BILAGA 2

Bullermodellering för Söderskogens vindkraftspark



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1 Inledning

wpd Finland Oy planerar att bygga en vindkraftspark som omfattar högst åtta vindkraftverk i området kring Söderskogen i Vörå kommun. I denna utredning, som är en del av konsekvensbedömningen i planbeskrivningen, redovisas resultatet av bullermodelleringen och beräkningen av det lågfrekventa bullret.

Bullermodelleringen är gjord med de beräkningsparametrar som beskrivs i Miljöförvaltningens anvisningar 2/2014 ”Modellering av buller från vindkraftverk” med hjälp av DECIBEL modulen i programmet WindPro version 3.3. Det lågfrekventa bullret beräknas med DSO 1284 enligt miljöministeriets anvisningar. Utgångsvärdena för ljudnivåerna är från vindkraftsmodellen Nordex N163 med den maximala ljudeffektnivån 109,2 dB(A).

2 Buller från vindkraftverk

Ljudet av ett vindkraftverk består av ljudet från rotorbladen (aerodynamiskt) och ljudet av kraftverkets maskineri (mekaniskt). Av dessa två orsakar ljudet av de roterande bladen i allmänhet större olägenheter. Ljudet från ett vindkraftverk uppkommer på hög höjd och är periodiskt med anledning av de roterande bladen. Ljudet är bredbandigt och innehåller även lågfrekvent (ca 20–200 Hz) ljud. Ljudets egenskaper, bland annat dess styrka, frekvens och tidsvariationer, beror på antalet vindkraftverk och dess egenskaper, deras avstånd till varandra samt vindhastigheten. [Miljöförvaltningens anvisningar 5/2016, Planering av vindkraftsutbyggnad. Uppdatering 2016]

Topografi, vegetation och väderlek, såsom vindens hastighet, riktning och temperatur, påverkar hur ljudet från vindkraftverket sprider sig till omgivningen. Ljudet sprids vanligtvis till ett större område när det sprids över vatten än över marken vilket beror på att dämpningen är mindre. Lågfrekventa ljud sprids till ett större område och dämpas knappt alls i atmosfären. Bakgrundsljud, till exempel från vind eller vågor, kan påverka hörbarheten av vindkraftverkets ljud och dess störande effekt. [Miljöförvaltningens anvisningar 5/2016, Planering av vindkraftsutbyggnad. Uppdatering 2016]

3 Riktvärden för utomhusbuller från vindkraftverk

Riktvärdena är ett verktyg för riskhantering och planering i vindkraftsprojekt. Med hjälp av dessa kan man identifiera områden som lämpar sig för vindkraftsbyggande.

Riktvärden för den kalkylerade bullernivån från vindkraftverk regleras i Statsrådets förordning om riktvärden för utomhusbuller från vindkraftverk (1107/2015). Riktvärdena är presenterade i tabell 1.

Tabell 1. Riktvärden för utomhusbuller från vindkraftverk

Riktvärden för utomhusbuller från vindkraftverk	bullernivån utomhus L_{Aeq} dagtid kl 7-22	bullernivån utomhus L_{Aeq} nattetid kl 22-7
Permanent bebyggelse	45 dB(A)	40 dB(A)
Fritidsbebyggelse	45 dB(A)	40 dB(A)
Vårdinrättningar	45 dB(A)	40 dB(A)
Läroanstalter	45 dB(A)	-
Rekreationsområden	45 dB(A)	-
Campingplatser	45 dB(A)	40 dB(A)
Nationalplatser	40 dB(A)	40 dB(A)

Dessutom har åtgärdsgränser för lågfrekvent buller inomhus fastställts som medelljudnivå under en timme. Dessa riktvärden är presenterade i tabell 2.

Tabell 2. Åtgärdsgränser för ekvivalentnivån för en timme lågfrekvensbuller inomhus i utrymmen som är avsedda att sova i. (SHM Förordning om boendehälsa, 23.4.2015)

Band / Hz	20	25	31,5	40	50	63	80	100	125	160	200
Leq, 1h / dB	74	64	56	49	44	42	40	38	36	34	32

4 Utvärderingsmetod

Bullermodelleringen är gjord med de beräkningsparametrar som beskrivs i Miljöförvaltningens anvisningar 2/2014 ”Modellering av buller från vindkraftverk” med hjälp av DECIBEL modulen i programmet WindPro version 3.3. Noggrannare uppgifter om beräkningen presenteras i bilaga 1.

I miljöministeriets anvisningar konstateras det att utgångsvärden vid modellering av buller från vindkraftverk är de garantivärden som tillverkaren uppgett i enlighet med standarden IEC TS 61400–14. I denna bullermodellering används den maximala ljudeffektnivån 109,2 dB(A) och 1/3 oktavbandsnivåer i intervallet 10 Hz – 10 kHz enligt dokumentet F008_276_A17_EN Revision 00 från tillverkaren Nordex. De modellerade vindkraftverken är utan sågtandade rotorblad eller annan ljudreducering. Vindkraftverken i modelleringen härleds från modellen Nordex N163 till modellen Future F180 med 180 meters rotordiameter, navhöjden 210 meter och effekten 5,6 MW.

Den valda vindkraftsmodellen i denna beräkning är Nordex N163, eftersom den motsvarar den nyaste teknologin och har en relativt hög ljudeffektnivå om 109,2 dB(A). Resultatet ger således den realistiska maximalnivån i denna omgivning. Det slutgiltiga valet av vindkraftsverksmodell väljs i ett senare skede, och kan då vara av samma modell eller med en lägre ljudeffektnivå.

De bostadshus och fritidshus som är närmast de preliminära vindkraftspositionerna i planbeskrivningen har valts till modelleringen (observationspunkter). Avståndet till dessa är ungefär 1,4 – 2,6 km. Bostadshusen RH01-14 (RH = residential house) och fritidshusen HH01-02 (HH = holiday house) är namngivna i slumpmässig ordning (Bild 1). Närmaste bostadshuset (RH04) ligger på 1,4 km avstånd från vindkraftverk 4.

Det är viktigt att även analysera de kumulativa konsekvenserna som för Söderskogens del betyder de sammanslagna konsekvenserna med vindkraftsparkerna Märkenkall, Lotlax och Lålax. Alla dessa projekt ligger inom en radie om 10 km och det är motiverat att analysera dessa tillsammans. För Märkenkall, Lotlax och Lålax del är modellen av vindkraftverken den som har använts i planläggningen eller i byggloven, beroende på vilket skede projektet befinner sig i (Tabell 3).

Tabell 3. Vindkraftsparkerna Märkenkall, Lotlax och Lålax

Projekt	Modell	Rotor-diameter	Nav-höjd	Ljudeffektnivå
Märkenkall, 15 vindkraftverk	Vestas V136 3,45 MW	136 m	172 m	108,2 dB(A)
Lålax, 4 vindkraftverk	Prokon P3000 3 MW	116,7 m	142 m	106,5 dB(A)
Lotlax, 3 vindkraftverk	Prokon P3000 3 MW	116,7 m	122 m	106,5 dB(A)

5 Resultat och slutsats

Resultaten av modelleringen jämförs med de riktvärden för utomhusbuller från Statsrådets förordning (Tabell 1) samt riktvärden för lågfrekvent buller inomhus från Social- och hälsovårdsministeriets förordning (Tabell 2).

Resultatet av bullermodelleringen, som är jämförelsebar med riktvärden för medelljudnivån, presenteras i kartan i bild 1. Från bullerutbredningskartan kan man konstatera att observationspunkterna RH02-RH06 ligger inom området där ljudnivån är mellan 35 dB(A)- 40 dB(A). Tabell 4 sammanfattar överskridningen av riktvärden för utomhusbuller som till antalet är 0 stycken. De beräknade ljudnivåerna för de utvalda bostadshusen och fritidshusen är presenterade i tabell 5. Noggrannare resultat av modelleringen presenteras i bilaga 2.

Nivåerna för det lågfrekventa bullret inomhus har beräknats med DSO 1284 modellen i enlighet med ministeriets anvisningar för de utvalda husen. Modelleringen visar att ministeriets riktvärden inte överskrids i något hus (bild 2 och bilaga 4).

Resultatet av bullermodelleringen för de sammanslagna konsekvenserna, som är jämförelsebar med riktvärden för medelljudnivån, presenteras i kartan i bild 3 och i bilaga 3.

Sammanfattningsvis kan man konstatera att riktvärden i Statsrådets förordning inte överskrids i något bostadshus eller fritidshus. Angående de kumulativa konsekvenserna kan man konstatera att riktvärden i Statsrådets förordning inte överskrids som en följd av de sammanslagna konsekvenserna.

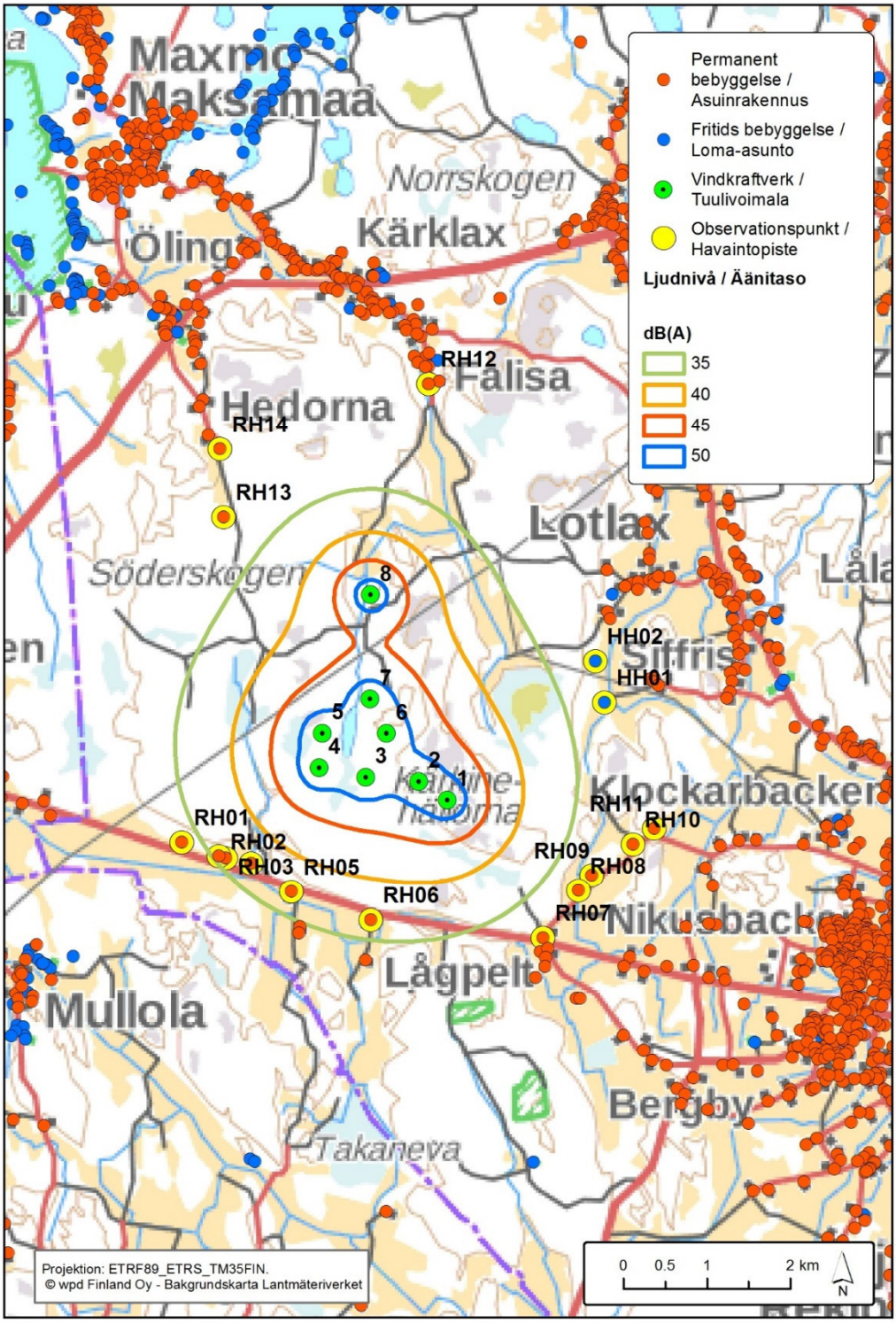


Bild 1. Bullerutbredningskarta

Tabell 4. Antal objekt vars riktvärden för utomhusbuller överskrids

Antal objekt vars riktvärden för utomhusbuller överskrids	Antal
Permanent bebyggelse	0 st
Fritidsbebyggelse	0 st
Vårdinrättningar	0 st
Läroanstalter	0 st
Rekreationsområden	0 st
Campingplatser	0 st
Nationalplatser	0 st

Tabell 5. Resultat av bullermodelleringen vid de närmast belägna byggnaderna

Bostad	dB(A)
HH01	32,4
HH02	32,2
RH01	33,7
RH02	35,4
RH03	35,8
RH04	36,9
RH05	36,8
RH06	36,5

Bostad	dB(A)
RH07	32,0
RH08	32,5
RH09	32,3
RH10	30,7
RH11	29,8
RH12	27,6
RH13	31,7
RH14	28,7

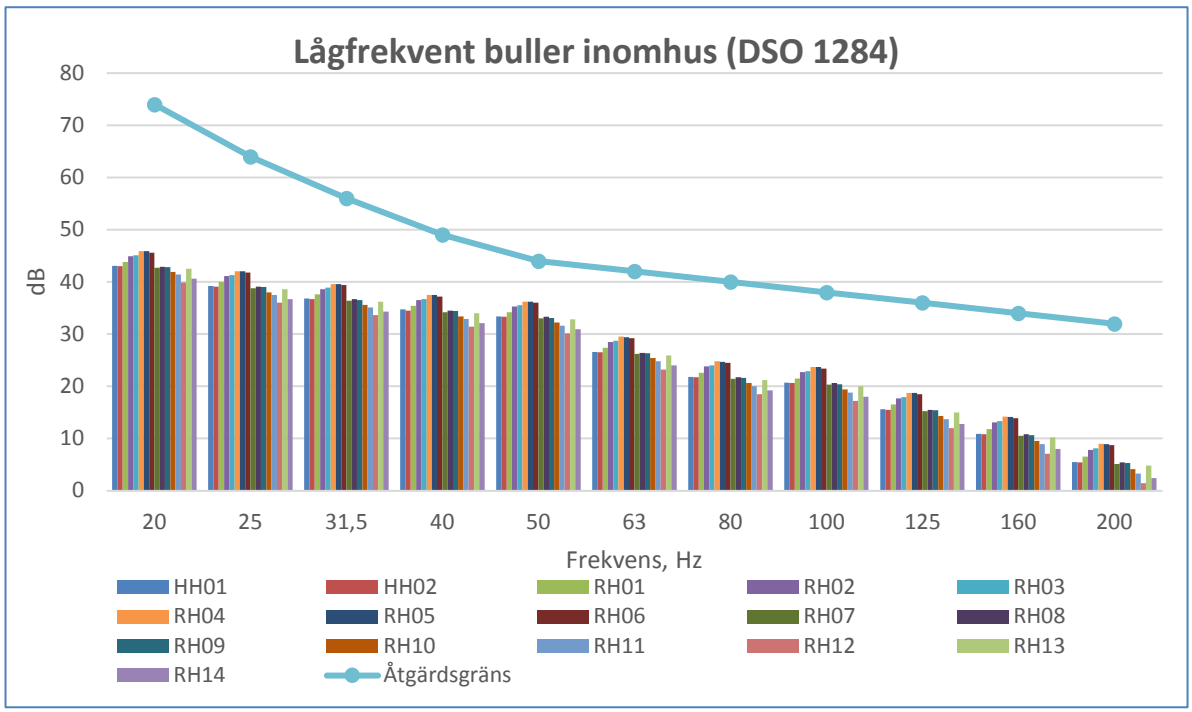


Bild 2. Det lågfrekventa bullret inomhus för de utvalda husen i förhållande till åtgärdsgränserna i SHM Förordning om boendehälsa.

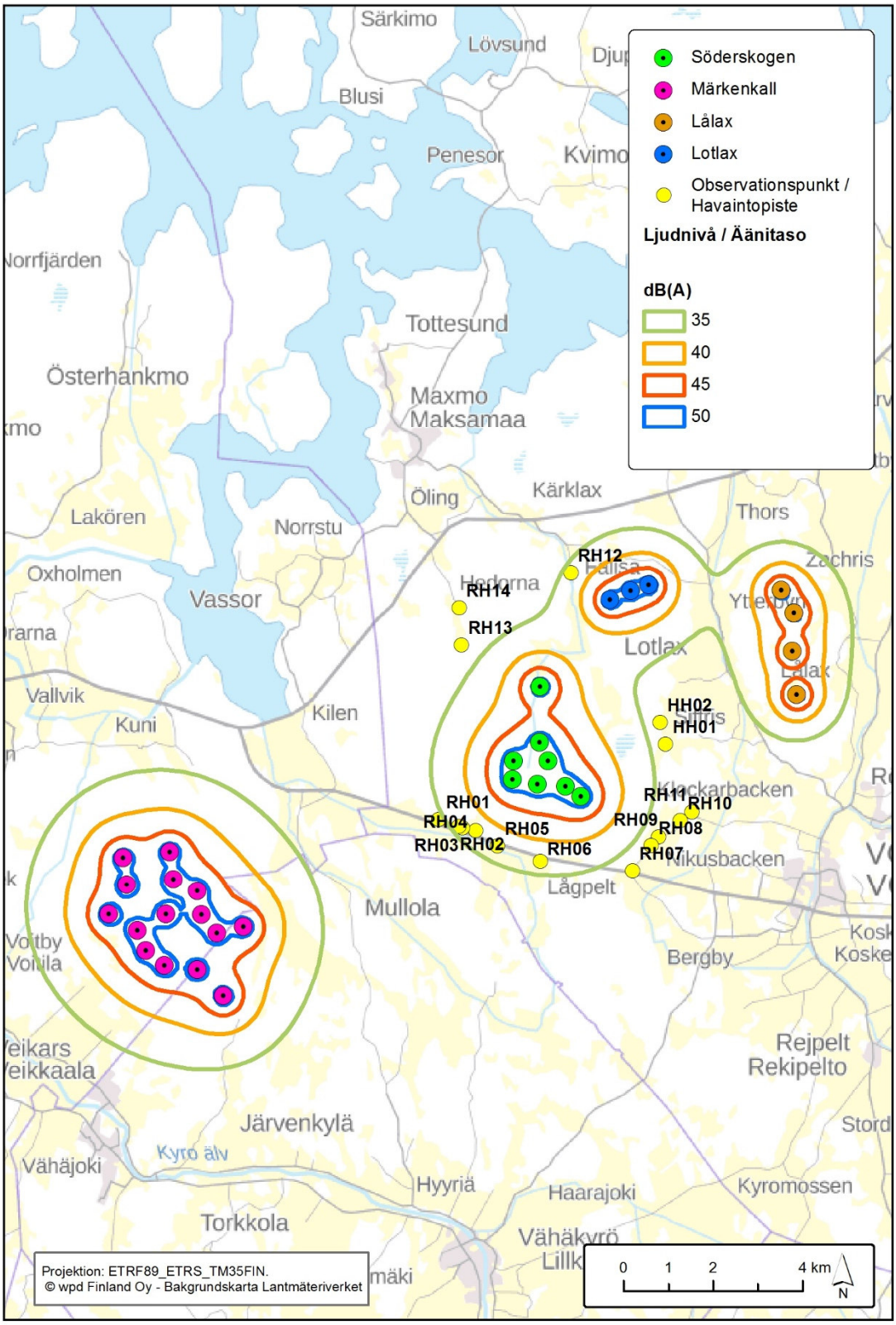


Bild 3. Bullerutbredningskarta, kumulativa konsekvenser

6 Bilagor

Bilaga 1 – Uppgifter om bullermodelleringen

Bilaga 2 – ISO 9613-2 modellering, Söderskogen

Bilaga 3 – ISO 9613-2 modellering, kumulativa konsekvenser

Bilaga 4 – DSO 1284 modellering, Söderskogen

Bilaga 1

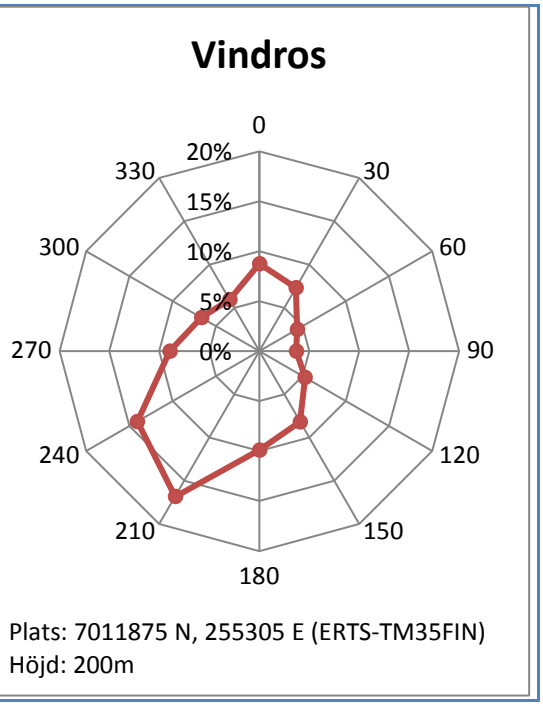
Uppgifter om bullermodelleringen

Uppgifter om bullermodelleringen		
Författare:	Anders Stenberg, wpd Finland Oy	
Datum:	13.11.2019	
Projektansvarig:	wpd Finland Oy	
Projekt:	Söderskogen	
Uppgifter om modelleringsprogrammet		
Modelleringsprogram och version:	WindPro 3.3	
Modelleringsmetod:	ISO 9613-2	
Uppgifter om vindkraftverket		
Tillverkare:	Typ:	Serienummer: -
Nordex	N163	
Nominell effekt	Navhöjd:	Rotordiameter:
5,6 MW	210 m	180 m
Torntyp:	Rörtorn	
Utgångsuppgifter för beräkningen (Ljudnivåer)		
Ljudnivå L_{WA} vid vindhastigheten 8 m/s (höjden 10 m):	109,2 dB(A)	
Högsta ljudnivån L_{WA}:	109,2 dB(A)	
Ljudeffektnivån 109,2 dB och 1/3 oktavbandsnivåer i intervallet 10 Hz – 10 kHz enligt dokumentet F008_276_A17_EN Revision 00 från tillverkaren Nordex		

Utgångsuppgifter om beräkningen		
Smalbandighet/		
Tonalitet	Impulsart	Signifikant pulserande (amplitudmodulering)
Nej	Nej	Nej
Resolution		
Beräkningshöjd:	Beräkningsrutans storlek	
4 m	10 m	
Meteorologiska faktorer		
Relativ fuktighet:	Temperatur:	
70 %	15 °C	
Terrängmodell		
Terrängmodellens källa:	Vågrät upplösning::	Lodrät upplösning::
Lantmäteriverket, korkeusmalli 10 m	10 m	1,4 m
Beaktande av absorption vid markytan		
Landområden, absorptionsfaktor 0,4		
Inverkan av markytans form		
När vindkraftverkets fundament ligger 60 meter högre än markytan i det bullerutsatta objektet lägger man 2 dB till garantivärdet för kraftverkets bullerutsläpp.		
Nej		
Kraftverksljudets riktningsverkan	Fri rymd: ja	Annan
Atmosfärens stabilitet i beräkningen/meteorologisk korrigering		
Enligt miljöministeriets anvisningar 2/2014		
Den statistiska vindfördelning		
Tabell 1 visar Vindatlasens vindfördelning på 200 meters höjd i punkten 7011875 N, 255305 E. Dessa värden är inte beaktade i beräkningen, utan alltid den vindriktning som är mest ogynnsam rakt mot byggnaden ifråga.		

Tabell 1. Vindatlasens vindfördelning på 200 meters höjd i punkten 7011875 N, 255305 E.

Vindriktning	Andel (%)	Vindhsatighet (m/s)
0	8,8	8,1
30	7,3	7,8
60	4,4	6,5
90	3,7	6,5
120	5,3	7,6
150	8,2	8,9
180	9,9	9,1
210	16,8	9,9
240	14,1	9,1
270	9,0	8,7
300	6,7	7,2
330	6,0	7,5
Medelvärde		8,5



Bilaga 2

ISO 9613-2 modellering, Söderskogen

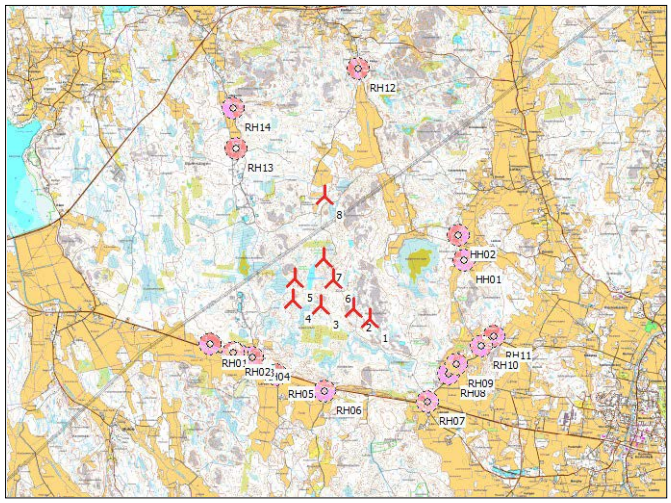
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Calculated:
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DECIBEL - Main Result

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance

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

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:150 000

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)]	Pure tones
1	255445	7011327	46,5	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
2	255108	7011549	50,2	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
3	254469	7011599	26,6	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
4	253911	7011714	27,9	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
5	253946	7012128	33,9	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
6	254714	7012124	38,4	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
7	254523	7012536	35,6	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No
8	254528	7013790	19,2	FUTURE F180 5.6 MW 5600 18...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	109,2	No

Calculation Results

Sound level

Noise sensitive area						Demands	Sound level	
No.	Name	East	North	Z [m]	Imission height [m]	Noise [dB(A)]	From WTGs [dB(A)]	2 dB penalty applied for one or more WTGs
HH01	HH01	257331	7012499	17,5	4,0	40,0	32,4	No
HH02	HH02	257219	7012995	17,0	4,0	40,0	32,2	No
RH01	RH01	252257	7010823	13,1	4,0	40,0	33,7	No
RH02	RH02	252700	7010660	15,5	4,0	40,0	35,4	No
RH03	RH03	252789	7010635	14,7	4,0	40,0	35,8	No
RH04	RH04	253090	7010568	15,5	4,0	40,0	36,9	No
RH05	RH05	253574	7010222	14,2	4,0	40,0	36,8	No
RH06	RH06	254528	7009881	18,4	4,0	40,0	36,5	No
RH07	RH07	256594	7009667	21,5	4,0	40,0	32,0	No
RH08	RH08	257015	7010236	19,0	4,0	40,0	32,5	No
RH09	RH09	257177	7010423	17,1	4,0	40,0	32,3	No
RH10	RH10	257669	7010798	18,8	4,0	40,0	30,7	No
RH11	RH11	257929	7010986	18,5	4,0	40,0	29,8	No
RH12	RH12	255219	7016333	14,3	4,0	40,0	27,6	No
RH13	RH13	252762	7014727	25,0	4,0	40,0	31,7	No
RH14	RH14	252714	7015547	21,4	4,0	40,0	28,7	No

Distances (m)

	WTG							
NSA	1	2	3	4	5	6	7	8
HH01	2219	2416	2998	3506	3403	2641	2806	3084
HH02	2433	2557	3082	3545	3384	2650	2732	2804
RH01	3226	2940	2343	1878	2133	2779	2839	3734
RH02	2822	2565	2001	1604	1924	2488	2614	3622
RH03	2743	2491	1936	1556	1888	2433	2572	3600
RH04	2472	2242	1720	1408	1778	2248	2433	3525
RH05	2172	2027	1641	1528	1940	2216	2499	3690

To be continued on next page...

