

DECIBEL - Main Result

Calculation: Bottenviken

Noise calculation model:

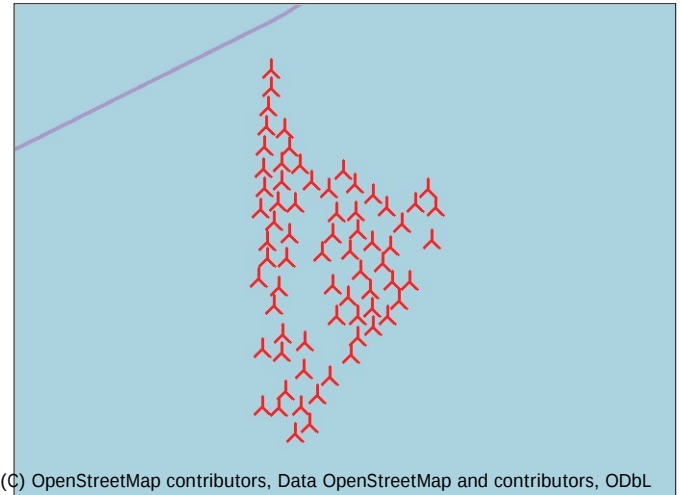
Danish 2019

The calculation is based on "BEK nr 135 af 07/02/2019" from the Danish Environmental Agency.

For wind turbines classified as offshore wind turbines multiple reflections (Lm) are applied.

All coordinates are in

Swedish UTM 33-SWREF99 (SE)



Scale 1:750 000

New WTG

WTGs

	Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated	Rotor diameter	Hub height	Noise data		First wind speed [m/s]	LwaRef [dB(A)]	Last wind speed [m/s]	LwaRef [dB(A)]	
					Valid	Manufact.					Offshore	Creator					Name
			[m]					[kW]	[m]	[m]							
1	879 242	7 210 831	-65.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
2	879 604	7 212 536	-56.6	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
3	881 034	7 213 866	-54.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
4	882 380	7 214 997	-55.9	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
5	883 321	7 216 717	-60.8	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
6	884 146	7 218 758	-56.6	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
7	882 363	7 218 591	-59.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
8	881 718	7 221 966	-64.9	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
9	880 335	7 217 406	-52.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
10	880 741	7 215 665	-55.0	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
11	878 218	7 216 523	-63.3	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
12	879 352	7 214 612	-57.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
13	877 226	7 214 435	-69.9	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
14	876 549	7 217 406	-64.5	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
15	879 113	7 219 151	-63.0	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
16	881 146	7 220 228	-56.0	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
17	879 853	7 222 199	-65.0	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
18	878 239	7 223 170	-62.2	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
19	877 924	7 224 895	-63.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
20	877 827	7 221 047	-64.8	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
21	875 065	7 220 595	-62.1	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
22	876 053	7 224 556	-64.3	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
23	875 817	7 222 412	-66.2	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
24	877 477	7 227 680	-63.0	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
25	876 157	7 228 817	-61.6	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
26	874 788	7 208 616	-52.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
27	877 463	7 208 326	-53.6	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
28	873 237	7 206 310	-62.1	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
29	872 340	7 210 079	-59.8	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
30	872 167	7 211 879	-69.5	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
31	875 939	7 203 437	-66.6	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
32	874 901	7 205 018	-59.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
33	876 346	7 206 399	-59.0	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
34	872 742	7 204 616	-57.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
35	874 897	7 226 829	-67.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
36	873 138	7 227 409	-68.9	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
37	871 763	7 228 912	-65.9	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
38	870 515	7 230 445	-63.3	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
39	870 990	7 214 574	-69.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
40	871 249	7 216 444	-69.2	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
41	871 686	7 219 385	-67.8	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
42	869 770	7 219 157	-60.8	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
43	871 680	7 221 883	-57.4	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
44	869 473	7 220 933	-58.5	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
45	869 889	7 222 911	-56.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
46	868 429	7 224 003	-61.3	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
47	870 006	7 224 886	-55.1	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
48	868 561	7 226 126	-58.6	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
49	870 231	7 226 936	-60.5	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
50	868 207	7 228 102	-46.7	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
51	869 912	7 228 753	-60.3	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
52	868 101	7 230 321	-50.5	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2
53	868 016	7 232 216	-51.9	MODERNENERGY ME263-20...Yes		MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBA	6.0	115.2	8.0	115.2

To be continued on next page...

