

Project:

Tuomiperä

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Calculated:

7.4.2014 11:26/2.8.579



DECIBEL - Main Result

Calculation: V126-3300 x 8 x HH137 (GF=0,4, z=4, T=15°C)

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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:

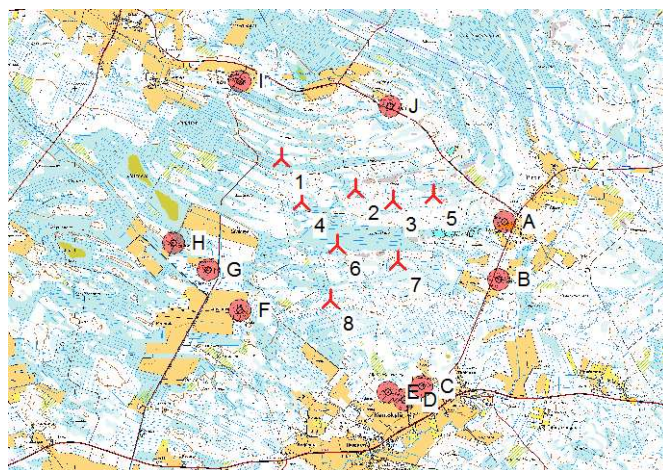
Pure and Impulse tone penalty are added to WTG source noise

Height above ground level, when no value in NSA object:

4,0 m Allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0,0 dB(A)



New WTG

Noise sensitive area

WTGs

	Finish TM ETRS-TM35FIN-ETRS89				WTG type			Noise data				Wind speed [m/s]	Lwa,ref [dB(A)]	Pure tones	
	East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator				Name
1	392 723	7 111 083	82,5	YP2-T1	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
2	393 701	7 110 679	85,0	YP2-T3	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
3	394 202	7 110 527	88,4	YP2-T4	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
4	392 985	7 110 511	83,5	YP2-T5	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
5	394 729	7 110 594	89,7	YP2-T6	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
6	393 458	7 109 936	83,8	YP2-T7	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
7	394 260	7 109 722	87,5	YP2-T8	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h
8	393 375	7 109 209	83,7	YP2-T9	Yes	VESTAS	V126-3 300	3 300	126,0	137,0	EMD	Level 0 - Estimated - Mode 0 - 01-2013	8,0	107,5	0 dB h

h) Generic octave distribution used

Calculation Results

Sound Level

Noise sensitive area No.	Name	Finish TM ETRS-TM35FIN-ETRS89				Imission height [m]	Demands Noise [dB(A)]	Sound Level From WTGs [dB(A)]	Demands fulfilled ? Noise
		East	North	Z [m]	Imission height [m]				
A	Asuinrakennus (Pinolantie 266)	395 675	7 110 246	87,5	4,0	40,0	38,0	Yes	
B	Hoitokoti (Pinolantie 189)	395 590	7 109 486	85,0	4,0	40,0	36,7	Yes	
C	Asuinrakennus (Männikkötie 33)	394 575	7 108 070	83,0	4,0	40,0	34,5	Yes	
D	Kantokylän kylätalo (Vanhakouluntie 36)	394 348	7 107 888	81,9	4,0	40,0	34,0	Yes	
E	Asuinrakennus (Vanhakouluntie 65)	394 131	7 107 990	82,8	4,0	40,0	35,0	Yes	
F	Asuinrakennus (Levänevantie 227)	392 179	7 109 070	80,0	4,0	40,0	37,1	Yes	
G	Asuinrakennus (Levänevantie 286)	391 760	7 109 605	80,0	4,0	40,0	36,1	Yes	
H	Asuinrakennus (Kivinevantie 75)	391 299	7 109 963	80,0	4,0	40,0	34,2	Yes	
I	Asuinrakennus (Levänevantie 441)	392 180	7 112 098	80,0	4,0	40,0	36,0	Yes	
J	Asuinrakennus (Tuomiperäntie 656)	394 165	7 111 764	85,8	4,0	40,0	39,0	Yes	

Distances (m)

NSA	WTG							
	1	2	3	4	5	6	7	8
A	3068	2021	1499	2703	1008	2238	1509	2523
B	3282	2234	1735	2800	1403	2179	1351	2233
C	3536	2751	2485	2913	2528	2174	1681	1654
D	3585	2865	2643	2956	2733	2233	1836	1641
E	3398	2723	2538	2769	2672	2059	1737	1434
F	2085	2215	2493	1651	2971	1544	2181	1204
G	1764	2219	2611	1524	3130	1730	2503	1663
H	1812	2507	2957	1773	3488	2159	2971	2209
I	1152	2081	2561	1780	2960	2512	3158	3127
J	1595	1180	1237	1721	1299	1960	2044	2674