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Calculated:
13.11.2019 15:17/3.3.247

DECIBEL - Main Result

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance

...continued from previous page

	WTG							
NSA	1	2	3	4	5	6	7	8
RH06	1711	1765	1718	1933	2320	2250	2654	3906
RH07	2017	2396	2869	3372	3613	3091	3536	4608
RH08	1911	2314	2885	3436	3603	2974	3389	4335
RH09	1952	2354	2949	3509	3651	2990	3390	4281
RH10	2285	2668	3297	3866	3952	3237	3592	4335
RH11	2506	2875	3511	4080	4141	3408	3739	4404
RH12	5008	4782	4790	4798	4391	4237	3858	2634
RH13	4328	3947	3561	3222	2853	3251	2809	1998
RH14	5023	4656	4317	4012	3631	3961	3510	2523

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance**Noise calculation model:** ISO 9613-2 Finland 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: HH01 HH01

Wind speed: 8,0 m/s
WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2219	2231	0	**26,31**	109,2	0,00	77,97	-	-	0,00	0,00	-
2	2416	2427	0	**25,18**	109,2	0,00	78,70	-	-	0,00	0,00	-
3	2998	3005	0	**22,26**	109,2	0,00	80,56	-	-	0,00	0,00	-
4	3506	3513	0	**20,06**	109,2	0,00	81,91	-	-	0,00	0,00	-
5	3403	3410	0	**20,48**	109,2	0,00	81,66	-	-	0,00	0,00	-
6	2641	2651	0	**23,99**	109,2	0,00	79,47	-	-	0,00	0,00	-
7	2806	2815	0	**23,16**	109,2	0,00	79,99	-	-	0,00	0,00	-
8	3084	3091	0	**21,87**	109,2	0,00	80,80	-	-	0,00	0,00	-
Sum				**32,43**								

- Data undefined due to calculation with octave data

Noise sensitive area: HH02 HH02

Wind speed: 8,0 m/s
WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2433	2445	0	**25,09**	109,2	0,00	78,76	-	-	0,00	0,00	-
2	2557	2568	0	**24,42**	109,2	0,00	79,19	-	-	0,00	0,00	-
3	3082	3089	0	**21,87**	109,2	0,00	80,80	-	-	0,00	0,00	-
4	3545	3551	0	**19,91**	109,2	0,00	82,01	-	-	0,00	0,00	-
5	3384	3391	0	**20,56**	109,2	0,00	81,61	-	-	0,00	0,00	-
6	2650	2659	0	**23,94**	109,2	0,00	79,50	-	-	0,00	0,00	-
7	2732	2742	0	**23,53**	109,2	0,00	79,76	-	-	0,00	0,00	-
8	2804	2811	0	**23,18**	109,2	0,00	79,98	-	-	0,00	0,00	-
Sum				**32,16**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH01 RH01

Wind speed: 8,0 m/s
WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	3226	3234	0	**21,23**	109,2	0,00	81,20	-	-	0,00	0,00	-
2	2940	2950	0	**22,51**	109,2	0,00	80,40	-	-	0,00	0,00	-
3	2343	2353	0	**25,60**	109,2	0,00	78,43	-	-	0,00	0,00	-
4	1878	1891	0	**28,48**	109,2	0,00	76,53	-	-	0,00	0,00	-
5	2133	2145	0	**26,83**	109,2	0,00	77,63	-	-	0,00	0,00	-
6	2779	2788	0	**23,29**	109,2	0,00	79,91	-	-	0,00	0,00	-
7	2839	2848	0	**23,00**	109,2	0,00	80,09	-	-	0,00	0,00	-
8	3734	3740	0	**19,18**	109,2	0,00	82,46	-	-	0,00	0,00	-
Sum				**33,72**								

- Data undefined due to calculation with octave data

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13.11.2019 15:17/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance**Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

Noise sensitive area: RH02 RH02

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2822	2832	0	**23,08**	109,2	0,00	80,04	-	-	0,00	0,00	-
2	2565	2576	0	**24,38**	109,2	0,00	79,22	-	-	0,00	0,00	-
3	2001	2013	0	**27,67**	109,2	0,00	77,08	-	-	0,00	0,00	-
4	1604	1619	0	**30,47**	109,2	0,00	75,18	-	-	0,00	0,00	-
5	1924	1937	0	**28,17**	109,2	0,00	76,74	-	-	0,00	0,00	-
6	2488	2499	0	**24,79**	109,2	0,00	78,95	-	-	0,00	0,00	-
7	2614	2624	0	**24,13**	109,2	0,00	79,38	-	-	0,00	0,00	-
8	3622	3628	0	**19,61**	109,2	0,00	82,19	-	-	0,00	0,00	-
Sum				**35,42**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH03 RH03

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2743	2753	0	**23,47**	109,2	0,00	79,80	-	-	0,00	0,00	-
2	2491	2503	0	**24,77**	109,2	0,00	78,97	-	-	0,00	0,00	-
3	1936	1949	0	**28,09**	109,2	0,00	76,79	-	-	0,00	0,00	-
4	1556	1571	0	**30,84**	109,2	0,00	74,93	-	-	0,00	0,00	-
5	1888	1901	0	**28,41**	109,2	0,00	76,58	-	-	0,00	0,00	-
6	2433	2444	0	**25,09**	109,2	0,00	78,76	-	-	0,00	0,00	-
7	2572	2582	0	**24,35**	109,2	0,00	79,24	-	-	0,00	0,00	-
8	3600	3607	0	**19,69**	109,2	0,00	82,14	-	-	0,00	0,00	-
Sum				**35,75**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH04 RH04

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2472	2484	0	**24,87**	109,2	0,00	78,90	-	-	0,00	0,00	-
2	2242	2255	0	**26,17**	109,2	0,00	78,06	-	-	0,00	0,00	-
3	1720	1734	0	**29,59**	109,2	0,00	75,78	-	-	0,00	0,00	-
4	1408	1425	0	**32,05**	109,2	0,00	74,08	-	-	0,00	0,00	-
5	1778	1792	0	**29,18**	109,2	0,00	76,07	-	-	0,00	0,00	-
6	2248	2259	0	**26,15**	109,2	0,00	78,08	-	-	0,00	0,00	-
7	2433	2443	0	**25,10**	109,2	0,00	78,76	-	-	0,00	0,00	-
8	3525	3532	0	**19,99**	109,2	0,00	81,96	-	-	0,00	0,00	-
Sum				**36,90**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH05 RH05

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2172	2185	0	**26,59**	109,2	0,00	77,79	-	-	0,00	0,00	-
2	2027	2041	0	**27,48**	109,2	0,00	77,20	-	-	0,00	0,00	-
3	1641	1655	0	**30,18**	109,2	0,00	75,38	-	-	0,00	0,00	-
4	1528	1544	0	**31,06**	109,2	0,00	74,77	-	-	0,00	0,00	-
5	1940	1953	0	**28,06**	109,2	0,00	76,82	-	-	0,00	0,00	-
6	2216	2228	0	**26,33**	109,2	0,00	77,96	-	-	0,00	0,00	-
7	2499	2510	0	**24,73**	109,2	0,00	78,99	-	-	0,00	0,00	-
8	3690	3696	0	**19,34**	109,2	0,00	82,36	-	-	0,00	0,00	-
Sum				**36,80**								

- Data undefined due to calculation with octave data

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance**Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

Noise sensitive area: RH06 RH06

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	1711	1727	0	**29,65**	109,2	0,00	75,75	-	-	0,00	0,00	-
2	1765	1781	0	**29,25**	109,2	0,00	76,01	-	-	0,00	0,00	-
3	1718	1731	0	**29,62**	109,2	0,00	75,77	-	-	0,00	0,00	-
4	1933	1945	0	**28,12**	109,2	0,00	76,78	-	-	0,00	0,00	-
5	2320	2331	0	**25,73**	109,2	0,00	78,35	-	-	0,00	0,00	-
6	2250	2261	0	**26,14**	109,2	0,00	78,09	-	-	0,00	0,00	-
7	2654	2663	0	**23,92**	109,2	0,00	79,51	-	-	0,00	0,00	-
8	3906	3912	0	**18,53**	109,2	0,00	82,85	-	-	0,00	0,00	-
Sum				**36,46**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH07 RH07

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2017	2031	0	**27,55**	109,2	0,00	77,15	-	-	0,00	0,00	-
2	2396	2408	0	**25,29**	109,2	0,00	78,63	-	-	0,00	0,00	-
3	2869	2877	0	**22,86**	109,2	0,00	80,18	-	-	0,00	0,00	-
4	3372	3379	0	**20,61**	109,2	0,00	81,58	-	-	0,00	0,00	-
5	3613	3619	0	**19,64**	109,2	0,00	82,17	-	-	0,00	0,00	-
6	3091	3099	0	**21,83**	109,2	0,00	80,83	-	-	0,00	0,00	-
7	3536	3543	0	**19,95**	109,2	0,00	81,99	-	-	0,00	0,00	-
8	4608	4613	0	**16,17**	109,2	0,00	84,28	-	-	0,00	0,00	-
Sum				**32,04**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH08 RH08

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	1911	1925	0	**28,25**	109,2	0,00	76,69	-	-	0,00	0,00	-
2	2314	2326	0	**25,76**	109,2	0,00	78,33	-	-	0,00	0,00	-
3	2885	2893	0	**22,78**	109,2	0,00	80,23	-	-	0,00	0,00	-
4	3436	3442	0	**20,35**	109,2	0,00	81,74	-	-	0,00	0,00	-
5	3603	3610	0	**19,68**	109,2	0,00	82,15	-	-	0,00	0,00	-
6	2974	2983	0	**22,36**	109,2	0,00	80,49	-	-	0,00	0,00	-
7	3389	3396	0	**20,54**	109,2	0,00	81,62	-	-	0,00	0,00	-
8	4335	4339	0	**17,05**	109,2	0,00	83,75	-	-	0,00	0,00	-
Sum				**32,49**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH09 RH09

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	1952	1966	0	**27,98**	109,2	0,00	76,87	-	-	0,00	0,00	-
2	2354	2366	0	**25,53**	109,2	0,00	78,48	-	-	0,00	0,00	-
3	2949	2957	0	**22,48**	109,2	0,00	80,42	-	-	0,00	0,00	-
4	3509	3516	0	**20,05**	109,2	0,00	81,92	-	-	0,00	0,00	-
5	3651	3657	0	**19,49**	109,2	0,00	82,26	-	-	0,00	0,00	-
6	2990	2999	0	**22,29**	109,2	0,00	80,54	-	-	0,00	0,00	-
7	3390	3397	0	**20,54**	109,2	0,00	81,62	-	-	0,00	0,00	-
8	4281	4286	0	**17,23**	109,2	0,00	83,64	-	-	0,00	0,00	-
Sum				**32,27**								

- Data undefined due to calculation with octave data

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13.11.2019 15:17/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance**Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

Noise sensitive area: RH10 RH10

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2285	2297	0	**25,92**	109,2	0,00	78,22	-	-	0,00	0,00	-
2	2668	2678	0	**23,85**	109,2	0,00	79,56	-	-	0,00	0,00	-
3	3297	3303	0	**20,93**	109,2	0,00	81,38	-	-	0,00	0,00	-
4	3866	3872	0	**18,68**	109,2	0,00	82,76	-	-	0,00	0,00	-
5	3952	3958	0	**18,37**	109,2	0,00	82,95	-	-	0,00	0,00	-
6	3237	3245	0	**21,19**	109,2	0,00	81,22	-	-	0,00	0,00	-
7	3592	3599	0	**19,72**	109,2	0,00	82,12	-	-	0,00	0,00	-
8	4335	4340	0	**17,05**	109,2	0,00	83,75	-	-	0,00	0,00	-
Sum				**30,70**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH11 RH11

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2506	2516	0	**24,70**	109,2	0,00	79,02	-	-	0,00	0,00	-
2	2875	2884	0	**22,83**	109,2	0,00	80,20	-	-	0,00	0,00	-
3	3511	3517	0	**20,05**	109,2	0,00	81,92	-	-	0,00	0,00	-
4	4080	4086	0	**17,91**	109,2	0,00	83,23	-	-	0,00	0,00	-
5	4141	4147	0	**17,70**	109,2	0,00	83,35	-	-	0,00	0,00	-
6	3408	3415	0	**20,46**	109,2	0,00	81,67	-	-	0,00	0,00	-
7	3739	3746	0	**19,15**	109,2	0,00	82,47	-	-	0,00	0,00	-
8	4404	4409	0	**16,82**	109,2	0,00	83,89	-	-	0,00	0,00	-
Sum				**29,78**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH12 RH12

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5008	5014	0	**14,97**	109,2	0,00	85,00	-	-	0,00	0,00	-
2	4782	4789	0	**15,63**	109,2	0,00	84,60	-	-	0,00	0,00	-
3	4790	4795	0	**15,61**	109,2	0,00	84,62	-	-	0,00	0,00	-
4	4798	4803	0	**15,59**	109,2	0,00	84,63	-	-	0,00	0,00	-
5	4391	4397	0	**16,86**	109,2	0,00	83,86	-	-	0,00	0,00	-
6	4237	4243	0	**17,37**	109,2	0,00	83,55	-	-	0,00	0,00	-
7	3858	3865	0	**18,71**	109,2	0,00	82,74	-	-	0,00	0,00	-
8	2634	2642	0	**24,03**	109,2	0,00	79,44	-	-	0,00	0,00	-
Sum				**27,56**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH13 RH13

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4328	4334	0	**17,07**	109,2	0,00	83,74	-	-	0,00	0,00	-
2	3947	3954	0	**18,38**	109,2	0,00	82,94	-	-	0,00	0,00	-
3	3561	3567	0	**19,85**	109,2	0,00	82,05	-	-	0,00	0,00	-
4	3222	3229	0	**21,25**	109,2	0,00	81,18	-	-	0,00	0,00	-
5	2853	2861	0	**22,94**	109,2	0,00	80,13	-	-	0,00	0,00	-
6	3251	3258	0	**21,13**	109,2	0,00	81,26	-	-	0,00	0,00	-
7	2809	2817	0	**23,15**	109,2	0,00	80,00	-	-	0,00	0,00	-
8	1998	2008	0	**27,70**	109,2	0,00	77,05	-	-	0,00	0,00	-
Sum				**31,68**								

- Data undefined due to calculation with octave data

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Calculated:
13.11.2019 15:17/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance**Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

Noise sensitive area: RH14 RH14

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5023	5028	0	**14,92**	109,2	0,00	85,03	-	-	0,00	0,00	-
2	4656	4662	0	**16,01**	109,2	0,00	84,37	-	-	0,00	0,00	-
3	4317	4323	0	**17,10**	109,2	0,00	83,71	-	-	0,00	0,00	-
4	4012	4018	0	**18,15**	109,2	0,00	83,08	-	-	0,00	0,00	-
5	3631	3638	0	**19,57**	109,2	0,00	82,22	-	-	0,00	0,00	-
6	3961	3968	0	**18,33**	109,2	0,00	82,97	-	-	0,00	0,00	-
7	3510	3517	0	**20,05**	109,2	0,00	81,92	-	-	0,00	0,00	-
8	2523	2532	0	**24,61**	109,2	0,00	79,07	-	-	0,00	0,00	-
Sum				**28,67**								

- Data undefined due to calculation with octave data

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DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance

Noise calculation model:
ISO 9613-2 Finland
Wind speed (in 10 m height):
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:
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

WTG: FUTURE F180 5.6 MW 5600 180.0 !-!
Noise: Third octave SPL without serrated trailing edge – Mode 0

Source	Source/Date	Creator	Edited
F008_276_A17_EN Revision 00, 2019-05-21 assuming N163 5.7 MW, without serrations	9.7.2019	USER	13.11.2019 12:29

					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	210,0	8,0	109,2	No	89,5	95,7	99,9	103,2	104,6	102,2	93,4	84,6

Noise sensitive area: HH01 HH01
Predefined calculation standard:
Imission 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: HH02 HH02
Predefined calculation standard:
Imission 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: RH01 RH01
Predefined calculation standard:
Imission 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: RH02 RH02
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

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DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance
Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: RH03 RH03
Predefined calculation standard:
Imission 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: RH04 RH04
Predefined calculation standard:
Imission 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: RH05 RH05
Predefined calculation standard:
Imission 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: RH06 RH06
Predefined calculation standard:
Imission 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: RH07 RH07
Predefined calculation standard:
Imission 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: RH08 RH08
Predefined calculation standard:
Imission 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: RH09 RH09
Predefined calculation standard:
Imission 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: RH10 RH10
Predefined calculation standard:
Imission 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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13.11.2019 15:17/3.3.247

DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance

Noise sensitive area: RH11 RH11

Predefined calculation standard:
Imission 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: RH12 RH12

Predefined calculation standard:
Imission 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: RH13 RH13

Predefined calculation standard:
Imission 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: RH14 RH14

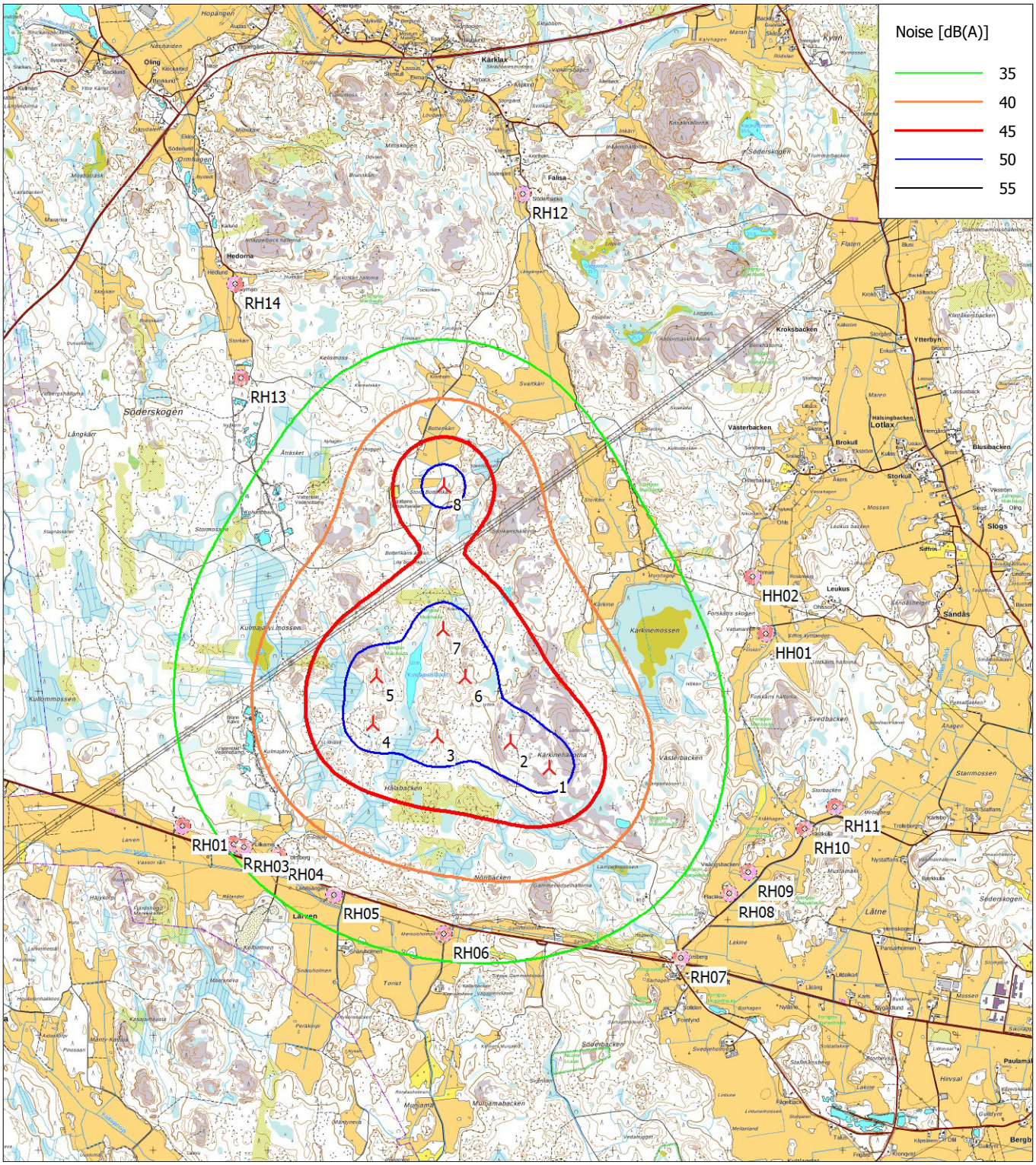
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

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

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DECIBEL - Map 8,0 m/s

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance



Map: Söde_Background map , Print scale 1:50 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 254 678 North: 7 012 558

New WTG Noise sensitive area

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

Bilaga 3

ISO 9613-2 modellering, kumulativa konsekvenser

Project:
Söderskogen

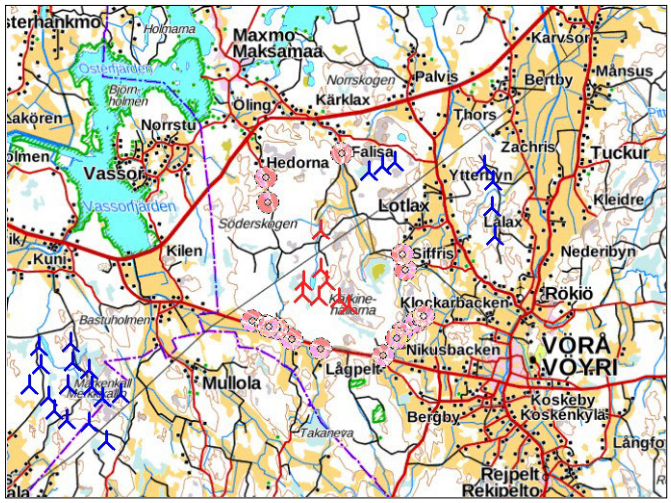
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Calculated:
18.11.2019 12:44/3.3.247

DECIBEL - Main Result

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)

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

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89



Scale 1:250 000

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)]	Pure tones
1	255445	7011327	46,5	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
2	255108	7011549	50,2	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
3	254469	7011599	26,6	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
4	253911	7011714	27,9	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
5	253946	7012128	33,9	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
6	254714	7012124	38,4	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
7	254523	7012536	35,6	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
8	254528	7013790	19,2	FUTURE F180 5.6 MW 5600 180.0...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge – Mode 0	8,0	109,2	No
Lotlax 1	256101	7015730	27,0	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	122,0	USER	Mode 0	8,0	106,5	No
Lotlax 2	256560	7015928	33,2	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	122,0	USER	Mode 0	8,0	106,5	No
Lotlax 3	256964	7016058	30,0	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	122,0	USER	Mode 0	8,0	106,5	No
Lålax 1	260278	7013601	21,1	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	142,0	USER	Mode 0	8,0	106,5	No
Lålax 2	260174	7014579	28,5	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	142,0	USER	Mode 0	8,0	106,5	No
Lålax 3	260216	7015429	20,8	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	142,0	USER	Mode 0	8,0	106,5	No
Lålax 4	259924	7015937	27,7	Prokon P3000 3030 116.7 !O! hub...	No	Prokon	P3000-3030	3030	116,7	142,0	USER	Mode 0	8,0	106,5	No
Märkenkall 01	247894	7008402	21,5	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 02	247294	7008259	25,0	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 03	246855	7007441	24,7	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 04	247445	7006854	25,9	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 05	246950	7008670	26,1	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 06	246864	7009208	21,0	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 07	246326	7009461	17,9	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 08	246247	7010081	20,5	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 09	246160	7008681	29,9	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 10	246126	7007532	23,9	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 11	245712	7007870	13,7	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 12	245517	7008318	15,8	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 13	245281	7009344	17,9	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 14	245200	7009948	18,9	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No
Märkenkall 15	244881	7008680	14,1	VESTAS V136-3.45 3rdOc 3450 13...	Yes	VESTAS	V136-3.45 3rdOc-3450	3450	136,0	172,0	USER	Mode 0 - 3.45MW - clean blades	8,0	108,2	No

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z [m]	Imission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	2 dB penalty applied for one or more WTGs
HH01	HH01	257331	7012499	17,5	4,0	40,0	33,6	No
HH02	HH02	257219	7012995	17,0	4,0	40,0	33,7	No
RH01	RH01	252257	7010823	13,1	4,0	40,0	34,4	No
RH02	RH02	252700	7010660	15,5	4,0	40,0	35,9	No
RH03	RH03	252789	7010635	14,7	4,0	40,0	36,1	No
RH04	RH04	253090	7010568	15,5	4,0	40,0	37,2	No
RH05	RH05	253574	7010222	14,2	4,0	40,0	37,1	No
RH06	RH06	254528	7009881	18,4	4,0	40,0	36,7	No
RH07	RH07	256594	7009667	21,5	4,0	40,0	32,5	No
RH08	RH08	257015	7010236	19,0	4,0	40,0	33,0	No
RH09	RH09	257177	7010423	17,1	4,0	40,0	32,8	No
RH10	RH10	257669	7010798	18,8	4,0	40,0	31,6	No
RH11	RH11	257929	7010986	18,5	4,0	40,0	30,9	No
RH12	RH12	255219	7016333	14,3	4,0	40,0	36,3	No
RH13	RH13	252762	7014727	25,0	4,0	40,0	32,6	No
RH14	RH14	252714	7015547	21,4	4,0	40,0	30,2	No

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18.11.2019 12:44/3.3.247

DECIBEL - Main Result

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)

Distances (m)

WTG	HH01	HH02	RH01	RH02	RH03	RH04	RH05	RH06	RH07	RH08	RH09	RH10	RH11	RH12	RH13	RH14
1	2219	2433	3226	2822	2743	2472	2172	1711	2017	1911	1952	2285	2506	5008	4328	5023
2	2416	2557	2940	2565	2491	2242	2027	1765	2396	2314	2354	2668	2875	4782	3947	4656
3	2998	3082	2343	2001	1936	1720	1641	1718	2869	2885	2949	3297	3511	4790	3561	4317
4	3506	3545	1878	1604	1556	1408	1528	1933	3372	3436	3509	3866	4080	4798	3222	4012
5	3403	3384	2133	1924	1888	1778	1940	2320	3613	3603	3651	3952	4141	4391	2853	3631
6	2641	2650	2779	2488	2433	2248	2216	2250	3091	2974	2990	3237	3408	4237	3251	3961
7	2806	2732	2839	2614	2572	2433	2499	2654	3536	3389	3390	3592	3739	3858	2809	3510
8	3084	2804	3734	3622	3600	3525	3690	3906	4608	4335	4281	4335	4404	2634	1998	2523
Lotlax 1	3455	2953	6229	6101	6073	5971	6056	6053	6079	5566	5411	5172	5080	1068	3484	3389
Lotlax 2	3512	3004	6672	6526	6495	6380	6436	6375	6257	5706	5536	5245	5125	1400	3980	3862
Lotlax 3	3576	3072	7035	6874	6840	6714	6744	6636	6397	5818	5635	5304	5159	1765	4404	4277
Lålax 1	3144	3117	8483	8123	8050	7796	7503	6844	5386	4684	4438	3827	3513	5746	7594	7805
Lålax 2	3520	3351	8757	8433	8367	8135	7903	7340	6074	5367	5121	4533	4234	5253	7408	7517
Lålax 3	4109	3859	9190	8895	8834	8620	8434	7940	6801	6096	5852	5282	4994	5075	7481	7498
Lålax 4	4304	3994	9210	8940	8884	8685	8537	8106	7095	6396	6156	5608	5334	4719	7258	7215
Märkenkall 01	10280	10387	4986	5307	5376	5625	5960	6792	8785	9297	9493	10058	10355	10789	7976	8612
Märkenkall 02	10888	10989	5582	5911	5982	6235	6574	7408	9399	9913	10109	10674	10971	11306	8463	9076
Märkenkall 03	11625	11750	6368	6668	6733	6970	7266	8046	9983	10530	10736	11315	11619	12199	9373	9994
Märkenkall 04	11376	11535	6233	6484	6541	6753	6988	7697	9565	10143	10358	10951	11261	12251	9493	10157
Märkenkall 05	11057	11134	5723	6081	6156	6422	6798	7669	9689	10179	10368	10921	11213	11266	8388	8966
Märkenkall 06	10964	11018	5625	6010	6089	6368	6781	7688	9734	10196	10376	10914	11199	10973	8072	8619
Märkenkall 07	11408	11443	6081	6481	6563	6849	7282	8207	10263	10709	10885	11414	11694	11231	8310	8816
Märkenkall 08	11336	11344	6051	6475	6560	6855	7323	8278	10348	10761	10927	11437	11709	10928	7996	8461
Märkenkall 09	11797	11862	6457	6828	6905	7177	7567	8448	10473	10958	11145	11694	11984	11850	8946	9485
Märkenkall 10	12248	12356	6953	7275	7344	7592	7913	8718	10676	11212	11414	11988	12289	12646	9781	10367
Märkenkall 11	12498	12587	7175	7519	7592	7850	8200	9036	11022	11540	11737	12302	12599	12719	9827	10383
Märkenkall 12	12523	12593	7185	7550	7626	7894	8272	9139	11151	11649	11840	12394	12686	12576	9666	10193
Märkenkall 13	12447	12475	7125	7530	7612	7899	8333	9256	11310	11759	11936	12464	12745	12141	9210	9674
Märkenkall 14	12387	12390	7105	7529	7614	7909	8372	9322	11389	11810	11977	12489	12762	11872	8939	9364
Märkenkall 15	13013	13061	7675	8060	8139	8417	8822	9715	11746	12225	12409	12953	13241	12853	9926	10409

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Calculated:
18.11.2019 12:44/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 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: HH01 HH01

Wind speed: 8,0 m/s
WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2219	2231	0	**26,31**	109,2	0,00	77,97	-	-	0,00	0,00	-
2	2416	2427	0	**25,18**	109,2	0,00	78,70	-	-	0,00	0,00	-
3	2998	3005	0	**22,26**	109,2	0,00	80,56	-	-	0,00	0,00	-
4	3506	3513	0	**20,06**	109,2	0,00	81,91	-	-	0,00	0,00	-
5	3403	3410	0	**20,48**	109,2	0,00	81,66	-	-	0,00	0,00	-
6	2641	2651	0	**23,99**	109,2	0,00	79,47	-	-	0,00	0,00	-
7	2806	2815	0	**23,16**	109,2	0,00	79,99	-	-	0,00	0,00	-
8	3084	3091	0	**21,87**	109,2	0,00	80,80	-	-	0,00	0,00	-
Lotlax 1	3455	3457	0	**18,71**	106,5	0,00	81,77	-	-	0,00	0,00	-
Lotlax 2	3512	3515	0	**18,49**	106,5	0,00	81,92	-	-	0,00	0,00	-
Lotlax 3	3576	3578	0	**18,25**	106,5	0,00	82,07	-	-	0,00	0,00	-
Lålax 1	3144	3148	0	**19,96**	106,5	0,00	80,96	-	-	0,00	0,00	-
Lålax 2	3520	3524	0	**18,46**	106,5	0,00	81,94	-	-	0,00	0,00	-
Lålax 3	4109	4112	0	**16,38**	106,5	0,00	83,28	-	-	0,00	0,00	-
Lålax 4	4304	4306	0	**15,76**	106,5	0,00	83,68	-	-	0,00	0,00	-
Märkenkall 01	10280	10282	0	**7,73**	108,2	0,00	91,24	-	-	0,00	0,00	-
Märkenkall 02	10888	10889	0	**7,01**	108,2	0,00	91,74	-	-	0,00	0,00	-
Märkenkall 03	11625	11626	0	**6,18**	108,2	0,00	92,31	-	-	0,00	0,00	-
Märkenkall 04	11376	11377	0	**6,45**	108,2	0,00	92,12	-	-	0,00	0,00	-
Märkenkall 05	11057	11058	0	**6,81**	108,2	0,00	91,87	-	-	0,00	0,00	-
Märkenkall 06	10964	10966	0	**6,92**	108,2	0,00	91,80	-	-	0,00	0,00	-
Märkenkall 07	11408	11410	0	**6,42**	108,2	0,00	92,15	-	-	0,00	0,00	-
Märkenkall 08	11336	11338	0	**6,50**	108,2	0,00	92,09	-	-	0,00	0,00	-
Märkenkall 09	11797	11798	0	**5,99**	108,2	0,00	92,44	-	-	0,00	0,00	-
Märkenkall 10	12248	12249	0	**5,51**	108,2	0,00	92,76	-	-	0,00	0,00	-
Märkenkall 11	12498	12499	0	**5,25**	108,2	0,00	92,94	-	-	0,00	0,00	-
Märkenkall 12	12523	12524	0	**5,23**	108,2	0,00	92,95	-	-	0,00	0,00	-
Märkenkall 13	12447	12448	0	**5,31**	108,2	0,00	92,90	-	-	0,00	0,00	-
Märkenkall 14	12387	12388	0	**5,37**	108,2	0,00	92,86	-	-	0,00	0,00	-
Märkenkall 15	13013	13014	0	**4,74**	108,2	0,00	93,29	-	-	0,00	0,00	-
Sum				**33,57**								

- Data undefined due to calculation with octave data

Noise sensitive area: HH02 HH02

Wind speed: 8,0 m/s
WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2433	2445	0	**25,09**	109,2	0,00	78,76	-	-	0,00	0,00	-
2	2557	2568	0	**24,42**	109,2	0,00	79,19	-	-	0,00	0,00	-
3	3082	3089	0	**21,87**	109,2	0,00	80,80	-	-	0,00	0,00	-
4	3545	3551	0	**19,91**	109,2	0,00	82,01	-	-	0,00	0,00	-
5	3384	3391	0	**20,56**	109,2	0,00	81,61	-	-	0,00	0,00	-

To be continued on next page...