Project:

Offshore Bottenhavet/Bottenviken

Licensed user:

Karlstad Modern Energy AB

Lantvårnsgatan 8

SE-65221 Karlstad

+46 702185064

Niklas Sondell / niklas.sondell@modernenergy.se

Calculated:

2022-10-12 15:59/3.5.552

DECIBEL - Main Result

Calculation: Bottenviken

...continued from previous page

Easting	Northing	Z	Row data/Description	WTG type		Type-generator	Power, rated	Rotor diameter	Hub height	Noise data			First wind speed [m/s]	LwaRef [dB(A)]	Last wind speed [m/s]	LwaRef [dB(A)]
				Valid	Manufact.					Offshore	Creator	Name				
[m]																
54	869 845	7 232 115	-64.1 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
55	867 928	7 234 156	-54.5 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
56	867 949	7 236 141	-60.8 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
57	867 751	7 237 928	-64.3 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
58	871 729	7 225 017	-65.6 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
59	874 593	7 202 211	-63.8 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
60	871 002	7 204 548	-59.8 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
61	874 550	7 211 356	-66.2 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
62	879 373	7 226 839	-66.6 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
63	880 884	7 225 688	-62.3 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
64	882 558	7 224 426	-64.6 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
65	883 695	7 226 437	-59.3 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
66	884 685	7 228 052	-57.0 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
67	885 780	7 226 312	-63.0 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
68	885 699	7 223 139	-66.2 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
69	869 026	7 217 152	-69.4 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2
70	870 254	7 210 179	-68.4 MODERNENERGY ME263-20...	Yes	MODERNENERGY	ME263-20-20 000	20 000	263.0	160.0	Yes	USER	115.2 dBa	6.0	115.2	8.0	115.2

Project:

Offshore Bottenhavet/Bottenviken

Licensed user:

Karlstad Modern Energy AB

Lantvårngatan 8

SE-65221 Karlstad

+46 702185064

Niklas Sondell / niklas.sondell@modernenergy.se

Calculated:

2022-10-12 15:59/3.5.552

DECIBEL - Assumptions for noise calculation

Calculation: Bottenviken

Noise calculation model:

Danish 2019

Wind speed (in 10 m height):

6.0 m/s - 8.0 m/s, step 2.0 m/s

Terrain reduction:

-1.5 dB(A) Onshore

-3 dB(A) Offshore

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 tones penalty is added to total noise impact at receptors

Noise sensitive area

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

1.5 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]
0.11	0.38	1.02	2.00	3.60	8.80	29.00	104.50

For wind turbines classified as offshore wind turbines multiple reflections (Lm) are applied.

Area object used for water areas: Area object (Roughness): REGIONS_Offshore_Bottenhavet_V2_0.w2r (2): 0,0000m(cl.0,0) Water bodies

All coordinates are in

Swedish UTM 33-SWEREF99 (SE)

WTG: MODERNENERGY ME263-20 20000 263.0 !O!

