Volkkilankankaan tuulivoimahanke, Kivijärvi

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Volkkilankankaan tuulivoimahanke

1 MELU- JA VARJOSTUSMALLINNUKSEN TAVOITTEET

Volkkilankankaan tuulivoimahankkeen hankeomistaja Winda Energy Oy suunnittelee hankevaihtoehdossa 1 (VE1) 15 voimalan rakentamista ja vaihtoehdossa 2 (VE2) 9 voimalan rakentamista Kivijärvelle. Lisäksi on mallinnettu meluvaikutukset hankevaihtoehdoille 1 ja 2 tilanteille, jolloin osa hankevaihtoehtojen voimaloista on sammutettu yön ajaksi ($VE1_{yö}$ ja $VE2_{yö}$). Tämä melu- ja varjostusmallinnusraportti on laadittu Volkkilankankaan tuulivoimahankkeen YVA-menettelyvaiheen sijoitussuunnitelmien perusteella.

Tuulivoimaloiden aiheuttamia meluvaikutuksia on arvioitu WindPRO-ohjelman DECIBEL-moduulilla. Tuulivoimaloiden aiheuttamat varjostusvaikutukset on mallinnettu WindPro-ohjelman SHADOW-moduulilla. Melu- ja varjostusmallinnukset on laatinut Aarni Nikkola ja laaduntarkastuksen on tehnyt Johanna Harju FCG Finnish Consulting Group Oy:stä.

2 LÄHTÖTIEDOT JA MENETELMÄT

2.1 Melu

2.1.1 Melumallinnus ISO 9613-2

Tuulivoimaloiden aiheuttamat äänenpainetasot on mallinnettu WindPRO-laskentaohjelman Decibel-moduulilla ISO 9613-2 standardin mukaisesti. Ympäristöhallinnon tuulivoimaloiden melun mallintamista koskevan ohjeen 2/2014 mukaisesti tuulen nopeutena käytettiin 10 m korkeudella mitattuna 8 m/s, ilman lämpötilana 15 °C, ilmanpaineena 101,325 kPa, ilman suhteellisena kosteutena 70 % ja maanpinnan kovuutena arvoa 0,4. Laskenta on tehty 4,0 m maan pinnan tasosta.

Volkkilankankaan tuulivoimaloiden äänenpainetasot on mallinnettu molemmissa vaihtoehdoissa voimalaitostyypillä Generic-10 MW, jonka napakorkeus on 200 metriä ja roottorinhalkaisija 250 metriä. Voimaloiden kokonaiskorkeus on näin ollen 325 metriä ja teho enimmillään 10 MW.

Voimalaitoksen Generic 250-10MW lähtömelutaso on 106,6 dB(A). Melun lähtöarvot perustuvat Nordex N163 -voimalamallin meluspektriin. Voimalaitosvalmistajan mukaan N163-6,8MW melutaso vastaa ylempää luottamusväliä 95 % ja on valmistajan mukaan melun takuuarvo, kun siihen lisätään 1,5 dB(A). Hankevastaavan pyynnöstä ei 1,5 dB(A) takuuarvoa ole lähtömelutasoon lisätty. Lähtömelutasoon on sen sijaan lisätty 2 dB(A):n varmuusarvo, sillä mallinnuksissa käytettävä voimala on kuvitteellinen, eikä olemassa oleva voimalamalli.

Melumallinnusten laskentatuloksia on havainnollistettu ns. keskiäänitasokarttojen avulla. Keskiäänitasokartoissa on melun keskiäänitaso- eli ekvivalenttiäänitasokäyrät (LAeq) 5 dB välein.

Taulukko 1. Volkkilankankaan tuulivoimahankkeen mallinnusohjelma ja tuulivoimaloiden äänitehotasot voimalaitoksella Generic 250–10 MW sekä melun erityispiirteet.

MALLINNUSOHJELMAN TIEDOT					
Mallinnusohjelma ja versio: WindPRO version 3.6.355				Mallinnusmenetelmä: ISO 9613-2	
TUULIVOIMALAN TIEDOT					
Tuulivoimalan valmistaja: Ei tietoa, laskennallinen malli				Tyyppi: Generic 250–10 MW	Sarjanumero/t:-
Nimellisteho: 10 MW		Napakorkeus: 200 m		Roottorin halkaisija: 250 m	Tornin tyyppi: teräs/hybridi
Mahdollisuudet vaikuttaa tuulivoimalan melupäästöön käytön aikana ja sen vaikutus meluun					
Lapakulman säätö		Pyörimisnopeus		Muu, mikä	
Kyllä	- dB	Kyllä	- dB	Noise mode säätö: Mode 0, STE	
~~Ei~~		~~Ei~~		Noise mode, lähtömelutaso	106,6 dB

AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT							
Third octave sound power levels F008_277_A17_EN, revision 05, 2022-07-18 **Taulukossa esitetään mallinnuksessa käytetty melupäästö varmuusarvoineen (+ 2,0 dB(A))**							
Oktaaveittain [Hz],dB(A)		1/3-oktaaveittain [Hz] LWA dB					
		20	76,5	200	96,2	1600	97,2
63	94,6	25	79,9	250	96,7	2000	95,8
125	99,3	31,5	81,8	315	97,5	2500	92,6
250	101,6	40	83	400	97,4	3150	89,3
500	102,1	50	84	500	97,2	4000	84,5
1000	102,5	63	90,3	630	97,5	5000	79,4
2000	100,4	80	92	800	97,7	6300	71,3
4000	90,9	100	92,6	1000	97,7	8000	62,6
8000	72	125	95,2	1250	97,9	10000	57,2
$L_{WA,tot}$ =108,6 dB(A)		160	95,2				

Melun erityispiirteiden mittaus ja havainnot:							
Kapeakaistaisuus / Tonaalisuus		Impulssimaisuus		Merkityksellinen sykintä (amplitudi-modulaatio)		Muu, Mikä:	
~~kyllä~~	ei	~~kyllä~~	ei	~~kyllä~~	ei	~~kyllä~~	ei

2.1.2 Matalataajuinen melu

Matalataajuinen melu laskettiin Ympäristöministeriön ohjeen 2/2014 mukaisin menetelmin käyttäen voimalavalmistajilta saatuja arvioita niiden äänitehotasoista.

Ohje 2/2014 antaa menetelmän matalataajuisen melun laskentaan rakennusten ulkopuolelle. Sosiaali- ja terveysministeriön Asumisterveysasetus 2015 antaa matalataajuiselle melulle toimenpiderajat asuinhuoneissa. Rakennusten sisälle kantautuva äänitaso arvioitiin Turun AMK:n (Keränen, Hakala ja Hongisto, 2018) julkistamien Anojanssi projektin tulosten mukaisten ääneneristävyysarvoin ja tuloksia verrattiin toimenpiderajoihin.

Taulukko 2. Suomalaisen pientalon julkisivun äänitasoeron alalikiarvo Anojanssi projektin tulosten mukaisesti.

f [Hz]	20	25	31.5	40	50	63	80	100	125	160	200
DLσ [dB]	7.6	8.3	9.2	10.3	11.5	13.0	14.8	16.8	18.8	21.1	22.8

Matalataajuisen melun laskelmassa huomioitiin maanpinnan muodon vaikutus ohjeen 4/2014 mukaisesti. Tulokset on esitetty taajuuskohtaisena taulukkona hankealuetta ympäröiville asuin- ja lomarakennuksille.

Taulukko 3. Käytetyt mallinnusparametrit ISO 9613-2 laskelmissa sekä melulle altistuvat kohteet.

AKUSTISET TIEDOT/LASKENNAN LÄHTÖTIEDOT			
Laskenta korkeus		Laskentaruudun koko [m·m]	
ISO 9613-2: 4,0 m		25x25 m	
Suhteellinen kosteus		Lämpötila	
70 %	Muu, mikä ja miksi:	ISO 9613-2: 15 C°	
Maastomallin lähde ja tarkkuus			
Maastomallin lähde: MML maastotietokanta		Vaakaresoluutio:1,0	Pystyresoluutio:0,5
Maan- ja vedenpinnan absorption ja heijastuksen huomioiminen, käytetyt kertoimet			
ISO 9613-2	0,4; 0		HUOM
Ilmakehän stabiilius laskennassa/meteorologinen korjaus			
Neutraali, (0): Neutraali		Muu, mikä ja miksi:	
Sääolosuhteiden huomiointi; laskennassa käytetty tuulen suunnat ja nopeus			
Tuulen suunta: 0-360°		Tuulen nopeus: 10 metrin korkeudella mitattuna 8 m/s	
Voimalan äänen suuntaavuus ja vaimentuminen			
Vapaa avaruus: kyllä		Muu, mikä, miksi:	

2.2 Varjostusmallinnus

Taulukko 4. Volkkilankankaan tuulivoimahankkeen mallinnusohjelma ja tuulivoimaloiden koko varjostusmallinnuksissa.

MALLINNUSOHJELMAN TIEDOT			
Mallinnusohjelma ja versio: WindPRO version 3.6.355		Mallinnusmenetelmä: ISO 9613-2	
TUULIVOIMALAN (TUULIVOIMALOIDEN TIEDOT)			
Tuulivoimalan valmistaja: Generic		Tyyppi: RD250	Sarjanumero/t:-
Nimellisteho: 10 MW	Napakorkeus: 200 m	Roottorin halkaisija: 250 m	Tornin tyyppi: teräs/hybridi

Tuulivoimaloiden varjostusvaikutukset on mallinnettu käyttäen roottorinhalkaisijaltaan 250 metristä voimalaitosta 200 metriä korkealla tornilla. Kokonaiskorkeudeltaan voimala on mallinnuksissa 325 metriä.

Varjostusvaikutuksia mallinnettiin WindPRO-ohjelman Shadow-moduulilla. Laskennassa varjot huomioidaan, kun aurinko on yli 3 astetta horisontin yläpuolella. Varjoksi lasketaan tilanne, jossa siipi peittää vähintään 20 % auringosta.

Varjostusmallinnuksessa huomioidaan siiven lavan maksimileveys sekä siiven kärjen leveys 90 % etäisyydellä turbiinista. Mallinnuksessa siiven oletetaan kapenevan lineaarisesti kohti kärjen leveysarvoa. Volkkilankankaan varjostusmallinnuksessa on käytetty siiven lavan maksimileveytenä 6,32 metriä ja siiven kärjen leveytenä 1,83 metriä.

Varjostusmallin laskennassa on huomioitu hankealueen korkeustiedot, tuulivoimaloiden sijainnit, tuulivoimalan napakorkeudet ja roottorin halkaisija sekä hankealueen aikavyöhyke. Mallinnuksessa otettiin huomioon auringon asema horisontissa eri kellon- ja vuodenaikoina, pilvisyys kuukausittain eli kuinka paljon aurinko paistaa ollessaan horisontin yläpuolella sekä tuulivoimalaitosten arvioitu vuotuinen käyntiaika.

Varjostuksen tarkastelukorkeutena lähialueen asuin- tai lomarakennusten pihapiirissä käytettiin 1,0 metriä ja laskenta-alueen kokoa 5,0 x 5,0 metriä. Laskentaikkunoiden suunnat asennettiin voimaloita kohti ns. ”greenhouse mode”.

Mallinnus tehtiin niin sanotulle todelliselle tilanteelle (real case). Mallinnus tehtiin kahdelle eri laskentatilanteelle:

1) Todellinen tilanne, jossa puuston suojaavaa vaikutusta ei huomioitu (real case, no forest)

2) Todellinen tilanne, jossa puuston suojaava vaikutus on huomioitu (real case, forest). Puuston korkeustiedot perustuvat Luonnonvarakeskus (Luke) vuoden 2021 monilähteiseen valtakunnan metsien inventointiin (MVMI), jossa käytetään valtakunnan metsien inventoinnin (VMI) maastomittausten lisäksi satelliittikuvia ja muita tietolähteitä, kuten Maanmittauslaitoksen numeerista maastotietokantaa ja korkeusmallia.

Auringon keskimääräiset paistetunnit perustuvat Jyväskylän lentoaseman sääaseman mitattuihin säätietoihin 1991–2010. Laskentojen tuulen suunta ja nopeusjakaumana käytettiin NASA:n MERRA-dataa (Modern Era Retrospective-analysis for Research and Applications) hankealueen läheisyydeltä.

Varjostusmallinnuksen tuloksia on havainnollistettu kartan avulla. Kartalla esitetään varjostusvaikutuksen (1, 8 ja 20 tuntia vuodessa) laajuus. Sen lisäksi mallinnuksessa on erikseen laskettu vaikutus tuulivoimahankealueen ympäristössä oleviin herkkiin kohteisiin.

2.3 Raja- ja ohjearvot

2.3.1 Melu

Valtioneuvoston asetuksessa (1107/2015) tuulivoimaloille on määritelty suunnitteluarvot päivä- ja yöajan keskiäänitasojen maksimiarvolle. Jos tuulivoimalan melu sisältää tonaalisia, kapeakaistaisia tai impulssimaisia komponentteja, tai se on selvästi amplitudimoduloitunutta, mallinnustuloksiin tulee ohjeen mukaan lisätä viisi desibeliä ennen ohjearvoon vertaamista. Koska ohjearvo sisältää jo tyypillisen tuulivoimamelun piirteet, edellä mainitut äänenpiirteiden tulee olla tuulivoimalalle epätyypillisen voimakkaita, jotta mallinnustuloksissa täytyy huomioida viiden desibelin lisä äänenvoimakkuuteen.

Taulukko 5. Valtioneuvoston asetuksen mukaiset tuulivoimaloiden melutason ohjearvot (Valtioneuvoston asetus 27.8.2015).

Vaikutuskohde	Päivä (7-22)	Yö (22-7)
Pysyvä asutus	45 dB	40 dB
Loma-asutus	45 dB	40 dB
Hoitolaitokset	45 dB	40 dB
Oppilaitokset	45 dB	—
Virkistysalueet	45 dB	—
Leirintäalueet	45 dB	40 dB
Kansallispuistot	40 dB	40 dB

Sosiaali- ja terveysministeriön asetuksessa (545/2015) on annettu matalataajuiselle melulle toimenpiderajoja. Toimenpiderajat koskevat asuinhuoneita ja ne on annettu taajuuspainottamattomina yhden tunnin keskiäänitasoina tersseittäin. Toimenpiderajat koskevat yöaikaa ja päivällä sallitaan 5 dB suuremmat arvot.

Taulukko 6. Matalataajuisen sisämelun tunnin keskiäänitason toimenpiderajat nukkumiseen tarkoitetuissa tiloissa.

Terssikaista Hz	20	25	31,5	40	50	63	80	100	125	160	200
Keskiäänitaso LZeq,1h, dB	74	64	56	49	44	42	40	38	36	34	32
Edellisestä laskettu keskiäänitaso A-painotettuna LAeq,1h, dB	24	19	17	14	14	16	18	19	20	21	21

Lisäksi yöaikainen mahdollisesti unihäiriötä aiheuttava melu, joka erottuu selvästi taustamelusta, ei saa ylittää 25 dB yhden tunnin keskiäänitasona LAeq,1h mitattuna niissä tiloissa, jotka on tarkoitettu nukkumiseen.

2.3.2 Varjostus

Suomessa ei ole viranomaisten antamia yleisiä määräyksiä tuulivoimaloiden muodostaman varjostuksen enimmäiskestoista eikä varjonmuodostuksen arviointiperusteista. Ympäristöministeriön tuulivoimarakentamisen suunnitteluohjeistuksessa esitetään käytettäväksi muiden maiden suosituksia välkkeen rajoittamisesta (Ympäristöministeriö 2012).

Useissa maissa on annettu raja-arvoja tai suosituksia hyväksyttävän välkevaikutuksen määrästä. Esimerkiksi Ruotsissa suositus on kahdeksan tuntia vuodessa ja 30 minuuttia päivässä.

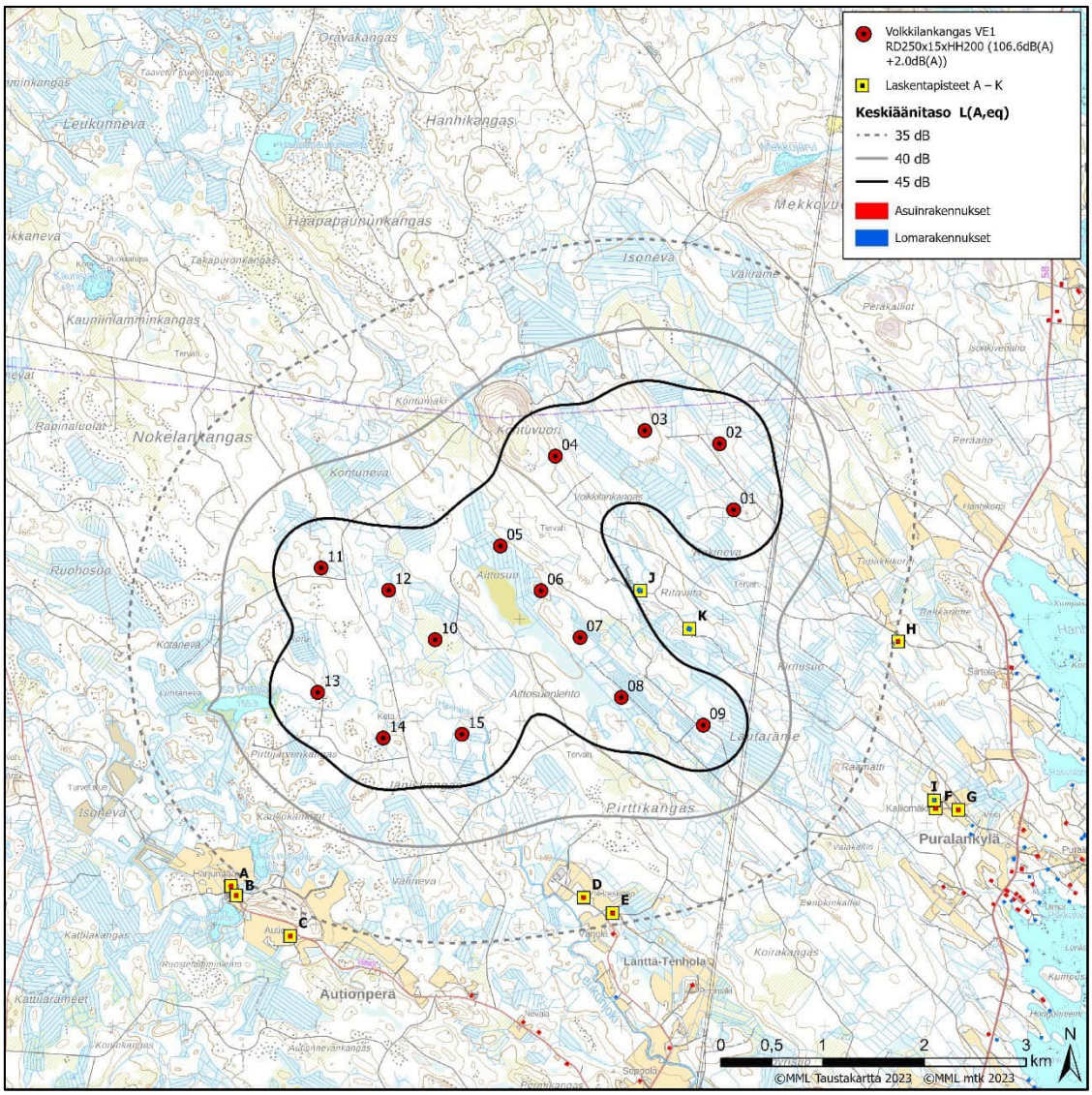
Arvioinnissa on tarkasteltu vaikutuksia alueella, jossa varjoja tai välkettä mallinnuksen mukaisessa todellisessa tilanteessa (”real case”) esiintyy vähintään kahdeksan tuntia vuodessa.

3 MELU- JA VARJOSTUSMALLINNUSTEN TULOKSET

3.1 Melumallinnus

3.1.1 Melun laskentatulokset ISO 9613-2 voimalaitoksella Generic 250–10 MW (106,6 dB + 2,0 dB)

Vaihtoehdon 1 (VE1) melumallinnuksen mukaan melutaso 40 dB(A) ylittyy lähimmillä lomarakennuksilla laskentapisteissä Lomarakennus J (44,6 dB(A)) ja Lomarakennus K (43,3 dB(A)), (Kuva 1 ja Taulukko 7). Katso tarkemmat laskentatulokset liitteestä 1.

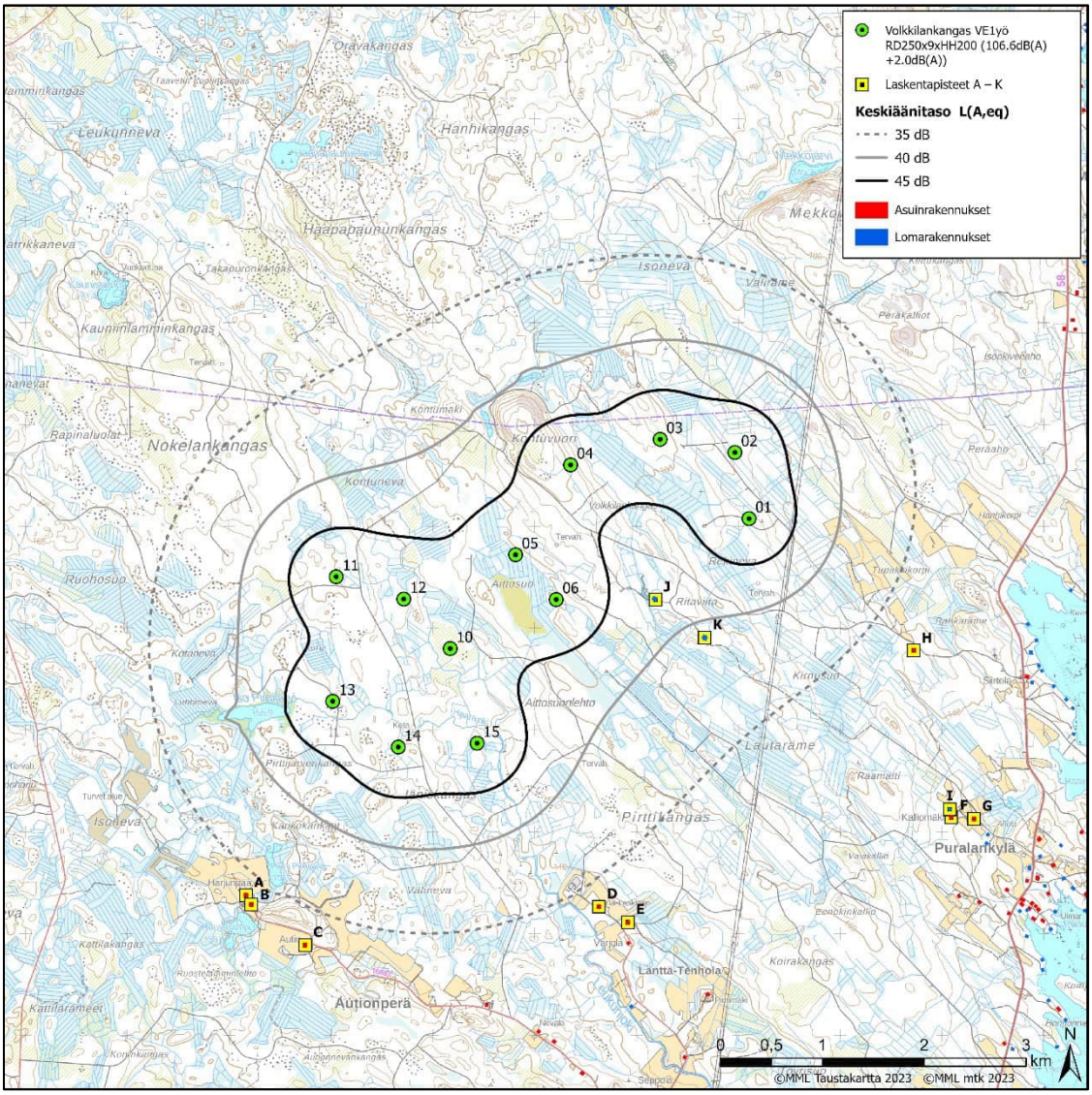


Kuva 1. Melumallinnuksen tulos VE1.

Taulukko 7. Laskennalliset melutasot Volkkilankankaan tuulivoimahankkeen ympäristössä voimalaitoksella Generic 250–10 MW hankevaihtoehdossa 1 (VE1).

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskenta-korkeus (m)	Melutaso dB(A)
Asuinrakennus A	396166	7008378	162,5	4,0	34,4
Asuinrakennus B	396217	7008287	162,5	4,0	34,2
Asuinrakennus C	396747	7007888	163,3	4,0	33,9
Asuinrakennus D	399630	7008266	138,6	4,0	36,3
Asuinrakennus E	399915	7008113	140	4,0	35,5
Asuinrakennus F	403090	7009142	142,5	4,0	31,7
Asuinrakennus G	403314	7009127	140,4	4,0	31,0
Asuinrakennus H	402721	7010782	147,5	4,0	34,8
Lomarakennus I	403075	7009222	142,5	4,0	31,9
Lomarakennus J	400187	7011281	167	4,0	44,6
Lomarakennus K	400669	7010907	163,8	4,0	43,3

Vaihtoehdosta 1 tehtiin lisäksi mallinnus, jossa voimalat 7, 8 ja 9 ovat sammutettuina ($VE1_{yö}$). Tämän melumallinnuksen mukaan melutaso 40 dB(A) ylittyy lähimmällä lomarakennuksella laskentapisteessä Lomarakennus J (41,8 dB(A)), (Kuva 2 ja Taulukko 8). Katso tarkemmat laskentatulokset liitteestä 2.

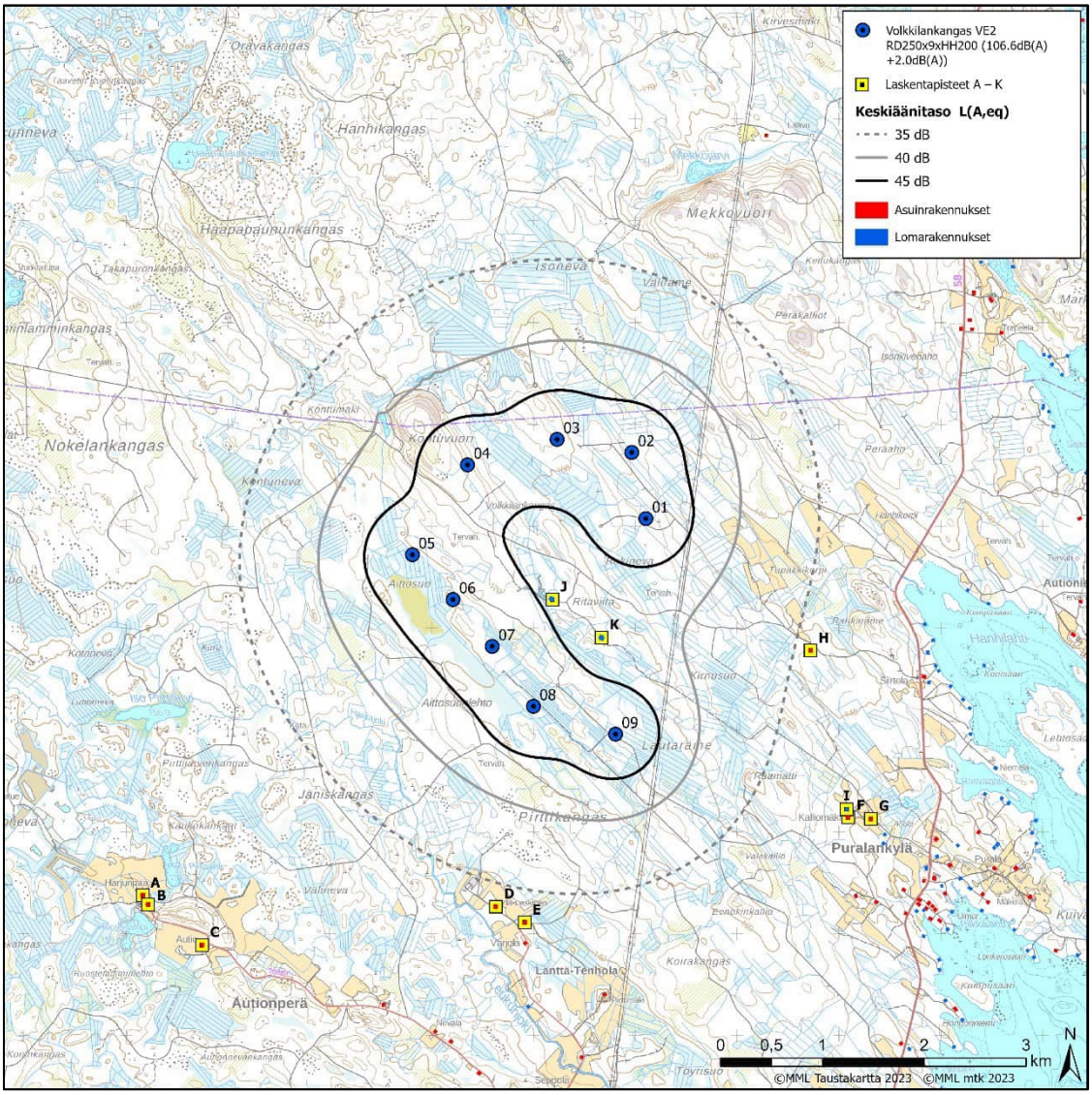


Kuva 2. Melumallinnuksen tulos VE1yö.

Taulukko 8. Laskennalliset melutasot Volkkilankankaan tuulivoimahankkeen ympäristössä voimalaitoksella Generic 250–10 MW hankevaihtoehdossa 1, kun voimalat 7, 8 ja 9 ovat sammutettuina ($VE1_{yö}$).

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskenta-korkeus (m)	Melutaso dB(A)
Asuinrakennus A	396166	7008378	162,5	4,0	34,0
Asuinrakennus B	396217	7008287	162,5	4,0	33,8
Asuinrakennus C	396747	7007888	163,3	4,0	33,4
Asuinrakennus D	399630	7008266	138,6	4,0	33,9
Asuinrakennus E	399915	7008113	140	4,0	32,8
Asuinrakennus F	403090	7009142	142,5	4,0	28,8
Asuinrakennus G	403314	7009127	140,4	4,0	28,3
Asuinrakennus H	402721	7010782	147,5	4,0	32,8
Lomarakennus I	403075	7009222	142,5	4,0	28,9
Lomarakennus J	400187	7011281	167	4,0	41,8
Lomarakennus K	400669	7010907	163,8	4,0	39,2

Vaihtoehdon 2 (VE2) melumallinnuksen mukaan melutaso 40 dB(A) ylittyy lähimmillä asuin- ja loma-rakennuksilla laskentapisteissä Lomarakennus J (44,2 dB(A)) ja Lomarakennus K (42,9 dB(A)), (Kuva 3 ja Taulukko 9). Katso tarkemmat laskentatulokset liitteestä 3.

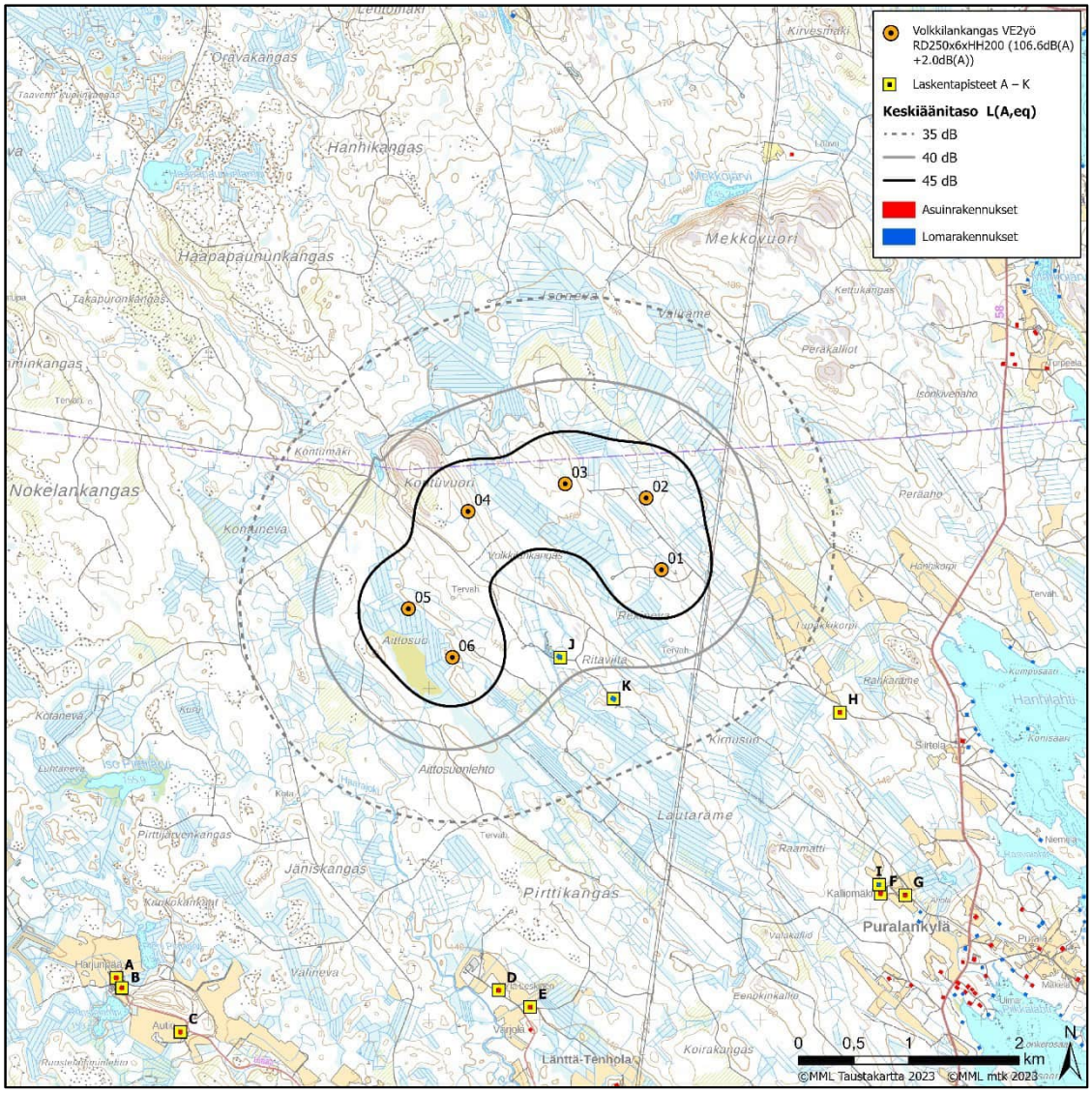


Kuva 3. Melumallinnuksen tulos VE2.

Taulukko 9. Laskennalliset melutasot Volkkilankankaan tuulivoimahankkeen ympäristössä voimalaitoksella Generic 250–10 MW hankevaihtoehdossa 2 (VE2).

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskenta-korkeus (m)	Melutaso dB(A)
Asuinrakennus A	396166	7008378	162,5	4,0	27,5
Asuinrakennus B	396217	7008287	162,5	4,0	27,4
Asuinrakennus C	396747	7007888	163,3	4,0	27,7
Asuinrakennus D	399630	7008266	138,6	4,0	33,9
Asuinrakennus E	399915	7008113	140	4,0	33,4
Asuinrakennus F	403090	7009142	142,5	4,0	30,9
Asuinrakennus G	403314	7009127	140,4	4,0	30,2
Asuinrakennus H	402721	7010782	147,5	4,0	34,3
Lomarakennus I	403075	7009222	142,5	4,0	31,1
Lomarakennus J	400187	7011281	167	4,0	44,2
Lomarakennus K	400669	7010907	163,8	4,0	42,9

Vaihtoehdosta 2 tehtiin lisäksi mallinnus, jossa voimalat 7, 8 ja 9 ovat sammutettuina ($VE2_{yö}$). Tämän melumallinnuksen mukaan melutaso 40 dB(A) ylittyy lähimmällä lomarakennuksella laskentapisteessä Lomarakennus J (41,1 dB(A)), (Kuva 4 ja Taulukko 10). Katso tarkemmat laskentatulokset liitteestä 4.



Kuva 4. Melumallinnuksen tulos VE2yö.

Taulukko 10. Laskennalliset melutasot Volkkilankankaan tuulivoimahankkeen ympäristössä voimalaitoksella Generic 250–10 MW hankevaihtoehdossa 2, kun voimalat 7, 8 ja 9 ovat sammutettuina (VE2yö).

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskenta-korkeus (m)	Melutaso dB(A)
Asuinrakennus A	396166	7008378	162,5	4,0	25,1
Asuinrakennus B	396217	7008287	162,5	4,0	25,0
Asuinrakennus C	396747	7007888	163,3	4,0	25,0
Asuinrakennus D	399630	7008266	138,6	4,0	28,4
Asuinrakennus E	399915	7008113	140	4,0	27,9
Asuinrakennus F	403090	7009142	142,5	4,0	27,0
Asuinrakennus G	403314	7009127	140,4	4,0	26,5
Asuinrakennus H	402721	7010782	147,5	4,0	31,9
Lomarakennus I	403075	7009222	142,5	4,0	27,2
Lomarakennus J	400187	7011281	167	4,0	41,1
Lomarakennus K	400669	7010907	163,8	4,0	38,4

3.1.2 Matalataajuiset melutasot voimalaitoksella Generic 250–10 MW (106,6 dB + 2,0 dB)

Sisätilojen laskennallisia tuloksia on verrattu Sosiaali- ja terveysministeriön (STM) Asumisterveysasetuksessa (545/2015) annettuihin toimenpiderajoihin. Nämä ovat enimmäisarvoja, jotka on laadittu yöaikaiselle melulle nukkumiseen tarkoitettuihin tiloihin. Toimenpiderajaa on verrattu myös äänitasoon tarkasteltujen rakennusten ulkopuolella.

Mallinnettaessa Volkkilankankaan tuulivoimahankkeen matalataajuisia melutasoja voimalaitostyypillä Generic 250–10 MW vaihtoehdossa 1 (VE1) ja vaihtoehdossa 2 (VE2) matalataajuinen melu ylittää Sosiaali- ja terveysministeriön asumisterveysohjearvon laskentapisteissä lomarakennus J ja lomarakennus K. Mallinnettaessa matalataajuisia melutasoja hankevaihtoehdossa 1 voimalat 7, 8 ja 9 sammutettuina (VE1yö), ylittyy matalataajuisen melun asumisterveysohjearvo laskentapisteessä lomarakennus J. Mallinnettaessa matalataajuisia melutasoja vaihtoehdossa 2 voimalat 7, 8 ja 9 sammutettuina (VE2yö), matalataajuisen melun asumisterveysarvo ei ylity laskentapisteissä A–K.

Taulukoissa 11–14 on esitetty matalataajuisen melun laskentatulokset vaihtoehdoissa VE1, VE1yö, VE2 ja VE2yö. Taulukoissa näkyy toimenpiderajan alitus (negatiivinen arvo) tai ylitys (positiivinen arvo). Rakennusten sisätiloissa melu on enimmillään 3,2 dB yli toimenpiderajan taajuudella 63 Hz (Lomarakennus J vaihtoehdossa 1 (VE1)). Katso tarkemmat laskentatulokset liitteistä 5–8.

Taulukko 11. Matalataajuisen melun laskentatulokset VE1.

Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	L eq,1h – Asumisterveysasetus sisällä	Hz	L eq,1h – Asumisterveysasetus sisällä	Hz
Asuinrakennus A	8,4	63	-4,6	63
Asuinrakennus B	8,3	63	-4,7	63
Asuinrakennus C	8,1	63	-4,9	63
Asuinrakennus D	10,0	63	-3,0	63
Asuinrakennus E	9,4	63	-3,6	63
Asuinrakennus F	6,6	63	-6,4	63
Asuinrakennus G	6,1	63	-6,9	63
Asuinrakennus H	8,8	63	-4,2	63
Lomarakennus I	6,7	63	-6,3	63
Lomarakennus J	16,2	63	3,2	63
Lomarakennus K	15,2	63	2,2	63

Taulukko 12. Matalataajuisen melun laskentatulokset VE1yö.

Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	L eq,1h – Asumisterveysasetus sisällä	Hz	L eq,1h – Asumisterveysasetus sisällä	Hz
Asuinrakennus A	7,9	63	-5,1	63
Asuinrakennus B	7,7	63	-5,3	63
Asuinrakennus C	7,5	63	-5,5	63
Asuinrakennus D	8,0	63	-5,0	63
Asuinrakennus E	7,3	63	-5,7	63
Asuinrakennus F	4,3	63	-8,7	63
Asuinrakennus G	4,0	63	-9,0	63
Asuinrakennus H	7,1	63	-5,9	63
Lomarakennus I	4,4	63	-8,6	63
Lomarakennus J	13,9	63	0,9	63
Lomarakennus K	12,0	63	-1,0	63

Taulukko 13. Matalataajuisen melun laskentatulokset VE2.

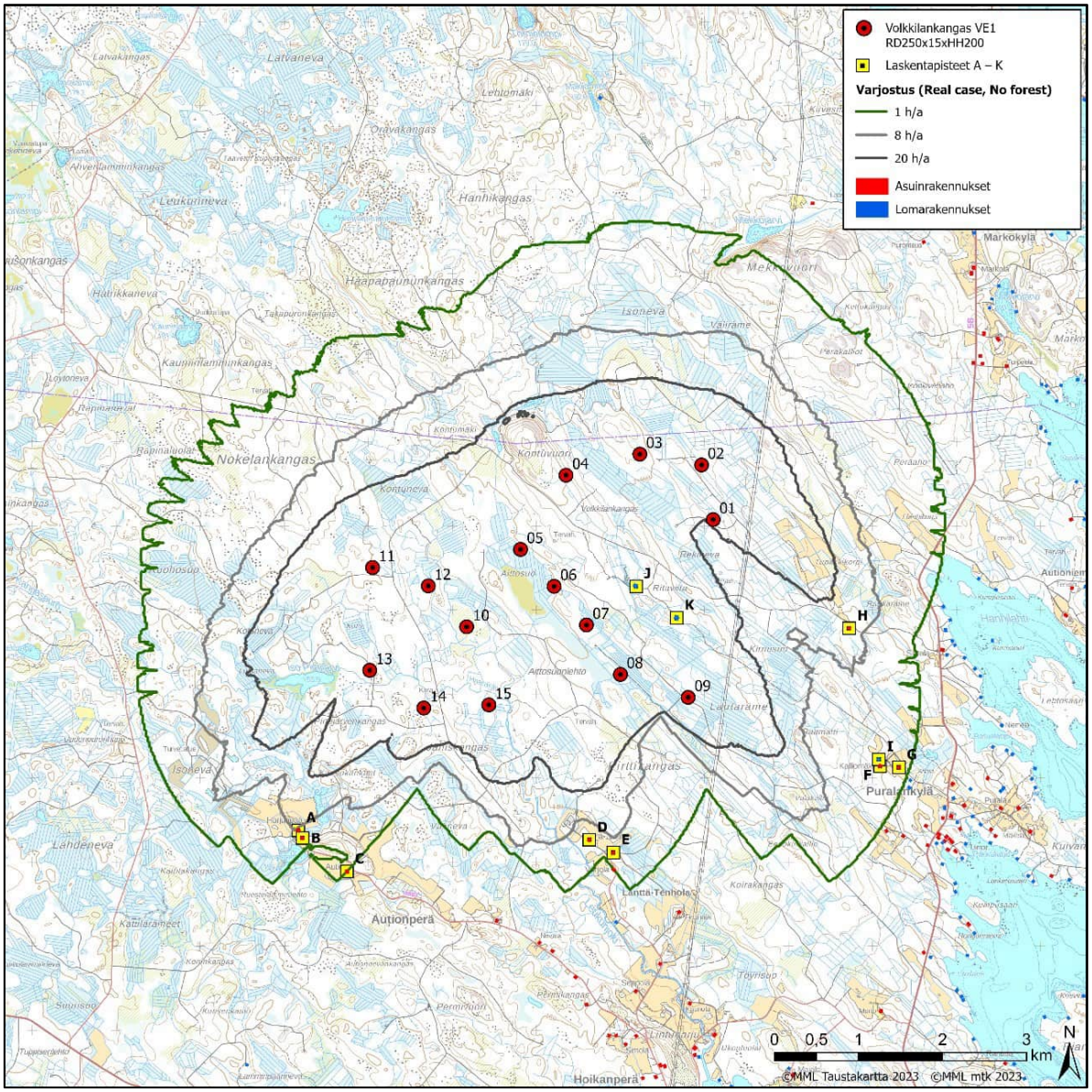
Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	L eq,1h – Asumisterveysasetus sisällä	Hz	L eq,1h – Asumisterveysasetus sisällä	Hz
Asuinrakennus A	3,0	63	-10,0	63
Asuinrakennus B	3,0	63	-10,0	63
Asuinrakennus C	3,2	63	-9,8	63
Asuinrakennus D	7,6	63	-5,4	63
Asuinrakennus E	7,3	63	-5,7	63
Asuinrakennus F	5,5	63	-7,5	63
Asuinrakennus G	5,0	63	-8,0	63
Asuinrakennus H	8,1	63	-4,9	63
Lomarakennus I	5,6	63	-7,4	63
Lomarakennus J	15,7	63	2,7	63
Lomarakennus K	14,6	63	1,6	63

Taulukko 14. Matalataajuisen melun laskentatulokset VE2yö.

Rakennus	Äänitaso ulkona		Äänitaso sisällä	
	L eq,1h – Asumisterveysasetus sisällä	Hz	L eq,1h – Asumisterveysasetus sisällä	Hz
Asuinrakennus A	0,7	63	-12,3	63
Asuinrakennus B	0,7	63	-12,3	63
Asuinrakennus C	0,7	63	-12,3	63
Asuinrakennus D	3,3	63	-9,7	63
Asuinrakennus E	2,9	63	-10,1	63
Asuinrakennus F	2,3	63	-10,7	63
Asuinrakennus G	1,9	63	-11,1	63
Asuinrakennus H	5,8	63	-7,2	63
Lomarakennus I	2,4	63	-10,6	63
Lomarakennus J	12,8	63	-0,2	63
Lomarakennus K	10,7	63	-2,3	63

3.2 Varjostusmallinnus voimalaitoksella Generic RD250 HH200

Vaihtoehdossa 1 (VE1) lähimpien asuin- ja lomarakennusten pihapiirissä varjostusvaikutus on yli 8 h/a laskentapisteissä asuinrakennus H (14 h 25 min/vuosi), lomarakennus J (62 h 7 min/vuosi), lomarakennus K (41 h 47 min/vuosi), kun puuston suojaavaa vaikutusta ei ole huomioitu. (Kuva 5, Taulukko 15) Katso tarkemmat laskentatulokset liitteestä 9.

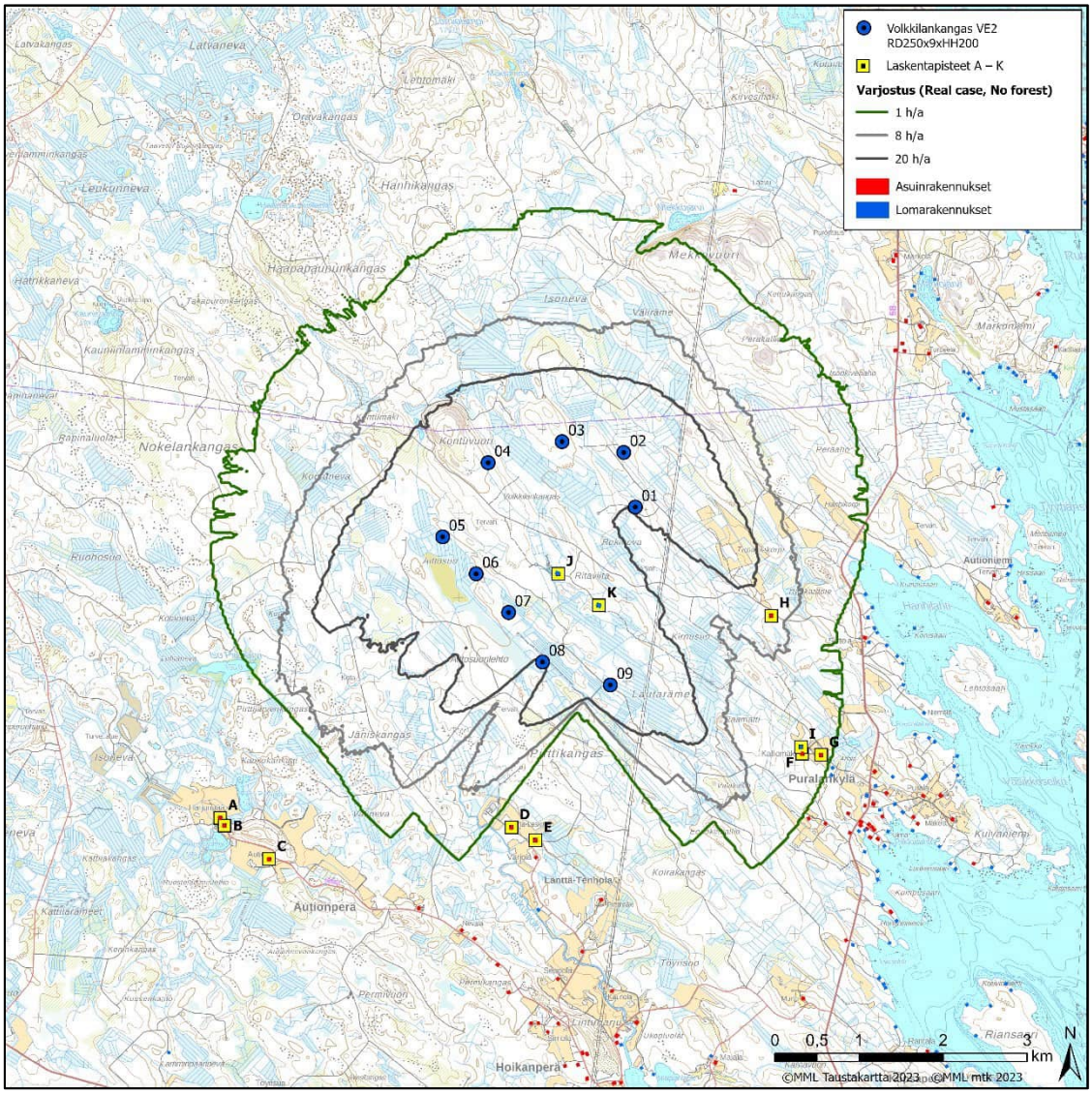


Kuva 5. Varjostusmallinnuksen tulos, kun puuston suojaavaa vaikutusta ei ole huomioitu hankevaihtoehdossa VE1.

Taulukko 15. Varjostusmallinnuksen tulos VE1, kun puuston suojaavaa vaikutusta ei ole huomioitu "real case, no forest".

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikkuna (m)	Varjostus (h/a)
Asuinrakennus A	396166	7008378	162,5	5,0 x 5,0	7:37
Asuinrakennus B	396217	7008287	162,5	5,0 x 5,0	5:56
Asuinrakennus C	396747	7007888	163,3	5,0 x 5,0	0:56
Asuinrakennus D	399630	7008266	138,6	5,0 x 5,0	5:22
Asuinrakennus E	399915	7008113	140	5,0 x 5,0	3:24
Asuinrakennus F	403090	7009142	142,5	5,0 x 5,0	2:26
Asuinrakennus G	403314	7009127	140,4	5,0 x 5,0	1:53
Asuinrakennus H	402721	7010782	147,5	5,0 x 5,0	14:25
Lomarakennus I	403075	7009222	142,5	5,0 x 5,0	2:25
Lomarakennus J	400187	7011281	167	5,0 x 5,0	62:07
Lomarakennus K	400669	7010907	163,8	5,0 x 5,0	41:47

Vaihtoehdossa 2 (VE2) lähimpien asuin- ja lomarakennusten pihapiirissä varjostusvaikutus on yli 8 h/a laskentapisteissä asuinrakennus H (14 h 25 min/vuosi), lomarakennus J (59 h 12 min/vuosi), lomarakennus K (40 h 18 min/vuosi), kun puuston suojaavaa vaikutusta ei ole huomioitu. (Kuva 6, Taulukko 16) Katso tarkemmat laskentatulokset liitteestä 10.

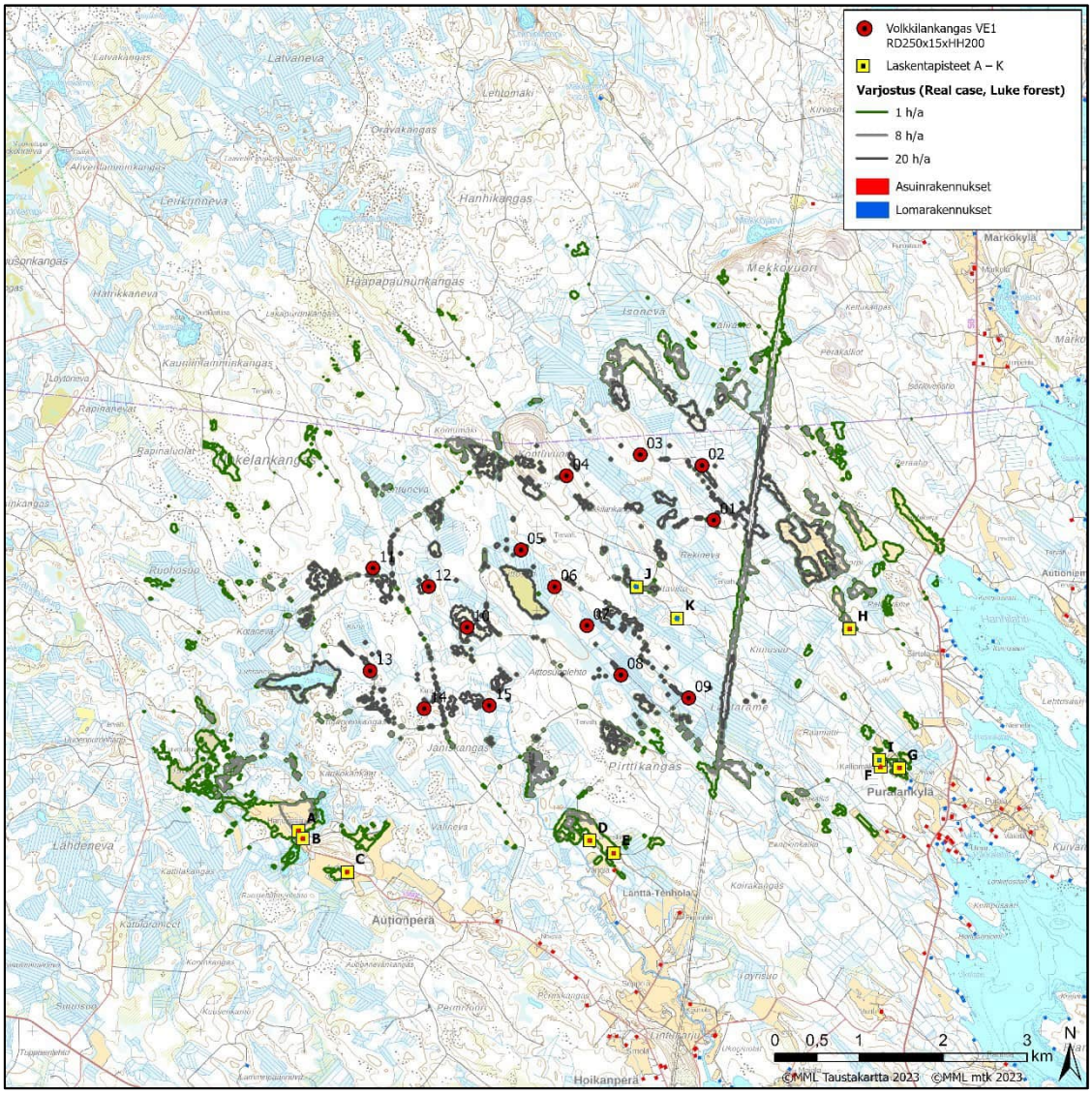


Kuva 6. Varjostusmallinnuksen tulos, kun puuston suojaavaa vaikutusta ei ole huomioitu hankevaihtoehdossa VE2.

Taulukko 16. Varjostusmallinnuksen tulos VE2, kun puuston suojaavaa vaikutusta ei ole huomioitu "real case, no forest".

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikkuna (m)	Varjostus (h/a)
Asuinrakennus A	396166	7008378	162,5	5,0 x 5,0	0:00
Asuinrakennus B	396217	7008287	162,5	5,0 x 5,0	0:00
Asuinrakennus C	396747	7007888	163,3	5,0 x 5,0	0:00
Asuinrakennus D	399630	7008266	138,6	5,0 x 5,0	0:00
Asuinrakennus E	399915	7008113	140	5,0 x 5,0	0:00
Asuinrakennus F	403090	7009142	142,5	5,0 x 5,0	2:26
Asuinrakennus G	403314	7009127	140,4	5,0 x 5,0	1:53
Asuinrakennus H	402721	7010782	147,5	5,0 x 5,0	14:25
Lomarakennus I	403075	7009222	142,5	5,0 x 5,0	2:25
Lomarakennus J	400187	7011281	167	5,0 x 5,0	59:12
Lomarakennus K	400669	7010907	163,8	5,0 x 5,0	40:18

Huomioitaessa puuston suojaava vaikutus (Luonnonvarakeskuksen puuston keskipituusaineisto 2021) vaihtoehdossa 1 (VE1), ylittää varjostusvaikutus 8 h/a laskentapisteissä asuinrakennus H (14h 25 min/vuosi) ja lomarakennus J (13 h 48 min/vuosi) (Kuva 7, Taulukko 17). Katso tarkemmat laskentatulokset liitteestä 11.

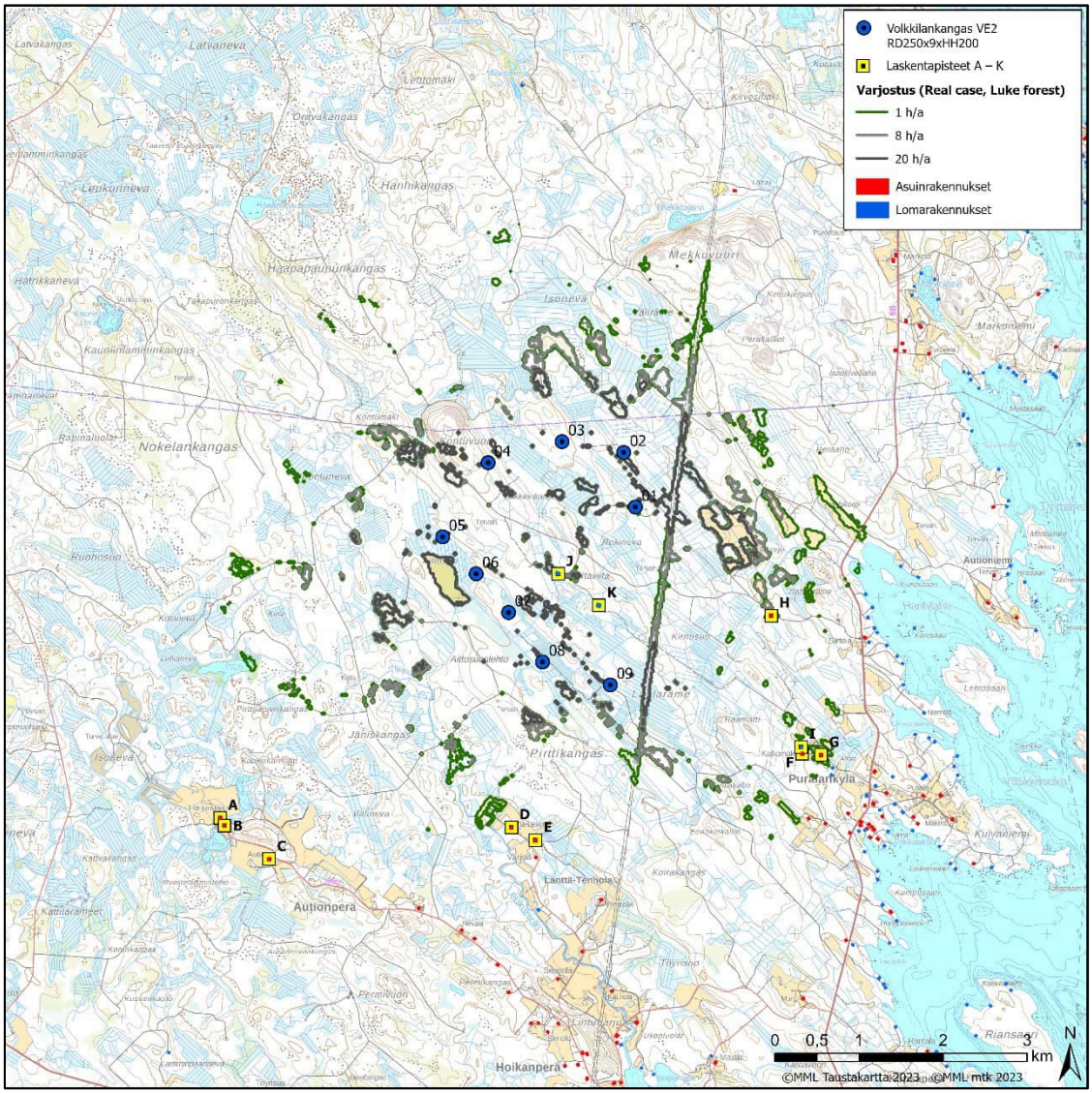


Kuva 7. Varjostusmallinnuksen tulos, kun puuston suojaava vaikutus on huomioitu hankevaihtoehdossa VE1.

Taulukko 17. Varjostusmallinnuksen tulos VE1, kun puuston suojaava vaikutus on huomioitu "real case, Luke forest".

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikkuna (m)	Varjostus (h/a)
Asuinrakennus A	396166	7008378	162,5	5,0 x 5,0	7:37
Asuinrakennus B	396217	7008287	162,5	5,0 x 5,0	3:09
Asuinrakennus C	396747	7007888	163,3	5,0 x 5,0	0:56
Asuinrakennus D	399630	7008266	138,6	5,0 x 5,0	4:27
Asuinrakennus E	399915	7008113	140	5,0 x 5,0	0:00
Asuinrakennus F	403090	7009142	142,5	5,0 x 5,0	0:00
Asuinrakennus G	403314	7009127	140,4	5,0 x 5,0	1:53
Asuinrakennus H	402721	7010782	147,5	5,0 x 5,0	14:25
Lomarakennus I	403075	7009222	142,5	5,0 x 5,0	0:00
Lomarakennus J	400187	7011281	167	5,0 x 5,0	13:48
Lomarakennus K	400669	7010907	163,8	5,0 x 5,0	0:00

Huomioitaessa puuston suojaava vaikutus (Luonnonvarakeskuksen puuston keskipituusaineisto 2021) vaihtoehdossa 2 (VE2), ylittää varjostusvaikutus 8 h/a laskentapisteissä asuinrakennus H (14 h 25 min/vuosi) ja lomarakennus J (13 h 48 min/vuosi). (Kuva 8, Taulukko 18) Katso tarkemmat laskentatulokset liitteestä 12.



Kuva 8. Varjostusmallinnuksen tulos, kun puuston suojaava vaikutus on huomioitu hankevaihtoehdossa VE2.

Taulukko 18. Varjostusmallinnuksen tulos VE2, kun puuston suojaava vaikutus on huomioitu "real case, Luke forest".

	ETRS89-TM35 Itä	ETRS89-TM35 Pohjoinen	Z (m)	Laskentaikkuna (m)	Varjostus (h/a)
Asuinrakennus A	396166	7008378	162,5	5,0 x 5,0	0:00
Asuinrakennus B	396217	7008287	162,5	5,0 x 5,0	0:00
Asuinrakennus C	396747	7007888	163,3	5,0 x 5,0	0:00
Asuinrakennus D	399630	7008266	138,6	5,0 x 5,0	0:00
Asuinrakennus E	399915	7008113	140	5,0 x 5,0	0:00
Asuinrakennus F	403090	7009142	142,5	5,0 x 5,0	0:00
Asuinrakennus G	403314	7009127	140,4	5,0 x 5,0	1:53
Asuinrakennus H	402721	7010782	147,5	5,0 x 5,0	14:25
Lomarakennus I	403075	7009222	142,5	5,0 x 5,0	0:00
Lomarakennus J	400187	7011281	167	5,0 x 5,0	13:48
Lomarakennus K	400669	7010907	163,8	5,0 x 5,0	0:00

FCG Finnish Consulting Group Oy

Aarni Nikkola, ins. AMK
Laatija

Johanna Harju, ins. AMK
Tarkastaja

LIITTEET

Liite 1. Volkkilankankaan tuulivoimahanke - Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2 /2014 (VE1) Generic 250–10 M.

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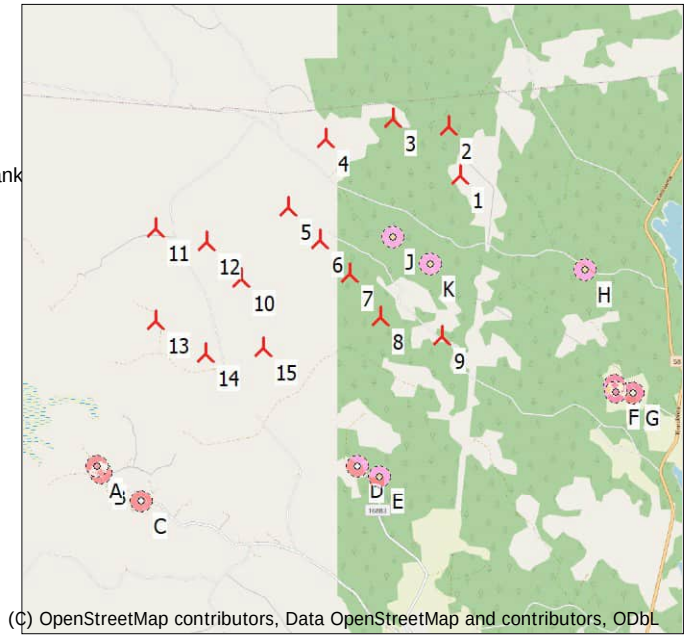
Calculated:
10.11.2023 12.14/3.6.355

DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE1_General_RD250x15xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilank
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



WTGs

	East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]
1	401 105	7 012 076	152,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
2	400 966	7 012 725	147,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
3	400 232	7 012 854	163,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
4	399 353	7 012 603	178,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
5	398 812	7 011 721	157,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
6	399 211	7 011 281	160,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
7	399 596	7 010 821	163,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
8	400 001	7 010 232	162,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
9	400 806	7 009 960	164,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
10	398 171	7 010 800	150,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
11	397 051	7 011 505	161,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
12	397 714	7 011 286	151,8	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
13	397 017	7 010 282	157,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
14	397 661	7 009 833	151,9	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
15	398 434	7 009 870	145,3	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z [m]	Immission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	4,0	40,0	34,4	1 006
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	4,0	40,0	34,2	1 050
C	Laskentapiste_C (Autio)	396 747	7 007 887	163,3	4,0	40,0	33,9	1 135
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	4,0	40,0	36,3	801
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	4,0	40,0	35,5	951
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	4,0	40,0	31,7	1 589
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	4,0	40,0	31,0	1 805
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	4,0	40,0	34,8	1 108
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	4,0	40,0	31,9	1 548
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	4,0	40,0	44,6	-1 404
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	4,0	40,0	43,3	-872

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Calculated:
10.11.2023 12.14/3.6.355

DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE1_General_RD250x15xHH200_108.6dB

Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K
1	6170	6184	6045	4085	4137	3543	3684	2070	3468	1214	1248
2	6476	6500	6420	4655	4731	4166	4296	2619	4089	1641	1843
3	6047	6081	6068	4627	4752	4685	4836	3239	4613	1574	1996
4	5292	5335	5388	4346	4525	5094	5270	3829	5029	1564	2148
5	4264	4304	4355	3550	3773	4995	5195	4020	4942	1444	2028
6	4208	4234	4194	3044	3245	4430	4634	3546	4379	976	1505
7	4212	4224	4090	2555	2727	3877	4085	3125	3829	749	1076
8	4260	4255	4011	2001	2121	3276	3492	2775	3236	1065	949
9	4903	4885	4558	2062	2050	2426	2642	2084	2386	1459	957
10	3144	3183	3242	2924	3204	5191	5408	4551	5152	2073	2501
11	3250	3324	3630	4140	4439	6485	6699	5716	6443	3144	3667
12	3295	3352	3534	3576	3862	5788	6001	5032	5745	2473	2979
13	2086	2150	2410	3300	3620	6179	6402	5726	6150	3324	3705
14	2086	2115	2150	2517	2836	5473	5697	5149	5449	2912	3194
15	2716	2725	2604	2001	2298	4712	4936	4383	4686	2250	2463

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Calculated:
10.11.2023 12.14/3.6.355

DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE1_General_RD250x15xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilankangas_melu_ja_varjostus_0.w2r (1)
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)
Octave data required
Frequency dependent air absorption

63	125	250	500	1 000	2 000	4 000	8 000
[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: Generic RD250 HH200 10000 250.0 !O!
Noise: Generic_RD250_HH200_STE_108.6 dB

Source	Source/Date	Creator	Edited
Nordex	18.7.2022	USER	9.11.2023 14.16

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	200,0	8,0	108,6	No	94,6	99,3	101,6	102,1	102,5	100,4	90,9	72,0

Noise sensitive area: A Laskentapiste_A (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: B Laskentapiste_B (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: C Laskentapiste_C (Autio)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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Calculated:
10.11.2023 12.14/3.6.355

DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE1_General_RD250x15xHH200_108.6dB

Noise sensitive area: D Laskentapiste_D (Ylä-Leskinen)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Laskentapiste_E (Leskinen)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Laskentapiste_F (Kalliomäki)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Laskentapiste_G (Alapelto)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Laskentapiste_H (Lepola)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Laskentapiste_I (Kalliomäki)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Laskentapiste_J (Ritaviita)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Laskentapiste_K (Ritaviita2)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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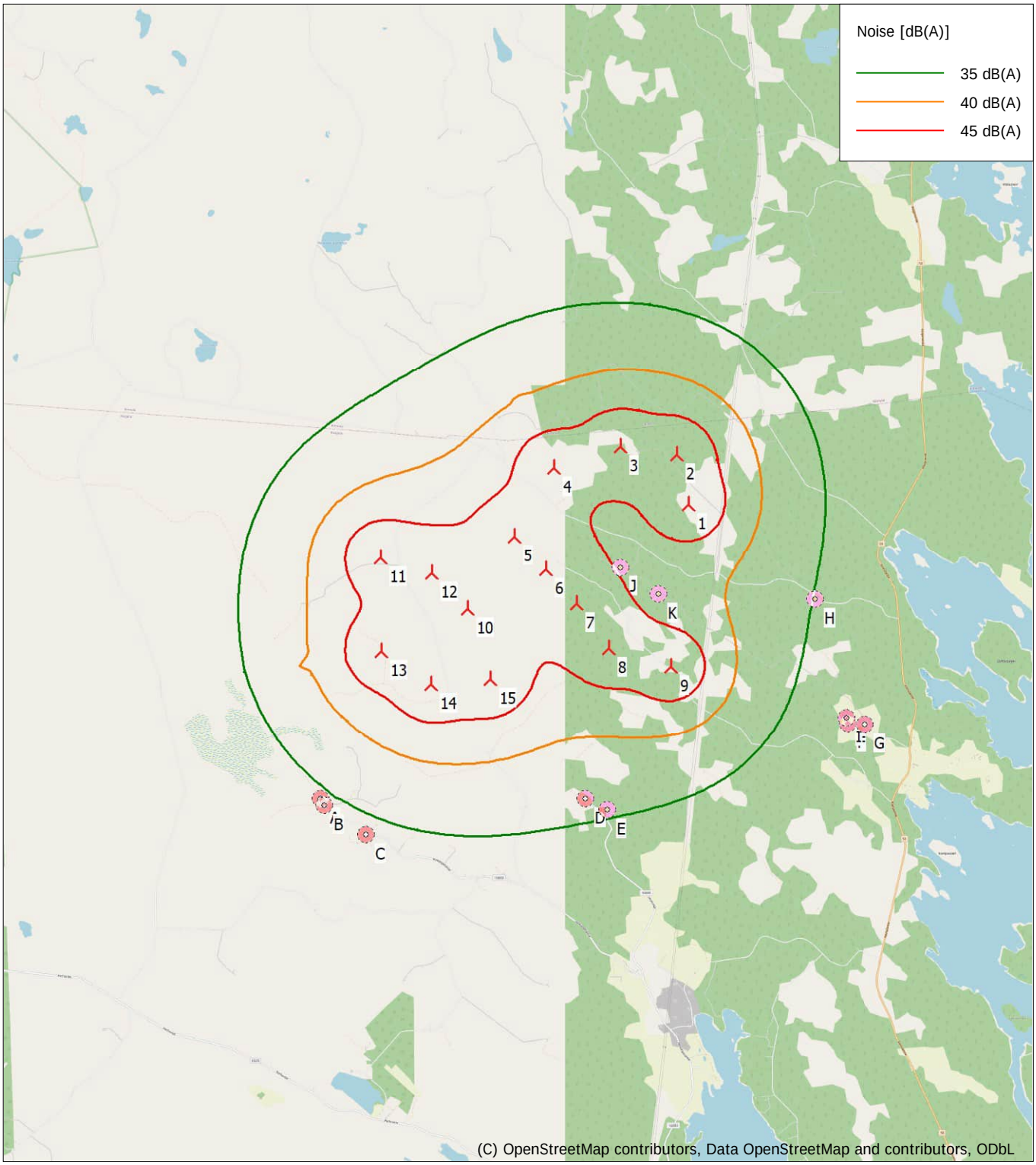
10.11.2023 12.14/3.6.355

DECIBEL - Map 8,0 m/s

Calculation: DECIBEL_Volkkilankangas_VE1_General_RD250x15xHH200_108.6dB



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 061 North: 7 011 343

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

Liite 2. Volkkilankankaan tuulivoimahanke - Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2 /2014 (VE1$_{yö}$) Generic 250–10 MW.

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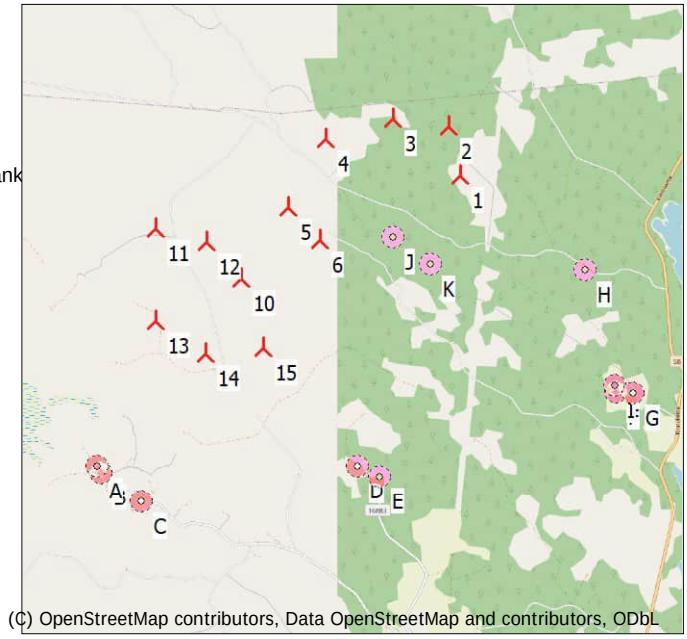
20.11.2023 13.35/3.6.355

DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE1yö_General_RD250x12xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilank
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Noise sensitive area

WTGs

	East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]
1	401 105	7 012 076	152,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
2	400 966	7 012 725	147,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
3	400 232	7 012 854	163,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
4	399 353	7 012 603	178,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
5	398 812	7 011 721	157,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
6	399 211	7 011 281	160,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
10	398 171	7 010 800	150,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
11	397 051	7 011 505	161,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
12	397 714	7 011 286	151,8	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
13	397 017	7 010 282	157,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
14	397 661	7 009 833	151,9	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
15	398 434	7 009 870	145,3	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z [m]	Demands Immission height [m]	Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	4,0	40,0	34,0	1 033
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	4,0	40,0	33,8	1 077
C	Laskentapiste_C (Autio)	396 747	7 007 887	163,3	4,0	40,0	33,4	1 168
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	4,0	40,0	33,9	1 078
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	4,0	40,0	32,8	1 375
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	4,0	40,0	28,8	2 684
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	4,0	40,0	28,3	2 828
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	4,0	40,0	32,8	1 220
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	4,0	40,0	28,9	2 610
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	4,0	40,0	41,8	-389
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	4,0	40,0	39,2	167

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20.11.2023 13.35/3.6.355

DECIBEL - Main Result

Calculation:

DECIBEL_Volkkilankangas_VE1yö_General_RD250x12xHH200_108.6dB Distances (m)

WTG	A	B	C	D	E	F	G	H	I	J	K
1	6170	6184	6045	4085	4137	3543	3684	2070	3468	1214	1248
2	6476	6500	6420	4655	4731	4166	4296	2619	4089	1641	1843
3	6047	6081	6068	4627	4752	4685	4836	3239	4613	1574	1996
4	5292	5335	5388	4346	4525	5094	5270	3829	5029	1564	2148
5	4264	4304	4355	3550	3773	4995	5195	4020	4942	1444	2028
6	4208	4234	4194	3044	3245	4430	4634	3546	4379	976	1505
10	3144	3183	3242	2924	3204	5191	5408	4551	5152	2073	2501
11	3250	3324	3630	4140	4439	6485	6699	5716	6443	3144	3667
12	3295	3352	3534	3576	3862	5788	6001	5032	5745	2473	2979
13	2086	2150	2410	3300	3620	6179	6402	5726	6150	3324	3705
14	2086	2115	2150	2517	2836	5473	5697	5149	5449	2912	3194
15	2716	2725	2604	2001	2298	4712	4936	4383	4686	2250	2463

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DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE1yö_General_RD250x12xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilankangas_melu_ja_varjostus_0.w2r (1)
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)
Octave data required
Frequency dependent air absorption

63	125	250	500	1 000	2 000	4 000	8 000
[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: Generic RD250 HH200 10000 250.0 !O!
Noise: Generic_RD250_HH200_STE_108.6 dB

Source	Source/Date	Creator	Edited
Nordex	18.7.2022	USER	9.11.2023 14.16

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	200,0	8,0	108,6	No	94,6	99,3	101,6	102,1	102,5	100,4	90,9	72,0

Noise sensitive area: A Laskentapiste_A (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: B Laskentapiste_B (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: C Laskentapiste_C (Autio)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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Aarni Nikkola / aarni.nikkola@fcg.fi
Calculated:
20.11.2023 13.35/3.6.355

DECIBEL - Assumptions for noise calculation

Calculation:
DECIBEL_Volkkilankangas_VE1yö_General_RD250x12xHH200_108.6dB Noise sensitive area: D Laskentapiste_D (Ylä-Leskinen)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Laskentapiste_E (Leskinen)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Laskentapiste_F (Kalliomäki)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Laskentapiste_G (Alapelto)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Laskentapiste_H (Lepola)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Laskentapiste_I (Kalliomäki)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Laskentapiste_J (Ritaviita)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Laskentapiste_K (Ritaviita2)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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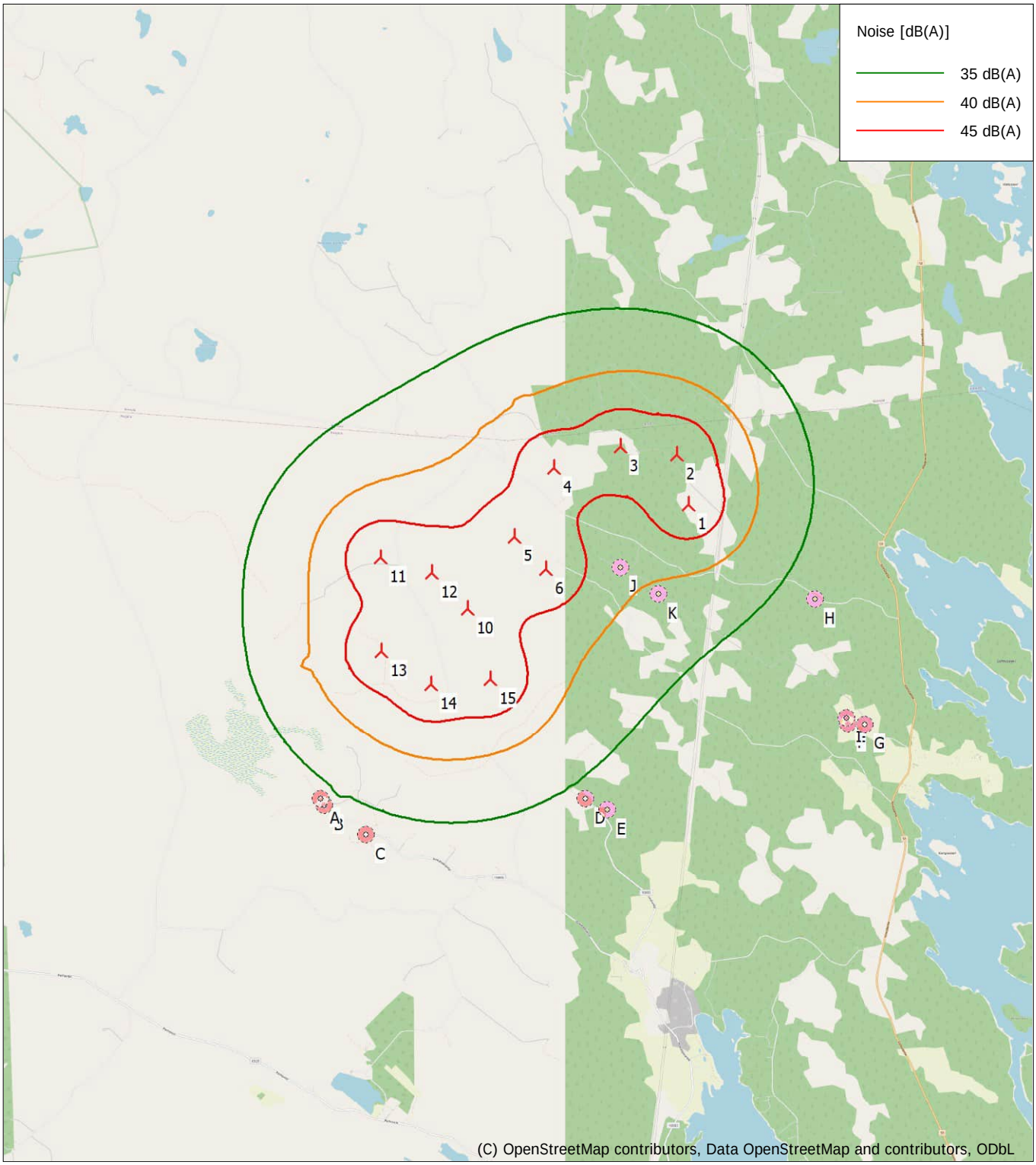
DECIBEL - Map 8,0 m/s

Calculation: DECIBEL_Volkkilankangas_VE1yö_General_RD250x12xHH200_108.6dB



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 061 North: 7 011 343

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

Liite 3. Volkkilankankaan tuulivoimahanke - Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2 /2014 (VE2) Generic 250–10 MW.

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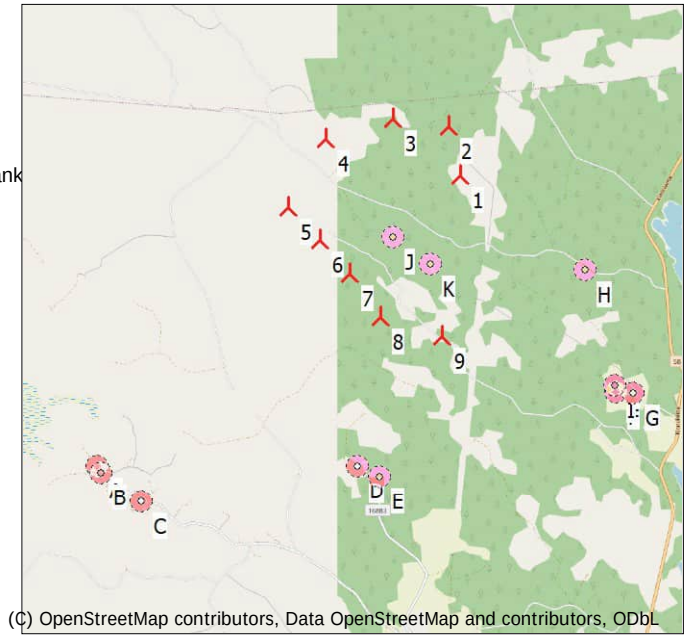
DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE2_General_RD250x9xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilank
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Noise sensitive area

WTGs

	East	North	Z [m]	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data Creator	Name	Wind speed [m/s]	LwA,ref [dB(A)]
1	401 105	7 012 076	152,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
2	400 966	7 012 725	147,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
3	400 233	7 012 854	163,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
4	399 353	7 012 603	177,9	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
5	398 812	7 011 721	157,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
6	399 211	7 011 281	160,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
7	399 596	7 010 821	163,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
8	400 000	7 010 233	162,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
9	400 807	7 009 959	164,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z [m]	Demands Immission height [m]	Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	4,0	40,0	27,5	3 036
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	4,0	40,0	27,4	3 055
C	Laskentapiste_C (Autio)	396 747	7 007 887	163,3	4,0	40,0	27,7	2 933
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	4,0	40,0	33,9	1 015
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	4,0	40,0	33,4	1 092
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	4,0	40,0	30,9	1 620
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	4,0	40,0	30,2	1 835
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	4,0	40,0	34,3	1 144
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	4,0	40,0	31,1	1 579
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	4,0	40,0	44,2	-1 330
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	4,0	40,0	42,9	-798

Distances (m)

	WTG								
NSA	1	2	3	4	5	6	7	8	9
A	6170	6476	6048	5293	4264	4208	4212	4260	4903
B	6184	6500	6081	5335	4305	4234	4224	4255	4885
C	6045	6420	6068	5388	4355	4194	4090	4011	4558
D	4085	4655	4627	4346	3551	3044	2555	2001	2062

To be continued on next page...

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9.11.2023 15.20/3.6.355

DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE2_General_RD250x9xHH200_108.6dB

...continued from previous page

	WTG								
NSA	1	2	3	4	5	6	7	8	9
E	4137	4731	4751	4525	3773	3245	2727	2122	2050
F	3543	4166	4684	5094	4995	4430	3877	3277	2425
G	3684	4296	4835	5270	5195	4634	4085	3493	2641
H	2070	2619	3238	3829	4020	3545	3125	2776	2084
I	3468	4089	4612	5029	4942	4379	3829	3237	2385
J	1214	1641	1574	1564	1444	976	749	1064	1459
K	1248	1843	1995	2148	2028	1505	1077	949	957

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9.11.2023 15.20/3.6.355

DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE2_General_RD250x9xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilankangas_melu_ja_varjostus_0.w2r (1)
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)
Octave data required
Frequency dependent air absorption

63	125	250	500	1 000	2 000	4 000	8 000
[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: Generic RD250 HH200 10000 250.0 !O!
Noise: Generic_RD250_HH200_STE_108.6 dB

Source	Source/Date	Creator	Edited
Nordex	18.7.2022	USER	9.11.2023 14.16

					Octave data							
Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	200,0	8,0	108,6	No	94,6	99,3	101,6	102,1	102,5	100,4	90,9	72,0

Noise sensitive area: A Laskentapiste_A (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: B Laskentapiste_B (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: C Laskentapiste_C (Autio)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE2_General_RD250x9xHH200_108.6dB

Noise sensitive area: D Laskentapiste_D (Ylä-Leskinen)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Laskentapiste_E (Leskinen)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Laskentapiste_F (Kalliomäki)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Laskentapiste_G (Alapelto)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Laskentapiste_H (Lepola)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Laskentapiste_I (Kalliomäki)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Laskentapiste_J (Ritaviita)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Laskentapiste_K (Ritaviita2)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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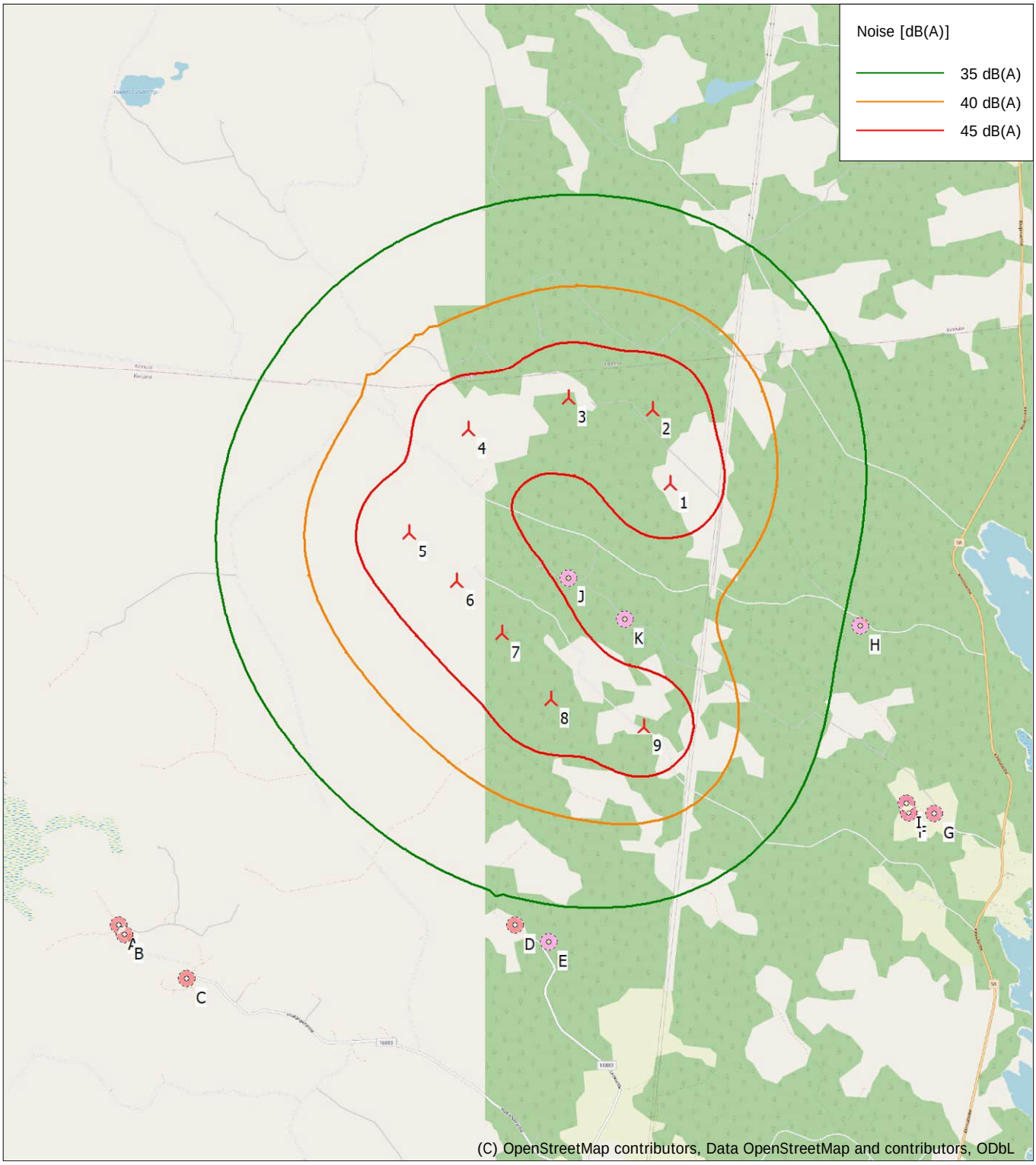
DECIBEL - Map 8,0 m/s

Calculation: DECIBEL_Volkkilankangas_VE2_General_RD250x9xHH200_108.6dB



0 500 1000 1500 2000 m

Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 885 North: 7 011 407

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

Liite 4. Volkkilankankaan tuulivoimahanke - Melun leviämismallinnuksen tulokset ISO 9613-2, YM 2 /2014 (VE2$_{yö}$) Generic 250–10 MW.

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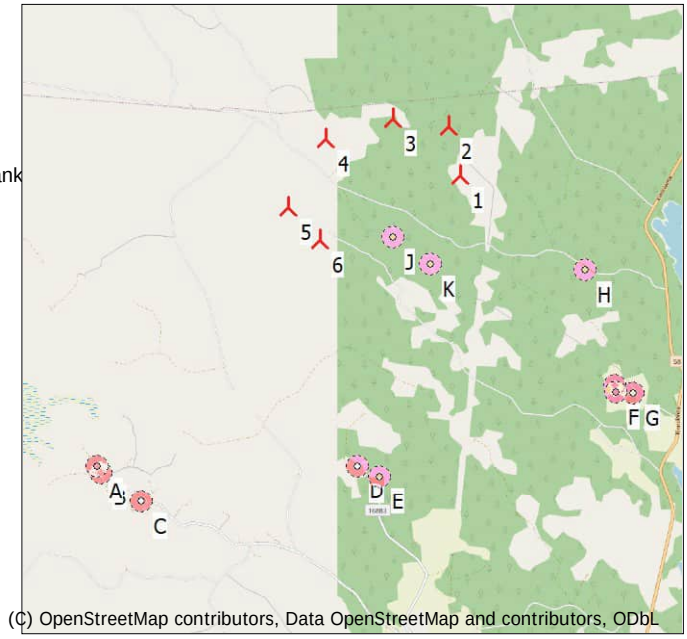
DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE2yö_General_RD250x6xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilank
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Noise sensitive area

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	Wind speed	LwA,ref
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]
1	401 105	7 012 076	152,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
2	400 966	7 012 725	147,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
3	400 233	7 012 854	163,6	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
4	399 353	7 012 603	177,9	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
5	398 812	7 011 721	157,5	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6
6	399 211	7 011 281	160,0	Generic RD250 HH200 100...	Yes	Generic	RD250 HH200-10 000	10 000	250,0	200,0	USER	Generic_RD250_HH200_STE_108.6 dB	8,0	108,6

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z [m]	Immission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	4,0	40,0	25,1	3 284
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	4,0	40,0	25,0	3 317
C	Laskentapiste_C (Autio)	396 747	7 007 887	163,3	4,0	40,0	25,0	3 309
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	4,0	40,0	28,4	2 209
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	4,0	40,0	27,9	2 410
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	4,0	40,0	27,0	2 715
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	4,0	40,0	26,5	2 858
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	4,0	40,0	31,9	1 245
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	4,0	40,0	27,2	2 641
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	4,0	40,0	41,1	-206
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	4,0	40,0	38,4	286

Distances (m)

	WTG					
NSA	1	2	3	4	5	6
A	6170	6476	6048	5293	4264	4208
B	6184	6500	6081	5335	4305	4234
C	6045	6420	6068	5388	4355	4194
D	4085	4655	4627	4346	3551	3044
E	4137	4731	4751	4525	3773	3245
F	3543	4166	4684	5094	4995	4430
G	3684	4296	4835	5270	5195	4634

To be continued on next page...

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DECIBEL - Main Result

Calculation: DECIBEL_Volkkilankangas_VE2yö_General_RD250x6xHH200_108.6dB

...continued from previous page

	WTG					
NSA	1	2	3	4	5	6
H	2070	2619	3238	3829	4020	3545
I	3468	4089	4612	5029	4942	4379
J	1214	1641	1574	1564	1444	976
K	1248	1843	1995	2148	2028	1505

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Calculated:
27.11.2023 14.45/3.6.355

DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE2yö_General_RD250x6xHH200_108.6dB

Noise calculation model:
ISO 9613-2 General
Wind speed (in 10 m height):
8,0 m/s
Ground attenuation:
General, terrain specific
Ground factor for porous ground: 0,4
Area object with hard ground: Area object (Roughness): REGIONS_Volkkilankangas_melu_ja_varjostus_0.w2r (1)
Area type with hard ground: Järvet
Ground factor for hard ground: 0,0
Meteorological coefficient, C0:
0,0 dB
Type of demand in calculation:
1: WTG noise is compared to demand (DK, DE, SE, NL etc.)
Noise values in calculation:
All noise values are mean values (Lwa) (Normal)
Pure tones:
Ignore pure tones setting on WTG
Height above ground level, when no value in NSA object:
4,0 m; Don't allow override of model height with height from NSA object
Uncertainty margin:
0,0 dB; Uncertainty margin in NSA has priority
Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:
0,0 dB(A)
Octave data required
Frequency dependent air absorption

63	125	250	500	1 000	2 000	4 000	8 000
[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]	[dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

WTG: Generic RD250 HH200 10000 250.0 !O!
Noise: Generic_RD250_HH200_STE_108.6 dB

Source	Source/Date	Creator	Edited
Nordex	18.7.2022	USER	9.11.2023 14.16

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data 63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]
From Windcat	200,0	8,0	108,6	No	94,6	99,3	101,6	102,1	102,5	100,4	90,9	72,0

Noise sensitive area: A Laskentapiste_A (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: B Laskentapiste_B (Harjunpää)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: C Laskentapiste_C (Autio)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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DECIBEL - Assumptions for noise calculation

Calculation: DECIBEL_Volkkilankangas_VE2yö_General_RD250x6xHH200_108.6dB

Noise sensitive area: D Laskentapiste_D (Ylä-Leskinen)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: E Laskentapiste_E (Leskinen)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: F Laskentapiste_F (Kalliomäki)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: G Laskentapiste_G (Alapelto)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: H Laskentapiste_H (Lepola)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: I Laskentapiste_I (Kalliomäki)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: J Laskentapiste_J (Ritaviita)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: K Laskentapiste_K (Ritaviita2)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand: 40,0 dB(A)
No distance demand

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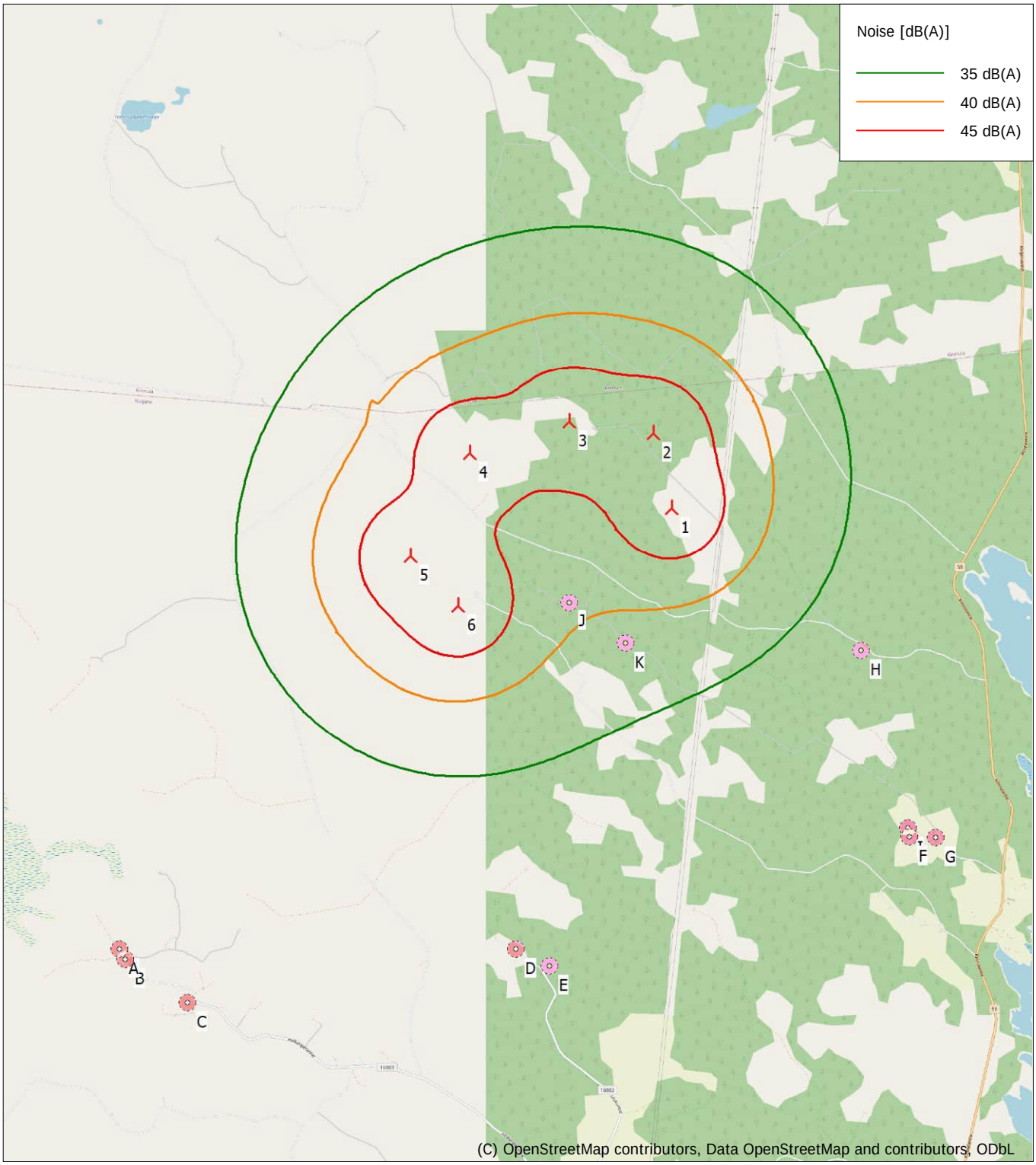
Calculated:
27.11.2023 14.45/3.6.355

DECIBEL - Map 8,0 m/s

Calculation: DECIBEL_Volkkilankangas_VE2yö_General_RD250x6xHH200_108.6dB



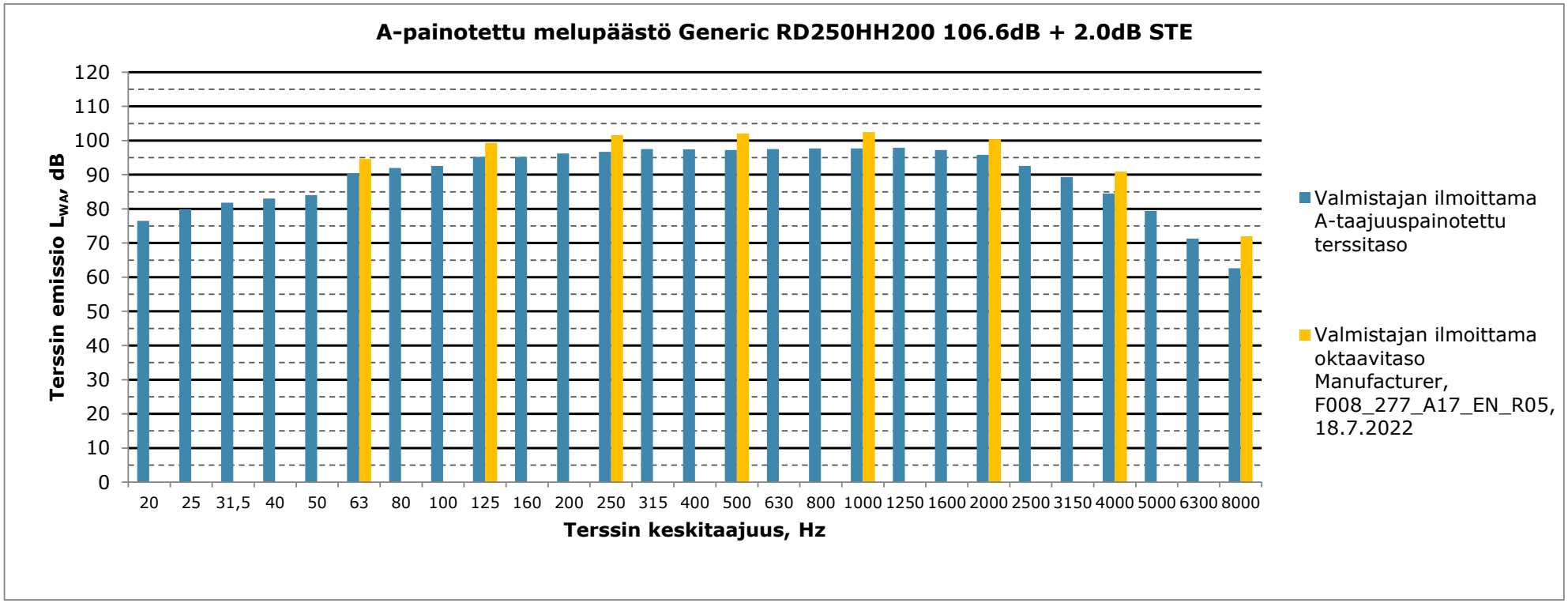
0 500 1000 1500 2000 m

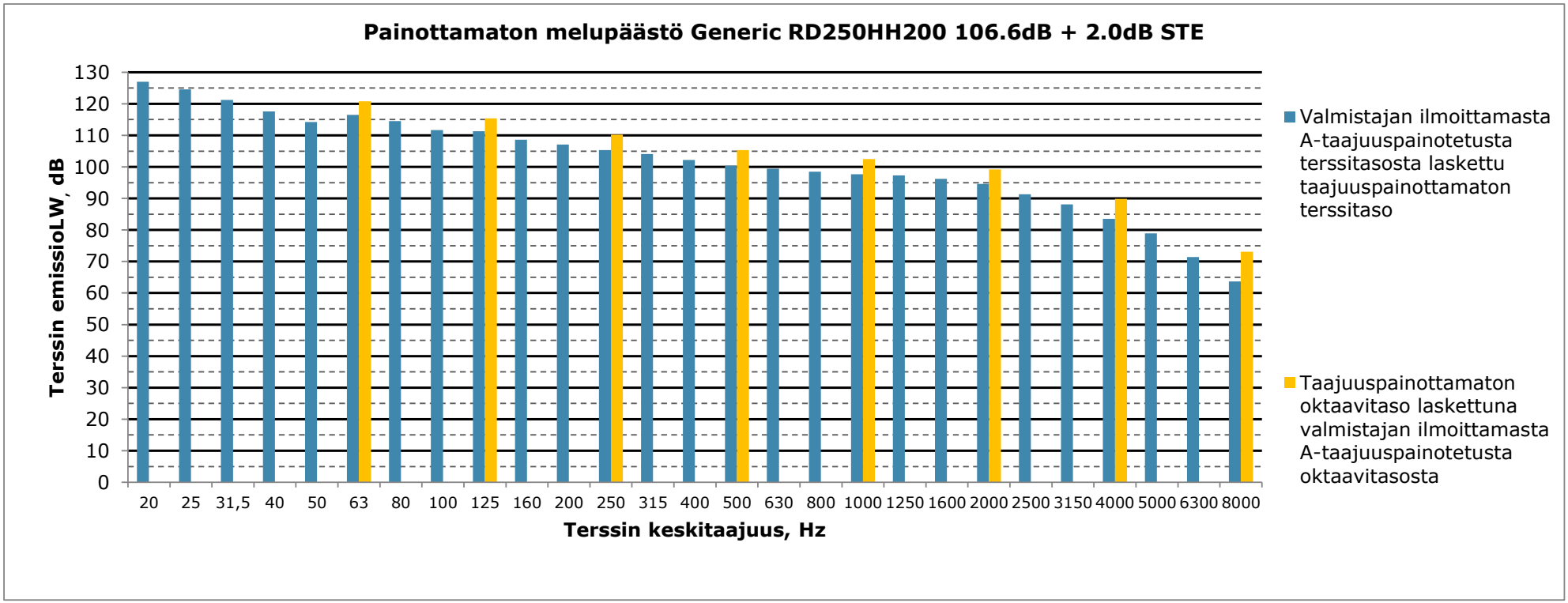
Map: EMD OpenStreetMap , Print scale 1:50 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 885 North: 7 011 621

New WTG Noise sensitive area

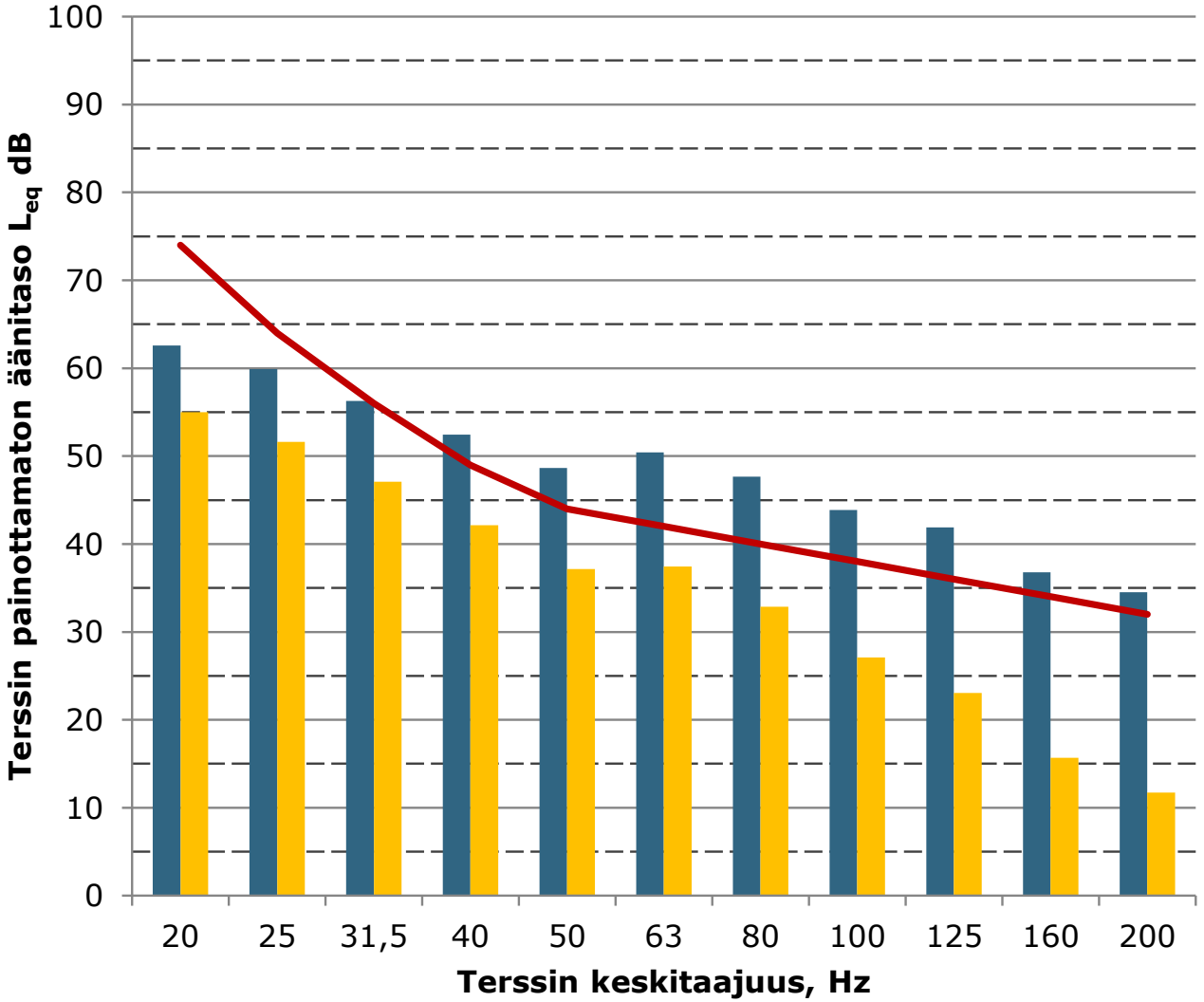
Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s
Height above sea level from active line object

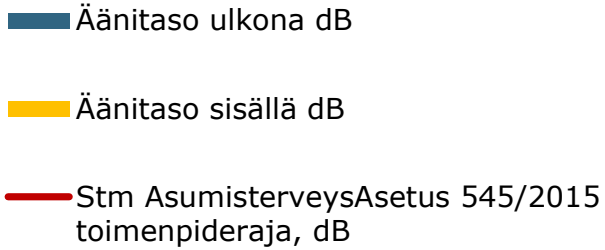
Liite 5. Volkkilankankaan tuulivoimahanke – matalataajuisen melun rakennuskohtaiset arvot VE1 Generic 250–10 MW.


