/45 17:36	07:13 18:27	07:02 20:21	06:00 21:11	05:22 21:53
8	08:44 09:14-09:30/16 16:46	08:07 08:42-09:29/47 17:38	07:10 18:29	07:00 20:22	05:58 21:13	05:21 21:54
9	08:43 09:13-09:31/18 16:47	08:06 08:42-09:29/47 17:40	07:08 18:31	06:57 20:24	05:56 21:14	05:21 05:50-05:51/1 21:54
10	08:43 09:13-09:32/19 16:49	08:04 08:41-09:30/49 17:42	07:06 18:33	06:55 20:26	05:55 21:16	05:20 05:50-05:52/2 21:55
11	08:42 09:12-09:33/21 16:50	08:02 08:41-09:30/49 17:44	07:04 18:34	06:53 20:27	05:53 21:17	05:20 05:50-05:52/2 21:56
12	08:42 09:11-09:33/22 16:52	08:00 08:40-09:31/51 17:46	07:01 18:36	06:51 20:29	05:51 21:19	05:20 05:49-05:52/3 21:57
13	08:41 09:10-09:34/24 16:53	07:58 08:40-09:31/51 17:48	06:59 18:38	06:49 20:31	05:50 21:21	05:19 05:49-05:53/4 21:57
14	08:40 09:09-09:34/25 16:55	07:57 08:40-09:31/51 17:49	06:57 18:40	06:46 20:32	05:48 21:22	05:19 05:49-05:53/4 21:58
15	08:39 09:08-09:35/27 16:56	07:55 08:40-09:31/51 17:51	06:55 18:41	06:44 20:34	05:47 21:24	05:19 05:49-05:54/5 21:58
16	08:39 09:07-09:36/29 16:58	07:53 08:40-09:31/51 17:53	06:52 18:43	06:42 20:36	05:45 21:25	05:19 05:49-05:54/5 21:59
17	08:38 09:07-09:36/29 16:59	07:51 08:40-09:31/51 17:55	06:50 18:45	06:40 20:38	05:44 21:27	05:19 05:49-05:54/5 21:59
18	08:37 09:07-09:37/30 17:01	07:49 08:40-09:31/51 17:57	06:48 18:47	06:38 20:39	05:42 21:28	05:19 05:49-05:54/5 22:00
19	08:36 09:07-09:37/30 17:03	07:47 08:40-09:31/51 17:59	06:45 18:48	06:35 20:41	05:41 21:30	05:19 05:49-05:55/6 22:00
20	08:35 09:08-09:38/30 17:04	07:45 08:40-09:31/51 18:00	06:43 18:50	06:33 20:43	05:39 21:31	05:19 05:49-05:55/6 22:01
21	08:34 09:08-09:37/29 17:06	07:43 08:41-09:30/49 18:02	06:41 18:52	06:31 20:44	05:38 21:32	05:19 05:50-05:56/6 22:01
22	08:32 09:08-09:38/30 17:08	07:41 08:41-09:30/49 18:04 17:34-17:37/3	06:39 18:53	06:29 20:46	05:37 21:34	05:19 05:50-05:56/6 22:01
23	08:31 09:09-09:38/29 17:09	07:39 08:41-09:28/47 18:06 17:34-17:39/5	06:36 18:55	06:27 20:48	05:36 21:35	05:19 05:50-05:56/6 22:01
24	08:30 09:09-09:38/29 17:11	07:37 08:42-09:27/45 18:08 17:33-17:41/8	06:34 18:57	06:25 20:49	05:34 21:37	05:20 05:50-05:55/5 22:01
25	08:29 09:10-09:38/28 17:13	07:34 08:43-09:26/43 18:10 17:33-17:43/10	06:32 18:59	06:23 20:51	05:33 21:38	05:20 05:51-05:56/5 22:01
26	08:28 09:11-09:38/27 17:15	07:32 08:44-09:25/41 18:11 17:34-17:45/11	06:29 19:00	06:21 20:53	05:32 21:39	05:20 05:51-05:56/5 22:01
27	08:26 08:59-09:08/9 17:16 09:12-09:37/25	07:30 08:45-09:24/39 18:13 17:34-17:47/13	06:27 19:02	06:19 20:54	05:31 21:41	05:21 05:52-05:57/5 22:01
28	08:25 08:56-09:37/41 17:18	07:28 08:46-09:23/37 18:15 17:34-17:48/14	06:25 19:04	06:17 20:56	05:30 21:42	05:21 05:52-05:56/4 22:01
29	08:23 08:53-09:36/43 17:20		07:22 20:05	06:15 20:58	05:29 21:43	05:22 05:53-05:57/4 22:01
30	08:22 08:51-09:35/44 17:22		07:20 20:07	06:13 20:59	05:28 21:44	05:22 05:53-05:56/3 22:01
31	08:21 08:50-09:34/44 17:24		07:18 20:09		05:27 21:45	
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	773	1359	121	0	0	97

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/Minutes with flicker
 First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: 1A Elz Hoed en Schil Vestas ReceptorsWTG: 1 - VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (1)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 05:54-05:57/3 22:01	05:59 21:29	06:49 20:27	07:38 19:18	07:31 08:11-08:59/48 17:12	08:22 08:54-09:15/21 16:32
2	05:24 05:54-05:56/2 22:00	06:01 21:27	06:50 20:25	07:39 19:16	07:33 08:11-08:59/48 17:10	08:23 08:55-09:14/19 16:31
3	05:25 05:55-05:56/1 22:00	06:02 21:26	06:52 20:23	07:41 19:13	07:35 08:12-08:58/46 17:09	08:25 08:57-09:15/18 16:31
4	05:25 05:56-05:57/1 21:59	06:04 21:24	06:54 20:20	07:43 19:11	07:36 08:13-08:58/45 17:07	08:26 08:58-09:14/16 16:30
5	05:26 21:59	06:06 21:22	06:55 20:18	07:44 19:09	07:38 08:13-08:56/43 17:05	08:27 09:00-09:15/15 16:30
6	05:27 21:58	06:07 21:20	06:57 20:16	07:46 19:07	07:40 08:14-08:55/41 17:03	08:29 09:01-09:15/14 16:29
7	05:28 21:58	06:09 21:19	06:59 20:14	07:48 19:04	07:42 08:15-08:55/40 17:02	08:30 09:02-09:14/12 16:29
8	05:29 21:57	06:10 21:17	07:00 20:11	07:49 19:02	07:44 08:16-08:54/38 17:00	08:31 09:04-09:15/11 16:29
9	05:30 21:57	06:12 21:15	07:02 20:09	07:51 09:31-09:43/12 19:00	07:45 08:18-09:00/42 16:58	08:32 09:05-09:15/10 16:28
10	05:31 21:56	06:13 21:13	07:03 20:07	07:53 09:27-09:47/20 18:58	07:47 08:19-09:03/44 16:57	08:33 09:06-09:14/8 16:28
11	05:32 21:55	06:15 21:11	07:05 20:04	07:54 09:24-09:50/26 18:55	07:49 08:21-09:05/44 16:55	08:34 09:07-09:14/7 16:28
12	05:33 21:54	06:17 21:09	07:07 20:02	07:56 09:22-09:53/31 18:53 18:10-18:19/9	07:51 08:23-09:07/44 16:54	08:35 09:08-09:14/6 16:28
13	05:34 21:53	06:18 21:07	07:08 20:00	07:58 09:19-09:54/35 18:51 18:08-18:20/12	07:52 08:25-09:08/43 16:52	08:36 09:09-09:14/5 16:28
14	05:35 21:52	06:20 21:05	07:10 19:57	07:59 09:18-09:55/37 18:49 18:07-18:21/14	07:54 08:28-09:09/41 16:51	08:37 09:10-09:14/4 16:28
15	05:36 21:51	06:21 21:03	07:11 19:55	08:01 09:17-09:57/40 18:47 18:06-18:19/13	07:56 08:32-08:41/9 16:49 08:45-09:10/25	08:38 09:11-09:14/3 16:28
16	05:37 21:50	06:23 21:01	07:13 19:53	08:03 09:16-09:58/42 18:44 18:06-18:17/11	07:58 08:44-09:11/27 16:48	08:39 09:12-09:14/2 16:28
17	05:39 21:49	06:25 20:59	07:15 19:50	08:05 09:15-09:59/44 18:42 18:05-18:14/9	07:59 08:44-09:12/28 16:46	08:40 09:13-09:15/2 16:28
18	05:40 21:48	06:26 20:57	07:16 19:48	08:06 09:13-09:59/46 18:40 18:05-18:11/6	08:01 08:43-09:12/29 16:45	08:41 09:13-09:14/1 16:28
19	05:41 21:47	06:28 20:55	07:18 19:46	08:08 09:12-10:00/48 18:38 18:05-18:09/4	08:03 08:43-09:12/29 16:44	08:41 09:14-09:15/1 16:29
20	05:42 21:46	06:29 20:53	07:20 19:43	08:10 09:12-10:00/48 18:36 18:06-18:07/1	08:04 08:43-09:13/30 16:43	08:42 16:29
21	05:44 21:45	06:31 20:51	07:21 19:41	08:12 09:11-10:01/50 18:34	08:06 08:44-09:13/29 16:41	08:43 16:29
22	05:45 21:44	06:33 20:49	07:23 19:39	08:13 09:11-10:01/50 18:32	08:08 08:44-09:14/30 16:40	08:43 16:30
23	05:46 21:42	06:34 20:47	07:24 19:36	08:15 09:10-10:01/51 18:30	08:09 08:45-09:14/29 16:39	08:44 16:30
24	05:48 21:41	06:36 20:45	07:26 19:34	08:17 09:09-10:01/52 18:28	08:11 08:44-09:14/30 16:38	08:44 09:16-09:17/1 16:31
25	05:49 21:40	06:38 20:43	07:28 19:32	07:19 08:09-09:01/52 17:26	08:13 08:45-09:14/29 16:37	08:44 09:17-09:18/1 16:32
26	05:51 21:38	06:39 20:40	07:29 19:30	07:20 08:09-09:01/52 17:24	08:14 08:46-09:15/29 16:36	08:45 09:17-09:18/1 16:32
27	05:52 21:37	06:41 20:38	07:31 19:27	07:22 08:09-09:01/52 17:22	08:16 08:47-09:14/27 16:35	08:45 09:17-09:19/2 16:33
28	05:53 21:35	06:42 20:36	07:33 19:25	07:24 08:09-09:01/52 17:20	08:17 08:49-09:14/25 16:34	08:45 09:17-09:20/3 16:34
29	05:55 21:34	06:44 20:34	07:34 19:23	07:26 08:10-09:00/50 17:18	08:19 08:51-09:15/24 16:34	08:45 09:17-09:21/4 16:35
30	05:56 21:32	06:46 20:32	07:36 19:20	07:27 08:10-09:00/50 17:16	08:20 08:52-09:14/22 16:33	08:46 09:17-09:22/5 16:36
31	05:58 21:31	06:47 20:29	 19:18	07:29 08:10-09:00/50 17:14	 16:32	08:46 09:17-09:23/6 16:37
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	7	0	0	1069	1058	198

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 2 - VESTAS V112-3.45 3450 112.0 !OI hub: 94,0 m (TOT: 150,0 m) (20)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 12:06-13:02/56 16:38	08:19 17:25	07:26 18:17	07:16 20:10	06:11 21:01	05:26 21:05-21:15/10 21:47
2	08:46 12:07-13:03/56 16:39	08:17 17:27	07:24 18:19	07:13 20:12	06:09 21:03	05:25 21:04-21:15/11 21:48
3	08:45 12:07-13:02/55 16:40	08:16 17:29	07:22 18:20	07:11 20:14	06:07 21:04	05:24 21:04-21:16/12 21:49
4	08:45 12:08-13:03/55 16:41	08:14 17:31	07:19 18:22	07:09 20:16	06:05 21:06	05:24 21:05-21:18/13 21:50
5	08:45 12:09-13:03/54 16:42	08:13 17:33	07:17 18:24	07:06 20:17	06:04 21:08	05:23 21:05-21:18/13 21:51
6	08:45 12:09-13:03/54 16:44	08:11 17:35	07:15 18:26	07:04 20:19	06:02 21:09	05:22 21:05-21:18/13 21:52
7	08:44 12:11-13:03/52 16:45	08:09 17:36	07:13 18:27	07:02 20:21	06:00 21:11	05:22 21:06-21:20/14 21:53
8	08:44 12:11-13:03/52 16:46	08:08 17:38	07:10 18:29	07:00 20:22	05:58 21:13	05:21 21:07-21:21/14 21:54
9	08:43 12:12-13:02/50 16:47	08:06 17:40	07:08 18:31	06:57 20:24	05:57 21:14	05:21 21:06-21:21/15 21:54
10	08:43 12:13-13:03/50 16:49	08:04 17:42	07:06 18:33	06:55 20:26	05:55 21:16	05:20 21:07-21:22/15 21:55
11	08:42 12:14-13:02/48 16:50	08:02 17:44	07:04 18:34	06:53 20:27	05:53 21:17	05:20 21:08-21:23/15 21:56
12	08:42 12:15-13:02/47 16:52	08:00 17:46	07:01 18:36	06:51 20:29	05:51 21:19	05:20 21:07-21:22/15 21:57
13	08:41 12:16-13:01/45 16:53	07:58 17:48	06:59 18:38	06:49 20:31	05:50 21:21	05:19 21:08-21:22/14 21:57
14	08:40 12:18-13:00/42 16:55	07:57 17:49	06:57 18:40	06:46 20:32	05:48 21:22	05:19 21:08-21:22/14 21:58
15	08:39 12:19-13:00/41 16:56	07:55 17:51	06:55 18:41	06:44 20:34	05:47 21:24	05:19 21:09-21:22/13 21:58
16	08:39 12:21-12:59/38 16:58	07:53 17:53	06:52 18:43	06:42 20:36	05:45 21:25	05:19 21:09-21:23/14 21:59
17	08:38 12:22-12:58/36 16:59	07:51 17:55	06:50 18:45	06:40 20:38	05:44 21:27	05:19 21:10-21:23/13 21:59
18	08:37 12:24-12:56/32 17:01	07:49 17:57	06:48 18:47	06:38 20:39	05:42 21:28	05:19 21:10-21:23/13 22:00
19	08:36 12:27-12:55/28 17:03	07:47 17:59	06:45 18:48	06:36 20:41	05:41 21:30	05:19 21:10-21:23/13 22:00
20	08:35 12:30-12:53/23 17:04	07:45 18:00	06:43 18:50	06:33 20:43	05:39 21:31	05:19 21:10-21:23/13 22:01
21	08:34 12:34-12:48/14 17:06	07:43 18:02	06:41 18:52	06:31 20:44	05:38 21:32	05:19 21:10-21:23/13 22:01
22	08:32 17:08	07:41 18:04	06:39 18:53	06:29 20:46	05:37 21:34	05:19 21:11-21:24/13 22:01
23	08:31 17:09	07:39 18:06	06:36 18:55	06:27 20:48	05:36 21:35	05:19 21:11-21:24/13 22:01
24	08:30 17:11	07:37 18:08	06:34 18:57	06:25 20:49	05:34 21:05-21:06/1 21:37	05:20 21:11-21:24/13 22:01
25	08:29 17:13	07:34 18:10	06:32 18:59	06:23 20:51	05:33 21:05-21:07/2 21:38	05:20 21:12-21:25/13 22:01
26	08:28 17:15	07:32 18:11	06:29 19:00	06:21 20:53	05:32 21:04-21:08/4 21:39	05:20 21:12-21:25/13 22:01
27	08:26 17:16	07:30 18:13	06:27 19:02	06:19 20:54	05:31 21:04-21:09/5 21:41	05:21 21:11-21:25/14 22:01
28	08:25 17:18	07:28 18:15	06:25 19:04	06:17 20:56	05:30 21:04-21:10/6 21:42	05:21 21:12-21:25/13 22:01
29	08:23 17:20	07:22 18:13	06:15 20:05	06:15 20:58	05:29 21:04-21:11/7 21:43	05:22 21:11-21:25/14 22:01
30	08:22 17:22	07:20 18:13	06:13 20:07	06:13 20:59	05:28 21:04-21:12/8 21:44	05:23 21:12-21:26/14 22:01
31	08:21 17:24	07:18 18:13	06:11 20:09	06:11 20:59	05:27 21:04-21:13/9 21:45	05:23 21:12-21:26/14 22:01
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	928	0	0	0	42	400

