

Tuppukangas Löytöneva

Kallioneva

Ahola

Puuroneva

Lankkuneva

Kotalehto

Harju

Annan-
kangas

Penikkalampi

Loseikon-
kangas

Viitaneva

Hanhelanperä

Kaunela

Tynnyrineva

Lehmikangas

Melalampi

Rönnö

Tuohi-
neva

Kokon-
neva

Iso Kaijanneva

Kivilampi

Hiukaneva

Pitkäsjärvi

Pitkäsneva

Pitkäsalo

Huhtaneva

Ojantaka

Linnakangas

Ahmaneva

Jylhy

Latva

Pa

Project: **Raah**
 Description: Raahen tuulivoimapuistot

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DECIBEL - Main Result

Calculation: Annankangas G128 x 10 x HH140 (107,5 dB, GF=0,4, T=15°) "Kaavaehdotus 5/2014"

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:

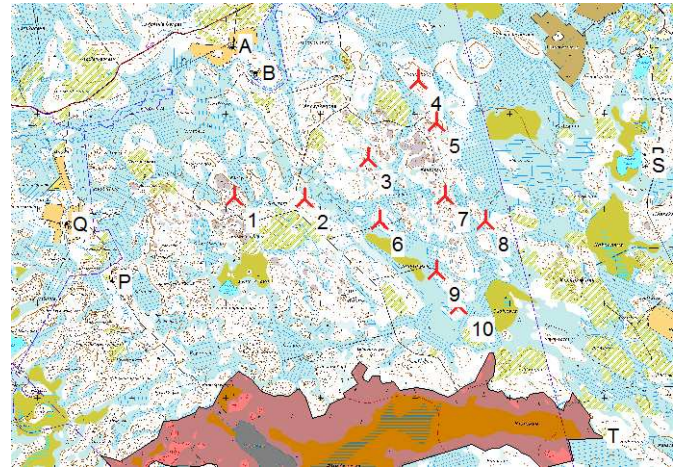
Pure and Impulse tone penalty are added to WTG source noise

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

ETRS 89 Zone: 35	East	North	Z	Row data/Description	WTG type			Noise data								
					Valid	Manufact.	Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]	Creator	Name	Wind speed [m/s]	Status	Lwa,ref [dB(A)]	Pure tones
1	395 451	7 151 984	110,0	10	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
2	395 224	7 152 350	110,0	9	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
3	395 736	7 152 877	105,1	8	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
4	395 307	7 153 142	108,8	7	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
5	394 621	7 152 879	108,8	6	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
6	393 827	7 153 110	103,9	2	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
7	394 498	7 153 539	108,9	3	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
8	395 220	7 153 912	106,8	5	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
9	395 027	7 154 363	102,5	4	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h
10	393 079	7 153 131	107,0	1	Yes	GAMESA	G128-4 500	4 500	128,0	140,0	USER	Runtime input	8,0	User value	107,5	0 dB h

h) Generic octave distribution used

Calculation Results

Sound Level

Noise sensitive area	No.	Name	ETRS 89 Zone: 35			Imission height [m]	Demands Noise [dB(A)]	Sound Level From WTGs [dB(A)]	Demands fulfilled ?
			East	North	Z [m]				
A	Harju	393 065	7 154 699	92,1	4,0	40,0	35,7	Yes	
B	Talkkunamaa	393 314	7 154 429	90,0	4,0	40,0	37,9	Yes	
C	Kokonmaa	399 007	7 147 372	103,7	4,0	40,0	20,7	Yes	
D	Kuusisaari	398 786	7 146 972	101,1	4,0	40,0	20,3	Yes	
E	Taistola	398 681	7 146 735	102,7	4,0	40,0	20,1	Yes	
F	Kettula	399 149	7 145 883	103,4	4,0	40,0	18,5	Yes	
G	Myllypelto	399 705	7 145 653	101,2	4,0	40,0	17,8	Yes	
H	Pehtarus	399 503	7 144 806	102,1	4,0	40,0	16,9	Yes	
I	Kiveliö	399 140	7 142 996	102,5	4,0	40,0	15,1	Yes	
J	Leinonen	399 836	7 142 274	100,0	4,0	40,0	14,0	Yes	
K	Myllypelto	394 267	7 144 129	102,5	4,0	40,0	17,6	Yes	
L	Makkarasaari	394 023	7 143 846	97,5	4,0	40,0	17,2	Yes	
M	Hakala	393 868	7 145 286	100,0	4,0	40,0	19,3	Yes	
N	Palosaari	394 505	7 146 812	110,5	4,0	40,0	22,1	Yes	
O	Hautakangas	394 124	7 148 899	113,2	4,0	40,0	27,0	Yes	
P	Hönnilä	391 792	7 152 246	95,0	4,0	40,0	33,0	Yes	
Q	Kaunela	391 316	7 152 836	87,8	4,0	40,0	31,5	Yes	
R	Ylilampi 1	397 413	7 153 565	105,0	4,0	40,0	34,0	Yes	
S	Ylilampi 2	397 422	7 153 455	105,0	4,0	40,0	34,0	Yes	
T	Natura-alue	395 780	7 151 481	105,0	4,0	40,0	42,2	No	