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DECIBEL - Detailed results

Calculation: V126-3300 x 8 x HH137 (GF=0,4, z=4, T=15°C) Noise calculation model: ISO 9613-2 General 8,0 m/s

Assumptions

Calculated L(DW) = LWA,ref + K + Dc - (Adiv + Aatm + Agr + Abar + Amisc) - Cmet
(when calculated with ground attenuation, then Dc = Domega)

LWA,ref:	Sound pressure level at WTG
K:	Pure tone
Dc:	Directivity correction
Adiv:	the attenuation due to geometrical divergence
Aatm:	the attenuation due to atmospheric absorption
Agr:	the attenuation due to ground effect
Abar:	the attenuation due to a barrier
Amisc:	the attenuation due to miscellaneous other effects
Cmet:	Meteorological correction

Calculation Results

Noise sensitive area: A Asuinrakennus (Pinolantie 266)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3 068	3 071	21,19	107,5	0,00	80,75	-	-	0,00	0,00	-	0,00
2	2 021	2 025	26,56	107,5	0,00	77,13	-	-	0,00	0,00	-	0,00
3	1 499	1 505	30,17	107,5	0,00	74,55	-	-	0,00	0,00	-	0,00
4	2 703	2 706	22,85	107,5	0,00	79,65	-	-	0,00	0,00	-	0,00
5	1 008	1 017	34,71	107,5	0,00	71,15	-	-	0,00	0,00	-	0,00
6	2 238	2 242	25,27	107,5	0,00	78,01	-	-	0,00	0,00	-	0,00
7	1 509	1 515	30,10	107,5	0,00	74,61	-	-	0,00	0,00	-	0,00
8	2 523	2 526	23,75	107,5	0,00	79,05	-	-	0,00	0,00	-	0,00
Sum	38,04											

- Data undefined due to calculation with octave data

Noise sensitive area: B Hoitokoti (Pinolantie 189)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3 282	3 285	20,29	107,5	0,00	81,33	-	-	0,00	0,00	-	0,00
2	2 234	2 238	25,29	107,5	0,00	78,00	-	-	0,00	0,00	-	0,00
3	1 735	1 741	28,43	107,5	0,00	75,81	-	-	0,00	0,00	-	0,00
4	2 800	2 803	22,39	107,5	0,00	79,95	-	-	0,00	0,00	-	0,00
5	1 403	1 410	30,95	107,5	0,00	73,98	-	-	0,00	0,00	-	0,00
6	2 179	2 183	25,61	107,5	0,00	77,78	-	-	0,00	0,00	-	0,00
7	1 351	1 358	31,39	107,5	0,00	73,66	-	-	0,00	0,00	-	0,00
8	2 233	2 236	25,31	107,5	0,00	77,99	-	-	0,00	0,00	-	0,00
Sum	36,67											

- Data undefined due to calculation with octave data

Noise sensitive area: C Asuinrakennus (Männikkötie 33)

WTG		Wind speed: 8,0 m/s										
No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	3 536	3 539	19,29	107,5	0,00	81,98	-	-	0,00	0,00	-	0,00
2	2 751	2 754	22,62	107,5	0,00	79,80	-	-	0,00	0,00	-	0,00
3	2 485	2 489	23,94	107,5	0,00	78,92	-	-	0,00	0,00	-	0,00
4	2 913	2 916	21,87	107,5	0,00	80,29	-	-	0,00	0,00	-	0,00
5	2 528	2 532	23,71	107,5	0,00	79,07	-	-	0,00	0,00	-	0,00
6	2 174	2 178	25,64	107,5	0,00	77,76	-	-	0,00	0,00	-	0,00
7	1 681	1 687	28,81	107,5	0,00	75,54	-	-	0,00	0,00	-	0,00
8	1 654	1 659	29,01	107,5	0,00	75,40	-	-	0,00	0,00	-	0,00
Sum	34,51											

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DECIBEL - Detailed results

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Noise sensitive area: D Kantokylän kylätalo (Vanhakouluntie 36)

		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 585	3 587	19,11	107,5	0,00	82,09	-	-	0,00	0,00	-	0,00
2	2 865	2 868	22,09	107,5	0,00	80,15	-	-	0,00	0,00	-	0,00
3	2 643	2 647	23,14	107,5	0,00	79,45	-	-	0,00	0,00	-	0,00
4	2 956	2 959	21,68	107,5	0,00	80,42	-	-	0,00	0,00	-	0,00
5	2 733	2 737	22,71	107,5	0,00	79,74	-	-	0,00	0,00	-	0,00
6	2 233	2 237	25,30	107,5	0,00	77,99	-	-	0,00	0,00	-	0,00
7	1 836	1 842	27,73	107,5	0,00	76,30	-	-	0,00	0,00	-	0,00
8	1 641	1 646	29,10	107,5	0,00	75,33	-	-	0,00	0,00	-	0,00