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 2 - VESTAS V112-3.45 3450 112.0 !OI hub: 94,0 m (TOT: 150,0 m) (20)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 21:12-21:27/15 22:01	05:59 21:29	06:49 20:27	07:38 19:18	07:31 17:12	08:22 11:56-12:44/48 16:32
2	05:24 21:11-21:27/16 22:00	06:01 21:27	06:50 20:25	07:39 19:16	07:33 17:10	08:23 11:56-12:45/49 16:31
3	05:25 21:12-21:27/15 22:00	06:02 21:26	06:52 20:23	07:41 19:13	07:35 17:09	08:25 11:56-12:46/50 16:31
4	05:25 21:12-21:26/14 21:59	06:04 21:24	06:54 20:20	07:43 19:11	07:36 17:07	08:26 11:55-12:47/52 16:30
5	05:26 21:12-21:26/14 21:59	06:06 21:22	06:55 20:18	07:44 19:09	07:38 17:05	08:27 11:56-12:48/52 16:30
6	05:27 21:11-21:25/14 21:58	06:07 21:20	06:57 20:16	07:46 19:07	07:40 17:03	08:29 11:55-12:49/54 16:29
7	05:28 21:11-21:25/14 21:58	06:09 21:19	06:59 20:14	07:48 19:04	07:42 17:02	08:30 11:55-12:49/54 16:29
8	05:29 21:12-21:24/12 21:57	06:10 21:17	07:00 20:11	07:49 19:02	07:44 17:00	08:31 11:56-12:51/55 16:29
9	05:30 21:12-21:24/12 21:57	06:12 21:15	07:02 20:09	07:51 19:00	07:45 16:58	08:32 11:56-12:51/55 16:28
10	05:31 21:12-21:23/11 21:56	06:13 21:13	07:03 20:07	07:53 18:58	07:47 16:57	08:33 11:56-12:52/56 16:28
11	05:32 21:12-21:23/11 21:55	06:15 21:11	07:05 20:04	07:54 18:55	07:49 16:55	08:34 11:56-12:52/56 16:28
12	05:33 21:12-21:22/10 21:54	06:17 21:09	07:07 20:02	07:56 18:53	07:51 16:54	08:35 11:56-12:53/57 16:28
13	05:34 21:12-21:21/9 21:53	06:18 21:07	07:08 20:00	07:58 18:51	07:52 16:52	08:36 11:56-12:54/58 16:28
14	05:35 21:12-21:20/8 21:52	06:20 21:05	07:10 19:57	07:59 18:49	07:54 16:51	08:37 11:56-12:54/58 16:28
15	05:36 21:12-21:19/7 21:52	06:21 21:03	07:11 19:55	08:01 18:47	07:56 16:49	08:38 11:57-12:55/58 16:28
16	05:37 21:13-21:18/5 21:51	06:23 21:01	07:13 19:53	08:03 18:44	07:58 16:48	08:39 11:57-12:56/59 16:28
17	05:39 21:13-21:17/4 21:49	06:25 20:59	07:15 19:50	08:05 18:42	07:59 16:46	08:40 11:58-12:56/58 16:28
18	05:40 21:14-21:17/3 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 16:45	08:41 11:58-12:56/58 16:28
19	05:41 21:14-21:16/2 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 16:44	08:41 11:58-12:57/59 16:29
20	05:42 21:46	06:29 20:53	07:20 19:44	08:10 18:36	08:04 16:43	08:42 11:59-12:58/59 16:29
21	05:44 21:45	06:31 20:51	07:21 19:41	08:12 18:34	08:06 12:10-12:24/14 16:41	08:43 11:59-12:58/59 16:29
22	05:45 21:44	06:33 20:49	07:23 19:39	08:13 18:32	08:08 12:06-12:29/23 16:40	08:43 12:00-12:59/59 16:30
23	05:46 21:42	06:34 20:47	07:24 19:37	08:15 18:30	08:09 12:03-12:31/28 16:39	08:44 12:00-12:59/59 16:30
24	05:48 21:41	06:36 20:45	07:26 19:34	08:17 18:28	08:11 12:02-12:33/31 16:38	08:44 12:00-12:59/59 16:31
25	05:49 21:40	06:38 20:43	07:28 19:32	07:19 17:26	08:13 12:00-12:36/36 16:37	08:44 12:01-13:00/59 16:32
26	05:51 21:38	06:39 20:40	07:29 19:30	07:20 17:24	08:14 12:00-12:38/38 16:36	08:45 12:02-13:00/58 16:32
27	05:52 21:37	06:41 20:38	07:31 19:27	07:22 17:22	08:16 11:58-12:39/41 16:35	08:45 12:02-13:01/59 16:33
28	05:53 21:35	06:42 20:36	07:33 19:25	07:24 17:20	08:17 11:58-12:40/42 16:34	08:45 12:03-13:01/58 16:34
29	05:55 21:34	06:44 20:34	07:34 19:23	07:26 17:18	08:19 11:57-12:42/45 16:34	08:45 12:03-13:01/58 16:35
30	05:56 21:32	06:46 20:32	07:36 19:20	07:27 17:16	08:20 11:56-12:43/47 16:33	08:46 12:04-13:01/57 16:36
31	05:58 21:31	06:47 20:29	07:37 17:14	07:29 17:14	08:21 11:56-12:44/48 16:33	08:46 12:05-13:02/57 16:37
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	196	0	0	0	345	1747

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 3 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (21)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 09:17-09:24/7 16:38	08:19 17:25	07:26 18:17	07:16 07:38-07:51/13 20:10	06:11 21:01	05:26 21:47
2	08:45 09:17-09:25/8 16:39	08:17 17:27	07:24 07:47-07:48/1 18:19	07:13 07:36-07:52/16 20:12	06:09 21:03	05:25 21:48
3	08:45 09:16-09:25/9 16:40	08:16 17:29	07:21 07:45-07:50/5 18:20	07:11 07:34-07:54/20 20:14	06:07 21:04	05:24 21:49
4	08:45 09:16-09:26/10 16:41	08:14 17:31	07:19 07:43-07:51/8 18:22	07:09 07:31-07:53/22 20:15	06:05 21:06	05:24 21:50
5	08:45 09:16-09:27/11 16:42	08:13 17:33	07:17 07:40-07:51/11 18:24	07:06 07:29-07:54/25 20:17	06:04 21:08	05:23 21:51
6	08:45 09:15-09:27/12 16:43	08:11 17:35	07:15 07:38-07:52/14 18:26	07:04 07:27-07:54/27 20:19	06:02 21:09	05:22 21:52
7	08:44 09:15-09:28/13 16:45	08:09 17:36	07:13 07:36-07:53/17 18:27	07:02 07:25-07:54/29 20:21	06:00 21:11	05:22 21:53
8	08:44 09:14-09:29/15 16:46	08:07 17:38	07:10 07:34-07:53/19 18:29	07:00 07:24-07:53/29 20:22	05:58 21:13	05:21 21:54
9	08:43 09:13-09:29/16 16:47	08:06 17:40	07:08 18:03-18:05/2 18:31 07:31-07:52/21	06:57 07:24-07:53/29 20:24	05:56 21:14	05:21 21:54
10	08:43 09:13-09:30/17 16:49	08:04 17:42	07:06 18:02-18:07/5 18:33 07:30-07:51/21	06:55 07:24-07:53/29 20:26	05:55 21:16	05:20 21:55
11	08:42 09:12-09:30/18 16:50	08:02 17:44	07:04 18:00-18:09/9 18:34 07:31-07:51/20	06:53 07:24-07:52/28 20:27	05:53 21:17	05:20 21:56
12	08:42 09:11-09:31/20 16:52	08:00 17:46	07:01 17:58-18:10/12 18:36 07:31-07:49/18	06:51 07:25-07:52/27 20:29	05:51 21:19	05:20 21:57
13	08:41 09:10-09:31/21 16:53	07:58 17:48	06:59 17:57-18:13/16 18:38 07:32-07:48/16	06:48 07:25-07:50/25 20:31	05:50 21:20	05:19 21:57
14	08:40 09:09-09:31/22 16:55	07:57 17:49	06:57 17:56-18:15/19 18:40 07:34-07:45/11	06:46 07:26-07:48/22 20:32	05:48 21:22	05:19 21:58
15	08:39 09:08-09:32/24 16:56	07:55 17:51	06:55 17:55-18:16/21 18:41 07:37-07:40/3	06:44 07:27-07:47/20 20:34	05:47 21:24	05:19 21:58
16	08:38 09:08-09:32/24 16:58	07:53 17:53	06:52 17:55-18:18/23 18:43	06:42 07:28-07:45/17 20:36	05:45 21:25	05:19 21:59
17	08:38 09:09-09:32/23 16:59	07:51 17:55	06:50 17:55-18:20/25 18:45	06:40 07:30-07:42/12 20:38	05:44 21:27	05:19 21:59
18	08:37 09:10-09:32/22 17:01	07:49 17:57	06:48 17:54-18:20/26 18:47	06:38 20:39	05:42 21:28	05:19 22:00
19	08:36 09:11-09:33/22 17:03	07:47 17:59	06:45 17:54-18:19/25 18:48	06:35 20:41	05:41 21:30	05:19 22:00
20	08:35 09:12-09:33/21 17:04	07:45 18:00	06:43 17:55-18:18/23 18:50	06:33 20:43	05:39 21:31	05:19 22:00
21	08:34 09:12-09:32/20 17:06	07:43 18:02	06:41 17:55-18:17/22 18:52	06:31 20:44	05:38 21:32	05:19 22:01
22	08:32 09:13-09:32/19 17:08	07:41 18:04	06:39 17:56-18:15/19 18:53	06:29 20:46	05:37 21:34	05:19 22:01
23	08:31 09:14-09:31/17 17:09	07:39 18:06	06:36 17:58-18:14/16 18:55	06:27 20:48	05:35 21:35	05:19 22:01
24	08:30 09:15-09:30/15 17:11	07:36 18:08	06:34 18:00-18:10/10 18:57	06:25 20:49	05:34 21:37	05:20 22:01
25	08:29 09:17-09:29/12 17:13	07:34 18:10	06:32 18:59	06:23 20:51	05:33 21:38	05:20 22:01
26	08:28 09:20-09:27/7 17:15	07:32 18:11	06:29 19:00	06:21 20:53	05:32 21:39	05:20 22:01
27	08:26 17:16	07:30 18:13	06:27 19:02	06:19 20:54	05:31 21:41	05:21 22:01
28	08:25 17:18	07:28 18:15	06:25 19:04	06:17 20:56	05:30 21:42	05:21 22:01
29	08:23 17:20	07:22 18:13	06:22 19:02	06:15 20:58	05:29 21:43	05:22 22:01
30	08:22 17:22	07:20 18:13	06:20 07:43-07:48/5 20:07	06:13 20:59	05:28 21:44	05:22 22:01
31	08:20 17:24	07:18 18:09	07:40-07:49/9 20:09		05:27 21:45	
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	425	0	472	390	0	0

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 3 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (21)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 22:01	05:59 21:29	06:49 20:27	07:23-07:51/28	07:38 19:18	08:22 16:32
2	05:24 22:00	06:01 21:27	06:50 20:25	07:22-07:51/29	07:39 19:16	08:23 16:31
3	05:24 22:00	06:02 21:26	06:52 20:23	07:22-07:51/29	07:41 19:13	08:25 16:31
4	05:25 21:59	06:04 21:24	06:54 20:20	07:21-07:50/29	07:42 19:11	08:26 16:30
5	05:26 21:59	06:06 21:22	06:55 20:18	07:21-07:51/30	07:44 19:09	08:27 16:30
6	05:27 21:58	06:07 21:20	06:57 20:16	07:23-07:50/27	07:46 19:07	08:29 16:29
7	05:28 21:58	06:09 21:19	06:59 20:14	07:24-07:49/25	07:48 19:04	08:30 16:29
8	05:29 21:57	06:10 21:17	07:00 20:11	07:26-07:49/23	07:49 19:02	08:31 16:29
9	05:30 21:57	06:12 21:15	07:02 20:09	07:27-07:47/20	07:51 19:00	08:32 16:28
10	05:31 21:56	06:13 21:13	07:03 20:07	07:29-07:46/17	07:53 18:58	08:33 16:28
11	05:32 21:55	06:15 21:11	07:05 20:04	07:30-07:44/14	07:54 18:55	08:34 16:28
12	05:33 21:54	06:17 21:09	07:07 20:02	07:32-07:42/10	07:56 18:53	08:35 16:28
13	05:34 21:53	06:18 21:07	07:08 20:00	07:34-07:40/6	07:58 18:51	08:36 16:28
14	05:35 21:52	06:20 21:05	07:10 19:57	07:10	07:59 18:49	08:37 16:28
15	05:36 21:51	06:21 21:03	07:11 19:55	07:11	08:01 18:47	08:38 16:28
16	05:37 21:50	06:23 21:01	07:13 19:53	07:13	08:03 18:44	08:39 16:28
17	05:38 21:49	06:25 20:59	07:15 19:50	07:15	08:05 18:42	08:40 16:28
18	05:40 21:48	06:26 20:57	07:16 19:48	07:16	08:06 18:40	08:41 16:28
19	05:41 21:47	06:28 20:55	07:18 19:46	18:48-18:57/9	08:08 18:38	08:41 16:29
20	05:42 21:46	06:29 20:53	07:19 19:43	18:44-18:59/15	08:10 18:36	08:42 16:29
21	05:44 21:45	06:31 20:51	07:21 19:41	18:42-19:01/19	08:11 18:34	08:43 16:29
22	05:45 21:44	06:33 20:49	07:23 19:39	18:41-19:02/21	08:13 18:32	08:43 16:30
23	05:46 21:42	06:34 20:47	07:24 19:36	18:39-19:02/23	08:15 18:30	08:44 16:30
24	05:48 21:41	06:36 20:45	07:26 19:34	18:38-19:03/25	08:17 18:28	08:44 16:31
25	05:49 21:40	06:37 20:43	07:28 19:32	18:38-19:03/25	07:19 17:26	08:44 16:32
26	05:51 21:38	06:39 20:40	07:29 19:29	18:37-19:02/25	07:20 17:24	08:45 16:32
27	05:52 21:37	06:41 20:38	07:31 19:27	18:36-19:00/24	07:22 17:22	08:45 16:33
28	05:53 21:35	06:42 20:36	07:33 19:25	18:36-18:57/21	07:24 17:20	08:45 16:34
29	05:55 21:34	06:44 20:34	07:34 19:23	18:36-18:55/19	07:26 17:18	08:45 16:35
30	05:56 21:32	06:46 20:32	07:36 19:20	18:37-18:53/16	07:27 17:16	08:46 16:36
31	05:58 21:31	06:47 20:29	07:38 19:18	18:31-18:47/12	07:29 17:14	08:46 16:36
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	0	125	552	201	288	203

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 4 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (22)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 14:22-14:44/22 16:38 15:27-15:59/32	08:19 17:25	07:26 18:17	07:15 20:10	06:11 21:01	05:26 21:47
2	08:45 14:23-14:43/20 16:39 15:27-15:59/32	08:17 17:27	07:24 18:18	07:13 20:12	06:09 21:03	05:25 21:48
3	08:45 14:24-14:42/18 16:40 15:28-16:00/32	08:16 17:29	07:21 18:20	07:11 20:14	06:07 21:04	05:24 21:49
4	08:45 14:27-14:42/15 16:41 15:28-16:00/32	08:14 17:31	07:19 18:22	07:09 20:15	06:05 21:06	05:24 21:50
5	08:45 14:28-14:41/13 16:42 15:28-16:00/32	08:13 17:33	07:17 18:24	07:06 20:17	06:03 21:08	05:23 21:51
6	08:45 14:31-14:40/9 16:43 15:29-16:01/32	08:11 17:35	07:15 18:26	07:04 20:19	06:02 06:27-06:28/1 21:09	05:22 21:52
7	08:44 15:29-16:01/32 16:45	08:09 17:36	07:13 18:27	07:02 20:21	06:00 06:25-06:28/3 21:11	05:22 21:53
8	08:44 15:30-16:02/32 16:46	08:07 17:38	07:10 18:29	07:00 20:22	05:58 06:23-06:28/5 21:12	05:21 21:53
9	08:43 15:30-16:02/32 16:47	08:06 17:40	07:08 18:31	06:57 20:24	05:56 06:22-06:29/7 21:14	05:21 21:54
10	08:43 15:31-16:02/31 16:49	08:04 17:42	07:06 18:33	06:55 20:26	05:55 06:20-06:28/8 21:16	05:20 21:55
11	08:42 15:32-16:03/31 16:50	08:02 17:44	07:04 18:34	06:53 20:27	05:53 06:19-06:29/10 21:17	05:20 21:56
12	08:41 15:32-16:03/31 16:52	08:00 17:46	07:01 18:36	06:51 20:29	05:51 06:17-06:28/11 21:19	05:20 21:57
13	08:41 15:33-16:03/30 16:53	07:58 17:47	06:59 18:38	06:48 20:31	05:50 06:16-06:28/12 21:20	05:19 21:57
14	08:40 15:33-16:03/30 16:55	07:56 17:49	06:57 18:40	06:46 20:32	05:48 06:14-06:27/13 21:22	05:19 21:58
15	08:39 15:34-16:03/29 16:56	07:55 17:51	06:55 18:41	06:44 20:34	05:47 06:13-06:27/14 21:24	05:19 21:58
16	08:38 15:35-16:03/28 16:58	07:53 17:53	06:52 18:43	06:42 20:36	05:45 06:14-06:25/11 21:25	05:19 21:59
17	08:38 15:36-16:03/27 16:59	07:51 17:55	06:50 18:45	06:40 20:37	05:44 06:15-06:24/9 21:27	05:19 21:59
18	08:37 15:37-16:03/26 17:01	07:49 17:57	06:48 18:46	06:38 20:39	05:42 06:17-06:23/6 21:28	05:19 22:00
19	08:36 15:38-16:03/25 17:03	07:47 17:59	06:45 18:48	06:35 20:41	05:41 21:30	05:19 22:00
20	08:35 15:39-16:02/23 17:04	07:45 18:00	06:43 18:50	06:33 20:43	05:39 21:31	05:19 22:00
21	08:33 15:40-16:01/21 17:06	07:43 18:02	06:41 18:52	06:31 20:44	05:38 21:32	05:19 22:01
22	08:32 15:42-16:00/18 17:08	07:41 18:04	06:38 18:53	06:29 20:46	05:37 21:34	05:19 22:01
23	08:31 15:44-16:00/16 17:09	07:39 18:06	06:36 18:55	06:27 20:48	05:35 21:35	05:19 22:01
24	08:30 15:46-15:57/11 17:11	07:36 18:08	06:34 18:57	06:25 20:49	05:34 21:37	05:20 22:01
25	08:29 15:50-15:54/4 17:13	07:34 18:09	06:32 18:58	06:23 20:51	05:33 21:38	05:20 22:01
26	08:27 17:15	07:32 18:11	06:29 19:00	06:21 20:53	05:32 21:39	05:20 22:01
27	08:26 17:16	07:30 18:13	06:27 19:02	06:19 20:54	05:31 21:41	05:21 22:01
28	08:25 17:18	07:28 18:15	06:25 19:04	06:17 20:56	05:30 21:42	05:21 22:01
29	08:23 17:20	07:22 18:05	06:15 20:05	06:15 20:58	05:29 21:43	05:22 22:01
30	08:22 17:22	07:20 18:07	06:13 20:07	06:13 20:59	05:28 21:44	05:22 22:01
31	08:20 17:23	07:18 20:09	06:11 20:09	06:11 20:57	05:27 21:45	05:22 22:01
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	766	0	0	0	110	0

