

## SHADOW - Main Result

**Calculation:** Bijvanck Bovenvariant**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

5 °

Day step for calculation

1 days

Time step for calculation

1 minutes

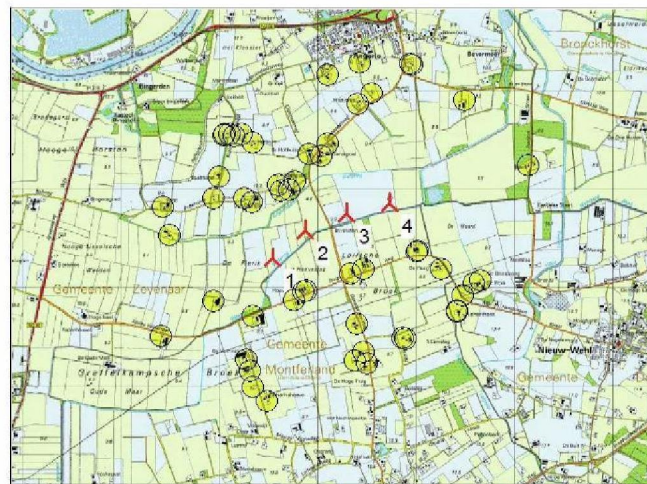
Sunshine probability S/S0 (Sun hours/Possible sun hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,18	0,26	0,29	0,36	0,40	0,35	0,36	0,40	0,34	0,31	0,21	0,16

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
286	416	580	586	479	466	610	1.170	1.177	649	488	377	7.284

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

All coordinates are in  
Dutch Stereo-RD/NAP 2000

New WTG

Scale 1:75.000

Shadow receptor

### WTGs

X (east)	Y (north)	Z	Row data/Description	WTG type				Shadow data			
				Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Calculation distance	RPM
								[kW]	[m]	[m]	[m]
1	205.544	443.288	0,0 Locatie 1	Yes	SENVION	3.0M122-3.000	3.000	122,0	120,0	1.723	11,2
2	205.880	443.574	0,0 Locatie 2	Yes	SENVION	3.0M122-3.000	3.000	122,0	120,0	1.723	11,2
3	206.304	443.742	0,0 Locatie 3	Yes	SENVION	3.0M122-3.000	3.000	122,0	120,0	1.723	11,2
4	206.733	443.849	0,0 Locatie 4	Yes	SENVION	3.0M122-3.000	3.000	122,0	120,0	1.723	11,2

### Shadow receptor-Input

No.	Name	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
		[m]	[m]	[m]	[m]	[m]	[m]	[°]	[°]	
A		204.436	443.812	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
B		204.496	443.526	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
C		204.414	442.498	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
D		207.483	442.910	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
E		207.592	443.031	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
F		207.660	443.057	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
G		207.423	442.752	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
H		207.427	442.743	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
I		207.264	443.175	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
J		207.504	444.884	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
K		206.949	445.271	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
L		205.635	443.973	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
M		205.722	443.988	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
N		205.775	444.068	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
O		205.342	443.865	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
P		205.602	444.034	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
Q		205.256	443.902	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
R		204.944	443.894	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
S		206.107	445.160	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
T		205.917	444.347	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
U		206.418	444.848	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
V		206.106	444.448	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
W		206.038	444.327	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
X		205.109	444.549	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
Y		205.157	444.525	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
Z		205.059	444.548	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AA		205.230	444.543	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AB		205.351	444.456	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AC		206.436	445.281	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"

To be continued on next page...

Project:

**Bijvanck Vergunning**

Description:

Slagschaduwberekening

Servion 3MM122, ashoogte: 120 meter

Licensed user:

**Bosch & Van Rijn**  
 Groenmarktstraat 56  
 NL-3521 AV Utrecht  
 +31 6 51 71 04 93

Calculated:

4-5-2016 13:49/3.0.651

## SHADOW - Main Result

### Calculation: Bijvanck Bovenvariant

...continued from previous page

No.	Name	X (east)	Y (north)	Z	Width	Height	Height a.g.l.	Degrees from south cw	Slope of window	Direction mode
				[m]	[m]	[m]	[m]	[°]	[°]	
AD		206.553	444.969	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AE		204.943	442.854	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AF		206.967	445.261	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AG		205.054	444.537	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AH		205.002	444.115	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AI		208.145	444.231	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AJ		206.508	442.226	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AK		206.389	442.254	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AL		206.472	442.334	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AM		206.901	442.468	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AN		206.868	442.483	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AO		207.012	443.357	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AP		206.340	443.122	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AQ		205.892	442.951	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AR		205.861	442.941	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AS		205.350	442.698	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AT		205.346	441.980	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AU		205.492	441.843	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AV		205.317	442.146	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AW		205.277	442.257	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AX		205.277	442.257	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AY		207.021	443.363	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
AZ		205.766	442.855	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
BA		206.404	442.617	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
BB		205.277	442.257	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
BC		206.475	443.170	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"
BD		206.868	442.483	0,0	8,0	5,0	0,5	0,0	90,0	"Green house mode"

## Calculation Results

Shadow receptor

No. Name

### Shadow, expected values

Shadow hours

per year

[h/year]

A	1:16
B	1:58
C	0:11
D	0:00
E	1:50
F	0:56
G	0:00
H	0:00
I	2:54
J	1:31
K	0:00
L	16:48
M	18:25
N	13:56
O	12:03
P	12:39
Q	9:36
R	5:11
S	0:00
T	6:20
U	0:00
V	3:16
W	6:55
X	1:42
Y	1:55
Z	1:41
AA	1:23
AB	1:58
AC	0:00

To be continued on next page...

Project:

**Bijvanck Vergunning**

Description:

Slagschaduwberekening

Servion 3MM122, ashoogte: 120 meter

Licensed user:

**Bosch & Van Rijn**  
Groenmarktstraat 56  
NL-3521 AV Utrecht  
+31 6 51 71 04 93

Calculated:

4-5-2016 13:49/3.0.651

## SHADOW - Main Result

**Calculation:** Bijvanck Bovenvariant

...continued from previous page

No.	Name	Shadow, expected values	
		Shadow hours	per year
			[h/year]
AD			0:00
AE			0:37
AF			0:00
AG			1:42
AH			3:41
AI			0:26
AJ			0:00
AK			0:00
AL			0:00
AM			0:45
AN			0:46
AO			7:22
AP			4:45
AQ			0:00
AR			0:00
AS			0:00
AT			0:00
AU			0:00
AV			0:00
AW			0:00
AX			0:00
AY			7:55
AZ			0:00
BA			0:00
BB			0:00
BC			3:17
BD			0:46