A-painotettu melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissio L_{WA} dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso
Valmistajan ilmoittama oktaavitaso Manufacturer, F008_277_A17_EN_R05, 18.7.2022


Painottamaton melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissioLW, dB
130
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

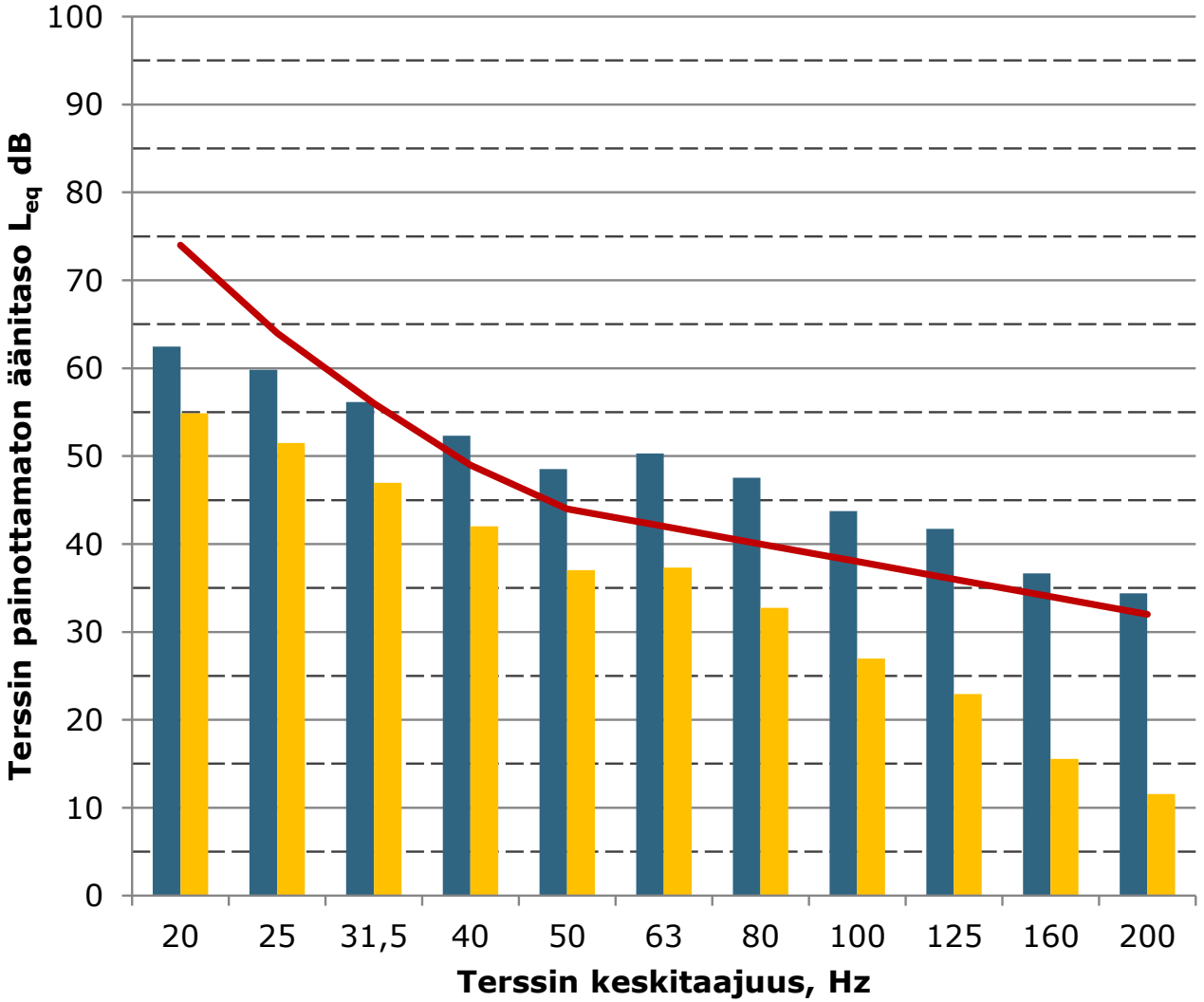
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_A (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

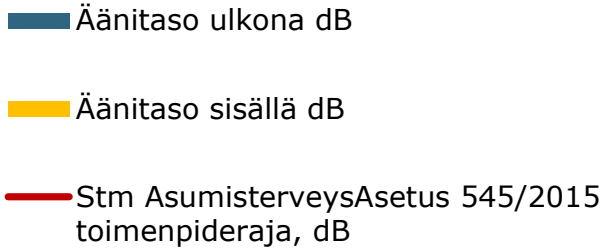




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

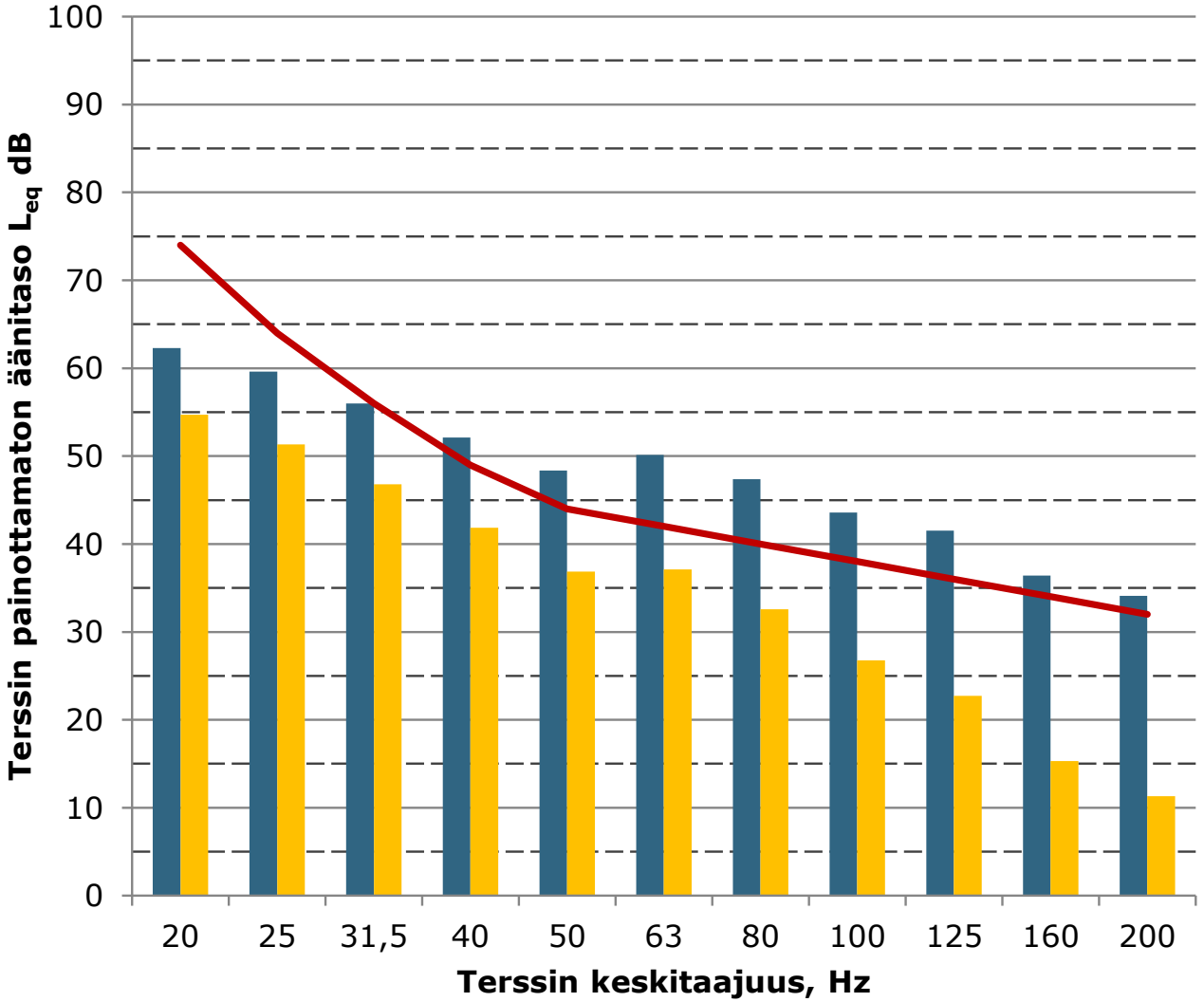
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_B (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

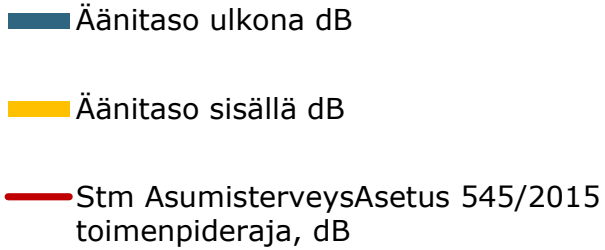




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

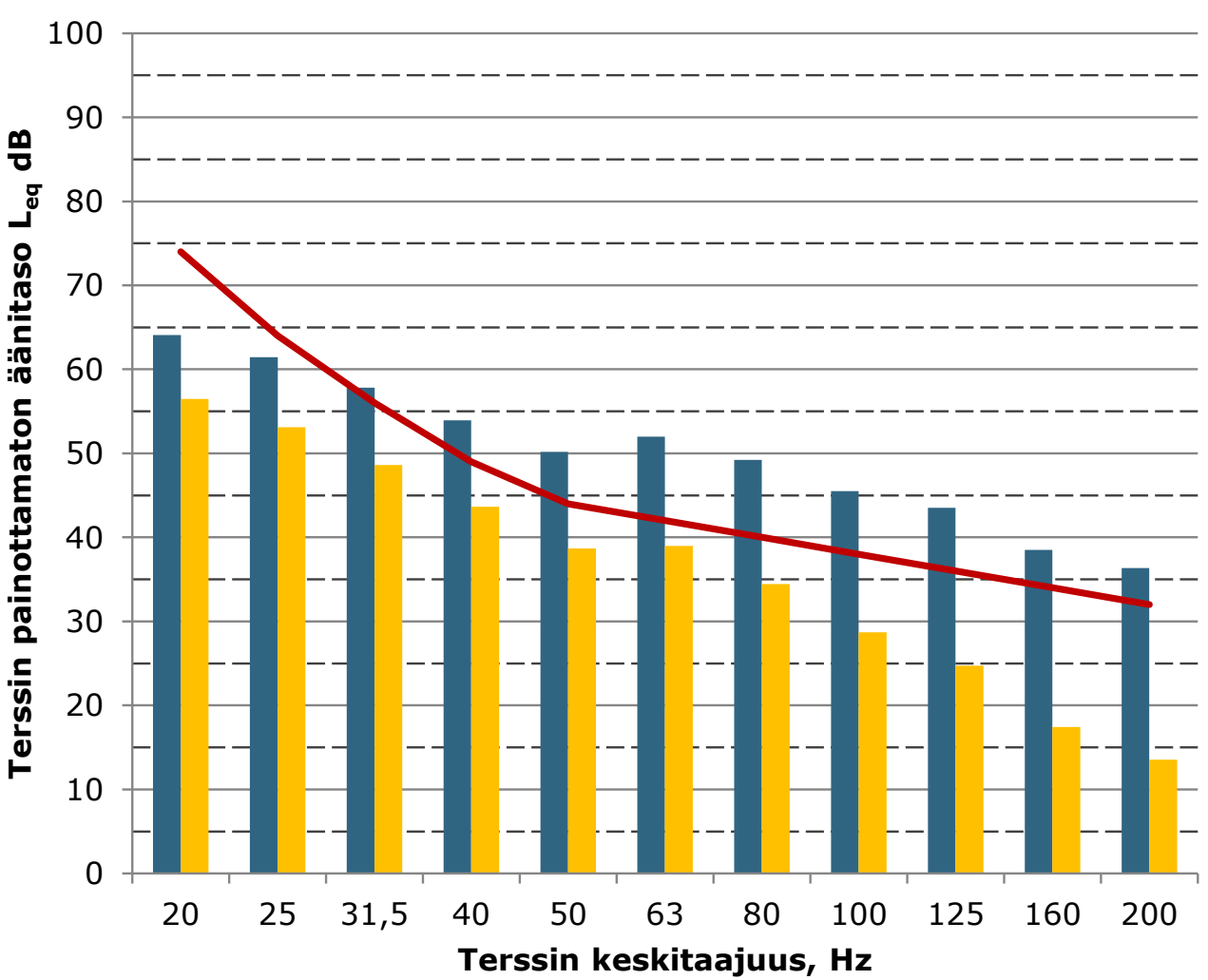
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_C (Autio), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_D (Ylä-Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan



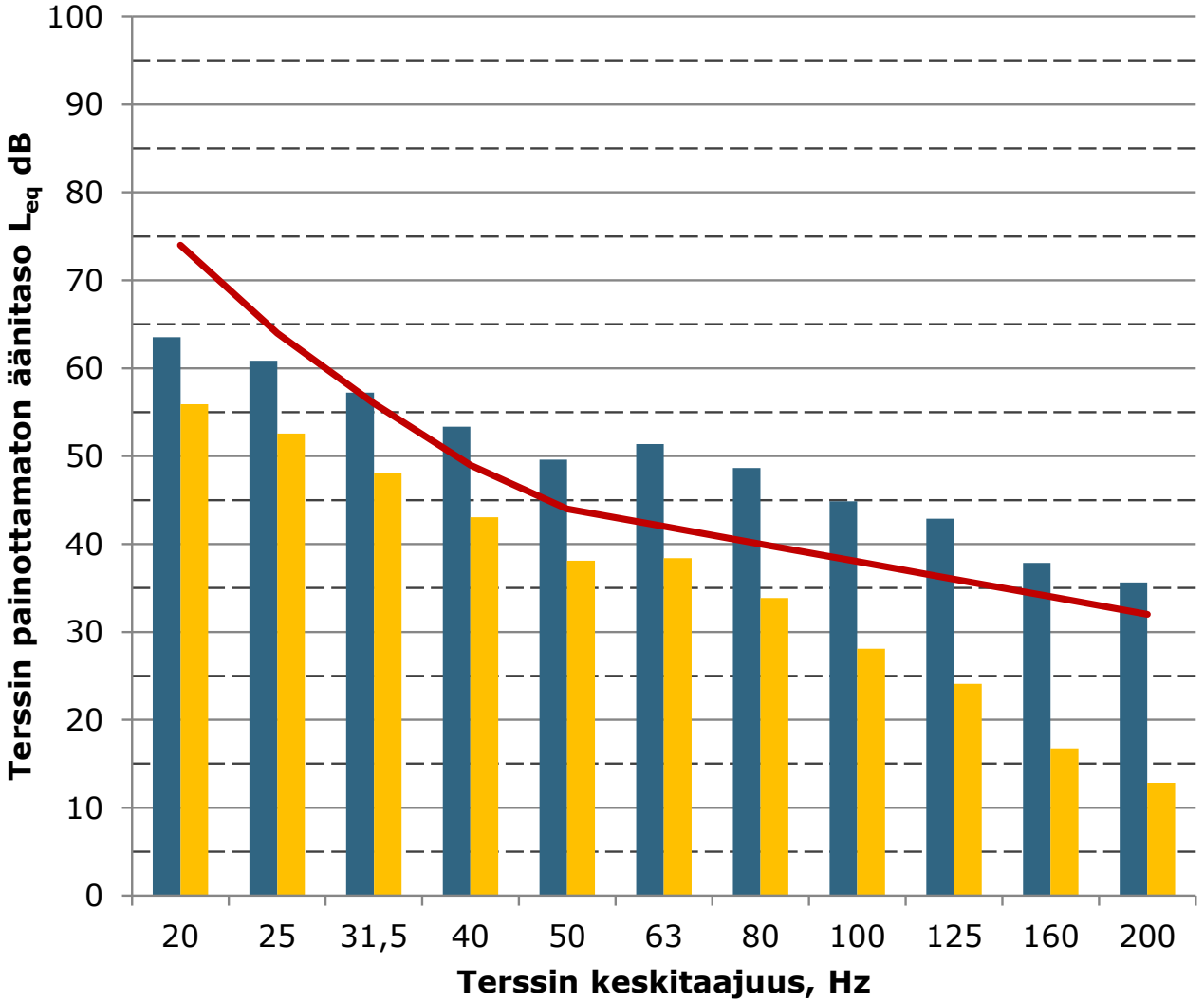
Äänitaso ulkona dB

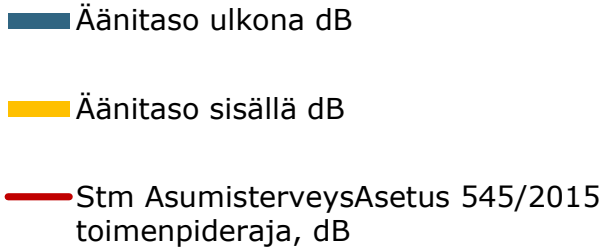
Äänitaso sisällä dB

Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB

Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

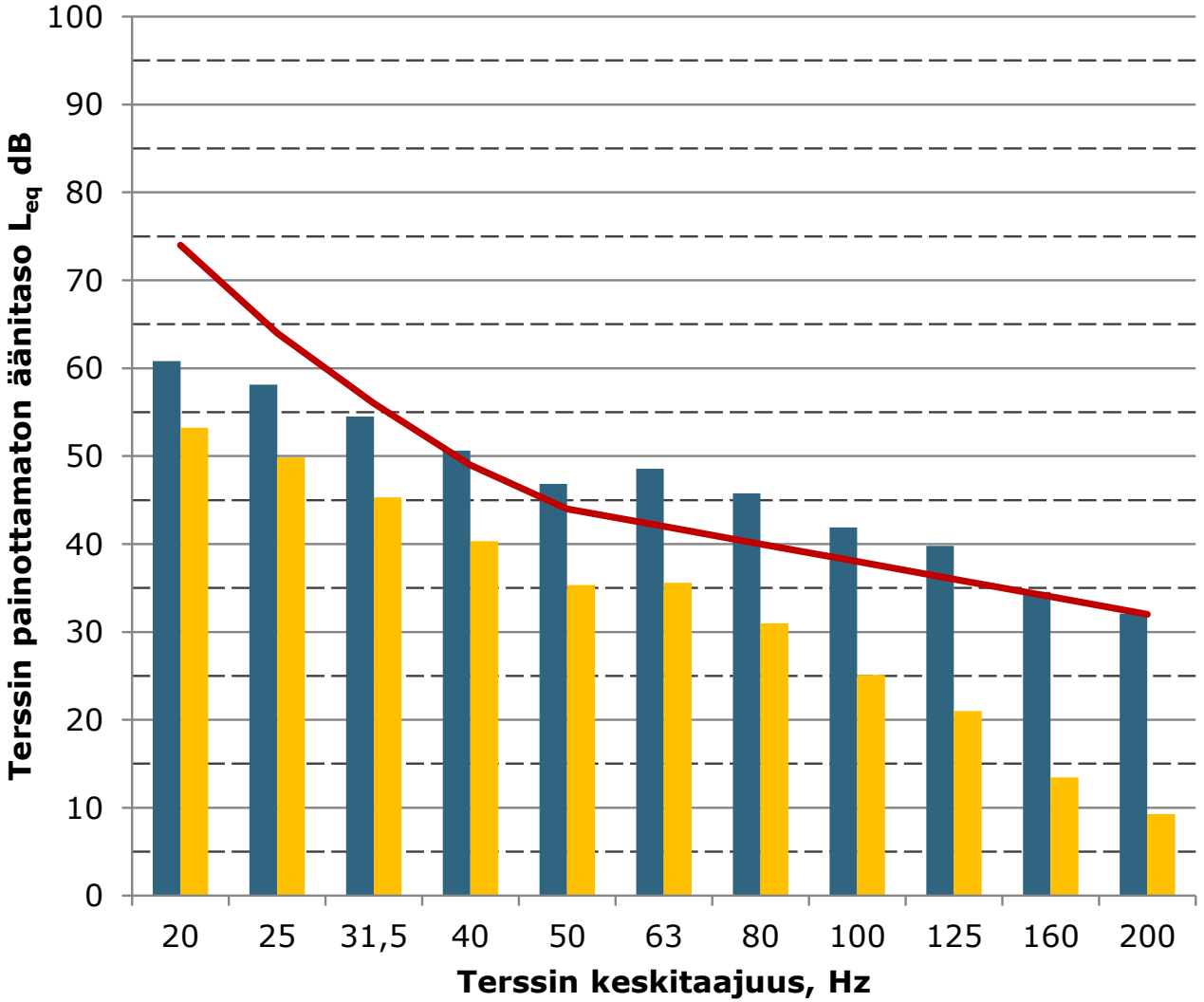
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_E (Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

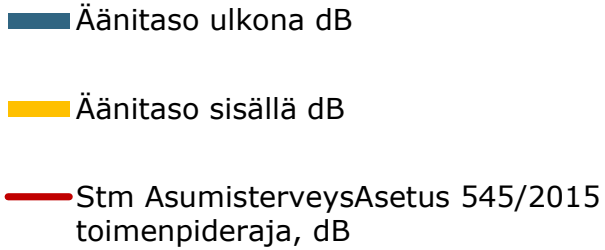




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

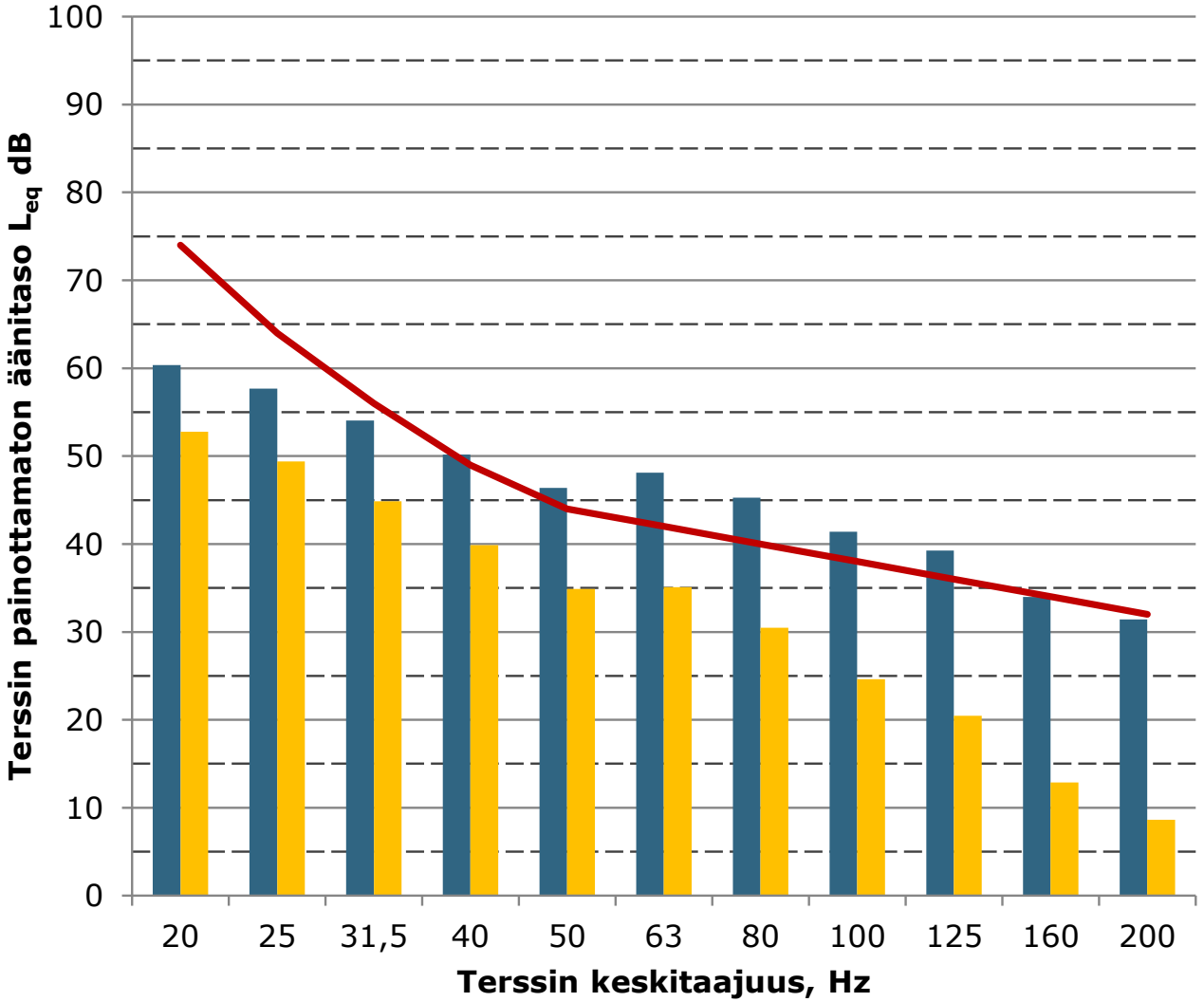
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_F (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_G (Alapelto), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan



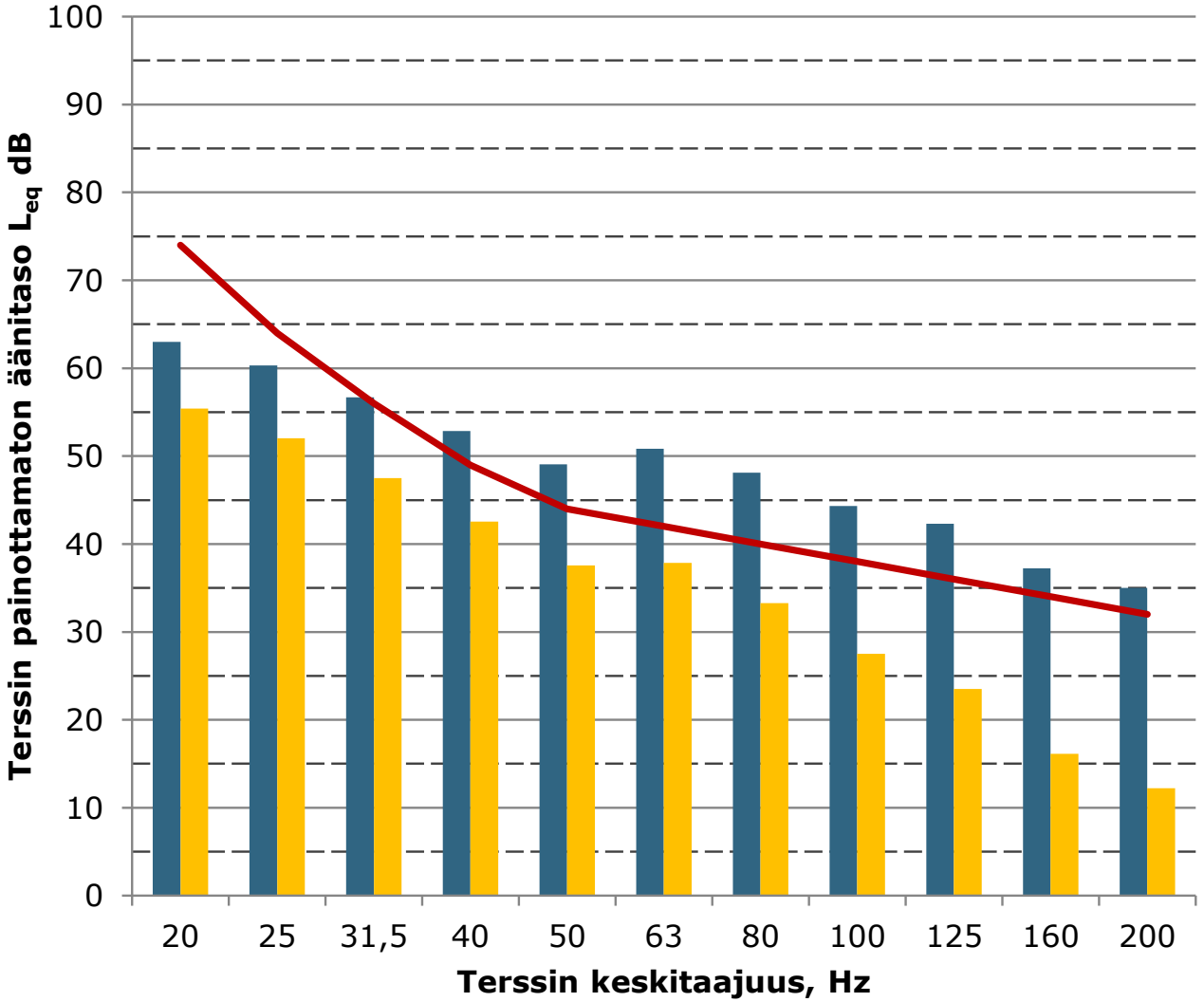
Äänitaso ulkona dB

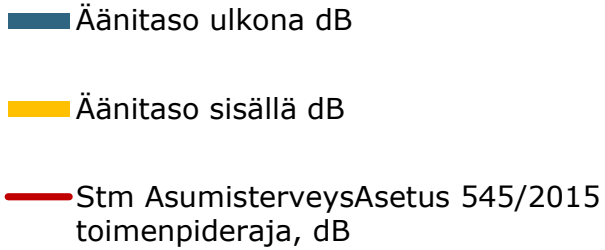
Äänitaso sisällä dB

Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB

Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

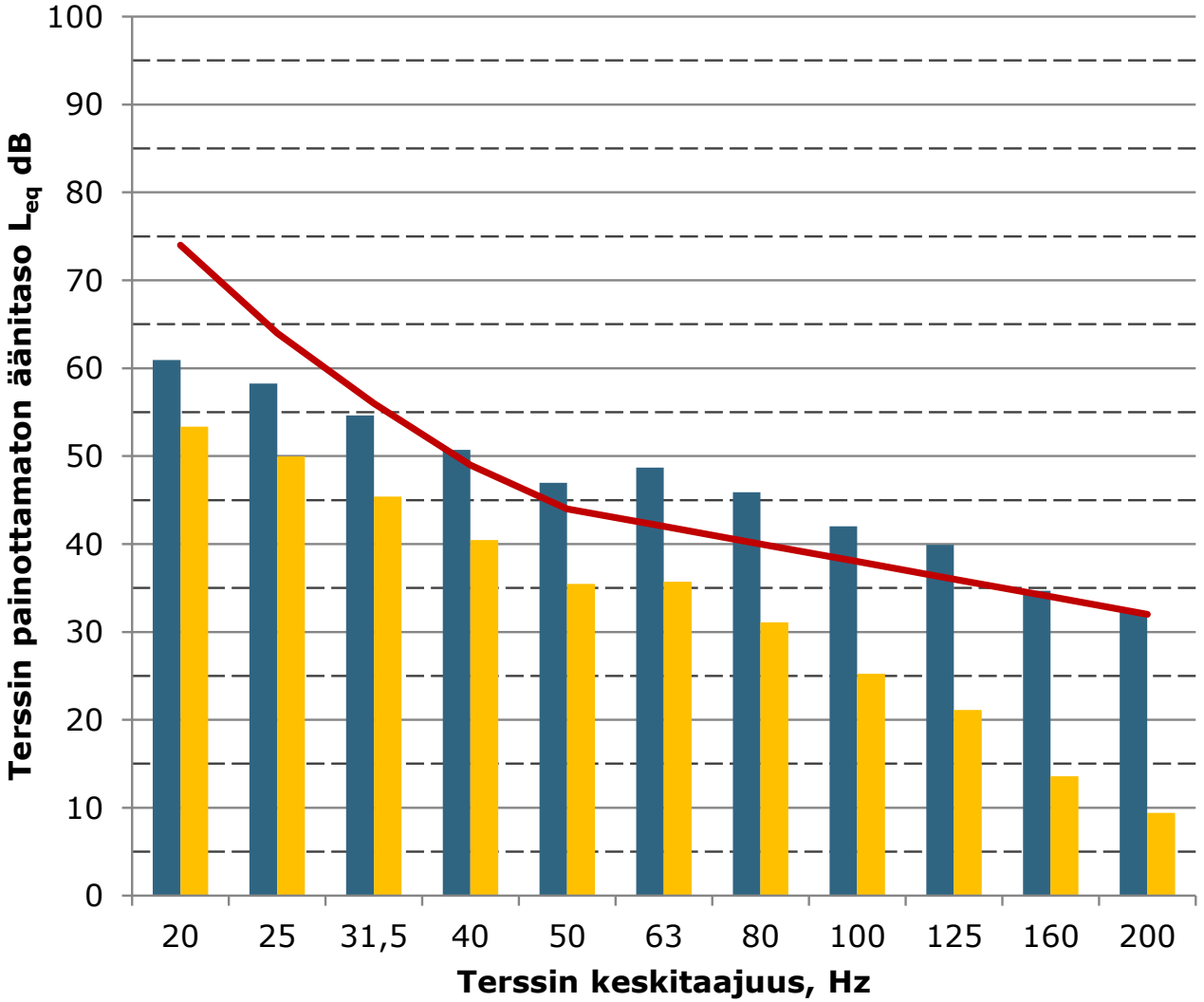
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_H (Lepola), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

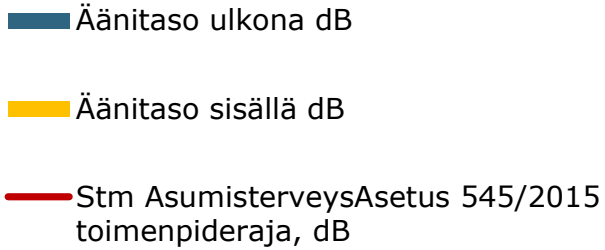




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

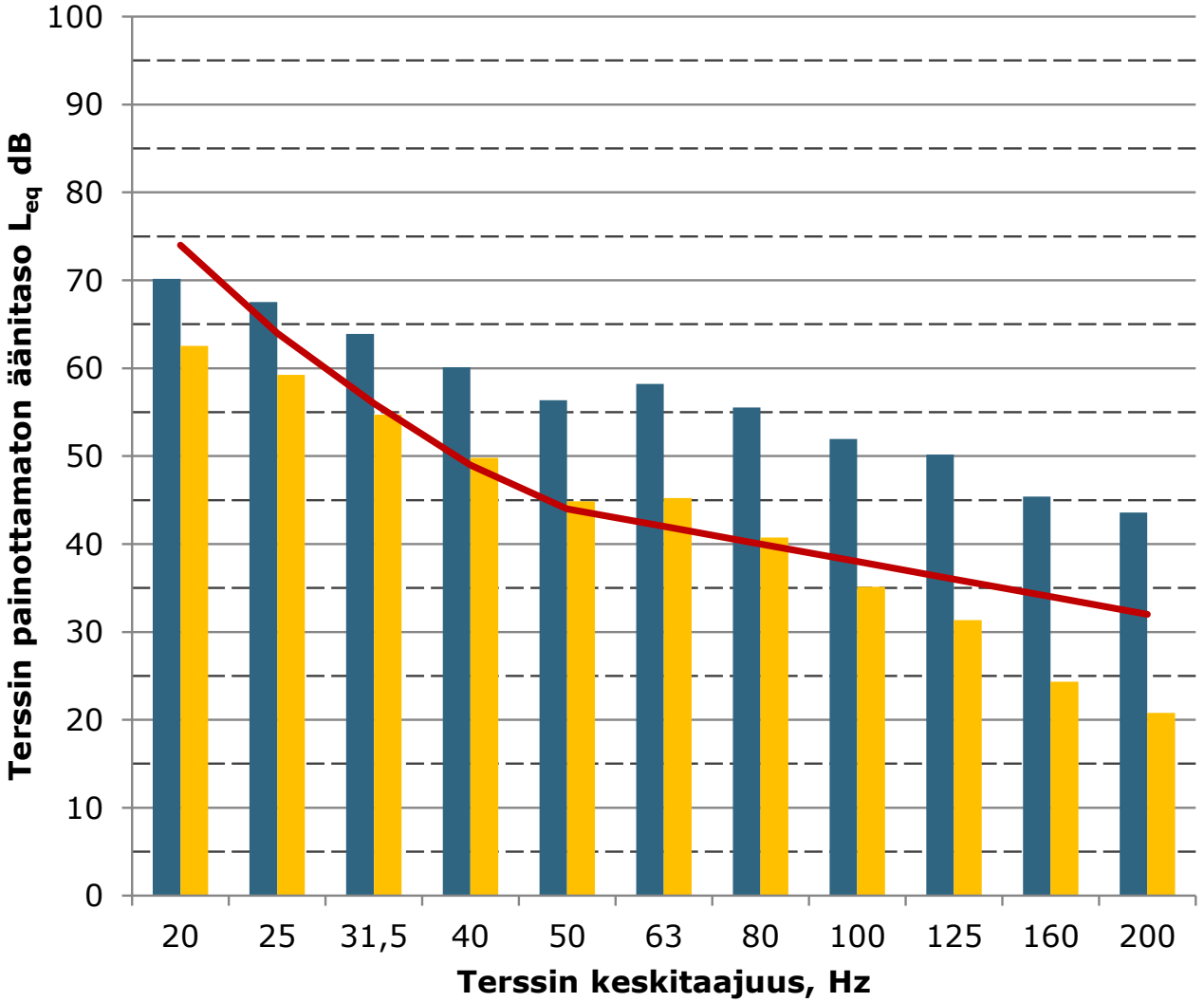
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_I (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

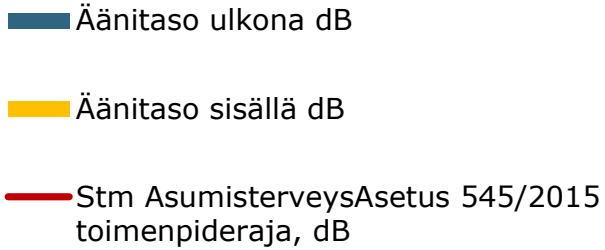




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

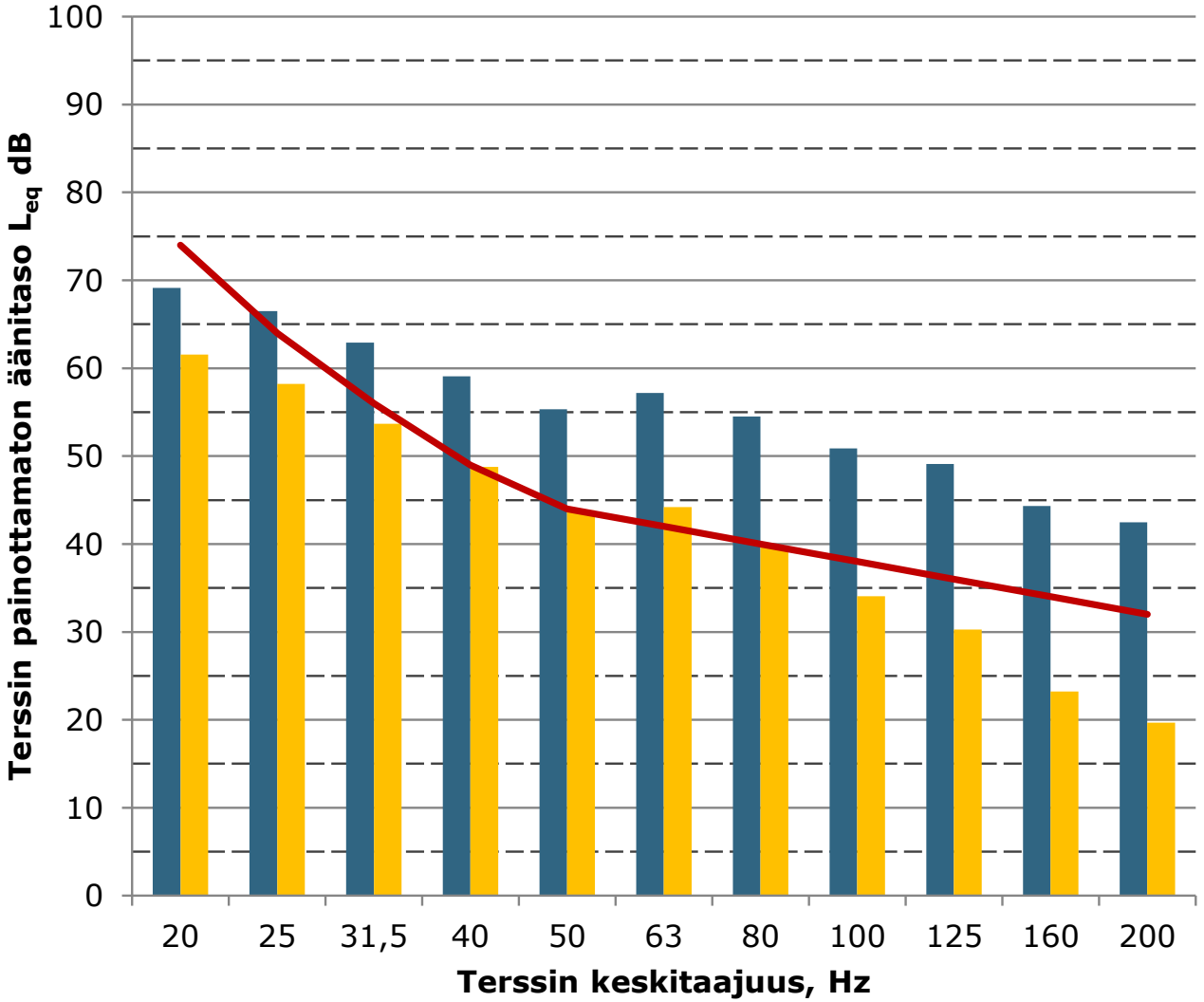
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_J (Ritaviita), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_K (Ritaviita2), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan



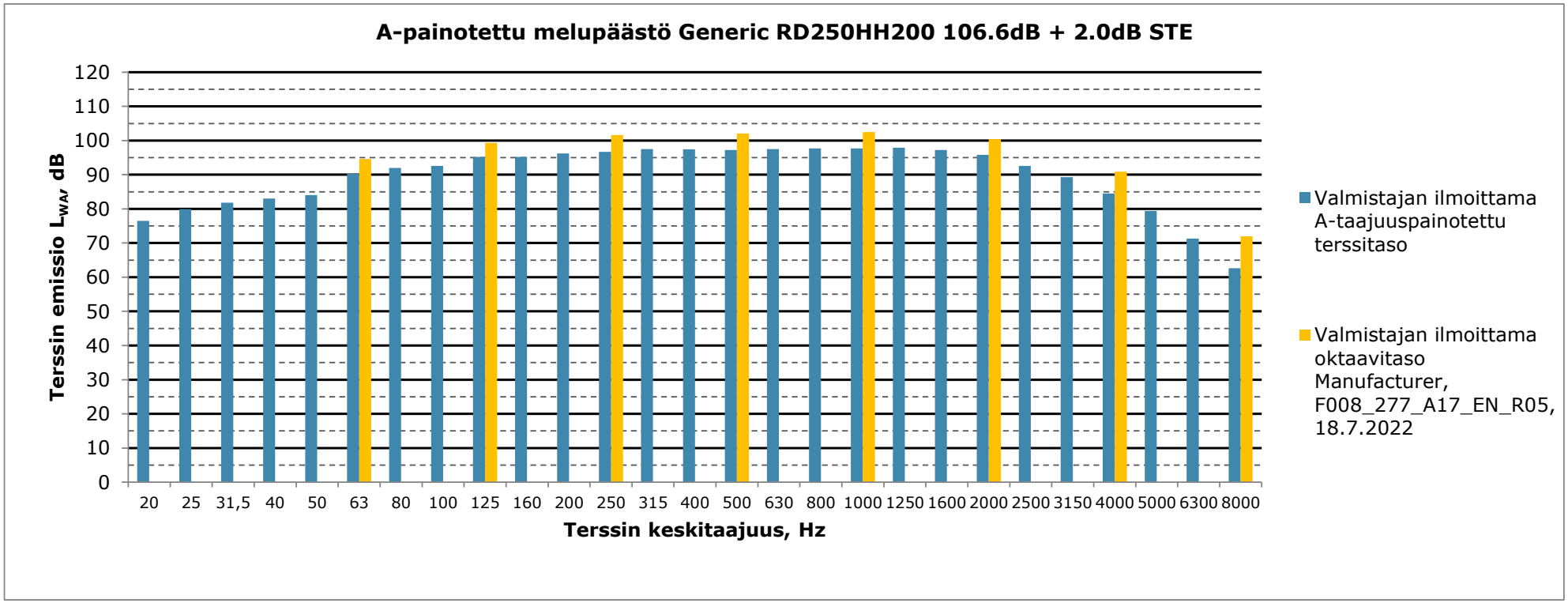
Äänitaso ulkona dB

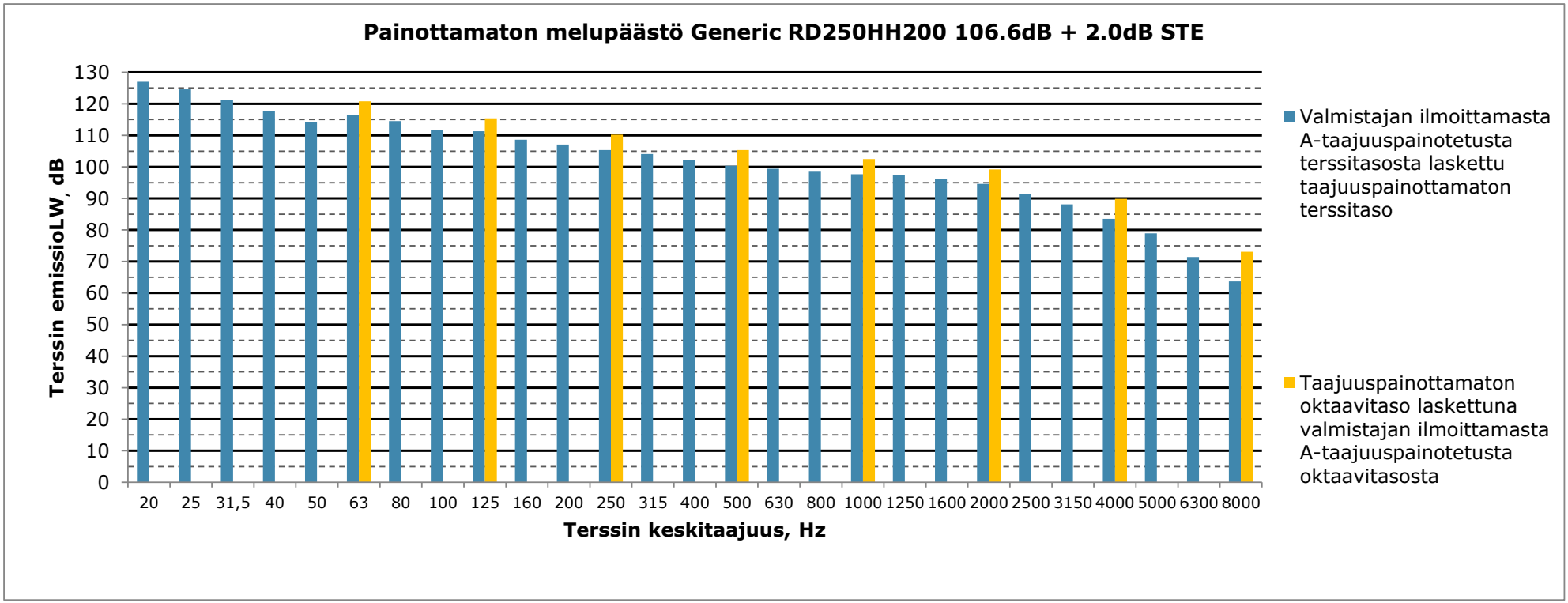
Äänitaso sisällä dB

Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB

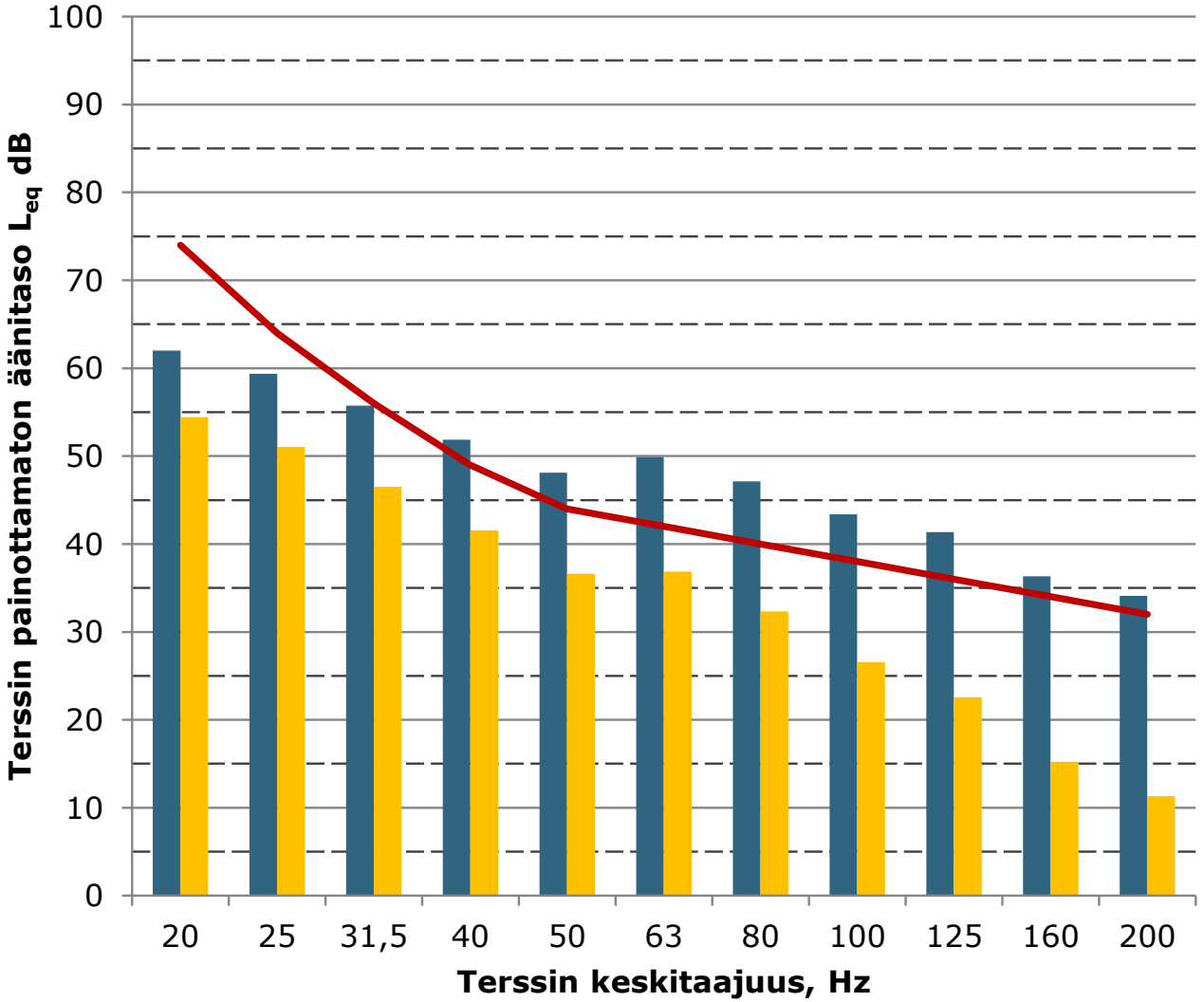
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 15
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

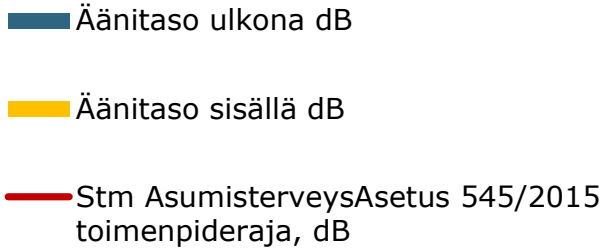
Liite 6. Volkkilankankaan tuulivoimahanke – matalataajuisen melun rakennuskohtaiset arvot VE1yö Generic 250–10 MW.


A-painotettu melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissio L_{WA} dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso
Valmistajan ilmoittama oktaavitaso Manufacturer, F008_277_A17_EN_R05, 18.7.2022


Painottamaton melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissioLW, dB
130
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

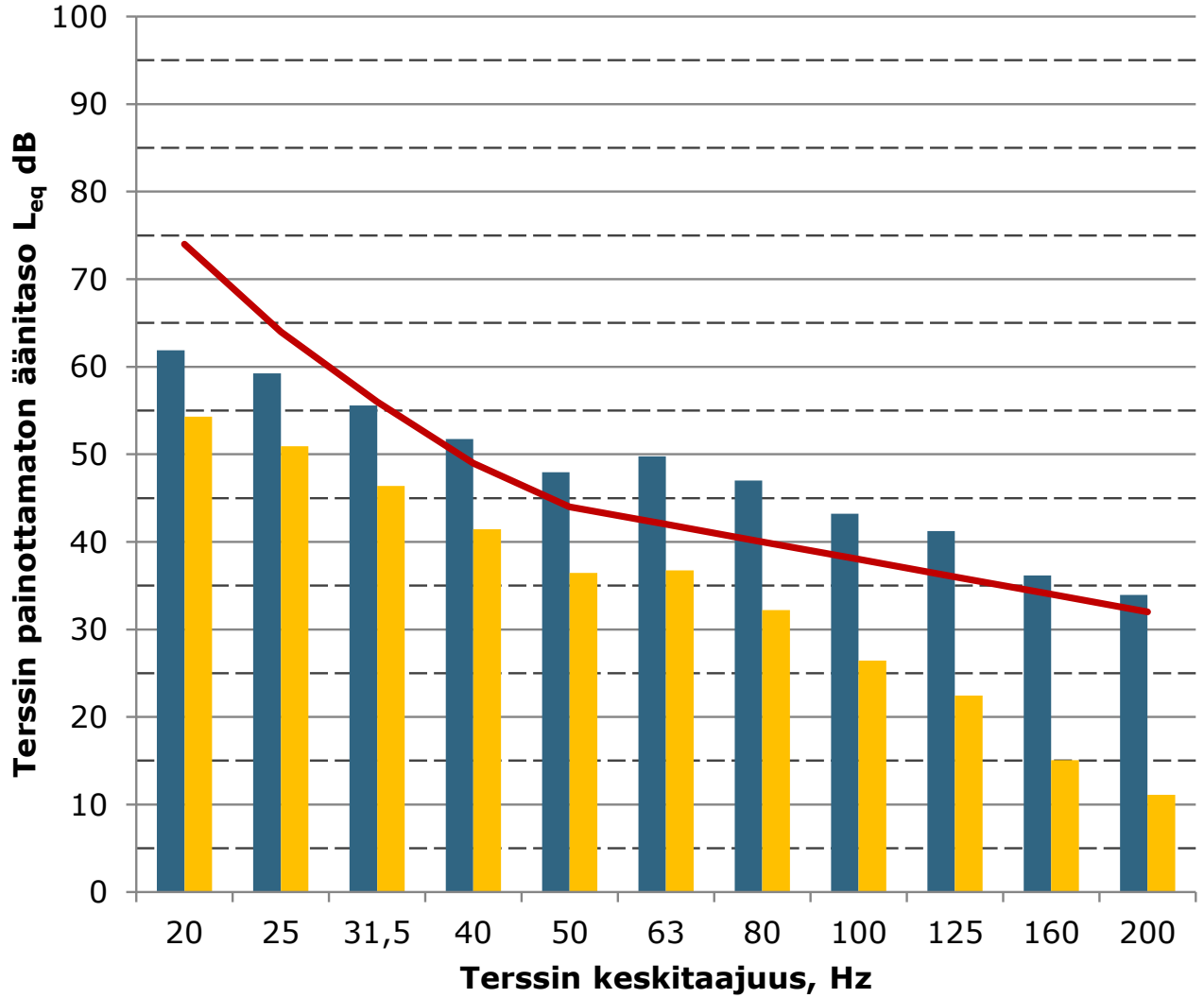
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_A (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

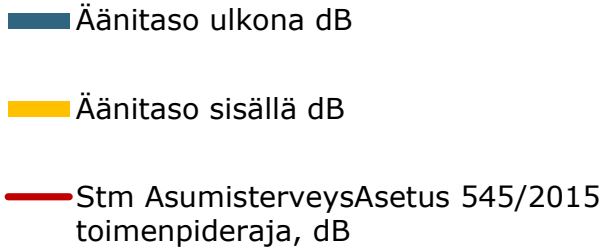




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

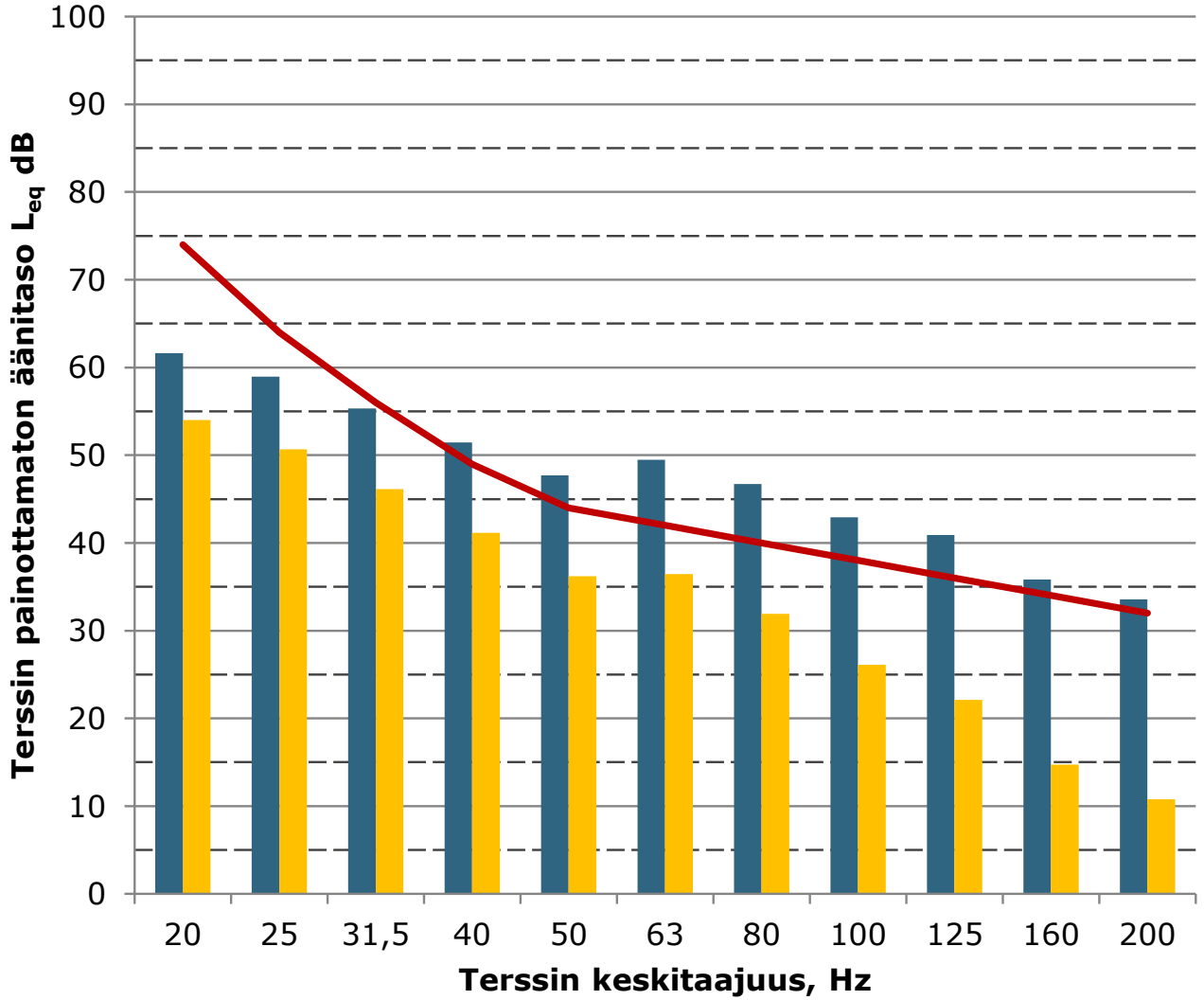
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_B (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

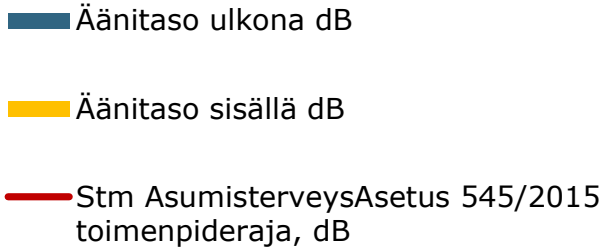




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

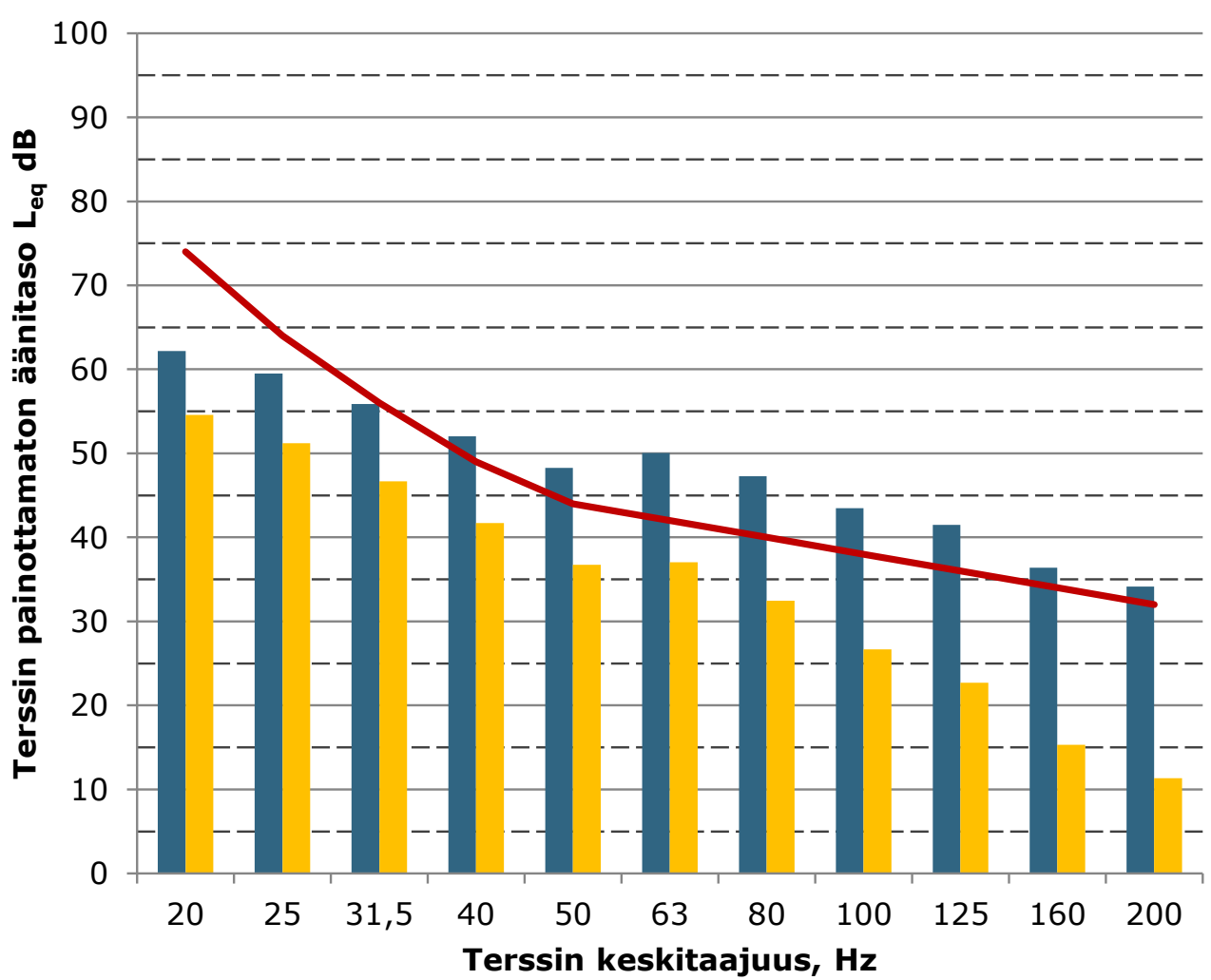
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_C (Autio), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_D (Ylä-Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan



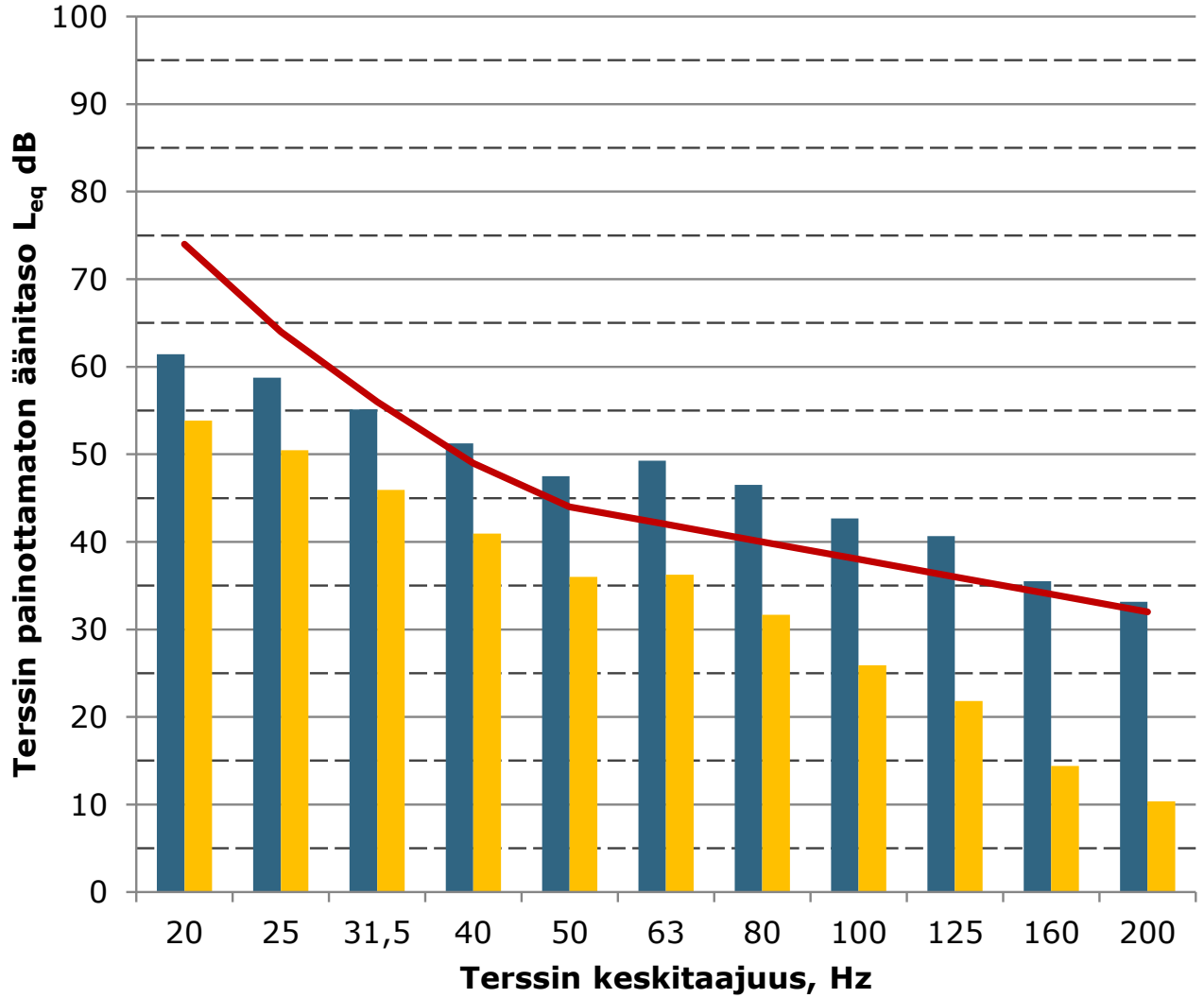
Äänitaso ulkona dB

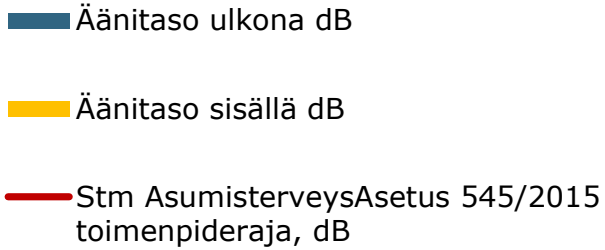
Äänitaso sisällä dB

Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB

Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

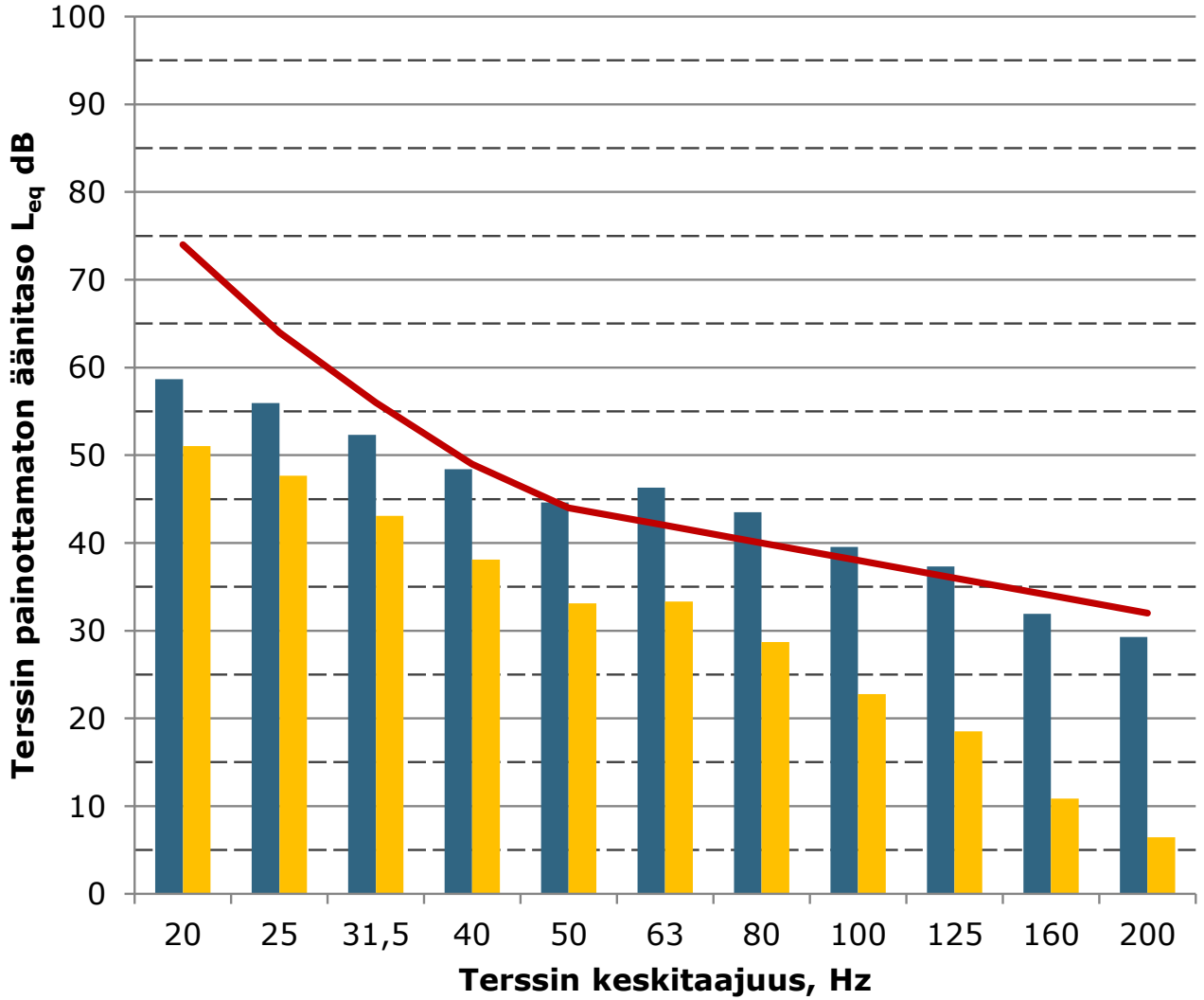
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_E (Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

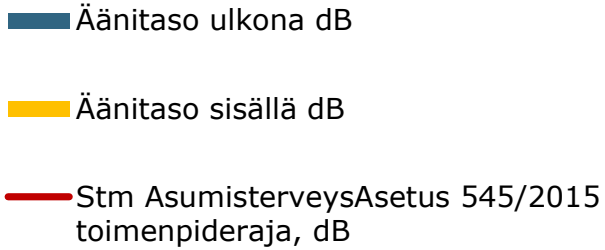




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

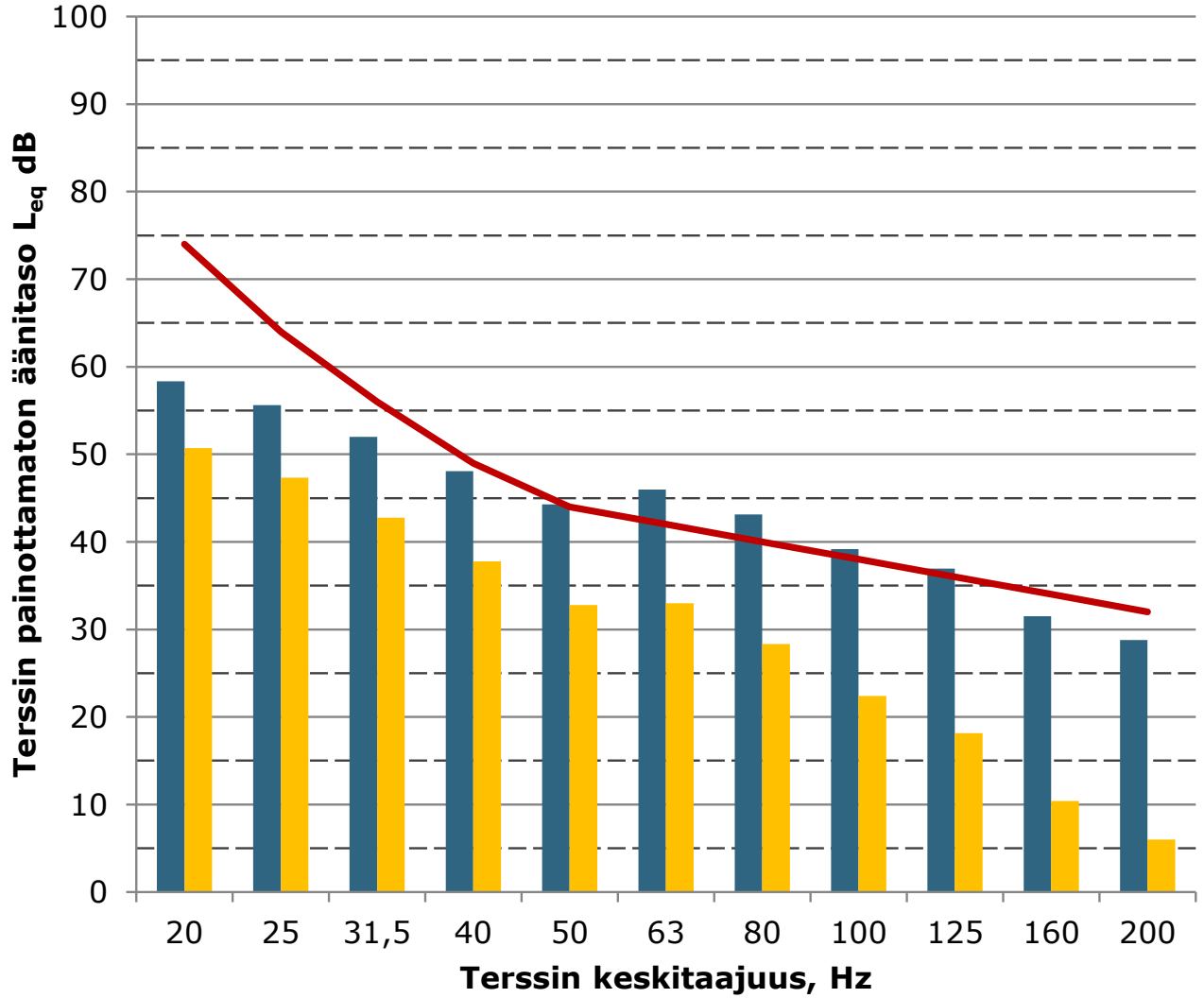
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_F (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

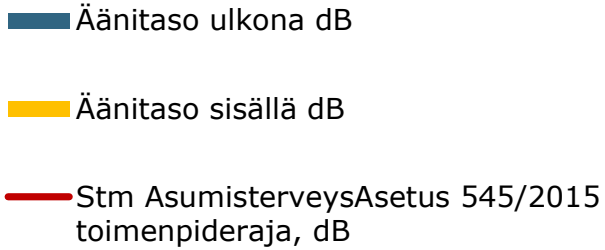




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

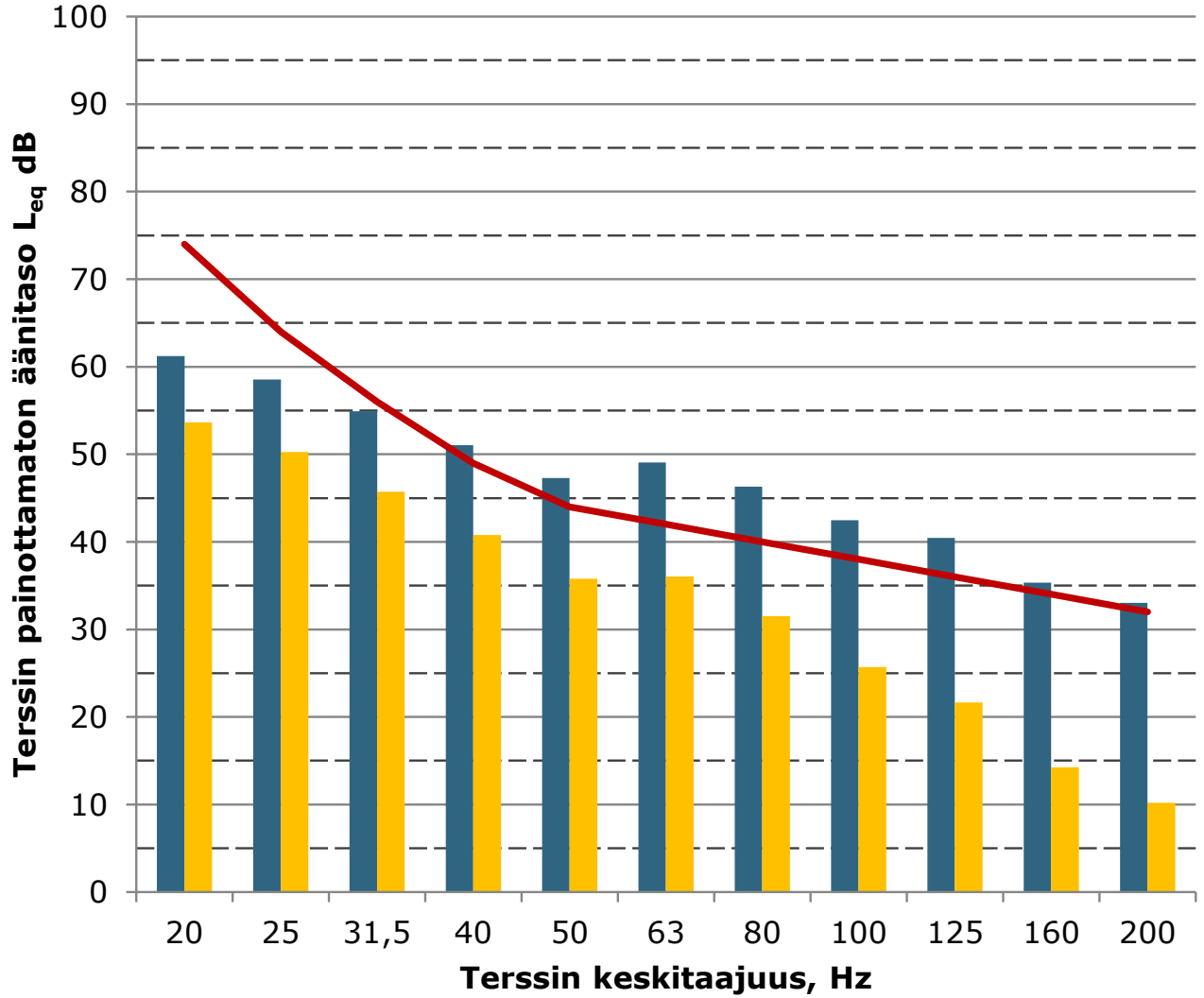
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_G (Alapelto), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

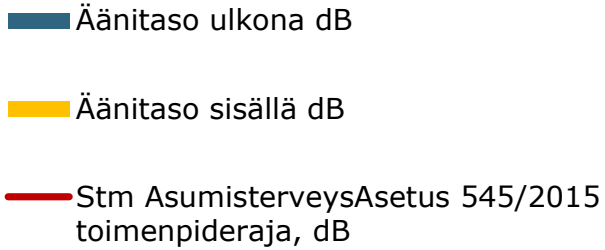




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

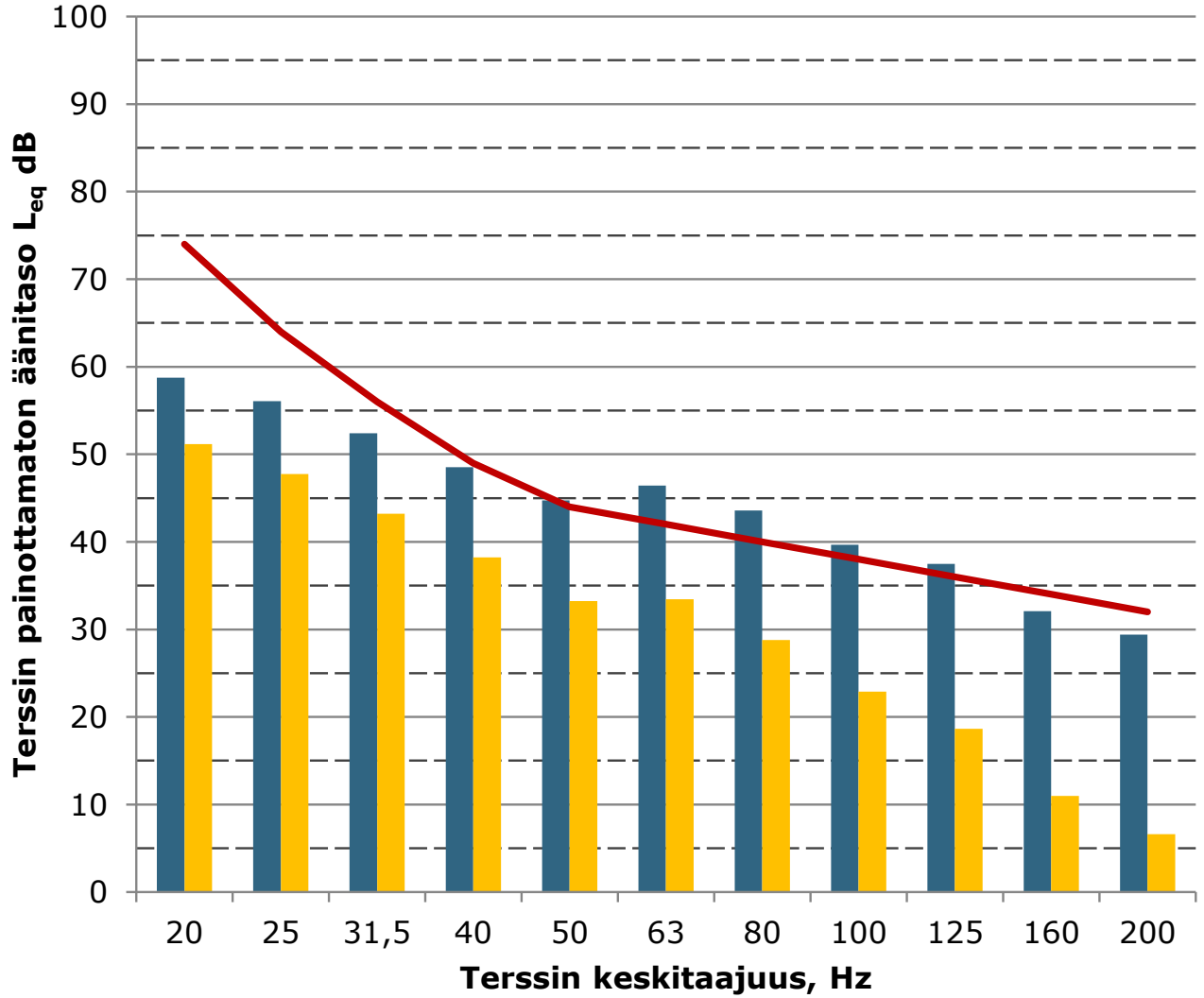
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_H (Lepola), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

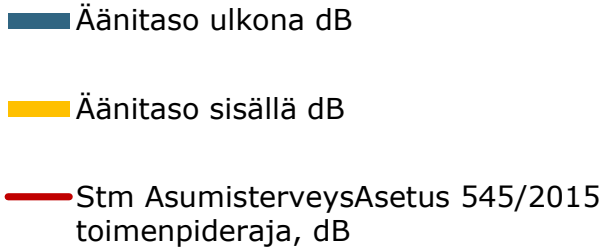




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

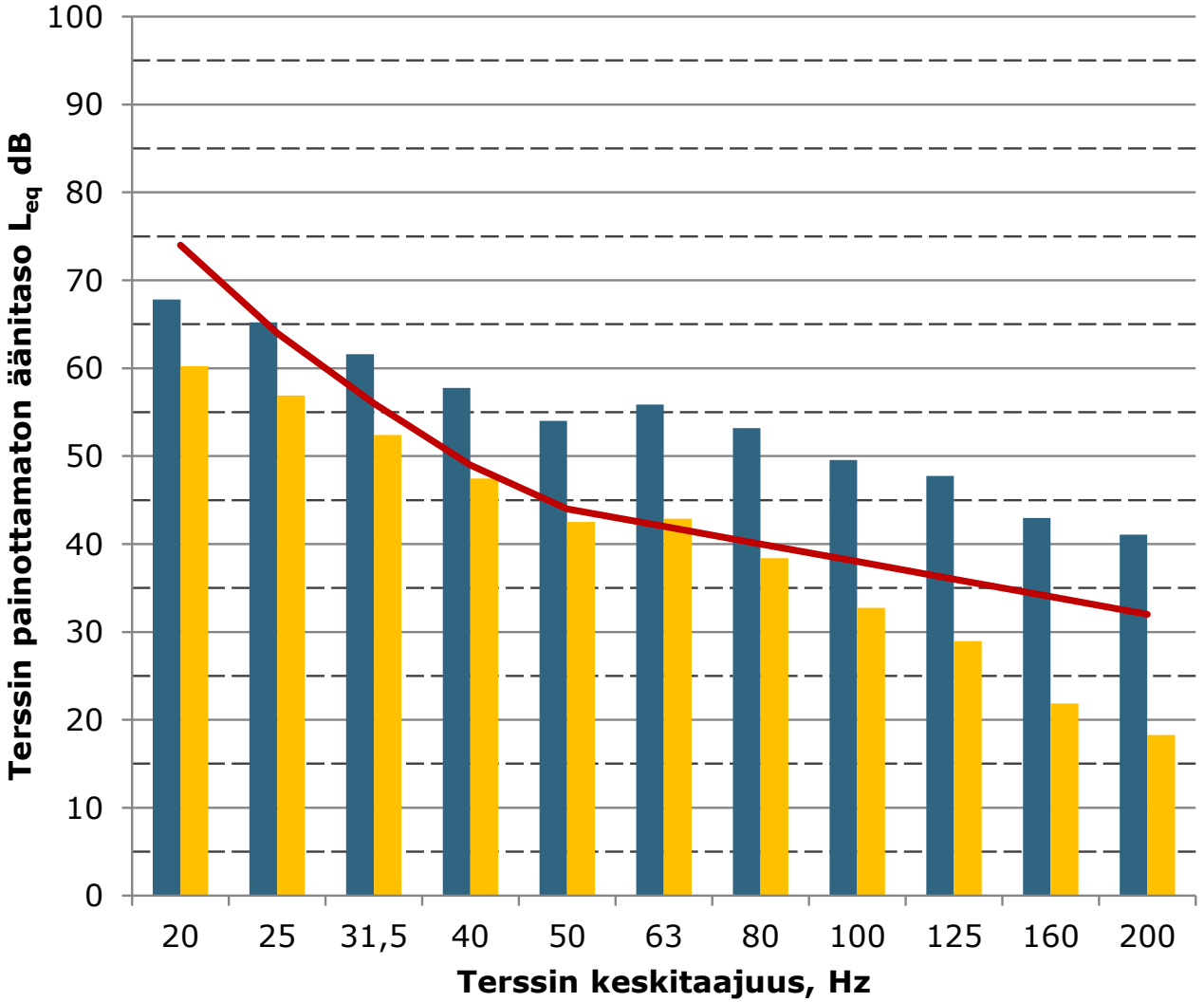
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_I (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

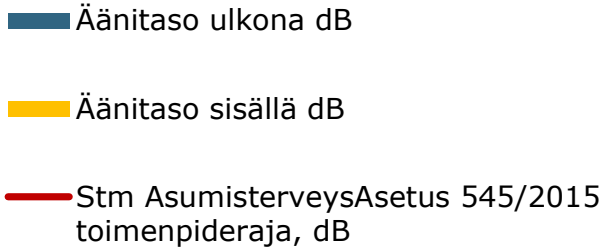




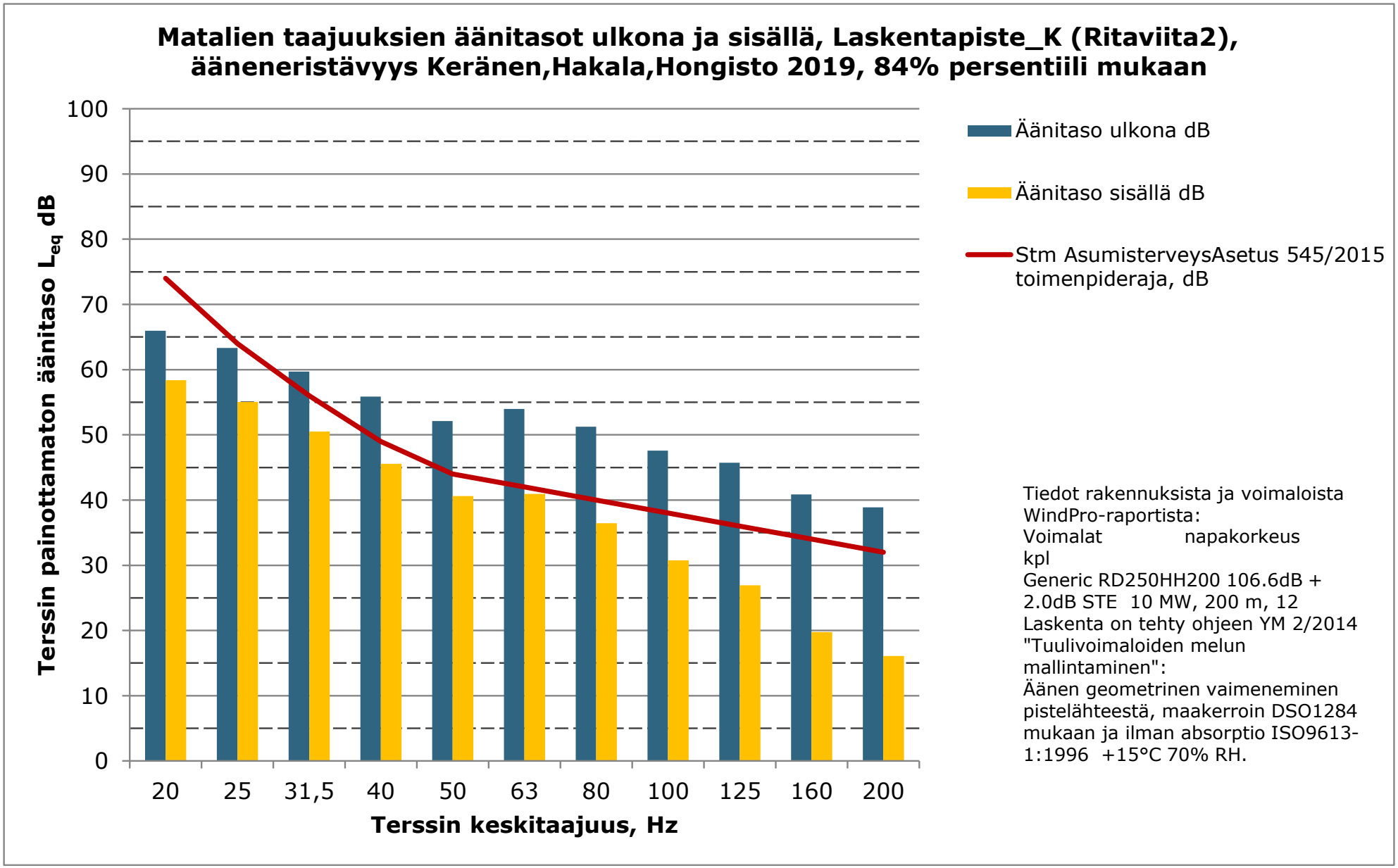
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_J (Ritaviita), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

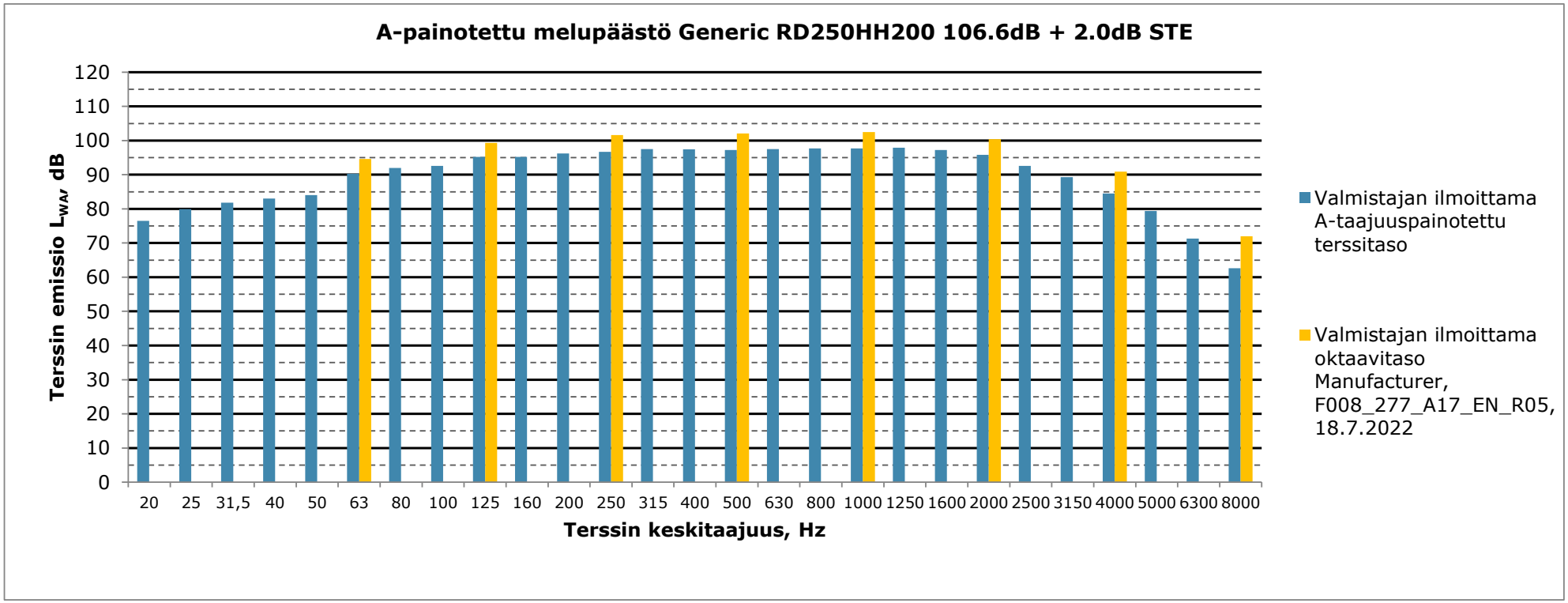


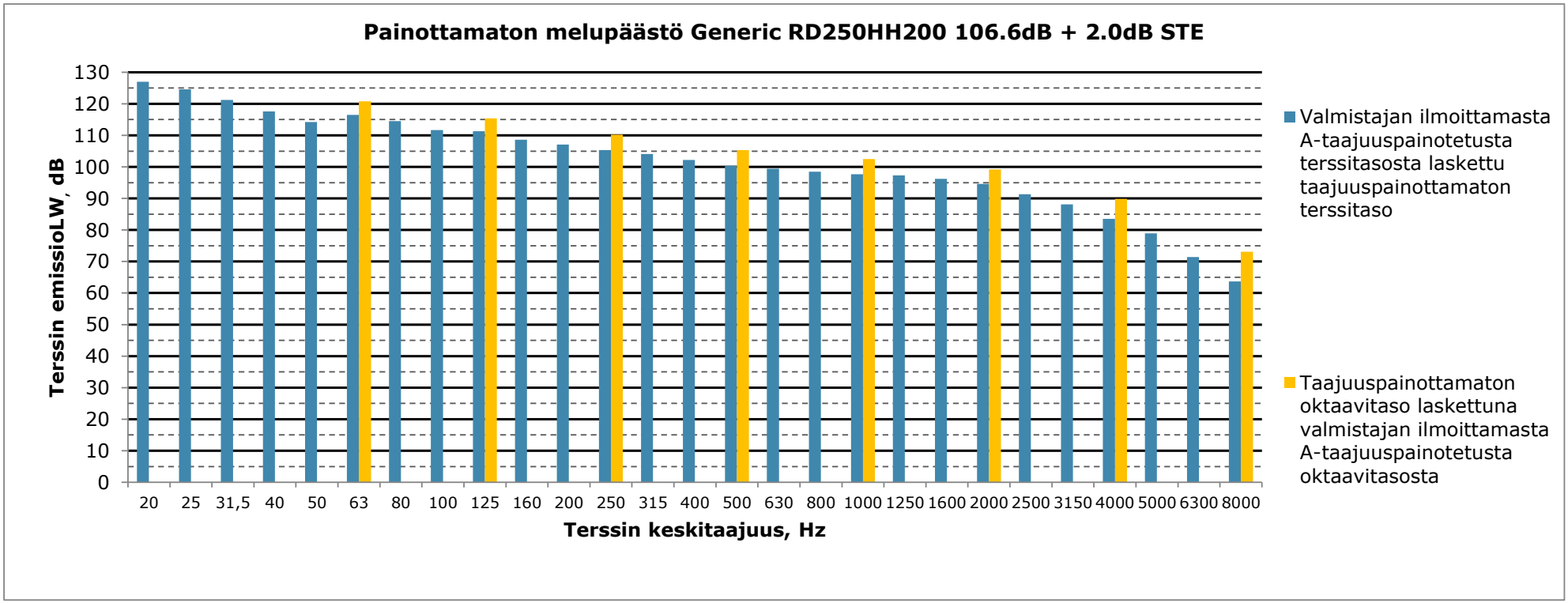


Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

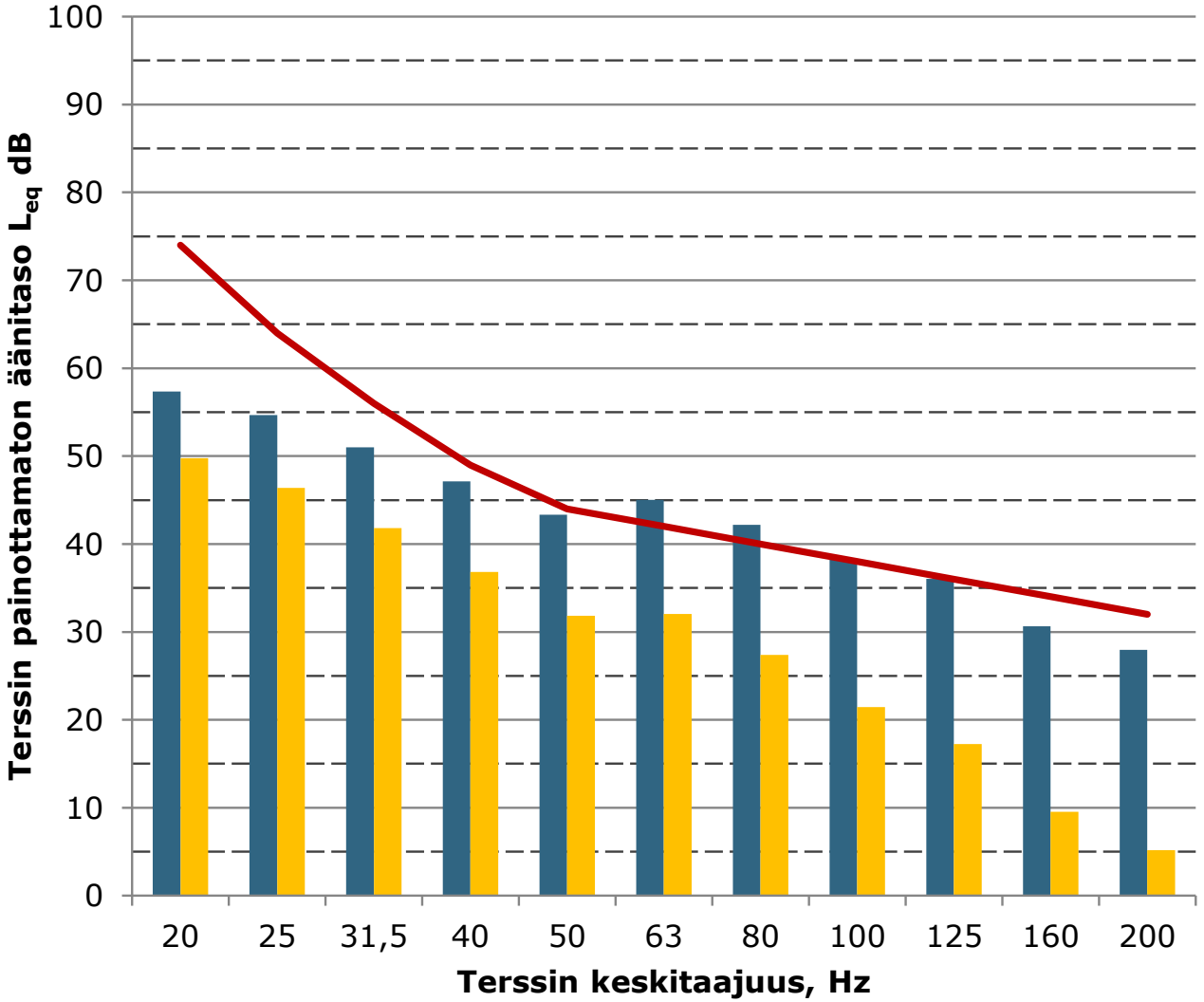

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_K (Ritaviita2), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan
Terssin painottamaton äänitaso Leq dB
100
90
80
70
60
50
40
30
20
10
0
20
25
31,5
40
50
63
80
100
125
160
200
Terssin keskitaajuus, Hz
Äänitaso ulkona dB
Äänitaso sisällä dB
Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Liite 7. Volkkilankankaan tuulivoimahanke – matalataajuisen melun rakennuskohtaiset arvot VE2 Generic 250–10 MW.