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 4 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (22)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 22:00	05:59 06:28-06:39/11 21:29	06:49 20:27	07:37 19:18	07:31 17:12	08:22 15:14-15:45/31 16:32
2	05:24 22:00	06:01 06:30-06:39/9 21:27	06:50 20:25	07:39 19:16	07:33 17:10	08:23 15:14-15:45/31 16:31
3	05:24 22:00	06:02 06:31-06:39/8 21:26	06:52 20:23	07:41 19:13	07:35 17:08	08:24 15:14-15:46/32 16:31
4	05:25 21:59	06:04 06:32-06:38/6 21:24	06:54 20:20	07:42 19:11	07:36 17:07	08:26 15:14-15:46/32 16:30
5	05:26 21:59	06:05 06:34-06:38/4 21:22	06:55 20:18	07:44 19:09	07:38 17:05	08:27 15:14-15:46/32 16:30
6	05:27 21:58	06:07 06:35-06:37/2 21:20	06:57 20:16	07:46 19:06	07:40 17:03	08:28 14:17-14:26/9 16:29 15:15-15:47/32
7	05:28 21:58	06:09 21:19	06:58 20:14	07:47 19:04	07:42 17:01	08:30 14:15-14:28/13 16:29 15:15-15:47/32
8	05:29 21:57	06:10 21:17	07:00 20:11	07:49 19:02	07:43 17:00	08:31 14:14-14:29/15 16:28 15:16-15:47/31
9	05:30 21:56	06:12 21:15	07:02 20:09	07:51 19:00	07:45 16:58	08:32 14:14-14:31/17 16:28 15:17-15:49/32
10	05:31 21:56	06:13 21:13	07:03 20:07	07:53 18:58	07:47 16:57	08:33 14:13-14:33/20 16:28 15:17-15:49/32
11	05:32 21:55	06:15 21:11	07:05 20:04	07:54 18:55	07:49 16:55	08:34 14:12-14:34/22 16:28 15:17-15:49/32
12	05:33 21:54	06:17 21:09	07:07 20:02	07:56 18:53	07:51 16:53	08:35 14:12-14:35/23 16:28 15:18-15:49/31
13	05:34 21:53	06:18 21:07	07:08 20:00	07:58 18:51	07:52 16:52	08:36 14:12-14:35/23 16:28 15:18-15:50/32
14	05:35 21:52	06:20 21:05	07:10 19:57	07:59 18:49	07:54 16:50	08:37 14:12-14:36/24 16:28 15:19-15:50/31
15	05:36 21:51	06:21 21:03	07:11 19:55	08:01 18:47	07:56 16:49	08:38 14:12-14:37/25 16:28 15:19-15:51/32
16	05:37 21:50	06:23 21:01	07:13 19:53	08:03 18:44	07:58 16:48	08:39 14:12-14:38/26 16:28 15:20-15:51/31
17	05:38 21:49	06:25 20:59	07:15 19:50	08:04 18:42	07:59 15:23-15:27/4 16:46	08:40 14:12-14:38/26 16:28 15:20-15:51/31
18	05:40 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 15:20-15:31/11 16:45	08:41 14:12-14:39/27 16:28 15:21-15:52/31
19	05:41 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 15:18-15:34/16 16:44	08:41 14:13-14:40/27 16:29 15:21-15:53/32
20	05:42 21:46	06:29 20:53	07:19 19:43	08:10 18:36	08:04 15:17-15:35/18 16:43	08:42 14:13-14:40/27 16:29 15:21-15:52/31
21	05:44 21:45	06:31 20:51	07:21 19:41	08:11 18:34	08:06 15:16-15:37/21 16:41	08:43 14:13-14:41/28 16:29 15:22-15:53/31
22	05:45 21:43	06:33 20:49	07:23 19:39	08:13 18:32	08:08 15:15-15:38/23 16:40	08:43 14:13-14:41/28 16:30 15:22-15:53/31
23	05:46 21:42	06:34 20:47	07:24 19:36	08:15 18:30	08:09 15:14-15:39/25 16:39	08:44 14:15-14:42/27 16:30 15:23-15:54/31
24	05:48 21:41	06:36 20:45	07:26 19:34	08:17 18:28	08:11 15:14-15:40/26 16:38	08:44 14:15-14:42/27 16:31 15:23-15:54/31
25	05:49 21:39	06:37 20:42	07:28 19:32	07:18 17:26	08:13 15:14-15:41/27 16:37	08:44 14:16-14:43/27 16:32 15:24-15:56/32
26	05:50 06:27-06:34/7 21:38	06:39 20:40	07:29 19:29	07:20 17:24	08:14 15:14-15:42/28 16:36	08:45 14:17-14:43/26 16:32 15:25-15:56/31
27	05:52 06:25-06:35/10 21:37	06:41 20:38	07:31 19:27	07:22 17:22	08:16 15:13-15:42/29 16:35	08:45 14:17-14:43/26 16:33 15:25-15:56/31
28	05:53 06:25-06:37/12 21:35	06:42 20:36	07:33 19:25	07:24 17:20	08:17 15:13-15:43/30 16:34	08:45 14:18-14:43/25 16:34 15:25-15:57/32
29	05:55 06:24-06:37/13 21:34	06:44 20:34	07:34 19:23	07:26 17:18	08:19 15:14-15:44/30 16:33	08:45 14:19-14:43/24 16:35 15:26-15:57/31
30	05:56 06:25-06:38/13 21:32	06:46 20:32	07:36 19:20	07:27 17:16	08:20 15:13-15:44/31 16:33	08:45 14:19-14:43/24 16:36 15:26-15:58/32
31	05:58 06:27-06:39/12 21:30	06:47 20:29	 17:14	 16:33	 16:33	08:46 14:21-14:43/22 16:36 15:27-15:58/31
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	67	40	0	0	319	1583

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 5 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (23)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 10:08-10:32/24 16:38	08:19 17:25	07:26 18:17	07:16 20:10	06:11 06:35-06:39/4 21:01	05:26 20:58-21:15/17 21:47
2	08:45 10:09-10:32/23 16:39	08:17 17:27	07:24 18:19	07:13 20:12	06:09 06:34-06:40/6 21:03	05:25 20:57-21:15/18 21:48
3	08:45 10:09-10:31/22 16:40	08:16 17:29	07:22 18:20	07:11 20:14	06:07 06:32-06:41/9 21:04	05:24 20:57-21:16/19 21:49
4	08:45 10:10-10:32/22 16:41	08:14 17:31	07:19 18:22	07:09 20:16	19:48-19:49/1 06:05 06:30-06:41/11 21:06	05:24 20:58-21:18/20 21:50
5	08:45 10:12-10:32/20 16:42	08:13 17:33	07:17 18:24	07:06 20:17	19:47-19:51/4 06:04 06:28-06:41/13 21:08	05:23 20:57-21:18/21 21:51
6	08:45 10:12-10:31/19 16:44	08:11 17:35	07:15 18:26	07:04 20:19	19:46-19:53/7 06:02 06:27-06:42/15 21:09	05:22 20:57-21:18/21 21:52
7	08:44 10:14-10:30/16 16:45	08:09 17:36	07:13 18:27	07:02 20:21	19:45-19:54/9 06:00 06:25-06:42/17 21:11	05:22 20:57-21:20/23 21:53
8	08:44 10:16-10:29/13 16:46	08:07 17:38	07:10 18:29	07:00 20:22	19:45-19:56/11 05:58 06:23-06:41/18 21:13	05:21 20:58-21:21/23 21:54
9	08:43 10:17-10:27/10 16:47	08:06 17:40	07:08 18:31	06:57 20:24	19:45-19:58/13 05:56 06:22-06:41/19 21:14	05:21 20:57-21:21/24 21:54
10	08:43 10:21-10:25/4 16:49	08:04 17:42	07:06 18:33	06:55 20:26	19:46-20:00/14 05:55 06:21-06:41/20 21:16	05:20 20:58-21:22/24 21:55
11	08:42 16:50 17:44	08:02 17:44	07:04 18:34	06:53 20:27	19:47-19:59/12 05:53 06:22-06:41/19 21:17	05:20 20:58-21:23/25 21:56
12	08:42 16:52 17:46	08:00 17:46	07:01 18:36	06:51 20:29	19:48-19:56/8 05:51 06:22-06:39/17 21:19	05:20 20:58-21:23/25 21:57
13	08:41 16:53 17:48	07:58 17:48	06:59 18:38	06:49 20:31	05:50 06:24-06:39/15 21:20	05:19 20:58-21:24/26 21:57
14	08:40 16:55 17:49	07:57 17:49	06:57 18:40	06:46 20:32	05:48 06:24-06:37/13 21:22	05:19 20:58-21:24/26 21:58
15	08:39 16:56 17:51	07:55 17:51	06:55 18:41	06:44 20:34	05:47 06:26-06:36/10 21:24	05:19 20:59-21:25/26 21:58
16	08:38 16:58 17:53	07:53 17:53	06:52 18:43	06:42 20:36	05:45 06:27-06:34/7 21:25	05:19 20:59-21:26/27 21:59
17	08:38 16:59 17:55	07:51 17:55	06:50 18:45	06:40 20:38	05:44 21:27	05:19 20:59-21:26/27 21:59
18	08:37 17:01 17:57	07:49 17:57	06:48 18:47	06:38 20:39	05:42 21:28	05:19 20:59-21:26/27 22:00
19	08:36 17:03 17:59	07:47 17:59	06:45 18:48	06:35 20:41	05:41 21:30	05:19 21:00-21:26/26 22:00
20	08:35 17:04 18:00	07:45 18:00	06:43 18:50	06:33 20:43	05:39 21:31	05:19 21:00-21:26/26 22:00
21	08:34 17:06 18:02	07:43 18:02	06:41 18:52	06:31 20:44	05:38 21:32	05:19 21:00-21:26/26 22:01
22	08:32 17:08 18:04	07:41 18:04	06:39 18:53	06:29 20:46	05:37 21:34	05:19 21:01-21:27/26 22:01
23	08:31 17:09 18:06	07:39 18:06	06:36 18:55	06:27 20:48	05:36 21:02-21:04/2 21:35	05:19 21:01-21:27/26 22:01
24	08:30 17:11 18:08	07:37 18:08	06:34 18:57	06:25 20:49	05:34 21:01-21:06/5 21:37	05:20 21:00-21:27/27 22:01
25	08:29 17:13 18:10	07:34 18:10	06:32 18:59	06:23 20:51	05:33 21:00-21:07/7 21:38	05:20 21:01-21:28/27 22:01
26	08:28 17:15 18:11	07:32 18:11	06:29 19:00	06:21 20:53	05:32 21:00-21:08/8 21:39	05:20 21:01-21:28/27 22:01
27	08:26 17:16 18:13	07:30 18:13	06:27 19:02	06:19 20:54	05:31 20:59-21:09/10 21:41	05:21 21:01-21:27/26 22:01
28	08:25 17:18 18:15	07:28 18:15	06:25 19:04	06:17 20:56	05:30 20:59-21:10/11 21:42	05:21 21:02-21:28/26 22:01
29	08:23 17:20 18:12	07:26 18:12	06:23 19:02	06:15 20:58	05:29 20:58-21:11/13 21:43	05:22 21:01-21:27/26 22:01
30	08:22 17:22 18:14	07:25 18:14	06:22 19:01	06:14 20:59	06:37-06:38/1 05:28 20:58-21:12/14 21:44	05:23 21:02-21:27/25 22:01
31	08:20 17:24 18:16	07:23 18:16	06:21 19:00	06:13 20:59	05:27 20:57-21:13/16 21:45	
Potential sun hours	260	278	367	416	485	498
Sum of minutes with flicker	173	0	0	80	299	733

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 5 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (23)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 21:02-21:27/25 22:00	05:59 06:32-06:50/18 21:29	06:49 19:46-19:58/12 20:27	07:38 19:18	07:31 17:12	08:22 16:32
2	05:24 21:02-21:27/25 22:00	06:01 06:32-06:51/19 21:27	06:50 19:44-19:58/14 20:25	07:39 19:16	07:33 17:10	08:23 10:04-10:07/3 16:31
3	05:25 21:03-21:27/24 22:00	06:02 06:31-06:51/20 21:26	06:52 19:43-19:56/13 20:23	07:41 19:13	07:35 17:09	08:25 10:01-10:11/10 16:31
4	05:25 21:03-21:26/23 21:59	06:04 06:32-06:51/19 21:24	06:54 19:42-19:53/11 20:20	07:43 19:11	07:36 17:07	08:26 10:00-10:13/13 16:30
5	05:26 21:04-21:26/22 21:59	06:06 06:34-06:52/18 21:22	06:55 19:42-19:51/9 20:18	07:44 19:09	07:38 17:05	08:27 10:00-10:15/15 16:30
6	05:27 21:03-21:25/22 21:58	06:07 06:35-06:51/16 21:20	06:57 19:41-19:48/7 20:16	07:46 19:07	07:40 17:03	08:29 09:59-10:17/18 16:29
7	05:28 21:03-21:25/22 21:58	06:09 06:37-06:51/14 21:19	06:59 19:42-19:47/5 20:14	07:48 19:04	07:42 17:02	08:30 09:58-10:18/20 16:29
8	05:29 21:04-21:24/20 21:57	06:10 06:38-06:50/12 21:17	07:00 19:43-19:45/2 20:11	07:49 19:02	07:44 17:00	08:31 09:58-10:20/22 16:29
9	05:30 21:04-21:24/20 21:57	06:12 06:40-06:50/10 21:15	07:02 20:09	07:51 19:00	07:45 16:58	08:32 09:58-10:20/22 16:28
10	05:31 21:05-21:23/18 21:56	06:13 06:41-06:49/8 21:13	07:03 20:07	07:53 18:58	07:47 16:57	08:33 09:58-10:21/23 16:28
11	05:32 21:05-21:23/18 21:55	06:15 06:43-06:49/6 21:11	07:05 20:04	07:54 18:55	07:49 16:55	08:34 09:58-10:22/24 16:28
12	05:33 21:06-21:22/16 21:54	06:17 06:44-06:47/3 21:09	07:07 20:02	07:56 18:53	07:51 16:54	08:35 09:58-10:23/25 16:28
13	05:34 21:06-21:21/15 21:53	06:18 21:07	07:08 20:00	07:58 18:51	07:52 16:52	08:36 09:58-10:23/25 16:28
14	05:35 21:06-21:20/14 21:52	06:20 21:05	07:10 19:57	07:59 18:49	07:54 16:51	08:37 09:58-10:24/26 16:28
15	05:36 21:07-21:19/12 21:51	06:21 21:03	07:11 19:55	08:01 18:47	07:56 16:49	08:38 09:58-10:25/27 16:28
16	05:37 21:07-21:18/11 21:50	06:23 21:01	07:13 19:53	08:03 18:44	07:58 16:48	08:39 09:59-10:26/27 16:28
17	05:39 21:08-21:17/9 21:49	06:25 20:59	07:15 19:50	08:05 18:42	07:59 16:46	08:40 09:59-10:27/28 16:28
18	05:40 21:10-21:17/7 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 16:45	08:41 09:59-10:27/28 16:28
19	05:41 21:10-21:16/6 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 16:44	08:41 10:00-10:27/27 16:29
20	05:42 21:11-21:15/4 21:46	06:29 20:53	07:20 19:43	08:10 18:36	08:04 16:43	08:42 10:01-10:28/27 16:29
21	05:44 21:45	06:31 20:51	07:21 19:41	08:12 18:34	08:06 16:41	08:43 10:00-10:28/28 16:29
22	05:45 21:44	06:33 20:49	07:23 19:39	08:13 18:32	08:08 16:40	08:43 10:01-10:29/28 16:30
23	05:46 21:42	06:34 20:47	07:24 19:36	08:15 18:30	08:09 16:39	08:44 10:01-10:29/28 16:30
24	05:48 21:41	06:36 20:45	07:26 19:34	08:17 18:28	08:11 16:38	08:44 10:02-10:29/27 16:31
25	05:49 21:40	06:38 20:43	07:28 19:32	07:19 17:26	08:13 16:37	08:44 10:03-10:31/28 16:32
26	05:51 21:38	06:39 20:40	07:29 19:30	07:20 17:24	08:14 16:36	08:45 10:03-10:31/28 16:32
27	05:52 06:40-06:42/2 21:37	06:41 20:38	07:31 19:27	07:22 17:22	08:16 16:35	08:45 10:04-10:31/27 16:33
28	05:53 06:37-06:46/9 21:35	06:42 20:36	07:33 19:25	07:24 17:20	08:17 16:34	08:45 10:04-10:31/27 16:34
29	05:55 06:35-06:47/12 21:34	06:44 20:34	07:34 19:23	07:26 17:18	08:19 16:34	08:45 10:05-10:31/26 16:35
30	05:56 06:34-06:48/14 21:32	06:46 20:32	07:36 19:20	07:27 17:16	08:20 16:33	08:46 10:06-10:31/25 16:36
31	05:58 06:34-06:50/16 21:31	06:47 19:48-19:56/8 20:29		07:29 17:14		08:46 10:06-10:32/26 16:37
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	386	171	73	0	0	708

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

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
Beneluxweg 125 Postbus 40
NL-4900 AA OOSTERHOUT
0513 634045
Koen Wilmer / koen.wilmer@anteagroup.com
Calculated:
7-2-2017 14:42/3.1.597

SHADOW - Calendar per WTG

Calculation: 1A Elz Hoed en Schil Vestas Receptors WTG: 6 - VESTAS V112-3.45 3450 112.0 !OI hub: 94,0 m (TOT: 150,0 m) (24)
Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to June) and rows for days (1 to 31). Each cell contains a grid of times (Sun rise, Sun set, First time with flicker, Last time with flicker, Minutes with flicker) for each day.