Sum 34,03

- Data undefined due to calculation with octave data

Noise sensitive area: E Asuinrakennus (Vanhakouluntie 65)

		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	3 398	3 401	19,83	107,5	0,00	81,63	-	-	0,00	0,00	-	0,00
2	2 723	2 726	22,75	107,5	0,00	79,71	-	-	0,00	0,00	-	0,00
3	2 538	2 542	23,67	107,5	0,00	79,10	-	-	0,00	0,00	-	0,00
4	2 769	2 772	22,54	107,5	0,00	79,86	-	-	0,00	0,00	-	0,00
5	2 672	2 675	23,00	107,5	0,00	79,55	-	-	0,00	0,00	-	0,00
6	2 059	2 063	26,32	107,5	0,00	77,29	-	-	0,00	0,00	-	0,00
7	1 737	1 742	28,41	107,5	0,00	75,82	-	-	0,00	0,00	-	0,00
8	1 434	1 440	30,70	107,5	0,00	74,17	-	-	0,00	0,00	-	0,00

Sum 35,04

- Data undefined due to calculation with octave data

Noise sensitive area: F Asuinrakennus (Levänevantie 227)

		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	2 085	2 089	26,16	107,5	0,00	77,40	-	-	0,00	0,00	-	0,00
2	2 215	2 219	25,41	107,5	0,00	77,92	-	-	0,00	0,00	-	0,00
3	2 493	2 497	23,90	107,5	0,00	78,95	-	-	0,00	0,00	-	0,00
4	1 651	1 657	29,03	107,5	0,00	75,38	-	-	0,00	0,00	-	0,00
5	2 971	2 974	21,61	107,5	0,00	80,47	-	-	0,00	0,00	-	0,00
6	1 544	1 551	29,82	107,5	0,00	74,81	-	-	0,00	0,00	-	0,00
7	2 181	2 185	25,60	107,5	0,00	77,79	-	-	0,00	0,00	-	0,00
8	1 204	1 212	32,71	107,5	0,00	72,67	-	-	0,00	0,00	-	0,00

Sum 37,11

- Data undefined due to calculation with octave data

Noise sensitive area: G Asuinrakennus (Levänevantie 286)

		Wind speed: 8,0 m/s										
No.	Distance	Sound distance	Calculated	LwA,ref	Dc	Adiv	Aatm	Agr	Abar	Amisc	A	Cmet
	[m]	[m]	[dB(A)]	[dB(A)]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]	[dB]
1	1 764	1 770	28,22	107,5	0,00	75,96	-	-	0,00	0,00	-	0,00
2	2 219	2 223	25,38	107,5	0,00	77,94	-	-	0,00	0,00	-	0,00
3	2 611	2 614	23,30	107,5	0,00	79,35	-	-	0,00	0,00	-	0,00
4	1 524	1 530	29,98	107,5	0,00	74,69	-	-	0,00	0,00	-	0,00
5	3 130	3 133	20,92	107,5	0,00	80,92	-	-	0,00	0,00	-	0,00
6	1 730	1 736	28,46	107,5	0,00	75,79	-	-	0,00	0,00	-	0,00
7	2 503	2 507	23,84	107,5	0,00	78,98	-	-	0,00	0,00	-	0,00
8	1 663	1 668	28,94	107,5	0,00	75,45	-	-	0,00	0,00	-	0,00

Sum 36,10

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DECIBEL - Detailed results

Calculation: V126-3300 x 8 x HH137 (GF=0,4, z=4, T=15°C) Noise calculation model: ISO 9613-2 General 8,0 m/s

Noise sensitive area: H Asuinrakennus (Kivinevantie 75)

WTG

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	1 812	1 817	27,90	107,5	0,00	76,19	-	-	0,00	0,00	-	0,00
2	2 507	2 510	23,83	107,5	0,00	79,00	-	-	0,00	0,00	-	0,00
3	2 957	2 961	21,67	107,5	0,00	80,43	-	-	0,00	0,00	-	0,00
4	1 773	1 778	28,16	107,5	0,00	76,00	-	-	0,00	0,00	-	0,00
5	3 488	3 491	19,47	107,5	0,00	81,86	-	-	0,00	0,00	-	0,00
6	2 159	2 164	25,72	107,5	0,00	77,70	-	-	0,00	0,00	-	0,00
7	2 971	2 974	21,61	107,5	0,00	80,47	-	-	0,00	0,00	-	0,00
8	2 209	2 213	25,44	107,5	0,00	77,90	-	-	0,00	0,00	-	0,00