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18.11.2019 12:44/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
6	2650	2659	0	**23,94**	109,2	0,00	79,50	-	-	0,00	0,00	-
7	2732	2742	0	**23,53**	109,2	0,00	79,76	-	-	0,00	0,00	-
8	2804	2811	0	**23,18**	109,2	0,00	79,98	-	-	0,00	0,00	-
Lotlax 1	2953	2955	0	**20,78**	106,5	0,00	80,41	-	-	0,00	0,00	-
Lotlax 2	3004	3007	0	**20,56**	106,5	0,00	80,56	-	-	0,00	0,00	-
Lotlax 3	3072	3074	0	**20,27**	106,5	0,00	80,76	-	-	0,00	0,00	-
Lålax 1	3117	3120	0	**20,07**	106,5	0,00	80,88	-	-	0,00	0,00	-
Lålax 2	3351	3354	0	**19,11**	106,5	0,00	81,51	-	-	0,00	0,00	-
Lålax 3	3859	3861	0	**17,23**	106,5	0,00	82,73	-	-	0,00	0,00	-
Lålax 4	3994	3997	0	**16,76**	106,5	0,00	83,03	-	-	0,00	0,00	-
Märkenkall 01	10387	10389	0	**7,60**	108,2	0,00	91,33	-	-	0,00	0,00	-
Märkenkall 02	10989	10990	0	**6,89**	108,2	0,00	91,82	-	-	0,00	0,00	-
Märkenkall 03	11750	11751	0	**6,04**	108,2	0,00	92,40	-	-	0,00	0,00	-
Märkenkall 04	11535	11536	0	**6,28**	108,2	0,00	92,24	-	-	0,00	0,00	-
Märkenkall 05	11134	11136	0	**6,72**	108,2	0,00	91,93	-	-	0,00	0,00	-
Märkenkall 06	11018	11019	0	**6,86**	108,2	0,00	91,84	-	-	0,00	0,00	-
Märkenkall 07	11443	11445	0	**6,38**	108,2	0,00	92,17	-	-	0,00	0,00	-
Märkenkall 08	11344	11345	0	**6,49**	108,2	0,00	92,10	-	-	0,00	0,00	-
Märkenkall 09	11862	11863	0	**5,92**	108,2	0,00	92,48	-	-	0,00	0,00	-
Märkenkall 10	12356	12357	0	**5,40**	108,2	0,00	92,84	-	-	0,00	0,00	-
Märkenkall 11	12587	12588	0	**5,16**	108,2	0,00	93,00	-	-	0,00	0,00	-
Märkenkall 12	12593	12594	0	**5,16**	108,2	0,00	93,00	-	-	0,00	0,00	-
Märkenkall 13	12475	12476	0	**5,28**	108,2	0,00	92,92	-	-	0,00	0,00	-
Märkenkall 14	12390	12391	0	**5,36**	108,2	0,00	92,86	-	-	0,00	0,00	-
Märkenkall 15	13061	13062	0	**4,69**	108,2	0,00	93,32	-	-	0,00	0,00	-
Sum				**33,67**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH01 RH01

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	3226	3234	0	**21,23**	109,2	0,00	81,20	-	-	0,00	0,00	-
2	2940	2950	0	**22,51**	109,2	0,00	80,40	-	-	0,00	0,00	-
3	2343	2353	0	**25,60**	109,2	0,00	78,43	-	-	0,00	0,00	-
4	1878	1891	0	**28,48**	109,2	0,00	76,53	-	-	0,00	0,00	-
5	2133	2145	0	**26,83**	109,2	0,00	77,63	-	-	0,00	0,00	-
6	2779	2788	0	**23,29**	109,2	0,00	79,91	-	-	0,00	0,00	-
7	2839	2848	0	**23,00**	109,2	0,00	80,09	-	-	0,00	0,00	-
8	3734	3740	0	**19,18**	109,2	0,00	82,46	-	-	0,00	0,00	-
Lotlax 1	6229	6231	0	**11,52**	106,5	0,00	86,89	-	-	0,00	0,00	-
Lotlax 2	6672	6674	0	**10,67**	106,5	0,00	87,49	-	-	0,00	0,00	-
Lotlax 3	7035	7037	0	**10,01**	106,5	0,00	87,95	-	-	0,00	0,00	-
Lålax 1	8483	8484	0	**7,53**	106,5	0,00	89,57	-	-	0,00	0,00	-
Lålax 2	8757	8758	0	**7,14**	106,5	0,00	89,85	-	-	0,00	0,00	-
Lålax 3	9190	9191	0	**6,54**	106,5	0,00	90,27	-	-	0,00	0,00	-
Lålax 4	9210	9211	0	**6,51**	106,5	0,00	90,29	-	-	0,00	0,00	-
Märkenkall 01	4986	4989	0	**16,48**	108,2	0,00	84,96	-	-	0,00	0,00	-
Märkenkall 02	5582	5585	0	**15,09**	108,2	0,00	85,94	-	-	0,00	0,00	-
Märkenkall 03	6368	6371	0	**13,56**	108,2	0,00	87,08	-	-	0,00	0,00	-
Märkenkall 04	6233	6235	0	**13,82**	108,2	0,00	86,90	-	-	0,00	0,00	-
Märkenkall 05	5723	5725	0	**14,81**	108,2	0,00	86,16	-	-	0,00	0,00	-
Märkenkall 06	5625	5628	0	**15,01**	108,2	0,00	86,01	-	-	0,00	0,00	-
Märkenkall 07	6081	6083	0	**14,11**	108,2	0,00	86,68	-	-	0,00	0,00	-
Märkenkall 08	6051	6053	0	**14,16**	108,2	0,00	86,64	-	-	0,00	0,00	-
Märkenkall 09	6457	6460	0	**13,40**	108,2	0,00	87,20	-	-	0,00	0,00	-
Märkenkall 10	6953	6955	0	**12,52**	108,2	0,00	87,85	-	-	0,00	0,00	-
Märkenkall 11	7175	7177	0	**12,15**	108,2	0,00	88,12	-	-	0,00	0,00	-
Märkenkall 12	7185	7187	0	**12,13**	108,2	0,00	88,13	-	-	0,00	0,00	-
Märkenkall 13	7125	7128	0	**12,23**	108,2	0,00	88,06	-	-	0,00	0,00	-
Märkenkall 14	7105	7108	0	**12,27**	108,2	0,00	88,03	-	-	0,00	0,00	-
Märkenkall 15	7675	7677	0	**11,34**	108,2	0,00	88,70	-	-	0,00	0,00	-
Sum				**34,43**								

- Data undefined due to calculation with octave data

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

Noise sensitive area: RH02 RH02

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2822	2832	0	**23,08**	109,2	0,00	80,04	-	-	0,00	0,00	-
2	2565	2576	0	**24,38**	109,2	0,00	79,22	-	-	0,00	0,00	-
3	2001	2013	0	**27,67**	109,2	0,00	77,08	-	-	0,00	0,00	-
4	1604	1619	0	**30,47**	109,2	0,00	75,18	-	-	0,00	0,00	-
5	1924	1937	0	**28,17**	109,2	0,00	76,74	-	-	0,00	0,00	-
6	2488	2499	0	**24,79**	109,2	0,00	78,95	-	-	0,00	0,00	-
7	2614	2624	0	**24,13**	109,2	0,00	79,38	-	-	0,00	0,00	-
8	3622	3628	0	**19,61**	109,2	0,00	82,19	-	-	0,00	0,00	-
Lotlax 1	6101	6102	0	**11,78**	106,5	0,00	86,71	-	-	0,00	0,00	-
Lotlax 2	6526	6527	0	**10,94**	106,5	0,00	87,29	-	-	0,00	0,00	-
Lotlax 3	6874	6875	0	**10,30**	106,5	0,00	87,75	-	-	0,00	0,00	-
Lålax 1	8123	8124	0	**8,06**	106,5	0,00	89,20	-	-	0,00	0,00	-
Lålax 2	8433	8434	0	**7,60**	106,5	0,00	89,52	-	-	0,00	0,00	-
Lålax 3	8895	8896	0	**6,94**	106,5	0,00	89,98	-	-	0,00	0,00	-
Lålax 4	8940	8941	0	**6,88**	106,5	0,00	90,03	-	-	0,00	0,00	-
Märkenkall 01	5307	5309	0	**15,67**	108,2	0,00	85,50	-	-	0,00	0,00	-
Märkenkall 02	5911	5914	0	**14,43**	108,2	0,00	86,44	-	-	0,00	0,00	-
Märkenkall 03	6668	6671	0	**13,02**	108,2	0,00	87,48	-	-	0,00	0,00	-
Märkenkall 04	6484	6487	0	**13,35**	108,2	0,00	87,24	-	-	0,00	0,00	-
Märkenkall 05	6081	6083	0	**14,11**	108,2	0,00	86,68	-	-	0,00	0,00	-
Märkenkall 06	6010	6012	0	**14,24**	108,2	0,00	86,58	-	-	0,00	0,00	-
Märkenkall 07	6481	6484	0	**13,36**	108,2	0,00	87,24	-	-	0,00	0,00	-
Märkenkall 08	6475	6477	0	**13,37**	108,2	0,00	87,23	-	-	0,00	0,00	-
Märkenkall 09	6828	6831	0	**12,74**	108,2	0,00	87,69	-	-	0,00	0,00	-
Märkenkall 10	7275	7277	0	**11,98**	108,2	0,00	88,24	-	-	0,00	0,00	-
Märkenkall 11	7519	7521	0	**11,59**	108,2	0,00	88,53	-	-	0,00	0,00	-
Märkenkall 12	7550	7552	0	**11,54**	108,2	0,00	88,56	-	-	0,00	0,00	-
Märkenkall 13	7530	7532	0	**11,57**	108,2	0,00	88,54	-	-	0,00	0,00	-
Märkenkall 14	7529	7531	0	**11,57**	108,2	0,00	88,54	-	-	0,00	0,00	-
Märkenkall 15	8060	8062	0	**10,74**	108,2	0,00	89,13	-	-	0,00	0,00	-
Sum				**35,85**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH03 RH03

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2743	2753	0	**23,47**	109,2	0,00	79,80	-	-	0,00	0,00	-
2	2491	2503	0	**24,77**	109,2	0,00	78,97	-	-	0,00	0,00	-
3	1936	1949	0	**28,09**	109,2	0,00	76,79	-	-	0,00	0,00	-
4	1556	1571	0	**30,84**	109,2	0,00	74,93	-	-	0,00	0,00	-
5	1888	1901	0	**28,41**	109,2	0,00	76,58	-	-	0,00	0,00	-
6	2433	2444	0	**25,09**	109,2	0,00	78,76	-	-	0,00	0,00	-
7	2572	2582	0	**24,35**	109,2	0,00	79,24	-	-	0,00	0,00	-
8	3600	3607	0	**19,69**	109,2	0,00	82,14	-	-	0,00	0,00	-
Lotlax 1	6073	6075	0	**11,83**	106,5	0,00	86,67	-	-	0,00	0,00	-
Lotlax 2	6495	6496	0	**11,00**	106,5	0,00	87,25	-	-	0,00	0,00	-
Lotlax 3	6840	6841	0	**10,36**	106,5	0,00	87,70	-	-	0,00	0,00	-
Lålax 1	8050	8051	0	**8,18**	106,5	0,00	89,12	-	-	0,00	0,00	-
Lålax 2	8367	8368	0	**7,70**	106,5	0,00	89,45	-	-	0,00	0,00	-
Lålax 3	8834	8836	0	**7,03**	106,5	0,00	89,92	-	-	0,00	0,00	-
Lålax 4	8884	8885	0	**6,96**	106,5	0,00	89,97	-	-	0,00	0,00	-
Märkenkall 01	5376	5379	0	**15,52**	108,2	0,00	85,61	-	-	0,00	0,00	-
Märkenkall 02	5982	5984	0	**14,30**	108,2	0,00	86,54	-	-	0,00	0,00	-
Märkenkall 03	6733	6736	0	**12,91**	108,2	0,00	87,57	-	-	0,00	0,00	-
Märkenkall 04	6541	6543	0	**13,25**	108,2	0,00	87,32	-	-	0,00	0,00	-
Märkenkall 05	6156	6158	0	**13,96**	108,2	0,00	86,79	-	-	0,00	0,00	-
Märkenkall 06	6089	6092	0	**14,09**	108,2	0,00	86,70	-	-	0,00	0,00	-
Märkenkall 07	6563	6566	0	**13,21**	108,2	0,00	87,35	-	-	0,00	0,00	-
Märkenkall 08	6560	6562	0	**13,22**	108,2	0,00	87,34	-	-	0,00	0,00	-
Märkenkall 09	6905	6908	0	**12,61**	108,2	0,00	87,79	-	-	0,00	0,00	-
Märkenkall 10	7344	7346	0	**11,87**	108,2	0,00	88,32	-	-	0,00	0,00	-

To be continued on next page...

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18.11.2019 12:44/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
Märkenkall 11	7592	7594	0	**11,47**	108,2	0,00	88,61	-	-	0,00	0,00	-
Märkenkall 12	7626	7628	0	**11,42**	108,2	0,00	88,65	-	-	0,00	0,00	-
Märkenkall 13	7612	7614	0	**11,44**	108,2	0,00	88,63	-	-	0,00	0,00	-
Märkenkall 14	7614	7616	0	**11,43**	108,2	0,00	88,63	-	-	0,00	0,00	-
Märkenkall 15	8139	8141	0	**10,62**	108,2	0,00	89,21	-	-	0,00	0,00	-
Sum				**36,15**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH04 RH04

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2472	2484	0	**24,87**	109,2	0,00	78,90	-	-	0,00	0,00	-
2	2242	2255	0	**26,17**	109,2	0,00	78,06	-	-	0,00	0,00	-
3	1720	1734	0	**29,59**	109,2	0,00	75,78	-	-	0,00	0,00	-
4	1408	1425	0	**32,05**	109,2	0,00	74,08	-	-	0,00	0,00	-
5	1778	1792	0	**29,18**	109,2	0,00	76,07	-	-	0,00	0,00	-
6	2248	2259	0	**26,15**	109,2	0,00	78,08	-	-	0,00	0,00	-
7	2433	2443	0	**25,10**	109,2	0,00	78,76	-	-	0,00	0,00	-
8	3525	3532	0	**19,99**	109,2	0,00	81,96	-	-	0,00	0,00	-
Lotlax 1	5971	5973	0	**12,04**	106,5	0,00	86,52	-	-	0,00	0,00	-
Lotlax 2	6380	6382	0	**11,22**	106,5	0,00	87,10	-	-	0,00	0,00	-
Lotlax 3	6714	6716	0	**10,59**	106,5	0,00	87,54	-	-	0,00	0,00	-
Lålax 1	7796	7798	0	**8,57**	106,5	0,00	88,84	-	-	0,00	0,00	-
Lålax 2	8135	8136	0	**8,05**	106,5	0,00	89,21	-	-	0,00	0,00	-
Lålax 3	8620	8621	0	**7,33**	106,5	0,00	89,71	-	-	0,00	0,00	-
Lålax 4	8685	8686	0	**7,24**	106,5	0,00	89,78	-	-	0,00	0,00	-
Märkenkall 01	5625	5628	0	**15,01**	108,2	0,00	86,01	-	-	0,00	0,00	-
Märkenkall 02	6235	6237	0	**13,81**	108,2	0,00	86,90	-	-	0,00	0,00	-
Märkenkall 03	6970	6973	0	**12,50**	108,2	0,00	87,87	-	-	0,00	0,00	-
Märkenkall 04	6753	6755	0	**12,87**	108,2	0,00	87,59	-	-	0,00	0,00	-
Märkenkall 05	6422	6425	0	**13,47**	108,2	0,00	87,16	-	-	0,00	0,00	-
Märkenkall 06	6368	6371	0	**13,57**	108,2	0,00	87,08	-	-	0,00	0,00	-
Märkenkall 07	6849	6851	0	**12,70**	108,2	0,00	87,72	-	-	0,00	0,00	-
Märkenkall 08	6855	6858	0	**12,69**	108,2	0,00	87,72	-	-	0,00	0,00	-
Märkenkall 09	7177	7179	0	**12,15**	108,2	0,00	88,12	-	-	0,00	0,00	-
Märkenkall 10	7592	7594	0	**11,47**	108,2	0,00	88,61	-	-	0,00	0,00	-
Märkenkall 11	7850	7852	0	**11,06**	108,2	0,00	88,90	-	-	0,00	0,00	-
Märkenkall 12	7894	7896	0	**11,00**	108,2	0,00	88,95	-	-	0,00	0,00	-
Märkenkall 13	7899	7900	0	**10,99**	108,2	0,00	88,95	-	-	0,00	0,00	-
Märkenkall 14	7909	7910	0	**10,97**	108,2	0,00	88,96	-	-	0,00	0,00	-
Märkenkall 15	8417	8419	0	**10,21**	108,2	0,00	89,51	-	-	0,00	0,00	-
Sum				**37,18**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH05 RH05

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2172	2185	0	**26,59**	109,2	0,00	77,79	-	-	0,00	0,00	-
2	2027	2041	0	**27,48**	109,2	0,00	77,20	-	-	0,00	0,00	-
3	1641	1655	0	**30,18**	109,2	0,00	75,38	-	-	0,00	0,00	-
4	1528	1544	0	**31,06**	109,2	0,00	74,77	-	-	0,00	0,00	-
5	1940	1953	0	**28,06**	109,2	0,00	76,82	-	-	0,00	0,00	-
6	2216	2228	0	**26,33**	109,2	0,00	77,96	-	-	0,00	0,00	-
7	2499	2510	0	**24,73**	109,2	0,00	78,99	-	-	0,00	0,00	-
8	3690	3696	0	**19,34**	109,2	0,00	82,36	-	-	0,00	0,00	-
Lotlax 1	6056	6057	0	**11,87**	106,5	0,00	86,65	-	-	0,00	0,00	-
Lotlax 2	6436	6437	0	**11,12**	106,5	0,00	87,17	-	-	0,00	0,00	-
Lotlax 3	6744	6746	0	**10,54**	106,5	0,00	87,58	-	-	0,00	0,00	-
Lålax 1	7503	7504	0	**9,04**	106,5	0,00	88,51	-	-	0,00	0,00	-
Lålax 2	7903	7905	0	**8,40**	106,5	0,00	88,96	-	-	0,00	0,00	-

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18.11.2019 12:44/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
Lålax 3	8434	8435	0	**7,60**	106,5	0,00	89,52	-	-	0,00	0,00	-
Lålax 4	8537	8539	0	**7,45**	106,5	0,00	89,63	-	-	0,00	0,00	-
Märkenkall 01	5960	5962	0	**14,34**	108,2	0,00	86,51	-	-	0,00	0,00	-
Märkenkall 02	6574	6577	0	**13,19**	108,2	0,00	87,36	-	-	0,00	0,00	-
Märkenkall 03	7266	7268	0	**12,00**	108,2	0,00	88,23	-	-	0,00	0,00	-
Märkenkall 04	6988	6990	0	**12,46**	108,2	0,00	87,89	-	-	0,00	0,00	-
Märkenkall 05	6798	6800	0	**12,79**	108,2	0,00	87,65	-	-	0,00	0,00	-
Märkenkall 06	6781	6783	0	**12,82**	108,2	0,00	87,63	-	-	0,00	0,00	-
Märkenkall 07	7282	7284	0	**11,97**	108,2	0,00	88,25	-	-	0,00	0,00	-
Märkenkall 08	7323	7325	0	**11,90**	108,2	0,00	88,30	-	-	0,00	0,00	-
Märkenkall 09	7567	7569	0	**11,51**	108,2	0,00	88,58	-	-	0,00	0,00	-
Märkenkall 10	7913	7915	0	**10,97**	108,2	0,00	88,97	-	-	0,00	0,00	-
Märkenkall 11	8200	8202	0	**10,53**	108,2	0,00	89,28	-	-	0,00	0,00	-
Märkenkall 12	8272	8274	0	**10,42**	108,2	0,00	89,35	-	-	0,00	0,00	-
Märkenkall 13	8333	8335	0	**10,34**	108,2	0,00	89,42	-	-	0,00	0,00	-
Märkenkall 14	8372	8374	0	**10,28**	108,2	0,00	89,46	-	-	0,00	0,00	-
Märkenkall 15	8822	8823	0	**9,63**	108,2	0,00	89,91	-	-	0,00	0,00	-
Sum				**37,06**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH06 RH06

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	1711	1727	0	**29,65**	109,2	0,00	75,75	-	-	0,00	0,00	-
2	1765	1781	0	**29,25**	109,2	0,00	76,01	-	-	0,00	0,00	-
3	1718	1731	0	**29,62**	109,2	0,00	75,77	-	-	0,00	0,00	-
4	1933	1945	0	**28,12**	109,2	0,00	76,78	-	-	0,00	0,00	-
5	2320	2331	0	**25,73**	109,2	0,00	78,35	-	-	0,00	0,00	-
6	2250	2261	0	**26,14**	109,2	0,00	78,09	-	-	0,00	0,00	-
7	2654	2663	0	**23,92**	109,2	0,00	79,51	-	-	0,00	0,00	-
8	3906	3912	0	**18,53**	109,2	0,00	82,85	-	-	0,00	0,00	-
Lotlax 1	6053	6054	0	**11,87**	106,5	0,00	86,64	-	-	0,00	0,00	-
Lotlax 2	6375	6377	0	**11,23**	106,5	0,00	87,09	-	-	0,00	0,00	-
Lotlax 3	6636	6637	0	**10,74**	106,5	0,00	87,44	-	-	0,00	0,00	-
Lålax 1	6844	6845	0	**10,17**	106,5	0,00	87,71	-	-	0,00	0,00	-
Lålax 2	7340	7342	0	**9,31**	106,5	0,00	88,32	-	-	0,00	0,00	-
Lålax 3	7940	7942	0	**8,34**	106,5	0,00	89,00	-	-	0,00	0,00	-
Lålax 4	8106	8107	0	**8,09**	106,5	0,00	89,18	-	-	0,00	0,00	-
Märkenkall 01	6792	6794	0	**12,80**	108,2	0,00	87,64	-	-	0,00	0,00	-
Märkenkall 02	7408	7411	0	**11,76**	108,2	0,00	88,40	-	-	0,00	0,00	-
Märkenkall 03	8046	8048	0	**10,76**	108,2	0,00	89,11	-	-	0,00	0,00	-
Märkenkall 04	7697	7699	0	**11,30**	108,2	0,00	88,73	-	-	0,00	0,00	-
Märkenkall 05	7669	7671	0	**11,35**	108,2	0,00	88,70	-	-	0,00	0,00	-
Märkenkall 06	7688	7690	0	**11,32**	108,2	0,00	88,72	-	-	0,00	0,00	-
Märkenkall 07	8207	8209	0	**10,52**	108,2	0,00	89,29	-	-	0,00	0,00	-
Märkenkall 08	8278	8279	0	**10,42**	108,2	0,00	89,36	-	-	0,00	0,00	-
Märkenkall 09	8448	8450	0	**10,17**	108,2	0,00	89,54	-	-	0,00	0,00	-
Märkenkall 10	8718	8720	0	**9,78**	108,2	0,00	89,81	-	-	0,00	0,00	-
Märkenkall 11	9036	9038	0	**9,34**	108,2	0,00	90,12	-	-	0,00	0,00	-
Märkenkall 12	9139	9141	0	**9,20**	108,2	0,00	90,22	-	-	0,00	0,00	-
Märkenkall 13	9256	9258	0	**9,04**	108,2	0,00	90,33	-	-	0,00	0,00	-
Märkenkall 14	9322	9323	0	**8,95**	108,2	0,00	90,39	-	-	0,00	0,00	-
Märkenkall 15	9715	9716	0	**8,44**	108,2	0,00	90,75	-	-	0,00	0,00	-
Sum				**36,69**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH07 RH07

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2017	2031	0	**27,55**	109,2	0,00	77,15	-	-	0,00	0,00	-

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
2	2396	2408	0	**25,29**	109,2	0,00	78,63	-	-	0,00	0,00	-
3	2869	2877	0	**22,86**	109,2	0,00	80,18	-	-	0,00	0,00	-
4	3372	3379	0	**20,61**	109,2	0,00	81,58	-	-	0,00	0,00	-
5	3613	3619	0	**19,64**	109,2	0,00	82,17	-	-	0,00	0,00	-
6	3091	3099	0	**21,83**	109,2	0,00	80,83	-	-	0,00	0,00	-
7	3536	3543	0	**19,95**	109,2	0,00	81,99	-	-	0,00	0,00	-
8	4608	4613	0	**16,17**	109,2	0,00	84,28	-	-	0,00	0,00	-
Lotlax 1	6079	6080	0	**11,82**	106,5	0,00	86,68	-	-	0,00	0,00	-
Lotlax 2	6257	6258	0	**11,46**	106,5	0,00	86,93	-	-	0,00	0,00	-
Lotlax 3	6397	6399	0	**11,19**	106,5	0,00	87,12	-	-	0,00	0,00	-
Lålax 1	5386	5388	0	**13,08**	106,5	0,00	85,63	-	-	0,00	0,00	-
Lålax 2	6074	6076	0	**11,62**	106,5	0,00	86,67	-	-	0,00	0,00	-
Lålax 3	6801	6803	0	**10,25**	106,5	0,00	87,65	-	-	0,00	0,00	-
Lålax 4	7095	7096	0	**9,73**	106,5	0,00	88,02	-	-	0,00	0,00	-
Märkenkall 01	8785	8787	0	**9,69**	108,2	0,00	89,88	-	-	0,00	0,00	-
Märkenkall 02	9399	9401	0	**8,85**	108,2	0,00	90,46	-	-	0,00	0,00	-
Märkenkall 03	9983	9985	0	**8,10**	108,2	0,00	90,99	-	-	0,00	0,00	-
Märkenkall 04	9565	9566	0	**8,63**	108,2	0,00	90,62	-	-	0,00	0,00	-
Märkenkall 05	9689	9690	0	**8,47**	108,2	0,00	90,73	-	-	0,00	0,00	-
Märkenkall 06	9734	9735	0	**8,41**	108,2	0,00	90,77	-	-	0,00	0,00	-
Märkenkall 07	10263	10264	0	**7,75**	108,2	0,00	91,23	-	-	0,00	0,00	-
Märkenkall 08	10348	10349	0	**7,65**	108,2	0,00	91,30	-	-	0,00	0,00	-
Märkenkall 09	10473	10475	0	**7,50**	108,2	0,00	91,40	-	-	0,00	0,00	-
Märkenkall 10	10676	10677	0	**7,25**	108,2	0,00	91,57	-	-	0,00	0,00	-
Märkenkall 11	11022	11023	0	**6,85**	108,2	0,00	91,85	-	-	0,00	0,00	-
Märkenkall 12	11151	11152	0	**6,71**	108,2	0,00	91,95	-	-	0,00	0,00	-
Märkenkall 13	11310	11311	0	**6,53**	108,2	0,00	92,07	-	-	0,00	0,00	-
Märkenkall 14	11389	11390	0	**6,44**	108,2	0,00	92,13	-	-	0,00	0,00	-
Märkenkall 15	11746	11747	0	**6,05**	108,2	0,00	92,40	-	-	0,00	0,00	-
Sum				**32,52**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH08 RH08

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	1911	1925	0	**28,25**	109,2	0,00	76,69	-	-	0,00	0,00	-
2	2314	2326	0	**25,76**	109,2	0,00	78,33	-	-	0,00	0,00	-
3	2885	2893	0	**22,78**	109,2	0,00	80,23	-	-	0,00	0,00	-
4	3436	3442	0	**20,35**	109,2	0,00	81,74	-	-	0,00	0,00	-
5	3603	3610	0	**19,68**	109,2	0,00	82,15	-	-	0,00	0,00	-
6	2974	2983	0	**22,36**	109,2	0,00	80,49	-	-	0,00	0,00	-
7	3389	3396	0	**20,54**	109,2	0,00	81,62	-	-	0,00	0,00	-
8	4335	4339	0	**17,05**	109,2	0,00	83,75	-	-	0,00	0,00	-
Lotlax 1	5566	5567	0	**12,90**	106,5	0,00	85,91	-	-	0,00	0,00	-
Lotlax 2	5706	5708	0	**12,60**	106,5	0,00	86,13	-	-	0,00	0,00	-
Lotlax 3	5818	5820	0	**12,36**	106,5	0,00	86,30	-	-	0,00	0,00	-
Lålax 1	4684	4686	0	**14,73**	106,5	0,00	84,42	-	-	0,00	0,00	-
Lålax 2	5367	5369	0	**13,12**	106,5	0,00	85,60	-	-	0,00	0,00	-
Lålax 3	6096	6098	0	**11,58**	106,5	0,00	86,70	-	-	0,00	0,00	-
Lålax 4	6396	6398	0	**11,00**	106,5	0,00	87,12	-	-	0,00	0,00	-
Märkenkall 01	9297	9299	0	**8,99**	108,2	0,00	90,37	-	-	0,00	0,00	-
Märkenkall 02	9913	9914	0	**8,19**	108,2	0,00	90,93	-	-	0,00	0,00	-
Märkenkall 03	10530	10531	0	**7,43**	108,2	0,00	91,45	-	-	0,00	0,00	-
Märkenkall 04	10143	10144	0	**7,90**	108,2	0,00	91,12	-	-	0,00	0,00	-
Märkenkall 05	10179	10180	0	**7,85**	108,2	0,00	91,16	-	-	0,00	0,00	-
Märkenkall 06	10196	10197	0	**7,83**	108,2	0,00	91,17	-	-	0,00	0,00	-
Märkenkall 07	10709	10711	0	**7,22**	108,2	0,00	91,60	-	-	0,00	0,00	-
Märkenkall 08	10761	10763	0	**7,15**	108,2	0,00	91,64	-	-	0,00	0,00	-
Märkenkall 09	10958	10959	0	**6,93**	108,2	0,00	91,80	-	-	0,00	0,00	-
Märkenkall 10	11212	11213	0	**6,64**	108,2	0,00	91,99	-	-	0,00	0,00	-
Märkenkall 11	11540	11541	0	**6,27**	108,2	0,00	92,24	-	-	0,00	0,00	-
Märkenkall 12	11649	11650	0	**6,15**	108,2	0,00	92,33	-	-	0,00	0,00	-

To be continued on next page...

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
Märkenkall 13	11759	11761	0	**6,03**	108,2	0,00	92,41	-	-	0,00	0,00	-
Märkenkall 14	11810	11811	0	**5,98**	108,2	0,00	92,45	-	-	0,00	0,00	-
Märkenkall 15	12225	12226	0	**5,54**	108,2	0,00	92,75	-	-	0,00	0,00	-
Sum				**32,97**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH09 RH09

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	1952	1966	0	**27,98**	109,2	0,00	76,87	-	-	0,00	0,00	-
2	2354	2366	0	**25,53**	109,2	0,00	78,48	-	-	0,00	0,00	-
3	2949	2957	0	**22,48**	109,2	0,00	80,42	-	-	0,00	0,00	-
4	3509	3516	0	**20,05**	109,2	0,00	81,92	-	-	0,00	0,00	-
5	3651	3657	0	**19,49**	109,2	0,00	82,26	-	-	0,00	0,00	-
6	2990	2999	0	**22,29**	109,2	0,00	80,54	-	-	0,00	0,00	-
7	3390	3397	0	**20,54**	109,2	0,00	81,62	-	-	0,00	0,00	-
8	4281	4286	0	**17,23**	109,2	0,00	83,64	-	-	0,00	0,00	-
Lotlax 1	5411	5413	0	**13,25**	106,5	0,00	85,67	-	-	0,00	0,00	-
Lotlax 2	5536	5537	0	**12,97**	106,5	0,00	85,87	-	-	0,00	0,00	-
Lotlax 3	5635	5637	0	**12,75**	106,5	0,00	86,02	-	-	0,00	0,00	-
Lålax 1	4438	4440	0	**15,37**	106,5	0,00	83,95	-	-	0,00	0,00	-
Lålax 2	5121	5123	0	**13,68**	106,5	0,00	85,19	-	-	0,00	0,00	-
Lålax 3	5852	5854	0	**12,08**	106,5	0,00	86,35	-	-	0,00	0,00	-
Lålax 4	6156	6158	0	**11,46**	106,5	0,00	86,79	-	-	0,00	0,00	-
Märkenkall 01	9493	9495	0	**8,73**	108,2	0,00	90,55	-	-	0,00	0,00	-
Märkenkall 02	10109	10111	0	**7,94**	108,2	0,00	91,10	-	-	0,00	0,00	-
Märkenkall 03	10736	10737	0	**7,18**	108,2	0,00	91,62	-	-	0,00	0,00	-
Märkenkall 04	10358	10360	0	**7,64**	108,2	0,00	91,31	-	-	0,00	0,00	-
Märkenkall 05	10368	10370	0	**7,62**	108,2	0,00	91,32	-	-	0,00	0,00	-
Märkenkall 06	10376	10378	0	**7,61**	108,2	0,00	91,32	-	-	0,00	0,00	-
Märkenkall 07	10885	10887	0	**7,01**	108,2	0,00	91,74	-	-	0,00	0,00	-
Märkenkall 08	10927	10928	0	**6,96**	108,2	0,00	91,77	-	-	0,00	0,00	-
Märkenkall 09	11145	11147	0	**6,71**	108,2	0,00	91,94	-	-	0,00	0,00	-
Märkenkall 10	11414	11416	0	**6,41**	108,2	0,00	92,15	-	-	0,00	0,00	-
Märkenkall 11	11737	11738	0	**6,06**	108,2	0,00	92,39	-	-	0,00	0,00	-
Märkenkall 12	11840	11841	0	**5,94**	108,2	0,00	92,47	-	-	0,00	0,00	-
Märkenkall 13	11936	11937	0	**5,84**	108,2	0,00	92,54	-	-	0,00	0,00	-
Märkenkall 14	11977	11979	0	**5,80**	108,2	0,00	92,57	-	-	0,00	0,00	-
Märkenkall 15	12409	12411	0	**5,34**	108,2	0,00	92,88	-	-	0,00	0,00	-
Sum				**32,81**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH10 RH10

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2285	2297	0	**25,92**	109,2	0,00	78,22	-	-	0,00	0,00	-
2	2668	2678	0	**23,85**	109,2	0,00	79,56	-	-	0,00	0,00	-
3	3297	3303	0	**20,93**	109,2	0,00	81,38	-	-	0,00	0,00	-
4	3866	3872	0	**18,68**	109,2	0,00	82,76	-	-	0,00	0,00	-
5	3952	3958	0	**18,37**	109,2	0,00	82,95	-	-	0,00	0,00	-
6	3237	3245	0	**21,19**	109,2	0,00	81,22	-	-	0,00	0,00	-
7	3592	3599	0	**19,72**	109,2	0,00	82,12	-	-	0,00	0,00	-
8	4335	4340	0	**17,05**	109,2	0,00	83,75	-	-	0,00	0,00	-
Lotlax 1	5172	5174	0	**13,80**	106,5	0,00	85,28	-	-	0,00	0,00	-
Lotlax 2	5245	5247	0	**13,63**	106,5	0,00	85,40	-	-	0,00	0,00	-
Lotlax 3	5304	5305	0	**13,49**	106,5	0,00	85,49	-	-	0,00	0,00	-
Lålax 1	3827	3829	0	**17,34**	106,5	0,00	82,66	-	-	0,00	0,00	-
Lålax 2	4533	4535	0	**15,12**	106,5	0,00	84,13	-	-	0,00	0,00	-
Lålax 3	5282	5284	0	**13,31**	106,5	0,00	85,46	-	-	0,00	0,00	-
Lålax 4	5608	5610	0	**12,59**	106,5	0,00	85,98	-	-	0,00	0,00	-

To be continued on next page...