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 6 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (24)
 Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) [DE BILT]
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 05:54-06:12/18 22:00 21:08-21:28/20	05:59 21:29	06:49 20:27	07:37 19:18	07:31 16:14-16:30/16 17:12	08:22 15:46-15:59/13 16:32
2	05:24 05:54-06:12/18 22:00 21:08-21:27/19	06:01 21:27	06:50 20:25	07:39 19:16	07:33 16:13-16:31/18 17:10	08:23 15:47-15:58/11 16:31
3	05:24 05:55-06:12/17 22:00 21:09-21:27/18	06:02 21:26	06:52 20:23	07:41 19:13	07:35 16:11-16:31/20 17:08	08:25 15:48-15:57/9 16:31
4	05:25 05:56-06:13/17 21:59 21:09-21:26/17	06:04 21:24	06:54 20:20	07:42 19:11	07:36 16:10-16:32/22 17:07	08:26 15:49-15:56/7 16:30
5	05:26 05:57-06:13/16 21:59 21:09-21:25/16	06:06 21:22	06:55 20:18	07:44 08:21-08:32/11 19:09	07:38 15:48-15:56/8 17:05 16:10-16:33/23	08:27 15:51-15:56/5 16:30
6	05:27 05:57-06:12/15 21:58 21:10-21:25/15	06:07 21:20	06:57 20:16	07:46 08:19-08:34/15 19:07	07:40 15:45-15:59/14 17:03 16:10-16:33/23	08:28 15:52-15:55/3 16:29
7	05:28 05:58-06:13/15 21:58 21:10-21:25/15	06:09 21:19	06:58 20:14	07:47 08:18-08:35/17 19:04	07:42 15:43-16:01/18 17:02 16:10-16:31/21	08:30 15:53-15:55/2 16:29
8	05:29 05:59-06:13/14 21:57 21:11-21:24/13	06:10 21:17	07:00 20:11	07:49 08:17-08:36/19 19:02	07:43 15:41-16:02/21 17:00 16:10-16:29/19	08:31 16:29
9	05:30 06:00-06:13/13 21:56 21:12-21:24/12	06:12 21:15	07:02 20:09	07:51 08:16-08:36/20 19:00	07:45 15:40-16:03/23 16:58 16:10-16:28/18	08:32 16:28
10	05:31 06:01-06:13/12 21:56 21:13-21:23/10	06:13 21:13	07:03 20:07	07:53 08:18-08:36/18 18:58	07:47 15:39-16:04/25 16:57 16:11-16:26/15	08:33 16:28
11	05:32 06:02-06:13/11 21:55 21:13-21:23/10	06:15 21:11	07:05 20:04	07:54 08:20-08:36/16 18:55	07:49 15:38-16:05/27 16:55 16:12-16:24/12	08:34 16:28
12	05:33 06:03-06:13/10 21:54 21:14-21:22/8	06:17 21:09	07:07 20:02	07:56 08:22-08:36/14 18:53	07:51 15:38-16:06/28 16:53 16:12-16:23/11	08:35 16:28
13	05:34 06:04-06:13/9 21:53 21:15-21:21/6	06:18 21:07	07:08 20:00	07:58 08:23-08:34/11 18:51	07:52 15:38-16:07/29 16:52 16:13-16:21/8	08:36 16:28
14	05:35 06:05-06:12/7 21:52 21:17-21:20/3	06:20 21:05	07:10 19:57	07:59 08:25-08:33/8 18:49	07:54 15:38-16:08/30 16:51 16:14-16:20/6	08:37 16:28
15	05:36 06:06-06:12/6 21:51 21:18-21:19/1	06:21 21:03	07:11 19:55	08:01 08:27-08:32/5 18:47	07:56 15:38-16:08/30 16:49 16:16-16:18/2	08:38 16:28
16	05:37 06:07-06:11/4 21:50	06:23 21:01	07:13 19:53	08:03 08:29-08:31/2 18:44	07:58 15:38-16:09/31 16:48	08:39 16:28
17	05:38 06:08-06:11/3 21:49	06:25 20:59	07:15 19:50	08:05 18:42	07:59 15:37-16:08/31 16:46	08:40 16:28
18	05:40 06:10-06:11/1 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 15:37-16:09/32 16:45	08:41 16:28
19	05:41 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 15:38-16:09/31 16:44	08:41 16:29
20	05:42 21:46	06:29 20:53	07:19 19:43	08:10 18:36	08:04 15:38-16:09/31 16:43	08:42 16:29
21	05:44 21:45	06:31 20:51	07:21 19:41	08:11 18:34	08:06 15:39-16:10/31 16:41	08:43 16:29
22	05:45 21:43	06:33 20:49	07:23 19:39	08:13 08:47-08:54/7 18:32	08:08 15:39-16:08/29 16:40	08:43 16:30
23	05:46 21:42	06:34 20:47	07:24 19:36	08:15 08:45-08:56/11 18:30	08:09 15:39-16:06/27 16:39	08:44 16:30
24	05:48 21:41	06:36 20:45	07:26 19:34	08:17 08:44-08:57/13 18:28	08:11 15:40-16:05/25 16:38	08:44 16:31
25	05:49 21:39	06:37 20:43	07:28 19:32	07:19 07:45-07:57/12 17:26	08:13 15:41-16:05/24 16:37	08:44 16:32
26	05:51 21:38	06:39 20:40	07:29 19:29	07:20 07:47-07:58/11 17:24	08:14 15:42-16:04/22 16:36	08:45 16:32
27	05:52 21:37	06:41 20:38	07:31 19:27	07:22 07:49-07:58/9 17:22	08:16 15:42-16:02/20 16:35	08:45 16:33
28	05:53 21:35	06:42 20:36	07:33 19:25	07:24 07:51-07:58/7 17:20	08:17 15:43-16:01/18 16:34	08:45 16:34
29	05:55 21:34	06:44 20:34	07:34 19:23	07:26 07:53-07:58/5 17:18	08:19 15:44-16:01/17 16:33	08:45 16:35
30	05:56 21:32	06:46 20:32	07:36 19:20	07:27 07:55-07:57/2 17:16 16:17-16:27/10	08:20 15:45-15:59/14 16:33	08:45 16:36
31	05:58 21:30	06:47 20:29	07:37 17:14	07:29 16:15-16:29/14		08:46 16:36
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	389	0	0	257	870	50

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 7 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (25)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 16:38	08:19 17:25	07:26 07:49-08:16/27 18:17	07:16 20:10	06:11 06:56-07:48/52 21:01	05:26 21:47
2	08:46 16:39	08:17 17:27	07:24 07:47-08:16/29 18:19	07:13 20:12	06:09 06:57-07:49/52 21:03	05:25 21:48
3	08:45 16:40	08:16 17:29	07:22 07:45-08:17/32 18:20	07:11 20:14	06:07 06:57-07:48/51 21:04	05:24 21:49
4	08:45 16:41	08:14 17:31	07:19 07:45-08:17/32 18:22	07:09 20:16	06:05 06:57-07:47/50 21:06	05:24 21:50
5	08:45 16:42	08:13 17:33	07:17 07:44-08:16/32 18:24	07:06 20:17	06:04 06:57-07:47/50 21:08	05:23 21:51
6	08:45 16:43	08:11 17:35	07:15 07:44-08:16/32 18:26	07:04 20:19	06:02 06:58-07:47/49 21:09	05:22 21:52
7	08:44 16:45	08:09 17:36	07:13 07:44-08:16/32 18:27	07:02 20:21	06:00 06:58-07:46/48 21:11	05:22 21:53
8	08:44 16:46	08:08 17:38	07:10 07:44-08:16/32 18:29	07:00 20:22	05:58 06:58-07:45/47 21:13	05:21 21:54
9	08:43 16:47	08:06 17:40	07:08 07:44-08:15/31 18:31	06:57 20:24	05:56 06:59-07:45/46 21:14	05:21 21:54
10	08:43 16:49	08:04 17:42	07:06 07:45-08:14/29 18:33	06:55 20:26	05:55 06:59-07:44/45 21:16	05:20 21:55
11	08:42 16:50	08:02 17:44	07:04 07:46-08:13/27 18:34	06:53 07:22-07:33/11 20:27	05:53 07:00-07:43/43 21:17	05:20 21:56
12	08:42 16:52	08:00 17:46	07:01 07:46-08:11/25 18:36	06:51 07:17-07:38/21 20:29	05:51 07:01-07:42/41 21:19	05:20 21:57
13	08:41 16:53	07:58 17:48	06:59 07:47-08:09/22 18:38	06:48 07:13-07:39/26 20:31	05:50 07:02-07:41/39 21:21	05:19 21:57
14	08:40 16:55	07:57 17:49	06:57 07:49-08:07/18 18:40	06:46 07:11-07:41/30 20:32	05:48 07:02-07:40/38 21:22	05:19 21:58
15	08:39 16:56	07:55 17:51	06:55 07:51-08:03/12 18:41	06:44 07:09-07:43/34 20:34	05:47 07:03-07:39/36 21:24	05:19 21:58
16	08:39 16:58	07:53 17:53	06:52 18:15-18:18/3 18:43	06:42 07:07-07:44/37 20:36	05:45 07:04-07:37/33 21:25	05:19 21:59
17	08:38 16:59	07:51 17:55	06:50 18:14-18:20/6 18:45	06:40 07:06-07:45/39 20:38	05:44 07:05-07:37/32 21:27	05:19 21:59
18	08:37 17:01	07:49 17:57	06:48 18:12-18:21/9 18:47	06:38 07:04-07:46/42 20:39	05:42 07:07-07:36/29 21:28	05:19 22:00
19	08:36 17:03	07:47 17:59	06:45 18:12-18:23/11 18:48	06:35 07:03-07:47/44 20:41	05:41 07:07-07:34/27 21:30	05:19 22:00
20	08:35 17:04	07:45 18:00	06:43 18:12-18:25/13 18:50	06:33 07:02-07:48/46 20:43	05:39 07:09-07:32/23 21:31	05:19 22:01
21	08:34 17:06	07:43 18:02	06:41 18:11-18:26/15 18:52	06:31 07:01-07:48/47 20:44	05:38 07:11-07:31/20 21:32	05:19 22:01
22	08:32 17:08	07:41 18:04	06:39 18:12-18:28/16 18:53	06:29 07:00-07:49/49 20:46	05:37 07:13-07:29/16 21:34	05:19 22:01
23	08:31 17:09	07:39 08:02-08:06/4 18:06	06:36 18:13-18:28/15 18:55	06:27 07:00-07:49/49 20:48	05:36 07:16-07:26/10 21:35	05:19 22:01
24	08:30 17:11	07:37 08:00-08:09/9 18:08	06:34 18:13-18:26/13 18:57	06:25 06:59-07:49/50 20:49	05:34 21:37	05:20 22:01
25	08:29 17:13	07:34 07:58-08:12/14 18:10	06:32 18:16-18:23/7 18:59	06:23 06:58-07:49/51 20:51	05:33 21:38	05:20 22:01
26	08:28 17:15	07:32 07:56-08:13/17 18:11	06:29 19:00	06:21 06:58-07:49/51 20:53	05:32 21:39	05:20 22:01
27	08:26 17:16	07:30 07:54-08:15/21 18:13	06:27 19:02	06:19 06:57-07:49/52 20:54	05:31 21:41	05:21 22:01
28	08:25 17:18	07:28 07:52-08:16/24 18:15	06:25 19:04	06:17 06:57-07:49/52 20:56	05:30 21:42	05:21 22:01
29	08:23 17:20		07:22 20:05	06:15 06:57-07:49/52 20:58	05:29 21:43	05:22 22:01
30	08:22 17:22		07:20 20:07	06:13 06:56-07:49/53 20:59	05:28 21:44	05:22 22:01
31	08:21 17:24		07:18 20:09		05:27 21:45	
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	0	89	520	836	877	0

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 7 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (25)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 22:01	05:59 07:11-07:53/42 21:29	06:49 07:21-07:32/11 20:27	07:38 08:26-08:50/24 19:18	07:31 17:12	08:22 16:32
2	05:24 22:00	06:01 07:10-07:54/44 21:27	06:50 20:25	07:39 08:24-08:50/26 19:16	07:33 17:10	08:23 16:31
3	05:24 22:00	06:02 07:09-07:54/45 21:26	06:52 20:23	07:41 08:23-08:51/28 19:13	07:35 17:08	08:25 16:31
4	05:25 21:59	06:04 07:08-07:54/46 21:24	06:54 20:20	07:43 08:22-08:52/30 19:11	07:36 17:07	08:26 16:30
5	05:26 21:59	06:06 07:08-07:55/47 21:22	06:55 20:18	07:44 08:21-08:52/31 19:09	07:38 17:05	08:27 16:30
6	05:27 21:58	06:07 07:07-07:55/48 21:20	06:57 20:16	07:46 08:20-08:52/32 19:07	07:40 17:03	08:29 16:29
7	05:28 21:58	06:09 07:07-07:56/49 21:19	06:59 20:14	07:48 08:20-08:52/32 19:04	07:42 17:02	08:30 16:29
8	05:29 21:57	06:10 07:06-07:56/50 21:17	07:00 20:11	07:49 08:20-08:52/32 19:02	07:44 17:00	08:31 16:29
9	05:30 21:57	06:12 07:06-07:57/51 21:15	07:02 20:09	07:51 08:19-08:51/32 19:00	07:45 16:58	08:32 16:28
10	05:31 21:56	06:13 07:05-07:57/52 21:13	07:03 20:07	07:53 08:19-08:51/32 18:58	07:47 16:57	08:33 16:28
11	05:32 21:55	06:15 07:06-07:57/51 21:11	07:05 20:04	07:54 08:20-08:51/31 18:55	07:49 16:55	08:34 16:28
12	05:33 21:54	06:17 07:05-07:57/52 21:09	07:07 20:02	07:56 08:22-08:50/28 18:53	07:51 16:54	08:35 16:28
13	05:34 21:53	06:18 07:05-07:57/52 21:07	07:08 20:00	07:58 08:23-08:48/25 18:51	07:52 16:52	08:36 16:28
14	05:35 21:52	06:20 07:04-07:56/52 21:05	07:10 19:57	07:59 08:25-08:47/22 18:49	07:54 16:51	08:37 16:28
15	05:36 21:52	06:21 07:05-07:57/52 21:03	07:11 19:55	08:01 08:27-08:46/19 18:47	07:56 16:49	08:38 16:28
16	05:37 21:50	06:23 07:04-07:56/52 21:01	07:13 19:53	08:03 08:29-08:45/16 18:44	07:58 16:48	08:39 10:07-10:12/5 16:28
17	05:39 21:49	06:25 07:05-07:56/51 20:59	07:15 19:50	08:05 08:31-08:43/12 18:42	07:59 16:46	08:40 10:07-10:14/7 16:28
18	05:40 21:48	06:26 07:04-07:55/51 20:57	07:16 19:04-19:10/6 19:48	08:06 08:32-08:40/8 18:40	08:01 16:45	08:41 10:06-10:14/8 16:28
19	05:41 21:47	06:28 07:05-07:55/50 20:55	07:18 19:01-19:13/12 19:46	08:08 18:38	08:03 16:44	08:41 10:07-10:15/8 16:29
20	05:42 07:28-07:33/5 21:46	06:29 07:04-07:54/50 20:53	07:20 18:59-19:13/14 19:43	08:10 18:36	08:04 16:43	08:42 10:07-10:16/9 16:29
21	05:44 07:24-07:37/13 21:45	06:31 07:05-07:53/48 20:51	07:21 18:58-19:14/16 19:41	08:12 18:34	08:06 16:41	08:43 10:07-10:16/9 16:29
22	05:45 07:22-07:41/19 21:44	06:33 07:05-07:52/47 20:49	07:23 18:57-19:12/15 19:39	08:13 18:32	08:08 16:40	08:43 10:08-10:17/9 16:30
23	05:46 07:20-07:42/22 21:42	06:34 07:06-07:51/45 20:47	07:24 18:56-19:09/13 19:36	08:15 18:30	08:09 16:39	08:44 10:08-10:17/9 16:30
24	05:48 07:19-07:44/25 21:41	06:36 07:07-07:51/44 20:45	07:26 18:56-19:07/11 19:34	08:17 18:28	08:11 16:38	08:44 10:09-10:17/8 16:31
25	05:49 07:17-07:45/28 21:40	06:37 07:07-07:49/42 20:43	07:28 18:56-19:05/9 19:32	07:19 17:26	08:13 16:37	08:44 10:10-10:18/8 16:32
26	05:51 07:16-07:47/31 21:38	06:39 07:09-07:48/39 20:40	07:29 18:55-19:02/7 19:30	07:20 17:24	08:14 16:36	08:45 10:11-10:18/7 16:32
27	05:52 07:15-07:48/33 21:37	06:41 07:09-07:46/37 20:38	07:31 18:56-19:00/4 19:27	07:22 17:22	08:16 16:35	08:45 10:12-10:17/5 16:33
28	05:53 07:14-07:48/34 21:35	06:42 07:11-07:45/34 20:36	07:33 18:56-18:57/1 19:25	07:24 17:20	08:17 16:34	08:45 10:14-10:16/2 16:34
29	05:55 07:13-07:50/37 21:34	06:44 07:12-07:42/30 20:34	07:34 08:30-08:46/16 19:23	07:26 17:18	08:19 16:34	08:45 16:35
30	05:56 07:12-07:51/39 21:32	06:46 07:14-07:40/26 20:32	07:36 08:28-08:48/20 19:20	07:27 17:16	08:20 16:33	08:46 16:36
31	05:58 07:12-07:52/40 21:31	06:47 07:16-07:36/20 20:29		07:29 17:14		08:46 16:36
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	326	1399	163	460	0	94

