

## *Bullermodellering för Söderskogens vindkraftspark*



## INNEHÅLLSFÖRTECKNING

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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<br>L <sub>Aeq</sub> dagtid kl 7-22 | bullernivån utomhus<br>L <sub>Aeq</sub> 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 1,5 – 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 1,5 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 Lålox. Alla dessa projekt ligger inom en radie om 10 km och det är motiverat att analysera dessa tillsammans. För Märkenkall, Lotlax och Lålox 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 Lålox

| Projekt                         | Modell                | Rotor-diameter | Nav-höjd | Ljudeffektnivå |
|---------------------------------|-----------------------|----------------|----------|----------------|
| Märkenkall,<br>15 vindkraftverk | GE 5.5-158<br>5,5 MW  | 158 m          | 161 m    | 106,0 dB(A)    |
| Lålox,<br>4 vindkraftverk       | Vestas V150<br>4,2 MW | 150 m          | 140 m    | 104,9 dB(A)    |
| Lotlax,<br>3 vindkraftverk      | Prokon P3000<br>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 medelljudnivå, presenteras i kartan i bild 1. Från bullerutbredningskartan kan man konstatera att observationspunkterna RH03-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 medelljudnivå, 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.

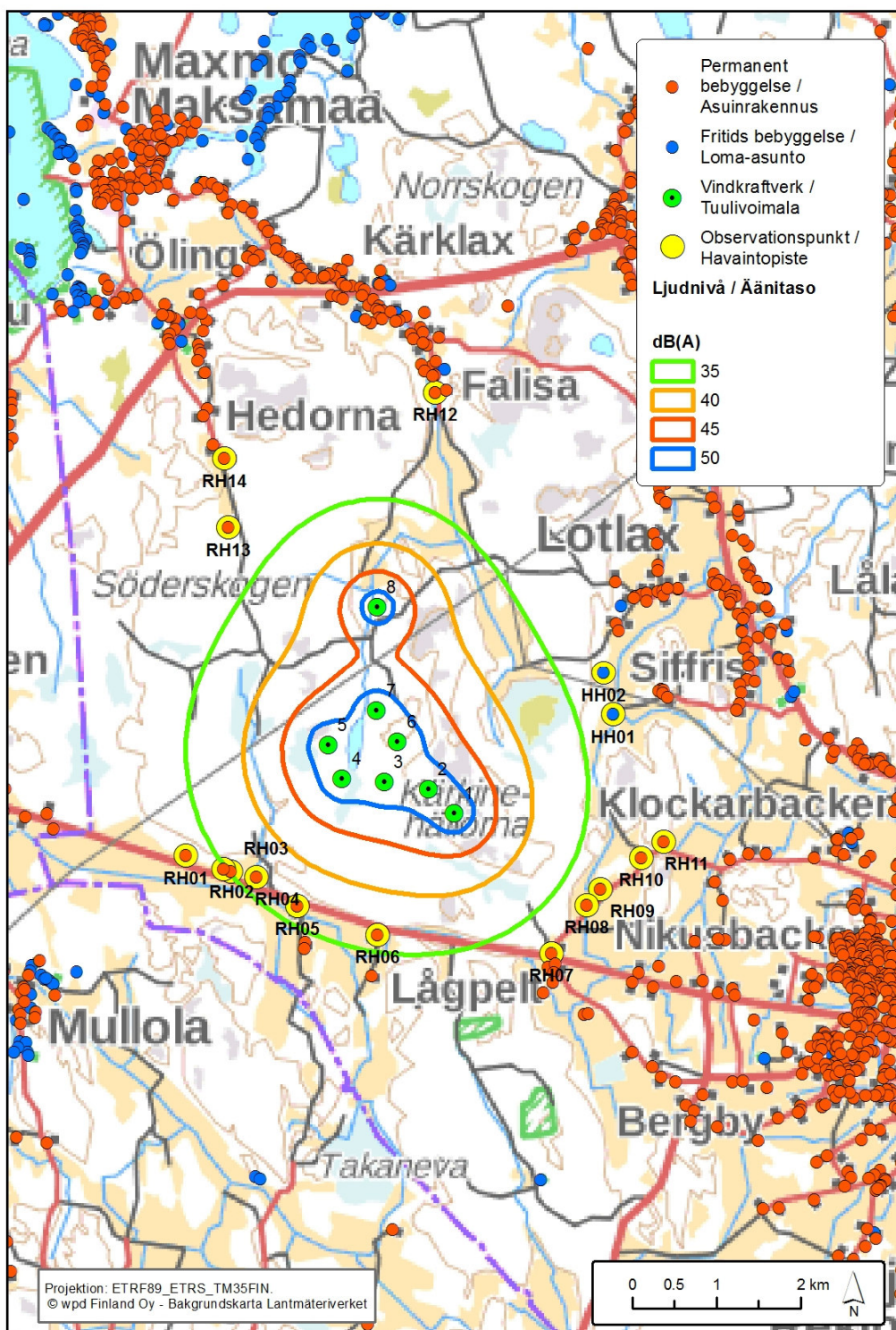


Bild 1. Bullerutbredningskarta

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  |
| Rekreatationsområden                                      | 0 st  |
| Campingplatser                                            | 0 st  |
| Nationalplatser                                           | 0 st  |

Tabell 5. Resultat av bullermodelleringen vid de närmast belägna byggnaderna

| Bostad | dB(A) | Bostad | dB(A) |
|--------|-------|--------|-------|
| HH01   | 32,7  | RH07   | 32,1  |
| HH02   | 32,4  | RH08   | 32,6  |
| RH01   | 33,2  | RH09   | 32,4  |
| RH02   | 34,8  | RH10   | 30,8  |
| RH03   | 35,1  | RH11   | 29,9  |
| RH04   | 36,2  | RH12   | 27,6  |
| RH05   | 36,3  | RH13   | 31,7  |
| RH06   | 36,2  | RH14   | 28,7  |

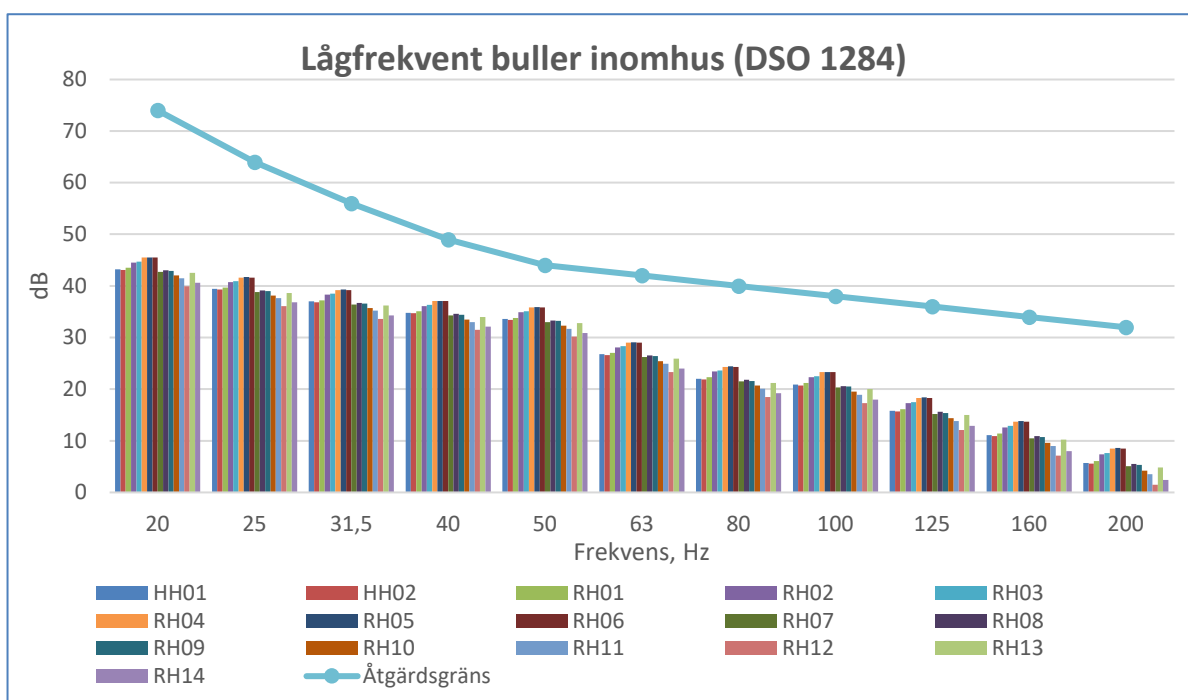


Bild 2. Det lågfrekventa bullret inomhus för de utvalda husen i förhållande till åtgärdsgränserna i SHM Förordning om boendehälsa.



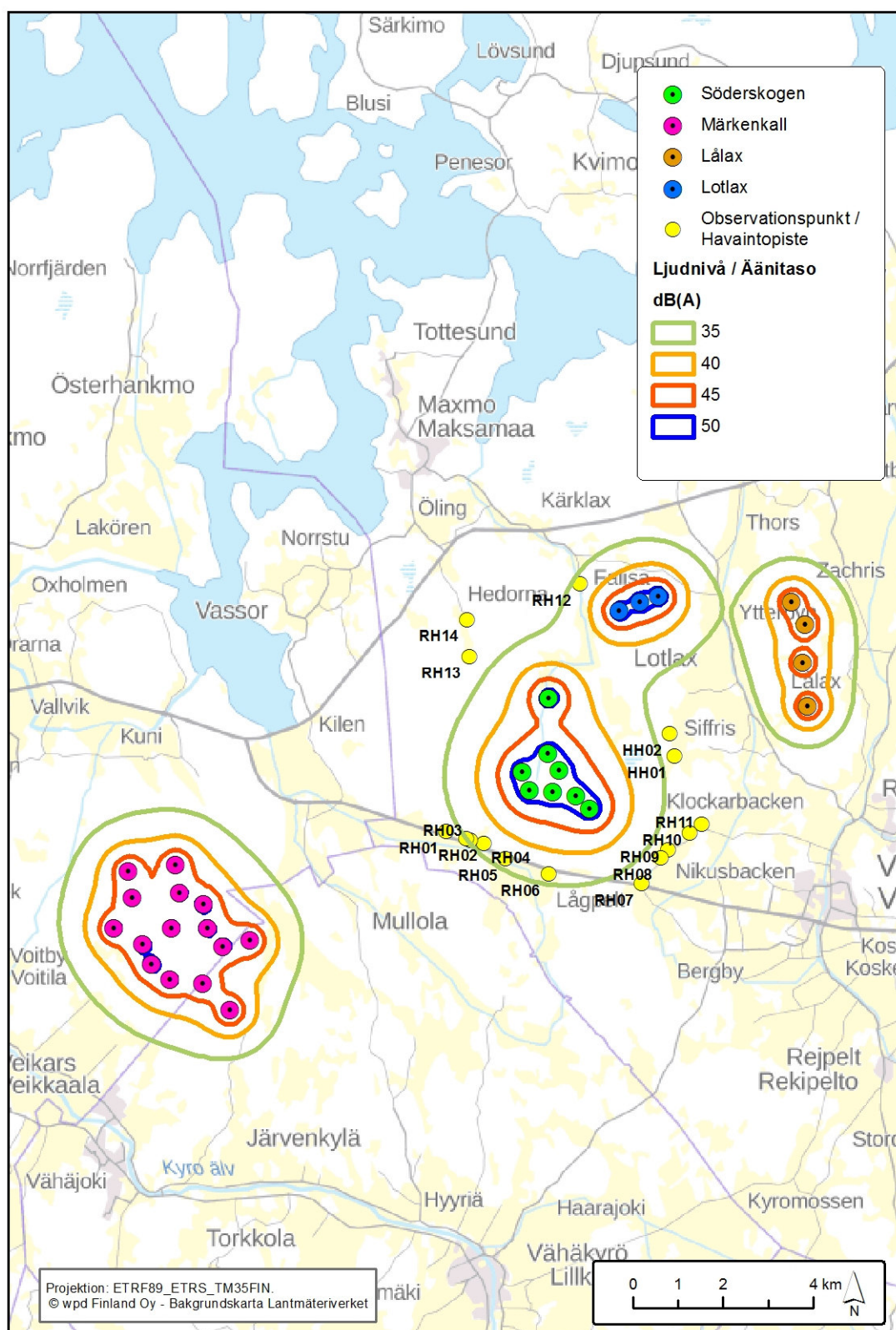


Bild 3. Bullerutbredningskarta, kumulativa konsekvenser

## 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



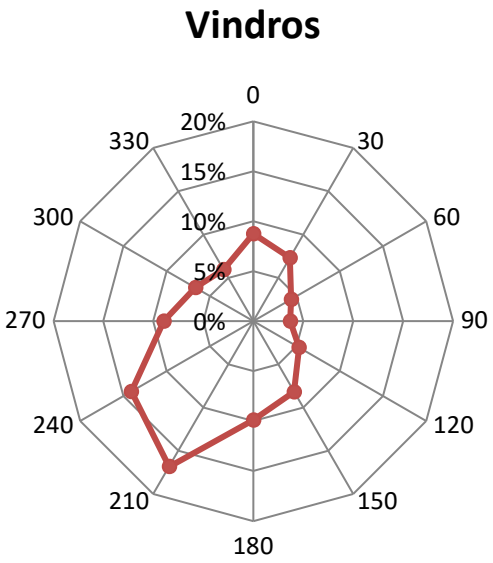
| Uppgifter om bullermodelleringen                                                                                                                      |                                 |                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------|
|                                                                                                                                                       |                                 |                |
| Författare:                                                                                                                                           | Anders Stenberg, wpd Finland Oy |                |
| Datum:                                                                                                                                                | 23.6.2021                       |                |
|                                                                                                                                                       |                                 |                |
| 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          |
|                                                                                                                                                       |                                 |                |
| Torn typ:                                                                                                                                             | Rörtorn                         |                |
|                                                                                                                                                       |                                 |                |
| Utgångsuppgifter för beräkningen (Ljudnivåer)                                                                                                         |                                 |                |
|                                                                                                                                                       |                                 |                |
| Ljudnivå $L_{WA}$ vid vindhastigheten 8 m/s (höjden 10 m):                                                                                            | 109,2 dB(A)                     |                |
|                                                                                                                                                       |                                 |                |
| Högsta ljudnivå $L_{WA}$ :                                                                                                                            | 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 |                                 |                |

|                                                                                                                                                                                                                        |                          |                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------|
| <b>Utgångsuppgifter om beräkningen</b>                                                                                                                                                                                 |                          |                                                |
|                                                                                                                                                                                                                        |                          |                                                |
| Smalbandighet/                                                                                                                                                                                                         |                          |                                                |
| Tonalitet                                                                                                                                                                                                              | Impulsart                | Signifikant pulserande<br>(amplitudmodulering) |
| Nej                                                                                                                                                                                                                    | Nej                      | Nej                                            |
| <b>Resolution</b>                                                                                                                                                                                                      |                          |                                                |
| Beräkningshöjd:                                                                                                                                                                                                        | Beräkningsrutans storlek |                                                |
| 4 m                                                                                                                                                                                                                    | 10 m                     |                                                |
| <b>Meteorologiska faktorer</b>                                                                                                                                                                                         |                          |                                                |
| Relativ fuktighet:                                                                                                                                                                                                     | Temperatur:              |                                                |
| 70 %                                                                                                                                                                                                                   | 15 °C                    |                                                |
| <b>Terrängmodell</b>                                                                                                                                                                                                   |                          |                                                |
|                                                                                                                                                                                                                        |                          |                                                |
| Terrängmodellens källa:                                                                                                                                                                                                | Vågrät upplösning::      | Lodrät upplösning::                            |
| Lantmäteriverket, höjdmodell 2 m                                                                                                                                                                                       | 2 m                      | 0,3-1,0 m                                      |
| <b>Beaktande av absorption vid markytan</b>                                                                                                                                                                            |                          |                                                |
| Landområden, absorptionsfaktor 0,4                                                                                                                                                                                     |                          |                                                |
| <b>Inverkan av markytans form</b>                                                                                                                                                                                      |                          |                                                |
| När vindkraftverkets fundament ligger 60 meter högre än markytan i det bullerutsatta objektet lägger man 2 dB till garantivärdet för kraftverkets bullerutsläpp.                                                       |                          |                                                |
| Nej                                                                                                                                                                                                                    |                          |                                                |
| <b>Kraftverksljudets riktningsverkan</b>                                                                                                                                                                               | Fri rymd: ja             | Annan                                          |
| <b>Atmosfärens stabilitet i beräkningen/meteorologisk korrigering</b>                                                                                                                                                  |                          |                                                |
| Enligt miljöministeriets anvisningar 2/2014                                                                                                                                                                            |                          |                                                |
|                                                                                                                                                                                                                        |                          |                                                |
| <b>Den statistiska vindfördelning</b>                                                                                                                                                                                  |                          |                                                |
|                                                                                                                                                                                                                        |                          |                                                |
| 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 (%) | Vindshastighet (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                  |