Sum 34,18

- Data undefined due to calculation with octave data

Noise sensitive area: I Asuinrakennus (Levänevantie 441)

WTG

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	1 152	1 160	33,22	107,5	0,00	72,29	-	-	0,00	0,00	-	0,00
2	2 081	2 085	26,19	107,5	0,00	77,38	-	-	0,00	0,00	-	0,00
3	2 561	2 565	23,55	107,5	0,00	79,18	-	-	0,00	0,00	-	0,00
4	1 780	1 785	28,12	107,5	0,00	76,03	-	-	0,00	0,00	-	0,00
5	2 960	2 963	21,66	107,5	0,00	80,44	-	-	0,00	0,00	-	0,00
6	2 512	2 516	23,80	107,5	0,00	79,01	-	-	0,00	0,00	-	0,00
7	3 158	3 161	20,80	107,5	0,00	81,00	-	-	0,00	0,00	-	0,00
8	3 127	3 130	20,94	107,5	0,00	80,91	-	-	0,00	0,00	-	0,00

Sum 36,04

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Noise sensitive area: J Asuinrakennus (Tuomiperäntie 656)

WTG

Wind speed: 8,0 m/s

No.	Distance [m]	Sound distance [m]	Calculated [dB(A)]	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]	Cmet [dB]
1	1 595	1 600	29,45	107,5	0,00	75,08	-	-	0,00	0,00	-	0,00
2	1 180	1 187	32,95	107,5	0,00	72,49	-	-	0,00	0,00	-	0,00
3	1 237	1 245	32,41	107,5	0,00	72,90	-	-	0,00	0,00	-	0,00
4	1 721	1 726	28,53	107,5	0,00	75,74	-	-	0,00	0,00	-	0,00
5	1 299	1 306	31,85	107,5	0,00	73,32	-	-	0,00	0,00	-	0,00
6	1 960	1 964	26,94	107,5	0,00	76,86	-	-	0,00	0,00	-	0,00
7	2 044	2 048	26,41	107,5	0,00	77,23	-	-	0,00	0,00	-	0,00
8	2 674	2 677	22,99	107,5	0,00	79,55	-	-	0,00	0,00	-	0,00

Sum 39,01

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DECIBEL - Assumptions for noise calculation

Calculation: V126-3300 x 8 x HH137 (GF=0,4, z=4, T=15°C) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

Noise calculation model:

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,4

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:

Pure and Impulse tone penalty are added to WTG source noise

Height above ground level, when no value in NSA object:

4,0 m Allow override of model height with height from NSA object

Deviation from "official" noise demands. Negative is more restrictive, positive is less restrictive.:

0,0 dB(A)

Octave data required

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]
0,1	0,4	1,1	2,4	4,1	8,8	26,6	95,0

WTG: VESTAS V126 3300 126.0 !O!

Noise: Level 0 - Estimated - Mode 0 - 01-2013

Source	Source/Date	Creator	Edited
General Specification V126-3.3 MW (Doc. no.:0034-7616 V05)	16.1.2013	EMD	30.4.2013 14:09

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	137,0	8,0	107,5	No	Generic data	89,1	96,1	99,5	102,1	101,9	99,0	94,2	84,7

NSA: Asuinrakennus (Pinolantie 266)-A

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Hoitokoti (Pinolantie 189)-B

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Asuinrakennus (Männikkötie 33)-C

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Kantokylän kylätalo (Vanhakouluntie 36)-D

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

Project:

Tuomiperä

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7.4.2014 11:47 / 6

Licensed user:

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Hans Vadback / hans.vadback@fcg.fi

Calculated:

7.4.2014 11:26/2.8.579



DECIBEL - Assumptions for noise calculation

Calculation: V126-3300 x 8 x HH137 (GF=0,4, z=4, T=15°C) **Noise calculation model:** ISO 9613-2 General 8,0 m/s

NSA: Asuinrakennus (Vanhakouluntie 65)-E

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Asuinrakennus (Levänevantie 227)-F

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Asuinrakennus (Levänevantie 286)-G

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Asuinrakennus (Kivinevantie 75)-H

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Asuinrakennus (Levänevantie 441)-I

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Asuinrakennus (Tuomiperäntie 656)-J