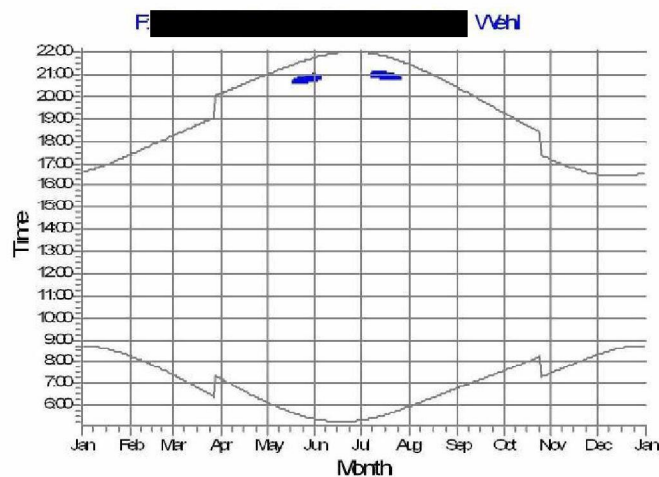
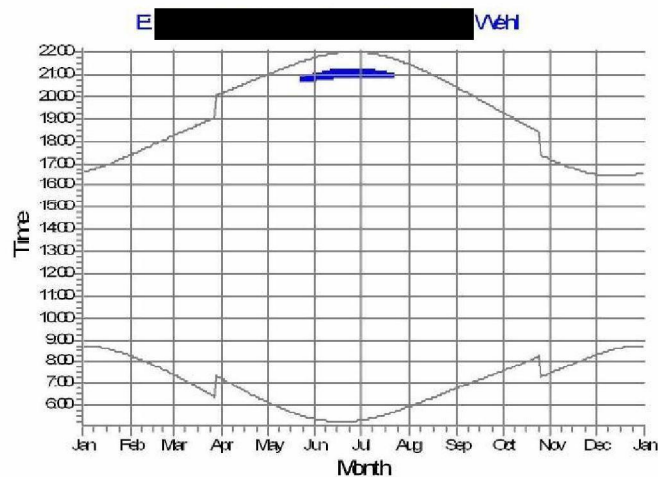
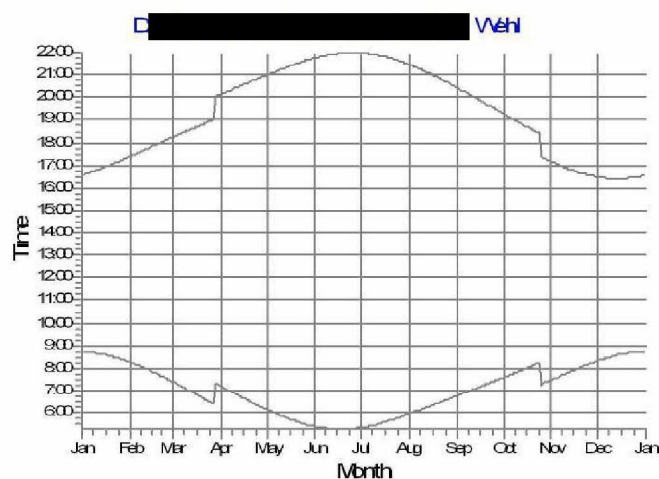
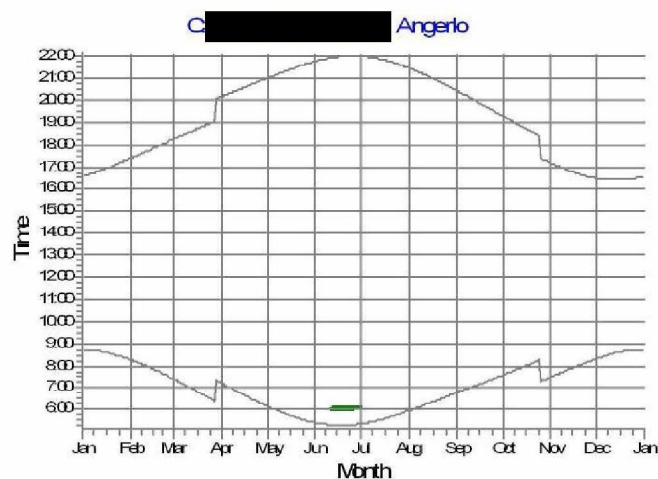
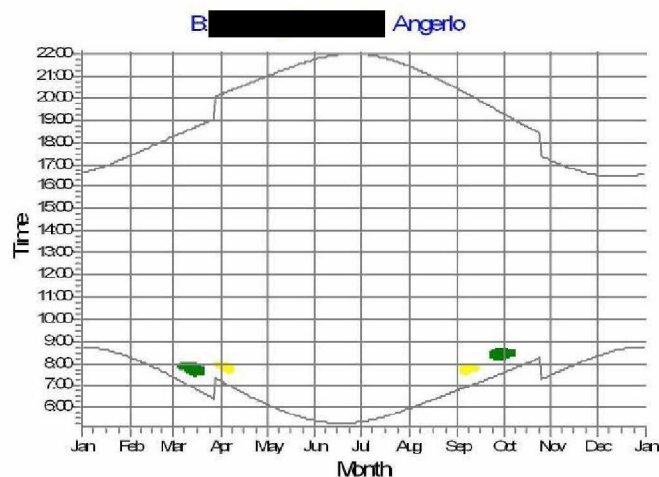
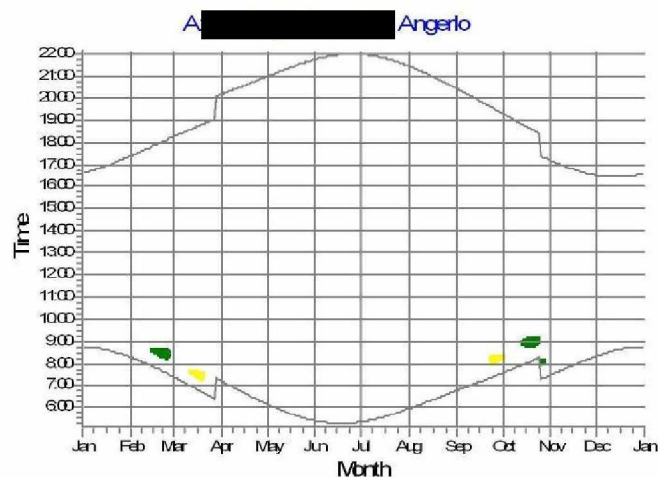
Total amount of flickering on the shadow receptors caused by each WTG

No.	Name	Worst case	Expected
		[h/year]	[h/year]
1	Locatie 1	197:27	21:53
2	Locatie 2	330:08	35:02
3	Locatie 3	240:31	29:23
4	Locatie 4	98:41	11:46



## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs

1: Locatie 1

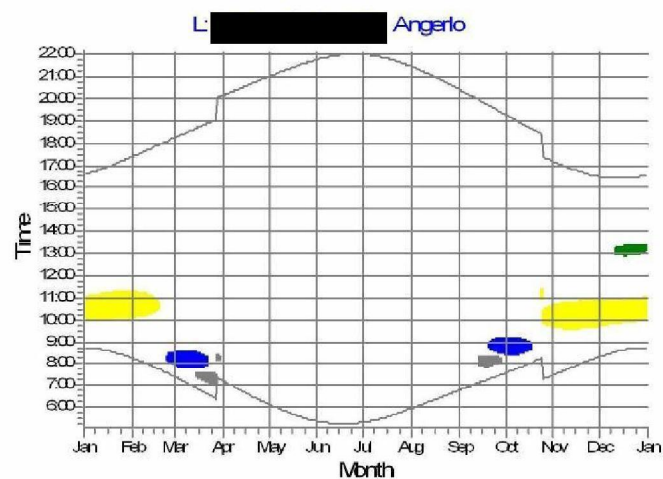
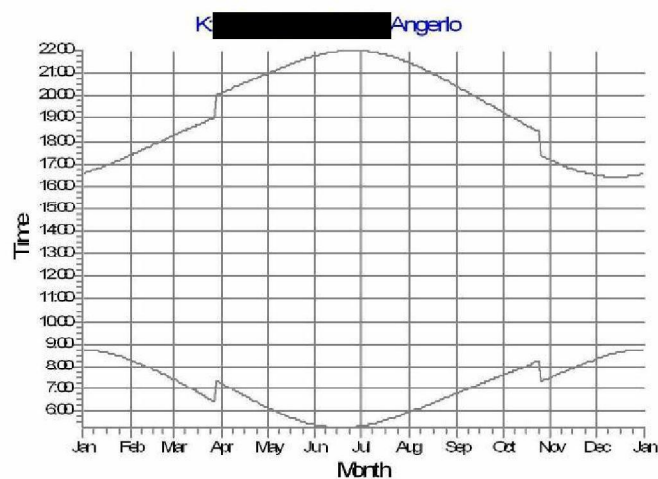
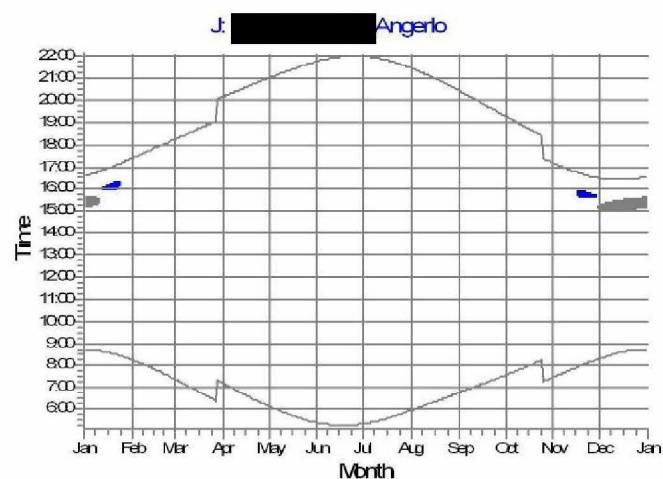
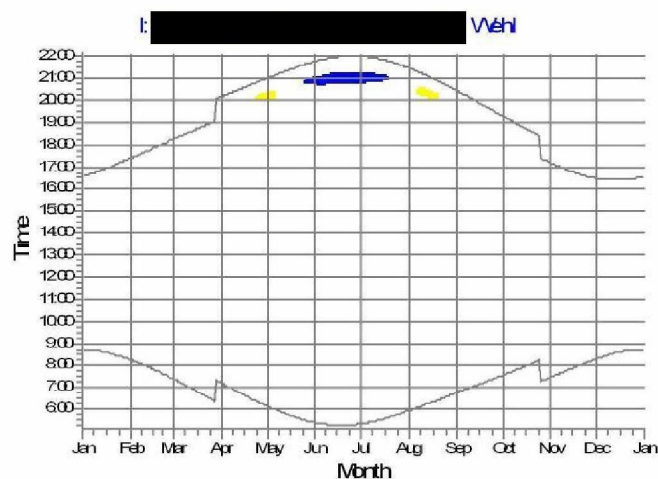
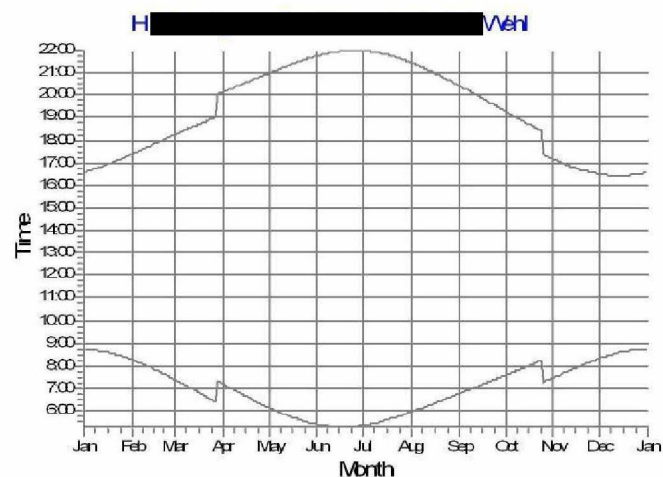
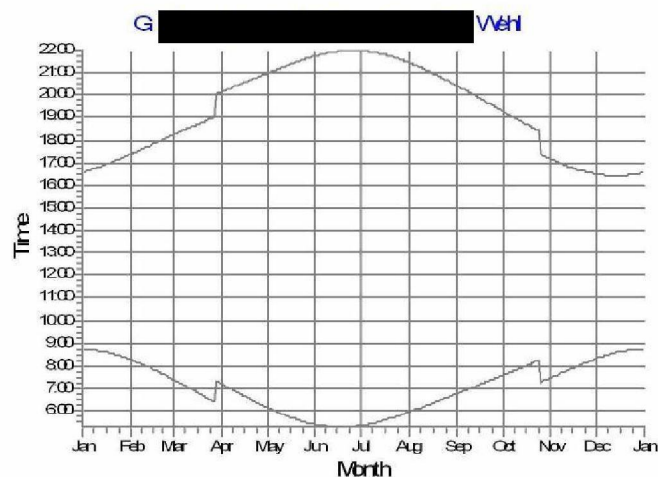
2: Locatie 2

