Project:

Urakkaneva

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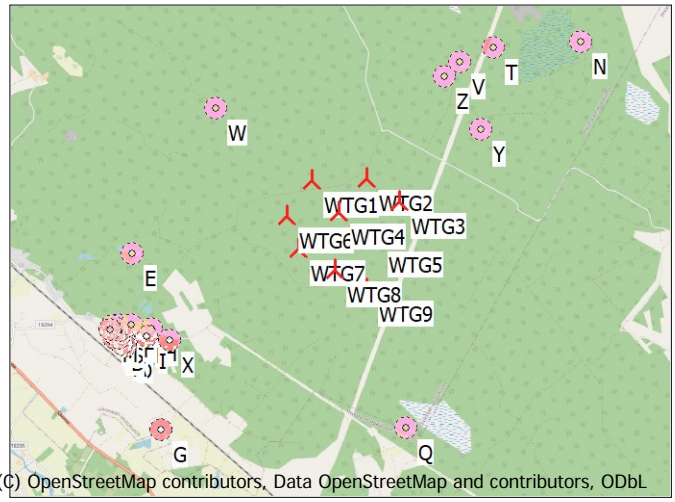
Dominik Fremgen / dominik.fremgen@abo-wind.de
Calculated:
2024-03-07 13:24/4.0.531

DECIBEL - Main Result

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB

Calculation is done according to Finnish guideline " Ympäristöhallinnon ohjeita 2 | 2014 " from the Ministry of the Environment of Finland

All coordinates are in
UTM (north)-ETRS89 Zone: 35



Scale 1:125.000

New WTG Noise sensitive area

WTGs

	Easting	Northing	Z	Row data/Description	WTG type Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Noise data Creator	Name	First wind speed	LwaRef	Last wind speed	LwaRef
			[m]					[kW]	[m]	[m]			[m/s]	[dB(A)]	[m/s]	[dB(A)]
WTG1	396.211	7.101.094	94,2	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG2	397.111	7.101.106	95,5	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG3	397.634	7.100.697	99,0	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG4	396.621	7.100.560	95,9	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG5	397.234	7.100.072	97,3	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG6	395.776	7.100.518	94,5	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG7	395.945	7.099.964	95,0	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG8	396.528	7.099.617	95,3	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6
WTG9	397.062	7.099.281	96,6	VESTAS V162-6.4 6400 162.0 !...	Yes	VESTAS	V162-6.4-6.400	6.400	162,0	169,0	USER	ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB	8,0	107,9	13,0	108,6

Calculation Results

Sound level

Noise sensitive area No.	Name	Easting	Northing	Z	Immission height	Demands Noise	Sound level From WTGs	Demands fulfilled ? Noise	2 dB penalty applied for one or more WTGs
				[m]	[m]	[dB(A)]	[dB(A)]		
A	Noise sensitive point: Finnish normal frequency - User defined (56)	392.954	7.098.494	80,0	4,0	40,0	27,9	Yes	No
B	Noise sensitive point: Finnish normal frequency - User defined (57)	392.893	7.098.598	81,8	4,0	40,0	27,8	Yes	No
C	Noise sensitive point: Finnish normal frequency - User defined (58)	392.838	7.098.600	81,3	4,0	40,0	27,7	Yes	No
D	Noise sensitive point: Finnish normal frequency - User defined (59)	392.910	7.098.814	85,6	4,0	40,0	28,2	Yes	No
E	Noise sensitive point: Finnish normal frequency - User defined (60)	393.183	7.099.997	90,0	4,0	40,0	30,4	Yes	No
F	Noise sensitive point: Finnish normal frequency - User defined (61)	393.127	7.098.800	85,0	4,0	40,0	28,9	Yes	No
G	Noise sensitive point: Finnish normal frequency - User defined (62)	393.552	7.097.057	73,2	4,0	40,0	26,6	Yes	No
H	Noise sensitive point: Finnish normal frequency - User defined (63)	393.465	7.098.732	85,0	4,0	40,0	30,0	Yes	No
I	Noise sensitive point: Finnish normal frequency - User defined (64)	393.379	7.098.610	82,3	4,0	40,0	29,5	Yes	No
J	Noise sensitive point: Finnish normal frequency - User defined (65)	392.813	7.098.803	85,1	4,0	40,0	27,9	Yes	No
K	Noise sensitive point: Finnish normal frequency - User defined (66)	392.834	7.098.708	84,4	4,0	40,0	27,8	Yes	No
L	Noise sensitive point: Finnish normal frequency - User defined (67)	393.324	7.098.709	85,0	4,0	40,0	29,5	Yes	No
M	Noise sensitive point: Finnish normal frequency - User defined (68)	392.772	7.098.738	84,2	4,0	40,0	27,7	Yes	No
N	Noise sensitive point: Finnish normal frequency - User defined (69)	400.743	7.103.242	104,3	4,0	40,0	25,3	Yes	No
O	Noise sensitive point: Finnish normal frequency - User defined (70)	393.011	7.098.445	80,0	4,0	40,0	28,0	Yes	No
P	Noise sensitive point: Finnish normal frequency - User defined (71)	392.807	7.098.774	85,0	4,0	40,0	27,8	Yes	No
Q	Noise sensitive point: Finnish normal frequency - User defined (72)	397.641	7.096.959	99,3	4,0	40,0	30,7	Yes	No
R	Noise sensitive point: Finnish normal frequency - User defined (73)	392.797	7.098.697	83,5	4,0	40,0	27,7	Yes	No
S	Noise sensitive point: Finnish normal frequency - User defined (74)	392.924	7.098.727	84,8	4,0	40,0	28,1	Yes	No
T	Noise sensitive point: Finnish normal frequency - User defined (75)	399.277	7.103.184	100,0	4,0	40,0	29,1	Yes	No
U	Noise sensitive point: Finnish normal frequency - User defined (76)	392.955	7.098.698	84,1	4,0	40,0	28,2	Yes	No
V	Noise sensitive point: Finnish normal frequency - User defined (77)	398.726	7.102.979	100,0	4,0	40,0	31,2	Yes	No
W	Noise sensitive point: Finnish normal frequency - User defined (78)	394.643	7.102.346	90,5	4,0	40,0	33,4	Yes	No