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 8 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (26)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 15:48-16:03/15 16:38	08:19 08:45-08:52/7 17:25	07:26 18:17	07:16 20:10	06:11 06:40-07:02/22 21:01	05:26 21:47
2	08:45 15:48-16:04/16 16:39	08:17 08:43-08:52/9 17:27	07:24 18:18	07:13 20:12	06:09 06:41-07:02/21 21:03	05:25 21:48
3	08:45 15:48-16:05/17 16:40	08:16 08:42-08:53/11 17:29	07:21 18:20	07:11 20:14	06:07 06:42-07:01/19 21:04	05:24 21:49
4	08:45 15:49-16:07/18 16:41	08:14 08:40-08:53/13 17:31	07:19 18:22	07:09 20:15	06:05 06:43-06:59/16 21:06	05:24 21:50
5	08:45 15:49-16:07/18 16:42	08:13 08:38-08:53/15 17:33	07:17 18:24	07:06 20:17	06:04 06:44-06:57/13 21:08	05:23 21:51
6	08:45 15:50-16:09/19 16:43	08:11 08:36-08:53/17 17:35	07:15 18:26	07:04 20:19	06:02 06:46-06:56/10 21:09	05:22 21:52
7	08:44 15:51-16:09/18 16:45	08:09 08:36-08:53/17 17:36	07:13 18:27	07:02 19:48-19:54/6 20:21	06:00 21:11	05:22 21:53
8	08:44 15:52-16:09/17 16:46	08:07 08:36-08:52/16 17:38	07:10 18:29	07:00 19:45-19:56/11 20:22	05:58 21:13	05:21 21:53
9	08:43 15:52-16:09/17 16:47	08:06 08:37-08:51/14 17:40	07:08 18:31	06:57 19:43-19:58/15 20:24	05:56 21:14	05:21 21:54
10	08:43 15:53-16:09/16 16:49	08:04 08:39-08:50/11 17:42	07:06 18:33	06:55 19:41-20:00/19 20:26	05:55 21:16	05:20 21:55
11	08:42 15:55-16:09/14 16:50	08:02 08:41-08:47/6 17:44	07:04 18:34	06:53 19:40-20:01/21 20:27	05:53 21:17	05:20 21:56
12	08:42 15:55-16:09/14 16:52	08:00 17:46	07:01 18:36	06:51 19:38-20:02/24 20:29	05:51 21:19	05:20 21:57
13	08:41 15:57-16:08/11 16:53	07:58 17:48	06:59 18:38	06:48 19:37-20:04/27 20:31	05:50 21:20	05:19 21:57
14	08:40 15:58-16:08/10 16:55	07:56 17:49	06:57 18:40	06:46 19:36-20:06/30 20:32	05:48 21:22	05:19 21:58
15	08:39 16:00-16:06/6 16:56	07:55 17:51	06:55 18:41	06:44 19:36-20:07/31 20:34	05:47 21:24	05:19 21:58
16	08:38 16:58	07:53 17:53	06:52 18:43	06:42 19:36-20:09/33 20:36	05:45 21:25	05:19 21:59
17	08:38 16:59	07:51 17:55	06:50 18:45	06:40 19:35-20:09/34 20:37	05:44 21:27	05:19 21:59
18	08:37 17:01	07:49 17:57	06:48 18:47	06:38 19:35-20:08/33 20:39	05:42 21:28	05:19 22:00
19	08:36 17:03	07:47 17:59	06:45 18:48	06:35 19:35-20:08/33 20:41	05:41 21:30	05:19 22:00
20	08:35 17:04	07:45 18:00	06:43 18:50	06:33 06:57-07:01/4 20:43	05:39 21:31	05:19 22:00
21	08:34 17:06	07:43 18:02	06:41 18:52	06:31 06:55-07:03/8 20:44	05:38 21:32	05:19 22:01
22	08:32 17:08	07:41 18:04	06:39 18:53	06:29 06:53-07:03/10 20:46	05:37 21:34	05:19 22:01
23	08:31 17:09	07:39 18:06	06:36 18:55	06:27 06:51-07:04/13 20:48	05:36 21:35	05:19 22:01
24	08:30 17:11	07:36 18:08	06:34 18:57	06:25 06:49-07:05/16 20:49	05:34 21:37	05:20 22:01
25	08:29 17:13	07:34 18:10	06:32 18:58	06:23 06:47-07:05/18 20:51	05:33 21:38	05:20 22:01
26	08:27 17:15	07:32 18:11	06:29 19:00	06:21 06:45-07:05/20 20:53	05:32 21:39	05:20 22:01
27	08:26 17:16	07:30 18:13	06:27 19:02	06:19 06:43-07:05/22 20:54	05:31 21:41	05:21 22:01
28	08:25 17:18	07:28 18:15	06:25 19:04	06:17 06:41-07:04/23 20:56	05:30 21:42	05:21 22:01
29	08:23 17:20	07:26 18:16	06:23 19:05	06:15 06:40-07:04/24 20:57	05:29 21:43	05:22 22:01
30	08:22 08:48-08:50/2 17:22	07:24 18:17	06:21 19:06	06:13 06:40-07:03/23 20:58	05:28 21:44	05:22 22:01
31	08:20 08:47-08:51/4 17:24	07:22 18:18	06:19 19:07	06:11 06:39-07:03/23 20:59	05:27 21:45	05:21 22:01
Potential sun hours	260	278	367	416	485	498
Sum of minutes with flicker	232	136	0	744	101	0

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 8 - VESTAS V112-3.45 3450 112.0 !OI hub: 94,0 m (TOT: 150,0 m) (26)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December	
1	05:23 22:00	05:59 21:29	06:49 20:27	19:39-20:00/21 07:37 19:18	07:31 17:12	08:08-08:20/12 16:32	08:22 15:37-15:51/14
2	05:24 22:00	06:01 21:27	06:50 20:25	19:39-19:58/19 07:39 19:16	07:33 17:10	08:07-08:21/14 16:31	08:23 15:36-15:52/16
3	05:24 22:00	06:02 21:26	06:52 20:23	19:41-19:56/15 07:41 19:13	07:35 17:08	08:06-08:22/16 16:31	08:24 15:36-15:53/17
4	05:25 21:59	06:04 21:24	06:54 20:20	19:42-19:53/11 07:42 19:11	07:36 17:07	08:05-08:23/18 16:30	08:26 15:36-15:53/17
5	05:26 21:59	06:06 21:22	06:55 20:18	19:45-19:51/6 07:44 19:09	07:38 17:05	08:06-08:23/17 16:30	08:27 15:36-15:54/18
6	05:27 21:58	06:07 21:20	06:57 20:16	06:57 19:07	07:46 17:03	08:08-08:23/15 16:29	08:28 15:36-15:55/19
7	05:28 21:58	06:09 21:19	06:58 20:14	06:58 19:04	07:47 17:02	08:10-08:23/13 16:29	08:30 15:36-15:55/19
8	05:29 21:57	06:10 21:17	07:00 20:11	07:49 19:02	07:43 17:00	08:12-08:23/11 16:29	08:31 15:36-15:54/18
9	05:30 21:56	06:12 21:15	07:02 20:09	07:51 19:00	07:45 16:58	08:14-08:23/9 16:28	08:32 15:37-15:54/17
10	05:31 21:56	06:13 21:13	07:03 20:07	07:53 18:58	07:47 16:57	08:16-08:23/7 16:28	08:33 15:38-15:54/16
11	05:32 21:55	06:15 21:11	07:05 20:04	07:54 18:55	07:49 16:55	08:18-08:22/4 16:28	08:34 15:38-15:53/15
12	05:33 21:54	06:17 21:09	07:07 20:02	07:56 18:53	07:51 16:54	08:20-08:22/2 16:28	08:35 15:38-15:53/15
13	05:34 21:53	06:18 21:07	07:08 20:00	07:58 18:51	07:52 16:52	08:36 16:28	08:36 15:39-15:53/14
14	05:35 21:52	06:20 21:05	07:10 19:57	07:59 18:49	07:54 16:51	08:37 16:28	08:37 15:39-15:53/14
15	05:36 21:51	06:21 21:03	07:11 19:55	08:01 18:47	07:56 16:49	08:38 16:28	08:38 15:40-15:53/13
16	05:37 21:50	06:23 21:01	07:13 19:53	08:03 18:44	07:58 16:48	08:39 16:28	08:39 15:40-15:53/13
17	05:39 21:49	06:25 20:59	07:15 19:50	08:05 18:42	07:59 16:46	08:40 16:28	08:40 15:40-15:53/13
18	05:40 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 16:45	08:41 16:28	08:41 15:41-15:53/12
19	05:41 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 16:44	08:41 16:29	08:41 15:42-15:54/12
20	05:42 21:46	06:29 20:53	07:19 19:43	08:10 18:36	08:04 16:43	08:42 16:29	08:42 15:41-15:53/12
21	05:44 21:45	06:31 20:51	07:21 19:41	08:11 18:34	08:06 16:41	08:43 16:29	08:43 15:42-15:54/12
22	05:45 21:43	06:33 20:49	07:23 19:39	08:13 18:32	08:08 16:40	08:43 16:30	08:43 15:42-15:54/12
23	05:46 21:42	06:34 20:47	07:24 19:36	08:15 18:30	08:09 16:39	08:44 16:30	08:44 15:43-15:55/12
24	05:48 21:41	06:36 20:45	07:26 19:34	08:17 18:28	08:11 16:38	08:44 16:31	08:44 15:43-15:56/13
25	05:49 21:39	06:37 20:43	07:28 19:32	07:18 17:26	08:13 16:37	08:44 16:32	08:44 15:45-15:57/12
26	05:51 21:38	06:39 20:40	07:29 19:29	07:20 17:24	08:14 16:36	08:45 16:32	08:45 15:45-15:57/12
27	05:52 21:37	06:41 20:38	07:31 19:27	07:22 17:22	08:16 16:35	15:39-15:45/6 16:33	08:45 15:45-15:58/13
28	05:53 21:35	06:42 20:36	07:33 19:25	07:24 17:20	08:17 16:34	15:38-15:48/10 16:34	08:45 15:46-15:59/13
29	05:55 21:34	06:44 20:34	07:34 19:23	07:26 17:18	08:19 16:34	15:38-15:49/11 16:35	08:45 15:46-16:00/14
30	05:56 21:32	06:46 20:32	07:36 19:20	07:27 17:16	08:20 16:33	15:37-15:50/13 16:36	08:45 15:46-16:01/15
31	05:58 21:30	06:47 20:29		07:29 17:14	08:10-08:17/7 17:14		08:46 15:47-16:02/15
Potential sun hours	501	453	381	332	267	244	
Sum of minutes with flicker	0	787	72	7	178	447	

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/Minutes with flicker
 First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

Project:

Windpark Oss (Elzenburg)

Licensed user:

Antea Group
Beneluxweg 125 Postbus 40
NL-4900 AA OOSTERHOUT
0513 634045
Koen Wilmer / koen.wilmer@anteagroup.com
Calculated:
7-2-2017 14:42/3.1.597

SHADOW - Calendar per WTG

Calculation: 1A Elz Hoed en Schil Vestas ReceptorsWTG: 9 - VESTAS V112-3.45 3450 112.0 !0! hub: 94,0 m (TOT: 150,0 m) (27)
Sunshine probability S (Average daily sunshine hours) [DE BILT]

Assumptions for shadow calculations

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
547 684 671 437 476 753 614 1.051 1.275 848 604 448 8.408
Idle start wind speed: Cut in wind speed from power curve

Table with columns for months (January to December) and rows for days (1 to 31). Each cell contains a time range (hh:mm) representing shadow periods. Summary rows at the bottom show 'Potential sun hours' and 'Sum of minutes with flicker' for each month.

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/Minutes with flicker



SHADOW - Calendar per WTG

Calculation: 1A Elz Hoed en Schil Vestas Receptors WTG: 10 - VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (28)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 09:17-09:29/12 16:38	08:19 09:19-09:21/2 17:25	07:26 18:17	07:16 20:10	06:11 21:01	05:26 06:03-06:40/37 21:47
2	08:45 09:17-09:29/12 16:39	08:17 17:27	07:24 18:19	07:13 20:12	06:09 21:03	05:25 06:02-06:40/38 21:48
3	08:45 09:16-09:29/13 16:40	08:16 17:29	07:21 18:20	07:11 20:14	06:07 21:04	05:24 06:02-06:40/38 21:49
4	08:45 09:16-09:30/14 16:41	08:14 17:31	07:19 18:22	07:09 20:15	06:05 21:06	05:24 06:03-06:40/37 21:50
5	08:45 09:16-09:31/15 16:42	08:13 17:33	07:17 18:24	07:06 19:48-19:51/3 20:17	06:04 21:08	05:23 06:03-06:40/37 21:51
6	08:45 09:15-09:30/15 16:44	08:11 17:35	07:15 18:26	07:04 19:46-19:53/7 20:19	06:02 21:09	05:22 06:03-06:41/38 21:52
7	08:44 09:15-09:31/16 16:45	08:09 17:36	07:13 18:27	07:02 19:44-19:54/10 20:21	06:00 21:11	05:22 06:03-06:40/37 21:53
8	08:44 09:14-09:31/17 16:46 16:11-16:12/1	08:07 17:38	07:10 18:29	07:00 19:43-19:56/13 20:22	05:58 21:13	05:21 06:04-06:41/37 21:54
9	08:43 09:13-09:31/18 16:47 16:11-16:13/2	08:06 17:40	07:08 18:31	06:57 19:43-19:58/15 20:24	05:56 21:14	05:21 06:03-06:40/37 21:54
10	08:43 09:13-09:32/19 16:49 16:11-16:14/3	08:04 17:42	07:06 18:33	06:55 19:42-20:00/18 20:26	05:55 21:16	05:20 06:04-06:41/37 21:55
11	08:42 09:12-09:32/20 16:50 16:11-16:17/6	08:02 17:44	07:04 18:34	06:53 19:42-20:01/19 20:27	05:53 06:19-06:21/2 21:17	05:20 06:05-06:41/36 21:56
12	08:42 09:11-09:31/20 16:52 16:11-16:18/7	08:00 17:46	07:01 18:36	06:51 19:41-20:02/21 20:29	05:51 06:17-06:26/9 21:19	05:20 06:04-06:41/37 21:57
13	08:41 09:10-09:31/21 16:53 16:11-16:20/9	07:58 17:48	06:59 18:38	06:48 19:41-20:03/22 20:31	05:50 06:16-06:29/13 21:20	05:19 06:05-06:41/36 21:57
14	08:40 09:09-09:31/22 16:55 16:11-16:21/10	07:57 17:49	06:57 18:40	06:46 19:42-20:02/20 20:32	05:48 06:14-06:30/16 21:22	05:19 06:05-06:41/36 21:58
15	08:39 09:08-09:30/22 16:56 16:11-16:23/12	07:55 17:51	06:55 18:41	06:44 19:43-20:01/18 20:34	05:47 06:13-06:31/18 21:24	05:19 06:05-06:42/37 21:58
16	08:38 09:07-09:29/22 16:58 16:12-16:25/13	07:53 17:53	06:52 18:43	06:42 19:44-20:00/16 20:36	05:45 06:11-06:32/21 21:25	05:19 06:06-06:42/36 21:59
17	08:38 09:06-09:29/23 16:59 16:12-16:26/14	07:51 17:55	06:50 18:45	06:40 19:45-19:58/13 20:38	05:44 06:10-06:33/23 21:27	05:19 06:06-06:42/36 21:59
18	08:37 09:05-09:29/24 17:01 16:13-16:28/15	07:49 17:57	06:48 18:47	06:38 19:48-19:55/7 20:39	05:42 06:09-06:34/25 21:28	05:19 06:06-06:42/36 22:00
19	08:36 09:04-09:30/26 17:03 16:13-16:30/17	07:47 17:59	06:45 18:48	06:35 20:41	05:41 06:07-06:34/27 21:30	05:19 06:06-06:42/36 22:00
20	08:35 09:05-09:31/26 17:04 16:14-16:32/18	07:45 18:00	06:43 18:50	06:33 20:43	05:39 06:06-06:35/29 21:31	05:19 06:06-06:42/36 22:00
21	08:34 09:04-09:30/26 17:06 16:14-16:32/18	07:43 18:02	06:41 18:52	06:31 20:44	05:38 06:05-06:36/31 21:32	05:19 06:06-06:42/36 22:01
22	08:32 09:05-09:31/26 17:08 16:15-16:32/17	07:41 18:04	06:39 18:53	06:29 20:46	05:37 06:04-06:37/33 21:34	05:19 06:07-06:43/36 22:01
23	08:31 09:06-09:31/25 17:09 16:17-16:32/15	07:39 18:06	06:36 18:55	06:27 20:48	05:36 06:03-06:37/34 21:35	05:19 06:07-06:43/36 22:01
24	08:30 09:06-09:30/24 17:11 16:17-16:31/14	07:36 18:08	06:34 18:57	06:25 20:49	05:34 06:03-06:38/35 21:37	05:20 06:07-06:43/36 22:01
25	08:29 09:07-09:31/24 17:13 16:19-16:30/11	07:34 18:10	06:32 18:59	06:23 20:51	05:33 06:02-06:38/36 21:38	05:20 06:08-06:44/36 22:01
26	08:27 09:08-09:31/23 17:15 16:21-16:28/7	07:32 18:11	06:29 19:00	06:21 20:53	05:32 06:02-06:38/36 21:39	05:20 06:08-06:44/36 22:01
27	08:26 09:08-09:30/22 17:16	07:30 18:13	06:27 19:02	06:19 20:54	05:31 06:02-06:39/37 21:41	05:21 06:08-06:45/37 22:01
28	08:25 09:10-09:30/20 17:18	07:28 18:15	06:25 19:04	06:17 20:56	05:30 06:02-06:39/37 21:42	05:21 06:08-06:44/36 22:01
29	08:23 09:11-09:28/17 17:20	07:22 18:05	07:22 20:05	06:15 20:58	05:29 06:02-06:39/37 21:43	05:22 06:09-06:45/36 22:01
30	08:22 09:12-09:27/15 17:22	07:20 18:07	07:20 20:07	06:13 20:59	05:28 06:02-06:39/37 21:44	05:22 06:08-06:45/37 22:01
31	08:20 09:15-09:25/10 17:24	07:18 18:09	07:18 20:09	06:11 20:59	05:27 06:02-06:39/37 21:45	05:22 06:08-06:45/37 22:01
Potential sun hours	260	278	367	416	485	498
Sum of minutes with flicker	818	2	0	202	573	1097