3: Locatie 3



## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



1: Locatie 1



2: Locatie 2



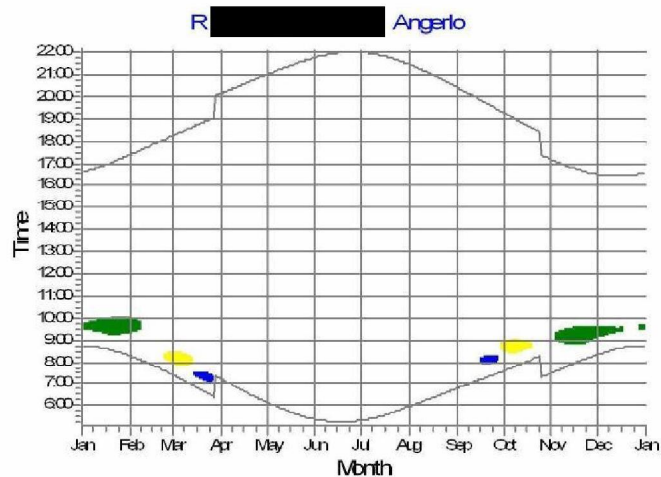
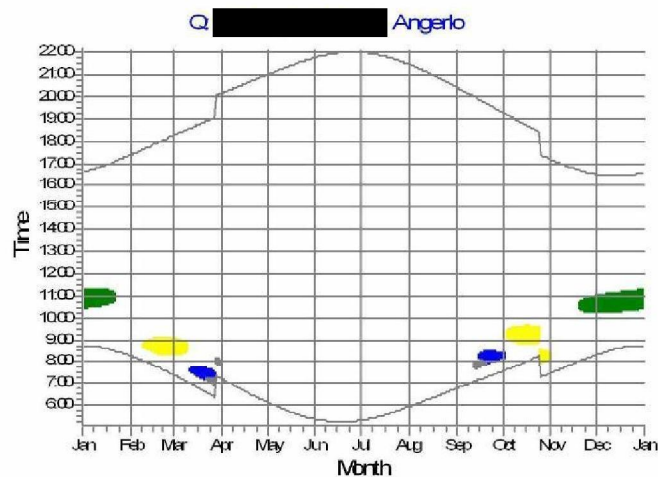
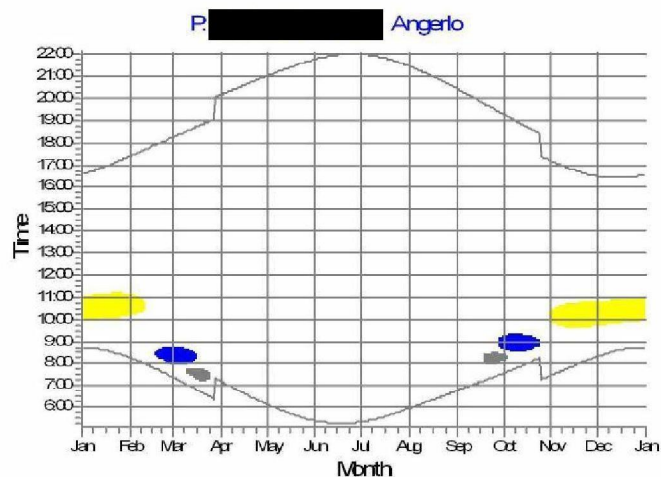
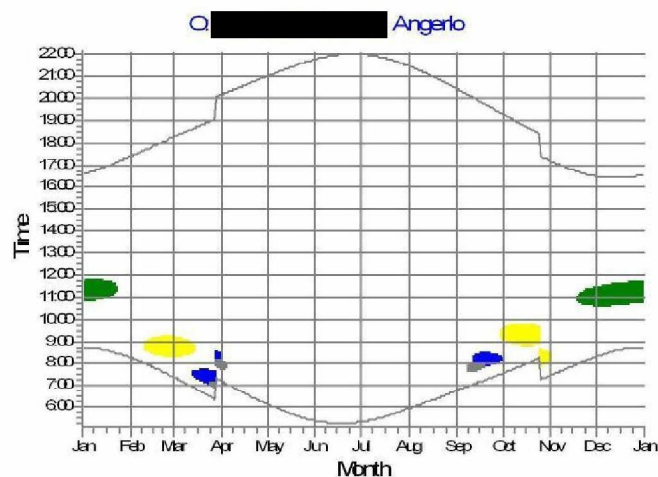
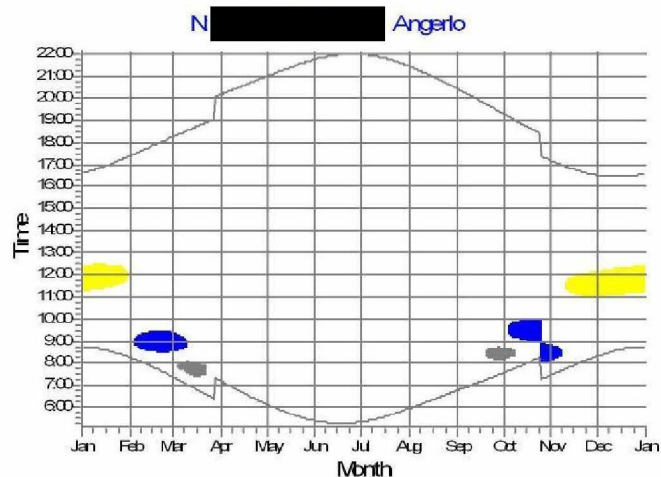
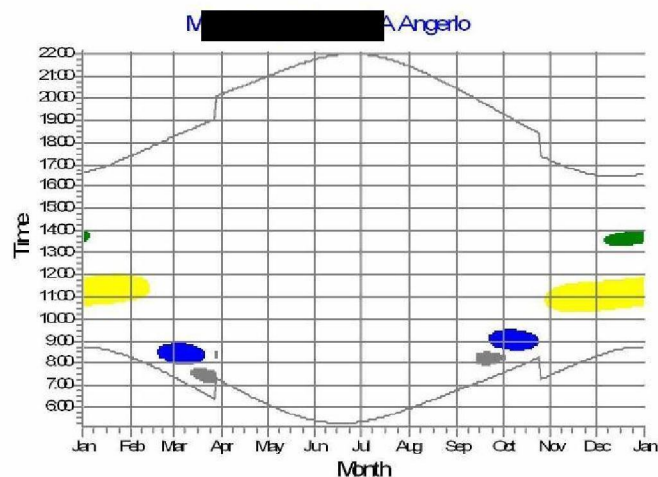
3: Locatie 3