To be continued on next page...

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DECIBEL - Main Result

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB

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Noise sensitive area						Demands	Sound level	Demands fulfilled ?	
No.	Name	Easting	Northing	Z	Immission height	Noise	From WTGs	Noise	2 dB penalty applied for one or more WTGs
				[m]	[m]	[dB(A)]	[dB(A)]		
X	Noise sensitive point: Finnish normal frequency - User defined (79)	393.762	7.098.534	81,3	4,0	40,0	30,7	Yes	No
Y	Noise sensitive point: Finnish normal frequency - User defined (80)	399.043	7.101.843	101,3	4,0	40,0	33,9	Yes	No
Z	Noise sensitive point: Finnish normal frequency - User defined (81)	398.461	7.102.746	100,0	4,0	40,0	32,8	Yes	No

Distances (m)

	WTG								
NSA	WTG1	WTG2	WTG3	WTG4	WTG5	WTG6	WTG7	WTG8	WTG9
A	4167	4910	5173	4209	4562	3473	3333	3746	4183
B	4152	4907	5185	4213	4585	3464	3344	3775	4225
C	4195	4954	5235	4261	4636	3509	3394	3828	4279
D	4012	4786	5086	4101	4503	3334	3246	3706	4178
E	3220	4082	4506	3484	4052	2645	2762	3367	3945
F	3844	4603	4890	3912	4300	3157	3049	3498	3964
G	4834	5391	5469	4658	4759	4114	3766	3925	4155
H	3622	4351	4609	3647	4000	2921	2770	3188	3639
I	3767	4490	4739	3784	4123	3064	2902	3306	3744
J	4098	4876	5180	4194	4600	3424	3341	3803	4276
K	4135	4904	5196	4216	4607	3454	3355	3804	4267
L	3745	4482	4747	3781	4141	3047	2906	3330	3782
M	4169	4943	5242	4259	4657	3492	3402	3858	4324
N	5015	4213	4018	4917	4729	5665	5810	5560	5407
O	4154	4888	5143	4184	4526	3456	3304	3707	4136
P	4119	4895	5196	4212	4614	3443	3356	3815	4285
Q	4376	4181	3738	3743	3140	4018	3451	2881	2393
R	4171	4941	5234	4254	4645	3492	3394	3843	4305
S	4050	4816	5106	4127	4515	3368	3265	3712	4175
T	3711	3001	2981	3733	3722	4400	4633	4504	4488
U	4042	4803	5088	4112	4494	3357	3247	3689	4148
V	3143	2473	2530	3206	3267	3842	4101	4017	4055
W	2006	2762	3416	2665	3447	2151	2714	3317	3905
X	3543	4223	4435	3504	3798	2827	2610	2970	3384
Y	2930	2068	1816	2741	2531	3525	3623	3359	3239
Z	2791	2124	2210	2857	2942	3489	3751	3678	3737