**Vindros**



Plats: 7011875 N, 255305 E (ERTS-TM35FIN)  
Höjd: 200m

## Bilaga 2

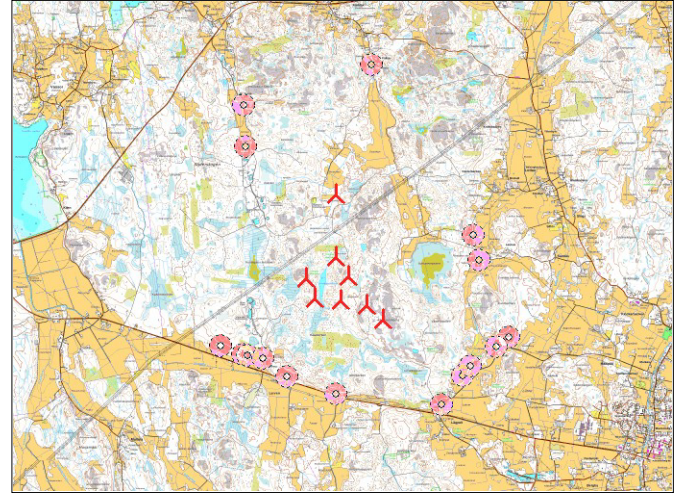
### ISO 9613-2 modellering, Söderskogen

## 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



▲ New WTG

■ Noise sensitive area

## WTGs

|   | East   | North   | Z    | Row data/Description          | WTG type |           |                  | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Noise data |                                                          | Wind speed [m/s] | LwA,ref [dB(A)] | Pure tones |
|---|--------|---------|------|-------------------------------|----------|-----------|------------------|-------------------|--------------------|----------------|------------|----------------------------------------------------------|------------------|-----------------|------------|
|   |        |         |      |                               | Valid    | Manufact. | Type-generator   |                   |                    |                | Creator    | Name                                                     |                  |                 |            |
| 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 | 255137 | 7011612 | 50,4 | 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         |
| 3 | 254614 | 7011705 | 38,8 | 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 | 254111 | 7011739 | 25,6 | 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         |
| 5 | 253945 | 7012144 | 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 | 254771 | 7012174 | 40,0 | 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 | 254521 | 7012552 | 35,1 | 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 | 19,3 | 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

| No.  | Name | East   | North   | Z    | Imission height | Noise   | Sound level | 2 dB penalty applied for one or more WTGs |
|------|------|--------|---------|------|-----------------|---------|-------------|-------------------------------------------|
|      |      |        |         | [m]  | [m]             | [dB(A)] | [dB(A)]     |                                           |
| HH01 | HH01 | 257331 | 7012499 | 17,6 | 4,0             | 40,0    | 32,7        | No                                        |
| HH02 | HH02 | 257219 | 7012995 | 17,2 | 4,0             | 40,0    | 32,4        | No                                        |
| RH01 | RH01 | 252257 | 7010823 | 13,0 | 4,0             | 40,0    | 33,2        | No                                        |
| RH02 | RH02 | 252700 | 7010660 | 15,9 | 4,0             | 40,0    | 34,8        | No                                        |
| RH03 | RH03 | 252789 | 7010635 | 15,0 | 4,0             | 40,0    | 35,1        | No                                        |
| RH04 | RH04 | 253090 | 7010568 | 15,6 | 4,0             | 40,0    | 36,2        | No                                        |
| RH05 | RH05 | 253574 | 7010222 | 14,2 | 4,0             | 40,0    | 36,3        | No                                        |
| RH06 | RH06 | 254528 | 7009881 | 18,5 | 4,0             | 40,0    | 36,2        | No                                        |
| RH07 | RH07 | 256594 | 7009667 | 21,5 | 4,0             | 40,0    | 32,1        | No                                        |
| RH08 | RH08 | 257015 | 7010236 | 19,0 | 4,0             | 40,0    | 32,6        | No                                        |
| RH09 | RH09 | 257177 | 7010423 | 17,1 | 4,0             | 40,0    | 32,4        | No                                        |
| RH10 | RH10 | 257669 | 7010798 | 18,9 | 4,0             | 40,0    | 30,8        | No                                        |
| RH11 | RH11 | 257929 | 7010986 | 18,8 | 4,0             | 40,0    | 29,9        | No                                        |
| RH12 | RH12 | 255219 | 7016333 | 14,4 | 4,0             | 40,0    | 27,6        | No                                        |
| RH13 | RH13 | 252762 | 7014727 | 25,2 | 4,0             | 40,0    | 31,7        | No                                        |
| RH14 | RH14 | 252714 | 7015547 | 21,5 | 4,0             | 40,0    | 28,7        | No                                        |

### Distances (m)

| WTG  |      |      |      |      |      |      |      |      |
|------|------|------|------|------|------|------|------|------|
| NSA  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
| HH01 | 2219 | 2365 | 2829 | 3306 | 3402 | 2579 | 2808 | 3084 |
| HH02 | 2433 | 2498 | 2905 | 3350 | 3380 | 2580 | 2732 | 2804 |
| RH01 | 3226 | 2984 | 2515 | 2067 | 2142 | 2852 | 2847 | 3734 |
| RH02 | 2822 | 2614 | 2179 | 1775 | 1935 | 2563 | 2624 | 3622 |
| RH03 | 2743 | 2542 | 2115 | 1722 | 1900 | 2508 | 2582 | 3600 |
| RH04 | 2472 | 2296 | 1900 | 1552 | 1791 | 2323 | 2444 | 3525 |
| RH05 | 2172 | 2090 | 1810 | 1608 | 1956 | 2288 | 2513 | 3690 |

To be continued on next page...

Project:

**Söderskogen**

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Calculated:

23.6.2021 11.01/3.3.247

## 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 | 1834 | 1825 | 1903 | 2336 | 2305 | 2670 | 3906 |
| RH07 | 2017 | 2429 | 2840 | 3232 | 3624 | 3098 | 3550 | 4608 |
| RH08 | 1911 | 2327 | 2813 | 3268 | 3612 | 2963 | 3401 | 4335 |
| RH09 | 1952 | 2359 | 2863 | 3334 | 3659 | 2973 | 3401 | 4281 |
| RH10 | 2285 | 2658 | 3185 | 3678 | 3958 | 3206 | 3602 | 4335 |
| RH11 | 2506 | 2859 | 3390 | 3889 | 4146 | 3372 | 3748 | 4404 |
| RH12 | 5008 | 4719 | 4665 | 4723 | 4376 | 4181 | 3843 | 2634 |
| RH13 | 4328 | 3914 | 3541 | 3276 | 2838 | 3246 | 2795 | 1998 |
| RH14 | 5023 | 4617 | 4283 | 4053 | 3616 | 3947 | 3495 | 2523 |

## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2219            | 2231                  | 0               | <b>26,31</b>          | 109,2              | 0,00       | 77,97        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2365            | 2377                  | 0               | <b>25,47</b>          | 109,2              | 0,00       | 78,52        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2829            | 2838                  | 0               | <b>23,05</b>          | 109,2              | 0,00       | 80,06        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3306            | 3313                  | 0               | <b>20,89</b>          | 109,2              | 0,00       | 81,40        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3402            | 3409                  | 0               | <b>20,49</b>          | 109,2              | 0,00       | 81,65        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2579            | 2589                  | 0               | <b>24,31</b>          | 109,2              | 0,00       | 79,26        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2808            | 2817                  | 0               | <b>23,15</b>          | 109,2              | 0,00       | 80,00        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3084            | 3091                  | 0               | <b>21,87</b>          | 109,2              | 0,00       | 80,80        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>32,66</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: HH02 HH02

Wind speed: 8,0 m/s

**WTG**

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2433            | 2445                  | 0               | <b>25,09</b>          | 109,2              | 0,00       | 78,76        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2498            | 2509                  | 0               | <b>24,74</b>          | 109,2              | 0,00       | 78,99        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2905            | 2914                  | 0               | <b>22,69</b>          | 109,2              | 0,00       | 80,29        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3350            | 3356                  | 0               | <b>20,71</b>          | 109,2              | 0,00       | 81,52        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3380            | 3388                  | 0               | <b>20,58</b>          | 109,2              | 0,00       | 81,60        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2580            | 2590                  | 0               | <b>24,30</b>          | 109,2              | 0,00       | 79,27        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2732            | 2741                  | 0               | <b>23,53</b>          | 109,2              | 0,00       | 79,76        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 2804            | 2811                  | 0               | <b>23,18</b>          | 109,2              | 0,00       | 79,98        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>32,41</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH01 RH01

Wind speed: 8,0 m/s

**WTG**

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 3226            | 3234                  | 0               | <b>21,23</b>          | 109,2              | 0,00       | 81,20        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2984            | 2994                  | 0               | <b>22,31</b>          | 109,2              | 0,00       | 80,53        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2515            | 2526                  | 0               | <b>24,64</b>          | 109,2              | 0,00       | 79,05        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 2067            | 2078                  | 0               | <b>27,25</b>          | 109,2              | 0,00       | 77,35        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 2142            | 2154                  | 0               | <b>26,78</b>          | 109,2              | 0,00       | 77,67        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2852            | 2862                  | 0               | <b>22,93</b>          | 109,2              | 0,00       | 80,13        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2847            | 2856                  | 0               | <b>22,96</b>          | 109,2              | 0,00       | 80,12        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3734            | 3740                  | 0               | <b>19,18</b>          | 109,2              | 0,00       | 82,46        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>33,18</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data



## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2822            | 2832                  | 0               | <b>23,08</b>          | 109,2              | 0,00       | 80,04        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2614            | 2625                  | 0               | <b>24,12</b>          | 109,2              | 0,00       | 79,38        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2179            | 2191                  | 0               | <b>26,55</b>          | 109,2              | 0,00       | 77,81        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 1775            | 1788                  | 0               | <b>29,20</b>          | 109,2              | 0,00       | 76,05        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 1935            | 1948                  | 0               | <b>28,09</b>          | 109,2              | 0,00       | 76,79        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2563            | 2574                  | 0               | <b>24,39</b>          | 109,2              | 0,00       | 79,21        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2624            | 2633                  | 0               | <b>24,08</b>          | 109,2              | 0,00       | 79,41        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3622            | 3628                  | 0               | <b>19,61</b>          | 109,2              | 0,00       | 82,19        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>34,79</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH03 RH03

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2743            | 2753                  | 0               | <b>23,47</b>          | 109,2              | 0,00       | 79,80        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2542            | 2553                  | 0               | <b>24,50</b>          | 109,2              | 0,00       | 79,14        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2115            | 2127                  | 0               | <b>26,94</b>          | 109,2              | 0,00       | 77,56        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 1722            | 1735                  | 0               | <b>29,58</b>          | 109,2              | 0,00       | 75,79        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 1900            | 1913                  | 0               | <b>28,33</b>          | 109,2              | 0,00       | 76,64        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2508            | 2519                  | 0               | <b>24,68</b>          | 109,2              | 0,00       | 79,02        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2582            | 2592                  | 0               | <b>24,29</b>          | 109,2              | 0,00       | 79,27        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3600            | 3607                  | 0               | <b>19,69</b>          | 109,2              | 0,00       | 82,14        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>35,11</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH04 RH04

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2472            | 2484                  | 0               | <b>24,87</b>          | 109,2              | 0,00       | 78,90        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2296            | 2309                  | 0               | <b>25,86</b>          | 109,2              | 0,00       | 78,27        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 1900            | 1914                  | 0               | <b>28,33</b>          | 109,2              | 0,00       | 76,64        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 1552            | 1567                  | 0               | <b>30,87</b>          | 109,2              | 0,00       | 74,90        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 1791            | 1805                  | 0               | <b>29,08</b>          | 109,2              | 0,00       | 76,13        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2323            | 2334                  | 0               | <b>25,71</b>          | 109,2              | 0,00       | 78,36        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2444            | 2455                  | 0               | <b>25,03</b>          | 109,2              | 0,00       | 78,80        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3525            | 3532                  | 0               | <b>19,99</b>          | 109,2              | 0,00       | 81,96        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>36,23</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH05 RH05

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2172            | 2185                  | 0               | <b>26,59</b>          | 109,2              | 0,00       | 77,79        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2090            | 2104                  | 0               | <b>27,09</b>          | 109,2              | 0,00       | 77,46        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 1810            | 1825                  | 0               | <b>28,94</b>          | 109,2              | 0,00       | 76,22        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 1608            | 1623                  | 0               | <b>30,44</b>          | 109,2              | 0,00       | 75,20        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 1956            | 1969                  | 0               | <b>27,96</b>          | 109,2              | 0,00       | 76,88        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2288            | 2300                  | 0               | <b>25,91</b>          | 109,2              | 0,00       | 78,23        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2513            | 2523                  | 0               | <b>24,66</b>          | 109,2              | 0,00       | 79,04        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3690            | 3696                  | 0               | <b>19,34</b>          | 109,2              | 0,00       | 82,36        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>36,28</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 1711            | 1727                  | 0               | <b>29,65</b>          | 109,2              | 0,00       | 75,75        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 1834            | 1849                  | 0               | <b>28,77</b>          | 109,2              | 0,00       | 76,34        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 1825            | 1839                  | 0               | <b>28,84</b>          | 109,2              | 0,00       | 76,29        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 1903            | 1915                  | 0               | <b>28,32</b>          | 109,2              | 0,00       | 76,64        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 2336            | 2346                  | 0               | <b>25,64</b>          | 109,2              | 0,00       | 78,41        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2305            | 2316                  | 0               | <b>25,81</b>          | 109,2              | 0,00       | 78,29        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2670            | 2679                  | 0               | <b>23,84</b>          | 109,2              | 0,00       | 79,56        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 3906            | 3912                  | 0               | <b>18,53</b>          | 109,2              | 0,00       | 82,85        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>36,21</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH07 RH07

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2017            | 2031                  | 0               | <b>27,55</b>          | 109,2              | 0,00       | 77,15        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2429            | 2440                  | 0               | <b>25,11</b>          | 109,2              | 0,00       | 78,75        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2840            | 2848                  | 0               | <b>23,00</b>          | 109,2              | 0,00       | 80,09        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3232            | 3239                  | 0               | <b>21,21</b>          | 109,2              | 0,00       | 81,21        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3624            | 3631                  | 0               | <b>19,60</b>          | 109,2              | 0,00       | 82,20        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 3098            | 3106                  | 0               | <b>21,80</b>          | 109,2              | 0,00       | 80,84        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3550            | 3557                  | 0               | <b>19,89</b>          | 109,2              | 0,00       | 82,02        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 4608            | 4613                  | 0               | <b>16,17</b>          | 109,2              | 0,00       | 84,28        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>32,06</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH08 RH08

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 1911            | 1925                  | 0               | <b>28,25</b>          | 109,2              | 0,00       | 76,69        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2327            | 2339                  | 0               | <b>25,68</b>          | 109,2              | 0,00       | 78,38        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2813            | 2822                  | 0               | <b>23,13</b>          | 109,2              | 0,00       | 80,01        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3268            | 3275                  | 0               | <b>21,06</b>          | 109,2              | 0,00       | 81,30        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3612            | 3619                  | 0               | <b>19,64</b>          | 109,2              | 0,00       | 82,17        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2963            | 2972                  | 0               | <b>22,41</b>          | 109,2              | 0,00       | 80,46        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3401            | 3409                  | 0               | <b>20,49</b>          | 109,2              | 0,00       | 81,65        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 4335            | 4339                  | 0               | <b>17,05</b>          | 109,2              | 0,00       | 83,75        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>32,55</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH09 RH09

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 1952            | 1966                  | 0               | <b>27,98</b>          | 109,2              | 0,00       | 76,87        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2359            | 2371                  | 0               | <b>25,50</b>          | 109,2              | 0,00       | 78,50        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2863            | 2872                  | 0               | <b>22,88</b>          | 109,2              | 0,00       | 80,16        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3334            | 3341                  | 0               | <b>20,78</b>          | 109,2              | 0,00       | 81,48        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3659            | 3665                  | 0               | <b>19,46</b>          | 109,2              | 0,00       | 82,28        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 2973            | 2982                  | 0               | <b>22,36</b>          | 109,2              | 0,00       | 80,49        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3401            | 3409                  | 0               | <b>20,49</b>          | 109,2              | 0,00       | 81,65        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 4281            | 4286                  | 0               | <b>17,23</b>          | 109,2              | 0,00       | 83,64        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>32,36</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2285            | 2297                  | 0               | <b>25,92</b>          | 109,2              | 0,00       | 78,22        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2658            | 2669                  | 0               | <b>23,89</b>          | 109,2              | 0,00       | 79,53        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 3185            | 3193                  | 0               | <b>21,41</b>          | 109,2              | 0,00       | 81,08        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3678            | 3685                  | 0               | <b>19,39</b>          | 109,2              | 0,00       | 82,33        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3958            | 3964                  | 0               | <b>18,35</b>          | 109,2              | 0,00       | 82,96        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 3206            | 3215                  | 0               | <b>21,32</b>          | 109,2              | 0,00       | 81,14        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3602            | 3609                  | 0               | <b>19,68</b>          | 109,2              | 0,00       | 82,15        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 4335            | 4340                  | 0               | <b>17,05</b>          | 109,2              | 0,00       | 83,75        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>30,82</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH11 RH11

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2506            | 2516                  | 0               | <b>24,70</b>          | 109,2              | 0,00       | 79,02        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2859            | 2869                  | 0               | <b>22,90</b>          | 109,2              | 0,00       | 80,15        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 3390            | 3397                  | 0               | <b>20,54</b>          | 109,2              | 0,00       | 81,62        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3889            | 3895                  | 0               | <b>18,60</b>          | 109,2              | 0,00       | 82,81        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 4146            | 4152                  | 0               | <b>17,68</b>          | 109,2              | 0,00       | 83,36        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 3372            | 3379                  | 0               | <b>20,61</b>          | 109,2              | 0,00       | 81,58        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3748            | 3754                  | 0               | <b>19,12</b>          | 109,2              | 0,00       | 82,49        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 4404            | 4409                  | 0               | <b>16,82</b>          | 109,2              | 0,00       | 83,89        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>29,91</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH12 RH12

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 5008            | 5014                  | 0               | <b>14,97</b>          | 109,2              | 0,00       | 85,00        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 4719            | 4725                  | 0               | <b>15,82</b>          | 109,2              | 0,00       | 84,49        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 4665            | 4670                  | 0               | <b>15,99</b>          | 109,2              | 0,00       | 84,39        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 4723            | 4728                  | 0               | <b>15,81</b>          | 109,2              | 0,00       | 84,49        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 4376            | 4382                  | 0               | <b>16,91</b>          | 109,2              | 0,00       | 83,83        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 4181            | 4187                  | 0               | <b>17,56</b>          | 109,2              | 0,00       | 83,44        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3843            | 3849                  | 0               | <b>18,77</b>          | 109,2              | 0,00       | 82,71        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 2634            | 2642                  | 0               | <b>24,03</b>          | 109,2              | 0,00       | 79,44        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>27,65</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH13 RH13

Wind speed: 8,0 m/s

#### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 4328            | 4334                  | 0               | <b>17,07</b>          | 109,2              | 0,00       | 83,74        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 3914            | 3921                  | 0               | <b>18,50</b>          | 109,2              | 0,00       | 82,87        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 3541            | 3548                  | 0               | <b>19,92</b>          | 109,2              | 0,00       | 82,00        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3276            | 3282                  | 0               | <b>21,02</b>          | 109,2              | 0,00       | 81,32        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 2838            | 2847                  | 0               | <b>23,01</b>          | 109,2              | 0,00       | 80,09        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 3246            | 3253                  | 0               | <b>21,15</b>          | 109,2              | 0,00       | 81,25        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 2795            | 2803                  | 0               | <b>23,22</b>          | 109,2              | 0,00       | 79,95        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 1998            | 2008                  | 0               | <b>27,70</b>          | 109,2              | 0,00       | 77,05        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>31,69</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 5023            | 5028                  | 0               | <b>14,92</b>          | 109,2              | 0,00       | 85,03        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 4617            | 4623                  | 0               | <b>16,13</b>          | 109,2              | 0,00       | 84,30        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 4283            | 4288                  | 0               | <b>17,22</b>          | 109,2              | 0,00       | 83,65        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 4053            | 4058                  | 0               | <b>18,01</b>          | 109,2              | 0,00       | 83,17        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3616            | 3622                  | 0               | <b>19,63</b>          | 109,2              | 0,00       | 82,18        | -            | -           | 0,00         | 0,00          | -         |
| 6   | 3947            | 3954                  | 0               | <b>18,38</b>          | 109,2              | 0,00       | 82,94        | -            | -           | 0,00         | 0,00          | -         |
| 7   | 3495            | 3502                  | 0               | <b>20,11</b>          | 109,2              | 0,00       | 81,89        | -            | -           | 0,00         | 0,00          | -         |
| 8   | 2523            | 2532                  | 0               | <b>24,61</b>          | 109,2              | 0,00       | 79,07        | -            | -           | 0,00         | 0,00          | -         |
| Sum |                 |                       |                 | <b>28,70</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## 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  | 9.7.2019    | USER    | 31.3.2021 7.59 |
| assuming N163 5.7 MW, without serrations |             |         |                |

| Status       | Hub height<br>[m] | Wind speed<br>[m/s] | LwA,ref<br>[dB(A)] | Pure tones | Octave data |      |      |       |       |       |      |      |
|--------------|-------------------|---------------------|--------------------|------------|-------------|------|------|-------|-------|-------|------|------|
|              |                   |                     |                    |            | 63          | 125  | 250  | 500   | 1000  | 2000  | 4000 | 8000 |
| 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:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