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: 1A Elz Hoed en Schil Vestas ReceptorsWTG: 10 - VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (28)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 06:09-06:45/36 22:00	05:59 06:28-06:35/7 21:29	06:49 19:41-20:00/19 20:27	07:38 19:18	07:31 17:12	08:22 08:54-09:14/20 16:32 15:53-15:59/6
2	05:24 06:08-06:45/37 22:00	06:01 21:27	06:50 19:40-19:58/18 20:25	07:39 19:16	07:33 17:10	08:23 08:55-09:14/19 16:31 15:54-15:58/4
3	05:25 06:09-06:46/37 22:00	06:02 21:26	06:52 19:41-19:56/15 20:23	07:41 19:13	07:35 17:08	08:25 08:57-09:15/18 16:31 15:55-15:57/2
4	05:25 06:09-06:46/37 21:59	06:04 21:24	06:54 19:40-19:53/13 20:20	07:42 19:11	07:36 17:07	08:26 08:58-09:15/17 16:30 15:55-15:56/1
5	05:26 06:09-06:47/38 21:59	06:06 21:22	06:55 19:41-19:51/10 20:18	07:44 19:09	07:38 17:05	08:27 09:00-09:16/16 16:30
6	05:27 06:09-06:46/37 21:58	06:07 21:20	06:57 19:41-19:48/7 20:16	07:46 19:07	07:40 17:03	08:28 09:01-09:17/16 16:29
7	05:28 06:09-06:46/37 21:58	06:09 21:19	06:59 19:43-19:47/4 20:14	07:48 19:04	07:42 17:02	08:30 09:02-09:17/15 16:29
8	05:29 06:09-06:47/38 21:57	06:10 21:17	07:00 20:11	07:49 19:02	07:43 17:00	08:31 09:04-09:18/14 16:29
9	05:30 06:10-06:47/37 21:57	06:12 21:15	07:02 20:09	07:51 19:00	07:45 16:58	08:32 09:05-09:18/13 16:28
10	05:31 06:10-06:47/37 21:56	06:13 21:13	07:03 20:07	07:53 18:58	07:47 08:49-08:52/3 16:57	08:33 09:06-09:18/12 16:28
11	05:32 06:10-06:47/37 21:55	06:15 21:11	07:05 20:04	07:54 18:55	07:49 08:45-08:56/11 16:55	08:34 09:07-09:19/12 16:28
12	05:33 06:10-06:48/38 21:54	06:17 21:09	07:07 20:02	07:56 18:53	07:51 08:44-08:59/15 16:54	08:35 09:08-09:19/11 16:28
13	05:34 06:10-06:48/38 21:53	06:18 21:07	07:08 20:00	07:58 18:51	07:52 08:43-09:00/17 16:52	08:36 09:09-09:19/10 16:28
14	05:35 06:10-06:48/38 21:52	06:20 21:05	07:10 19:57	07:59 18:49	07:54 08:42-09:02/20 16:51	08:37 09:10-09:20/10 16:28
15	05:36 06:11-06:47/36 21:51	06:21 21:03	07:11 19:55	08:01 18:47	07:56 08:41-09:03/22 16:49	08:38 09:11-09:20/9 16:28
16	05:37 06:11-06:47/36 21:50	06:23 21:01	07:13 19:53	08:03 18:44	07:58 08:41-09:04/23 15:55-16:02/7	08:39 09:12-09:21/9 16:28
17	05:39 06:11-06:47/36 21:49	06:25 20:59	07:15 19:50	08:05 18:42	07:59 08:41-09:05/24 16:46 15:52-16:03/11	08:40 09:13-09:21/8 16:28
18	05:40 06:12-06:48/36 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 08:40-09:04/24 16:45 15:51-16:05/14	08:41 09:13-09:21/8 16:28
19	05:41 06:12-06:47/35 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 08:40-09:05/25 16:44 15:51-16:06/15	08:41 09:14-09:22/8 16:29
20	05:42 06:12-06:47/35 21:46	06:29 20:53	07:20 19:43	08:10 18:36	08:04 08:40-09:06/26 16:43 15:50-16:07/17	08:42 09:15-09:23/8 16:29
21	05:44 06:13-06:46/33 21:45	06:31 20:51	07:21 19:41	08:11 18:34	08:06 08:40-09:06/26 16:41 15:50-16:08/18	08:43 09:15-09:23/8 16:29
22	05:45 06:15-06:47/32 21:43	06:33 20:49	07:23 19:39	08:13 18:32	08:08 08:41-09:07/26 16:40 15:50-16:08/18	08:43 09:16-09:24/8 16:30
23	05:46 06:16-06:46/30 21:42	06:34 20:47	07:24 19:36	08:15 18:30	08:09 08:40-09:06/26 16:39 15:49-16:06/17	08:44 09:16-09:24/8 16:30
24	05:48 06:17-06:45/28 21:41	06:36 20:45	07:26 19:34	08:17 18:28	08:11 08:42-09:06/24 16:38 15:50-16:05/15	08:44 09:16-09:24/8 16:31
25	05:49 06:18-06:44/26 21:39	06:37 19:50-19:58/8 20:43	07:28 19:32	07:19 17:26	08:13 08:44-09:07/23 16:37 15:50-16:05/15	08:44 09:17-09:25/8 16:32
26	05:51 06:20-06:44/24 21:38	06:39 19:47-20:00/13 20:40	07:29 19:30	07:20 17:24	08:14 08:46-09:08/22 16:36 15:51-16:04/13	08:45 09:17-09:25/8 16:32
27	05:52 06:21-06:43/22 21:37	06:41 19:45-20:02/17 20:38	07:31 19:27	07:22 17:22	08:16 08:47-09:09/22 16:35 15:51-16:02/11	08:45 09:17-09:26/9 16:33
28	05:53 06:23-06:43/20 21:35	06:42 19:44-20:03/19 20:36	07:33 19:25	07:24 17:20	08:17 08:49-09:11/22 16:34 15:51-16:01/10	08:45 09:17-09:26/9 16:34
29	05:55 06:24-06:41/17 21:34	06:44 19:43-20:03/20 20:34	07:34 19:23	07:26 17:18	08:19 08:51-09:12/21 16:34 15:52-16:01/9	08:45 09:17-09:27/10 16:35
30	05:56 06:25-06:39/14 21:32	06:46 19:42-20:04/22 20:32	07:36 19:20	07:27 17:16	08:20 08:52-09:13/21 16:33 15:52-15:59/7	08:45 09:17-09:27/10 16:36
31	05:58 06:27-06:38/11 21:30	06:47 19:41-20:02/21 20:29		07:29 17:14		08:46 09:17-09:28/11 16:37
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	993	127	86	0	640	363

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 11 - VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (29)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 16:38	08:19 08:45-08:49/4 17:25	07:26 07:57-08:25/28 18:17	07:16 20:10	06:11 21:01	05:26 21:47
2	08:45 16:39	08:17 08:43-08:50/7 17:27	07:24 07:57-08:24/27 18:19	07:13 20:12	06:09 21:03	05:25 21:48
3	08:45 16:40	08:16 08:42-08:51/9 17:29	07:21 07:58-08:23/25 18:20	07:11 20:14	06:07 21:04	05:24 21:49
4	08:45 16:41	08:14 08:40-08:52/12 17:31	07:19 07:59-08:22/23 18:22	07:09 20:15	06:05 21:06	05:24 21:50
5	08:45 16:42	08:13 08:38-08:52/14 17:33	07:17 08:00-08:20/20 18:24	07:06 20:17	06:04 21:08	05:23 21:51
6	08:45 16:43	08:11 08:36-08:52/16 17:35	07:15 08:02-08:18/16 18:26	07:04 20:19	06:02 21:09	05:22 21:52
7	08:44 16:45	08:09 17:03-17:07/4 17:36 08:35-08:53/18	07:13 08:04-08:15/11 18:27	07:02 20:21	06:00 20:40-20:42/2 21:11	05:22 21:53
8	08:44 16:46	08:07 17:03-17:10/7 17:38 08:33-08:53/20	07:10 18:29	07:00 20:22	05:58 20:39-20:43/4 21:13	05:21 21:54
9	08:43 16:47	08:06 17:02-17:12/10 17:40 08:33-08:52/19	07:08 18:31	06:57 20:24	05:56 20:39-20:45/6 21:14	05:21 21:54
10	08:43 16:49	08:04 17:02-17:14/12 17:42 08:33-08:51/18	07:06 18:33	06:55 20:26	05:55 20:38-20:46/8 21:16	05:20 21:55
11	08:42 16:50	08:02 17:01-17:15/14 17:44 08:34-08:50/16	07:04 18:34	06:53 20:27	05:53 20:38-20:48/10 21:17	05:20 21:56
12	08:42 16:52	08:00 17:01-17:17/16 17:46 08:35-08:49/14	07:01 18:36	06:51 20:29	05:51 20:37-20:49/12 21:19	05:20 21:57
13	08:41 16:53	07:58 17:01-17:19/18 17:48 08:37-08:47/10	06:59 18:38	06:48 20:31	05:50 20:37-20:51/14 21:20	05:19 21:57
14	08:40 16:55	07:57 17:01-17:21/20 17:49	06:57 18:40	06:46 20:32	05:48 20:36-20:52/16 21:22	05:19 21:58
15	08:39 16:56	07:55 17:01-17:23/22 17:51	06:55 18:41	06:44 20:34	05:47 20:37-20:54/17 21:24	05:19 21:58
16	08:38 16:58	07:53 17:02-17:25/23 17:53	06:52 18:43	06:42 20:36	05:45 20:36-20:54/18 21:25	05:19 21:59
17	08:38 16:59	07:51 08:15-08:17/2 17:55 17:03-17:27/24	06:50 18:45	06:40 20:38	05:44 20:37-20:56/19 21:27	05:19 21:59
18	08:37 17:01	07:49 08:13-08:20/7 17:57 17:04-17:29/25	06:48 18:47	06:38 20:39	05:42 20:37-20:58/21 21:28	05:19 22:00
19	08:36 17:03	07:47 08:11-08:22/11 17:59 17:05-17:32/27	06:45 18:48	06:35 20:41	05:41 20:37-20:57/20 21:30	05:19 22:00
20	08:35 17:04	07:45 08:09-08:23/14 17:18-17:33/15 18:00 17:08-17:17/9	06:43 18:50	06:33 20:43	05:39 20:38-20:57/19 21:31	05:19 22:00
21	08:34 17:06	07:43 08:07-08:24/17 18:02 17:19-17:32/13	06:41 18:52	06:31 20:44	05:38 20:39-20:56/17 21:32	05:19 22:01
22	08:32 17:08	07:41 08:05-08:25/20 18:04 17:20-17:29/9	06:39 18:53	06:29 20:46	05:37 20:40-20:56/16 21:34	05:19 22:01
23	08:31 17:09	07:39 08:02-08:25/23 18:06	06:36 18:55	06:27 20:48	05:36 20:41-20:56/15 21:35	05:19 22:01
24	08:30 17:11	07:36 08:00-08:26/26 18:08	06:34 18:57	06:25 20:49	05:34 20:42-20:55/13 21:37	05:20 22:01
25	08:29 17:13	07:34 07:58-08:26/28 18:10	06:32 18:59	06:23 20:51	05:33 20:43-20:54/11 21:38	05:20 22:01
26	08:28 17:15	07:32 07:57-08:26/29 18:11	06:29 19:00	06:21 20:53	05:32 20:45-20:53/8 21:39	05:20 22:01
27	08:26 17:16	07:30 07:57-08:26/29 18:13	06:27 19:02	06:19 20:54	05:31 20:47-20:50/3 21:41	05:21 22:01
28	08:25 17:18	07:28 07:57-08:26/29 18:15	06:25 19:04	06:17 20:56	05:30 21:42	05:21 22:01
29	08:23 17:20		06:22 20:05	06:15 20:58	05:29 21:43	05:22 22:01
30	08:22 17:22		06:20 20:07	06:13 20:59	05:28 21:44	05:22 22:01
31	08:20 08:47-08:49/2 17:24		07:18 20:09		05:27 21:45	
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	2	680	150	0	269	0

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: 1A Elz Hoed en Schil Vestas Receptors WTG: 11 - VESTAS V112-3.45 3450 112.0 !O! hub: 94,0 m (TOT: 150,0 m) (29)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
547	684	671	437	476	753	614	1.051	1.275	848	604	448	8.408

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 22:00	05:59 20:47-20:59/12 21:29	06:49 20:27	07:38 19:18	07:31 16:31-16:43/12 17:12 08:03-08:21/18	08:22 16:32
2	05:24 22:00	06:01 20:47-20:57/10 21:27	06:50 20:25	07:39 19:16	07:33 16:32-16:41/9 17:10 08:02-08:22/20	08:23 16:31
3	05:24 22:00	06:02 20:48-20:56/8 21:26	06:52 20:23	07:41 19:13	07:35 16:33-16:39/6 17:08 08:03-08:22/19	08:25 16:31
4	05:25 21:59	06:04 20:48-20:54/6 21:24	06:54 20:20	07:42 19:11	07:36 16:33-16:36/3 17:07 08:05-08:23/18	08:26 16:30
5	05:26 21:59	06:06 20:50-20:53/3 21:22	06:55 20:18	07:44 19:09	07:38 08:07-08:23/16 17:05	08:27 16:30
6	05:27 21:58	06:07 20:50-20:51/1 21:20	06:57 20:16	07:46 08:43-08:49/6 19:07	07:40 08:08-08:22/14 17:03	08:28 16:29
7	05:28 21:58	06:09 21:19	06:59 20:14	07:48 08:39-08:53/14 19:04	07:42 08:10-08:22/12 17:02	08:30 16:29
8	05:29 21:57	06:10 21:17	07:00 20:11	07:49 08:37-08:55/18 19:02	07:43 08:12-08:21/9 17:00	08:31 16:29
9	05:30 21:57	06:12 21:15	07:02 20:09	07:51 08:34-08:56/22 19:00	07:45 08:14-08:21/7 16:58	08:32 16:28
10	05:31 21:56	06:13 21:13	07:03 20:07	07:53 08:33-08:57/24 18:58	07:47 08:16-08:20/4 16:57	08:33 16:28
11	05:32 21:55	06:15 21:11	07:05 20:04	07:54 08:32-08:58/26 18:55	07:49 08:18-08:19/1 16:55	08:34 16:28
12	05:33 21:54	06:17 21:09	07:07 20:02	07:56 08:31-08:58/27 18:53	07:51 16:54	08:35 16:28
13	05:34 21:53	06:18 21:07	07:08 20:00	07:58 08:30-08:58/28 18:51	07:52 16:52	08:36 16:28
14	05:35 21:52	06:20 21:05	07:10 19:57	07:59 08:29-08:58/29 18:49	07:54 16:51	08:37 16:28
15	05:36 21:51	06:21 21:03	07:11 19:55	08:01 08:29-08:58/29 18:47	07:56 16:49	08:38 16:28
16	05:37 21:50	06:23 21:01	07:13 19:53	08:03 08:29-08:58/29 18:44	07:58 16:48	08:39 16:28
17	05:39 20:54-21:00/6 21:49	06:25 20:59	07:15 19:50	08:05 08:31-08:58/27 18:42	07:59 16:46	08:40 16:28
18	05:40 20:53-21:03/10 21:48	06:26 20:57	07:16 19:48	08:06 08:32-08:57/25 18:40	08:01 16:45	08:41 16:28
19	05:41 20:52-21:04/12 21:47	06:28 20:55	07:18 19:46	08:08 08:34-08:56/22 18:38 17:54-17:58/4	08:03 16:44	08:41 16:29
20	05:42 20:51-21:05/14 21:46	06:29 20:53	07:19 19:43	08:10 08:36-08:55/19 18:36 17:51-18:01/10	08:04 16:43	08:42 16:29
21	05:44 20:50-21:05/15 21:45	06:31 20:51	07:21 19:41	08:11 08:38-08:54/16 17:49-18:03/14 18:34 17:41-17:44/3	08:06 16:41	08:43 16:29
22	05:45 20:49-21:06/17 21:44	06:33 20:49	07:23 19:39	08:13 08:40-08:53/13 18:32 17:37-18:03/26	08:08 16:40	08:43 16:30
23	05:46 20:49-21:07/18 21:42	06:34 20:47	07:24 19:36	08:15 08:42-08:52/10 18:30 17:34-18:00/26	08:09 16:39	08:44 16:30
24	05:48 20:48-21:07/19 21:41	06:36 20:45	07:26 19:34	08:17 08:43-08:49/6 18:28 17:33-17:58/25	08:11 16:38	08:44 16:31
25	05:49 20:47-21:08/21 21:39	06:37 20:43	07:28 19:32	07:19 07:45-07:46/1 17:26 16:32-16:56/24	08:13 16:37	08:44 16:32
26	05:51 20:48-21:08/20 21:38	06:39 20:40	07:29 19:30	07:20 16:31-16:54/23 17:24	08:14 16:36	08:45 16:32
27	05:52 20:47-21:06/19 21:37	06:41 20:38	07:31 19:27	07:22 16:31-16:52/21 17:22	08:16 16:35	08:45 16:33
28	05:53 20:47-21:04/17 21:35	06:42 20:36	07:33 19:25	07:24 16:30-16:51/21 17:20 08:10-08:13/3	08:17 16:34	08:45 16:34
29	05:55 20:47-21:04/17 21:34	06:44 20:34	07:34 19:23	07:26 16:30-16:49/19 17:18 08:06-08:17/11	08:19 16:34	08:45 16:35
30	05:56 20:47-21:02/15 21:32	06:46 20:32	07:36 19:20	07:27 16:30-16:47/17 17:16 08:05-08:19/14	08:20 16:33	08:46 16:36
31	05:58 20:47-21:01/14 21:30	06:47 20:29	 17:14 08:04-08:20/16	 17:14 08:04-08:20/16	 16:33	08:46 16:36
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	234	40	0	682	168	0