A-painotettu melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissio L_{WA} dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso
Valmistajan ilmoittama oktaavitaso Manufacturer, F008_277_A17_EN_R05, 18.7.2022


Painottamaton melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissioLW, dB
130
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_A (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan



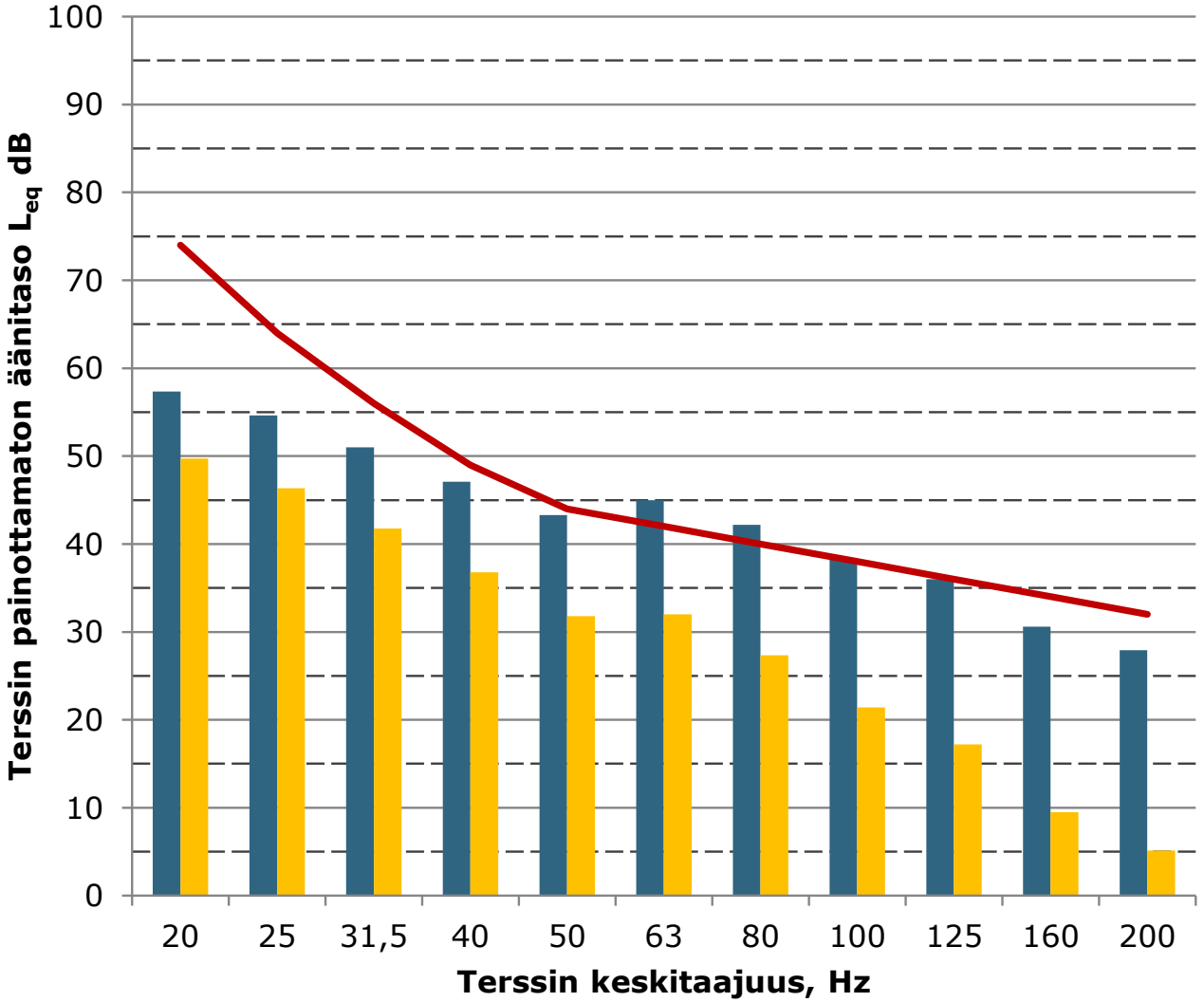
Äänitaso ulkona dB

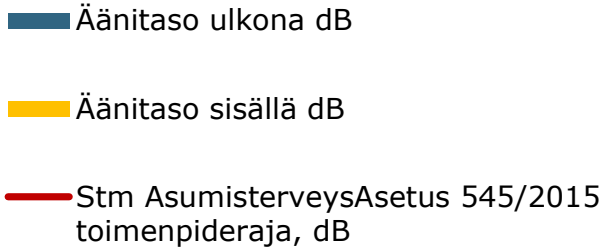
Äänitaso sisällä dB

Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB

Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

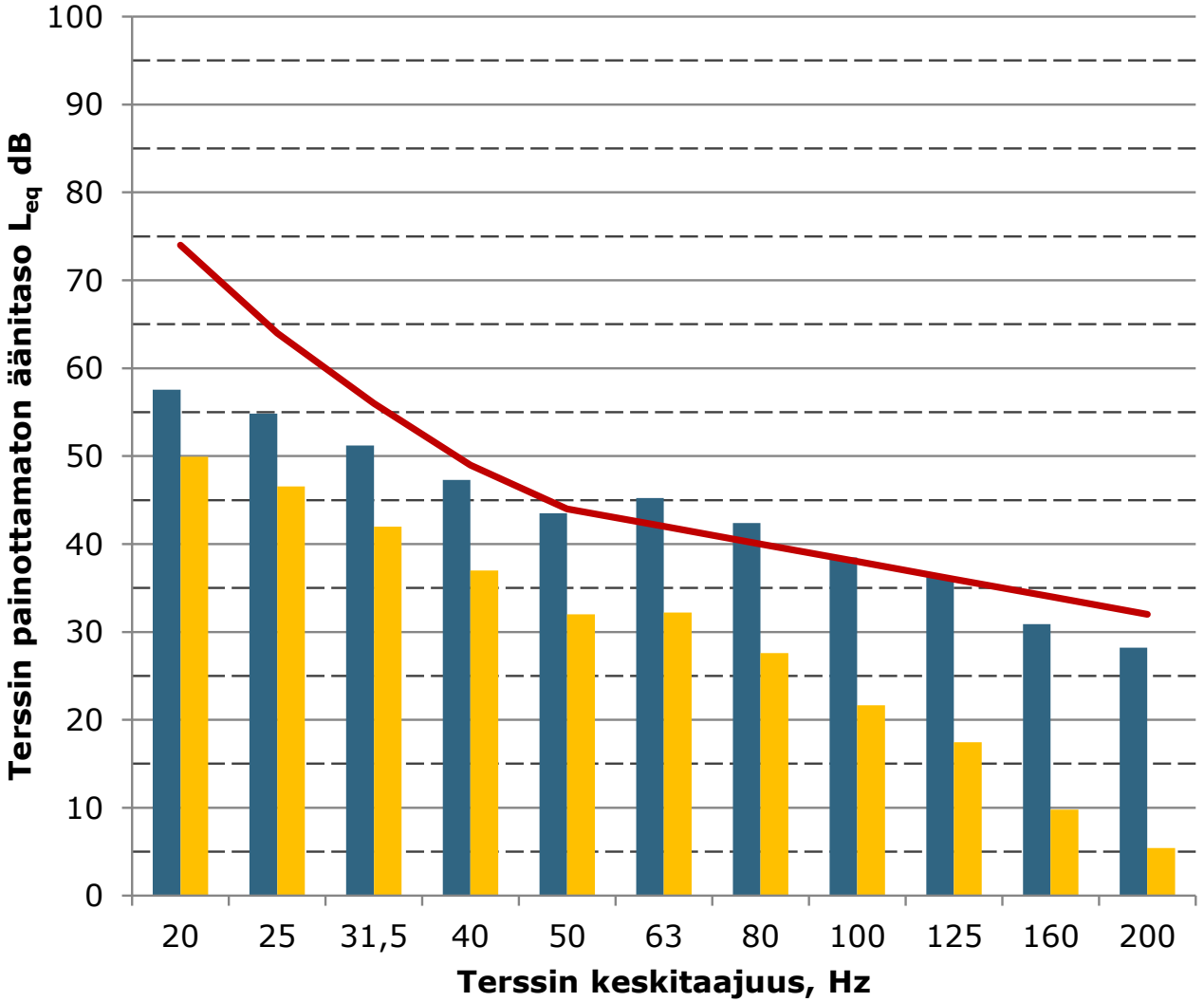
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_B (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

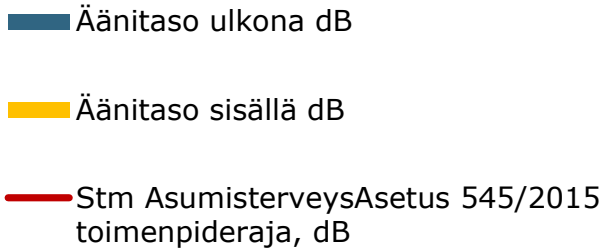




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

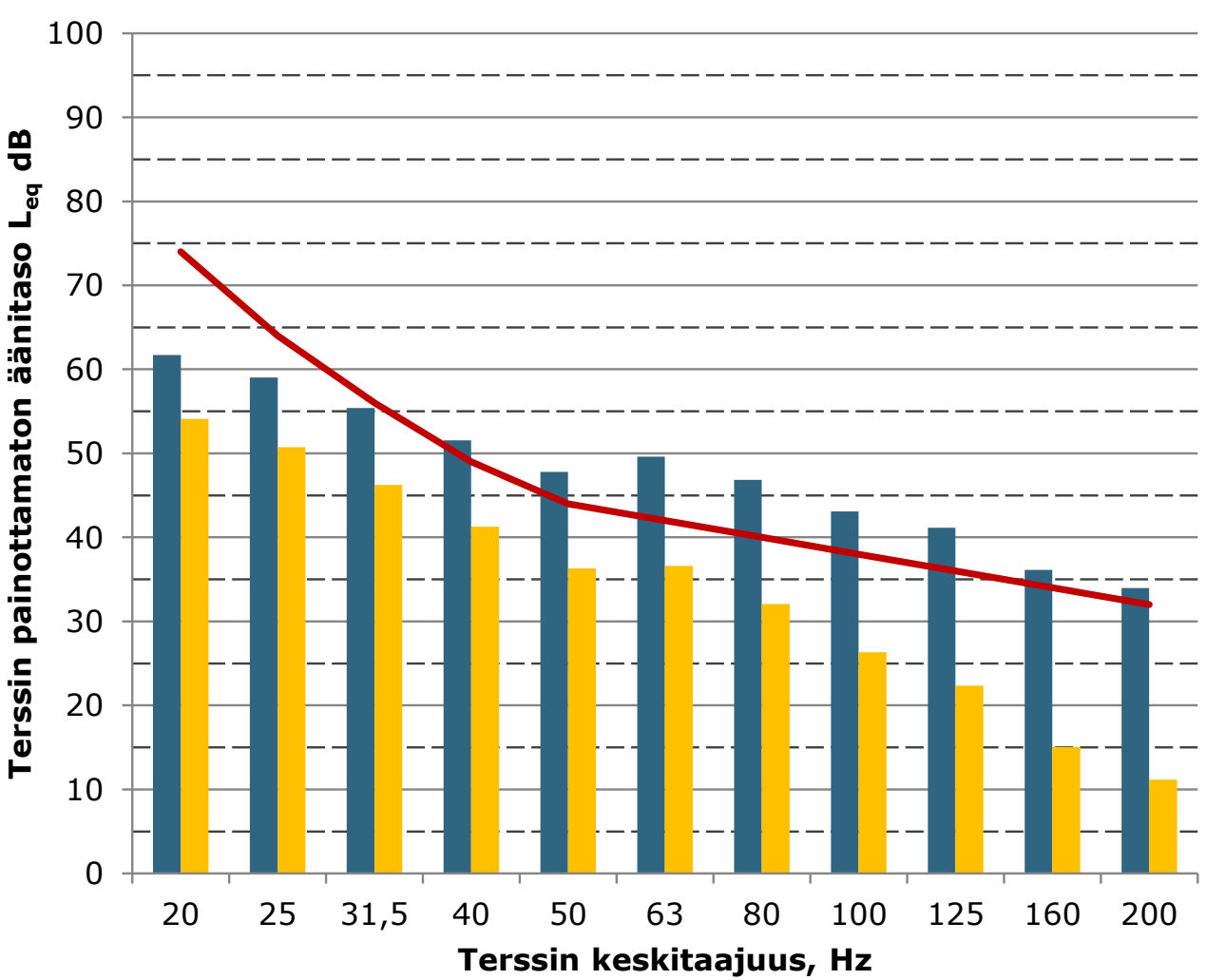
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_C (Autio), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

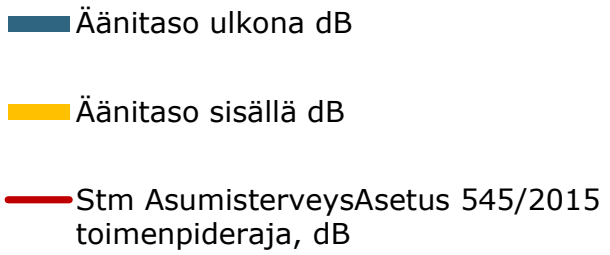




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

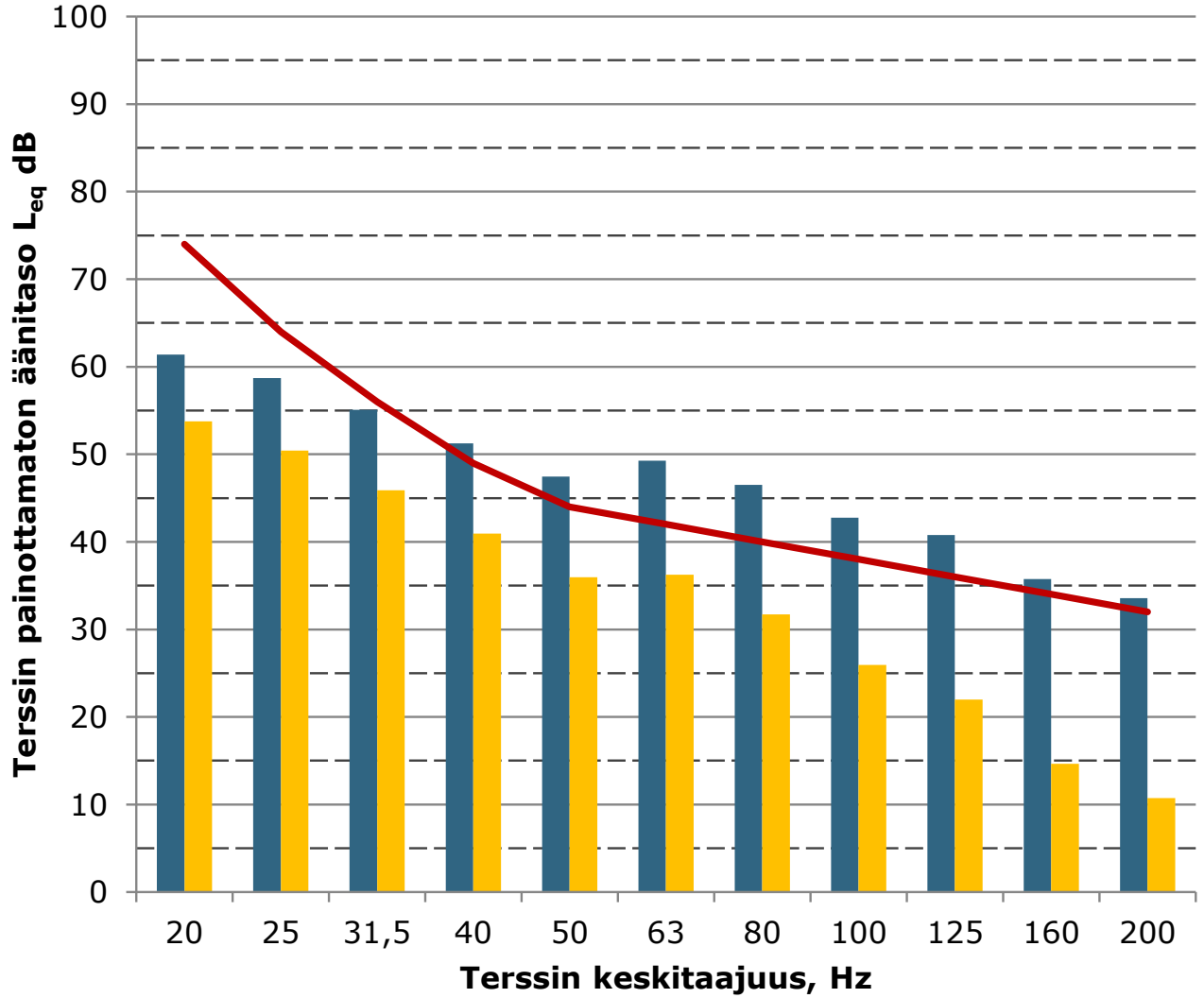
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_D (Ylä-Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

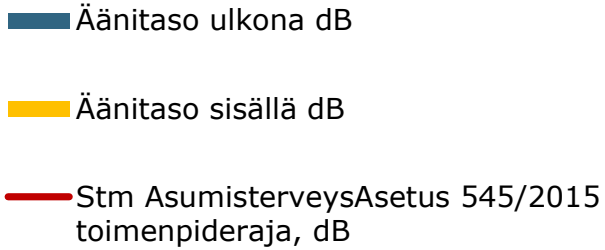




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

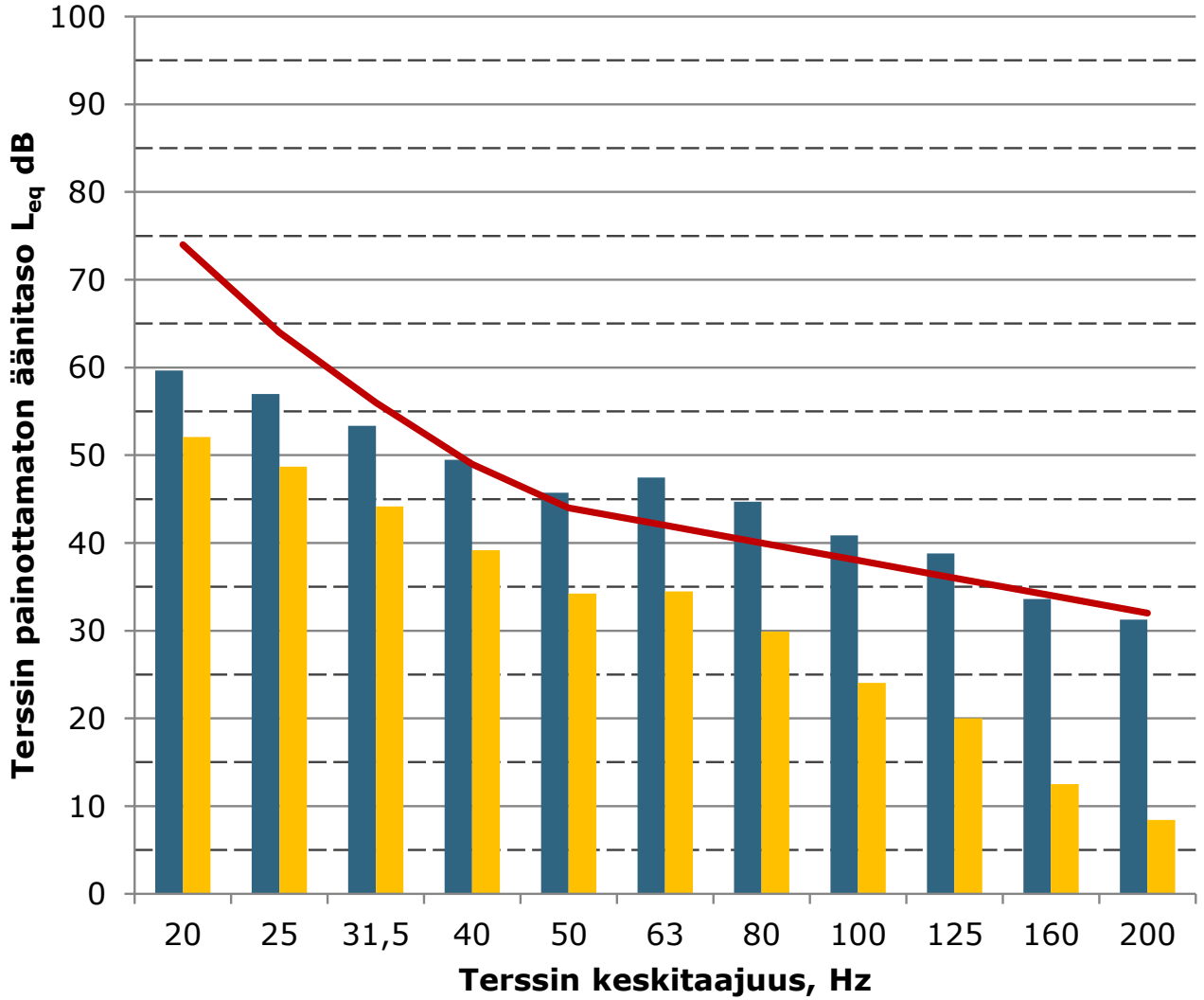
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_E (Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

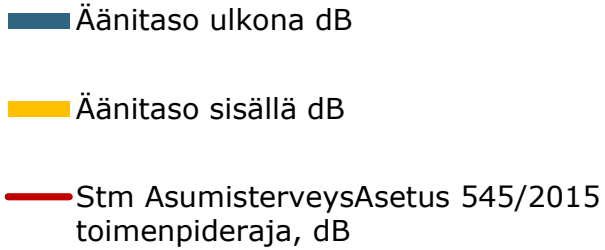




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

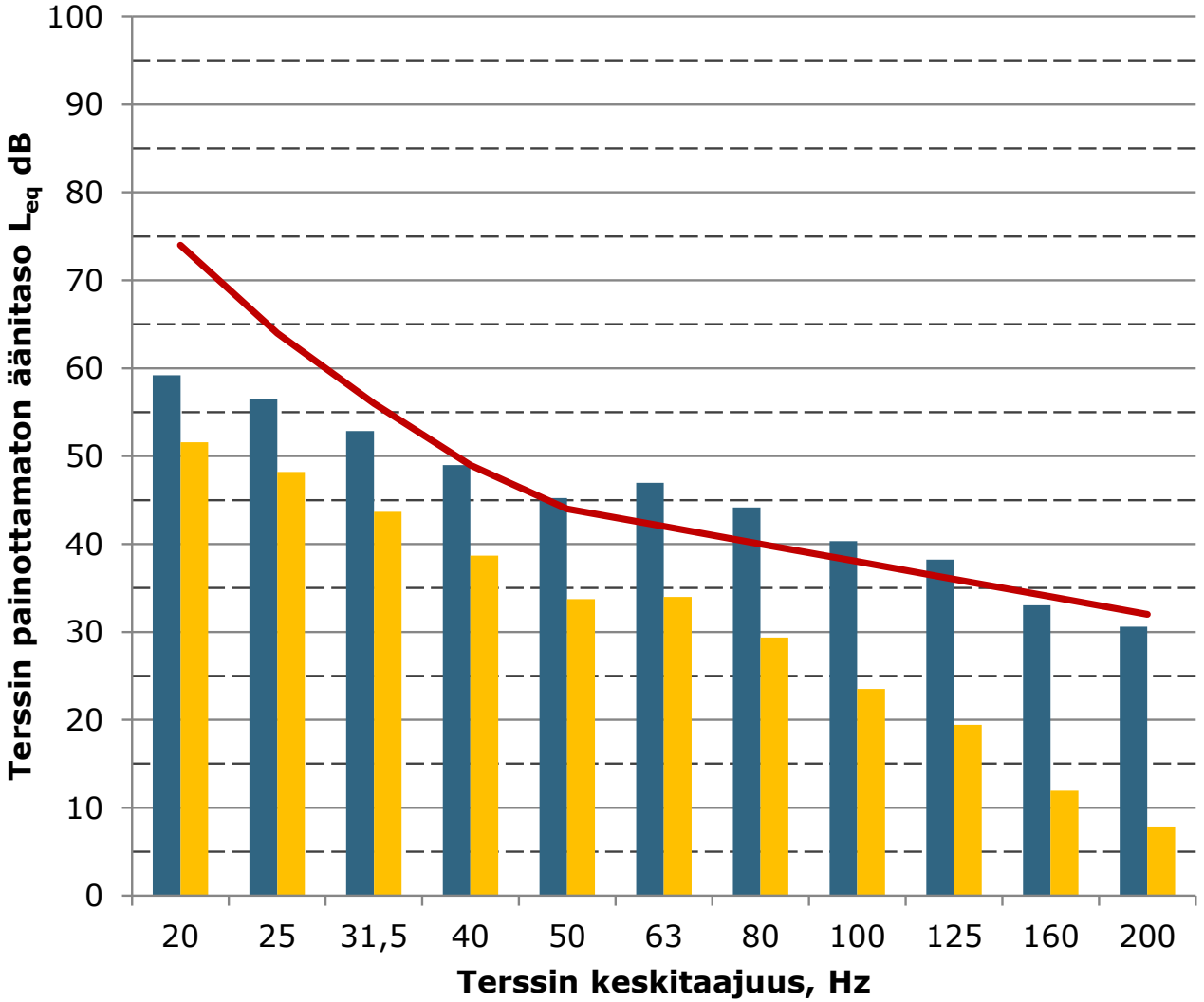
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_F (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_G (Alapelto), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan



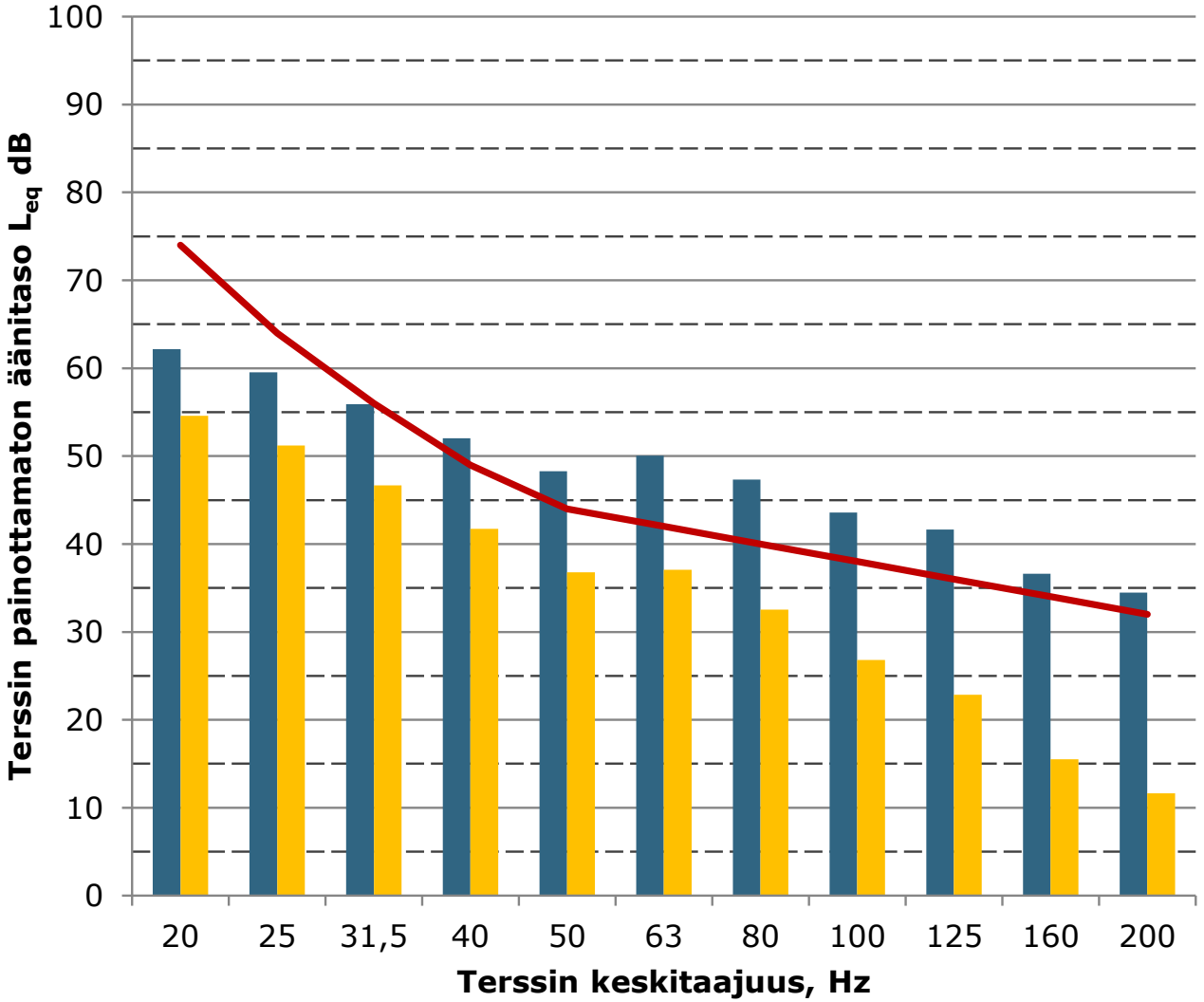
Äänitaso ulkona dB

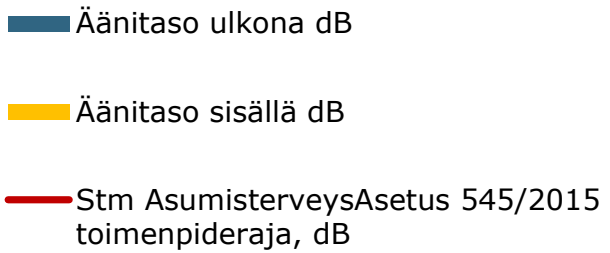
Äänitaso sisällä dB

Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB

Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

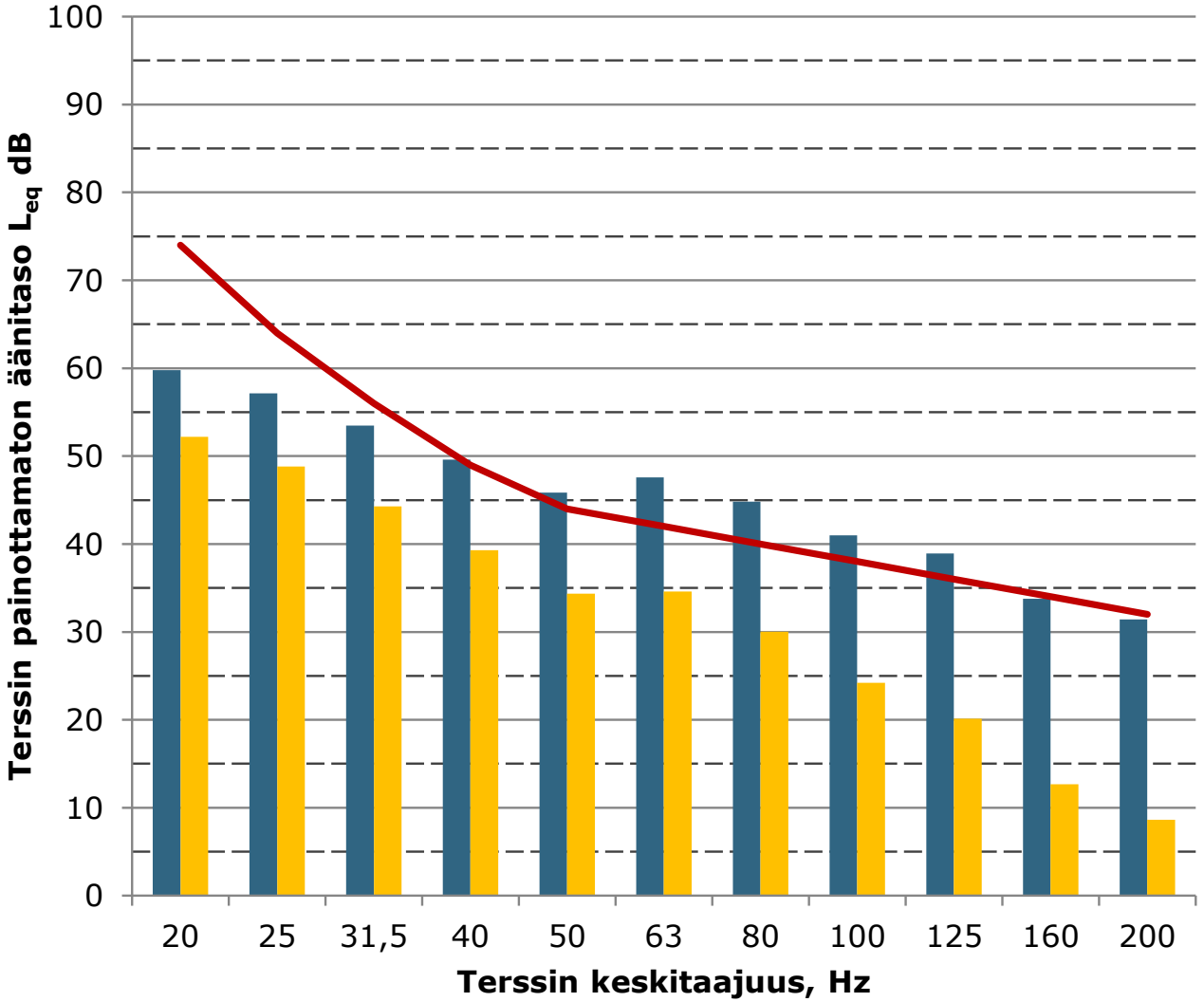
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_H (Lepola), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

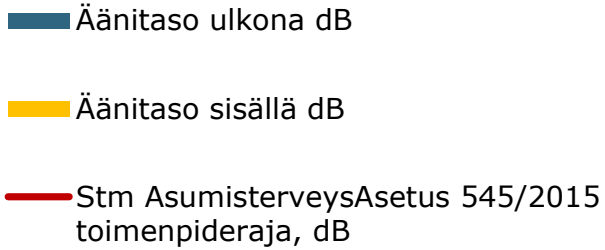




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

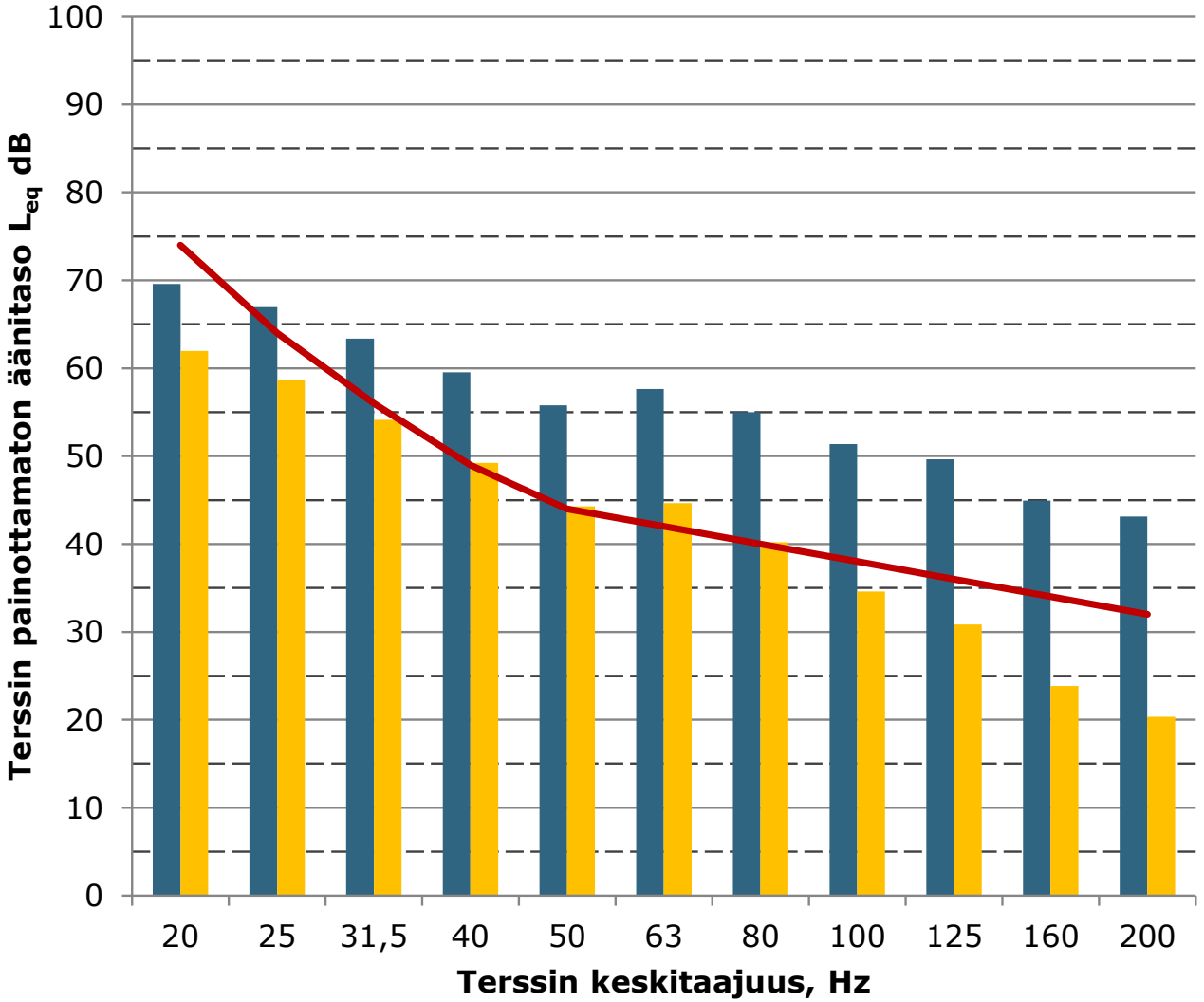
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_I (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

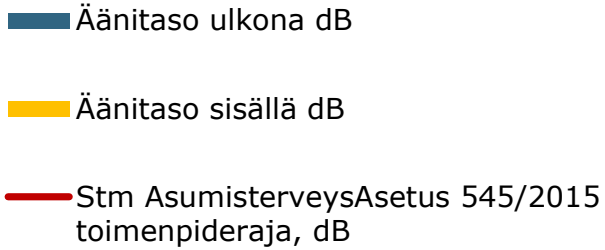




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

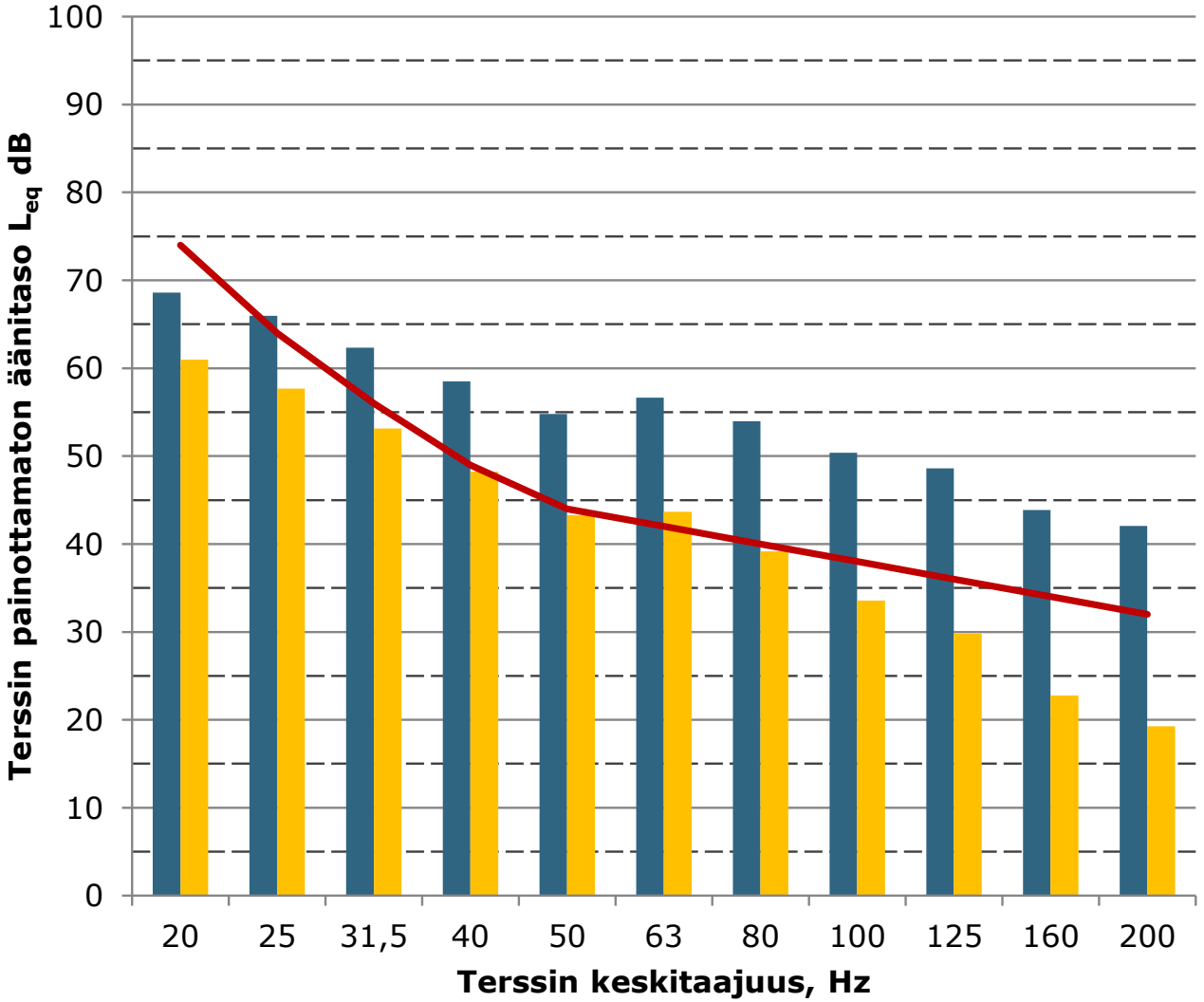
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_J (Ritaviita), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

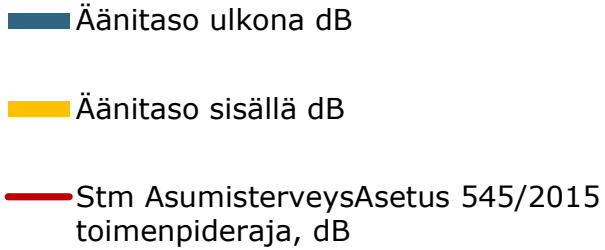




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

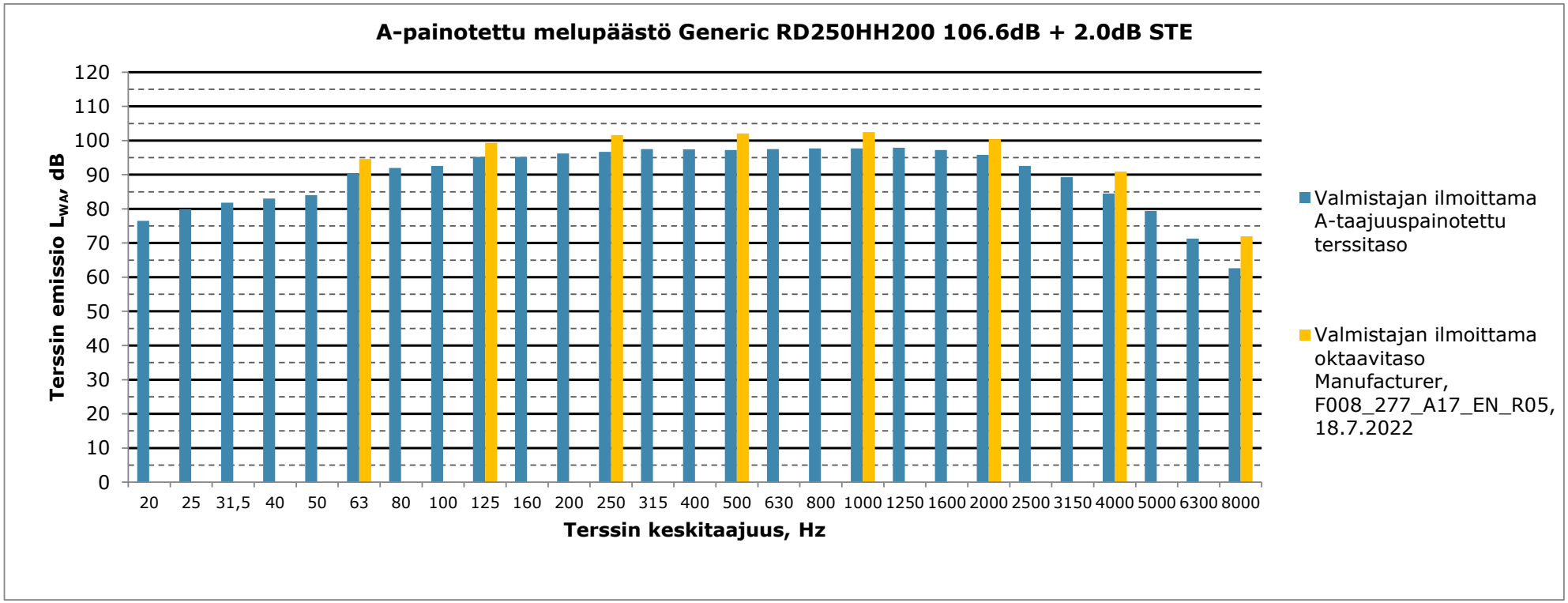
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_K (Ritaviita2), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

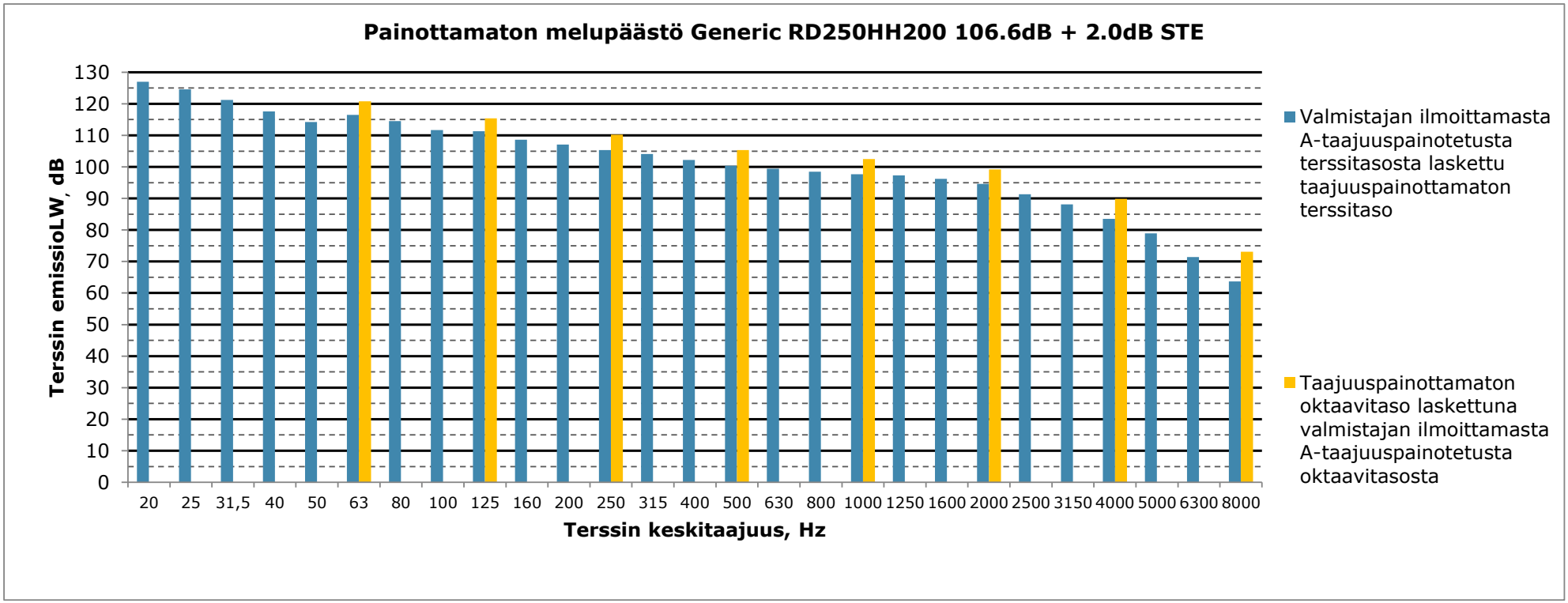




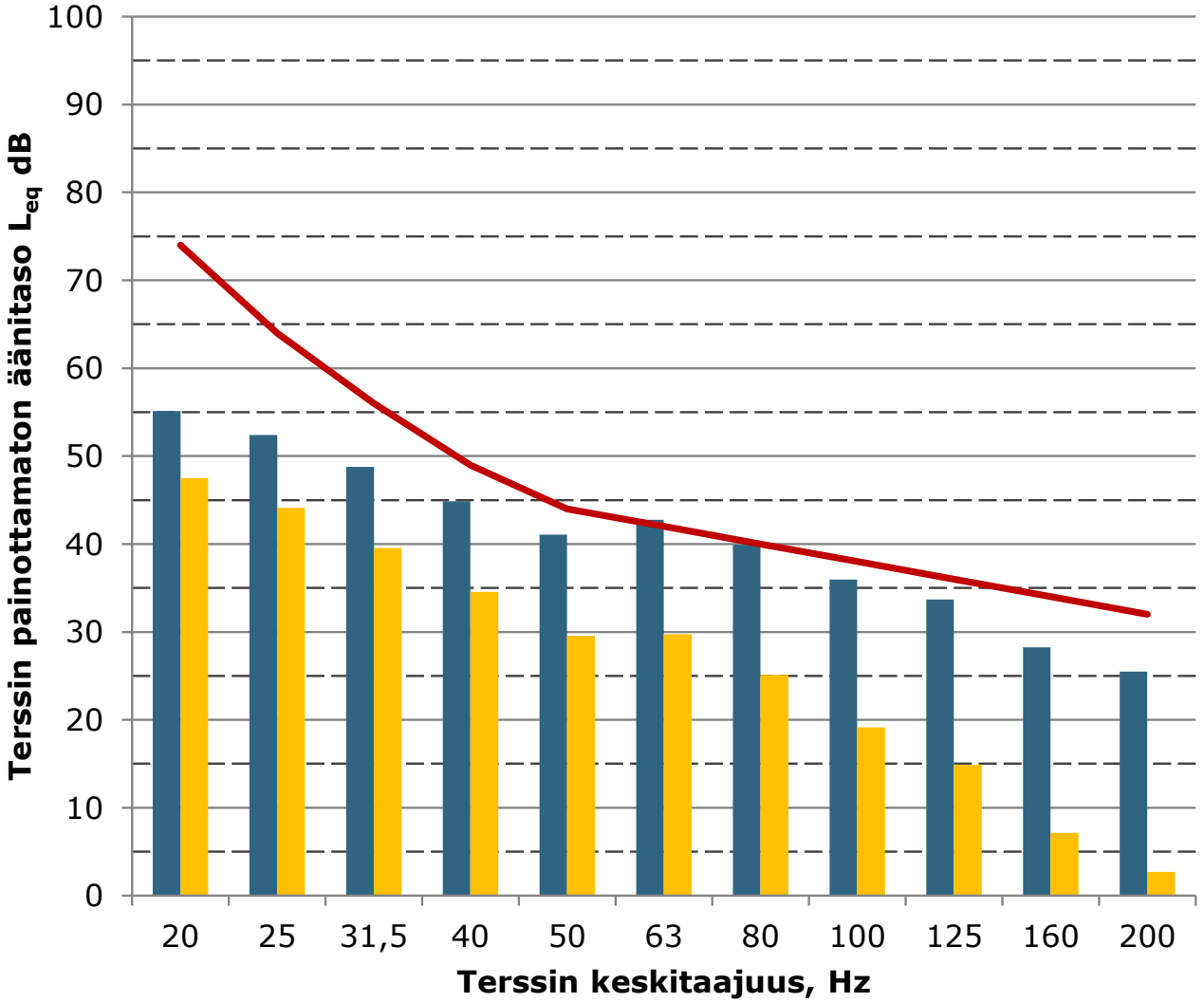
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 9
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

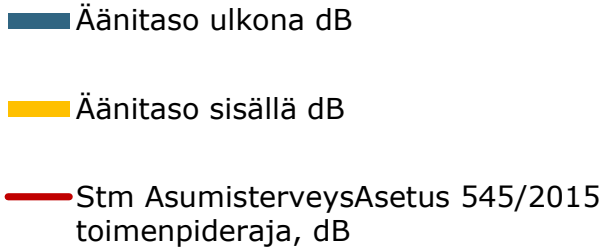
Liite 8. Volkkilankankaan tuulivoimahanke – matalataajuisen melun rakennuskohtaiset arvot VE2yö Generic 250–10 MW.


A-painotettu melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissio L_{WA} dB
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittama A-taajuuspainotettu terssitaso
Valmistajan ilmoittama oktaavitaso Manufacturer, F008_277_A17_EN_R05, 18.7.2022


Painottamaton melupäästö Generic RD250HH200 106.6dB + 2.0dB STE
Terssin emissioLW, dB
130
120
110
100
90
80
70
60
50
40
30
20
10
0
20 25 31,5 40 50 63 80 100 125 160 200 250 315 400 500 630 800 1000 1250 1600 2000 2500 3150 4000 5000 6300 8000
Terssin keskitaajuus, Hz
Valmistajan ilmoittamasta A-taajuuspainotetusta terssitasosta laskettu taajuuspainottamaton terssitaso
Taajuuspainottamaton oktaavitaso laskettuna valmistajan ilmoittamasta A-taajuuspainotetusta oktaavitasosta

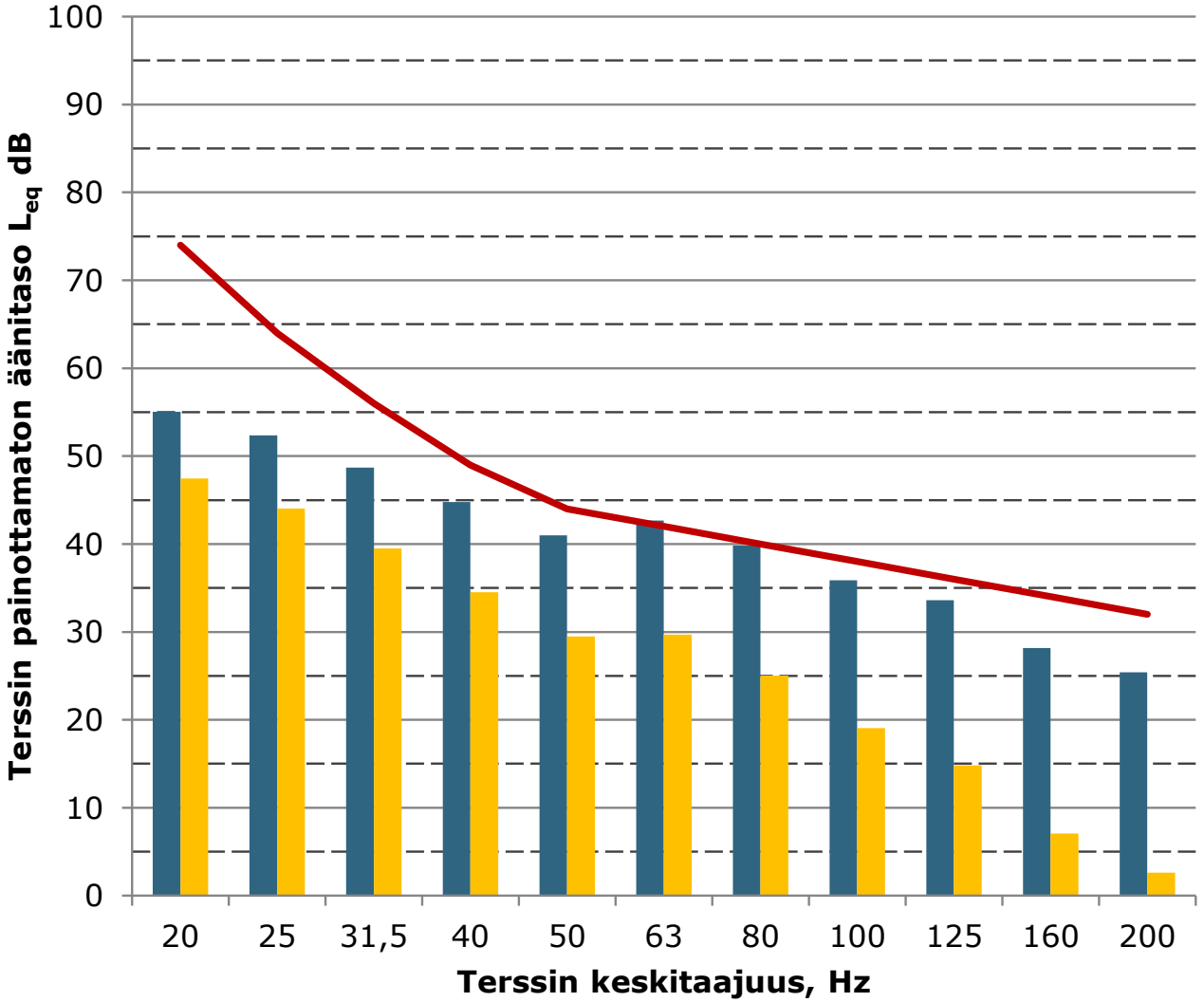
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_A (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

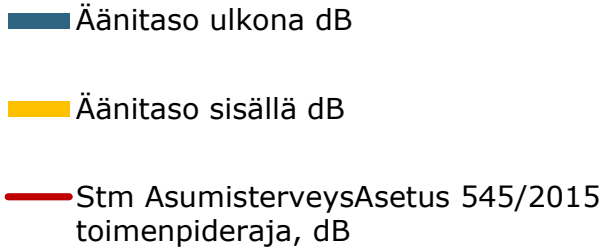




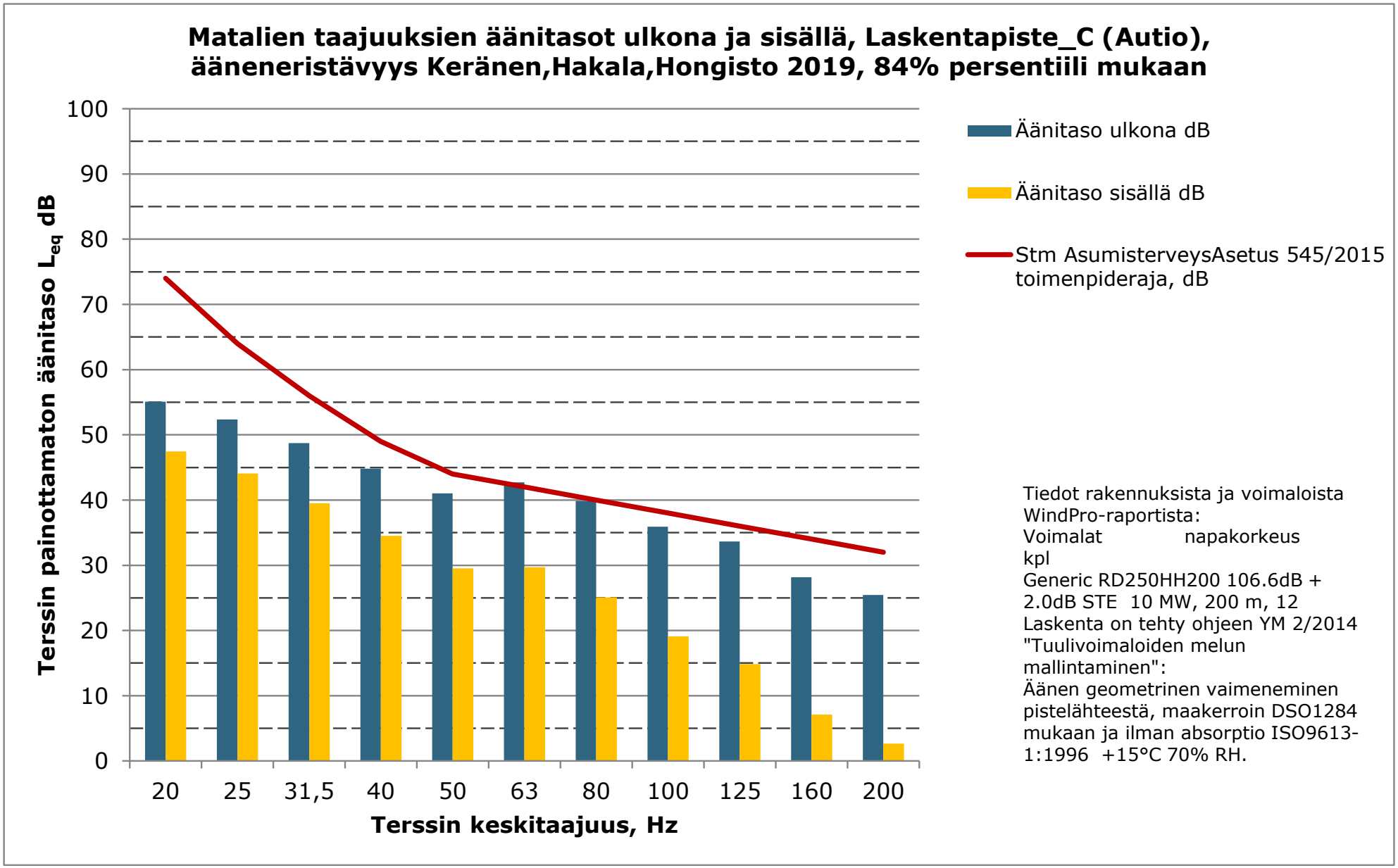
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_B (Harjunpää), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

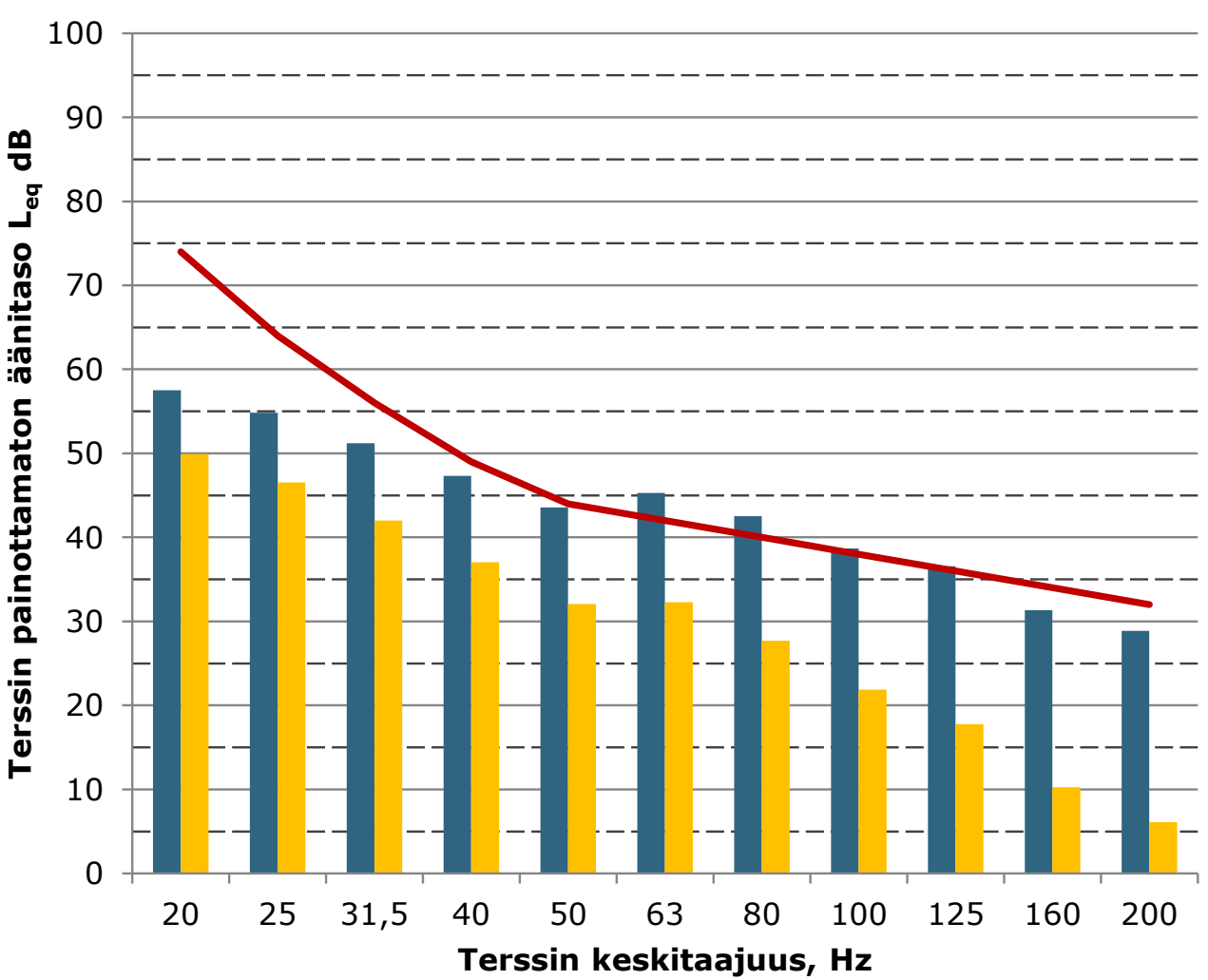


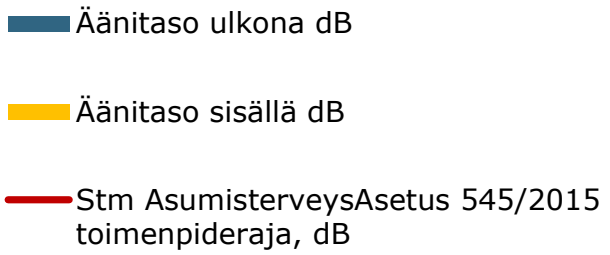


Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.


Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_C (Autio), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan
Terssin painottamaton äänitaso L_{eq} dB
100
90
80
70
60
50
40
30
20
10
0
20
25
31,5
40
50
63
80
100
125
160
200
Terssin keskitaajuus, Hz
Äänitaso ulkona dB
Äänitaso sisällä dB
Stm AsumisterveysAsetus 545/2015 toimenpideraja, dB
Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus
kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

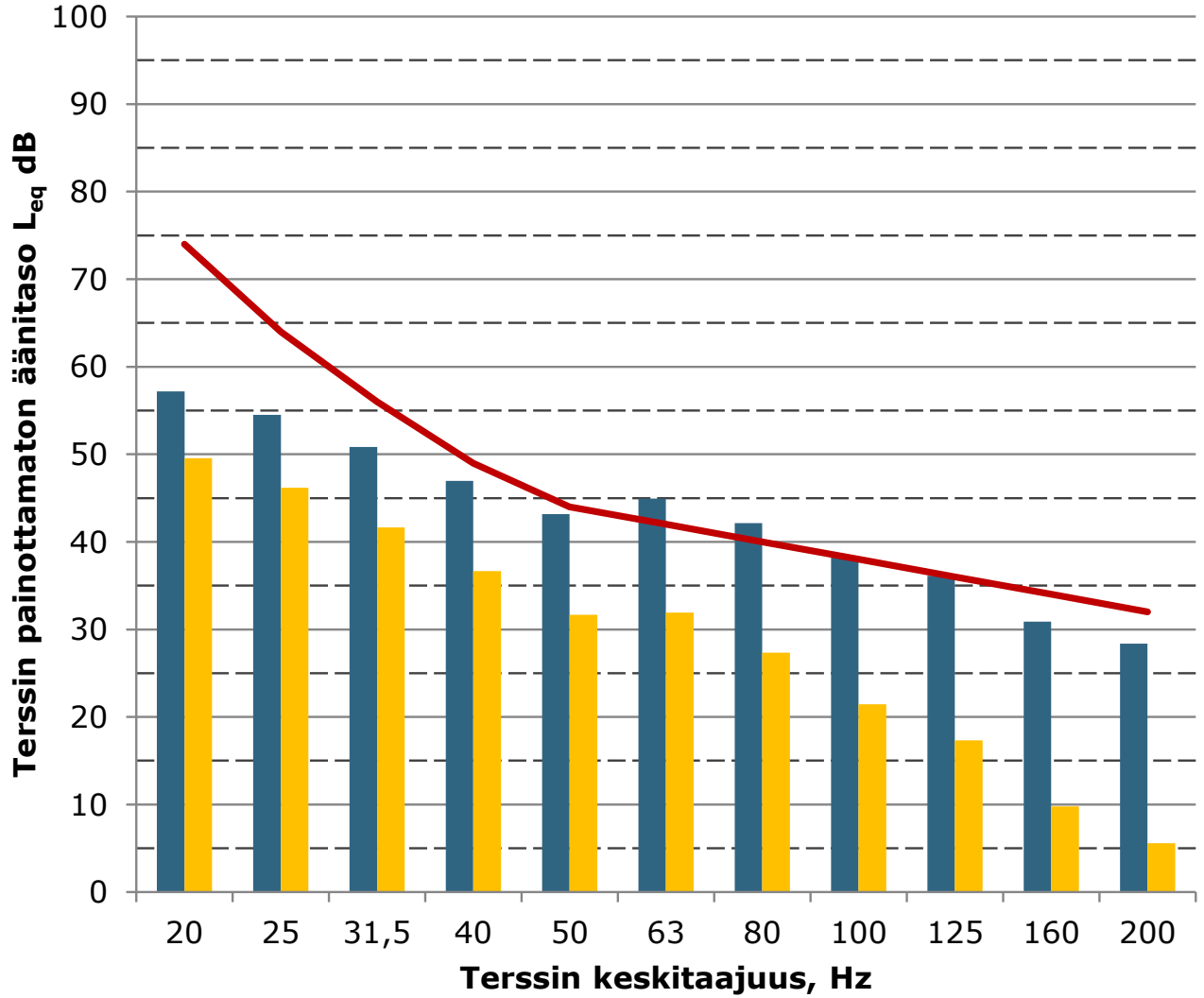
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_D (Ylä-Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

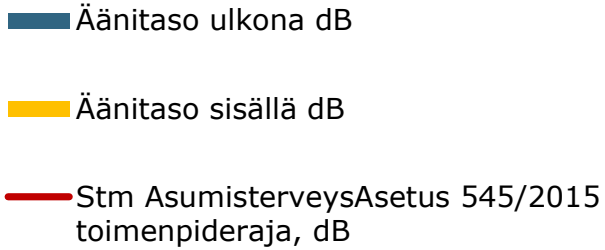




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

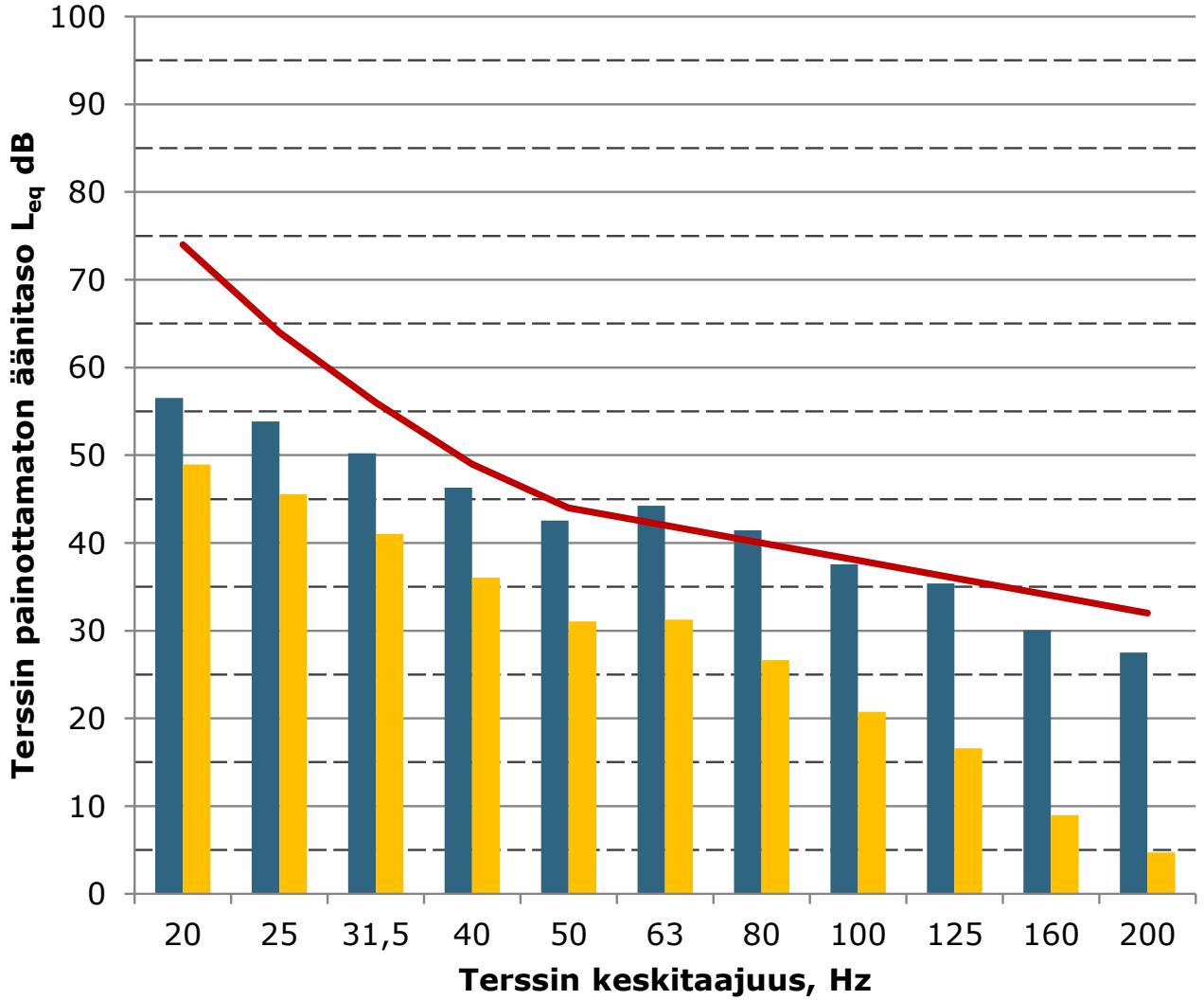
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_E (Leskinen), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

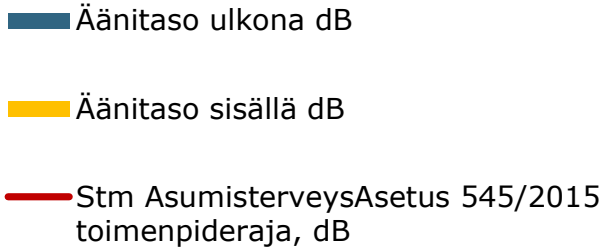




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

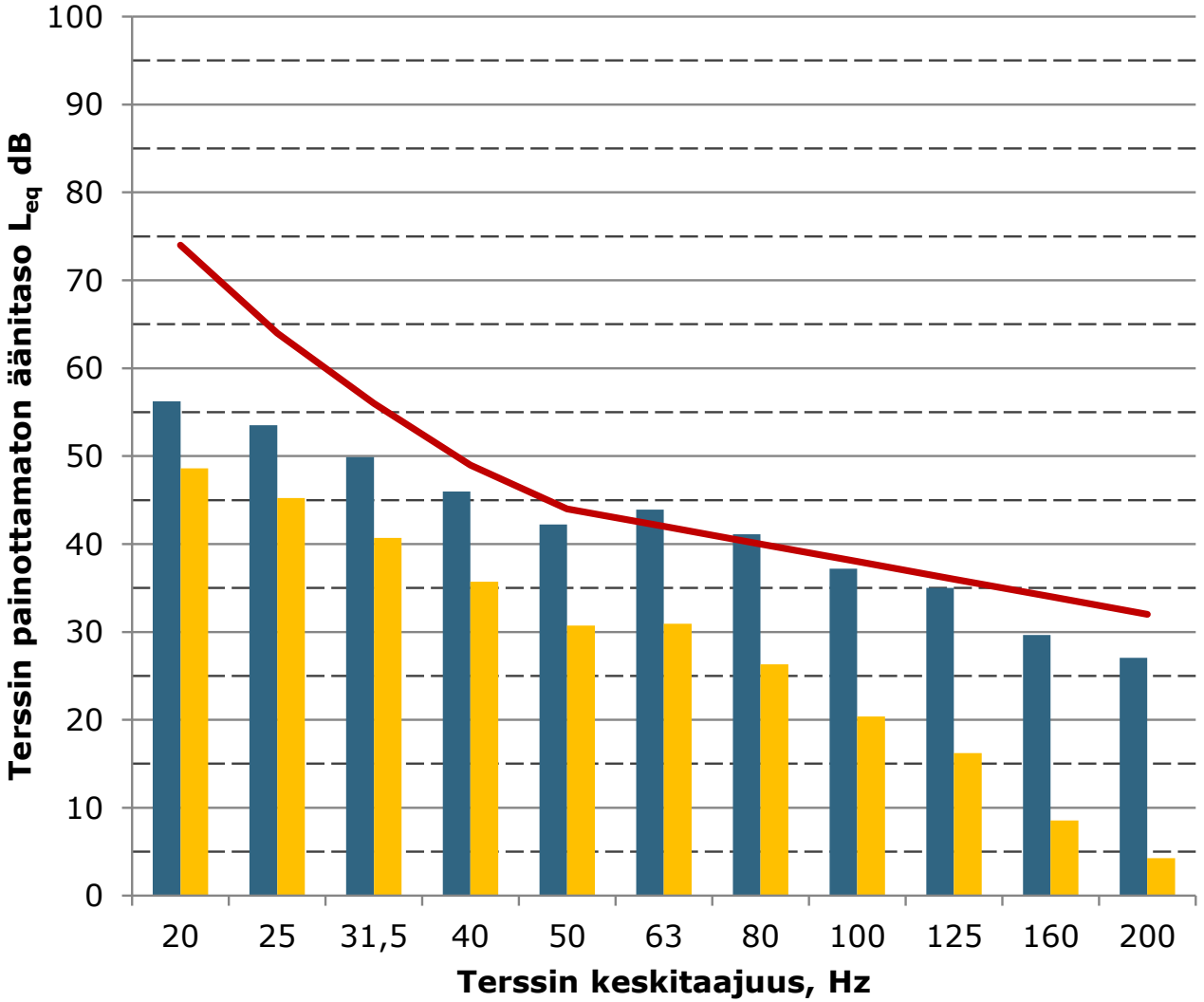
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_F (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

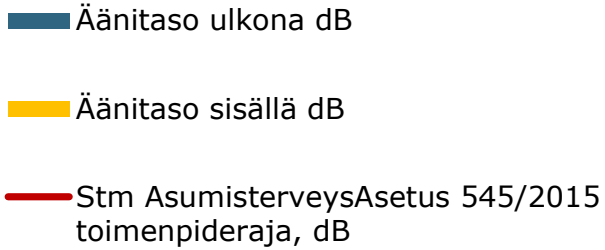




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

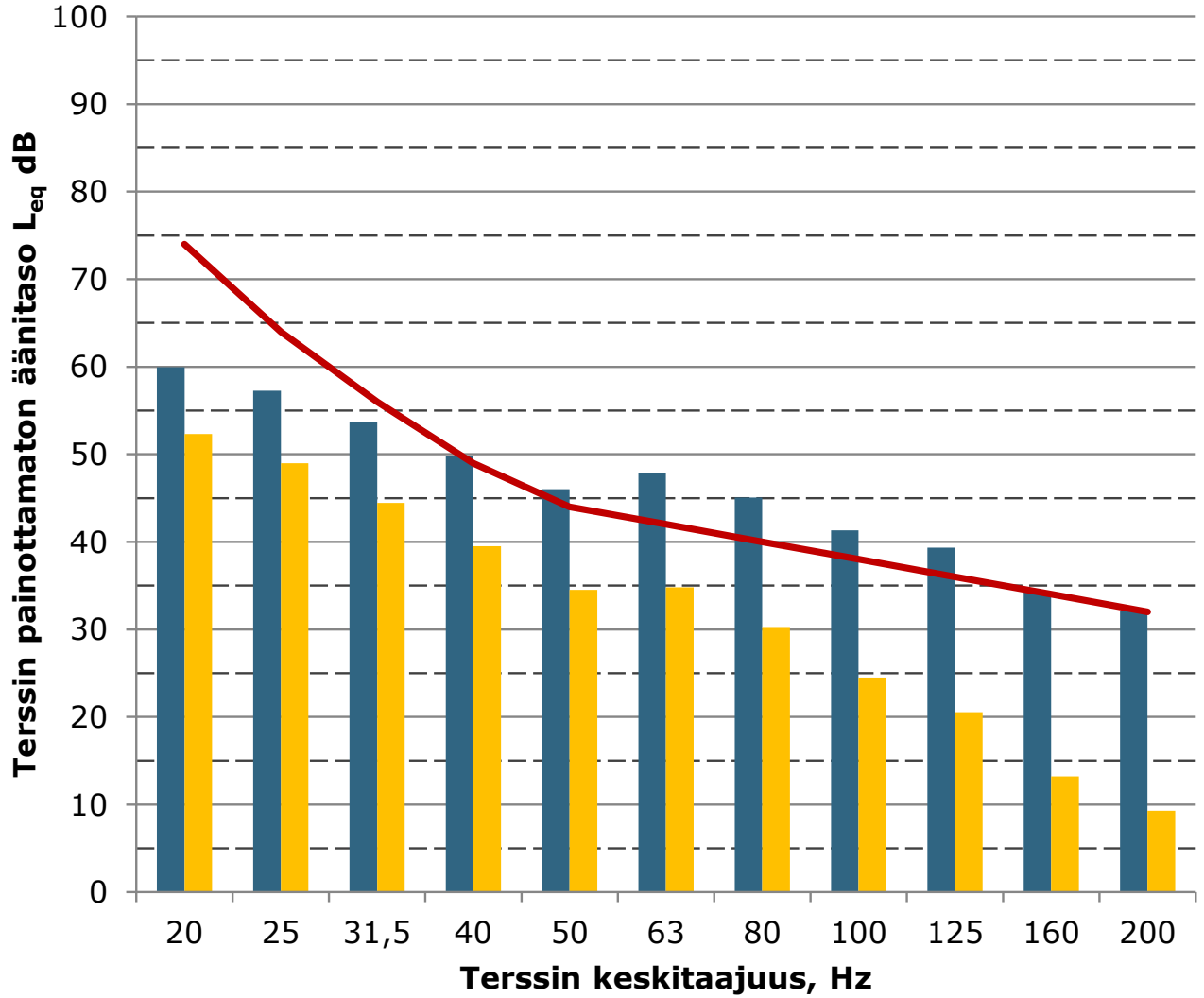
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_G (Alapelto), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

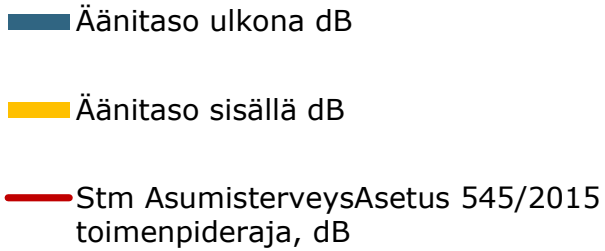




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

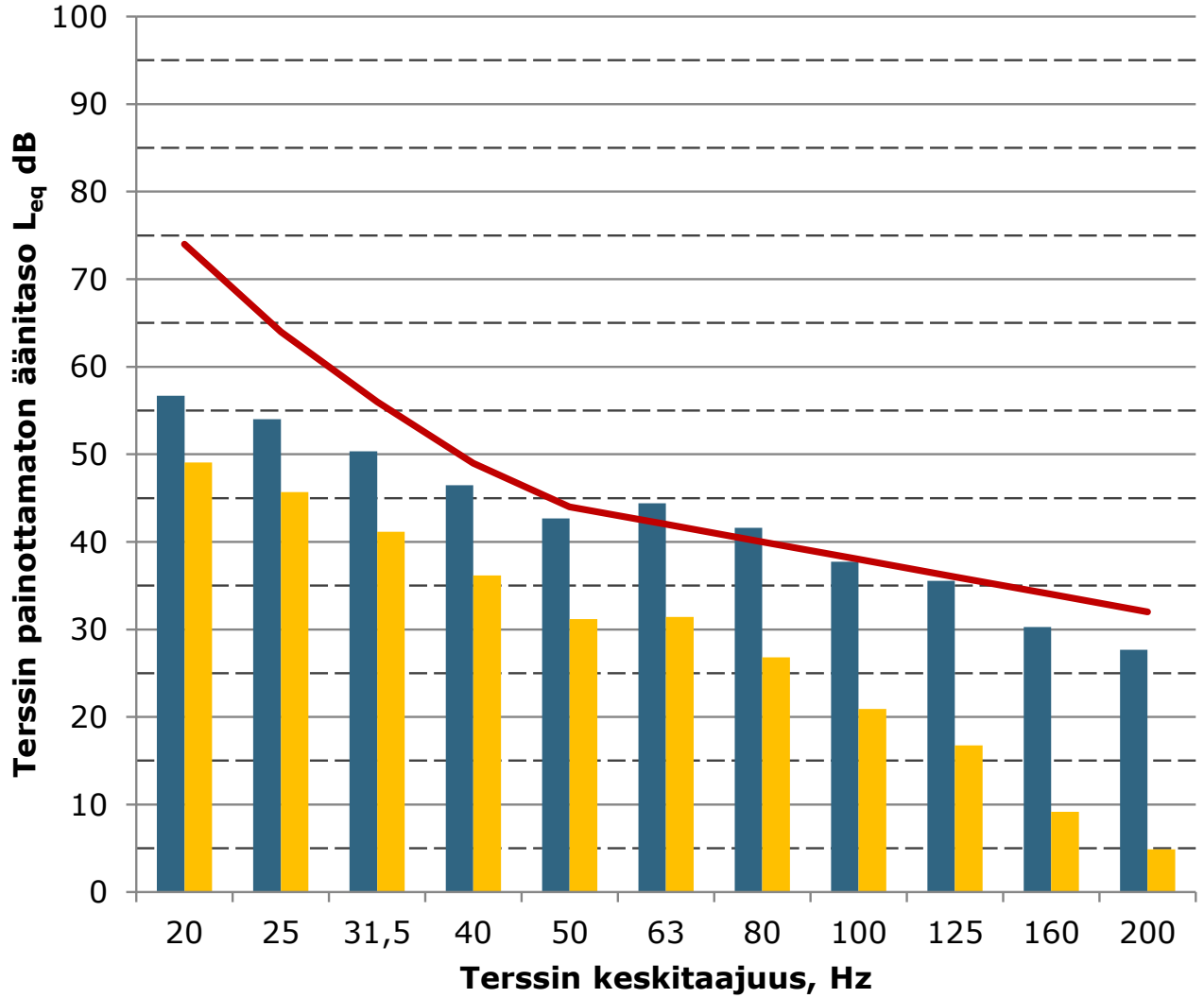
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_H (Lepola), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

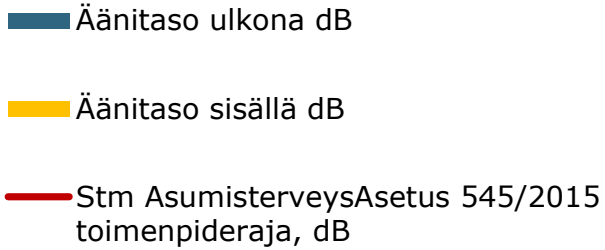




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

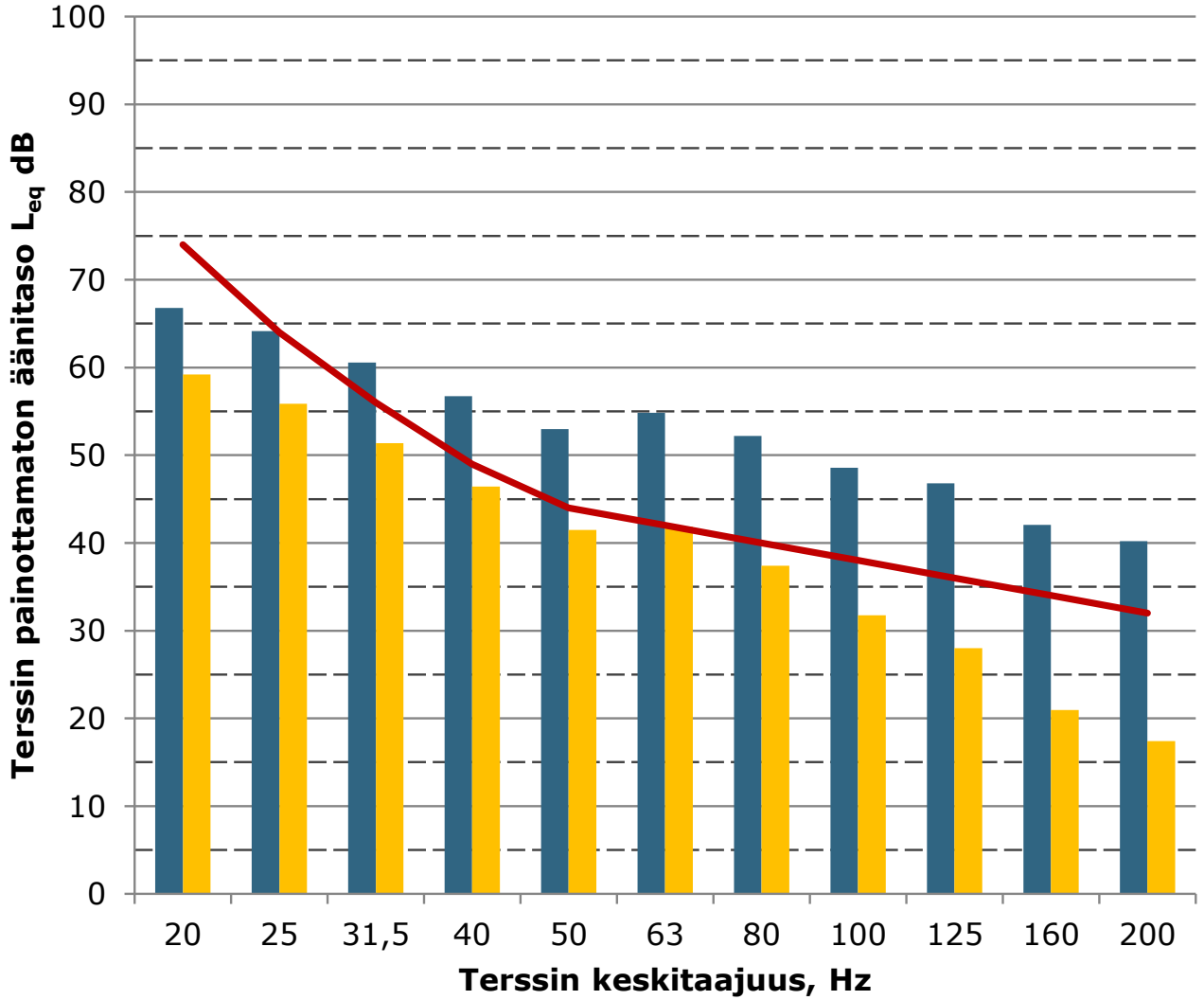
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_I (Kalliomäki), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

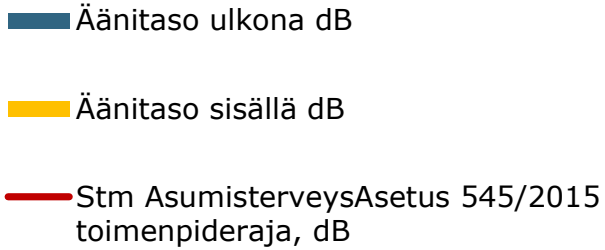




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

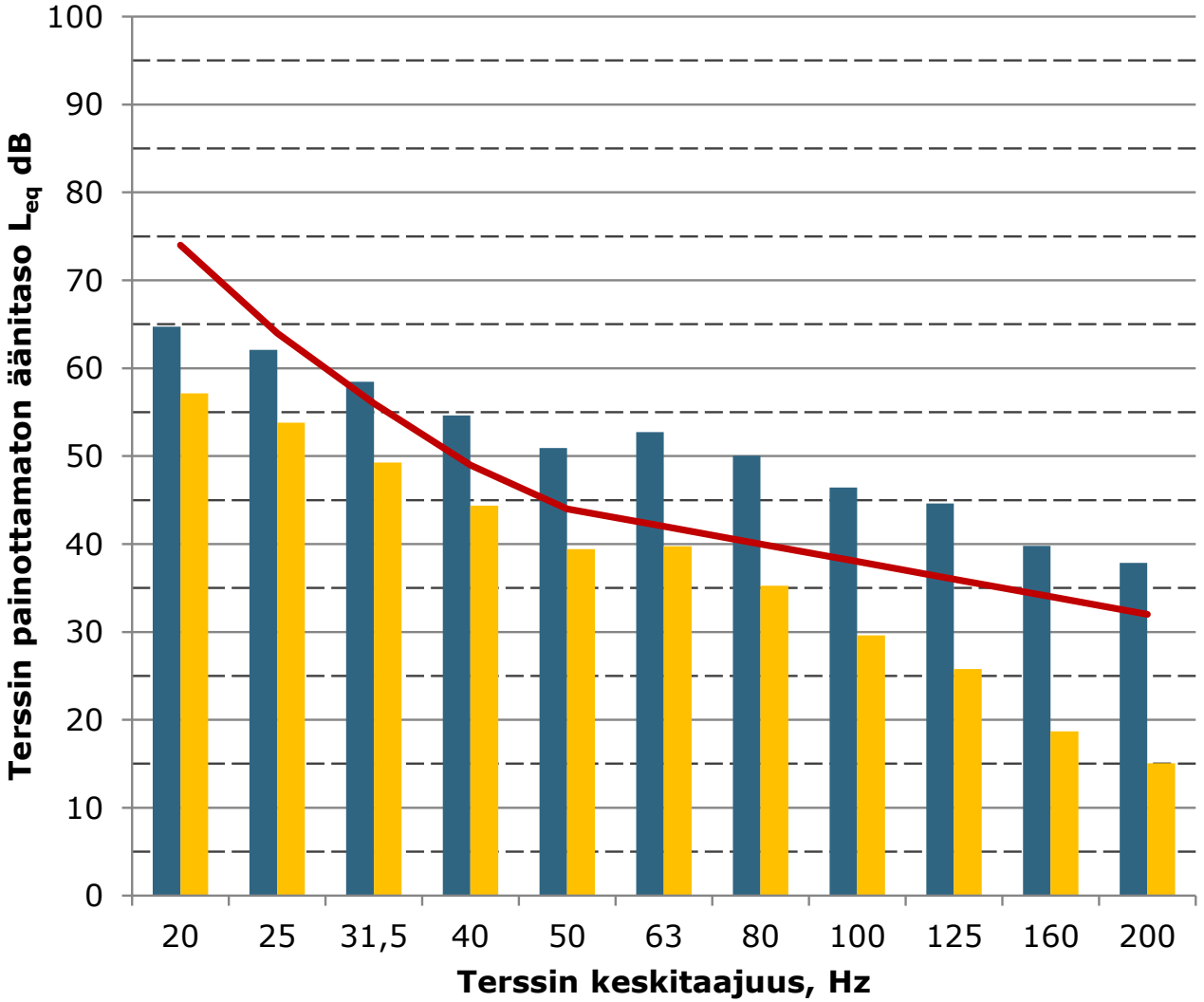
Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_J (Ritaviita), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan

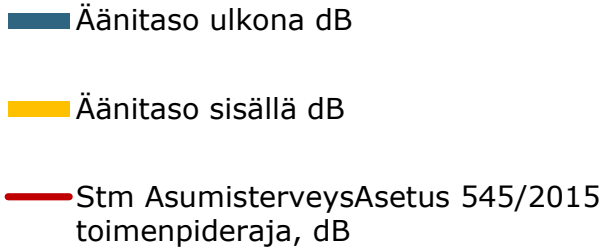




Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Matalien taajuuksien äänitasot ulkona ja sisällä, Laskentapiste_K (Ritaviita2), ääneneristävyys Keränen,Hakala,Hongisto 2019, 84% persentiili mukaan





Tiedot rakennuksista ja voimaloista WindPro-raportista:
Voimalat napakorkeus kpl
Generic RD250HH200 106.6dB + 2.0dB STE 10 MW, 200 m, 12
Laskenta on tehty ohjeen YM 2/2014 "Tuulivoimaloiden melun mallintaminen":
Äänen geometrinen vaimeneminen pistelähteestä, maakerroin DSO1284 mukaan ja ilman absorptio ISO9613-1:1996 +15°C 70% RH.

Liite 9. Volkkilankankaan tuulivoimahanke – varjostusmallinnuksen tulokset ”real case, no forest” (VE1).

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Aarni Nikkola / aarni.nikkola@fcg.fi
Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

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) []

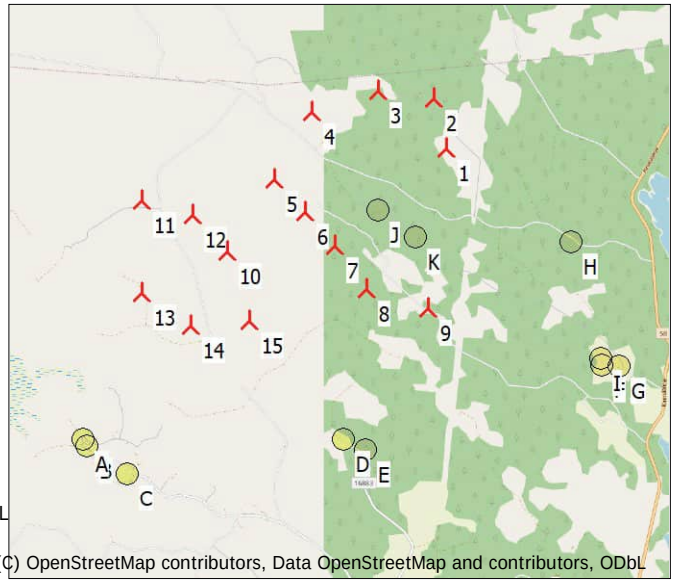
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_WIND PRO MELUMAL
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	401 105	7 012 076	152,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
2	400 966	7 012 725	147,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
3	400 232	7 012 854	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
4	399 353	7 012 603	178,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
5	398 812	7 011 721	157,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
6	399 211	7 011 281	160,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
7	399 596	7 010 821	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
8	400 001	7 010 232	162,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
9	400 806	7 009 960	164,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
10	398 171	7 010 800	150,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
11	397 051	7 011 505	161,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
12	397 714	7 011 286	151,8	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
13	397 017	7 010 282	157,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
14	397 661	7 009 833	151,9	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
15	398 434	7 009 870	145,3	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste_C (Autio)	396 747	7 007 888	163,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

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Aarni Nikkola / aarni.nikkola@fcg.fi
Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste_A (Harjunpää)	7:37
B	Laskentapiste_B (Harjunpää)	5:56
C	Laskentapiste_C (Autio)	0:56
D	Laskentapiste_D (Ylä-Leskinen)	5:22
E	Laskentapiste_E (Leskinen)	3:24
F	Laskentapiste_F (Kalliomäki)	2:26
G	Laskentapiste_G (Alapelto)	1:53
H	Laskentapiste_H (Lepola)	14:25
I	Laskentapiste_I (Kalliomäki)	2:25
J	Laskentapiste_J (Ritaviita)	62:07
K	Laskentapiste_K (Ritaviita2)	41:47

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

No.	Name	Expected [h/year]
1	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (275)	18:36
2	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (274)	4:08
3	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (273)	0:00
4	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (282)	1:37
5	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (272)	10:46
6	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (271)	20:19
7	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (270)	26:37
8	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (269)	16:08
9	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)	17:12
10	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (281)	3:15
11	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (279)	0:00
12	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (280)	1:21
13	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (278)	0:00
14	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (277)	10:17
15	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)	10:40

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.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: A - Laskentapiste_A (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.25 (14)	04.34	05.20 (15)	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05 20	04.47 (14)	23.31 30	04.55 (14)	22.18 14	05.34 (15)	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31	04.25 (14)	03.18	04.25 (14)	04.37	05.23 (15)	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08 22	04.47 (14)	23.30 30	04.55 (14)	22.15 12	05.35 (15)	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	04.24 (14)	03.20	04.25 (14)	04.40	05.25 (15)	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10 23	04.47 (14)	23.29 30	04.55 (14)	22.12 9	05.34 (15)	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	04.23 (14)	03.21	04.25 (14)	04.42	05.28 (15)	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12 25	04.48 (14)	23.27 30	04.55 (14)	22.09 5	05.33 (15)	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	04.21 (14)	03.23	04.25 (14)	04.45	05.30 (15)	06.15	07.37	08.08	09.35
	14.57	16.25	17.50	20.19	21.47	23.14 27	04.48 (14)	23.26 29	04.54 (14)	22.06 2	05.32 (15)	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	04.20 (14)	03.25	04.26 (14)	04.48		06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17 28	04.48 (14)	23.24 29	04.55 (14)	22.03		20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	04.19 (14)	03.27	04.27 (14)	04.51		06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19 30	04.49 (14)	23.22 27	04.54 (14)	22.00		20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	05.20 (15) 03.20	04.20 (14)	03.29	04.29 (14)	04.54		06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56 3	05.23 (15) 23.21 29	04.49 (14)	23.21 26	04.55 (14)	21.57		20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	05.17 (15) 03.19	04.20 (14)	03.31	04.31 (14)	04.57		06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59 7	05.24 (15) 23.22 29	04.49 (14)	23.19 24	04.55 (14)	21.53		20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	05.14 (15) 03.17	04.19 (14)	03.34	04.32 (14)	05.00		06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02 10	05.24 (15) 23.24 30	04.49 (14)	23.17 22	04.54 (14)	21.50		20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	05.12 (15) 03.16	04.20 (14)	03.36	04.34 (14)	05.03		06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05 13	05.25 (15) 23.26 30	04.50 (14)	23.15 21	04.55 (14)	21.47		20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.07	04.28	05.09 (15) 03.15	04.20 (14)	03.38	04.36 (14)	05.06		06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08 15	05.24 (15) 23.27 30	04.50 (14)	23.12 19	04.55 (14)	21.44		19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	05.06 (15) 03.13	04.20 (14)	03.41	04.38 (14)	05.09		06.37	08.00	08.32	09.51
	15.16	16.50	18.14	20.42	22.11 18	05.24 (15) 23.29 30	04.50 (14)	23.10 16	04.54 (14)	21.40		19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	05.04 (15) 03.12	04.21 (14)	03.43	04.40 (14)	05.12		06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14 21	05.25 (15) 23.30 30	04.51 (14)	23.08 14	04.54 (14)	21.37		19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	05.01 (15) 03.12	04.20 (14)	03.46	04.42 (14)	05.15		06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17 23	05.24 (15) 23.31 31	04.51 (14)	23.06 12	04.54 (14)	21.34		19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	05.02 (15) 03.11	04.21 (14)	03.48	04.44 (14)	05.18		06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20 22	05.24 (15) 23.32 30	04.51 (14)	23.03 9	04.53 (14)	21.30		19.45	18.04	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	05.03 (15) 03.10	04.21 (14)	03.51	04.46 (14)	05.21		06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23 22	05.25 (15) 23.33 31	04.52 (14)	23.01 10	05.25 (15)	21.27		19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	05.02 (15) 03.10	04.21 (14)	03.54	04.48 (14)	05.24		06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.57	22.26 22	05.24 (15) 23.34 31	04.52 (14)	22.58 13	05.28 (15)	21.24		19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	05.03 (15) 03.09	04.22 (14)	03.56	04.50 (14)	05.27		06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29 21	05.24 (15) 23.35 30	04.52 (14)	22.56 12	05.29 (15)	21.21		19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	05.04 (15) 03.09	04.22 (14)	03.59	05.16 (15)	05.29		06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32 19	05.23 (15) 23.35 30	04.52 (14)	22.53 14	05.30 (15)	21.17		19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	05.04 (15) 03.09	04.22 (14)	04.02	05.15 (15)	05.32		06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35 18	05.22 (15) 23.36 30	04.52 (14)	22.50 16	05.31 (15)	21.14		19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	05.05 (15) 03.09	04.22 (14)	04.05	05.14 (15)	05.35		07.01	08.26	09.00	10.00
	15.42	17.18	18.39	21.08	22.38 16	05.21 (15) 23.36 30	04.52 (14)	22.48 18	05.32 (15)	21.11		19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	05.06 (15) 03.10	04.23 (14)	04.07	05.14 (15)	05.38		07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41 15	05.21 (15) 23.36 30	04.53 (14)	22.45 19	05.33 (15)	21.07		19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	05.07 (15) 03.10	04.23 (14)	04.10	05.14 (15)	05.41		07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44 13	05.20 (15) 23.36 30	04.53 (14)	22.42 20	05.34 (15)	21.04		19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	04.39 (14) 03.11	04.23 (14)	04.13	05.13 (15)	05.44		07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47 13	05.19 (15) 23.35 31	04.54 (14)	22.39 21	05.34 (15)	21.00		19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	04.37 (14) 03.11	04.23 (14)	04.16	05.13 (15)	05.47		07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49 12	05.17 (15) 23.35 30	04.53 (14)	22.36 22	05.35 (15)	20.57		19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	04.35 (14) 03.12	04.23 (14)	04.19	05.13 (15)	05.49		07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52 8	04.43 (14) 23.35 31	04.54 (14)	22.33 22	05.35 (15)	20.54		19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	04.34 (14) 03.13	04.24 (14)	04.22	05.13 (15)	05.52		07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55 11	04.45 (14) 23.34 30	04.54 (14)	22.30 22	05.35 (15)	20.50		19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	04.32 (14) 03.14	04.24 (14)	04.25	05.13 (15)	05.55		07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57 13	04.45 (14) 23.33 30	04.54 (14)	22.27 22	05.35 (15)	20.47		19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	04.30 (14) 03.15	04.24 (14)	04.28	05.15 (15)	05.58		07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00 15	04.45 (14) 23.32 30	04.54 (14)	22.24 20	05.35 (15)	20.43		18.57	16.18	14.56	14.45
31	09.00		06.48		03.36	04.28 (14)		04.31	05.18 (15)	06.01			07.53		10.00
	16.10		20.05		23.03 18	04.46 (14)		22.21 17	05.35 (15)	20.40			16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case					368	868	636	42				
Sun reduction					0,45	0,40	0,44	0,41				
Oper. time red.					0,90	0,90	0,90	0,90				
Wind dir. red.					0,63	0,62	0,63	0,63				
Total reduction					0,26	0,23	0,25	0,24				
Total, real					94	196	158	10				

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: B - Laskentapiste_B (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05 6	04.27 (14) 23.31 22	04.20 (14) 22.18 5	05.20 (15) 20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.32	04.25 (14) 03.18	04.21 (14) 04.37	05.23 (15) 06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08 7	04.32 (14) 23.30 21	04.42 (14) 22.15 1	05.24 (15) 20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	04.24 (14) 03.20	04.22 (14) 04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10 10	04.34 (14) 23.29 20	04.42 (14) 22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	04.23 (14) 03.21	04.23 (14) 04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12 11	04.34 (14) 23.27 19	04.42 (14) 22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	04.21 (14) 03.23	04.24 (14) 04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14 13	04.34 (14) 23.26 17	04.41 (14) 22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	04.20 (14) 03.25	04.26 (14) 04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17 15	04.35 (14) 23.24 16	04.42 (14) 22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	04.19 (14) 03.27	04.27 (14) 04.51	06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19 17	04.36 (14) 23.22 14	04.41 (14) 22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	03.20	04.18 (14) 03.29	04.29 (14) 04.54	06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56	23.21 18	04.36 (14) 23.21 12	04.41 (14) 21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.19	04.17 (14) 03.31	04.31 (14) 04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22 19	04.36 (14) 23.19 10	04.41 (14) 21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	04.16 (14) 03.34	04.32 (14) 05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24 21	04.37 (14) 23.17 8	04.40 (14) 21.50	20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	05.12 (15) 03.16	04.16 (14) 03.36	04.34 (14) 05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05 3	05.15 (15) 23.26 22	04.38 (14) 23.15 6	04.40 (14) 21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	05.09 (15) 03.15	04.15 (14) 03.38	04.36 (14) 05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08 6	05.15 (15) 23.27 23	04.38 (14) 23.12 10	05.17 (15) 21.44	19.59	18.17	15.40	14.39
13	09.43	08.21	06.49	06.03	04.25	05.06 (15) 03.13	04.14 (14) 03.41	04.38 (14) 05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11 9	05.15 (15) 23.29 24	04.38 (14) 23.10 11	05.19 (15) 21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	05.04 (15) 03.12	04.14 (14) 03.43	05.09 (15) 05.12	06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14 12	05.16 (15) 23.30 24	04.38 (14) 23.08 11	05.20 (15) 21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	05.01 (15) 03.12	04.13 (14) 03.46	05.08 (15) 05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17 14	05.15 (15) 23.31 25	04.38 (14) 23.06 14	05.22 (15) 21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	04.59 (15) 03.11	04.13 (14) 03.48	05.07 (15) 05.18	06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20 17	05.16 (15) 23.32 26	04.39 (14) 23.03 16	05.23 (15) 21.30	19.45	18.04	15.29	14.37
17	09.35	08.08	06.35	05.50	04.13	04.57 (15) 03.10	04.13 (14) 03.51	05.07 (15) 05.21	06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23 19	05.16 (15) 23.33 26	04.39 (14) 23.01 16	05.23 (15) 21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	04.54 (15) 03.10	04.13 (14) 03.54	05.06 (15) 05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26 22	05.16 (15) 23.34 26	04.39 (14) 22.58 18	05.24 (15) 21.24	19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	04.54 (15) 03.09	04.13 (14) 03.56	05.05 (15) 05.27	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29 22	05.16 (15) 23.35 27	04.40 (14) 22.56 20	05.25 (15) 21.21	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	04.54 (15) 03.09	04.13 (14) 03.59	05.05 (15) 05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32 22	05.16 (15) 23.35 27	04.40 (14) 22.53 20	05.25 (15) 21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	04.53 (15) 03.09	04.13 (14) 04.02	05.04 (15) 05.32	06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35 22	05.15 (15) 23.35 27	04.40 (14) 22.50 21	05.25 (15) 21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	04.54 (15) 03.09	04.13 (14) 04.05	05.04 (15) 05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38 21	05.15 (15) 23.36 27	04.40 (14) 22.48 21	05.25 (15) 21.11	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	04.55 (15) 03.10	04.14 (14) 04.07	05.04 (15) 05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41 20	05.15 (15) 23.36 27	04.41 (14) 22.45 22	05.26 (15) 21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	04.55 (15) 03.10	04.14 (14) 04.10	05.04 (15) 05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44 20	05.15 (15) 23.36 27	04.41 (14) 22.42 22	05.26 (15) 21.04	19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	04.56 (15) 03.11	04.15 (14) 04.13	05.03 (15) 05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47 18	05.14 (15) 23.35 26	04.41 (14) 22.39 23	05.26 (15) 21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	04.56 (15) 03.11	04.15 (14) 04.16	05.06 (15) 05.47	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49 18	05.14 (15) 23.35 26	04.41 (14) 22.36 21	05.27 (15) 20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	04.57 (15) 03.12	04.16 (14) 04.19	05.08 (15) 05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52 16	05.13 (15) 23.34 25	04.41 (14) 22.33 18	05.26 (15) 20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	04.59 (15) 03.13	04.17 (14) 04.22	05.11 (15) 05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55 14	05.13 (15) 23.34 25	04.42 (14) 22.30 16	05.27 (15) 20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	04.59 (15) 03.14	04.18 (14) 04.25	05.13 (15) 05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57 13	05.12 (15) 23.33 24	04.42 (14) 22.27 13	05.26 (15) 20.47	19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	05.00 (15) 03.15	04.18 (14) 04.28	05.15 (15) 05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00 11	05.11 (15) 23.32 23	04.41 (14) 22.24 10	05.25 (15) 20.43	18.57	16.18	14.56	14.45
31	09.00		06.48		03.36	04.28 (14)	04.31	05.18 (15) 06.01		07.53		10.00
	16.10		20.05		23.03 10	05.09 (15)	22.21 8	05.26 (15) 20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case					329	644	496	6				
Sun reduction					0,45	0,40	0,44	0,41				
Oper. time red.					0,90	0,90	0,90	0,90				
Wind dir. red.					0,63	0,63	0,63	0,63				
Total reduction					0,26	0,23	0,25	0,24				
Total, real					84	147	124	1				

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: C - Laskentapiste_C (Autio)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June		July		August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34		03.17	04.20 (15)	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.07	21.35	23.05		23.31	7 04.27 (15)	22.18	20.37	18.54	16.12	14.54
2	09.58	08.54	07.26	06.41	05.00	03.32		03.18	04.21 (15)	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.07		23.30	6 04.27 (15)	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29		03.20	04.22 (15)	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10		23.29	5 04.27 (15)	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27		03.21	04.23 (15)	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.47	20.16	21.44	23.12		23.27	3 04.26 (15)	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25		03.23	04.24 (15)	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14		23.26	2 04.26 (15)	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24		03.25		04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.16		23.24		22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	04.19 (15)	03.27		04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	1 04.20 (15)	23.22		22.00	20.16	18.34	15.54	14.44
8	09.51	08.36	07.06	06.20	04.41	03.20	04.18 (15)	03.29		04.54	06.23	07.45	08.17	09.41
	15.03	16.35	17.59	20.27	21.56	23.21	3 04.21 (15)	23.20		21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.19	04.17 (15)	03.31		04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	4 04.21 (15)	23.19		21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	04.16 (15)	03.34		05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	5 04.21 (15)	23.17		21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	04.16 (15)	03.36		05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	7 04.23 (15)	23.14		21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.15	04.15 (15)	03.38		05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	8 04.23 (15)	23.12		21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	04.14 (15)	03.41		05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11	23.29	8 04.22 (15)	23.10		21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	04.14 (15)	03.43		05.12	06.39	08.02	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	9 04.23 (15)	23.08		21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	04.13 (15)	03.46		05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.48	22.17	23.31	10 04.23 (15)	23.05		21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	04.13 (15)	03.48		05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.51	22.20	23.32	11 04.24 (15)	23.03		21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	04.13 (15)	03.51		05.21	06.48	08.11	08.44	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	11 04.24 (15)	23.01		21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	04.13 (15)	03.54		05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26	23.34	11 04.24 (15)	22.58		21.24	19.38	17.57	15.23	14.37
19	09.30	08.02	06.29	05.43	04.07	03.10	04.13 (15)	03.56		05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	12 04.25 (15)	22.56		21.20	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	04.13 (15)	03.59		05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	12 04.25 (15)	22.53		21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.13 (15)	04.02		05.32	06.58	08.23	08.56	10.00
	15.39	17.15	18.36	21.05	22.35	23.35	12 04.25 (15)	22.50		21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.13 (15)	04.05		05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	12 04.25 (15)	22.47		21.10	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.14 (15)	04.07		05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	12 04.26 (15)	22.45		21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.14 (15)	04.10		05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	12 04.26 (15)	22.42		21.04	19.18	17.37	15.08	14.39
25	09.16	07.42	06.08	05.23	03.51	03.11	04.15 (15)	04.13		05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	11 04.26 (15)	22.39		21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.15 (15)	04.16		05.47	07.12	07.38	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23.35	11 04.26 (15)	22.36		20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.16 (15)	04.19		05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52	23.34	10 04.26 (15)	22.33		20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.17 (15)	04.22		05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	10 04.27 (15)	22.30		20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.09	03.41	03.14	04.18 (15)	04.25		05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	9 04.27 (15)	22.27		20.47	19.01	16.21	14.58	14.44
30	09.02		06.51	05.06	03.38	03.15	04.18 (15)	04.28		05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	8 04.26 (15)	22.24		20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36			04.31		06.01		07.53		10.00
	16.10		20.05		23.03			22.21		20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case							219		23					
Sun reduction							0,40		0,44					
Oper. time red.							0,90		0,90					
Wind dir. red.							0,64		0,64					
Total reduction							0,23		0,25					
Total, real							51		6					

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: D - Laskentapiste_D (Ylä-Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May		June		July		August		September	October	November	December
1	09.59	08.57	07.29	06.44	05.03		03.33		03.16		04.33		06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35		23.05	18	23.31	6	22.18	7	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59		03.31		03.18		04.36		06.06	07.29	07.58	09.27
	14.51	16.16	17.41	20.10	21.38		23.07	16	23.30	5	22.15	3	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56		03.29		03.20		04.39		06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41		23.10	15	23.28	3	22.12		20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53		03.27		03.21		04.42		06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44		23.12	14	23.27	8	22.09		20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50		03.25		03.23		04.45		06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47		23.14	13	23.25	8	22.06		20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47		03.23		03.25		04.48		06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50		23.16	11	23.24	11	22.03		20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43		03.22		03.27		04.51		06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53		23.18	9	23.22	12	21.59		20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40		03.20		03.29		04.54		06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56		23.20	8	23.20	14	21.56		20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37		03.18		03.31		04.57		06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59		23.22	5	23.18	15	21.53		20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	21.16 (14)	03.17		03.33		05.00		06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	1 21.17 (14)	23.24	4	23.16	16	21.50		20.06	18.23	15.45	14.41
11	09.46	08.27	06.56	06.10	04.31	21.14 (14)	03.15		03.36		05.03		06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	5 21.19 (14)	23.26	6	23.14	18	21.47		20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	21.14 (14)	03.14		03.38		05.06		06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	8 21.22 (14)	23.27	7	23.19	19	21.43		19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	21.12 (14)	03.13		03.40		05.09		06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	12 21.24 (14)	23.29	8	23.10	19	21.40		19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	21.12 (14)	03.12		03.43		05.12		06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	15 21.27 (14)	23.30	9	23.08	20	21.37		19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	21.11 (14)	03.11		03.45		05.15		06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	18 21.29 (14)	23.31	10	23.05	22	21.34		19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	21.11 (14)	03.11		03.48		05.18		06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	21 21.32 (14)	23.32	11	23.03	22	21.30		19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	21.10 (14)	03.10		03.51		05.20		06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	24 21.34 (14)	23.33	12	23.00	23	21.27		19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	21.10 (14)	03.10		03.53		05.23		06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	25 21.35 (14)	23.34	12	22.58	24	21.24		19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	21.11 (14)	03.09		03.56		05.26		06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	24 21.35 (14)	23.34	12	22.55	24	21.20		19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	21.10 (14)	03.09		03.59		05.29		06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	25 21.35 (14)	23.35	12	22.53	24	21.17		19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	21.10 (14)	03.09		04.02		05.32		06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	25 21.35 (14)	23.35	13	22.50	24	21.14		19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	21.10 (14)	03.09		04.04		05.35		07.01	08.25	08.59	10.00
	15.41	17.18	18.39	21.08	22.38	25 21.35 (14)	23.35	13	22.47	25	21.10		19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	21.11 (14)	03.09		04.07		05.38		07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	24 21.35 (14)	23.35	12	22.45	25	21.07		19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	21.11 (14)	03.10		04.10		05.41		07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	24 21.35 (14)	23.35	12	22.42	25	21.04		19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	21.11 (14)	03.10		04.13		05.43		07.09	08.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	24 21.35 (14)	23.35	11	22.39	24	21.00		19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	21.12 (14)	03.11		04.16		05.46		07.12	07.37	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23 21.35 (14)	23.35	11	22.36	24	20.57		19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	21.12 (14)	03.12		04.19		05.49		07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	22 21.34 (14)	23.34	11	22.33	23	20.53		19.07	16.28	15.02	14.41
28	09.08	07.32	05.58	05.13	03.43	21.12 (14)	03.13		04.22		05.52		07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	22 21.34 (14)	23.34	9	22.30	20	20.50		19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	21.14 (14)	03.14		04.24		05.55		07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	20 21.34 (14)	23.33	9	22.27	17	20.47		19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	21.14 (14)	03.15		04.27		05.58		07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	20 21.34 (14)	23.32	8	22.27	14	20.43		18.57	16.18	14.56	14.45
31	08.59		06.47		03.36	21.14 (14)			04.30		06.00			07.52		10.00
	16.09		20.04		23.02	19 21.33 (14)			22.21	10	21.34 (14)	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559		606		594		502		392	308	206	151
Total, worst case						426		321		544		10				
Sun reduction						0,45		0,40		0,44		0,41				
Oper. time red.						0,90		0,90		0,90		0,90				
Wind dir. red.						0,63		0,64		0,63		0,63				
Total reduction						0,26		0,23		0,25		0,24				
Total, real						109		75		136		2				