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

**Uncertainty margin:** Use default value from calculation model

**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**



## DECIBEL - Assumptions for noise calculation

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

**Noise sensitive area: RH11 RH11**

**Predefined calculation standard:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

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

**Uncertainty margin:** Use default value from calculation model

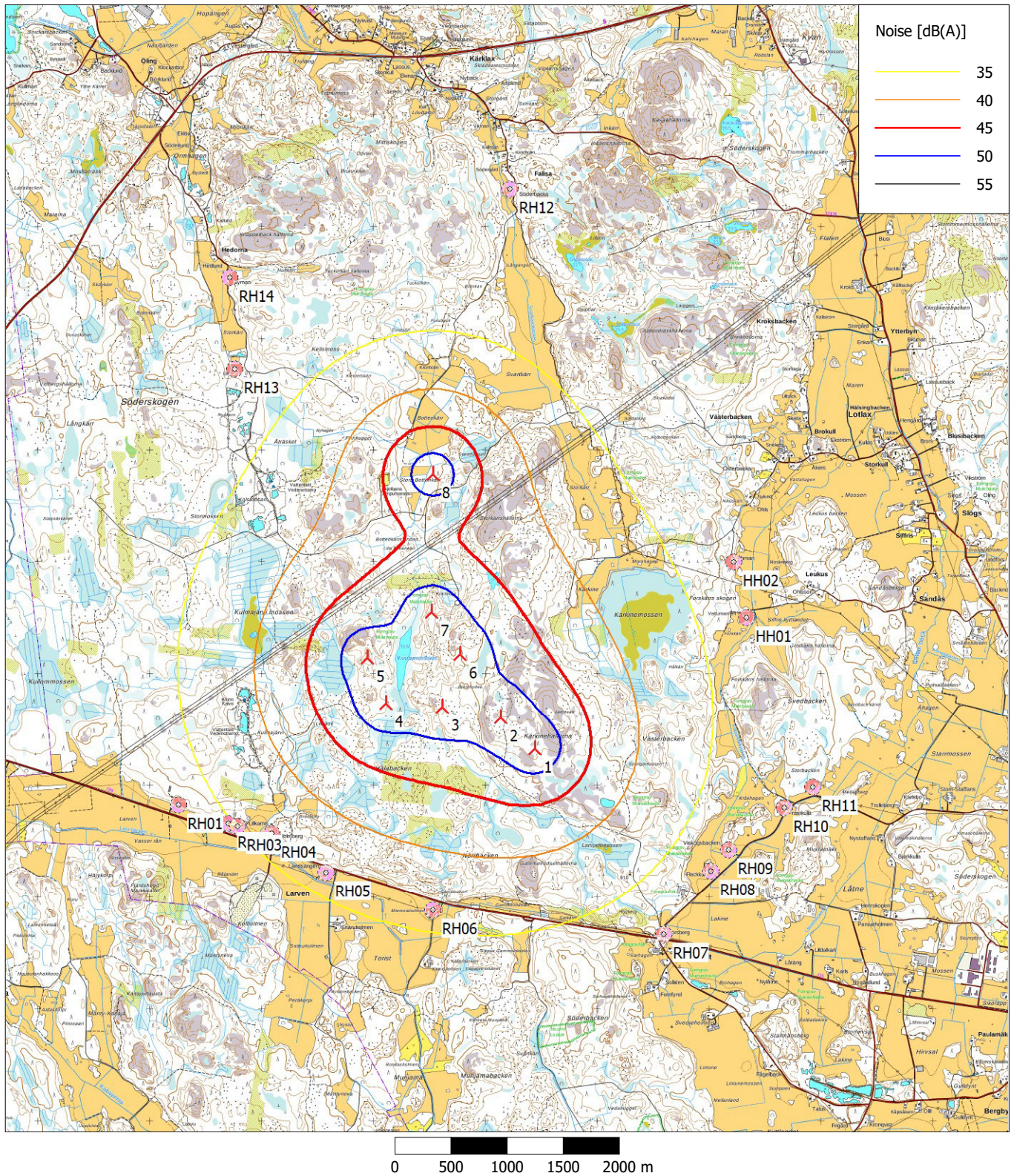
**Noise demand:** 40,0 dB(A)

**No distance demand**



## 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: 254 695 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

Licensed user:

wpd AG

Stephanitorsbollwerk 3 (Haus LUV)

DE-28211 Bremen

+49 7142 77810

Anders Stenberg / a.stenberg@wpd.fi

Calculated:

16.9.2021 9.18/3.3.294

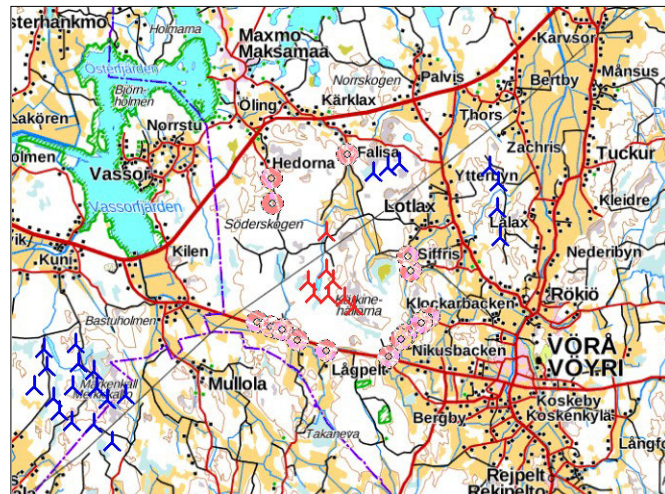
## DECIBEL - Main Result

**Calculation:** MP Proposal, 8x F180 @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    | Row data/Description               | WTG type |                | Type-generator          | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Noise data |                                                          | Wind speed [m/s] | LwA_ref [dB(A)] | Pure tones |
|---------------|--------|---------|------|------------------------------------|----------|----------------|-------------------------|-------------------|--------------------|----------------|------------|----------------------------------------------------------|------------------|-----------------|------------|
|               |        |         |      |                                    | Valid    | Manufact.      |                         |                   |                    |                | Creator    | Name                                                     |                  |                 |            |
|               |        |         |      | [m]                                |          |                |                         |                   |                    |                |            |                                                          |                  |                 |            |
| 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             | 255137 | 7011612 | 50,4 | 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         |
| 3             | 254614 | 7011705 | 38,8 | 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             | 254111 | 7011739 | 25,8 | 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             | 253945 | 7012144 | 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             | 254771 | 7012174 | 40,0 | 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             | 254521 | 7012552 | 35,0 | 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            | IOI      | 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            | IOI      | 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            | IOI      | Prokon         | P3000-3030              | 3030              | 116,7              | 122,0          | USER       | Mode 0                                                   | 8,0              | 106,5           | No         |
| Lälax 1       | 260278 | 7013601 | 21,1 | VESTAS V150-4.2 4200 150.0         | IOI      | VESTAS         | V150-4.2-4200           | 4200              | 150,0              | 140,0          | USER       | V150 4.2 MW 3rd Oct serrated blades                      | 8,0              | 104,9           | No         |
| Lälax 2       | 260174 | 7014579 | 28,5 | VESTAS V150-4.2 4200 150.0         | IOI      | VESTAS         | V150-4.2-4200           | 4200              | 150,0              | 140,0          | USER       | V150 4.2 MW 3rd Oct serrated blades                      | 8,0              | 104,9           | No         |
| Lälax 3       | 260216 | 7015429 | 20,8 | VESTAS V150-4.2 4200 150.0         | IOI      | VESTAS         | V150-4.2-4200           | 4200              | 150,0              | 140,0          | USER       | V150 4.2 MW 3rd Oct serrated blades                      | 8,0              | 104,9           | No         |
| Lälax 4       | 259924 | 7015937 | 27,7 | VESTAS V150-4.2 4200 150.0         | IOI      | VESTAS         | V150-4.2-4200           | 4200              | 150,0              | 140,0          | USER       | V150 4.2 MW 3rd Oct serrated blades                      | 8,0              | 104,9           | No         |
| Märkenkall 01 | 247894 | 7008402 | 21,5 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 02 | 247294 | 7008259 | 25,0 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 03 | 246855 | 7007441 | 24,7 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 04 | 247445 | 7006854 | 25,9 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 05 | 246950 | 7008670 | 26,1 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 06 | 246864 | 7009208 | 21,0 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 07 | 246326 | 7009461 | 17,9 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 08 | 246247 | 7010081 | 20,5 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 09 | 246160 | 7008681 | 29,9 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 10 | 246126 | 7007532 | 23,9 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 11 | 245712 | 7007870 | 13,7 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 12 | 245517 | 7008318 | 15,8 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 13 | 245281 | 7009344 | 17,9 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 14 | 245200 | 7009948 | 18,9 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |
| Märkenkall 15 | 244881 | 7008680 | 14,1 | GE WIND ENERGY 5.5-158 Thrust 6... | Yes      | GE WIND ENERGY | 5.5-158 Thrust 665-5500 | 5500              | 158,0              | 161,0          | EMD        | 5.5-158 NO                                               | 7,9              | 106,0           | No         |

## Calculation Results

### Sound level

#### Noise sensitive area

| No.  | Name | East   | North   | Z    | 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          | 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          | 33,5              | No                                        |
| RH02 | RH02 | 252700 | 7010660 | 15,5 | 4,0                 | 40,0          | 35,0              | No                                        |
| RH03 | RH03 | 252789 | 7010635 | 14,7 | 4,0                 | 40,0          | 35,3              | No                                        |
| RH04 | RH04 | 253090 | 7010568 | 15,5 | 4,0                 | 40,0          | 36,4              | No                                        |
| RH05 | RH05 | 253574 | 7010222 | 14,2 | 4,0                 | 40,0          | 36,4              | No                                        |
| RH06 | RH06 | 254528 | 7009881 | 18,4 | 4,0                 | 40,0          | 36,3              | No                                        |
| RH07 | RH07 | 256594 | 7009667 | 21,5 | 4,0                 | 40,0          | 32,4              | No                                        |
| RH08 | RH08 | 257015 | 7010236 | 19,0 | 4,0                 | 40,0          | 32,9              | No                                        |
| RH09 | RH09 | 257177 | 7010423 | 17,1 | 4,0                 | 40,0          | 32,7              | No                                        |
| RH10 | RH10 | 257669 | 7010798 | 18,8 | 4,0                 | 40,0          | 31,5              | No                                        |
| RH11 | RH11 | 257929 | 7010986 | 18,5 | 4,0                 | 40,0          | 30,8              | No                                        |
| RH12 | RH12 | 255219 | 7016333 | 14,3 | 4,0                 | 40,0          | 36,3              | No                                        |
| RH13 | RH13 | 252762 | 7014727 | 25,0 | 4,0                 | 40,0          | 32,3              | No                                        |
| RH14 | RH14 | 252714 | 7015547 | 21,4 | 4,0                 | 40,0          | 29,9              | No                                        |

## 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             | 2365  | 2498  | 2984 | 2614 | 2542 | 2296 | 2090 | 1834 | 2429  | 2327  | 2359  | 2658  | 2859  | 4719  | 3914 | 4617  |
| 3             | 2829  | 2905  | 2515 | 2179 | 2115 | 1900 | 1810 | 1825 | 2840  | 2813  | 2863  | 3185  | 3390  | 4665  | 3541 | 4283  |
| 4             | 3306  | 3350  | 2067 | 1775 | 1722 | 1552 | 1608 | 1903 | 3232  | 3268  | 3334  | 3678  | 3889  | 4723  | 3276 | 4053  |
| 5             | 3402  | 3380  | 2142 | 1935 | 1900 | 1791 | 1956 | 2336 | 3624  | 3612  | 3659  | 3958  | 4146  | 4376  | 2838 | 3616  |
| 6             | 2579  | 2580  | 2852 | 2563 | 2508 | 2323 | 2288 | 2305 | 3098  | 2963  | 2973  | 3206  | 3372  | 4181  | 3246 | 3947  |
| 7             | 2808  | 2732  | 2847 | 2624 | 2582 | 2444 | 2513 | 2670 | 3550  | 3401  | 3401  | 3602  | 3748  | 3843  | 2795 | 3495  |
| 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 |

## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x F180 @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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 2219            | 2231                  | 0               | <b>26,31</b>          | 109,2              | 0,00       | 77,97        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2365            | 2377                  | 0               | <b>25,47</b>          | 109,2              | 0,00       | 78,52        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2829            | 2838                  | 0               | <b>23,05</b>          | 109,2              | 0,00       | 80,06        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 3306            | 3313                  | 0               | <b>20,89</b>          | 109,2              | 0,00       | 81,40        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 3402            | 3409                  | 0               | <b>20,49</b>          | 109,2              | 0,00       | 81,65        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2579            | 2589                  | 0               | <b>24,31</b>          | 109,2              | 0,00       | 79,26        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2808            | 2817                  | 0               | <b>23,15</b>          | 109,2              | 0,00       | 80,00        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 3084            | 3091                  | 0               | <b>21,87</b>          | 109,2              | 0,00       | 80,80        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 3455            | 3457                  | 0               | <b>18,71</b>          | 106,5              | 0,00       | 81,77        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 3512            | 3515                  | 0               | <b>18,49</b>          | 106,5              | 0,00       | 81,92        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 3576            | 3578                  | 0               | <b>18,25</b>          | 106,5              | 0,00       | 82,07        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 3144            | 3147                  | 0               | <b>18,87</b>          | 104,9              | 0,00       | 80,96        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 3520            | 3524                  | 0               | <b>17,37</b>          | 104,9              | 0,00       | 81,94        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 4109            | 4112                  | 0               | <b>15,28</b>          | 104,9              | 0,00       | 83,28        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 4304            | 4306                  | 0               | <b>14,65</b>          | 104,9              | 0,00       | 83,68        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 10280           | 10282                 | 0               | <b>3,21</b>           | 106,0              | 0,00       | 91,24        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 10888           | 10889                 | 0               | <b>2,50</b>           | 106,0              | 0,00       | 91,74        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 11625           | 11626                 | 0               | <b>1,70</b>           | 106,0              | 0,00       | 92,31        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 11376           | 11377                 | 0               | <b>1,96</b>           | 106,0              | 0,00       | 92,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 11057           | 11058                 | 0               | <b>2,31</b>           | 106,0              | 0,00       | 91,87        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 10964           | 10965                 | 0               | <b>2,42</b>           | 106,0              | 0,00       | 91,80        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 11408           | 11409                 | 0               | <b>1,93</b>           | 106,0              | 0,00       | 92,15        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 11336           | 11338                 | 0               | <b>2,01</b>           | 106,0              | 0,00       | 92,09        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 11797           | 11798                 | 0               | <b>1,52</b>           | 106,0              | 0,00       | 92,44        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 12248           | 12249                 | 0               | <b>1,06</b>           | 106,0              | 0,00       | 92,76        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 12498           | 12499                 | 0               | <b>0,81</b>           | 106,0              | 0,00       | 92,94        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 12523           | 12524                 | 0               | <b>0,78</b>           | 106,0              | 0,00       | 92,95        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 12447           | 12448                 | 0               | <b>0,86</b>           | 106,0              | 0,00       | 92,90        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 12387           | 12388                 | 0               | <b>0,92</b>           | 106,0              | 0,00       | 92,86        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 13013           | 13014                 | 0               | <b>0,31</b>           | 106,0              | 0,00       | 93,29        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>33,57</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

#### Noise sensitive area: HH02 HH02

Wind speed: 8,0 m/s

##### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|-----|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1   | 2433            | 2445                  | 0               | <b>25,09</b>          | 109,2              | 0,00       | 78,76        | -            | -           | 0,00         | 0,00          | -         |
| 2   | 2498            | 2509                  | 0               | <b>24,74</b>          | 109,2              | 0,00       | 78,99        | -            | -           | 0,00         | 0,00          | -         |
| 3   | 2905            | 2914                  | 0               | <b>22,69</b>          | 109,2              | 0,00       | 80,29        | -            | -           | 0,00         | 0,00          | -         |
| 4   | 3350            | 3357                  | 0               | <b>20,71</b>          | 109,2              | 0,00       | 81,52        | -            | -           | 0,00         | 0,00          | -         |
| 5   | 3380            | 3388                  | 0               | <b>20,58</b>          | 109,2              | 0,00       | 81,60        | -            | -           | 0,00         | 0,00          | -         |

To be continued on next page...

## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 6             | 2580            | 2590                  | 0               | <b>24,30</b>          | 109,2              | 0,00       | 79,27        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2732            | 2741                  | 0               | <b>23,53</b>          | 109,2              | 0,00       | 79,76        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 2804            | 2811                  | 0               | <b>23,18</b>          | 109,2              | 0,00       | 79,98        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 2953            | 2955                  | 0               | <b>20,78</b>          | 106,5              | 0,00       | 80,41        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 3004            | 3007                  | 0               | <b>20,56</b>          | 106,5              | 0,00       | 80,56        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 3072            | 3074                  | 0               | <b>20,27</b>          | 106,5              | 0,00       | 80,76        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 3117            | 3120                  | 0               | <b>18,99</b>          | 104,9              | 0,00       | 80,88        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 3351            | 3354                  | 0               | <b>18,03</b>          | 104,9              | 0,00       | 81,51        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 3859            | 3861                  | 0               | <b>16,14</b>          | 104,9              | 0,00       | 82,73        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 3994            | 3997                  | 0               | <b>15,67</b>          | 104,9              | 0,00       | 83,03        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 10387           | 10388                 | 0               | <b>3,08</b>           | 106,0              | 0,00       | 91,33        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 10989           | 10990                 | 0               | <b>2,39</b>           | 106,0              | 0,00       | 91,82        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 11750           | 11751                 | 0               | <b>1,57</b>           | 106,0              | 0,00       | 92,40        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 11535           | 11536                 | 0               | <b>1,79</b>           | 106,0              | 0,00       | 92,24        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 11134           | 11136                 | 0               | <b>2,23</b>           | 106,0              | 0,00       | 91,93        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 11018           | 11019                 | 0               | <b>2,36</b>           | 106,0              | 0,00       | 91,84        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 11443           | 11445                 | 0               | <b>1,89</b>           | 106,0              | 0,00       | 92,17        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 11344           | 11345                 | 0               | <b>2,00</b>           | 106,0              | 0,00       | 92,10        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 11862           | 11863                 | 0               | <b>1,45</b>           | 106,0              | 0,00       | 92,48        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 12356           | 12357                 | 0               | <b>0,95</b>           | 106,0              | 0,00       | 92,84        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 12587           | 12588                 | 0               | <b>0,72</b>           | 106,0              | 0,00       | 93,00        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 12593           | 12594                 | 0               | <b>0,71</b>           | 106,0              | 0,00       | 93,00        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 12475           | 12476                 | 0               | <b>0,83</b>           | 106,0              | 0,00       | 92,92        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 12390           | 12391                 | 0               | <b>0,91</b>           | 106,0              | 0,00       | 92,86        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 13061           | 13062                 | 0               | <b>0,27</b>           | 106,0              | 0,00       | 93,32        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>33,66</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH01 RH01

Wind speed: 8,0 m/s

### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 3226            | 3234                  | 0               | <b>21,23</b>          | 109,2              | 0,00       | 81,20        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2984            | 2994                  | 0               | <b>22,31</b>          | 109,2              | 0,00       | 80,53        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2515            | 2526                  | 0               | <b>24,64</b>          | 109,2              | 0,00       | 79,05        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 2067            | 2078                  | 0               | <b>27,25</b>          | 109,2              | 0,00       | 77,35        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 2142            | 2154                  | 0               | <b>26,78</b>          | 109,2              | 0,00       | 77,67        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2852            | 2862                  | 0               | <b>22,93</b>          | 109,2              | 0,00       | 80,13        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2847            | 2856                  | 0               | <b>22,96</b>          | 109,2              | 0,00       | 80,12        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 3734            | 3740                  | 0               | <b>19,18</b>          | 109,2              | 0,00       | 82,46        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 6229            | 6231                  | 0               | <b>11,52</b>          | 106,5              | 0,00       | 86,89        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 6672            | 6674                  | 0               | <b>10,67</b>          | 106,5              | 0,00       | 87,49        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 7035            | 7037                  | 0               | <b>10,01</b>          | 106,5              | 0,00       | 87,95        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 8483            | 8484                  | 0               | <b>6,13</b>           | 104,9              | 0,00       | 89,57        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 8757            | 8758                  | 0               | <b>5,72</b>           | 104,9              | 0,00       | 89,85        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 9190            | 9191                  | 0               | <b>5,09</b>           | 104,9              | 0,00       | 90,27        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 9210            | 9211                  | 0               | <b>5,06</b>           | 104,9              | 0,00       | 90,29        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 4986            | 4988                  | 0               | <b>12,12</b>          | 106,0              | 0,00       | 84,96        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 5582            | 5584                  | 0               | <b>10,75</b>          | 106,0              | 0,00       | 85,94        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 6368            | 6371                  | 0               | <b>9,13</b>           | 106,0              | 0,00       | 87,08        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 6233            | 6235                  | 0               | <b>9,39</b>           | 106,0              | 0,00       | 86,90        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 5723            | 5725                  | 0               | <b>10,44</b>          | 106,0              | 0,00       | 86,16        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 5625            | 5628                  | 0               | <b>10,65</b>          | 106,0              | 0,00       | 86,01        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 6081            | 6083                  | 0               | <b>9,70</b>           | 106,0              | 0,00       | 86,68        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 6051            | 6053                  | 0               | <b>9,76</b>           | 106,0              | 0,00       | 86,64        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 6457            | 6460                  | 0               | <b>8,96</b>           | 106,0              | 0,00       | 87,20        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 6953            | 6955                  | 0               | <b>8,04</b>           | 106,0              | 0,00       | 87,85        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 7175            | 7176                  | 0               | <b>7,65</b>           | 106,0              | 0,00       | 88,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 7185            | 7187                  | 0               | <b>7,64</b>           | 106,0              | 0,00       | 88,13        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 7125            | 7127                  | 0               | <b>7,74</b>           | 106,0              | 0,00       | 88,06        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 7105            | 7107                  | 0               | <b>7,77</b>           | 106,0              | 0,00       | 88,03        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 7675            | 7677                  | 0               | <b>6,82</b>           | 106,0              | 0,00       | 88,70        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>33,54</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data



## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 2822            | 2832                  | 0               | <b>23,08</b>          | 109,2              | 0,00       | 80,04        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2614            | 2625                  | 0               | <b>24,12</b>          | 109,2              | 0,00       | 79,38        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2179            | 2191                  | 0               | <b>26,55</b>          | 109,2              | 0,00       | 77,81        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 1775            | 1788                  | 0               | <b>29,20</b>          | 109,2              | 0,00       | 76,05        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 1935            | 1948                  | 0               | <b>28,09</b>          | 109,2              | 0,00       | 76,79        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2563            | 2574                  | 0               | <b>24,39</b>          | 109,2              | 0,00       | 79,21        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2624            | 2633                  | 0               | <b>24,08</b>          | 109,2              | 0,00       | 79,41        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 3622            | 3628                  | 0               | <b>19,61</b>          | 109,2              | 0,00       | 82,19        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 6101            | 6102                  | 0               | <b>11,78</b>          | 106,5              | 0,00       | 86,71        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 6526            | 6527                  | 0               | <b>10,94</b>          | 106,5              | 0,00       | 87,29        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 6874            | 6875                  | 0               | <b>10,30</b>          | 106,5              | 0,00       | 87,75        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 1      | 8123            | 8124                  | 0               | <b>6,70</b>           | 104,9              | 0,00       | 89,20        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 2      | 8433            | 8434                  | 0               | <b>6,21</b>           | 104,9              | 0,00       | 89,52        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 3      | 8895            | 8896                  | 0               | <b>5,52</b>           | 104,9              | 0,00       | 89,98        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 4      | 8940            | 8941                  | 0               | <b>5,45</b>           | 104,9              | 0,00       | 90,03        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 5307            | 5309                  | 0               | <b>11,37</b>          | 106,0              | 0,00       | 85,50        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 5911            | 5914                  | 0               | <b>10,04</b>          | 106,0              | 0,00       | 86,44        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 6668            | 6670                  | 0               | <b>8,56</b>           | 106,0              | 0,00       | 87,48        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 6484            | 6486                  | 0               | <b>8,91</b>           | 106,0              | 0,00       | 87,24        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 6081            | 6083                  | 0               | <b>9,70</b>           | 106,0              | 0,00       | 86,68        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 6010            | 6012                  | 0               | <b>9,84</b>           | 106,0              | 0,00       | 86,58        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 6481            | 6483                  | 0               | <b>8,91</b>           | 106,0              | 0,00       | 87,24        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 6475            | 6477                  | 0               | <b>8,92</b>           | 106,0              | 0,00       | 87,23        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 6828            | 6830                  | 0               | <b>8,27</b>           | 106,0              | 0,00       | 87,69        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 7275            | 7277                  | 0               | <b>7,48</b>           | 106,0              | 0,00       | 88,24        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 7519            | 7521                  | 0               | <b>7,07</b>           | 106,0              | 0,00       | 88,53        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 7550            | 7552                  | 0               | <b>7,02</b>           | 106,0              | 0,00       | 88,56        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 7530            | 7531                  | 0               | <b>7,06</b>           | 106,0              | 0,00       | 88,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 7529            | 7530                  | 0               | <b>7,06</b>           | 106,0              | 0,00       | 88,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 8060            | 8062                  | 0               | <b>6,21</b>           | 106,0              | 0,00       | 89,13        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>35,02</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH03 RH03

Wind speed: 8,0 m/s

#### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 2743            | 2753                  | 0               | <b>23,47</b>          | 109,2              | 0,00       | 79,80        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2542            | 2553                  | 0               | <b>24,50</b>          | 109,2              | 0,00       | 79,14        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2115            | 2127                  | 0               | <b>26,94</b>          | 109,2              | 0,00       | 77,56        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 1722            | 1735                  | 0               | <b>29,58</b>          | 109,2              | 0,00       | 75,79        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 1900            | 1914                  | 0               | <b>28,33</b>          | 109,2              | 0,00       | 76,64        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2508            | 2519                  | 0               | <b>24,68</b>          | 109,2              | 0,00       | 79,02        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2582            | 2592                  | 0               | <b>24,29</b>          | 109,2              | 0,00       | 79,27        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 3600            | 3607                  | 0               | <b>19,69</b>          | 109,2              | 0,00       | 82,14        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 6073            | 6075                  | 0               | <b>11,83</b>          | 106,5              | 0,00       | 86,67        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 6495            | 6496                  | 0               | <b>11,00</b>          | 106,5              | 0,00       | 87,25        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 6840            | 6841                  | 0               | <b>10,36</b>          | 106,5              | 0,00       | 87,70        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 1      | 8050            | 8051                  | 0               | <b>6,81</b>           | 104,9              | 0,00       | 89,12        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 2      | 8367            | 8368                  | 0               | <b>6,31</b>           | 104,9              | 0,00       | 89,45        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 3      | 8834            | 8836                  | 0               | <b>5,60</b>           | 104,9              | 0,00       | 89,92        | -            | -           | 0,00         | 0,00          | -         |
| Lållax 4      | 8884            | 8885                  | 0               | <b>5,53</b>           | 104,9              | 0,00       | 89,97        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 5376            | 5378                  | 0               | <b>11,21</b>          | 106,0              | 0,00       | 85,61        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 5982            | 5984                  | 0               | <b>9,90</b>           | 106,0              | 0,00       | 86,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 6733            | 6735                  | 0               | <b>8,44</b>           | 106,0              | 0,00       | 87,57        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 6541            | 6543                  | 0               | <b>8,80</b>           | 106,0              | 0,00       | 87,32        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 6156            | 6158                  | 0               | <b>9,55</b>           | 106,0              | 0,00       | 86,79        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 6089            | 6092                  | 0               | <b>9,68</b>           | 106,0              | 0,00       | 86,69        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 6563            | 6565                  | 0               | <b>8,76</b>           | 106,0              | 0,00       | 87,35        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 6560            | 6562                  | 0               | <b>8,76</b>           | 106,0              | 0,00       | 87,34        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 6905            | 6907                  | 0               | <b>8,13</b>           | 106,0              | 0,00       | 87,79        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 7344            | 7346                  | 0               | <b>7,37</b>           | 106,0              | 0,00       | 88,32        | -            | -           | 0,00         | 0,00          | -         |

To be continued on next page...

## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| Märkenkall 11 | 7592            | 7593                  | 0               | <b>6,96</b>           | 106,0              | 0,00       | 88,61        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 7626            | 7628                  | 0               | <b>6,90</b>           | 106,0              | 0,00       | 88,65        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 7612            | 7614                  | 0               | <b>6,92</b>           | 106,0              | 0,00       | 88,63        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 7614            | 7616                  | 0               | <b>6,92</b>           | 106,0              | 0,00       | 88,63        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 8139            | 8141                  | 0               | <b>6,09</b>           | 106,0              | 0,00       | 89,21        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>35,32</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH04 RH04

Wind speed: 8,0 m/s

### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 2472            | 2484                  | 0               | <b>24,87</b>          | 109,2              | 0,00       | 78,90        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2296            | 2309                  | 0               | <b>25,86</b>          | 109,2              | 0,00       | 78,27        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 1900            | 1914                  | 0               | <b>28,33</b>          | 109,2              | 0,00       | 76,64        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 1552            | 1567                  | 0               | <b>30,87</b>          | 109,2              | 0,00       | 74,90        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 1791            | 1805                  | 0               | <b>29,08</b>          | 109,2              | 0,00       | 76,13        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2323            | 2334                  | 0               | <b>25,71</b>          | 109,2              | 0,00       | 78,36        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2444            | 2455                  | 0               | <b>25,03</b>          | 109,2              | 0,00       | 78,80        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 3525            | 3532                  | 0               | <b>19,99</b>          | 109,2              | 0,00       | 81,96        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 5971            | 5973                  | 0               | <b>12,04</b>          | 106,5              | 0,00       | 86,52        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 6380            | 6382                  | 0               | <b>11,22</b>          | 106,5              | 0,00       | 87,10        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 6714            | 6716                  | 0               | <b>10,59</b>          | 106,5              | 0,00       | 87,54        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 7796            | 7797                  | 0               | <b>7,23</b>           | 104,9              | 0,00       | 88,84        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 8135            | 8136                  | 0               | <b>6,68</b>           | 104,9              | 0,00       | 89,21        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 8620            | 8621                  | 0               | <b>5,92</b>           | 104,9              | 0,00       | 89,71        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 8685            | 8686                  | 0               | <b>5,83</b>           | 104,9              | 0,00       | 89,78        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 5625            | 5628                  | 0               | <b>10,65</b>          | 106,0              | 0,00       | 86,01        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 6235            | 6237                  | 0               | <b>9,39</b>           | 106,0              | 0,00       | 86,90        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 6970            | 6972                  | 0               | <b>8,01</b>           | 106,0              | 0,00       | 87,87        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 6753            | 6755                  | 0               | <b>8,40</b>           | 106,0              | 0,00       | 87,59        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 6422            | 6424                  | 0               | <b>9,02</b>           | 106,0              | 0,00       | 87,16        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 6368            | 6370                  | 0               | <b>9,13</b>           | 106,0              | 0,00       | 87,08        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 6849            | 6851                  | 0               | <b>8,23</b>           | 106,0              | 0,00       | 87,71        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 6855            | 6857                  | 0               | <b>8,22</b>           | 106,0              | 0,00       | 87,72        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 7177            | 7179                  | 0               | <b>7,65</b>           | 106,0              | 0,00       | 88,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 7592            | 7593                  | 0               | <b>6,96</b>           | 106,0              | 0,00       | 88,61        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 7850            | 7852                  | 0               | <b>6,54</b>           | 106,0              | 0,00       | 88,90        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 7894            | 7896                  | 0               | <b>6,47</b>           | 106,0              | 0,00       | 88,95        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 7899            | 7900                  | 0               | <b>6,46</b>           | 106,0              | 0,00       | 88,95        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 7909            | 7910                  | 0               | <b>6,45</b>           | 106,0              | 0,00       | 88,96        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 8417            | 8419                  | 0               | <b>5,68</b>           | 106,0              | 0,00       | 89,50        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>36,38</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH05 RH05

Wind speed: 8,0 m/s

### WTG

| No.      | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|----------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1        | 2172            | 2185                  | 0               | <b>26,59</b>          | 109,2              | 0,00       | 77,79        | -            | -           | 0,00         | 0,00          | -         |
| 2        | 2090            | 2104                  | 0               | <b>27,09</b>          | 109,2              | 0,00       | 77,46        | -            | -           | 0,00         | 0,00          | -         |
| 3        | 1810            | 1825                  | 0               | <b>28,94</b>          | 109,2              | 0,00       | 76,22        | -            | -           | 0,00         | 0,00          | -         |
| 4        | 1608            | 1623                  | 0               | <b>30,43</b>          | 109,2              | 0,00       | 75,20        | -            | -           | 0,00         | 0,00          | -         |
| 5        | 1956            | 1969                  | 0               | <b>27,96</b>          | 109,2              | 0,00       | 76,88        | -            | -           | 0,00         | 0,00          | -         |
| 6        | 2288            | 2300                  | 0               | <b>25,91</b>          | 109,2              | 0,00       | 78,23        | -            | -           | 0,00         | 0,00          | -         |
| 7        | 2513            | 2523                  | 0               | <b>24,66</b>          | 109,2              | 0,00       | 79,04        | -            | -           | 0,00         | 0,00          | -         |
| 8        | 3690            | 3696                  | 0               | <b>19,34</b>          | 109,2              | 0,00       | 82,36        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1 | 6056            | 6057                  | 0               | <b>11,87</b>          | 106,5              | 0,00       | 86,65        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2 | 6436            | 6437                  | 0               | <b>11,12</b>          | 106,5              | 0,00       | 87,17        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3 | 6744            | 6746                  | 0               | <b>10,54</b>          | 106,5              | 0,00       | 87,58        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1  | 7503            | 7504                  | 0               | <b>7,72</b>           | 104,9              | 0,00       | 88,51        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2  | 7903            | 7905                  | 0               | <b>7,05</b>           | 104,9              | 0,00       | 88,96        | -            | -           | 0,00         | 0,00          | -         |

To be continued on next page...

## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| Lålx 3        | 8434            | 8435                  | 0               | <b>6,21</b>           | 104,9              | 0,00       | 89,52        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 4        | 8537            | 8539                  | 0               | <b>6,05</b>           | 104,9              | 0,00       | 89,63        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 5960            | 5962                  | 0               | <b>9,94</b>           | 106,0              | 0,00       | 86,51        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 6574            | 6577                  | 0               | <b>8,73</b>           | 106,0              | 0,00       | 87,36        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 7266            | 7268                  | 0               | <b>7,50</b>           | 106,0              | 0,00       | 88,23        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 6988            | 6990                  | 0               | <b>7,98</b>           | 106,0              | 0,00       | 87,89        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 6798            | 6800                  | 0               | <b>8,32</b>           | 106,0              | 0,00       | 87,65        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 6781            | 6783                  | 0               | <b>8,35</b>           | 106,0              | 0,00       | 87,63        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 7282            | 7284                  | 0               | <b>7,47</b>           | 106,0              | 0,00       | 88,25        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 7323            | 7324                  | 0               | <b>7,40</b>           | 106,0              | 0,00       | 88,30        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 7567            | 7568                  | 0               | <b>7,00</b>           | 106,0              | 0,00       | 88,58        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 7913            | 7914                  | 0               | <b>6,44</b>           | 106,0              | 0,00       | 88,97        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 8200            | 8201                  | 0               | <b>6,00</b>           | 106,0              | 0,00       | 89,28        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 8272            | 8274                  | 0               | <b>5,89</b>           | 106,0              | 0,00       | 89,35        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 8333            | 8334                  | 0               | <b>5,80</b>           | 106,0              | 0,00       | 89,42        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 8372            | 8373                  | 0               | <b>5,74</b>           | 106,0              | 0,00       | 89,46        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 8822            | 8823                  | 0               | <b>5,10</b>           | 106,0              | 0,00       | 89,91        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>36,42</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH06 RH06

Wind speed: 8,0 m/s

### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 1711            | 1727                  | 0               | <b>29,65</b>          | 109,2              | 0,00       | 75,75        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 1834            | 1849                  | 0               | <b>28,77</b>          | 109,2              | 0,00       | 76,34        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 1825            | 1839                  | 0               | <b>28,84</b>          | 109,2              | 0,00       | 76,29        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 1903            | 1915                  | 0               | <b>28,32</b>          | 109,2              | 0,00       | 76,64        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 2336            | 2346                  | 0               | <b>25,64</b>          | 109,2              | 0,00       | 78,41        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2305            | 2316                  | 0               | <b>25,81</b>          | 109,2              | 0,00       | 78,29        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2670            | 2679                  | 0               | <b>23,84</b>          | 109,2              | 0,00       | 79,56        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 3906            | 3912                  | 0               | <b>18,53</b>          | 109,2              | 0,00       | 82,85        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 6053            | 6054                  | 0               | <b>11,87</b>          | 106,5              | 0,00       | 86,64        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 6375            | 6377                  | 0               | <b>11,23</b>          | 106,5              | 0,00       | 87,09        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 6636            | 6637                  | 0               | <b>10,74</b>          | 106,5              | 0,00       | 87,44        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 1        | 6844            | 6845                  | 0               | <b>8,90</b>           | 104,9              | 0,00       | 87,71        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 2        | 7340            | 7341                  | 0               | <b>8,00</b>           | 104,9              | 0,00       | 88,32        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 3        | 7940            | 7942                  | 0               | <b>6,99</b>           | 104,9              | 0,00       | 89,00        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 4        | 8106            | 8107                  | 0               | <b>6,72</b>           | 104,9              | 0,00       | 89,18        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 6792            | 6794                  | 0               | <b>8,33</b>           | 106,0              | 0,00       | 87,64        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 7408            | 7410                  | 0               | <b>7,26</b>           | 106,0              | 0,00       | 88,40        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 8046            | 8048                  | 0               | <b>6,24</b>           | 106,0              | 0,00       | 89,11        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 7697            | 7699                  | 0               | <b>6,78</b>           | 106,0              | 0,00       | 88,73        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 7669            | 7671                  | 0               | <b>6,83</b>           | 106,0              | 0,00       | 88,70        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 7688            | 7690                  | 0               | <b>6,80</b>           | 106,0              | 0,00       | 88,72        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 8207            | 8209                  | 0               | <b>5,99</b>           | 106,0              | 0,00       | 89,29        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 8278            | 8279                  | 0               | <b>5,88</b>           | 106,0              | 0,00       | 89,36        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 8448            | 8449                  | 0               | <b>5,63</b>           | 106,0              | 0,00       | 89,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 8718            | 8720                  | 0               | <b>5,24</b>           | 106,0              | 0,00       | 89,81        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 9036            | 9037                  | 0               | <b>4,80</b>           | 106,0              | 0,00       | 90,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 9139            | 9140                  | 0               | <b>4,66</b>           | 106,0              | 0,00       | 90,22        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 9256            | 9257                  | 0               | <b>4,50</b>           | 106,0              | 0,00       | 90,33        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 9322            | 9323                  | 0               | <b>4,42</b>           | 106,0              | 0,00       | 90,39        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 9715            | 9716                  | 0               | <b>3,91</b>           | 106,0              | 0,00       | 90,75        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>36,34</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## 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: RH07 RH07

Wind speed: 8,0 m/s

#### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 2017            | 2031                  | 0               | <b>27,55</b>          | 109,2              | 0,00       | 77,15        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2429            | 2440                  | 0               | <b>25,11</b>          | 109,2              | 0,00       | 78,75        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2840            | 2848                  | 0               | <b>23,00</b>          | 109,2              | 0,00       | 80,09        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 3232            | 3239                  | 0               | <b>21,21</b>          | 109,2              | 0,00       | 81,21        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 3624            | 3631                  | 0               | <b>19,60</b>          | 109,2              | 0,00       | 82,20        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 3098            | 3106                  | 0               | <b>21,80</b>          | 109,2              | 0,00       | 80,84        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 3550            | 3557                  | 0               | <b>19,89</b>          | 109,2              | 0,00       | 82,02        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 4608            | 4613                  | 0               | <b>16,17</b>          | 109,2              | 0,00       | 84,28        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 6079            | 6080                  | 0               | <b>11,82</b>          | 106,5              | 0,00       | 86,68        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 6257            | 6258                  | 0               | <b>11,46</b>          | 106,5              | 0,00       | 86,93        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 6397            | 6399                  | 0               | <b>11,19</b>          | 106,5              | 0,00       | 87,12        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 5386            | 5388                  | 0               | <b>11,92</b>          | 104,9              | 0,00       | 85,63        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 6074            | 6076                  | 0               | <b>10,42</b>          | 104,9              | 0,00       | 86,67        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 6801            | 6803                  | 0               | <b>8,98</b>           | 104,9              | 0,00       | 87,65        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 7095            | 7096                  | 0               | <b>8,44</b>           | 104,9              | 0,00       | 88,02        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 8785            | 8787                  | 0               | <b>5,15</b>           | 106,0              | 0,00       | 89,88        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 9399            | 9401                  | 0               | <b>4,31</b>           | 106,0              | 0,00       | 90,46        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 9983            | 9984                  | 0               | <b>3,57</b>           | 106,0              | 0,00       | 90,99        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 9565            | 9566                  | 0               | <b>4,10</b>           | 106,0              | 0,00       | 90,61        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 9689            | 9690                  | 0               | <b>3,94</b>           | 106,0              | 0,00       | 90,73        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 9734            | 9735                  | 0               | <b>3,88</b>           | 106,0              | 0,00       | 90,77        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 10263           | 10264                 | 0               | <b>3,23</b>           | 106,0              | 0,00       | 91,23        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 10348           | 10349                 | 0               | <b>3,13</b>           | 106,0              | 0,00       | 91,30        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 10473           | 10474                 | 0               | <b>2,98</b>           | 106,0              | 0,00       | 91,40        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 10676           | 10677                 | 0               | <b>2,74</b>           | 106,0              | 0,00       | 91,57        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 11022           | 11023                 | 0               | <b>2,35</b>           | 106,0              | 0,00       | 91,85        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 11151           | 11152                 | 0               | <b>2,21</b>           | 106,0              | 0,00       | 91,95        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 11310           | 11311                 | 0               | <b>2,03</b>           | 106,0              | 0,00       | 92,07        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 11389           | 11390                 | 0               | <b>1,95</b>           | 106,0              | 0,00       | 92,13        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 11746           | 11747                 | 0               | <b>1,57</b>           | 106,0              | 0,00       | 92,40        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>32,36</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH08 RH08

Wind speed: 8,0 m/s

#### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 1911            | 1925                  | 0               | <b>28,25</b>          | 109,2              | 0,00       | 76,69        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2327            | 2339                  | 0               | <b>25,68</b>          | 109,2              | 0,00       | 78,38        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2813            | 2822                  | 0               | <b>23,13</b>          | 109,2              | 0,00       | 80,01        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 3268            | 3275                  | 0               | <b>21,06</b>          | 109,2              | 0,00       | 81,30        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 3612            | 3619                  | 0               | <b>19,64</b>          | 109,2              | 0,00       | 82,17        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2963            | 2972                  | 0               | <b>22,41</b>          | 109,2              | 0,00       | 80,46        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 3401            | 3409                  | 0               | <b>20,49</b>          | 109,2              | 0,00       | 81,65        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 4335            | 4339                  | 0               | <b>17,05</b>          | 109,2              | 0,00       | 83,75        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 5566            | 5567                  | 0               | <b>12,90</b>          | 106,5              | 0,00       | 85,91        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 5706            | 5708                  | 0               | <b>12,60</b>          | 106,5              | 0,00       | 86,13        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 5818            | 5820                  | 0               | <b>12,36</b>          | 106,5              | 0,00       | 86,30        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 4684            | 4686                  | 0               | <b>13,63</b>          | 104,9              | 0,00       | 84,42        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 5367            | 5369                  | 0               | <b>11,97</b>          | 104,9              | 0,00       | 85,60        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 6096            | 6098                  | 0               | <b>10,37</b>          | 104,9              | 0,00       | 86,70        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 6396            | 6398                  | 0               | <b>9,77</b>           | 104,9              | 0,00       | 87,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 9297            | 9298                  | 0               | <b>4,45</b>           | 106,0              | 0,00       | 90,37        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 9913            | 9914                  | 0               | <b>3,66</b>           | 106,0              | 0,00       | 90,93        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 10530           | 10531                 | 0               | <b>2,91</b>           | 106,0              | 0,00       | 91,45        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 10143           | 10144                 | 0               | <b>3,37</b>           | 106,0              | 0,00       | 91,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 10179           | 10180                 | 0               | <b>3,33</b>           | 106,0              | 0,00       | 91,16        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 10196           | 10197                 | 0               | <b>3,31</b>           | 106,0              | 0,00       | 91,17        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 10709           | 10711                 | 0               | <b>2,70</b>           | 106,0              | 0,00       | 91,60        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 10761           | 10763                 | 0               | <b>2,65</b>           | 106,0              | 0,00       | 91,64        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 10958           | 10959                 | 0               | <b>2,42</b>           | 106,0              | 0,00       | 91,80        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 11212           | 11213                 | 0               | <b>2,14</b>           | 106,0              | 0,00       | 91,99        | -            | -           | 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| Märkenkall 11 | 11540           | 11541                 | 0               | <b>1,79</b>           | 106,0              | 0,00       | 92,24        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 11649           | 11650                 | 0               | <b>1,67</b>           | 106,0              | 0,00       | 92,33        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 11759           | 11760                 | 0               | <b>1,56</b>           | 106,0              | 0,00       | 92,41        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 11810           | 11811                 | 0               | <b>1,50</b>           | 106,0              | 0,00       | 92,45        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 12225           | 12226                 | 0               | <b>1,08</b>           | 106,0              | 0,00       | 92,75        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>32,88</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH09 RH09

Wind speed: 8,0 m/s

### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 1952            | 1966                  | 0               | <b>27,98</b>          | 109,2              | 0,00       | 76,87        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2359            | 2371                  | 0               | <b>25,50</b>          | 109,2              | 0,00       | 78,50        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 2863            | 2872                  | 0               | <b>22,88</b>          | 109,2              | 0,00       | 80,16        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 3334            | 3341                  | 0               | <b>20,78</b>          | 109,2              | 0,00       | 81,48        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 3659            | 3665                  | 0               | <b>19,46</b>          | 109,2              | 0,00       | 82,28        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 2973            | 2982                  | 0               | <b>22,36</b>          | 109,2              | 0,00       | 80,49        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 3401            | 3409                  | 0               | <b>20,49</b>          | 109,2              | 0,00       | 81,65        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 4281            | 4286                  | 0               | <b>17,23</b>          | 109,2              | 0,00       | 83,64        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 5411            | 5413                  | 0               | <b>13,25</b>          | 106,5              | 0,00       | 85,67        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 5536            | 5537                  | 0               | <b>12,97</b>          | 106,5              | 0,00       | 85,87        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 5635            | 5637                  | 0               | <b>12,75</b>          | 106,5              | 0,00       | 86,02        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 4438            | 4440                  | 0               | <b>14,28</b>          | 104,9              | 0,00       | 83,95        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 5121            | 5123                  | 0               | <b>12,54</b>          | 104,9              | 0,00       | 85,19        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 5852            | 5854                  | 0               | <b>10,89</b>          | 104,9              | 0,00       | 86,35        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 6156            | 6158                  | 0               | <b>10,25</b>          | 104,9              | 0,00       | 86,79        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 9493            | 9495                  | 0               | <b>4,19</b>           | 106,0              | 0,00       | 90,55        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 10109           | 10111                 | 0               | <b>3,41</b>           | 106,0              | 0,00       | 91,10        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 10736           | 10737                 | 0               | <b>2,67</b>           | 106,0              | 0,00       | 91,62        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 10358           | 10359                 | 0               | <b>3,12</b>           | 106,0              | 0,00       | 91,31        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 10368           | 10370                 | 0               | <b>3,10</b>           | 106,0              | 0,00       | 91,32        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 10376           | 10378                 | 0               | <b>3,09</b>           | 106,0              | 0,00       | 91,32        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 10885           | 10886                 | 0               | <b>2,50</b>           | 106,0              | 0,00       | 91,74        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 10927           | 10928                 | 0               | <b>2,46</b>           | 106,0              | 0,00       | 91,77        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 11145           | 11147                 | 0               | <b>2,21</b>           | 106,0              | 0,00       | 91,94        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 11414           | 11415                 | 0               | <b>1,92</b>           | 106,0              | 0,00       | 92,15        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 11737           | 11738                 | 0               | <b>1,58</b>           | 106,0              | 0,00       | 92,39        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 11840           | 11841                 | 0               | <b>1,47</b>           | 106,0              | 0,00       | 92,47        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 11936           | 11937                 | 0               | <b>1,37</b>           | 106,0              | 0,00       | 92,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 11977           | 11978                 | 0               | <b>1,33</b>           | 106,0              | 0,00       | 92,57        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 12409           | 12410                 | 0               | <b>0,89</b>           | 106,0              | 0,00       | 92,88        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>32,73</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH10 RH10

Wind speed: 8,0 m/s

### WTG

| No.      | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|----------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1        | 2285            | 2297                  | 0               | <b>25,92</b>          | 109,2              | 0,00       | 78,22        | -            | -           | 0,00         | 0,00          | -         |
| 2        | 2658            | 2669                  | 0               | <b>23,89</b>          | 109,2              | 0,00       | 79,53        | -            | -           | 0,00         | 0,00          | -         |
| 3        | 3185            | 3193                  | 0               | <b>21,41</b>          | 109,2              | 0,00       | 81,08        | -            | -           | 0,00         | 0,00          | -         |
| 4        | 3678            | 3685                  | 0               | <b>19,39</b>          | 109,2              | 0,00       | 82,33        | -            | -           | 0,00         | 0,00          | -         |
| 5        | 3958            | 3964                  | 0               | <b>18,35</b>          | 109,2              | 0,00       | 82,96        | -            | -           | 0,00         | 0,00          | -         |
| 6        | 3206            | 3215                  | 0               | <b>21,32</b>          | 109,2              | 0,00       | 81,14        | -            | -           | 0,00         | 0,00          | -         |
| 7        | 3602            | 3609                  | 0               | <b>19,68</b>          | 109,2              | 0,00       | 82,15        | -            | -           | 0,00         | 0,00          | -         |
| 8        | 4335            | 4340                  | 0               | <b>17,05</b>          | 109,2              | 0,00       | 83,75        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1 | 5172            | 5174                  | 0               | <b>13,80</b>          | 106,5              | 0,00       | 85,28        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2 | 5245            | 5247                  | 0               | <b>13,63</b>          | 106,5              | 0,00       | 85,40        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3 | 5304            | 5305                  | 0               | <b>13,49</b>          | 106,5              | 0,00       | 85,49        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1  | 3827            | 3829                  | 0               | <b>16,25</b>          | 104,9              | 0,00       | 82,66        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2  | 4533            | 4535                  | 0               | <b>14,02</b>          | 104,9              | 0,00       | 84,13        | -            | -           | 0,00         | 0,00          | -         |

To be continued on next page...



## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| Lålx 3        | 5282            | 5284                  | 0               | <b>12,16</b>          | 104,9              | 0,00       | 85,46        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 4        | 5608            | 5610                  | 0               | <b>11,42</b>          | 104,9              | 0,00       | 85,98        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 10058           | 10059                 | 0               | <b>3,48</b>           | 106,0              | 0,00       | 91,05        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 10674           | 10675                 | 0               | <b>2,75</b>           | 106,0              | 0,00       | 91,57        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 11315           | 11317                 | 0               | <b>2,03</b>           | 106,0              | 0,00       | 92,07        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 10951           | 10952                 | 0               | <b>2,43</b>           | 106,0              | 0,00       | 91,79        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 10921           | 10922                 | 0               | <b>2,46</b>           | 106,0              | 0,00       | 91,77        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 10914           | 10915                 | 0               | <b>2,47</b>           | 106,0              | 0,00       | 91,76        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 11414           | 11415                 | 0               | <b>1,92</b>           | 106,0              | 0,00       | 92,15        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 11437           | 11438                 | 0               | <b>1,90</b>           | 106,0              | 0,00       | 92,17        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 11694           | 11695                 | 0               | <b>1,62</b>           | 106,0              | 0,00       | 92,36        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 11988           | 11989                 | 0               | <b>1,32</b>           | 106,0              | 0,00       | 92,58        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 12302           | 12303                 | 0               | <b>1,00</b>           | 106,0              | 0,00       | 92,80        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 12394           | 12395                 | 0               | <b>0,91</b>           | 106,0              | 0,00       | 92,86        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 12464           | 12465                 | 0               | <b>0,84</b>           | 106,0              | 0,00       | 92,91        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 12489           | 12490                 | 0               | <b>0,82</b>           | 106,0              | 0,00       | 92,93        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 12953           | 12954                 | 0               | <b>0,37</b>           | 106,0              | 0,00       | 93,25        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>31,46</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH11 RH11

Wind speed: 8,0 m/s

### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 2506            | 2516                  | 0               | <b>24,70</b>          | 109,2              | 0,00       | 79,02        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 2859            | 2869                  | 0               | <b>22,90</b>          | 109,2              | 0,00       | 80,16        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 3390            | 3397                  | 0               | <b>20,54</b>          | 109,2              | 0,00       | 81,62        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 3889            | 3895                  | 0               | <b>18,60</b>          | 109,2              | 0,00       | 82,81        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 4146            | 4152                  | 0               | <b>17,68</b>          | 109,2              | 0,00       | 83,36        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 3372            | 3379                  | 0               | <b>20,61</b>          | 109,2              | 0,00       | 81,58        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 3748            | 3755                  | 0               | <b>19,12</b>          | 109,2              | 0,00       | 82,49        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 4404            | 4409                  | 0               | <b>16,82</b>          | 109,2              | 0,00       | 83,89        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 5080            | 5082                  | 0               | <b>14,01</b>          | 106,5              | 0,00       | 85,12        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 5125            | 5126                  | 0               | <b>13,91</b>          | 106,5              | 0,00       | 85,20        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 5159            | 5161                  | 0               | <b>13,83</b>          | 106,5              | 0,00       | 85,25        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 1        | 3513            | 3516                  | 0               | <b>17,40</b>          | 104,9              | 0,00       | 81,92        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 2        | 4234            | 4236                  | 0               | <b>14,87</b>          | 104,9              | 0,00       | 83,54        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 3        | 4994            | 4996                  | 0               | <b>12,85</b>          | 104,9              | 0,00       | 84,97        | -            | -           | 0,00         | 0,00          | -         |
| Lålx 4        | 5334            | 5336                  | 0               | <b>12,04</b>          | 104,9              | 0,00       | 85,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 10355           | 10356                 | 0               | <b>3,12</b>           | 106,0              | 0,00       | 91,30        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 10971           | 10972                 | 0               | <b>2,41</b>           | 106,0              | 0,00       | 91,81        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 11619           | 11620                 | 0               | <b>1,70</b>           | 106,0              | 0,00       | 92,30        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 11261           | 11262                 | 0               | <b>2,09</b>           | 106,0              | 0,00       | 92,03        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 11213           | 11214                 | 0               | <b>2,14</b>           | 106,0              | 0,00       | 92,00        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 11199           | 11200                 | 0               | <b>2,16</b>           | 106,0              | 0,00       | 91,98        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 11694           | 11695                 | 0               | <b>1,62</b>           | 106,0              | 0,00       | 92,36        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 11709           | 11710                 | 0               | <b>1,61</b>           | 106,0              | 0,00       | 92,37        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 11984           | 11985                 | 0               | <b>1,32</b>           | 106,0              | 0,00       | 92,57        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 12289           | 12290                 | 0               | <b>1,01</b>           | 106,0              | 0,00       | 92,79        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 12599           | 12600                 | 0               | <b>0,71</b>           | 106,0              | 0,00       | 93,01        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 12686           | 12687                 | 0               | <b>0,62</b>           | 106,0              | 0,00       | 93,07        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 12745           | 12746                 | 0               | <b>0,57</b>           | 106,0              | 0,00       | 93,11        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 12762           | 12763                 | 0               | <b>0,55</b>           | 106,0              | 0,00       | 93,12        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 13241           | 13241                 | 0               | <b>0,10</b>           | 106,0              | 0,00       | 93,44        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>30,77</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## 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: RH12 RH12