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Calculated:
18.11.2019 12:44/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
Märkenkall 01	10058	10059	0	**8,00**	108,2	0,00	91,05	-	-	0,00	0,00	-
Märkenkall 02	10674	10675	0	**7,26**	108,2	0,00	91,57	-	-	0,00	0,00	-
Märkenkall 03	11315	11317	0	**6,52**	108,2	0,00	92,07	-	-	0,00	0,00	-
Märkenkall 04	10951	10952	0	**6,93**	108,2	0,00	91,79	-	-	0,00	0,00	-
Märkenkall 05	10921	10922	0	**6,97**	108,2	0,00	91,77	-	-	0,00	0,00	-
Märkenkall 06	10914	10915	0	**6,98**	108,2	0,00	91,76	-	-	0,00	0,00	-
Märkenkall 07	11414	11415	0	**6,41**	108,2	0,00	92,15	-	-	0,00	0,00	-
Märkenkall 08	11437	11438	0	**6,38**	108,2	0,00	92,17	-	-	0,00	0,00	-
Märkenkall 09	11694	11695	0	**6,10**	108,2	0,00	92,36	-	-	0,00	0,00	-
Märkenkall 10	11988	11989	0	**5,79**	108,2	0,00	92,58	-	-	0,00	0,00	-
Märkenkall 11	12302	12303	0	**5,46**	108,2	0,00	92,80	-	-	0,00	0,00	-
Märkenkall 12	12394	12395	0	**5,36**	108,2	0,00	92,86	-	-	0,00	0,00	-
Märkenkall 13	12464	12466	0	**5,29**	108,2	0,00	92,91	-	-	0,00	0,00	-
Märkenkall 14	12489	12491	0	**5,26**	108,2	0,00	92,93	-	-	0,00	0,00	-
Märkenkall 15	12953	12954	0	**4,80**	108,2	0,00	93,25	-	-	0,00	0,00	-
Sum				**31,57**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH11 RH11

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	2506	2516	0	**24,70**	109,2	0,00	79,02	-	-	0,00	0,00	-
2	2875	2884	0	**22,83**	109,2	0,00	80,20	-	-	0,00	0,00	-
3	3511	3517	0	**20,05**	109,2	0,00	81,92	-	-	0,00	0,00	-
4	4080	4086	0	**17,91**	109,2	0,00	83,23	-	-	0,00	0,00	-
5	4141	4147	0	**17,70**	109,2	0,00	83,35	-	-	0,00	0,00	-
6	3408	3415	0	**20,46**	109,2	0,00	81,67	-	-	0,00	0,00	-
7	3739	3746	0	**19,15**	109,2	0,00	82,47	-	-	0,00	0,00	-
8	4404	4409	0	**16,82**	109,2	0,00	83,89	-	-	0,00	0,00	-
Lotlax 1	5080	5082	0	**14,01**	106,5	0,00	85,12	-	-	0,00	0,00	-
Lotlax 2	5125	5126	0	**13,91**	106,5	0,00	85,20	-	-	0,00	0,00	-
Lotlax 3	5159	5161	0	**13,83**	106,5	0,00	85,25	-	-	0,00	0,00	-
Lålax 1	3513	3516	0	**18,49**	106,5	0,00	81,92	-	-	0,00	0,00	-
Lålax 2	4234	4236	0	**15,98**	106,5	0,00	83,54	-	-	0,00	0,00	-
Lålax 3	4994	4996	0	**13,98**	106,5	0,00	84,97	-	-	0,00	0,00	-
Lålax 4	5334	5336	0	**13,19**	106,5	0,00	85,54	-	-	0,00	0,00	-
Märkenkall 01	10355	10356	0	**7,64**	108,2	0,00	91,30	-	-	0,00	0,00	-
Märkenkall 02	10971	10973	0	**6,91**	108,2	0,00	91,81	-	-	0,00	0,00	-
Märkenkall 03	11619	11621	0	**6,18**	108,2	0,00	92,30	-	-	0,00	0,00	-
Märkenkall 04	11261	11262	0	**6,58**	108,2	0,00	92,03	-	-	0,00	0,00	-
Märkenkall 05	11213	11214	0	**6,64**	108,2	0,00	92,00	-	-	0,00	0,00	-
Märkenkall 06	11199	11200	0	**6,65**	108,2	0,00	91,98	-	-	0,00	0,00	-
Märkenkall 07	11694	11696	0	**6,10**	108,2	0,00	92,36	-	-	0,00	0,00	-
Märkenkall 08	11709	11710	0	**6,09**	108,2	0,00	92,37	-	-	0,00	0,00	-
Märkenkall 09	11984	11985	0	**5,79**	108,2	0,00	92,57	-	-	0,00	0,00	-
Märkenkall 10	12289	12290	0	**5,47**	108,2	0,00	92,79	-	-	0,00	0,00	-
Märkenkall 11	12599	12600	0	**5,15**	108,2	0,00	93,01	-	-	0,00	0,00	-
Märkenkall 12	12686	12687	0	**5,06**	108,2	0,00	93,07	-	-	0,00	0,00	-
Märkenkall 13	12745	12746	0	**5,00**	108,2	0,00	93,11	-	-	0,00	0,00	-
Märkenkall 14	12762	12763	0	**4,99**	108,2	0,00	93,12	-	-	0,00	0,00	-
Märkenkall 15	13241	13242	0	**4,51**	108,2	0,00	93,44	-	-	0,00	0,00	-
Sum				**30,93**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH12 RH12

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5008	5014	0	**14,97**	109,2	0,00	85,00	-	-	0,00	0,00	-
2	4782	4789	0	**15,63**	109,2	0,00	84,60	-	-	0,00	0,00	-
3	4790	4795	0	**15,61**	109,2	0,00	84,62	-	-	0,00	0,00	-

To be continued on next page...

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
4	4798	4803	0	**15,59**	109,2	0,00	84,63	-	-	0,00	0,00	-
5	4391	4397	0	**16,86**	109,2	0,00	83,86	-	-	0,00	0,00	-
6	4237	4243	0	**17,37**	109,2	0,00	83,55	-	-	0,00	0,00	-
7	3858	3865	0	**18,71**	109,2	0,00	82,74	-	-	0,00	0,00	-
8	2634	2642	0	**24,03**	109,2	0,00	79,44	-	-	0,00	0,00	-
Lotlax 1	1068	1076	0	**33,08**	106,5	0,00	71,64	-	-	0,00	0,00	-
Lotlax 2	1400	1407	0	**30,00**	106,5	0,00	73,96	-	-	0,00	0,00	-
Lotlax 3	1765	1771	0	**27,26**	106,5	0,00	75,96	-	-	0,00	0,00	-
Lålax 1	5746	5748	0	**12,30**	106,5	0,00	86,19	-	-	0,00	0,00	-
Lålax 2	5253	5255	0	**13,37**	106,5	0,00	85,41	-	-	0,00	0,00	-
Lålax 3	5075	5077	0	**13,79**	106,5	0,00	85,11	-	-	0,00	0,00	-
Lålax 4	4719	4721	0	**14,65**	106,5	0,00	84,48	-	-	0,00	0,00	-
Märkenkall 01	10789	10790	0	**7,12**	108,2	0,00	91,66	-	-	0,00	0,00	-
Märkenkall 02	11306	11307	0	**6,53**	108,2	0,00	92,07	-	-	0,00	0,00	-
Märkenkall 03	12199	12200	0	**5,56**	108,2	0,00	92,73	-	-	0,00	0,00	-
Märkenkall 04	12251	12252	0	**5,51**	108,2	0,00	92,76	-	-	0,00	0,00	-
Märkenkall 05	11266	11267	0	**6,57**	108,2	0,00	92,04	-	-	0,00	0,00	-
Märkenkall 06	10973	10974	0	**6,91**	108,2	0,00	91,81	-	-	0,00	0,00	-
Märkenkall 07	11231	11232	0	**6,61**	108,2	0,00	92,01	-	-	0,00	0,00	-
Märkenkall 08	10928	10929	0	**6,96**	108,2	0,00	91,77	-	-	0,00	0,00	-
Märkenkall 09	11850	11851	0	**5,93**	108,2	0,00	92,48	-	-	0,00	0,00	-
Märkenkall 10	12646	12647	0	**5,10**	108,2	0,00	93,04	-	-	0,00	0,00	-
Märkenkall 11	12719	12720	0	**5,03**	108,2	0,00	93,09	-	-	0,00	0,00	-
Märkenkall 12	12576	12577	0	**5,17**	108,2	0,00	92,99	-	-	0,00	0,00	-
Märkenkall 13	12141	12142	0	**5,62**	108,2	0,00	92,69	-	-	0,00	0,00	-
Märkenkall 14	11872	11873	0	**5,91**	108,2	0,00	92,49	-	-	0,00	0,00	-
Märkenkall 15	12853	12854	0	**4,89**	108,2	0,00	93,18	-	-	0,00	0,00	-
Sum				**36,32**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH13 RH13

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	4328	4334	0	**17,07**	109,2	0,00	83,74	-	-	0,00	0,00	-
2	3947	3954	0	**18,38**	109,2	0,00	82,94	-	-	0,00	0,00	-
3	3561	3567	0	**19,85**	109,2	0,00	82,05	-	-	0,00	0,00	-
4	3222	3229	0	**21,25**	109,2	0,00	81,18	-	-	0,00	0,00	-
5	2853	2861	0	**22,94**	109,2	0,00	80,13	-	-	0,00	0,00	-
6	3251	3258	0	**21,13**	109,2	0,00	81,26	-	-	0,00	0,00	-
7	2809	2817	0	**23,15**	109,2	0,00	80,00	-	-	0,00	0,00	-
8	1998	2008	0	**27,70**	109,2	0,00	77,05	-	-	0,00	0,00	-
Lotlax 1	3484	3486	0	**18,60**	106,5	0,00	81,85	-	-	0,00	0,00	-
Lotlax 2	3980	3982	0	**16,91**	106,5	0,00	83,00	-	-	0,00	0,00	-
Lotlax 3	4404	4406	0	**15,73**	106,5	0,00	83,88	-	-	0,00	0,00	-
Lålax 1	7594	7595	0	**8,89**	106,5	0,00	88,61	-	-	0,00	0,00	-
Lålax 2	7408	7409	0	**9,20**	106,5	0,00	88,40	-	-	0,00	0,00	-
Lålax 3	7481	7483	0	**9,08**	106,5	0,00	88,48	-	-	0,00	0,00	-
Lålax 4	7258	7259	0	**9,45**	106,5	0,00	88,22	-	-	0,00	0,00	-
Märkenkall 01	7976	7977	0	**10,87**	108,2	0,00	89,04	-	-	0,00	0,00	-
Märkenkall 02	8463	8465	0	**10,14**	108,2	0,00	89,55	-	-	0,00	0,00	-
Märkenkall 03	9373	9374	0	**8,88**	108,2	0,00	90,44	-	-	0,00	0,00	-
Märkenkall 04	9493	9495	0	**8,73**	108,2	0,00	90,55	-	-	0,00	0,00	-
Märkenkall 05	8388	8390	0	**10,25**	108,2	0,00	89,48	-	-	0,00	0,00	-
Märkenkall 06	8072	8073	0	**10,73**	108,2	0,00	89,14	-	-	0,00	0,00	-
Märkenkall 07	8310	8311	0	**10,37**	108,2	0,00	89,39	-	-	0,00	0,00	-
Märkenkall 08	7996	7998	0	**10,84**	108,2	0,00	89,06	-	-	0,00	0,00	-
Märkenkall 09	8946	8947	0	**9,46**	108,2	0,00	90,03	-	-	0,00	0,00	-
Märkenkall 10	9781	9782	0	**8,35**	108,2	0,00	90,81	-	-	0,00	0,00	-
Märkenkall 11	9827	9829	0	**8,29**	108,2	0,00	90,85	-	-	0,00	0,00	-
Märkenkall 12	9666	9667	0	**8,50**	108,2	0,00	90,71	-	-	0,00	0,00	-
Märkenkall 13	9210	9211	0	**9,10**	108,2	0,00	90,29	-	-	0,00	0,00	-
Märkenkall 14	8939	8941	0	**9,47**	108,2	0,00	90,03	-	-	0,00	0,00	-

To be continued on next page...

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types) **Noise calculation model:** ISO 9613-2 Finland 8,0 m/s

...continued from previous page

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
Märkenkall 15	9926	9928	0	**8,17**	108,2	0,00	90,94	-	-	0,00	0,00	-
Sum				**32,55**								

- Data undefined due to calculation with octave data

Noise sensitive area: RH14 RH14

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Penalty [dB]	**Calculated [dB(A)]**	LwA,ref [dB(A)]	Dc [dB]	Adiv [dB]	Aatm [dB]	Agr [dB]	Abar [dB]	Amisc [dB]	A [dB]
1	5023	5028	0	**14,92**	109,2	0,00	85,03	-	-	0,00	0,00	-
2	4656	4662	0	**16,01**	109,2	0,00	84,37	-	-	0,00	0,00	-
3	4317	4323	0	**17,10**	109,2	0,00	83,71	-	-	0,00	0,00	-
4	4012	4018	0	**18,15**	109,2	0,00	83,08	-	-	0,00	0,00	-
5	3631	3638	0	**19,57**	109,2	0,00	82,22	-	-	0,00	0,00	-
6	3961	3968	0	**18,33**	109,2	0,00	82,97	-	-	0,00	0,00	-
7	3510	3517	0	**20,05**	109,2	0,00	81,92	-	-	0,00	0,00	-
8	2523	2532	0	**24,61**	109,2	0,00	79,07	-	-	0,00	0,00	-
Lotlax 1	3389	3392	0	**18,97**	106,5	0,00	81,61	-	-	0,00	0,00	-
Lotlax 2	3862	3864	0	**17,26**	106,5	0,00	82,74	-	-	0,00	0,00	-
Lotlax 3	4277	4279	0	**16,07**	106,5	0,00	83,63	-	-	0,00	0,00	-
Lålax 1	7805	7806	0	**8,56**	106,5	0,00	88,85	-	-	0,00	0,00	-
Lålax 2	7517	7519	0	**9,02**	106,5	0,00	88,52	-	-	0,00	0,00	-
Lålax 3	7498	7499	0	**9,05**	106,5	0,00	88,50	-	-	0,00	0,00	-
Lålax 4	7215	7217	0	**9,52**	106,5	0,00	88,17	-	-	0,00	0,00	-
Märkenkall 01	8612	8614	0	**9,93**	108,2	0,00	89,70	-	-	0,00	0,00	-
Märkenkall 02	9076	9077	0	**9,28**	108,2	0,00	90,16	-	-	0,00	0,00	-
Märkenkall 03	9994	9996	0	**8,08**	108,2	0,00	91,00	-	-	0,00	0,00	-
Märkenkall 04	10157	10159	0	**7,88**	108,2	0,00	91,14	-	-	0,00	0,00	-
Märkenkall 05	8966	8968	0	**9,43**	108,2	0,00	90,05	-	-	0,00	0,00	-
Märkenkall 06	8619	8621	0	**9,92**	108,2	0,00	89,71	-	-	0,00	0,00	-
Märkenkall 07	8816	8818	0	**9,64**	108,2	0,00	89,91	-	-	0,00	0,00	-
Märkenkall 08	8461	8463	0	**10,15**	108,2	0,00	89,55	-	-	0,00	0,00	-
Märkenkall 09	9485	9486	0	**8,74**	108,2	0,00	90,54	-	-	0,00	0,00	-
Märkenkall 10	10367	10369	0	**7,62**	108,2	0,00	91,31	-	-	0,00	0,00	-
Märkenkall 11	10383	10384	0	**7,61**	108,2	0,00	91,33	-	-	0,00	0,00	-
Märkenkall 12	10193	10194	0	**7,84**	108,2	0,00	91,17	-	-	0,00	0,00	-
Märkenkall 13	9674	9675	0	**8,49**	108,2	0,00	90,71	-	-	0,00	0,00	-
Märkenkall 14	9364	9365	0	**8,90**	108,2	0,00	90,43	-	-	0,00	0,00	-
Märkenkall 15	10409	10410	0	**7,57**	108,2	0,00	91,35	-	-	0,00	0,00	-
Sum				**30,24**								

- Data undefined due to calculation with octave data

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18.11.2019 12:44/3.3.247

DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)

Noise calculation model:
ISO 9613-2 Finland
Wind speed (in 10 m height):
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:
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 [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

WTG: FUTURE F180 5.6 MW 5600 180.0 !-!
Noise: Third octave SPL without serrated trailing edge – Mode 0

Source	Source/Date	Creator	Edited
F008_276_A17_EN Revision 00, 2019-05-21 assuming N163 5.7 MW, without serrations	9.7.2019	USER	13.11.2019 12:29

					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	210,0	8,0	109,2	No	89,5	95,7	99,9	103,2	104,6	102,2	93,4	84,6

WTG: Prokon P3000 3030 116.7 !O!
Noise: Mode 0

Source	Source/Date	Creator	Edited
	25.9.2019	USER	15.10.2019 10:54

					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	142,0	8,0	106,5	No	88,6	95,1	98,6	101,0	100,8	98,0	93,2	84,5
From Windcat	122,0	8,0	106,5	No	88,6	95,1	98,6	101,0	100,8	98,0	93,2	84,5

WTG: VESTAS V136-3.45 3rdOc 3450 136.0 !O!
Noise: Mode 0 - 3.45MW - clean blades

Source	Source/Date	Creator	Edited
0055-9919_V01 - V136-3_45MW Third Octaves.pdf	2.3.2016	USER	17.10.2019 19:34

					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	172,0	8,0	108,2	No	90,0	98,8	101,7	102,2	101,5	99,9	93,2	75,0

Noise sensitive area: HH01 HH01

Predefined calculation standard:
Imission 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: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)

Noise sensitive area: HH02 HH02

Predefined calculation standard:
Imission 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: RH01 RH01

Predefined calculation standard:
Imission 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: RH02 RH02

Predefined calculation standard:
Imission 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: RH03 RH03

Predefined calculation standard:
Imission 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: RH04 RH04

Predefined calculation standard:
Imission 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: RH05 RH05

Predefined calculation standard:
Imission 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: RH06 RH06

Predefined calculation standard:
Imission 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: RH07 RH07

Predefined calculation standard:
Imission 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: RH08 RH08

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

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DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)
Noise demand: 40,0 dB(A)
No distance demand

Noise sensitive area: RH09 RH09
Predefined calculation standard:
Imission 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: RH10 RH10
Predefined calculation standard:
Imission 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: RH11 RH11
Predefined calculation standard:
Imission 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: RH12 RH12
Predefined calculation standard:
Imission 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: RH13 RH13
Predefined calculation standard:
Imission 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

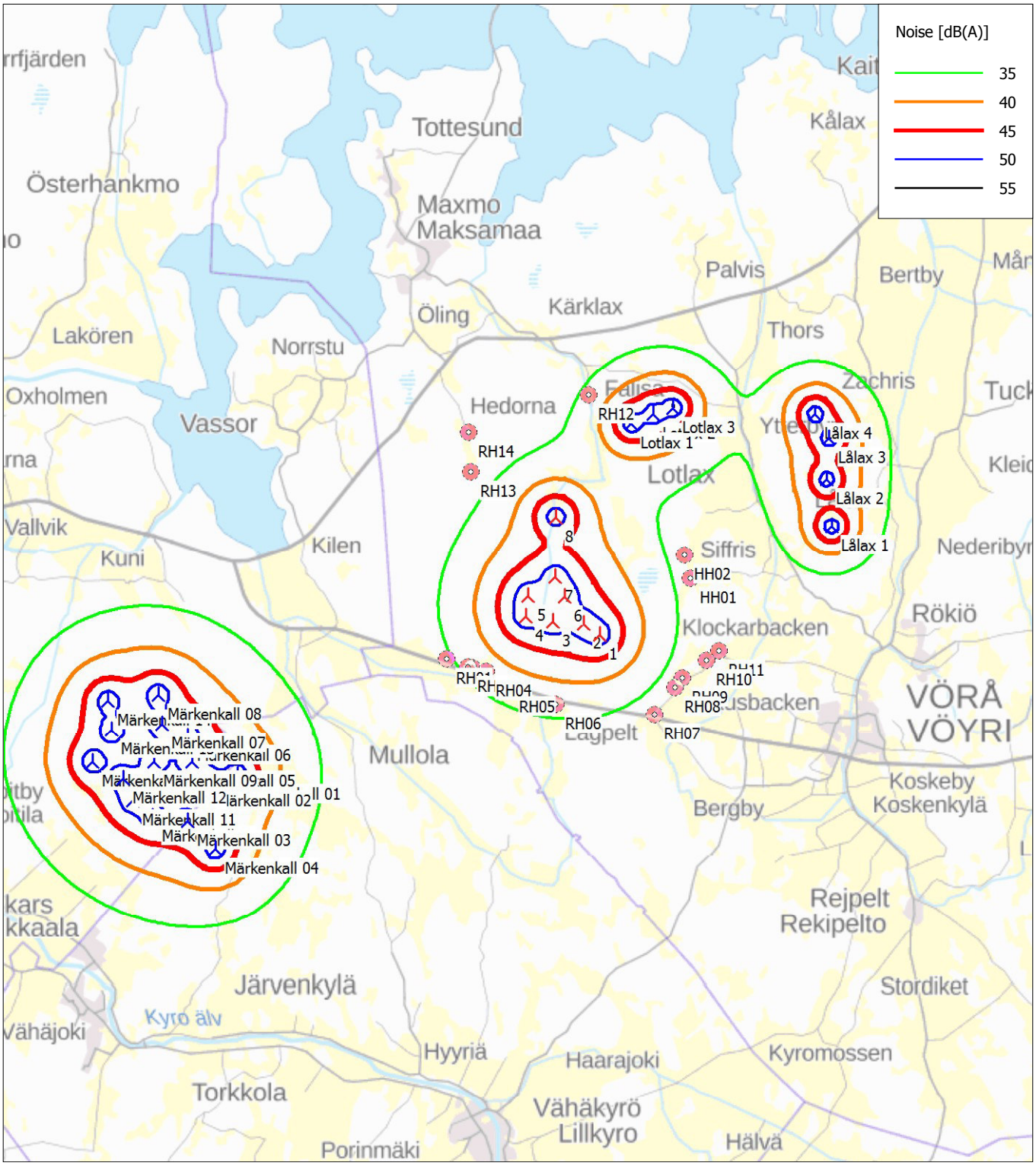
Noise sensitive area: RH14 RH14
Predefined calculation standard:
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

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

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DECIBEL - Map 8,0 m/s

Calculation: MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)



Map: Söde_Background map_160k , Print scale 1:120 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 252 580 North: 7 011 456

New WTG Noise sensitive area

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

Bilaga 4

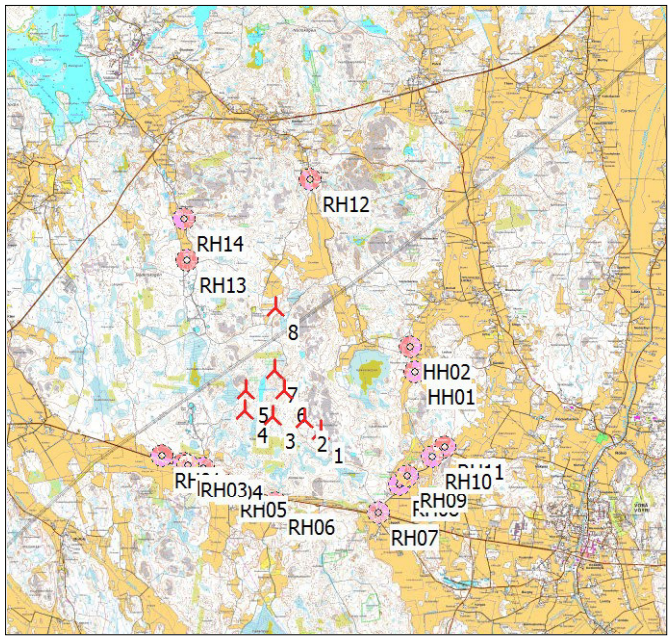
DSO 1284 modellering, Söderskogen

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DECIBEL - Main Result

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor

Noise calculation model:
Finland Low frequency
Wind speed (in 10 m height):
8,0 m/s
Spectral distribution:
From 20,0 Hz to 200,0 Hz
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 tone penalty is subtracted from demand
Model: 5,0 dB(A)
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)



Scale 1:150 000

New WTG Noise sensitive area

All coordinates are in
Finish TM ETRS-TM35FIN-ETRS89

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	255445	7011327	46,5	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
2	255108	7011549	50,2	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
3	254469	7011599	26,6	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
4	253911	7011714	27,9	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
5	253946	7012128	33,9	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
6	254714	7012124	38,4	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
7	254523	7012536	35,6	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2
8	254528	7013790	19,2	FUTURE F180 5.6 MW 5600 1...	Yes	FUTURE	F180 5.6 MW-5600	5600	180,0	210,0	USER	Third octave SPL without serrated trailing edge –	Mode 0	8,0	98,2

Calculation Results

Sound level

Noise sensitive area No.	Name	East	North	Z	Imission height	Most critical demand Frequency	Noise	Predicted sound level WTG noise
				[m]	[m]	[Hz]	[dB]	[dB]
HH01	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (HH01)	257331	7012499	17,5	4,0	50,0	44,0	33,4
HH02	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (HH02)	257219	7012995	17,0	4,0	50,0	44,0	33,3
RH01	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH01)	252257	7010823	13,1	4,0	50,0	44,0	34,2
RH02	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH02)	252700	7010660	15,5	4,0	50,0	44,0	35,3
RH03	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH03)	252789	7010635	14,7	4,0	50,0	44,0	35,5
RH04	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH04)	253090	7010568	15,5	4,0	50,0	44,0	36,2
RH05	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH05)	253574	7010222	14,2	4,0	50,0	44,0	36,2
RH06	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH06)	254528	7009881	18,4	4,0	50,0	44,0	36,0
RH07	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH07)	256594	7009667	21,5	4,0	50,0	44,0	33,0
RH08	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH08)	257015	7010236	19,0	4,0	50,0	44,0	33,3
RH09	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH09)	257177	7010423	17,1	4,0	50,0	44,0	33,1
RH10	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH10)	257669	7010798	18,8	4,0	50,0	44,0	32,2
RH11	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH11)	257929	7010986	18,5	4,0	50,0	44,0	31,6
RH12	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH12)	255219	7016333	14,3	4,0	50,0	44,0	30,1
RH13	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH13)	252762	7014727	25,0	4,0	50,0	44,0	32,8
RH14	Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH14)	252714	7015547	21,4	4,0	50,0	44,0	30,9

***)Spectral distribution, please see details in report "Detailed results"**

Distances (m)

	WTG							
NSA	1	2	3	4	5	6	7	8
HH01	2219	2416	2998	3506	3403	2641	2806	3084
HH02	2433	2557	3082	3545	3384	2650	2732	2804
RH01	3226	2940	2343	1878	2133	2779	2839	3734
RH02	2822	2565	2001	1604	1924	2488	2614	3622

To be continued on next page...