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: E - Laskentapiste_E (Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	22.00 (15)	03.16	22.02 (15)	04.33	06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35	23.05	7 22.07 (15)	23.31	24 22.26 (15)	22.18	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59	03.31	21.59 (15)	03.18	22.03 (15)	04.36	06.06	07.28	07.58	09.27
	14.51	16.16	17.41	20.10	21.38	23.07	9 22.08 (15)	23.30	22 22.25 (15)	22.15	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56	03.29	21.59 (15)	03.20	22.04 (15)	04.39	06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41	23.10	11 22.10 (15)	23.28	21 22.25 (15)	22.12	20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53	03.27	21.58 (15)	03.21	22.04 (15)	04.42	06.12	07.34	08.04	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	13 22.11 (15)	23.27	20 22.24 (15)	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	21.58 (15)	03.23	22.04 (15)	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	15 22.13 (15)	23.25	18 22.22 (15)	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	21.58 (15)	03.25	22.05 (15)	04.48	06.17	07.40	08.11	09.36
	14.59	16.28	17.53	20.22	21.50	23.16	17 22.15 (15)	23.24	17 22.22 (15)	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.22	21.58 (15)	03.27	22.05 (15)	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.18	18 22.16 (15)	23.22	15 22.20 (15)	21.59	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	21.58 (15)	03.29	22.06 (15)	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	20 22.18 (15)	23.20	14 22.20 (15)	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	21.58 (15)	03.31	22.06 (15)	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	21 22.19 (15)	23.18	12 22.18 (15)	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	21.58 (15)	03.33	22.07 (15)	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	22 22.20 (15)	23.16	10 22.17 (15)	21.50	20.06	18.23	15.45	14.41
11	09.46	08.27	06.55	06.10	04.31	03.15	21.58 (15)	03.36	22.08 (15)	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23 22.21 (15)	23.14	7 22.15 (15)	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	21.59 (15)	03.38	22.09 (15)	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	24 22.23 (15)	23.12	5 22.14 (15)	21.43	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	21.58 (15)	03.40	22.09 (15)	05.09	06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	23.29	25 22.23 (15)	23.10	3 22.12 (15)	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	21.59 (15)	03.43		05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	26 22.25 (15)	23.08		21.37	19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	03.11	21.59 (15)	03.45		05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	26 22.25 (15)	23.05		21.33	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.11	21.59 (15)	03.48		05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	26 22.25 (15)	23.03		21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	21.59 (15)	03.51		05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	27 22.26 (15)	23.00		21.27	19.42	18.00	15.26	14.36
18	09.32	08.05	06.32	05.46	04.10	03.10	22.00 (15)	03.53		05.23	06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	26 22.26 (15)	22.58		21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	03.09	21.59 (15)	03.56		05.26	06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	23.34	27 22.26 (15)	22.55		21.20	19.35	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	22.00 (15)	03.59		05.29	06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	27 22.27 (15)	22.53		21.17	19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	03.09	22.00 (15)	04.02		05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	27 22.27 (15)	22.50		21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	03.09	22.00 (15)	04.04		05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	27 22.27 (15)	22.47		21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	22.00 (15)	04.07		05.38	07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.35	27 22.27 (15)	22.44		21.07	19.21	17.40	15.11	14.38
24	09.18	07.45	06.11	05.26	03.53	03.10	22.01 (15)	04.10		05.41	07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.43	23.35	26 22.27 (15)	22.42		21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	22.01 (15)	04.13		05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	23.35	26 22.27 (15)	22.39		21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	22.01 (15)	04.16		05.46	07.12	07.37	09.11	10.01
	15.54	17.29	18.50	21.20	22.49	23.35	27 22.28 (15)	22.36		20.57	19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	03.12	22.02 (15)	04.19		05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.34	26 22.28 (15)	22.33		20.53	19.07	16.28	15.02	14.41
28	09.08	07.32	05.57	05.13	03.43	03.13	22.01 (15)	04.22		05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	26 22.27 (15)	22.30		20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	22.02 (15)	04.24		05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	25 22.27 (15)	22.27		20.47	19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	22.01 (15)	03.15	22.02 (15)	04.27	05.58	07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	2 22.03 (15)	23.32	25 22.27 (15)	22.24	20.43	18.57	16.18	14.56	14.45
31	08.59		06.47		03.36	22.00 (15)			04.30	06.00		07.52		10.00
	16.09		20.04		23.02	5 22.05 (15)			22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case					7		672		188					
Sun reduction					0,45		0,40		0,44					
Oper. time red.					0,90		0,90		0,90					
Wind dir. red.					0,64		0,64		0,64					
Total reduction					0,26		0,23		0,25					
Total, real					2		156		47					

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

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

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10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: F - Laskentapiste_F (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May		June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.44		05.02	20.05 (9)	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	14 20.19 (9)	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	20.07 (9)	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	10 20.17 (9)	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56		03.29	03.19	04.39		06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41		23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53		03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44		23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49		03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47		23.14	23.25	22.06		20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46		03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50		23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23		04.43		03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53		23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40		03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56		23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37		03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30		21.59		23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34		03.16	03.33	05.00	20.19 (9)	06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02		23.24	23.16	21.50	4 20.23 (9)	20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31		03.15	03.35	05.03	20.14 (9)	06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05		23.26	23.14	21.46	12 20.26 (9)	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06		04.27		03.14	03.38	05.06	20.13 (9)	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08		23.27	23.12	21.43	15 20.28 (9)	19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24		03.13	03.40	05.08	20.10 (9)	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11		23.28	23.10	21.40	19 20.29 (9)	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59		04.21		03.12	03.42	05.11	20.10 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44		22.14		23.30	23.08	21.37	20 20.30 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56		04.18		03.11	03.45	05.14	20.09 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47		22.17		23.31	23.05	21.33	22 20.31 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	20.08 (9)	04.15		03.10	03.48	05.17	20.08 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	5 20.13 (9)	22.20		23.32	23.03	21.30	23 20.31 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	20.06 (9)	04.12		03.10	03.50	05.20	20.07 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	10 20.16 (9)	22.23		23.33	23.00	21.27	24 20.31 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	20.04 (9)	04.10		03.09	03.53	05.23	20.07 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	14 20.18 (9)	22.26		23.34	22.58	21.23	25 20.32 (9)	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	20.03 (9)	04.07		03.09	03.56	05.26	20.06 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	18 20.21 (9)	22.29		23.34	22.55	21.20	25 20.31 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	20.02 (9)	04.04		03.09	03.58	05.29	20.06 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	22 20.24 (9)	22.32		23.35	22.53	21.17	25 20.31 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	20.02 (9)	04.01		03.09	04.01	05.32	20.06 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	23 20.25 (9)	22.35		23.35	22.50	21.13	24 20.30 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	20.01 (9)	03.58		03.09	04.04	05.35	20.06 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	25 20.26 (9)	22.38		23.35	22.47	21.10	24 20.30 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	20.01 (9)	03.55		03.09	04.07	05.37	20.07 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	25 20.26 (9)	22.41		23.35	22.44	21.07	21 20.28 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	20.01 (9)	03.53		03.09	04.10	05.40	20.07 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	25 20.26 (9)	22.43		23.35	22.42	21.03	17 20.24 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	20.01 (9)	03.50		03.10	04.12	05.43	20.08 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	24 20.25 (9)	22.46		23.35	22.39	21.00	13 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	20.01 (9)	03.47		03.11	04.15	05.46	20.08 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	24 20.25 (9)	22.49		23.35	22.36	20.57	10 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	20.01 (9)	03.45		03.11	04.18	05.49	20.10 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	23 20.24 (9)	22.52		23.34	22.33	20.53	5 20.15 (9)	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	20.02 (9)	03.42		03.12	04.21	05.52		07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	21 20.23 (9)	22.54		23.33	22.30	20.50		19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	20.03 (9)	03.40		03.13	04.24	05.54		07.20	07.46	09.19	10.01
	16.03		19.59	21.29	19 20.22 (9)	22.57		23.33	22.27	20.46		19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	20.04 (9)	03.38		03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32	17 20.21 (9)	23.00		23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35			04.30	06.00			07.52		10.00
	16.09		20.04			23.02			22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		559		606	595	503		392	308	206	150
Total, worst case					295		24				328				
Sun reduction					0,40		0,45				0,41				
Oper. time red.					0,90		0,90				0,90				
Wind dir. red.					0,61		0,61				0,61				
Total reduction					0,22		0,25				0,23				
Total, real					65		6				75				

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: G - Laskentapiste_G (Alapelto)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May	June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.43		05.02	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56	03.29	03.19	04.39		06.08	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41	23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53	03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44	23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49	03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47	23.14	23.25	22.06		20.22	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46	03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50	23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.52	08.39	07.09	06.23		04.43	03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53	23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40	03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56	23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37	03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.01	20.30		21.59	23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34	03.16	03.33	05.00		06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02	23.24	23.16	21.50		20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31	03.15	03.35	05.03		06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05	23.26	23.14	21.46		20.02	18.20	15.42	14.39
12	09.44	08.24	06.52	06.06		04.27	03.14	03.38	05.05		06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08	23.27	23.12	21.43		19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24	03.13	03.40	05.08		06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11	23.28	23.10	21.40		19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	20.05 (9)	04.21	03.12	03.42	05.11	20.13 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	2 20.07 (9)	22.14	23.30	23.08	21.37	6 20.19 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	20.03 (9)	04.18	03.11	03.45	05.14	20.10 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	7 20.10 (9)	22.17	23.31	23.05	21.33	12 20.22 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	20.02 (9)	04.15	03.10	03.48	05.17	20.07 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	11 20.13 (9)	22.20	23.32	23.03	21.30	16 20.23 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	20.01 (9)	04.12	03.10	03.50	05.20	20.06 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	15 20.16 (9)	22.23	23.33	23.00	21.27	18 20.24 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	19.59 (9)	04.09	03.09	03.53	05.23	20.06 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	19 20.18 (9)	22.26	23.34	22.58	21.23	19 20.25 (9)	19.38	17.56	15.23	14.36
19	09.30	08.01	06.28	05.42	19.58 (9)	04.07	03.09	03.56	05.26	20.04 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	23 20.21 (9)	22.29	23.34	22.55	21.20	21 20.25 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	19.58 (9)	04.04	03.09	03.58	05.29	20.04 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	23 20.21 (9)	22.32	23.35	22.53	21.17	22 20.26 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	19.58 (9)	04.01	03.09	04.01	05.32	20.03 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	23 20.21 (9)	22.35	23.35	22.50	21.13	22 20.25 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	19.58 (9)	03.58	03.09	04.04	05.35	20.03 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22 20.20 (9)	22.38	23.35	22.47	21.10	22 20.25 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	19.58 (9)	03.55	03.09	04.07	05.37	20.03 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.41	21.11	22 20.20 (9)	22.41	23.35	22.44	21.07	22 20.25 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	19.59 (9)	03.53	03.09	04.10	05.40	20.02 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	20 20.19 (9)	22.43	23.35	22.42	21.03	22 20.24 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.07	05.22	19.59 (9)	03.50	03.10	04.12	05.43	20.03 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	19 20.18 (9)	22.46	23.35	22.39	21.00	18 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	20.00 (9)	03.47	03.11	04.15	05.46	20.02 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	17 20.17 (9)	22.49	23.35	22.36	20.57	16 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.15	20.01 (9)	03.45	03.11	04.18	05.49	20.03 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	15 20.16 (9)	22.52	23.34	22.33	20.53	12 20.15 (9)	19.07	16.27	15.01	14.41
28	09.07	07.32	05.57	05.12	20.03 (9)	03.42	03.12	04.21	05.52	20.05 (9)	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	11 20.14 (9)	22.54	23.33	22.30	20.50	7 20.12 (9)	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	20.07 (9)	03.40	03.13	04.24	05.54	20.06 (9)	07.20	07.46	09.19	10.01
	16.03		19.58	21.29	3 20.10 (9)	22.57	23.33	22.27	20.46	2 20.08 (9)	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06		03.38	03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32		23.00	23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35		04.30	06.00			07.52		10.00
	16.09		20.04			23.02		22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		559	606	595	503		392	308	206	150
Total, worst case					252					257				
Sun reduction					0,40					0,41				
Oper. time red.					0,90					0,90				
Wind dir. red.					0,61					0,61				
Total reduction					0,22					0,23				
Total, real					55					58				

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February			March			April	May			June		
1	09.59	08.57			07.29		16.41 (9)	06.44	05.02			03.33		21.09 (1)
	14.48	16.12			17.38	21	17.02 (9)	20.07	21.35			23.05	43	22.06 (2)
2	09.58	08.54			07.26		16.39 (9)	06.40	04.59			03.31		21.10 (1)
	14.50	16.15			17.41	25	17.04 (9)	20.10	21.38			23.07	46	22.09 (2)
3	09.57	08.51			07.22		16.39 (9)	06.37	04.56			03.29		21.09 (1)
	14.52	16.18			17.44	26	17.05 (9)	20.13	21.41			23.10	47	22.10 (2)
4	09.56	08.48			07.19		16.38 (9)	06.33	04.53			03.26		21.10 (1)
	14.54	16.21			17.47	27	17.05 (9)	20.16	21.44			23.12	48	22.12 (2)
5	09.55	08.45			07.16		16.38 (9)	06.30	04.49			03.25		21.11 (1)
	14.56	16.25			17.50	28	17.06 (9)	20.18	21.47			23.14	50	22.14 (2)
6	09.54	08.42			07.12		16.37 (9)	06.26	04.46			03.23		21.12 (1)
	14.58	16.28			17.53	28	17.05 (9)	20.21	21.50			23.16	49	22.15 (2)
7	09.53	08.39			07.09		16.37 (9)	06.23	04.43			03.21		21.11 (1)
	15.00	16.31			17.56	28	17.05 (9)	20.24	21.53			23.19	50	22.15 (2)
8	09.51	08.36			07.05		16.37 (9)	06.20	04.40			03.19		21.12 (1)
	15.03	16.34			17.59	27	17.04 (9)	20.27	21.56			23.21	49	22.15 (2)
9	09.50	08.33			07.02		16.37 (9)	06.16	04.37			03.18		21.12 (1)
	15.05	16.37			18.02	27	17.04 (9)	20.30	21.59			23.22	48	22.15 (2)
10	09.48	08.30			06.59		16.37 (9)	06.13	04.34			03.16		21.13 (1)
	15.07	16.40			18.04	26	17.03 (9)	20.33	22.02			23.24	48	22.16 (2)
11	09.46	08.27			06.55		16.38 (9)	06.09	04.30		21.14 (1)	03.15		21.13 (1)
	15.10	16.43			18.07	24	17.02 (9)	20.36	22.05	5	21.19 (1)	23.26	48	22.16 (2)
12	09.45	08.24			06.52		16.39 (9)	06.06	04.27		21.12 (1)	03.14		21.14 (1)
	15.13	16.47			18.10	21	17.00 (9)	20.39	22.08	10	21.22 (1)	23.27	47	22.16 (2)
13	09.43	08.21			06.49		16.41 (9)	06.03	04.24		21.12 (1)	03.12		21.15 (1)
	15.15	16.50			18.13	18	16.59 (9)	20.42	22.11	13	21.25 (1)	23.29	46	22.17 (2)
14	09.41	08.17			06.45		16.43 (9)	05.59	04.21		21.10 (1)	03.11		21.15 (1)
	15.18	16.53			18.16	12	16.55 (9)	20.44	22.14	17	21.27 (1)	23.30	47	22.17 (2)
15	09.39	08.14			06.42			05.56	04.18		21.10 (1)	03.11		21.15 (1)
	15.21	16.56			18.19			20.47	22.17	20	21.30 (1)	23.31	46	22.17 (2)
16	09.37	08.11			06.38			05.52	04.15		21.09 (1)	03.10		21.15 (1)
	15.23	16.59			18.22			20.50	22.20	22	21.31 (1)	23.32	46	22.17 (2)
17	09.35	08.08			06.35			05.49	04.12		21.09 (1)	03.09		21.16 (1)
	15.26	17.02			18.24			20.53	22.23	25	21.34 (1)	23.33	45	22.17 (2)
18	09.33	08.05			06.31			05.46	04.09		21.09 (1)	03.09		21.16 (1)
	15.29	17.05			18.27			20.56	22.26	27	21.36 (1)	23.34	45	22.17 (2)
19	09.30	08.02			06.28			05.42	04.06		21.07 (1)	03.08		21.16 (1)
	15.32	17.08			18.30			20.59	22.29	29	21.36 (1)	23.35	45	22.18 (2)
20	09.28	07.58			06.25			05.39	04.04		21.08 (1)	03.08		21.17 (1)
	15.35	17.11			18.33			21.02	22.32	29	21.37 (1)	23.35	44	22.18 (2)
21	09.26	07.55			06.21			05.35	04.01		21.08 (1)	03.08		21.17 (1)
	15.38	17.14			18.36			21.05	22.35	29	21.37 (1)	23.35	44	22.18 (2)
22	09.23	07.52			06.18			05.32	03.58		21.08 (1)	03.08		21.17 (1)
	15.41	17.17			18.39			21.08	22.38	30	21.38 (1)	23.36	44	22.18 (2)
23	09.21	07.49			06.14			05.29	03.55		21.08 (1)	03.09		21.18 (1)
	15.44	17.20			18.42			21.11	22.41	30	21.38 (1)	23.36	44	22.19 (2)
24	09.18	07.45			06.11			05.25	03.53		21.07 (1)	03.09		21.17 (1)
	15.47	17.23			18.44			21.14	22.44	30	21.37 (1)	23.36	46	22.19 (2)
25	09.16	07.42			06.08			05.22	03.50		21.07 (1)	03.10		21.18 (1)
	15.50	17.26			18.47			21.17	22.46	30	21.37 (1)	23.35	45	22.19 (2)
26	09.13	07.39		16.45 (9)	06.04			05.19	03.47		21.08 (1)	03.10		21.17 (1)
	15.53	17.29	7	16.52 (9)	18.50			21.20	22.49	32	21.55 (2)	23.35	46	22.19 (2)
27	09.10	07.35		16.44 (9)	06.01			05.15	03.45		21.08 (1)	03.11		21.18 (1)
	15.56	17.32	12	16.56 (9)	18.53			21.23	22.52	35	21.57 (2)	23.34	45	22.19 (2)
28	09.08	07.32		16.41 (9)	05.57			05.12	03.42		21.08 (1)	03.12		21.18 (1)
	15.59	17.35	17	16.58 (9)	18.56			21.26	22.55	37	21.59 (2)	23.34	46	22.20 (2)
29	09.05				06.54			05.09	03.40		21.08 (1)	03.13		21.18 (1)
	16.03				19.59			21.29	22.57	40	22.01 (2)	23.33	46	22.20 (2)
30	09.02				06.50			05.06	03.37		21.08 (1)	03.14		21.18 (1)
	16.06				20.01			21.32	23.00	40	22.02 (2)	23.32	48	22.21 (2)
31	08.59				06.47				03.35		21.09 (1)			
	16.09				20.04				23.02	43	22.05 (2)			
Potential sun hours	181	242			363			447	560			606		
Total, worst case			36			338				573			1391	
Sun reduction			0,26			0,37				0,45			0,40	
Oper. time red.			0,90			0,90				0,90			0,90	
Wind dir. red.			0,62			0,62				0,63			0,63	
Total reduction			0,15			0,21				0,26			0,23	
Total, real			5			71				147			319	

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July		August		September		October		November	December
1	03.16		04.33		06.03		07.26		07.55	09.24
	23.31	48	22.18	8	21.32 (1)		20.36		18.53	20	17.39 (9)	16.11	14.53
2	03.17		04.36		06.06		07.28		07.58	09.27
	23.30	49	22.15	3	21.28 (1)		20.33		18.50	23	17.40 (9)	16.08	14.51
3	03.19		04.39		06.08		07.31		08.01	09.29
	23.29	49	22.12		20.29		18.47	25	17.41 (9)	16.05	14.50
4	03.21		04.42		06.11		07.34		08.04	09.32
	23.27	50	22.09		20.26		18.43	26	17.41 (9)	16.02	14.48
5	03.22		04.45		06.14		07.37		08.07	09.34
	23.26	49	22.06		20.23		18.40	27	17.41 (9)	15.59	14.46
6	03.24		04.48		06.17		07.39		08.11	09.37
	23.24	50	22.03		20.19		18.36	28	17.41 (9)	15.56	14.45
7	03.26		04.51		06.20		07.42		08.14	09.39
	23.22	49	21.59		20.16		18.33	29	17.41 (9)	15.53	14.44
8	03.28		04.54		06.22		07.45		08.17	09.41
	23.20	48	21.56		20.12		18.30	28	17.40 (9)	15.50	14.42
9	03.30		04.57		06.25		07.48		08.20	09.43
	23.19	48	21.53		20.09		18.26	28	17.40 (9)	15.47	14.41
10	03.33		05.00		06.28		07.51		08.23	09.45
	23.17	46	21.50		20.05		18.23	27	17.39 (9)	15.45	14.40
11	03.35		05.02		06.31		07.54		08.26	09.47
	23.14	45	21.47		20.02		18.20	25	17.38 (9)	15.42	14.39
12	03.37		05.05		06.33		07.56		08.29	09.49
	23.12	44	21.43		19.59		18.16	24	17.37 (9)	15.39	14.38
13	03.40		05.08		06.36		07.59		08.32	09.50
	23.10	41	21.40		19.55		18.13	19	17.33 (9)	15.36	14.38
14	03.42		05.11		06.39		08.02		08.35	09.52
	23.08	40	21.37		19.52		18.10	15	17.30 (9)	15.33	14.37
15	03.45		05.14		06.42		08.05		08.38	09.53
	23.05	38	21.33		19.48		18.06	10	17.27 (9)	15.30	14.37
16	03.47		05.17		06.44		08.08		08.41	09.55
	23.03	36	21.30		19.45		18.03	4	17.23 (9)	15.28	14.36
17	03.50		05.20		06.47		08.11		08.44	09.56
	23.01	33	21.27		19.41		18.00		15.25	14.36
18	03.53		05.23		06.50		08.14		08.47	09.57
	22.58	31	21.23		19.38		17.56		15.23	14.36
19	03.55		05.26		06.53		08.17		08.50	09.58
	22.55	30	21.20		19.35		17.53		15.20	14.36
20	03.58		05.29		06.55		08.19		08.53	09.59
	22.53	30	21.17		19.31		17.50		15.17	14.36
21	04.01		05.32		06.58		08.22		08.56	10.00
	22.50	30	21.13		19.28		17.47		15.15	14.36
22	04.04		05.35		07.01		08.25		08.59	10.00
	22.47	29	21.10		19.24		17.43		15.12	14.37
23	04.07		05.37		07.03		08.28		09.02	10.01
	22.45	29	21.07		19.21		17.40		15.10	14.37
24	04.09		05.40		07.06		08.31		09.05	10.01
	22.42	29	21.03		19.17		17.37		15.08	14.38
25	04.12		05.43		07.09		07.34		09.08	10.01
	22.39	28	21.00		19.14		16.34		15.05	14.39
26	04.15		05.46		07.12		07.37		09.11	10.01
	22.36	27	20.57		19.10		16.30		15.03	14.40
27	04.18		05.49		07.14		07.40		09.14	10.01
	22.33	24	20.53		19.07		16.27		15.01	14.41
28	04.21		05.52		07.17		07.43		09.16	10.01
	22.30	21	20.50		19.04		16.24		14.59	14.42
29	04.24		05.54		07.20		17.24 (9)	07.46		09.19	10.01
	22.27	19	20.46		19.00	10	17.34 (9)	16.21		14.57	14.43
30	04.27		05.57		07.23		17.21 (9)	07.49		09.22	10.00
	22.24	16	20.43		18.57	16	17.37 (9)	16.18		14.55	14.45
31	04.30		06.00					07.52			10.00
	22.21	12	20.40					16.15			14.46
Potential sun hours	595		503		392			307		206	150
Total, worst case		1118		11		26			358			
Sun reduction		0,44		0,41		0,31			0,19			
Oper. time red.		0,90		0,90		0,90			0,90			
Wind dir. red.		0,63		0,63		0,62			0,62			
Total reduction		0,25		0,24		0,18			0,11			
Total, real		279		3		5			38			

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: I - Laskentapiste_I (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May	June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.44		05.02	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56	03.29	03.19	04.39		06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41	23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53	03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44	23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49	03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47	23.14	23.25	22.06		20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46	03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50	23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23		04.43	03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53	23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40	03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56	23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37	03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30		21.59	23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34	03.16	03.33	05.00		06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02	23.24	23.16	21.50		20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31	03.15	03.35	05.03		06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05	23.26	23.14	21.46		20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06		04.27	03.14	03.38	05.06	20.12 (9)	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08	23.27	23.12	21.43	4 20.16 (9)	19.59	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24	03.13	03.40	05.08	20.08 (9)	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11	23.29	23.10	21.40	11 20.19 (9)	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	20.02 (9)	04.21	03.12	03.42	05.11	20.06 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	5 20.07 (9)	22.14	23.30	23.08	21.37	15 20.21 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	20.00 (9)	04.18	03.11	03.45	05.14	20.05 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	10 20.10 (9)	22.17	23.31	23.05	21.33	18 20.23 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	19.59 (9)	04.15	03.10	03.48	05.17	20.03 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	14 20.13 (9)	22.20	23.32	23.03	21.30	20 20.23 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	19.58 (9)	04.12	03.10	03.50	05.20	20.02 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	18 20.16 (9)	22.23	23.33	23.00	21.27	22 20.24 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	19.56 (9)	04.10	03.09	03.53	05.23	20.02 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22 20.18 (9)	22.26	23.34	22.58	21.23	23 20.25 (9)	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	19.55 (9)	04.07	03.09	03.56	05.26	20.00 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	24 20.19 (9)	22.29	23.34	22.55	21.20	24 20.24 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	19.55 (9)	04.04	03.09	03.58	05.29	20.00 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	25 20.20 (9)	22.32	23.35	22.53	21.17	25 20.25 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	19.55 (9)	04.01	03.09	04.01	05.32	19.59 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	25 20.20 (9)	22.35	23.35	22.50	21.13	25 20.24 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	19.55 (9)	03.58	03.09	04.04	05.35	19.59 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	25 20.20 (9)	22.38	23.35	22.47	21.10	25 20.24 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	19.55 (9)	03.55	03.09	04.07	05.37	20.00 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	24 20.19 (9)	22.41	23.35	22.44	21.07	24 20.24 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	19.55 (9)	03.53	03.09	04.10	05.40	19.59 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	24 20.19 (9)	22.43	23.35	22.42	21.03	24 20.23 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	19.55 (9)	03.50	03.10	04.12	05.43	20.00 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	23 20.18 (9)	22.46	23.35	22.39	21.00	21 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	19.56 (9)	03.47	03.11	04.15	05.46	19.59 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	21 20.17 (9)	22.49	23.35	22.36	20.57	19 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	19.57 (9)	03.45	03.11	04.18	05.49	20.00 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	19 20.16 (9)	22.52	23.34	22.33	20.53	15 20.15 (9)	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	19.58 (9)	03.42	03.12	04.21	05.52	20.02 (9)	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	17 20.15 (9)	22.54	23.33	22.30	20.50	10 20.12 (9)	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	19.59 (9)	03.40	03.13	04.24	05.54	20.03 (9)	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	14 20.13 (9)	22.57	23.33	22.27	20.46	5 20.08 (9)	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	20.01 (9)	03.38	03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32	10 20.11 (9)	23.00	23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35		04.30	06.00			07.52		10.00
	16.09		20.04			23.02		22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		560	606	595	503		392	308	206	150
Total, worst case					320					330				
Sun reduction					0,40					0,41				
Oper. time red.					0,90					0,90				
Wind dir. red.					0,61					0,61				
Total reduction					0,22					0,23				
Total, real					70					75				

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

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

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: J - Laskentapiste_J (Ritaviita)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January		February		March		April		May		June		
1	09.59		12.53 (8)	08.57		10.21 (9)	07.29		15.12 (7)	06.44		16.21 (7)	05.02		18.36 (6)	03.33		04.31 (1)
	14.48	7	13.00 (8)	16.12	97	13.35 (8)	17.38	67	16.19 (7)	20.07	86	19.22 (6)	21.35	71	20.21 (5)	23.05	41	05.12 (1)
2	09.59		12.51 (8)	08.54		10.21 (9)	07.26		15.11 (7)	06.40		16.24 (7)	04.59		18.38 (6)	03.31		04.31 (1)
	14.50	12	13.03 (8)	16.15	97	13.35 (8)	17.41	70	16.21 (7)	20.10	81	19.22 (6)	21.38	66	20.20 (5)	23.08	43	05.14 (1)
3	09.58		12.49 (8)	08.51		10.21 (9)	07.22		15.10 (7)	06.37		16.28 (7)	04.56		18.41 (6)	03.29		04.30 (1)
	14.52	16	13.05 (8)	16.18	99	13.36 (8)	17.44	71	16.21 (7)	20.13	75	19.23 (6)	21.41	59	20.19 (5)	23.10	44	05.14 (1)
4	09.57		12.48 (8)	08.48		10.21 (9)	07.19		15.10 (7)	06.33		16.35 (7)	04.53		18.44 (6)	03.27		04.31 (1)
	14.54	19	13.07 (8)	16.22	97	13.35 (8)	17.47	71	16.21 (7)	20.16	61	19.23 (6)	21.44	52	20.19 (5)	23.12	43	05.14 (1)
5	09.56		12.48 (8)	08.45		10.22 (9)	07.16		15.08 (7)	06.30		18.29 (6)	04.50		19.42 (5)	03.25		04.31 (1)
	14.56	20	13.08 (8)	16.25	97	13.36 (8)	17.50	73	16.21 (7)	20.19	55	19.24 (6)	21.47	36	20.18 (5)	23.15	44	05.15 (1)
6	09.54		12.47 (8)	08.42		10.21 (9)	07.12		15.07 (7)	06.27		18.28 (6)	04.46		19.43 (5)	03.23		04.31 (1)
	14.58	23	13.10 (8)	16.28	97	13.35 (8)	17.53	74	16.21 (7)	20.22	56	19.24 (6)	21.50	35	20.18 (5)	23.17	45	05.16 (1)
7	09.53		12.46 (8)	08.39		10.21 (9)	07.09		15.07 (7)	06.23		18.27 (6)	04.43		19.44 (5)	03.21		04.31 (1)
	15.00	26	13.12 (8)	16.31	97	13.35 (8)	17.56	76	17.21 (10)	20.24	57	19.24 (6)	21.53	33	20.17 (5)	23.19	45	05.16 (1)
8	09.52		12.46 (8)	08.36		10.22 (9)	07.06		15.06 (7)	06.20		18.26 (6)	04.40		19.44 (5)	03.19		04.31 (1)
	15.03	28	13.14 (8)	16.34	99	15.51 (15)	17.59	80	17.23 (10)	20.27	58	19.24 (6)	21.56	31	20.15 (5)	23.21	46	05.17 (1)
9	09.50		12.45 (8)	08.33		10.22 (9)	07.02		15.06 (7)	06.16		18.26 (6)	04.37		19.45 (5)	03.18		04.31 (1)
	15.05	30	13.15 (8)	16.37	102	15.54 (15)	18.02	87	17.27 (10)	20.30	59	19.25 (6)	21.59	29	20.14 (5)	23.23	46	05.17 (1)
10	09.48		12.44 (8)	08.30		10.23 (9)	06.59		15.05 (7)	06.13		18.26 (6)	04.34		19.47 (5)	03.16		04.31 (1)
	15.08	32	13.16 (8)	16.40	104	15.58 (15)	18.05	90	17.29 (10)	20.33	59	19.25 (6)	22.02	26	20.13 (5)	23.24	46	05.17 (1)
11	09.47		12.44 (8)	08.27		10.24 (9)	06.55		15.05 (7)	06.10		18.25 (6)	04.31		19.48 (5)	03.15		04.30 (1)
	15.10	33	13.17 (8)	16.44	105	16.01 (15)	18.08	95	17.33 (10)	20.36	59	19.24 (6)	22.05	24	20.12 (5)	23.26	47	05.17 (1)
12	09.45		12.44 (8)	08.24		10.25 (9)	06.52		15.05 (7)	06.06		18.25 (6)	04.28		19.51 (5)	03.14		04.30 (1)
	15.13	35	13.19 (8)	16.47	107	16.05 (15)	18.10	98	17.35 (10)	20.39	59	19.24 (6)	22.08	19	20.10 (5)	23.28	47	05.17 (1)
13	09.43		12.42 (8)	08.21		10.25 (9)	06.49		15.05 (7)	06.03		18.24 (6)	04.24		19.53 (5)	03.13		04.31 (1)
	15.15	38	13.20 (8)	16.50	108	16.08 (15)	18.13	102	17.39 (10)	20.42	69	20.06 (5)	22.11	15	20.08 (5)	23.29	47	05.18 (1)
14	09.41		12.42 (8)	08.18		10.27 (9)	06.45		15.05 (7)	05.59		18.24 (6)	04.21		19.56 (5)	03.12		04.30 (1)
	15.18	39	13.21 (8)	16.53	108	16.11 (15)	18.16	104	17.41 (10)	20.45	74	20.08 (5)	22.14	8	20.04 (5)	23.30	48	05.18 (1)
15	09.39		10.40 (9)	08.15		10.28 (9)	06.42		15.05 (7)	05.56		18.24 (6)	04.18			03.11		04.31 (1)
	15.21	44	13.23 (8)	16.56	101	16.10 (15)	18.19	103	17.40 (10)	20.48	78	20.10 (5)	22.17			23.32	48	05.19 (1)
16	09.37		10.36 (9)	08.11		10.30 (9)	06.39		15.05 (7)	05.53		18.24 (6)	04.15			03.10		04.31 (1)
	15.24	51	13.23 (8)	16.59	105	16.11 (15)	18.22	103	17.40 (10)	20.50	83	20.13 (5)	22.20			23.33	48	05.19 (1)
17	09.35		10.33 (9)	08.08		10.32 (9)	06.35		15.05 (7)	05.49		18.24 (6)	04.12			03.09		04.31 (1)
	15.26	58	13.25 (8)	17.02	100	16.10 (15)	18.25	101	17.39 (10)	20.53	87	20.16 (5)	22.23			23.34	48	05.19 (1)
18	09.33		10.29 (9)	08.05		10.36 (9)	06.32		15.05 (7)	05.46		18.24 (6)	04.10			03.09		04.31 (1)
	15.29	65	13.25 (8)	17.05	93	16.10 (15)	18.28	100	17.38 (10)	20.56	90	20.19 (5)	22.26			23.34	48	05.19 (1)
19	09.31		10.26 (9)	08.02		12.49 (8)	06.28		15.05 (7)	05.42		18.24 (6)	04.07		04.51 (1)	03.09		04.31 (1)
	15.32	71	13.27 (8)	17.08	80	16.09 (15)	18.30	98	17.37 (10)	20.59	92	20.20 (5)	22.29	1	04.52 (1)	23.35	49	05.20 (1)
20	09.28		10.24 (9)	07.59		12.52 (8)	06.25		15.06 (7)	05.39		18.24 (6)	04.04		04.49 (1)	03.08		04.31 (1)
	15.35	75	13.27 (8)	17.11	76	16.09 (7)	18.33	93	17.36 (10)	21.02	93	20.21 (5)	22.32	9	04.58 (1)	23.35	49	05.20 (1)
21	09.26		10.24 (9)	07.55		12.54 (8)	06.21		15.06 (7)	05.36		18.25 (6)	04.01		04.47 (1)	03.08		04.31 (1)
	15.38	77	13.28 (8)	17.14	76	16.11 (7)	18.36	90	17.34 (10)	21.05	93	20.21 (5)	22.35	14	05.01 (1)	23.36	49	05.20 (1)
22	09.23		10.24 (9)	07.52		12.58 (8)	06.18		15.07 (7)	05.32		18.25 (6)	03.58		04.45 (1)	03.09		04.32 (1)
	15.41	81	13.30 (8)	17.17	72	16.13 (7)	18.39	83	17.32 (10)	21.08	94	20.22 (5)	22.38	18	05.03 (1)	23.36	49	05.21 (1)
23	09.21		10.23 (9)	07.49		13.04 (8)	06.15		15.07 (7)	05.29		18.26 (6)	03.55		04.43 (1)	03.09		04.32 (1)
	15.44	84	13.30 (8)	17.20	62	16.14 (7)	18.42	79	18.07 (12)	21.11	92	20.22 (5)	22.41	22	05.05 (1)	23.36	49	05.21 (1)
24	09.18		10.23 (9)	07.46		15.18 (7)	06.11		15.08 (7)	05.26		18.27 (6)	03.53		04.41 (1)	03.09		04.32 (1)
	15.47	85	13.31 (8)	17.23	57	16.15 (7)	18.45	73	18.11 (12)	21.14	91	20.22 (5)	22.44	25	05.06 (1)	23.36	49	05.21 (1)
25	09.16		10.22 (9)	07.42		15.16 (7)	06.08		15.08 (7)	05.22		18.28 (6)	03.50		04.39 (1)	03.10		04.33 (1)
	15.50	87	13.31 (8)	17.26	60	16.16 (7)	18.47	84	18.13 (12)	21.17	89	20.22 (5)	22.47	28	05.07 (1)	23.36	48	05.21 (1)
26	09.13		10.22 (9)	07.39		15.15 (7)	06.04		15.10 (7)	05.19		18.29 (6)	03.47		04.37 (1)	03.10		04.33 (1)
	15.53	90	13.32 (8)	17.29	63	16.18 (7)	18.50	88	18.16 (12)	21.20	87	20.22 (5)	22.49	31	05.08 (1)	23.35	49	05.22 (1)
27	09.11		10.21 (9)	07.36		15.14 (7)	06.01		15.11 (7)	05.16		18.30 (6)	03.45		04.35 (1)	03.11		04.33 (1)
	15.57	92	13.33 (8)	17.32	64	16.18 (7)	18.53	92	18.19 (12)	21.23	85	20.22 (5)	22.52	34	05.09 (1)	23.35	48	05.21 (1)
28	09.08		10.21 (9)	07.32		15.13 (7)	05.57		15.12 (7)	05.12		18.31 (6)	03.42		04.33 (1)	03.12		04.34 (1)
	16.00	94	13.34 (8)	17.35	66	16.19 (7)	18.56	95	18.21 (12)	21.26	83	20.22 (5)	22.55	37	05.10 (1)	23.34	47	05.21 (1)
29	09.05		10.21 (9)				06.54		16.14 (7)	05.09		18.32 (6)	03.40		04.33 (1)	03.13		04.34 (1)
	16.03	95	13.34 (8)				19.59	95	19.23 (12)	21.29	80	20.22 (5)	22.58	38	05.11 (1)	23.33	48	05.22 (1)
30	09.02		10.21 (9)				06.51		16.15 (7)	05.06		18.34 (6)	03.38		04.33 (1)	03.15		04.34 (1)
	16.06	96	13.35 (8)				20.02	93	19.22 (12)	21.32	75	20.21 (5)	23.00	39	05.12 (1)	23.32	48	05.22 (1)
31	09.00		10.21 (9)				06.47		16.18 (7)				03.35		04.32 (1)			
	16.09	96	13.34 (8)				20.04	89	19.22 (12)				23.03	40	05.12 (1)			
Potential sun hours	181			242			363			447			560			606		
Total, worst case		1699			2489			2717			2300			840			1406	
Sun reduction		0,14			0,26			0,37			0,40			0,45			0,40	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,66			0,65			0,63			0,62			0,62			0,63	
Total reduction		0,08			0,15			0,21			0,22			0,25			0,23	
Total, real		140			381			579			516			212			323	

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

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: J - Laskentapiste_J (Ritaviita)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July			August			September			October			November			December		
1	03.16		04.35 (1)	04.33		20.00 (5)	06.03		18.24 (6)	07.26		15.44 (7)	07.55		09.53 (9)	09.25		12.26 (8)
	23.31	47	05.22 (1)	22.18	21	20.21 (5)	20.36	59	19.23 (6)	18.54	100	18.16 (10)	16.12	104	15.27 (15)	14.53	34	13.00 (8)
2	03.17		04.35 (1)	04.36		19.58 (5)	06.06		18.24 (6)	07.28		15.44 (7)	07.59		09.53 (9)	09.27		12.27 (8)
	23.30	47	05.22 (1)	22.15	24	20.22 (5)	20.33	59	19.23 (6)	18.50	97	18.13 (10)	16.09	101	15.23 (15)	14.51	32	12.59 (8)
3	03.19		04.35 (1)	04.39		19.57 (5)	06.09		18.24 (6)	07.31		15.44 (7)	08.02		09.52 (9)	09.30		12.29 (8)
	23.29	47	05.22 (1)	22.12	27	20.24 (5)	20.30	59	19.23 (6)	18.47	92	18.09 (10)	16.06	98	15.19 (15)	14.50	30	12.59 (8)
4	03.21		04.36 (1)	04.42		19.55 (5)	06.11		18.23 (6)	07.34		15.44 (7)	08.05		09.52 (9)	09.32		12.30 (8)
	23.27	46	05.22 (1)	22.09	29	20.24 (5)	20.26	58	19.21 (6)	18.43	88	18.06 (10)	16.02	95	13.05 (8)	14.48	28	12.58 (8)
5	03.22		04.36 (1)	04.45		19.54 (5)	06.14		18.24 (6)	07.37		15.44 (7)	08.08		09.51 (9)	09.35		12.31 (8)
	23.26	46	05.22 (1)	22.06	32	20.26 (5)	20.23	57	19.21 (6)	18.40	83	18.02 (10)	15.59	97	13.05 (8)	14.47	26	12.57 (8)
6	03.24		04.36 (1)	04.48		19.54 (5)	06.17		18.24 (6)	07.40		15.44 (7)	08.11		09.51 (9)	09.37		12.33 (8)
	23.24	45	05.21 (1)	22.03	33	20.27 (5)	20.19	57	19.21 (6)	18.37	77	17.59 (10)	15.56	98	13.05 (8)	14.45	24	12.57 (8)
7	03.26		04.37 (1)	04.51		19.52 (5)	06.20		18.24 (6)	07.42		15.44 (7)	08.14		09.51 (9)	09.39		12.35 (8)
	23.23	45	05.22 (1)	22.00	35	20.27 (5)	20.16	55	19.19 (6)	18.33	74	16.58 (7)	15.53	99	13.06 (8)	14.44	21	12.56 (8)
8	03.28		04.37 (1)	04.54		19.00 (6)	06.23		16.32 (7)	07.45		15.44 (7)	08.17		09.51 (9)	09.41		12.36 (8)
	23.21	44	05.21 (1)	21.56	39	20.28 (5)	20.13	57	19.18 (6)	18.30	73	16.57 (7)	15.51	97	13.05 (8)	14.42	18	12.54 (8)
9	03.31		04.38 (1)	04.57		18.52 (6)	06.25		16.22 (7)	07.48		15.44 (7)	08.20		09.51 (9)	09.43		12.38 (8)
	23.19	43	05.21 (1)	21.53	55	20.28 (5)	20.09	73	19.16 (6)	18.27	72	16.56 (7)	15.48	99	13.06 (8)	14.41	15	12.53 (8)
10	03.33		04.39 (1)	05.00		18.49 (6)	06.28		16.17 (7)	07.51		15.44 (7)	08.23		09.52 (9)	09.45		12.40 (8)
	23.17	42	05.21 (1)	21.50	62	20.29 (5)	20.06	80	19.15 (6)	18.23	72	16.56 (7)	15.45	97	13.06 (8)	14.40	12	12.52 (8)
11	03.35		04.39 (1)	05.03		18.46 (6)	06.31		16.14 (7)	07.54		15.45 (7)	08.26		09.52 (9)	09.47		12.43 (8)
	23.15	41	05.20 (1)	21.47	67	20.28 (5)	20.02	84	19.14 (6)	18.20	70	16.55 (7)	15.42	97	13.06 (8)	14.39	8	12.51 (8)
12	03.38		04.40 (1)	05.06		18.44 (6)	06.34		16.10 (7)	07.57		15.45 (7)	08.29		09.52 (9)	09.49		
	23.13	40	05.20 (1)	21.43	72	20.29 (5)	19.59	88	19.13 (12)	18.16	69	16.54 (7)	15.39	95	13.05 (8)	14.38		
13	03.40		04.40 (1)	05.09		18.42 (6)	06.36		16.07 (7)	07.59		15.46 (7)	08.32		09.53 (9)	09.51		
	23.10	40	05.20 (1)	21.40	77	20.30 (5)	19.55	93	19.14 (12)	18.13	67	16.53 (7)	15.36	94	13.05 (8)	14.38		
14	03.42		04.41 (1)	05.11		18.39 (6)	06.39		16.05 (7)	08.02		15.46 (7)	08.35		09.53 (9)	09.52		
	23.08	39	05.20 (1)	21.37	81	20.29 (5)	19.52	95	19.14 (12)	18.10	66	16.52 (7)	15.33	93	13.05 (8)	14.37		
15	03.45		04.42 (1)	05.14		18.38 (6)	06.42		16.02 (7)	08.05		15.47 (7)	08.38		09.54 (9)	09.54		
	23.06	37	05.19 (1)	21.34	83	20.29 (5)	19.48	94	19.11 (12)	18.06	63	16.50 (7)	15.31	92	13.05 (8)	14.37		
16	03.48		04.43 (1)	05.17		18.36 (6)	06.45		16.00 (7)	08.08		15.47 (7)	08.41		09.55 (9)	09.55		
	23.03	36	05.19 (1)	21.30	87	20.29 (5)	19.45	93	19.08 (12)	18.03	62	16.49 (7)	15.28	90	13.05 (8)	14.36		
17	03.50		04.45 (1)	05.20		18.35 (6)	06.47		15.59 (7)	08.11		15.48 (7)	08.44		09.56 (9)	09.56		
	23.01	33	05.18 (1)	21.27	89	20.29 (5)	19.42	89	19.05 (12)	18.00	59	16.47 (7)	15.25	87	13.05 (8)	14.36		
18	03.53		04.47 (1)	05.23		18.34 (6)	06.50		15.56 (7)	08.14		15.49 (7)	08.48		09.57 (9)	09.57		
	22.58	30	05.17 (1)	21.24	90	20.29 (5)	19.38	85	19.01 (12)	17.57	57	16.46 (7)	15.23	85	13.05 (8)	14.36		
19	03.56		04.49 (1)	05.26		18.32 (6)	06.53		15.55 (7)	08.17		13.32 (8)	08.51		09.58 (9)	09.58		
	22.56	27	05.16 (1)	21.20	92	20.28 (5)	19.35	73	18.58 (12)	17.53	67	16.44 (7)	15.20	84	13.05 (8)	14.36		
20	03.58		04.51 (1)	05.29		18.31 (6)	06.55		15.54 (7)	08.20		13.27 (8)	08.54		09.58 (9)	09.59		
	22.53	24	05.15 (1)	21.17	94	20.28 (5)	19.31	75	18.55 (12)	17.50	74	16.43 (7)	15.18	81	13.04 (8)	14.36		
21	04.01		04.54 (1)	05.32		18.31 (6)	06.58		15.53 (7)	08.23		13.24 (8)	08.56		09.59 (9)	10.00		
	22.50	20	05.14 (1)	21.14	92	20.27 (5)	19.28	82	18.17 (10)	17.47	76	16.41 (7)	15.15	77	13.03 (8)	14.36		
22	04.04		04.56 (1)	05.35		18.29 (6)	07.01		15.51 (7)	08.26		13.21 (8)	08.59		10.00 (9)	10.00		
	22.48	16	05.12 (1)	21.10	93	20.26 (5)	19.24	87	18.18 (10)	17.43	77	16.38 (15)	15.13	75	13.03 (8)	14.37		
23	04.07		04.58 (1)	05.38		18.29 (6)	07.04		15.50 (7)	08.28		13.19 (8)	09.02		10.02 (9)	10.01		
	22.45	12	05.10 (1)	21.07	92	20.25 (5)	19.21	93	18.20 (10)	17.40	79	16.39 (15)	15.10	71	13.03 (8)	14.37		
24	04.10		05.01 (1)	05.40		18.27 (6)	07.06		15.49 (7)	08.31		11.05 (9)	09.05		10.06 (9)	10.01		
	22.42	6	05.07 (1)	21.04	93	20.24 (5)	19.18	96	18.21 (10)	17.37	94	16.40 (15)	15.08	64	13.02 (8)	14.38		
25	04.13			05.43		18.27 (6)	07.09		15.47 (7)	07.34		10.01 (9)	09.08		10.11 (9)	10.02		
	22.39			21.00	90	20.21 (5)	19.14	99	18.20 (10)	16.34	101	15.40 (15)	15.06	59	13.03 (8)	14.39		
26	04.15			05.46		18.27 (6)	07.12		15.47 (7)	07.37		09.59 (9)	09.11		10.15 (9)	10.02		
	22.36			20.57	86	20.19 (5)	19.11	101	18.21 (10)	16.31	104	15.40 (15)	15.03	51	13.02 (8)	14.40		
27	04.18			05.49		18.26 (6)	07.15		15.46 (7)	07.40		09.58 (9)	09.14		10.19 (9)	10.02		
	22.33			20.53	83	20.15 (5)	19.07	103	18.21 (10)	16.27	103	15.41 (15)	15.01	44	13.02 (8)	14.41		
28	04.21			05.52		18.25 (6)	07.17		15.46 (7)	07.43		09.56 (9)	09.17		12.23 (8)	10.01		
	22.30			20.50	79	20.12 (5)	19.04	103	18.21 (10)	16.24	107	15.40 (15)	14.59	38	13.01 (8)	14.42		
29	04.24			05.55		18.25 (6)	07.20		15.45 (7)	07.46		09.55 (9)	09.19		12.24 (8)	10.01		
	22.27			20.47	74	20.09 (5)	19.00	104	18.21 (10)	16.21	109	15.38 (15)	14.57	37	13.01 (8)	14.43		
30	04.27		20.05 (5)	05.57		18.24 (6)	07.23		15.44 (7)	07.49		09.54 (9)	09.22		12.25 (8)	10.01		
	22.24	12	20.17 (5)	20.43	68	20.05 (5)	18.57	103	18.19 (10)	16.18	107	15.34 (15)	14.55	35	13.00 (8)	14.45		
31	04.30		20.02 (5)	06.00		18.24 (6)				07.52		09.54 (9)				10.00		
	22.21	17	20.19 (5)	20.40	60	19.24 (6)				16.15	106	15.31 (15)				14.46		
Potential sun hours	595			503			392			307			206			150		
Total, worst case		882			2099			2454			2545			2434			248	
Sun reduction		0,44			0,41			0,31			0,19			0,10			0,07	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,63			0,61			0,62			0,64			0,66			0,66	
Total reduction		0,25			0,23			0,18			0,11			0,06			0,04	
Total, real		221			484			437			282			142			10	

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

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

Licensed user:
FCG Finnish Consulting Group Oy
Osmontie 34, PO Box 950
FI-00601 Helsinki
+358104095666
Aarni Nikkola / aarni.nikkola@fcg.fi
Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: K - Laskentapiste_K (Ritaviita2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January			February			March			April			May			June		
1	09.59			08.57		11.23 (9)	07.29		14.52 (8)	06.44		18.17 (7)	05.02		19.33 (6)	03.33		
	14.48			16.12	59	12.22 (9)	17.38	85	17.01 (15)	20.07	52	19.09 (7)	21.35	62	20.41 (5)	23.05		
2	09.59			08.54		11.22 (9)	07.26		14.51 (8)	06.40		18.16 (7)	04.59		19.34 (6)	03.31		
	14.50			16.15	60	12.22 (9)	17.41	84	17.00 (15)	20.10	53	19.09 (7)	21.38	58	20.40 (5)	23.08		
3	09.58			08.51		11.21 (9)	07.22		14.52 (8)	06.37		18.16 (7)	04.56		19.35 (6)	03.29		
	14.52			16.18	61	12.22 (9)	17.44	83	17.00 (15)	20.13	53	19.09 (7)	21.41	55	20.40 (5)	23.10		
4	09.57			08.48		11.22 (9)	07.19		14.51 (8)	06.33		18.14 (7)	04.53		19.36 (6)	03.27		
	14.54			16.22	61	12.23 (9)	17.47	81	16.58 (15)	20.16	54	19.08 (7)	21.44	51	20.39 (5)	23.12		
5	09.55			08.45		11.21 (9)	07.16		14.52 (8)	06.30		18.14 (7)	04.50		19.38 (6)	03.25		22.13 (4)
	14.56			16.25	62	12.23 (9)	17.50	78	16.58 (15)	20.19	54	19.08 (7)	21.47	47	20.38 (5)	23.15	1	22.14 (4)
6	09.54			08.42		11.22 (9)	07.12		14.52 (8)	06.27		18.14 (7)	04.46		19.41 (6)	03.23		22.12 (4)
	14.58			16.28	75	15.29 (8)	17.53	73	16.56 (15)	20.22	54	19.08 (7)	21.50	40	20.38 (5)	23.17	3	22.15 (4)
7	09.53			08.39		11.21 (9)	07.09		14.53 (8)	06.23		18.13 (7)	04.43		19.44 (6)	03.21		22.12 (4)
	15.00			16.31	84	15.33 (8)	17.56	68	16.54 (15)	20.24	54	19.07 (7)	21.53	33	20.37 (5)	23.19	5	22.17 (4)
8	09.51			08.36		11.22 (9)	07.06		14.53 (8)	06.20		18.14 (7)	04.40		20.15 (5)	03.19		22.11 (4)
	15.03			16.34	90	15.37 (8)	17.59	54	15.47 (8)	20.27	53	19.07 (7)	21.56	21	20.36 (5)	23.21	7	22.18 (4)
9	09.50		11.39 (9)	08.33		11.22 (9)	07.02		14.55 (8)	06.16		18.14 (7)	04.37		20.16 (5)	03.18		22.11 (4)
	15.05	12	11.51 (9)	16.37	95	15.39 (8)	18.02	52	15.47 (8)	20.30	60	19.55 (6)	21.59	18	20.34 (5)	23.23	9	22.20 (4)
10	09.48		11.37 (9)	08.30		11.22 (9)	06.59		14.55 (8)	06.13		18.13 (7)	04.34		20.18 (5)	03.16		22.10 (4)
	15.08	17	11.54 (9)	16.40	99	15.42 (8)	18.05	50	15.45 (8)	20.33	67	19.57 (6)	22.02	15	20.33 (5)	23.24	11	22.21 (4)
11	09.47		11.35 (9)	08.27		11.22 (9)	06.55		14.56 (8)	06.09		18.14 (7)	04.31		20.20 (5)	03.15		22.10 (4)
	15.10	22	11.57 (9)	16.44	102	15.43 (8)	18.07	48	15.44 (8)	20.36	70	20.00 (6)	22.05	11	20.31 (5)	23.26	12	22.22 (4)
12	09.45		11.34 (9)	08.24		11.23 (9)	06.52		14.57 (8)	06.06		18.14 (7)	04.28			03.14		22.09 (4)
	15.13	25	11.59 (9)	16.47	104	15.45 (8)	18.10	45	15.42 (8)	20.39	75	20.03 (6)	22.08			23.28	13	22.22 (4)
13	09.43		11.32 (9)	08.21		11.22 (9)	06.49		14.59 (8)	06.03		18.15 (7)	04.24			03.13		22.10 (4)
	15.15	29	12.01 (9)	16.50	107	15.46 (8)	18.13	42	15.41 (8)	20.42	77	20.06 (6)	22.11			23.29	14	22.24 (4)
14	09.41		11.32 (9)	08.18		11.23 (9)	06.45		15.00 (8)	05.59		18.15 (7)	04.21			03.12		22.09 (4)
	15.18	31	12.03 (9)	16.53	108	15.48 (8)	18.16	38	15.38 (8)	20.45	79	20.08 (6)	22.14			23.30	15	22.24 (4)
15	09.39		11.31 (9)	08.15		11.23 (9)	06.42		15.03 (8)	05.56		18.16 (7)	04.18			03.11		22.10 (4)
	15.21	34	12.05 (9)	16.56	110	15.48 (8)	18.19	33	15.36 (8)	20.47	80	20.09 (6)	22.17			23.31	16	22.26 (4)
16	09.37		11.30 (9)	08.11		11.24 (9)	06.38		15.07 (8)	05.52		18.17 (7)	04.15			03.10		22.10 (4)
	15.24	36	12.06 (9)	16.59	111	15.50 (8)	18.22	27	15.34 (8)	20.50	79	20.09 (6)	22.20			23.32	17	22.27 (4)
17	09.35		11.29 (9)	08.08		11.24 (9)	06.35		15.10 (8)	05.49		18.18 (7)	04.12			03.09		22.10 (4)
	15.26	39	12.08 (9)	17.02	112	15.50 (8)	18.25	19	15.29 (8)	20.53	79	20.10 (6)	22.23			23.33	17	22.27 (4)
18	09.33		11.28 (9)	08.05		11.25 (9)	06.32			05.46		18.19 (7)	04.10			03.09		22.10 (4)
	15.29	40	12.08 (9)	17.05	111	15.51 (8)	18.28			20.56	77	20.10 (6)	22.26			23.34	17	22.27 (4)
19	09.30		11.28 (9)	08.02		11.25 (9)	06.28			05.42		18.19 (7)	04.07			03.09		22.10 (4)
	15.32	42	12.10 (9)	17.08	111	15.51 (8)	18.30			20.59	76	20.10 (6)	22.29			23.35	18	22.28 (4)
20	09.28		11.27 (9)	07.59		11.27 (9)	06.25		17.41 (7)	05.39		18.21 (7)	04.04			03.08		22.10 (4)
	15.35	44	12.11 (9)	17.11	110	15.52 (8)	18.33	13	17.59 (10)	21.02	76	20.24 (5)	22.32			23.35	18	22.28 (4)
21	09.26		11.27 (9)	07.55		11.27 (9)	06.21		17.35 (7)	05.36		18.23 (7)	04.01			03.08		22.10 (4)
	15.38	46	12.13 (9)	17.14	109	15.52 (8)	18.36	27	18.02 (10)	21.05	79	20.27 (5)	22.35			23.36	18	22.28 (4)
22	09.23		11.25 (9)	07.52		11.29 (9)	06.18		17.32 (7)	05.32		18.26 (7)	03.58			03.09		22.11 (4)
	15.41	48	12.13 (9)	17.17	107	15.53 (8)	18.39	33	18.05 (10)	21.08	77	20.29 (5)	22.38			23.36	18	22.29 (4)
23	09.21		11.25 (9)	07.49		11.30 (9)	06.15		17.29 (7)	05.29		18.29 (7)	03.55			03.09		22.11 (4)
	15.44	50	12.15 (9)	17.20	107	16.43 (15)	18.42	38	18.07 (10)	21.11	75	20.32 (5)	22.41			23.36	18	22.29 (4)
24	09.18		11.25 (9)	07.46		11.32 (9)	06.11		17.27 (7)	05.26		18.34 (7)	03.53			03.09		22.11 (4)
	15.47	51	12.16 (9)	17.23	109	16.46 (15)	18.45	44	18.11 (10)	21.14	68	20.35 (5)	22.44			23.36	17	22.28 (4)
25	09.16		11.24 (9)	07.42		11.33 (9)	06.08		17.25 (7)	05.22		19.30 (6)	03.50			03.10		22.12 (4)
	15.50	53	12.17 (9)	17.26	109	16.49 (15)	18.47	48	18.13 (10)	21.17	63	20.38 (5)	22.47			23.36	17	22.29 (4)
26	09.13		11.25 (9)	07.39		11.35 (9)	06.04		17.23 (7)	05.19		19.31 (6)	03.47			03.10		22.12 (4)
	15.53	53	12.18 (9)	17.29	111	16.53 (15)	18.50	52	18.15 (10)	21.20	65	20.40 (5)	22.49			23.35	17	22.29 (4)
27	09.11		11.24 (9)	07.36		11.38 (9)	06.01		17.22 (7)	05.16		19.31 (6)	03.45			03.11		22.12 (4)
	15.56	54	12.18 (9)	17.32	108	16.56 (15)	18.53	53	18.15 (10)	21.23	67	20.42 (5)	22.52			23.35	16	22.28 (4)
28	09.08		11.24 (9)	07.32		11.42 (9)	05.57		17.21 (7)	05.12		19.31 (6)	03.42			03.12		22.13 (4)
	16.00	56	12.20 (9)	17.35	102	16.59 (15)	18.56	52	18.13 (10)	21.26	66	20.42 (5)	22.55			23.34	15	22.28 (4)
29	09.05		11.23 (9)				06.54		18.20 (7)	05.09		19.32 (6)	03.40			03.13		22.13 (4)
	16.03	57	12.20 (9)				19.59	52	19.12 (10)	21.29	65	20.42 (5)	22.57			23.33	15	22.28 (4)
30	09.02		11.23 (9)				06.51		18.18 (7)	05.06		19.32 (6)	03.38			03.15		22.14 (4)
	16.06	58	12.21 (9)				20.02	52	19.10 (10)	21.32	64	20.41 (5)	23.00			23.32	13	22.27 (4)
31	09.00		11.22 (9)				06.47		18.18 (7)				03.35					
	16.09	59	12.21 (9)				20.04	51	19.09 (10)				23.03					
Potential sun hours	181			242			363			447			560			606		
Total, worst case		956			2694			1475			2011			411			357	
Sun reduction		0,14			0,26			0,37			0,40			0,45			0,40	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,66			0,64			0,62			0,61			0,61			0,64	
Total reduction		0,08			0,15			0,21			0,22			0,25			0,24	
Total, real		79			410			312			448			103			84	

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

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

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10.11.2023 9.40/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest Shadow receptor: K - Laskentapiste_K (Ritaviita2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July		August		September		October		November		December		
1	03.16		22.14 (4)	04.33		20.33 (5)	06.03		18.13 (7)	07.26		15.37 (8)	07.55		10.52 (9)	09.25		11.18 (9)
	23.31	12	22.26 (4)	22.18	6	20.39 (5)	20.36	69	19.58 (6)	18.54	44	16.21 (8)	16.12	97	15.11 (8)	14.53	21	11.39 (9)
2	03.17		22.15 (4)	04.36		20.29 (5)	06.06		18.12 (7)	07.28		15.35 (8)	07.58		10.51 (9)	09.27		11.20 (9)
	23.30	11	22.26 (4)	22.15	13	20.42 (5)	20.33	67	19.56 (6)	18.50	47	16.22 (8)	16.09	94	15.08 (8)	14.51	18	11.38 (9)
3	03.19		22.15 (4)	04.39		20.28 (5)	06.09		18.12 (7)	07.31		15.34 (8)	08.02		10.51 (9)	09.30		11.23 (9)
	23.29	10	22.25 (4)	22.12	16	20.44 (5)	20.30	60	19.53 (6)	18.47	49	16.23 (8)	16.05	89	15.06 (8)	14.50	12	11.35 (9)
4	03.21		22.16 (4)	04.42		20.25 (5)	06.11		18.11 (7)	07.34		15.32 (8)	08.05		10.52 (9)	09.32		
	23.27	8	22.24 (4)	22.09	20	20.45 (5)	20.26	53	19.04 (7)	18.43	52	16.24 (8)	16.02	83	15.03 (8)	14.48		
5	03.22		22.17 (4)	04.45		20.25 (5)	06.14		18.11 (7)	07.37		15.31 (8)	08.08		10.51 (9)	09.34		
	23.26	6	22.23 (4)	22.06	21	20.46 (5)	20.23	53	19.04 (7)	18.40	54	16.25 (8)	15.59	74	14.58 (8)	14.47		
6	03.24		22.17 (4)	04.48		19.52 (6)	06.17		18.09 (7)	07.40		15.30 (8)	08.11		10.52 (9)	09.37		
	23.24	5	22.22 (4)	22.03	37	20.48 (5)	20.19	55	19.04 (7)	18.37	63	17.29 (15)	15.56	61	11.53 (9)	14.45		
7	03.26		22.19 (4)	04.51		19.49 (6)	06.20		18.09 (7)	07.42		15.29 (8)	08.14		10.52 (9)	09.39		
	23.22	2	22.21 (4)	22.00	44	20.48 (5)	20.16	54	19.03 (7)	18.33	71	17.31 (15)	15.53	62	11.54 (9)	14.44		
8	03.28			04.54		19.47 (6)	06.23		18.10 (7)	07.45		15.28 (8)	08.17		10.52 (9)	09.41		
	23.21			21.56	49	20.49 (5)	20.12	53	19.03 (7)	18.30	76	17.33 (15)	15.51	61	11.53 (9)	14.42		
9	03.31			04.57		19.45 (6)	06.25		18.09 (7)	07.48		15.26 (8)	08.20		10.53 (9)	09.43		
	23.19			21.53	52	20.48 (5)	20.09	53	19.02 (7)	18.26	79	17.33 (15)	15.48	60	11.53 (9)	14.41		
10	03.33			05.00		19.44 (6)	06.28		18.09 (7)	07.51		15.26 (8)	08.23		10.54 (9)	09.45		
	23.17			21.50	56	20.49 (5)	20.06	53	19.02 (7)	18.23	80	17.33 (15)	15.45	59	11.53 (9)	14.40		
11	03.35			05.03		19.42 (6)	06.31		18.09 (7)	07.54		15.25 (8)	08.26		10.53 (9)	09.47		
	23.15			21.47	59	20.49 (5)	20.02	52	19.01 (7)	18.20	83	17.34 (15)	15.42	59	11.52 (9)	14.39		
12	03.38			05.06		19.41 (6)	06.34		18.09 (7)	07.57		15.26 (8)	08.29		10.54 (9)	09.49		
	23.12			21.43	61	20.49 (5)	19.59	51	19.00 (7)	18.16	84	17.35 (15)	15.39	58	11.52 (9)	14.38		
13	03.40			05.09		19.40 (6)	06.36		18.10 (7)	07.59		12.19 (9)	08.32		10.55 (9)	09.50		
	23.10			21.40	64	20.50 (5)	19.55	52	19.02 (10)	18.13	96	17.34 (15)	15.36	57	11.52 (9)	14.38		
14	03.42			05.11		19.39 (6)	06.39		18.10 (7)	08.02		12.13 (9)	08.35		10.56 (9)	09.52		
	23.08			21.37	65	20.49 (5)	19.52	53	19.03 (10)	18.10	106	17.31 (15)	15.33	55	11.51 (9)	14.37		
15	03.45			05.14		19.38 (6)	06.42		18.10 (7)	08.05		12.09 (9)	08.38		10.57 (9)	09.54		
	23.06			21.34	67	20.49 (5)	19.48	53	19.03 (10)	18.06	110	17.27 (15)	15.31	54	11.51 (9)	14.37		
16	03.48			05.17		19.37 (6)	06.45		18.11 (7)	08.08		12.06 (9)	08.41		10.57 (9)	09.55		
	23.03			21.30	67	20.48 (5)	19.45	52	19.03 (10)	18.03	110	17.23 (15)	15.28	54	11.51 (9)	14.36		
17	03.50			05.20		19.37 (6)	06.47		18.12 (7)	08.11		12.04 (9)	08.44		10.58 (9)	09.56		
	23.01			21.27	65	20.46 (5)	19.42	51	19.03 (10)	18.00	110	17.20 (15)	15.25	53	11.51 (9)	14.36		
18	03.53			05.23		19.37 (6)	06.50		18.12 (7)	08.14		12.02 (9)	08.47		10.59 (9)	09.57		
	22.58			21.24	63	20.44 (5)	19.38	49	19.01 (10)	17.57	108	17.16 (15)	15.23	51	11.50 (9)	14.36		
19	03.56			05.26		18.38 (7)	06.53		18.14 (7)	08.17		12.00 (9)	08.50		10.59 (9)	09.58		
	22.56			21.20	70	20.40 (5)	19.35	44	18.58 (10)	17.53	107	16.24 (8)	15.20	50	11.49 (9)	14.36		
20	03.58			05.29		18.34 (7)	06.55		18.15 (7)	08.20		11.59 (9)	08.53		11.00 (9)	09.59		
	22.53			21.17	74	20.37 (5)	19.31	40	18.55 (10)	17.50	108	16.24 (8)	15.18	48	11.48 (9)	14.36		
21	04.01			05.32		18.31 (7)	06.58		18.16 (7)	08.23		11.58 (9)	08.56		11.02 (9)	10.00		
	22.50			21.14	77	20.35 (5)	19.28	35	18.51 (10)	17.47	109	16.23 (8)	15.15	46	11.48 (9)	14.36		
22	04.04			05.35		18.27 (7)	07.01		18.19 (7)	08.25		11.56 (9)	08.59		11.03 (9)	10.00		
	22.48			21.10	77	20.31 (5)	19.24	28	18.47 (10)	17.43	111	16.22 (8)	15.13	44	11.47 (9)	14.37		
23	04.07			05.38		18.25 (7)	07.04		18.23 (7)	08.28		11.55 (9)	09.02		11.04 (9)	10.01		
	22.45			21.07	76	20.28 (5)	19.21	19	18.44 (10)	17.40	111	16.21 (8)	15.10	42	11.46 (9)	14.37		
24	04.10			05.40		18.23 (7)	07.06			08.31		11.55 (9)	09.05		11.05 (9)	10.01		
	22.42			21.04	75	20.13 (6)	19.18			17.37	112	16.21 (8)	15.08	41	11.46 (9)	14.38		
25	04.13			05.43		18.21 (7)	07.09			07.34		10.54 (9)	09.08		11.07 (9)	10.01		
	22.39			21.00	78	20.13 (6)	19.14			16.34	111	15.20 (8)	15.06	38	11.45 (9)	14.39		
26	04.15			05.46		18.20 (7)	07.12		15.54 (8)	07.37		10.53 (9)	09.11		11.08 (9)	10.02		
	22.36			20.57	80	20.13 (6)	19.11	16	16.10 (8)	16.31	110	15.18 (8)	15.03	36	11.44 (9)	14.40		
27	04.18			05.49		18.18 (7)	07.15		15.49 (8)	07.40		10.53 (9)	09.14		11.10 (9)	10.02		
	22.33			20.53	80	20.11 (6)	19.07	25	16.14 (8)	16.27	109	15.18 (8)	15.01	34	11.44 (9)	14.41		
28	04.21			05.52		18.17 (7)	07.17		15.45 (8)	07.43		10.52 (9)	09.17		11.12 (9)	10.01		
	22.30			20.50	80	20.10 (6)	19.04	32	16.17 (8)	16.24	109	15.17 (8)	14.59	31	11.43 (9)	14.42		
29	04.24			05.55		18.15 (7)	07.20		15.43 (8)	07.46		10.52 (9)	09.19		11.14 (9)	10.01		
	22.27			20.47	80	20.08 (6)	19.00	36	16.19 (8)	16.21	106	15.15 (8)	14.57	28	11.42 (9)	14.43		
30	04.27			05.57		18.15 (7)	07.23		15.39 (8)	07.49		10.52 (9)	09.22		11.15 (9)	10.01		
	22.24			20.43	76	20.05 (6)	18.57	41	16.20 (8)	16.18	103	15.14 (8)	14.55	26	11.41 (9)	14.45		
31	04.30			06.00		18.14 (7)				07.52		10.51 (9)				10.00		
	22.21			20.40	74	20.02 (6)				16.15	101	15.12 (8)				14.46		
Potential sun hours	595			503			392			307			206			150		
Total, worst case		54			1822			1299			2829			1645			51	
Sun reduction		0,44			0,41			0,31			0,19			0,10			0,07	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,64			0,61			0,62			0,63			0,66			0,66	
Total reduction		0,26			0,23			0,18			0,11			0,06			0,04	
Total, real		14			419			229			312			96			2	

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

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

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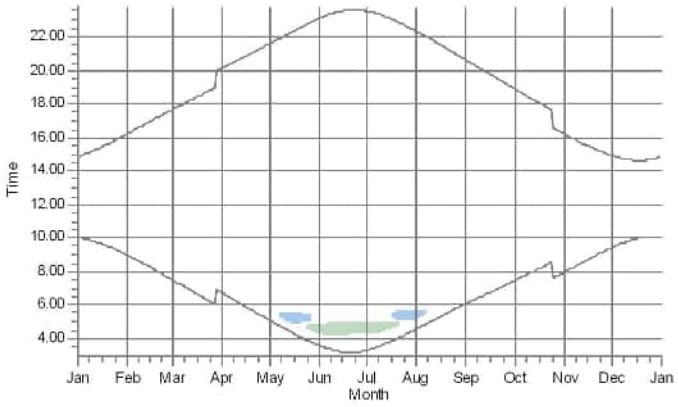
Calculated:
10.11.2023 9.40/3.6.355

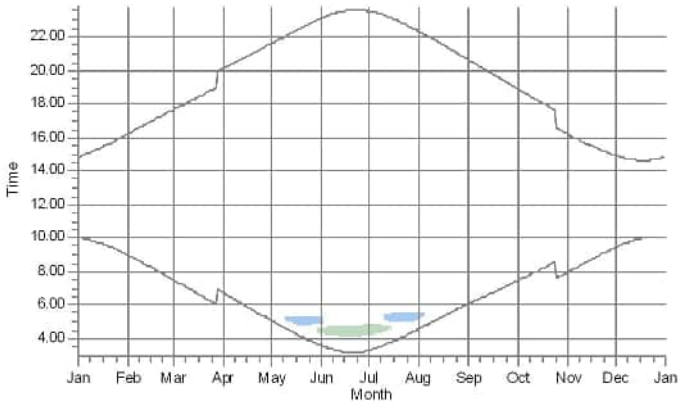
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

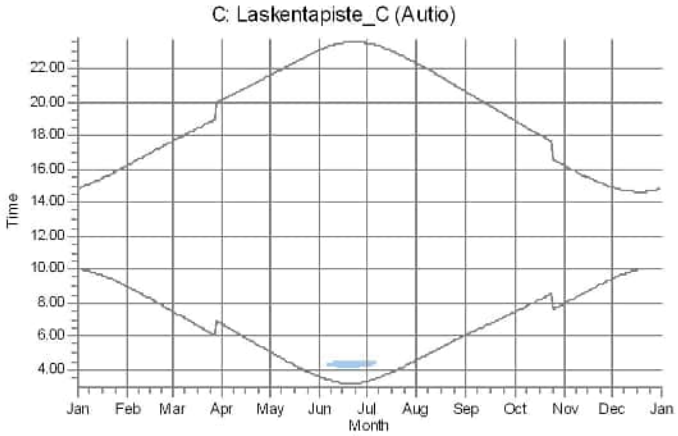
A: Laskentapiste_A (Harjunpää)



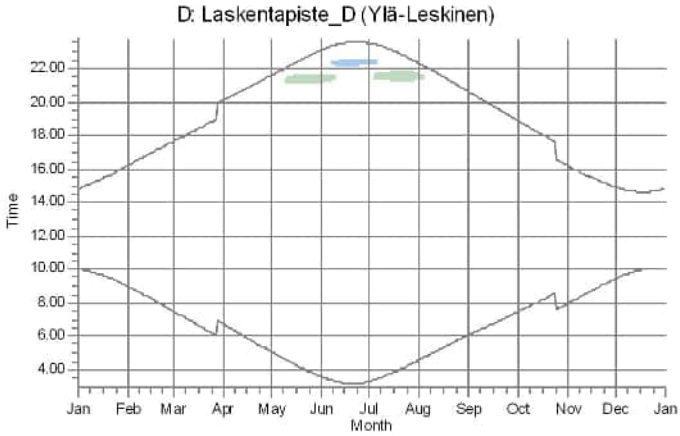
B: Laskentapiste_B (Harjunpää)



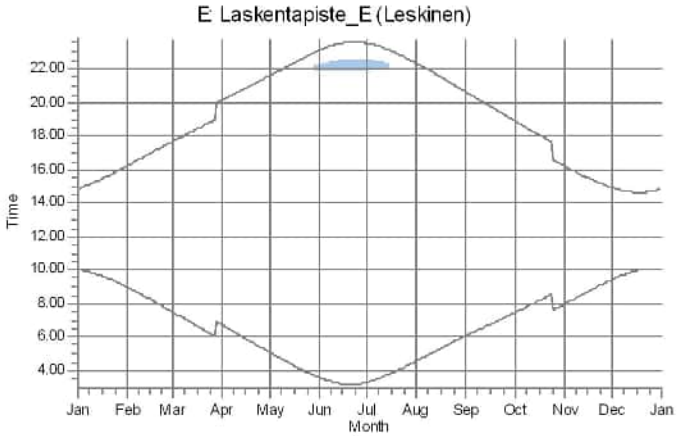
C: Laskentapiste_C (Autio)



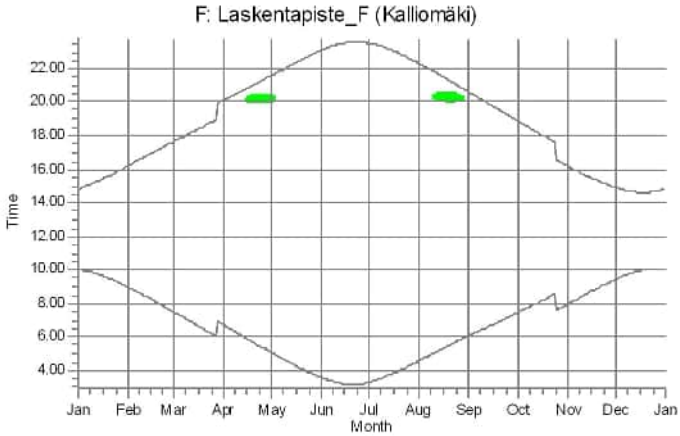
D: Laskentapiste_D (Ylä-Leskinen)



E: Laskentapiste_E (Leskinen)



F: Laskentapiste_F (Kalliomäki)



WTGs

9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)

14: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (277)

15: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)

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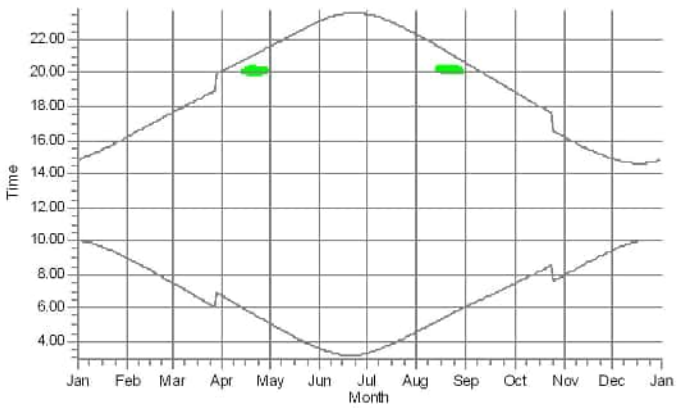
Calculated:
10.11.2023 9.40/3.6.355

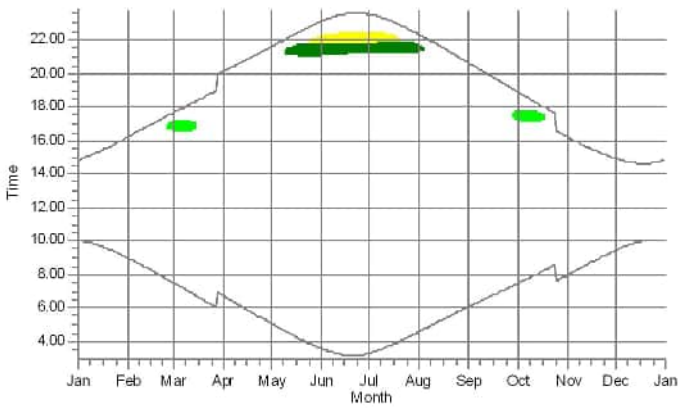
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

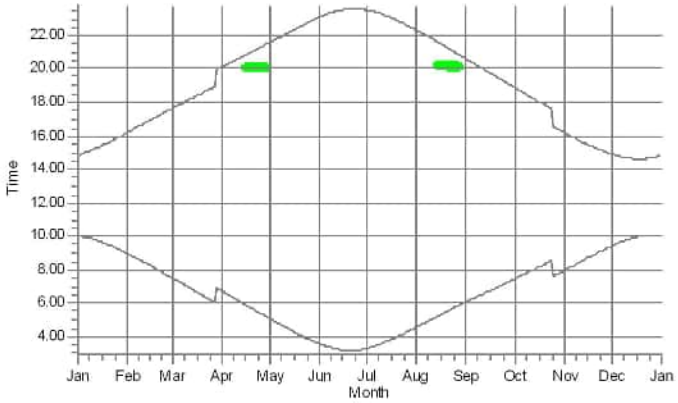
G: Laskentapiste_G (Alapelto)



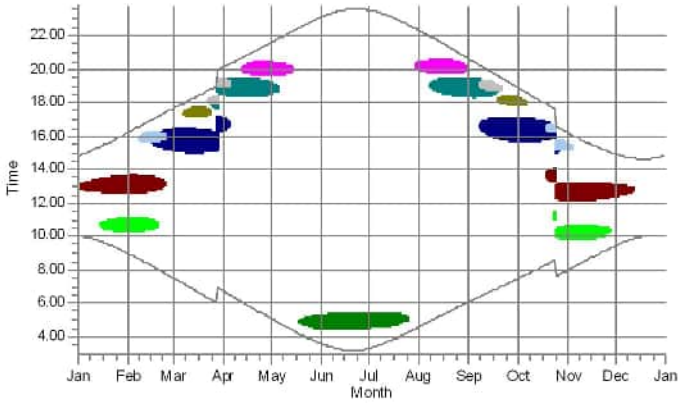
H: Laskentapiste_H (Lepola)



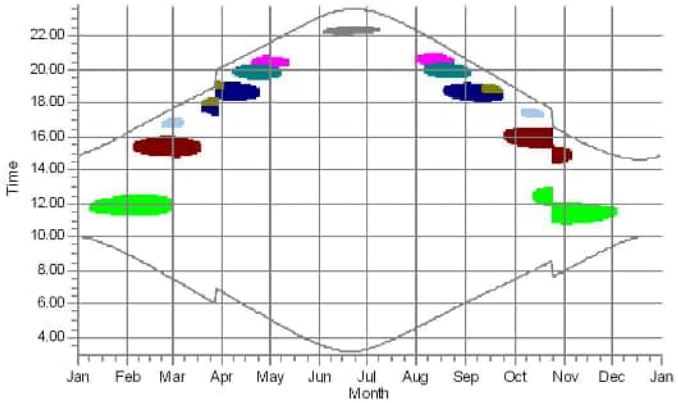
I: Laskentapiste_I (Kalliomäki)



J: Laskentapiste_J (Ritaviita)



K: Laskentapiste_K (Ritaviita2)



WTGs

- 1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (275)
- 2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (274)
- 4: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (282)
- 5: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (272)
- 6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (271)
- 7: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (270)
- 8: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (269)
- 9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)
- 10: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (281)
- 12: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (280)
- 15: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)

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SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 1 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (275)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.02	03.33 04.31-05.12/41	03.16 04.35-05.22/47	04.33 21.24-21.32/8	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05 21.09-21.37/28	23.31 21.18-21.41/23	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 04.31-05.14/43	03.17 04.35-05.22/47	04.36 21.25-21.28/3	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08 21.10-21.38/28	23.30 21.18-21.42/24	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 04.30-05.14/44	03.19 04.35-05.22/47	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10 21.09-21.37/28	23.29 21.18-21.42/24	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 04.31-05.14/43	03.20 04.36-05.22/46	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.12 21.10-21.37/27	23.27 21.17-21.42/25	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 04.31-05.15/44	03.22 04.36-05.22/46	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15 21.11-21.38/27	23.26 21.18-21.43/25	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23 04.31-05.16/45	03.24 04.36-05.21/45	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17 21.12-21.38/26	23.24 21.17-21.43/26	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 04.31-05.16/45	03.26 04.37-05.22/45	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19 21.11-21.37/26	23.23 21.18-21.44/26	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 04.31-05.17/46	03.28 04.37-05.21/44	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21 21.12-21.37/25	23.21 21.17-21.44/27	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18 04.31-05.17/46	03.30 04.38-05.21/43	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23 21.12-21.36/24	23.19 21.17-21.45/28	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16 04.31-05.17/46	03.33 04.39-05.21/42	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.24 21.13-21.37/24	23.17 21.17-21.45/28	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30 21.14-21.19/5	03.15 04.30-05.17/47	03.35 04.39-05.20/41	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26 21.13-21.37/24	23.15 21.17-21.45/28	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27 21.12-21.22/10	03.14 04.30-05.17/47	03.37 04.40-05.20/40	05.05	06.33	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28 21.14-21.37/23	23.13 21.17-21.46/29	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24 21.12-21.25/13	03.12 04.31-05.18/47	03.40 04.40-05.20/40	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29 21.15-21.37/22	23.10 21.17-21.46/29	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21 21.10-21.27/17	03.11 04.30-05.18/48	03.42 04.41-05.20/39	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30 21.15-21.37/22	23.08 21.17-21.46/29	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18 21.10-21.30/20	03.11 04.31-05.19/48	03.45 04.42-05.19/37	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.32 21.15-21.37/22	23.06 21.17-21.47/30	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15 21.09-21.31/22	03.10 04.31-05.19/48	03.47 04.43-05.19/36	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.20	23.33 21.15-21.37/22	23.03 21.17-21.47/30	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12 21.09-21.34/25	03.09 04.31-05.19/48	03.50 04.45-05.18/33	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.25	20.53	22.23	23.34 21.16-21.37/21	23.01 21.17-21.47/30	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09 21.09-21.36/27	03.09 04.31-05.19/48	03.53 04.47-05.17/30	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34 21.16-21.37/21	22.58 21.17-21.47/30	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07 04.51-04.52/1	03.08 04.31-05.20/49	03.55 04.49-05.16/27	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29 21.07-21.36/29	23.35 21.16-21.37/21	22.56 21.17-21.47/30	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 04.49-04.58/9	03.08 04.31-05.20/49	03.58 04.51-05.15/24	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32 21.08-21.37/29	23.35 21.17-21.37/20	22.53 21.17-21.47/30	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01 04.47-05.01/14	03.08 04.31-05.20/49	04.01 04.54-05.14/20	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35 21.08-21.37/29	23.36 21.17-21.37/20	22.50 21.18-21.48/30	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58 04.45-05.03/18	03.08 04.32-05.21/49	04.04 04.56-05.12/16	05.35	07.01	08.25	08.59	10.01
	15.41	17.17	18.39	21.08	22.38 21.08-21.38/30	23.36 21.17-21.37/20	22.48 21.18-21.47/29	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55 04.43-05.05/22	03.09 04.32-05.21/49	04.07 04.58-05.10/12	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41 21.08-21.38/30	23.36 21.18-21.38/20	22.45 21.18-21.47/29	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53 04.41-05.06/25	03.09 04.32-05.21/49	04.09 05.01-05.07/6	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44 21.07-21.37/30	23.36 21.17-21.38/21	22.42 21.18-21.47/29	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50 04.39-05.07/28	03.10 04.33-05.21/48	04.12 21.19-21.47/28	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47 21.07-21.37/30	23.36 21.18-21.39/21	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 04.37-05.08/31	03.10 04.33-05.22/49	04.15 21.19-21.46/27	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49 21.08-21.38/30	23.35 21.17-21.39/22	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45 04.35-05.09/34	03.11 04.33-05.21/48	04.18 21.19-21.43/24	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52 21.08-21.38/30	23.35 21.18-21.39/21	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 04.33-05.10/37	03.12 04.34-05.21/47	04.21 21.20-21.41/21	05.52	07.17	07.43	09.17	10.01
	15.59	17.35	18.56	21.26	22.55 21.08-21.38/30	23.34 21.18-21.40/22	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 04.33-05.11/38	03.13 04.34-05.22/48	04.24 21.20-21.39/19	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58 21.08-21.38/30	23.33 21.18-21.40/22	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.37 04.33-05.12/39	03.14 04.34-05.22/48	04.27 21.21-21.37/16	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00 21.08-21.37/29	23.32 21.18-21.41/23	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35 04.32-05.12/40		04.30 21.22-21.34/12	06.00		07.52		10.00
	16.09		20.04		23.03 21.09-21.38/29		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	860	2099	1668	11	0	0	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

Licensed user:
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Aarni Nikkola / aarni.nikkola@fcg.fi
Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 2 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (274)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33 21.51-22.06/15	03.16 21.56-22.21/25	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 21.51-22.09/18	03.17 21.56-22.21/25	04.36	06.06	07.28	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 21.51-22.10/19	03.19 21.56-22.21/25	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 21.51-22.12/21	03.20 21.56-22.21/25	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 21.51-22.14/23	03.22 21.57-22.21/24	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.26	04.46	03.23 21.52-22.15/23	03.24 21.57-22.21/24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.51-22.15/24	03.26 21.58-22.21/23	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 21.51-22.15/24	03.28 21.58-22.19/21	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.17 21.51-22.15/24	03.30 21.58-22.18/20	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16 21.52-22.16/24	03.33 21.59-22.17/18	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30	03.15 21.52-22.16/24	03.35 21.58-22.15/17	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13 21.52-22.16/24	03.37 21.59-22.14/15	05.05	06.33	07.57	08.29	09.49
	15.12	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12 21.53-22.17/24	03.40 22.00-22.12/12	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11 21.52-22.17/25	03.42 22.00-22.11/11	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10 21.53-22.17/24	03.45 22.01-22.09/8	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15	03.10 21.53-22.17/24	03.47 22.01-22.07/6	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09 21.53-22.17/24	03.50 22.02-22.05/3	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09 21.53-22.17/24	03.53 22.02-22.03/1	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.06	03.08 21.54-22.18/24	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08 21.54-22.18/24	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08 21.54-22.18/24	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.08 21.54-22.18/24	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.08 21.55-22.19/24	04.07	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53	03.09 21.54-22.19/25	04.09	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09 21.55-22.19/24	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 21.53-21.55/2	03.10 21.55-22.19/24	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.15	03.45 21.52-21.57/5	03.11 21.55-22.19/24	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 21.52-21.59/7	03.12 21.56-22.20/24	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 21.51-22.01/10	03.13 21.56-22.20/24	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.37 21.51-22.02/11	03.14 21.56-22.21/25	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35 21.51-22.05/14		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	49	698	303	0	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 3 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (273)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.32	22.18	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26	03.20	04.42	06.11	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24	03.22	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.30	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.09	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13	03.37	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	03.40	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10	03.45	05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.39	05.52	04.15	03.10	03.47	05.17	06.45	08.08	08.42	09.55
	15.23	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.35	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.30	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.09	05.40	07.06	08.31	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.00	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.04		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	205	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 4 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (282)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33		03.16	22.14-22.26/12	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05		23.32		22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31		03.17	22.15-22.26/11	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08		23.30		22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.23	06.37	04.56	03.29		03.19	22.15-22.25/10	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10		23.29		22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27		03.21	22.16-22.24/8	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13		23.28		22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	22.13-22.14/1	03.22	22.17-22.23/6	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15		23.26		22.06	20.23	18.40	15.59	14.47
6	09.55	08.42	07.12	06.27	04.46	03.23	22.12-22.15/3	03.24	22.17-22.22/5	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17		23.25		22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	22.12-22.17/5	03.26	22.19-22.21/2	04.51	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19		23.23		22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	22.11-22.18/7	03.28		04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21		23.21		21.57	20.13	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	22.11-22.20/9	03.30		04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23		23.19		21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	22.10-22.21/11	03.33		05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.05	20.33	22.02	23.25		23.17		21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	22.10-22.22/12	03.35		05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26		23.15		21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	22.09-22.22/13	03.37		05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28		23.13		21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	22.10-22.24/14	03.40		05.09	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29		23.11		21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	22.09-22.24/15	03.42		05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31		23.08		21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.11	22.10-22.26/16	03.45		05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32		23.06		21.34	19.49	18.06	15.31	14.37
16	09.37	08.12	06.39	05.53	04.15	03.10	22.10-22.27/17	03.47		05.17	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33		23.03		21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	22.10-22.27/17	03.50		05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.54	22.24	23.34		23.01		21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	22.10-22.27/17	03.53		05.23	06.50	08.14	08.48	09.58
	15.29	17.05	18.28	20.56	22.27	23.35		22.58		21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	22.10-22.28/18	03.56		05.26	06.53	08.17	08.51	09.59
	15.32	17.08	18.30	20.59	22.30	23.35		22.56		21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	22.10-22.28/18	03.58		05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36		22.53		21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	22.10-22.28/18	04.01		05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36		22.51		21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	22.11-22.29/18	04.04		05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36		22.48		21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	22.11-22.29/18	04.07		05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36		22.45		21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	22.11-22.28/17	04.10		05.40	07.07	08.32	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36		22.42		21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	22.12-22.29/17	04.12		05.43	07.09	07.35	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36		22.39		21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	22.12-22.29/17	04.15		05.46	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36		22.36		20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	22.12-22.28/16	04.18		05.49	07.15	07.41	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35		22.34		20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	22.13-22.28/15	04.21		05.52	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34		22.31		20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	22.13-22.28/15	04.24		05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.34		22.28		20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	22.14-22.27/13	04.27		05.57	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33		22.25		20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35			04.30		06.00		07.53		10.00
	16.09		20.05		23.03			22.22		20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606		595		503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	357		54		0	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 5 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (272)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03 19.41-20.41/60	03.33	03.16	04.33 20.33-20.39/6	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.19 20.00-20.21/21	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59 19.41-20.40/59	03.31	03.17	04.36 20.29-20.42/13	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15 19.58-20.22/24	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56 19.41-20.40/59	03.29	03.19	04.39 20.28-20.44/16	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12 19.57-20.24/27	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53 19.41-20.39/58	03.27	03.21	04.42 20.25-20.45/20	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09 19.55-20.24/29	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50 19.42-20.38/56	03.25	03.23	04.45 19.54-20.46/52	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46 19.43-20.38/55	03.23	03.24	04.48 19.54-20.48/54	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43 19.44-20.37/53	03.21	03.26	04.51 19.52-20.48/56	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40 19.44-20.36/52	03.19	03.28	04.54 19.52-20.49/57	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37 20.16-20.34/18	03.18	03.31	04.57 19.50-20.48/58	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59 19.45-20.14/29	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34 20.18-20.33/15	03.16	03.33	05.00 19.50-20.49/59	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02 19.47-20.13/26	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31 20.20-20.31/11	03.15	03.35	05.03 19.49-20.49/60	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05 19.48-20.12/24	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28 19.51-20.10/19	03.14	03.38	05.06 19.49-20.49/60	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03 19.57-20.06/9	04.25 19.53-20.08/15	03.13	03.40	05.09 19.49-20.50/61	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59 19.53-20.08/15	04.22 19.56-20.04/8	03.12	03.42	05.12 19.48-20.49/61	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56 19.51-20.10/19	04.19	03.11	03.45	05.15 19.48-20.49/61	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53 19.49-20.13/24	04.16	03.10	03.48	05.17 19.47-20.48/61	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49 19.48-20.16/28	04.13	03.09	03.50	05.20 19.47-20.46/59	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46 19.47-20.19/32	04.10	03.09	03.53	05.23 19.48-20.44/56	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42 19.45-20.20/35	04.07	03.09	03.56	05.26 19.47-20.40/53	06.53	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39 19.44-20.24/40	04.04	03.08	03.58	05.29 19.47-20.37/50	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36 19.43-20.27/44	04.01	03.08	04.01	05.32 19.48-20.35/47	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32 19.42-20.29/47	03.58	03.09	04.04	05.35 19.48-20.31/43	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29 19.42-20.32/50	03.56	03.09	04.07	05.38 19.49-20.28/39	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26 19.41-20.35/54	03.53	03.09	04.10	05.41 19.48-20.24/36	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22 19.41-20.38/57	03.50	03.10	04.13	05.43 19.49-20.21/32	07.09	07.35	09.08	10.02
	15.50	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19 19.41-20.40/59	03.48	03.10	04.15	05.46 19.51-20.19/28	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16 19.41-20.42/61	03.45	03.11	04.18	05.49 19.51-20.15/24	07.15	07.41	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.33	05.58	05.12 19.41-20.42/61	03.42	03.12	04.21	05.52 19.53-20.12/19	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09 19.41-20.42/61	03.40	03.13	04.24	05.55 19.55-20.09/14	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06 19.41-20.41/60	03.38	03.15	04.27 20.05-20.17/12	05.58 19.57-20.05/8	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30 20.02-20.19/17	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	756	617	0	29	1364	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 6 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (271)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44 18.34-19.22/48	05.03 19.33-20.05/32	03.33	03.16	04.33	06.03 19.40-19.58/18	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35 18.36-19.07/31	23.05	23.31	22.18	20.37 18.24-19.23/59	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40 18.32-19.22/50	04.59 19.34-20.03/29	03.31	03.17	04.36	06.06 19.42-19.56/14	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38 18.38-19.05/27	23.08	23.30	22.15	20.33 18.24-19.23/59	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37 18.31-19.23/52	04.56 19.35-20.02/27	03.29	03.19	04.39	06.09 19.46-19.53/7	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41 18.41-19.02/21	23.10	23.29	22.12	20.30 18.24-19.23/59	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34 18.30-19.23/53	04.53 19.36-20.00/24	03.27	03.21	04.42	06.12 18.23-19.21/58	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44 18.44-18.58/14	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.56	08.45	07.16	06.30 18.29-19.24/55	04.50 19.38-19.59/21	03.25	03.23	04.45	06.14 18.24-19.21/57	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27 18.28-19.24/56	04.46 19.41-19.57/16	03.23	03.24	04.48 19.52-20.05/13	06.17 18.24-19.21/57	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23 18.27-19.24/57	04.43 19.44-19.54/10	03.21	03.26	04.51 19.49-20.07/18	06.20 18.24-19.19/55	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20 18.26-19.24/58	04.40	03.19	03.29	04.54 19.47-20.09/22	06.23 18.25-19.18/53	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56 19.00-19.03/3	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16 19.48-19.55/7	04.37	03.18	03.31	04.57 19.45-20.10/25	06.25 18.25-19.16/51	07.48	08.20	09.43
	15.05	16.37	18.02	20.30 18.26-19.25/59	21.59	23.23	23.19	21.53 18.52-19.09/17	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13 19.43-19.57/14	04.34	03.16	03.33	05.00 19.44-20.12/28	06.28 18.26-19.15/49	07.51	08.23	09.45
	15.08	16.41	18.05	20.33 18.26-19.25/59	22.02	23.25	23.17	21.50 18.49-19.12/23	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10 19.41-20.00/19	04.31	03.15	03.35	05.03 19.42-20.12/30	06.31 18.27-19.14/47	07.54	08.26	09.47
	15.10	16.44	18.08	20.36 18.25-19.24/59	22.05	23.26	23.15	21.47 18.46-19.14/28	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06 19.39-20.03/24	04.28	03.14	03.38	05.06 19.41-20.13/32	06.34 18.27-19.12/45	07.57	08.29	09.49
	15.13	16.47	18.10	20.39 18.25-19.24/59	22.08	23.28	23.13	21.44 18.44-19.16/32	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03 19.38-20.06/28	04.25	03.13	03.40	05.09 19.40-20.14/34	06.36 18.28-19.11/43	08.00	08.32	09.51
	15.15	16.50	18.13	20.42 18.24-19.24/60	22.11	23.29	23.10	21.40 18.42-19.18/36	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59 19.36-20.08/32	04.22	03.12	03.43	05.12 19.39-20.14/35	06.39 18.30-19.09/39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45 18.24-19.23/59	22.14	23.30	23.08	21.37 18.39-19.19/40	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56 19.35-20.09/34	04.19	03.11	03.45	05.14 19.38-20.15/37	06.42 18.31-19.06/35	08.05	08.38	09.54
	15.21	16.56	18.19	20.48 18.24-19.23/59	22.18	23.32	23.06	21.34 18.38-19.20/42	19.49	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53 19.34-20.09/35	04.16	03.10	03.48	05.17 19.37-20.15/38	06.45 18.33-19.03/30	08.08	08.42	09.55
	15.24	16.59	18.22	20.51 18.24-19.23/59	22.21	23.33	23.03	21.30 18.36-19.21/45	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49 19.33-20.10/37	04.13	03.09	03.50	05.20 19.37-20.15/38	06.47 18.36-19.00/24	08.11	08.45	09.56
	15.27	17.02	18.25	20.53 18.24-19.23/59	22.23	23.34	23.01	21.27 18.35-19.22/47	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46 19.32-20.10/38	04.10	03.09	03.53	05.23 19.37-20.16/39	06.50 18.39-18.55/16	08.14	08.48	09.57
	15.29	17.05	18.28	20.56 18.24-19.22/58	22.26	23.34	22.58	21.24 18.34-19.23/49	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42 19.31-20.10/39	04.07	03.09	03.56	05.26 19.36-20.15/39	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59 18.24-19.21/57	22.29	23.35	22.56	21.20 18.32-19.23/51	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39 19.31-20.10/39	04.04	03.09	03.58	05.29 19.36-20.15/39	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02 18.24-19.20/56	22.32	23.35	22.53	21.17 18.31-19.24/53	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36 19.30-20.10/40	04.01	03.09	04.01	05.32 19.36-20.15/39	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05 18.25-19.20/55	22.35	23.36	22.50	21.14 18.31-19.24/53	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32 19.30-20.10/40	03.58	03.09	04.04	05.35 19.35-20.14/39	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08 18.25-19.19/54	22.38	23.36	22.48	21.10 18.29-19.24/55	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29 19.30-20.10/40	03.56	03.09	04.07	05.38 19.35-20.14/39	07.04	08.29	09.02	10.01
	15.44	17.20	18.42	21.11 18.26-19.18/52	22.41	23.36	22.45	21.07 18.29-19.25/56	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26 19.30-20.09/39	03.53	03.09	04.10	05.41 19.35-20.13/38	07.07	08.32	09.05	10.01
	15.47	17.23	18.45	21.14 18.27-19.17/50	22.44	23.36	22.42	21.04 18.27-19.24/57	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 17.52-18.06/14	05.22 19.30-20.09/39	03.50	03.10	04.13	05.43 19.35-20.13/38	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17 18.28-19.16/48	22.47	23.36	22.39	21.00 18.27-19.25/58	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 17.48-18.11/23	05.19 19.31-20.09/38	03.48	03.11	04.15	05.46 19.36-20.13/37	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20 18.29-19.15/46	22.50	23.35	22.36	20.57 18.27-19.25/58	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01 17.45-18.14/29	05.16 19.31-20.08/37	03.45	03.11	04.18	05.49 19.36-20.11/35	07.15	07.40	09.14	10.02
	15.57	17.32	18.53	21.23 18.30-19.14/44	22.52	23.35	22.33	20.54 18.26-19.25/59	19.07	16.27	15.01	14.41
28	09.08	07.32	05.58 17.41-18.16/35	05.12 19.31-20.07/36	03.42	03.12	04.21	05.52 19.36-20.10/34	07.18	07.43	09.17	10.01
	16.00	17.35	18.56	21.26 18.31-19.13/42	22.55	23.34	22.30	20.50 18.25-19.25/60	19.04	16.24	14.59	14.42
29	09.05		06.54 18.40-19.18/38	05.09 19.32-20.07/35	03.40	03.13	04.24	05.55 19.36-20.08/32	07.20	07.46	09.19	10.01
	16.03		19.59	21.29 18.32-19.11/39	22.58	23.33	22.28	20.47 18.25-19.25/60	19.01	16.21	14.57	14.43
30	09.02		06.51 18.37-19.19/42	05.06 19.32-20.06/34	03.38	03.15	04.27	05.58 19.38-20.05/27	07.23	07.49	09.22	10.01
	16.06		20.02	21.32 18.34-19.09/35	23.00	23.32	22.25	20.43 18.24-19.24/60	18.57	16.18	14.55	14.45
31	09.00		06.47 18.36-19.20/44		03.35		04.30	06.00 19.39-20.02/23		07.53		10.00
	16.09		20.05		23.03		22.21	20.40 18.24-19.24/60		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	225	2321	252	0	0	1950	875	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 7 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (270)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February		March		April		May	June
1	09.59	08.57		07.29	15.12-16.19/67	06.44	18.17-19.09/52	05.03	03.33
	14.48	16.12		17.38		20.07	16.21-16.59/38	21.35	23.05
2	09.59	08.54		07.26	15.11-16.21/70	06.40	18.16-19.09/53	04.59	03.31
	14.50	16.15		17.41		20.10	16.24-16.55/31	21.38	23.08
3	09.58	08.51		07.22	15.10-16.21/71	06.37	18.16-19.09/53	04.56	03.29
	14.52	16.19		17.44		20.13	16.28-16.51/23	21.41	23.10
4	09.57	08.48		07.19	15.10-16.21/71	06.33	18.14-19.08/54	04.53	03.27
	14.54	16.22		17.47		20.16	16.35-16.43/8	21.44	23.12
5	09.56	08.45		07.16	15.08-16.21/73	06.30	18.14-19.08/54	04.50	03.25
	14.56	16.25		17.50		20.19		21.47	23.15
6	09.54	08.42		07.12	15.07-16.21/74	06.27	18.14-19.08/54	04.46	03.23
	14.58	16.28		17.53		20.22		21.50	23.17
7	09.53	08.39		07.09	15.07-16.22/75	06.23	18.13-19.07/54	04.43	03.21
	15.01	16.31		17.56		20.24		21.53	23.19
8	09.52	08.36		07.06	15.06-16.21/75	06.20	18.14-19.07/53	04.40	03.19
	15.03	16.34		17.59		20.27		21.56	23.21
9	09.50	08.33		07.02	15.06-16.22/76	06.16	18.14-19.07/53	04.37	03.18
	15.05	16.37		18.02		20.30		21.59	23.23
10	09.48	08.30		06.59	15.05-16.21/76	06.13	18.13-19.06/53	04.34	03.16
	15.08	16.41		18.05		20.33		22.02	23.24
11	09.47	08.27		06.56	15.05-16.21/76	06.10	18.14-19.05/51	04.31	03.15
	15.10	16.44		18.08		20.36		22.05	23.26
12	09.45	08.24		06.52	15.05-16.21/76	06.06	18.14-19.05/51	04.28	03.14
	15.13	16.47		18.10		20.39		22.08	23.28
13	09.43	08.21		06.49	15.05-16.21/76	06.03	18.15-19.04/49	04.25	03.13
	15.15	16.50		18.13		20.42		22.11	23.29
14	09.41	08.18		06.45	15.05-16.21/76	05.59	18.15-19.02/47	04.22	03.12
	15.18	16.53		18.16		20.45		22.14	23.30
15	09.39	08.15	15.44-15.48/4	06.42	15.05-16.20/75	05.56	18.16-19.02/46	04.19	03.11
	15.21	16.56		18.19		20.48		22.17	23.32
16	09.37	08.11	15.36-15.57/21	06.39	15.05-16.20/75	05.53	18.17-19.01/44	04.16	03.10
	15.24	16.59		18.22		20.50		22.20	23.33
17	09.35	08.08	15.32-16.01/29	06.35	15.05-16.19/74	05.49	18.18-19.00/42	04.13	03.10
	15.27	17.02		18.25		20.53		22.23	23.33
18	09.33	08.05	15.29-16.04/35	06.32	15.05-16.19/74	05.46	18.19-18.58/39	04.10	03.09
	15.29	17.05		18.28		20.56		22.26	23.34
19	09.31	08.02	15.26-16.06/40	06.28	15.05-16.18/73	05.42	18.19-18.56/37	04.07	03.09
	15.32	17.08		18.30		20.59		22.29	23.35
20	09.28	07.59	15.25-16.09/44	06.25	17.41-17.52/11	05.39	18.21-18.54/33	04.04	03.09
	15.35	17.11		18.33	15.06-16.17/71	21.02		22.32	23.35
21	09.26	07.55	15.22-16.11/49	06.21	17.35-17.56/21	05.36	18.23-18.53/30	04.01	03.09
	15.38	17.14		18.36	15.06-16.16/70	21.05		22.35	23.36
22	09.23	07.52	15.21-16.13/52	06.18	17.32-18.00/28	05.32	18.26-18.50/24	03.58	03.09
	15.41	17.17		18.39	15.07-16.15/68	21.08		22.38	23.36
23	09.21	07.49	15.19-16.14/55	06.15	17.29-18.01/32	05.29	18.29-18.47/18	03.56	03.09
	15.44	17.20		18.42	15.07-16.14/67	21.11		22.41	23.36
24	09.18	07.46	15.18-16.15/57	06.11	17.27-18.03/36	05.26	18.34-18.42/8	03.53	03.09
	15.47	17.23		18.45	15.08-16.13/65	21.14		22.44	23.36
25	09.16	07.42	15.16-16.16/60	06.08	17.25-18.04/39	05.22		03.50	03.10
	15.50	17.26		18.47	15.08-16.11/63	21.17		22.47	23.36
26	09.13	07.39	15.15-16.18/63	06.04	17.23-18.06/43	05.19		03.48	03.11
	15.53	17.29		18.50	15.10-16.10/60	21.20		22.49	23.35
27	09.11	07.36	15.14-16.18/64	06.01	17.22-18.07/45	05.16		03.45	03.11
	15.57	17.32		18.53	15.11-16.09/58	21.23		22.52	23.35
28	09.08	07.32	15.13-16.19/66	05.57	17.21-18.07/46	05.12		03.42	03.12
	16.00	17.35		18.56	15.12-16.07/55	21.26		22.55	23.34
29	09.05			06.54	18.20-19.08/48	05.09		03.40	03.13
	16.03			19.59	16.14-17.06/52	21.29		22.58	23.33
30	09.02			06.51	18.18-19.08/50	05.06		03.38	03.15
	16.06			20.02	16.15-17.03/48	21.32		23.00	23.32
31	09.00			06.47	18.18-19.08/50			03.35	
	16.09			20.04	16.18-17.01/43			23.03	
Potential sun hours	181	242		363		447		560	606
Sum of minutes with flicker	0	639		2572		1152		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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 7 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (270)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August		September		October		November	December
1	03.16	04.33		06.03	18.13-19.04/51	07.26	15.44-17.00/76	07.56	09.25
	23.31	22.18		20.36		18.54		16.12	14.53
2	03.18	04.36		06.06	18.12-19.05/53	07.29	15.44-17.00/76	07.59	09.27
	23.30	22.15		20.33		18.50		16.09	14.52
3	03.19	04.39		06.09	18.12-19.05/53	07.31	15.44-17.00/76	08.02	09.30
	23.29	22.12		20.30		18.47		16.06	14.50
4	03.21	04.42		06.12	18.11-19.04/53	07.34	15.44-16.59/75	08.05	09.32
	23.27	22.09		20.26		18.43		16.03	14.48
5	03.23	04.45		06.14	18.11-19.04/53	07.37	15.44-16.59/75	08.08	09.35
	23.26	22.06		20.23		18.40		16.00	14.47
6	03.24	04.48		06.17	18.09-19.04/55	07.40	15.44-16.58/74	08.11	09.37
	23.24	22.03		20.19		18.37		15.57	14.45
7	03.26	04.51		06.20	18.09-19.03/54	07.42	15.44-16.58/74	08.14	09.39
	23.22	22.00		20.16		18.33		15.54	14.44
8	03.29	04.54		06.23	18.10-19.03/53	07.45	15.44-16.57/73	08.17	09.41
	23.21	21.56		20.13	16.32-16.36/4	18.30		15.51	14.43
9	03.31	04.57		06.25	18.09-19.02/53	07.48	15.44-16.56/72	08.20	09.43
	23.19	21.53		20.09	16.22-16.44/22	18.27		15.48	14.41
10	03.33	05.00		06.28	18.09-19.02/53	07.51	15.44-16.56/72	08.23	09.45
	23.17	21.50		20.06	16.17-16.48/31	18.23		15.45	14.40
11	03.35	05.03		06.31	18.09-19.01/52	07.54	15.45-16.55/70	08.26	09.47
	23.15	21.47		20.02	16.14-16.51/37	18.20		15.42	14.39
12	03.38	05.06		06.34	18.09-19.00/51	07.57	15.45-16.54/69	08.29	09.49
	23.13	21.44		19.59	16.10-16.52/42	18.17		15.39	14.39
13	03.40	05.09		06.36	18.10-18.59/49	07.59	15.46-16.53/67	08.32	09.51
	23.10	21.40		19.55	16.07-16.54/47	18.13		15.36	14.38
14	03.43	05.12		06.39	18.10-18.59/49	08.02	15.46-16.52/66	08.35	09.52
	23.08	21.37		19.52	16.05-16.56/51	18.10		15.33	14.37
15	03.45	05.14		06.42	18.10-18.57/47	08.05	15.47-16.50/63	08.38	09.54
	23.06	21.34		19.48	16.02-16.56/54	18.07		15.31	14.37
16	03.48	05.17		06.45	18.11-18.56/45	08.08	15.47-16.49/62	08.41	09.55
	23.03	21.30		19.45	16.00-16.58/58	18.03		15.28	14.36
17	03.50	05.20		06.47	18.12-18.54/42	08.11	15.48-16.47/59	08.44	09.56
	23.01	21.27		19.42	15.59-16.59/60	18.00		15.25	14.36
18	03.53	05.23		06.50	18.12-18.52/40	08.14	15.49-16.46/57	08.48	09.57
	22.58	21.24		19.38	15.56-16.59/63	17.57		15.23	14.36
19	03.56	05.26	18.38-18.49/11	06.53	18.14-18.50/36	08.17	15.50-16.44/54	08.51	09.58
	22.56	21.20		19.35	15.55-17.00/65	17.53		15.20	14.36
20	03.58	05.29	18.34-18.53/19	06.56	18.15-18.49/34	08.20	15.52-16.43/51	08.54	09.59
	22.53	21.17		19.31	15.54-17.00/66	17.50		15.18	14.36
21	04.01	05.32	18.31-18.56/25	06.58	18.16-18.45/29	08.23	15.54-16.41/47	08.57	10.00
	22.50	21.14		19.28	15.53-17.01/68	17.47		15.15	14.37
22	04.04	05.35	18.27-18.57/30	07.01	18.19-18.42/23	08.26	15.55-16.38/43	08.59	10.00
	22.48	21.10		19.24	15.51-17.00/69	17.44		15.13	14.37
23	04.07	05.38	18.25-18.59/34	07.04	18.23-18.38/15	08.28	15.57-16.36/39	09.02	10.01
	22.45	21.07		19.21	15.50-17.01/71	17.40		15.10	14.37
24	04.10	05.41	18.23-19.00/37	07.06	15.49-17.01/72	08.31	16.00-16.34/34	09.05	10.01
	22.42	21.04		19.18		17.37		15.08	14.38
25	04.13	05.43	18.21-19.01/40	07.09	15.47-17.01/74	07.34	15.03-15.30/27	09.08	10.02
	22.39	21.00		19.14		16.34		15.06	14.39
26	04.16	05.46	18.20-19.03/43	07.12	15.47-17.01/74	07.37	15.07-15.25/18	09.11	10.02
	22.36	20.57		19.11		16.31		15.03	14.40
27	04.18	05.49	18.18-19.03/45	07.15	15.46-17.01/75	07.40		09.14	10.02
	22.33	20.54		19.07		16.27		15.01	14.41
28	04.21	05.52	18.17-19.03/46	07.17	15.46-17.01/75	07.43		09.17	10.01
	22.30	20.50		19.04		16.24		14.59	14.42
29	04.24	05.55	18.15-19.03/48	07.20	15.45-17.01/76	07.46		09.19	10.01
	22.27	20.47		19.00		16.21		14.57	14.43
30	04.27	05.58	18.15-19.04/49	07.23	15.44-17.00/76	07.49		09.22	10.01
	22.24	20.43		18.57		16.18		14.55	14.45
31	04.30	06.00	18.14-19.05/51			07.52			10.00
	22.21	20.40				16.15			14.46
Potential sun hours	595	503		392		307		206	150
Sum of minutes with flicker	0	478		2373		1569		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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 8 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (269)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June
1	09.59 12.53-13.00/7	08.57 12.39-13.35/56	07.29 14.52-15.53/61	06.44	05.03	03.33
	14.48	16.12	17.38	20.07	21.35	23.05
2	09.58 12.51-13.03/12	08.54 12.39-13.35/56	07.26 14.51-15.52/61	06.40	04.59	03.31
	14.50	16.15	17.41	20.10	21.38	23.08
3	09.58 12.49-13.05/16	08.51 12.39-13.36/57	07.22 14.52-15.52/60	06.37	04.56	03.29
	14.52	16.19	17.44	20.13	21.41	23.10
4	09.57 12.48-13.07/19	08.48 12.39-13.35/56	07.19 14.51-15.51/60	06.33	04.53	03.27
	14.54	16.22	17.47	20.16	21.44	23.12
5	09.55 12.48-13.08/20	08.45 12.40-13.36/56	07.16 14.52-15.51/59	06.30	04.50	03.25
	14.56	16.25	17.50	20.19	21.47	23.14
6	09.54 12.47-13.10/23	08.42 15.16-15.29/13	07.12 14.52-15.49/57	06.27	04.46	03.23
	14.58	16.28 12.39-13.35/56	17.53	20.22	21.50	23.17
7	09.53 12.46-13.12/26	08.39 15.11-15.33/22	07.09 14.53-15.49/56	06.23	04.43	03.21
	15.01	16.31 12.39-13.35/56	17.56	20.24	21.53	23.19
8	09.51 12.46-13.14/28	08.36 15.09-15.37/28	07.06 14.53-15.47/54	06.20	04.40	03.20
	15.03	16.34 12.40-13.35/55	17.59	20.27	21.56	23.21
9	09.50 12.45-13.15/30	08.33 15.06-15.39/33	07.02 14.55-15.47/52	06.16	04.37	03.18
	15.05	16.37 12.40-13.35/55	18.02	20.30	21.59	23.23
10	09.48 12.44-13.16/32	08.30 15.05-15.42/37	06.59 14.55-15.45/50	06.13	04.34	03.16
	15.08	16.41 12.41-13.35/54	18.05	20.33	22.02	23.24
11	09.47 12.44-13.17/33	08.27 15.03-15.43/40	06.55 14.56-15.44/48	06.10	04.31	03.15
	15.10	16.44 12.41-13.34/53	18.08	20.36	22.05	23.26
12	09.45 12.44-13.19/35	08.24 15.02-15.45/43	06.52 14.57-15.42/45	06.06	04.28	03.14
	15.13	16.47 12.42-13.34/52	18.10	20.39	22.08	23.27
13	09.43 12.42-13.20/38	08.21 15.00-15.46/46	06.49 14.59-15.41/42	06.03	04.25	03.13
	15.15	16.50 12.42-13.33/51	18.13	20.42	22.11	23.29
14	09.41 12.42-13.21/39	08.18 15.00-15.48/48	06.45 15.00-15.38/38	05.59	04.22	03.12
	15.18	16.53 12.43-13.33/50	18.16	20.45	22.14	23.30
15	09.39 12.42-13.23/41	08.15 14.58-15.48/50	06.42 15.03-15.36/33	05.56	04.19	03.11
	15.21	16.56 12.44-13.31/47	18.19	20.48	22.17	23.31
16	09.37 12.41-13.23/42	08.11 14.58-15.50/52	06.39 15.07-15.34/27	05.53	04.16	03.10
	15.24	16.59 12.45-13.31/46	18.22	20.50	22.20	23.32
17	09.35 12.41-13.25/44	08.08 14.56-15.50/54	06.35 15.10-15.29/19	05.49	04.13	03.10
	15.27	17.02 12.46-13.29/43	18.25	20.53	22.23	23.33
18	09.33 12.40-13.25/45	08.05 14.56-15.51/55	06.32	05.46	04.10	03.09
	15.29	17.05 12.48-13.28/40	18.28	20.56	22.26	23.34
19	09.30 12.41-13.27/46	08.02 14.55-15.51/56	06.28	05.42	04.07	03.09
	15.32	17.08 12.49-13.26/37	18.30	20.59	22.29	23.35
20	09.28 12.40-13.27/47	07.59 14.55-15.52/57	06.25	05.39	04.04	03.09
	15.35	17.11 12.52-13.24/32	18.33	21.02	22.32	23.35
21	09.26 12.40-13.28/48	07.55 14.54-15.52/58	06.21	05.36	04.01	03.09
	15.38	17.14 12.54-13.21/27	18.36	21.05	22.35	23.36
22	09.23 12.40-13.30/50	07.52 14.54-15.53/59	06.18	05.32	03.58	03.09
	15.41	17.17 12.58-13.18/20	18.39	21.08	22.38	23.36
23	09.21 12.39-13.30/51	07.49 14.53-15.53/60	06.15	05.29	03.56	03.09
	15.44	17.20 13.04-13.11/7	18.42	21.11	22.41	23.36
24	09.18 12.40-13.31/51	07.46 14.53-15.54/61	06.11	05.26	03.53	03.09
	15.47	17.23	18.45	21.14	22.44	23.36
25	09.16 12.39-13.31/52	07.42 14.52-15.53/61	06.08	05.22	03.50	03.10
	15.50	17.26	18.47	21.17	22.47	23.35
26	09.13 12.39-13.32/53	07.39 14.52-15.54/62	06.04	05.19	03.48	03.11
	15.53	17.29	18.50	21.20	22.49	23.35
27	09.11 12.39-13.33/54	07.36 14.52-15.53/61	06.01	05.16	03.45	03.11
	15.57	17.32	18.53	21.23	22.52	23.35
28	09.08 12.39-13.34/55	07.32 14.52-15.53/61	05.57	05.12	03.43	03.12
	16.00	17.35	18.56	21.26	22.55	23.34
29	09.05 12.38-13.34/56		06.54	05.09	03.40	03.14
	16.03		19.59	21.29	22.57	23.33
30	09.02 12.39-13.35/56		06.51	05.06	03.38	03.15
	16.06		20.02	21.32	23.00	23.32
31	09.00 12.38-13.34/56		06.47		03.35	
	16.09		20.04		23.03	
Potential sun hours	181	242	363	447	560	606
Sum of minutes with flicker	1205	2179	822	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 8 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (269)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August	September	October	November	December
1	03.16	04.33	06.03	07.26 15.37-16.21/44	07.55 14.35-15.11/36	09.25 12.26-13.00/34
	23.31	22.18	20.36	18.54	16.12 12.10-13.04/54	14.53
2	03.18	04.36	06.06	07.29 15.35-16.22/47	07.58 14.36-15.08/32	09.27 12.27-12.59/32
	23.30	22.15	20.33	18.50	16.09 12.10-13.05/55	14.52
3	03.19	04.39	06.09	07.31 15.34-16.23/49	08.02 14.39-15.06/27	09.30 12.29-12.59/30
	23.29	22.12	20.30	18.47	16.06 12.09-13.05/56	14.50
4	03.21	04.42	06.12	07.34 15.32-16.24/52	08.05 14.42-15.03/21	09.32 12.30-12.58/28
	23.27	22.09	20.26	18.43	16.03 12.10-13.05/55	14.48
5	03.23	04.45	06.14	07.37 15.31-16.25/54	08.08 14.46-14.58/12	09.34 12.31-12.57/26
	23.26	22.06	20.23	18.40	16.00 12.09-13.05/56	14.47
6	03.25	04.48	06.17	07.40 15.30-16.25/55	08.11 12.09-13.05/56	09.37 12.33-12.57/24
	23.24	22.03	20.19	18.37	15.57	14.45
7	03.27	04.51	06.20	07.42 15.29-16.26/57	08.14 12.09-13.06/57	09.39 12.35-12.56/21
	23.22	22.00	20.16	18.33	15.54	14.44
8	03.29	04.54	06.23	07.45 15.28-16.26/58	08.17 12.09-13.05/56	09.41 12.36-12.54/18
	23.21	21.56	20.12	18.30	15.51	14.43
9	03.31	04.57	06.25	07.48 15.26-16.25/59	08.20 12.09-13.06/57	09.43 12.38-12.53/15
	23.19	21.53	20.09	18.27	15.48	14.41
10	03.33	05.00	06.28	07.51 15.26-16.25/59	08.23 12.10-13.06/56	09.45 12.40-12.52/12
	23.17	21.50	20.06	18.23	15.45	14.40
11	03.35	05.03	06.31	07.54 15.25-16.25/60	08.26 12.10-13.06/56	09.47 12.43-12.51/8
	23.15	21.47	20.02	18.20	15.42	14.39
12	03.38	05.06	06.34	07.57 15.26-16.26/60	08.29 12.10-13.05/55	09.49
	23.12	21.43	19.59	18.16	15.39	14.39
13	03.40	05.09	06.36	07.59 15.25-16.26/61	08.32 12.10-13.05/55	09.50
	23.10	21.40	19.55	18.13	15.36	14.38
14	03.43	05.12	06.39	08.02 15.25-16.26/61	08.35 12.11-13.05/54	09.52
	23.08	21.37	19.52	18.10	15.33	14.37
15	03.45	05.14	06.42	08.05 15.24-16.26/62	08.38 12.11-13.05/54	09.53
	23.06	21.34	19.48	18.06	15.31	14.37
16	03.48	05.17	06.45	08.08 15.24-16.25/61	08.41 12.12-13.05/53	09.55
	23.03	21.30	19.45	18.03	15.28	14.36
17	03.50	05.20	06.47	08.11 15.24-16.25/61	08.44 12.13-13.05/52	09.56
	23.01	21.27	19.42	18.00	15.25	14.36
18	03.53	05.23	06.50	08.14 15.24-16.24/60	08.47 12.14-13.05/51	09.57
	22.58	21.24	19.38	17.57	15.23	14.36
19	03.56	05.26	06.53	08.17 15.24-16.24/60	08.50 12.14-13.05/51	09.58
	22.56	21.20	19.35	17.53 13.32-13.45/13	15.20	14.36
20	03.58	05.29	06.55	08.20 15.25-16.24/59	08.53 12.14-13.04/50	09.59
	22.53	21.17	19.31	17.50 13.27-13.50/23	15.18	14.36
21	04.01	05.32	06.58	08.23 15.25-16.23/58	08.56 12.15-13.03/48	10.00
	22.50	21.14	19.28	17.47 13.24-13.53/29	15.15	14.37
22	04.04	05.35	07.01	08.25 15.25-16.22/57	08.59 12.16-13.03/47	10.00
	22.47	21.10	19.24	17.43 13.21-13.55/34	15.13	14.37
23	04.07	05.38	07.04	08.28 15.25-16.21/56	09.02 12.17-13.03/46	10.01
	22.45	21.07	19.21	17.40 13.19-13.56/37	15.10	14.38
24	04.10	05.41	07.06	08.31 15.26-16.21/55	09.05 12.18-13.02/44	10.01
	22.42	21.04	19.18	17.37 13.18-13.58/40	15.08	14.38
25	04.13	05.43	07.09	07.34 14.27-15.20/53	09.08 12.19-13.03/44	10.01
	22.39	21.00	19.14	16.34 12.16-12.59/43	15.06	14.39
26	04.16	05.46	07.12 15.54-16.10/16	07.37 14.27-15.18/51	09.11 12.20-13.02/42	10.01
	22.36	20.57	19.11	16.31 12.14-13.00/46	15.04	14.40
27	04.18	05.49	07.15 15.49-16.14/25	07.40 14.29-15.18/49	09.14 12.21-13.02/41	10.01
	22.33	20.53	19.07	16.27 12.14-13.02/48	15.01	14.41
28	04.21	05.52	07.17 15.45-16.17/32	07.43 14.29-15.17/48	09.17 12.23-13.01/38	10.01
	22.30	20.50	19.04	16.24 12.12-13.02/50	14.59	14.42
29	04.24	05.55	07.20 15.43-16.19/36	07.46 14.30-15.15/45	09.19 12.24-13.01/37	10.01
	22.27	20.47	19.00	16.21 12.12-13.03/51	14.57	14.43
30	04.27	05.58	07.23 15.39-16.20/41	07.49 14.32-15.14/42	09.22 12.25-13.00/35	10.01
	22.24	20.43	18.57	16.18 12.11-13.03/52	14.55	14.45
31	04.30	06.00		07.52 14.33-15.12/39		10.00
	22.21	20.40		16.15 12.11-13.04/53		14.46
Potential sun hours	595	503	392	307	206	150
Sum of minutes with flicker	0	0	150	2211	1639	248