4: Locatie 4

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



1: Locatie 1



2: Locatie 2



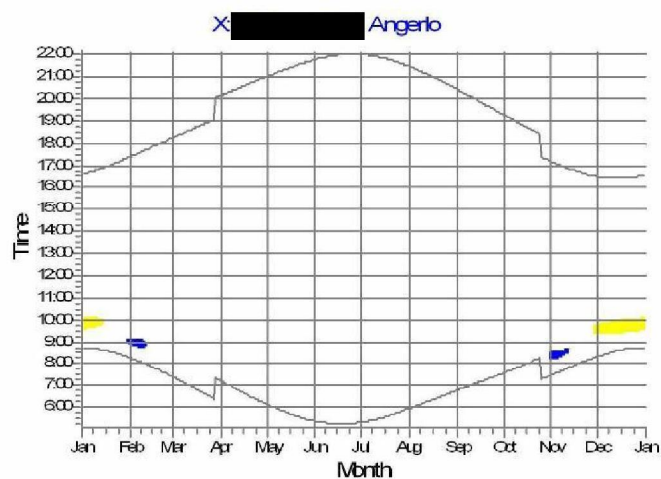
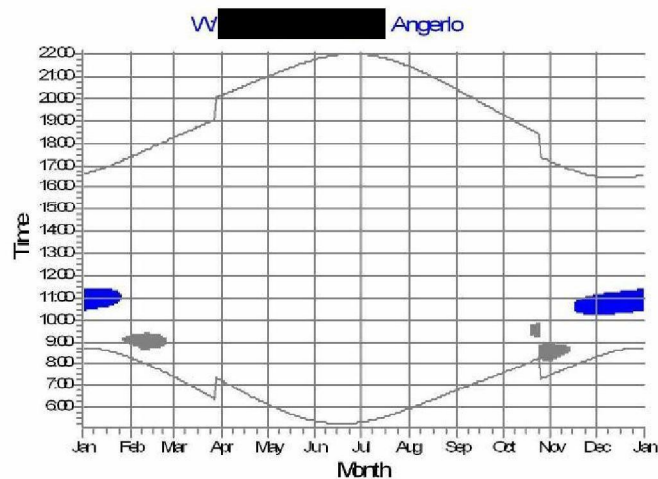
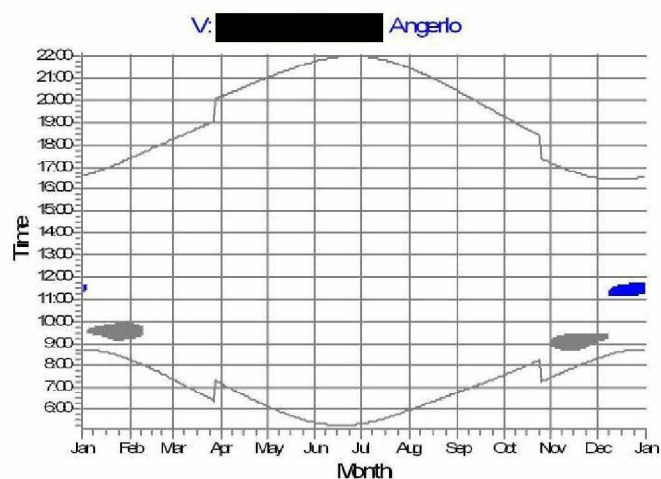
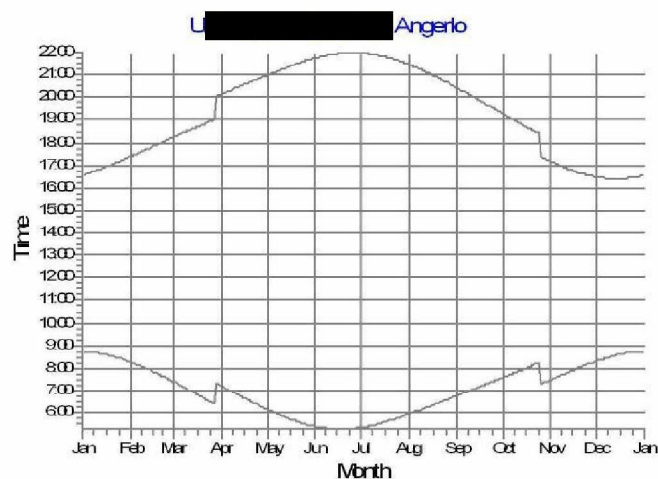
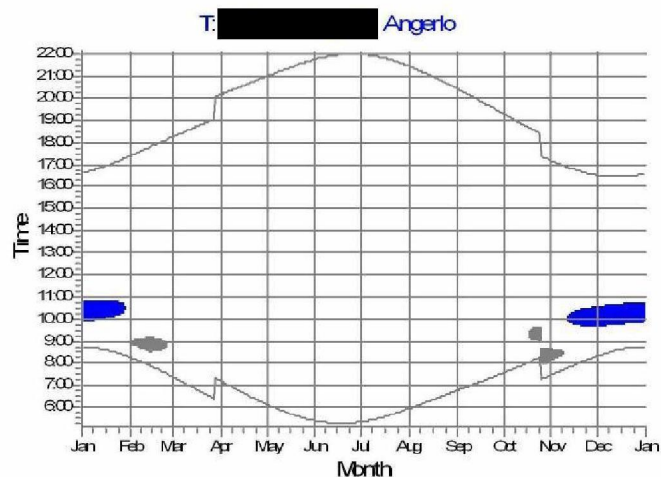
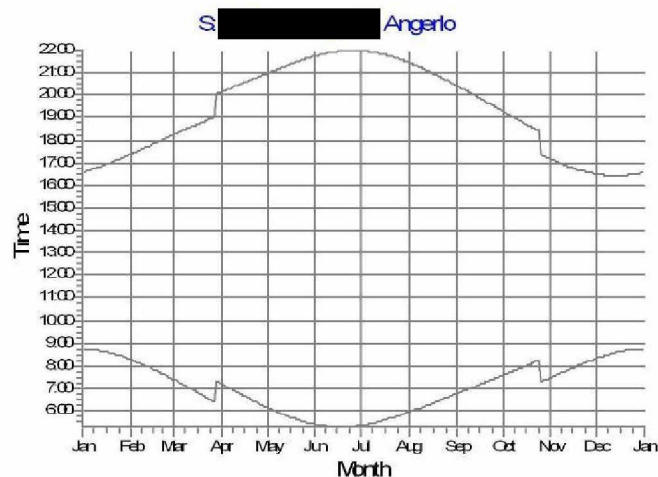
3: Locatie 3



4: Locatie 4

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs

2: Locatie 2

3: Locatie 3

4: Locatie 4



Project:

**Bijvanck Vergunning**

Description:

Slagschaduwberekening

Senvion 3MM122, ashoogte: 120 meter

Licensed user:

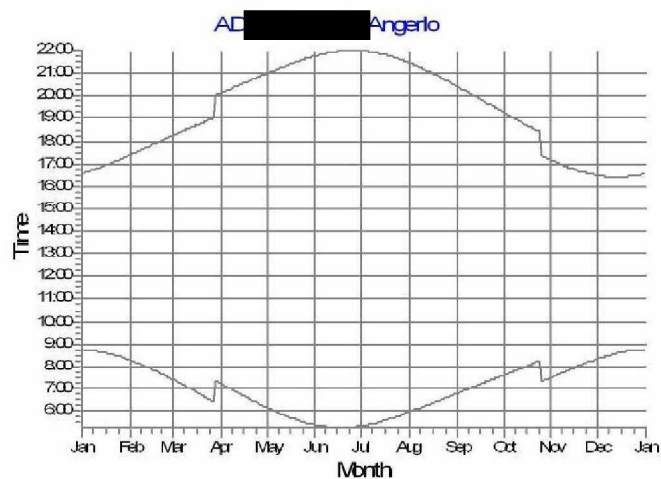
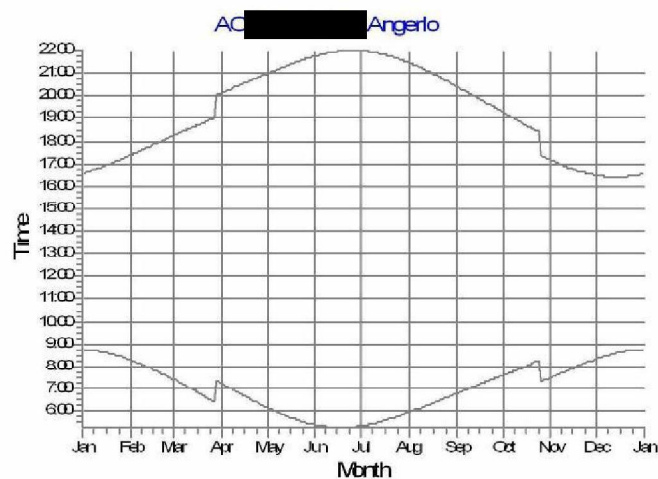
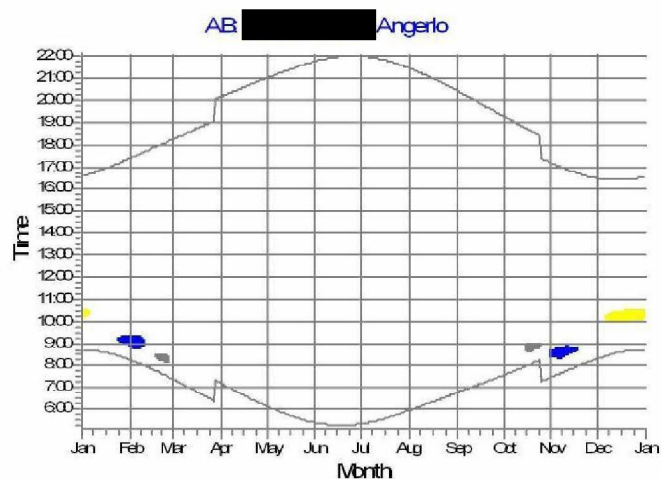
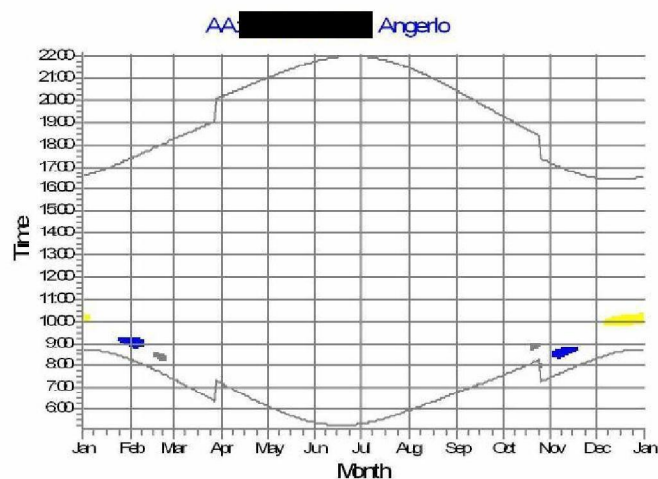
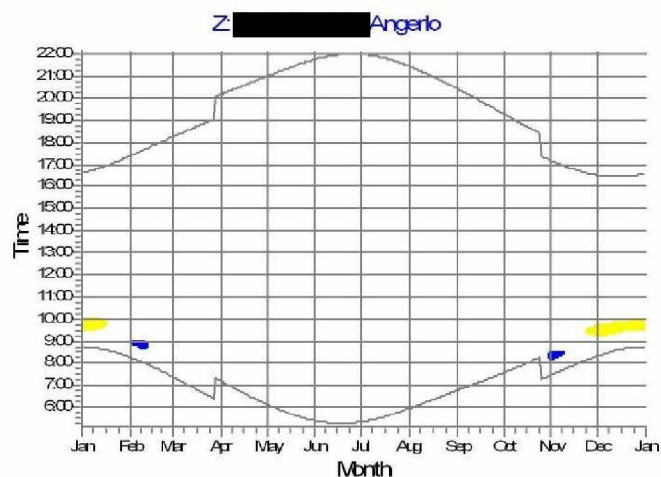
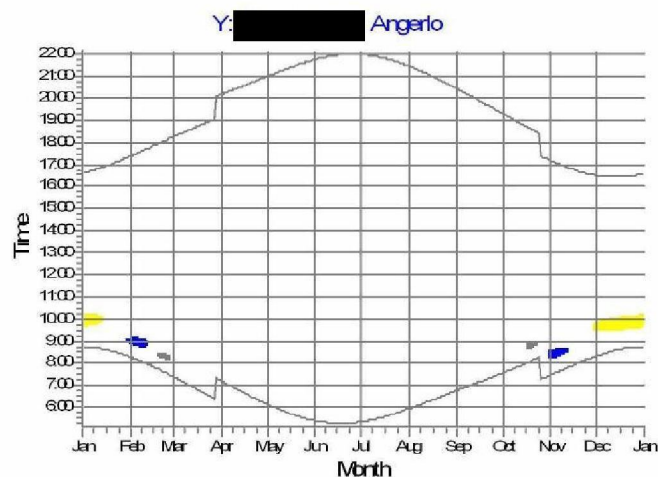
**Bosch & Van Rijn**  
Groenmarktstraat 56  
NL-3521 AV Utrecht  
+31 6 51 71 04 93