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: 6B 3 x langs N329 Nordex Receptors WTG: 1 - NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (76)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 478 759 620 1.062 1.287 856 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 09:41-10:14/33 16:38	08:19 10:04-10:10/6 17:25 16:38-16:55/17	07:26 18:17	07:16 20:10	06:11 06:35-06:51/16 21:01	05:26 21:47
2	08:45 09:41-10:15/34 16:39	08:17 16:38-16:57/19 17:27	07:24 18:19	07:13 20:12	06:09 06:34-06:53/19 21:03	05:25 21:48
3	08:45 09:41-10:15/34 16:40	08:16 16:38-16:58/20 17:29	07:22 18:20	07:11 20:14	06:07 06:33-06:53/20 21:04	05:24 21:49
4	08:45 09:42-10:16/34 16:41	08:14 16:38-16:58/20 17:31	07:19 18:22	07:09 20:16	06:05 06:32-06:53/21 21:06	05:24 21:50
5	08:45 09:42-10:17/35 16:42	08:13 16:38-16:57/19 17:33	07:17 18:24	07:06 19:49-19:51/2 20:17	06:04 06:31-06:53/22 21:08	05:23 21:51
6	08:45 09:42-10:17/35 16:44	08:11 16:39-16:57/18 17:35	07:15 18:26	07:04 19:45-19:53/8 20:19	06:02 06:32-06:54/22 21:09	05:22 21:52
7	08:44 09:43-10:18/35 16:45	08:09 16:39-16:56/17 17:36	07:13 18:27	07:02 19:42-19:54/12 20:21	06:00 06:31-06:53/22 21:11	05:22 21:53
8	08:44 09:43-10:18/35 16:46	08:07 16:41-16:56/15 17:38	07:10 18:29	07:00 19:40-19:56/16 20:22	05:58 06:31-06:53/22 21:13	05:21 21:54
9	08:43 09:43-10:19/36 16:47	08:06 16:42-16:55/13 17:40	07:08 18:31	06:57 19:39-19:58/19 20:24	05:56 06:32-06:53/21 21:14	05:21 21:54
10	08:43 09:44-10:20/36 16:49	08:04 16:44-16:53/9 17:42	07:06 18:33	06:55 19:39-19:59/20 20:26	05:55 06:32-06:52/20 21:16	05:20 21:55
11	08:42 09:44-10:20/36 16:50	08:02 17:44 17:44	07:04 18:34	06:53 19:38-19:59/21 20:27	05:53 06:33-06:52/19 21:17	05:20 21:56
12	08:42 09:44-10:20/36 16:52	08:00 17:46 17:46	07:01 18:36	06:51 19:37-19:58/21 20:29	05:51 06:33-06:51/18 21:19	05:20 21:57
13	08:41 09:44-10:21/37 16:53	07:58 17:48 17:48	06:59 18:38	06:49 19:37-19:58/21 20:31	05:50 06:34-06:51/17 21:20	05:19 21:57
14	08:40 09:44-10:21/37 16:55	07:57 17:49 17:49	06:57 18:40	06:46 19:37-19:57/20 20:32	05:48 06:35-06:49/14 21:22	05:19 21:58
15	08:39 09:45-10:21/36 16:56	07:55 17:51 17:51	06:55 18:41	06:44 19:38-19:57/19 20:34	05:47 06:36-06:48/12 21:24	05:19 21:58
16	08:38 09:45-10:22/37 16:58	07:53 17:53 17:53	06:52 18:43	06:42 19:38-19:56/18 20:36	05:45 06:37-06:46/9 21:25	05:19 21:59
17	08:38 09:46-10:22/36 16:59	07:51 17:55 17:55	06:50 18:45	06:40 19:40-19:54/14 20:38	05:44 21:27	05:19 21:59
18	08:37 09:46-10:22/36 17:01	07:49 17:57 17:57	06:48 18:47	06:38 19:41-19:53/12 20:39	05:42 21:28	05:19 22:00
19	08:36 09:47-10:23/36 17:03	07:47 17:59 17:59	06:45 18:48	06:35 19:44-19:50/6 20:41	05:41 21:30	05:19 22:00
20	08:35 09:48-10:23/35 17:04	07:45 18:00 18:00	06:43 18:50	06:33 20:43	05:39 21:31	05:19 22:00
21	08:34 09:48-10:22/34 17:06	07:43 18:02 18:02	06:41 18:52	06:31 20:44	05:38 21:32	05:19 22:01
22	08:32 09:49-10:22/33 17:08	07:41 18:04 18:04	06:39 18:53	06:29 20:46	05:37 21:34	05:19 22:01
23	08:31 09:50-10:22/32 17:09	07:39 18:06 18:06	06:36 18:55	06:27 20:48	05:36 21:35	05:19 22:01
24	08:30 09:50-10:21/31 17:11	07:37 18:08 18:08	06:34 18:57	06:25 20:49	05:34 21:37	05:20 22:01
25	08:29 09:51-10:21/30 17:13	07:34 18:10 18:10	06:32 18:59	06:23 20:51	05:33 21:38	05:20 22:01
26	08:28 09:53-10:21/28 17:15	07:32 18:11 18:11	06:29 19:00	06:21 20:53	05:32 21:39	05:20 22:01
27	08:26 09:53-10:20/27 17:16	07:30 18:13 18:13	06:27 19:02	06:19 20:54	05:31 21:41	05:21 22:01
28	08:25 09:55-10:20/25 17:18	07:28 18:15 18:15	06:25 19:04	06:17 06:41-06:47/6 20:56	05:30 21:42	05:21 22:01
29	08:23 09:56-10:18/22 17:20	07:26 18:17 18:17	06:23 19:05	06:15 06:39-06:49/10 20:58	05:29 21:43	05:22 22:01
30	08:22 09:57-10:16/19 17:22	07:24 18:19 18:19	06:21 19:07	06:13 06:37-06:50/13 20:59	05:28 21:44	05:23 22:01
31	08:20 10:00-10:14/14 17:24	07:22 18:21 18:21	06:19 19:09	06:11 21:00	05:27 21:45	05:23 22:01
Potential sun hours	260	278	367	416	485	498
Sum of minutes with flicker	1050	173	0	258	294	0

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: 6B 3 x langs N329 Nordex Receptors WTG: 1 - NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (76)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 478 759 620 1.062 1.287 856 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 22:00	05:59 06:43-07:02/19 21:29	06:49 19:37-19:58/21 20:27	07:38 19:18	07:31 16:13-16:23/10 17:12	08:22 09:26-10:02/36 16:32
2	05:24 22:00	06:01 06:43-07:03/20 21:27	06:50 19:37-19:57/20 20:25	07:39 19:16	07:33 16:12-16:25/13 17:10	08:23 09:26-10:02/36 16:31
3	05:25 22:00	06:02 06:42-07:03/21 21:26	06:52 19:37-19:56/19 20:23	07:41 19:13	07:35 16:10-16:26/16 17:09	08:25 09:27-10:03/36 16:31
4	05:25 21:59	06:04 06:41-07:03/22 21:24	06:54 19:37-19:53/16 20:20	07:43 19:11	07:36 16:09-16:26/17 17:07	08:26 09:27-10:03/36 16:30
5	05:26 21:59	06:06 06:41-07:03/22 21:22	06:55 19:39-19:51/12 20:18	07:44 19:09	07:38 16:08-16:27/19 17:05	08:27 09:28-10:03/35 16:30
6	05:27 21:58	06:07 06:41-07:03/22 21:20	06:57 19:40-19:48/8 20:16	07:46 19:07	07:40 16:08-16:27/19 17:03	08:28 09:28-10:03/35 16:29
7	05:28 21:58	06:09 06:41-07:03/22 21:19	06:59 19:43-19:47/4 20:14	07:48 19:04	07:42 16:08-16:27/19 17:02	08:30 09:28-10:03/35 16:29
8	05:29 21:57	06:10 06:41-07:02/21 21:17	07:00 20:11	07:49 19:02	07:44 16:08-16:28/20 17:00	08:31 09:30-10:04/34 16:29
9	05:30 21:57	06:12 06:42-07:02/20 21:15	07:02 20:09	07:51 19:00	07:45 16:09-16:28/19 16:58	08:32 09:30-10:04/34 16:28
10	05:31 21:56	06:13 06:41-07:01/20 21:13	07:03 20:07	07:53 18:58	07:47 09:35-09:41/6 16:57 16:09-16:26/17	08:33 09:30-10:04/34 16:28
11	05:32 21:55	06:15 06:43-07:01/18 21:11	07:05 20:04	07:54 18:55	07:49 09:31-09:45/14 16:55 16:10-16:24/14	08:34 09:31-10:04/33 16:28
12	05:33 21:54	06:17 06:44-06:59/15 21:09	07:07 20:02	07:56 18:53	07:51 09:29-09:48/19 16:54 16:11-16:23/12	08:35 09:31-10:05/34 16:28
13	05:34 21:53	06:18 06:46-06:59/13 21:07	07:08 20:00	07:58 18:51	07:52 09:28-09:50/22 16:52 16:12-16:21/9	08:36 09:32-10:05/33 16:28
14	05:35 21:52	06:20 06:47-06:56/9 21:05	07:10 19:57	07:59 18:49	07:54 09:27-09:52/25 16:51 16:13-16:20/7	08:37 09:33-10:05/32 16:28
15	05:36 21:51	06:21 06:49-06:53/4 21:03	07:11 19:55	08:01 18:47	07:56 09:26-09:53/27 16:49 16:15-16:18/3	08:38 09:33-10:06/33 16:28
16	05:37 21:50	06:23 21:01	07:13 19:53	08:03 18:44	07:58 09:25-09:54/29 16:48	08:39 09:34-10:06/32 16:28
17	05:39 21:49	06:25 20:59	07:15 19:50	08:05 18:42	07:59 09:25-09:55/30 16:46	08:40 09:34-10:07/33 16:28
18	05:40 21:48	06:26 20:57	07:16 19:48	08:06 18:40	08:01 09:24-09:55/31 16:45	08:41 09:34-10:07/33 16:28
19	05:41 21:47	06:28 20:55	07:18 19:46	08:08 18:38	08:03 09:24-09:56/32 16:44	08:41 09:35-10:07/32 16:29
20	05:42 21:46	06:29 20:53	07:20 19:43	08:10 18:36	08:04 09:24-09:57/33 16:43	08:42 09:36-10:08/32 16:29
21	05:44 21:45	06:31 20:51	07:21 19:41	08:12 18:34	08:06 09:24-09:58/34 16:41	08:43 09:35-10:08/33 16:29
22	05:45 21:44	06:33 20:49	07:23 19:39	08:13 18:32	08:08 09:24-09:59/35 16:40	08:43 09:36-10:09/33 16:30
23	05:46 21:42	06:34 20:47	07:24 19:36	08:15 18:30	08:09 09:23-09:59/36 16:39	08:44 09:36-10:09/33 16:30
24	05:48 21:41	06:36 19:46-19:53/7 20:45	07:26 19:34	08:17 18:28	08:11 09:23-09:59/36 16:38	08:44 09:37-10:09/32 16:31
25	05:49 21:39	06:38 19:44-19:56/12 20:43	07:28 19:32	07:19 17:26	08:13 09:24-10:00/36 16:37	08:44 09:38-10:10/32 16:32
26	05:51 21:38	06:39 19:41-19:56/15 20:40	07:29 19:30	07:20 17:24	08:14 09:24-10:01/37 16:36	08:45 09:38-10:11/33 16:32
27	05:52 06:50-06:55/5 21:37	06:41 19:40-19:58/18 20:38	07:31 19:27	07:22 17:22	08:16 09:24-10:00/36 16:35	08:45 09:38-10:11/33 16:33
28	05:53 06:48-06:58/10 21:35	06:42 19:40-19:59/19 20:36	07:33 19:25	07:24 17:20	08:17 09:24-10:01/37 16:34	08:45 09:39-10:12/33 16:34
29	05:55 06:46-06:59/13 21:34	06:44 19:38-19:58/20 20:34	07:34 19:23	07:26 17:18	08:19 09:25-10:02/37 16:34	08:45 09:39-10:12/33 16:35
30	05:56 06:45-07:00/15 21:32	06:46 19:38-19:59/21 20:32	07:36 19:20	07:27 17:16	08:20 09:25-10:02/37 16:33	08:46 09:40-10:13/33 16:36
31	05:58 06:44-07:01/17 21:30	06:47 19:37-19:58/21 20:29		07:29 16:17-16:20/3 17:14		08:46 09:40-10:13/33 16:37
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	60	401	100	3	843	1039

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: 6B 3 x langs N329 Nordex Receptors WTG: 2 - NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (77)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 478 759 620 1.062 1.287 856 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 16:38	08:19 17:25	07:26 17:15-17:46/31 18:17	07:16 20:10	06:11 21:01	05:26 20:40-21:02/22 21:47
2	08:45 16:39	08:17 17:27	07:24 08:02-08:13/11 18:19 17:15-17:46/31	07:13 20:12	06:09 21:03	05:25 20:41-21:02/21 21:48
3	08:45 16:40	08:16 17:29	07:22 07:59-08:17/18 18:20 17:16-17:45/29	07:11 20:14	06:07 21:04	05:24 20:41-21:02/21 21:49
4	08:45 16:41	08:14 17:31	07:19 07:56-08:19/23 18:22 17:16-17:44/28	07:09 20:16	06:05 21:06	05:24 20:41-21:01/20 21:50
5	08:45 16:42	08:13 17:33	07:17 07:53-08:20/27 18:24 17:17-17:42/25	07:06 20:17	06:04 21:08	05:23 20:42-21:02/20 21:51
6	08:45 16:43	08:11 17:35	07:15 07:52-08:21/29 18:26 17:19-17:40/21	07:04 20:19	06:02 21:09	05:22 20:42-21:01/19 21:52
7	08:44 16:45	08:09 08:38-08:49/11 17:36	07:13 07:51-08:23/32 18:27 17:22-17:31/9	07:02 20:21	06:00 21:11	05:22 20:43-21:01/18 21:53
8	08:44 16:46	08:07 08:36-08:51/15 17:38	07:10 07:49-08:23/34 18:29	07:00 20:22	05:58 21:13	05:21 20:44-21:02/18 21:54
9	08:43 16:47	08:06 08:34-08:52/18 17:40	07:08 07:48-08:24/36 18:31	06:57 20:24	05:56 21:14	05:21 20:44-21:01/17 21:54
10	08:43 16:49	08:04 08:33-08:53/20 17:42	07:06 07:48-08:24/36 18:33	06:55 20:26	05:55 21:16	05:20 20:45-21:01/16 21:55
11	08:42 16:50	08:02 08:32-08:54/22 17:44	07:04 07:47-08:25/38 18:34	06:53 20:27	05:53 21:17	05:20 20:46-21:01/15 21:56
12	08:42 16:52	08:00 08:31-08:55/24 17:46	07:01 07:46-08:24/38 18:36	06:51 20:29	05:51 21:19	05:20 20:45-21:01/16 21:57
13	08:41 16:53	07:58 08:30-08:56/26 17:48	06:59 07:46-08:24/38 18:38	06:48 20:31	05:50 21:20	05:19 20:46-21:01/15 21:57
14	08:40 16:55	07:57 08:30-08:56/26 17:49	06:57 07:46-08:24/38 18:40	06:46 20:32	05:48 20:45-20:52/7 21:22	05:19 20:47-21:01/14 21:58
15	08:39 16:56	07:55 08:30-08:56/26 17:51	06:55 07:45-08:23/38 18:41	06:44 20:34	05:47 20:44-20:54/10 21:24	05:19 20:47-21:01/14 21:58
16	08:38 16:58	07:53 08:29-08:56/27 17:53	06:52 07:45-08:23/38 18:43	06:42 20:36	05:45 20:42-20:54/12 21:25	05:19 20:48-21:01/13 21:59
17	08:38 16:59	07:51 08:30-08:56/26 17:55	06:50 07:45-08:23/38 18:45	06:40 20:38	05:44 20:41-20:56/15 21:27	05:19 20:48-21:01/13 21:59
18	08:37 17:01	07:49 08:30-08:56/26 17:57	06:48 07:45-08:21/36 18:47	06:38 20:39	05:42 20:41-20:58/17 21:28	05:19 20:49-21:01/12 22:00
19	08:36 17:03	07:47 08:30-08:56/26 17:59	06:45 07:46-08:20/34 18:48	06:35 20:41	05:41 20:40-20:58/18 21:30	05:19 20:49-21:01/12 22:00
20	08:35 17:04	07:45 17:24-17:33/9 18:00 08:31-08:55/24	06:43 07:47-08:19/32 18:50	06:33 20:43	05:39 20:39-21:00/21 21:31	05:19 20:49-21:01/12 22:00
21	08:34 17:06	07:43 17:21-17:36/15 18:02 08:32-08:54/22	06:41 07:47-08:17/30 18:52	06:31 20:44	05:38 20:39-21:01/22 21:32	05:19 20:49-21:01/12 22:01
22	08:32 17:08	07:41 17:19-17:37/18 18:04 08:33-08:53/20	06:39 07:48-08:16/28 18:53	06:29 20:46	05:37 20:39-21:01/22 21:34	05:19 20:50-21:02/12 22:01
23	08:31 17:09	07:39 17:18-17:39/21 18:06 08:33-08:50/17	06:36 07:50-08:14/24 18:55	06:27 20:48	05:36 20:39-21:02/23 21:35	05:19 20:50-21:02/12 22:01
24	08:30 17:11	07:36 17:17-17:41/24 18:08 08:36-08:48/12	06:34 07:51-08:12/21 18:57	06:25 20:49	05:34 20:39-21:02/23 21:37	05:20 20:50-21:02/12 22:01
25	08:29 17:13	07:34 17:16-17:43/27 18:10 08:40-08:44/4	06:32 07:53-08:08/15 18:59	06:23 20:51	05:33 20:39-21:02/23 21:38	05:20 20:50-21:03/13 22:01
26	08:28 17:15	07:32 17:16-17:45/29 18:11	06:29 19:00	06:21 20:53	05:32 20:39-21:03/24 21:39	05:20 20:50-21:03/13 22:01
27	08:26 17:16	07:30 17:16-17:47/31 18:13	06:27 19:02	06:19 20:54	05:31 20:39-21:03/24 21:41	05:21 20:49-21:03/14 22:01
28	08:25 17:18	07:28 17:15-17:46/31 18:15	06:25 19:04	06:17 20:56	05:30 20:39-21:03/24 21:42	05:21 20:50-21:04/14 22:01
29	08:23 17:20		07:22 20:05	06:15 20:58	05:29 20:39-21:02/23 21:43	05:22 20:49-21:04/15 22:01
30	08:22 17:22		07:20 20:07	06:13 20:59	05:28 20:40-21:02/22 21:44	05:22 20:50-21:05/15 22:01
31	08:20 17:24		07:18 20:09		05:27 20:40-21:02/22 21:45	
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	0	597	906	0	352	460

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: 6B 3 x langs N329 Nordex Receptors WTG: 2 - NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (77)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
 1,48 2,65 3,60 5,24 6,59 6,28 6,20 6,12 4,48 3,32 1,87 1,32