Wind speed: 8,0 m/s

#### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 5008            | 5014                  | 0               | <b>14,97</b>          | 109,2              | 0,00       | 85,00        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 4719            | 4725                  | 0               | <b>15,82</b>          | 109,2              | 0,00       | 84,49        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 4665            | 4670                  | 0               | <b>15,99</b>          | 109,2              | 0,00       | 84,39        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 4723            | 4728                  | 0               | <b>15,81</b>          | 109,2              | 0,00       | 84,49        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 4376            | 4382                  | 0               | <b>16,91</b>          | 109,2              | 0,00       | 83,83        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 4181            | 4187                  | 0               | <b>17,56</b>          | 109,2              | 0,00       | 83,44        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 3843            | 3849                  | 0               | <b>18,77</b>          | 109,2              | 0,00       | 82,71        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 2634            | 2642                  | 0               | <b>24,03</b>          | 109,2              | 0,00       | 79,44        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 1068            | 1076                  | 0               | <b>33,08</b>          | 106,5              | 0,00       | 71,64        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 1400            | 1407                  | 0               | <b>30,00</b>          | 106,5              | 0,00       | 73,96        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 1765            | 1771                  | 0               | <b>27,26</b>          | 106,5              | 0,00       | 75,96        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 5746            | 5748                  | 0               | <b>11,12</b>          | 104,9              | 0,00       | 86,19        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 5253            | 5255                  | 0               | <b>12,23</b>          | 104,9              | 0,00       | 85,41        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 5075            | 5077                  | 0               | <b>12,66</b>          | 104,9              | 0,00       | 85,11        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 4719            | 4721                  | 0               | <b>13,54</b>          | 104,9              | 0,00       | 84,48        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 10789           | 10790                 | 0               | <b>2,61</b>           | 106,0              | 0,00       | 91,66        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 11306           | 11307                 | 0               | <b>2,04</b>           | 106,0              | 0,00       | 92,07        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 12199           | 12200                 | 0               | <b>1,10</b>           | 106,0              | 0,00       | 92,73        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 12251           | 12252                 | 0               | <b>1,05</b>           | 106,0              | 0,00       | 92,76        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 11266           | 11267                 | 0               | <b>2,08</b>           | 106,0              | 0,00       | 92,04        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 10973           | 10974                 | 0               | <b>2,41</b>           | 106,0              | 0,00       | 91,81        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 11231           | 11232                 | 0               | <b>2,12</b>           | 106,0              | 0,00       | 92,01        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 10928           | 10929                 | 0               | <b>2,46</b>           | 106,0              | 0,00       | 91,77        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 11850           | 11851                 | 0               | <b>1,46</b>           | 106,0              | 0,00       | 92,48        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 12646           | 12647                 | 0               | <b>0,66</b>           | 106,0              | 0,00       | 93,04        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 12719           | 12720                 | 0               | <b>0,59</b>           | 106,0              | 0,00       | 93,09        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 12576           | 12577                 | 0               | <b>0,73</b>           | 106,0              | 0,00       | 92,99        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 12141           | 12142                 | 0               | <b>1,16</b>           | 106,0              | 0,00       | 92,69        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 11872           | 11873                 | 0               | <b>1,44</b>           | 106,0              | 0,00       | 92,49        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 12853           | 12854                 | 0               | <b>0,46</b>           | 106,0              | 0,00       | 93,18        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>36,27</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH13 RH13

Wind speed: 8,0 m/s

#### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 4328            | 4334                  | 0               | <b>17,07</b>          | 109,2              | 0,00       | 83,74        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 3914            | 3921                  | 0               | <b>18,50</b>          | 109,2              | 0,00       | 82,87        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 3541            | 3548                  | 0               | <b>19,92</b>          | 109,2              | 0,00       | 82,00        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 3276            | 3282                  | 0               | <b>21,02</b>          | 109,2              | 0,00       | 81,32        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 2838            | 2847                  | 0               | <b>23,01</b>          | 109,2              | 0,00       | 80,09        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 3246            | 3253                  | 0               | <b>21,15</b>          | 109,2              | 0,00       | 81,25        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 2795            | 2803                  | 0               | <b>23,22</b>          | 109,2              | 0,00       | 79,95        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 1998            | 2008                  | 0               | <b>27,70</b>          | 109,2              | 0,00       | 77,05        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 3484            | 3486                  | 0               | <b>18,60</b>          | 106,5              | 0,00       | 81,85        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 3980            | 3982                  | 0               | <b>16,91</b>          | 106,5              | 0,00       | 83,00        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 4404            | 4406                  | 0               | <b>15,73</b>          | 106,5              | 0,00       | 83,88        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 7594            | 7595                  | 0               | <b>7,57</b>           | 104,9              | 0,00       | 88,61        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 7408            | 7409                  | 0               | <b>7,89</b>           | 104,9              | 0,00       | 88,40        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 7481            | 7483                  | 0               | <b>7,76</b>           | 104,9              | 0,00       | 88,48        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 7258            | 7259                  | 0               | <b>8,15</b>           | 104,9              | 0,00       | 88,22        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 7976            | 7977                  | 0               | <b>6,34</b>           | 106,0              | 0,00       | 89,04        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 8463            | 8465                  | 0               | <b>5,61</b>           | 106,0              | 0,00       | 89,55        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 9373            | 9374                  | 0               | <b>4,35</b>           | 106,0              | 0,00       | 90,44        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 9493            | 9495                  | 0               | <b>4,19</b>           | 106,0              | 0,00       | 90,55        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 8388            | 8390                  | 0               | <b>5,72</b>           | 106,0              | 0,00       | 89,48        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 8072            | 8073                  | 0               | <b>6,20</b>           | 106,0              | 0,00       | 89,14        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 8310            | 8311                  | 0               | <b>5,84</b>           | 106,0              | 0,00       | 89,39        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 7996            | 7998                  | 0               | <b>6,31</b>           | 106,0              | 0,00       | 89,06        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 8946            | 8947                  | 0               | <b>4,92</b>           | 106,0              | 0,00       | 90,03        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 9781            | 9782                  | 0               | <b>3,82</b>           | 106,0              | 0,00       | 90,81        | -            | -           | 0,00         | 0,00          | -         |

To be continued on next page...

## 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<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| Märkenkall 11 | 9827            | 9829                  | 0               | <b>3,76</b>           | 106,0              | 0,00       | 90,85        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 9666            | 9667                  | 0               | <b>3,97</b>           | 106,0              | 0,00       | 90,71        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 9210            | 9211                  | 0               | <b>4,57</b>           | 106,0              | 0,00       | 90,29        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 8939            | 8940                  | 0               | <b>4,93</b>           | 106,0              | 0,00       | 90,03        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 9926            | 9927                  | 0               | <b>3,64</b>           | 106,0              | 0,00       | 90,94        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>32,32</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

### Noise sensitive area: RH14 RH14

Wind speed: 8,0 m/s

### WTG

| No.           | Distance<br>[m] | Sound distance<br>[m] | Penalty<br>[dB] | Calculated<br>[dB(A)] | LwA,ref<br>[dB(A)] | Dc<br>[dB] | Adiv<br>[dB] | Aatm<br>[dB] | Agr<br>[dB] | Abar<br>[dB] | Amisc<br>[dB] | A<br>[dB] |
|---------------|-----------------|-----------------------|-----------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|
| 1             | 5023            | 5028                  | 0               | <b>14,92</b>          | 109,2              | 0,00       | 85,03        | -            | -           | 0,00         | 0,00          | -         |
| 2             | 4617            | 4623                  | 0               | <b>16,13</b>          | 109,2              | 0,00       | 84,30        | -            | -           | 0,00         | 0,00          | -         |
| 3             | 4283            | 4288                  | 0               | <b>17,22</b>          | 109,2              | 0,00       | 83,65        | -            | -           | 0,00         | 0,00          | -         |
| 4             | 4053            | 4058                  | 0               | <b>18,01</b>          | 109,2              | 0,00       | 83,17        | -            | -           | 0,00         | 0,00          | -         |
| 5             | 3616            | 3622                  | 0               | <b>19,63</b>          | 109,2              | 0,00       | 82,18        | -            | -           | 0,00         | 0,00          | -         |
| 6             | 3947            | 3954                  | 0               | <b>18,38</b>          | 109,2              | 0,00       | 82,94        | -            | -           | 0,00         | 0,00          | -         |
| 7             | 3495            | 3502                  | 0               | <b>20,11</b>          | 109,2              | 0,00       | 81,89        | -            | -           | 0,00         | 0,00          | -         |
| 8             | 2523            | 2532                  | 0               | <b>24,61</b>          | 109,2              | 0,00       | 79,07        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 1      | 3389            | 3392                  | 0               | <b>18,97</b>          | 106,5              | 0,00       | 81,61        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 2      | 3862            | 3864                  | 0               | <b>17,26</b>          | 106,5              | 0,00       | 82,74        | -            | -           | 0,00         | 0,00          | -         |
| Lotlax 3      | 4277            | 4279                  | 0               | <b>16,07</b>          | 106,5              | 0,00       | 83,63        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 1       | 7805            | 7806                  | 0               | <b>7,21</b>           | 104,9              | 0,00       | 88,85        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 2       | 7517            | 7518                  | 0               | <b>7,70</b>           | 104,9              | 0,00       | 88,52        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 3       | 7498            | 7499                  | 0               | <b>7,73</b>           | 104,9              | 0,00       | 88,50        | -            | -           | 0,00         | 0,00          | -         |
| Lålax 4       | 7215            | 7217                  | 0               | <b>8,22</b>           | 104,9              | 0,00       | 88,17        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 01 | 8612            | 8614                  | 0               | <b>5,39</b>           | 106,0              | 0,00       | 89,70        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 02 | 9076            | 9077                  | 0               | <b>4,75</b>           | 106,0              | 0,00       | 90,16        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 03 | 9994            | 9995                  | 0               | <b>3,56</b>           | 106,0              | 0,00       | 91,00        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 04 | 10157           | 10159                 | 0               | <b>3,36</b>           | 106,0              | 0,00       | 91,14        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 05 | 8966            | 8968                  | 0               | <b>4,90</b>           | 106,0              | 0,00       | 90,05        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 06 | 8619            | 8621                  | 0               | <b>5,38</b>           | 106,0              | 0,00       | 89,71        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 07 | 8816            | 8818                  | 0               | <b>5,10</b>           | 106,0              | 0,00       | 89,91        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 08 | 8461            | 8463                  | 0               | <b>5,61</b>           | 106,0              | 0,00       | 89,55        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 09 | 9485            | 9486                  | 0               | <b>4,20</b>           | 106,0              | 0,00       | 90,54        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 10 | 10367           | 10368                 | 0               | <b>3,10</b>           | 106,0              | 0,00       | 91,31        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 11 | 10383           | 10384                 | 0               | <b>3,09</b>           | 106,0              | 0,00       | 91,33        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 12 | 10193           | 10194                 | 0               | <b>3,31</b>           | 106,0              | 0,00       | 91,17        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 13 | 9674            | 9675                  | 0               | <b>3,96</b>           | 106,0              | 0,00       | 90,71        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 14 | 9364            | 9365                  | 0               | <b>4,36</b>           | 106,0              | 0,00       | 90,43        | -            | -           | 0,00         | 0,00          | -         |
| Märkenkall 15 | 10409           | 10410                 | 0               | <b>3,06</b>           | 106,0              | 0,00       | 91,35        | -            | -           | 0,00         | 0,00          | -         |
| Sum           |                 |                       |                 | <b>29,90</b>          |                    |            |              |              |             |              |               |           |

- Data undefined due to calculation with octave data

## DECIBEL - Assumptions for noise calculation

**Calculation:** MP Proposal, 8x180 @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      | 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  | 9.7.2019    | USER    | 31.3.2021 7.59 |
| assuming N163 5.7 MW, without serrations |             |         |                |

**Octave data**

| Status       | Hub height | Wind speed | LwA,ref | Pure tones | 63   | 125  | 250  | 500   | 1000  | 2000  | 4000 | 8000 |
|--------------|------------|------------|---------|------------|------|------|------|-------|-------|-------|------|------|
|              | [m]        | [m/s]      | [dB(A)] |            | [dB] | [dB] | [dB] | [dB]  | [dB]  | [dB]  | [dB] | [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:** GE WIND ENERGY 5.5-158 Thrust 665 5500 158.0 !O!

**Noise:** 5.5-158 NO

| Source                                    | Source/Date | Creator | Edited          |
|-------------------------------------------|-------------|---------|-----------------|
| Noise_Emission-NO_5.3-158-50Hz_IEC_EN_r01 | 12.3.2018   | EMD     | 21.1.2019 12.38 |

**Octave data**

| Status       | Hub height | Wind speed | LwA,ref | Pure tones | 63   | 125  | 250  | 500  | 1000  | 2000 | 4000 | 8000 |
|--------------|------------|------------|---------|------------|------|------|------|------|-------|------|------|------|
|              | [m]        | [m/s]      | [dB(A)] |            | [dB] | [dB] | [dB] | [dB] | [dB]  | [dB] | [dB] | [dB] |
| From Windcat | 161,0      | 7,9        | 106,0   | No         | 87,2 | 92,6 | 97,2 | 99,6 | 101,3 | 99,1 | 91,7 | 76,0 |

**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 | Wind speed | LwA,ref | Pure tones | 63   | 125  | 250  | 500   | 1000  | 2000 | 4000 | 8000 |
|--------------|------------|------------|---------|------------|------|------|------|-------|-------|------|------|------|
|              | [m]        | [m/s]      | [dB(A)] |            | [dB] | [dB] | [dB] | [dB]  | [dB]  | [dB] | [dB] | [dB] |
| 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 |

## DECIBEL - Assumptions for noise calculation

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

**WTG:** VESTAS V150-4.2 4200 150.0 !O!

**Noise:** V150 4.2 MW 3rd Oct serrated blades

Source Source/Date Creator Edited  
Vestas 18.9.2017 USER 10.9.2021 16.45  
V150-4\_0&4\_2MW Third Octaves, 0067-4767\_V01.pdf

| Status       | Hub height<br>[m] | Wind speed<br>[m/s] | LwA,ref<br>[dB(A)] | Pure tones | Octave data |             |             |             |              |              |              |              |
|--------------|-------------------|---------------------|--------------------|------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|--------------|
|              |                   |                     |                    |            | 63<br>[dB]  | 125<br>[dB] | 250<br>[dB] | 500<br>[dB] | 1000<br>[dB] | 2000<br>[dB] | 4000<br>[dB] | 8000<br>[dB] |
| From Windcat | 140,0             | 8,0                 | 104,9              | No         | 86,3        | 93,6        | 98,2        | 99,9        | 98,9         | 95,0         | 88,4         | 78,9         |

### 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

**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**



## DECIBEL - Assumptions for noise calculation

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

**Noise sensitive area: RH06 RH06**

**Predefined calculation standard:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

**Immission 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:**

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

**Uncertainty margin:** Use default value from calculation model

Project:

**Söderskogen**

Licensed user:

**wpd AG**

Stephanitorsbollwerk 3 (Haus LUV)

DE-28211 Bremen

+49 7142 77810

Anders Stenberg / a.stenberg@wpd.fi

Calculated:

16.9.2021 9.18/3.3.294

## DECIBEL - Assumptions for noise calculation

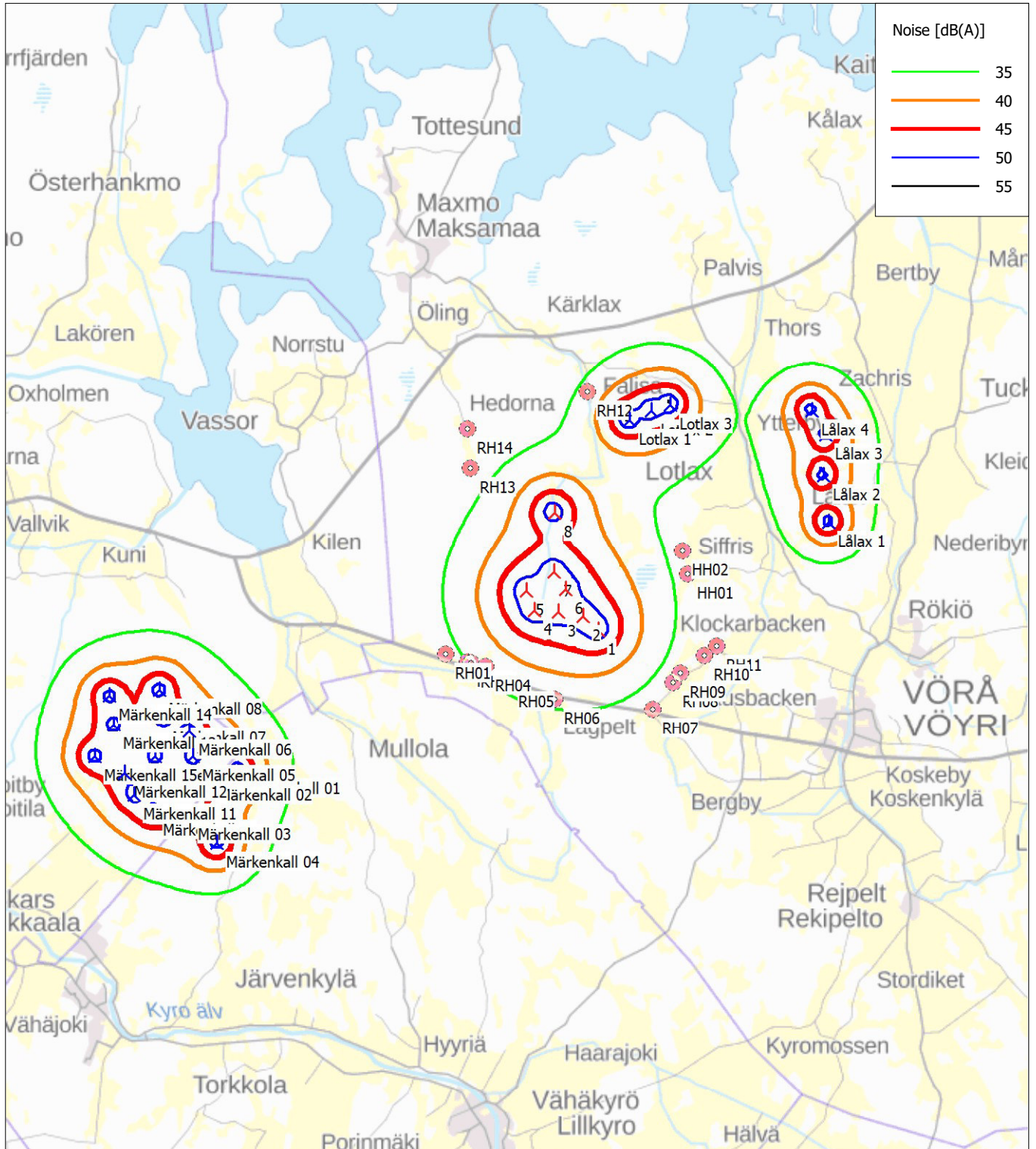
**Calculation:** MP Proposal, 8xF180 @210m, expected 1/3 octave band performance, cumulative impact (permitted WTG types)