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

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10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January		February		March		April		May		June
1	09.59		08.57	11.23-12.22/59	07.29	16.41-17.02/21	06.44		05.03	20.05-20.19/14	03.33
	14.48		16.12	10.21-11.02/41	17.38		20.07		21.35		23.05
2	09.58		08.54	11.22-12.22/60	07.26	16.39-17.04/25	06.40		04.59	20.07-20.17/10	03.31
	14.50		16.15	10.21-11.02/41	17.41		20.10		21.38		23.07
3	09.57		08.51	11.21-12.22/61	07.22	16.39-17.05/26	06.37		04.56		03.29
	14.52		16.18	10.21-11.03/42	17.44		20.13		21.41		23.10
4	09.56		08.48	11.22-12.23/61	07.19	16.38-17.05/27	06.33		04.53		03.27
	14.54		16.22	10.21-11.02/41	17.47		20.16		21.44		23.12
5	09.55		08.45	11.21-12.23/62	07.16	16.38-17.06/28	06.30		04.50		03.25
	14.56		16.25	10.22-11.03/41	17.50		20.19		21.47		23.14
6	09.54		08.42	11.22-12.24/62	07.12	16.37-17.05/28	06.27		04.46		03.23
	14.58		16.28	10.21-11.02/41	17.53		20.21		21.50		23.17
7	09.53		08.39	11.21-12.23/62	07.09	16.37-17.05/28	06.23		04.43		03.21
	15.01		16.31	10.21-11.02/41	17.56		20.24		21.53		23.19
8	09.51		08.36	11.22-12.24/62	07.06	16.37-17.04/27	06.20		04.40		03.20
	15.03		16.34	10.22-11.02/40	17.59		20.27		21.56		23.21
9	09.50	11.39-11.51/12	08.33	11.22-12.24/62	07.02	16.37-17.04/27	06.16		04.37		03.18
	15.05		16.37	10.22-11.01/39	18.02		20.30		21.59		23.22
10	09.48	11.37-11.54/17	08.30	11.22-12.24/62	06.59	16.37-17.03/26	06.13		04.34		03.16
	15.08		16.40	10.23-11.01/38	18.05		20.33		22.02		23.24
11	09.47	11.35-11.57/22	08.27	11.22-12.24/62	06.55	16.38-17.02/24	06.09		04.31		03.15
	15.10		16.44	10.24-11.00/36	18.07		20.36		22.05		23.26
12	09.45	11.34-11.59/25	08.24	11.23-12.24/61	06.52	16.39-17.00/21	06.06		04.28		03.14
	15.13		16.47	10.25-11.00/35	18.10		20.39		22.08		23.27
13	09.43	11.32-12.01/29	08.21	11.22-12.23/61	06.49	16.41-16.59/18	06.03		04.25		03.13
	15.15		16.50	10.25-10.58/33	18.13		20.42		22.11		23.29
14	09.41	11.32-12.03/31	08.18	11.23-12.23/60	06.45	16.43-16.55/12	05.59	20.02-20.07/5	04.21		03.12
	15.18		16.53	10.27-10.58/31	18.16		20.45		22.14		23.30
15	09.39	11.31-12.05/34	08.14	11.23-12.23/60	06.42		05.56	20.00-20.10/10	04.18		03.11
	15.21	10.40-10.43/3	16.56	10.28-10.56/28	18.19		20.47		22.17		23.31
16	09.37	11.30-12.06/36	08.11	11.24-12.23/59	06.38		05.53	19.59-20.13/14	04.16		03.10
	15.24	10.36-10.45/9	16.59	10.30-10.54/24	18.22		20.50		22.20		23.32
17	09.35	11.29-12.08/39	08.08	11.24-12.22/58	06.35		05.49	19.58-20.16/18	04.13		03.10
	15.27	10.33-10.47/14	17.02	10.32-10.51/19	18.25		20.53		22.23		23.33
18	09.33	11.28-12.08/40	08.05	11.25-12.21/56	06.32		05.46	19.56-20.18/22	04.10		03.09
	15.29	10.29-10.49/20	17.05	10.36-10.48/12	18.27		20.56		22.26		23.34
19	09.30	11.28-12.10/42	08.02	11.25-12.20/55	06.28		05.42	19.55-20.21/26	04.07		03.09
	15.32	10.26-10.51/25	17.08		18.30		20.59		22.29		23.35
20	09.28	11.27-12.11/44	07.58	11.27-12.20/53	06.25		05.39	19.55-20.24/29	04.04		03.09
	15.35	10.24-10.52/28	17.11		18.33		21.02		22.32		23.35
21	09.26	11.27-12.13/46	07.55	11.27-12.18/51	06.21		05.36	19.55-20.25/30	04.01		03.09
	15.38	10.24-10.53/29	17.14		18.36		21.05		22.35		23.35
22	09.23	11.25-12.13/48	07.52	11.29-12.17/48	06.18		05.32	19.55-20.26/31	03.58		03.09
	15.41	10.24-10.55/31	17.17		18.39		21.08		22.38		23.36
23	09.21	11.25-12.15/50	07.49	11.30-12.15/45	06.15		05.29	19.55-20.26/31	03.56		03.09
	15.44	10.23-10.56/33	17.20		18.42		21.11		22.41		23.36
24	09.18	11.25-12.16/51	07.45	11.32-12.14/42	06.11		05.26	19.55-20.26/31	03.53		03.09
	15.47	10.23-10.57/34	17.23		18.45		21.14		22.44		23.36
25	09.16	11.24-12.17/53	07.42	11.33-12.11/38	06.08		05.22	19.55-20.25/30	03.50		03.10
	15.50	10.22-10.57/35	17.26		18.47		21.17		22.46		23.35
26	09.13	11.25-12.18/53	07.39	11.35-12.09/34	06.04		05.19	19.56-20.25/29	03.48		03.11
	15.53	10.22-10.59/37	17.29	16.45-16.52/7	18.50		21.20		22.49		23.35
27	09.10	11.24-12.18/54	07.36	11.38-12.06/28	06.01		05.16	19.57-20.24/27	03.45		03.11
	15.57	10.21-10.59/38	17.32	16.44-16.56/12	18.53		21.23		22.52		23.34
28	09.08	11.24-12.20/56	07.32	11.42-12.02/20	05.57		05.12	19.58-20.23/25	03.42		03.12
	16.00	10.21-11.00/39	17.35	16.41-16.58/17	18.56		21.26		22.55		23.34
29	09.05	11.23-12.20/57			06.54		05.09	19.59-20.22/23	03.40		03.14
	16.03	10.21-11.00/39			19.59		21.29		22.57		23.33
30	09.02	11.23-12.21/58			06.51		05.06	20.01-20.21/20	03.38		03.15
	16.06	10.21-11.01/40			20.02		21.32		23.00		23.32
31	08.59	11.22-12.21/59			06.47				03.35		
	16.09	10.21-11.01/40			20.04				23.03		
Potential sun hours	181		242		363		447		560		606
Sum of minutes with flicker		1450		2163		338		401		24	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August		September		October		November		December	
1	03.16	04.33		06.03		07.26	17.19-17.39/20	07.55	10.52-11.53/61	09.24	11.18-11.39/21
	23.31	22.18		20.36		18.54		16.12	09.53-10.31/38	14.53	
2	03.18	04.36		06.06		07.28	17.17-17.40/23	07.58	10.51-11.53/62	09.27	11.20-11.38/18
	23.30	22.15		20.33		18.50		16.09	09.53-10.32/39	14.52	
3	03.19	04.39		06.09		07.31	17.16-17.41/25	08.01	10.51-11.53/62	09.30	11.23-11.35/12
	23.29	22.12		20.30		18.47		16.06	09.52-10.32/40	14.50	
4	03.21	04.42		06.11		07.34	17.15-17.41/26	08.05	10.52-11.54/62	09.32	
	23.27	22.09		20.26		18.43		16.02	09.52-10.32/40	14.48	
5	03.23	04.45		06.14		07.37	17.14-17.41/27	08.08	10.51-11.53/62	09.34	
	23.26	22.06		20.23		18.40		15.59	09.51-10.32/41	14.47	
6	03.25	04.48		06.17		07.40	17.13-17.41/28	08.11	10.52-11.53/61	09.37	
	23.24	22.03		20.19		18.37		15.56	09.51-10.33/42	14.45	
7	03.26	04.51		06.20		07.42	17.12-17.41/29	08.14	10.52-11.54/62	09.39	
	23.22	21.59		20.16		18.33		15.53	09.51-10.33/42	14.44	
8	03.29	04.54		06.23		07.45	17.12-17.40/28	08.17	10.52-11.53/61	09.41	
	23.20	21.56		20.12		18.30		15.51	09.51-10.32/41	14.43	
9	03.31	04.57		06.25		07.48	17.12-17.40/28	08.20	10.53-11.53/60	09.43	
	23.19	21.53		20.09		18.26		15.48	09.51-10.33/42	14.41	
10	03.33	05.00	20.19-20.23/4	06.28		07.51	17.12-17.39/27	08.23	10.54-11.53/59	09.45	
	23.17	21.50		20.06		18.23		15.45	09.52-10.33/41	14.40	
11	03.35	05.03	20.14-20.26/12	06.31		07.54	17.13-17.38/25	08.26	10.53-11.52/59	09.47	
	23.14	21.47		20.02		18.20		15.42	09.52-10.33/41	14.39	
12	03.38	05.06	20.12-20.28/16	06.34		07.56	17.13-17.37/24	08.29	10.54-11.52/58	09.49	
	23.12	21.43		19.59		18.16		15.39	09.52-10.32/40	14.39	
13	03.40	05.09	20.08-20.29/21	06.36		07.59	12.19-12.31/12	08.32	10.55-11.52/57	09.50	
	23.10	21.40		19.55		18.13	17.14-17.33/19	15.36	09.53-10.32/39	14.38	
14	03.43	05.12	20.06-20.30/24	06.39		08.02	12.13-12.37/24	08.35	10.56-11.51/55	09.52	
	23.08	21.37		19.52		18.10	17.15-17.30/15	15.33	09.53-10.32/39	14.37	
15	03.45	05.14	20.05-20.31/26	06.42		08.05	12.09-12.40/31	08.38	10.57-11.51/54	09.53	
	23.05	21.34		19.48		18.06	17.17-17.27/10	15.31	09.54-10.32/38	14.37	
16	03.48	05.17	20.03-20.31/28	06.44		08.08	12.06-12.42/36	08.41	10.57-11.51/54	09.55	
	23.03	21.30		19.45		18.03	17.19-17.23/4	15.28	09.55-10.32/37	14.36	
17	03.50	05.20	20.02-20.31/29	06.47		08.11	12.04-12.44/40	08.44	10.58-11.51/53	09.56	
	23.01	21.27		19.42		18.00		15.25	09.56-10.31/35	14.36	
18	03.53	05.23	20.02-20.32/30	06.50		08.14	12.02-12.45/43	08.47	10.59-11.50/51	09.57	
	22.58	21.24		19.38		17.57		15.23	09.57-10.31/34	14.36	
19	03.56	05.26	20.00-20.31/31	06.53		08.17	12.00-12.47/47	08.50	10.59-11.49/50	09.58	
	22.55	21.20		19.35		17.53		15.20	09.58-10.31/33	14.36	
20	03.58	05.29	20.00-20.31/31	06.55		08.20	11.59-12.48/49	08.53	11.00-11.48/48	09.59	
	22.53	21.17		19.31		17.50		15.18	09.58-10.29/31	14.36	
21	04.01	05.32	19.59-20.30/31	06.58		08.22	11.58-12.49/51	08.56	11.02-11.48/46	10.00	
	22.50	21.14		19.28		17.47		15.15	09.59-10.28/29	14.37	
22	04.04	05.35	19.59-20.30/31	07.01		08.25	11.56-12.50/54	08.59	11.03-11.47/44	10.00	
	22.47	21.10		19.24		17.43		15.13	10.00-10.28/28	14.37	
23	04.07	05.38	20.00-20.28/28	07.04		08.28	11.55-12.50/55	09.02	11.04-11.46/42	10.01	
	22.45	21.07		19.21		17.40		15.10	10.02-10.27/25	14.37	
24	04.10	05.40	19.59-20.24/25	07.06		08.31	11.55-12.52/57	09.05	11.05-11.46/41	10.01	
	22.42	21.04		19.17		17.37	11.05-11.19/14	15.08	10.06-10.26/20	14.38	
25	04.13	05.43	20.00-20.21/21	07.09		07.34	10.54-11.52/58	09.08	11.07-11.45/38	10.01	
	22.39	21.00		19.14		16.34	10.01-10.22/21	15.06	10.11-10.26/15	14.39	
26	04.15	05.46	19.59-20.18/19	07.12		07.37	10.53-11.52/59	09.11	11.08-11.44/36	10.01	
	22.36	20.57		19.11		16.31	09.59-10.24/25	15.03	10.15-10.24/9	14.40	
27	04.18	05.49	20.00-20.15/15	07.15		07.40	10.53-11.53/60	09.14	11.10-11.44/34	10.01	
	22.33	20.53		19.07		16.27	09.58-10.26/28	15.01	10.19-10.22/3	14.41	
28	04.21	05.52	20.02-20.12/10	07.17		07.43	10.52-11.53/61	09.16	11.12-11.43/31	10.01	
	22.30	20.50		19.04		16.24	09.56-10.27/31	14.59		14.42	
29	04.24	05.55	20.03-20.08/5	07.20	17.24-17.34/10	07.46	10.52-11.53/61	09.19	11.14-11.42/28	10.01	
	22.27	20.47		19.00		16.21	09.55-10.29/34	14.57		14.43	
30	04.27	05.57		07.23	17.21-17.37/16	07.49	10.52-11.53/61	09.22	11.15-11.41/26	10.01	
	22.24	20.43		18.57		16.18	09.54-10.29/35	14.55		14.45	
31	04.30	06.00				07.52	10.51-11.53/62			10.00	
	22.21	20.40				16.15	09.54-10.31/37			14.46	
Potential sun hours	595	503		392		308		206		150	
Sum of minutes with flicker	0	437		26		1504		2419		51	

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 10 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (281)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44 18.57-19.06/9	05.03	03.33	03.16	04.33	06.03	07.26 17.52-18.16/24	07.56	09.25
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29 17.52-18.13/21	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31 17.53-18.09/16	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34 17.53-18.06/13	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37 17.54-18.02/8	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40 17.56-17.59/3	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09 17.20-17.21/1	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06 17.18-17.23/5	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02 17.16-17.27/11	06.17	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59 17.15-17.29/14	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56 17.14-17.33/19	06.10	04.31	03.15	03.35	05.03	06.31 18.50-18.58/8	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52 17.13-17.35/22	06.06	04.28	03.14	03.38	05.06	06.34 18.46-19.00/14	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49 17.13-17.39/26	06.03	04.25	03.13	03.40	05.09	06.36 18.44-19.02/18	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.12	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45 17.13-17.41/28	05.59	04.22	03.12	03.43	05.12	06.39 18.43-19.03/20	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.30	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42 17.12-17.40/28	05.56	04.19	03.11	03.45	05.15	06.42 18.41-19.03/22	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39 17.12-17.40/28	05.53	04.16	03.10	03.48	05.18	06.45 18.41-19.03/22	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35 17.12-17.39/27	05.49	04.13	03.10	03.50	05.20	06.47 18.40-19.03/23	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32 17.12-17.38/26	05.46	04.10	03.09	03.53	05.23	06.50 18.39-19.01/22	08.14	08.48	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28 17.12-17.37/25	05.43	04.07	03.09	03.56	05.26	06.53 18.39-18.58/19	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25 17.57-17.59/2	05.39	04.04	03.09	03.59	05.29	06.56 18.39-18.55/16	08.20	08.54	09.59
	15.35	17.11	18.33 17.14-17.36/22	21.02	22.32	23.35	22.53	21.17	19.31 18.08-18.13/5	17.50	15.18	14.36
21	09.26	07.55	06.22 17.55-18.02/7	05.36	04.01	03.09	04.01	05.32	06.58 18.39-18.51/12	08.23	08.57	10.00
	15.38	17.15	18.36 17.14-17.34/20	21.05	22.35	23.36	22.50	21.14	19.28 18.03-18.17/14	17.47	15.15	14.37
22	09.24	07.52	06.18 17.54-18.05/11	05.32	03.58	03.09	04.04	05.35	07.01 18.39-18.47/8	08.26	09.00	10.01
	15.41	17.18	18.39 17.17-17.32/15	21.08	22.38	23.36	22.48	21.10	19.25 18.00-18.18/18	17.44	15.13	14.37
23	09.21	07.49	06.15 17.53-18.07/14	05.29	03.56	03.09	04.07	05.38	07.04 18.40-18.44/4	08.29	09.03	10.01
	15.44	17.21	18.42 17.19-17.28/9	21.11	22.41	23.36	22.45	21.07	19.21 17.58-18.20/22	17.40	15.10	14.38
24	09.19	07.46	06.11 17.52-18.11/19	05.26	03.53	03.09	04.10	05.41	07.07 17.57-18.21/24	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 17.51-18.13/22	05.22	03.50	03.10	04.13	05.43	07.09 17.55-18.20/25	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 17.52-18.15/23	05.19	03.48	03.11	04.16	05.46	07.12 17.54-18.21/27	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01 17.52-18.15/23	05.16	03.45	03.12	04.19	05.49	07.15 17.53-18.21/28	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.28	15.01	14.41
28	09.08	07.33	05.58 17.52-18.13/21	05.13	03.43	03.12	04.21	05.52	07.18 17.53-18.21/28	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54 18.52-19.12/20	05.09	03.40	03.14	04.24	05.55	07.20 17.53-18.21/28	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51 18.53-19.10/17	05.06	03.38	03.15	04.27	05.58	07.23 17.52-18.19/27	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47 18.55-19.09/14		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	519	9	0	0	0	0	454	85	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 11 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (279)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.08	21.35	23.06	23.32	22.19	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.16	17.42	20.10	21.38	23.08	23.30	22.16	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.32	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.55	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.25	22.03	20.20	18.37	15.57	14.45
7	09.53	08.40	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.46	08.17	09.41
	15.03	16.34	17.59	20.28	21.57	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.18	03.31	04.57	06.26	07.48	08.20	09.44
	15.05	16.38	18.02	20.30	22.00	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.46
	15.08	16.41	18.05	20.33	22.03	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.37	08.00	08.33	09.51
	15.16	16.50	18.14	20.42	22.12	23.29	23.11	21.40	19.56	18.13	15.36	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.36	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.04	21.31	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.48	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.58
	15.30	17.05	18.28	20.57	22.27	23.35	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.59
	15.32	17.09	18.31	21.00	22.30	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.35	17.12	18.33	21.02	22.33	23.36	22.53	21.17	19.32	17.50	15.18	14.36
21	09.26	07.56	06.22	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.51	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.33	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.06	10.02
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.43	06.08	05.23	03.50	03.10	04.13	05.44	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.50	23.36	22.37	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.34	20.54	19.08	16.28	15.01	14.41
28	09.08	07.33	05.58	05.13	03.43	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.44	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.01		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 12 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (280)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44 19.01-19.21/20	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.07	21.35	23.05	23.31	22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40 19.01-19.19/18	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37 19.03-19.17/14	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34 19.04-19.14/10	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23 19.00-19.09/9	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18	03.31	04.57	06.26 18.56-19.11/15	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28 18.54-19.12/18	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.03	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31 18.53-19.13/20	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34 18.51-19.13/22	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.37 18.51-19.14/23	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.56	18.13	15.36	14.38
14	09.41	08.18	06.46	05.59	04.22	03.12	03.43	05.12	06.39 18.50-19.14/24	08.02	08.36	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42 18.49-19.11/22	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45 18.49-19.08/19	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.31	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47 18.49-19.05/16	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50 18.49-19.01/12	08.14	08.48	09.57
	15.30	17.05	18.28	20.57	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53 18.50-18.58/8	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.30	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56 18.51-18.55/4	08.20	08.54	09.59
	15.35	17.12	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.56	06.22	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15 18.04-18.07/3	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.19	07.46	06.11 18.03-18.11/8	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 18.01-18.13/12	05.22	03.50	03.10	04.13	05.43	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 18.01-18.16/15	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01 18.01-18.19/18	05.16	03.45	03.11	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.28	15.01	14.41
28	09.08	07.33	05.58 18.00-18.21/21	05.13	03.43	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54 19.00-19.23/23	05.09	03.40	03.14	04.24	05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51 18.59-19.22/23	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47 19.00-19.22/22		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	145	62	0	0	0	0	212	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 13 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (278)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.08	21.35	23.05	23.31	22.19	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.16	17.42	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.32	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.28	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18	03.31	04.57	06.26	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.14	20.42	22.12	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.36	09.52
	15.18	16.53	18.16	20.45	22.15	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.31	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.21	06.48	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.57	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.54	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.01	03.09	04.02	05.32	06.58	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.33	03.59	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.42	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.11	14.38
24	09.19	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.43	06.08	05.23	03.50	03.10	04.13	05.44	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.34	20.54	19.08	16.28	15.02	14.41
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	15.00	14.42
29	09.05		06.54	05.09	03.40	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.25	20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36		04.30	06.01		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.47
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 14 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (277)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33 21.15-21.33/18	03.16 04.20-04.55/35	04.33 21.24-21.31/7	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.07	21.35	23.05 04.27-04.47/20	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31 21.16-21.32/16	03.18 04.21-04.55/34	04.36 21.26-21.29/3	06.06	07.29	07.59	09.27
	14.50	16.16	17.41	20.10	21.38	23.08 04.25-04.47/22	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29 21.17-21.32/15	03.19 04.22-04.55/33	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10 04.24-04.47/23	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27 21.17-21.31/14	03.21 21.28-21.34/6	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12 04.23-04.48/25	23.27 04.23-04.55/32	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25 21.18-21.31/13	03.23 21.27-21.35/8	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15 04.21-04.48/27	23.26 04.24-04.54/30	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23 21.19-21.30/11	03.25 21.26-21.37/11	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17 04.20-04.48/28	23.24 04.26-04.55/29	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.21-21.30/9	03.27 21.25-21.37/12	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19 04.19-04.49/30	23.22 04.27-04.54/27	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20 21.22-21.29/7	03.29 21.25-21.39/14	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21 04.18-04.49/31	23.21 04.29-04.55/26	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18 21.24-21.27/3	03.31 21.24-21.39/15	04.57	06.26	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23 04.17-04.49/32	23.19 04.31-04.55/24	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34 21.16-21.17/1	03.17 04.16-04.49/33	03.33 21.24-21.40/16	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17 04.32-04.54/22	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31 21.14-21.19/5	03.15 04.16-04.50/34	03.36 21.23-21.41/18	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15 04.34-04.55/21	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28 21.14-21.22/8	03.14 04.15-04.50/35	03.38 21.23-21.42/19	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.28	23.13 04.36-04.55/19	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25 21.12-21.24/12	03.13 04.14-04.50/36	03.40 21.22-21.41/19	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.11	23.29	23.10 04.38-04.54/16	21.40	19.56	18.13	15.36	14.38
14	09.41	08.18	06.46	06.00	04.22 21.12-21.27/15	03.12 04.14-04.51/37	03.43 21.22-21.42/20	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08 04.40-04.54/14	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19 21.11-21.29/18	03.11 04.13-04.51/38	03.45 21.21-21.43/22	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06 04.42-04.54/12	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16 21.11-21.32/21	03.10 04.13-04.51/38	03.48 21.21-21.43/22	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.20	23.33	23.03 04.44-04.53/9	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13 21.10-21.34/24	03.10 04.13-04.52/39	03.51 21.21-21.44/23	05.21	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.23	23.33	23.01 04.46-04.53/7	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10 21.10-21.35/25	03.09 04.13-04.52/39	03.53 21.20-21.44/24	05.23	06.50	08.14	08.48	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58 04.48-04.52/4	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.43	04.07 21.11-21.35/24	03.09 04.13-04.52/39	03.56 21.21-21.45/24	05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56 04.50-04.51/1	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 21.10-21.35/25	03.09 04.13-04.52/39	03.59 21.21-21.45/24	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.01 21.10-21.35/25	03.09 04.13-04.52/39	04.02 21.21-21.45/24	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.33	03.59 21.10-21.35/25	03.09 04.13-04.52/39	04.04 21.20-21.45/25	05.35	07.01	08.26	09.00	10.00
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56 21.11-21.35/24	03.09 04.14-04.53/39	04.07 21.20-21.45/25	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53 21.11-21.35/24	03.10 04.14-04.53/39	04.10 21.21-21.46/25	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.23	03.50 21.11-21.35/24	03.10 04.15-04.54/39	04.13 21.21-21.45/24	05.44	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47 04.39-04.41/2	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.05	05.19	03.48 21.12-21.35/23	03.11 04.15-04.53/38	04.16 21.21-21.45/24	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.49 04.37-04.42/5	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45 21.12-21.34/22	03.12 04.16-04.54/38	04.19 21.21-21.44/23	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52 04.35-04.43/8	23.35	22.33	20.54	19.07	16.28	15.02	14.41
28	09.08	07.33	05.58	05.13	03.43 21.12-21.34/22	03.13 04.17-04.54/37	04.22 21.21-21.41/20	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55 04.34-04.45/11	23.34	22.30	20.50	19.04	16.24	15.00	14.42
29	09.05		06.54	05.09	03.40 21.14-21.34/20	03.14 04.18-04.54/36	04.25 21.22-21.39/17	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58 04.32-04.45/13	23.33	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38 21.14-21.34/20	03.15 04.18-04.54/36	04.27 21.22-21.36/14	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00 04.30-04.45/15	23.32	22.25	20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36 21.14-21.33/19		04.30 21.24-21.34/10	06.01		07.53		10.00
	16.09		20.05		23.03 04.28-04.46/18		22.21	20.40		16.15		14.47
Potential sun hours	181	242	363	447	560	606	595	503	392	308	206	150
Sum of minutes with flicker	0	0	0	0	498	1131	923	10	0	0	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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 15 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February		March		April	May		June	
1	09.59	08.57		07.29	16.37-17.01/24	06.44	05.03		03.33	22.00-22.07/7
	14.49	16.12		17.38		20.07	21.35		23.05	05.05-05.06/1
2	09.59	08.54		07.26	16.37-17.00/23	06.40	04.59		03.31	21.59-22.08/9
	14.50	16.16		17.41		20.10	21.38		23.08	
3	09.58	08.51		07.23	16.37-17.00/23	06.37	04.56		03.29	21.59-22.10/11
	14.52	16.19		17.44		20.13	21.41		23.10	
4	09.57	08.48		07.19	16.37-16.58/21	06.34	04.53		03.27	21.58-22.11/13
	14.54	16.22		17.47		20.16	21.44		23.12	
5	09.55	08.45		07.16	16.39-16.58/19	06.30	04.50		03.25	21.58-22.13/15
	14.56	16.25		17.50		20.19	21.47		23.15	
6	09.54	08.42		07.12	16.40-16.56/16	06.27	04.47		03.23	21.58-22.15/17
	14.58	16.28		17.53		20.22	21.50		23.17	
7	09.53	08.39		07.09	16.42-16.54/12	06.23	04.43		03.21	21.58-22.16/18
	15.01	16.31		17.56		20.25	21.53		23.19	04.19-04.20/1
8	09.52	08.36	15.47-15.51/4	07.06		06.20	04.40	05.20-05.23/3	03.20	21.58-22.18/20
	15.03	16.34		17.59		20.27	21.56		23.21	04.18-04.21/3
9	09.50	08.33	15.46-15.54/8	07.02		06.17	04.37	05.17-05.24/7	03.18	21.58-22.19/21
	15.05	16.38		18.02		20.30	21.59		23.23	04.17-04.21/4
10	09.48	08.30	15.46-15.58/12	06.59		06.13	04.34	05.14-05.24/10	03.17	21.58-22.20/22
	15.08	16.41		18.05		20.33	22.02		23.24	04.16-04.21/5
11	09.47	08.27	15.45-16.01/16	06.56		06.10	04.31	05.12-05.25/13	03.15	21.58-22.21/23
	15.10	16.44		18.08		20.36	22.05		23.26	04.16-04.23/7
12	09.45	08.24	15.45-16.05/20	06.52		06.06	04.28	05.09-05.24/15	03.14	21.59-22.23/24
	15.13	16.47		18.11		20.39	22.08		23.28	04.15-04.23/8
13	09.43	08.21	15.44-16.08/24	06.49		06.03	04.25	05.06-05.24/18	03.13	21.58-22.23/25
	15.16	16.50		18.13		20.42	22.11		23.29	04.14-04.22/8
14	09.41	08.18	15.44-16.11/27	06.45		05.59	04.22	05.04-05.25/21	03.12	21.59-22.25/26
	15.18	16.53		18.16		20.45	22.14		23.30	04.14-04.23/9
15	09.39	08.15	15.44-16.10/26	06.42		05.56	04.19	05.01-05.24/23	03.11	21.59-22.25/26
	15.21	16.56		18.19		20.48	22.17		23.31	04.13-04.23/10
16	09.37	08.11	15.45-16.11/26	06.39		05.53	04.16	04.59-05.24/25	03.10	21.59-22.26/27
	15.24	16.59		18.22		20.51	22.20		23.32	04.13-04.24/11
17	09.35	08.08	15.44-16.10/26	06.35		05.49	04.13	04.57-05.25/28	03.10	21.59-22.27/28
	15.27	17.02		18.25		20.53	22.23		23.33	04.13-04.24/11
18	09.33	08.05	15.45-16.10/25	06.32		05.46	04.10	04.54-05.24/30	03.09	22.00-22.28/28
	15.30	17.05		18.28		20.56	22.26		23.34	04.13-04.24/11
19	09.31	08.02	15.46-16.09/23	06.28		05.43	04.07	04.54-05.24/30	03.09	21.59-22.28/29
	15.33	17.08		18.31		20.59	22.29		23.35	04.13-04.25/12
20	09.28	07.59	15.47-16.08/21	06.25		05.39	04.04	04.54-05.23/29	03.09	22.00-22.28/28
	15.35	17.12		18.33		21.02	22.32		23.35	04.13-04.25/12
21	09.26	07.55	15.48-16.06/18	06.22		05.36	04.01	04.53-05.22/29	03.09	22.00-22.29/29
	15.38	17.15		18.36		21.05	22.35		23.36	04.13-04.25/12
22	09.23	07.52	15.50-16.05/15	06.18		05.32	03.58	04.54-05.21/27	03.09	22.00-22.29/29
	15.41	17.18		18.39		21.08	22.38		23.36	04.13-04.25/12
23	09.21	07.49	16.41-16.43/2	06.15		05.29	03.56	04.55-05.21/26	03.09	22.00-22.28/28
	15.44	17.21	15.53-16.01/8	18.42		21.11	22.41		23.36	04.14-04.26/12
24	09.18	07.46	16.40-16.46/6	06.11		05.26	03.53	04.55-05.20/25	03.10	22.01-22.29/28
	15.47	17.24		18.45		21.14	22.44		23.36	04.14-04.26/12
25	09.16	07.42	16.39-16.49/10	06.08		05.22	03.50	04.56-05.19/23	03.10	22.01-22.28/27
	15.51	17.27		18.48		21.17	22.47		23.36	04.15-04.26/11
26	09.13	07.39	16.38-16.53/15	06.04		05.19	03.48	04.56-05.17/21	03.11	22.01-22.28/27
	15.54	17.30		18.50		21.20	22.49		23.35	04.15-04.26/11
27	09.11	07.36	16.37-16.56/19	06.01		05.16	03.45	04.57-05.13/16	03.12	22.02-22.29/27
	15.57	17.33		18.53		21.23	22.52		23.35	04.16-04.26/10
28	09.08	07.32	16.38-16.59/21	05.58		05.13	03.43	04.59-05.13/14	03.13	22.01-22.27/26
	16.00	17.36		18.56		21.26	22.55		23.34	04.17-04.27/10
29	09.05			06.54		05.09	03.40	04.59-05.12/13	03.14	22.02-22.27/25
	16.03			19.59		21.29	22.57		23.33	04.18-04.27/9
30	09.02			06.51		05.06	03.38	22.01-22.03/2	03.15	22.02-22.27/25
	16.06			20.02		21.32	23.00	05.00-05.11/11	23.32	04.18-04.26/8
31	09.00			06.47			03.36	22.00-22.05/5		
	16.09			20.05			23.03	05.02-05.09/7		
Potential sun hours	181	242		363		447	560		606	
Sum of minutes with flicker	0	372		138		0	471		908	

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

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Calculated:
10.11.2023 9.40/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest WTG: 15 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August	September	October	November	December
1	03.16 22.02-22.26/24	04.33 05.20-05.34/14	06.03	07.26	07.56 15.15-15.27/12	09.25
	23.31 04.20-04.27/7	22.18	20.37	18.54	16.12	14.54
2	03.18 22.03-22.25/22	04.36 05.23-05.35/12	06.06	07.29	07.59 15.16-15.23/7	09.27
	23.30 04.21-04.27/6	22.15	20.33	18.50	16.09	14.52
3	03.19 22.04-22.25/21	04.39 05.25-05.34/9	06.09	07.31	08.02 15.17-15.19/2	09.30
	23.29 04.22-04.27/5	22.12	20.30	18.47	16.06	14.50
4	03.21 22.04-22.24/20	04.42 05.28-05.33/5	06.12	07.34	08.05	09.32
	23.27 04.23-04.26/3	22.09	20.26	18.44	16.03	14.48
5	03.23 22.04-22.22/18	04.45 05.30-05.32/2	06.14	07.37	08.08	09.35
	23.26 04.24-04.26/2	22.06	20.23	18.40	16.00	14.47
6	03.25 22.05-22.22/17	04.48	06.17	07.40 17.21-17.29/8	08.11	09.37
	23.24	22.03	20.19	18.37	15.57	14.45
7	03.27 22.05-22.20/15	04.51	06.20	07.43 17.17-17.31/14	08.14	09.39
	23.22	22.00	20.16	18.33	15.54	14.44
8	03.29 22.06-22.20/14	04.54	06.23	07.45 17.15-17.33/18	08.17	09.41
	23.21	21.56	20.13	18.30	15.51	14.43
9	03.31 22.06-22.18/12	04.57	06.25	07.48 17.13-17.33/20	08.20	09.43
	23.19	21.53	20.09	18.27	15.48	14.42
10	03.33 22.07-22.17/10	05.00	06.28	07.51 17.12-17.33/21	08.23	09.45
	23.17	21.50	20.06	18.23	15.45	14.41
11	03.35 22.08-22.15/7	05.03	06.31	07.54 17.11-17.34/23	08.26	09.47
	23.15	21.47	20.02	18.20	15.42	14.40
12	03.38 22.09-22.14/5	05.06	06.34	07.57 17.11-17.35/24	08.29	09.49
	23.12 05.11-05.17/6	21.44	19.59	18.17	15.39	14.39
13	03.40 22.09-22.12/3	05.09	06.36	08.00 17.11-17.34/23	08.32	09.51
	23.10 05.10-05.19/9	21.40	19.55	18.13	15.36	14.38
14	03.43 05.09-05.20/11	05.12	06.39	08.02 17.10-17.31/21	08.35	09.52
	23.08	21.37	19.52	18.10	15.34	14.37
15	03.45 05.08-05.22/14	05.15	06.42	08.05 17.10-17.27/17	08.38	09.54
	23.06	21.34	19.49	18.07	15.31	14.37
16	03.48 05.07-05.23/16	05.18	06.45	08.08 17.10-17.23/13	08.41	09.55
	23.03	21.30	19.45	18.03	15.28	14.37
17	03.51 05.07-05.25/18	05.20	06.47	08.11 17.11-17.20/9	08.45	09.56
	23.01	21.27	19.42	18.00	15.26	14.36
18	03.53 05.06-05.28/22	05.23	06.50	08.14 17.11-17.16/5	08.48	09.57
	22.58	21.24	19.38	17.57	15.23	14.36
19	03.56 05.05-05.29/24	05.26	06.53	08.17 16.22-16.33/11	08.51	09.58
	22.56	21.20	19.35	17.53	15.20	14.36
20	03.59 05.05-05.30/25	05.29	06.56	08.20 16.20-16.36/16	08.54	09.59
	22.53	21.17	19.31	17.50	15.18	14.36
21	04.01 05.04-05.31/27	05.32	06.58	08.23 16.18-16.38/20	08.57	10.00
	22.50	21.14	19.28	17.47	15.15	14.37
22	04.04 05.04-05.32/28	05.35	07.01	08.26 16.17-16.38/21	08.59	10.00
	22.48	21.10	19.25	17.44	15.13	14.37
23	04.07 05.04-05.33/29	05.38	07.04	08.29 16.15-16.39/24	09.02	10.01
	22.45	21.07	19.21	17.40	15.11	14.38
24	04.10 05.04-05.34/30	05.41	07.07	08.32 16.15-16.40/25	09.05	10.01
	22.42	21.04	19.18	17.37	15.08	14.38
25	04.13 05.03-05.34/31	05.43	07.09	07.34 15.14-15.40/26	09.08	10.01
	22.39	21.00	19.14	16.34	15.06	14.39
26	04.16 05.06-05.35/29	05.46	07.12	07.37 15.14-15.40/26	09.11	10.02
	22.36	20.57	19.11	16.31	15.04	14.40
27	04.19 05.08-05.35/27	05.49	07.15	07.40 15.14-15.41/27	09.14	10.02
	22.33	20.54	19.07	16.28	15.02	14.41
28	04.22 05.11-05.35/24	05.52	07.18	07.43 15.14-15.40/26	09.17	10.01
	22.30	20.50	19.04	16.24	14.59	14.42
29	04.24 05.13-05.35/22	05.55	07.20	07.46 15.14-15.38/24	09.19	10.01
	22.27	20.47	19.01	16.21	14.57	14.44
30	04.27 05.15-05.35/20	05.58	07.23	07.49 15.14-15.34/20	09.22	10.01
	22.24	20.43	18.57	16.18	14.55	14.45
31	04.30 05.18-05.35/17	06.00		07.53 15.15-15.31/16		10.00
	22.21	20.40		16.15		14.47
Potential sun hours	595	503	392	308	206	150
Sum of minutes with flicker	640	42	0	498	21	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

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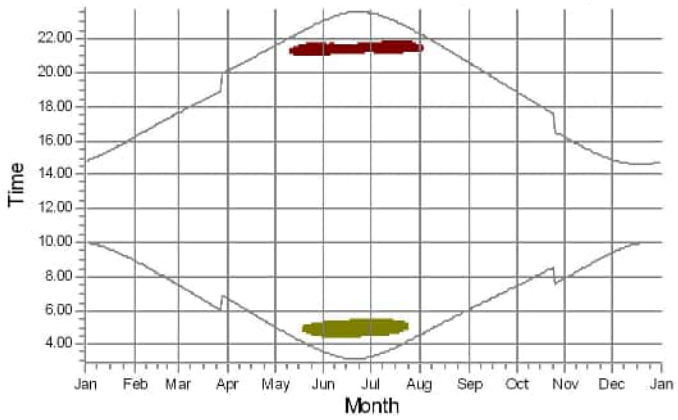
Calculated:
10.11.2023 9.40/3.6.355

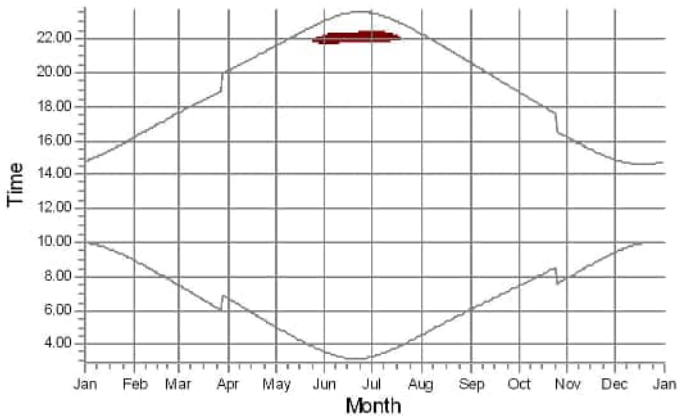
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

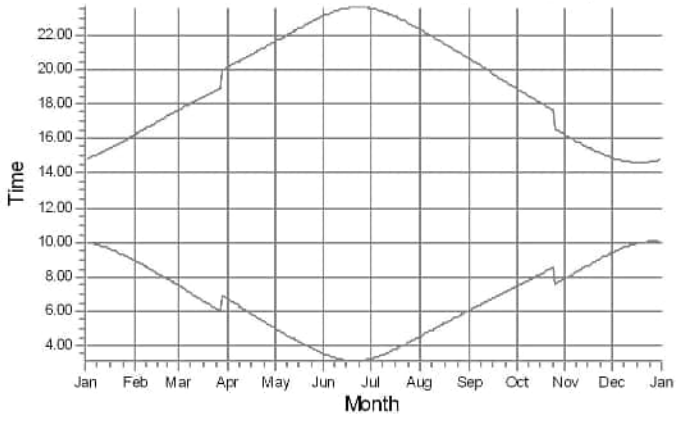
1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



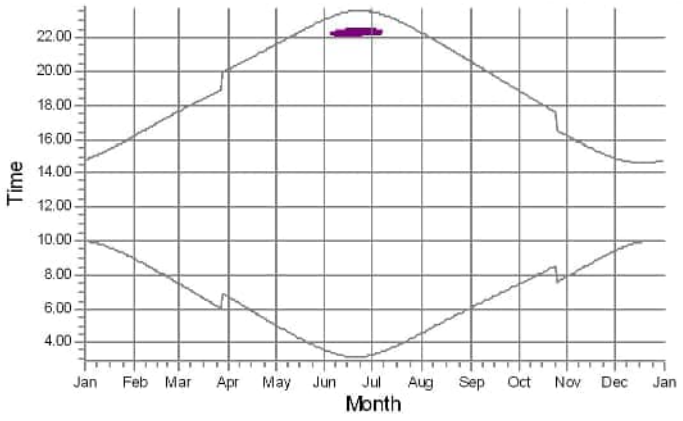
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



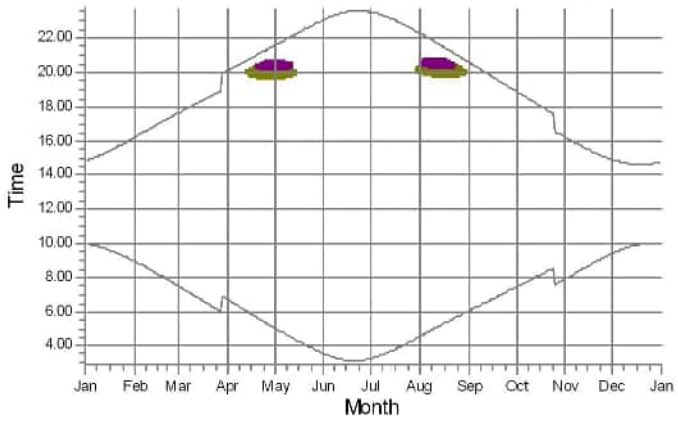
3: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



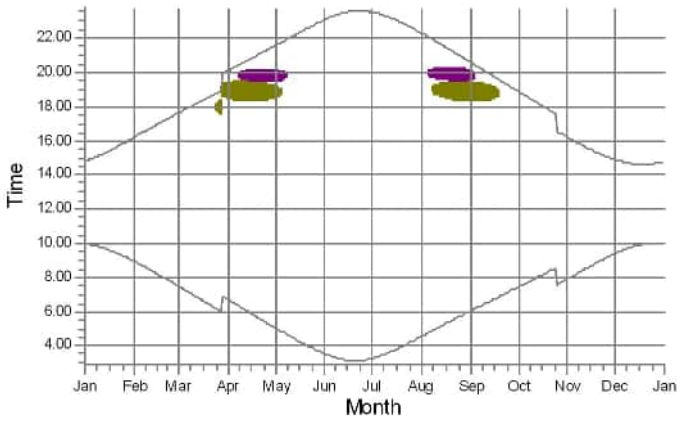
4: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



5: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



Shadow receptors

H: Laskentapiste_H (Lepola)

J: Laskentapiste_J (Ritaviita)

K: Laskentapiste_K (Ritaviita2)

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Calculated:
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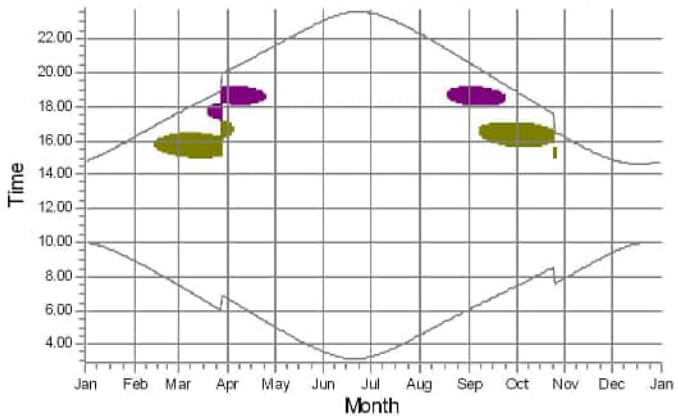
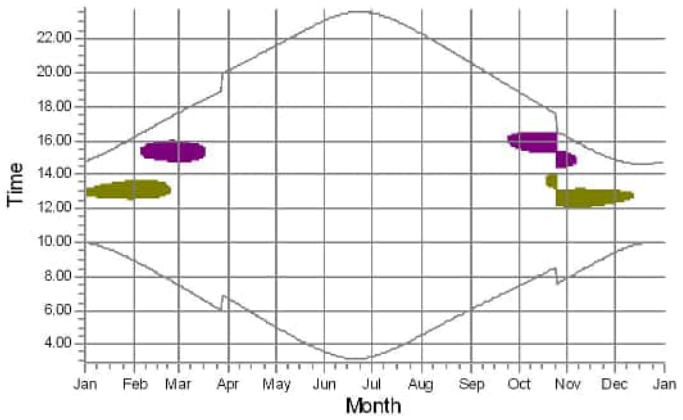
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

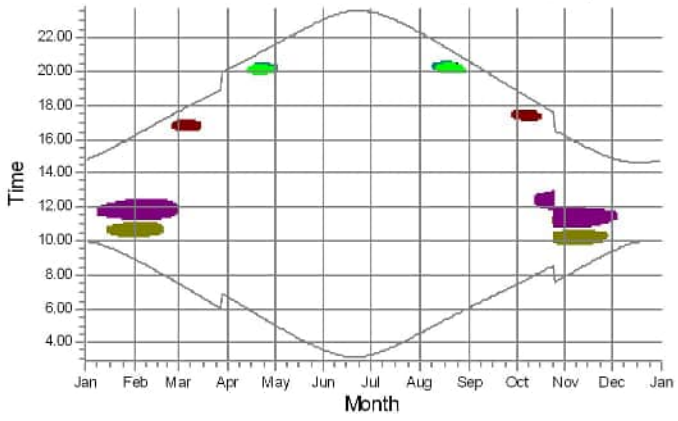
7: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



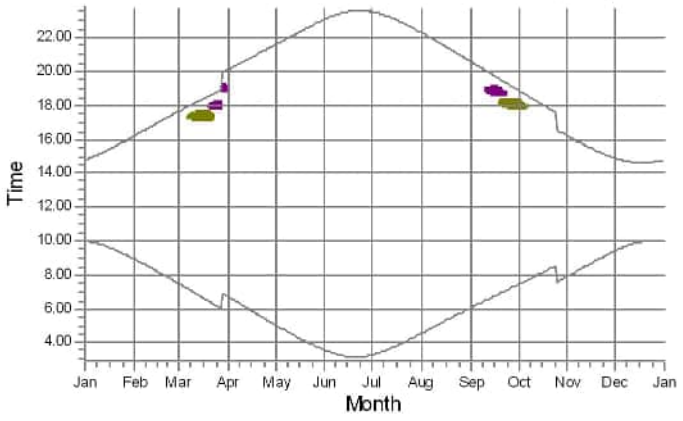
8: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



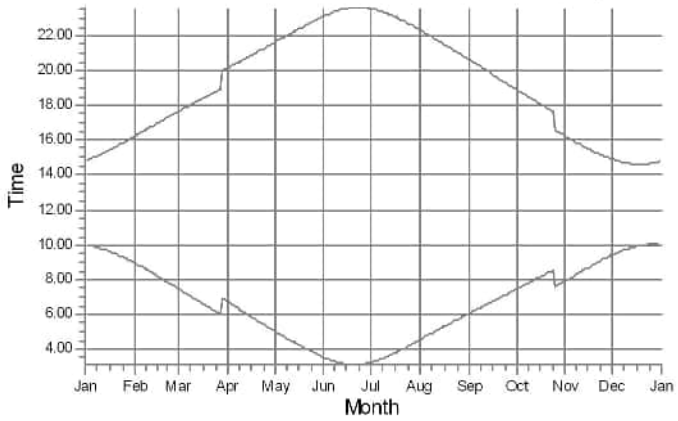
9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



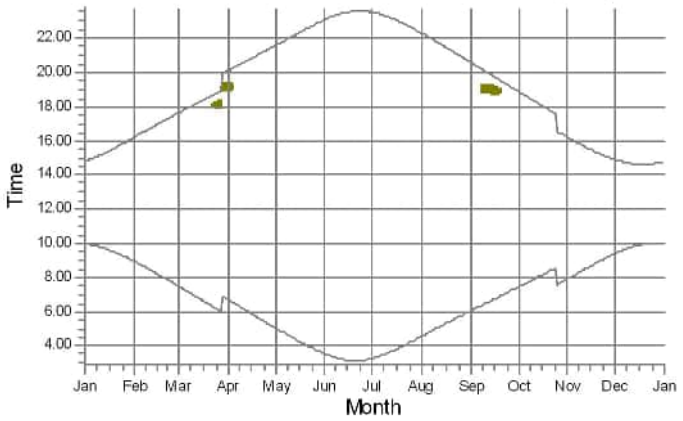
10: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



11: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



12: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



Shadow receptors

- F: Laskentapiste_F (Kalliomäki)
- G: Laskentapiste_G (Alapelto)
- H: Laskentapiste_H (Lepola)
- I: Laskentapiste_I (Kalliomäki)
- J: Laskentapiste_J (Ritaviita)
- K: Laskentapiste_K (Ritaviita2)

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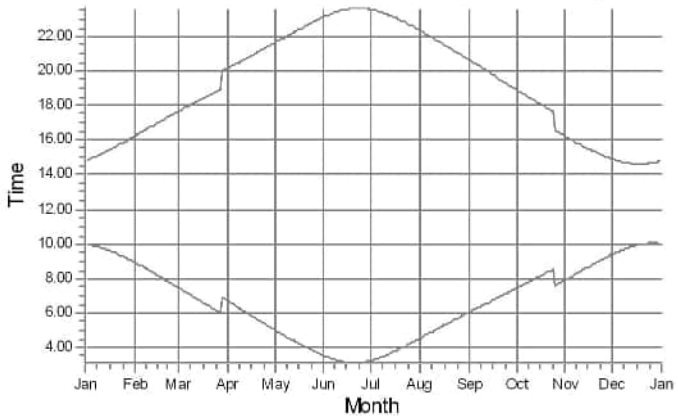
Calculated:
10.11.2023 9.40/3.6.355

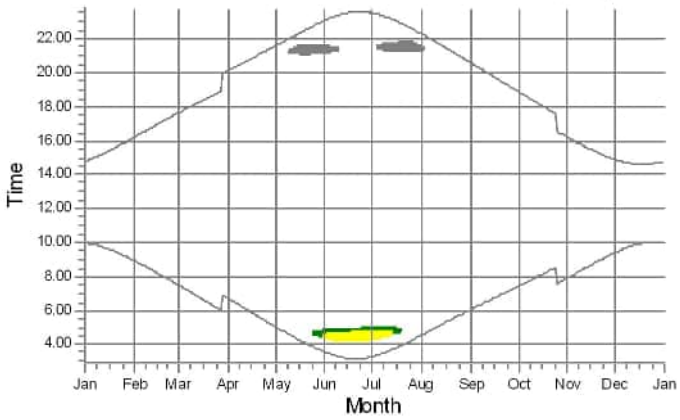
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest

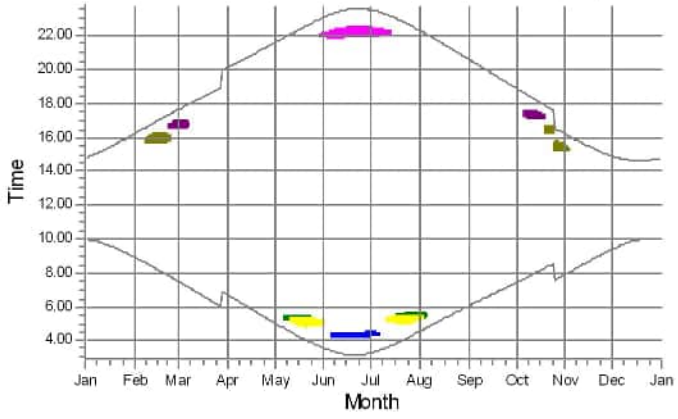
13: Generic RD250 HH200 b.V172 10000 250.0 IO! hub: 200,0 m (TOT: 32



14: Generic RD250 HH200 b.V172 10000 250.0 IO! hub: 200,0 m (TOT: 32



15: Generic RD250 HH200 b.V172 10000 250.0 IO! hub: 200,0 m (TOT: 32



Shadow receptors

A: Laskentapiste_A (Harjunpää)	D: Laskentapiste_D (Ylä-Leskinen)	K: Laskentapiste_K (Ritaviita2)
B: Laskentapiste_B (Harjunpää)	E: Laskentapiste_E (Leskinen)	
C: Laskentapiste_C (Autio)	J: Laskentapiste_J (Ritaviita)	

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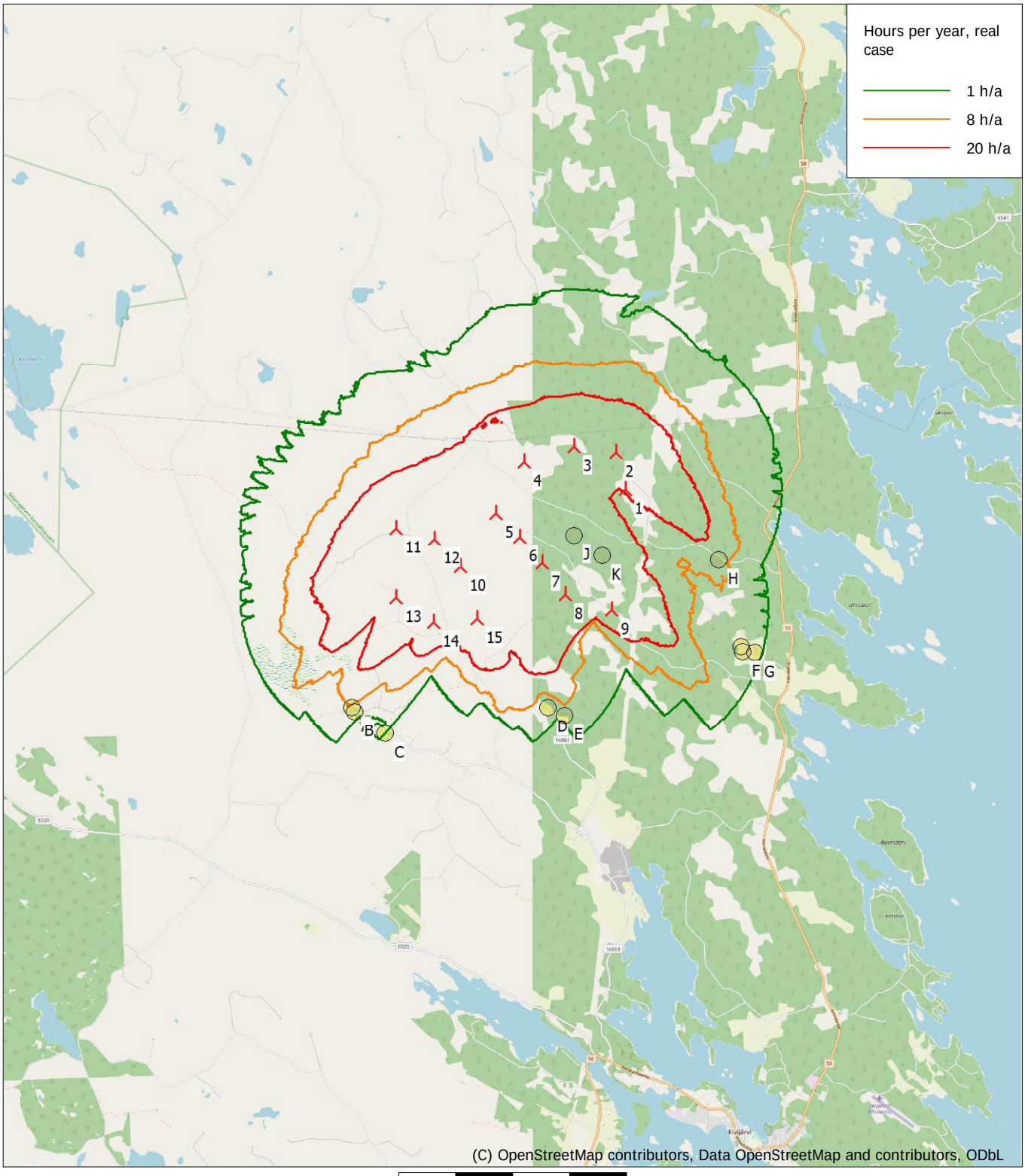
10.11.2023 9.40/3.6.355

SHADOW - Map

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_no forest



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 380 North: 7 010 740

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_WIND PRO MELUMALLINNUS TESTI 2_3.wpo (1)

Time step: 3 minutes, Day step: 7 days, Map resolution: 20 m, Visibility resolution: 10 m, Eye height: 1,5 m

Liite 10. Volkkilankankaan tuulivoimahanke – varjostusmallinnuksen tulokset ”real case, no forest” (VE2).

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SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest

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) []

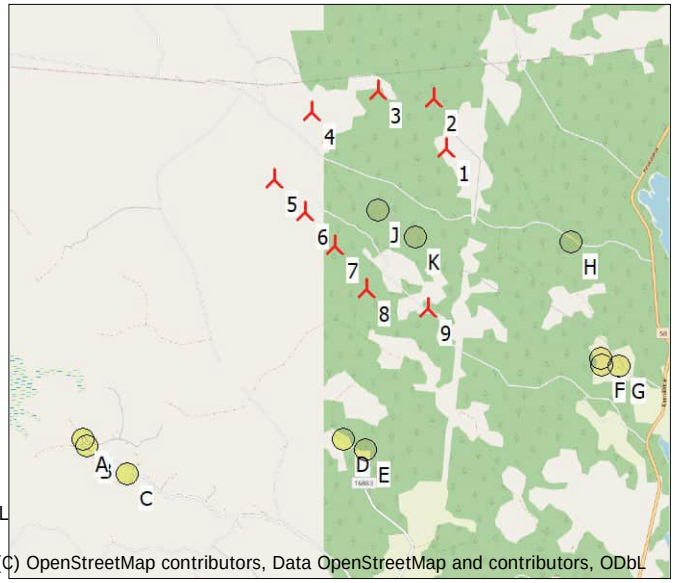
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_WIND PRO MELUMAL
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	401 105	7 012 076	152,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
2	400 966	7 012 725	147,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
3	400 233	7 012 854	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
4	399 353	7 012 603	177,9	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
5	398 812	7 011 721	157,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
6	399 211	7 011 281	160,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
7	399 596	7 010 821	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
8	400 000	7 010 233	162,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
9	400 807	7 009 959	164,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste_C (Autio)	396 747	7 007 888	163,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste_A (Harjunpää)	0:00
B	Laskentapiste_B (Harjunpää)	0:00

To be continued on next page...

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10.11.2023 9.43/3.6.355

SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest

...continued from previous page

No.	Name	Shadow, expected values Shadow hours per year [h/year]
C	Laskentapiste_C (Autio)	0:00
D	Laskentapiste_D (Ylä-Leskinen)	0:00
E	Laskentapiste_E (Leskinen)	0:00
F	Laskentapiste_F (Kalliomäki)	2:26
G	Laskentapiste_G (Alapelto)	1:53
H	Laskentapiste_H (Lepola)	14:25
I	Laskentapiste_I (Kalliomäki)	2:25
J	Laskentapiste_J (Ritaviita)	59:12
K	Laskentapiste_K (Ritaviita2)	40:18

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

No.	Name	Expected [h/year]
1	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (267)	18:36
2	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (262)	4:08
3	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (261)	0:00
4	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (265)	1:37
5	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (260)	10:45
6	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (263)	20:19
7	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (266)	26:36
8	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (264)	16:07
9	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)	17:12

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.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

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SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: A - Laskentapiste_A (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31	03.18	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08	23.30	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.20	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.35
	14.57	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	03.20	03.29	04.54	06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.19	03.31	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.34	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	03.36	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.07	04.28	03.15	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	23.12	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.41	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.14	20.42	22.11	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	03.46	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.04	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	03.51	05.21	06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	03.54	05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.57	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.27	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.02	05.32	06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.05	05.35	07.01	08.26	09.00	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.07	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	03.11	04.13	05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.47	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.33	20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	03.15	04.28	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	09.00		06.48		03.36		04.31	06.01		07.53		10.00
	16.10		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: B - Laskentapiste_B (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.32	03.18	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08	23.30	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.20	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	03.20	03.29	04.54	06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.19	03.31	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.34	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	03.36	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.15	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	23.12	21.44	19.59	18.17	15.40	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.41	05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	03.46	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.04	15.29	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	03.51	05.21	06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	03.54	05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.27	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.02	05.32	06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.05	05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.07	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	03.11	04.13	05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.47	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.19	05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52	23.34	22.33	20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	03.15	04.28	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	09.00		06.48		03.36		04.31	06.01		07.53		10.00
	16.10		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: C - Laskentapiste_C (Autio)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.58	08.54	07.26	06.41	05.00	03.32	03.18	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.07	23.30	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.20	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.34	15.54	14.44
8	09.51	08.36	07.06	06.20	04.41	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.35	17.59	20.27	21.56	23.21	23.20	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.19	03.31	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.34	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	03.36	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.15	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	23.12	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.41	05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	03.46	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.48	22.17	23.31	23.05	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	03.51	05.21	06.48	08.11	08.44	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	03.54	05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.37
19	09.30	08.02	06.29	05.43	04.07	03.10	03.56	05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.20	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.02	05.32	06.58	08.23	08.56	10.00
	15.39	17.15	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.05	05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	22.47	21.10	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.07	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.39
25	09.16	07.42	06.08	05.23	03.51	03.11	04.13	05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.47	07.12	07.38	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.19	05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52	23.34	22.33	20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.09	03.41	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.58	14.44
30	09.02		06.51	05.06	03.38	03.15	04.28	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36		04.31	06.01		07.53		10.00
	16.10		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: D - Laskentapiste_D (Ylä-Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.58	09.27
	14.51	16.16	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56	03.29	03.20	04.39	06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41	23.10	23.28	22.12	20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.25	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.22	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.16	21.50	20.06	18.23	15.45	14.41
11	09.46	08.27	06.56	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.34	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.00	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.10	03.53	05.23	06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	03.09	04.02	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.18	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.35	22.45	21.07	19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.35	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.28	15.02	14.41
28	09.08	07.32	05.58	05.13	03.43	03.13	04.22	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	08.59		06.47		03.36		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: E - Laskentapiste_E (Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.28	07.58	09.27
	14.51	16.16	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56	03.29	03.20	04.39	06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41	23.10	23.28	22.12	20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.04	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.25	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.36
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.22	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.16	21.50	20.06	18.23	15.45	14.41
11	09.46	08.27	06.55	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.00	21.27	19.42	18.00	15.26	14.36
18	09.32	08.05	06.32	05.46	04.10	03.10	03.53	05.23	06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.35	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	03.09	04.02	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.11	14.38
24	09.18	07.45	06.11	05.26	03.53	03.10	04.10	05.41	07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.43	23.35	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.54	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.28	15.02	14.41
28	09.08	07.32	05.57	05.13	03.43	03.13	04.22	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	08.59		06.47		03.36		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: F - Laskentapiste_F (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May		June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.44		05.02	20.05 (9)	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	14 20.19 (9)	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	20.07 (9)	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	10 20.17 (9)	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56		03.29	03.19	04.39		06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41		23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53		03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44		23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49		03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47		23.14	23.25	22.06		20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46		03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50		23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23		04.43		03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53		23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40		03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56		23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37		03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30		21.59		23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34		03.16	03.33	05.00	20.19 (9)	06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02		23.24	23.16	21.50	4 20.23 (9)	20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31		03.15	03.35	05.03	20.14 (9)	06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05		23.26	23.14	21.46	12 20.26 (9)	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06		04.27		03.14	03.38	05.06	20.13 (9)	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08		23.27	23.12	21.43	15 20.28 (9)	19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24		03.13	03.40	05.08	20.10 (9)	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11		23.28	23.10	21.40	19 20.29 (9)	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59		04.21		03.12	03.42	05.11	20.10 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44		22.14		23.30	23.08	21.37	20 20.30 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56		04.18		03.11	03.45	05.14	20.09 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47		22.17		23.31	23.05	21.33	22 20.31 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	20.08 (9)	04.15		03.10	03.48	05.17	20.08 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	5 20.13 (9)	22.20		23.32	23.03	21.30	23 20.31 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	20.06 (9)	04.12		03.10	03.50	05.20	20.07 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	10 20.16 (9)	22.23		23.33	23.00	21.27	24 20.31 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	20.04 (9)	04.10		03.09	03.53	05.23	20.07 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	14 20.18 (9)	22.26		23.34	22.58	21.23	25 20.32 (9)	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	20.03 (9)	04.07		03.09	03.56	05.26	20.06 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	18 20.21 (9)	22.29		23.34	22.55	21.20	25 20.31 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	20.02 (9)	04.04		03.09	03.58	05.29	20.06 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	22 20.24 (9)	22.32		23.35	22.53	21.17	25 20.31 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	20.02 (9)	04.01		03.09	04.01	05.32	20.06 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	23 20.25 (9)	22.35		23.35	22.50	21.13	24 20.30 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	20.01 (9)	03.58		03.09	04.04	05.35	20.06 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	25 20.26 (9)	22.38		23.35	22.47	21.10	24 20.30 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	20.01 (9)	03.55		03.09	04.07	05.37	20.07 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	25 20.26 (9)	22.41		23.35	22.44	21.07	21 20.28 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	20.01 (9)	03.53		03.09	04.10	05.40	20.07 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	25 20.26 (9)	22.43		23.35	22.42	21.03	17 20.24 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	20.01 (9)	03.50		03.10	04.12	05.43	20.08 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	24 20.25 (9)	22.46		23.35	22.39	21.00	13 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	20.01 (9)	03.47		03.11	04.15	05.46	20.08 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	24 20.25 (9)	22.49		23.35	22.36	20.57	10 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	20.01 (9)	03.45		03.11	04.18	05.49	20.10 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	23 20.24 (9)	22.52		23.34	22.33	20.53	5 20.15 (9)	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	20.02 (9)	03.42		03.12	04.21	05.52		07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	21 20.23 (9)	22.54		23.33	22.30	20.50		19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	20.03 (9)	03.40		03.13	04.24	05.54		07.20	07.46	09.19	10.01
	16.03		19.59	21.29	19 20.22 (9)	22.57		23.33	22.27	20.46		19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	20.04 (9)	03.38		03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32	17 20.21 (9)	23.00		23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35			04.30	06.00			07.52		10.00
	16.09		20.04			23.02			22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		559		606	595	503		392	308	206	150
Total, worst case					295		24				328				
Sun reduction					0,40		0,45				0,41				
Oper. time red.					0,90		0,90				0,90				
Wind dir. red.					0,61		0,61				0,61				
Total reduction					0,22		0,25				0,23				
Total, real					65		6				75				

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: G - Laskentapiste_G (Alapelto)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May	June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.43		05.02	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56	03.29	03.19	04.39		06.08	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41	23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53	03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44	23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49	03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47	23.14	23.25	22.06		20.22	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46	03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50	23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.52	08.39	07.09	06.23		04.43	03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53	23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40	03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56	23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37	03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.01	20.30		21.59	23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34	03.16	03.33	05.00		06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02	23.24	23.16	21.50		20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31	03.15	03.35	05.03		06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05	23.26	23.14	21.46		20.02	18.20	15.42	14.39
12	09.44	08.24	06.52	06.06		04.27	03.14	03.38	05.05		06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08	23.27	23.12	21.43		19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24	03.13	03.40	05.08		06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11	23.28	23.10	21.40		19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	20.05 (9)	04.21	03.12	03.42	05.11	20.13 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	2 20.07 (9)	22.14	23.30	23.08	21.37	6 20.19 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	20.03 (9)	04.18	03.11	03.45	05.14	20.10 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	7 20.10 (9)	22.17	23.31	23.05	21.33	12 20.22 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	20.02 (9)	04.15	03.10	03.48	05.17	20.07 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	11 20.13 (9)	22.20	23.32	23.03	21.30	16 20.23 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	20.01 (9)	04.12	03.10	03.50	05.20	20.06 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	15 20.16 (9)	22.23	23.33	23.00	21.27	18 20.24 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	19.59 (9)	04.09	03.09	03.53	05.23	20.06 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	19 20.18 (9)	22.26	23.34	22.58	21.23	19 20.25 (9)	19.38	17.56	15.23	14.36
19	09.30	08.01	06.28	05.42	19.58 (9)	04.07	03.09	03.56	05.26	20.04 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	23 20.21 (9)	22.29	23.34	22.55	21.20	21 20.25 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	19.58 (9)	04.04	03.09	03.58	05.29	20.04 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	23 20.21 (9)	22.32	23.35	22.53	21.17	22 20.26 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	19.58 (9)	04.01	03.09	04.01	05.32	20.03 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	23 20.21 (9)	22.35	23.35	22.50	21.13	22 20.25 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	19.58 (9)	03.58	03.09	04.04	05.35	20.03 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22 20.20 (9)	22.38	23.35	22.47	21.10	22 20.25 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	19.58 (9)	03.55	03.09	04.07	05.37	20.03 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.41	21.11	22 20.20 (9)	22.41	23.35	22.44	21.07	22 20.25 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	19.59 (9)	03.53	03.09	04.10	05.40	20.02 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	20 20.19 (9)	22.43	23.35	22.42	21.03	22 20.24 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.07	05.22	19.59 (9)	03.50	03.10	04.12	05.43	20.03 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	19 20.18 (9)	22.46	23.35	22.39	21.00	18 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	20.00 (9)	03.47	03.11	04.15	05.46	20.02 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	17 20.17 (9)	22.49	23.35	22.36	20.57	16 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.15	20.01 (9)	03.45	03.11	04.18	05.49	20.03 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	15 20.16 (9)	22.52	23.34	22.33	20.53	12 20.15 (9)	19.07	16.27	15.01	14.41
28	09.07	07.32	05.57	05.12	20.03 (9)	03.42	03.12	04.21	05.52	20.05 (9)	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	11 20.14 (9)	22.54	23.33	22.30	20.50	7 20.12 (9)	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	20.07 (9)	03.40	03.13	04.24	05.54	20.06 (9)	07.20	07.46	09.19	10.01
	16.03		19.58	21.29	3 20.10 (9)	22.57	23.33	22.27	20.46	2 20.08 (9)	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06		03.38	03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32		23.00	23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35		04.30	06.00			07.52		10.00
	16.09		20.04			23.02		22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		559	606	595	503		392	308	206	150
Total, worst case					252					257				
Sun reduction					0,40					0,41				
Oper. time red.					0,90					0,90				
Wind dir. red.					0,61					0,61				
Total reduction					0,22					0,23				
Total, real					55					58				

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January		February			March			April		May			June		
1	09.59		08.57			07.29		16.41 (9)	06.44		05.02			03.33		21.09 (1)
	14.48		16.12			17.38	21	17.02 (9)	20.07		21.35			23.05	43	22.06 (2)
2	09.58		08.54			07.26		16.39 (9)	06.40		04.59			03.31		21.10 (1)
	14.50		16.15			17.41	25	17.04 (9)	20.10		21.38			23.07	46	22.09 (2)
3	09.57		08.51			07.22		16.39 (9)	06.37		04.56			03.29		21.09 (1)
	14.52		16.18			17.44	26	17.05 (9)	20.13		21.41			23.10	47	22.10 (2)
4	09.56		08.48			07.19		16.38 (9)	06.33		04.53			03.26		21.10 (1)
	14.54		16.21			17.47	27	17.05 (9)	20.16		21.44			23.12	48	22.12 (2)
5	09.55		08.45			07.16		16.38 (9)	06.30		04.49			03.25		21.11 (1)
	14.56		16.25			17.50	28	17.06 (9)	20.18		21.47			23.14	50	22.14 (2)
6	09.54		08.42			07.12		16.37 (9)	06.26		04.46			03.23		21.12 (1)
	14.58		16.28			17.53	28	17.05 (9)	20.21		21.50			23.16	49	22.15 (2)
7	09.53		08.39			07.09		16.37 (9)	06.23		04.43			03.21		21.11 (1)
	15.00		16.31			17.56	28	17.05 (9)	20.24		21.53			23.19	50	22.15 (2)
8	09.51		08.36			07.05		16.37 (9)	06.20		04.40			03.19		21.12 (1)
	15.03		16.34			17.59	27	17.04 (9)	20.27		21.56			23.21	49	22.15 (2)
9	09.50		08.33			07.02		16.37 (9)	06.16		04.37			03.18		21.12 (1)
	15.05		16.37			18.02	27	17.04 (9)	20.30		21.59			23.22	48	22.15 (2)
10	09.48		08.30			06.59		16.37 (9)	06.13		04.34			03.16		21.13 (1)
	15.07		16.40			18.04	25	17.02 (9)	20.33		22.02			23.24	48	22.16 (2)
11	09.46		08.27			06.55		16.38 (9)	06.09		04.30		21.14 (1)	03.15		21.13 (1)
	15.10		16.43			18.07	24	17.02 (9)	20.36		22.05	5	21.19 (1)	23.26	48	22.16 (2)
12	09.45		08.24			06.52		16.39 (9)	06.06		04.27		21.12 (1)	03.14		21.14 (1)
	15.13		16.47			18.10	21	17.00 (9)	20.39		22.08	10	21.22 (1)	23.27	47	22.16 (2)
13	09.43		08.21			06.49		16.41 (9)	06.03		04.24		21.12 (1)	03.12		21.15 (1)
	15.15		16.50			18.13	18	16.59 (9)	20.42		22.11	13	21.25 (1)	23.29	46	22.17 (2)
14	09.41		08.17			06.45		16.43 (9)	05.59		04.21		21.10 (1)	03.11		21.15 (1)
	15.18		16.53			18.16	12	16.55 (9)	20.44		22.14	17	21.27 (1)	23.30	47	22.17 (2)
15	09.39		08.14			06.42			05.56		04.18		21.10 (1)	03.11		21.15 (1)
	15.21		16.56			18.19			20.47		22.17	20	21.30 (1)	23.31	46	22.17 (2)
16	09.37		08.11			06.38			05.52		04.15		21.09 (1)	03.10		21.15 (1)
	15.23		16.59			18.22			20.50		22.20	22	21.31 (1)	23.32	46	22.17 (2)
17	09.35		08.08			06.35			05.49		04.12		21.09 (1)	03.09		21.16 (1)
	15.26		17.02			18.24			20.53		22.23	25	21.34 (1)	23.33	45	22.17 (2)
18	09.33		08.05			06.31			05.46		04.09		21.09 (1)	03.09		21.16 (1)
	15.29		17.05			18.27			20.56		22.26	27	21.36 (1)	23.34	45	22.17 (2)
19	09.30		08.02			06.28			05.42		04.06		21.07 (1)	03.08		21.16 (1)
	15.32		17.08			18.30			20.59		22.29	29	21.36 (1)	23.35	45	22.18 (2)
20	09.28		07.58			06.25			05.39		04.04		21.08 (1)	03.08		21.17 (1)
	15.35		17.11			18.33			21.02		22.32	29	21.37 (1)	23.35	44	22.18 (2)
21	09.26		07.55			06.21			05.35		04.01		21.08 (1)	03.08		21.17 (1)
	15.38		17.14			18.36			21.05		22.35	29	21.37 (1)	23.35	44	22.18 (2)
22	09.23		07.52			06.18			05.32		03.58		21.08 (1)	03.08		21.17 (1)
	15.41		17.17			18.39			21.08		22.38	30	21.38 (1)	23.36	44	22.18 (2)
23	09.21		07.49			06.14			05.29		03.55		21.08 (1)	03.09		21.18 (1)
	15.44		17.20			18.42			21.11		22.41	30	21.38 (1)	23.36	44	22.19 (2)
24	09.18		07.45			06.11			05.25		03.53		21.07 (1)	03.09		21.17 (1)
	15.47		17.23			18.44			21.14		22.44	30	21.37 (1)	23.36	46	22.19 (2)
25	09.16		07.42			06.08			05.22		03.50		21.07 (1)	03.10		21.18 (1)
	15.50		17.26			18.47			21.17		22.46	30	21.37 (1)	23.35	45	22.19 (2)
26	09.13		07.39		16.45 (9)	06.04			05.19		03.47		21.08 (1)	03.10		21.17 (1)
	15.53		17.29	7	16.52 (9)	18.50			21.20		22.49	32	21.55 (2)	23.35	46	22.19 (2)
27	09.10		07.35		16.44 (9)	06.01			05.15		03.45		21.08 (1)	03.11		21.18 (1)
	15.56		17.32	12	16.56 (9)	18.53			21.23		22.52	35	21.57 (2)	23.34	45	22.19 (2)
28	09.08		07.32		16.41 (9)	05.57			05.12		03.42		21.08 (1)	03.12		21.18 (1)
	15.59		17.35	17	16.58 (9)	18.56			21.26		22.55	37	21.59 (2)	23.34	46	22.20 (2)
29	09.05					06.54			05.09		03.40		21.08 (1)	03.13		21.18 (1)
	16.03					19.59			21.29		22.57	40	22.01 (2)	23.33	46	22.20 (2)
30	09.02					06.50			05.06		03.37		21.08 (1)	03.14		21.18 (1)
	16.06					20.01			21.32		23.00	40	22.02 (2)	23.32	48	22.21 (2)
31	08.59					06.47					03.35		21.09 (1)			
	16.09					20.04					23.02	43	22.05 (2)			
Potential sun hours	181		242			363			447		560			606		
Total, worst case				36			337					573			1391	
Sun reduction				0,26			0,37					0,45			0,40	
Oper. time red.				0,90			0,90					0,90			0,90	
Wind dir. red.				0,62			0,62					0,63			0,63	
Total reduction				0,15			0,21					0,26			0,23	
Total, real				5			71					147			319	

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July		August		September		October		November	December
1	03.16	21.18 (1)	04.33	21.24 (1)	06.03		07.26	17.19 (9)	07.55	09.24
	23.31	48 22.21 (2)	22.18	8 21.32 (1)	20.36		18.53	20 17.39 (9)	16.11	14.53
2	03.17	21.18 (1)	04.36	21.25 (1)	06.06		07.28	17.17 (9)	07.58	09.27
	23.30	49 22.21 (2)	22.15	3 21.28 (1)	20.33		18.50	23 17.40 (9)	16.08	14.51
3	03.19	21.18 (1)	04.39		06.08		07.31	17.16 (9)	08.01	09.29
	23.29	49 22.21 (2)	22.12		20.29		18.47	25 17.41 (9)	16.05	14.50
4	03.21	21.17 (1)	04.42		06.11		07.34	17.15 (9)	08.04	09.32
	23.27	50 22.21 (2)	22.09		20.26		18.43	26 17.41 (9)	16.02	14.48
5	03.22	21.18 (1)	04.45		06.14		07.37	17.14 (9)	08.07	09.34
	23.26	49 22.21 (2)	22.06		20.23		18.40	27 17.41 (9)	15.59	14.46
6	03.24	21.17 (1)	04.48		06.17		07.39	17.13 (9)	08.11	09.37
	23.24	50 22.21 (2)	22.03		20.19		18.36	28 17.41 (9)	15.56	14.45
7	03.26	21.18 (1)	04.51		06.20		07.42	17.12 (9)	08.14	09.39
	23.22	49 22.21 (2)	21.59		20.16		18.33	29 17.41 (9)	15.53	14.44
8	03.28	21.17 (1)	04.54		06.22		07.45	17.12 (9)	08.17	09.41
	23.20	48 22.19 (2)	21.56		20.12		18.30	28 17.40 (9)	15.50	14.42
9	03.30	21.17 (1)	04.57		06.25		07.48	17.12 (9)	08.20	09.43
	23.19	48 22.18 (2)	21.53		20.09		18.26	28 17.40 (9)	15.47	14.41
10	03.33	21.17 (1)	05.00		06.28		07.51	17.12 (9)	08.23	09.45
	23.17	46 22.17 (2)	21.50		20.05		18.23	27 17.39 (9)	15.45	14.40
11	03.35	21.17 (1)	05.02		06.31		07.54	17.12 (9)	08.26	09.47
	23.14	45 22.15 (2)	21.47		20.02		18.20	26 17.38 (9)	15.42	14.39
12	03.37	21.17 (1)	05.05		06.33		07.56	17.13 (9)	08.29	09.49
	23.12	44 22.14 (2)	21.43		19.59		18.16	24 17.37 (9)	15.39	14.38
13	03.40	21.17 (1)	05.08		06.36		07.59	17.14 (9)	08.32	09.50
	23.10	41 22.12 (2)	21.40		19.55		18.13	19 17.33 (9)	15.36	14.38
14	03.42	21.17 (1)	05.11		06.39		08.02	17.15 (9)	08.35	09.52
	23.08	40 22.11 (2)	21.37		19.52		18.10	15 17.30 (9)	15.33	14.37
15	03.45	21.17 (1)	05.14		06.42		08.05	17.17 (9)	08.38	09.53
	23.05	38 22.09 (2)	21.33		19.48		18.06	10 17.27 (9)	15.30	14.37
16	03.47	21.17 (1)	05.17		06.44		08.08	17.19 (9)	08.41	09.55
	23.03	36 22.07 (2)	21.30		19.45		18.03	4 17.23 (9)	15.28	14.36
17	03.50	21.17 (1)	05.20		06.47		08.11		08.44	09.56
	23.01	33 22.05 (2)	21.27		19.41		18.00		15.25	14.36
18	03.53	21.17 (1)	05.23		06.50		08.14		08.47	09.57
	22.58	31 22.03 (2)	21.23		19.38		17.56		15.23	14.36
19	03.55	21.17 (1)	05.26		06.53		08.17		08.50	09.58
	22.55	30 21.47 (1)	21.20		19.35		17.53		15.20	14.36
20	03.58	21.17 (1)	05.29		06.55		08.19		08.53	09.59
	22.53	30 21.47 (1)	21.17		19.31		17.50		15.17	14.36
21	04.01	21.18 (1)	05.32		06.58		08.22		08.56	10.00
	22.50	30 21.48 (1)	21.13		19.28		17.47		15.15	14.36
22	04.04	21.18 (1)	05.35		07.01		08.25		08.59	10.00
	22.47	29 21.47 (1)	21.10		19.24		17.43		15.12	14.37
23	04.07	21.18 (1)	05.37		07.03		08.28		09.02	10.01
	22.45	29 21.47 (1)	21.07		19.21		17.40		15.10	14.37
24	04.09	21.18 (1)	05.40		07.06		08.31		09.05	10.01
	22.42	29 21.47 (1)	21.03		19.17		17.37		15.08	14.38
25	04.12	21.19 (1)	05.43		07.09		07.34		09.08	10.01
	22.39	28 21.47 (1)	21.00		19.14		16.34		15.05	14.39
26	04.15	21.19 (1)	05.46		07.12		07.37		09.11	10.01
	22.36	27 21.46 (1)	20.57		19.10		16.30		15.03	14.40
27	04.18	21.19 (1)	05.49		07.14		07.40		09.14	10.01
	22.33	24 21.43 (1)	20.53		19.07		16.27		15.01	14.41
28	04.21	21.20 (1)	05.52		07.17		07.43		09.16	10.01
	22.30	21 21.41 (1)	20.50		19.04		16.24		14.59	14.42
29	04.24	21.20 (1)	05.54		07.20	17.24 (9)	07.46		09.19	10.01
	22.27	19 21.39 (1)	20.46		19.00	10 17.34 (9)	16.21		14.57	14.43
30	04.27	21.21 (1)	05.57		07.23	17.21 (9)	07.49		09.22	10.00
	22.24	16 21.37 (1)	20.43		18.57	16 17.37 (9)	16.18		14.55	14.45
31	04.30	21.22 (1)	06.00				07.52			10.00
	22.21	12 21.34 (1)	20.40				16.15			14.46
Potential sun hours	595		503		392		307		206	150
Total, worst case		1118		11		26		359		
Sun reduction		0,44		0,41		0,31		0,19		
Oper. time red.		0,90		0,90		0,90		0,90		
Wind dir. red.		0,63		0,63		0,62		0,62		
Total reduction		0,25		0,24		0,18		0,11		
Total, real		279		3		5		38		

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: I - Laskentapiste_I (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May	June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.44		05.02	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56	03.29	03.19	04.39		06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41	23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53	03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44	23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49	03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47	23.14	23.25	22.06		20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46	03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50	23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23		04.43	03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53	23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40	03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56	23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37	03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30		21.59	23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34	03.16	03.33	05.00		06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02	23.24	23.16	21.50		20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31	03.15	03.35	05.03		06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05	23.26	23.14	21.46		20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06		04.27	03.14	03.38	05.06	20.12 (9)	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08	23.27	23.12	21.43	4 20.16 (9)	19.59	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24	03.13	03.40	05.08	20.08 (9)	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11	23.29	23.10	21.40	11 20.19 (9)	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	20.02 (9)	04.21	03.12	03.42	05.11	20.06 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	5 20.07 (9)	22.14	23.30	23.08	21.37	15 20.21 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	20.00 (9)	04.18	03.11	03.45	05.14	20.05 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	10 20.10 (9)	22.17	23.31	23.05	21.33	18 20.23 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	19.59 (9)	04.15	03.10	03.48	05.17	20.03 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	14 20.13 (9)	22.20	23.32	23.03	21.30	20 20.23 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	19.58 (9)	04.12	03.10	03.50	05.20	20.02 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	18 20.16 (9)	22.23	23.33	23.00	21.27	22 20.24 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	19.56 (9)	04.10	03.09	03.53	05.23	20.02 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22 20.18 (9)	22.26	23.34	22.58	21.23	23 20.25 (9)	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	19.55 (9)	04.07	03.09	03.56	05.26	20.00 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	24 20.19 (9)	22.29	23.34	22.55	21.20	24 20.24 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	19.55 (9)	04.04	03.09	03.58	05.29	20.00 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	25 20.20 (9)	22.32	23.35	22.53	21.17	25 20.25 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	19.55 (9)	04.01	03.09	04.01	05.32	19.59 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	25 20.20 (9)	22.35	23.35	22.50	21.13	25 20.24 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	19.55 (9)	03.58	03.09	04.04	05.35	19.59 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	25 20.20 (9)	22.38	23.35	22.47	21.10	25 20.24 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	19.55 (9)	03.55	03.09	04.07	05.37	20.00 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	24 20.19 (9)	22.41	23.35	22.44	21.07	24 20.24 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	19.55 (9)	03.53	03.09	04.10	05.40	19.59 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	24 20.19 (9)	22.43	23.35	22.42	21.03	24 20.23 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	19.55 (9)	03.50	03.10	04.12	05.43	20.00 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	23 20.18 (9)	22.46	23.35	22.39	21.00	21 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	19.56 (9)	03.47	03.11	04.15	05.46	19.59 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	21 20.17 (9)	22.49	23.35	22.36	20.57	19 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	19.56 (9)	03.45	03.11	04.18	05.49	20.00 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	20 20.16 (9)	22.52	23.34	22.33	20.53	15 20.15 (9)	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	19.58 (9)	03.42	03.12	04.21	05.52	20.02 (9)	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	17 20.15 (9)	22.54	23.33	22.30	20.50	10 20.12 (9)	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	19.59 (9)	03.40	03.13	04.24	05.54	20.03 (9)	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	14 20.13 (9)	22.57	23.33	22.27	20.46	5 20.08 (9)	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	20.01 (9)	03.38	03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32	10 20.11 (9)	23.00	23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35		04.30	06.00			07.52		10.00
	16.09		20.04			23.02		22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		560	606	595	503		392	308	206	150
Total, worst case					321					330				
Sun reduction					0,40					0,41				
Oper. time red.					0,90					0,90				
Wind dir. red.					0,61					0,61				
Total reduction					0,22					0,23				
Total, real					70					75				

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: J - Laskentapiste_J (Ritaviita)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January			February			March			April			May			June		
1	09.59		12.53 (8)	08.57		10.21 (9)	07.29		15.12 (7)	06.44		16.21 (7)	05.02		18.36 (6)	03.33		04.31 (1)
	14.48	7	13.00 (8)	16.12	97	13.35 (8)	17.38	67	16.19 (7)	20.07	86	19.22 (6)	21.35	71	20.21 (5)	23.05	41	05.12 (1)
2	09.59		12.51 (8)	08.54		10.21 (9)	07.26		15.11 (7)	06.40		16.24 (7)	04.59		18.38 (6)	03.31		04.31 (1)
	14.50	12	13.03 (8)	16.15	97	13.35 (8)	17.41	70	16.21 (7)	20.10	81	19.22 (6)	21.38	66	20.20 (5)	23.08	43	05.14 (1)
3	09.58		12.50 (8)	08.51		10.21 (9)	07.22		15.10 (7)	06.37		16.28 (7)	04.56		18.41 (6)	03.29		04.30 (1)
	14.52	15	13.05 (8)	16.18	99	13.36 (8)	17.44	71	16.21 (7)	20.13	75	19.23 (6)	21.41	60	20.20 (5)	23.10	44	05.14 (1)
4	09.57		12.48 (8)	08.48		10.21 (9)	07.19		15.10 (7)	06.33		16.35 (7)	04.53		18.44 (6)	03.27		04.31 (1)
	14.54	19	13.07 (8)	16.22	97	13.35 (8)	17.47	71	16.21 (7)	20.16	61	19.23 (6)	21.44	52	20.19 (5)	23.12	43	05.14 (1)
5	09.56		12.48 (8)	08.45		10.22 (9)	07.16		15.09 (7)	06.30		18.29 (6)	04.50		19.42 (5)	03.25		04.31 (1)
	14.56	20	13.08 (8)	16.25	97	13.36 (8)	17.50	72	16.21 (7)	20.19	55	19.24 (6)	21.47	36	20.18 (5)	23.15	44	05.15 (1)
6	09.54		12.47 (8)	08.42		10.21 (9)	07.12		15.07 (7)	06.27		18.28 (6)	04.46		19.43 (5)	03.23		04.31 (1)
	14.58	23	13.10 (8)	16.28	97	13.35 (8)	17.53	74	16.21 (7)	20.22	56	19.24 (6)	21.50	35	20.18 (5)	23.17	45	05.16 (1)
7	09.53		12.46 (8)	08.39		10.21 (9)	07.09		15.07 (7)	06.23		18.27 (6)	04.43		19.44 (5)	03.21		04.31 (1)
	15.00	26	13.12 (8)	16.31	97	13.35 (8)	17.56	75	16.22 (7)	20.24	57	19.24 (6)	21.53	33	20.17 (5)	23.19	45	05.16 (1)
8	09.52		12.46 (8)	08.36		10.22 (9)	07.06		15.06 (7)	06.20		18.26 (6)	04.40		19.45 (5)	03.19		04.31 (1)
	15.03	28	13.14 (8)	16.34	95	13.35 (8)	17.59	75	16.21 (7)	20.27	58	19.24 (6)	21.56	31	20.16 (5)	23.21	46	05.17 (1)
9	09.50		12.45 (8)	08.33		10.22 (9)	07.02		15.06 (7)	06.16		18.26 (6)	04.37		19.45 (5)	03.18		04.31 (1)
	15.05	30	13.15 (8)	16.37	94	13.35 (8)	18.02	76	16.22 (7)	20.30	59	19.25 (6)	21.59	29	20.14 (5)	23.23	46	05.17 (1)
10	09.48		12.44 (8)	08.30		10.23 (9)	06.59		15.05 (7)	06.13		18.26 (6)	04.34		19.47 (5)	03.16		04.31 (1)
	15.08	32	13.16 (8)	16.40	92	13.35 (8)	18.05	76	16.21 (7)	20.33	59	19.25 (6)	22.02	27	20.14 (5)	23.24	46	05.17 (1)
11	09.47		12.44 (8)	08.27		10.23 (9)	06.55		15.05 (7)	06.10		18.25 (6)	04.31		19.48 (5)	03.15		04.30 (1)
	15.10	34	13.18 (8)	16.44	90	13.34 (8)	18.08	77	16.22 (7)	20.36	59	19.24 (6)	22.05	24	20.12 (5)	23.26	47	05.17 (1)
12	09.45		12.44 (8)	08.24		10.25 (9)	06.52		15.05 (7)	06.06		18.25 (6)	04.28		19.51 (5)	03.14		04.30 (1)
	15.13	35	13.19 (8)	16.47	87	13.34 (8)	18.10	76	16.21 (7)	20.39	59	19.24 (6)	22.08	20	20.11 (5)	23.28	47	05.17 (1)
13	09.43		12.43 (8)	08.21		10.25 (9)	06.49		15.05 (7)	06.03		18.24 (6)	04.24		19.53 (5)	03.13		04.31 (1)
	15.15	37	13.20 (8)	16.50	84	13.33 (8)	18.13	76	16.21 (7)	20.42	69	20.06 (5)	22.11	15	20.08 (5)	23.29	47	05.18 (1)
14	09.41		12.42 (8)	08.18		10.27 (9)	06.45		15.05 (7)	05.59		18.24 (6)	04.21		19.56 (5)	03.12		04.30 (1)
	15.18	39	13.21 (8)	16.53	81	13.33 (8)	18.16	76	16.21 (7)	20.45	74	20.08 (5)	22.14	8	20.04 (5)	23.30	48	05.18 (1)
15	09.39		10.40 (9)	08.15		10.28 (9)	06.42		15.05 (7)	05.56		18.24 (6)	04.18			03.11		04.31 (1)
	15.21	44	13.23 (8)	16.56	78	15.48 (7)	18.19	75	16.20 (7)	20.48	78	20.10 (5)	22.17			23.32	48	05.19 (1)
16	09.37		10.36 (9)	08.11		10.30 (9)	06.39		15.05 (7)	05.53		18.24 (6)	04.15			03.10		04.31 (1)
	15.24	51	13.23 (8)	16.59	90	15.57 (7)	18.22	75	16.20 (7)	20.50	83	20.13 (5)	22.20			23.33	49	05.20 (1)
17	09.35		10.33 (9)	08.08		10.32 (9)	06.35		15.05 (7)	05.49		18.24 (6)	04.12			03.09		04.31 (1)
	15.26	58	13.25 (8)	17.02	91	16.01 (7)	18.25	74	16.19 (7)	20.53	87	20.16 (5)	22.23			23.34	48	05.19 (1)
18	09.33		10.29 (9)	08.05		10.36 (9)	06.32		15.05 (7)	05.46		18.24 (6)	04.10			03.09		04.31 (1)
	15.29	65	13.25 (8)	17.05	87	16.04 (7)	18.28	74	16.19 (7)	20.56	90	20.19 (5)	22.26			23.34	48	05.19 (1)
19	09.31		10.26 (9)	08.02		12.49 (8)	06.28		15.05 (7)	05.42		18.24 (6)	04.07		04.51 (1)	03.09		04.31 (1)
	15.32	71	13.27 (8)	17.08	77	16.06 (7)	18.30	73	16.18 (7)	20.59	92	20.20 (5)	22.29	1	04.52 (1)	23.35	49	05.20 (1)
20	09.28		10.24 (9)	07.59		12.52 (8)	06.25		15.06 (7)	05.39		18.24 (6)	04.04		04.49 (1)	03.08		04.31 (1)
	15.35	74	13.27 (8)	17.11	76	16.09 (7)	18.33	71	16.17 (7)	21.02	93	20.21 (5)	22.32	9	04.58 (1)	23.35	49	05.20 (1)
21	09.26		10.24 (9)	07.55		12.54 (8)	06.21		15.06 (7)	05.36		18.25 (6)	04.01		04.47 (1)	03.08		04.31 (1)
	15.38	77	13.28 (8)	17.14	76	16.11 (7)	18.36	70	16.16 (7)	21.05	93	20.21 (5)	22.35	14	05.01 (1)	23.36	49	05.20 (1)
22	09.23		10.24 (9)	07.52		12.58 (8)	06.18		15.07 (7)	05.32		18.25 (6)	03.58		04.45 (1)	03.09		04.32 (1)
	15.41	81	13.30 (8)	17.17	72	16.13 (7)	18.39	68	16.15 (7)	21.08	93	20.22 (5)	22.38	18	05.03 (1)	23.36	49	05.21 (1)
23	09.21		10.23 (9)	07.49		13.04 (8)	06.15		15.07 (7)	05.29		18.26 (6)	03.55		04.43 (1)	03.09		04.32 (1)
	15.44	83	13.30 (8)	17.20	62	16.14 (7)	18.42	67	16.14 (7)	21.11	92	20.22 (5)	22.41	22	05.05 (1)	23.36	49	05.21 (1)
24	09.18		10.23 (9)	07.46		15.18 (7)	06.11		15.08 (7)	05.26		18.27 (6)	03.53		04.41 (1)	03.09		04.32 (1)
	15.47	85	13.31 (8)	17.23	57	16.15 (7)	18.45	65	16.13 (7)	21.14	90	20.22 (5)	22.44	25	05.06 (1)	23.36	49	05.21 (1)
25	09.16		10.22 (9)	07.42		15.16 (7)	06.08		15.08 (7)	05.22		18.28 (6)	03.50		04.39 (1)	03.10		04.33 (1)
	15.50	87	13.31 (8)	17.26	60	16.16 (7)	18.47	77	18.06 (6)	21.17	89	20.22 (5)	22.47	28	05.07 (1)	23.36	48	05.21 (1)
26	09.13		10.22 (9)	07.39		15.15 (7)	06.04		15.10 (7)	05.19		18.29 (6)	03.47		04.37 (1)	03.10		04.33 (1)
	15.53	91	13.33 (8)	17.29	63	16.18 (7)	18.50	83	18.11 (6)	21.20	87	20.22 (5)	22.49	31	05.08 (1)	23.35	49	05.22 (1)
27	09.11		10.21 (9)	07.36		15.14 (7)	06.01		15.11 (7)	05.16		18.30 (6)	03.45		04.35 (1)	03.11		04.33 (1)
	15.57	92	13.33 (8)	17.32	64	16.18 (7)	18.53	87	18.14 (6)	21.23	85	20.22 (5)	22.52	34	05.09 (1)	23.35	48	05.21 (1)
28	09.08		10.21 (9)	07.32		15.13 (7)	05.57		15.12 (7)	05.12		18.31 (6)	03.42		04.33 (1)	03.12		04.34 (1)
	16.00	94	13.34 (8)	17.35	66	16.19 (7)	18.56	90	18.16 (6)	21.26	83	20.22 (5)	22.55	37	05.10 (1)	23.34	48	05.22 (1)
29	09.05		10.21 (9)				06.54		16.14 (7)	05.09		18.32 (6)	03.40		04.33 (1)	03.13		04.34 (1)
	16.03	94	13.34 (8)				19.59	90	19.18 (6)	21.29	80	20.22 (5)	22.58	38	05.11 (1)	23.33	48	05.22 (1)
30	09.02		10.21 (9)				06.51		16.15 (7)	05.06		18.34 (6)	03.38		04.33 (1)	03.15		04.34 (1)
	16.06	96	13.35 (8)				20.02	90	19.19 (6)	21.32	75	20.21 (5)	23.00	39	05.12 (1)	23.32	48	05.22 (1)
31	09.00		10.21 (9)				06.47		16.18 (7)				03.35		04.32 (1)			
	16.09	95	13.34 (8)				20.04	87	19.20 (6)				23.03	40	05.12 (1)			
Potential sun hours	181			242			363			447			560			606		
Total, worst case		1695			2323			2348			2298			843			1408	
Sun reduction		0,14			0,26			0,37			0,40			0,45			0,40	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,66			0,65			0,63			0,62			0,62			0,63	
Total reduction		0,08			0,15			0,21			0,22			0,25			0,23	
Total, real		140			357			503			516			213			323	