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DECIBEL - Main Result

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor

...continued from previous page

	WTG							
NSA	1	2	3	4	5	6	7	8
RH03	2743	2491	1936	1556	1888	2433	2572	3600
RH04	2472	2242	1720	1408	1778	2248	2433	3525
RH05	2172	2027	1641	1528	1940	2216	2499	3690
RH06	1711	1765	1718	1933	2320	2250	2654	3906
RH07	2017	2396	2869	3372	3613	3091	3536	4608
RH08	1911	2314	2885	3436	3603	2974	3389	4335
RH09	1952	2354	2949	3509	3651	2990	3390	4281
RH10	2285	2668	3297	3866	3952	3237	3592	4335
RH11	2506	2875	3511	4080	4141	3408	3739	4404
RH12	5008	4782	4790	4798	4391	4237	3858	2634
RH13	4328	3947	3561	3222	2853	3251	2809	1998
RH14	5023	4656	4317	4012	3631	3961	3510	2523

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

Assumptions

Cmet: Meteorological correction

Calculation Results

Noise sensitive area: HH01 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (HH01)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2219	2231						
1			20	**36,03**	64,5	0,00	5,60	6,60
1			25	**32,18**	68,5	0,04	5,40	8,40
1			32	**29,76**	74,0	0,07	5,20	10,80
1			40	**27,62**	77,5	0,11	5,00	11,40
1			50	**26,37**	82,6	0,16	4,70	13,00
1			63	**19,58**	83,9	0,25	4,30	16,60
1			80	**14,87**	86,7	0,36	3,70	19,70
1			100	**13,77**	91,4	0,56	3,00	21,20
1			125	**8,78**	89,9	0,85	1,80	20,20
1			160	**4,16**	91,2	1,27	0,00	21,20
1			200	**-1,10**	92,8	1,83	0,00	25,00
2	2416	2427						
2			20	**35,30**	64,5	0,00	5,60	6,60
2			25	**31,45**	68,5	0,05	5,40	8,40
2			32	**29,02**	74,0	0,07	5,20	10,80
2			40	**26,88**	77,5	0,12	5,00	11,40
2			50	**25,63**	82,6	0,17	4,70	13,00
2			63	**18,83**	83,9	0,27	4,30	16,60
2			80	**14,11**	86,7	0,39	3,70	19,70
2			100	**12,99**	91,4	0,61	3,00	21,20
2			125	**7,97**	89,9	0,92	1,80	20,20
2			160	**3,31**	91,2	1,38	0,00	21,20
2			200	**-1,99**	92,8	1,99	0,00	25,00
3	2998	3005						
3			20	**33,44**	64,5	0,00	5,60	6,60
3			25	**29,58**	68,5	0,06	5,40	8,40
3			32	**27,15**	74,0	0,09	5,20	10,80
3			40	**24,99**	77,5	0,15	5,00	11,40
3			50	**23,73**	82,6	0,21	4,70	13,00
3			63	**16,91**	83,9	0,33	4,30	16,60
3			80	**12,16**	86,7	0,48	3,70	19,70
3			100	**10,99**	91,4	0,75	3,00	21,20
3			125	**5,90**	89,9	1,14	1,80	20,20
3			160	**1,13**	91,2	1,71	0,00	21,20
3			200	**-4,32**	92,8	2,46	0,00	25,00
4	3506	3513						
4			20	**32,09**	64,5	0,00	5,60	6,60
4			25	**28,22**	68,5	0,07	5,40	8,40
4			32	**25,78**	74,0	0,11	5,20	10,80
4			40	**23,61**	77,5	0,18	5,00	11,40
4			50	**22,34**	82,6	0,25	4,70	13,00
4			63	**15,50**	83,9	0,39	4,30	16,60
4			80	**10,72**	86,7	0,56	3,70	19,70
4			100	**9,51**	91,4	0,88	3,00	21,20
4			125	**4,35**	89,9	1,33	1,80	20,20
4			160	**-0,52**	91,2	2,00	0,00	21,20
4			200	**-6,09**	92,8	2,88	0,00	25,00
5	3403	3410						
5			20	**32,34**	64,5	0,00	5,60	6,60
5			25	**28,48**	68,5	0,07	5,40	8,40
5			32	**26,04**	74,0	0,10	5,20	10,80
5			40	**23,87**	77,5	0,17	5,00	11,40
5			50	**22,61**	82,6	0,24	4,70	13,00
5			63	**15,77**	83,9	0,38	4,30	16,60
5			80	**11,00**	86,7	0,55	3,70	19,70
5			100	**9,79**	91,4	0,85	3,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
5			125	**4,65**	89,9	1,30	1,80	20,20
5			160	**-0,20**	91,2	1,94	0,00	21,20
5			200	**-5,75**	92,8	2,80	0,00	25,00
6	2641	2651						
6			20	**34,53**	64,5	0,00	5,60	6,60
6			25	**30,68**	68,5	0,05	5,40	8,40
6			32	**28,25**	74,0	0,08	5,20	10,80
6			40	**26,10**	77,5	0,13	5,00	11,40
6			50	**24,85**	82,6	0,19	4,70	13,00
6			63	**18,04**	83,9	0,29	4,30	16,60
6			80	**13,31**	86,7	0,42	3,70	19,70
6			100	**12,17**	91,4	0,66	3,00	21,20
6			125	**7,12**	89,9	1,01	1,80	20,20
6			160	**2,42**	91,2	1,51	0,00	21,20
6			200	**-2,94**	92,8	2,17	0,00	25,00
7	2806	2815						
7			20	**34,01**	64,5	0,00	5,60	6,60
7			25	**30,15**	68,5	0,06	5,40	8,40
7			32	**27,73**	74,0	0,08	5,20	10,80
7			40	**25,57**	77,5	0,14	5,00	11,40
7			50	**24,31**	82,6	0,20	4,70	13,00
7			63	**17,50**	83,9	0,31	4,30	16,60
7			80	**12,76**	86,7	0,45	3,70	19,70
7			100	**11,61**	91,4	0,70	3,00	21,20
7			125	**6,54**	89,9	1,07	1,80	20,20
7			160	**1,81**	91,2	1,60	0,00	21,20
7			200	**-3,60**	92,8	2,31	0,00	25,00
8	3084	3091						
8			20	**33,20**	64,5	0,00	5,60	6,60
8			25	**29,34**	68,5	0,06	5,40	8,40
8			32	**26,91**	74,0	0,09	5,20	10,80
8			40	**24,74**	77,5	0,15	5,00	11,40
8			50	**23,48**	82,6	0,22	4,70	13,00
8			63	**16,66**	83,9	0,34	4,30	16,60
8			80	**11,90**	86,7	0,49	3,70	19,70
8			100	**10,73**	91,4	0,77	3,00	21,20
8			125	**5,62**	89,9	1,17	1,80	20,20
8			160	**0,84**	91,2	1,76	0,00	21,20
8			200	**-4,63**	92,8	2,53	0,00	25,00
Sum								
Sum			20	**43,09**				
Sum			25	**39,24**				
Sum			32	**36,81**				
Sum			40	**34,65**				
Sum			50	**33,40**				
Sum			63	**26,59**				
Sum			80	**21,85**				
Sum			100	**20,70**				
Sum			125	**15,64**				
Sum			160	**10,92**				
Sum			200	**5,54**				

Noise sensitive area: HH02 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (HH02)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2433	2445						
1			20	**35,24**	64,5	0,00	5,60	6,60
1			25	**31,39**	68,5	0,05	5,40	8,40
1			32	**28,96**	74,0	0,07	5,20	10,80
1			40	**26,81**	77,5	0,12	5,00	11,40
1			50	**25,56**	82,6	0,17	4,70	13,00
1			63	**18,77**	83,9	0,27	4,30	16,60

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1			80	**14,04**	86,7	0,39	3,70	19,70
1			100	**12,92**	91,4	0,61	3,00	21,20
1			125	**7,91**	89,9	0,93	1,80	20,20
1			160	**3,24**	91,2	1,39	0,00	21,20
1			200	**-2,07**	92,8	2,00	0,00	25,00
2	2557	2568						
2			20	**34,81**	64,5	0,00	5,60	6,60
2			25	**30,96**	68,5	0,05	5,40	8,40
2			32	**28,53**	74,0	0,08	5,20	10,80
2			40	**26,38**	77,5	0,13	5,00	11,40
2			50	**25,13**	82,6	0,18	4,70	13,00
2			63	**18,33**	83,9	0,28	4,30	16,60
2			80	**13,60**	86,7	0,41	3,70	19,70
2			100	**12,47**	91,4	0,64	3,00	21,20
2			125	**7,43**	89,9	0,98	1,80	20,20
2			160	**2,74**	91,2	1,46	0,00	21,20
2			200	**-2,60**	92,8	2,11	0,00	25,00
3	3082	3089						
3			20	**33,20**	64,5	0,00	5,60	6,60
3			25	**29,34**	68,5	0,06	5,40	8,40
3			32	**26,91**	74,0	0,09	5,20	10,80
3			40	**24,75**	77,5	0,15	5,00	11,40
3			50	**23,49**	82,6	0,22	4,70	13,00
3			63	**16,66**	83,9	0,34	4,30	16,60
3			80	**11,91**	86,7	0,49	3,70	19,70
3			100	**10,73**	91,4	0,77	3,00	21,20
3			125	**5,63**	89,9	1,17	1,80	20,20
3			160	**0,84**	91,2	1,76	0,00	21,20
3			200	**-4,63**	92,8	2,53	0,00	25,00
4	3545	3551						
4			20	**31,99**	64,5	0,00	5,60	6,60
4			25	**28,12**	68,5	0,07	5,40	8,40
4			32	**25,69**	74,0	0,11	5,20	10,80
4			40	**23,51**	77,5	0,18	5,00	11,40
4			50	**22,24**	82,6	0,25	4,70	13,00
4			63	**15,40**	83,9	0,39	4,30	16,60
4			80	**10,62**	86,7	0,57	3,70	19,70
4			100	**9,40**	91,4	0,89	3,00	21,20
4			125	**4,24**	89,9	1,35	1,80	20,20
4			160	**-0,63**	91,2	2,02	0,00	21,20
4			200	**-6,22**	92,8	2,91	0,00	25,00
5	3384	3391						
5			20	**32,39**	64,5	0,00	5,60	6,60
5			25	**28,53**	68,5	0,07	5,40	8,40
5			32	**26,09**	74,0	0,10	5,20	10,80
5			40	**23,92**	77,5	0,17	5,00	11,40
5			50	**22,66**	82,6	0,24	4,70	13,00
5			63	**15,82**	83,9	0,37	4,30	16,60
5			80	**11,05**	86,7	0,54	3,70	19,70
5			100	**9,85**	91,4	0,85	3,00	21,20
5			125	**4,70**	89,9	1,29	1,80	20,20
5			160	**-0,14**	91,2	1,93	0,00	21,20
5			200	**-5,69**	92,8	2,78	0,00	25,00
6	2650	2659						
6			20	**34,50**	64,5	0,00	5,60	6,60
6			25	**30,65**	68,5	0,05	5,40	8,40
6			32	**28,22**	74,0	0,08	5,20	10,80
6			40	**26,07**	77,5	0,13	5,00	11,40
6			50	**24,82**	82,6	0,19	4,70	13,00
6			63	**18,01**	83,9	0,29	4,30	16,60
6			80	**13,28**	86,7	0,43	3,70	19,70
6			100	**12,14**	91,4	0,66	3,00	21,20
6			125	**7,09**	89,9	1,01	1,80	20,20
6			160	**2,39**	91,2	1,52	0,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
6			200	**-2,98**	92,8	2,18	0,00	25,00
7	2732	2742						
7			20	**34,24**	64,5	0,00	5,60	6,60
7			25	**30,38**	68,5	0,05	5,40	8,40
7			32	**27,96**	74,0	0,08	5,20	10,80
7			40	**25,80**	77,5	0,14	5,00	11,40
7			50	**24,55**	82,6	0,19	4,70	13,00
7			63	**17,74**	83,9	0,30	4,30	16,60
7			80	**13,00**	86,7	0,44	3,70	19,70
7			100	**11,85**	91,4	0,69	3,00	21,20
7			125	**6,80**	89,9	1,04	1,80	20,20
7			160	**2,08**	91,2	1,56	0,00	21,20
7			200	**-3,31**	92,8	2,25	0,00	25,00
8	2804	2811						
8			20	**34,02**	64,5	0,00	5,60	6,60
8			25	**30,17**	68,5	0,06	5,40	8,40
8			32	**27,74**	74,0	0,08	5,20	10,80
8			40	**25,58**	77,5	0,14	5,00	11,40
8			50	**24,33**	82,6	0,20	4,70	13,00
8			63	**17,51**	83,9	0,31	4,30	16,60
8			80	**12,77**	86,7	0,45	3,70	19,70
8			100	**11,62**	91,4	0,70	3,00	21,20
8			125	**6,55**	89,9	1,07	1,80	20,20
8			160	**1,82**	91,2	1,60	0,00	21,20
8			200	**-3,58**	92,8	2,31	0,00	25,00
Sum								
Sum			20	**42,96**				
Sum			25	**39,10**				
Sum			32	**36,68**				
Sum			40	**34,52**				
Sum			50	**33,26**				
Sum			63	**26,45**				
Sum			80	**21,71**				
Sum			100	**20,56**				
Sum			125	**15,49**				
Sum			160	**10,76**				
Sum			200	**5,36**				

Noise sensitive area: RH01 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH01)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	3226	3234						
1			20	**32,80**	64,5	0,00	5,60	6,60
1			25	**28,94**	68,5	0,06	5,40	8,40
1			32	**26,51**	74,0	0,10	5,20	10,80
1			40	**24,34**	77,5	0,16	5,00	11,40
1			50	**23,08**	82,6	0,23	4,70	13,00
1			63	**16,25**	83,9	0,36	4,30	16,60
1			80	**11,49**	86,7	0,52	3,70	19,70
1			100	**10,30**	91,4	0,81	3,00	21,20
1			125	**5,18**	89,9	1,23	1,80	20,20
1			160	**0,36**	91,2	1,84	0,00	21,20
1			200	**-5,15**	92,8	2,65	0,00	25,00
2	2940	2950						
2			20	**33,60**	64,5	0,00	5,60	6,60
2			25	**29,74**	68,5	0,06	5,40	8,40
2			32	**27,31**	74,0	0,09	5,20	10,80
2			40	**25,16**	77,5	0,15	5,00	11,40
2			50	**23,90**	82,6	0,21	4,70	13,00
2			63	**17,08**	83,9	0,32	4,30	16,60
2			80	**12,33**	86,7	0,47	3,70	19,70
2			100	**11,17**	91,4	0,74	3,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
2			125	**6,08**	89,9	1,12	1,80	20,20
2			160	**1,32**	91,2	1,68	0,00	21,20
2			200	**-4,12**	92,8	2,42	0,00	25,00
3	2343	2353						
3			20	**35,57**	64,5	0,00	5,60	6,60
3			25	**31,72**	68,5	0,05	5,40	8,40
3			32	**29,30**	74,0	0,07	5,20	10,80
3			40	**27,15**	77,5	0,12	5,00	11,40
3			50	**25,90**	82,6	0,16	4,70	13,00
3			63	**19,11**	83,9	0,26	4,30	16,60
3			80	**14,39**	86,7	0,38	3,70	19,70
3			100	**13,28**	91,4	0,59	3,00	21,20
3			125	**8,27**	89,9	0,89	1,80	20,20
3			160	**3,63**	91,2	1,34	0,00	21,20
3			200	**-1,66**	92,8	1,93	0,00	25,00
4	1878	1891						
4			20	**37,47**	64,5	0,00	5,60	6,60
4			25	**33,63**	68,5	0,04	5,40	8,40
4			32	**31,21**	74,0	0,06	5,20	10,80
4			40	**29,07**	77,5	0,09	5,00	11,40
4			50	**27,84**	82,6	0,13	4,70	13,00
4			63	**21,06**	83,9	0,21	4,30	16,60
4			80	**16,37**	86,7	0,30	3,70	19,70
4			100	**15,30**	91,4	0,47	3,00	21,20
4			125	**10,35**	89,9	0,72	1,80	20,20
4			160	**5,79**	91,2	1,08	0,00	21,20
4			200	**0,62**	92,8	1,55	0,00	25,00
5	2133	2145						
5			20	**36,37**	64,5	0,00	5,60	6,60
5			25	**32,53**	68,5	0,04	5,40	8,40
5			32	**30,11**	74,0	0,06	5,20	10,80
5			40	**27,96**	77,5	0,11	5,00	11,40
5			50	**26,72**	82,6	0,15	4,70	13,00
5			63	**19,94**	83,9	0,24	4,30	16,60
5			80	**15,23**	86,7	0,34	3,70	19,70
5			100	**14,14**	91,4	0,54	3,00	21,20
5			125	**9,16**	89,9	0,82	1,80	20,20
5			160	**4,55**	91,2	1,22	0,00	21,20
5			200	**-0,69**	92,8	1,76	0,00	25,00
6	2779	2788						
6			20	**34,09**	64,5	0,00	5,60	6,60
6			25	**30,24**	68,5	0,06	5,40	8,40
6			32	**27,81**	74,0	0,08	5,20	10,80
6			40	**25,65**	77,5	0,14	5,00	11,40
6			50	**24,40**	82,6	0,20	4,70	13,00
6			63	**17,59**	83,9	0,31	4,30	16,60
6			80	**12,85**	86,7	0,45	3,70	19,70
6			100	**11,70**	91,4	0,70	3,00	21,20
6			125	**6,63**	89,9	1,06	1,80	20,20
6			160	**1,90**	91,2	1,59	0,00	21,20
6			200	**-3,49**	92,8	2,29	0,00	25,00
7	2839	2848						
7			20	**33,91**	64,5	0,00	5,60	6,60
7			25	**30,05**	68,5	0,06	5,40	8,40
7			32	**27,62**	74,0	0,09	5,20	10,80
7			40	**25,47**	77,5	0,14	5,00	11,40
7			50	**24,21**	82,6	0,20	4,70	13,00
7			63	**17,40**	83,9	0,31	4,30	16,60
7			80	**12,65**	86,7	0,46	3,70	19,70
7			100	**11,50**	91,4	0,71	3,00	21,20
7			125	**6,43**	89,9	1,08	1,80	20,20
7			160	**1,69**	91,2	1,62	0,00	21,20
7			200	**-3,73**	92,8	2,34	0,00	25,00
8	3734	3740						

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18.11.2019 15:40/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
8			20	**31,54**	64,5	0,00	5,60	6,60
8			25	**27,67**	68,5	0,07	5,40	8,40
8			32	**25,23**	74,0	0,11	5,20	10,80
8			40	**23,06**	77,5	0,19	5,00	11,40
8			50	**21,78**	82,6	0,26	4,70	13,00
8			63	**14,93**	83,9	0,41	4,30	16,60
8			80	**10,14**	86,7	0,60	3,70	19,70
8			100	**8,91**	91,4	0,93	3,00	21,20
8			125	**3,72**	89,9	1,42	1,80	20,20
8			160	**-1,19**	91,2	2,13	0,00	21,20
8			200	**-6,82**	92,8	3,07	0,00	25,00
Sum								
Sum			20	**43,83**				
Sum			25	**39,98**				
Sum			32	**37,56**				
Sum			40	**35,41**				
Sum			50	**34,16**				
Sum			63	**27,36**				
Sum			80	**22,63**				
Sum			100	**21,51**				
Sum			125	**16,48**				
Sum			160	**11,81**				
Sum			200	**6,49**				

Noise sensitive area: RH02 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH02)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2822	2832						
1			20	**33,96**	64,5	0,00	5,60	6,60
1			25	**30,10**	68,5	0,06	5,40	8,40
1			32	**27,67**	74,0	0,08	5,20	10,80
1			40	**25,52**	77,5	0,14	5,00	11,40
1			50	**24,26**	82,6	0,20	4,70	13,00
1			63	**17,45**	83,9	0,31	4,30	16,60
1			80	**12,70**	86,7	0,45	3,70	19,70
1			100	**11,55**	91,4	0,71	3,00	21,20
1			125	**6,48**	89,9	1,08	1,80	20,20
1			160	**1,74**	91,2	1,61	0,00	21,20
1			200	**-3,67**	92,8	2,32	0,00	25,00
2	2565	2576						
2			20	**34,78**	64,5	0,00	5,60	6,60
2			25	**30,93**	68,5	0,05	5,40	8,40
2			32	**28,50**	74,0	0,08	5,20	10,80
2			40	**26,35**	77,5	0,13	5,00	11,40
2			50	**25,10**	82,6	0,18	4,70	13,00
2			63	**18,30**	83,9	0,28	4,30	16,60
2			80	**13,57**	86,7	0,41	3,70	19,70
2			100	**12,44**	91,4	0,64	3,00	21,20
2			125	**7,40**	89,9	0,98	1,80	20,20
2			160	**2,71**	91,2	1,47	0,00	21,20
2			200	**-2,63**	92,8	2,11	0,00	25,00
3	2001	2013						
3			20	**36,92**	64,5	0,00	5,60	6,60
3			25	**33,08**	68,5	0,04	5,40	8,40
3			32	**30,66**	74,0	0,06	5,20	10,80
3			40	**28,52**	77,5	0,10	5,00	11,40
3			50	**27,28**	82,6	0,14	4,70	13,00
3			63	**20,50**	83,9	0,22	4,30	16,60
3			80	**15,80**	86,7	0,32	3,70	19,70
3			100	**14,72**	91,4	0,50	3,00	21,20
3			125	**9,76**	89,9	0,76	1,80	20,20
3			160	**5,18**	91,2	1,15	0,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
3			200	**-0,03**	92,8	1,65	0,00	25,00
4	1604	1619						
4			20	**38,82**	64,5	0,00	5,60	6,60
4			25	**34,98**	68,5	0,03	5,40	8,40
4			32	**32,57**	74,0	0,05	5,20	10,80
4			40	**30,44**	77,5	0,08	5,00	11,40
4			50	**29,20**	82,6	0,11	4,70	13,00
4			63	**22,44**	83,9	0,18	4,30	16,60
4			80	**17,76**	86,7	0,26	3,70	19,70
4			100	**16,71**	91,4	0,40	3,00	21,20
4			125	**11,80**	89,9	0,62	1,80	20,20
4			160	**7,29**	91,2	0,92	0,00	21,20
4			200	**2,19**	92,8	1,33	0,00	25,00
5	1924	1937						
5			20	**37,26**	64,5	0,00	5,60	6,60
5			25	**33,42**	68,5	0,04	5,40	8,40
5			32	**31,00**	74,0	0,06	5,20	10,80
5			40	**28,86**	77,5	0,10	5,00	11,40
5			50	**27,62**	82,6	0,14	4,70	13,00
5			63	**20,85**	83,9	0,21	4,30	16,60
5			80	**16,15**	86,7	0,31	3,70	19,70
5			100	**15,07**	91,4	0,48	3,00	21,20
5			125	**10,12**	89,9	0,74	1,80	20,20
5			160	**5,56**	91,2	1,10	0,00	21,20
5			200	**0,37**	92,8	1,59	0,00	25,00
6	2488	2499						
6			20	**35,05**	64,5	0,00	5,60	6,60
6			25	**31,20**	68,5	0,05	5,40	8,40
6			32	**28,77**	74,0	0,07	5,20	10,80
6			40	**26,62**	77,5	0,12	5,00	11,40
6			50	**25,37**	82,6	0,17	4,70	13,00
6			63	**18,57**	83,9	0,27	4,30	16,60
6			80	**13,85**	86,7	0,40	3,70	19,70
6			100	**12,72**	91,4	0,62	3,00	21,20
6			125	**7,70**	89,9	0,95	1,80	20,20
6			160	**3,02**	91,2	1,42	0,00	21,20
6			200	**-2,30**	92,8	2,05	0,00	25,00
7	2614	2624						
7			20	**34,62**	64,5	0,00	5,60	6,60
7			25	**30,77**	68,5	0,05	5,40	8,40
7			32	**28,34**	74,0	0,08	5,20	10,80
7			40	**26,19**	77,5	0,13	5,00	11,40
7			50	**24,94**	82,6	0,18	4,70	13,00
7			63	**18,13**	83,9	0,29	4,30	16,60
7			80	**13,40**	86,7	0,42	3,70	19,70
7			100	**12,27**	91,4	0,66	3,00	21,20
7			125	**7,23**	89,9	1,00	1,80	20,20
7			160	**2,53**	91,2	1,50	0,00	21,20
7			200	**-2,83**	92,8	2,15	0,00	25,00
8	3622	3628						
8			20	**31,81**	64,5	0,00	5,60	6,60
8			25	**27,93**	68,5	0,07	5,40	8,40
8			32	**25,50**	74,0	0,11	5,20	10,80
8			40	**23,33**	77,5	0,18	5,00	11,40
8			50	**22,05**	82,6	0,25	4,70	13,00
8			63	**15,21**	83,9	0,40	4,30	16,60
8			80	**10,43**	86,7	0,58	3,70	19,70
8			100	**9,20**	91,4	0,91	3,00	21,20
8			125	**4,03**	89,9	1,38	1,80	20,20
8			160	**-0,86**	91,2	2,07	0,00	21,20
8			200	**-6,47**	92,8	2,97	0,00	25,00
Sum								
Sum			20	**44,91**				
Sum			25	**41,06**				

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
Sum			32	**38,64**				
Sum			40	**36,50**				
Sum			50	**35,25**				
Sum			63	**28,47**				
Sum			80	**23,76**				
Sum			100	**22,66**				
Sum			125	**17,67**				
Sum			160	**13,06**				
Sum			200	**7,82**				

Noise sensitive area: RH03 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH03)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2743	2753						
1			20	**34,20**	64,5	0,00	5,60	6,60
1			25	**30,35**	68,5	0,06	5,40	8,40
1			32	**27,92**	74,0	0,08	5,20	10,80
1			40	**25,76**	77,5	0,14	5,00	11,40
1			50	**24,51**	82,6	0,19	4,70	13,00
1			63	**17,70**	83,9	0,30	4,30	16,60
1			80	**12,96**	86,7	0,44	3,70	19,70
1			100	**11,81**	91,4	0,69	3,00	21,20
1			125	**6,76**	89,9	1,05	1,80	20,20
1			160	**2,03**	91,2	1,57	0,00	21,20
1			200	**-3,36**	92,8	2,26	0,00	25,00
2	2491	2503						
2			20	**35,03**	64,5	0,00	5,60	6,60
2			25	**31,18**	68,5	0,05	5,40	8,40
2			32	**28,76**	74,0	0,08	5,20	10,80
2			40	**26,61**	77,5	0,13	5,00	11,40
2			50	**25,36**	82,6	0,18	4,70	13,00
2			63	**18,55**	83,9	0,28	4,30	16,60
2			80	**13,83**	86,7	0,40	3,70	19,70
2			100	**12,70**	91,4	0,63	3,00	21,20
2			125	**7,68**	89,9	0,95	1,80	20,20
2			160	**3,00**	91,2	1,43	0,00	21,20
2			200	**-2,32**	92,8	2,05	0,00	25,00
3	1936	1949						
3			20	**37,21**	64,5	0,00	5,60	6,60
3			25	**33,37**	68,5	0,04	5,40	8,40
3			32	**30,95**	74,0	0,06	5,20	10,80
3			40	**28,81**	77,5	0,10	5,00	11,40
3			50	**27,57**	82,6	0,14	4,70	13,00
3			63	**20,79**	83,9	0,21	4,30	16,60
3			80	**16,09**	86,7	0,31	3,70	19,70
3			100	**15,02**	91,4	0,49	3,00	21,20
3			125	**10,07**	89,9	0,74	1,80	20,20
3			160	**5,50**	91,2	1,11	0,00	21,20
3			200	**0,31**	92,8	1,60	0,00	25,00
4	1556	1571						
4			20	**39,07**	64,5	0,00	5,60	6,60
4			25	**35,24**	68,5	0,03	5,40	8,40
4			32	**32,83**	74,0	0,05	5,20	10,80
4			40	**30,70**	77,5	0,08	5,00	11,40
4			50	**29,46**	82,6	0,11	4,70	13,00
4			63	**22,70**	83,9	0,17	4,30	16,60
4			80	**18,02**	86,7	0,25	3,70	19,70
4			100	**16,98**	91,4	0,39	3,00	21,20
4			125	**12,08**	89,9	0,60	1,80	20,20
4			160	**7,58**	91,2	0,90	0,00	21,20
4			200	**2,49**	92,8	1,29	0,00	25,00
5	1888	1901						

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
5			20	**37,42**	64,5	0,00	5,60	6,60
5			25	**33,58**	68,5	0,04	5,40	8,40
5			32	**31,16**	74,0	0,06	5,20	10,80
5			40	**29,02**	77,5	0,10	5,00	11,40
5			50	**27,79**	82,6	0,13	4,70	13,00
5			63	**21,01**	83,9	0,21	4,30	16,60
5			80	**16,31**	86,7	0,30	3,70	19,70
5			100	**15,24**	91,4	0,48	3,00	21,20
5			125	**10,30**	89,9	0,72	1,80	20,20
5			160	**5,74**	91,2	1,08	0,00	21,20
5			200	**0,56**	92,8	1,56	0,00	25,00
6	2433	2444						
6			20	**35,24**	64,5	0,00	5,60	6,60
6			25	**31,39**	68,5	0,05	5,40	8,40
6			32	**28,97**	74,0	0,07	5,20	10,80
6			40	**26,82**	77,5	0,12	5,00	11,40
6			50	**25,57**	82,6	0,17	4,70	13,00
6			63	**18,77**	83,9	0,27	4,30	16,60
6			80	**14,05**	86,7	0,39	3,70	19,70
6			100	**12,93**	91,4	0,61	3,00	21,20
6			125	**7,91**	89,9	0,93	1,80	20,20
6			160	**3,25**	91,2	1,39	0,00	21,20
6			200	**-2,07**	92,8	2,00	0,00	25,00
7	2572	2582						
7			20	**34,76**	64,5	0,00	5,60	6,60
7			25	**30,91**	68,5	0,05	5,40	8,40
7			32	**28,48**	74,0	0,08	5,20	10,80
7			40	**26,33**	77,5	0,13	5,00	11,40
7			50	**25,08**	82,6	0,18	4,70	13,00
7			63	**18,28**	83,9	0,28	4,30	16,60
7			80	**13,55**	86,7	0,41	3,70	19,70
7			100	**12,42**	91,4	0,65	3,00	21,20
7			125	**7,38**	89,9	0,98	1,80	20,20
7			160	**2,69**	91,2	1,47	0,00	21,20
7			200	**-2,66**	92,8	2,12	0,00	25,00
8	3600	3607						
8			20	**31,86**	64,5	0,00	5,60	6,60
8			25	**27,99**	68,5	0,07	5,40	8,40
8			32	**25,55**	74,0	0,11	5,20	10,80
8			40	**23,38**	77,5	0,18	5,00	11,40
8			50	**22,11**	82,6	0,25	4,70	13,00
8			63	**15,26**	83,9	0,40	4,30	16,60
8			80	**10,48**	86,7	0,58	3,70	19,70
8			100	**9,26**	91,4	0,90	3,00	21,20
8			125	**4,09**	89,9	1,37	1,80	20,20
8			160	**-0,80**	91,2	2,06	0,00	21,20
8			200	**-6,40**	92,8	2,96	0,00	25,00
Sum								
Sum			20	**45,12**				
Sum			25	**41,28**				
Sum			32	**38,86**				
Sum			40	**36,72**				
Sum			50	**35,47**				
Sum			63	**28,69**				
Sum			80	**23,98**				
Sum			100	**22,89**				
Sum			125	**17,91**				
Sum			160	**13,31**				
Sum			200	**8,08**				

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

Noise sensitive area: RH04 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH04)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2472	2484						
1			20	**35,10**	64,5	0,00	5,60	6,60
1			25	**31,25**	68,5	0,05	5,40	8,40
1			32	**28,82**	74,0	0,07	5,20	10,80
1			40	**26,67**	77,5	0,12	5,00	11,40
1			50	**25,42**	82,6	0,17	4,70	13,00
1			63	**18,63**	83,9	0,27	4,30	16,60
1			80	**13,90**	86,7	0,40	3,70	19,70
1			100	**12,78**	91,4	0,62	3,00	21,20
1			125	**7,75**	89,9	0,94	1,80	20,20
1			160	**3,08**	91,2	1,42	0,00	21,20
1			200	**-2,24**	92,8	2,04	0,00	25,00
2	2242	2255						
2			20	**35,94**	64,5	0,00	5,60	6,60
2			25	**32,09**	68,5	0,05	5,40	8,40
2			32	**29,67**	74,0	0,07	5,20	10,80
2			40	**27,52**	77,5	0,11	5,00	11,40
2			50	**26,28**	82,6	0,16	4,70	13,00
2			63	**19,49**	83,9	0,25	4,30	16,60
2			80	**14,78**	86,7	0,36	3,70	19,70
2			100	**13,67**	91,4	0,56	3,00	21,20
2			125	**8,68**	89,9	0,86	1,80	20,20
2			160	**4,05**	91,2	1,29	0,00	21,20
2			200	**-1,21**	92,8	1,85	0,00	25,00
3	1720	1734						
3			20	**38,22**	64,5	0,00	5,60	6,60
3			25	**34,38**	68,5	0,03	5,40	8,40
3			32	**31,97**	74,0	0,05	5,20	10,80
3			40	**29,83**	77,5	0,09	5,00	11,40
3			50	**28,60**	82,6	0,12	4,70	13,00
3			63	**21,83**	83,9	0,19	4,30	16,60
3			80	**17,14**	86,7	0,28	3,70	19,70
3			100	**16,09**	91,4	0,43	3,00	21,20
3			125	**11,16**	89,9	0,66	1,80	20,20
3			160	**6,63**	91,2	0,99	0,00	21,20
3			200	**1,50**	92,8	1,42	0,00	25,00
4	1408	1425						
4			20	**39,92**	64,5	0,00	5,60	6,60
4			25	**36,09**	68,5	0,03	5,40	8,40
4			32	**33,68**	74,0	0,04	5,20	10,80
4			40	**31,55**	77,5	0,07	5,00	11,40
4			50	**30,32**	82,6	0,10	4,70	13,00
4			63	**23,57**	83,9	0,16	4,30	16,60
4			80	**18,89**	86,7	0,23	3,70	19,70
4			100	**17,87**	91,4	0,36	3,00	21,20
4			125	**12,98**	89,9	0,54	1,80	20,20
4			160	**8,51**	91,2	0,81	0,00	21,20
4			200	**3,45**	92,8	1,17	0,00	25,00
5	1778	1792						
5			20	**37,93**	64,5	0,00	5,60	6,60
5			25	**34,10**	68,5	0,04	5,40	8,40
5			32	**31,68**	74,0	0,05	5,20	10,80
5			40	**29,55**	77,5	0,09	5,00	11,40
5			50	**28,31**	82,6	0,13	4,70	13,00
5			63	**21,54**	83,9	0,20	4,30	16,60
5			80	**16,85**	86,7	0,29	3,70	19,70
5			100	**15,79**	91,4	0,45	3,00	21,20
5			125	**10,85**	89,9	0,68	1,80	20,20
5			160	**6,31**	91,2	1,02	0,00	21,20
5			200	**1,17**	92,8	1,47	0,00	25,00
6	2248	2259						
6			20	**35,92**	64,5	0,00	5,60	6,60
6			25	**32,08**	68,5	0,05	5,40	8,40