**Noise demand:** 40,0 dB(A)

**No distance demand**

## DECIBEL - Map 8,0 m/s

**Calculation:** MP Proposal, 8x F180 @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



## 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:

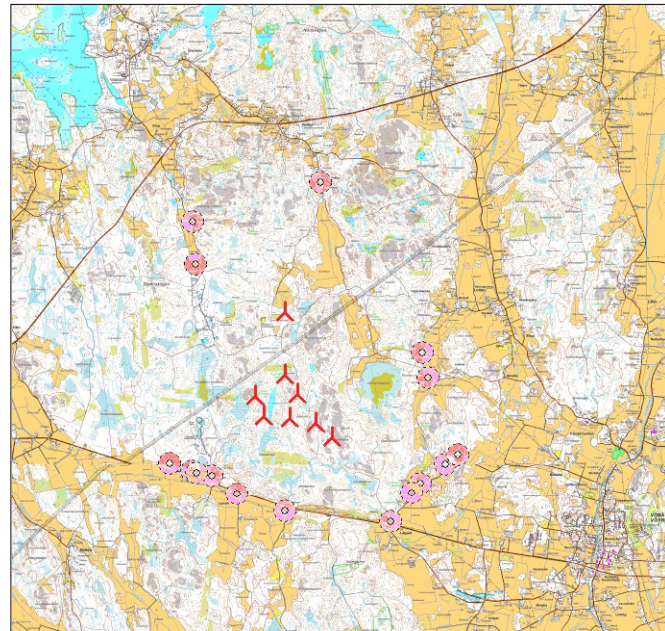
0,0 dB; Uncertainty margin in NSA has priority

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

0,0 dB(A)

All coordinates are in

Finish TM ETRS-TM35FIN-ETRS89



Scale 1:150 000

▲ New WTG

■ Noise sensitive area

## WTGs

|   | East   | North   | Z    | Row data/Description         | WTG type |           |                  | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Noise data |                                                          | Wind speed [m/s] | LwA <sub>ref</sub> [dB(A)] |
|---|--------|---------|------|------------------------------|----------|-----------|------------------|-------------------|--------------------|----------------|------------|----------------------------------------------------------|------------------|----------------------------|
|   |        |         |      |                              | Valid    | Manufact. | Type-generator   |                   |                    |                | Creator    | Name                                                     |                  |                            |
|   |        |         |      | [m]                          |          |           |                  |                   |                    |                |            |                                                          |                  |                            |
| 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 | 255137 | 7011612 | 50,4 | 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                       |
| 3 | 254614 | 7011705 | 38,8 | 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 | 254111 | 7011739 | 25,6 | 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                       |
| 5 | 253945 | 7012144 | 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 | 254771 | 7012174 | 40,0 | 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 | 254521 | 7012552 | 35,1 | 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 | 19,3 | 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    | Immission height [m] | Frequency [Hz] | Noise [dB] | WTG noise [dB] |
|------|-----------------------------------------------------------------------------------------------------|--------|---------|------|----------------------|----------------|------------|----------------|
| HH01 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (HH01) | 257331 | 7012499 | 17,6 | 4,0                  | 50,0           | 44,0       | 33,6           |
| HH02 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (HH02) | 257219 | 7012995 | 17,2 | 4,0                  | 50,0           | 44,0       | 33,4           |
| RH01 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH01) | 252257 | 7010823 | 13,0 | 4,0                  | 50,0           | 44,0       | 33,8           |
| RH02 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH02) | 252700 | 7010660 | 15,9 | 4,0                  | 50,0           | 44,0       | 34,9           |
| RH03 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH03) | 252789 | 7010635 | 15,0 | 4,0                  | 50,0           | 44,0       | 35,1           |
| RH04 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH04) | 253090 | 7010568 | 15,6 | 4,0                  | 50,0           | 44,0       | 35,8           |
| RH05 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH05) | 253574 | 7010222 | 14,2 | 4,0                  | 50,0           | 44,0       | 35,9           |
| RH06 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH06) | 254528 | 7009881 | 18,5 | 4,0                  | 50,0           | 44,0       | 35,8           |
| RH07 | Noise sensitive point: Finnish low frequency - Residential 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 - Residential 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 - Residential health guide 2003, indoor - night (RH09) | 257177 | 7010423 | 17,1 | 4,0                  | 50,0           | 44,0       | 33,2           |
| RH10 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH10) | 257669 | 7010798 | 18,9 | 4,0                  | 50,0           | 44,0       | 32,3           |
| RH11 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH11) | 257929 | 7010986 | 18,8 | 4,0                  | 50,0           | 44,0       | 31,7           |
| RH12 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH12) | 255219 | 7016333 | 14,4 | 4,0                  | 50,0           | 44,0       | 30,2           |
| RH13 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH13) | 252762 | 7014727 | 25,2 | 4,0                  | 50,0           | 44,0       | 32,8           |
| RH14 | Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH14) | 252714 | 7015547 | 21,5 | 4,0                  | 50,0           | 44,0       | 30,9           |

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

### Distances (m)

| NSA  | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|------|------|------|------|------|------|------|------|------|
| HH01 | 2219 | 2365 | 2829 | 3306 | 3402 | 2579 | 2808 | 3084 |
| HH02 | 2433 | 2498 | 2905 | 3350 | 3380 | 2580 | 2732 | 2804 |
| RH01 | 3226 | 2984 | 2515 | 2067 | 2142 | 2852 | 2847 | 3734 |
| RH02 | 2822 | 2614 | 2179 | 1775 | 1935 | 2563 | 2624 | 3622 |

To be continued on next page...

**DECIBEL - Main Result****Calculation:** MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor*...continued from previous page*

| <b>WTG</b> |      |      |      |      |      |      |      |      |
|------------|------|------|------|------|------|------|------|------|
| NSA        | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
| RH03       | 2743 | 2542 | 2115 | 1722 | 1900 | 2508 | 2582 | 3600 |
| RH04       | 2472 | 2296 | 1900 | 1552 | 1791 | 2323 | 2444 | 3525 |
| RH05       | 2172 | 2090 | 1810 | 1608 | 1956 | 2288 | 2513 | 3690 |
| RH06       | 1711 | 1834 | 1825 | 1903 | 2336 | 2305 | 2670 | 3906 |
| RH07       | 2017 | 2429 | 2840 | 3232 | 3624 | 3098 | 3550 | 4608 |
| RH08       | 1911 | 2327 | 2813 | 3268 | 3612 | 2963 | 3401 | 4335 |
| RH09       | 1952 | 2359 | 2863 | 3334 | 3659 | 2973 | 3401 | 4281 |
| RH10       | 2285 | 2658 | 3185 | 3678 | 3958 | 3206 | 3602 | 4335 |
| RH11       | 2506 | 2859 | 3390 | 3889 | 4146 | 3372 | 3748 | 4404 |
| RH12       | 5008 | 4719 | 4665 | 4723 | 4376 | 4181 | 3843 | 2634 |
| RH13       | 4328 | 3914 | 3541 | 3276 | 2838 | 3246 | 2795 | 1998 |
| RH14       | 5023 | 4617 | 4283 | 4053 | 3616 | 3947 | 3495 | 2523 |



## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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 - Residential health guide 2003, indoor - night (HH01)**

Wind speed: 8,0 m/s

**WTG**

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 2219            | 2231                  | 20                | <b>36,03</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>32,18</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>29,76</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>27,62</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>26,37</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>19,58</b>       | 83,9               | 0,25         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>14,87</b>       | 86,7               | 0,36         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>13,77</b>       | 91,4               | 0,56         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>8,78</b>        | 89,9               | 0,85         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>4,16</b>        | 91,2               | 1,27         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-1,10</b>       | 92,8               | 1,83         | 0,00        | 25,00          |
| 2   | 2365            | 2377                  | 20                | <b>35,48</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>31,63</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>29,21</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>27,06</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>25,81</b>       | 82,6               | 0,17         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>19,02</b>       | 83,9               | 0,26         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>14,30</b>       | 86,7               | 0,38         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>13,19</b>       | 91,4               | 0,59         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>8,18</b>        | 89,9               | 0,90         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>3,53</b>        | 91,2               | 1,35         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-1,77</b>       | 92,8               | 1,95         | 0,00        | 25,00          |
| 3   | 2829            | 2838                  | 20                | <b>33,94</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>30,08</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>27,66</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>25,50</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>24,24</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>17,43</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>12,69</b>       | 86,7               | 0,45         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>11,53</b>       | 91,4               | 0,71         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>6,46</b>        | 89,9               | 1,08         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>1,72</b>        | 91,2               | 1,62         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>-3,69</b>       | 92,8               | 2,33         | 0,00        | 25,00          |
| 4   | 3306            | 3313                  | 20                | <b>32,60</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>28,73</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>26,30</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>24,13</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 4   |                 |                       | 50                | <b>22,86</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>16,03</b>       | 83,9               | 0,36         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>11,27</b>       | 86,7               | 0,53         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>10,07</b>       | 91,4               | 0,83         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>4,94</b>        | 89,9               | 1,26         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>0,11</b>        | 91,2               | 1,89         | 0,00        | 21,20          |
| 4   |                 |                       | 200               | <b>-5,42</b>       | 92,8               | 2,72         | 0,00        | 25,00          |
| 5   | 3402            | 3409                  | 20                | <b>32,35</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5   |                 |                       | 25                | <b>28,48</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 5   |                 |                       | 32                | <b>26,04</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 5   |                 |                       | 40                | <b>23,88</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 5   |                 |                       | 50                | <b>22,61</b>       | 82,6               | 0,24         | 4,70        | 13,00          |
| 5   |                 |                       | 63                | <b>15,77</b>       | 83,9               | 0,38         | 4,30        | 16,60          |
| 5   |                 |                       | 80                | <b>11,00</b>       | 86,7               | 0,55         | 3,70        | 19,70          |
| 5   |                 |                       | 100               | <b>9,79</b>        | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |  |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|--|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |  |
| 5          | 2579            | 2589                  | 125               | <b>4,65</b>        | 89,9               | 1,30         | 1,80        | 20,20          |  |
| 5          |                 |                       | 160               | <b>-0,20</b>       | 91,2               | 1,94         | 0,00        | 21,20          |  |
| 5          |                 |                       | 200               | <b>-5,75</b>       | 92,8               | 2,80         | 0,00        | 25,00          |  |
| 6          |                 |                       | 20                | <b>34,74</b>       | 64,5               | 0,00         | 5,60        | 6,60           |  |
| 6          |                 |                       | 25                | <b>30,89</b>       | 68,5               | 0,05         | 5,40        | 8,40           |  |
| 6          |                 |                       | 32                | <b>28,46</b>       | 74,0               | 0,08         | 5,20        | 10,80          |  |
| 6          |                 |                       | 40                | <b>26,31</b>       | 77,5               | 0,13         | 5,00        | 11,40          |  |
| 6          |                 |                       | 50                | <b>25,06</b>       | 82,6               | 0,18         | 4,70        | 13,00          |  |
| 6          |                 |                       | 63                | <b>18,25</b>       | 83,9               | 0,28         | 4,30        | 16,60          |  |
| 6          |                 |                       | 80                | <b>13,52</b>       | 86,7               | 0,41         | 3,70        | 19,70          |  |
| 6          | 2808            | 2817                  | 100               | <b>12,39</b>       | 91,4               | 0,65         | 3,00        | 21,20          |  |
| 6          |                 |                       | 125               | <b>7,35</b>        | 89,9               | 0,98         | 1,80        | 20,20          |  |
| 6          |                 |                       | 160               | <b>2,66</b>        | 91,2               | 1,48         | 0,00        | 21,20          |  |
| 6          |                 |                       | 200               | <b>-2,68</b>       | 92,8               | 2,12         | 0,00        | 25,00          |  |
| 7          |                 |                       | 20                | <b>34,00</b>       | 64,5               | 0,00         | 5,60        | 6,60           |  |
| 7          |                 |                       | 25                | <b>30,15</b>       | 68,5               | 0,06         | 5,40        | 8,40           |  |
| 7          |                 |                       | 32                | <b>27,72</b>       | 74,0               | 0,08         | 5,20        | 10,80          |  |
| 7          |                 |                       | 40                | <b>25,56</b>       | 77,5               | 0,14         | 5,00        | 11,40          |  |
| 7          |                 |                       | 50                | <b>24,31</b>       | 82,6               | 0,20         | 4,70        | 13,00          |  |
| 7          |                 |                       | 63                | <b>17,49</b>       | 83,9               | 0,31         | 4,30        | 16,60          |  |
| 7          | 3084            | 3091                  | 80                | <b>12,75</b>       | 86,7               | 0,45         | 3,70        | 19,70          |  |
| 7          |                 |                       | 100               | <b>11,60</b>       | 91,4               | 0,70         | 3,00        | 21,20          |  |
| 7          |                 |                       | 125               | <b>6,53</b>        | 89,9               | 1,07         | 1,80        | 20,20          |  |
| 7          |                 |                       | 160               | <b>1,80</b>        | 91,2               | 1,61         | 0,00        | 21,20          |  |
| 7          |                 |                       | 200               | <b>-3,61</b>       | 92,8               | 2,31         | 0,00        | 25,00          |  |
| 8          |                 |                       | 20                | <b>33,20</b>       | 64,5               | 0,00         | 5,60        | 6,60           |  |
| 8          |                 |                       | 25                | <b>29,34</b>       | 68,5               | 0,06         | 5,40        | 8,40           |  |
| 8          |                 |                       | 32                | <b>26,91</b>       | 74,0               | 0,09         | 5,20        | 10,80          |  |
| 8          |                 |                       | 40                | <b>24,74</b>       | 77,5               | 0,15         | 5,00        | 11,40          |  |
| 8          |                 |                       | 50                | <b>23,48</b>       | 82,6               | 0,22         | 4,70        | 13,00          |  |
| 8          |                 |                       | 63                | <b>16,66</b>       | 83,9               | 0,34         | 4,30        | 16,60          |  |
| 8          |                 |                       | 80                | <b>11,90</b>       | 86,7               | 0,49         | 3,70        | 19,70          |  |
| 8          |                 |                       | 100               | <b>10,73</b>       | 91,4               | 0,77         | 3,00        | 21,20          |  |
| 8          |                 |                       | 125               | <b>5,62</b>        | 89,9               | 1,17         | 1,80        | 20,20          |  |
| 8          |                 |                       | 160               | <b>0,84</b>        | 91,2               | 1,76         | 0,00        | 21,20          |  |
| 8          |                 |                       | 200               | <b>-4,63</b>       | 92,8               | 2,53         | 0,00        | 25,00          |  |
| Sum        |                 |                       |                   |                    |                    |              |             |                |  |
| Sum        |                 |                       | 20                | <b>43,25</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 25                | <b>39,39</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 32                | <b>36,97</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 40                | <b>34,81</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 50                | <b>33,56</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 63                | <b>26,75</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 80                | <b>22,01</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 100               | <b>20,87</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 125               | <b>15,82</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 160               | <b>11,10</b>       |                    |              |             |                |  |
| Sum        |                 |                       | 200               | <b>5,73</b>        |                    |              |             |                |  |