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DECIBEL - Assumptions for noise calculation

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB

Noise calculation model:
ISO 9613-2 Finland
Wind speed (at 10 m height):
Highest noise value at receptor
Ground attenuation:
General, Ground factor: 0,4
Meteorological coefficient, C0:
Selected option: Fixed value: 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 tones penalty is added to total noise impact at receptors
Noise sensitive area
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 model 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 [dB/km]	125 [dB/km]	250 [dB/km]	500 [dB/km]	1.000 [dB/km]	2.000 [dB/km]	4.000 [dB/km]	8.000 [dB/km]
0,10	0,38	1,12	2,36	4,08	8,78	26,60	95,00

All coordinates are in
UTM (north)-ETRS89 Zone: 35

WTG: VESTAS V162-6.4 6400 162.0 !-!
Noise: ZZ_TRZ_V162-6.4_STE_PO6400_106.6+2.0dB

Source	Source/Date	Creator	Edited
Man./CHI	2022-10-13	USER	2024-03-07 13:23

Document no.: 0133-3544.V01

					Octave data							
Status	Hub height [m]	Wind speed (10m) [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	169,0	8,0	107,9	No	88,8	96,3	101,0	102,9	102,0	98,2	91,7	82,4
From Windcat	169,0	9,0	108,2	No	88,5	96,1	101,0	103,1	102,4	98,9	92,7	83,6
From Windcat	169,0	10,0	108,4	No	88,1	96,0	101,0	103,3	102,9	99,6	93,6	84,7
From Windcat	169,0	11,0	108,6	No	87,6	95,6	100,9	103,4	103,2	100,1	94,3	85,6
From Windcat	169,0	12,0	108,6	No	86,6	95,0	100,5	103,3	103,3	100,5	94,9	86,5
From Windcat	169,0	13,0	108,6	No	85,6	94,3	100,1	103,2	103,4	100,9	95,5	87,3

Noise sensitive area: A Noise sensitive point: Finnish normal frequency - User defined (56)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: B Noise sensitive point: Finnish normal frequency - User defined (57)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

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Calculated:
2024-03-07 13:24/4.0.531

DECIBEL - Assumptions for noise calculation

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB

Noise sensitive area: C Noise sensitive point: Finnish normal frequency - User defined (58)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: D Noise sensitive point: Finnish normal frequency - User defined (59)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: E Noise sensitive point: Finnish normal frequency - User defined (60)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: F Noise sensitive point: Finnish normal frequency - User defined (61)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: G Noise sensitive point: Finnish normal frequency - User defined (62)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: H Noise sensitive point: Finnish normal frequency - User defined (63)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: I Noise sensitive point: Finnish normal frequency - User defined (64)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: J Noise sensitive point: Finnish normal frequency - User defined (65)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning

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DECIBEL - Assumptions for noise calculation

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: K Noise sensitive point: Finnish normal frequency - User defined (66)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: L Noise sensitive point: Finnish normal frequency - User defined (67)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: M Noise sensitive point: Finnish normal frequency - User defined (68)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: N Noise sensitive point: Finnish normal frequency - User defined (69)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: O Noise sensitive point: Finnish normal frequency - User defined (70)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: P Noise sensitive point: Finnish normal frequency - User defined (71)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: Q Noise sensitive point: Finnish normal frequency - User defined (72)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

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DECIBEL - Assumptions for noise calculation

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB

Noise sensitive area: R Noise sensitive point: Finnish normal frequency - User defined (73)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: S Noise sensitive point: Finnish normal frequency - User defined (74)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: T Noise sensitive point: Finnish normal frequency - User defined (75)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: U Noise sensitive point: Finnish normal frequency - User defined (76)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: V Noise sensitive point: Finnish normal frequency - User defined (77)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: W Noise sensitive point: Finnish normal frequency - User defined (78)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: X Noise sensitive point: Finnish normal frequency - User defined (79)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

Noise sensitive area: Y Noise sensitive point: Finnish normal frequency - User defined (80)
Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning

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DECIBEL - Assumptions for noise calculation

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB

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

Noise sensitive area: Z Noise sensitive point: Finnish normal frequency - User defined (81)

Predefined calculation standard:
Immission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model
No temporal binning
Noise demand: 40,0 dB(A)
No distance demand
Pure tone penalty: 0 dB