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: J - Laskentapiste_J (Ritaviita)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July		August		September		October		November		December		
1	03.16		04.35 (1)	04.33		20.00 (5)	06.03		18.24 (6)	07.26		15.44 (7)	07.55		09.53 (9)	09.25		12.26 (8)
	23.31	47	05.22 (1)	22.18	21	20.21 (5)	20.36	59	19.23 (6)	18.54	76	17.00 (7)	16.12	92	13.04 (8)	14.53	34	13.00 (8)
2	03.17		04.35 (1)	04.36		19.58 (5)	06.06		18.24 (6)	07.28		15.44 (7)	07.59		09.53 (9)	09.27		12.27 (8)
	23.30	47	05.22 (1)	22.15	24	20.22 (5)	20.33	59	19.23 (6)	18.50	76	17.00 (7)	16.09	94	13.05 (8)	14.51	32	12.59 (8)
3	03.19		04.35 (1)	04.39		19.57 (5)	06.09		18.24 (6)	07.31		15.44 (7)	08.02		09.52 (9)	09.30		12.29 (8)
	23.29	47	05.22 (1)	22.12	27	20.24 (5)	20.30	59	19.23 (6)	18.47	76	17.00 (7)	16.06	96	13.05 (8)	14.50	30	12.59 (8)
4	03.21		04.36 (1)	04.42		19.55 (5)	06.11		18.23 (6)	07.34		15.44 (7)	08.05		09.52 (9)	09.32		12.30 (8)
	23.27	46	05.22 (1)	22.09	30	20.25 (5)	20.26	58	19.21 (6)	18.43	75	16.59 (7)	16.02	95	13.05 (8)	14.48	28	12.58 (8)
5	03.22		04.36 (1)	04.45		19.54 (5)	06.14		18.24 (6)	07.37		15.44 (7)	08.08		09.51 (9)	09.35		12.32 (8)
	23.26	46	05.22 (1)	22.06	32	20.26 (5)	20.23	57	19.21 (6)	18.40	75	16.59 (7)	15.59	97	13.05 (8)	14.47	25	12.57 (8)
6	03.24		04.36 (1)	04.48		19.54 (5)	06.17		18.24 (6)	07.40		15.44 (7)	08.11		09.51 (9)	09.37		12.33 (8)
	23.24	45	05.21 (1)	22.03	33	20.27 (5)	20.19	57	19.21 (6)	18.37	74	16.58 (7)	15.56	99	13.06 (8)	14.45	24	12.57 (8)
7	03.26		04.37 (1)	04.51		19.52 (5)	06.20		18.24 (6)	07.42		15.44 (7)	08.14		09.51 (9)	09.39		12.35 (8)
	23.23	45	05.22 (1)	22.00	35	20.27 (5)	20.16	55	19.19 (6)	18.33	74	16.58 (7)	15.53	98	13.06 (8)	14.44	21	12.56 (8)
8	03.28		04.37 (1)	04.54		18.59 (6)	06.23		16.32 (7)	07.45		15.44 (7)	08.17		09.51 (9)	09.41		12.36 (8)
	23.21	44	05.21 (1)	21.56	40	20.28 (5)	20.13	57	19.18 (6)	18.30	73	16.57 (7)	15.51	97	13.05 (8)	14.42	18	12.54 (8)
9	03.31		04.38 (1)	04.57		18.52 (6)	06.25		16.22 (7)	07.48		15.44 (7)	08.20		09.51 (9)	09.43		12.38 (8)
	23.19	43	05.21 (1)	21.53	55	20.28 (5)	20.09	73	19.16 (6)	18.27	72	16.56 (7)	15.48	99	13.06 (8)	14.41	15	12.53 (8)
10	03.33		04.39 (1)	05.00		18.49 (6)	06.28		16.17 (7)	07.51		15.44 (7)	08.23		09.52 (9)	09.45		12.40 (8)
	23.17	42	05.21 (1)	21.50	62	20.29 (5)	20.06	80	19.15 (6)	18.23	72	16.56 (7)	15.45	97	13.06 (8)	14.40	12	12.52 (8)
11	03.35		04.39 (1)	05.03		18.46 (6)	06.31		16.14 (7)	07.54		15.45 (7)	08.26		09.52 (9)	09.47		12.43 (8)
	23.15	41	05.20 (1)	21.47	68	20.29 (5)	20.02	84	19.14 (6)	18.20	70	16.55 (7)	15.42	97	13.06 (8)	14.39	8	12.51 (8)
12	03.38		04.40 (1)	05.06		18.44 (6)	06.34		16.10 (7)	07.57		15.45 (7)	08.29		09.52 (9)	09.49		
	23.13	40	05.20 (1)	21.43	72	20.29 (5)	19.59	87	19.12 (6)	18.16	69	16.54 (7)	15.39	95	13.05 (8)	14.38		
13	03.40		04.40 (1)	05.09		18.42 (6)	06.36		16.07 (7)	07.59		15.46 (7)	08.32		09.53 (9)	09.51		
	23.10	40	05.20 (1)	21.40	77	20.30 (5)	19.55	90	19.11 (6)	18.13	67	16.53 (7)	15.36	94	13.05 (8)	14.38		
14	03.42		04.41 (1)	05.11		18.39 (6)	06.39		16.05 (7)	08.02		15.46 (7)	08.35		09.53 (9)	09.52		
	23.08	39	05.20 (1)	21.37	81	20.29 (5)	19.52	90	19.09 (6)	18.10	66	16.52 (7)	15.33	94	13.06 (8)	14.37		
15	03.45		04.42 (1)	05.14		18.38 (6)	06.42		16.02 (7)	08.05		15.47 (7)	08.38		09.54 (9)	09.54		
	23.06	37	05.19 (1)	21.34	83	20.29 (5)	19.48	89	19.06 (6)	18.06	63	16.50 (7)	15.31	92	13.06 (8)	14.37		
16	03.48		04.43 (1)	05.17		18.36 (6)	06.45		16.00 (7)	08.08		15.47 (7)	08.41		09.55 (9)	09.55		
	23.03	36	05.19 (1)	21.30	87	20.29 (5)	19.45	88	19.03 (6)	18.03	62	16.49 (7)	15.28	90	13.05 (8)	14.36		
17	03.50		04.45 (1)	05.20		18.35 (6)	06.47		15.59 (7)	08.11		15.48 (7)	08.44		09.56 (9)	09.56		
	23.01	33	05.18 (1)	21.27	89	20.29 (5)	19.42	84	19.00 (6)	18.00	59	16.47 (7)	15.25	87	13.05 (8)	14.36		
18	03.53		04.47 (1)	05.23		18.34 (6)	06.50		15.56 (7)	08.14		15.49 (7)	08.48		09.57 (9)	09.57		
	22.58	30	05.17 (1)	21.24	90	20.29 (5)	19.38	79	18.55 (6)	17.57	57	16.46 (7)	15.23	85	13.05 (8)	14.36		
19	03.56		04.49 (1)	05.26		18.32 (6)	06.53		15.55 (7)	08.17		13.32 (8)	08.51		09.58 (9)	09.58		
	22.56	27	05.16 (1)	21.20	92	20.28 (5)	19.35	65	17.00 (7)	17.53	67	16.44 (7)	15.20	83	13.05 (8)	14.36		
20	03.58		04.51 (1)	05.29		18.31 (6)	06.55		15.54 (7)	08.20		13.27 (8)	08.54		09.58 (9)	09.59		
	22.53	24	05.15 (1)	21.17	93	20.28 (5)	19.31	66	17.00 (7)	17.50	74	16.43 (7)	15.18	81	13.04 (8)	14.36		
21	04.01		04.54 (1)	05.32		18.31 (6)	06.58		15.53 (7)	08.23		13.24 (8)	08.56		09.59 (9)	10.00		
	22.50	20	05.14 (1)	21.14	92	20.27 (5)	19.28	68	17.01 (7)	17.47	76	16.41 (7)	15.15	77	13.03 (8)	14.36		
22	04.04		04.56 (1)	05.35		18.29 (6)	07.01		15.51 (7)	08.26		13.21 (8)	08.59		10.00 (9)	10.00		
	22.48	16	05.12 (1)	21.10	93	20.26 (5)	19.24	69	17.00 (7)	17.43	78	16.39 (7)	15.13	75	13.03 (8)	14.37		
23	04.07		04.58 (1)	05.38		18.29 (6)	07.04		15.50 (7)	08.28		13.19 (8)	09.02		10.02 (9)	10.01		
	22.45	12	05.10 (1)	21.07	92	20.25 (5)	19.21	71	17.01 (7)	17.40	76	16.36 (7)	15.10	71	13.03 (8)	14.37		
24	04.10		05.01 (1)	05.40		18.27 (6)	07.06		15.49 (7)	08.31		11.05 (9)	09.05		10.06 (9)	10.01		
	22.42	6	05.07 (1)	21.04	92	20.24 (5)	19.18	72	17.01 (7)	17.37	89	16.34 (7)	15.08	64	13.02 (8)	14.38		
25	04.13			05.43		18.27 (6)	07.09		15.48 (7)	07.34		10.01 (9)	09.08		10.11 (9)	10.02		
	22.39			21.00	89	20.21 (5)	19.14	73	17.01 (7)	16.34	91	15.30 (7)	15.06	57	13.03 (8)	14.39		
26	04.15			05.46		18.27 (6)	07.12		15.47 (7)	07.37		09.59 (9)	09.11		10.15 (9)	10.02		
	22.36			20.57	86	20.19 (5)	19.11	74	17.01 (7)	16.31	89	15.25 (7)	15.03	51	13.03 (8)	14.40		
27	04.18			05.49		18.26 (6)	07.15		15.46 (7)	07.40		09.58 (9)	09.14		10.19 (9)	10.02		
	22.33			20.53	83	20.15 (5)	19.07	75	17.01 (7)	16.27	76	13.02 (8)	15.01	43	13.02 (8)	14.41		
28	04.21			05.52		18.25 (6)	07.17		15.46 (7)	07.43		09.56 (9)	09.17		12.23 (8)	10.01		
	22.30			20.50	79	20.12 (5)	19.04	75	17.01 (7)	16.24	80	13.02 (8)	14.59	39	13.02 (8)	14.42		
29	04.24			05.55		18.25 (6)	07.20		15.46 (7)	07.46		09.55 (9)	09.19		12.24 (8)	10.01		
	22.27			20.47	74	20.09 (5)	19.00	75	17.01 (7)	16.21	85	13.03 (8)	14.57	37	13.01 (8)	14.43		
30	04.27		20.05 (5)	05.57		18.24 (6)	07.23		15.44 (7)	07.49		09.54 (9)	09.22		12.25 (8)	10.01		
	22.24	12	20.17 (5)	20.43	68	20.05 (5)	18.57	76	17.00 (7)	16.18	87	13.03 (8)	14.55	35	13.00 (8)	14.45		
31	04.30		20.02 (5)	06.00		18.24 (6)				07.52		09.54 (9)				10.00		
	22.21	17	20.19 (5)	20.40	60	19.24 (6)				16.15	90	13.04 (8)				14.46		
Potential sun hours	595			503			392			307			206			150		
Total, worst case		882			2099			2164			2314			2411			247	
Sun reduction		0,44			0,41			0,31			0,19			0,10			0,07	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,63			0,61			0,63			0,64			0,66			0,66	
Total reduction		0,25			0,23			0,18			0,11			0,06			0,04	
Total, real		221			485			387			258			141			10	

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: K - Laskentapiste_K (Ritaviita2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January			February			March			April			May			June		
1	09.59			08.57		11.23 (9)	07.29		14.52 (8)	06.44		18.17 (7)	05.02		19.33 (6)	03.33		
	14.48			16.12	59	12.22 (9)	17.38	61	15.53 (8)	20.07	52	19.09 (7)	21.35	62	20.41 (5)	23.05		
2	09.59			08.54		11.22 (9)	07.26		14.51 (8)	06.40		18.16 (7)	04.59		19.34 (6)	03.31		
	14.50			16.15	60	12.22 (9)	17.41	61	15.52 (8)	20.10	53	19.09 (7)	21.38	59	20.41 (5)	23.08		
3	09.58			08.51		11.21 (9)	07.22		14.52 (8)	06.37		18.16 (7)	04.56		19.35 (6)	03.29		
	14.52			16.18	61	12.22 (9)	17.44	60	15.52 (8)	20.13	53	19.09 (7)	21.41	55	20.40 (5)	23.10		
4	09.57			08.48		11.22 (9)	07.19		14.52 (8)	06.33		18.14 (7)	04.53		19.36 (6)	03.27		
	14.54			16.22	61	12.23 (9)	17.47	59	15.51 (8)	20.16	54	19.08 (7)	21.44	51	20.39 (5)	23.12		
5	09.55			08.45		11.21 (9)	07.16		14.52 (8)	06.30		18.14 (7)	04.50		19.38 (6)	03.25		22.13 (4)
	14.56			16.25	62	12.23 (9)	17.50	59	15.51 (8)	20.19	54	19.08 (7)	21.47	47	20.38 (5)	23.15	1	22.14 (4)
6	09.54			08.42		11.22 (9)	07.12		14.52 (8)	06.27		18.14 (7)	04.46		19.41 (6)	03.23		22.12 (4)
	14.58			16.28	75	15.29 (8)	17.53	57	15.49 (8)	20.22	54	19.08 (7)	21.50	40	20.38 (5)	23.17	3	22.15 (4)
7	09.53			08.39		11.21 (9)	07.09		14.53 (8)	06.23		18.13 (7)	04.43		19.44 (6)	03.21		22.12 (4)
	15.00			16.31	83	15.33 (8)	17.56	56	15.49 (8)	20.24	54	19.07 (7)	21.53	33	20.37 (5)	23.19	5	22.17 (4)
8	09.51			08.36		11.22 (9)	07.06		14.53 (8)	06.20		18.14 (7)	04.40		20.15 (5)	03.19		22.11 (4)
	15.03			16.34	90	15.37 (8)	17.59	55	15.48 (8)	20.27	53	19.07 (7)	21.56	21	20.36 (5)	23.21	7	22.18 (4)
9	09.50		11.39 (9)	08.33		11.21 (9)	07.02		14.55 (8)	06.16		18.14 (7)	04.37		20.16 (5)	03.18		22.11 (4)
	15.05	12	11.51 (9)	16.37	95	15.39 (8)	18.02	52	15.47 (8)	20.30	60	19.55 (6)	21.59	18	20.34 (5)	23.23	9	22.20 (4)
10	09.48		11.37 (9)	08.30		11.22 (9)	06.59		14.55 (8)	06.13		18.13 (7)	04.34		20.18 (5)	03.16		22.10 (4)
	15.08	17	11.54 (9)	16.40	99	15.42 (8)	18.05	50	15.45 (8)	20.33	67	19.57 (6)	22.02	15	20.33 (5)	23.24	11	22.21 (4)
11	09.47		11.35 (9)	08.27		11.22 (9)	06.55		14.57 (8)	06.09		18.14 (7)	04.31		20.20 (5)	03.15		22.10 (4)
	15.10	22	11.57 (9)	16.44	102	15.43 (8)	18.07	48	15.45 (8)	20.36	70	20.00 (6)	22.05	11	20.31 (5)	23.26	12	22.22 (4)
12	09.45		11.34 (9)	08.24		11.23 (9)	06.52		14.57 (8)	06.06		18.14 (7)	04.28			03.14		22.09 (4)
	15.13	25	11.59 (9)	16.47	104	15.45 (8)	18.10	45	15.42 (8)	20.39	75	20.03 (6)	22.08			23.28	13	22.22 (4)
13	09.43		11.32 (9)	08.21		11.22 (9)	06.49		14.59 (8)	06.03		18.15 (7)	04.24			03.13		22.10 (4)
	15.15	29	12.01 (9)	16.50	107	15.46 (8)	18.13	42	15.41 (8)	20.42	77	20.06 (6)	22.11			23.29	14	22.24 (4)
14	09.41		11.32 (9)	08.18		11.23 (9)	06.45		15.01 (8)	05.59		18.15 (7)	04.21			03.12		22.09 (4)
	15.18	31	12.03 (9)	16.53	108	15.48 (8)	18.16	38	15.39 (8)	20.45	79	20.08 (6)	22.14			23.30	15	22.24 (4)
15	09.39		11.31 (9)	08.15		11.23 (9)	06.42		15.03 (8)	05.56		18.16 (7)	04.18			03.11		22.10 (4)
	15.21	34	12.05 (9)	16.56	110	15.48 (8)	18.19	34	15.37 (8)	20.47	80	20.09 (6)	22.17			23.31	16	22.26 (4)
16	09.37		11.30 (9)	08.11		11.24 (9)	06.38		15.07 (8)	05.52		18.17 (7)	04.15			03.10		22.10 (4)
	15.24	36	12.06 (9)	16.59	111	15.50 (8)	18.22	27	15.34 (8)	20.50	79	20.09 (6)	22.20			23.32	17	22.27 (4)
17	09.35		11.29 (9)	08.08		11.24 (9)	06.35		15.10 (8)	05.49		18.18 (7)	04.12			03.09		22.10 (4)
	15.26	39	12.08 (9)	17.02	111	15.50 (8)	18.25	20	15.30 (8)	20.53	79	20.10 (6)	22.23			23.33	17	22.27 (4)
18	09.33		11.28 (9)	08.05		11.25 (9)	06.32			05.46		18.19 (7)	04.10			03.09		22.10 (4)
	15.29	40	12.08 (9)	17.05	111	15.51 (8)	18.28			20.56	78	20.10 (6)	22.26			23.34	17	22.27 (4)
19	09.30		11.28 (9)	08.02		11.25 (9)	06.28			05.42		18.19 (7)	04.07			03.09		22.10 (4)
	15.32	42	12.10 (9)	17.08	111	15.51 (8)	18.30			20.59	76	20.10 (6)	22.29			23.35	18	22.28 (4)
20	09.28		11.27 (9)	07.59		11.27 (9)	06.25		17.41 (7)	05.39		18.21 (7)	04.04			03.08		22.10 (4)
	15.35	44	12.11 (9)	17.11	109	15.52 (8)	18.33	11	17.52 (7)	21.02	76	20.24 (5)	22.32			23.35	18	22.28 (4)
21	09.26		11.26 (9)	07.55		11.27 (9)	06.21		17.35 (7)	05.36		18.23 (7)	04.01			03.08		22.10 (4)
	15.38	46	12.12 (9)	17.14	109	15.52 (8)	18.36	21	17.56 (7)	21.05	79	20.27 (5)	22.35			23.36	18	22.28 (4)
22	09.23		11.25 (9)	07.52		11.29 (9)	06.18		17.32 (7)	05.32		18.26 (7)	03.58			03.09		22.11 (4)
	15.41	48	12.13 (9)	17.17	107	15.53 (8)	18.39	28	18.00 (7)	21.08	77	20.29 (5)	22.38			23.36	18	22.29 (4)
23	09.21		11.25 (9)	07.49		11.29 (9)	06.15		17.29 (7)	05.29		18.29 (7)	03.55			03.09		22.11 (4)
	15.44	50	12.15 (9)	17.20	106	15.53 (8)	18.42	32	18.01 (7)	21.11	75	20.32 (5)	22.41			23.36	18	22.29 (4)
24	09.18		11.25 (9)	07.46		11.31 (9)	06.11		17.27 (7)	05.26		18.34 (7)	03.53			03.09		22.11 (4)
	15.47	51	12.16 (9)	17.23	104	15.54 (8)	18.45	36	18.03 (7)	21.14	68	20.35 (5)	22.44			23.36	17	22.28 (4)
25	09.16		11.24 (9)	07.42		11.33 (9)	06.08		17.25 (7)	05.22		19.30 (6)	03.50			03.10		22.12 (4)
	15.50	53	12.17 (9)	17.26	99	15.53 (8)	18.47	39	18.04 (7)	21.17	63	20.38 (5)	22.47			23.36	17	22.29 (4)
26	09.13		11.24 (9)	07.39		11.35 (9)	06.04		17.24 (7)	05.19		19.31 (6)	03.47			03.10		22.12 (4)
	15.53	54	12.18 (9)	17.29	96	15.54 (8)	18.50	42	18.06 (7)	21.20	65	20.40 (5)	22.49			23.35	17	22.29 (4)
27	09.11		11.24 (9)	07.36		11.38 (9)	06.01		17.22 (7)	05.16		19.31 (6)	03.45			03.11		22.12 (4)
	15.56	54	12.18 (9)	17.32	89	15.53 (8)	18.53	45	18.07 (7)	21.23	67	20.42 (5)	22.52			23.35	16	22.28 (4)
28	09.08		11.24 (9)	07.32		11.42 (9)	05.57		17.21 (7)	05.12		19.31 (6)	03.42			03.12		22.13 (4)
	16.00	56	12.20 (9)	17.35	81	15.53 (8)	18.56	46	18.07 (7)	21.26	66	20.42 (5)	22.55			23.34	15	22.28 (4)
29	09.05		11.23 (9)				06.54		18.20 (7)	05.09		19.32 (6)	03.40			03.13		22.13 (4)
	16.03	57	12.20 (9)				19.59	48	19.08 (7)	21.29	65	20.42 (5)	22.57			23.33	15	22.28 (4)
30	09.02		11.23 (9)				06.51		18.18 (7)	05.06		19.32 (6)	03.38			03.15		22.14 (4)
	16.06	58	12.21 (9)				20.02	50	19.08 (7)	21.32	63	20.41 (5)	23.00			23.32	13	22.27 (4)
31	09.00		11.22 (9)				06.47		18.18 (7)				03.35					
	16.09	59	12.21 (9)				20.04	50	19.08 (7)				23.03					
Potential sun hours	181			242			363			447			560			606		
Total, worst case		957			2620			1272			2011			412			357	
Sun reduction		0,14			0,26			0,37			0,40			0,45			0,40	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,66			0,64			0,62			0,61			0,61			0,64	
Total reduction		0,08			0,15			0,21			0,22			0,25			0,24	
Total, real		79			399			269			448			104			84	

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

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest Shadow receptor: K - Laskentapiste_K (Ritaviita2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

July			August			September			October			November			December		
1	03.16		22.14 (4)	04.33		20.33 (5)	06.03		18.13 (7)	07.26		15.37 (8)	07.55		10.51 (9)	09.25		11.17 (9)
	23.31	12	22.26 (4)	22.18	6	20.39 (5)	20.36	69	19.58 (6)	18.54	44	16.21 (8)	16.12	98	15.11 (8)	14.53	22	11.39 (9)
2	03.17		22.15 (4)	04.36		20.29 (5)	06.06		18.12 (7)	07.28		15.36 (8)	07.58		10.51 (9)	09.27		11.20 (9)
	23.30	11	22.26 (4)	22.15	13	20.42 (5)	20.33	67	19.56 (6)	18.50	46	16.22 (8)	16.09	94	15.08 (8)	14.51	18	11.38 (9)
3	03.19		22.15 (4)	04.39		20.28 (5)	06.09		18.12 (7)	07.31		15.34 (8)	08.02		10.51 (9)	09.30		11.23 (9)
	23.29	10	22.25 (4)	22.12	16	20.44 (5)	20.30	60	19.53 (6)	18.47	49	16.23 (8)	16.05	89	15.06 (8)	14.50	12	11.35 (9)
4	03.21		22.16 (4)	04.42		20.25 (5)	06.11		18.11 (7)	07.34		15.33 (8)	08.05		10.52 (9)	09.32		
	23.27	8	22.24 (4)	22.09	20	20.45 (5)	20.26	53	19.04 (7)	18.43	51	16.24 (8)	16.02	82	15.03 (8)	14.48		
5	03.22		22.17 (4)	04.45		20.25 (5)	06.14		18.11 (7)	07.37		15.31 (8)	08.08		10.51 (9)	09.34		
	23.26	6	22.23 (4)	22.06	21	20.46 (5)	20.23	53	19.04 (7)	18.40	54	16.25 (8)	15.59	73	14.58 (8)	14.47		
6	03.24		22.17 (4)	04.48		19.52 (6)	06.17		18.09 (7)	07.40		15.30 (8)	08.11		10.52 (9)	09.37		
	23.24	5	22.22 (4)	22.03	37	20.48 (5)	20.19	55	19.04 (7)	18.37	55	16.25 (8)	15.56	61	11.53 (9)	14.45		
7	03.26		22.19 (4)	04.51		19.49 (6)	06.20		18.10 (7)	07.42		15.29 (8)	08.14		10.52 (9)	09.39		
	23.22	2	22.21 (4)	22.00	44	20.48 (5)	20.16	53	19.03 (7)	18.33	57	16.26 (8)	15.53	62	11.54 (9)	14.44		
8	03.28			04.54		19.47 (6)	06.23		18.10 (7)	07.45		15.28 (8)	08.17		10.52 (9)	09.41		
	23.21			21.56	49	20.49 (5)	20.12	53	19.03 (7)	18.30	58	16.26 (8)	15.51	61	11.53 (9)	14.42		
9	03.31			04.57		19.45 (6)	06.25		18.09 (7)	07.48		15.27 (8)	08.20		10.53 (9)	09.43		
	23.19			21.53	52	20.48 (5)	20.09	53	19.02 (7)	18.26	58	16.25 (8)	15.48	60	11.53 (9)	14.41		
10	03.33			05.00		19.44 (6)	06.28		18.09 (7)	07.51		15.26 (8)	08.23		10.53 (9)	09.45		
	23.17			21.50	56	20.49 (5)	20.06	53	19.02 (7)	18.23	59	16.25 (8)	15.45	60	11.53 (9)	14.40		
11	03.35			05.03		19.42 (6)	06.31		18.09 (7)	07.54		15.25 (8)	08.26		10.53 (9)	09.47		
	23.15			21.47	59	20.49 (5)	20.02	52	19.01 (7)	18.20	60	16.25 (8)	15.42	59	11.52 (9)	14.39		
12	03.38			05.06		19.41 (6)	06.34		18.09 (7)	07.57		15.26 (8)	08.29		10.54 (9)	09.49		
	23.12			21.43	61	20.49 (5)	19.59	51	19.00 (7)	18.16	60	16.26 (8)	15.39	58	11.52 (9)	14.38		
13	03.40			05.09		19.40 (6)	06.36		18.10 (7)	07.59		12.19 (9)	08.32		10.55 (9)	09.50		
	23.10			21.40	64	20.50 (5)	19.55	49	18.59 (7)	18.13	73	16.26 (8)	15.36	57	11.52 (9)	14.38		
14	03.42			05.11		19.39 (6)	06.39		18.10 (7)	08.02		12.13 (9)	08.35		10.56 (9)	09.52		
	23.08			21.37	65	20.49 (5)	19.52	49	18.59 (7)	18.10	84	16.26 (8)	15.33	55	11.51 (9)	14.37		
15	03.45			05.14		19.38 (6)	06.42		18.10 (7)	08.05		12.09 (9)	08.38		10.56 (9)	09.54		
	23.06			21.34	67	20.49 (5)	19.48	47	18.57 (7)	18.06	92	16.26 (8)	15.31	55	11.51 (9)	14.37		
16	03.48			05.17		19.37 (6)	06.45		18.11 (7)	08.08		12.06 (9)	08.41		10.57 (9)	09.55		
	23.03			21.30	67	20.48 (5)	19.45	45	18.56 (7)	18.03	97	16.25 (8)	15.28	54	11.51 (9)	14.36		
17	03.50			05.20		19.37 (6)	06.47		18.12 (7)	08.11		12.04 (9)	08.44		10.58 (9)	09.56		
	23.01			21.27	65	20.46 (5)	19.42	43	18.55 (7)	18.00	101	16.25 (8)	15.25	52	11.50 (9)	14.36		
18	03.53			05.23		19.37 (6)	06.50		18.12 (7)	08.14		12.02 (9)	08.47		10.59 (9)	09.57		
	22.58			21.24	63	20.44 (5)	19.38	40	18.52 (7)	17.57	103	16.24 (8)	15.23	51	11.50 (9)	14.36		
19	03.56			05.26		18.38 (7)	06.53		18.14 (7)	08.17		12.00 (9)	08.50		10.59 (9)	09.58		
	22.56			21.20	70	20.40 (5)	19.35	36	18.50 (7)	17.53	106	16.24 (8)	15.20	50	11.49 (9)	14.36		
20	03.58			05.29		18.34 (7)	06.55		18.15 (7)	08.20		11.59 (9)	08.53		11.00 (9)	09.59		
	22.53			21.17	74	20.37 (5)	19.31	34	18.49 (7)	17.50	108	16.24 (8)	15.18	48	11.48 (9)	14.36		
21	04.01			05.32		18.31 (7)	06.58		18.16 (7)	08.23		11.58 (9)	08.56		11.02 (9)	10.00		
	22.50			21.14	77	20.35 (5)	19.28	29	18.45 (7)	17.47	109	16.23 (8)	15.15	46	11.48 (9)	14.36		
22	04.04			05.35		18.27 (7)	07.01		18.19 (7)	08.25		11.56 (9)	08.59		11.03 (9)	10.00		
	22.48			21.10	77	20.31 (5)	19.24	23	18.42 (7)	17.43	111	16.22 (8)	15.13	44	11.47 (9)	14.37		
23	04.07			05.38		18.26 (7)	07.04		18.23 (7)	08.28		11.55 (9)	09.02		11.04 (9)	10.01		
	22.45			21.07	75	20.28 (5)	19.21	15	18.38 (7)	17.40	111	16.21 (8)	15.10	42	11.46 (9)	14.37		
24	04.10			05.40		18.23 (7)	07.06			08.31		11.55 (9)	09.05		11.05 (9)	10.01		
	22.42			21.04	75	20.13 (6)	19.18			17.37	111	16.21 (8)	15.08	41	11.46 (9)	14.38		
25	04.13			05.43		18.21 (7)	07.09			07.34		10.54 (9)	09.08		11.06 (9)	10.01		
	22.39			21.00	78	20.13 (6)	19.14			16.34	111	15.20 (8)	15.06	39	11.45 (9)	14.39		
26	04.15			05.46		18.20 (7)	07.12		15.54 (8)	07.37		10.53 (9)	09.11		11.08 (9)	10.02		
	22.36			20.57	80	20.13 (6)	19.11	16	16.10 (8)	16.31	111	15.19 (8)	15.03	36	11.44 (9)	14.40		
27	04.18			05.49		18.18 (7)	07.15		15.49 (8)	07.40		10.53 (9)	09.14		11.10 (9)	10.02		
	22.33			20.53	80	20.11 (6)	19.07	25	16.14 (8)	16.27	109	15.18 (8)	15.01	34	11.44 (9)	14.41		
28	04.21			05.52		18.17 (7)	07.17		15.45 (8)	07.43		10.52 (9)	09.17		11.12 (9)	10.01		
	22.30			20.50	80	20.10 (6)	19.04	32	16.17 (8)	16.24	109	15.17 (8)	14.59	31	11.43 (9)	14.42		
29	04.24			05.55		18.15 (7)	07.20		15.43 (8)	07.46		10.52 (9)	09.19		11.14 (9)	10.01		
	22.27			20.47	80	20.08 (6)	19.00	36	16.19 (8)	16.21	105	15.15 (8)	14.57	28	11.42 (9)	14.43		
30	04.27			05.57		18.15 (7)	07.23		15.39 (8)	07.49		10.52 (9)	09.22		11.15 (9)	10.01		
	22.24			20.43	76	20.05 (6)	18.57	41	16.20 (8)	16.18	103	15.14 (8)	14.55	26	11.41 (9)	14.45		
31	04.30			06.00		18.14 (7)				07.52		10.51 (9)				10.00		
	22.21			20.40	74	20.02 (6)				16.15	101	15.12 (8)				14.46		
Potential sun hours	595			503			392			307			206			150		
Total, worst case		54			1821			1232			2606			1646			52	
Sun reduction		0,44			0,41			0,31			0,19			0,10			0,07	
Oper. time red.		0,90			0,90			0,90			0,90			0,90			0,90	
Wind dir. red.		0,64			0,61			0,62			0,64			0,66			0,66	
Total reduction		0,26			0,23			0,18			0,11			0,06			0,04	
Total, real		14			419			217			288			96			2	

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

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

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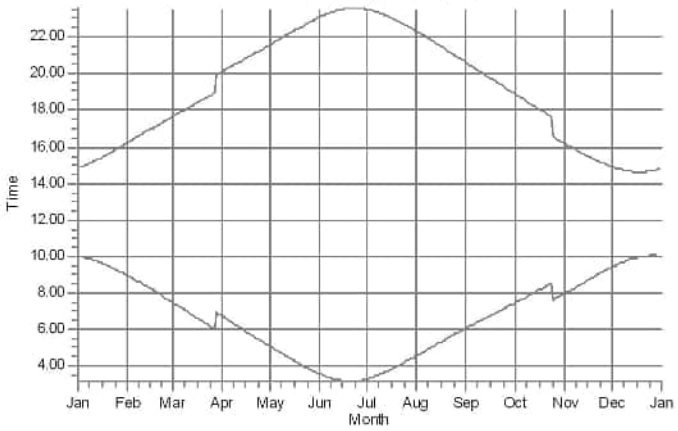
Calculated:
10.11.2023 9.43/3.6.355

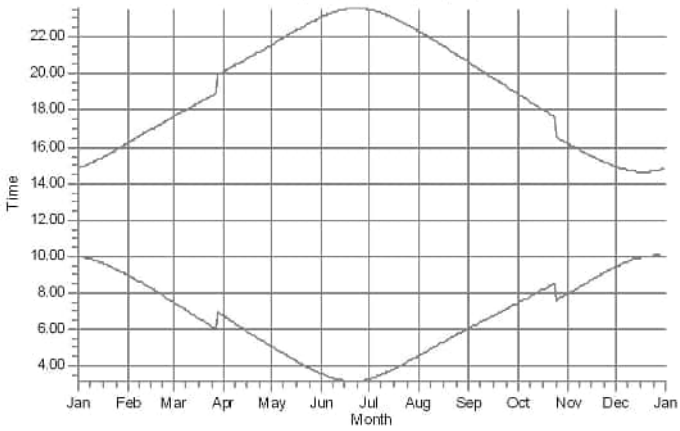
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest

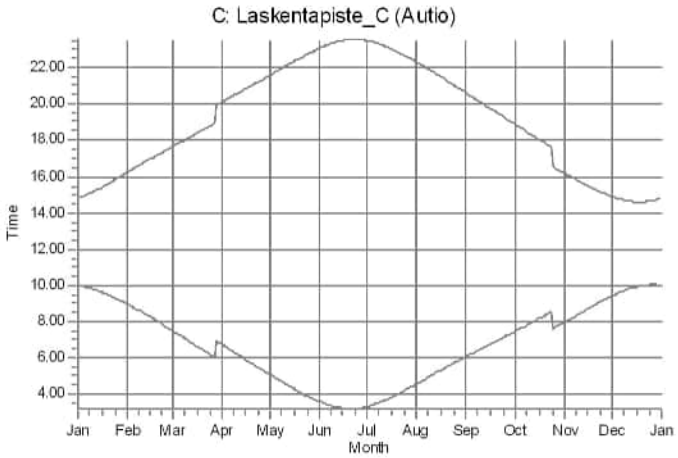
A: Laskentapiste_A (Harjunpää)



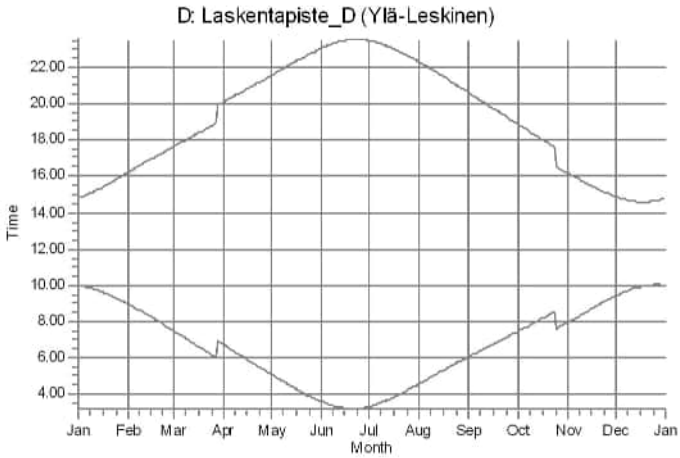
B: Laskentapiste_B (Harjunpää)



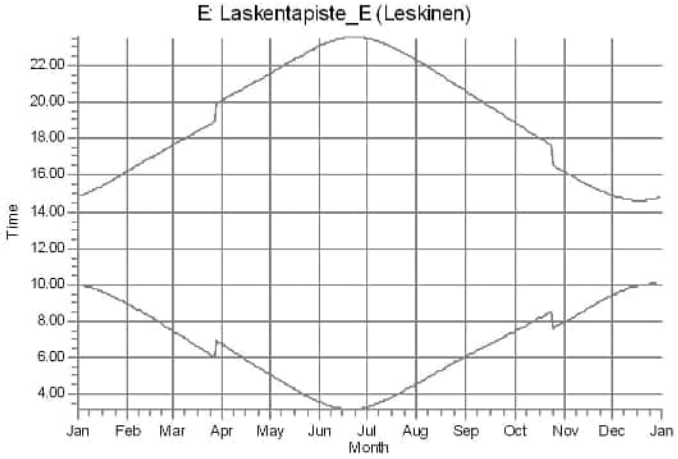
C: Laskentapiste_C (Autio)



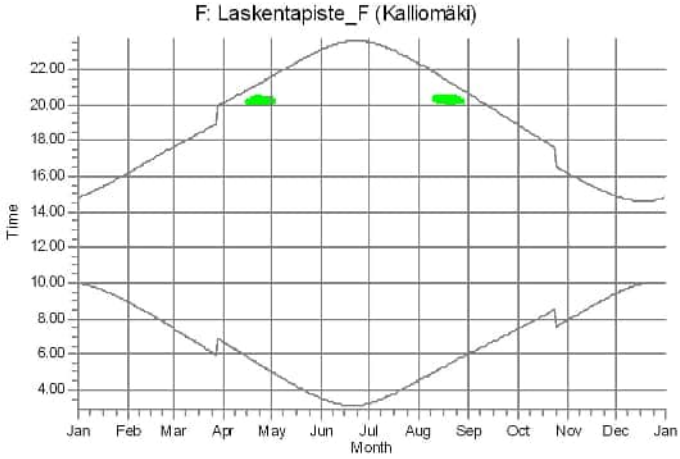
D: Laskentapiste_D (Ylä-Leskinen)



E: Laskentapiste_E (Leskinen)



F: Laskentapiste_F (Kalliomäki)



WTGs

9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

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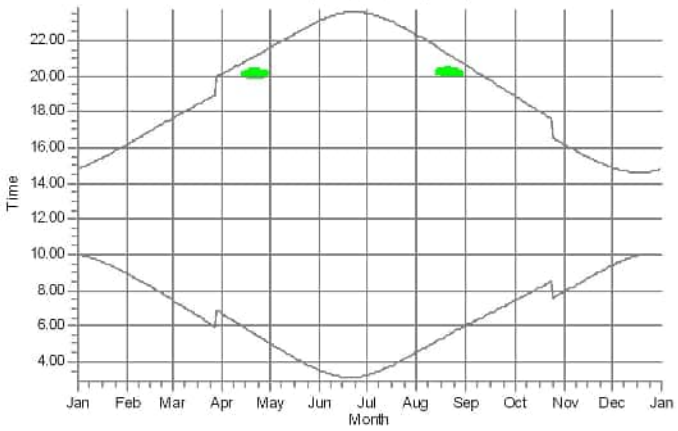
Calculated:
10.11.2023 9.43/3.6.355

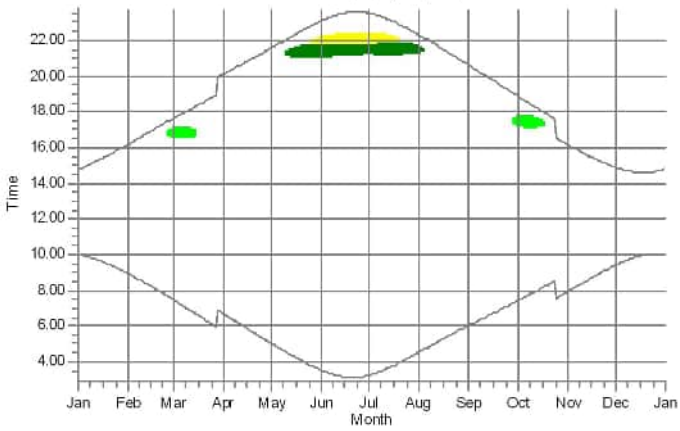
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest

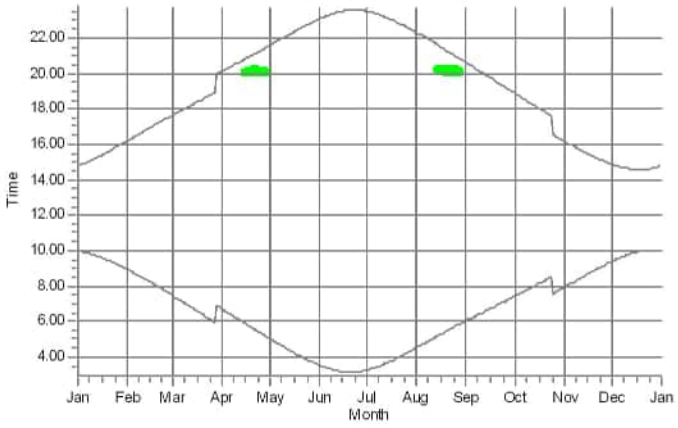
G: Laskentapiste_G (Alapelto)



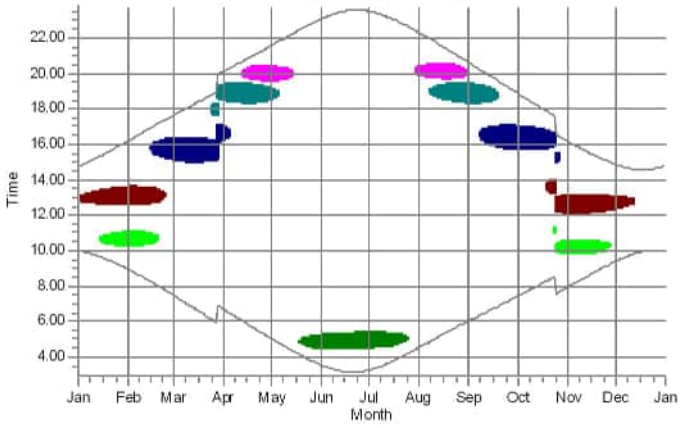
H: Laskentapiste_H (Lepola)



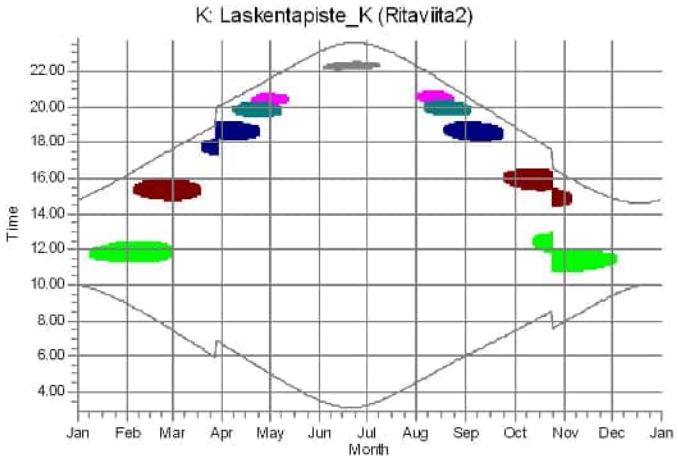
I: Laskentapiste_I (Kalliomäki)



J: Laskentapiste_J (Ritaviita)



K: Laskentapiste_K (Ritaviita2)



WTGs

1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (267)
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (262)
4: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (265)
5: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (260)
6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (263)
7: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (266)
8: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (264)
9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 1 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (267)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.02	03.33 04.31-05.12/41	03.16 04.35-05.22/47	04.33 21.24-21.32/8	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05 21.09-21.37/28	23.31 21.18-21.41/23	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 04.31-05.14/43	03.17 04.35-05.22/47	04.36 21.25-21.28/3	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08 21.10-21.38/28	23.30 21.18-21.42/24	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 04.30-05.14/44	03.19 04.35-05.22/47	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10 21.09-21.37/28	23.29 21.18-21.42/24	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 04.31-05.14/43	03.20 04.36-05.22/46	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.12 21.10-21.37/27	23.27 21.17-21.42/25	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 04.31-05.15/44	03.22 04.36-05.22/46	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15 21.11-21.38/27	23.26 21.18-21.43/25	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23 04.31-05.16/45	03.24 04.36-05.21/45	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17 21.12-21.38/26	23.24 21.17-21.43/26	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 04.31-05.16/45	03.26 04.37-05.22/45	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19 21.11-21.37/26	23.23 21.18-21.44/26	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 04.31-05.17/46	03.28 04.37-05.21/44	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21 21.12-21.37/25	23.21 21.17-21.44/27	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18 04.31-05.17/46	03.30 04.38-05.21/43	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23 21.12-21.36/24	23.19 21.17-21.45/28	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16 04.31-05.17/46	03.33 04.39-05.21/42	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.24 21.13-21.37/24	23.17 21.17-21.45/28	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30 21.14-21.19/5	03.15 04.30-05.17/47	03.35 04.39-05.20/41	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26 21.13-21.37/24	23.15 21.17-21.45/28	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27 21.12-21.22/10	03.14 04.30-05.17/47	03.37 04.40-05.20/40	05.05	06.33	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28 21.14-21.37/23	23.13 21.17-21.46/29	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24 21.12-21.25/13	03.12 04.31-05.18/47	03.40 04.40-05.20/40	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29 21.15-21.37/22	23.10 21.17-21.46/29	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21 21.10-21.27/17	03.11 04.30-05.18/48	03.42 04.41-05.20/39	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30 21.15-21.37/22	23.08 21.17-21.46/29	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18 21.10-21.30/20	03.11 04.31-05.19/48	03.45 04.42-05.19/37	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.32 21.15-21.37/22	23.06 21.17-21.47/30	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15 21.09-21.31/22	03.10 04.31-05.20/49	03.47 04.43-05.19/36	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.20	23.33 21.15-21.37/22	23.03 21.17-21.47/30	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12 21.09-21.34/25	03.09 04.31-05.19/48	03.50 04.45-05.18/33	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.25	20.53	22.23	23.34 21.16-21.37/21	23.01 21.17-21.47/30	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09 21.09-21.36/27	03.09 04.31-05.19/48	03.53 04.47-05.17/30	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34 21.16-21.37/21	22.58 21.17-21.47/30	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07 04.51-04.52/1	03.08 04.31-05.20/49	03.55 04.49-05.16/27	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29 21.07-21.36/29	23.35 21.16-21.37/21	22.56 21.17-21.47/30	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 04.49-04.58/9	03.08 04.31-05.20/49	03.58 04.51-05.15/24	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32 21.08-21.37/29	23.35 21.17-21.37/20	22.53 21.17-21.47/30	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01 04.47-05.01/14	03.08 04.31-05.20/49	04.01 04.54-05.14/20	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35 21.08-21.37/29	23.36 21.17-21.37/20	22.50 21.18-21.48/30	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58 04.45-05.03/18	03.08 04.32-05.21/49	04.04 04.56-05.12/16	05.35	07.01	08.25	08.59	10.01
	15.41	17.17	18.39	21.08	22.38 21.08-21.38/30	23.36 21.17-21.37/20	22.48 21.18-21.47/29	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55 04.43-05.05/22	03.09 04.32-05.21/49	04.07 04.58-05.10/12	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41 21.08-21.38/30	23.36 21.18-21.38/20	22.45 21.18-21.47/29	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53 04.41-05.06/25	03.09 04.32-05.21/49	04.09 05.01-05.07/6	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44 21.07-21.37/30	23.36 21.17-21.38/21	22.42 21.18-21.47/29	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50 04.39-05.07/28	03.10 04.33-05.21/48	04.12 21.19-21.47/28	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47 21.07-21.37/30	23.36 21.18-21.39/21	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 04.37-05.08/31	03.10 04.33-05.22/49	04.15 21.19-21.46/27	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49 21.08-21.38/30	23.35 21.17-21.39/22	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45 04.35-05.09/34	03.11 04.33-05.21/48	04.18 21.19-21.43/24	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52 21.08-21.38/30	23.35 21.18-21.39/21	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 04.33-05.10/37	03.12 04.34-05.22/48	04.21 21.20-21.41/21	05.52	07.17	07.43	09.17	10.01
	15.59	17.35	18.56	21.26	22.55 21.08-21.38/30	23.34 21.18-21.40/22	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 04.33-05.11/38	03.13 04.34-05.22/48	04.24 21.20-21.39/19	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58 21.08-21.38/30	23.33 21.18-21.40/22	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.37 04.33-05.12/39	03.14 04.34-05.22/48	04.27 21.21-21.37/16	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00 21.08-21.37/29	23.32 21.18-21.41/23	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35 04.32-05.12/40		04.30 21.22-21.34/12	06.00		07.52		10.00
	16.09		20.04		23.03 21.09-21.38/29		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	860	2101	1668	11	0	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 2 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (262)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33 21.51-22.06/15	03.16 21.56-22.21/25	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 21.51-22.09/18	03.17 21.56-22.21/25	04.36	06.06	07.28	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 21.51-22.10/19	03.19 21.56-22.21/25	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 21.51-22.12/21	03.20 21.56-22.21/25	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 21.51-22.14/23	03.22 21.57-22.21/24	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.26	04.46	03.23 21.52-22.15/23	03.24 21.57-22.21/24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.51-22.15/24	03.26 21.58-22.21/23	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 21.51-22.15/24	03.28 21.58-22.19/21	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.17 21.51-22.15/24	03.30 21.58-22.18/20	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16 21.52-22.16/24	03.33 21.59-22.17/18	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30	03.15 21.52-22.16/24	03.35 21.58-22.15/17	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13 21.52-22.16/24	03.37 21.59-22.14/15	05.05	06.33	07.57	08.29	09.49
	15.12	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12 21.53-22.17/24	03.40 22.00-22.12/12	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11 21.52-22.17/25	03.42 22.00-22.11/11	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10 21.53-22.17/24	03.45 22.01-22.09/8	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15	03.10 21.53-22.17/24	03.47 22.01-22.07/6	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09 21.53-22.17/24	03.50 22.02-22.05/3	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09 21.53-22.17/24	03.53 22.02-22.03/1	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.06	03.08 21.54-22.18/24	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08 21.54-22.18/24	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08 21.54-22.18/24	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.08 21.54-22.18/24	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.08 21.55-22.19/24	04.07	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53	03.09 21.54-22.19/25	04.09	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09 21.55-22.19/24	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 21.53-21.55/2	03.10 21.55-22.19/24	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.15	03.45 21.52-21.57/5	03.11 21.55-22.19/24	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 21.52-21.59/7	03.12 21.56-22.20/24	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 21.51-22.01/10	03.13 21.56-22.20/24	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.37 21.51-22.02/11	03.14 21.56-22.21/25	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35 21.51-22.05/14		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	49	698	303	0	0	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 3 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (261)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.32	22.18	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26	03.20	04.42	06.11	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24	03.22	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.30	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.09	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13	03.37	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	03.40	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10	03.45	05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.39	05.52	04.15	03.10	03.47	05.17	06.45	08.08	08.42	09.55
	15.23	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.35	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.30	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.09	05.40	07.06	08.31	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.00	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.04		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	205	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 4 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (265)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June		July		August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33		03.16	22.14-22.26/12	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05		23.32		22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31		03.17	22.15-22.26/11	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08		23.30		22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.23	06.37	04.56	03.29		03.19	22.15-22.25/10	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10		23.29		22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27		03.21	22.16-22.24/8	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13		23.28		22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	22.13-22.14/1	03.22	22.17-22.23/6	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15		23.26		22.06	20.23	18.40	15.59	14.47
6	09.55	08.42	07.12	06.27	04.46	03.23	22.12-22.15/3	03.24	22.17-22.22/5	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17		23.25		22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	22.12-22.17/5	03.26	22.19-22.21/2	04.51	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19		23.23		22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	22.11-22.18/7	03.28		04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21		23.21		21.57	20.13	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	22.11-22.20/9	03.30		04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23		23.19		21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	22.10-22.21/11	03.33		05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.05	20.33	22.02	23.25		23.17		21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	22.10-22.22/12	03.35		05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26		23.15		21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	22.09-22.22/13	03.37		05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28		23.13		21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	22.10-22.24/14	03.40		05.09	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29		23.11		21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	22.09-22.24/15	03.42		05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31		23.08		21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.11	22.10-22.26/16	03.45		05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32		23.06		21.34	19.49	18.06	15.31	14.37
16	09.37	08.12	06.39	05.53	04.15	03.10	22.10-22.27/17	03.47		05.17	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33		23.03		21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	22.10-22.27/17	03.50		05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.54	22.24	23.34		23.01		21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	22.10-22.27/17	03.53		05.23	06.50	08.14	08.48	09.58
	15.29	17.05	18.28	20.56	22.27	23.35		22.58		21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	22.10-22.28/18	03.56		05.26	06.53	08.17	08.51	09.59
	15.32	17.08	18.30	20.59	22.30	23.35		22.56		21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	22.10-22.28/18	03.58		05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36		22.53		21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	22.10-22.28/18	04.01		05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36		22.51		21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	22.11-22.29/18	04.04		05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36		22.48		21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	22.11-22.29/18	04.07		05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36		22.45		21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	22.11-22.28/17	04.10		05.40	07.07	08.32	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36		22.42		21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	22.12-22.29/17	04.12		05.43	07.09	07.35	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36		22.39		21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	22.12-22.29/17	04.15		05.46	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36		22.36		20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	22.12-22.28/16	04.18		05.49	07.15	07.41	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35		22.34		20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	22.13-22.28/15	04.21		05.52	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34		22.31		20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	22.13-22.28/15	04.24		05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.34		22.28		20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	22.14-22.27/13	04.27		05.57	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33		22.25		20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35			04.30		06.00		07.53		10.00
	16.09		20.05		23.03			22.22		20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606		595		503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	357		54		0	0	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 5 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (260)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03 19.41-20.41/60	03.33	03.16	04.33 20.33-20.39/6	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.19 20.00-20.21/21	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59 19.41-20.41/60	03.31	03.17	04.36 20.29-20.42/13	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15 19.58-20.22/24	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56 19.41-20.40/59	03.29	03.19	04.39 20.28-20.44/16	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12 19.57-20.24/27	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53 19.41-20.39/58	03.27	03.21	04.42 19.55-20.45/50	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50 19.42-20.38/56	03.25	03.23	04.45 19.54-20.46/52	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46 19.43-20.38/55	03.23	03.24	04.48 19.54-20.48/54	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43 19.44-20.37/53	03.21	03.26	04.51 19.52-20.48/56	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40 19.45-20.36/51	03.19	03.28	04.54 19.52-20.49/57	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37 20.16-20.34/18	03.18	03.31	04.57 19.50-20.48/58	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59 19.45-20.14/29	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34 20.18-20.33/15	03.16	03.33	05.00 19.50-20.49/59	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02 19.47-20.14/27	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31 20.20-20.31/11	03.15	03.35	05.03 19.49-20.49/60	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05 19.48-20.12/24	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28 19.51-20.11/20	03.14	03.38	05.06 19.49-20.49/60	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03 19.57-20.06/9	04.25 19.53-20.08/15	03.13	03.40	05.09 19.49-20.50/61	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59 19.53-20.08/15	04.22 19.56-20.04/8	03.12	03.42	05.12 19.48-20.49/61	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56 19.51-20.10/19	04.19	03.11	03.45	05.15 19.48-20.49/61	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53 19.49-20.13/24	04.16	03.10	03.48	05.17 19.47-20.48/61	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49 19.48-20.16/28	04.13	03.09	03.50	05.20 19.47-20.46/59	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46 19.47-20.19/32	04.10	03.09	03.53	05.23 19.48-20.44/56	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42 19.45-20.20/35	04.07	03.09	03.56	05.26 19.47-20.40/53	06.53	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39 19.44-20.24/40	04.04	03.08	03.58	05.29 19.48-20.37/49	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36 19.43-20.27/44	04.01	03.08	04.01	05.32 19.48-20.35/47	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32 19.43-20.29/46	03.58	03.09	04.04	05.35 19.48-20.31/43	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29 19.42-20.32/50	03.56	03.09	04.07	05.38 19.49-20.28/39	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26 19.42-20.35/53	03.53	03.09	04.10	05.41 19.49-20.24/35	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22 19.41-20.38/57	03.50	03.10	04.13	05.43 19.50-20.21/31	07.09	07.35	09.08	10.02
	15.50	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19 19.41-20.40/59	03.48	03.10	04.15	05.46 19.51-20.19/28	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16 19.41-20.42/61	03.45	03.11	04.18	05.49 19.51-20.15/24	07.15	07.41	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.33	05.58	05.12 19.41-20.42/61	03.42	03.12	04.21	05.52 19.53-20.12/19	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09 19.41-20.42/61	03.40	03.13	04.24	05.55 19.55-20.09/14	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06 19.41-20.41/60	03.38	03.15	04.27 20.05-20.17/12	05.58 19.57-20.05/8	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30 20.02-20.19/17	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	754	619	0	29	1362	0	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 6 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (263)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44 18.34-19.22/48	05.03 19.33-20.05/32	03.33	03.16	04.33	06.03 19.40-19.58/18	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35 18.36-19.07/31	23.05	23.31	22.18	20.37 18.24-19.23/59	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40 18.32-19.22/50	04.59 19.34-20.03/29	03.31	03.17	04.36	06.06 19.42-19.56/14	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38 18.38-19.05/27	23.08	23.30	22.15	20.33 18.24-19.23/59	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37 18.31-19.23/52	04.56 19.35-20.02/27	03.29	03.19	04.39	06.09 19.46-19.53/7	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41 18.41-19.02/21	23.10	23.29	22.12	20.30 18.24-19.23/59	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34 18.30-19.23/53	04.53 19.36-20.00/24	03.27	03.21	04.42	06.12 18.23-19.21/58	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44 18.44-18.58/14	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.56	08.45	07.16	06.30 18.29-19.24/55	04.50 19.38-19.59/21	03.25	03.23	04.45	06.14 18.24-19.21/57	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27 18.28-19.24/56	04.46 19.41-19.57/16	03.23	03.24	04.48 19.52-20.05/13	06.17 18.24-19.21/57	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23 18.27-19.24/57	04.43 19.44-19.54/10	03.21	03.26	04.51 19.49-20.07/18	06.20 18.24-19.19/55	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20 18.26-19.24/58	04.40	03.19	03.29	04.54 19.47-20.09/22	06.23 18.25-19.18/53	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56 18.59-19.03/4	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16 19.48-19.55/7	04.37	03.18	03.31	04.57 19.45-20.10/25	06.25 18.25-19.16/51	07.48	08.20	09.43
	15.05	16.37	18.02	20.30 18.26-19.25/59	21.59	23.23	23.19	21.53 18.52-19.09/17	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13 19.43-19.57/14	04.34	03.16	03.33	05.00 19.44-20.12/28	06.28 18.26-19.15/49	07.51	08.23	09.45
	15.08	16.41	18.05	20.33 18.26-19.25/59	22.02	23.25	23.17	21.50 18.49-19.12/23	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10 19.41-20.00/19	04.31	03.15	03.35	05.03 19.42-20.12/30	06.31 18.27-19.14/47	07.54	08.26	09.47
	15.10	16.44	18.08	20.36 18.25-19.24/59	22.05	23.26	23.15	21.47 18.46-19.14/28	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06 19.39-20.03/24	04.28	03.14	03.38	05.06 19.41-20.13/32	06.34 18.27-19.12/45	07.57	08.29	09.49
	15.13	16.47	18.10	20.39 18.25-19.24/59	22.08	23.28	23.13	21.44 18.44-19.16/32	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03 19.38-20.06/28	04.25	03.13	03.40	05.09 19.40-20.14/34	06.36 18.28-19.11/43	08.00	08.32	09.51
	15.15	16.50	18.13	20.42 18.24-19.24/60	22.11	23.29	23.10	21.40 18.42-19.18/36	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59 19.36-20.08/32	04.22	03.12	03.43	05.12 19.39-20.14/35	06.39 18.30-19.09/39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45 18.24-19.23/59	22.14	23.30	23.08	21.37 18.39-19.19/40	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56 19.35-20.09/34	04.19	03.11	03.45	05.14 19.38-20.15/37	06.42 18.31-19.06/35	08.05	08.38	09.54
	15.21	16.56	18.19	20.48 18.24-19.23/59	22.18	23.32	23.06	21.34 18.38-19.20/42	19.49	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53 19.34-20.09/35	04.16	03.10	03.48	05.17 19.37-20.15/38	06.45 18.33-19.03/30	08.08	08.42	09.55
	15.24	16.59	18.22	20.51 18.24-19.23/59	22.21	23.33	23.03	21.30 18.36-19.21/45	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49 19.33-20.10/37	04.13	03.09	03.50	05.20 19.37-20.15/38	06.47 18.36-19.00/24	08.11	08.45	09.56
	15.27	17.02	18.25	20.53 18.24-19.23/59	22.23	23.34	23.01	21.27 18.35-19.22/47	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46 19.32-20.10/38	04.10	03.09	03.53	05.23 19.37-20.16/39	06.50 18.39-18.55/16	08.14	08.48	09.57
	15.29	17.05	18.28	20.56 18.24-19.22/58	22.26	23.34	22.58	21.24 18.34-19.23/49	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42 19.31-20.10/39	04.07	03.09	03.56	05.26 19.36-20.15/39	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59 18.24-19.21/57	22.29	23.35	22.56	21.20 18.32-19.23/51	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39 19.31-20.10/39	04.04	03.09	03.58	05.29 19.36-20.15/39	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02 18.24-19.20/56	22.32	23.35	22.53	21.17 18.31-19.24/53	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36 19.30-20.10/40	04.01	03.09	04.01	05.32 19.36-20.15/39	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05 18.25-19.20/55	22.35	23.36	22.50	21.14 18.31-19.24/53	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32 19.30-20.10/40	03.58	03.09	04.04	05.35 19.35-20.14/39	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08 18.25-19.19/54	22.38	23.36	22.48	21.10 18.29-19.24/55	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29 19.30-20.10/40	03.56	03.09	04.07	05.38 19.35-20.14/39	07.04	08.29	09.02	10.01
	15.44	17.20	18.42	21.11 18.26-19.18/52	22.41	23.36	22.45	21.07 18.29-19.25/56	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26 19.30-20.09/39	03.53	03.09	04.10	05.41 19.35-20.13/38	07.07	08.32	09.05	10.01
	15.47	17.23	18.45	21.14 18.27-19.17/50	22.44	23.36	22.42	21.04 18.27-19.24/57	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 17.52-18.06/14	05.22 19.30-20.09/39	03.50	03.10	04.13	05.43 19.35-20.13/38	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17 18.28-19.16/48	22.47	23.36	22.39	21.00 18.27-19.25/58	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 17.48-18.11/23	05.19 19.31-20.09/38	03.48	03.11	04.15	05.46 19.36-20.13/37	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20 18.29-19.15/46	22.50	23.35	22.36	20.57 18.27-19.25/58	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01 17.45-18.14/29	05.16 19.31-20.08/37	03.45	03.11	04.18	05.49 19.36-20.11/35	07.15	07.40	09.14	10.02
	15.57	17.32	18.53	21.23 18.30-19.14/44	22.52	23.35	22.33	20.54 18.26-19.25/59	19.07	16.27	15.01	14.41
28	09.08	07.32	05.58 17.41-18.16/35	05.12 19.31-20.07/36	03.42	03.12	04.21	05.52 19.36-20.10/34	07.18	07.43	09.17	10.01
	16.00	17.35	18.56	21.26 18.31-19.13/42	22.55	23.34	22.30	20.50 18.25-19.25/60	19.04	16.24	14.59	14.42
29	09.05		06.54 18.40-19.18/38	05.09 19.32-20.07/35	03.40	03.13	04.24	05.55 19.36-20.08/32	07.20	07.46	09.19	10.01
	16.03		19.59	21.29 18.32-19.11/39	22.58	23.33	22.28	20.47 18.25-19.25/60	19.01	16.21	14.57	14.43
30	09.02		06.51 18.37-19.19/42	05.06 19.32-20.06/34	03.38	03.15	04.27	05.58 19.38-20.05/27	07.23	07.49	09.22	10.01
	16.06		20.02	21.32 18.34-19.09/35	23.00	23.32	22.25	20.43 18.24-19.24/60	18.57	16.18	14.55	14.45
31	09.00		06.47 18.36-19.20/44		03.35		04.30	06.00 19.39-20.02/23		07.53		10.00
	16.09		20.05		23.03		22.21	20.40 18.24-19.24/60		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	225	2321	252	0	0	1951	875	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 7 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (266)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February		March		April		May	June
1	09.59	08.57		07.29	15.12-16.19/67	06.44	18.17-19.09/52	05.03	03.33
	14.48	16.12		17.38		20.07	16.21-16.59/38	21.35	23.05
2	09.59	08.54		07.26	15.11-16.21/70	06.40	18.16-19.09/53	04.59	03.31
	14.50	16.15		17.41		20.10	16.24-16.55/31	21.38	23.08
3	09.58	08.51		07.22	15.10-16.21/71	06.37	18.16-19.09/53	04.56	03.29
	14.52	16.19		17.44		20.13	16.28-16.51/23	21.41	23.10
4	09.57	08.48		07.19	15.10-16.21/71	06.33	18.14-19.08/54	04.53	03.27
	14.54	16.22		17.47		20.16	16.35-16.43/8	21.44	23.12
5	09.56	08.45		07.16	15.09-16.21/72	06.30	18.14-19.08/54	04.50	03.25
	14.56	16.25		17.50		20.19		21.47	23.15
6	09.54	08.42		07.12	15.07-16.21/74	06.27	18.14-19.08/54	04.46	03.23
	14.58	16.28		17.53		20.22		21.50	23.17
7	09.53	08.39		07.09	15.07-16.22/75	06.23	18.13-19.07/54	04.43	03.21
	15.01	16.31		17.56		20.24		21.53	23.19
8	09.52	08.36		07.06	15.06-16.21/75	06.20	18.14-19.07/53	04.40	03.19
	15.03	16.34		17.59		20.27		21.56	23.21
9	09.50	08.33		07.02	15.06-16.22/76	06.16	18.14-19.07/53	04.37	03.18
	15.05	16.37		18.02		20.30		21.59	23.23
10	09.48	08.30		06.59	15.05-16.21/76	06.13	18.13-19.06/53	04.34	03.16
	15.08	16.41		18.05		20.33		22.02	23.24
11	09.47	08.27		06.56	15.05-16.22/77	06.10	18.14-19.05/51	04.31	03.15
	15.10	16.44		18.08		20.36		22.05	23.26
12	09.45	08.24		06.52	15.05-16.21/76	06.06	18.14-19.05/51	04.28	03.14
	15.13	16.47		18.10		20.39		22.08	23.28
13	09.43	08.21		06.49	15.05-16.21/76	06.03	18.15-19.04/49	04.25	03.13
	15.15	16.50		18.13		20.42		22.11	23.29
14	09.41	08.18		06.45	15.05-16.21/76	05.59	18.15-19.02/47	04.22	03.12
	15.18	16.53		18.16		20.45		22.14	23.30
15	09.39	08.15	15.45-15.48/3	06.42	15.05-16.20/75	05.56	18.16-19.02/46	04.19	03.11
	15.21	16.56		18.19		20.48		22.17	23.32
16	09.37	08.11	15.37-15.57/20	06.39	15.05-16.20/75	05.53	18.17-19.01/44	04.16	03.10
	15.24	16.59		18.22		20.50		22.20	23.33
17	09.35	08.08	15.32-16.01/29	06.35	15.05-16.19/74	05.49	18.18-19.00/42	04.13	03.10
	15.27	17.02		18.25		20.53		22.23	23.33
18	09.33	08.05	15.29-16.04/35	06.32	15.05-16.19/74	05.46	18.19-18.59/40	04.10	03.09
	15.29	17.05		18.28		20.56		22.26	23.34
19	09.31	08.02	15.26-16.06/40	06.28	15.05-16.18/73	05.42	18.19-18.56/37	04.07	03.09
	15.32	17.08		18.30		20.59		22.29	23.35
20	09.28	07.59	15.25-16.09/44	06.25	17.41-17.52/11	05.39	18.21-18.54/33	04.04	03.09
	15.35	17.11		18.33	15.06-16.17/71	21.02		22.32	23.35
21	09.26	07.55	15.22-16.11/49	06.21	17.35-17.56/21	05.36	18.23-18.53/30	04.01	03.09
	15.38	17.14		18.36	15.06-16.16/70	21.05		22.35	23.36
22	09.23	07.52	15.21-16.13/52	06.18	17.32-18.00/28	05.32	18.26-18.50/24	03.58	03.09
	15.41	17.17		18.39	15.07-16.15/68	21.08		22.38	23.36
23	09.21	07.49	15.19-16.14/55	06.15	17.29-18.01/32	05.29	18.29-18.47/18	03.56	03.09
	15.44	17.20		18.42	15.07-16.14/67	21.11		22.41	23.36
24	09.18	07.46	15.18-16.15/57	06.11	17.27-18.03/36	05.26	18.34-18.42/8	03.53	03.09
	15.47	17.23		18.45	15.08-16.13/65	21.14		22.44	23.36
25	09.16	07.42	15.16-16.16/60	06.08	17.25-18.04/39	05.22		03.50	03.10
	15.50	17.26		18.47	15.08-16.11/63	21.17		22.47	23.36
26	09.13	07.39	15.15-16.18/63	06.04	17.24-18.06/42	05.19		03.48	03.11
	15.53	17.29		18.50	15.10-16.10/60	21.20		22.49	23.35
27	09.11	07.36	15.14-16.18/64	06.01	17.22-18.07/45	05.16		03.45	03.11
	15.57	17.32		18.53	15.11-16.09/58	21.23		22.52	23.35
28	09.08	07.32	15.13-16.19/66	05.57	17.21-18.07/46	05.12		03.42	03.12
	16.00	17.35		18.56	15.12-16.07/55	21.26		22.55	23.34
29	09.05			06.54	18.20-19.08/48	05.09		03.40	03.13
	16.03			19.59	16.14-17.06/52	21.29		22.58	23.33
30	09.02			06.51	18.18-19.08/50	05.06		03.38	03.15
	16.06			20.02	16.15-17.03/48	21.32		23.00	23.32
31	09.00			06.47	18.18-19.08/50			03.35	
	16.09			20.04	16.18-17.01/43			23.03	
Potential sun hours	181	242		363		447		560	606
Sum of minutes with flicker	0	637		2571		1153		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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 7 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (266)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August		September		October		November	December
1	03.16	04.33		06.03	18.13-19.04/51	07.26	15.44-17.00/76	07.56	09.25
	23.31	22.18		20.36		18.54		16.12	14.53
2	03.18	04.36		06.06	18.12-19.05/53	07.29	15.44-17.00/76	07.59	09.27
	23.30	22.15		20.33		18.50		16.09	14.52
3	03.19	04.39		06.09	18.12-19.05/53	07.31	15.44-17.00/76	08.02	09.30
	23.29	22.12		20.30		18.47		16.06	14.50
4	03.21	04.42		06.12	18.11-19.04/53	07.34	15.44-16.59/75	08.05	09.32
	23.27	22.09		20.26		18.43		16.03	14.48
5	03.23	04.45		06.14	18.11-19.04/53	07.37	15.44-16.59/75	08.08	09.35
	23.26	22.06		20.23		18.40		16.00	14.47
6	03.24	04.48		06.17	18.09-19.04/55	07.40	15.44-16.58/74	08.11	09.37
	23.24	22.03		20.19		18.37		15.57	14.45
7	03.26	04.51		06.20	18.10-19.03/53	07.42	15.44-16.58/74	08.14	09.39
	23.22	22.00		20.16		18.33		15.54	14.44
8	03.29	04.54		06.23	18.10-19.03/53	07.45	15.44-16.57/73	08.17	09.41
	23.21	21.56		20.13	16.32-16.36/4	18.30		15.51	14.43
9	03.31	04.57		06.25	18.09-19.02/53	07.48	15.44-16.56/72	08.20	09.43
	23.19	21.53		20.09	16.22-16.44/22	18.27		15.48	14.41
10	03.33	05.00		06.28	18.09-19.02/53	07.51	15.44-16.56/72	08.23	09.45
	23.17	21.50		20.06	16.17-16.48/31	18.23		15.45	14.40
11	03.35	05.03		06.31	18.09-19.01/52	07.54	15.45-16.55/70	08.26	09.47
	23.15	21.47		20.02	16.14-16.51/37	18.20		15.42	14.39
12	03.38	05.06		06.34	18.09-19.00/51	07.57	15.45-16.54/69	08.29	09.49
	23.13	21.44		19.59	16.10-16.52/42	18.17		15.39	14.39
13	03.40	05.09		06.36	18.10-18.59/49	07.59	15.46-16.53/67	08.32	09.51
	23.10	21.40		19.55	16.07-16.54/47	18.13		15.36	14.38
14	03.43	05.12		06.39	18.10-18.59/49	08.02	15.46-16.52/66	08.35	09.52
	23.08	21.37		19.52	16.05-16.56/51	18.10		15.33	14.37
15	03.45	05.14		06.42	18.10-18.57/47	08.05	15.47-16.50/63	08.38	09.54
	23.06	21.34		19.48	16.02-16.56/54	18.07		15.31	14.37
16	03.48	05.17		06.45	18.11-18.56/45	08.08	15.47-16.49/62	08.41	09.55
	23.03	21.30		19.45	16.00-16.58/58	18.03		15.28	14.36
17	03.50	05.20		06.47	18.12-18.55/43	08.11	15.48-16.47/59	08.44	09.56
	23.01	21.27		19.42	15.59-16.59/60	18.00		15.25	14.36
18	03.53	05.23		06.50	18.12-18.52/40	08.14	15.49-16.46/57	08.48	09.57
	22.58	21.24		19.38	15.56-16.59/63	17.57		15.23	14.36
19	03.56	05.26	18.38-18.49/11	06.53	18.14-18.50/36	08.17	15.50-16.44/54	08.51	09.58
	22.56	21.20		19.35	15.55-17.00/65	17.53		15.20	14.36
20	03.58	05.29	18.34-18.53/19	06.56	18.15-18.49/34	08.20	15.52-16.43/51	08.54	09.59
	22.53	21.17		19.31	15.54-17.00/66	17.50		15.18	14.36
21	04.01	05.32	18.31-18.56/25	06.58	18.16-18.45/29	08.23	15.54-16.41/47	08.57	10.00
	22.50	21.14		19.28	15.53-17.01/68	17.47		15.15	14.37
22	04.04	05.35	18.27-18.57/30	07.01	18.19-18.42/23	08.26	15.55-16.39/44	08.59	10.00
	22.48	21.10		19.24	15.51-17.00/69	17.44		15.13	14.37
23	04.07	05.38	18.26-18.59/33	07.04	18.23-18.38/15	08.28	15.57-16.36/39	09.02	10.01
	22.45	21.07		19.21	15.50-17.01/71	17.40		15.10	14.37
24	04.10	05.41	18.23-19.00/37	07.06	15.49-17.01/72	08.31	16.00-16.34/34	09.05	10.01
	22.42	21.04		19.18		17.37		15.08	14.38
25	04.13	05.43	18.21-19.01/40	07.09	15.48-17.01/73	07.34	15.03-15.30/27	09.08	10.02
	22.39	21.00		19.14		16.34		15.06	14.39
26	04.16	05.46	18.20-19.03/43	07.12	15.47-17.01/74	07.37	15.07-15.25/18	09.11	10.02
	22.36	20.57		19.11		16.31		15.03	14.40
27	04.18	05.49	18.18-19.03/45	07.15	15.46-17.01/75	07.40		09.14	10.02
	22.33	20.54		19.07		16.27		15.01	14.41
28	04.21	05.52	18.17-19.03/46	07.17	15.46-17.01/75	07.43		09.17	10.01
	22.30	20.50		19.04		16.24		14.59	14.42
29	04.24	05.55	18.15-19.03/48	07.20	15.46-17.01/75	07.46		09.19	10.01
	22.27	20.47		19.00		16.21		14.57	14.43
30	04.27	05.58	18.15-19.04/49	07.23	15.44-17.00/76	07.49		09.22	10.01
	22.24	20.43		18.57		16.18		14.55	14.45
31	04.30	06.00	18.14-19.05/51			07.52			10.00
	22.21	20.40				16.15			14.46
Potential sun hours	595	503		392		307		206	150
Sum of minutes with flicker	0	477		2371		1570		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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 8 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (264)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June
1	09.59 12.53-13.00/7	08.57 12.39-13.35/56	07.29 14.52-15.53/61	06.44	05.03	03.33
	14.48	16.12	17.38	20.07	21.35	23.05
2	09.58 12.51-13.03/12	08.54 12.39-13.35/56	07.26 14.51-15.52/61	06.40	04.59	03.31
	14.50	16.15	17.41	20.10	21.38	23.08
3	09.58 12.50-13.05/15	08.51 12.39-13.36/57	07.22 14.52-15.52/60	06.37	04.56	03.29
	14.52	16.19	17.44	20.13	21.41	23.10
4	09.57 12.48-13.07/19	08.48 12.39-13.35/56	07.19 14.52-15.51/59	06.33	04.53	03.27
	14.54	16.22	17.47	20.16	21.44	23.12
5	09.55 12.48-13.08/20	08.45 12.40-13.36/56	07.16 14.52-15.51/59	06.30	04.50	03.25
	14.56	16.25	17.50	20.19	21.47	23.14
6	09.54 12.47-13.10/23	08.42 15.16-15.29/13	07.12 14.52-15.49/57	06.27	04.46	03.23
	14.58	16.28 12.39-13.35/56	17.53	20.22	21.50	23.17
7	09.53 12.46-13.12/26	08.39 15.12-15.33/21	07.09 14.53-15.49/56	06.23	04.43	03.21
	15.01	16.31 12.39-13.35/56	17.56	20.24	21.53	23.19
8	09.51 12.46-13.14/28	08.36 15.09-15.37/28	07.06 14.53-15.48/55	06.20	04.40	03.20
	15.03	16.34 12.40-13.35/55	17.59	20.27	21.56	23.21
9	09.50 12.45-13.15/30	08.33 15.07-15.39/32	07.02 14.55-15.47/52	06.16	04.37	03.18
	15.05	16.37 12.40-13.35/55	18.02	20.30	21.59	23.23
10	09.48 12.44-13.16/32	08.30 15.05-15.42/37	06.59 14.55-15.45/50	06.13	04.34	03.16
	15.08	16.41 12.41-13.35/54	18.05	20.33	22.02	23.24
11	09.47 12.44-13.18/34	08.27 15.03-15.43/40	06.55 14.57-15.45/48	06.10	04.31	03.15
	15.10	16.44 12.41-13.34/53	18.08	20.36	22.05	23.26
12	09.45 12.44-13.19/35	08.24 15.02-15.45/43	06.52 14.57-15.42/45	06.06	04.28	03.14
	15.13	16.47 12.42-13.34/52	18.10	20.39	22.08	23.27
13	09.43 12.43-13.20/37	08.21 15.00-15.46/46	06.49 14.59-15.41/42	06.03	04.25	03.13
	15.15	16.50 12.42-13.33/51	18.13	20.42	22.11	23.29
14	09.41 12.42-13.21/39	08.18 15.00-15.48/48	06.45 15.01-15.39/38	05.59	04.22	03.12
	15.18	16.53 12.43-13.33/50	18.16	20.45	22.14	23.30
15	09.39 12.42-13.23/41	08.15 14.58-15.48/50	06.42 15.03-15.37/34	05.56	04.19	03.11
	15.21	16.56 12.44-13.31/47	18.19	20.48	22.17	23.31
16	09.37 12.41-13.23/42	08.11 14.58-15.50/52	06.39 15.07-15.34/27	05.53	04.16	03.10
	15.24	16.59 12.45-13.31/46	18.22	20.50	22.20	23.32
17	09.35 12.41-13.25/44	08.08 14.56-15.50/54	06.35 15.10-15.30/20	05.49	04.13	03.10
	15.27	17.02 12.46-13.29/43	18.25	20.53	22.23	23.33
18	09.33 12.40-13.25/45	08.05 14.56-15.51/55	06.32	05.46	04.10	03.09
	15.29	17.05 12.48-13.28/40	18.28	20.56	22.26	23.34
19	09.30 12.41-13.27/46	08.02 14.55-15.51/56	06.28	05.42	04.07	03.09
	15.32	17.08 12.49-13.26/37	18.30	20.59	22.29	23.35
20	09.28 12.40-13.27/47	07.59 14.55-15.52/57	06.25	05.39	04.04	03.09
	15.35	17.11 12.52-13.24/32	18.33	21.02	22.32	23.35
21	09.26 12.40-13.28/48	07.55 14.54-15.52/58	06.21	05.36	04.01	03.09
	15.38	17.14 12.54-13.21/27	18.36	21.05	22.35	23.36
22	09.23 12.40-13.30/50	07.52 14.54-15.53/59	06.18	05.32	03.58	03.09
	15.41	17.17 12.58-13.18/20	18.39	21.08	22.38	23.36
23	09.21 12.39-13.30/51	07.49 14.53-15.53/60	06.15	05.29	03.56	03.09
	15.44	17.20 13.04-13.11/7	18.42	21.11	22.41	23.36
24	09.18 12.40-13.31/51	07.46 14.53-15.54/61	06.11	05.26	03.53	03.09
	15.47	17.23	18.45	21.14	22.44	23.36
25	09.16 12.39-13.31/52	07.42 14.52-15.53/61	06.08	05.22	03.50	03.10
	15.50	17.26	18.47	21.17	22.47	23.35
26	09.13 12.39-13.33/54	07.39 14.52-15.54/62	06.04	05.19	03.48	03.11
	15.53	17.29	18.50	21.20	22.49	23.35
27	09.11 12.39-13.33/54	07.36 14.52-15.53/61	06.01	05.16	03.45	03.11
	15.57	17.32	18.53	21.23	22.52	23.35
28	09.08 12.39-13.34/55	07.32 14.52-15.53/61	05.57	05.12	03.43	03.12
	16.00	17.35	18.56	21.26	22.55	23.34
29	09.05 12.39-13.34/55		06.54	05.09	03.40	03.14
	16.03		19.59	21.29	22.57	23.33
30	09.02 12.39-13.35/56		06.51	05.06	03.38	03.15
	16.06		20.02	21.32	23.00	23.32
31	09.00 12.39-13.34/55		06.47		03.35	
	16.09		20.04		23.03	
Potential sun hours	181	242	363	447	560	606
Sum of minutes with flicker	1203	2177	824	0	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 8 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (264)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August	September	October	November	December
1	03.16	04.33	06.03	07.26 15.37-16.21/44	07.55 14.35-15.11/36	09.25 12.26-13.00/34
	23.31	22.18	20.36	18.54	16.12 12.10-13.04/54	14.53
2	03.18	04.36	06.06	07.29 15.36-16.22/46	07.58 14.36-15.08/32	09.27 12.27-12.59/32
	23.30	22.15	20.33	18.50	16.09 12.10-13.05/55	14.52
3	03.19	04.39	06.09	07.31 15.34-16.23/49	08.02 14.39-15.06/27	09.30 12.29-12.59/30
	23.29	22.12	20.30	18.47	16.06 12.09-13.05/56	14.50
4	03.21	04.42	06.12	07.34 15.33-16.24/51	08.05 14.43-15.03/20	09.32 12.30-12.58/28
	23.27	22.09	20.26	18.43	16.03 12.10-13.05/55	14.48
5	03.23	04.45	06.14	07.37 15.31-16.25/54	08.08 14.47-14.58/11	09.34 12.32-12.57/25
	23.26	22.06	20.23	18.40	16.00 12.09-13.05/56	14.47
6	03.25	04.48	06.17	07.40 15.30-16.25/55	08.11 12.09-13.06/57	09.37 12.33-12.57/24
	23.24	22.03	20.19	18.37	15.57	14.45
7	03.27	04.51	06.20	07.42 15.29-16.26/57	08.14 12.10-13.06/56	09.39 12.35-12.56/21
	23.22	22.00	20.16	18.33	15.54	14.44
8	03.29	04.54	06.23	07.45 15.28-16.26/58	08.17 12.09-13.05/56	09.41 12.36-12.54/18
	23.21	21.56	20.12	18.30	15.51	14.43
9	03.31	04.57	06.25	07.48 15.27-16.25/58	08.20 12.09-13.06/57	09.43 12.38-12.53/15
	23.19	21.53	20.09	18.27	15.48	14.41
10	03.33	05.00	06.28	07.51 15.26-16.25/59	08.23 12.10-13.06/56	09.45 12.40-12.52/12
	23.17	21.50	20.06	18.23	15.45	14.40
11	03.35	05.03	06.31	07.54 15.25-16.25/60	08.26 12.10-13.06/56	09.47 12.43-12.51/8
	23.15	21.47	20.02	18.20	15.42	14.39
12	03.38	05.06	06.34	07.57 15.26-16.26/60	08.29 12.10-13.05/55	09.49
	23.12	21.43	19.59	18.16	15.39	14.39
13	03.40	05.09	06.36	07.59 15.25-16.26/61	08.32 12.10-13.05/55	09.50
	23.10	21.40	19.55	18.13	15.36	14.38
14	03.43	05.12	06.39	08.02 15.25-16.26/61	08.35 12.11-13.06/55	09.52
	23.08	21.37	19.52	18.10	15.33	14.37
15	03.45	05.14	06.42	08.05 15.25-16.26/61	08.38 12.12-13.06/54	09.53
	23.06	21.34	19.48	18.06	15.31	14.37
16	03.48	05.17	06.45	08.08 15.24-16.25/61	08.41 12.12-13.05/53	09.55
	23.03	21.30	19.45	18.03	15.28	14.36
17	03.50	05.20	06.47	08.11 15.24-16.25/61	08.44 12.13-13.05/52	09.56
	23.01	21.27	19.42	18.00	15.25	14.36
18	03.53	05.23	06.50	08.14 15.24-16.24/60	08.47 12.14-13.05/51	09.57
	22.58	21.24	19.38	17.57	15.23	14.36
19	03.56	05.26	06.53	08.17 15.24-16.24/60	08.50 12.14-13.05/51	09.58
	22.56	21.20	19.35	17.53 13.32-13.45/13	15.20	14.36
20	03.58	05.29	06.55	08.20 15.25-16.24/59	08.53 12.14-13.04/50	09.59
	22.53	21.17	19.31	17.50 13.27-13.50/23	15.18	14.36
21	04.01	05.32	06.58	08.23 15.25-16.23/58	08.56 12.15-13.03/48	10.00
	22.50	21.14	19.28	17.47 13.24-13.53/29	15.15	14.37
22	04.04	05.35	07.01	08.25 15.25-16.22/57	08.59 12.16-13.03/47	10.00
	22.47	21.10	19.24	17.43 13.21-13.55/34	15.13	14.37
23	04.07	05.38	07.04	08.28 15.25-16.21/56	09.02 12.17-13.03/46	10.01
	22.45	21.07	19.21	17.40 13.19-13.56/37	15.10	14.38
24	04.10	05.41	07.06	08.31 15.26-16.21/55	09.05 12.18-13.02/44	10.01
	22.42	21.04	19.18	17.37 13.18-13.59/41	15.08	14.38
25	04.13	05.43	07.09	07.34 14.27-15.20/53	09.08 12.20-13.03/43	10.01
	22.39	21.00	19.14	16.34 12.16-12.59/43	15.06	14.39
26	04.16	05.46	07.12 15.54-16.10/16	07.37 14.27-15.19/52	09.11 12.21-13.03/42	10.01
	22.36	20.57	19.11	16.31 12.14-13.00/46	15.04	14.40
27	04.18	05.49	07.15 15.49-16.14/25	07.40 14.29-15.18/49	09.14 12.22-13.02/40	10.01
	22.33	20.53	19.07	16.27 12.14-13.02/48	15.01	14.41
28	04.21	05.52	07.17 15.45-16.17/32	07.43 14.29-15.17/48	09.17 12.23-13.02/39	10.01
	22.30	20.50	19.04	16.24 12.13-13.02/49	14.59	14.42
29	04.24	05.55	07.20 15.43-16.19/36	07.46 14.30-15.15/45	09.19 12.24-13.01/37	10.01
	22.27	20.47	19.00	16.21 12.12-13.03/51	14.57	14.43
30	04.27	05.58	07.23 15.39-16.20/41	07.49 14.32-15.14/42	09.22 12.25-13.00/35	10.01
	22.24	20.43	18.57	16.18 12.11-13.03/52	14.55	14.45
31	04.30	06.00		07.52 14.33-15.12/39		10.00
	22.21	20.40		16.15 12.11-13.04/53		14.46
Potential sun hours	595	503	392	307	206	150
Sum of minutes with flicker	0	0	150	2208	1637	247

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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January		February		March		April		May		June
1	09.59		08.57	11.23-12.22/59	07.29	16.41-17.02/21	06.44		05.03	20.05-20.19/14	03.33
	14.48		16.12	10.21-11.02/41	17.38		20.07		21.35		23.05
2	09.58		08.54	11.22-12.22/60	07.26	16.39-17.04/25	06.40		04.59	20.07-20.17/10	03.31
	14.50		16.15	10.21-11.02/41	17.41		20.10		21.38		23.07
3	09.57		08.51	11.21-12.22/61	07.22	16.39-17.05/26	06.37		04.56		03.29
	14.52		16.18	10.21-11.03/42	17.44		20.13		21.41		23.10
4	09.56		08.48	11.22-12.23/61	07.19	16.38-17.05/27	06.33		04.53		03.27
	14.54		16.22	10.21-11.02/41	17.47		20.16		21.44		23.12
5	09.55		08.45	11.21-12.23/62	07.16	16.38-17.06/28	06.30		04.50		03.25
	14.56		16.25	10.22-11.03/41	17.50		20.19		21.47		23.14
6	09.54		08.42	11.22-12.24/62	07.12	16.37-17.05/28	06.27		04.46		03.23
	14.58		16.28	10.21-11.02/41	17.53		20.21		21.50		23.17
7	09.53		08.39	11.21-12.23/62	07.09	16.37-17.05/28	06.23		04.43		03.21
	15.01		16.31	10.21-11.02/41	17.56		20.24		21.53		23.19
8	09.51		08.36	11.22-12.24/62	07.06	16.37-17.04/27	06.20		04.40		03.20
	15.03		16.34	10.22-11.02/40	17.59		20.27		21.56		23.21
9	09.50	11.39-11.51/12	08.33	11.21-12.24/63	07.02	16.37-17.04/27	06.16		04.37		03.18
	15.05		16.37	10.22-11.01/39	18.02		20.30		21.59		23.22
10	09.48	11.37-11.54/17	08.30	11.22-12.24/62	06.59	16.37-17.02/25	06.13		04.34		03.16
	15.08		16.40	10.23-11.01/38	18.05		20.33		22.02		23.24
11	09.47	11.35-11.57/22	08.27	11.22-12.24/62	06.55	16.38-17.02/24	06.09		04.31		03.15
	15.10		16.44	10.23-11.00/37	18.07		20.36		22.05		23.26
12	09.45	11.34-11.59/25	08.24	11.23-12.24/61	06.52	16.39-17.00/21	06.06		04.28		03.14
	15.13		16.47	10.25-11.00/35	18.10		20.39		22.08		23.27
13	09.43	11.32-12.01/29	08.21	11.22-12.23/61	06.49	16.41-16.59/18	06.03		04.25		03.13
	15.15		16.50	10.25-10.58/33	18.13		20.42		22.11		23.29
14	09.41	11.32-12.03/31	08.18	11.23-12.23/60	06.45	16.43-16.55/12	05.59	20.02-20.07/5	04.21		03.12
	15.18		16.53	10.27-10.58/31	18.16		20.45		22.14		23.30
15	09.39	11.31-12.05/34	08.14	11.23-12.23/60	06.42		05.56	20.00-20.10/10	04.18		03.11
	15.21	10.40-10.43/3	16.56	10.28-10.56/28	18.19		20.47		22.17		23.31
16	09.37	11.30-12.06/36	08.11	11.24-12.23/59	06.38		05.53	19.59-20.13/14	04.16		03.10
	15.24	10.36-10.45/9	16.59	10.30-10.54/24	18.22		20.50		22.20		23.32
17	09.35	11.29-12.08/39	08.08	11.24-12.21/57	06.35		05.49	19.58-20.16/18	04.13		03.10
	15.27	10.33-10.47/14	17.02	10.32-10.51/19	18.25		20.53		22.23		23.33
18	09.33	11.28-12.08/40	08.05	11.25-12.21/56	06.32		05.46	19.56-20.18/22	04.10		03.09
	15.29	10.29-10.49/20	17.05	10.36-10.48/12	18.27		20.56		22.26		23.34
19	09.30	11.28-12.10/42	08.02	11.25-12.20/55	06.28		05.42	19.55-20.21/26	04.07		03.09
	15.32	10.26-10.51/25	17.08		18.30		20.59		22.29		23.35
20	09.28	11.27-12.11/44	07.58	11.27-12.19/52	06.25		05.39	19.55-20.24/29	04.04		03.09
	15.35	10.24-10.51/27	17.11		18.33		21.02		22.32		23.35
21	09.26	11.26-12.12/46	07.55	11.27-12.18/51	06.21		05.36	19.55-20.25/30	04.01		03.09
	15.38	10.24-10.53/29	17.14		18.36		21.05		22.35		23.35
22	09.23	11.25-12.13/48	07.52	11.29-12.17/48	06.18		05.32	19.55-20.26/31	03.58		03.09
	15.41	10.24-10.55/31	17.17		18.39		21.08		22.38		23.36
23	09.21	11.25-12.15/50	07.49	11.29-12.15/46	06.15		05.29	19.55-20.26/31	03.56		03.09
	15.44	10.23-10.55/32	17.20		18.42		21.11		22.41		23.36
24	09.18	11.25-12.16/51	07.45	11.31-12.14/43	06.11		05.26	19.55-20.26/31	03.53		03.09
	15.47	10.23-10.57/34	17.23		18.45		21.14		22.44		23.36
25	09.16	11.24-12.17/53	07.42	11.33-12.11/38	06.08		05.22	19.55-20.25/30	03.50		03.10
	15.50	10.22-10.57/35	17.26		18.47		21.17		22.46		23.35
26	09.13	11.24-12.18/54	07.39	11.35-12.09/34	06.04		05.19	19.56-20.25/29	03.48		03.11
	15.53	10.22-10.59/37	17.29	16.45-16.52/7	18.50		21.20		22.49		23.35
27	09.10	11.24-12.18/54	07.36	11.38-12.06/28	06.01		05.16	19.56-20.24/28	03.45		03.11
	15.57	10.21-10.59/38	17.32	16.44-16.56/12	18.53		21.23		22.52		23.34
28	09.08	11.24-12.20/56	07.32	11.42-12.02/20	05.57		05.12	19.58-20.23/25	03.42		03.12
	16.00	10.21-11.00/39	17.35	16.41-16.58/17	18.56		21.26		22.55		23.34
29	09.05	11.23-12.20/57			06.54		05.09	19.59-20.22/23	03.40		03.14
	16.03	10.21-11.00/39			19.59		21.29		22.57		23.33
30	09.02	11.23-12.21/58			06.51		05.06	20.01-20.21/20	03.38		03.15
	16.06	10.21-11.01/40			20.02		21.32		23.00		23.32
31	08.59	11.22-12.21/59			06.47				03.35		
	16.09	10.21-11.01/40			20.04				23.03		
Potential sun hours	181		242		363		447		560		606
Sum of minutes with flicker		1449		2165		337		402		24	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

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Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August		September		October		November		December	
1	03.16	04.33		06.03		07.26	17.19-17.39/20	07.55	10.51-11.53/62	09.24	11.17-11.39/22
	23.31	22.18		20.36		18.54		16.12	09.53-10.31/38	14.53	
2	03.18	04.36		06.06		07.28	17.17-17.40/23	07.58	10.51-11.53/62	09.27	11.20-11.38/18
	23.30	22.15		20.33		18.50		16.09	09.53-10.32/39	14.52	
3	03.19	04.39		06.09		07.31	17.16-17.41/25	08.01	10.51-11.53/62	09.30	11.23-11.35/12
	23.29	22.12		20.30		18.47		16.06	09.52-10.32/40	14.50	
4	03.21	04.42		06.11		07.34	17.15-17.41/26	08.05	10.52-11.54/62	09.32	
	23.27	22.09		20.26		18.43		16.02	09.52-10.32/40	14.48	
5	03.23	04.45		06.14		07.37	17.14-17.41/27	08.08	10.51-11.53/62	09.34	
	23.26	22.06		20.23		18.40		15.59	09.51-10.32/41	14.47	
6	03.25	04.48		06.17		07.40	17.13-17.41/28	08.11	10.52-11.53/61	09.37	
	23.24	22.03		20.19		18.37		15.56	09.51-10.33/42	14.45	
7	03.26	04.51		06.20		07.42	17.12-17.41/29	08.14	10.52-11.54/62	09.39	
	23.22	21.59		20.16		18.33		15.53	09.51-10.33/42	14.44	
8	03.29	04.54		06.23		07.45	17.12-17.40/28	08.17	10.52-11.53/61	09.41	
	23.20	21.56		20.12		18.30		15.51	09.51-10.32/41	14.43	
9	03.31	04.57		06.25		07.48	17.12-17.40/28	08.20	10.53-11.53/60	09.43	
	23.19	21.53		20.09		18.26		15.48	09.51-10.33/42	14.41	
10	03.33	05.00	20.19-20.23/4	06.28		07.51	17.12-17.39/27	08.23	10.53-11.53/60	09.45	
	23.17	21.50		20.06		18.23		15.45	09.52-10.33/41	14.40	
11	03.35	05.03	20.14-20.26/12	06.31		07.54	17.12-17.38/26	08.26	10.53-11.52/59	09.47	
	23.14	21.47		20.02		18.20		15.42	09.52-10.33/41	14.39	
12	03.38	05.06	20.12-20.28/16	06.34		07.56	17.13-17.37/24	08.29	10.54-11.52/58	09.49	
	23.12	21.43		19.59		18.16		15.39	09.52-10.32/40	14.39	
13	03.40	05.09	20.08-20.29/21	06.36		07.59	12.19-12.31/12	08.32	10.55-11.52/57	09.50	
	23.10	21.40		19.55		18.13	17.14-17.33/19	15.36	09.53-10.32/39	14.38	
14	03.43	05.12	20.06-20.30/24	06.39		08.02	12.13-12.36/23	08.35	10.56-11.51/55	09.52	
	23.08	21.37		19.52		18.10	17.15-17.30/15	15.33	09.53-10.32/39	14.37	
15	03.45	05.14	20.05-20.31/26	06.42		08.05	12.09-12.40/31	08.38	10.56-11.51/55	09.53	
	23.05	21.34		19.48		18.06	17.17-17.27/10	15.31	09.54-10.32/38	14.37	
16	03.48	05.17	20.03-20.31/28	06.44		08.08	12.06-12.42/36	08.41	10.57-11.51/54	09.55	
	23.03	21.30		19.45		18.03	17.19-17.23/4	15.28	09.55-10.32/37	14.36	
17	03.50	05.20	20.02-20.31/29	06.47		08.11	12.04-12.44/40	08.44	10.58-11.50/52	09.56	
	23.01	21.27		19.42		18.00		15.25	09.56-10.31/35	14.36	
18	03.53	05.23	20.02-20.32/30	06.50		08.14	12.02-12.45/43	08.47	10.59-11.50/51	09.57	
	22.58	21.24		19.38		17.57		15.23	09.57-10.31/34	14.36	
19	03.56	05.26	20.00-20.31/31	06.53		08.17	12.00-12.46/46	08.50	10.59-11.49/50	09.58	
	22.55	21.20		19.35		17.53		15.20	09.58-10.30/32	14.36	
20	03.58	05.29	20.00-20.31/31	06.55		08.20	11.59-12.48/49	08.53	11.00-11.48/48	09.59	
	22.53	21.17		19.31		17.50		15.18	09.58-10.29/31	14.36	
21	04.01	05.32	19.59-20.30/31	06.58		08.22	11.58-12.49/51	08.56	11.02-11.48/46	10.00	
	22.50	21.14		19.28		17.47		15.15	09.59-10.28/29	14.37	
22	04.04	05.35	19.59-20.30/31	07.01		08.25	11.56-12.50/54	08.59	11.03-11.47/44	10.00	
	22.47	21.10		19.24		17.43		15.13	10.00-10.28/28	14.37	
23	04.07	05.38	20.00-20.28/28	07.04		08.28	11.55-12.50/55	09.02	11.04-11.46/42	10.01	
	22.45	21.07		19.21		17.40		15.10	10.02-10.27/25	14.37	
24	04.10	05.40	19.59-20.24/25	07.06		08.31	11.55-12.51/56	09.05	11.05-11.46/41	10.01	
	22.42	21.04		19.17		17.37	11.05-11.19/14	15.08	10.06-10.26/20	14.38	
25	04.13	05.43	20.00-20.21/21	07.09		07.34	10.54-11.52/58	09.08	11.06-11.45/39	10.01	
	22.39	21.00		19.14		16.34	10.01-10.22/21	15.06	10.11-10.25/14	14.39	
26	04.15	05.46	19.59-20.18/19	07.12		07.37	10.53-11.52/59	09.11	11.08-11.44/36	10.01	
	22.36	20.57		19.11		16.31	09.59-10.24/25	15.03	10.15-10.24/9	14.40	
27	04.18	05.49	20.00-20.15/15	07.15		07.40	10.53-11.53/60	09.14	11.10-11.44/34	10.01	
	22.33	20.53		19.07		16.27	09.58-10.26/28	15.01	10.19-10.22/3	14.41	
28	04.21	05.52	20.02-20.12/10	07.17		07.43	10.52-11.53/61	09.16	11.12-11.43/31	10.01	
	22.30	20.50		19.04		16.24	09.56-10.27/31	14.59		14.42	
29	04.24	05.55	20.03-20.08/5	07.20	17.24-17.34/10	07.46	10.52-11.52/60	09.19	11.14-11.42/28	10.01	
	22.27	20.47		19.00		16.21	09.55-10.29/34	14.57		14.43	
30	04.27	05.57		07.23	17.21-17.37/16	07.49	10.52-11.53/61	09.22	11.15-11.41/26	10.01	
	22.24	20.43		18.57		16.18	09.54-10.29/35	14.55		14.45	
31	04.30	06.00				07.52	10.51-11.53/62			10.00	
	22.21	20.40				16.15	09.54-10.31/37			14.46	
Potential sun hours	595	503		392		308		206		150	
Sum of minutes with flicker	0	437		26		1501		2420		52	

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

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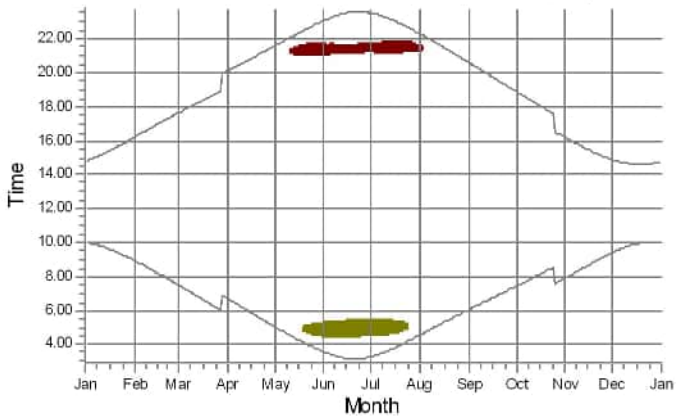
10.11.2023 9.43/3.6.355

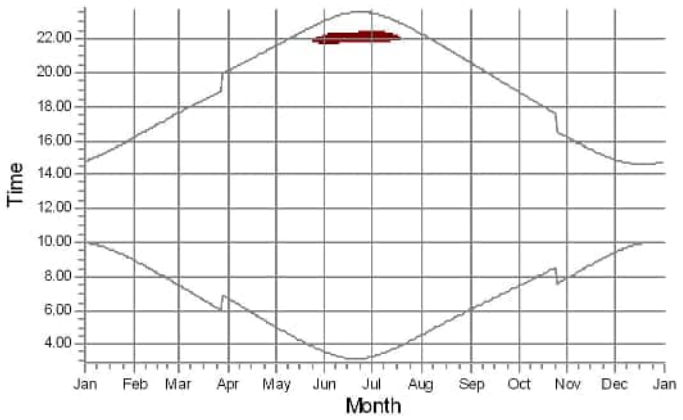
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest

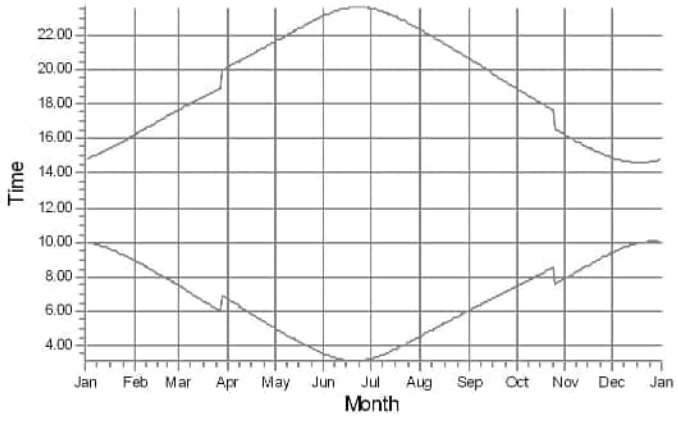
1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



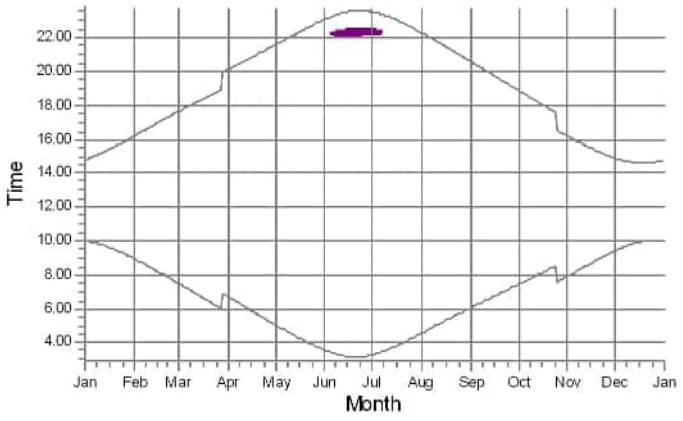
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



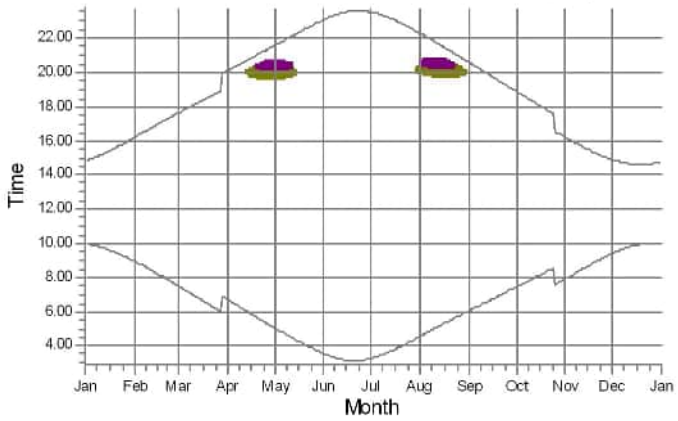
3: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



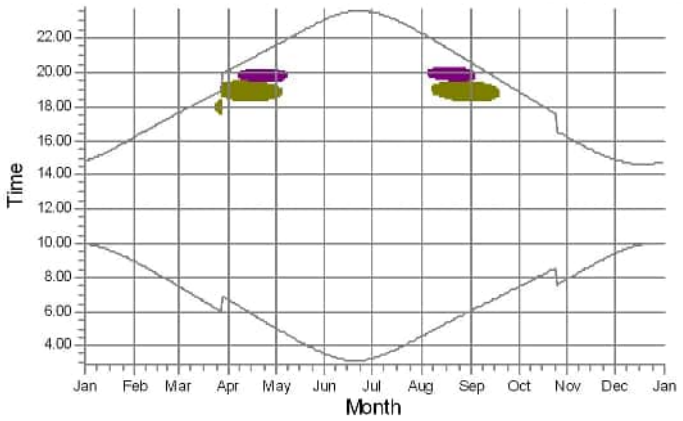
4: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



5: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



Shadow receptors

H: Laskentapiste_H (Lepola)

J: Laskentapiste_J (Ritaviita)

K: Laskentapiste_K (Ritaviita2)

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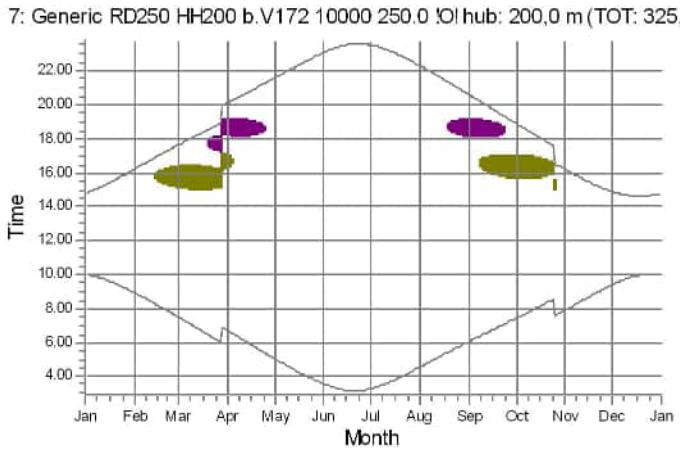
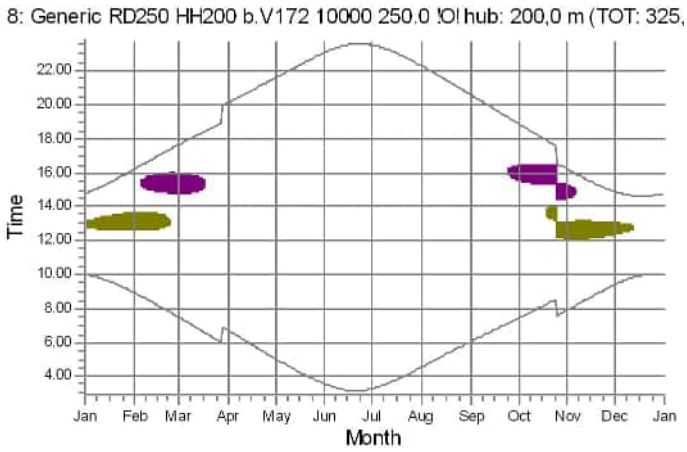
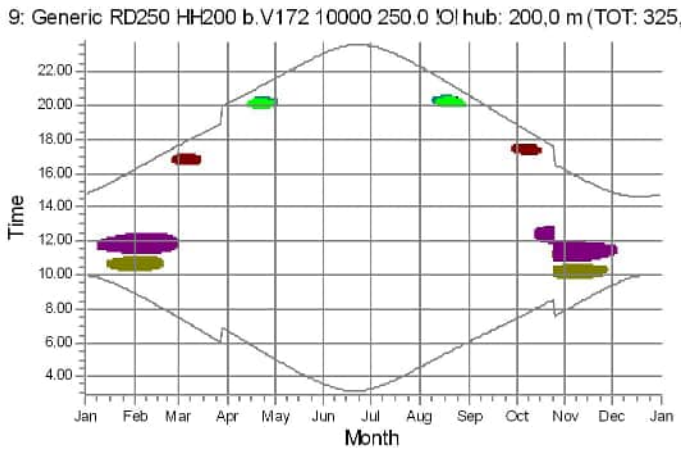
Calculated:
10.11.2023 9.43/3.6.355

SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest







Shadow receptors

- F: Laskentapiste_F (Kalliomäki)
- G: Laskentapiste_G (Alapelto)
- H: Laskentapiste_H (Lepola)
- I: Laskentapiste_I (Kalliomäki)
- J: Laskentapiste_J (Ritaviita)
- K: Laskentapiste_K (Ritaviita2)

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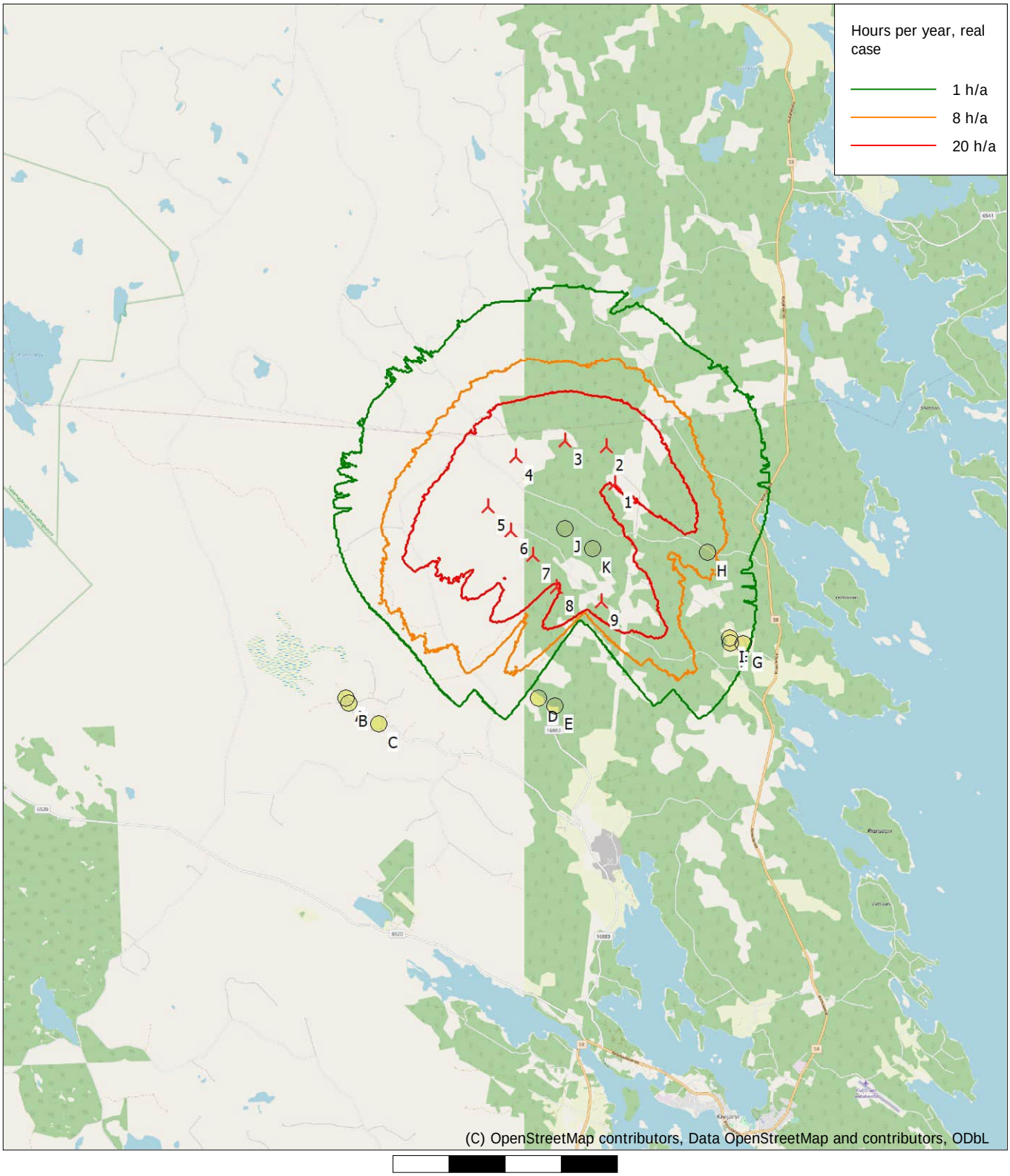
SHADOW - Map

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_no forest



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 390 North: 7 010 760

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_WIND PRO MELUMALLINNUS TESTI 2_3.wpo (1)

Time step: 4 minutes, Day step: 14 days, Map resolution: 30 m, Visibility resolution: 15 m, Eye height: 1,5 m

Liite 11. Volkkilankankaan tuulivoimahanke – varjostusmallinnuksen tulokset ”real case, Luke forest” (VE1).