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
6			32	**29,65**	74,0	0,07	5,20	10,80
6			40	**27,51**	77,5	0,11	5,00	11,40
6			50	**26,26**	82,6	0,16	4,70	13,00
6			63	**19,47**	83,9	0,25	4,30	16,60
6			80	**14,76**	86,7	0,36	3,70	19,70
6			100	**13,66**	91,4	0,56	3,00	21,20
6			125	**8,66**	89,9	0,86	1,80	20,20
6			160	**4,03**	91,2	1,29	0,00	21,20
6			200	**-1,23**	92,8	1,85	0,00	25,00
7	2433	2443						
7			20	**35,24**	64,5	0,00	5,60	6,60
7			25	**31,39**	68,5	0,05	5,40	8,40
7			32	**28,97**	74,0	0,07	5,20	10,80
7			40	**26,82**	77,5	0,12	5,00	11,40
7			50	**25,57**	82,6	0,17	4,70	13,00
7			63	**18,77**	83,9	0,27	4,30	16,60
7			80	**14,05**	86,7	0,39	3,70	19,70
7			100	**12,93**	91,4	0,61	3,00	21,20
7			125	**7,91**	89,9	0,93	1,80	20,20
7			160	**3,25**	91,2	1,39	0,00	21,20
7			200	**-2,06**	92,8	2,00	0,00	25,00
8	3525	3532						
8			20	**32,04**	64,5	0,00	5,60	6,60
8			25	**28,17**	68,5	0,07	5,40	8,40
8			32	**25,73**	74,0	0,11	5,20	10,80
8			40	**23,56**	77,5	0,18	5,00	11,40
8			50	**22,29**	82,6	0,25	4,70	13,00
8			63	**15,45**	83,9	0,39	4,30	16,60
8			80	**10,68**	86,7	0,57	3,70	19,70
8			100	**9,46**	91,4	0,88	3,00	21,20
8			125	**4,30**	89,9	1,34	1,80	20,20
8			160	**-0,57**	91,2	2,01	0,00	21,20
8			200	**-6,16**	92,8	2,90	0,00	25,00
Sum								
Sum			20	**45,88**				
Sum			25	**42,04**				
Sum			32	**39,62**				
Sum			40	**37,48**				
Sum			50	**36,24**				
Sum			63	**29,46**				
Sum			80	**24,76**				
Sum			100	**23,69**				
Sum			125	**18,73**				
Sum			160	**14,16**				
Sum			200	**8,98**				

Noise sensitive area: RH05 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH05)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2172	2185						
1			20	**36,21**	64,5	0,00	5,60	6,60
1			25	**32,37**	68,5	0,04	5,40	8,40
1			32	**29,95**	74,0	0,07	5,20	10,80
1			40	**27,80**	77,5	0,11	5,00	11,40
1			50	**26,56**	82,6	0,15	4,70	13,00
1			63	**19,77**	83,9	0,24	4,30	16,60
1			80	**15,06**	86,7	0,35	3,70	19,70
1			100	**13,97**	91,4	0,55	3,00	21,20
1			125	**8,98**	89,9	0,83	1,80	20,20
1			160	**4,37**	91,2	1,25	0,00	21,20
1			200	**-0,88**	92,8	1,79	0,00	25,00
2	2027	2041						

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
2			20	**36,80**	64,5	0,00	5,60	6,60
2			25	**32,96**	68,5	0,04	5,40	8,40
2			32	**30,54**	74,0	0,06	5,20	10,80
2			40	**28,40**	77,5	0,10	5,00	11,40
2			50	**27,16**	82,6	0,14	4,70	13,00
2			63	**20,38**	83,9	0,22	4,30	16,60
2			80	**15,67**	86,7	0,33	3,70	19,70
2			100	**14,59**	91,4	0,51	3,00	21,20
2			125	**9,63**	89,9	0,78	1,80	20,20
2			160	**5,04**	91,2	1,16	0,00	21,20
2			200	**-0,17**	92,8	1,67	0,00	25,00
3	1641	1655						
3			20	**38,62**	64,5	0,00	5,60	6,60
3			25	**34,79**	68,5	0,03	5,40	8,40
3			32	**32,37**	74,0	0,05	5,20	10,80
3			40	**30,24**	77,5	0,08	5,00	11,40
3			50	**29,01**	82,6	0,12	4,70	13,00
3			63	**22,24**	83,9	0,18	4,30	16,60
3			80	**17,56**	86,7	0,26	3,70	19,70
3			100	**16,51**	91,4	0,41	3,00	21,20
3			125	**11,59**	89,9	0,63	1,80	20,20
3			160	**7,08**	91,2	0,94	0,00	21,20
3			200	**1,96**	92,8	1,36	0,00	25,00
4	1528	1544						
4			20	**39,23**	64,5	0,00	5,60	6,60
4			25	**35,40**	68,5	0,03	5,40	8,40
4			32	**32,98**	74,0	0,05	5,20	10,80
4			40	**30,85**	77,5	0,08	5,00	11,40
4			50	**29,62**	82,6	0,11	4,70	13,00
4			63	**22,86**	83,9	0,17	4,30	16,60
4			80	**18,18**	86,7	0,25	3,70	19,70
4			100	**17,14**	91,4	0,39	3,00	21,20
4			125	**12,24**	89,9	0,59	1,80	20,20
4			160	**7,75**	91,2	0,88	0,00	21,20
4			200	**2,66**	92,8	1,27	0,00	25,00
5	1940	1953						
5			20	**37,18**	64,5	0,00	5,60	6,60
5			25	**33,35**	68,5	0,04	5,40	8,40
5			32	**30,93**	74,0	0,06	5,20	10,80
5			40	**28,79**	77,5	0,10	5,00	11,40
5			50	**27,55**	82,6	0,14	4,70	13,00
5			63	**20,77**	83,9	0,21	4,30	16,60
5			80	**16,07**	86,7	0,31	3,70	19,70
5			100	**15,00**	91,4	0,49	3,00	21,20
5			125	**10,04**	89,9	0,74	1,80	20,20
5			160	**5,47**	91,2	1,11	0,00	21,20
5			200	**0,28**	92,8	1,60	0,00	25,00
6	2216	2228						
6			20	**36,04**	64,5	0,00	5,60	6,60
6			25	**32,20**	68,5	0,04	5,40	8,40
6			32	**29,77**	74,0	0,07	5,20	10,80
6			40	**27,63**	77,5	0,11	5,00	11,40
6			50	**26,39**	82,6	0,16	4,70	13,00
6			63	**19,60**	83,9	0,25	4,30	16,60
6			80	**14,89**	86,7	0,36	3,70	19,70
6			100	**13,78**	91,4	0,56	3,00	21,20
6			125	**8,79**	89,9	0,85	1,80	20,20
6			160	**4,17**	91,2	1,27	0,00	21,20
6			200	**-1,09**	92,8	1,83	0,00	25,00
7	2499	2510						
7			20	**35,01**	64,5	0,00	5,60	6,60
7			25	**31,16**	68,5	0,05	5,40	8,40
7			32	**28,73**	74,0	0,08	5,20	10,80
7			40	**26,58**	77,5	0,13	5,00	11,40

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
7			50	**25,33**	82,6	0,18	4,70	13,00
7			63	**18,53**	83,9	0,28	4,30	16,60
7			80	**13,81**	86,7	0,40	3,70	19,70
7			100	**12,68**	91,4	0,63	3,00	21,20
7			125	**7,65**	89,9	0,95	1,80	20,20
7			160	**2,98**	91,2	1,43	0,00	21,20
7			200	**-2,35**	92,8	2,06	0,00	25,00
8	3690	3696						
8			20	**31,64**	64,5	0,00	5,60	6,60
8			25	**27,77**	68,5	0,07	5,40	8,40
8			32	**25,33**	74,0	0,11	5,20	10,80
8			40	**23,16**	77,5	0,18	5,00	11,40
8			50	**21,89**	82,6	0,26	4,70	13,00
8			63	**15,04**	83,9	0,41	4,30	16,60
8			80	**10,25**	86,7	0,59	3,70	19,70
8			100	**9,02**	91,4	0,92	3,00	21,20
8			125	**3,84**	89,9	1,40	1,80	20,20
8			160	**-1,06**	91,2	2,11	0,00	21,20
8			200	**-6,69**	92,8	3,03	0,00	25,00
Sum								
Sum			20	**45,85**				
Sum			25	**42,01**				
Sum			32	**39,59**				
Sum			40	**37,46**				
Sum			50	**36,22**				
Sum			63	**29,44**				
Sum			80	**24,74**				
Sum			100	**23,66**				
Sum			125	**18,70**				
Sum			160	**14,13**				
Sum			200	**8,94**				

Noise sensitive area: RH06 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH06)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	1711	1727						
1			20	**38,25**	64,5	0,00	5,60	6,60
1			25	**34,42**	68,5	0,03	5,40	8,40
1			32	**32,00**	74,0	0,05	5,20	10,80
1			40	**29,87**	77,5	0,09	5,00	11,40
1			50	**28,63**	82,6	0,12	4,70	13,00
1			63	**21,86**	83,9	0,19	4,30	16,60
1			80	**17,18**	86,7	0,28	3,70	19,70
1			100	**16,12**	91,4	0,43	3,00	21,20
1			125	**11,20**	89,9	0,66	1,80	20,20
1			160	**6,67**	91,2	0,98	0,00	21,20
1			200	**1,54**	92,8	1,42	0,00	25,00
2	1765	1781						
2			20	**37,99**	64,5	0,00	5,60	6,60
2			25	**34,15**	68,5	0,04	5,40	8,40
2			32	**31,73**	74,0	0,05	5,20	10,80
2			40	**29,60**	77,5	0,09	5,00	11,40
2			50	**28,36**	82,6	0,12	4,70	13,00
2			63	**21,59**	83,9	0,20	4,30	16,60
2			80	**16,90**	86,7	0,28	3,70	19,70
2			100	**15,84**	91,4	0,45	3,00	21,20
2			125	**10,91**	89,9	0,68	1,80	20,20
2			160	**6,37**	91,2	1,02	0,00	21,20
2			200	**1,23**	92,8	1,46	0,00	25,00
3	1718	1731						
3			20	**38,23**	64,5	0,00	5,60	6,60
3			25	**34,40**	68,5	0,03	5,40	8,40

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
3			32	**31,98**	74,0	0,05	5,20	10,80
3			40	**29,85**	77,5	0,09	5,00	11,40
3			50	**28,61**	82,6	0,12	4,70	13,00
3			63	**21,84**	83,9	0,19	4,30	16,60
3			80	**17,16**	86,7	0,28	3,70	19,70
3			100	**16,10**	91,4	0,43	3,00	21,20
3			125	**11,18**	89,9	0,66	1,80	20,20
3			160	**6,65**	91,2	0,99	0,00	21,20
3			200	**1,51**	92,8	1,42	0,00	25,00
4	1933	1945						
4			20	**37,22**	64,5	0,00	5,60	6,60
4			25	**33,38**	68,5	0,04	5,40	8,40
4			32	**30,96**	74,0	0,06	5,20	10,80
4			40	**28,82**	77,5	0,10	5,00	11,40
4			50	**27,59**	82,6	0,14	4,70	13,00
4			63	**20,81**	83,9	0,21	4,30	16,60
4			80	**16,11**	86,7	0,31	3,70	19,70
4			100	**15,04**	91,4	0,49	3,00	21,20
4			125	**10,08**	89,9	0,74	1,80	20,20
4			160	**5,51**	91,2	1,11	0,00	21,20
4			200	**0,33**	92,8	1,59	0,00	25,00
5	2320	2331						
5			20	**35,65**	64,5	0,00	5,60	6,60
5			25	**31,80**	68,5	0,05	5,40	8,40
5			32	**29,38**	74,0	0,07	5,20	10,80
5			40	**27,23**	77,5	0,12	5,00	11,40
5			50	**25,99**	82,6	0,16	4,70	13,00
5			63	**19,19**	83,9	0,26	4,30	16,60
5			80	**14,48**	86,7	0,37	3,70	19,70
5			100	**13,37**	91,4	0,58	3,00	21,20
5			125	**8,36**	89,9	0,89	1,80	20,20
5			160	**3,72**	91,2	1,33	0,00	21,20
5			200	**-1,56**	92,8	1,91	0,00	25,00
6	2250	2261						
6			20	**35,91**	64,5	0,00	5,60	6,60
6			25	**32,07**	68,5	0,05	5,40	8,40
6			32	**29,65**	74,0	0,07	5,20	10,80
6			40	**27,50**	77,5	0,11	5,00	11,40
6			50	**26,26**	82,6	0,16	4,70	13,00
6			63	**19,47**	83,9	0,25	4,30	16,60
6			80	**14,75**	86,7	0,36	3,70	19,70
6			100	**13,65**	91,4	0,57	3,00	21,20
6			125	**8,66**	89,9	0,86	1,80	20,20
6			160	**4,03**	91,2	1,29	0,00	21,20
6			200	**-1,24**	92,8	1,85	0,00	25,00
7	2654	2663						
7			20	**34,49**	64,5	0,00	5,60	6,60
7			25	**30,64**	68,5	0,05	5,40	8,40
7			32	**28,21**	74,0	0,08	5,20	10,80
7			40	**26,06**	77,5	0,13	5,00	11,40
7			50	**24,81**	82,6	0,19	4,70	13,00
7			63	**18,00**	83,9	0,29	4,30	16,60
7			80	**13,27**	86,7	0,43	3,70	19,70
7			100	**12,13**	91,4	0,67	3,00	21,20
7			125	**7,08**	89,9	1,01	1,80	20,20
7			160	**2,37**	91,2	1,52	0,00	21,20
7			200	**-2,99**	92,8	2,18	0,00	25,00
8	3906	3912						
8			20	**31,15**	64,5	0,00	5,60	6,60
8			25	**27,27**	68,5	0,08	5,40	8,40
8			32	**24,83**	74,0	0,12	5,20	10,80
8			40	**22,66**	77,5	0,20	5,00	11,40
8			50	**21,38**	82,6	0,27	4,70	13,00
8			63	**14,52**	83,9	0,43	4,30	16,60

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
8			80	**9,73**	86,7	0,63	3,70	19,70
8			100	**8,47**	91,4	0,98	3,00	21,20
8			125	**3,27**	89,9	1,49	1,80	20,20
8			160	**-1,68**	91,2	2,23	0,00	21,20
8			200	**-7,36**	92,8	3,21	0,00	25,00
Sum								
Sum			20	**45,64**				
Sum			25	**41,79**				
Sum			32	**39,37**				
Sum			40	**37,23**				
Sum			50	**35,99**				
Sum			63	**29,21**				
Sum			80	**24,51**				
Sum			100	**23,43**				
Sum			125	**18,47**				
Sum			160	**13,88**				
Sum			200	**8,68**				

Noise sensitive area: RH07 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH07)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2017	2031						
1			20	**36,85**	64,5	0,00	5,60	6,60
1			25	**33,01**	68,5	0,04	5,40	8,40
1			32	**30,59**	74,0	0,06	5,20	10,80
1			40	**28,45**	77,5	0,10	5,00	11,40
1			50	**27,21**	82,6	0,14	4,70	13,00
1			63	**20,42**	83,9	0,22	4,30	16,60
1			80	**15,72**	86,7	0,32	3,70	19,70
1			100	**14,64**	91,4	0,51	3,00	21,20
1			125	**9,68**	89,9	0,77	1,80	20,20
1			160	**5,09**	91,2	1,16	0,00	21,20
1			200	**-0,12**	92,8	1,67	0,00	25,00
2	2396	2408						
2			20	**35,37**	64,5	0,00	5,60	6,60
2			25	**31,52**	68,5	0,05	5,40	8,40
2			32	**29,10**	74,0	0,07	5,20	10,80
2			40	**26,95**	77,5	0,12	5,00	11,40
2			50	**25,70**	82,6	0,17	4,70	13,00
2			63	**18,90**	83,9	0,26	4,30	16,60
2			80	**14,18**	86,7	0,39	3,70	19,70
2			100	**13,07**	91,4	0,60	3,00	21,20
2			125	**8,05**	89,9	0,91	1,80	20,20
2			160	**3,40**	91,2	1,37	0,00	21,20
2			200	**-1,91**	92,8	1,97	0,00	25,00
3	2869	2877						
3			20	**33,82**	64,5	0,00	5,60	6,60
3			25	**29,96**	68,5	0,06	5,40	8,40
3			32	**27,53**	74,0	0,09	5,20	10,80
3			40	**25,38**	77,5	0,14	5,00	11,40
3			50	**24,12**	82,6	0,20	4,70	13,00
3			63	**17,30**	83,9	0,32	4,30	16,60
3			80	**12,56**	86,7	0,46	3,70	19,70
3			100	**11,40**	91,4	0,72	3,00	21,20
3			125	**6,33**	89,9	1,09	1,80	20,20
3			160	**1,58**	91,2	1,64	0,00	21,20
3			200	**-3,84**	92,8	2,36	0,00	25,00
4	3372	3379						
4			20	**32,42**	64,5	0,00	5,60	6,60
4			25	**28,56**	68,5	0,07	5,40	8,40
4			32	**26,12**	74,0	0,10	5,20	10,80
4			40	**23,96**	77,5	0,17	5,00	11,40

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
4			50	**22,69**	82,6	0,24	4,70	13,00
4			63	**15,85**	83,9	0,37	4,30	16,60
4			80	**11,08**	86,7	0,54	3,70	19,70
4			100	**9,88**	91,4	0,84	3,00	21,20
4			125	**4,74**	89,9	1,28	1,80	20,20
4			160	**-0,10**	91,2	1,93	0,00	21,20
4			200	**-5,65**	92,8	2,77	0,00	25,00
5	3613	3619						
5			20	**31,83**	64,5	0,00	5,60	6,60
5			25	**27,95**	68,5	0,07	5,40	8,40
5			32	**25,52**	74,0	0,11	5,20	10,80
5			40	**23,35**	77,5	0,18	5,00	11,40
5			50	**22,07**	82,6	0,25	4,70	13,00
5			63	**15,23**	83,9	0,40	4,30	16,60
5			80	**10,45**	86,7	0,58	3,70	19,70
5			100	**9,22**	91,4	0,90	3,00	21,20
5			125	**4,05**	89,9	1,38	1,80	20,20
5			160	**-0,84**	91,2	2,06	0,00	21,20
5			200	**-6,44**	92,8	2,97	0,00	25,00
6	3091	3099						
6			20	**33,17**	64,5	0,00	5,60	6,60
6			25	**29,31**	68,5	0,06	5,40	8,40
6			32	**26,88**	74,0	0,09	5,20	10,80
6			40	**24,72**	77,5	0,15	5,00	11,40
6			50	**23,46**	82,6	0,22	4,70	13,00
6			63	**16,63**	83,9	0,34	4,30	16,60
6			80	**11,88**	86,7	0,50	3,70	19,70
6			100	**10,70**	91,4	0,77	3,00	21,20
6			125	**5,60**	89,9	1,18	1,80	20,20
6			160	**0,81**	91,2	1,77	0,00	21,20
6			200	**-4,67**	92,8	2,54	0,00	25,00
7	3536	3543						
7			20	**32,01**	64,5	0,00	5,60	6,60
7			25	**28,14**	68,5	0,07	5,40	8,40
7			32	**25,71**	74,0	0,11	5,20	10,80
7			40	**23,54**	77,5	0,18	5,00	11,40
7			50	**22,27**	82,6	0,25	4,70	13,00
7			63	**15,42**	83,9	0,39	4,30	16,60
7			80	**10,65**	86,7	0,57	3,70	19,70
7			100	**9,43**	91,4	0,89	3,00	21,20
7			125	**4,27**	89,9	1,35	1,80	20,20
7			160	**-0,61**	91,2	2,02	0,00	21,20
7			200	**-6,19**	92,8	2,91	0,00	25,00
8	4608	4613						
8			20	**29,72**	64,5	0,00	5,60	6,60
8			25	**25,83**	68,5	0,09	5,40	8,40
8			32	**23,38**	74,0	0,14	5,20	10,80
8			40	**21,19**	77,5	0,23	5,00	11,40
8			50	**19,90**	82,6	0,32	4,70	13,00
8			63	**13,01**	83,9	0,51	4,30	16,60
8			80	**8,18**	86,7	0,74	3,70	19,70
8			100	**6,87**	91,4	1,15	3,00	21,20
8			125	**1,57**	89,9	1,75	1,80	20,20
8			160	**-3,51**	91,2	2,63	0,00	21,20
8			200	**-9,36**	92,8	3,78	0,00	25,00
Sum								
Sum			20	**42,69**				
Sum			25	**38,83**				
Sum			32	**36,40**				
Sum			40	**34,24**				
Sum			50	**32,99**				
Sum			63	**26,17**				
Sum			80	**21,43**				
Sum			100	**20,28**				

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
Sum			125	**15,21**				
Sum			160	**10,48**				
Sum			200	**5,09**				

Noise sensitive area: RH08 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH08)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	1911	1925						
1			20	**37,31**	64,5	0,00	5,60	6,60
1			25	**33,47**	68,5	0,04	5,40	8,40
1			32	**31,05**	74,0	0,06	5,20	10,80
1			40	**28,92**	77,5	0,10	5,00	11,40
1			50	**27,68**	82,6	0,13	4,70	13,00
1			63	**20,90**	83,9	0,21	4,30	16,60
1			80	**16,20**	86,7	0,31	3,70	19,70
1			100	**15,13**	91,4	0,48	3,00	21,20
1			125	**10,18**	89,9	0,73	1,80	20,20
1			160	**5,61**	91,2	1,10	0,00	21,20
1			200	**0,43**	92,8	1,58	0,00	25,00
2	2314	2326						
2			20	**35,67**	64,5	0,00	5,60	6,60
2			25	**31,82**	68,5	0,05	5,40	8,40
2			32	**29,40**	74,0	0,07	5,20	10,80
2			40	**27,25**	77,5	0,12	5,00	11,40
2			50	**26,01**	82,6	0,16	4,70	13,00
2			63	**19,21**	83,9	0,26	4,30	16,60
2			80	**14,50**	86,7	0,37	3,70	19,70
2			100	**13,39**	91,4	0,58	3,00	21,20
2			125	**8,38**	89,9	0,88	1,80	20,20
2			160	**3,74**	91,2	1,33	0,00	21,20
2			200	**-1,54**	92,8	1,91	0,00	25,00
3	2885	2893						
3			20	**33,77**	64,5	0,00	5,60	6,60
3			25	**29,91**	68,5	0,06	5,40	8,40
3			32	**27,49**	74,0	0,09	5,20	10,80
3			40	**25,33**	77,5	0,14	5,00	11,40
3			50	**24,07**	82,6	0,20	4,70	13,00
3			63	**17,25**	83,9	0,32	4,30	16,60
3			80	**12,51**	86,7	0,46	3,70	19,70
3			100	**11,35**	91,4	0,72	3,00	21,20
3			125	**6,27**	89,9	1,10	1,80	20,20
3			160	**1,52**	91,2	1,65	0,00	21,20
3			200	**-3,90**	92,8	2,37	0,00	25,00
4	3436	3442						
4			20	**32,26**	64,5	0,00	5,60	6,60
4			25	**28,39**	68,5	0,07	5,40	8,40
4			32	**25,96**	74,0	0,10	5,20	10,80
4			40	**23,79**	77,5	0,17	5,00	11,40
4			50	**22,52**	82,6	0,24	4,70	13,00
4			63	**15,68**	83,9	0,38	4,30	16,60
4			80	**10,91**	86,7	0,55	3,70	19,70
4			100	**9,70**	91,4	0,86	3,00	21,20
4			125	**4,56**	89,9	1,31	1,80	20,20
4			160	**-0,30**	91,2	1,96	0,00	21,20
4			200	**-5,86**	92,8	2,82	0,00	25,00
5	3603	3610						
5			20	**31,85**	64,5	0,00	5,60	6,60
5			25	**27,98**	68,5	0,07	5,40	8,40
5			32	**25,54**	74,0	0,11	5,20	10,80
5			40	**23,37**	77,5	0,18	5,00	11,40
5			50	**22,10**	82,6	0,25	4,70	13,00
5			63	**15,25**	83,9	0,40	4,30	16,60

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
5			80	**10,47**	86,7	0,58	3,70	19,70
5			100	**9,25**	91,4	0,90	3,00	21,20
5			125	**4,08**	89,9	1,37	1,80	20,20
5			160	**-0,81**	91,2	2,06	0,00	21,20
5			200	**-6,41**	92,8	2,96	0,00	25,00
6	2974	2983						
6			20	**33,51**	64,5	0,00	5,60	6,60
6			25	**29,65**	68,5	0,06	5,40	8,40
6			32	**27,22**	74,0	0,09	5,20	10,80
6			40	**25,06**	77,5	0,15	5,00	11,40
6			50	**23,80**	82,6	0,21	4,70	13,00
6			63	**16,98**	83,9	0,33	4,30	16,60
6			80	**12,23**	86,7	0,48	3,70	19,70
6			100	**11,06**	91,4	0,75	3,00	21,20
6			125	**5,97**	89,9	1,13	1,80	20,20
6			160	**1,21**	91,2	1,70	0,00	21,20
6			200	**-4,24**	92,8	2,45	0,00	25,00
7	3389	3396						
7			20	**32,38**	64,5	0,00	5,60	6,60
7			25	**28,51**	68,5	0,07	5,40	8,40
7			32	**26,08**	74,0	0,10	5,20	10,80
7			40	**23,91**	77,5	0,17	5,00	11,40
7			50	**22,64**	82,6	0,24	4,70	13,00
7			63	**15,81**	83,9	0,37	4,30	16,60
7			80	**11,04**	86,7	0,54	3,70	19,70
7			100	**9,83**	91,4	0,85	3,00	21,20
7			125	**4,69**	89,9	1,29	1,80	20,20
7			160	**-0,16**	91,2	1,94	0,00	21,20
7			200	**-5,70**	92,8	2,78	0,00	25,00
8	4335	4339						
8			20	**30,25**	64,5	0,00	5,60	6,60
8			25	**26,36**	68,5	0,09	5,40	8,40
8			32	**23,92**	74,0	0,13	5,20	10,80
8			40	**21,73**	77,5	0,22	5,00	11,40
8			50	**20,45**	82,6	0,30	4,70	13,00
8			63	**13,57**	83,9	0,48	4,30	16,60
8			80	**8,76**	86,7	0,69	3,70	19,70
8			100	**7,47**	91,4	1,08	3,00	21,20
8			125	**2,20**	89,9	1,65	1,80	20,20
8			160	**-2,82**	91,2	2,47	0,00	21,20
8			200	**-8,61**	92,8	3,56	0,00	25,00
Sum								
Sum			20	**42,95**				
Sum			25	**39,09**				
Sum			32	**36,66**				
Sum			40	**34,51**				
Sum			50	**33,25**				
Sum			63	**26,44**				
Sum			80	**21,71**				
Sum			100	**20,56**				
Sum			125	**15,51**				
Sum			160	**10,79**				
Sum			200	**5,42**				

Noise sensitive area: RH09 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH09)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	1952	1966						
1			20	**37,13**	64,5	0,00	5,60	6,60
1			25	**33,29**	68,5	0,04	5,40	8,40
1			32	**30,87**	74,0	0,06	5,20	10,80
1			40	**28,73**	77,5	0,10	5,00	11,40

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1			50	**27,49**	82,6	0,14	4,70	13,00
1			63	**20,71**	83,9	0,22	4,30	16,60
1			80	**16,01**	86,7	0,31	3,70	19,70
1			100	**14,94**	91,4	0,49	3,00	21,20
1			125	**9,98**	89,9	0,75	1,80	20,20
1			160	**5,41**	91,2	1,12	0,00	21,20
1			200	**0,22**	92,8	1,61	0,00	25,00
2	2354	2366						
2			20	**35,52**	64,5	0,00	5,60	6,60
2			25	**31,67**	68,5	0,05	5,40	8,40
2			32	**29,25**	74,0	0,07	5,20	10,80
2			40	**27,10**	77,5	0,12	5,00	11,40
2			50	**25,86**	82,6	0,17	4,70	13,00
2			63	**19,06**	83,9	0,26	4,30	16,60
2			80	**14,34**	86,7	0,38	3,70	19,70
2			100	**13,23**	91,4	0,59	3,00	21,20
2			125	**8,22**	89,9	0,90	1,80	20,20
2			160	**3,57**	91,2	1,35	0,00	21,20
2			200	**-1,72**	92,8	1,94	0,00	25,00
3	2949	2957						
3			20	**33,58**	64,5	0,00	5,60	6,60
3			25	**29,72**	68,5	0,06	5,40	8,40
3			32	**27,29**	74,0	0,09	5,20	10,80
3			40	**25,13**	77,5	0,15	5,00	11,40
3			50	**23,88**	82,6	0,21	4,70	13,00
3			63	**17,06**	83,9	0,33	4,30	16,60
3			80	**12,31**	86,7	0,47	3,70	19,70
3			100	**11,14**	91,4	0,74	3,00	21,20
3			125	**6,06**	89,9	1,12	1,80	20,20
3			160	**1,30**	91,2	1,69	0,00	21,20
3			200	**-4,14**	92,8	2,42	0,00	25,00
4	3509	3516						
4			20	**32,08**	64,5	0,00	5,60	6,60
4			25	**28,21**	68,5	0,07	5,40	8,40
4			32	**25,77**	74,0	0,11	5,20	10,80
4			40	**23,60**	77,5	0,18	5,00	11,40
4			50	**22,33**	82,6	0,25	4,70	13,00
4			63	**15,49**	83,9	0,39	4,30	16,60
4			80	**10,72**	86,7	0,56	3,70	19,70
4			100	**9,50**	91,4	0,88	3,00	21,20
4			125	**4,34**	89,9	1,34	1,80	20,20
4			160	**-0,52**	91,2	2,00	0,00	21,20
4			200	**-6,10**	92,8	2,88	0,00	25,00
5	3651	3657						
5			20	**31,74**	64,5	0,00	5,60	6,60
5			25	**27,86**	68,5	0,07	5,40	8,40
5			32	**25,43**	74,0	0,11	5,20	10,80
5			40	**23,25**	77,5	0,18	5,00	11,40
5			50	**21,98**	82,6	0,26	4,70	13,00
5			63	**15,13**	83,9	0,40	4,30	16,60
5			80	**10,35**	86,7	0,59	3,70	19,70
5			100	**9,12**	91,4	0,91	3,00	21,20
5			125	**3,95**	89,9	1,39	1,80	20,20
5			160	**-0,95**	91,2	2,08	0,00	21,20
5			200	**-6,56**	92,8	3,00	0,00	25,00
6	2990	2999						
6			20	**33,46**	64,5	0,00	5,60	6,60
6			25	**29,60**	68,5	0,06	5,40	8,40
6			32	**27,17**	74,0	0,09	5,20	10,80
6			40	**25,01**	77,5	0,15	5,00	11,40
6			50	**23,75**	82,6	0,21	4,70	13,00
6			63	**16,93**	83,9	0,33	4,30	16,60
6			80	**12,18**	86,7	0,48	3,70	19,70
6			100	**11,01**	91,4	0,75	3,00	21,20