Calculated:

4-5-2016 13:49/3.0.651

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



2: Locatie 2



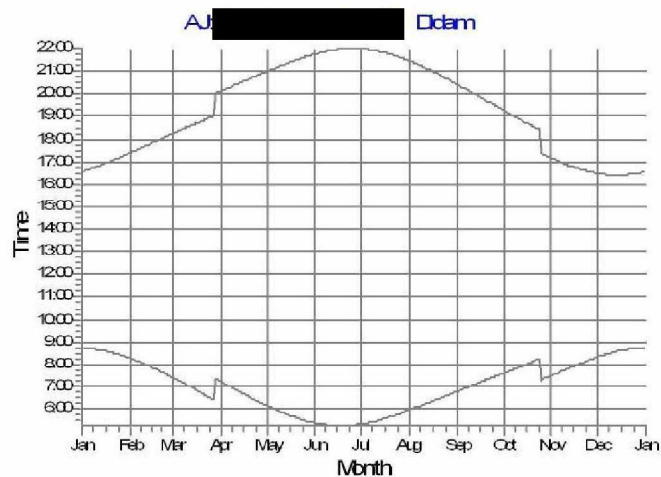
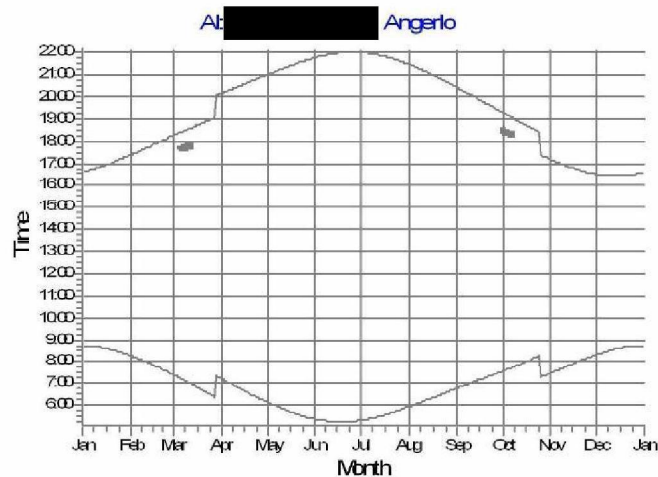
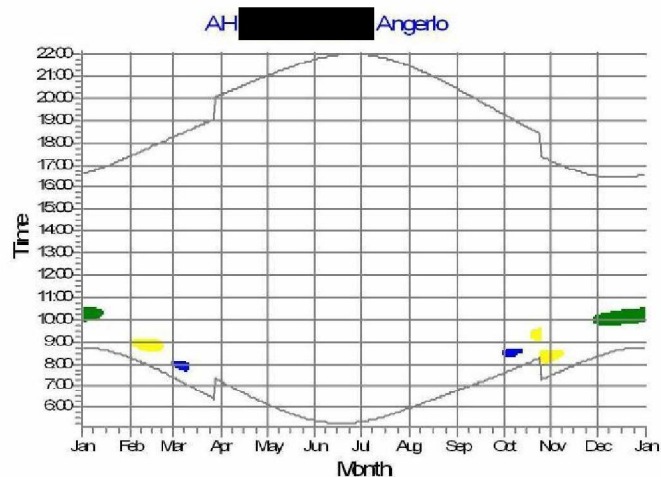
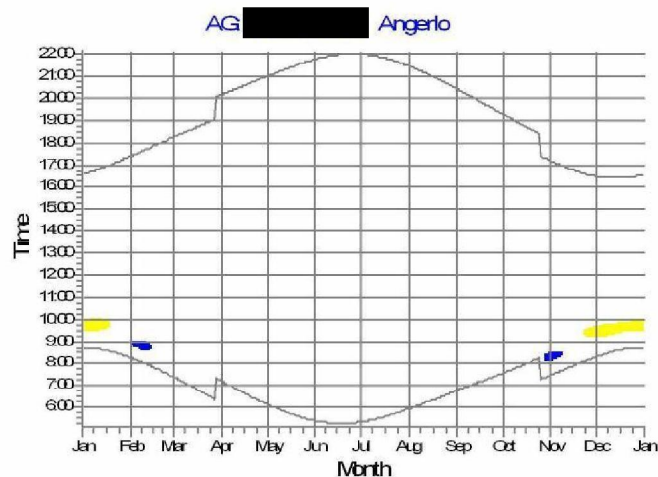
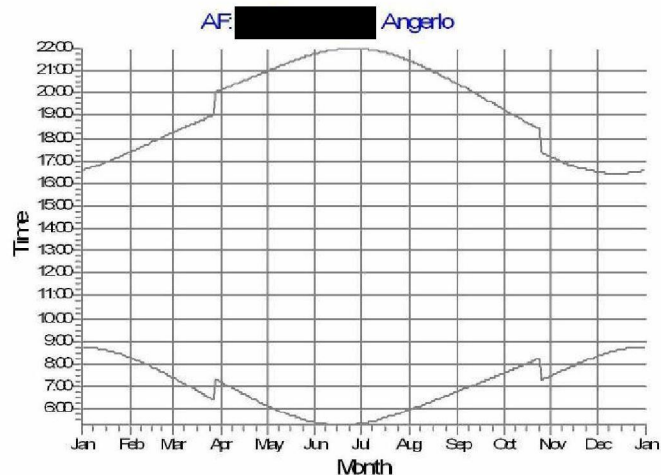
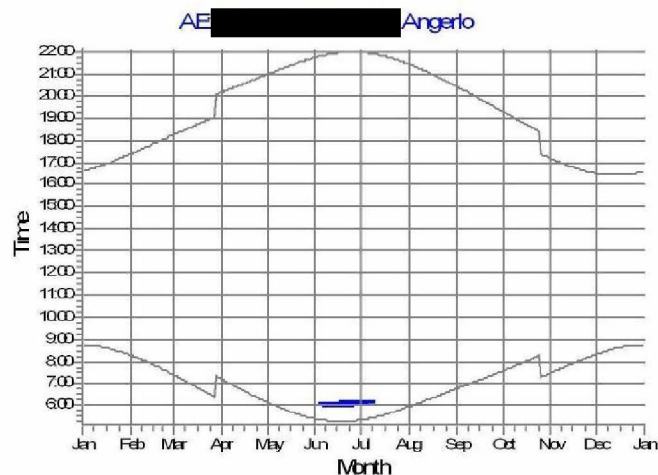
3: Locatie 3