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SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

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) []

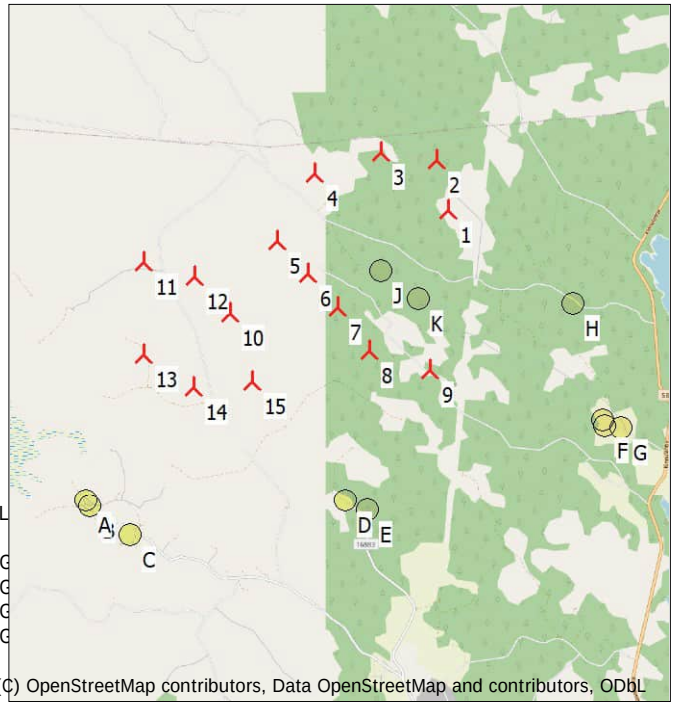
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_WIND PRO MELUMAL
Area object(s) used in calculation:
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	401 105	7 012 076	152,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
2	400 966	7 012 725	147,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
3	400 232	7 012 854	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
4	399 353	7 012 603	178,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
5	398 812	7 011 721	157,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
6	399 211	7 011 281	160,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
7	399 596	7 010 821	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
8	400 001	7 010 232	162,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
9	400 806	7 009 960	164,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
10	398 171	7 010 800	150,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
11	397 051	7 011 505	161,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
12	397 714	7 011 286	151,8	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
13	397 017	7 010 282	157,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
14	397 661	7 009 833	151,9	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
15	398 434	7 009 870	145,3	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste_C (Autio)	396 747	7 007 888	163,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

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10.11.2023 9.53/3.6.355

SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste_A (Harjunpää)	7:37
B	Laskentapiste_B (Harjunpää)	3:09
C	Laskentapiste_C (Autio)	0:56
D	Laskentapiste_D (Ylä-Leskinen)	4:27
E	Laskentapiste_E (Leskinen)	0:00
F	Laskentapiste_F (Kalliomäki)	0:00
G	Laskentapiste_G (Alapelto)	1:53
H	Laskentapiste_H (Lepola)	14:25
I	Laskentapiste_I (Kalliomäki)	0:00
J	Laskentapiste_J (Ritaviita)	13:48
K	Laskentapiste_K (Ritaviita2)	0:00

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

No.	Name	Expected [h/year]
1	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (275)	8:19
2	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (274)	4:08
3	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (273)	0:00
4	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (282)	0:00
5	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (272)	0:00
6	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (271)	13:48
7	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (270)	0:00
8	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (269)	0:00
9	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)	3:52
10	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (281)	0:00
11	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (279)	0:00
12	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (280)	0:00
13	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (278)	0:00
14	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (277)	10:17
15	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)	3:26

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.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: A - Laskentapiste_A (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.25 (14)	04.34	05.20 (15)	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05 20	04.47 (14)	23.31 30	04.55 (14)	22.18 14	05.34 (15)	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31	04.25 (14)	03.18	04.25 (14)	04.37	05.23 (15)	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08 22	04.47 (14)	23.30 30	04.55 (14)	22.15 12	05.35 (15)	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	04.24 (14)	03.20	04.25 (14)	04.40	05.25 (15)	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10 23	04.47 (14)	23.29 30	04.55 (14)	22.12 9	05.34 (15)	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	04.23 (14)	03.21	04.25 (14)	04.42	05.28 (15)	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12 25	04.48 (14)	23.27 30	04.55 (14)	22.09 5	05.33 (15)	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	04.21 (14)	03.23	04.25 (14)	04.45	05.30 (15)	06.15	07.37	08.08	09.35
	14.57	16.25	17.50	20.19	21.47	23.14 27	04.48 (14)	23.26 29	04.54 (14)	22.06 2	05.32 (15)	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	04.20 (14)	03.25	04.26 (14)	04.48		06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17 28	04.48 (14)	23.24 29	04.55 (14)	22.03		20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	04.19 (14)	03.27	04.27 (14)	04.51		06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19 30	04.49 (14)	23.22 27	04.54 (14)	22.00		20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	05.20 (15) 03.20	04.20 (14)	03.29	04.29 (14)	04.54		06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56 3	05.23 (15) 23.21 29	04.49 (14)	23.21 26	04.55 (14)	21.57		20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	05.17 (15) 03.19	04.20 (14)	03.31	04.31 (14)	04.57		06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59 7	05.24 (15) 23.22 29	04.49 (14)	23.19 24	04.55 (14)	21.53		20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	05.14 (15) 03.17	04.19 (14)	03.34	04.32 (14)	05.00		06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02 10	05.24 (15) 23.24 30	04.49 (14)	23.17 22	04.54 (14)	21.50		20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	05.12 (15) 03.16	04.20 (14)	03.36	04.34 (14)	05.03		06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05 13	05.25 (15) 23.26 30	04.50 (14)	23.15 21	04.55 (14)	21.47		20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.07	04.28	05.09 (15) 03.15	04.20 (14)	03.38	04.36 (14)	05.06		06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08 15	05.24 (15) 23.27 30	04.50 (14)	23.12 19	04.55 (14)	21.44		19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	05.06 (15) 03.13	04.20 (14)	03.41	04.38 (14)	05.09		06.37	08.00	08.32	09.51
	15.16	16.50	18.14	20.42	22.11 18	05.24 (15) 23.29 30	04.50 (14)	23.10 16	04.54 (14)	21.40		19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	05.04 (15) 03.12	04.21 (14)	03.43	04.40 (14)	05.12		06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14 21	05.25 (15) 23.30 30	04.51 (14)	23.08 14	04.54 (14)	21.37		19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	05.01 (15) 03.12	04.20 (14)	03.46	04.42 (14)	05.15		06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17 23	05.24 (15) 23.31 31	04.51 (14)	23.06 12	04.54 (14)	21.34		19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	05.02 (15) 03.11	04.21 (14)	03.48	04.44 (14)	05.18		06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20 22	05.24 (15) 23.32 30	04.51 (14)	23.03 9	04.53 (14)	21.30		19.45	18.04	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	05.03 (15) 03.10	04.21 (14)	03.51	04.46 (14)	05.21		06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23 22	05.25 (15) 23.33 31	04.52 (14)	23.01 10	05.25 (15)	21.27		19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	05.02 (15) 03.10	04.21 (14)	03.54	04.48 (14)	05.24		06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.57	22.26 22	05.24 (15) 23.34 31	04.52 (14)	22.58 13	05.28 (15)	21.24		19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	05.03 (15) 03.09	04.22 (14)	03.56	04.50 (14)	05.27		06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29 21	05.24 (15) 23.35 30	04.52 (14)	22.56 12	05.29 (15)	21.21		19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	05.04 (15) 03.09	04.22 (14)	03.59	05.16 (15)	05.29		06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32 19	05.23 (15) 23.35 30	04.52 (14)	22.53 14	05.30 (15)	21.17		19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	05.04 (15) 03.09	04.22 (14)	04.02	05.15 (15)	05.32		06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35 18	05.22 (15) 23.36 30	04.52 (14)	22.50 16	05.31 (15)	21.14		19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	05.05 (15) 03.09	04.22 (14)	04.05	05.14 (15)	05.35		07.01	08.26	09.00	10.00
	15.42	17.18	18.39	21.08	22.38 16	05.21 (15) 23.36 30	04.52 (14)	22.48 18	05.32 (15)	21.11		19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	05.06 (15) 03.10	04.23 (14)	04.07	05.14 (15)	05.38		07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41 15	05.21 (15) 23.36 30	04.53 (14)	22.45 19	05.33 (15)	21.07		19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	05.07 (15) 03.10	04.23 (14)	04.10	05.14 (15)	05.41		07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44 13	05.20 (15) 23.36 30	04.53 (14)	22.42 20	05.34 (15)	21.04		19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	04.39 (14) 03.11	04.23 (14)	04.13	05.13 (15)	05.44		07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47 13	05.19 (15) 23.35 31	04.54 (14)	22.39 21	05.34 (15)	21.00		19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	04.37 (14) 03.11	04.23 (14)	04.16	05.13 (15)	05.47		07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49 12	05.17 (15) 23.35 30	04.53 (14)	22.36 22	05.35 (15)	20.57		19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	04.35 (14) 03.12	04.23 (14)	04.19	05.13 (15)	05.49		07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52 8	04.43 (14) 23.35 31	04.54 (14)	22.33 22	05.35 (15)	20.54		19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	04.34 (14) 03.13	04.24 (14)	04.22	05.13 (15)	05.52		07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55 11	04.45 (14) 23.34 30	04.54 (14)	22.30 22	05.35 (15)	20.50		19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	04.32 (14) 03.14	04.24 (14)	04.25	05.13 (15)	05.55		07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57 13	04.45 (14) 23.33 30	04.54 (14)	22.27 22	05.35 (15)	20.47		19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	04.30 (14) 03.15	04.24 (14)	04.28	05.15 (15)	05.58		07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00 15	04.45 (14) 23.32 30	04.54 (14)	22.24 20	05.35 (15)	20.43		18.57	16.18	14.56	14.45
31	09.00		06.48		03.36	04.28 (14)		04.31	05.18 (15)	06.01			07.53		10.00
	16.10		20.05		23.03 18	04.46 (14)		22.21 17	05.35 (15)	20.40			16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case					368	868	636	42				
Sun reduction					0,45	0,40	0,44	0,41				
Oper. time red.					0,90	0,90	0,90	0,90				
Wind dir. red.					0,63	0,62	0,63	0,63				
Total reduction					0,26	0,23	0,25	0,24				
Total, real					94	196	158	10				

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

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

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10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: B - Laskentapiste_B (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May		June		July		August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03		03.34	04.27 (14)	03.17	04.20 (14)	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35		23.05	5 04.32 (14)	23.31	22 04.42 (14)	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00		03.32	04.25 (14)	03.18	04.21 (14)	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38		23.08	7 04.32 (14)	23.30	21 04.42 (14)	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56		03.29	04.24 (14)	03.20	04.22 (14)	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41		23.10	10 04.34 (14)	23.29	20 04.42 (14)	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53		03.27	04.23 (14)	03.21	04.23 (14)	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44		23.12	11 04.34 (14)	23.27	19 04.42 (14)	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50		03.25	04.21 (14)	03.23	04.24 (14)	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47		23.14	13 04.34 (14)	23.26	17 04.41 (14)	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47		03.24	04.20 (14)	03.25	04.26 (14)	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50		23.17	15 04.35 (14)	23.24	16 04.42 (14)	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44		03.22	04.19 (14)	03.27	04.27 (14)	04.51	06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53		23.19	17 04.36 (14)	23.22	14 04.41 (14)	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41		03.20	04.18 (14)	03.29	04.29 (14)	04.54	06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56		23.21	18 04.36 (14)	23.21	12 04.41 (14)	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37		03.19	04.17 (14)	03.31	04.31 (14)	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59		23.22	19 04.36 (14)	23.19	10 04.41 (14)	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34		03.17	04.16 (14)	03.34	04.32 (14)	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02		23.24	21 04.37 (14)	23.17	8 04.40 (14)	21.50	20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31		03.16	04.16 (14)	03.36	04.34 (14)	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05		23.26	22 04.38 (14)	23.15	6 04.40 (14)	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28		03.15	04.15 (14)	03.38	04.36 (14)	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08		23.27	23 04.38 (14)	23.12	4 04.40 (14)	21.44	19.59	18.17	15.40	14.39
13	09.43	08.21	06.49	06.03	04.25		03.13	04.14 (14)	03.41	04.38 (14)	05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11		23.29	24 04.38 (14)	23.10	2 04.40 (14)	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22		03.12	04.14 (14)	03.43		05.12	06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14		23.30	24 04.38 (14)	23.08		21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19		03.12	04.13 (14)	03.46		05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17		23.31	25 04.38 (14)	23.06		21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16		03.11	04.13 (14)	03.48		05.18	06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20		23.32	26 04.39 (14)	23.03		21.30	19.45	18.04	15.29	14.37
17	09.35	08.08	06.35	05.50	04.13		03.10	04.13 (14)	03.51		05.21	06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23		23.33	26 04.39 (14)	23.01		21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10		03.10	04.13 (14)	03.54		05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26		23.34	26 04.39 (14)	22.58		21.24	19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07		03.09	04.13 (14)	03.56		05.27	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29		23.35	27 04.40 (14)	22.56		21.21	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04		03.09	04.13 (14)	03.59		05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32		23.35	27 04.40 (14)	22.53		21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02		03.09	04.13 (14)	04.02		05.32	06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35		23.35	27 04.40 (14)	22.50		21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59		03.09	04.13 (14)	04.05		05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38		23.36	27 04.40 (14)	22.48		21.11	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56		03.10	04.14 (14)	04.07		05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41		23.36	27 04.41 (14)	22.45		21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53		03.10	04.14 (14)	04.10		05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44		23.36	27 04.41 (14)	22.42		21.04	19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51		03.11	04.15 (14)	04.13		05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47		23.35	26 04.41 (14)	22.39		21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48		03.11	04.15 (14)	04.16		05.47	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49		23.35	26 04.41 (14)	22.36		20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46		03.12	04.16 (14)	04.19		05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52		23.34	25 04.41 (14)	22.33		20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43		03.13	04.17 (14)	04.22		05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55		23.34	25 04.42 (14)	22.30		20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41		03.14	04.18 (14)	04.25		05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57		23.33	24 04.42 (14)	22.27		20.47	19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38		03.15	04.18 (14)	04.28		05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00		23.32	23 04.41 (14)	22.24		20.43	18.57	16.18	14.56	14.45
31	09.00		06.48		03.36	04.28 (14)			04.31		06.01		07.53		10.00
	16.10		20.05		23.03	3 04.31 (14)			22.21		20.40		16.15		14.47
Potential sun hours	182	242	363	447	559		606		594		502	392	308	206	151
Total, worst case					3		643		171						
Sun reduction					0,45		0,40		0,44						
Oper. time red.					0,90		0,90		0,90						
Wind dir. red.					0,63		0,63		0,63						
Total reduction					0,25		0,23		0,25						
Total, real					1		146		42						

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: C - Laskentapiste_C (Autio)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June		July		August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34		03.17	04.20 (15)	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.07	21.35	23.05		23.31	7 04.27 (15)	22.18	20.37	18.54	16.12	14.54
2	09.58	08.54	07.26	06.41	05.00	03.32		03.18	04.21 (15)	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.07		23.30	6 04.27 (15)	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29		03.20	04.22 (15)	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10		23.29	5 04.27 (15)	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27		03.21	04.23 (15)	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.47	20.16	21.44	23.12		23.27	3 04.26 (15)	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25		03.23	04.24 (15)	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14		23.26	2 04.26 (15)	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24		03.25		04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.16		23.24		22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	04.19 (15)	03.27		04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	1 04.20 (15)	23.22		22.00	20.16	18.34	15.54	14.44
8	09.51	08.36	07.06	06.20	04.41	03.20	04.18 (15)	03.29		04.54	06.23	07.45	08.17	09.41
	15.03	16.35	17.59	20.27	21.56	23.21	3 04.21 (15)	23.20		21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.19	04.17 (15)	03.31		04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	4 04.21 (15)	23.19		21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	04.16 (15)	03.34		05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	5 04.21 (15)	23.17		21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	04.16 (15)	03.36		05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	7 04.23 (15)	23.14		21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.15	04.15 (15)	03.38		05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	8 04.23 (15)	23.12		21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	04.14 (15)	03.41		05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11	23.29	8 04.22 (15)	23.10		21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	04.14 (15)	03.43		05.12	06.39	08.02	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	9 04.23 (15)	23.08		21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	04.13 (15)	03.46		05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.48	22.17	23.31	10 04.23 (15)	23.05		21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	04.13 (15)	03.48		05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.51	22.20	23.32	11 04.24 (15)	23.03		21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	04.13 (15)	03.51		05.21	06.48	08.11	08.44	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	11 04.24 (15)	23.01		21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	04.13 (15)	03.54		05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26	23.34	11 04.24 (15)	22.58		21.24	19.38	17.57	15.23	14.37
19	09.30	08.02	06.29	05.43	04.07	03.10	04.13 (15)	03.56		05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	12 04.25 (15)	22.56		21.20	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	04.13 (15)	03.59		05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	12 04.25 (15)	22.53		21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.13 (15)	04.02		05.32	06.58	08.23	08.56	10.00
	15.39	17.15	18.36	21.05	22.35	23.35	12 04.25 (15)	22.50		21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.13 (15)	04.05		05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	12 04.25 (15)	22.47		21.10	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.14 (15)	04.07		05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	12 04.26 (15)	22.45		21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.14 (15)	04.10		05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	12 04.26 (15)	22.42		21.04	19.18	17.37	15.08	14.39
25	09.16	07.42	06.08	05.23	03.51	03.11	04.15 (15)	04.13		05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	11 04.26 (15)	22.39		21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.15 (15)	04.16		05.47	07.12	07.38	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23.35	11 04.26 (15)	22.36		20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.16 (15)	04.19		05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52	23.34	10 04.26 (15)	22.33		20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.17 (15)	04.22		05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	10 04.27 (15)	22.30		20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.09	03.41	03.14	04.18 (15)	04.25		05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	9 04.27 (15)	22.27		20.47	19.01	16.21	14.58	14.44
30	09.02		06.51	05.06	03.38	03.15	04.18 (15)	04.28		05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	8 04.26 (15)	22.24		20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36			04.31		06.01		07.53		10.00
	16.10		20.05		23.03			22.21		20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605		594		502	392	308	206	151
Total, worst case							219		23					
Sun reduction							0,40		0,44					
Oper. time red.							0,90		0,90					
Wind dir. red.							0,64		0,64					
Total reduction							0,23		0,25					
Total, real							51		6					

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: D - Laskentapiste_D (Ylä-Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May		June		July		August		September	October	November	December
1	09.59	08.57	07.29	06.44	05.03		03.33		03.16		04.33		06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35		23.05	18	21.33 (14)	23.31		22.18	7	21.31 (14)	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59		03.31		21.16 (14)	03.18		04.36		21.26 (14)	06.06	07.29	07.58	09.27
	14.51	16.16	17.41	20.10	21.38		23.07	16	21.32 (14)	23.30		22.15	3	21.29 (14)	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56		03.29		21.17 (14)	03.20		04.39			06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41		23.10	15	21.32 (14)	23.28		22.12			20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53		03.27		21.17 (14)	03.21	21.28 (14)	04.42			06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44		23.12	14	21.31 (14)	23.27	6	21.34 (14)	22.09		20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50		03.25		21.18 (14)	03.23		21.27 (14)	04.45		06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47		23.14	13	21.31 (14)	23.25	8	21.35 (14)	22.06		20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47		03.23		21.19 (14)	03.25		21.26 (14)	04.48		06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50		23.16	11	21.30 (14)	23.24	11	21.37 (14)	22.03		20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43		03.22		21.21 (14)	03.27		21.25 (14)	04.51		06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53		23.18	9	21.30 (14)	23.22	12	21.37 (14)	21.59		20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40		03.20		21.22 (14)	03.29		21.25 (14)	04.54		06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56		23.20	7	21.29 (14)	23.20	14	21.39 (14)	21.56		20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37		03.18		21.24 (14)	03.31		21.24 (14)	04.57		06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59		23.22	3	21.27 (14)	23.18	15	21.39 (14)	21.53		20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	21.16 (14)	03.17			03.33		21.24 (14)	05.00		06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	1 21.17 (14)	23.24			23.16	16	21.40 (14)	21.50		20.06	18.23	15.45	14.41
11	09.46	08.27	06.56	06.10	04.31	21.14 (14)	03.15			03.36		21.23 (14)	05.03		06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	5 21.19 (14)	23.26			23.14	18	21.41 (14)	21.47		20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	21.14 (14)	03.14			03.38		21.23 (14)	05.06		06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	8 21.22 (14)	23.27			23.12	19	21.42 (14)	21.43		19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	21.12 (14)	03.13			03.40		21.22 (14)	05.09		06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	12 21.24 (14)	23.29			23.10	19	21.41 (14)	21.40		19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	21.12 (14)	03.12			03.43		21.22 (14)	05.12		06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	15 21.27 (14)	23.30			23.08	20	21.42 (14)	21.37		19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	21.11 (14)	03.11			03.45		21.21 (14)	05.15		06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	18 21.29 (14)	23.31			23.05	22	21.43 (14)	21.34		19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	21.11 (14)	03.11			03.48		21.21 (14)	05.18		06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	21 21.32 (14)	23.32			23.03	22	21.43 (14)	21.30		19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	21.10 (14)	03.10			03.51		21.21 (14)	05.20		06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	24 21.34 (14)	23.33			23.00	23	21.44 (14)	21.27		19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	21.10 (14)	03.10			03.53		21.20 (14)	05.23		06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	25 21.35 (14)	23.34			22.58	24	21.44 (14)	21.24		19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	21.11 (14)	03.09			03.56		21.21 (14)	05.26		06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	24 21.35 (14)	23.34			22.55	24	21.45 (14)	21.20		19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	21.10 (14)	03.09			03.59		21.21 (14)	05.29		06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	25 21.35 (14)	23.35			22.53	24	21.45 (14)	21.17		19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	21.10 (14)	03.09			04.02		21.21 (14)	05.32		06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	25 21.35 (14)	23.35			22.50	24	21.45 (14)	21.14		19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	21.10 (14)	03.09			04.04		21.20 (14)	05.35		07.01	08.25	08.59	10.00
	15.41	17.18	18.39	21.08	22.38	25 21.35 (14)	23.35			22.47	25	21.45 (14)	21.10		19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	21.11 (14)	03.09			04.07		21.20 (14)	05.38		07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	24 21.35 (14)	23.35			22.45	25	21.45 (14)	21.07		19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	21.11 (14)	03.10			04.10		21.21 (14)	05.41		07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	24 21.35 (14)	23.35			22.42	25	21.46 (14)	21.04		19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	21.11 (14)	03.10			04.13		21.21 (14)	05.43		07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	24 21.35 (14)	23.35			22.39	24	21.45 (14)	21.00		19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	21.12 (14)	03.11			04.16		21.21 (14)	05.46		07.12	07.37	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23 21.35 (14)	23.35			22.36	24	21.45 (14)	20.57		19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	21.12 (14)	03.12			04.19		21.21 (14)	05.49		07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	22 21.34 (14)	23.34			22.33	23	21.44 (14)	20.53		19.07	16.28	15.02	14.41
28	09.08	07.32	05.58	05.13	03.43	21.12 (14)	03.13			04.22		21.21 (14)	05.52		07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	22 21.34 (14)	23.34			22.30	20	21.41 (14)	20.50		19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	21.14 (14)	03.14			04.24		21.22 (14)	05.55		07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	20 21.34 (14)	23.33			22.27	17	21.39 (14)	20.47		19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	21.14 (14)	03.15			04.27		21.22 (14)	05.58		07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	20 21.34 (14)	23.32			22.24	14	21.36 (14)	20.43		18.57	16.18	14.56	14.45
31	08.59		06.47		03.36	21.14 (14)				04.30		21.24 (14)	06.00			07.52		10.00
	16.09		20.04		23.02	19 21.33 (14)				22.21	10	21.34 (14)	20.40			16.15		14.47
Potential sun hours	182	242	363	447	559		606		594		502		392	308	206	151
Total, worst case						426		106		528		10				
Sun reduction						0,45		0,40		0,44		0,41				
Oper. time red.						0,90		0,90		0,90		0,90				
Wind dir. red.						0,63		0,63		0,63		0,63				
Total reduction						0,26		0,23		0,25		0,24				
Total, real						109		24		132		2				

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: E - Laskentapiste_E (Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.28	07.58	09.27
	14.51	16.16	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56	03.29	03.20	04.39	06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41	23.10	23.28	22.12	20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.04	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.25	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.36
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.22	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.16	21.50	20.06	18.23	15.45	14.41
11	09.46	08.27	06.55	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.00	21.27	19.42	18.00	15.26	14.36
18	09.32	08.05	06.32	05.46	04.10	03.10	03.53	05.23	06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.35	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	03.09	04.02	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.11	14.38
24	09.18	07.45	06.11	05.26	03.53	03.10	04.10	05.41	07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.43	23.35	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.54	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.28	15.02	14.41
28	09.08	07.32	05.57	05.13	03.43	03.13	04.22	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	08.59		06.47		03.36		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: F - Laskentapiste_F (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.56	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40	04.59	03.31	03.17	04.36	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13	21.41	23.10	23.28	22.12	20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30	04.49	03.25	03.23	04.45	06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18	21.47	23.14	23.25	22.06	20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26	04.46	03.23	03.24	04.48	06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21	21.50	23.16	23.24	22.02	20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20	04.40	03.19	03.28	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33	22.02	23.24	23.16	21.50	20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09	04.31	03.15	03.35	05.03	06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.14	21.46	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.14	03.38	05.06	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03	04.24	03.13	03.40	05.08	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41	22.11	23.28	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	04.21	03.12	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	04.15	03.10	03.48	05.17	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	22.23	23.33	23.00	21.27	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.23	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.58	05.29	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	04.01	03.09	04.01	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.13	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	03.55	03.09	04.07	05.37	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	03.53	03.09	04.10	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	22.43	23.35	22.42	21.03	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	03.50	03.10	04.12	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.11	04.15	05.46	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	03.45	03.11	04.18	05.49	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.54	23.33	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.54	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.46	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.38	03.15	04.27	05.57	07.23	07.49	09.22	10.00
	16.06		20.01	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	08.59		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.46
Potential sun hours	182	242	363	447	559	606	595	503	392	308	206	150
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: G - Laskentapiste_G (Alapelto)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May	June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.43		05.02	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56	03.29	03.19	04.39		06.08	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41	23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53	03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44	23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49	03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47	23.14	23.25	22.06		20.22	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46	03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50	23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.52	08.39	07.09	06.23		04.43	03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53	23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40	03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56	23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37	03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.01	20.30		21.59	23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34	03.16	03.33	05.00		06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02	23.24	23.16	21.50		20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31	03.15	03.35	05.03		06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05	23.26	23.14	21.46		20.02	18.20	15.42	14.39
12	09.44	08.24	06.52	06.06		04.27	03.14	03.38	05.05		06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08	23.27	23.12	21.43		19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24	03.13	03.40	05.08		06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11	23.28	23.10	21.40		19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	20.05 (9)	04.21	03.12	03.42	05.11	20.13 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	2 20.07 (9)	22.14	23.30	23.08	21.37	6 20.19 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	20.03 (9)	04.18	03.11	03.45	05.14	20.10 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	7 20.10 (9)	22.17	23.31	23.05	21.33	12 20.22 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	20.02 (9)	04.15	03.10	03.48	05.17	20.07 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	11 20.13 (9)	22.20	23.32	23.03	21.30	16 20.23 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	20.01 (9)	04.12	03.10	03.50	05.20	20.06 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	15 20.16 (9)	22.23	23.33	23.00	21.27	18 20.24 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	19.59 (9)	04.09	03.09	03.53	05.23	20.06 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	19 20.18 (9)	22.26	23.34	22.58	21.23	19 20.25 (9)	19.38	17.56	15.23	14.36
19	09.30	08.01	06.28	05.42	19.58 (9)	04.07	03.09	03.56	05.26	20.04 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	23 20.21 (9)	22.29	23.34	22.55	21.20	21 20.25 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	19.58 (9)	04.04	03.09	03.58	05.29	20.04 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	23 20.21 (9)	22.32	23.35	22.53	21.17	22 20.26 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	19.58 (9)	04.01	03.09	04.01	05.32	20.03 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	23 20.21 (9)	22.35	23.35	22.50	21.13	22 20.25 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	19.58 (9)	03.58	03.09	04.04	05.35	20.03 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22 20.20 (9)	22.38	23.35	22.47	21.10	22 20.25 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	19.58 (9)	03.55	03.09	04.07	05.37	20.03 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.41	21.11	22 20.20 (9)	22.41	23.35	22.44	21.07	22 20.25 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	19.59 (9)	03.53	03.09	04.10	05.40	20.02 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	20 20.19 (9)	22.43	23.35	22.42	21.03	22 20.24 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.07	05.22	19.59 (9)	03.50	03.10	04.12	05.43	20.03 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	19 20.18 (9)	22.46	23.35	22.39	21.00	18 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	20.00 (9)	03.47	03.11	04.15	05.46	20.02 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	17 20.17 (9)	22.49	23.35	22.36	20.57	16 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.15	20.01 (9)	03.45	03.11	04.18	05.49	20.03 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	15 20.16 (9)	22.52	23.34	22.33	20.53	12 20.15 (9)	19.07	16.27	15.01	14.41
28	09.07	07.32	05.57	05.12	20.03 (9)	03.42	03.12	04.21	05.52	20.05 (9)	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	11 20.14 (9)	22.54	23.33	22.30	20.50	7 20.12 (9)	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	20.07 (9)	03.40	03.13	04.24	05.54	20.06 (9)	07.20	07.46	09.19	10.01
	16.03		19.58	21.29	3 20.10 (9)	22.57	23.33	22.27	20.46	2 20.08 (9)	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06		03.38	03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32		23.00	23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35		04.30	06.00			07.52		10.00
	16.09		20.04			23.02		22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		559	606	595	503		392	308	206	150
Total, worst case					252					257				
Sun reduction					0,40					0,41				
Oper. time red.					0,90					0,90				
Wind dir. red.					0,61					0,61				
Total reduction					0,22					0,23				
Total, real					55					58				

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January		February			March			April			May			June		
1	09.59		08.57			07.29		16.41 (9)	06.44			05.02			03.33		21.09 (1)
	14.48		16.12			17.38	21	17.02 (9)	20.07			21.35			23.05	43	22.06 (2)
2	09.58		08.54			07.26		16.39 (9)	06.40			04.59			03.31		21.10 (1)
	14.50		16.15			17.41	25	17.04 (9)	20.10			21.38			23.07	46	22.09 (2)
3	09.57		08.51			07.22		16.39 (9)	06.37			04.56			03.29		21.09 (1)
	14.52		16.18			17.44	26	17.05 (9)	20.13			21.41			23.10	47	22.10 (2)
4	09.56		08.48			07.19		16.38 (9)	06.33			04.53			03.26		21.10 (1)
	14.54		16.21			17.47	27	17.05 (9)	20.16			21.44			23.12	48	22.12 (2)
5	09.55		08.45			07.16		16.38 (9)	06.30			04.49			03.25		21.11 (1)
	14.56		16.25			17.50	28	17.06 (9)	20.18			21.47			23.14	50	22.14 (2)
6	09.54		08.42			07.12		16.37 (9)	06.26			04.46			03.23		21.12 (1)
	14.58		16.28			17.53	28	17.05 (9)	20.21			21.50			23.16	49	22.15 (2)
7	09.53		08.39			07.09		16.37 (9)	06.23			04.43			03.21		21.11 (1)
	15.00		16.31			17.56	28	17.05 (9)	20.24			21.53			23.19	50	22.15 (2)
8	09.51		08.36			07.05		16.37 (9)	06.20			04.40			03.19		21.12 (1)
	15.03		16.34			17.59	27	17.04 (9)	20.27			21.56			23.21	49	22.15 (2)
9	09.50		08.33			07.02		16.37 (9)	06.16			04.37			03.18		21.12 (1)
	15.05		16.37			18.02	27	17.04 (9)	20.30			21.59			23.22	48	22.15 (2)
10	09.48		08.30			06.59		16.37 (9)	06.13			04.34			03.16		21.13 (1)
	15.07		16.40			18.04	26	17.03 (9)	20.33			22.02			23.24	48	22.16 (2)
11	09.46		08.27			06.55		16.38 (9)	06.09			04.30		21.14 (1)	03.15		21.13 (1)
	15.10		16.43			18.07	24	17.02 (9)	20.36			22.05	5	21.19 (1)	23.26	48	22.16 (2)
12	09.45		08.24			06.52		16.39 (9)	06.06			04.27		21.12 (1)	03.14		21.14 (1)
	15.13		16.47			18.10	21	17.00 (9)	20.39			22.08	10	21.22 (1)	23.27	47	22.16 (2)
13	09.43		08.21			06.49		16.41 (9)	06.03			04.24		21.12 (1)	03.12		21.15 (1)
	15.15		16.50			18.13	18	16.59 (9)	20.42			22.11	13	21.25 (1)	23.29	46	22.17 (2)
14	09.41		08.17			06.45		16.43 (9)	05.59			04.21		21.10 (1)	03.11		21.15 (1)
	15.18		16.53			18.16	12	16.55 (9)	20.44			22.14	17	21.27 (1)	23.30	47	22.17 (2)
15	09.39		08.14			06.42			05.56			04.18		21.10 (1)	03.11		21.15 (1)
	15.21		16.56			18.19			20.47			22.17	20	21.30 (1)	23.31	46	22.17 (2)
16	09.37		08.11			06.38			05.52			04.15		21.09 (1)	03.10		21.15 (1)
	15.23		16.59			18.22			20.50			22.20	22	21.31 (1)	23.32	46	22.17 (2)
17	09.35		08.08			06.35			05.49			04.12		21.09 (1)	03.09		21.16 (1)
	15.26		17.02			18.24			20.53			22.23	25	21.34 (1)	23.33	45	22.17 (2)
18	09.33		08.05			06.31			05.46			04.09		21.09 (1)	03.09		21.16 (1)
	15.29		17.05			18.27			20.56			22.26	27	21.36 (1)	23.34	45	22.17 (2)
19	09.30		08.02			06.28			05.42			04.06		21.07 (1)	03.08		21.16 (1)
	15.32		17.08			18.30			20.59			22.29	29	21.36 (1)	23.35	45	22.18 (2)
20	09.28		07.58			06.25			05.39			04.04		21.08 (1)	03.08		21.17 (1)
	15.35		17.11			18.33			21.02			22.32	29	21.37 (1)	23.35	44	22.18 (2)
21	09.26		07.55			06.21			05.35			04.01		21.08 (1)	03.08		21.17 (1)
	15.38		17.14			18.36			21.05			22.35	29	21.37 (1)	23.35	44	22.18 (2)
22	09.23		07.52			06.18			05.32			03.58		21.08 (1)	03.08		21.17 (1)
	15.41		17.17			18.39			21.08			22.38	30	21.38 (1)	23.36	44	22.18 (2)
23	09.21		07.49			06.14			05.29			03.55		21.08 (1)	03.09		21.18 (1)
	15.44		17.20			18.42			21.11			22.41	30	21.38 (1)	23.36	44	22.19 (2)
24	09.18		07.45			06.11			05.25			03.53		21.07 (1)	03.09		21.17 (1)
	15.47		17.23			18.44			21.14			22.44	30	21.37 (1)	23.36	46	22.19 (2)
25	09.16		07.42			06.08			05.22			03.50		21.07 (1)	03.10		21.18 (1)
	15.50		17.26			18.47			21.17			22.46	30	21.37 (1)	23.35	45	22.19 (2)
26	09.13		07.39		16.45 (9)	06.04			05.19			03.47		21.08 (1)	03.10		21.17 (1)
	15.53		17.29	7	16.52 (9)	18.50			21.20			22.49	32	21.55 (2)	23.35	46	22.19 (2)
27	09.10		07.35		16.44 (9)	06.01			05.15			03.45		21.08 (1)	03.11		21.18 (1)
	15.56		17.32	12	16.56 (9)	18.53			21.23			22.52	35	21.57 (2)	23.34	45	22.19 (2)
28	09.08		07.32		16.41 (9)	05.57			05.12			03.42		21.08 (1)	03.12		21.18 (1)
	15.59		17.35	17	16.58 (9)	18.56			21.26			22.55	37	21.59 (2)	23.34	46	22.20 (2)
29	09.05					06.54			05.09			03.40		21.08 (1)	03.13		21.18 (1)
	16.03					19.59			21.29			22.57	40	22.01 (2)	23.33	46	22.20 (2)
30	09.02					06.50			05.06			03.37		21.08 (1)	03.14		21.18 (1)
	16.06					20.01			21.32			23.00	40	22.02 (2)	23.32	48	22.21 (2)
31	08.59					06.47						03.35		21.09 (1)			
	16.09					20.04						23.02	43	22.05 (2)			
Potential sun hours	181		242			363			447			560			606		
Total, worst case				36			338						573			1391	
Sun reduction				0,26			0,37						0,45			0,40	
Oper. time red.				0,90			0,90						0,90			0,90	
Wind dir. red.				0,62			0,62						0,63			0,63	
Total reduction				0,15			0,21						0,26			0,23	
Total, real				5			71						147			319	

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July		August		September		October		November	December
1	03.16	21.18 (1)	04.33	21.24 (1)	06.03		07.26	17.19 (9)	07.55	09.24
	23.31	48 22.21 (2)	22.18	8 21.32 (1)	20.36		18.53	20 17.39 (9)	16.11	14.53
2	03.17	21.18 (1)	04.36	21.25 (1)	06.06		07.28	17.17 (9)	07.58	09.27
	23.30	49 22.21 (2)	22.15	3 21.28 (1)	20.33		18.50	23 17.40 (9)	16.08	14.51
3	03.19	21.18 (1)	04.39		06.08		07.31	17.16 (9)	08.01	09.29
	23.29	49 22.21 (2)	22.12		20.29		18.47	25 17.41 (9)	16.05	14.50
4	03.21	21.17 (1)	04.42		06.11		07.34	17.15 (9)	08.04	09.32
	23.27	50 22.21 (2)	22.09		20.26		18.43	26 17.41 (9)	16.02	14.48
5	03.22	21.18 (1)	04.45		06.14		07.37	17.14 (9)	08.07	09.34
	23.26	49 22.21 (2)	22.06		20.23		18.40	27 17.41 (9)	15.59	14.46
6	03.24	21.17 (1)	04.48		06.17		07.39	17.13 (9)	08.11	09.37
	23.24	50 22.21 (2)	22.03		20.19		18.36	28 17.41 (9)	15.56	14.45
7	03.26	21.18 (1)	04.51		06.20		07.42	17.12 (9)	08.14	09.39
	23.22	49 22.21 (2)	21.59		20.16		18.33	29 17.41 (9)	15.53	14.44
8	03.28	21.17 (1)	04.54		06.22		07.45	17.12 (9)	08.17	09.41
	23.20	48 22.19 (2)	21.56		20.12		18.30	28 17.40 (9)	15.50	14.42
9	03.30	21.17 (1)	04.57		06.25		07.48	17.12 (9)	08.20	09.43
	23.19	48 22.18 (2)	21.53		20.09		18.26	28 17.40 (9)	15.47	14.41
10	03.33	21.17 (1)	05.00		06.28		07.51	17.12 (9)	08.23	09.45
	23.17	46 22.17 (2)	21.50		20.05		18.23	27 17.39 (9)	15.45	14.40
11	03.35	21.17 (1)	05.02		06.31		07.54	17.13 (9)	08.26	09.47
	23.14	45 22.15 (2)	21.47		20.02		18.20	25 17.38 (9)	15.42	14.39
12	03.37	21.17 (1)	05.05		06.33		07.56	17.13 (9)	08.29	09.49
	23.12	44 22.14 (2)	21.43		19.59		18.16	24 17.37 (9)	15.39	14.38
13	03.40	21.17 (1)	05.08		06.36		07.59	17.14 (9)	08.32	09.50
	23.10	41 22.12 (2)	21.40		19.55		18.13	19 17.33 (9)	15.36	14.38
14	03.42	21.17 (1)	05.11		06.39		08.02	17.15 (9)	08.35	09.52
	23.08	40 22.11 (2)	21.37		19.52		18.10	15 17.30 (9)	15.33	14.37
15	03.45	21.17 (1)	05.14		06.42		08.05	17.17 (9)	08.38	09.53
	23.05	38 22.09 (2)	21.33		19.48		18.06	10 17.27 (9)	15.30	14.37
16	03.47	21.17 (1)	05.17		06.44		08.08	17.19 (9)	08.41	09.55
	23.03	36 22.07 (2)	21.30		19.45		18.03	4 17.23 (9)	15.28	14.36
17	03.50	21.17 (1)	05.20		06.47		08.11		08.44	09.56
	23.01	33 22.05 (2)	21.27		19.41		18.00		15.25	14.36
18	03.53	21.17 (1)	05.23		06.50		08.14		08.47	09.57
	22.58	31 22.03 (2)	21.23		19.38		17.56		15.23	14.36
19	03.55	21.17 (1)	05.26		06.53		08.17		08.50	09.58
	22.55	30 21.47 (1)	21.20		19.35		17.53		15.20	14.36
20	03.58	21.17 (1)	05.29		06.55		08.19		08.53	09.59
	22.53	30 21.47 (1)	21.17		19.31		17.50		15.17	14.36
21	04.01	21.18 (1)	05.32		06.58		08.22		08.56	10.00
	22.50	30 21.48 (1)	21.13		19.28		17.47		15.15	14.36
22	04.04	21.18 (1)	05.35		07.01		08.25		08.59	10.00
	22.47	29 21.47 (1)	21.10		19.24		17.43		15.12	14.37
23	04.07	21.18 (1)	05.37		07.03		08.28		09.02	10.01
	22.45	29 21.47 (1)	21.07		19.21		17.40		15.10	14.37
24	04.09	21.18 (1)	05.40		07.06		08.31		09.05	10.01
	22.42	29 21.47 (1)	21.03		19.17		17.37		15.08	14.38
25	04.12	21.19 (1)	05.43		07.09		07.34		09.08	10.01
	22.39	28 21.47 (1)	21.00		19.14		16.34		15.05	14.39
26	04.15	21.19 (1)	05.46		07.12		07.37		09.11	10.01
	22.36	27 21.46 (1)	20.57		19.10		16.30		15.03	14.40
27	04.18	21.19 (1)	05.49		07.14		07.40		09.14	10.01
	22.33	24 21.43 (1)	20.53		19.07		16.27		15.01	14.41
28	04.21	21.20 (1)	05.52		07.17		07.43		09.16	10.01
	22.30	21 21.41 (1)	20.50		19.04		16.24		14.59	14.42
29	04.24	21.20 (1)	05.54		07.20	17.24 (9)	07.46		09.19	10.01
	22.27	19 21.39 (1)	20.46		19.00	10 17.34 (9)	16.21		14.57	14.43
30	04.27	21.21 (1)	05.57		07.23	17.21 (9)	07.49		09.22	10.00
	22.24	16 21.37 (1)	20.43		18.57	16 17.37 (9)	16.18		14.55	14.45
31	04.30	21.22 (1)	06.00				07.52			10.00
	22.21	12 21.34 (1)	20.40				16.15			14.46
Potential sun hours	595		503		392		307		206	150
Total, worst case		1118		11		26		358		
Sun reduction		0,44		0,41		0,31		0,19		
Oper. time red.		0,90		0,90		0,90		0,90		
Wind dir. red.		0,63		0,63		0,62		0,62		
Total reduction		0,25		0,24		0,18		0,11		
Total, real		279		3		5		38		

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: I - Laskentapiste_I (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.56	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40	04.59	03.31	03.17	04.36	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13	21.41	23.10	23.28	22.12	20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30	04.49	03.25	03.23	04.45	06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18	21.47	23.14	23.25	22.06	20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26	04.46	03.23	03.24	04.48	06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21	21.50	23.16	23.24	22.02	20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20	04.40	03.19	03.28	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33	22.02	23.24	23.16	21.50	20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09	04.31	03.15	03.35	05.03	06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.14	21.46	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.14	03.38	05.06	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03	04.24	03.13	03.40	05.08	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	04.21	03.12	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	04.15	03.10	03.48	05.17	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	22.23	23.33	23.00	21.27	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.23	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.58	05.29	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	04.01	03.09	04.01	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.13	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	03.55	03.09	04.07	05.37	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	03.53	03.09	04.10	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	22.43	23.35	22.42	21.03	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	03.50	03.10	04.12	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.11	04.15	05.46	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	03.45	03.11	04.18	05.49	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.54	23.33	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.54	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.46	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.38	03.15	04.27	05.57	07.23	07.49	09.22	10.00
	16.06		20.01	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	08.59		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.46
Potential sun hours	182	242	363	447	560	606	595	503	392	308	206	150
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: J - Laskentapiste_J (Ritaviita)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	18.34 (6)	05.02	18.36 (6)	03.33	03.16	04.33	06.03	18.24 (6)	07.26	07.55	09.25
	14.48	16.12	17.38	20.07 48	19.22 (6)	21.35 31	19.07 (6)	23.05	23.31	22.18	20.36 59	19.23 (6)	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	18.32 (6)	04.59	18.38 (6)	03.31	03.17	04.36	06.06	18.24 (6)	07.28	07.59	09.27
	14.50	16.15	17.41	20.10 50	19.22 (6)	21.38 27	19.05 (6)	23.08	23.30	22.15	20.33 59	19.23 (6)	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	18.31 (6)	04.56	18.41 (6)	03.29	03.19	04.39	06.09	18.24 (6)	07.31	08.02	09.30
	14.52	16.18	17.44	20.13 52	19.23 (6)	21.41 21	19.02 (6)	23.10	23.29	22.12	20.30 59	19.23 (6)	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	18.30 (6)	04.53	18.44 (6)	03.27	03.21	04.42	06.11	18.23 (6)	07.34	08.05	09.32
	14.54	16.22	17.47	20.16 53	19.23 (6)	21.44 14	18.58 (6)	23.12	23.27	22.09	20.26 58	19.21 (6)	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	18.29 (6)	04.50		03.25	03.22	04.45	06.14	18.24 (6)	07.37	08.08	09.35
	14.56	16.25	17.50	20.19 55	19.24 (6)	21.47		23.15	23.26	22.06	20.23 57	19.21 (6)	18.40	15.59	14.47
6	09.54	08.42	07.12	06.27	18.28 (6)	04.46		03.23	03.24	04.48	06.17	18.24 (6)	07.40	08.11	09.37
	14.58	16.28	17.53	20.22 56	19.24 (6)	21.50		23.17	23.24	22.03	20.19 57	19.21 (6)	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	18.27 (6)	04.43		03.21	03.26	04.51	06.20	18.24 (6)	07.42	08.14	09.39
	15.00	16.31	17.56	20.24 57	19.24 (6)	21.53		23.19	23.23	22.00	20.16 55	19.19 (6)	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	18.26 (6)	04.40		03.19	03.28	04.54	19.00 (6)	06.23	18.25 (6)	07.45	08.17	09.41
	15.03	16.34	17.59	20.27 58	19.24 (6)	21.56		23.21	23.21	21.56 3	19.03 (6)	20.13 53	19.18 (6)	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	18.26 (6)	04.37		03.18	03.31	04.57	18.52 (6)	06.25	18.25 (6)	07.48	08.20	09.43
	15.05	16.37	18.02	20.30 59	19.25 (6)	21.59		23.23	23.19	21.53 17	19.09 (6)	20.09 51	19.16 (6)	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13	18.26 (6)	04.34		03.16	03.33	05.00	18.49 (6)	06.28	18.26 (6)	07.51	08.23	09.45
	15.08	16.40	18.05	20.33 59	19.25 (6)	22.02		23.24	23.17	21.50 23	19.12 (6)	20.06 49	19.15 (6)	18.23	15.45	14.40
11	09.47	08.27	06.55	06.10	18.25 (6)	04.31		03.15	03.35	05.03	18.46 (6)	06.31	18.27 (6)	07.54	08.26	09.47
	15.10	16.44	18.08	20.36 59	19.24 (6)	22.05		23.26	23.15	21.47 28	19.14 (6)	20.02 47	19.14 (6)	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	18.25 (6)	04.28		03.14	03.38	05.06	18.44 (6)	06.34	18.27 (6)	07.57	08.29	09.49
	15.13	16.47	18.10	20.39 59	19.24 (6)	22.08		23.28	23.13	21.43 32	19.16 (6)	19.59 45	19.12 (6)	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	18.24 (6)	04.24		03.13	03.40	05.09	18.42 (6)	06.36	18.28 (6)	07.59	08.32	09.51
	15.15	16.50	18.13	20.42 60	19.24 (6)	22.11		23.29	23.10	21.40 36	19.18 (6)	19.55 43	19.11 (6)	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	18.24 (6)	04.21		03.12	03.42	05.11	18.39 (6)	06.39	18.30 (6)	08.02	08.35	09.52
	15.18	16.53	18.16	20.45 59	19.23 (6)	22.14		23.30	23.08	21.37 40	19.19 (6)	19.52 39	19.09 (6)	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	18.24 (6)	04.18		03.11	03.45	05.14	18.38 (6)	06.42	18.31 (6)	08.05	08.38	09.54
	15.21	16.56	18.19	20.48 59	19.23 (6)	22.17		23.32	23.06	21.34 42	19.20 (6)	19.48 35	19.06 (6)	18.06	15.31	14.37
16	09.37	08.11	06.39	05.53	18.24 (6)	04.15		03.10	03.48	05.17	18.36 (6)	06.45	18.33 (6)	08.08	08.41	09.55
	15.24	16.59	18.22	20.50 59	19.23 (6)	22.20		23.33	23.03	21.30 45	19.21 (6)	19.45 30	19.03 (6)	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	18.24 (6)	04.12		03.09	03.50	05.20	18.35 (6)	06.47	18.36 (6)	08.11	08.44	09.56
	15.26	17.02	18.25	20.53 59	19.23 (6)	22.23		23.34	23.01	21.27 47	19.22 (6)	19.42 24	19.00 (6)	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	18.24 (6)	04.10		03.09	03.53	05.23	18.34 (6)	06.50	18.39 (6)	08.14	08.48	09.57
	15.29	17.05	18.28	20.56 58	19.22 (6)	22.26		23.34	22.58	21.24 49	19.23 (6)	19.38 16	18.55 (6)	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	18.24 (6)	04.07		03.09	03.56	05.26	18.32 (6)	06.53		08.17	08.51	09.58
	15.32	17.08	18.30	20.59 57	19.21 (6)	22.29		23.35	22.56	21.20 51	19.23 (6)	19.35		17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	18.24 (6)	04.04		03.08	03.58	05.29	18.31 (6)	06.55		08.20	08.54	09.59
	15.35	17.11	18.33	21.02 56	19.20 (6)	22.32		23.35	22.53	21.17 53	19.24 (6)	19.31		17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	18.25 (6)	04.01		03.08	04.01	05.32	18.31 (6)	06.58		08.23	08.56	10.00
	15.38	17.14	18.36	21.05 55	19.20 (6)	22.35		23.36	22.50	21.14 53	19.24 (6)	19.28		17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	18.25 (6)	03.58		03.09	04.04	05.35	18.29 (6)	07.01		08.26	08.59	10.00
	15.41	17.17	18.39	21.08 54	19.19 (6)	22.38		23.36	22.48	21.10 55	19.24 (6)	19.24		17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	18.26 (6)	03.55		03.09	04.07	05.38	18.29 (6)	07.04		08.28	09.02	10.01
	15.44	17.20	18.42	21.11 52	19.18 (6)	22.41		23.36	22.45	21.07 56	19.25 (6)	19.21		17.40	15.10	14.37
24	09.18	07.46	06.11	05.26	18.27 (6)	03.53		03.09	04.10	05.40	18.27 (6)	07.06		08.31	09.05	10.01
	15.47	17.23	18.45	21.14 50	19.17 (6)	22.44		23.36	22.42	21.04 57	19.24 (6)	19.18		17.37	15.08	14.38
25	09.16	07.42	06.08	17.52 (6)	05.22	18.28 (6)	03.50		03.10	04.13	05.43	18.27 (6)	07.09		07.34	09.08	10.02
	15.50	17.26	18.47 14	18.06 (6)	21.17 48	19.16 (6)	22.47		23.36	22.39	21.00 58	19.25 (6)	19.14		16.34	15.06	14.39
26	09.13	07.39	06.04	17.48 (6)	05.19	18.29 (6)	03.47		03.10	04.15	05.46	18.27 (6)	07.12		07.37	09.11	10.02
	15.53	17.29	18.50 23	18.11 (6)	21.20 46	19.15 (6)	22.49		23.35	22.36	20.57 58	19.25 (6)	19.11		16.31	15.03	14.40
27	09.11	07.36	06.01	17.45 (6)	05.16	18.30 (6)	03.45		03.11	04.18	05.49	18.26 (6)	07.15		07.40	09.14	10.02
	15.57	17.32	18.53 29	18.14 (6)	21.23 44	19.14 (6)	22.52		23.35	22.33	20.53 59	19.25 (6)	19.07		16.27	15.01	14.41
28	09.08	07.32	05.57	17.41 (6)	05.12	18.31 (6)	03.42		03.12	04.21	05.52	18.25 (6)	07.17		07.43	09.17	10.01
	16.00	17.35	18.56 35	18.16 (6)	21.26 42	19.13 (6)	22.55		23.34	22.30	20.50 60	19.25 (6)	19.04		16.24	14.59	14.42
29	09.05		06.54	18.40 (6)	05.09	18.32 (6)	03.40		03.13	04.24	05.55	18.25 (6)	07.20		07.46	09.19	10.01
	16.03		19.59 38	19.18 (6)	21.29 39	19.11 (6)	22.58		23.33	22.27	20.47 60	19.25 (6)	19.00		16.21	14.57	14.43
30	09.02		06.51	18.37 (6)	05.06	18.34 (6)	03.38		03.15	04.27	05.57	18.24 (6)	07.23		07.49	09.22	10.01
	16.06		20.02 42	19.19 (6)	21.32 35	19.09 (6)	23.00		23.32	22.24	20.43 60	19.24 (6)	18.57		16.18	14.55	14.45
31	09.00		06.47	18.36 (6)			03.35			04.30	06.00	18.24 (6)			07.52		10.00
	16.09		20.04 44	19.20 (6)			23.03			22.21	20.40 60	19.24 (6)			16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Total, worst case			225	1597	93			1102	836			
Sun reduction			0,37	0,40	0,45			0,41	0,31			
Oper. time red.			0,90	0,90	0,90			0,90	0,90			
Wind dir. red.			0,62	0,62	0,62			0,62	0,62			
Total reduction			0,21	0,22	0,25			0,23	0,18			
Total, real			47	357	23			255	146			

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

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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest Shadow receptor: K - Laskentapiste_K (Ritaviita2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.11	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.22	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.22	22.00	20.16	18.33	15.53	14.44
8	09.51	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.48	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.12	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.12	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.47	22.17	23.31	23.06	21.34	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	04.15	03.10	03.48	05.17	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.55	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26	03.53	03.09	04.10	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.38	03.15	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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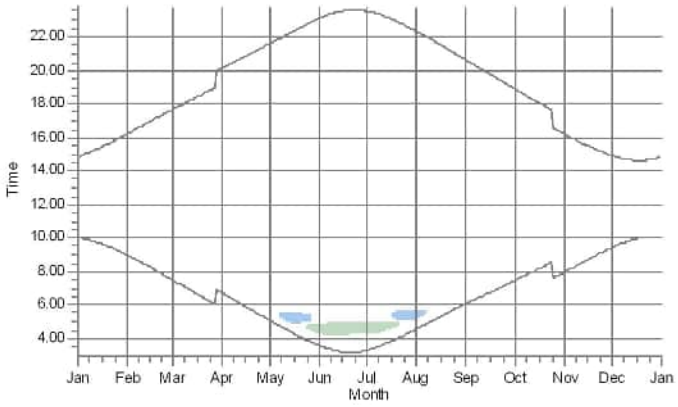
10.11.2023 9.53/3.6.355

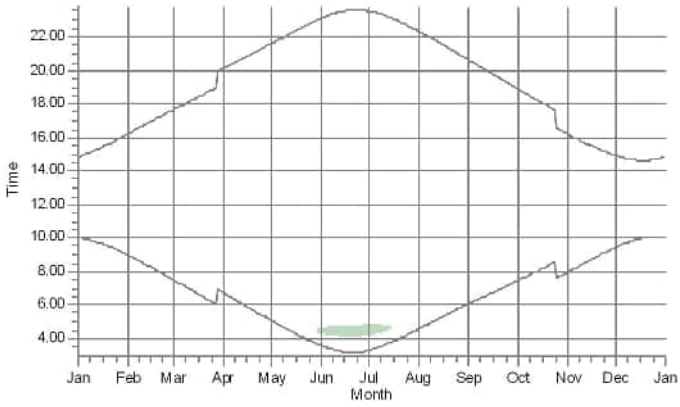
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

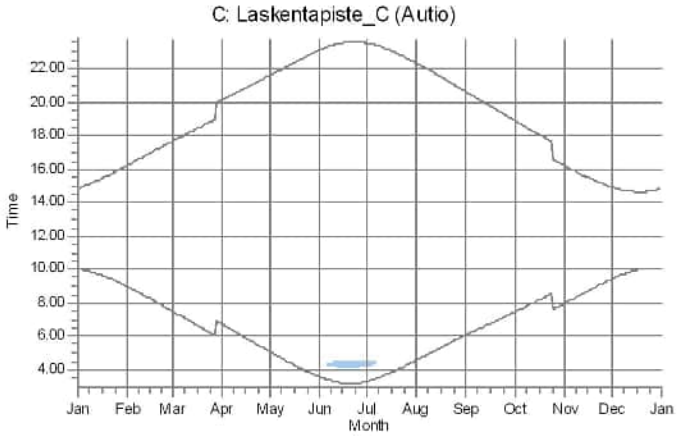
A: Laskentapiste_A (Harjunpää)



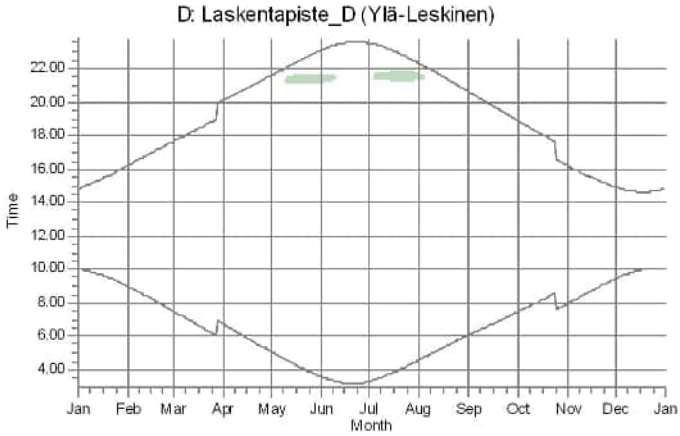
B: Laskentapiste_B (Harjunpää)



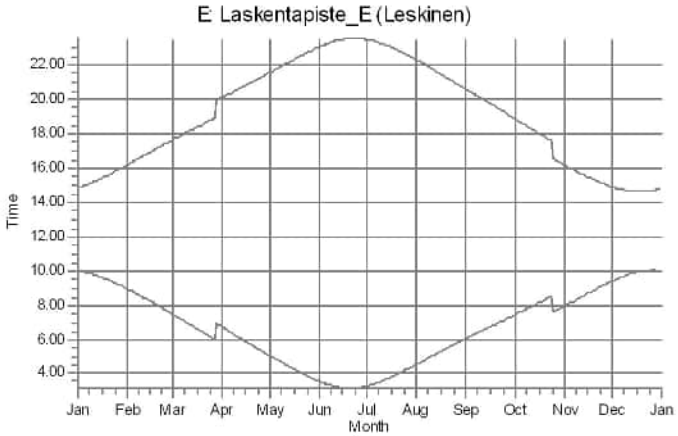
C: Laskentapiste_C (Autio)



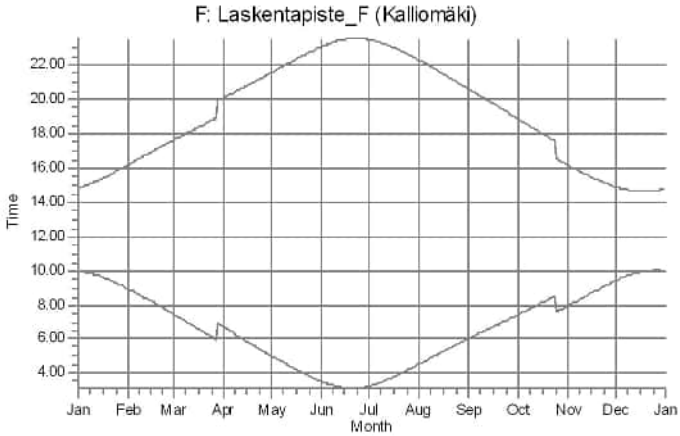
D: Laskentapiste_D (Ylä-Leskinen)



E: Laskentapiste_E (Leskinen)



F: Laskentapiste_F (Kalliomäki)



WTGs

14: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (277)

15: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)

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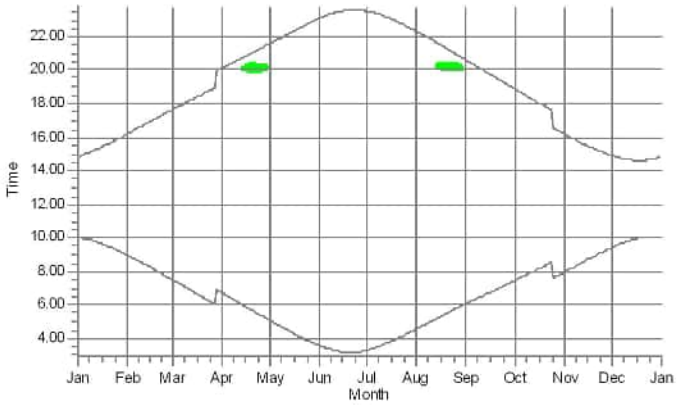
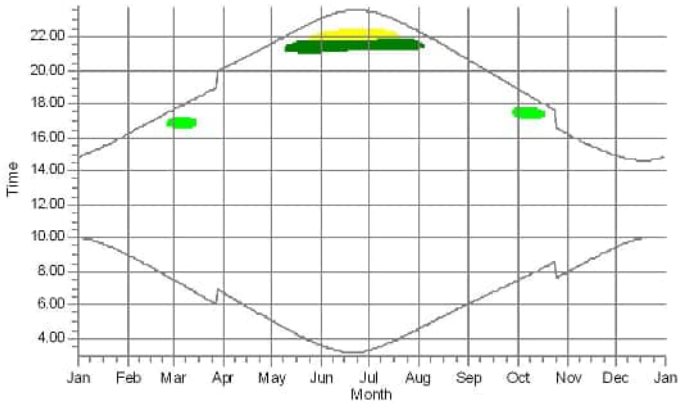
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

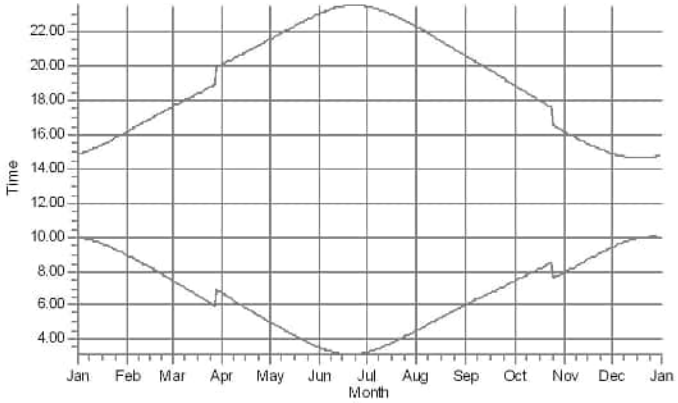
G: Laskentapiste_G (Alapelto)



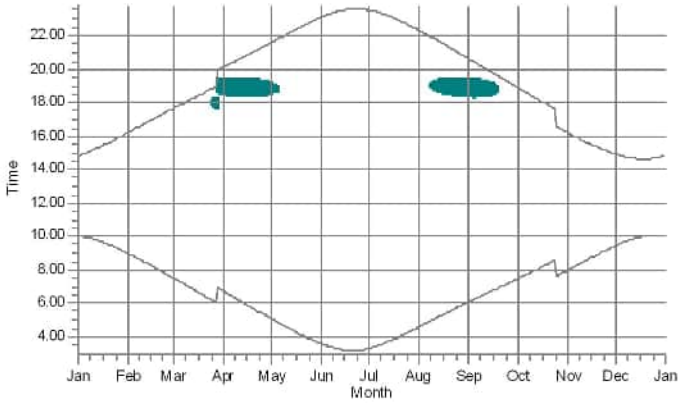
H: Laskentapiste_H (Lepola)



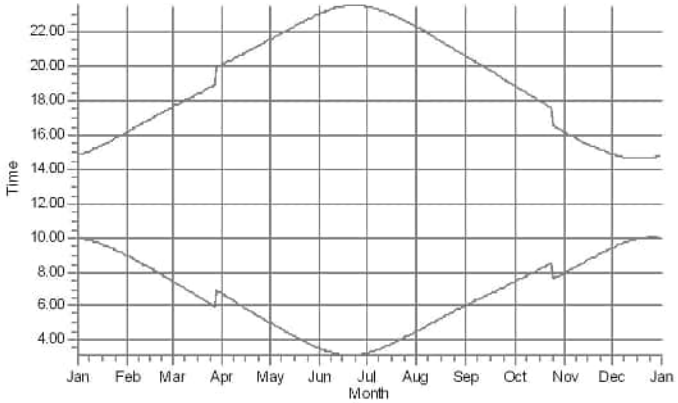
I: Laskentapiste_I (Kalliomäki)



J: Laskentapiste_J (Ritaviita)



K: Laskentapiste_K (Ritaviita2)



WTGs

1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (275)
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (274)
6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (271)
9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)

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SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 1 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (275)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.02	03.33 21.09-21.37/28	03.16 21.18-21.41/23	04.33 21.24-21.32/8	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 21.10-21.38/28	03.17 21.18-21.42/24	04.36 21.25-21.28/3	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 21.09-21.37/28	03.19 21.18-21.42/24	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 21.10-21.37/27	03.20 21.17-21.42/25	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 21.11-21.38/27	03.22 21.18-21.43/25	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23 21.12-21.38/26	03.24 21.17-21.43/26	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.11-21.37/26	03.26 21.18-21.44/26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 21.12-21.37/25	03.28 21.17-21.44/27	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18 21.12-21.36/24	03.30 21.17-21.45/28	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16 21.13-21.37/24	03.33 21.17-21.45/28	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30 21.14-21.19/5	03.15 21.13-21.37/24	03.35 21.17-21.45/28	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27 21.12-21.22/10	03.14 21.14-21.37/23	03.37 21.17-21.46/29	05.05	06.33	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.13	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24 21.12-21.25/13	03.12 21.15-21.37/22	03.40 21.17-21.46/29	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21 21.10-21.27/17	03.11 21.15-21.37/22	03.42 21.17-21.46/29	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18 21.10-21.30/20	03.11 21.15-21.37/22	03.45 21.17-21.47/30	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15 21.09-21.31/22	03.10 21.15-21.37/22	03.47 21.17-21.47/30	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.20	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12 21.09-21.34/25	03.09 21.16-21.37/21	03.50 21.17-21.47/30	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09 21.09-21.36/27	03.09 21.16-21.37/21	03.53 21.17-21.47/30	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07 21.07-21.36/29	03.08 21.16-21.37/21	03.55 21.17-21.47/30	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 21.08-21.37/29	03.08 21.17-21.37/20	03.58 21.17-21.47/30	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01 21.08-21.37/29	03.08 21.17-21.37/20	04.01 21.18-21.48/30	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58 21.08-21.38/30	03.08 21.17-21.37/20	04.04 21.18-21.47/29	05.35	07.01	08.25	08.59	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55 21.08-21.38/30	03.09 21.18-21.38/20	04.07 21.18-21.47/29	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53 21.07-21.37/30	03.09 21.17-21.38/21	04.09 21.18-21.47/29	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50 21.07-21.37/30	03.10 21.18-21.39/21	04.12 21.19-21.47/28	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 21.08-21.38/30	03.10 21.17-21.39/22	04.15 21.19-21.46/27	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45 21.08-21.38/30	03.11 21.18-21.39/21	04.18 21.19-21.43/24	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 21.08-21.38/30	03.12 21.18-21.40/22	04.21 21.20-21.41/21	05.52	07.17	07.43	09.17	10.01
	15.59	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 21.08-21.38/30	03.13 21.18-21.40/22	04.24 21.20-21.39/19	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.37 21.08-21.37/29	03.14 21.18-21.41/23	04.27 21.21-21.37/16	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35 21.09-21.38/29		04.30 21.22-21.34/12	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	524	693	815	11	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

WTG: 2 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (274)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33 21.51-22.06/15	03.16 21.56-22.21/25	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 21.51-22.09/18	03.17 21.56-22.21/25	04.36	06.06	07.28	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 21.51-22.10/19	03.19 21.56-22.21/25	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 21.51-22.12/21	03.20 21.56-22.21/25	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 21.51-22.14/23	03.22 21.57-22.21/24	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.26	04.46	03.23 21.52-22.15/23	03.24 21.57-22.21/24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.51-22.15/24	03.26 21.58-22.21/23	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 21.51-22.15/24	03.28 21.58-22.19/21	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.17 21.51-22.15/24	03.30 21.58-22.18/20	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16 21.52-22.16/24	03.33 21.59-22.17/18	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30	03.15 21.52-22.16/24	03.35 21.58-22.15/17	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13 21.52-22.16/24	03.37 21.59-22.14/15	05.05	06.33	07.57	08.29	09.49
	15.12	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12 21.53-22.17/24	03.40 22.00-22.12/12	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11 21.52-22.17/25	03.42 22.00-22.11/11	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10 21.53-22.17/24	03.45 22.01-22.09/8	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15	03.10 21.53-22.17/24	03.47 22.01-22.07/6	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09 21.53-22.17/24	03.50 22.02-22.05/3	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09 21.53-22.17/24	03.53 22.02-22.03/1	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.06	03.08 21.54-22.18/24	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08 21.54-22.18/24	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08 21.54-22.18/24	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.08 21.54-22.18/24	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.08 21.55-22.19/24	04.07	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53	03.09 21.54-22.19/25	04.09	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09 21.55-22.19/24	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 21.53-21.55/2	03.10 21.55-22.19/24	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.15	03.45 21.52-21.57/5	03.11 21.55-22.19/24	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 21.52-21.59/7	03.12 21.56-22.20/24	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 21.51-22.01/10	03.13 21.56-22.20/24	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.37 21.51-22.02/11	03.14 21.56-22.21/25	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35 21.51-22.05/14		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	49	698	303	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 3 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (273)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.32	22.18	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26	03.20	04.42	06.11	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24	03.22	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.30	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.09	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13	03.37	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	03.40	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10	03.45	05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.39	05.52	04.15	03.10	03.47	05.17	06.45	08.08	08.42	09.55
	15.23	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.35	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.30	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.09	05.40	07.06	08.31	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.00	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.04		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	205	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 4 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (282)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.32	22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.22	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.47
6	09.55	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.25	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.30	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.37	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	03.40	05.09	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.06	15.31	14.37
16	09.37	08.12	06.39	05.53	04.15	03.10	03.47	05.17	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.58
	15.29	17.05	18.28	20.56	22.27	23.35	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	03.56	05.26	06.53	08.17	08.51	09.59
	15.32	17.08	18.30	20.59	22.30	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.51	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.40	07.07	08.32	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.12	05.43	07.09	07.35	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.41	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	04.27	05.57	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 5 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (272)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.42	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.17	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.13	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.35	09.08	10.02
	15.50	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.10	04.15	05.46	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.41	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.33	05.58	05.12	03.42	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 6 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (271)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44 18.34-19.22/48	05.03 18.36-19.07/31	03.33	03.16	04.33	06.03 18.24-19.23/59	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40 18.32-19.22/50	04.59 18.38-19.05/27	03.31	03.17	04.36	06.06 18.24-19.23/59	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37 18.31-19.23/52	04.56 18.41-19.02/21	03.29	03.19	04.39	06.09 18.24-19.23/59	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34 18.30-19.23/53	04.53 18.44-18.58/14	03.27	03.21	04.42	06.12 18.23-19.21/58	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.56	08.45	07.16	06.30 18.29-19.24/55	04.50	03.25	03.23	04.45	06.14 18.24-19.21/57	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27 18.28-19.24/56	04.46	03.23	03.24	04.48	06.17 18.24-19.21/57	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23 18.27-19.24/57	04.43	03.21	03.26	04.51	06.20 18.24-19.19/55	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20 18.26-19.24/58	04.40	03.19	03.29	04.54 19.00-19.03/3	06.23 18.25-19.18/53	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16 18.26-19.25/59	04.37	03.18	03.31	04.57 18.52-19.09/17	06.25 18.25-19.16/51	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13 18.26-19.25/59	04.34	03.16	03.33	05.00 18.49-19.12/23	06.28 18.26-19.15/49	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10 18.25-19.24/59	04.31	03.15	03.35	05.03 18.46-19.14/28	06.31 18.27-19.14/47	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06 18.25-19.24/59	04.28	03.14	03.38	05.06 18.44-19.16/32	06.34 18.27-19.12/45	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03 18.24-19.24/60	04.25	03.13	03.40	05.09 18.42-19.18/36	06.36 18.28-19.11/43	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59 18.24-19.23/59	04.22	03.12	03.43	05.12 18.39-19.19/40	06.39 18.30-19.09/39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56 18.24-19.23/59	04.19	03.11	03.45	05.14 18.38-19.20/42	06.42 18.31-19.06/35	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53 18.24-19.23/59	04.16	03.10	03.48	05.17 18.36-19.21/45	06.45 18.33-19.03/30	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49 18.24-19.23/59	04.13	03.09	03.50	05.20 18.35-19.22/47	06.47 18.36-19.00/24	08.11	08.45	09.56
	15.27	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46 18.24-19.22/58	04.10	03.09	03.53	05.23 18.34-19.23/49	06.50 18.39-18.55/16	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42 18.24-19.21/57	04.07	03.09	03.56	05.26 18.32-19.23/51	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39 18.24-19.20/56	04.04	03.09	03.58	05.29 18.31-19.24/53	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36 18.25-19.20/55	04.01	03.09	04.01	05.32 18.31-19.24/53	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32 18.25-19.19/54	03.58	03.09	04.04	05.35 18.29-19.24/55	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29 18.26-19.18/52	03.56	03.09	04.07	05.38 18.29-19.25/56	07.04	08.29	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26 18.27-19.17/50	03.53	03.09	04.10	05.41 18.27-19.24/57	07.07	08.32	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 17.52-18.06/14	05.22 18.28-19.16/48	03.50	03.10	04.13	05.43 18.27-19.25/58	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 17.48-18.11/23	05.19 18.29-19.15/46	03.48	03.11	04.15	05.46 18.27-19.25/58	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01 17.45-18.14/29	05.16 18.30-19.14/44	03.45	03.11	04.18	05.49 18.26-19.25/59	07.15	07.40	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.58 17.41-18.16/35	05.12 18.31-19.13/42	03.42	03.12	04.21	05.52 18.25-19.25/60	07.18	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54 18.40-19.18/38	05.09 18.32-19.11/39	03.40	03.13	04.24	05.55 18.25-19.25/60	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.02		06.51 18.37-19.19/42	05.06 18.34-19.09/35	03.38	03.15	04.27	05.58 18.24-19.24/60	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47 18.36-19.20/44		03.35		04.30	06.00 18.24-19.24/60		07.53		10.00
	16.09		20.05		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	225	1597	93	0	0	1102	836	0	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: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 7 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (270)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.19	23.22	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.32	23.06	21.34	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.10	03.48	05.17	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.58	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 8 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (269)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.19	23.22	22.00	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.16	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.14	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.48	18.06	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.10	03.48	05.17	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.58	05.29	06.55	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.36	22.47	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.18	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.43	03.12	04.21	05.52	07.17	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June
1	09.59	08.57	07.29 16.41-17.02/21	06.44	05.03	03.33
	14.48	16.12	17.38	20.07	21.35	23.05
2	09.58	08.54	07.26 16.39-17.04/25	06.40	04.59	03.31
	14.50	16.15	17.41	20.10	21.38	23.07
3	09.57	08.51	07.22 16.39-17.05/26	06.37	04.56	03.29
	14.52	16.18	17.44	20.13	21.41	23.10
4	09.56	08.48	07.19 16.38-17.05/27	06.33	04.53	03.27
	14.54	16.22	17.47	20.16	21.44	23.12
5	09.55	08.45	07.16 16.38-17.06/28	06.30	04.50	03.25
	14.56	16.25	17.50	20.19	21.47	23.14
6	09.54	08.42	07.12 16.37-17.05/28	06.27	04.46	03.23
	14.58	16.28	17.53	20.21	21.50	23.17
7	09.53	08.39	07.09 16.37-17.05/28	06.23	04.43	03.21
	15.01	16.31	17.56	20.24	21.53	23.19
8	09.51	08.36	07.06 16.37-17.04/27	06.20	04.40	03.20
	15.03	16.34	17.59	20.27	21.56	23.21
9	09.50	08.33	07.02 16.37-17.04/27	06.16	04.37	03.18
	15.05	16.37	18.02	20.30	21.59	23.22
10	09.48	08.30	06.59 16.37-17.03/26	06.13	04.34	03.16
	15.08	16.40	18.05	20.33	22.02	23.24
11	09.47	08.27	06.55 16.38-17.02/24	06.09	04.31	03.15
	15.10	16.44	18.07	20.36	22.05	23.26
12	09.45	08.24	06.52 16.39-17.00/21	06.06	04.28	03.14
	15.13	16.47	18.10	20.39	22.08	23.27
13	09.43	08.21	06.49 16.41-16.59/18	06.03	04.25	03.13
	15.15	16.50	18.13	20.42	22.11	23.29
14	09.41	08.18	06.45 16.43-16.55/12	05.59 20.05-20.07/2	04.21	03.12
	15.18	16.53	18.16	20.45	22.14	23.30
15	09.39	08.14	06.42	05.56 20.03-20.10/7	04.18	03.11
	15.21	16.56	18.19	20.47	22.17	23.31
16	09.37	08.11	06.38	05.53 20.02-20.13/11	04.16	03.10
	15.24	16.59	18.22	20.50	22.20	23.32
17	09.35	08.08	06.35	05.49 20.01-20.16/15	04.13	03.10
	15.27	17.02	18.25	20.53	22.23	23.33
18	09.33	08.05	06.32	05.46 19.59-20.18/19	04.10	03.09
	15.29	17.05	18.27	20.56	22.26	23.34
19	09.30	08.02	06.28	05.42 19.58-20.21/23	04.07	03.09
	15.32	17.08	18.30	20.59	22.29	23.35
20	09.28	07.58	06.25	05.39 19.58-20.21/23	04.04	03.09
	15.35	17.11	18.33	21.02	22.32	23.35
21	09.26	07.55	06.21	05.36 19.58-20.21/23	04.01	03.09
	15.38	17.14	18.36	21.05	22.35	23.35
22	09.23	07.52	06.18	05.32 19.58-20.20/22	03.58	03.09
	15.41	17.17	18.39	21.08	22.38	23.36
23	09.21	07.49	06.15	05.29 19.58-20.20/22	03.56	03.09
	15.44	17.20	18.42	21.11	22.41	23.36
24	09.18	07.45	06.11	05.26 19.59-20.19/20	03.53	03.09
	15.47	17.23	18.45	21.14	22.44	23.36
25	09.16	07.42	06.08	05.22 19.59-20.18/19	03.50	03.10
	15.50	17.26	18.47	21.17	22.46	23.35
26	09.13	07.39 16.45-16.52/7	06.04	05.19 20.00-20.17/17	03.48	03.11
	15.53	17.29	18.50	21.20	22.49	23.35
27	09.10	07.36 16.44-16.56/12	06.01	05.16 20.01-20.16/15	03.45	03.11
	15.57	17.32	18.53	21.23	22.52	23.34
28	09.08	07.32 16.41-16.58/17	05.57	05.12 20.03-20.14/11	03.42	03.12
	16.00	17.35	18.56	21.26	22.55	23.34
29	09.05		06.54	05.09 20.07-20.10/3	03.40	03.14
	16.03		19.59	21.29	22.57	23.33
30	09.02		06.51	05.06	03.38	03.15
	16.06		20.02	21.32	23.00	23.32
31	08.59		06.47		03.35	
	16.09		20.04		23.03	
Potential sun hours	181	242	363	447	560	606
Sum of minutes with flicker	0	36	338	252	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (268)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August		September		October		November	December
1	03.16	04.33		06.03		07.26	17.19-17.39/20	07.55	09.24
	23.31	22.18		20.36		18.54		16.12	14.53
2	03.18	04.36		06.06		07.28	17.17-17.40/23	07.58	09.27
	23.30	22.15		20.33		18.50		16.09	14.52
3	03.19	04.39		06.09		07.31	17.16-17.41/25	08.01	09.30
	23.29	22.12		20.30		18.47		16.06	14.50
4	03.21	04.42		06.11		07.34	17.15-17.41/26	08.05	09.32
	23.27	22.09		20.26		18.43		16.02	14.48
5	03.23	04.45		06.14		07.37	17.14-17.41/27	08.08	09.34
	23.26	22.06		20.23		18.40		15.59	14.47
6	03.25	04.48		06.17		07.40	17.13-17.41/28	08.11	09.37
	23.24	22.03		20.19		18.37		15.56	14.45
7	03.26	04.51		06.20		07.42	17.12-17.41/29	08.14	09.39
	23.22	21.59		20.16		18.33		15.53	14.44
8	03.29	04.54		06.23		07.45	17.12-17.40/28	08.17	09.41
	23.20	21.56		20.12		18.30		15.51	14.43
9	03.31	04.57		06.25		07.48	17.12-17.40/28	08.20	09.43
	23.19	21.53		20.09		18.26		15.48	14.41
10	03.33	05.00		06.28		07.51	17.12-17.39/27	08.23	09.45
	23.17	21.50		20.06		18.23		15.45	14.40
11	03.35	05.03		06.31		07.54	17.13-17.38/25	08.26	09.47
	23.14	21.47		20.02		18.20		15.42	14.39
12	03.38	05.06		06.34		07.56	17.13-17.37/24	08.29	09.49
	23.12	21.43		19.59		18.16		15.39	14.39
13	03.40	05.09		06.36		07.59	17.14-17.33/19	08.32	09.50
	23.10	21.40		19.55		18.13		15.36	14.38
14	03.43	05.12	20.13-20.19/6	06.39		08.02	17.15-17.30/15	08.35	09.52
	23.08	21.37		19.52		18.10		15.33	14.37
15	03.45	05.14	20.10-20.22/12	06.42		08.05	17.17-17.27/10	08.38	09.53
	23.05	21.34		19.48		18.06		15.31	14.37
16	03.48	05.17	20.07-20.23/16	06.44		08.08	17.19-17.23/4	08.41	09.55
	23.03	21.30		19.45		18.03		15.28	14.36
17	03.50	05.20	20.06-20.24/18	06.47		08.11		08.44	09.56
	23.01	21.27		19.42		18.00		15.25	14.36
18	03.53	05.23	20.06-20.25/19	06.50		08.14		08.47	09.57
	22.58	21.24		19.38		17.57		15.23	14.36
19	03.56	05.26	20.04-20.25/21	06.53		08.17		08.50	09.58
	22.55	21.20		19.35		17.53		15.20	14.36
20	03.58	05.29	20.04-20.26/22	06.55		08.20		08.53	09.59
	22.53	21.17		19.31		17.50		15.18	14.36
21	04.01	05.32	20.03-20.25/22	06.58		08.22		08.56	10.00
	22.50	21.14		19.28		17.47		15.15	14.37
22	04.04	05.35	20.03-20.25/22	07.01		08.25		08.59	10.00
	22.47	21.10		19.24		17.43		15.13	14.37
23	04.07	05.38	20.03-20.25/22	07.04		08.28		09.02	10.01
	22.45	21.07		19.21		17.40		15.10	14.37
24	04.10	05.40	20.02-20.24/22	07.06		08.31		09.05	10.01
	22.42	21.04		19.17		17.37		15.08	14.38
25	04.13	05.43	20.03-20.21/18	07.09		07.34		09.08	10.01
	22.39	21.00		19.14		16.34		15.06	14.39
26	04.15	05.46	20.02-20.18/16	07.12		07.37		09.11	10.01
	22.36	20.57		19.11		16.31		15.03	14.40
27	04.18	05.49	20.03-20.15/12	07.15		07.40		09.14	10.01
	22.33	20.53		19.07		16.27		15.01	14.41
28	04.21	05.52	20.05-20.12/7	07.17		07.43		09.16	10.01
	22.30	20.50		19.04		16.24		14.59	14.42
29	04.24	05.55	20.06-20.08/2	07.20	17.24-17.34/10	07.46		09.19	10.01
	22.27	20.47		19.00		16.21		14.57	14.43
30	04.27	05.57		07.23	17.21-17.37/16	07.49		09.22	10.01
	22.24	20.43		18.57		16.18		14.55	14.45
31	04.30	06.00				07.52			10.00
	22.21	20.40				16.15			14.46
Potential sun hours	595	503		392		308		206	150
Sum of minutes with flicker	0	257		26		358		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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 10 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (281)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.12	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.30	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.28	15.01	14.41
28	09.08	07.33	05.58	05.13	03.43	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 11 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (279)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.08	21.35	23.06	23.32	22.19	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.16	17.42	20.10	21.38	23.08	23.30	22.16	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.32	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.55	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.25	22.03	20.20	18.37	15.57	14.45
7	09.53	08.40	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.46	08.17	09.41
	15.03	16.34	17.59	20.28	21.57	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.18	03.31	04.57	06.26	07.48	08.20	09.44
	15.05	16.38	18.02	20.30	22.00	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.46
	15.08	16.41	18.05	20.33	22.03	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.37	08.00	08.33	09.51
	15.16	16.50	18.14	20.42	22.12	23.29	23.11	21.40	19.56	18.13	15.36	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.36	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.04	21.31	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.48	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.58
	15.30	17.05	18.28	20.57	22.27	23.35	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.59
	15.32	17.09	18.31	21.00	22.30	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.35	17.12	18.33	21.02	22.33	23.36	22.53	21.17	19.32	17.50	15.18	14.36
21	09.26	07.56	06.22	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.51	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.33	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.06	10.02
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.43	06.08	05.23	03.50	03.10	04.13	05.44	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.50	23.36	22.37	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.34	20.54	19.08	16.28	15.01	14.41
28	09.08	07.33	05.58	05.13	03.43	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.44	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.01		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 12 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (280)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.07	21.35	23.05	23.31	22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18	03.31	04.57	06.26	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.03	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.56	18.13	15.36	14.38
14	09.41	08.18	06.46	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.36	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.31	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.30	17.05	18.28	20.57	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.30	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.35	17.12	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.56	06.22	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.28	15.01	14.41
28	09.08	07.33	05.58	05.13	03.43	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 13 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (278)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.08	21.35	23.05	23.31	22.19	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.16	17.42	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.32	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.28	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18	03.31	04.57	06.26	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.49	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.14	20.42	22.12	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.36	09.52
	15.18	16.53	18.16	20.45	22.15	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.31	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.21	06.48	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.57	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.54	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.01	03.09	04.02	05.32	06.58	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.24	07.52	06.18	05.33	03.59	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.42	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.11	14.38
24	09.19	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.43	06.08	05.23	03.50	03.10	04.13	05.44	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.34	20.54	19.08	16.28	15.02	14.41
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.02
	16.00	17.36	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	15.00	14.42
29	09.05		06.54	05.09	03.40	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.25	20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36		04.30	06.01		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.47
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 14 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (277)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33 21.15-21.33/18	03.16 04.20-04.55/35	04.33 21.24-21.31/7	06.03	07.26	07.56	09.25
	14.49	16.12	17.39	20.07	21.35	23.05 04.27-04.47/20	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31 21.16-21.32/16	03.18 04.21-04.55/34	04.36 21.26-21.29/3	06.06	07.29	07.59	09.27
	14.50	16.16	17.41	20.10	21.38	23.08 04.25-04.47/22	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29 21.17-21.32/15	03.19 04.22-04.55/33	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10 04.24-04.47/23	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27 21.17-21.31/14	03.21 21.28-21.34/6	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12 04.23-04.48/25	23.27 04.23-04.55/32	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25 21.18-21.31/13	03.23 21.27-21.35/8	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15 04.21-04.48/27	23.26 04.24-04.54/30	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.23 21.19-21.30/11	03.25 21.26-21.37/11	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17 04.20-04.48/28	23.24 04.26-04.55/29	22.03	20.20	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.21-21.30/9	03.27 21.25-21.37/12	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19 04.19-04.49/30	23.22 04.27-04.54/27	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.20 21.22-21.29/7	03.29 21.25-21.39/14	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21 04.18-04.49/31	23.21 04.29-04.55/26	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.18 21.24-21.27/3	03.31 21.24-21.39/15	04.57	06.26	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23 04.17-04.49/32	23.19 04.31-04.55/24	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34 21.16-21.17/1	03.17 04.16-04.49/33	03.33 21.24-21.40/16	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17 04.32-04.54/22	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31 21.14-21.19/5	03.15 04.16-04.50/34	03.36 21.23-21.41/18	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15 04.34-04.55/21	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28 21.14-21.22/8	03.14 04.15-04.50/35	03.38 21.23-21.42/19	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.28	23.13 04.36-04.55/19	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25 21.12-21.24/12	03.13 04.14-04.50/36	03.40 21.22-21.41/19	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.11	23.29	23.10 04.38-04.54/16	21.40	19.56	18.13	15.36	14.38
14	09.41	08.18	06.46	06.00	04.22 21.12-21.27/15	03.12 04.14-04.51/37	03.43 21.22-21.42/20	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08 04.40-04.54/14	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19 21.11-21.29/18	03.11 04.13-04.51/38	03.45 21.21-21.43/22	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06 04.42-04.54/12	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16 21.11-21.32/21	03.10 04.13-04.51/38	03.48 21.21-21.43/22	05.18	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.20	23.33	23.03 04.44-04.53/9	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13 21.10-21.34/24	03.10 04.13-04.52/39	03.51 21.21-21.44/23	05.21	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.23	23.33	23.01 04.46-04.53/7	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10 21.10-21.35/25	03.09 04.13-04.52/39	03.53 21.20-21.44/24	05.23	06.50	08.14	08.48	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58 04.48-04.52/4	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.43	04.07 21.11-21.35/24	03.09 04.13-04.52/39	03.56 21.21-21.45/24	05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56 04.50-04.51/1	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 21.10-21.35/25	03.09 04.13-04.52/39	03.59 21.21-21.45/24	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.01 21.10-21.35/25	03.09 04.13-04.52/39	04.02 21.21-21.45/24	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.33	03.59 21.10-21.35/25	03.09 04.13-04.52/39	04.04 21.20-21.45/25	05.35	07.01	08.26	09.00	10.00
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56 21.11-21.35/24	03.09 04.14-04.53/39	04.07 21.20-21.45/25	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53 21.11-21.35/24	03.10 04.14-04.53/39	04.10 21.21-21.46/25	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.23	03.50 21.11-21.35/24	03.10 04.15-04.54/39	04.13 21.21-21.45/24	05.44	07.09	07.35	09.08	10.02
	15.51	17.27	18.48	21.17	22.47 04.39-04.41/2	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.05	05.19	03.48 21.12-21.35/23	03.11 04.15-04.53/38	04.16 21.21-21.45/24	05.46	07.12	07.38	09.11	10.02
	15.54	17.30	18.50	21.20	22.49 04.37-04.42/5	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45 21.12-21.34/22	03.12 04.16-04.54/38	04.19 21.21-21.44/23	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52 04.35-04.43/8	23.35	22.33	20.54	19.07	16.28	15.02	14.41
28	09.08	07.33	05.58	05.13	03.43 21.12-21.34/22	03.13 04.17-04.54/37	04.22 21.21-21.41/20	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55 04.34-04.45/11	23.34	22.30	20.50	19.04	16.24	15.00	14.42
29	09.05		06.54	05.09	03.40 21.14-21.34/20	03.14 04.18-04.54/36	04.25 21.22-21.39/17	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58 04.32-04.45/13	23.33	22.28	20.47	19.01	16.21	14.57	14.44
30	09.03		06.51	05.06	03.38 21.14-21.34/20	03.15 04.18-04.54/36	04.27 21.22-21.36/14	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00 04.30-04.45/15	23.32	22.25	20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36 21.14-21.33/19		04.30 21.24-21.34/10	06.01		07.53		10.00
	16.09		20.05		23.03 04.28-04.46/18		22.21	20.40		16.15		14.47
Potential sun hours	181	242	363	447	560	606	595	503	392	308	206	150
Sum of minutes with flicker	0	0	0	0	498	1131	923	10	0	0	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

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Calculated:
10.11.2023 9.53/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest WTG: 15 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (276)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16 04.20-04.27/7	04.33 05.20-05.34/14	06.03	07.26	07.56	09.25
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.40	04.59	03.31	03.18 04.21-04.27/6	04.36 05.23-05.35/12	06.06	07.29	07.59	09.27
	14.50	16.16	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19 04.22-04.27/5	04.39 05.25-05.34/9	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21 04.23-04.26/3	04.42 05.28-05.33/5	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23 04.24-04.26/2	04.45 05.30-05.32/2	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 04.19-04.20/1	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40 05.20-05.23/3	03.20 04.18-04.21/3	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37 05.17-05.24/7	03.18 04.17-04.21/4	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34 05.14-05.24/10	03.17 04.16-04.21/5	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31 05.12-05.25/13	03.15 04.16-04.23/7	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28 05.09-05.24/15	03.14 04.15-04.23/8	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.28	23.12	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25 05.06-05.24/18	03.13 04.14-04.22/8	03.40	05.09	06.36	08.00	08.32	09.51
	15.16	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22 05.04-05.25/21	03.12 04.14-04.23/9	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.37
15	09.39	08.15	06.42	05.56	04.19 05.01-05.24/23	03.11 04.13-04.23/10	03.45	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16 05.02-05.24/22	03.10 04.13-04.24/11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13 05.03-05.25/22	03.10 04.13-04.24/11	03.51 05.22-05.25/3	05.20	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10 05.02-05.24/22	03.09 04.13-04.24/11	03.53 05.19-05.28/9	05.23	06.50	08.14	08.48	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.43	04.07 05.03-05.24/21	03.09 04.13-04.25/12	03.56 05.18-05.29/11	05.26	06.53	08.17	08.51	09.58
	15.33	17.08	18.31	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 05.04-05.23/19	03.09 04.13-04.25/12	03.59 05.16-05.30/14	05.29	06.56	08.20	08.54	09.59
	15.35	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36	04.01 05.04-05.22/18	03.09 04.13-04.25/12	04.01 05.15-05.31/16	05.32	06.58	08.23	08.57	10.00
	15.38	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.58 05.05-05.21/16	03.09 04.13-04.25/12	04.04 05.14-05.32/18	05.35	07.01	08.26	08.59	10.00
	15.41	17.18	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56 05.06-05.21/15	03.09 04.14-04.26/12	04.07 05.14-05.33/19	05.38	07.04	08.29	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53 05.07-05.20/13	03.10 04.14-04.26/12	04.10 05.14-05.34/20	05.41	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50 05.08-05.19/11	03.10 04.15-04.26/11	04.13 05.13-05.34/21	05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48 05.10-05.17/7	03.11 04.15-04.26/11	04.16 05.13-05.35/22	05.46	07.12	07.37	09.11	10.02
	15.54	17.30	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.12 04.16-04.26/10	04.19 05.13-05.35/22	05.49	07.15	07.40	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.28	15.02	14.41
28	09.08	07.32	05.58	05.13	03.43	03.13 04.17-04.27/10	04.22 05.13-05.35/22	05.52	07.18	07.43	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14 04.18-04.27/9	04.24 05.13-05.35/22	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	03.15 04.18-04.26/8	04.27 05.15-05.35/20	05.58	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.36		04.30 05.18-05.35/17	06.00		07.53		10.00
	16.09		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	181	242	363	447	560	606	595	503	392	308	206	150
Sum of minutes with flicker	0	0	0	0	296	219	279	42	0	0	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

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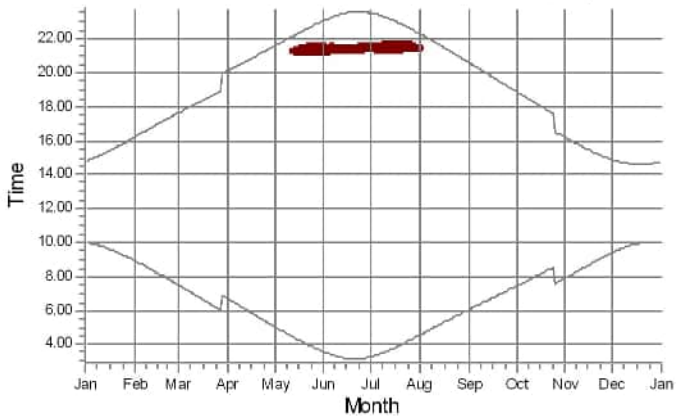
Calculated:
10.11.2023 9.53/3.6.355

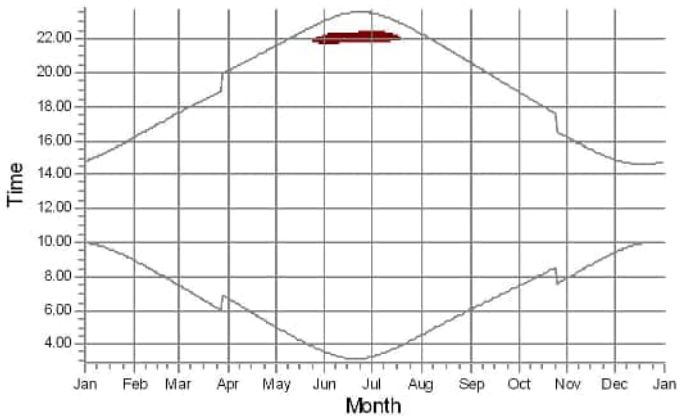
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

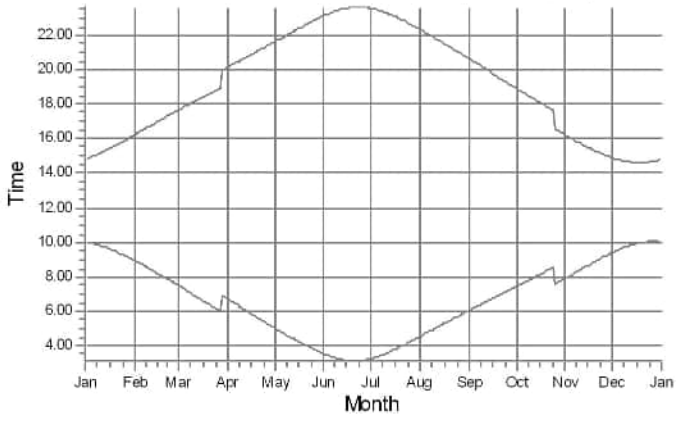
1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



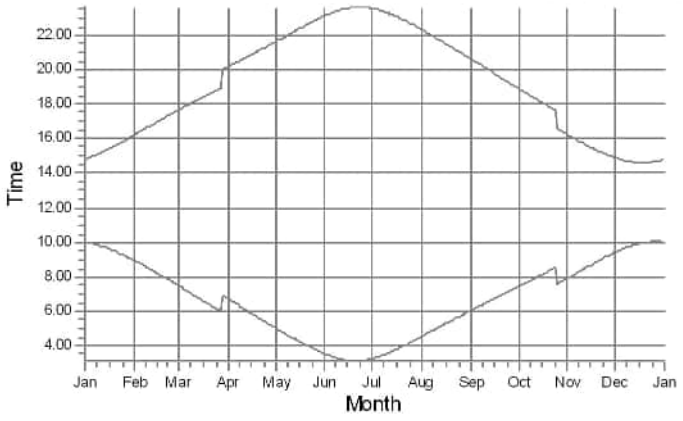
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



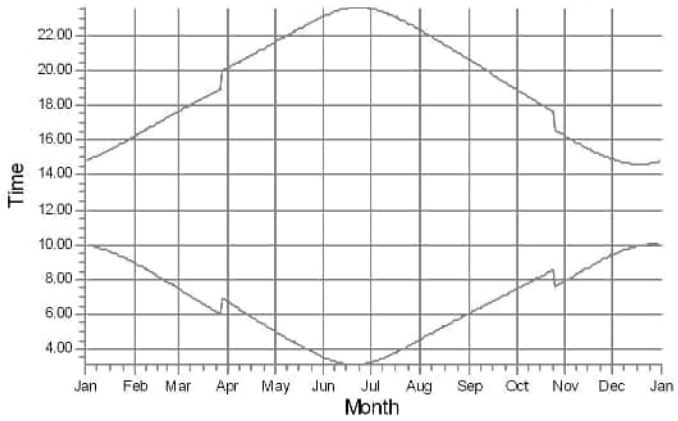
3: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



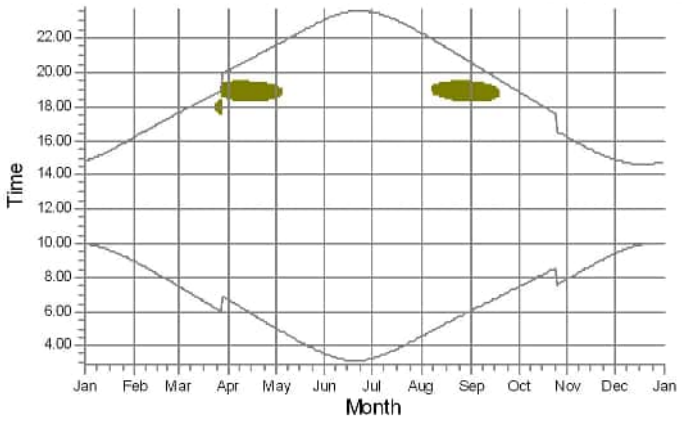
4: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



5: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



Shadow receptors

H: Laskentapiste_H (Lepola)

J: Laskentapiste_J (Ritaviita)

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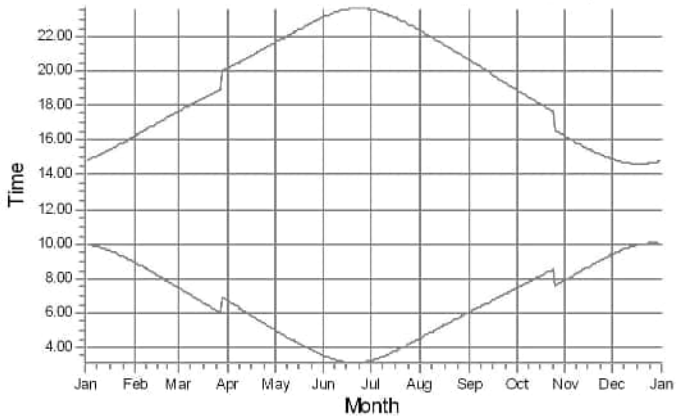
Calculated:
10.11.2023 9.53/3.6.355

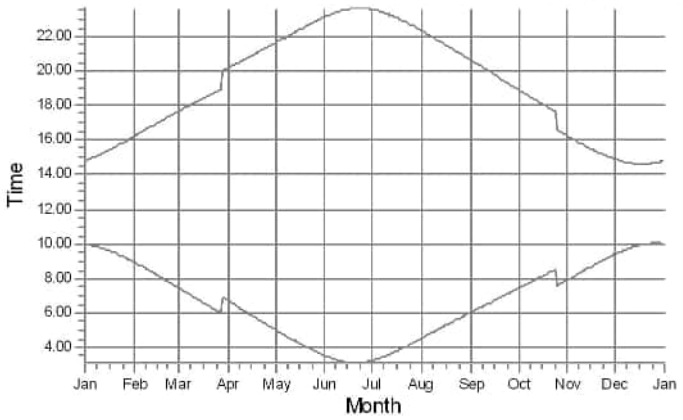
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

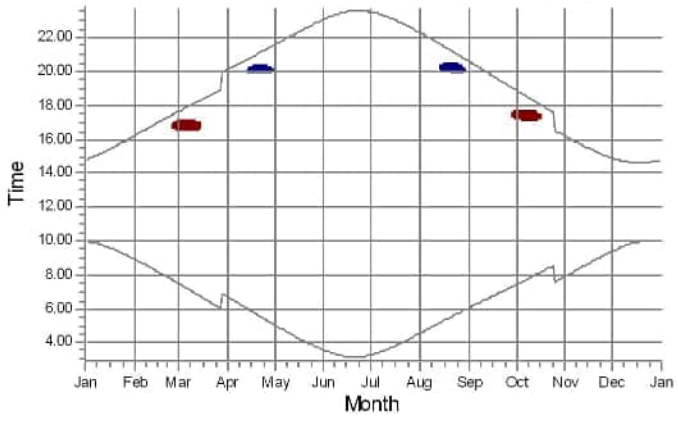
7: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



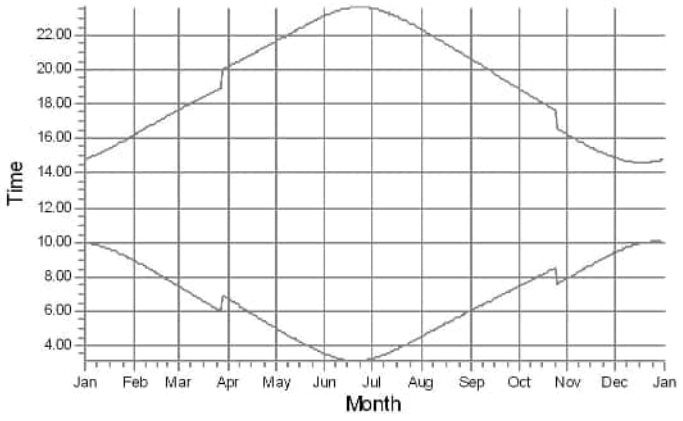
8: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



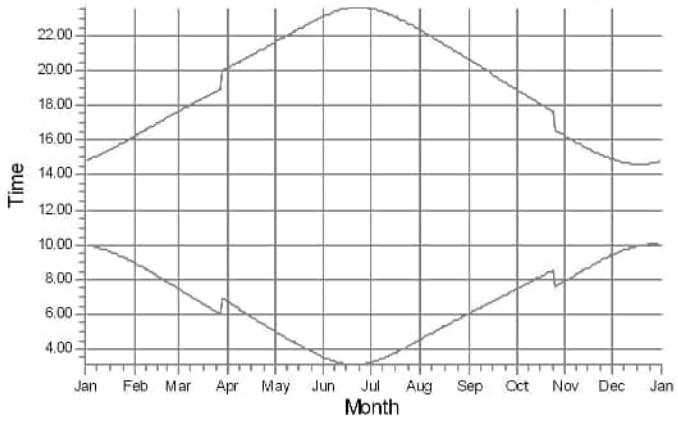
9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



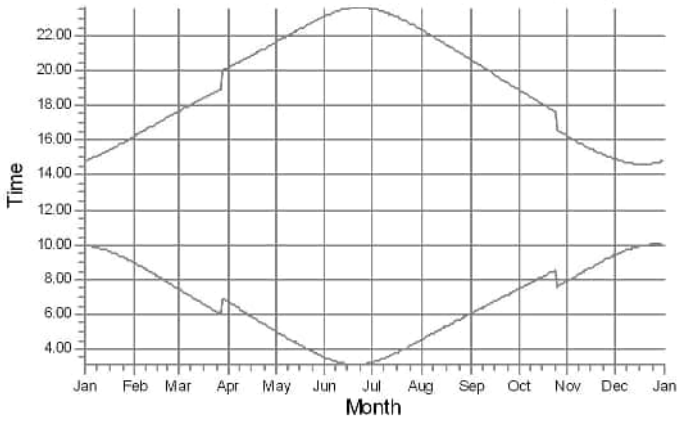
10: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



11: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



12: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325



Shadow receptors

G: Laskentapiste_G (Alapelto)

H: Laskentapiste_H (Lepola)

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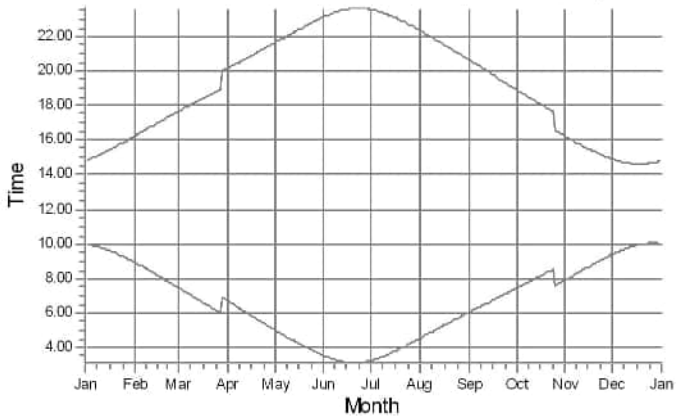
Calculated:
10.11.2023 9.53/3.6.355

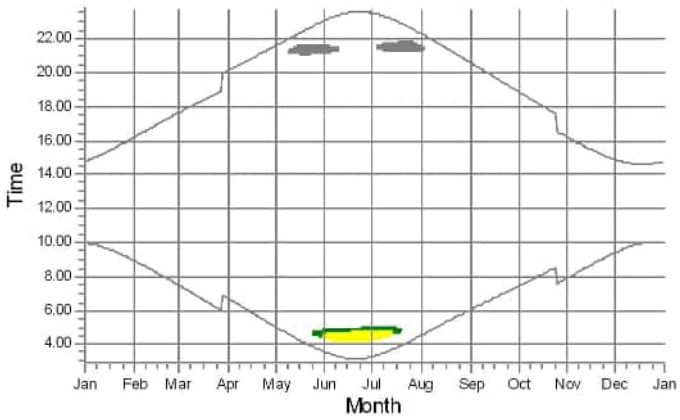
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest

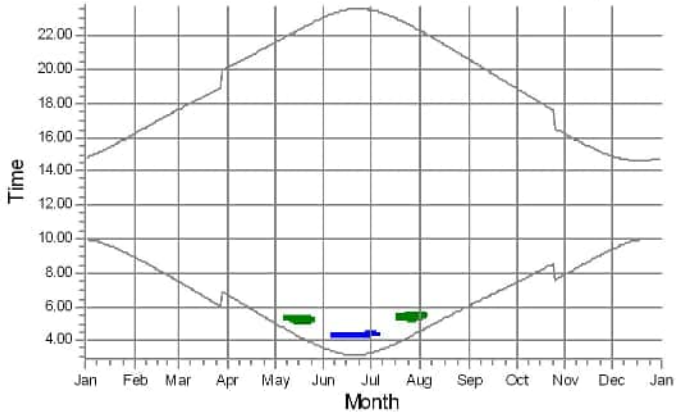
13: Generic RD250 HH200 b.V172 10000 250.0 IO! hub: 200,0 m (TOT: 32



14: Generic RD250 HH200 b.V172 10000 250.0 IO! hub: 200,0 m (TOT: 32



15: Generic RD250 HH200 b.V172 10000 250.0 IO! hub: 200,0 m (TOT: 32



Shadow receptors

A: Laskentapiste_A (Harjunpää)
B: Laskentapiste_B (Harjunpää)
C: Laskentapiste_C (Autio)
D: Laskentapiste_D (Ylä-Leskinen)

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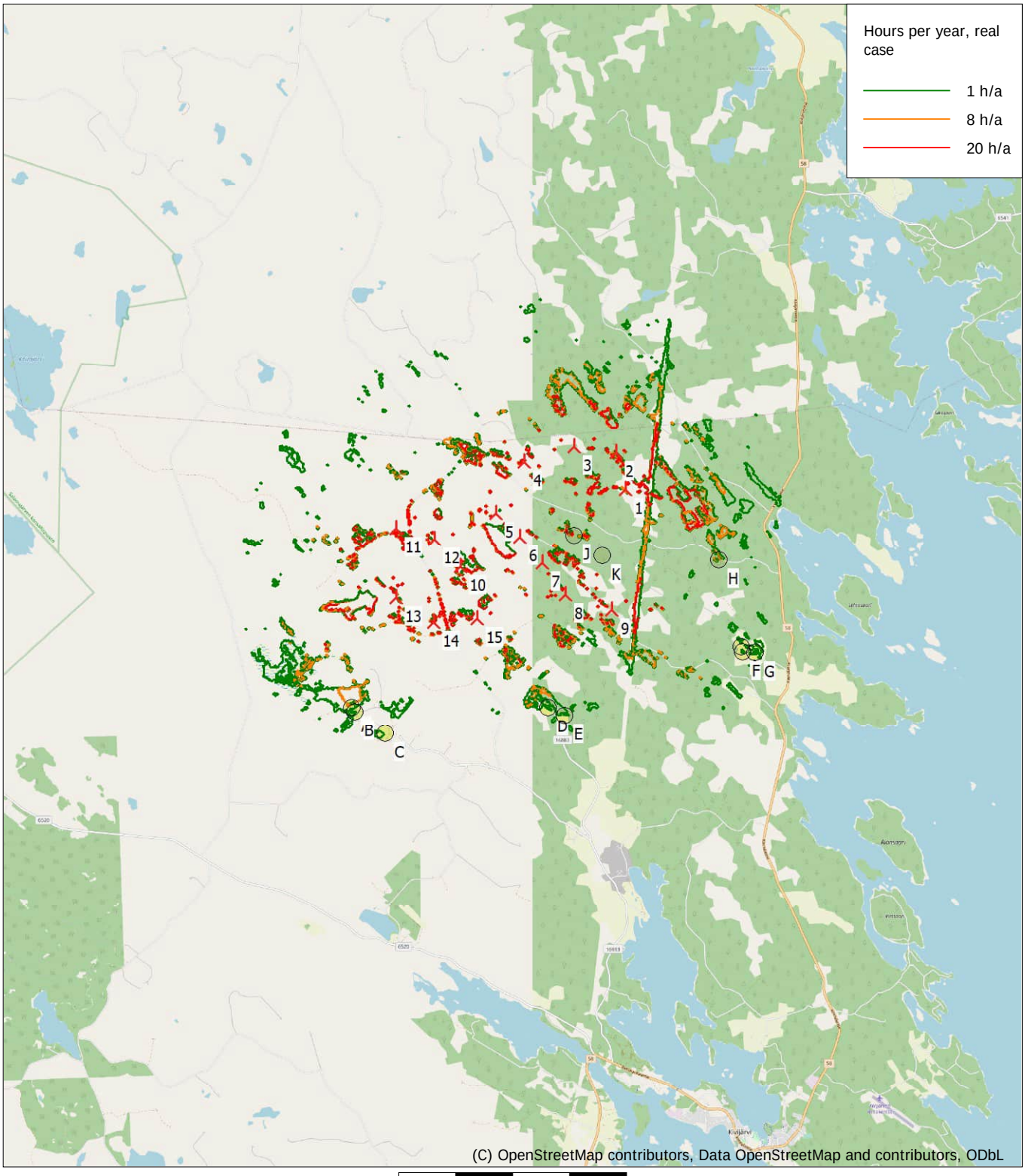
10.11.2023 9.53/3.6.355

SHADOW - Map

Calculation: SHADOW_Volkkilankangas_VE1_General_RD250x15xHH200_Luke forest



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 380 North: 7 010 740

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_WIND PRO MELUMALLINNUS TESTI 2_3.wpo (1)

Time step: 3 minutes, Day step: 7 days, Map resolution: 20 m, Visibility resolution: 10 m, Eye height: 1,5 m

Liite 12. Volkkilankankaan tuulivoimahanke – varjostusmallinnuksen tulokset ”real case, Luke forest” (VE2).