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18.11.2019 15:40/3.3.247

DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
6			125	**5,92**	89,9	1,14	1,80	20,20
6			160	**1,15**	91,2	1,71	0,00	21,20
6			200	**-4,30**	92,8	2,46	0,00	25,00
7	3390	3397						
7			20	**32,38**	64,5	0,00	5,60	6,60
7			25	**28,51**	68,5	0,07	5,40	8,40
7			32	**26,08**	74,0	0,10	5,20	10,80
7			40	**23,91**	77,5	0,17	5,00	11,40
7			50	**22,64**	82,6	0,24	4,70	13,00
7			63	**15,80**	83,9	0,37	4,30	16,60
7			80	**11,03**	86,7	0,54	3,70	19,70
7			100	**9,83**	91,4	0,85	3,00	21,20
7			125	**4,69**	89,9	1,29	1,80	20,20
7			160	**-0,16**	91,2	1,94	0,00	21,20
7			200	**-5,71**	92,8	2,79	0,00	25,00
8	4281	4286						
8			20	**30,36**	64,5	0,00	5,60	6,60
8			25	**26,47**	68,5	0,09	5,40	8,40
8			32	**24,03**	74,0	0,13	5,20	10,80
8			40	**21,85**	77,5	0,21	5,00	11,40
8			50	**20,56**	82,6	0,30	4,70	13,00
8			63	**13,69**	83,9	0,47	4,30	16,60
8			80	**8,87**	86,7	0,69	3,70	19,70
8			100	**7,59**	91,4	1,07	3,00	21,20
8			125	**2,33**	89,9	1,63	1,80	20,20
8			160	**-2,68**	91,2	2,44	0,00	21,20
8			200	**-8,45**	92,8	3,51	0,00	25,00
Sum								
Sum			20	**42,82**				
Sum			25	**38,97**				
Sum			32	**36,54**				
Sum			40	**34,38**				
Sum			50	**33,13**				
Sum			63	**26,31**				
Sum			80	**21,57**				
Sum			100	**20,42**				
Sum			125	**15,36**				
Sum			160	**10,64**				
Sum			200	**5,26**				

Noise sensitive area: RH10 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH10)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2285	2297						
1			20	**35,78**	64,5	0,00	5,60	6,60
1			25	**31,93**	68,5	0,05	5,40	8,40
1			32	**29,51**	74,0	0,07	5,20	10,80
1			40	**27,36**	77,5	0,11	5,00	11,40
1			50	**26,12**	82,6	0,16	4,70	13,00
1			63	**19,32**	83,9	0,25	4,30	16,60
1			80	**14,61**	86,7	0,37	3,70	19,70
1			100	**13,50**	91,4	0,57	3,00	21,20
1			125	**8,50**	89,9	0,87	1,80	20,20
1			160	**3,87**	91,2	1,31	0,00	21,20
1			200	**-1,41**	92,8	1,88	0,00	25,00
2	2668	2678						
2			20	**34,44**	64,5	0,00	5,60	6,60
2			25	**30,59**	68,5	0,05	5,40	8,40
2			32	**28,16**	74,0	0,08	5,20	10,80
2			40	**26,01**	77,5	0,13	5,00	11,40
2			50	**24,76**	82,6	0,19	4,70	13,00
2			63	**17,95**	83,9	0,29	4,30	16,60

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
2			80	**13,21**	86,7	0,43	3,70	19,70
2			100	**12,07**	91,4	0,67	3,00	21,20
2			125	**7,03**	89,9	1,02	1,80	20,20
2			160	**2,32**	91,2	1,53	0,00	21,20
2			200	**-3,05**	92,8	2,20	0,00	25,00
3	3297	3303						
3			20	**32,62**	64,5	0,00	5,60	6,60
3			25	**28,75**	68,5	0,07	5,40	8,40
3			32	**26,32**	74,0	0,10	5,20	10,80
3			40	**24,16**	77,5	0,17	5,00	11,40
3			50	**22,89**	82,6	0,23	4,70	13,00
3			63	**16,06**	83,9	0,36	4,30	16,60
3			80	**11,29**	86,7	0,53	3,70	19,70
3			100	**10,09**	91,4	0,83	3,00	21,20
3			125	**4,97**	89,9	1,26	1,80	20,20
3			160	**0,14**	91,2	1,88	0,00	21,20
3			200	**-5,39**	92,8	2,71	0,00	25,00
4	3866	3872						
4			20	**31,24**	64,5	0,00	5,60	6,60
4			25	**27,36**	68,5	0,08	5,40	8,40
4			32	**24,93**	74,0	0,12	5,20	10,80
4			40	**22,75**	77,5	0,19	5,00	11,40
4			50	**21,47**	82,6	0,27	4,70	13,00
4			63	**14,62**	83,9	0,43	4,30	16,60
4			80	**9,82**	86,7	0,62	3,70	19,70
4			100	**8,57**	91,4	0,97	3,00	21,20
4			125	**3,37**	89,9	1,47	1,80	20,20
4			160	**-1,57**	91,2	2,21	0,00	21,20
4			200	**-7,23**	92,8	3,17	0,00	25,00
5	3952	3958						
5			20	**31,05**	64,5	0,00	5,60	6,60
5			25	**27,17**	68,5	0,08	5,40	8,40
5			32	**24,73**	74,0	0,12	5,20	10,80
5			40	**22,55**	77,5	0,20	5,00	11,40
5			50	**21,27**	82,6	0,28	4,70	13,00
5			63	**14,42**	83,9	0,44	4,30	16,60
5			80	**9,62**	86,7	0,63	3,70	19,70
5			100	**8,36**	91,4	0,99	3,00	21,20
5			125	**3,15**	89,9	1,50	1,80	20,20
5			160	**-1,81**	91,2	2,26	0,00	21,20
5			200	**-7,49**	92,8	3,25	0,00	25,00
6	3237	3245						
6			20	**32,78**	64,5	0,00	5,60	6,60
6			25	**28,91**	68,5	0,06	5,40	8,40
6			32	**26,48**	74,0	0,10	5,20	10,80
6			40	**24,31**	77,5	0,16	5,00	11,40
6			50	**23,05**	82,6	0,23	4,70	13,00
6			63	**16,22**	83,9	0,36	4,30	16,60
6			80	**11,46**	86,7	0,52	3,70	19,70
6			100	**10,27**	91,4	0,81	3,00	21,20
6			125	**5,14**	89,9	1,23	1,80	20,20
6			160	**0,33**	91,2	1,85	0,00	21,20
6			200	**-5,18**	92,8	2,66	0,00	25,00
7	3592	3599						
7			20	**31,88**	64,5	0,00	5,60	6,60
7			25	**28,00**	68,5	0,07	5,40	8,40
7			32	**25,57**	74,0	0,11	5,20	10,80
7			40	**23,40**	77,5	0,18	5,00	11,40
7			50	**22,12**	82,6	0,25	4,70	13,00
7			63	**15,28**	83,9	0,40	4,30	16,60
7			80	**10,50**	86,7	0,58	3,70	19,70
7			100	**9,28**	91,4	0,90	3,00	21,20
7			125	**4,11**	89,9	1,37	1,80	20,20
7			160	**-0,78**	91,2	2,05	0,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
7			200	**-6,37**	92,8	2,95	0,00	25,00
8	4335	4340						
8			20	**30,25**	64,5	0,00	5,60	6,60
8			25	**26,36**	68,5	0,09	5,40	8,40
8			32	**23,92**	74,0	0,13	5,20	10,80
8			40	**21,73**	77,5	0,22	5,00	11,40
8			50	**20,45**	82,6	0,30	4,70	13,00
8			63	**13,57**	83,9	0,48	4,30	16,60
8			80	**8,76**	86,7	0,69	3,70	19,70
8			100	**7,46**	91,4	1,09	3,00	21,20
8			125	**2,20**	89,9	1,65	1,80	20,20
8			160	**-2,82**	91,2	2,47	0,00	21,20
8			200	**-8,61**	92,8	3,56	0,00	25,00
Sum								
Sum			20	**41,90**				
Sum			25	**38,04**				
Sum			32	**35,61**				
Sum			40	**33,44**				
Sum			50	**32,18**				
Sum			63	**25,36**				
Sum			80	**20,60**				
Sum			100	**19,42**				
Sum			125	**14,31**				
Sum			160	**9,53**				
Sum			200	**4,06**				

Noise sensitive area: RH11 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH11)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	2506	2516						
1			20	**34,98**	64,5	0,00	5,60	6,60
1			25	**31,13**	68,5	0,05	5,40	8,40
1			32	**28,71**	74,0	0,08	5,20	10,80
1			40	**26,56**	77,5	0,13	5,00	11,40
1			50	**25,31**	82,6	0,18	4,70	13,00
1			63	**18,51**	83,9	0,28	4,30	16,60
1			80	**13,78**	86,7	0,40	3,70	19,70
1			100	**12,66**	91,4	0,63	3,00	21,20
1			125	**7,63**	89,9	0,96	1,80	20,20
1			160	**2,95**	91,2	1,43	0,00	21,20
1			200	**-2,38**	92,8	2,06	0,00	25,00
2	2875	2884						
2			20	**33,80**	64,5	0,00	5,60	6,60
2			25	**29,94**	68,5	0,06	5,40	8,40
2			32	**27,51**	74,0	0,09	5,20	10,80
2			40	**25,35**	77,5	0,14	5,00	11,40
2			50	**24,10**	82,6	0,20	4,70	13,00
2			63	**17,28**	83,9	0,32	4,30	16,60
2			80	**12,54**	86,7	0,46	3,70	19,70
2			100	**11,38**	91,4	0,72	3,00	21,20
2			125	**6,30**	89,9	1,10	1,80	20,20
2			160	**1,55**	91,2	1,64	0,00	21,20
2			200	**-3,87**	92,8	2,37	0,00	25,00
3	3511	3517						
3			20	**32,08**	64,5	0,00	5,60	6,60
3			25	**28,21**	68,5	0,07	5,40	8,40
3			32	**25,77**	74,0	0,11	5,20	10,80
3			40	**23,60**	77,5	0,18	5,00	11,40
3			50	**22,33**	82,6	0,25	4,70	13,00
3			63	**15,49**	83,9	0,39	4,30	16,60
3			80	**10,71**	86,7	0,56	3,70	19,70
3			100	**9,50**	91,4	0,88	3,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
3			125	**4,34**	89,9	1,34	1,80	20,20
3			160	**-0,53**	91,2	2,00	0,00	21,20
3			200	**-6,11**	92,8	2,88	0,00	25,00
4	4080	4086						
4			20	**30,77**	64,5	0,00	5,60	6,60
4			25	**26,89**	68,5	0,08	5,40	8,40
4			32	**24,45**	74,0	0,12	5,20	10,80
4			40	**22,27**	77,5	0,20	5,00	11,40
4			50	**20,99**	82,6	0,29	4,70	13,00
4			63	**14,12**	83,9	0,45	4,30	16,60
4			80	**9,32**	86,7	0,65	3,70	19,70
4			100	**8,05**	91,4	1,02	3,00	21,20
4			125	**2,82**	89,9	1,55	1,80	20,20
4			160	**-2,16**	91,2	2,33	0,00	21,20
4			200	**-7,88**	92,8	3,35	0,00	25,00
5	4141	4147						
5			20	**30,65**	64,5	0,00	5,60	6,60
5			25	**26,76**	68,5	0,08	5,40	8,40
5			32	**24,32**	74,0	0,12	5,20	10,80
5			40	**22,14**	77,5	0,21	5,00	11,40
5			50	**20,86**	82,6	0,29	4,70	13,00
5			63	**13,99**	83,9	0,46	4,30	16,60
5			80	**9,18**	86,7	0,66	3,70	19,70
5			100	**7,91**	91,4	1,04	3,00	21,20
5			125	**2,67**	89,9	1,58	1,80	20,20
5			160	**-2,32**	91,2	2,36	0,00	21,20
5			200	**-8,05**	92,8	3,40	0,00	25,00
6	3408	3415						
6			20	**32,33**	64,5	0,00	5,60	6,60
6			25	**28,46**	68,5	0,07	5,40	8,40
6			32	**26,03**	74,0	0,10	5,20	10,80
6			40	**23,86**	77,5	0,17	5,00	11,40
6			50	**22,59**	82,6	0,24	4,70	13,00
6			63	**15,76**	83,9	0,38	4,30	16,60
6			80	**10,99**	86,7	0,55	3,70	19,70
6			100	**9,78**	91,4	0,85	3,00	21,20
6			125	**4,63**	89,9	1,30	1,80	20,20
6			160	**-0,21**	91,2	1,95	0,00	21,20
6			200	**-5,77**	92,8	2,80	0,00	25,00
7	3739	3746						
7			20	**31,53**	64,5	0,00	5,60	6,60
7			25	**27,65**	68,5	0,07	5,40	8,40
7			32	**25,22**	74,0	0,11	5,20	10,80
7			40	**23,04**	77,5	0,19	5,00	11,40
7			50	**21,77**	82,6	0,26	4,70	13,00
7			63	**14,92**	83,9	0,41	4,30	16,60
7			80	**10,13**	86,7	0,60	3,70	19,70
7			100	**8,89**	91,4	0,94	3,00	21,20
7			125	**3,71**	89,9	1,42	1,80	20,20
7			160	**-1,21**	91,2	2,14	0,00	21,20
7			200	**-6,84**	92,8	3,07	0,00	25,00
8	4404	4409						
8			20	**30,11**	64,5	0,00	5,60	6,60
8			25	**26,22**	68,5	0,09	5,40	8,40
8			32	**23,78**	74,0	0,13	5,20	10,80
8			40	**21,59**	77,5	0,22	5,00	11,40
8			50	**20,30**	82,6	0,31	4,70	13,00
8			63	**13,43**	83,9	0,49	4,30	16,60
8			80	**8,61**	86,7	0,71	3,70	19,70
8			100	**7,31**	91,4	1,10	3,00	21,20
8			125	**2,04**	89,9	1,68	1,80	20,20
8			160	**-3,00**	91,2	2,51	0,00	21,20
8			200	**-8,80**	92,8	3,62	0,00	25,00
Sum								

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
Sum			20	**41,36**				
Sum			25	**37,49**				
Sum			32	**35,06**				
Sum			40	**32,89**				
Sum			50	**31,62**				
Sum			63	**24,79**				
Sum			80	**20,02**				
Sum			100	**18,82**				
Sum			125	**13,69**				
Sum			160	**8,86**				
Sum			200	**3,34**				

Noise sensitive area: RH12 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH12)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	5008	5014						
1			20	**29,00**	64,5	0,00	5,60	6,60
1			25	**25,10**	68,5	0,10	5,40	8,40
1			32	**22,65**	74,0	0,15	5,20	10,80
1			40	**20,45**	77,5	0,25	5,00	11,40
1			50	**19,15**	82,6	0,35	4,70	13,00
1			63	**12,25**	83,9	0,55	4,30	16,60
1			80	**7,39**	86,7	0,80	3,70	19,70
1			100	**6,04**	91,4	1,25	3,00	21,20
1			125	**0,69**	89,9	1,91	1,80	20,20
1			160	**-4,46**	91,2	2,86	0,00	21,20
1			200	**-10,41**	92,8	4,11	0,00	25,00
2	4782	4789						
2			20	**29,40**	64,5	0,00	5,60	6,60
2			25	**25,50**	68,5	0,10	5,40	8,40
2			32	**23,05**	74,0	0,14	5,20	10,80
2			40	**20,86**	77,5	0,24	5,00	11,40
2			50	**19,56**	82,6	0,34	4,70	13,00
2			63	**12,67**	83,9	0,53	4,30	16,60
2			80	**7,83**	86,7	0,77	3,70	19,70
2			100	**6,50**	91,4	1,20	3,00	21,20
2			125	**1,18**	89,9	1,82	1,80	20,20
2			160	**-3,93**	91,2	2,73	0,00	21,20
2			200	**-9,83**	92,8	3,93	0,00	25,00
3	4790	4795						
3			20	**29,38**	64,5	0,00	5,60	6,60
3			25	**25,49**	68,5	0,10	5,40	8,40
3			32	**23,04**	74,0	0,14	5,20	10,80
3			40	**20,84**	77,5	0,24	5,00	11,40
3			50	**19,55**	82,6	0,34	4,70	13,00
3			63	**12,66**	83,9	0,53	4,30	16,60
3			80	**7,82**	86,7	0,77	3,70	19,70
3			100	**6,48**	91,4	1,20	3,00	21,20
3			125	**1,16**	89,9	1,82	1,80	20,20
3			160	**-3,95**	91,2	2,73	0,00	21,20
3			200	**-9,85**	92,8	3,93	0,00	25,00
4	4798	4803						
4			20	**29,37**	64,5	0,00	5,60	6,60
4			25	**25,47**	68,5	0,10	5,40	8,40
4			32	**23,03**	74,0	0,14	5,20	10,80
4			40	**20,83**	77,5	0,24	5,00	11,40
4			50	**19,53**	82,6	0,34	4,70	13,00
4			63	**12,64**	83,9	0,53	4,30	16,60
4			80	**7,80**	86,7	0,77	3,70	19,70
4			100	**6,47**	91,4	1,20	3,00	21,20
4			125	**1,14**	89,9	1,83	1,80	20,20
4			160	**-3,97**	91,2	2,74	0,00	21,20

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
4			200	**-9,87**	92,8	3,94	0,00	25,00
5	4391	4397						
5			20	**30,14**	64,5	0,00	5,60	6,60
5			25	**26,25**	68,5	0,09	5,40	8,40
5			32	**23,81**	74,0	0,13	5,20	10,80
5			40	**21,62**	77,5	0,22	5,00	11,40
5			50	**20,33**	82,6	0,31	4,70	13,00
5			63	**13,45**	83,9	0,48	4,30	16,60
5			80	**8,63**	86,7	0,70	3,70	19,70
5			100	**7,34**	91,4	1,10	3,00	21,20
5			125	**2,07**	89,9	1,67	1,80	20,20
5			160	**-2,97**	91,2	2,51	0,00	21,20
5			200	**-8,77**	92,8	3,61	0,00	25,00
6	4237	4243						
6			20	**30,45**	64,5	0,00	5,60	6,60
6			25	**26,56**	68,5	0,08	5,40	8,40
6			32	**24,12**	74,0	0,13	5,20	10,80
6			40	**21,93**	77,5	0,21	5,00	11,40
6			50	**20,65**	82,6	0,30	4,70	13,00
6			63	**13,78**	83,9	0,47	4,30	16,60
6			80	**8,97**	86,7	0,68	3,70	19,70
6			100	**7,69**	91,4	1,06	3,00	21,20
6			125	**2,43**	89,9	1,61	1,80	20,20
6			160	**-2,57**	91,2	2,42	0,00	21,20
6			200	**-8,33**	92,8	3,48	0,00	25,00
7	3858	3865						
7			20	**31,26**	64,5	0,00	5,60	6,60
7			25	**27,38**	68,5	0,08	5,40	8,40
7			32	**24,94**	74,0	0,12	5,20	10,80
7			40	**22,76**	77,5	0,19	5,00	11,40
7			50	**21,49**	82,6	0,27	4,70	13,00
7			63	**14,63**	83,9	0,43	4,30	16,60
7			80	**9,84**	86,7	0,62	3,70	19,70
7			100	**8,59**	91,4	0,97	3,00	21,20
7			125	**3,39**	89,9	1,47	1,80	20,20
7			160	**-1,54**	91,2	2,20	0,00	21,20
7			200	**-7,21**	92,8	3,17	0,00	25,00
8	2634	2642						
8			20	**34,56**	64,5	0,00	5,60	6,60
8			25	**30,71**	68,5	0,05	5,40	8,40
8			32	**28,28**	74,0	0,08	5,20	10,80
8			40	**26,13**	77,5	0,13	5,00	11,40
8			50	**24,88**	82,6	0,18	4,70	13,00
8			63	**18,07**	83,9	0,29	4,30	16,60
8			80	**13,34**	86,7	0,42	3,70	19,70
8			100	**12,20**	91,4	0,66	3,00	21,20
8			125	**7,16**	89,9	1,00	1,80	20,20
8			160	**2,45**	91,2	1,51	0,00	21,20
8			200	**-2,91**	92,8	2,17	0,00	25,00
Sum								
Sum			20	**39,88**				
Sum			25	**36,00**				
Sum			32	**33,56**				
Sum			40	**31,38**				
Sum			50	**30,11**				
Sum			63	**23,25**				
Sum			80	**18,45**				
Sum			100	**17,20**				
Sum			125	**11,99**				
Sum			160	**7,06**				
Sum			200	**1,41**				

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

Noise sensitive area: RH13 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH13)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	4328	4334						
1			20	**30,26**	64,5	0,00	5,60	6,60
1			25	**26,38**	68,5	0,09	5,40	8,40
1			32	**23,93**	74,0	0,13	5,20	10,80
1			40	**21,75**	77,5	0,22	5,00	11,40
1			50	**20,46**	82,6	0,30	4,70	13,00
1			63	**13,59**	83,9	0,48	4,30	16,60
1			80	**8,77**	86,7	0,69	3,70	19,70
1			100	**7,48**	91,4	1,08	3,00	21,20
1			125	**2,22**	89,9	1,65	1,80	20,20
1			160	**-2,81**	91,2	2,47	0,00	21,20
1			200	**-8,59**	92,8	3,55	0,00	25,00
2	3947	3954						
2			20	**31,06**	64,5	0,00	5,60	6,60
2			25	**27,18**	68,5	0,08	5,40	8,40
2			32	**24,74**	74,0	0,12	5,20	10,80
2			40	**22,56**	77,5	0,20	5,00	11,40
2			50	**21,28**	82,6	0,28	4,70	13,00
2			63	**14,43**	83,9	0,43	4,30	16,60
2			80	**9,63**	86,7	0,63	3,70	19,70
2			100	**8,37**	91,4	0,99	3,00	21,20
2			125	**3,16**	89,9	1,50	1,80	20,20
2			160	**-1,79**	91,2	2,25	0,00	21,20
2			200	**-7,48**	92,8	3,24	0,00	25,00
3	3561	3567						
3			20	**31,95**	64,5	0,00	5,60	6,60
3			25	**28,08**	68,5	0,07	5,40	8,40
3			32	**25,65**	74,0	0,11	5,20	10,80
3			40	**23,48**	77,5	0,18	5,00	11,40
3			50	**22,20**	82,6	0,25	4,70	13,00
3			63	**15,36**	83,9	0,39	4,30	16,60
3			80	**10,58**	86,7	0,57	3,70	19,70
3			100	**9,36**	91,4	0,89	3,00	21,20
3			125	**4,20**	89,9	1,36	1,80	20,20
3			160	**-0,68**	91,2	2,03	0,00	21,20
3			200	**-6,27**	92,8	2,92	0,00	25,00
4	3222	3229						
4			20	**32,82**	64,5	0,00	5,60	6,60
4			25	**28,95**	68,5	0,06	5,40	8,40
4			32	**26,52**	74,0	0,10	5,20	10,80
4			40	**24,36**	77,5	0,16	5,00	11,40
4			50	**23,09**	82,6	0,23	4,70	13,00
4			63	**16,26**	83,9	0,36	4,30	16,60
4			80	**11,50**	86,7	0,52	3,70	19,70
4			100	**10,31**	91,4	0,81	3,00	21,20
4			125	**5,19**	89,9	1,23	1,80	20,20
4			160	**0,38**	91,2	1,84	0,00	21,20
4			200	**-5,13**	92,8	2,65	0,00	25,00
5	2853	2861						
5			20	**33,87**	64,5	0,00	5,60	6,60
5			25	**30,01**	68,5	0,06	5,40	8,40
5			32	**27,58**	74,0	0,09	5,20	10,80
5			40	**25,43**	77,5	0,14	5,00	11,40
5			50	**24,17**	82,6	0,20	4,70	13,00
5			63	**17,35**	83,9	0,31	4,30	16,60
5			80	**12,61**	86,7	0,46	3,70	19,70
5			100	**11,45**	91,4	0,72	3,00	21,20
5			125	**6,38**	89,9	1,09	1,80	20,20
5			160	**1,64**	91,2	1,63	0,00	21,20
5			200	**-3,78**	92,8	2,35	0,00	25,00
6	3251	3258						
6			20	**32,74**	64,5	0,00	5,60	6,60
6			25	**28,87**	68,5	0,07	5,40	8,40

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
6			32	**26,44**	74,0	0,10	5,20	10,80
6			40	**24,28**	77,5	0,16	5,00	11,40
6			50	**23,01**	82,6	0,23	4,70	13,00
6			63	**16,18**	83,9	0,36	4,30	16,60
6			80	**11,42**	86,7	0,52	3,70	19,70
6			100	**10,23**	91,4	0,81	3,00	21,20
6			125	**5,10**	89,9	1,24	1,80	20,20
6			160	**0,28**	91,2	1,86	0,00	21,20
6			200	**-5,23**	92,8	2,67	0,00	25,00
7	2809	2817						
7			20	**34,00**	64,5	0,00	5,60	6,60
7			25	**30,15**	68,5	0,06	5,40	8,40
7			32	**27,72**	74,0	0,08	5,20	10,80
7			40	**25,56**	77,5	0,14	5,00	11,40
7			50	**24,31**	82,6	0,20	4,70	13,00
7			63	**17,49**	83,9	0,31	4,30	16,60
7			80	**12,75**	86,7	0,45	3,70	19,70
7			100	**11,60**	91,4	0,70	3,00	21,20
7			125	**6,53**	89,9	1,07	1,80	20,20
7			160	**1,80**	91,2	1,61	0,00	21,20
7			200	**-3,61**	92,8	2,31	0,00	25,00
8	1998	2008						
8			20	**36,95**	64,5	0,00	5,60	6,60
8			25	**33,11**	68,5	0,04	5,40	8,40
8			32	**30,69**	74,0	0,06	5,20	10,80
8			40	**28,55**	77,5	0,10	5,00	11,40
8			50	**27,31**	82,6	0,14	4,70	13,00
8			63	**20,53**	83,9	0,22	4,30	16,60
8			80	**15,83**	86,7	0,32	3,70	19,70
8			100	**14,74**	91,4	0,50	3,00	21,20
8			125	**9,78**	89,9	0,76	1,80	20,20
8			160	**5,20**	91,2	1,14	0,00	21,20
8			200	**0,00**	92,8	1,65	0,00	25,00
Sum								
Sum			20	**42,46**				
Sum			25	**38,60**				
Sum			32	**36,17**				
Sum			40	**34,01**				
Sum			50	**32,75**				
Sum			63	**25,93**				
Sum			80	**21,19**				
Sum			100	**20,03**				
Sum			125	**14,95**				
Sum			160	**10,21**				
Sum			200	**4,79**				

Noise sensitive area: RH14 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH14)

Wind speed: 8,0 m/s

WTG

No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
1	5023	5028						
1			20	**28,97**	64,5	0,00	5,60	6,60
1			25	**25,07**	68,5	0,10	5,40	8,40
1			32	**22,62**	74,0	0,15	5,20	10,80
1			40	**20,42**	77,5	0,25	5,00	11,40
1			50	**19,12**	82,6	0,35	4,70	13,00
1			63	**12,22**	83,9	0,55	4,30	16,60
1			80	**7,37**	86,7	0,80	3,70	19,70
1			100	**6,02**	91,4	1,26	3,00	21,20
1			125	**0,66**	89,9	1,91	1,80	20,20
1			160	**-4,49**	91,2	2,87	0,00	21,20
1			200	**-10,45**	92,8	4,12	0,00	25,00
2	4656	4662						

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
2			20	**29,63**	64,5	0,00	5,60	6,60
2			25	**25,74**	68,5	0,09	5,40	8,40
2			32	**23,29**	74,0	0,14	5,20	10,80
2			40	**21,10**	77,5	0,23	5,00	11,40
2			50	**19,80**	82,6	0,33	4,70	13,00
2			63	**12,92**	83,9	0,51	4,30	16,60
2			80	**8,08**	86,7	0,75	3,70	19,70
2			100	**6,76**	91,4	1,17	3,00	21,20
2			125	**1,46**	89,9	1,77	1,80	20,20
2			160	**-3,63**	91,2	2,66	0,00	21,20
2			200	**-9,49**	92,8	3,82	0,00	25,00
3	4317	4323						
3			20	**30,29**	64,5	0,00	5,60	6,60
3			25	**26,40**	68,5	0,09	5,40	8,40
3			32	**23,96**	74,0	0,13	5,20	10,80
3			40	**21,77**	77,5	0,22	5,00	11,40
3			50	**20,48**	82,6	0,30	4,70	13,00
3			63	**13,61**	83,9	0,48	4,30	16,60
3			80	**8,79**	86,7	0,69	3,70	19,70
3			100	**7,50**	91,4	1,08	3,00	21,20
3			125	**2,24**	89,9	1,64	1,80	20,20
3			160	**-2,78**	91,2	2,46	0,00	21,20
3			200	**-8,56**	92,8	3,54	0,00	25,00
4	4012	4018						
4			20	**30,92**	64,5	0,00	5,60	6,60
4			25	**27,04**	68,5	0,08	5,40	8,40
4			32	**24,60**	74,0	0,12	5,20	10,80
4			40	**22,42**	77,5	0,20	5,00	11,40
4			50	**21,14**	82,6	0,28	4,70	13,00
4			63	**14,28**	83,9	0,44	4,30	16,60
4			80	**9,48**	86,7	0,64	3,70	19,70
4			100	**8,22**	91,4	1,00	3,00	21,20
4			125	**2,99**	89,9	1,53	1,80	20,20
4			160	**-1,97**	91,2	2,29	0,00	21,20
4			200	**-7,68**	92,8	3,29	0,00	25,00
5	3631	3638						
5			20	**31,78**	64,5	0,00	5,60	6,60
5			25	**27,91**	68,5	0,07	5,40	8,40
5			32	**25,47**	74,0	0,11	5,20	10,80
5			40	**23,30**	77,5	0,18	5,00	11,40
5			50	**22,03**	82,6	0,25	4,70	13,00
5			63	**15,18**	83,9	0,40	4,30	16,60
5			80	**10,40**	86,7	0,58	3,70	19,70
5			100	**9,17**	91,4	0,91	3,00	21,20
5			125	**4,00**	89,9	1,38	1,80	20,20
5			160	**-0,89**	91,2	2,07	0,00	21,20
5			200	**-6,50**	92,8	2,98	0,00	25,00
6	3961	3968						
6			20	**31,03**	64,5	0,00	5,60	6,60
6			25	**27,15**	68,5	0,08	5,40	8,40
6			32	**24,71**	74,0	0,12	5,20	10,80
6			40	**22,53**	77,5	0,20	5,00	11,40
6			50	**21,25**	82,6	0,28	4,70	13,00
6			63	**14,39**	83,9	0,44	4,30	16,60
6			80	**9,59**	86,7	0,63	3,70	19,70
6			100	**8,34**	91,4	0,99	3,00	21,20
6			125	**3,12**	89,9	1,51	1,80	20,20
6			160	**-1,83**	91,2	2,26	0,00	21,20
6			200	**-7,52**	92,8	3,25	0,00	25,00
7	3510	3517						
7			20	**32,08**	64,5	0,00	5,60	6,60
7			25	**28,21**	68,5	0,07	5,40	8,40
7			32	**25,77**	74,0	0,11	5,20	10,80
7			40	**23,60**	77,5	0,18	5,00	11,40

To be continued on next page...