4: Locatie 4

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



1: Locatie 1



2: Locatie 2



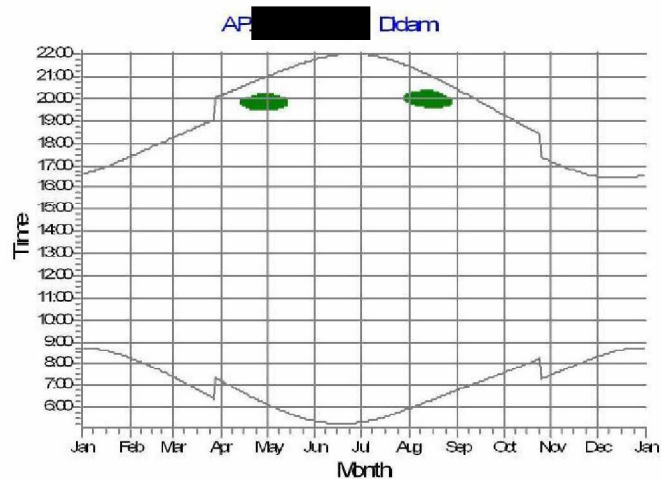
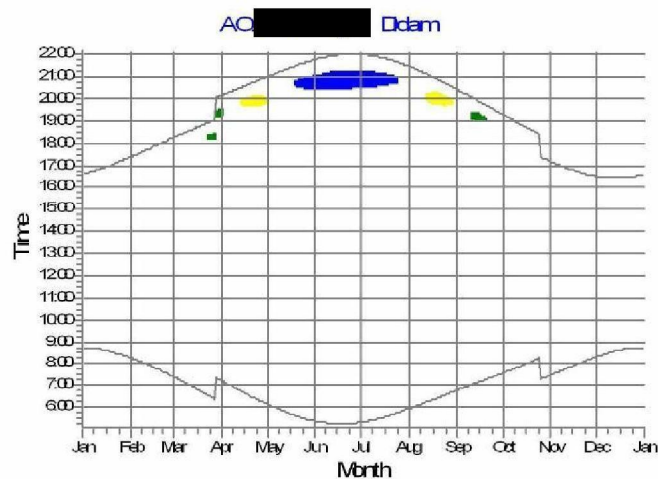
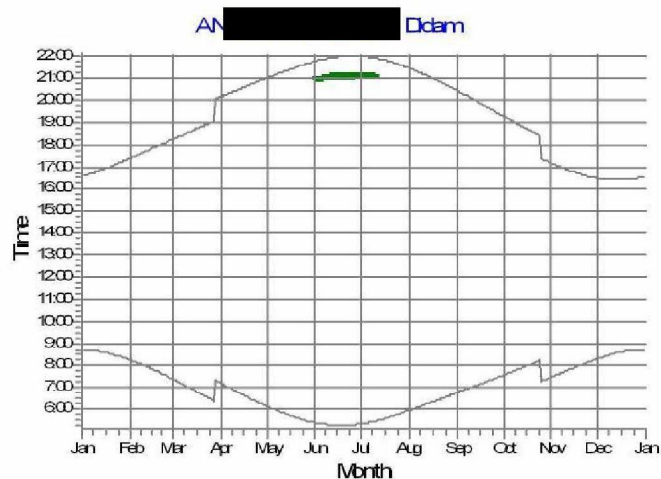
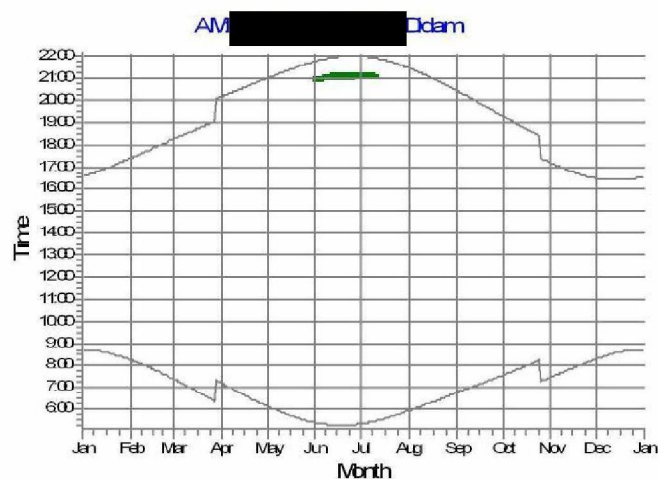
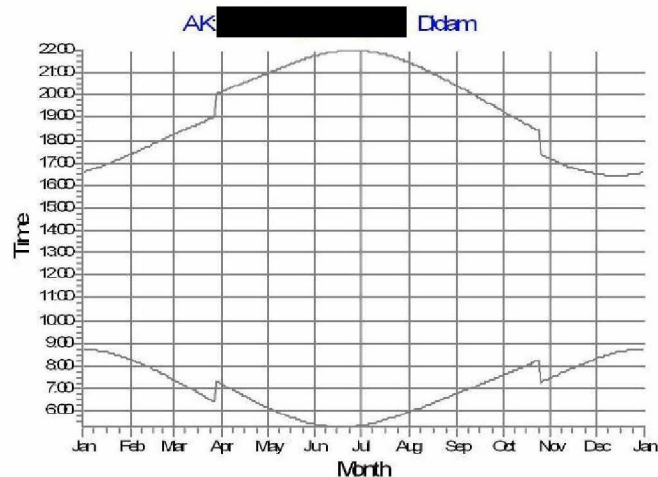
3: Locatie 3



4: Locatie 4

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



1: Locatie 1



2: Locatie 2



3: Locatie 3



Project:  
**Bijvanck Vergunning**

Description:  
Slagschaduwberekening

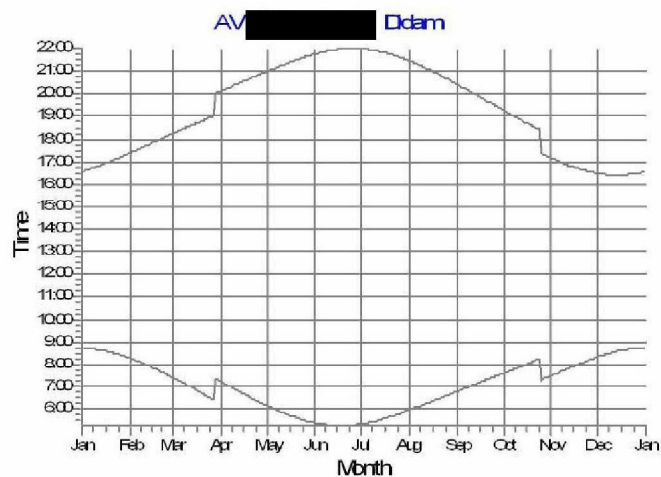
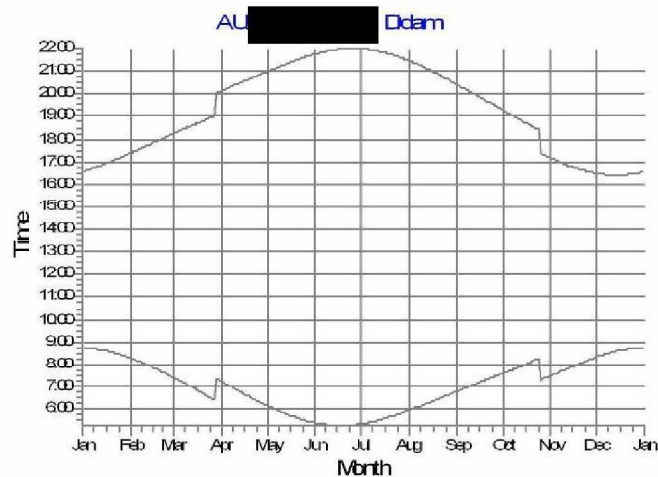
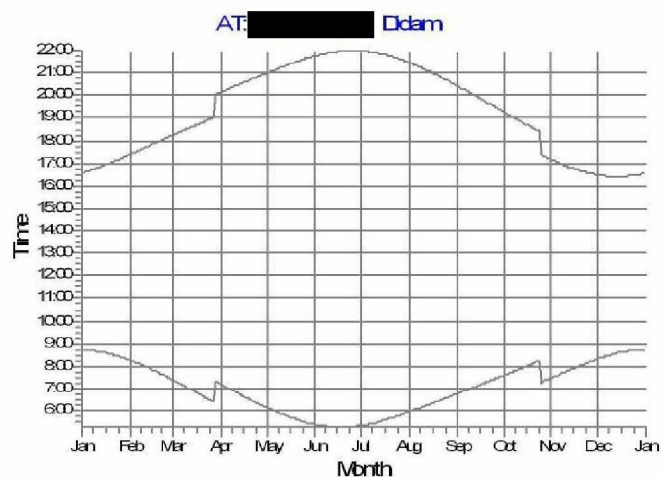
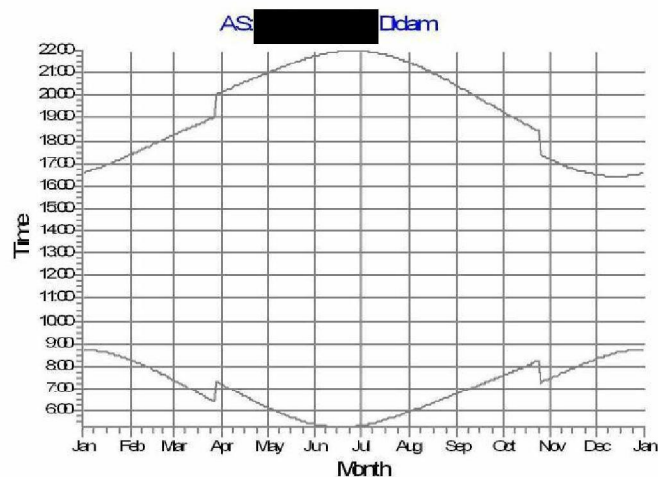
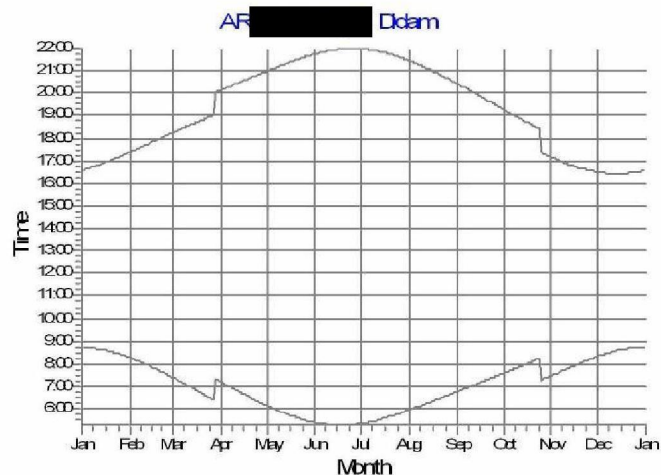
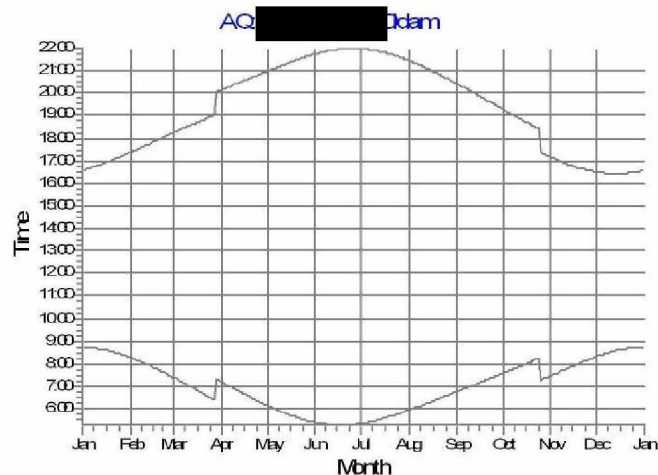
Senvion 3MM122, ashoogte: 120 meter