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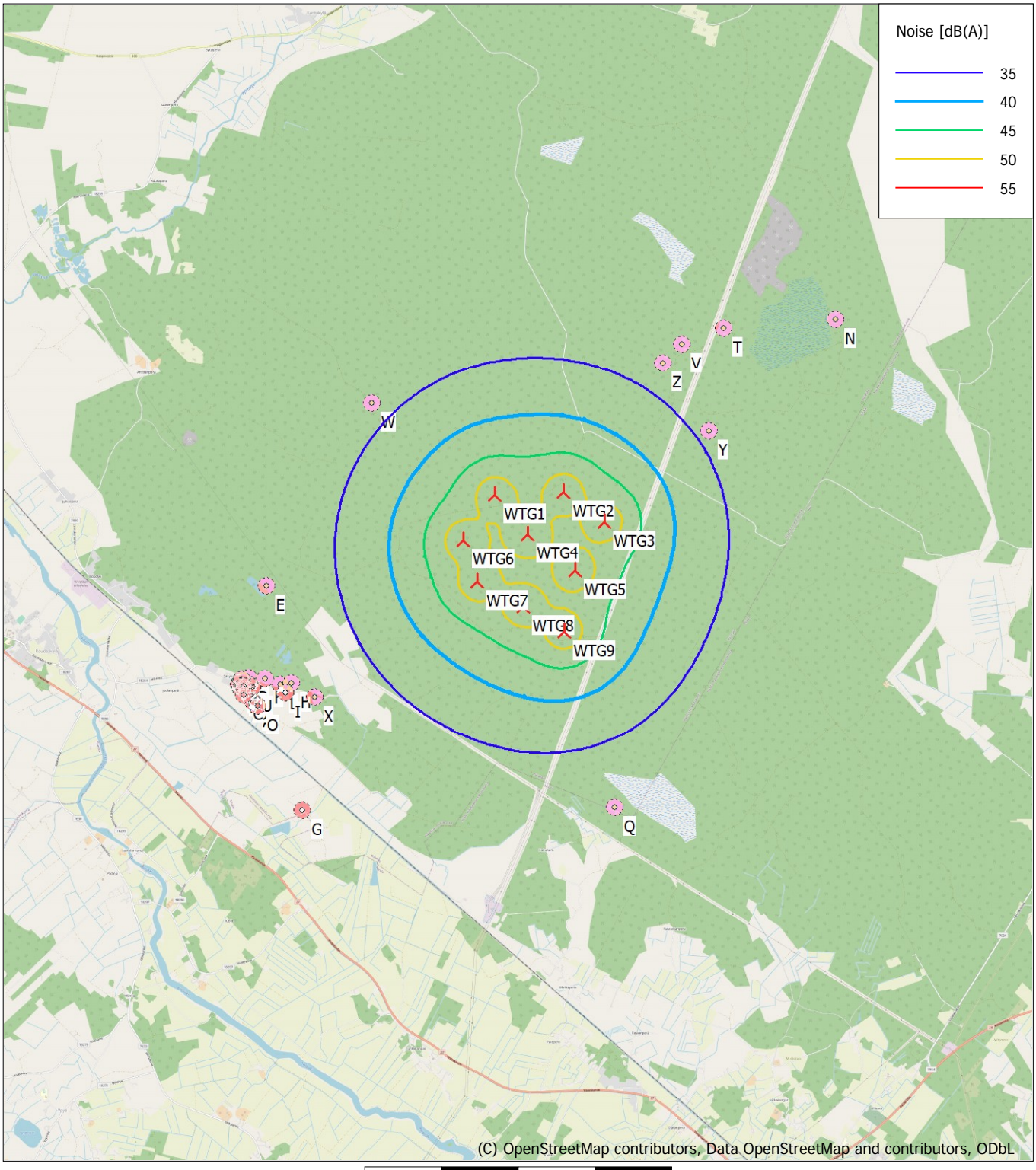
DECIBEL - Map Highest noise value at receptor

Calculation: 2024-03-07_Urakkaneva_Noise-normal freq_9x V162-6.4_HH169_106.6+2.0dB



0 1 2 3 4 km

Map: EMD OpenStreetMap , Print scale 1:75.000, Map center UTM (north)-ETRS89 Zone: 35 East: 396.705 North: 7.100.194

New WTG Noise sensitive area

Noise calculation model: ISO 9613-2 Finland. Wind speed: Highest noise value at receptor
Height above sea level from active line object