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SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest

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) []

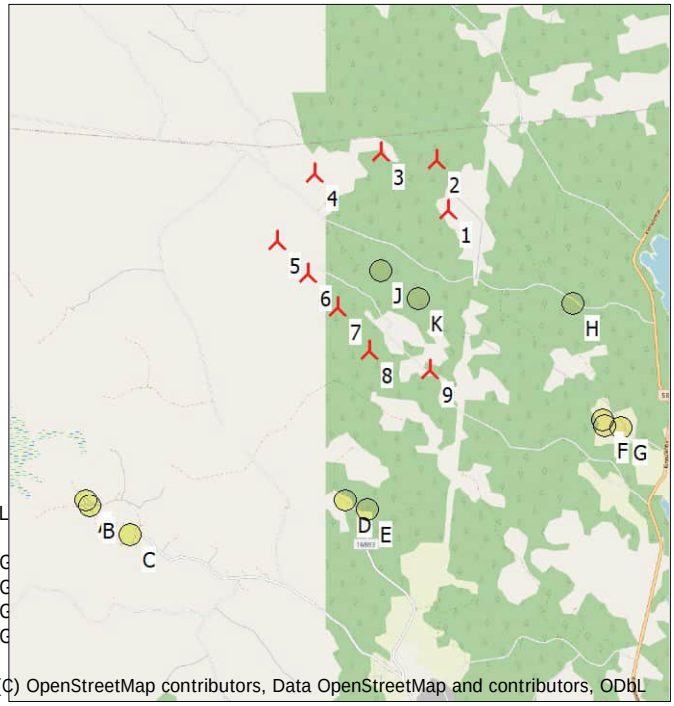
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

A ZVI (Zones of Visual Influence) calculation is performed before flicker calculation so non visible WTG do not contribute to calculated flicker values. A WTG will be visible if it is visible from any part of the receiver window. The ZVI calculation is based on the following assumptions:
Height contours used: Height Contours: CONTOURLINE_WIND PRO MELUMAL
Area object(s) used in calculation:
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Area object (Heights a.g.l. for e.g. Forest (ORA tool) or ZVI obstructions): REC
Receptor grid resolution: 1,0 m

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:100 000
New WTG
Shadow receptor

WTGs

	East	North	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Shadow data Calculation distance	RPM
			[m]					[kW]	[m]	[m]	[m]	[RPM]
1	401 105	7 012 076	152,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
2	400 966	7 012 725	147,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
3	400 233	7 012 854	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
4	399 353	7 012 603	177,9	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
5	398 812	7 011 721	157,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
6	399 211	7 011 281	160,0	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
7	399 596	7 010 821	163,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
8	400 000	7 010 233	162,5	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4
9	400 807	7 009 959	164,6	Generic RD250 HH20...	Yes	Generic	RD250 HH200 b.V172-10 000	10 000	250,0	200,0	2 769	10,4

Shadow receptor-Input

No.	Name	East	North	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode	Eye height (ZVI) a.g.l.
				[m]	[m]	[m]	[m]	[°]		[m]
A	Laskentapiste_A (Harjunpää)	396 166	7 008 378	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
B	Laskentapiste_B (Harjunpää)	396 217	7 008 287	162,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
C	Laskentapiste_C (Autio)	396 747	7 007 888	163,3	5,0	5,0	1,0	90,0	"Green house mode"	6,0
D	Laskentapiste_D (Ylä-Leskinen)	399 630	7 008 266	138,6	5,0	5,0	1,0	90,0	"Green house mode"	6,0
E	Laskentapiste_E (Leskinen)	399 915	7 008 113	140,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
F	Laskentapiste_F (Kalliomäki)	403 090	7 009 142	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
G	Laskentapiste_G (Alapelto)	403 314	7 009 127	140,4	5,0	5,0	1,0	90,0	"Green house mode"	6,0
H	Laskentapiste_H (Lepola)	402 721	7 010 782	147,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
I	Laskentapiste_I (Kalliomäki)	403 075	7 009 222	142,5	5,0	5,0	1,0	90,0	"Green house mode"	6,0
J	Laskentapiste_J (Ritaviita)	400 187	7 011 281	167,0	5,0	5,0	1,0	90,0	"Green house mode"	6,0
K	Laskentapiste_K (Ritaviita2)	400 669	7 010 907	163,8	5,0	5,0	1,0	90,0	"Green house mode"	6,0

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10.11.2023 10.00/3.6.355

SHADOW - Main Result

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest

Calculation Results

Shadow receptor

No.	Name	Shadow, expected values Shadow hours per year [h/year]
A	Laskentapiste_A (Harjunpää)	0:00
B	Laskentapiste_B (Harjunpää)	0:00
C	Laskentapiste_C (Autio)	0:00
D	Laskentapiste_D (Ylä-Leskinen)	0:00
E	Laskentapiste_E (Leskinen)	0:00
F	Laskentapiste_F (Kalliomäki)	0:00
G	Laskentapiste_G (Alapelto)	1:53
H	Laskentapiste_H (Lepola)	14:25
I	Laskentapiste_I (Kalliomäki)	0:00
J	Laskentapiste_J (Ritaviita)	13:48
K	Laskentapiste_K (Ritaviita2)	0:00

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

No.	Name	Expected [h/year]
1	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (267)	8:19
2	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (262)	4:08
3	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (261)	0:00
4	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (265)	0:00
5	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (260)	0:00
6	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (263)	13:48
7	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (266)	0:00
8	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (264)	0:00
9	Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)	3:52

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.

The calculation of the total expected values for a given receptor assumes a weighted average directional reduction for all WTGs contributing to shadow flicker within the same day. In the case where shadow flicker from different WTGs is not concurrent within the day, the total expected time at a given receptor may deviate marginally from the individual flicker time caused by each turbine separately.

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10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: A - Laskentapiste_A (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.31	03.18	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08	23.30	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.20	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.35
	14.57	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	03.20	03.29	04.54	06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.19	03.31	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.34	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	03.36	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.07	04.28	03.15	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	23.12	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.41	05.09	06.37	08.00	08.32	09.51
	15.16	16.50	18.14	20.42	22.11	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	03.46	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.04	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	03.51	05.21	06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	03.54	05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.57	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.27	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.02	05.32	06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.05	05.35	07.01	08.26	09.00	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.07	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	03.11	04.13	05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.47	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.19	05.49	07.15	07.41	09.14	10.02
	15.57	17.33	18.53	21.23	22.52	23.35	22.33	20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	03.15	04.28	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	09.00		06.48		03.36		04.31	06.01		07.53		10.00
	16.10		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: B - Laskentapiste_B (Harjunpää)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.08	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.59	08.54	07.26	06.41	05.00	03.32	03.18	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.08	23.30	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.20	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.48	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.32	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.34	15.54	14.44
8	09.52	08.36	07.06	06.20	04.41	03.20	03.29	04.54	06.23	07.46	08.17	09.41
	15.03	16.35	17.59	20.28	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.03	06.17	04.37	03.19	03.31	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.34	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.24	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	03.36	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.15	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	23.12	21.44	19.59	18.17	15.40	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.41	05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.03	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	03.46	05.15	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.42	09.55
	15.24	17.00	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.04	15.29	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	03.51	05.21	06.48	08.11	08.45	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	03.54	05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.37
19	09.31	08.02	06.29	05.43	04.07	03.09	03.56	05.27	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.34	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.02	05.32	06.59	08.23	08.57	10.00
	15.39	17.15	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.05	05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	22.48	21.11	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.07	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.39
25	09.16	07.43	06.08	05.23	03.51	03.11	04.13	05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.47	07.12	07.38	09.11	10.02
	15.54	17.30	18.51	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.19	05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52	23.34	22.33	20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.10	03.41	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.58	14.44
30	09.03		06.51	05.06	03.38	03.15	04.28	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	09.00		06.48		03.36		04.31	06.01		07.53		10.00
	16.10		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: C - Laskentapiste_C (Autio)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.34	03.17	04.34	06.03	07.26	07.56	09.25
	14.49	16.13	17.39	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.54
2	09.58	08.54	07.26	06.41	05.00	03.32	03.18	04.37	06.06	07.29	07.59	09.27
	14.51	16.16	17.42	20.10	21.38	23.07	23.30	22.15	20.33	18.51	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.20	04.40	06.09	07.32	08.02	09.30
	14.53	16.19	17.45	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.55	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.44	16.03	14.49
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.15	07.37	08.08	09.34
	14.57	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.13	06.27	04.47	03.24	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.20	18.37	15.57	14.46
7	09.53	08.39	07.09	06.24	04.44	03.22	03.27	04.51	06.20	07.43	08.14	09.39
	15.01	16.31	17.56	20.25	21.53	23.19	23.22	22.00	20.16	18.34	15.54	14.44
8	09.51	08.36	07.06	06.20	04.41	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.35	17.59	20.27	21.56	23.21	23.20	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.17	04.37	03.19	03.31	04.57	06.26	07.48	08.20	09.43
	15.06	16.38	18.02	20.30	21.59	23.22	23.19	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.34	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.41
11	09.47	08.27	06.56	06.10	04.31	03.16	03.36	05.03	06.31	07.54	08.26	09.47
	15.11	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.15	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.11	20.39	22.08	23.27	23.12	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.41	05.09	06.37	08.00	08.32	09.50
	15.16	16.50	18.14	20.42	22.11	23.29	23.10	21.40	19.56	18.13	15.37	14.38
14	09.41	08.18	06.46	06.00	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.19	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.15	06.42	05.56	04.19	03.12	03.46	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.48	22.17	23.31	23.05	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.51	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.50	04.13	03.10	03.51	05.21	06.48	08.11	08.44	09.56
	15.27	17.03	18.25	20.54	22.23	23.33	23.01	21.27	19.42	18.00	15.26	14.37
18	09.33	08.05	06.32	05.46	04.10	03.10	03.54	05.24	06.50	08.14	08.48	09.57
	15.30	17.06	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.37
19	09.30	08.02	06.29	05.43	04.07	03.10	03.56	05.26	06.53	08.17	08.51	09.58
	15.33	17.09	18.31	20.59	22.29	23.35	22.56	21.20	19.35	17.54	15.21	14.37
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.54	09.59
	15.36	17.12	18.33	21.02	22.32	23.35	22.53	21.17	19.32	17.50	15.18	14.37
21	09.26	07.56	06.22	05.36	04.02	03.09	04.02	05.32	06.58	08.23	08.56	10.00
	15.39	17.15	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.16	14.37
22	09.23	07.52	06.18	05.33	03.59	03.09	04.05	05.35	07.01	08.26	08.59	10.00
	15.42	17.18	18.39	21.08	22.38	23.36	22.47	21.10	19.25	17.44	15.13	14.38
23	09.21	07.49	06.15	05.29	03.56	03.10	04.07	05.38	07.04	08.29	09.02	10.01
	15.45	17.21	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.41	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.07	08.32	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.39
25	09.16	07.42	06.08	05.23	03.51	03.11	04.13	05.44	07.09	07.35	09.08	10.01
	15.51	17.27	18.48	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.40
26	09.13	07.39	06.05	05.19	03.48	03.11	04.16	05.47	07.12	07.38	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.46	03.12	04.19	05.49	07.15	07.41	09.14	10.01
	15.57	17.33	18.53	21.23	22.52	23.34	22.33	20.54	19.08	16.28	15.02	14.42
28	09.08	07.33	05.58	05.13	03.43	03.13	04.22	05.52	07.18	07.44	09.17	10.01
	16.00	17.36	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.25	15.00	14.43
29	09.05		06.54	05.09	03.41	03.14	04.25	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.01	16.21	14.58	14.44
30	09.02		06.51	05.06	03.38	03.15	04.28	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	09.00		06.47		03.36		04.31	06.01		07.53		10.00
	16.10		20.05		23.03		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: D - Laskentapiste_D (Ylä-Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.58	09.27
	14.51	16.16	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56	03.29	03.20	04.39	06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41	23.10	23.28	22.12	20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.25	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.22	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.38	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.16	21.50	20.06	18.23	15.45	14.41
11	09.46	08.27	06.56	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.34	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.00	21.27	19.42	18.00	15.26	14.36
18	09.33	08.05	06.32	05.46	04.10	03.10	03.53	05.23	06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	03.09	04.02	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.18	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.35	22.45	21.07	19.21	17.40	15.11	14.38
24	09.18	07.46	06.11	05.26	03.53	03.10	04.10	05.41	07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.44	23.35	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.54	17.30	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.28	15.02	14.41
28	09.08	07.32	05.58	05.13	03.43	03.13	04.22	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	08.59		06.47		03.36		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	606	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: E - Laskentapiste_E (Leskinen)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.24
	14.49	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.54
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.28	07.58	09.27
	14.51	16.16	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.09	14.52
3	09.57	08.51	07.22	06.37	04.56	03.29	03.20	04.39	06.09	07.31	08.01	09.29
	14.52	16.19	17.44	20.13	21.41	23.10	23.28	22.12	20.30	18.47	16.06	14.50
4	09.56	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.04	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.25	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.47	03.23	03.25	04.48	06.17	07.40	08.11	09.36
	14.59	16.28	17.53	20.22	21.50	23.16	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.22	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.27	15.48	14.42
10	09.48	08.30	06.59	06.13	04.34	03.17	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.16	21.50	20.06	18.23	15.45	14.41
11	09.46	08.27	06.55	06.10	04.31	03.15	03.36	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.14	21.47	20.02	18.20	15.42	14.40
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.16	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.34	14.38
15	09.39	08.14	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.11	03.48	05.18	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.37
17	09.35	08.08	06.35	05.49	04.13	03.10	03.51	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.00	21.27	19.42	18.00	15.26	14.36
18	09.32	08.05	06.32	05.46	04.10	03.10	03.53	05.23	06.50	08.14	08.47	09.57
	15.30	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.43	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.33	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.35	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.59	05.29	06.56	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.37
21	09.26	07.55	06.21	05.36	04.01	03.09	04.02	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.59	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.21	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.11	14.38
24	09.18	07.45	06.11	05.26	03.53	03.10	04.10	05.41	07.06	08.31	09.05	10.01
	15.48	17.24	18.45	21.14	22.43	23.35	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.51	17.27	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.54	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.10	07.36	06.01	05.16	03.45	03.12	04.19	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.28	15.02	14.41
28	09.08	07.32	05.57	05.13	03.43	03.13	04.22	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.44
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.00
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.56	14.45
31	08.59		06.47		03.36		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.47
Potential sun hours	182	242	363	447	559	605	594	502	392	308	206	151
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: F - Laskentapiste_F (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.56	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40	04.59	03.31	03.17	04.36	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13	21.41	23.10	23.28	22.12	20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30	04.49	03.25	03.23	04.45	06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18	21.47	23.14	23.25	22.06	20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26	04.46	03.23	03.24	04.48	06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21	21.50	23.16	23.24	22.02	20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20	04.40	03.19	03.28	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33	22.02	23.24	23.16	21.50	20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09	04.31	03.15	03.35	05.03	06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.14	21.46	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.14	03.38	05.06	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03	04.24	03.13	03.40	05.08	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41	22.11	23.28	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	04.21	03.12	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	04.15	03.10	03.48	05.17	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	22.23	23.33	23.00	21.27	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.23	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.58	05.29	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	04.01	03.09	04.01	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.13	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	03.55	03.09	04.07	05.37	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	03.53	03.09	04.10	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	22.43	23.35	22.42	21.03	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	03.50	03.10	04.12	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.11	04.15	05.46	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	03.45	03.11	04.18	05.49	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.54	23.33	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.54	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.46	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.38	03.15	04.27	05.57	07.23	07.49	09.22	10.00
	16.06		20.01	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	08.59		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.46
Potential sun hours	182	242	363	447	559	606	595	503	392	308	206	150
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: G - Laskentapiste_G (Alapelto)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April		May	June	July	August		September	October	November	December
1	09.59	08.56	07.29	06.43		05.02	03.33	03.16	04.33		06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07		21.35	23.05	23.31	22.18		20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40		04.59	03.31	03.17	04.36		06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10		21.38	23.07	23.30	22.15		20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37		04.56	03.29	03.19	04.39		06.08	07.31	08.01	09.29
	14.52	16.18	17.44	20.13		21.41	23.10	23.28	22.12		20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33		04.53	03.27	03.21	04.42		06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16		21.44	23.12	23.27	22.09		20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30		04.49	03.25	03.23	04.45		06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18		21.47	23.14	23.25	22.06		20.22	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26		04.46	03.23	03.24	04.48		06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21		21.50	23.16	23.24	22.02		20.19	18.36	15.56	14.45
7	09.52	08.39	07.09	06.23		04.43	03.21	03.26	04.51		06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24		21.53	23.18	23.22	21.59		20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20		04.40	03.19	03.28	04.54		06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27		21.56	23.20	23.20	21.56		20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16		04.37	03.18	03.31	04.57		06.25	07.48	08.20	09.43
	15.05	16.37	18.01	20.30		21.59	23.22	23.18	21.53		20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13		04.34	03.16	03.33	05.00		06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33		22.02	23.24	23.16	21.50		20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09		04.31	03.15	03.35	05.03		06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36		22.05	23.26	23.14	21.46		20.02	18.20	15.42	14.39
12	09.44	08.24	06.52	06.06		04.27	03.14	03.38	05.05		06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39		22.08	23.27	23.12	21.43		19.58	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03		04.24	03.13	03.40	05.08		06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41		22.11	23.28	23.10	21.40		19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	20.05 (9)	04.21	03.12	03.42	05.11	20.13 (9)	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	2 20.07 (9)	22.14	23.30	23.08	21.37	6 20.19 (9)	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	20.03 (9)	04.18	03.11	03.45	05.14	20.10 (9)	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	7 20.10 (9)	22.17	23.31	23.05	21.33	12 20.22 (9)	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	20.02 (9)	04.15	03.10	03.48	05.17	20.07 (9)	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	11 20.13 (9)	22.20	23.32	23.03	21.30	16 20.23 (9)	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	20.01 (9)	04.12	03.10	03.50	05.20	20.06 (9)	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	15 20.16 (9)	22.23	23.33	23.00	21.27	18 20.24 (9)	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	19.59 (9)	04.09	03.09	03.53	05.23	20.06 (9)	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	19 20.18 (9)	22.26	23.34	22.58	21.23	19 20.25 (9)	19.38	17.56	15.23	14.36
19	09.30	08.01	06.28	05.42	19.58 (9)	04.07	03.09	03.56	05.26	20.04 (9)	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	23 20.21 (9)	22.29	23.34	22.55	21.20	21 20.25 (9)	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	19.58 (9)	04.04	03.09	03.58	05.29	20.04 (9)	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	23 20.21 (9)	22.32	23.35	22.53	21.17	22 20.26 (9)	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	19.58 (9)	04.01	03.09	04.01	05.32	20.03 (9)	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	23 20.21 (9)	22.35	23.35	22.50	21.13	22 20.25 (9)	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	19.58 (9)	03.58	03.09	04.04	05.35	20.03 (9)	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22 20.20 (9)	22.38	23.35	22.47	21.10	22 20.25 (9)	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	19.58 (9)	03.55	03.09	04.07	05.37	20.03 (9)	07.03	08.28	09.02	10.00
	15.44	17.20	18.41	21.11	22 20.20 (9)	22.41	23.35	22.44	21.07	22 20.25 (9)	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	19.59 (9)	03.53	03.09	04.10	05.40	20.02 (9)	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	20 20.19 (9)	22.43	23.35	22.42	21.03	22 20.24 (9)	19.17	17.37	15.08	14.38
25	09.15	07.42	06.07	05.22	19.59 (9)	03.50	03.10	04.12	05.43	20.03 (9)	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	19 20.18 (9)	22.46	23.35	22.39	21.00	18 20.21 (9)	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	20.00 (9)	03.47	03.11	04.15	05.46	20.02 (9)	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	17 20.17 (9)	22.49	23.35	22.36	20.57	16 20.18 (9)	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.15	20.01 (9)	03.45	03.11	04.18	05.49	20.03 (9)	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	15 20.16 (9)	22.52	23.34	22.33	20.53	12 20.15 (9)	19.07	16.27	15.01	14.41
28	09.07	07.32	05.57	05.12	20.03 (9)	03.42	03.12	04.21	05.52	20.05 (9)	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	11 20.14 (9)	22.54	23.33	22.30	20.50	7 20.12 (9)	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	20.07 (9)	03.40	03.13	04.24	05.54	20.06 (9)	07.20	07.46	09.19	10.01
	16.03		19.58	21.29	3 20.10 (9)	22.57	23.33	22.27	20.46	2 20.08 (9)	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06		03.38	03.15	04.27	05.57		07.23	07.49	09.22	10.00
	16.06		20.01	21.32		23.00	23.32	22.24	20.43		18.57	16.18	14.55	14.45
31	08.59		06.47			03.35		04.30	06.00			07.52		10.00
	16.09		20.04			23.02		22.21	20.40			16.15		14.46
Potential sun hours	182	242	363	447		559	606	595	503		392	308	206	150
Total, worst case					252					257				
Sun reduction					0,40					0,41				
Oper. time red.					0,90					0,90				
Wind dir. red.					0,61					0,61				
Total reduction					0,22					0,23				
Total, real					55					58				

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January		February			March			April			May			June		
1	09.59		08.57			07.29		16.41 (9)	06.44			05.02			03.33		21.09 (1)
	14.48		16.12			17.38	21	17.02 (9)	20.07			21.35			23.05	43	22.06 (2)
2	09.58		08.54			07.26		16.39 (9)	06.40			04.59			03.31		21.10 (1)
	14.50		16.15			17.41	25	17.04 (9)	20.10			21.38			23.07	46	22.09 (2)
3	09.57		08.51			07.22		16.39 (9)	06.37			04.56			03.29		21.09 (1)
	14.52		16.18			17.44	26	17.05 (9)	20.13			21.41			23.10	47	22.10 (2)
4	09.56		08.48			07.19		16.38 (9)	06.33			04.53			03.26		21.10 (1)
	14.54		16.21			17.47	27	17.05 (9)	20.16			21.44			23.12	48	22.12 (2)
5	09.55		08.45			07.16		16.38 (9)	06.30			04.49			03.25		21.11 (1)
	14.56		16.25			17.50	28	17.06 (9)	20.18			21.47			23.14	50	22.14 (2)
6	09.54		08.42			07.12		16.37 (9)	06.26			04.46			03.23		21.12 (1)
	14.58		16.28			17.53	28	17.05 (9)	20.21			21.50			23.16	49	22.15 (2)
7	09.53		08.39			07.09		16.37 (9)	06.23			04.43			03.21		21.11 (1)
	15.00		16.31			17.56	28	17.05 (9)	20.24			21.53			23.19	50	22.15 (2)
8	09.51		08.36			07.05		16.37 (9)	06.20			04.40			03.19		21.12 (1)
	15.03		16.34			17.59	27	17.04 (9)	20.27			21.56			23.21	49	22.15 (2)
9	09.50		08.33			07.02		16.37 (9)	06.16			04.37			03.18		21.12 (1)
	15.05		16.37			18.02	27	17.04 (9)	20.30			21.59			23.22	48	22.15 (2)
10	09.48		08.30			06.59		16.37 (9)	06.13			04.34			03.16		21.13 (1)
	15.07		16.40			18.04	25	17.02 (9)	20.33			22.02			23.24	48	22.16 (2)
11	09.46		08.27			06.55		16.38 (9)	06.09			04.30		21.14 (1)	03.15		21.13 (1)
	15.10		16.43			18.07	24	17.02 (9)	20.36			22.05	5	21.19 (1)	23.26	48	22.16 (2)
12	09.45		08.24			06.52		16.39 (9)	06.06			04.27		21.12 (1)	03.14		21.14 (1)
	15.13		16.47			18.10	21	17.00 (9)	20.39			22.08	10	21.22 (1)	23.27	47	22.16 (2)
13	09.43		08.21			06.49		16.41 (9)	06.03			04.24		21.12 (1)	03.12		21.15 (1)
	15.15		16.50			18.13	18	16.59 (9)	20.42			22.11	13	21.25 (1)	23.29	46	22.17 (2)
14	09.41		08.17			06.45		16.43 (9)	05.59			04.21		21.10 (1)	03.11		21.15 (1)
	15.18		16.53			18.16	12	16.55 (9)	20.44			22.14	17	21.27 (1)	23.30	47	22.17 (2)
15	09.39		08.14			06.42			05.56			04.18		21.10 (1)	03.11		21.15 (1)
	15.21		16.56			18.19			20.47			22.17	20	21.30 (1)	23.31	46	22.17 (2)
16	09.37		08.11			06.38			05.52			04.15		21.09 (1)	03.10		21.15 (1)
	15.23		16.59			18.22			20.50			22.20	22	21.31 (1)	23.32	46	22.17 (2)
17	09.35		08.08			06.35			05.49			04.12		21.09 (1)	03.09		21.16 (1)
	15.26		17.02			18.24			20.53			22.23	25	21.34 (1)	23.33	45	22.17 (2)
18	09.33		08.05			06.31			05.46			04.09		21.09 (1)	03.09		21.16 (1)
	15.29		17.05			18.27			20.56			22.26	27	21.36 (1)	23.34	45	22.17 (2)
19	09.30		08.02			06.28			05.42			04.06		21.07 (1)	03.08		21.16 (1)
	15.32		17.08			18.30			20.59			22.29	29	21.36 (1)	23.35	45	22.18 (2)
20	09.28		07.58			06.25			05.39			04.04		21.08 (1)	03.08		21.17 (1)
	15.35		17.11			18.33			21.02			22.32	29	21.37 (1)	23.35	44	22.18 (2)
21	09.26		07.55			06.21			05.35			04.01		21.08 (1)	03.08		21.17 (1)
	15.38		17.14			18.36			21.05			22.35	29	21.37 (1)	23.35	44	22.18 (2)
22	09.23		07.52			06.18			05.32			03.58		21.08 (1)	03.08		21.17 (1)
	15.41		17.17			18.39			21.08			22.38	30	21.38 (1)	23.36	44	22.18 (2)
23	09.21		07.49			06.14			05.29			03.55		21.08 (1)	03.09		21.18 (1)
	15.44		17.20			18.42			21.11			22.41	30	21.38 (1)	23.36	44	22.19 (2)
24	09.18		07.45			06.11			05.25			03.53		21.07 (1)	03.09		21.17 (1)
	15.47		17.23			18.44			21.14			22.44	30	21.37 (1)	23.36	46	22.19 (2)
25	09.16		07.42			06.08			05.22			03.50		21.07 (1)	03.10		21.18 (1)
	15.50		17.26			18.47			21.17			22.46	30	21.37 (1)	23.35	45	22.19 (2)
26	09.13		07.39		16.45 (9)	06.04			05.19			03.47		21.08 (1)	03.10		21.17 (1)
	15.53		17.29	7	16.52 (9)	18.50			21.20			22.49	32	21.55 (2)	23.35	46	22.19 (2)
27	09.10		07.35		16.44 (9)	06.01			05.15			03.45		21.08 (1)	03.11		21.18 (1)
	15.56		17.32	12	16.56 (9)	18.53			21.23			22.52	35	21.57 (2)	23.34	45	22.19 (2)
28	09.08		07.32		16.41 (9)	05.57			05.12			03.42		21.08 (1)	03.12		21.18 (1)
	15.59		17.35	17	16.58 (9)	18.56			21.26			22.55	37	21.59 (2)	23.34	46	22.20 (2)
29	09.05					06.54			05.09			03.40		21.08 (1)	03.13		21.18 (1)
	16.03					19.59			21.29			22.57	40	22.01 (2)	23.33	46	22.20 (2)
30	09.02					06.50			05.06			03.37		21.08 (1)	03.14		21.18 (1)
	16.06					20.01			21.32			23.00	40	22.02 (2)	23.32	48	22.21 (2)
31	08.59					06.47						03.35		21.09 (1)			
	16.09					20.04						23.02	43	22.05 (2)			
Potential sun hours	181		242			363			447			560			606		
Total, worst case				36			337						573			1391	
Sun reduction				0,26			0,37						0,45			0,40	
Oper. time red.				0,90			0,90						0,90			0,90	
Wind dir. red.				0,62			0,62						0,63			0,63	
Total reduction				0,15			0,21						0,26			0,23	
Total, real				5			71						147			319	

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: H - Laskentapiste_H (Lepola)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July		August		September		October		November	December
1	03.16		04.33		06.03		07.26		07.55	09.24
	23.31	48	22.18	8	21.32 (1)		20.36		18.53	20	17.39 (9)	16.11	14.53
2	03.17		04.36		06.06		07.28		07.58	09.27
	23.30	49	22.15	3	21.28 (1)		20.33		18.50	23	17.40 (9)	16.08	14.51
3	03.19		04.39		06.08		07.31		08.01	09.29
	23.29	49	22.12		20.29		18.47	25	17.41 (9)	16.05	14.50
4	03.21		04.42		06.11		07.34		08.04	09.32
	23.27	50	22.09		20.26		18.43	26	17.41 (9)	16.02	14.48
5	03.22		04.45		06.14		07.37		08.07	09.34
	23.26	49	22.06		20.23		18.40	27	17.41 (9)	15.59	14.46
6	03.24		04.48		06.17		07.39		08.11	09.37
	23.24	50	22.03		20.19		18.36	28	17.41 (9)	15.56	14.45
7	03.26		04.51		06.20		07.42		08.14	09.39
	23.22	49	21.59		20.16		18.33	29	17.41 (9)	15.53	14.44
8	03.28		04.54		06.22		07.45		08.17	09.41
	23.20	48	21.56		20.12		18.30	28	17.40 (9)	15.50	14.42
9	03.30		04.57		06.25		07.48		08.20	09.43
	23.19	48	21.53		20.09		18.26	28	17.40 (9)	15.47	14.41
10	03.33		05.00		06.28		07.51		08.23	09.45
	23.17	46	21.50		20.05		18.23	27	17.39 (9)	15.45	14.40
11	03.35		05.02		06.31		07.54		08.26	09.47
	23.14	45	21.47		20.02		18.20	26	17.38 (9)	15.42	14.39
12	03.37		05.05		06.33		07.56		08.29	09.49
	23.12	44	21.43		19.59		18.16	24	17.37 (9)	15.39	14.38
13	03.40		05.08		06.36		07.59		08.32	09.50
	23.10	41	21.40		19.55		18.13	19	17.33 (9)	15.36	14.38
14	03.42		05.11		06.39		08.02		08.35	09.52
	23.08	40	21.37		19.52		18.10	15	17.30 (9)	15.33	14.37
15	03.45		05.14		06.42		08.05		08.38	09.53
	23.05	38	21.33		19.48		18.06	10	17.27 (9)	15.30	14.37
16	03.47		05.17		06.44		08.08		08.41	09.55
	23.03	36	21.30		19.45		18.03	4	17.23 (9)	15.28	14.36
17	03.50		05.20		06.47		08.11		08.44	09.56
	23.01	33	21.27		19.41		18.00		15.25	14.36
18	03.53		05.23		06.50		08.14		08.47	09.57
	22.58	31	21.23		19.38		17.56		15.23	14.36
19	03.55		05.26		06.53		08.17		08.50	09.58
	22.55	30	21.20		19.35		17.53		15.20	14.36
20	03.58		05.29		06.55		08.19		08.53	09.59
	22.53	30	21.17		19.31		17.50		15.17	14.36
21	04.01		05.32		06.58		08.22		08.56	10.00
	22.50	30	21.13		19.28		17.47		15.15	14.36
22	04.04		05.35		07.01		08.25		08.59	10.00
	22.47	29	21.10		19.24		17.43		15.12	14.37
23	04.07		05.37		07.03		08.28		09.02	10.01
	22.45	29	21.07		19.21		17.40		15.10	14.37
24	04.09		05.40		07.06		08.31		09.05	10.01
	22.42	29	21.03		19.17		17.37		15.08	14.38
25	04.12		05.43		07.09		07.34		09.08	10.01
	22.39	28	21.00		19.14		16.34		15.05	14.39
26	04.15		05.46		07.12		07.37		09.11	10.01
	22.36	27	20.57		19.10		16.30		15.03	14.40
27	04.18		05.49		07.14		07.40		09.14	10.01
	22.33	24	20.53		19.07		16.27		15.01	14.41
28	04.21		05.52		07.17		07.43		09.16	10.01
	22.30	21	20.50		19.04		16.24		14.59	14.42
29	04.24		05.54		07.20		17.24 (9)		07.46		09.19	10.01
	22.27	19	20.46		19.00	10	17.34 (9)		16.21		14.57	14.43
30	04.27		05.57		07.23		17.21 (9)		07.49		09.22	10.00
	22.24	16	20.43		18.57	16	17.37 (9)		16.18		14.55	14.45
31	04.30		06.00						07.52			10.00
	22.21	12	20.40						16.15			14.46
Potential sun hours	595		503		392				307		206	150
Total, worst case		1118		11		26				359			
Sun reduction		0,44		0,41		0,31				0,19			
Oper. time red.		0,90		0,90		0,90				0,90			
Wind dir. red.		0,63		0,63		0,62				0,62			
Total reduction		0,25		0,24		0,18				0,11			
Total, real		279		3		5				38			

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: I - Laskentapiste_I (Kalliomäki)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.56	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.25	07.55	09.24
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.53	16.12	14.53
2	09.58	08.54	07.25	06.40	04.59	03.31	03.17	04.36	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.07	23.30	22.15	20.33	18.50	16.08	14.51
3	09.57	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.01	09.29
	14.52	16.18	17.44	20.13	21.41	23.10	23.28	22.12	20.29	18.47	16.05	14.50
4	09.56	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.11	07.34	08.04	09.32
	14.54	16.21	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.55	08.45	07.15	06.30	04.49	03.25	03.23	04.45	06.14	07.37	08.07	09.34
	14.56	16.25	17.50	20.18	21.47	23.14	23.25	22.06	20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.26	04.46	03.23	03.24	04.48	06.17	07.39	08.10	09.36
	14.58	16.28	17.53	20.21	21.50	23.16	23.24	22.02	20.19	18.36	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.13	09.39
	15.00	16.31	17.56	20.24	21.53	23.18	23.22	21.59	20.16	18.33	15.53	14.44
8	09.51	08.36	07.05	06.20	04.40	03.19	03.28	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.20	23.20	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.22	23.18	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.04	20.33	22.02	23.24	23.16	21.50	20.05	18.23	15.45	14.40
11	09.46	08.27	06.55	06.09	04.31	03.15	03.35	05.03	06.31	07.53	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.14	21.46	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.14	03.38	05.06	06.33	07.56	08.29	09.48
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.48	06.03	04.24	03.13	03.40	05.08	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.41	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.17	06.45	05.59	04.21	03.12	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.44	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.14	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.47	22.17	23.31	23.05	21.33	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	04.15	03.10	03.48	05.17	06.44	08.08	08.41	09.54
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.24	20.53	22.23	23.33	23.00	21.27	19.41	18.00	15.25	14.36
18	09.32	08.05	06.31	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.23	19.38	17.56	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.16	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.34	22.55	21.20	19.34	17.53	15.20	14.36
20	09.28	07.58	06.25	05.39	04.04	03.09	03.58	05.29	06.55	08.19	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.17	14.36
21	09.25	07.55	06.21	05.35	04.01	03.09	04.01	05.32	06.58	08.22	08.56	09.59
	15.38	17.14	18.36	21.05	22.35	23.35	22.50	21.13	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.35	22.47	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.14	05.29	03.55	03.09	04.07	05.37	07.03	08.28	09.02	10.00
	15.44	17.20	18.42	21.11	22.41	23.35	22.44	21.07	19.21	17.40	15.10	14.37
24	09.18	07.45	06.11	05.25	03.53	03.09	04.10	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.44	21.14	22.43	23.35	22.42	21.03	19.17	17.37	15.08	14.38
25	09.15	07.42	06.08	05.22	03.50	03.10	04.12	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.46	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.11	04.15	05.46	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.10	16.30	15.03	14.40
27	09.10	07.35	06.01	05.16	03.45	03.11	04.18	05.49	07.14	07.40	09.13	10.01
	15.56	17.32	18.53	21.23	22.52	23.34	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.16	10.01
	16.00	17.35	18.56	21.26	22.54	23.33	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.54	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.46	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.38	03.15	04.27	05.57	07.23	07.49	09.22	10.00
	16.06		20.01	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	08.59		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.02		22.21	20.40		16.15		14.46
Potential sun hours	182	242	363	447	560	606	595	503	392	308	206	150
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: J - Laskentapiste_J (Ritaviita)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	18.34 (6) 05.02	18.36 (6) 03.33	03.16	04.33	06.03	18.24 (6) 07.26	07.55	09.25
	14.48	16.12	17.38	20.07 48	19.22 (6) 21.35 31	19.07 (6) 23.05	23.31	22.18	20.36 59	19.23 (6) 18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	18.32 (6) 04.59	18.38 (6) 03.31	03.17	04.36	06.06	18.24 (6) 07.28	07.59	09.27
	14.50	16.15	17.41	20.10 50	19.22 (6) 21.38 27	19.05 (6) 23.08	23.30	22.15	20.33 59	19.23 (6) 18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	18.31 (6) 04.56	18.41 (6) 03.29	03.19	04.39	06.09	18.24 (6) 07.31	08.02	09.30
	14.52	16.18	17.44	20.13 52	19.23 (6) 21.41 21	19.02 (6) 23.10	23.29	22.12	20.30 59	19.23 (6) 18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	18.30 (6) 04.53	18.44 (6) 03.27	03.21	04.42	06.11	18.23 (6) 07.34	08.05	09.32
	14.54	16.22	17.47	20.16 53	19.23 (6) 21.44 14	18.58 (6) 23.12	23.27	22.09	20.26 58	19.21 (6) 18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	18.29 (6) 04.50	03.25	03.22	04.45	06.14	18.24 (6) 07.37	08.08	09.35
	14.56	16.25	17.50	20.19 55	19.24 (6) 21.47	23.15	23.26	22.06	20.23 57	19.21 (6) 18.40	15.59	14.47
6	09.54	08.42	07.12	06.27	18.28 (6) 04.46	03.23	03.24	04.48	06.17	18.24 (6) 07.40	08.11	09.37
	14.58	16.28	17.53	20.22 56	19.24 (6) 21.50	23.17	23.24	22.03	20.19 57	19.21 (6) 18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	18.27 (6) 04.43	03.21	03.26	04.51	06.20	18.24 (6) 07.42	08.14	09.39
	15.00	16.31	17.56	20.24 57	19.24 (6) 21.53	23.19	23.23	22.00	20.16 55	19.19 (6) 18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	18.26 (6) 04.40	03.19	03.28	04.54 18.59 (6)	06.23	18.25 (6) 07.45	08.17	09.41
	15.03	16.34	17.59	20.27 58	19.24 (6) 21.56	23.21	23.21	21.56 4 19.03 (6)	20.13 53	19.18 (6) 18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	18.26 (6) 04.37	03.18	03.31	04.57	18.52 (6) 06.25	18.25 (6) 07.48	08.20	09.43
	15.05	16.37	18.02	20.30 59	19.25 (6) 21.59	23.23	23.19	21.53 17	19.09 (6) 20.09 51	19.16 (6) 18.27	15.48	14.41
10	09.48	08.30	06.59	06.13	18.26 (6) 04.34	03.16	03.33	05.00	18.49 (6) 06.28	18.26 (6) 07.51	08.23	09.45
	15.08	16.40	18.05	20.33 59	19.25 (6) 22.02	23.24	23.17	21.50 23	19.12 (6) 20.06 49	19.15 (6) 18.23	15.45	14.40
11	09.47	08.27	06.55	06.10	18.25 (6) 04.31	03.15	03.35	05.03	18.46 (6) 06.31	18.27 (6) 07.54	08.26	09.47
	15.10	16.44	18.08	20.36 59	19.24 (6) 22.05	23.26	23.15	21.47 28	19.14 (6) 20.02 47	19.14 (6) 18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	18.25 (6) 04.28	03.14	03.38	05.06	18.44 (6) 06.34	18.27 (6) 07.57	08.29	09.49
	15.13	16.47	18.10	20.39 59	19.24 (6) 22.08	23.28	23.13	21.43 32	19.16 (6) 19.59 45	19.12 (6) 18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	18.24 (6) 04.24	03.13	03.40	05.09	18.42 (6) 06.36	18.28 (6) 07.59	08.32	09.51
	15.15	16.50	18.13	20.42 60	19.24 (6) 22.11	23.29	23.10	21.40 36	19.18 (6) 19.55 43	19.11 (6) 18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	18.24 (6) 04.21	03.12	03.42	05.11	18.39 (6) 06.39	18.30 (6) 08.02	08.35	09.52
	15.18	16.53	18.16	20.45 59	19.23 (6) 22.14	23.30	23.08	21.37 40	19.19 (6) 19.52 39	19.09 (6) 18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	18.24 (6) 04.18	03.11	03.45	05.14	18.38 (6) 06.42	18.31 (6) 08.05	08.38	09.54
	15.21	16.56	18.19	20.48 59	19.23 (6) 22.17	23.32	23.06	21.34 42	19.20 (6) 19.48 35	19.06 (6) 18.06	15.31	14.37
16	09.37	08.11	06.39	05.53	18.24 (6) 04.15	03.10	03.48	05.17	18.36 (6) 06.45	18.33 (6) 08.08	08.41	09.55
	15.24	16.59	18.22	20.50 59	19.23 (6) 22.20	23.33	23.03	21.30 45	19.21 (6) 19.45 30	19.03 (6) 18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	18.24 (6) 04.12	03.09	03.50	05.20	18.35 (6) 06.47	18.36 (6) 08.11	08.44	09.56
	15.26	17.02	18.25	20.53 59	19.23 (6) 22.23	23.34	23.01	21.27 47	19.22 (6) 19.42 24	19.00 (6) 18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	18.24 (6) 04.10	03.09	03.53	05.23	18.34 (6) 06.50	18.39 (6) 08.14	08.48	09.57
	15.29	17.05	18.28	20.56 58	19.22 (6) 22.26	23.34	22.58	21.24 49	19.23 (6) 19.38 16	18.55 (6) 17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	18.24 (6) 04.07	03.09	03.56	05.26	18.32 (6) 06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59 57	19.21 (6) 22.29	23.35	22.56	21.20 51	19.23 (6) 19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	18.24 (6) 04.04	03.08	03.58	05.29	18.31 (6) 06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02 56	19.20 (6) 22.32	23.35	22.53	21.17 53	19.24 (6) 19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	18.25 (6) 04.01	03.08	04.01	05.32	18.31 (6) 06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05 55	19.20 (6) 22.35	23.36	22.50	21.14 53	19.24 (6) 19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	18.25 (6) 03.58	03.09	04.04	05.35	18.29 (6) 07.01	08.26	08.59	10.00
	15.41	17.17	18.39	21.08 54	19.19 (6) 22.38	23.36	22.48	21.10 55	19.24 (6) 19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	18.26 (6) 03.55	03.09	04.07	05.38	18.29 (6) 07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11 52	19.18 (6) 22.41	23.36	22.45	21.07 56	19.25 (6) 19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26	18.27 (6) 03.53	03.09	04.10	05.40	18.27 (6) 07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14 50	19.17 (6) 22.44	23.36	22.42	21.04 57	19.24 (6) 19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 17.52 (6)	05.22	18.28 (6) 03.50	03.10	04.13	05.43	18.27 (6) 07.09	07.34	09.08	10.02
	15.50	17.26	18.47 14 18.06 (6)	21.17 48	19.16 (6) 22.47	23.36	22.39	21.00 58	19.25 (6) 19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 17.48 (6)	05.19	18.29 (6) 03.47	03.10	04.15	05.46	18.27 (6) 07.12	07.37	09.11	10.02
	15.53	17.29	18.50 23 18.11 (6)	21.20 46	19.15 (6) 22.49	23.35	22.36	20.57 58	19.25 (6) 19.11	16.31	15.03	14.40
27	09.11	07.36	06.01 17.45 (6)	05.16	18.30 (6) 03.45	03.11	04.18	05.49	18.26 (6) 07.15	07.40	09.14	10.02
	15.57	17.32	18.53 29 18.14 (6)	21.23 44	19.14 (6) 22.52	23.35	22.33	20.53 59	19.25 (6) 19.07	16.27	15.01	14.41
28	09.08	07.32	05.57 17.41 (6)	05.12	18.31 (6) 03.42	03.12	04.21	05.52	18.25 (6) 07.17	07.43	09.17	10.01
	16.00	17.35	18.56 35 18.16 (6)	21.26 42	19.13 (6) 22.55	23.34	22.30	20.50 60	19.25 (6) 19.04	16.24	14.59	14.42
29	09.05		06.54 18.40 (6)	05.09	18.32 (6) 03.40	03.13	04.24	05.55	18.25 (6) 07.20	07.46	09.19	10.01
	16.03		19.59 38 19.18 (6)	21.29 39	19.11 (6) 22.58	23.33	22.27	20.47 60	19.25 (6) 19.00	16.21	14.57	14.43
30	09.02		06.51 18.37 (6)	05.06	18.34 (6) 03.38	03.15	04.27	05.57	18.24 (6) 07.23	07.49	09.22	10.01
	16.06		20.02 42 19.19 (6)	21.32 35	19.09 (6) 23.00	23.32	22.24	20.43 60	19.24 (6) 18.57	16.18	14.55	14.45
31	09.00		06.47 18.36 (6)		03.35		04.30	06.00	18.24 (6)	07.52		10.00
	16.09		20.04 44 19.20 (6)		23.03		22.21	20.40 60	19.24 (6)	16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Total, worst case			225	1597	93			1103	836			
Sun reduction			0,37	0,40	0,45			0,41	0,31			
Oper. time red.			0,90	0,90	0,90			0,90	0,90			
Wind dir. red.			0,62	0,62	0,62			0,62	0,62			
Total reduction			0,21	0,22	0,25			0,23	0,18			
Total, real			47	357	23			255	146			

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

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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest Shadow receptor: K - Laskentapiste_K (Ritaviita2)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.11	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.22	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.22	22.00	20.16	18.33	15.53	14.44
8	09.51	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.48	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.12	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.12	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.47	22.17	23.31	23.06	21.34	19.48	18.06	15.31	14.37
16	09.37	08.11	06.38	05.52	04.15	03.10	03.48	05.17	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.55	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26	03.53	03.09	04.10	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.38	03.15	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Total, worst case												
Sun reduction												
Oper. time red.												
Wind dir. red.												
Total reduction												
Total, real												

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

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

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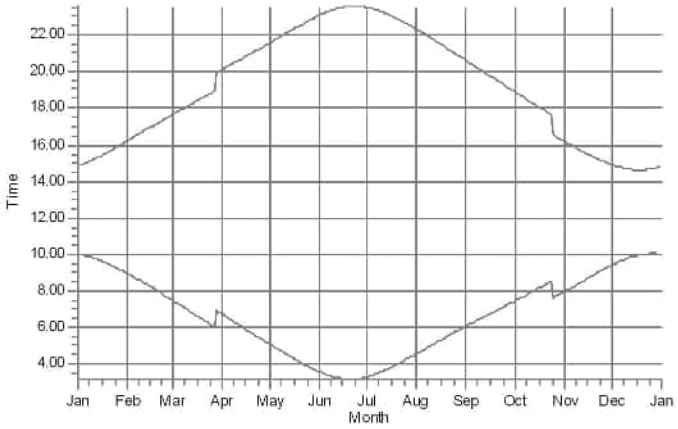
Aarni Nikkola / aarni.nikkola@fcg.fi
Calculated:
10.11.2023 10.00/3.6.355

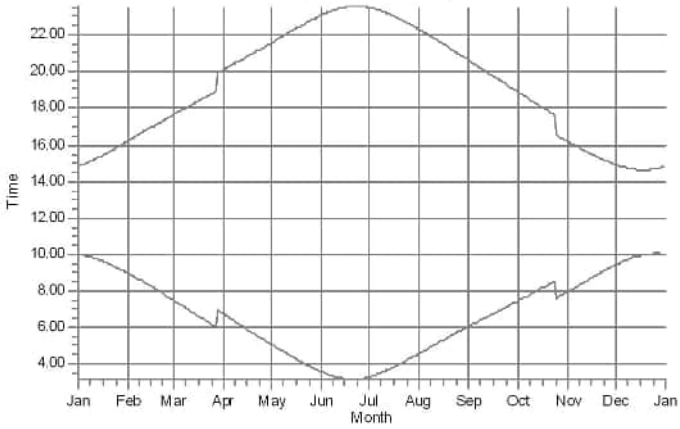
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest

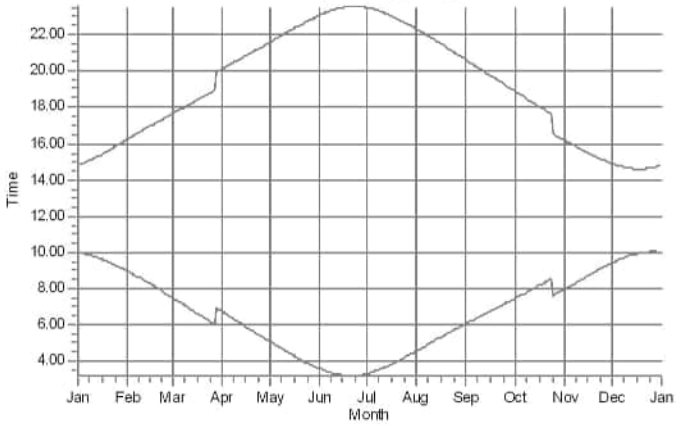
A: Laskentapiste_A (Harjunpää)



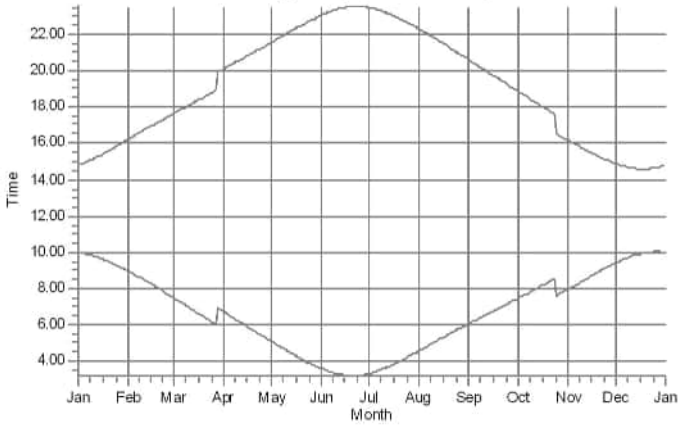
B: Laskentapiste_B (Harjunpää)



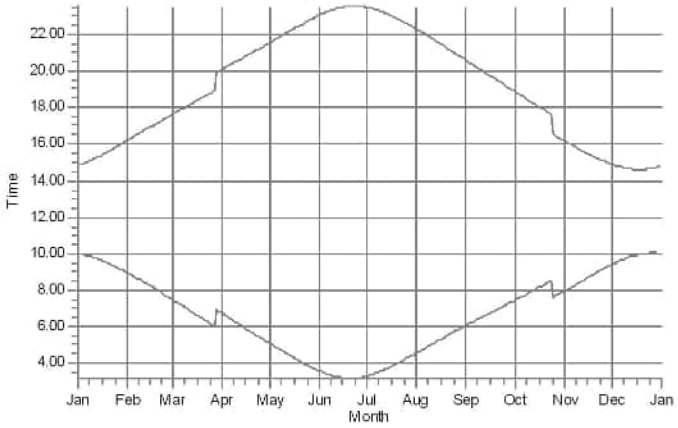
C: Laskentapiste_C (Autio)



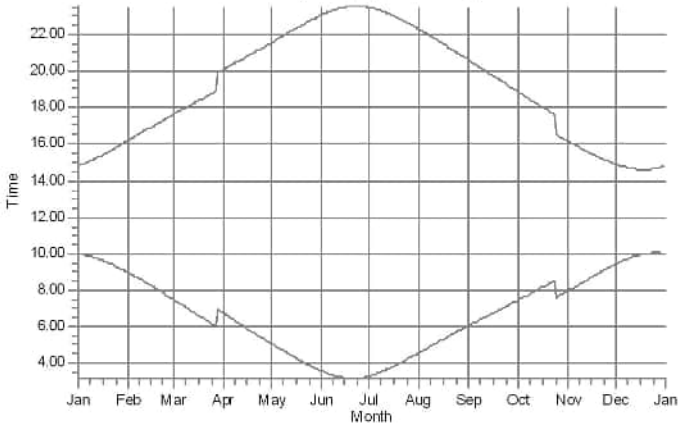
D: Laskentapiste_D (Ylä-Leskinen)



E: Laskentapiste_E (Leskinen)



F: Laskentapiste_F (Kalliomäki)



WTGs

Licensed user:
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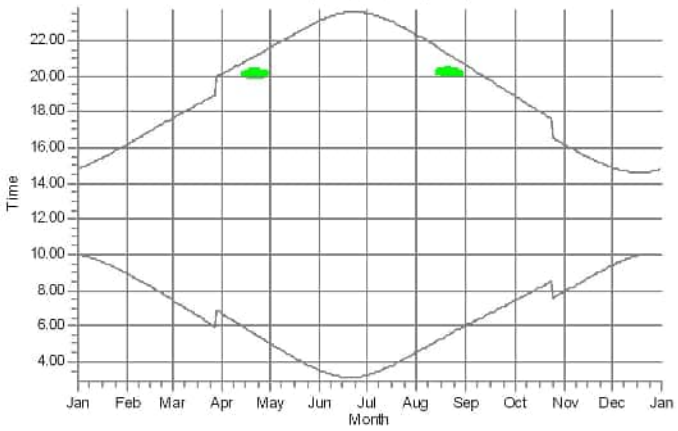
Calculated:
10.11.2023 10.00/3.6.355

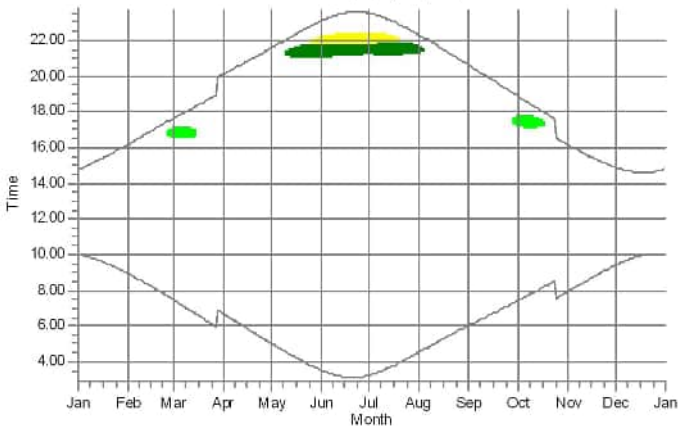
SHADOW - Calendar, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest

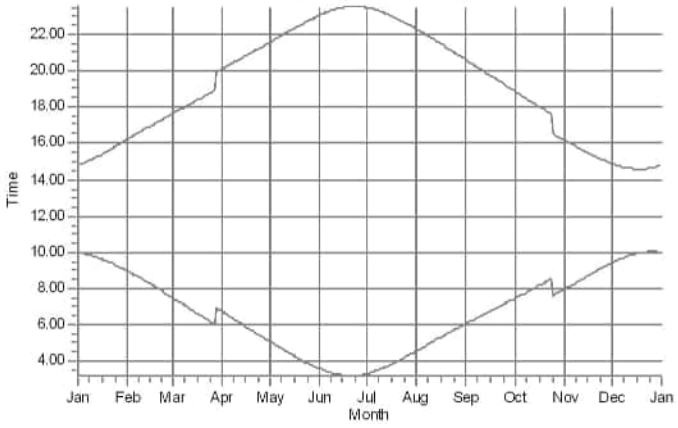
G: Laskentapiste_G (Alapelto)



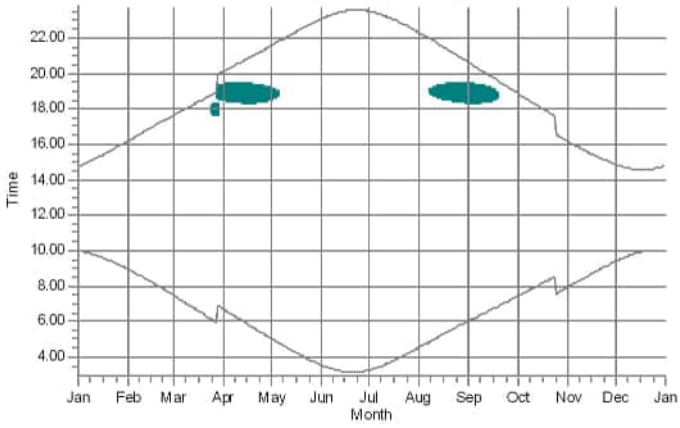
H: Laskentapiste_H (Lepola)



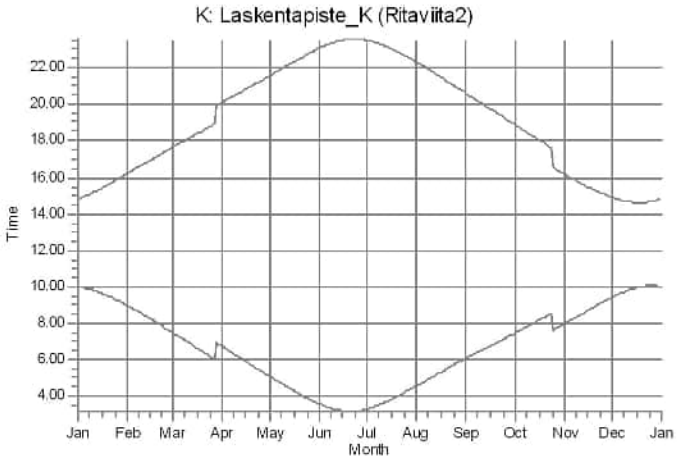
I: Laskentapiste_I (Kalliomäki)



J: Laskentapiste_J (Ritaviita)



K: Laskentapiste_K (Ritaviita2)



WTGs

1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (267)
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (262)
6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (263)
9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 1 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (267)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.02	03.33 21.09-21.37/28	03.16 21.18-21.41/23	04.33 21.24-21.32/8	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 21.10-21.38/28	03.17 21.18-21.42/24	04.36 21.25-21.28/3	06.06	07.28	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 21.09-21.37/28	03.19 21.18-21.42/24	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 21.10-21.37/27	03.20 21.17-21.42/25	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 21.11-21.38/27	03.22 21.18-21.43/25	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23 21.12-21.38/26	03.24 21.17-21.43/26	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.11-21.37/26	03.26 21.18-21.44/26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 21.12-21.37/25	03.28 21.17-21.44/27	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18 21.12-21.36/24	03.30 21.17-21.45/28	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16 21.13-21.37/24	03.33 21.17-21.45/28	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30 21.14-21.19/5	03.15 21.13-21.37/24	03.35 21.17-21.45/28	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27 21.12-21.22/10	03.14 21.14-21.37/23	03.37 21.17-21.46/29	05.05	06.33	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.13	21.43	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24 21.12-21.25/13	03.12 21.15-21.37/22	03.40 21.17-21.46/29	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21 21.10-21.27/17	03.11 21.15-21.37/22	03.42 21.17-21.46/29	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18 21.10-21.30/20	03.11 21.15-21.37/22	03.45 21.17-21.47/30	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15 21.09-21.31/22	03.10 21.15-21.37/22	03.47 21.17-21.47/30	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.20	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12 21.09-21.34/25	03.09 21.16-21.37/21	03.50 21.17-21.47/30	05.20	06.47	08.11	08.44	09.56
	15.26	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09 21.09-21.36/27	03.09 21.16-21.37/21	03.53 21.17-21.47/30	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07 21.07-21.36/29	03.08 21.16-21.37/21	03.55 21.17-21.47/30	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04 21.08-21.37/29	03.08 21.17-21.37/20	03.58 21.17-21.47/30	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01 21.08-21.37/29	03.08 21.17-21.37/20	04.01 21.18-21.48/30	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58 21.08-21.38/30	03.08 21.17-21.37/20	04.04 21.18-21.47/29	05.35	07.01	08.25	08.59	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55 21.08-21.38/30	03.09 21.18-21.38/20	04.07 21.18-21.47/29	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53 21.07-21.37/30	03.09 21.17-21.38/21	04.09 21.18-21.47/29	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50 21.07-21.37/30	03.10 21.18-21.39/21	04.12 21.19-21.47/28	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 21.08-21.38/30	03.10 21.17-21.39/22	04.15 21.19-21.46/27	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45 21.08-21.38/30	03.11 21.18-21.39/21	04.18 21.19-21.43/24	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 21.08-21.38/30	03.12 21.18-21.40/22	04.21 21.20-21.41/21	05.52	07.17	07.43	09.17	10.01
	15.59	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 21.08-21.38/30	03.13 21.18-21.40/22	04.24 21.20-21.39/19	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.50	05.06	03.37 21.08-21.37/29	03.14 21.18-21.41/23	04.27 21.21-21.37/16	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35 21.09-21.38/29		04.30 21.22-21.34/12	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	524	693	815	11	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 2 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (262)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33 21.51-22.06/15	03.16 21.56-22.21/25	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31 21.51-22.09/18	03.17 21.56-22.21/25	04.36	06.06	07.28	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.08	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28 21.51-22.10/19	03.19 21.56-22.21/25	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26 21.51-22.12/21	03.20 21.56-22.21/25	04.42	06.11	07.34	08.05	09.32
	14.54	16.21	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24 21.51-22.14/23	03.22 21.57-22.21/24	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.26	04.46	03.23 21.52-22.15/23	03.24 21.57-22.21/24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21 21.51-22.15/24	03.26 21.58-22.21/23	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19 21.51-22.15/24	03.28 21.58-22.19/21	04.54	06.22	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.17 21.51-22.15/24	03.30 21.58-22.18/20	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16 21.52-22.16/24	03.33 21.59-22.17/18	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.09	04.30	03.15 21.52-22.16/24	03.35 21.58-22.15/17	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13 21.52-22.16/24	03.37 21.59-22.14/15	05.05	06.33	07.57	08.29	09.49
	15.12	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12 21.53-22.17/24	03.40 22.00-22.12/12	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11 21.52-22.17/25	03.42 22.00-22.11/11	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10 21.53-22.17/24	03.45 22.01-22.09/8	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.38	05.52	04.15	03.10 21.53-22.17/24	03.47 22.01-22.07/6	05.17	06.44	08.08	08.41	09.55
	15.23	16.59	18.22	20.50	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09 21.53-22.17/24	03.50 22.02-22.05/3	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09 21.53-22.17/24	03.53 22.02-22.03/1	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.27	20.56	22.26	23.34	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.06	03.08 21.54-22.18/24	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08 21.54-22.18/24	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08 21.54-22.18/24	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32	03.58	03.08 21.54-22.18/24	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.08 21.55-22.19/24	04.07	05.37	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.25	03.53	03.09 21.54-22.19/25	04.09	05.40	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.17	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09 21.55-22.19/24	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47 21.53-21.55/2	03.10 21.55-22.19/24	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.15	03.45 21.52-21.57/5	03.11 21.55-22.19/24	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42 21.52-21.59/7	03.12 21.56-22.20/24	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40 21.51-22.01/10	03.13 21.56-22.20/24	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.37 21.51-22.02/11	03.14 21.56-22.21/25	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35 21.51-22.05/14		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	49	698	303	0	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 3 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (261)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.32	22.18	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.22	06.37	04.56	03.28	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.05	14.50
4	09.57	08.48	07.19	06.33	04.53	03.26	03.20	04.42	06.11	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.49	03.24	03.22	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.46
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.00	16.31	17.56	20.24	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.50	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.30	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.26	15.47	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.07	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.09	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.43	18.07	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.27	03.13	03.37	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	03.40	05.08	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.10	03.45	05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.48	18.06	15.31	14.36
16	09.37	08.11	06.39	05.52	04.15	03.10	03.47	05.17	06.45	08.08	08.42	09.55
	15.23	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.53	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.09	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.35	22.58	21.24	19.38	17.56	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	03.55	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.30	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.55	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.17	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.12	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.09	05.40	07.06	08.31	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.09	04.12	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.05	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36	22.36	20.57	19.11	16.30	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.02
	15.59	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.00	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	04.27	05.57	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.44
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.04		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	205	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 4 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (265)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.02	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.32	22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.51
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.18	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.43	16.02	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.22	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	15.59	14.47
6	09.55	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.25	22.03	20.19	18.37	15.56	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.53	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.42
9	09.50	08.33	07.02	06.16	04.37	03.18	03.30	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.40	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.06	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.37	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.16	15.39	14.38
13	09.43	08.21	06.49	06.03	04.24	03.12	03.40	05.09	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.11	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.21	03.11	03.42	05.11	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.18	03.11	03.45	05.14	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.06	15.31	14.37
16	09.37	08.12	06.39	05.53	04.15	03.10	03.47	05.17	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.12	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.26	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.58
	15.29	17.05	18.28	20.56	22.27	23.35	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.08	03.56	05.26	06.53	08.17	08.51	09.59
	15.32	17.08	18.30	20.59	22.30	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.51	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.08	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.55	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.40	07.07	08.32	09.05	10.02
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.12	05.43	07.09	07.35	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.47	03.10	04.15	05.46	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.36	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.41	09.14	10.02
	15.56	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.47	09.20	10.01
	16.03		19.59	21.29	22.58	23.34	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.37	03.14	04.27	05.57	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 5 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (260)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	10.00	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.19	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.17	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.23	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.13	23.28	22.09	20.26	18.44	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.28	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.57	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.49	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.09	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.12	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.42	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.15	23.31	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.15	06.42	08.05	08.39	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.12	06.39	05.53	04.16	03.10	03.48	05.17	06.45	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.13	03.09	03.50	05.20	06.47	08.11	08.45	09.56
	15.27	17.02	18.25	20.54	22.24	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.27	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.31	20.59	22.29	23.35	22.56	21.21	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.08	03.58	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.36	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36	04.01	03.08	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.24	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.25	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.29	09.03	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.19	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.07	08.32	09.05	10.01
	15.47	17.24	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.35	09.08	10.02
	15.50	17.27	18.48	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.10	04.15	05.46	07.12	07.38	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.41	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.34	20.54	19.07	16.27	15.01	14.41
28	09.08	07.33	05.58	05.12	03.42	03.12	04.21	05.52	07.18	07.44	09.17	10.02
	16.00	17.35	18.56	21.26	22.55	23.34	22.31	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.47	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.03		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.50	09.22	10.01
	16.06		20.02	21.32	23.00	23.33	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.53		10.00
	16.09		20.05		23.03		22.22	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 6 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (263)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44 18.34-19.22/48	05.03 18.36-19.07/31	03.33	03.16	04.33	06.03 18.24-19.23/59	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.37	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40 18.32-19.22/50	04.59 18.38-19.05/27	03.31	03.17	04.36	06.06 18.24-19.23/59	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37 18.31-19.23/52	04.56 18.41-19.02/21	03.29	03.19	04.39	06.09 18.24-19.23/59	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.34 18.30-19.23/53	04.53 18.44-18.58/14	03.27	03.21	04.42	06.12 18.23-19.21/58	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.56	08.45	07.16	06.30 18.29-19.24/55	04.50	03.25	03.23	04.45	06.14 18.24-19.21/57	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27 18.28-19.24/56	04.46	03.23	03.24	04.48	06.17 18.24-19.21/57	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23 18.27-19.24/57	04.43	03.21	03.26	04.51	06.20 18.24-19.19/55	07.43	08.14	09.39
	15.00	16.31	17.56	20.25	21.53	23.19	23.23	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20 18.26-19.24/58	04.40	03.19	03.29	04.54 18.59-19.03/4	06.23 18.25-19.18/53	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16 18.26-19.25/59	04.37	03.18	03.31	04.57 18.52-19.09/17	06.25 18.25-19.16/51	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13 18.26-19.25/59	04.34	03.16	03.33	05.00 18.49-19.12/23	06.28 18.26-19.15/49	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.25	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10 18.25-19.24/59	04.31	03.15	03.35	05.03 18.46-19.14/28	06.31 18.27-19.14/47	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06 18.25-19.24/59	04.28	03.14	03.38	05.06 18.44-19.16/32	06.34 18.27-19.12/45	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03 18.24-19.24/60	04.25	03.13	03.40	05.09 18.42-19.18/36	06.36 18.28-19.11/43	08.00	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59 18.24-19.23/59	04.22	03.12	03.43	05.12 18.39-19.19/40	06.39 18.30-19.09/39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56 18.24-19.23/59	04.19	03.11	03.45	05.14 18.38-19.20/42	06.42 18.31-19.06/35	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.18	23.32	23.06	21.34	19.49	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53 18.24-19.23/59	04.16	03.10	03.48	05.17 18.36-19.21/45	06.45 18.33-19.03/30	08.08	08.42	09.55
	15.24	16.59	18.22	20.51	22.21	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49 18.24-19.23/59	04.13	03.09	03.50	05.20 18.35-19.22/47	06.47 18.36-19.00/24	08.11	08.45	09.56
	15.27	17.02	18.25	20.53	22.23	23.34	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46 18.24-19.22/58	04.10	03.09	03.53	05.23 18.34-19.23/49	06.50 18.39-18.55/16	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42 18.24-19.21/57	04.07	03.09	03.56	05.26 18.32-19.23/51	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39 18.24-19.20/56	04.04	03.09	03.58	05.29 18.31-19.24/53	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.22	05.36 18.25-19.20/55	04.01	03.09	04.01	05.32 18.31-19.24/53	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.36
22	09.23	07.52	06.18	05.32 18.25-19.19/54	03.58	03.09	04.04	05.35 18.29-19.24/55	07.01	08.26	09.00	10.01
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29 18.26-19.18/52	03.56	03.09	04.07	05.38 18.29-19.25/56	07.04	08.29	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26 18.27-19.17/50	03.53	03.09	04.10	05.41 18.27-19.24/57	07.07	08.32	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08 17.52-18.06/14	05.22 18.28-19.16/48	03.50	03.10	04.13	05.43 18.27-19.25/58	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04 17.48-18.11/23	05.19 18.29-19.15/46	03.48	03.11	04.15	05.46 18.27-19.25/58	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.50	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01 17.45-18.14/29	05.16 18.30-19.14/44	03.45	03.11	04.18	05.49 18.26-19.25/59	07.15	07.40	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.58 17.41-18.16/35	05.12 18.31-19.13/42	03.42	03.12	04.21	05.52 18.25-19.25/60	07.18	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54 18.40-19.18/38	05.09 18.32-19.11/39	03.40	03.13	04.24	05.55 18.25-19.25/60	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.28	20.47	19.01	16.21	14.57	14.43
30	09.02		06.51 18.37-19.19/42	05.06 18.34-19.09/35	03.38	03.15	04.27	05.58 18.24-19.24/60	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.25	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47 18.36-19.20/44		03.35		04.30	06.00 18.24-19.24/60		07.53		10.00
	16.09		20.05		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	225	1597	93	0	0	1103	836	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 7 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (266)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.56	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.59	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.59	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.56	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.35
	14.56	16.25	17.50	20.19	21.47	23.15	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.24	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.26	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.19	23.22	22.00	20.16	18.33	15.54	14.44
8	09.52	08.36	07.06	06.20	04.40	03.19	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.13	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.56	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.28	23.13	21.44	19.59	18.17	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.51
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.14	06.42	08.05	08.38	09.54
	15.21	16.56	18.19	20.48	22.17	23.32	23.06	21.34	19.48	18.07	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.10	03.48	05.17	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.33	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.48	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.31	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.51	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.58	05.29	06.56	08.20	08.54	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.57	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.26	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.36	22.48	21.10	19.24	17.44	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.37
24	09.18	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.02
	15.50	17.26	18.47	21.17	22.47	23.36	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.02
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.03	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.02
	15.57	17.32	18.53	21.23	22.52	23.35	22.33	20.54	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.42	03.12	04.21	05.52	07.17	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.13	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.58	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 8 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (264)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June	July	August	September	October	November	December
1	09.59	08.57	07.29	06.44	05.03	03.33	03.16	04.33	06.03	07.26	07.55	09.25
	14.48	16.12	17.38	20.07	21.35	23.05	23.31	22.18	20.36	18.54	16.12	14.53
2	09.58	08.54	07.26	06.40	04.59	03.31	03.18	04.36	06.06	07.29	07.58	09.27
	14.50	16.15	17.41	20.10	21.38	23.08	23.30	22.15	20.33	18.50	16.09	14.52
3	09.58	08.51	07.22	06.37	04.56	03.29	03.19	04.39	06.09	07.31	08.02	09.30
	14.52	16.19	17.44	20.13	21.41	23.10	23.29	22.12	20.30	18.47	16.06	14.50
4	09.57	08.48	07.19	06.33	04.53	03.27	03.21	04.42	06.12	07.34	08.05	09.32
	14.54	16.22	17.47	20.16	21.44	23.12	23.27	22.09	20.26	18.43	16.03	14.48
5	09.55	08.45	07.16	06.30	04.50	03.25	03.23	04.45	06.14	07.37	08.08	09.34
	14.56	16.25	17.50	20.19	21.47	23.14	23.26	22.06	20.23	18.40	16.00	14.47
6	09.54	08.42	07.12	06.27	04.46	03.23	03.25	04.48	06.17	07.40	08.11	09.37
	14.58	16.28	17.53	20.22	21.50	23.17	23.24	22.03	20.19	18.37	15.57	14.45
7	09.53	08.39	07.09	06.23	04.43	03.21	03.27	04.51	06.20	07.42	08.14	09.39
	15.01	16.31	17.56	20.24	21.53	23.19	23.22	22.00	20.16	18.33	15.54	14.44
8	09.51	08.36	07.06	06.20	04.40	03.20	03.29	04.54	06.23	07.45	08.17	09.41
	15.03	16.34	17.59	20.27	21.56	23.21	23.21	21.56	20.12	18.30	15.51	14.43
9	09.50	08.33	07.02	06.16	04.37	03.18	03.31	04.57	06.25	07.48	08.20	09.43
	15.05	16.37	18.02	20.30	21.59	23.23	23.19	21.53	20.09	18.27	15.48	14.41
10	09.48	08.30	06.59	06.13	04.34	03.16	03.33	05.00	06.28	07.51	08.23	09.45
	15.08	16.41	18.05	20.33	22.02	23.24	23.17	21.50	20.06	18.23	15.45	14.40
11	09.47	08.27	06.55	06.10	04.31	03.15	03.35	05.03	06.31	07.54	08.26	09.47
	15.10	16.44	18.08	20.36	22.05	23.26	23.15	21.47	20.02	18.20	15.42	14.39
12	09.45	08.24	06.52	06.06	04.28	03.14	03.38	05.06	06.34	07.57	08.29	09.49
	15.13	16.47	18.10	20.39	22.08	23.27	23.12	21.43	19.59	18.16	15.39	14.39
13	09.43	08.21	06.49	06.03	04.25	03.13	03.40	05.09	06.36	07.59	08.32	09.50
	15.15	16.50	18.13	20.42	22.11	23.29	23.10	21.40	19.55	18.13	15.36	14.38
14	09.41	08.18	06.45	05.59	04.22	03.12	03.43	05.12	06.39	08.02	08.35	09.52
	15.18	16.53	18.16	20.45	22.14	23.30	23.08	21.37	19.52	18.10	15.33	14.37
15	09.39	08.15	06.42	05.56	04.19	03.11	03.45	05.14	06.42	08.05	08.38	09.53
	15.21	16.56	18.19	20.48	22.17	23.31	23.06	21.34	19.48	18.06	15.31	14.37
16	09.37	08.11	06.39	05.53	04.16	03.10	03.48	05.17	06.45	08.08	08.41	09.55
	15.24	16.59	18.22	20.50	22.20	23.32	23.03	21.30	19.45	18.03	15.28	14.36
17	09.35	08.08	06.35	05.49	04.13	03.10	03.50	05.20	06.47	08.11	08.44	09.56
	15.27	17.02	18.25	20.53	22.23	23.33	23.01	21.27	19.42	18.00	15.25	14.36
18	09.33	08.05	06.32	05.46	04.10	03.09	03.53	05.23	06.50	08.14	08.47	09.57
	15.29	17.05	18.28	20.56	22.26	23.34	22.58	21.24	19.38	17.57	15.23	14.36
19	09.30	08.02	06.28	05.42	04.07	03.09	03.56	05.26	06.53	08.17	08.50	09.58
	15.32	17.08	18.30	20.59	22.29	23.35	22.56	21.20	19.35	17.53	15.20	14.36
20	09.28	07.59	06.25	05.39	04.04	03.09	03.58	05.29	06.55	08.20	08.53	09.59
	15.35	17.11	18.33	21.02	22.32	23.35	22.53	21.17	19.31	17.50	15.18	14.36
21	09.26	07.55	06.21	05.36	04.01	03.09	04.01	05.32	06.58	08.23	08.56	10.00
	15.38	17.14	18.36	21.05	22.35	23.36	22.50	21.14	19.28	17.47	15.15	14.37
22	09.23	07.52	06.18	05.32	03.58	03.09	04.04	05.35	07.01	08.25	08.59	10.00
	15.41	17.17	18.39	21.08	22.38	23.36	22.47	21.10	19.24	17.43	15.13	14.37
23	09.21	07.49	06.15	05.29	03.56	03.09	04.07	05.38	07.04	08.28	09.02	10.01
	15.44	17.20	18.42	21.11	22.41	23.36	22.45	21.07	19.21	17.40	15.10	14.38
24	09.18	07.46	06.11	05.26	03.53	03.09	04.10	05.41	07.06	08.31	09.05	10.01
	15.47	17.23	18.45	21.14	22.44	23.36	22.42	21.04	19.18	17.37	15.08	14.38
25	09.16	07.42	06.08	05.22	03.50	03.10	04.13	05.43	07.09	07.34	09.08	10.01
	15.50	17.26	18.47	21.17	22.47	23.35	22.39	21.00	19.14	16.34	15.06	14.39
26	09.13	07.39	06.04	05.19	03.48	03.11	04.16	05.46	07.12	07.37	09.11	10.01
	15.53	17.29	18.50	21.20	22.49	23.35	22.36	20.57	19.11	16.31	15.04	14.40
27	09.11	07.36	06.01	05.16	03.45	03.11	04.18	05.49	07.15	07.40	09.14	10.01
	15.57	17.32	18.53	21.23	22.52	23.35	22.33	20.53	19.07	16.27	15.01	14.41
28	09.08	07.32	05.57	05.12	03.43	03.12	04.21	05.52	07.17	07.43	09.17	10.01
	16.00	17.35	18.56	21.26	22.55	23.34	22.30	20.50	19.04	16.24	14.59	14.42
29	09.05		06.54	05.09	03.40	03.14	04.24	05.55	07.20	07.46	09.19	10.01
	16.03		19.59	21.29	22.57	23.33	22.27	20.47	19.00	16.21	14.57	14.43
30	09.02		06.51	05.06	03.38	03.15	04.27	05.58	07.23	07.49	09.22	10.01
	16.06		20.02	21.32	23.00	23.32	22.24	20.43	18.57	16.18	14.55	14.45
31	09.00		06.47		03.35		04.30	06.00		07.52		10.00
	16.09		20.04		23.03		22.21	20.40		16.15		14.46
Potential sun hours	181	242	363	447	560	606	595	503	392	307	206	150
Sum of minutes with flicker	0	0	0	0	0	0	0	0	0	0	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	January	February	March	April	May	June
1	09.59	08.57	07.29 16.41-17.02/21	06.44	05.03	03.33
	14.48	16.12	17.38	20.07	21.35	23.05
2	09.58	08.54	07.26 16.39-17.04/25	06.40	04.59	03.31
	14.50	16.15	17.41	20.10	21.38	23.07
3	09.57	08.51	07.22 16.39-17.05/26	06.37	04.56	03.29
	14.52	16.18	17.44	20.13	21.41	23.10
4	09.56	08.48	07.19 16.38-17.05/27	06.33	04.53	03.27
	14.54	16.22	17.47	20.16	21.44	23.12
5	09.55	08.45	07.16 16.38-17.06/28	06.30	04.50	03.25
	14.56	16.25	17.50	20.19	21.47	23.14
6	09.54	08.42	07.12 16.37-17.05/28	06.27	04.46	03.23
	14.58	16.28	17.53	20.21	21.50	23.17
7	09.53	08.39	07.09 16.37-17.05/28	06.23	04.43	03.21
	15.01	16.31	17.56	20.24	21.53	23.19
8	09.51	08.36	07.06 16.37-17.04/27	06.20	04.40	03.20
	15.03	16.34	17.59	20.27	21.56	23.21
9	09.50	08.33	07.02 16.37-17.04/27	06.16	04.37	03.18
	15.05	16.37	18.02	20.30	21.59	23.22
10	09.48	08.30	06.59 16.37-17.02/25	06.13	04.34	03.16
	15.08	16.40	18.05	20.33	22.02	23.24
11	09.47	08.27	06.55 16.38-17.02/24	06.09	04.31	03.15
	15.10	16.44	18.07	20.36	22.05	23.26
12	09.45	08.24	06.52 16.39-17.00/21	06.06	04.28	03.14
	15.13	16.47	18.10	20.39	22.08	23.27
13	09.43	08.21	06.49 16.41-16.59/18	06.03	04.25	03.13
	15.15	16.50	18.13	20.42	22.11	23.29
14	09.41	08.18	06.45 16.43-16.55/12	05.59 20.05-20.07/2	04.21	03.12
	15.18	16.53	18.16	20.45	22.14	23.30
15	09.39	08.14	06.42	05.56 20.03-20.10/7	04.18	03.11
	15.21	16.56	18.19	20.47	22.17	23.31
16	09.37	08.11	06.38	05.53 20.02-20.13/11	04.16	03.10
	15.24	16.59	18.22	20.50	22.20	23.32
17	09.35	08.08	06.35	05.49 20.01-20.16/15	04.13	03.10
	15.27	17.02	18.25	20.53	22.23	23.33
18	09.33	08.05	06.32	05.46 19.59-20.18/19	04.10	03.09
	15.29	17.05	18.27	20.56	22.26	23.34
19	09.30	08.02	06.28	05.42 19.58-20.21/23	04.07	03.09
	15.32	17.08	18.30	20.59	22.29	23.35
20	09.28	07.58	06.25	05.39 19.58-20.21/23	04.04	03.09
	15.35	17.11	18.33	21.02	22.32	23.35
21	09.26	07.55	06.21	05.36 19.58-20.21/23	04.01	03.09
	15.38	17.14	18.36	21.05	22.35	23.35
22	09.23	07.52	06.18	05.32 19.58-20.20/22	03.58	03.09
	15.41	17.17	18.39	21.08	22.38	23.36
23	09.21	07.49	06.15	05.29 19.58-20.20/22	03.56	03.09
	15.44	17.20	18.42	21.11	22.41	23.36
24	09.18	07.45	06.11	05.26 19.59-20.19/20	03.53	03.09
	15.47	17.23	18.45	21.14	22.44	23.36
25	09.16	07.42	06.08	05.22 19.59-20.18/19	03.50	03.10
	15.50	17.26	18.47	21.17	22.46	23.35
26	09.13	07.39 16.45-16.52/7	06.04	05.19 20.00-20.17/17	03.48	03.11
	15.53	17.29	18.50	21.20	22.49	23.35
27	09.10	07.36 16.44-16.56/12	06.01	05.16 20.01-20.16/15	03.45	03.11
	15.57	17.32	18.53	21.23	22.52	23.34
28	09.08	07.32 16.41-16.58/17	05.57	05.12 20.03-20.14/11	03.42	03.12
	16.00	17.35	18.56	21.26	22.55	23.34
29	09.05		06.54	05.09 20.07-20.10/3	03.40	03.14
	16.03		19.59	21.29	22.57	23.33
30	09.02		06.51	05.06	03.38	03.15
	16.06		20.02	21.32	23.00	23.32
31	08.59		06.47		03.35	
	16.09		20.04		23.03	
Potential sun hours	181	242	363	447	560	606
Sum of minutes with flicker	0	36	337	252	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

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Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Calendar per WTG

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest WTG: 9 - Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,0 m) (259)

Assumptions for shadow calculations

Sunshine probability S (Average daily sunshine hours) []

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0,81	2,25	4,39	5,97	8,13	8,13	8,42	6,71	4,10	1,90	0,67	0,32

Operational time

N	NNE	ENE	E	ESE	SSE	S	SSW	WSW	W	WNW	NNW	Sum
522	389	363	412	532	713	908	1 077	922	797	628	620	7 883

	July	August		September		October		November	December
1	03.16	04.33		06.03		07.26	17.19-17.39/20	07.55	09.24
	23.31	22.18		20.36		18.54		16.12	14.53
2	03.18	04.36		06.06		07.28	17.17-17.40/23	07.58	09.27
	23.30	22.15		20.33		18.50		16.09	14.52
3	03.19	04.39		06.09		07.31	17.16-17.41/25	08.01	09.30
	23.29	22.12		20.30		18.47		16.06	14.50
4	03.21	04.42		06.11		07.34	17.15-17.41/26	08.05	09.32
	23.27	22.09		20.26		18.43		16.02	14.48
5	03.23	04.45		06.14		07.37	17.14-17.41/27	08.08	09.34
	23.26	22.06		20.23		18.40		15.59	14.47
6	03.25	04.48		06.17		07.40	17.13-17.41/28	08.11	09.37
	23.24	22.03		20.19		18.37		15.56	14.45
7	03.26	04.51		06.20		07.42	17.12-17.41/29	08.14	09.39
	23.22	21.59		20.16		18.33		15.53	14.44
8	03.29	04.54		06.23		07.45	17.12-17.40/28	08.17	09.41
	23.20	21.56		20.12		18.30		15.51	14.43
9	03.31	04.57		06.25		07.48	17.12-17.40/28	08.20	09.43
	23.19	21.53		20.09		18.26		15.48	14.41
10	03.33	05.00		06.28		07.51	17.12-17.39/27	08.23	09.45
	23.17	21.50		20.06		18.23		15.45	14.40
11	03.35	05.03		06.31		07.54	17.12-17.38/26	08.26	09.47
	23.14	21.47		20.02		18.20		15.42	14.39
12	03.38	05.06		06.34		07.56	17.13-17.37/24	08.29	09.49
	23.12	21.43		19.59		18.16		15.39	14.39
13	03.40	05.09		06.36		07.59	17.14-17.33/19	08.32	09.50
	23.10	21.40		19.55		18.13		15.36	14.38
14	03.43	05.12	20.13-20.19/6	06.39		08.02	17.15-17.30/15	08.35	09.52
	23.08	21.37		19.52		18.10		15.33	14.37
15	03.45	05.14	20.10-20.22/12	06.42		08.05	17.17-17.27/10	08.38	09.53
	23.05	21.34		19.48		18.06		15.31	14.37
16	03.48	05.17	20.07-20.23/16	06.44		08.08	17.19-17.23/4	08.41	09.55
	23.03	21.30		19.45		18.03		15.28	14.36
17	03.50	05.20	20.06-20.24/18	06.47		08.11		08.44	09.56
	23.01	21.27		19.42		18.00		15.25	14.36
18	03.53	05.23	20.06-20.25/19	06.50		08.14		08.47	09.57
	22.58	21.24		19.38		17.57		15.23	14.36
19	03.56	05.26	20.04-20.25/21	06.53		08.17		08.50	09.58
	22.55	21.20		19.35		17.53		15.20	14.36
20	03.58	05.29	20.04-20.26/22	06.55		08.20		08.53	09.59
	22.53	21.17		19.31		17.50		15.18	14.36
21	04.01	05.32	20.03-20.25/22	06.58		08.22		08.56	10.00
	22.50	21.14		19.28		17.47		15.15	14.37
22	04.04	05.35	20.03-20.25/22	07.01		08.25		08.59	10.00
	22.47	21.10		19.24		17.43		15.13	14.37
23	04.07	05.38	20.03-20.25/22	07.04		08.28		09.02	10.01
	22.45	21.07		19.21		17.40		15.10	14.37
24	04.10	05.40	20.02-20.24/22	07.06		08.31		09.05	10.01
	22.42	21.04		19.17		17.37		15.08	14.38
25	04.13	05.43	20.03-20.21/18	07.09		07.34		09.08	10.01
	22.39	21.00		19.14		16.34		15.06	14.39
26	04.15	05.46	20.02-20.18/16	07.12		07.37		09.11	10.01
	22.36	20.57		19.11		16.31		15.03	14.40
27	04.18	05.49	20.03-20.15/12	07.15		07.40		09.14	10.01
	22.33	20.53		19.07		16.27		15.01	14.41
28	04.21	05.52	20.05-20.12/7	07.17		07.43		09.16	10.01
	22.30	20.50		19.04		16.24		14.59	14.42
29	04.24	05.55	20.06-20.08/2	07.20	17.24-17.34/10	07.46		09.19	10.01
	22.27	20.47		19.00		16.21		14.57	14.43
30	04.27	05.57		07.23	17.21-17.37/16	07.49		09.22	10.01
	22.24	20.43		18.57		16.18		14.55	14.45
31	04.30	06.00				07.52			10.00
	22.21	20.40				16.15			14.46
Potential sun hours	595	503		392		308		206	150
Sum of minutes with flicker	0	257		26		359		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

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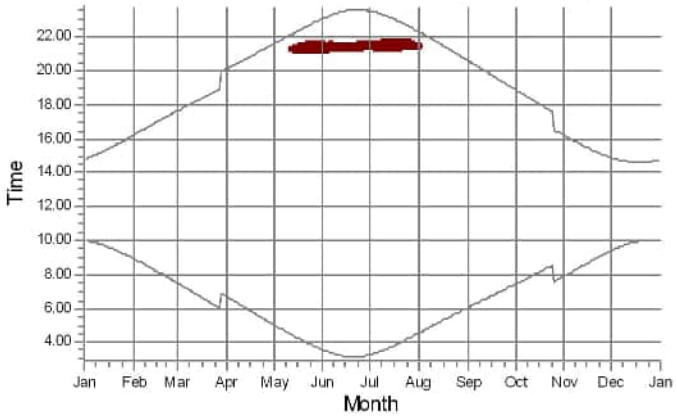
Calculated:
10.11.2023 10.00/3.6.355

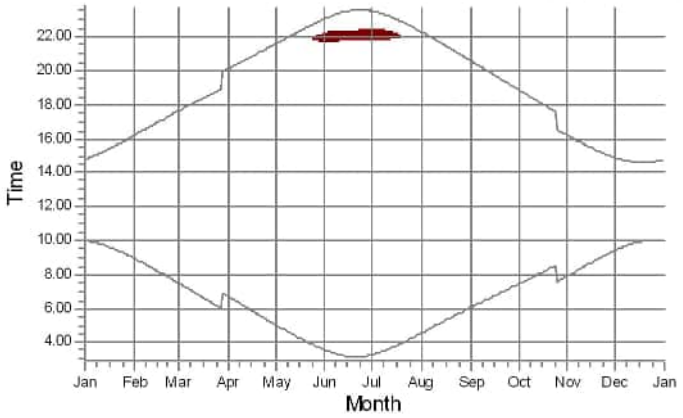
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest

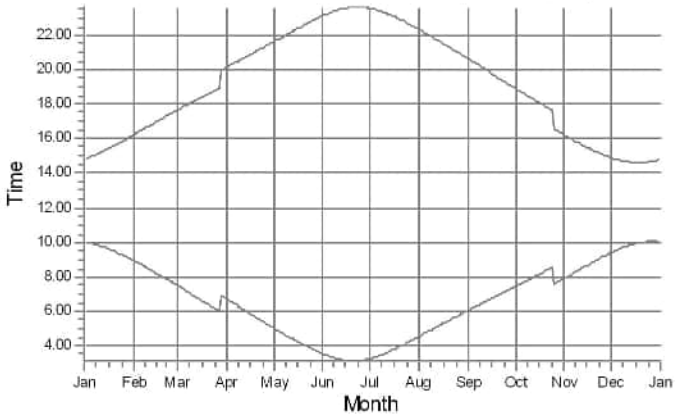
1: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



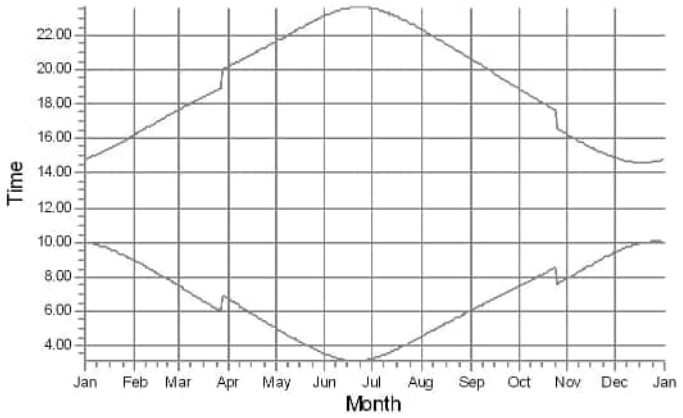
2: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



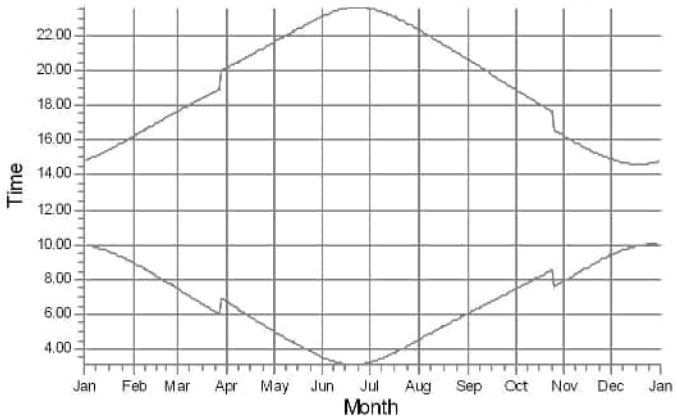
3: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



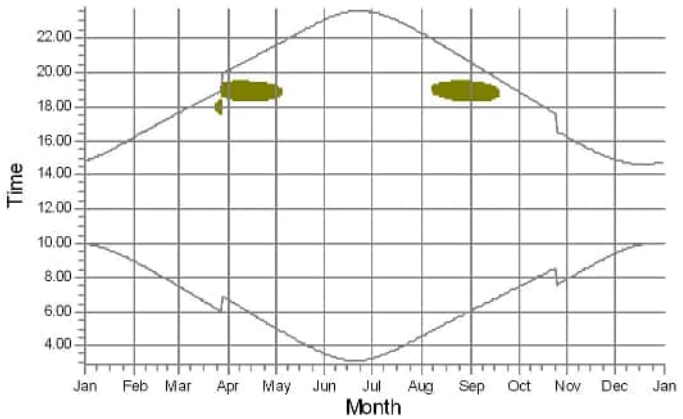
4: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



5: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



6: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



Shadow receptors

H: Laskentapiste_H (Lepola)

J: Laskentapiste_J (Ritaviita)

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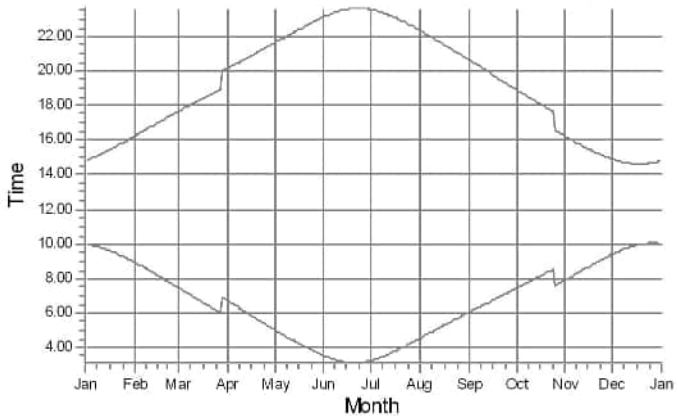
Calculated:
10.11.2023 10.00/3.6.355

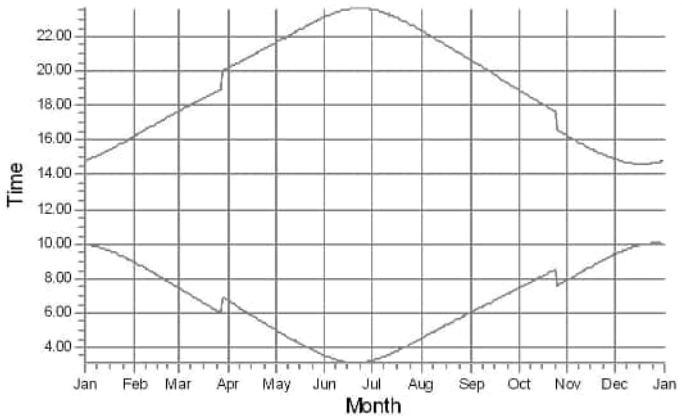
SHADOW - Calendar per WTG, graphical

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest

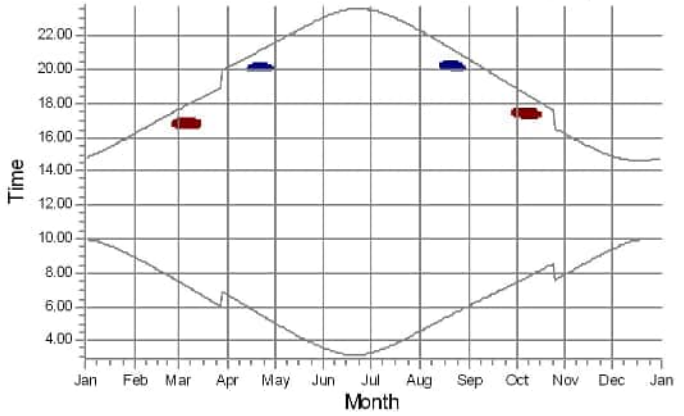
7: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



8: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



9: Generic RD250 HH200 b.V172 10000 250.0 !O! hub: 200,0 m (TOT: 325,



Shadow receptors

G: Laskentapiste_G (Alapelto)

H: Laskentapiste_H (Lepola)

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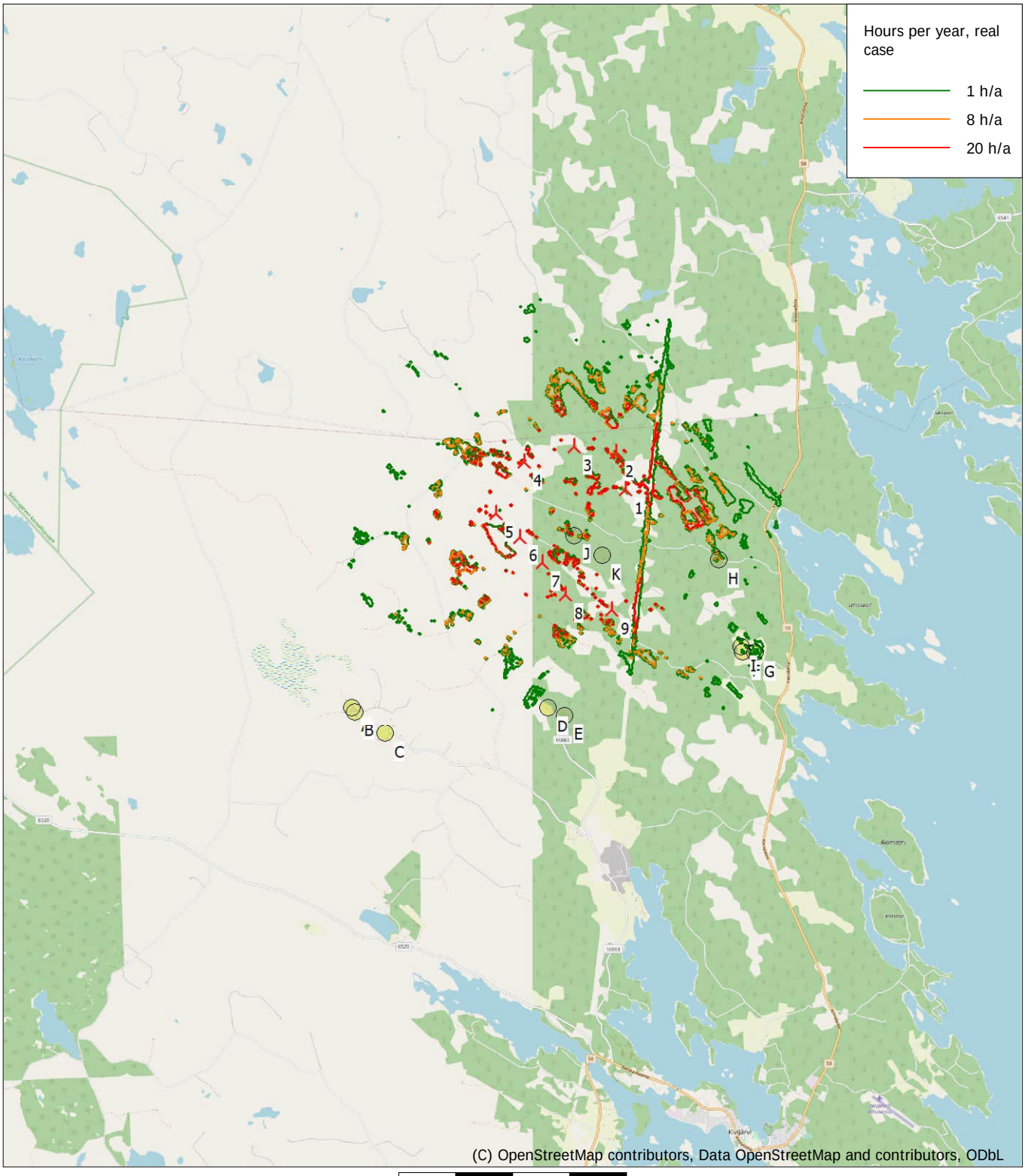
Calculated:
10.11.2023 10.00/3.6.355

SHADOW - Map

Calculation: SHADOW_Volkkilankangas_VE2_General_RD250x9xHH200_Luke forest



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:100 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 399 380 North: 7 010 740

New WTG Shadow receptor

Flicker map level: Height Contours: CONTOURLINE_WIND PRO MELUMALLINNUS TESTI 2_3.wpo (1)

Time step: 3 minutes, Day step: 7 days, Map resolution: 20 m, Visibility resolution: 10 m, Eye height: 1,5 m