Licensed user:  
**Bosch & Van Rijn**  
Groenmarktstraat 56  
NL-3521 AV Utrecht  
+31 6 51 71 04 93

Calculated:  
4-5-2016 13:49/3.0.651

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs

Project:  
**Bijvanck Vergunning**

Description:  
Slagschaduwberekening

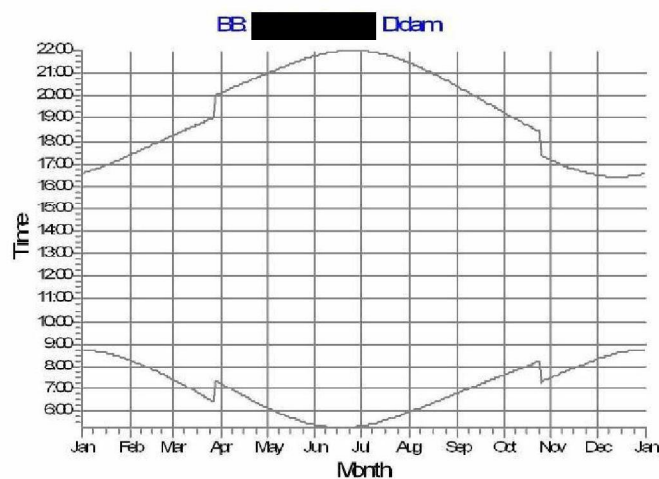
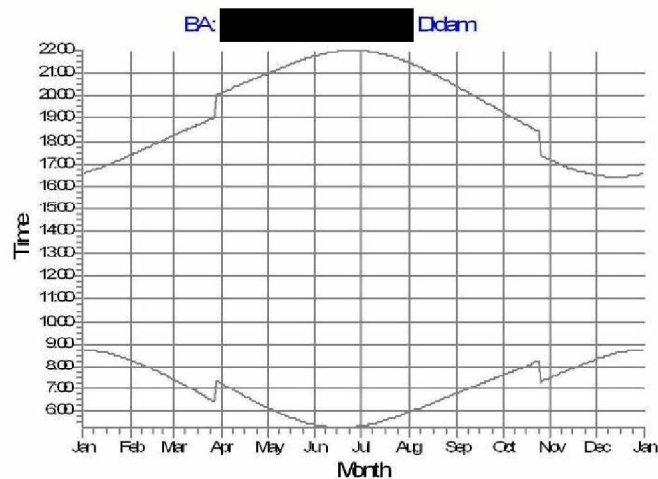
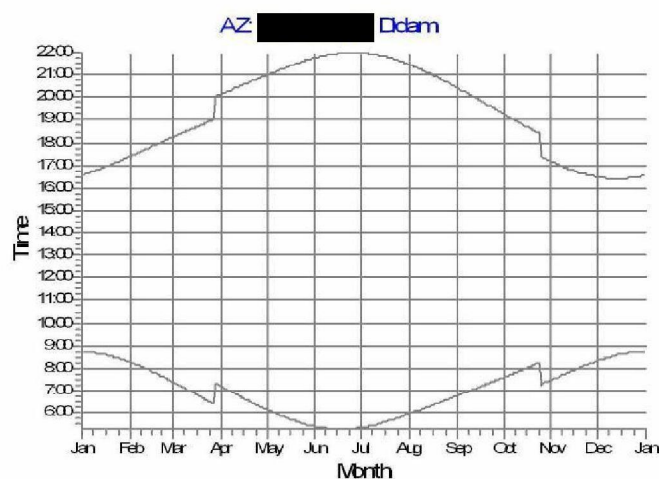
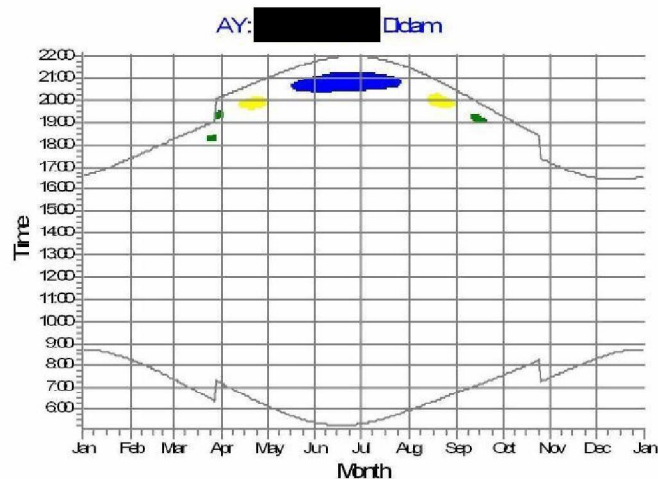
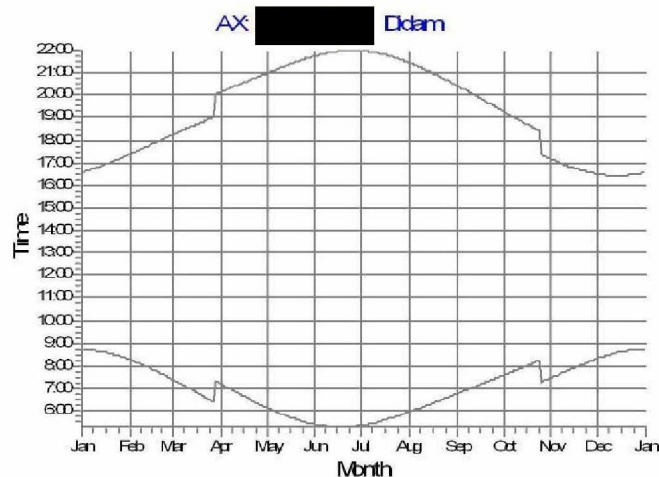
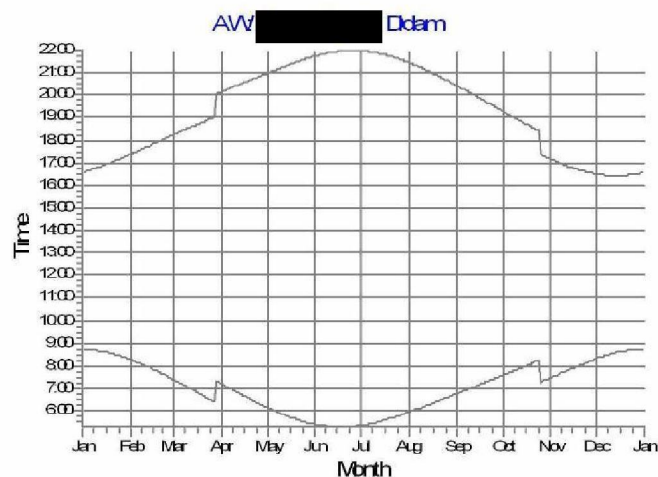
Senvion 3MM122, ashoogte: 120 meter