Noise: 115.2 dBa

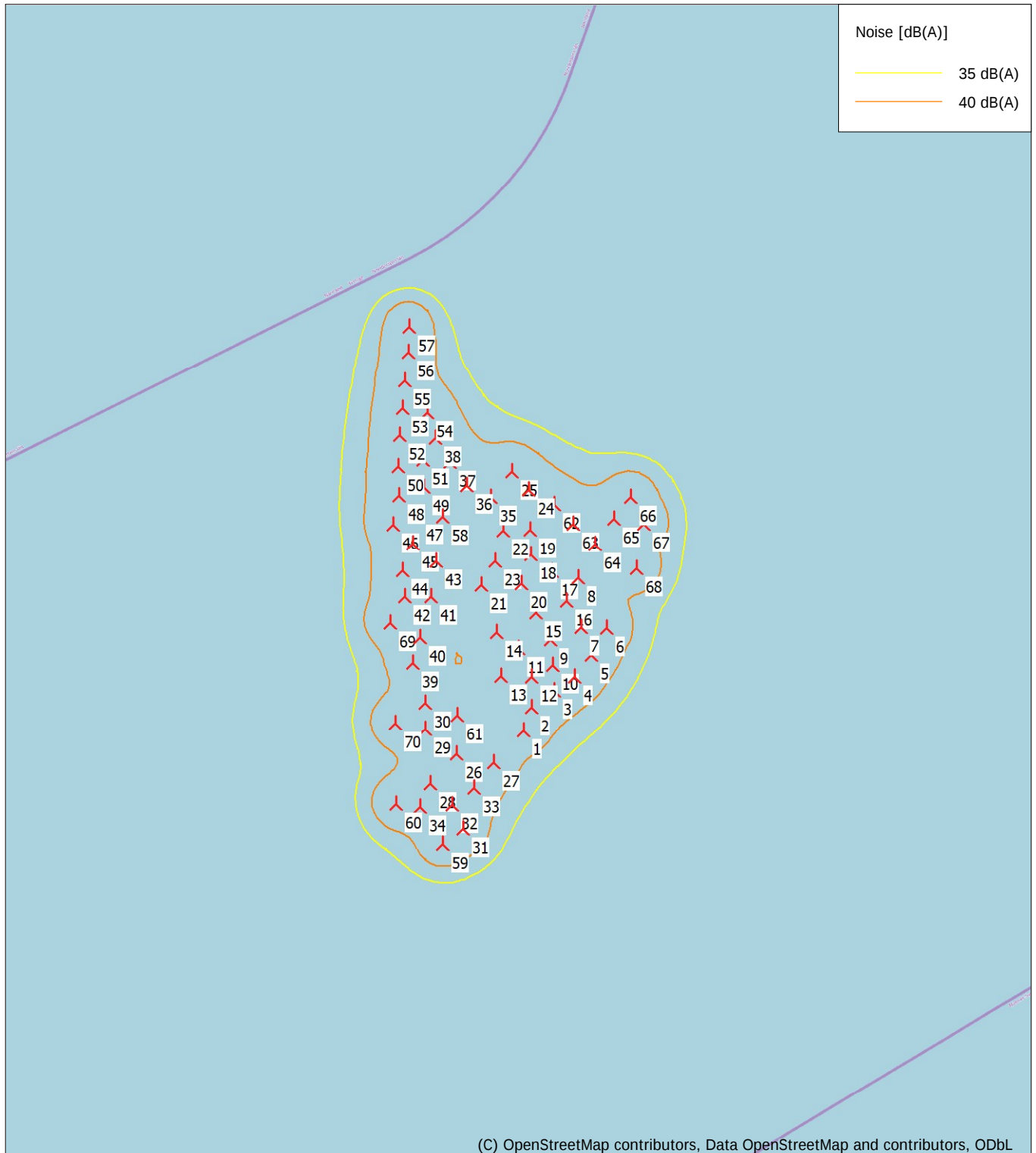
Source Source/Date Creator Edited

2021-09-13 USER 2021-11-10 15:14

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	160.0	6.0	115.2	No	93.6	102.3	107.9	110.3	109.7	105.9	99.1	89.1
From Windcat	160.0	8.0	115.2	No	93.6	102.3	107.9	110.3	109.7	105.9	99.1	89.1

DECIBEL - Map 8.0 m/s

Calculation: Bottenviken



0 5 10 15 20 km

Map: EMD OpenStreetMap , Print scale 1:400 000, Map center Swedish UTM 33-SWREF99 (SE) East: 876 765 North: 7 220 069
New WTG

Noise calculation model: Danish 2019. Wind speed: 8.0 m/s
Height above sea level from active line object