Predefined calculation standard:

Imission height(a.g.l.): Use standard value from calculation model

Noise demand: 40,0 dB(A)

Distance demand:

Project:

Tuomiperä

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7.4.2014 11:47 / 7

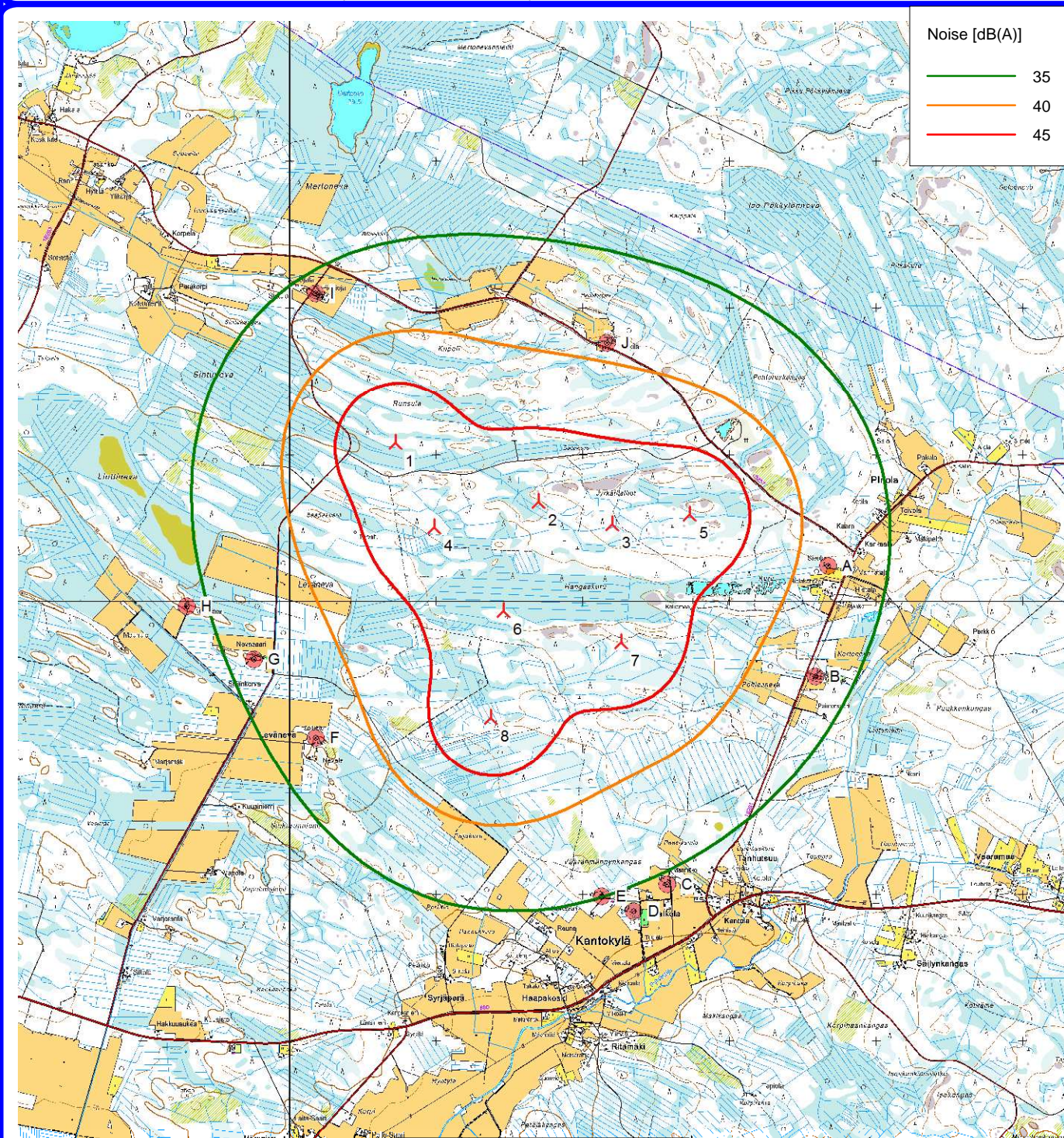
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Hans Vadback / hans.vadback@fcg.fi
Calculated:
7.4.2014 11:26/2.8.579



DECIBEL - Map 8,0 m/s

Calculation: V126-3300 x 8 x HH137 (GF=0,4, z=4, T=15°C) Noise calculation model: ISO 9613-2 General 8,0 m/s



0 500 1000 1500 2000 m

Map: Peruskartat , Print scale 1:40 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 393 726 North: 7 110 146

▲ 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