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DECIBEL - Detailed results

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

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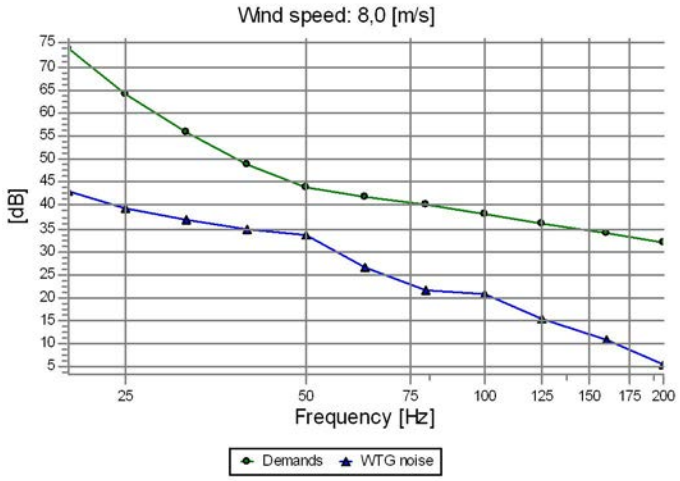
WTG No.	Distance [m]	Sound distance [m]	Frequency [Hz]	**Calculated [dB]**	LwA,ref [dB(A)]	Aatm [dB]	Agr [dB]	Lsigma [dB]
7			50	**22,33**	82,6	0,25	4,70	13,00
7			63	**15,49**	83,9	0,39	4,30	16,60
7			80	**10,71**	86,7	0,56	3,70	19,70
7			100	**9,50**	91,4	0,88	3,00	21,20
7			125	**4,34**	89,9	1,34	1,80	20,20
7			160	**-0,53**	91,2	2,00	0,00	21,20
7			200	**-6,11**	92,8	2,88	0,00	25,00
8	2523	2532						
8			20	**34,93**	64,5	0,00	5,60	6,60
8			25	**31,08**	68,5	0,05	5,40	8,40
8			32	**28,66**	74,0	0,08	5,20	10,80
8			40	**26,51**	77,5	0,13	5,00	11,40
8			50	**25,25**	82,6	0,18	4,70	13,00
8			63	**18,45**	83,9	0,28	4,30	16,60
8			80	**13,73**	86,7	0,41	3,70	19,70
8			100	**12,60**	91,4	0,63	3,00	21,20
8			125	**7,57**	89,9	0,96	1,80	20,20
8			160	**2,89**	91,2	1,44	0,00	21,20
8			200	**-2,44**	92,8	2,08	0,00	25,00
Sum								
Sum			20	**40,61**				
Sum			25	**36,74**				
Sum			32	**34,30**				
Sum			40	**32,13**				
Sum			50	**30,86**				
Sum			63	**24,01**				
Sum			80	**19,23**				
Sum			100	**18,01**				
Sum			125	**12,84**				
Sum			160	**7,96**				
Sum			200	**2,38**				

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DECIBEL - Detailed results, graphic

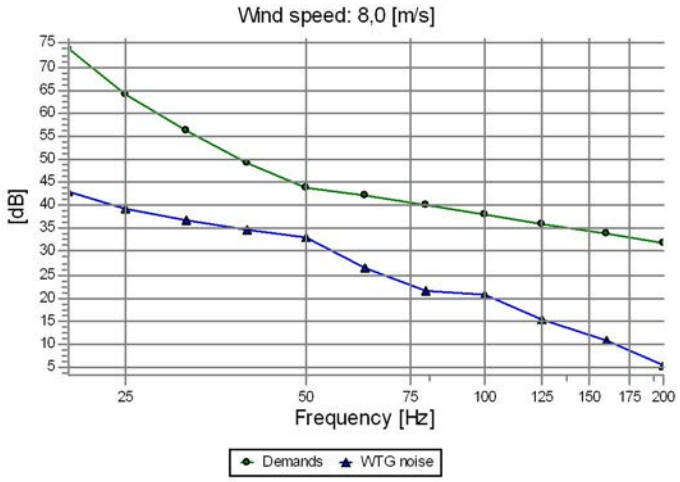
Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

HH01 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (HH01)



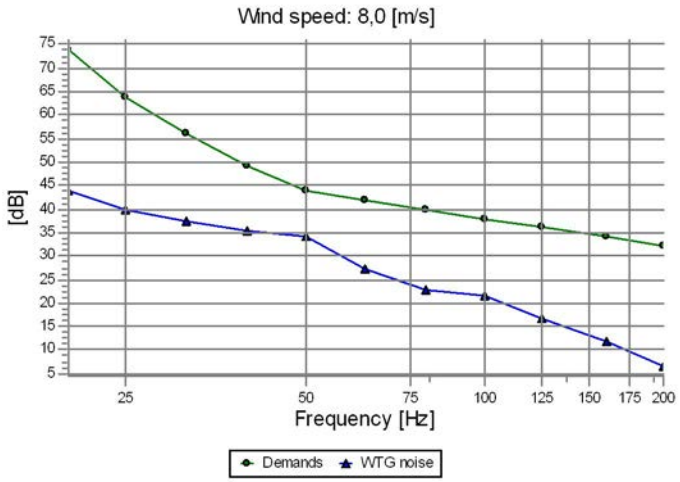
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	43,1	Yes
25,0	64,0	39,2	Yes
31,5	56,0	36,8	Yes
40,0	49,0	34,7	Yes
50,0	44,0	33,4	Yes
63,0	42,0	26,6	Yes
80,0	40,0	21,8	Yes
100,0	38,0	20,7	Yes
125,0	36,0	15,6	Yes
160,0	34,0	10,9	Yes
200,0	32,0	5,5	Yes

HH02 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (HH02)



Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	43,0	Yes
25,0	64,0	39,1	Yes
31,5	56,0	36,7	Yes
40,0	49,0	34,5	Yes
50,0	44,0	33,3	Yes
63,0	42,0	26,5	Yes
80,0	40,0	21,7	Yes
100,0	38,0	20,6	Yes
125,0	36,0	15,5	Yes
160,0	34,0	10,8	Yes
200,0	32,0	5,4	Yes

RH01 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH01)



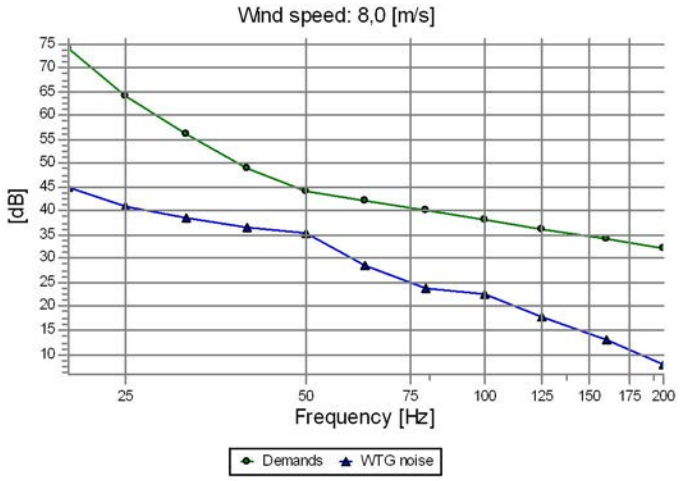
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	43,8	Yes
25,0	64,0	40,0	Yes
31,5	56,0	37,6	Yes
40,0	49,0	35,4	Yes
50,0	44,0	34,2	Yes
63,0	42,0	27,4	Yes
80,0	40,0	22,6	Yes
100,0	38,0	21,5	Yes
125,0	36,0	16,5	Yes
160,0	34,0	11,8	Yes
200,0	32,0	6,5	Yes

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DECIBEL - Detailed results, graphic

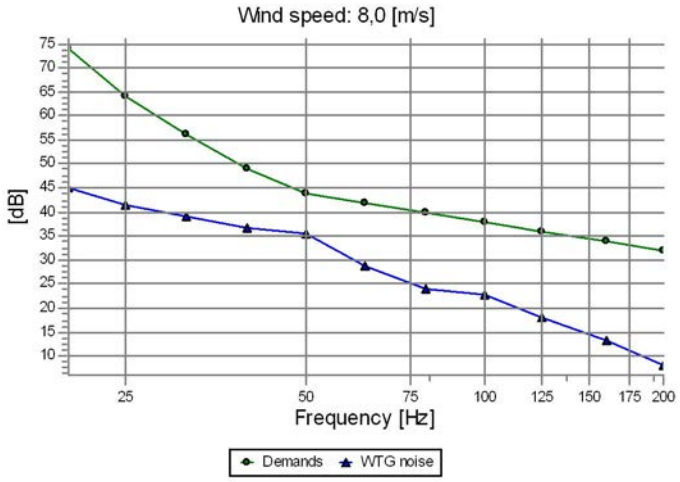
Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

RH02 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH02)



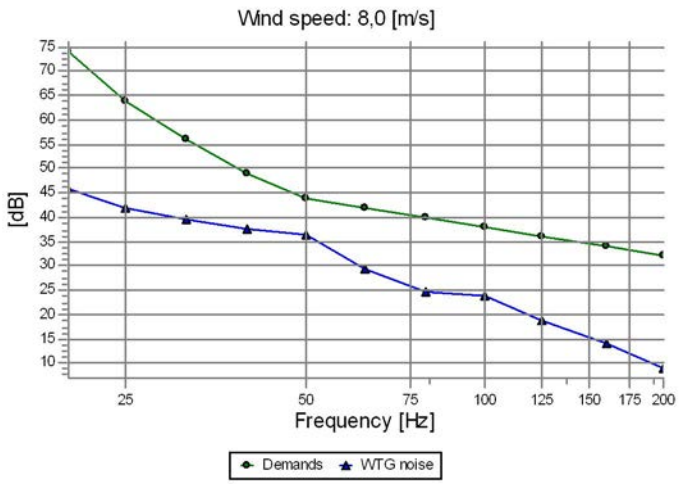
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	44,9	Yes
25,0	64,0	41,1	Yes
31,5	56,0	38,6	Yes
40,0	49,0	36,5	Yes
50,0	44,0	35,3	Yes
63,0	42,0	28,5	Yes
80,0	40,0	23,8	Yes
100,0	38,0	22,7	Yes
125,0	36,0	17,7	Yes
160,0	34,0	13,1	Yes
200,0	32,0	7,8	Yes

RH03 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH03)



Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	45,1	Yes
25,0	64,0	41,3	Yes
31,5	56,0	38,9	Yes
40,0	49,0	36,7	Yes
50,0	44,0	35,5	Yes
63,0	42,0	28,7	Yes
80,0	40,0	24,0	Yes
100,0	38,0	22,9	Yes
125,0	36,0	17,9	Yes
160,0	34,0	13,3	Yes
200,0	32,0	8,1	Yes

RH04 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH04)



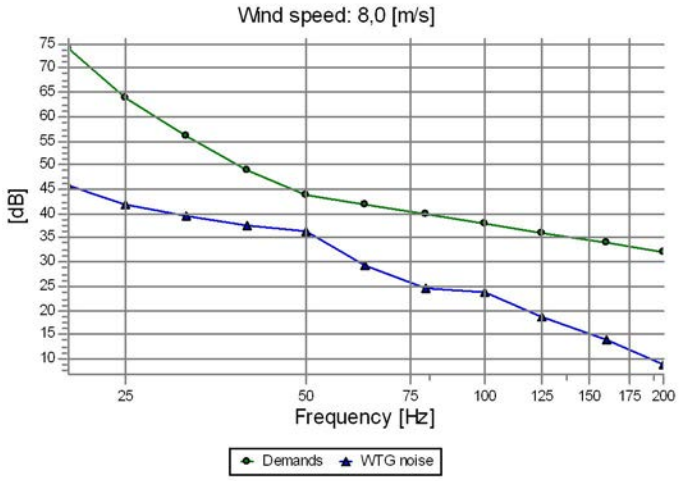
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	45,9	Yes
25,0	64,0	42,0	Yes
31,5	56,0	39,6	Yes
40,0	49,0	37,5	Yes
50,0	44,0	36,2	Yes
63,0	42,0	29,5	Yes
80,0	40,0	24,8	Yes
100,0	38,0	23,7	Yes
125,0	36,0	18,7	Yes
160,0	34,0	14,2	Yes
200,0	32,0	9,0	Yes

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DECIBEL - Detailed results, graphic

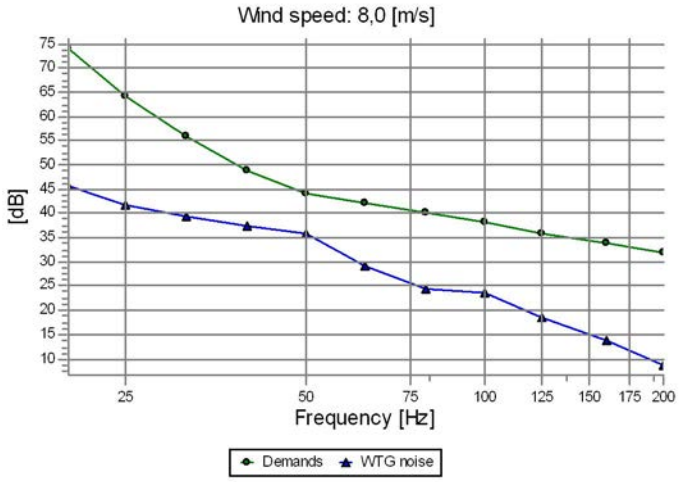
Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

RH05 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH05)



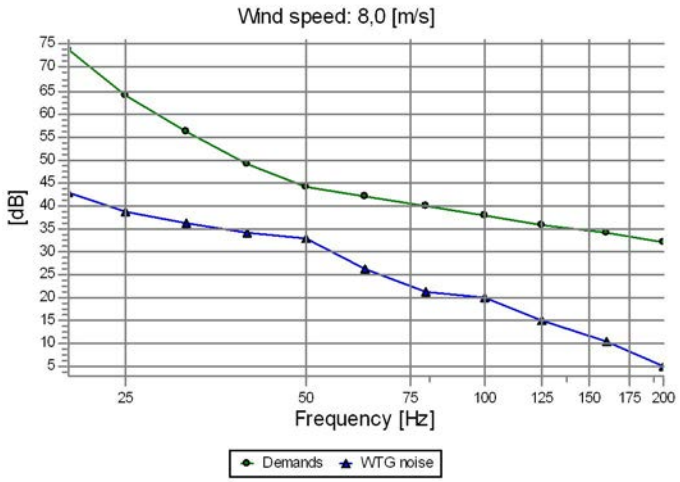
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	45,9	Yes
25,0	64,0	42,0	Yes
31,5	56,0	39,6	Yes
40,0	49,0	37,5	Yes
50,0	44,0	36,2	Yes
63,0	42,0	29,4	Yes
80,0	40,0	24,7	Yes
100,0	38,0	23,7	Yes
125,0	36,0	18,7	Yes
160,0	34,0	14,1	Yes
200,0	32,0	8,9	Yes

RH06 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH06)



Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	45,6	Yes
25,0	64,0	41,8	Yes
31,5	56,0	39,4	Yes
40,0	49,0	37,2	Yes
50,0	44,0	36,0	Yes
63,0	42,0	29,2	Yes
80,0	40,0	24,5	Yes
100,0	38,0	23,4	Yes
125,0	36,0	18,5	Yes
160,0	34,0	13,9	Yes
200,0	32,0	8,7	Yes

RH07 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH07)



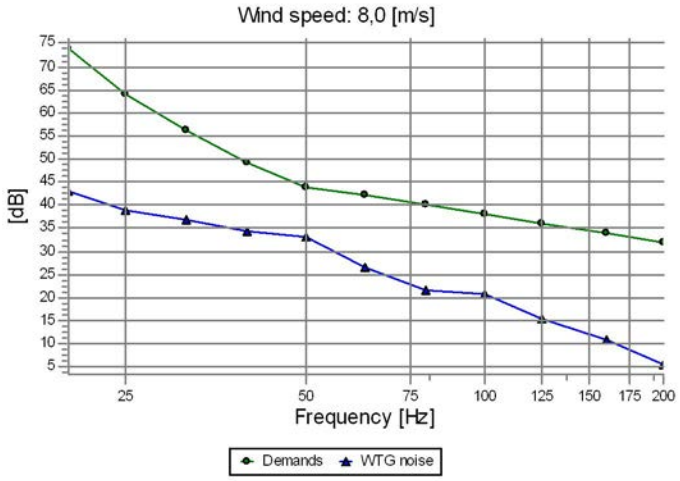
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	42,7	Yes
25,0	64,0	38,8	Yes
31,5	56,0	36,4	Yes
40,0	49,0	34,2	Yes
50,0	44,0	33,0	Yes
63,0	42,0	26,2	Yes
80,0	40,0	21,4	Yes
100,0	38,0	20,3	Yes
125,0	36,0	15,2	Yes
160,0	34,0	10,5	Yes
200,0	32,0	5,1	Yes

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Calculated:
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DECIBEL - Detailed results, graphic

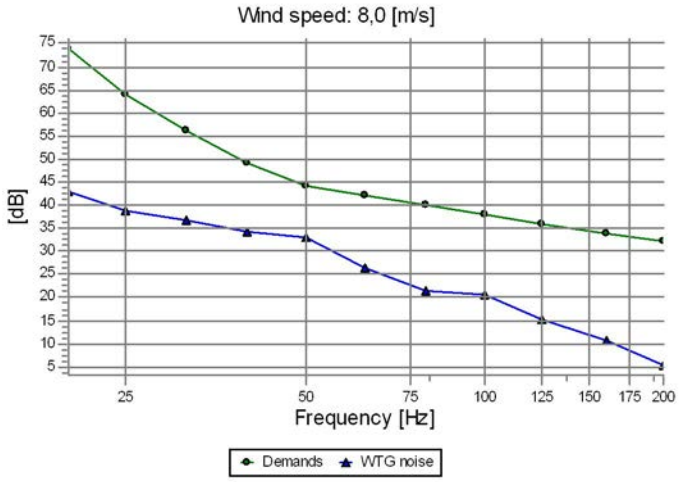
Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

RH08 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH08)



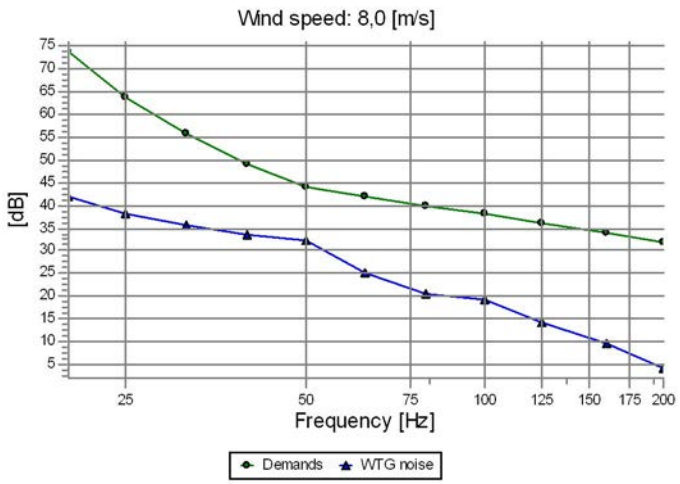
Frequency [Hz]	Sound level Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	42,9	Yes
25,0	64,0	39,1	Yes
31,5	56,0	36,7	Yes
40,0	49,0	34,5	Yes
50,0	44,0	33,3	Yes
63,0	42,0	26,4	Yes
80,0	40,0	21,7	Yes
100,0	38,0	20,6	Yes
125,0	36,0	15,5	Yes
160,0	34,0	10,8	Yes
200,0	32,0	5,4	Yes

RH09 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH09)



Frequency [Hz]	Sound level Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	42,8	Yes
25,0	64,0	39,0	Yes
31,5	56,0	36,5	Yes
40,0	49,0	34,4	Yes
50,0	44,0	33,1	Yes
63,0	42,0	26,3	Yes
80,0	40,0	21,6	Yes
100,0	38,0	20,4	Yes
125,0	36,0	15,4	Yes
160,0	34,0	10,6	Yes
200,0	32,0	5,3	Yes

RH10 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH10)



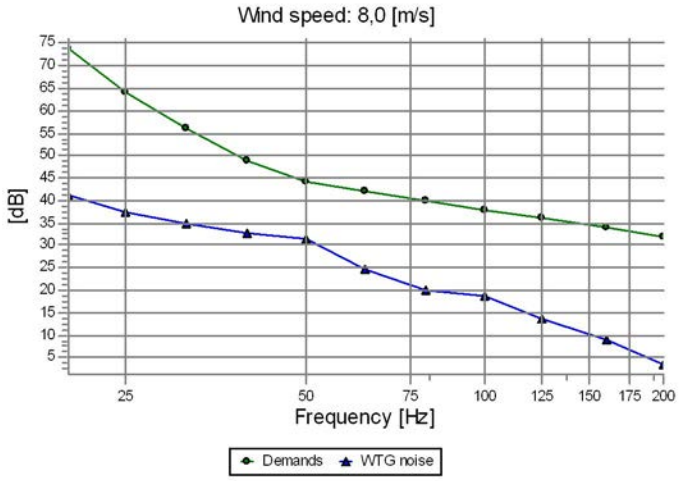
Frequency [Hz]	Sound level Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	41,9	Yes
25,0	64,0	38,0	Yes
31,5	56,0	35,6	Yes
40,0	49,0	33,4	Yes
50,0	44,0	32,2	Yes
63,0	42,0	25,4	Yes
80,0	40,0	20,6	Yes
100,0	38,0	19,4	Yes
125,0	36,0	14,3	Yes
160,0	34,0	9,5	Yes
200,0	32,0	4,1	Yes

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Calculated:
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DECIBEL - Detailed results, graphic

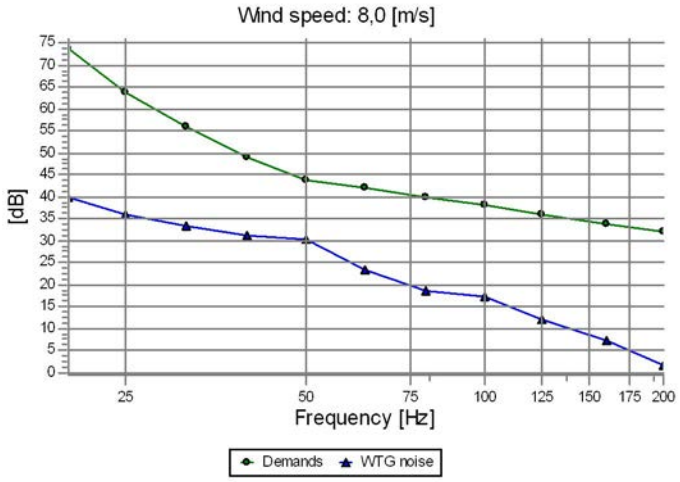
Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

RH11 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH11)



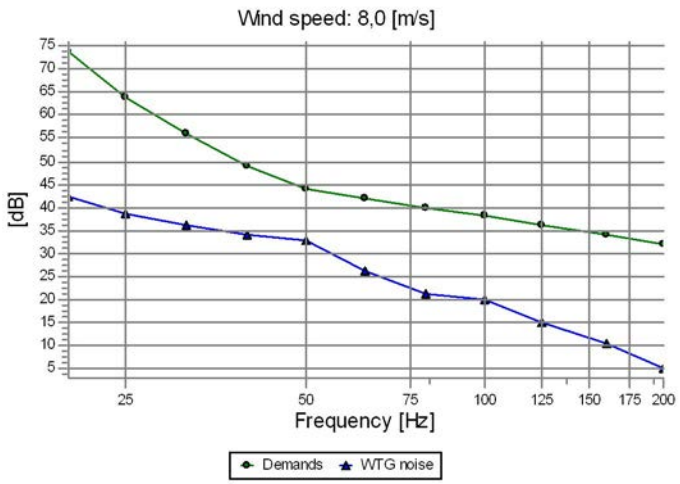
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	41,4	Yes
25,0	64,0	37,5	Yes
31,5	56,0	35,1	Yes
40,0	49,0	32,9	Yes
50,0	44,0	31,6	Yes
63,0	42,0	24,8	Yes
80,0	40,0	20,0	Yes
100,0	38,0	18,8	Yes
125,0	36,0	13,7	Yes
160,0	34,0	8,9	Yes
200,0	32,0	3,3	Yes

RH12 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH12)



Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	39,9	Yes
25,0	64,0	36,0	Yes
31,5	56,0	33,6	Yes
40,0	49,0	31,4	Yes
50,0	44,0	30,1	Yes
63,0	42,0	23,2	Yes
80,0	40,0	18,5	Yes
100,0	38,0	17,2	Yes
125,0	36,0	12,0	Yes
160,0	34,0	7,1	Yes
200,0	32,0	1,4	Yes

RH13 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH13)



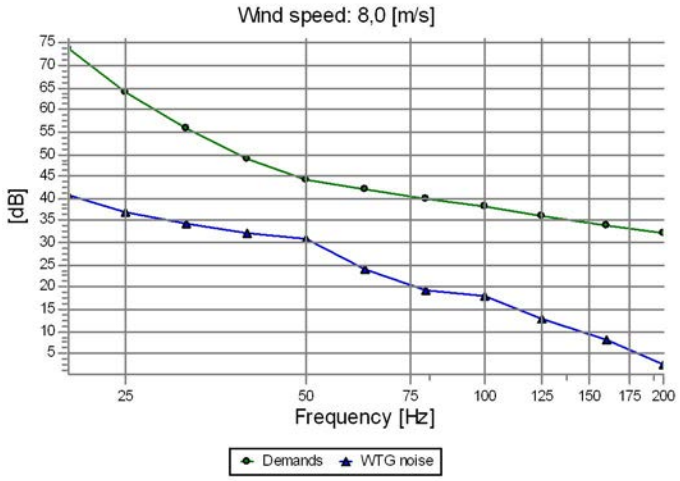
Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	42,5	Yes
25,0	64,0	38,6	Yes
31,5	56,0	36,2	Yes
40,0	49,0	34,0	Yes
50,0	44,0	32,8	Yes
63,0	42,0	25,9	Yes
80,0	40,0	21,2	Yes
100,0	38,0	20,0	Yes
125,0	36,0	15,0	Yes
160,0	34,0	10,2	Yes
200,0	32,0	4,8	Yes

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Calculated:
18.11.2019 15:40/3.3.247

DECIBEL - Detailed results, graphic

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor**Noise calculation model:** Finland Low frequency 8,0 m/s

RH14 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - night (RH14)



Sound level			
Frequency [Hz]	Demands [dB]	WTG noise [dB]	Demands fulfilled ?
20,0	74,0	40,6	Yes
25,0	64,0	36,7	Yes
31,5	56,0	34,3	Yes
40,0	49,0	32,1	Yes
50,0	44,0	30,9	Yes
63,0	42,0	24,0	Yes
80,0	40,0	19,2	Yes
100,0	38,0	18,0	Yes
125,0	36,0	12,8	Yes
160,0	34,0	8,0	Yes
200,0	32,0	2,4	Yes

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Calculated:
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DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor

Noise calculation model:
Finland Low frequency
Wind speed (in 10 m height):
8,0 m/s
Spectral distribution:
From 20,0 Hz to 200,0 Hz
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 tone penalty is subtracted from demand
Model: 5,0 dB(A)
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)
Low frequency calculation
dLsigma

20,0 Hz [dB]	25,0 Hz [dB]	31,5 Hz [dB]	40,0 Hz [dB]	50,0 Hz [dB]	63,0 Hz [dB]	80,0 Hz [dB]	100,0 Hz [dB]	125,0 Hz [dB]	160,0 Hz [dB]	200,0 Hz [dB]
6,6	8,4	10,8	11,4	13,0	16,6	19,7	21,2	20,2	21,2	25,0

WTG: FUTURE F180 5.6 MW 5600 180.0 !-!
Noise: Third octave SPL without serrated trailing edge – Mode 0

Source	Source/Date	Creator	Edited
F008_276_A17_EN Revision 00, 2019-05-21 assuming N163 5.7 MW, without serrations	9.7.2019	USER	13.11.2019 12:29

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	20,0 Hz [dB]	25,0 Hz [dB]	31,5 Hz [dB]	40,0 Hz [dB]	50,0 Hz [dB]	63,0 Hz [dB]	80,0 Hz [dB]	100,0 Hz [dB]	125,0 Hz [dB]	160,0 Hz [dB]	200,0 Hz [dB]
From Windcat	210,0	8,0	98,2	64,5	68,5	74,0	77,5	82,6	83,9	86,7	91,4	89,9	91,2	92,8

Noise sensitive area: HH01 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: HH02 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

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Calculated:
18.11.2019 15:40/3.3.247

DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor

Noise sensitive area: RH01 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH02 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH03 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH04 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH05 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH06 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

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DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH07 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH08 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH09 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH10 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH11 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH12 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

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DECIBEL - Assumptions for noise calculation

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH13 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

Noise sensitive area: RH14 Noise sensitive point: Finnish low frequency - Residental health guide 2003, indoor - ni

Predefined calculation standard: Residential health guide 2003, indoor - night
Imission height(a.g.l.): Use standard value from calculation model
Uncertainty margin: Use default value from calculation model

Noise demand:

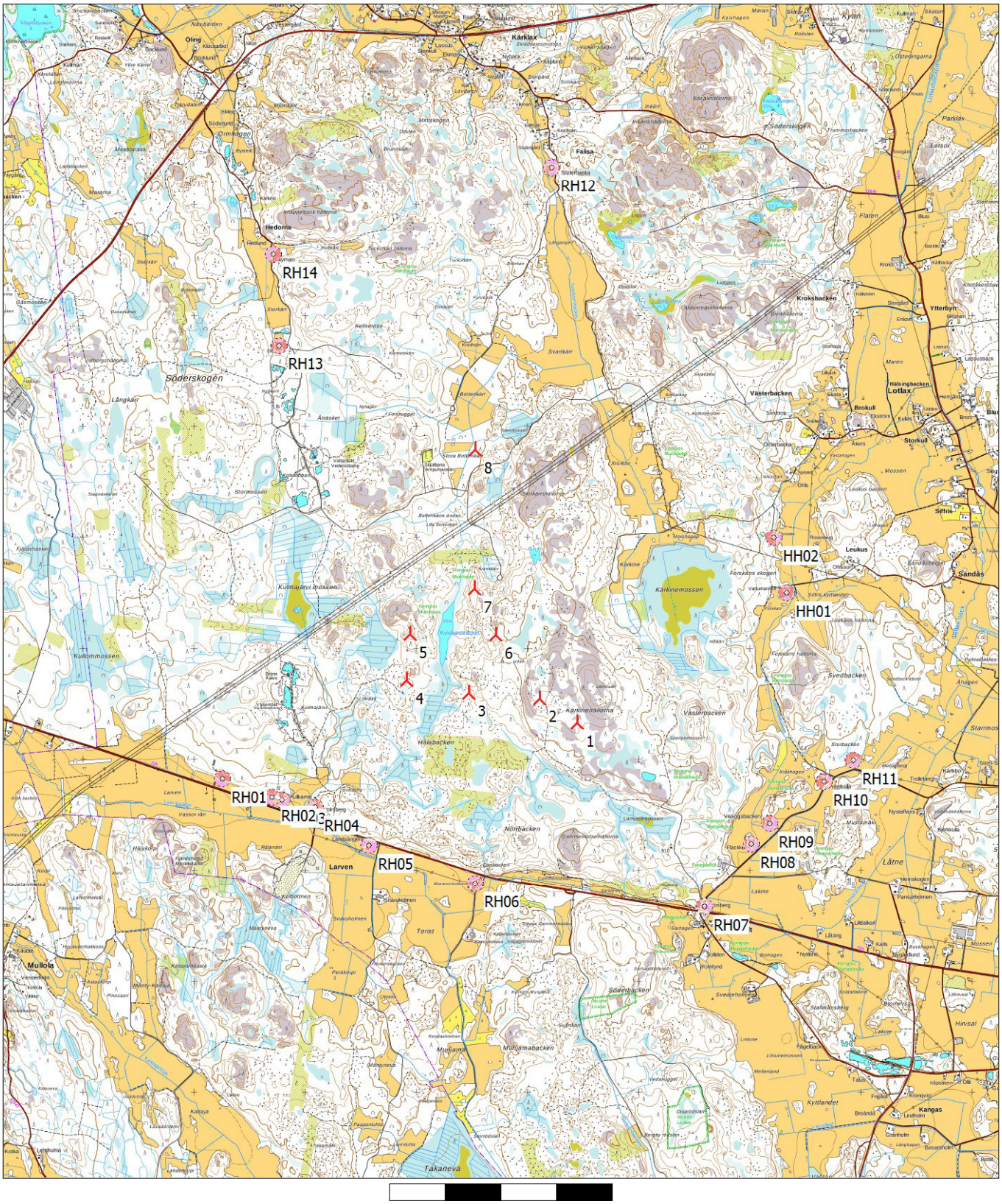
20,0 Hz	25,0 Hz	31,5 Hz	40,0 Hz	50,0 Hz	63,0 Hz	80,0 Hz	100,0 Hz	125,0 Hz	160,0 Hz	200,0 Hz
74,0 dB	64,0 dB	56,0 dB	49,0 dB	44,0 dB	42,0 dB	40,0 dB	38,0 dB	36,0 dB	34,0 dB	32,0 dB

No distance demand

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DECIBEL - Map 8,0 m/s

Calculation: MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor



0 500 1000 1500 2000 m

Map: Söde_Background map , Print scale 1:50 000, Map center Finish TM ETRS-TM35FIN-ETRS89 East: 254 241 North: 7 012 132

New WTG Noise sensitive area