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DECIBEL - Main Result

Calculation: Annankangas G128 x 10 x HH140 (107,5 dB, GF=0,4, T=15°) "Kaavaehdotus 5/2014"

Distances (m)

		WTG									
NSA	1	2	3	4	5	6	7	8	9	10	
A	3615	3191	3234	2730	2395	1763	1844	2293	1986	1568	
B	3247	2823	2877	2373	2028	1415	1481	1975	1714	1315	
C	5823	6252	6403	6854	7040	7730	7639	7557	8044	8264	
D	6021	6451	6646	7084	7228	7891	7843	7803	8292	8397	
E	6163	6594	6812	7241	7365	8013	7987	7968	8458	8502	
F	7134	7565	7782	8213	8334	8975	8958	8939	9429	9454	
G	7627	8058	8242	8685	8835	9495	9450	9398	9887	9991	
H	8243	8673	8907	9332	9434	10058	10065	10063	10553	10515	
I	9716	10141	10451	10846	10868	11425	11520	11599	12089	11809	
J	10654	11081	11368	11774	11817	12390	12465	12520	13010	12787	
K	7943	8276	8870	9072	8757	8991	9412	9829	10262	9080	
L	8262	8588	9192	9384	9053	9266	9704	10137	10565	9333	
M	6882	7193	7817	7987	7630	7824	8277	8731	9151	7884	
N	5258	5585	6189	6381	6068	6335	6727	7136	7569	6478	
O	3359	3622	4293	4405	4011	4222	4655	5132	5538	4359	
P	3667	3434	3994	3628	2899	2211	2999	3812	3866	1562	
Q	4221	3938	4420	4002	3305	2526	3258	4047	4007	1788	
R	2519	2503	1812	2148	2875	3614	2915	2217	2510	4355	
S	2459	2460	1782	2138	2859	3611	2925	2249	2561	4354	
T	601	1032	1396	1727	1501	1814	2148	2495	2979	1840	

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DECIBEL - Assumptions for noise calculation

Calculation: Annankangas G128 x 10 x HH140 (107,5 dB, GF=0,4, T=15°) "Kaavaehdotus 5/2014"

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: GAMESA G128 4500 128.0 !O!

Noise: Runtime input

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]
User value	140,0	8,0	107,5	No	Generic data	89,1	96,1	99,5	102,1	101,9	99,0	94,2	84,7

NSA: Harju-A

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Talkkunamaa-B

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Kokonmaa-C

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Kuusisaari-D

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

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DECIBEL - Assumptions for noise calculation

Calculation: Annankangas G128 x 10 x HH140 (107,5 dB, GF=0,4, T=15°) "Kaavaehdotus 5/2014"

NSA: Taistola-E

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Kettula-F

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Myllypelto-G

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Pehtarus-H

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Kiveliö-I

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Leinonen-J

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Myllypelto-K

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Makkarasaari-L

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Hakala-M

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

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DECIBEL - Assumptions for noise calculation

Calculation: Annankangas G128 x 10 x HH140 (107,5 dB, GF=0,4, T=15°) "Kaavaehdotus 5/2014"

NSA: Palosaari-N

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Hautakangas-O

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Hönnilä-P

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Kaunela-Q

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Ylilampi 1-R

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Ylilampi 2-S

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

NSA: Natura-alue-T

Predefined calculation standard:

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

Noise demand: 40,0 dB(A)

Distance demand:

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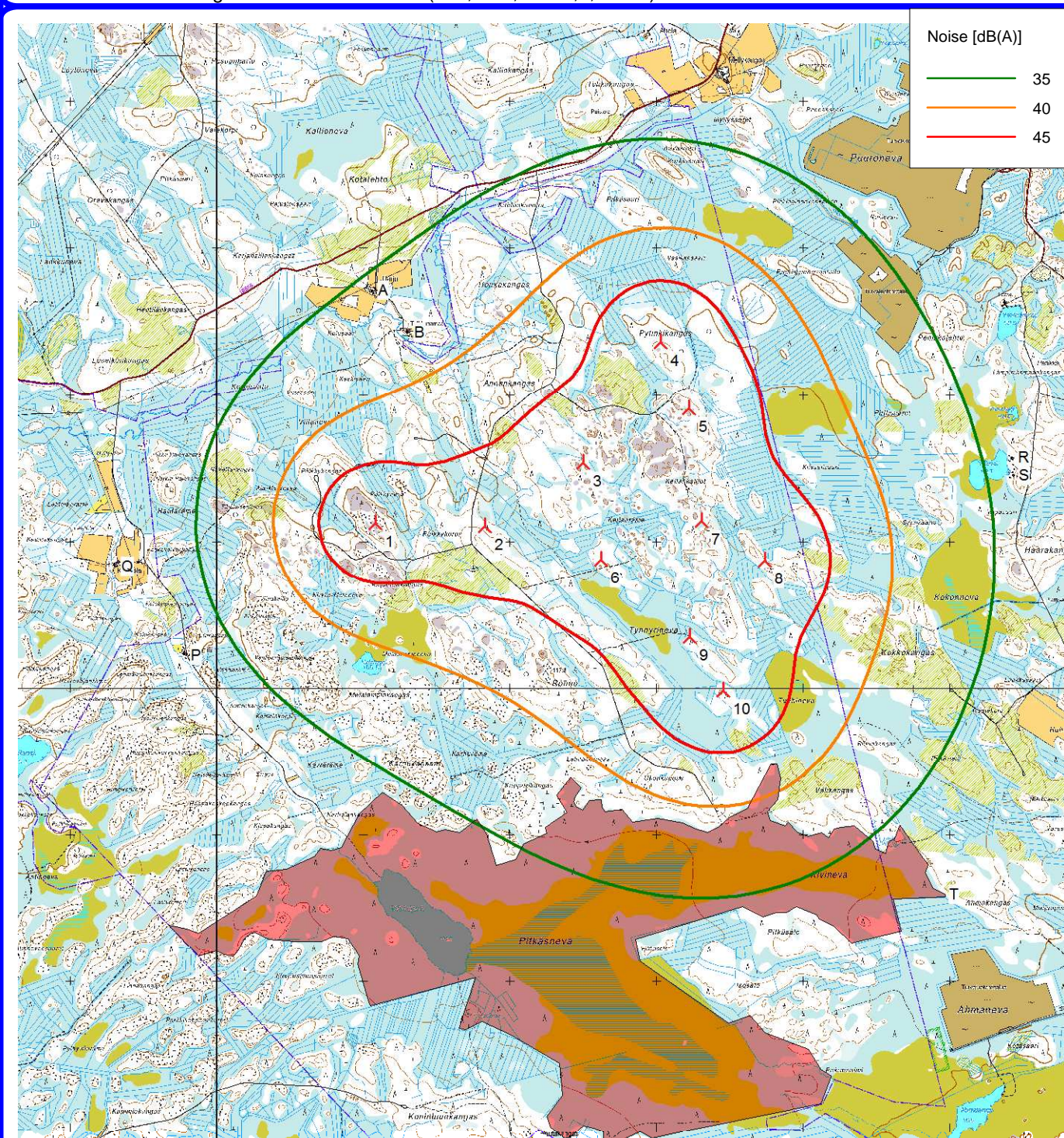
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DECIBEL - Map 8,0 m/s

Calculation: Annankangas G128 x 10 x HH140 (107,5 dB, GF=0,4, T=15°) "Kaavaehdotus 5/2014"



Noise [dB(A)]	
—	35
—	40
—	45

0 500 1000 1500 2000 m

Map: Uusi peruskartta, etelä , Print scale 1:40 000, Map center ETRS 89 Zone: 35 East: 394 221 North: 7 152 726

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