Operational time

N NNE ENE E ESE SSE S SSW WSW W WNW NNW Sum
 552 691 677 440 478 759 620 1.062 1.287 856 608 452 8.481
 Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 20:50-21:05/15 22:00	05:59 21:29	06:49 20:27	07:38 08:26-09:04/38 19:18	07:31 08:02-08:23/21 17:12	08:22 16:32
2	05:24 20:49-21:05/16 22:00	06:01 21:27	06:50 20:25	07:39 08:25-09:03/38 19:16	07:33 08:04-08:22/18 17:10	08:23 16:31
3	05:24 20:49-21:06/17 22:00	06:02 21:26	06:52 20:23	07:41 08:25-09:02/37 19:13	07:35 08:06-08:20/14 17:08	08:25 16:31
4	05:25 20:49-21:07/18 21:59	06:04 21:24	06:54 20:20	07:42 08:26-09:02/36 19:11	07:36 08:08-08:18/10 17:07	08:26 16:30
5	05:26 20:48-21:07/19 21:59	06:06 21:22	06:55 20:18	07:44 08:25-09:00/35 19:09	07:38 17:05	08:27 16:30
6	05:27 20:48-21:07/19 21:58	06:07 21:20	06:57 20:16	07:46 08:26-08:59/33 19:07 18:00-18:05/5	07:40 17:03	08:29 16:29
7	05:28 20:48-21:08/20 21:58	06:09 21:19	06:59 20:14	07:48 08:27-08:58/31 19:04 17:56-18:15/19	07:42 17:02	08:30 16:29
8	05:29 20:48-21:08/20 21:57	06:10 21:17	07:00 20:11	07:49 08:29-08:57/28 19:02 17:53-18:16/23	07:44 17:00	08:31 16:29
9	05:30 20:48-21:09/21 21:57	06:12 21:15	07:02 20:09	07:51 08:29-08:54/25 19:00 17:51-18:18/27	07:45 16:58	08:32 16:28
10	05:31 20:48-21:10/22 21:56	06:13 21:13	07:03 20:07	07:53 08:31-08:52/21 18:58 17:50-18:19/29	07:47 16:57	08:33 16:28
11	05:32 20:48-21:10/22 21:55	06:15 21:11	07:05 20:04	07:54 08:34-08:50/16 18:55 17:50-18:20/30	07:49 16:55	08:34 16:28
12	05:33 20:48-21:10/22 21:54	06:17 21:09	07:07 20:02	07:56 08:39-08:44/5 18:53 17:48-18:19/31	07:51 16:54	08:35 16:28
13	05:34 20:48-21:11/23 21:53	06:18 21:07	07:08 20:00	07:58 17:48-18:19/31 18:51	07:52 16:52	08:36 10:00-10:06/6 16:28
14	05:35 20:48-21:11/23 21:52	06:20 21:05	07:10 19:57	07:59 17:48-18:19/31 18:49	07:54 16:51	08:37 10:00-10:07/7 16:28
15	05:36 20:48-21:11/23 21:51	06:21 21:03	07:11 19:55	08:01 17:48-18:19/31 18:47	07:56 16:49	08:38 10:00-10:08/8 16:28
16	05:37 20:48-21:11/23 21:50	06:23 21:01	07:13 19:53	08:03 17:48-18:17/29 18:44	07:58 16:48	08:39 10:00-10:10/10 16:28
17	05:39 20:48-21:11/23 21:49	06:25 20:59	07:15 19:50	08:05 17:48-18:14/26 18:42 09:10-09:18/8	07:59 16:46	08:40 10:00-10:11/11 16:28
18	05:40 20:49-21:12/23 21:48	06:26 20:57	07:16 08:42-08:54/12 19:48	08:06 17:48-18:11/23 18:40 09:06-09:20/14	08:01 16:45	08:41 09:59-10:11/12 16:28
19	05:41 20:49-21:12/23 21:47	06:28 20:55	07:18 08:39-08:58/19 19:46	08:08 17:49-18:09/20 18:38 09:04-09:22/18	08:03 16:44	08:41 10:00-10:12/12 16:29
20	05:42 20:49-21:12/23 21:46	06:29 20:53	07:20 08:36-09:00/24 19:43	08:10 17:51-18:07/16 18:36 09:03-09:24/21	08:04 16:43	08:42 10:01-10:13/12 16:29
21	05:44 20:49-21:11/22 21:45	06:31 20:51	07:21 08:34-09:01/27 19:41	08:11 17:52-18:05/13 18:34 09:02-09:25/23	08:06 16:41	08:43 10:01-10:13/12 16:29
22	05:45 20:49-21:11/22 21:44	06:33 20:49	07:23 08:33-09:02/29 19:39	08:13 17:56-18:02/6 18:32 09:01-09:26/25	08:08 16:40	08:43 10:02-10:14/12 16:30
23	05:46 20:50-21:11/21 21:42	06:34 20:47	07:24 08:31-09:03/32 19:36	08:15 09:01-09:26/25 18:30	08:09 16:39	08:44 10:02-10:14/12 16:30
24	05:48 20:50-21:10/20 21:41	06:36 20:45	07:26 08:30-09:04/34 19:34	08:17 09:00-09:27/27 18:28	08:11 16:38	08:44 10:02-10:14/12 16:31
25	05:49 20:50-21:08/18 21:40	06:37 20:43	07:28 08:29-09:04/35 19:32	07:19 07:59-08:26/27 17:26	08:13 16:37	08:44 10:03-10:15/12 16:32
26	05:51 20:52-21:08/16 21:38	06:39 20:40	07:29 08:27-09:04/37 19:30	07:20 07:59-08:26/27 17:24	08:14 16:36	08:45 10:04-10:15/11 16:32
27	05:52 20:52-21:06/14 21:37	06:41 20:38	07:31 08:27-09:05/38 19:27	07:22 07:59-08:26/27 17:22	08:16 16:35	08:45 10:04-10:15/11 16:33
28	05:53 20:53-21:04/11 21:35	06:42 20:36	07:33 08:27-09:05/38 19:25	07:24 07:59-08:25/26 17:20	08:17 16:34	08:45 10:05-10:14/9 16:34
29	05:55 20:55-21:04/9 21:34	06:44 20:34	07:34 08:25-09:04/39 19:23	07:26 08:00-08:25/25 17:18	08:19 16:34	08:45 10:06-10:14/8 16:35
30	05:56 20:57-21:02/5 21:32	06:46 20:32	07:36 08:25-09:04/39 19:20	07:27 08:00-08:24/24 17:16	08:20 16:33	08:46 10:08-10:14/6 16:36
31	05:58 21:31	06:47 20:29		07:29 08:01-08:24/23 17:14		08:46 10:10-10:13/3 16:36
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	573	0	403	1073	63	186

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/Minutes with flicker
 First time (hh:mm) with flicker-Last time (hh:mm) with flicker/Minutes with flicker

SHADOW - Calendar per WTG

Calculation: 6B 3 x langs N329 Nordex Receptors WTG: 3 - NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (78)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
552	691	677	440	478	759	620	1.062	1.287	856	608	452	8.481

Idle start wind speed: Cut in wind speed from power curve

	January	February	March	April	May	June
1	08:46 16:38	08:19 08:49-09:10/21 17:25	07:26 18:17	07:16 19:09-19:38/29 20:10 08:04-08:19/15	06:11 06:51-07:23/32 21:01	05:26 21:47
2	08:46 16:39	08:17 08:48-09:11/23 17:27	07:24 18:19	07:13 19:10-19:40/30 20:12 08:07-08:16/9	06:09 06:52-07:24/32 21:03	05:25 21:48
3	08:45 16:40	08:16 08:48-09:12/24 17:29	07:21 18:20	07:11 19:10-19:39/29 20:14	06:07 06:52-07:24/32 21:04	05:24 21:49
4	08:45 16:41	08:14 08:47-09:13/26 17:31	07:19 18:22	07:09 19:10-19:40/30 20:15	06:05 06:52-07:23/31 21:06	05:24 21:50
5	08:45 16:42	08:13 08:47-09:13/26 17:33	07:17 18:24	07:06 19:10-19:41/31 20:17	06:04 06:52-07:22/30 21:08	05:23 21:51
6	08:45 16:43	08:11 08:46-09:14/28 17:35	07:15 18:26	07:04 19:09-19:41/32 20:19	06:02 06:53-07:22/29 21:09	05:22 21:52
7	08:44 16:44	08:09 08:47-09:15/28 17:36	07:13 18:27	07:02 19:08-19:40/32 20:21	06:00 06:53-07:21/28 21:11	05:22 21:53
8	08:44 16:45	08:07 08:47-09:15/28 17:38	07:10 18:29	07:00 19:08-19:40/32 20:22	05:58 06:53-07:20/27 21:13	05:21 21:54
9	08:43 16:47	08:06 08:47-09:15/28 17:40	07:08 18:31	06:57 19:08-19:40/32 20:24	05:56 06:55-07:20/25 21:14	05:21 21:54
10	08:43 16:49	08:04 08:47-09:15/28 17:42	07:06 18:33	06:55 19:08-19:39/31 20:26	05:55 06:55-07:18/23 21:16	05:20 21:55
11	08:42 16:50	08:02 08:47-09:14/27 17:44	07:04 18:34	06:53 19:08-19:39/31 20:27	05:53 06:56-07:18/22 21:17	05:20 21:56
12	08:42 16:52	08:00 08:48-09:14/26 17:46	07:01 18:36	06:51 19:08-19:37/29 20:29	05:51 06:57-07:16/19 21:19	05:20 21:57
13	08:41 16:53	07:58 08:48-09:13/25 17:48	06:59 18:38	06:48 19:09-19:36/27 20:31	05:50 06:59-07:15/16 21:21	05:19 21:57
14	08:40 16:55	07:57 08:49-09:12/23 17:49	06:57 18:40	06:46 19:10-19:35/25 20:32	05:48 07:00-07:12/12 21:22	05:19 21:58
15	08:39 16:56	07:55 08:50-09:11/21 17:51	06:55 18:41	06:44 19:11-19:34/23 20:34	05:47 07:04-07:09/5 21:24	05:19 21:58
16	08:38 16:58	07:53 08:51-09:10/19 17:53	06:52 18:43	06:42 19:12-19:32/20 20:36	05:45 21:25	05:19 21:59
17	08:38 16:59	07:51 08:53-09:08/15 17:55	06:50 18:45	06:40 19:14-19:30/16 20:38	05:44 21:27	05:19 21:59
18	08:37 17:01	07:49 08:56-09:05/9 17:57	06:48 07:13-07:20/7 18:47	06:38 19:17-19:27/10 20:39	05:42 21:28	05:19 22:00
19	08:36 17:03	07:47 17:59	06:45 07:09-07:23/14 18:48	06:35 20:41	05:41 21:30	05:19 22:00
20	08:35 17:04	07:45 18:00	06:43 07:07-07:25/18 18:50	06:33 07:04-07:16/12 20:43	05:39 21:31	05:19 22:01
21	08:34 17:06	07:43 18:02	06:41 07:05-07:25/20 18:52	06:31 07:02-07:19/17 20:44	05:38 21:32	05:19 22:01
22	08:32 17:08	07:41 18:04	06:39 07:04-07:26/22 18:53	06:29 07:00-07:20/20 20:46	05:37 21:34	05:19 22:01
23	08:31 17:09	07:39 18:06	06:36 07:03-07:27/24 18:55 18:18-18:30/12	06:27 06:58-07:21/23 20:48	05:35 21:35	05:19 22:01
24	08:30 17:11	07:36 18:08	06:34 07:03-07:27/24 18:57 18:15-18:31/16	06:25 06:56-07:22/26 20:49	05:34 21:37	05:20 22:01
25	08:29 17:13	07:34 18:10	06:32 07:02-07:27/25 18:59 18:14-18:32/18	06:23 06:55-07:23/28 20:51	05:33 21:38	05:20 22:01
26	08:28 17:15	07:32 18:11	06:29 07:02-07:27/25 19:00 18:12-18:34/22	06:21 06:54-07:23/29 20:53	05:32 21:39	05:20 22:01
27	08:26 17:16	07:30 18:13	06:27 07:02-07:26/24 19:02 18:11-18:33/22	06:19 06:54-07:24/30 20:54	05:31 21:41	05:21 22:01
28	08:25 08:59-09:00/1 17:18	07:28 18:15	06:25 07:01-07:25/24 19:04 18:10-18:34/24	06:17 06:53-07:24/31 20:56	05:30 21:42	05:21 22:01
29	08:23 08:54-09:05/11 17:20		07:22 19:10-19:34/24 20:05 08:02-08:24/22	06:15 06:52-07:24/32 20:58	05:29 21:43	05:22 22:01
30	08:22 08:52-09:07/15 17:22		07:20 19:10-19:36/26 20:07 08:03-08:23/20	06:13 06:52-07:24/32 20:59	05:28 21:44	05:22 22:01
31	08:20 08:51-09:09/18 17:24		07:18 19:09-19:37/28 20:09 08:03-08:21/18		05:27 21:45	
Potential sun hours	259	278	367	416	485	498
Sum of minutes with flicker	45	425	479	793	363	0

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: 6B 3 x langs N329 Nordex Receptors WTG: 3 - NORDEX N131/3300 DE 3300 131.0 !-! hub: 144,0 m (TOT: 209,5 m) (78)
 Sunshine probability S (Average daily sunshine hours) [DE BILT]

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1,48	2,65	3,60	5,24	6,59	6,28	6,20	6,12	4,48	3,32	1,87	1,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
552	691	677	440	478	759	620	1.062	1.287	856	608	452	8.481

Idle start wind speed: Cut in wind speed from power curve

	July	August	September	October	November	December
1	05:23 22:01	05:59 07:07-07:27/20 21:29	06:49 19:07-19:38/31 20:27	07:38 19:18	07:31 08:17-08:44/27 17:12	08:22 16:32
2	05:24 22:00	06:01 07:06-07:29/23 21:27	06:50 19:06-19:37/31 20:25	07:39 19:16	07:33 08:16-08:44/28 17:10	08:23 16:31
3	05:24 22:00	06:02 07:05-07:29/24 21:26	06:52 19:06-19:38/32 20:23	07:41 19:13	07:35 08:17-08:45/28 17:08	08:25 16:31
4	05:25 21:59	06:04 07:04-07:30/26 21:24	06:54 19:05-19:37/32 20:18	07:42 19:11	07:36 08:17-08:44/27 17:07	08:26 16:30
5	05:26 21:59	06:05 07:03-07:31/28 21:22	06:55 19:05-19:37/32 20:18	07:44 19:09	07:38 08:17-08:44/27 17:05	08:27 16:30
6	05:27 21:58	06:07 07:02-07:31/29 21:20	06:57 19:04-19:36/32 20:16	07:46 19:07	07:40 08:17-08:43/26 17:03	08:29 16:29
7	05:28 21:58	06:09 07:02-07:32/30 21:19	06:58 19:05-19:36/31 20:14	07:48 19:04	07:42 08:17-08:43/26 17:02	08:30 16:29
8	05:29 21:57	06:10 07:01-07:32/31 21:17	07:00 19:05-19:35/30 20:11	07:49 19:02	07:44 08:18-08:42/24 17:00	08:31 16:28
9	05:30 21:57	06:12 07:01-07:33/32 21:15	07:02 19:04-19:34/30 20:09	07:51 19:00	07:45 08:19-08:41/22 16:58	08:32 16:28
10	05:31 21:56	06:13 07:00-07:32/32 21:13	07:03 19:03-19:33/30 20:07	07:53 18:58	07:47 08:20-08:41/21 16:57	08:33 16:28
11	05:32 21:55	06:15 07:01-07:33/32 21:11	07:05 19:02-19:31/29 20:04	07:54 18:55	07:49 08:22-08:40/18 16:55	08:34 16:28
12	05:33 21:54	06:17 07:00-07:32/32 21:09	07:07 19:01-19:29/28 20:02	07:56 18:53	07:51 08:24-08:38/14 16:53	08:35 16:28
13	05:34 21:53	06:18 07:00-07:32/32 21:07	07:08 19:00-19:26/26 20:00	07:58 18:51	07:52 08:26-08:36/10 16:52	08:36 16:28
14	05:35 21:52	06:20 07:00-07:31/31 21:05	07:10 19:00-19:24/24 19:57	07:59 18:49	07:54 16:51	08:37 16:28
15	05:36 21:51	06:21 07:01-07:31/30 21:03	07:11 19:00-19:24/24 19:55	08:01 18:47	07:56 16:49	08:38 16:28
16	05:37 21:50	06:23 07:00-07:30/30 21:01	07:13 19:00-19:25/25 19:53	08:03 18:44	07:58 16:48	08:39 16:28
17	05:38 21:49	06:25 07:01-07:30/29 20:59	07:15 19:00-19:25/25 19:50	08:05 18:42	07:59 16:46	08:40 16:28
18	05:40 21:48	06:26 07:01-07:28/27 20:57	07:16 19:00-19:25/25 19:48	08:06 18:40	08:01 16:45	08:41 16:28
19	05:41 21:47	06:28 07:02-07:28/26 20:55	07:18 19:00-19:25/25 19:46	08:08 18:38	08:03 16:44	08:41 16:29
20	05:42 21:46	06:29 07:03-07:26/23 20:53	07:19 19:00-19:25/25 19:43	08:10 18:36	08:04 16:43	08:42 16:29
21	05:44 21:45	06:31 07:05-07:25/20 20:51	07:21 19:00-19:25/25 19:41	08:11 18:34	08:06 16:41	08:43 16:29
22	05:45 21:44	06:33 07:06-07:22/16 20:49	07:23 19:00-19:25/25 19:39	08:13 18:32	08:08 16:40	08:43 16:30
23	05:46 21:42	06:34 07:09-07:20/11 20:47	07:24 19:00-19:25/25 19:36	08:15 18:30	08:09 16:39	08:44 16:30
24	05:48 21:41	06:36 20:45	07:26 19:00-19:25/25 19:34	08:17 09:24-09:35/11 18:28	08:11 16:38	08:44 16:31
25	05:49 21:40	06:37 19:19-19:30/11 20:43	07:28 19:00-19:25/25 19:32	08:19 08:22-08:38/16 17:26	08:13 16:37	08:44 16:32
26	05:50 21:38	06:39 19:16-19:32/16 20:40	07:29 19:29	08:20 08:20-08:40/20 17:24	08:14 16:36	08:45 16:32
27	05:52 21:37	06:41 19:14-19:34/20 20:38	07:31 19:27	08:19 08:19-08:41/22 17:22	08:16 16:35	08:45 16:33
28	05:53 21:35	06:42 19:13-19:36/23 20:36	07:33 19:25	08:18 08:18-08:42/24 17:20	08:17 16:34	08:45 16:34
29	05:55 07:13-07:22/9 21:34	06:44 19:10-19:36/26 20:34	07:34 19:23	08:18 08:18-08:43/25 17:18	08:19 16:33	08:45 16:35
30	05:56 07:10-07:24/14 21:32	06:46 19:10-19:37/27 20:32	07:36 19:20	08:17 08:17-08:44/27 17:16	08:20 16:33	08:46 16:36
31	05:58 07:09-07:26/17 21:31	06:47 19:08-19:37/29 20:29		08:17 08:17-08:44/27 17:14		08:46 16:36
Potential sun hours	501	453	381	332	267	244
Sum of minutes with flicker	40	766	857	172	298	0

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

Over Antea Group

Van stad tot land, van water tot lucht; de adviseurs en ingenieurs van Antea Group dragen in Nederland sinds jaar en dag bij aan onze leefomgeving. We ontwerpen bruggen en wegen, realiseren woonwijken en waterwerken. Maar we zijn ook betrokken bij thema's zoals milieu, veiligheid, assetmanagement en energie. Onder de naam Oranjewoud groeiden we uit tot een allround en onafhankelijk partner voor bedrijfsleven en overheden. Als Antea Group zetten we deze expertise ook mondiaal in. Door hoogwaardige kennis te combineren met een pragmatische aanpak maken we oplossingen haalbaar én uitvoerbaar. Doelgericht, met oog voor duurzaamheid. Op deze manier anticiperen we op de vragen van vandaag en de oplossingen van de toekomst. Al meer dan 60 jaar.

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