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+31 6 51 71 04 93

Calculated:  
4-5-2016 13:49/3.0.651

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



1: Locatie 1



2: Locatie 2



3: Locatie 3

Project:

**Bijvanck Vergunning**

Description:

Slagschaduwberekening

Senvion 3MM122, ashoogte: 120 meter

Licensed user:

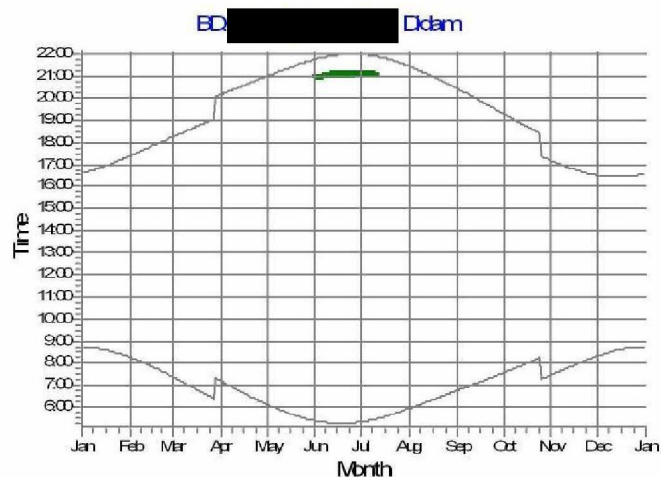
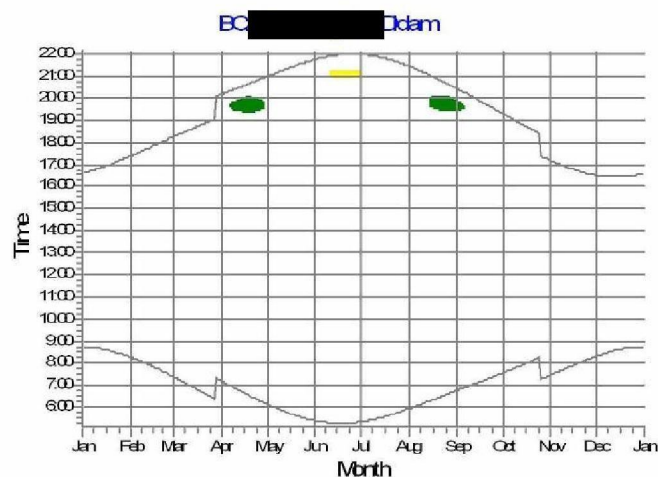
**Bosch & Van Rijn**  
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+31 6 51 71 04 93

Calculated:

4-5-2016 13:49/3.0.651

## SHADOW - Calendar, graphical

Calculation: Bijvanck Bovenvariant



WTGs



1: Locatie 1



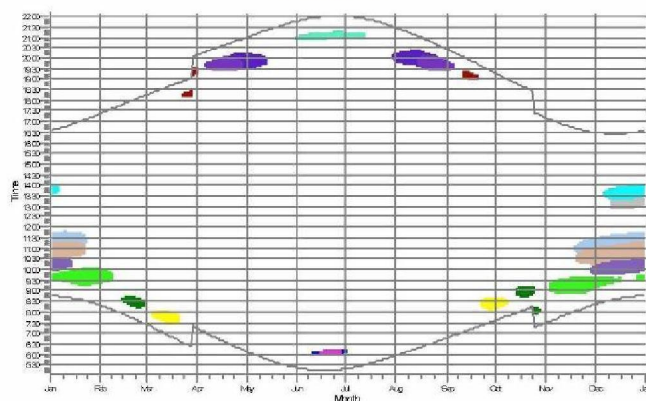
2: Locatie 2



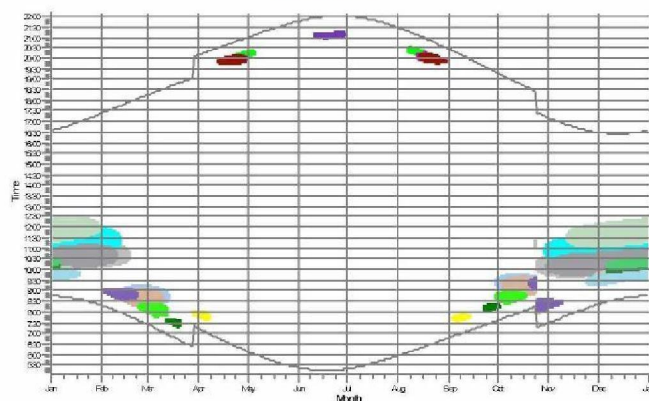
## SHADOW - Calendar per WTG, graphical

Calculation: Bijvanck Bovenvariant

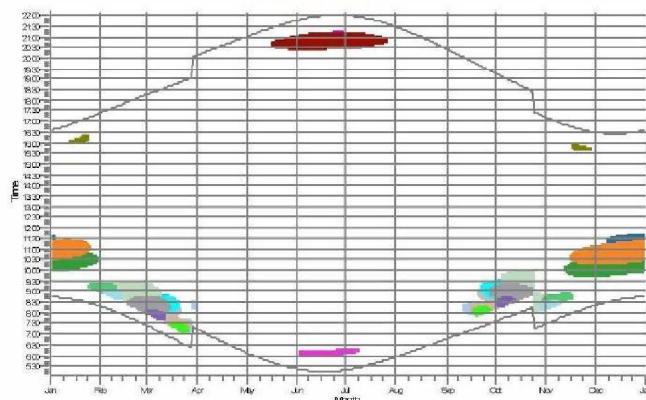
1: Locatie 1



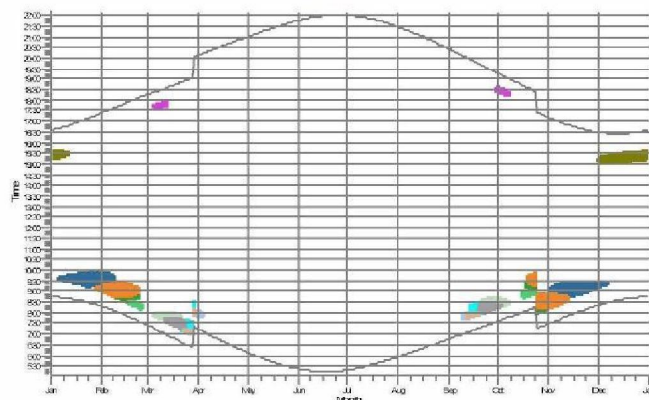
2: Locatie 2



3: Locatie 3



4: Locatie 4



### Shadow receptors

A: Broekzijpestraat 10: Angerlo	L: Broekzijpestraat 1: Angerlo	T: Didamsweg 19: Angerlo	AB: Kruisstraat 7: Angerlo	AQ: Truileweg 2: Didam
B: Broekzijpestraat 5: Angerlo	M: Broekzijpestraat 1A: Angerlo	Y: Ganspoelweg 7: Angerlo	AE: Kleine Veldstraat 7: Angerlo	AP: Truileweg 4: Didam
C: Kleine Veldstraat 6: Angerlo	N: Broekzijpestraat 2: Angerlo	W: Ganspoelweg 9: Angerlo	AS: Kruisstraat 6: Angerlo	AV: Truileweg 2a: Didam
E: Monseigneur Hendriksstraat 24: Wehl	O: Broekzijpestraat 3: Angerlo	X: Kruisstraat 1: Angerlo	AH: Kruisstraat 8: Angerlo	BC: Truileweg 2a: Didam
F: Monseigneur Hendriksstraat 26: Wehl	P: Broekzijpestraat 4: Angerlo	Y: Kruisstraat 3: Angerlo	AI: Periksestraat 4: Angerlo	BD: Boslegstraat 24: Didam
J: Monseigneur Hendriksstraat 31: Wehl	Q: Broekzijpestraat 6: Angerlo	Z: Kruisstraat 4: Angerlo	AM: Boslegstraat 22: Didam	
J: Eldikseweg 2: Angerlo	R: Broekzijpestraat 8: Angerlo	AA: Kruisstraat 5: Angerlo	AN: Boslegstraat 24: Didam	



## SHADOW - Map

Calculation: Bijvanck Bovenvariant



Map: Bitmap map: 40E\_Doesburg\_2006.tif , Print scale 1:40.000, Map center Dutch Stereo-RD/NAP 2000 East: 206.320 North: 443.560  
 New WTG Shadow receptor  
 Flicker map level: 0 m above sea level