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

Wind speed: 8,0 m/s

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

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s

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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          |                 |                       | 80                | <b>14,04</b>       | 86,7               | 0,39         | 3,70        | 19,70          |
| 1          |                 |                       | 100               | <b>12,92</b>       | 91,4               | 0,61         | 3,00        | 21,20          |
| 1          |                 |                       | 125               | <b>7,91</b>        | 89,9               | 0,93         | 1,80        | 20,20          |
| 1          |                 |                       | 160               | <b>3,24</b>        | 91,2               | 1,39         | 0,00        | 21,20          |
| 1          |                 |                       | 200               | <b>-2,07</b>       | 92,8               | 2,00         | 0,00        | 25,00          |
| 2          | 2498            | 2509                  |                   |                    |                    |              |             |                |
| 2          |                 |                       | 20                | <b>35,01</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>31,16</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>28,73</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>26,58</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>25,33</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>18,53</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>13,81</b>       | 86,7               | 0,40         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>12,68</b>       | 91,4               | 0,63         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>7,66</b>        | 89,9               | 0,95         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>2,98</b>        | 91,2               | 1,43         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-2,35</b>       | 92,8               | 2,06         | 0,00        | 25,00          |
| 3          | 2905            | 2914                  |                   |                    |                    |              |             |                |
| 3          |                 |                       | 20                | <b>33,71</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>29,85</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>27,42</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>25,27</b>       | 77,5               | 0,15         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>24,01</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>17,19</b>       | 83,9               | 0,32         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>12,45</b>       | 86,7               | 0,47         | 3,70        | 19,70          |
| 3          |                 |                       | 100               | <b>11,28</b>       | 91,4               | 0,73         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>6,20</b>        | 89,9               | 1,11         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>1,45</b>        | 91,2               | 1,66         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-3,98</b>       | 92,8               | 2,39         | 0,00        | 25,00          |
| 4          | 3350            | 3356                  |                   |                    |                    |              |             |                |
| 4          |                 |                       | 20                | <b>32,48</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>28,62</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>26,18</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>24,01</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>22,75</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>15,91</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>11,15</b>       | 86,7               | 0,54         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>9,94</b>        | 91,4               | 0,84         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>4,81</b>        | 89,9               | 1,28         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>-0,03</b>       | 91,2               | 1,91         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>-5,57</b>       | 92,8               | 2,75         | 0,00        | 25,00          |
| 5          | 3380            | 3388                  |                   |                    |                    |              |             |                |
| 5          |                 |                       | 20                | <b>32,40</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>28,53</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>26,10</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>23,93</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>22,67</b>       | 82,6               | 0,24         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>15,83</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>11,06</b>       | 86,7               | 0,54         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>9,86</b>        | 91,4               | 0,85         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>4,72</b>        | 89,9               | 1,29         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>-0,13</b>       | 91,2               | 1,93         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-5,68</b>       | 92,8               | 2,78         | 0,00        | 25,00          |
| 6          | 2580            | 2590                  |                   |                    |                    |              |             |                |
| 6          |                 |                       | 20                | <b>34,73</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>30,88</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>28,46</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>26,30</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>25,05</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>18,25</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>13,52</b>       | 86,7               | 0,41         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>12,39</b>       | 91,4               | 0,65         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>7,35</b>        | 89,9               | 0,98         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>2,66</b>        | 91,2               | 1,48         | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 6          |                 |                       | 200               | <b>-2,69</b>       | 92,8               | 2,12         | 0,00        | 25,00          |
| 7          | 2732            | 2741                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>34,24</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>30,39</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>27,96</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>25,80</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>24,55</b>       | 82,6               | 0,19         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>17,74</b>       | 83,9               | 0,30         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>13,00</b>       | 86,7               | 0,44         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>11,86</b>       | 91,4               | 0,69         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>6,80</b>        | 89,9               | 1,04         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>2,08</b>        | 91,2               | 1,56         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-3,31</b>       | 92,8               | 2,25         | 0,00        | 25,00          |
| 8          | 2804            | 2811                  |                   |                    |                    |              |             |                |
| 8          |                 |                       | 20                | <b>34,02</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>30,17</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>27,74</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>25,58</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>24,33</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>17,51</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>12,77</b>       | 86,7               | 0,45         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>11,62</b>       | 91,4               | 0,70         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>6,55</b>        | 89,9               | 1,07         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>1,82</b>        | 91,2               | 1,60         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-3,58</b>       | 92,8               | 2,31         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>43,12</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>39,27</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>36,84</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>34,68</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>33,43</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>26,62</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>21,88</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>20,73</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>15,67</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>10,95</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>5,56</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          | 3226            | 3234                  |                   |                    |                    |              |             |                |
| 1          |                 |                       | 20                | <b>32,80</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1          |                 |                       | 25                | <b>28,94</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 1          |                 |                       | 32                | <b>26,51</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 1          |                 |                       | 40                | <b>24,34</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 1          |                 |                       | 50                | <b>23,08</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 1          |                 |                       | 63                | <b>16,25</b>       | 83,9               | 0,36         | 4,30        | 16,60          |
| 1          |                 |                       | 80                | <b>11,49</b>       | 86,7               | 0,52         | 3,70        | 19,70          |
| 1          |                 |                       | 100               | <b>10,30</b>       | 91,4               | 0,81         | 3,00        | 21,20          |
| 1          |                 |                       | 125               | <b>5,18</b>        | 89,9               | 1,23         | 1,80        | 20,20          |
| 1          |                 |                       | 160               | <b>0,36</b>        | 91,2               | 1,84         | 0,00        | 21,20          |
| 1          |                 |                       | 200               | <b>-5,15</b>       | 92,8               | 2,65         | 0,00        | 25,00          |
| 2          | 2984            | 2994                  |                   |                    |                    |              |             |                |
| 2          |                 |                       | 20                | <b>33,47</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>29,61</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>27,18</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>25,02</b>       | 77,5               | 0,15         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>23,76</b>       | 82,6               | 0,21         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>16,94</b>       | 83,9               | 0,33         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>12,20</b>       | 86,7               | 0,48         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>11,03</b>       | 91,4               | 0,75         | 3,00        | 21,20          |

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x F180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s

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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 2          | 2515            | 2526                  | 125               | <b>5,94</b>        | 89,9               | 1,14         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>1,17</b>        | 91,2               | 1,71         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-4,28</b>       | 92,8               | 2,46         | 0,00        | 25,00          |
| 3          |                 |                       | 20                | <b>34,95</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>31,10</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>28,68</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>26,53</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>25,28</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>18,47</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>13,75</b>       | 86,7               | 0,40         | 3,70        | 19,70          |
| 3          | 2067            | 2078                  | 100               | <b>12,62</b>       | 91,4               | 0,63         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>7,59</b>        | 89,9               | 0,96         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>2,91</b>        | 91,2               | 1,44         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-2,42</b>       | 92,8               | 2,07         | 0,00        | 25,00          |
| 4          |                 |                       | 20                | <b>36,65</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>32,80</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>30,38</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>28,24</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>27,00</b>       | 82,6               | 0,15         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>20,22</b>       | 83,9               | 0,23         | 4,30        | 16,60          |
| 4          | 2142            | 2154                  | 80                | <b>15,51</b>       | 86,7               | 0,33         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>14,43</b>       | 91,4               | 0,52         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>9,46</b>        | 89,9               | 0,79         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>4,86</b>        | 91,2               | 1,18         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>-0,36</b>       | 92,8               | 1,70         | 0,00        | 25,00          |
| 5          |                 |                       | 20                | <b>36,33</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>32,49</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>30,07</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>27,93</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>26,68</b>       | 82,6               | 0,15         | 4,70        | 13,00          |
| 5          | 2852            | 2862                  | 63                | <b>19,90</b>       | 83,9               | 0,24         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>15,19</b>       | 86,7               | 0,34         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>14,10</b>       | 91,4               | 0,54         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>9,12</b>        | 89,9               | 0,82         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>4,51</b>        | 91,2               | 1,23         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-0,73</b>       | 92,8               | 1,77         | 0,00        | 25,00          |
| 6          |                 |                       | 20                | <b>33,87</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>30,01</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>27,58</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>25,42</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 6          | 2847            | 2856                  | 50                | <b>24,17</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>17,35</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>12,61</b>       | 86,7               | 0,46         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>11,45</b>       | 91,4               | 0,72         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>6,38</b>        | 89,9               | 1,09         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>1,64</b>        | 91,2               | 1,63         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-3,78</b>       | 92,8               | 2,35         | 0,00        | 25,00          |
| 7          |                 |                       | 20                | <b>33,88</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>30,03</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>27,60</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 7          | 3734            | 3740                  | 40                | <b>25,44</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>24,18</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>17,37</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>12,63</b>       | 86,7               | 0,46         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>11,47</b>       | 91,4               | 0,71         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>6,40</b>        | 89,9               | 1,09         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>1,66</b>        | 91,2               | 1,63         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-3,76</b>       | 92,8               | 2,34         | 0,00        | 25,00          |
| 8          |                 |                       |                   |                    |                    |              |             |                |

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 8   |                 |                       | 20                | <b>31,54</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8   |                 |                       | 25                | <b>27,67</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 8   |                 |                       | 32                | <b>25,23</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 8   |                 |                       | 40                | <b>23,06</b>       | 77,5               | 0,19         | 5,00        | 11,40          |
| 8   |                 |                       | 50                | <b>21,78</b>       | 82,6               | 0,26         | 4,70        | 13,00          |
| 8   |                 |                       | 63                | <b>14,93</b>       | 83,9               | 0,41         | 4,30        | 16,60          |
| 8   |                 |                       | 80                | <b>10,14</b>       | 86,7               | 0,60         | 3,70        | 19,70          |
| 8   |                 |                       | 100               | <b>8,91</b>        | 91,4               | 0,93         | 3,00        | 21,20          |
| 8   |                 |                       | 125               | <b>3,72</b>        | 89,9               | 1,42         | 1,80        | 20,20          |
| 8   |                 |                       | 160               | <b>-1,19</b>       | 91,2               | 2,13         | 0,00        | 21,20          |
| 8   |                 |                       | 200               | <b>-6,82</b>       | 92,8               | 3,07         | 0,00        | 25,00          |
| Sum |                 |                       |                   |                    |                    |              |             |                |
| Sum |                 |                       | 20                | <b>43,52</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>39,67</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>37,24</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>35,09</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>33,84</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>27,03</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>22,30</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>21,17</b>       |                    |              |             |                |
| Sum |                 |                       | 125               | <b>16,13</b>       |                    |              |             |                |
| Sum |                 |                       | 160               | <b>11,44</b>       |                    |              |             |                |
| Sum |                 |                       | 200               | <b>6,09</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 2822            | 2832                  | 20                | <b>33,96</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>30,10</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>27,67</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>25,52</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>24,26</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>17,45</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>12,70</b>       | 86,7               | 0,45         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>11,55</b>       | 91,4               | 0,71         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>6,48</b>        | 89,9               | 1,08         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>1,74</b>        | 91,2               | 1,61         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-3,66</b>       | 92,8               | 2,32         | 0,00        | 25,00          |
| 2   | 2614            | 2625                  | 20                | <b>34,62</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>30,76</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>28,34</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>26,19</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>24,93</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>18,13</b>       | 83,9               | 0,29         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>13,40</b>       | 86,7               | 0,42         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>12,26</b>       | 91,4               | 0,66         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>7,22</b>        | 89,9               | 1,00         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>2,52</b>        | 91,2               | 1,50         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-2,84</b>       | 92,8               | 2,15         | 0,00        | 25,00          |
| 3   | 2179            | 2191                  | 20                | <b>36,19</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>32,34</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>29,92</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>27,78</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>26,53</b>       | 82,6               | 0,15         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>19,75</b>       | 83,9               | 0,24         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>15,04</b>       | 86,7               | 0,35         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>13,94</b>       | 91,4               | 0,55         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>8,96</b>        | 89,9               | 0,83         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>4,34</b>        | 91,2               | 1,25         | 0,00        | 21,20          |

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s

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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 3          |                 |                       | 200               | <b>-0,91</b>       | 92,8               | 1,80         | 0,00        | 25,00          |
| 4          | 1775            | 1788                  |                   |                    |                    |              |             |                |
| 4          |                 |                       | 20                | <b>37,95</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>34,12</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>31,70</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>29,56</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>28,33</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>21,56</b>       | 83,9               | 0,20         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>16,87</b>       | 86,7               | 0,29         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>15,81</b>       | 91,4               | 0,45         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>10,87</b>       | 89,9               | 0,68         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>6,33</b>        | 91,2               | 1,02         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>1,19</b>        | 92,8               | 1,47         | 0,00        | 25,00          |
| 5          | 1935            | 1948                  |                   |                    |                    |              |             |                |
| 5          |                 |                       | 20                | <b>37,21</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>33,37</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>30,95</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>28,81</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>27,57</b>       | 82,6               | 0,14         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>20,79</b>       | 83,9               | 0,21         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>16,09</b>       | 86,7               | 0,31         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>15,02</b>       | 91,4               | 0,49         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>10,07</b>       | 89,9               | 0,74         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>5,50</b>        | 91,2               | 1,11         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>0,31</b>        | 92,8               | 1,60         | 0,00        | 25,00          |
| 6          | 2563            | 2574                  |                   |                    |                    |              |             |                |
| 6          |                 |                       | 20                | <b>34,79</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>30,94</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>28,51</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>26,36</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>25,11</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>18,31</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>13,58</b>       | 86,7               | 0,41         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>12,45</b>       | 91,4               | 0,64         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>7,41</b>        | 89,9               | 0,98         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>2,72</b>        | 91,2               | 1,47         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-2,62</b>       | 92,8               | 2,11         | 0,00        | 25,00          |
| 7          | 2624            | 2633                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>34,59</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>30,74</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>28,31</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>26,16</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>24,91</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>18,10</b>       | 83,9               | 0,29         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>13,37</b>       | 86,7               | 0,42         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>12,23</b>       | 91,4               | 0,66         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>7,19</b>        | 89,9               | 1,00         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>2,49</b>        | 91,2               | 1,50         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-2,87</b>       | 92,8               | 2,16         | 0,00        | 25,00          |
| 8          | 3622            | 3628                  |                   |                    |                    |              |             |                |
| 8          |                 |                       | 20                | <b>31,81</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>27,93</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>25,50</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>23,33</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>22,05</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>15,21</b>       | 83,9               | 0,40         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>10,43</b>       | 86,7               | 0,58         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>9,20</b>        | 91,4               | 0,91         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>4,03</b>        | 89,9               | 1,38         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>-0,86</b>       | 91,2               | 2,07         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-6,47</b>       | 92,8               | 2,97         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>44,54</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>40,69</b>       |                    |              |             |                |

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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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| Sum        |                 |                       | 32                | <b>38,27</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>36,12</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>34,88</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>28,09</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>23,37</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>22,26</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>17,26</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>12,63</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>7,36</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          | 2743            | 2753                  |                   |                    |                    |              |             |                |
| 1          |                 |                       | 20                | <b>34,20</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1          |                 |                       | 25                | <b>30,35</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 1          |                 |                       | 32                | <b>27,92</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 1          |                 |                       | 40                | <b>25,76</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 1          |                 |                       | 50                | <b>24,51</b>       | 82,6               | 0,19         | 4,70        | 13,00          |
| 1          |                 |                       | 63                | <b>17,70</b>       | 83,9               | 0,30         | 4,30        | 16,60          |
| 1          |                 |                       | 80                | <b>12,96</b>       | 86,7               | 0,44         | 3,70        | 19,70          |
| 1          |                 |                       | 100               | <b>11,81</b>       | 91,4               | 0,69         | 3,00        | 21,20          |
| 1          |                 |                       | 125               | <b>6,76</b>        | 89,9               | 1,05         | 1,80        | 20,20          |
| 1          |                 |                       | 160               | <b>2,03</b>        | 91,2               | 1,57         | 0,00        | 21,20          |
| 1          |                 |                       | 200               | <b>-3,36</b>       | 92,8               | 2,26         | 0,00        | 25,00          |
| 2          | 2542            | 2553                  |                   |                    |                    |              |             |                |
| 2          |                 |                       | 20                | <b>34,86</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>31,01</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>28,58</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>26,43</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>25,18</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>18,38</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>13,65</b>       | 86,7               | 0,41         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>12,52</b>       | 91,4               | 0,64         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>7,49</b>        | 89,9               | 0,97         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>2,80</b>        | 91,2               | 1,46         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-2,54</b>       | 92,8               | 2,09         | 0,00        | 25,00          |
| 3          | 2115            | 2127                  |                   |                    |                    |              |             |                |
| 3          |                 |                       | 20                | <b>36,44</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>32,60</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>30,18</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>28,04</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>26,80</b>       | 82,6               | 0,15         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>20,01</b>       | 83,9               | 0,23         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>15,30</b>       | 86,7               | 0,34         | 3,70        | 19,70          |
| 3          |                 |                       | 100               | <b>14,21</b>       | 91,4               | 0,53         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>9,24</b>        | 89,9               | 0,81         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>4,63</b>        | 91,2               | 1,21         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-0,60</b>       | 92,8               | 1,74         | 0,00        | 25,00          |
| 4          | 1722            | 1735                  |                   |                    |                    |              |             |                |
| 4          |                 |                       | 20                | <b>38,21</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>34,38</b>       | 68,5               | 0,03         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>31,96</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>29,83</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>28,59</b>       | 82,6               | 0,12         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>21,82</b>       | 83,9               | 0,19         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>17,13</b>       | 86,7               | 0,28         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>16,08</b>       | 91,4               | 0,43         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>11,15</b>       | 89,9               | 0,66         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>6,62</b>        | 91,2               | 0,99         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>1,49</b>        | 92,8               | 1,42         | 0,00        | 25,00          |
| 5          | 1900            | 1913                  |                   |                    |                    |              |             |                |

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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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 5          |                 |                       | 20                | <b>37,36</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>33,53</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>31,11</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>28,97</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>27,73</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>20,95</b>       | 83,9               | 0,21         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>16,26</b>       | 86,7               | 0,31         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>15,19</b>       | 91,4               | 0,48         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>10,24</b>       | 89,9               | 0,73         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>5,67</b>        | 91,2               | 1,09         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>0,49</b>        | 92,8               | 1,57         | 0,00        | 25,00          |
| 6          | 2508            | 2519                  | 20                | <b>34,98</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>31,13</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>28,70</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>26,55</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>25,30</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>18,50</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>13,77</b>       | 86,7               | 0,40         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>12,65</b>       | 91,4               | 0,63         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>7,62</b>        | 89,9               | 0,96         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>2,94</b>        | 91,2               | 1,44         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-2,39</b>       | 92,8               | 2,07         | 0,00        | 25,00          |
| 7          | 2582            | 2592                  | 20                | <b>34,73</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>30,87</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>28,45</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>26,30</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>25,04</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>18,24</b>       | 83,9               | 0,29         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>13,51</b>       | 86,7               | 0,41         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>12,38</b>       | 91,4               | 0,65         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>7,34</b>        | 89,9               | 0,99         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>2,65</b>        | 91,2               | 1,48         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-2,70</b>       | 92,8               | 2,13         | 0,00        | 25,00          |
| 8          | 3600            | 3607                  | 20                | <b>31,86</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>27,99</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>25,55</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>23,38</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>22,11</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>15,26</b>       | 83,9               | 0,40         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>10,48</b>       | 86,7               | 0,58         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>9,26</b>        | 91,4               | 0,90         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>4,09</b>        | 89,9               | 1,37         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>-0,80</b>       | 91,2               | 2,06         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-6,40</b>       | 92,8               | 2,96         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>44,75</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>40,90</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>38,48</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>36,33</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>35,09</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>28,30</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>23,58</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>22,48</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>17,49</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>12,86</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>7,61</b>        |                    |              |             |                |

## 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 - Residential health guide 2003, indoor - night (RH04)

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 2472            | 2484                  |                   |                    |                    |              |             |                |
| 1   |                 |                       | 20                | <b>35,10</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>31,25</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>28,82</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>26,67</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>25,42</b>       | 82,6               | 0,17         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>18,63</b>       | 83,9               | 0,27         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>13,90</b>       | 86,7               | 0,40         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>12,78</b>       | 91,4               | 0,62         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>7,75</b>        | 89,9               | 0,94         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>3,08</b>        | 91,2               | 1,42         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-2,24</b>       | 92,8               | 2,04         | 0,00        | 25,00          |
| 2   | 2296            | 2309                  |                   |                    |                    |              |             |                |
| 2   |                 |                       | 20                | <b>35,73</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>31,89</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>29,46</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>27,32</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>26,07</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>19,28</b>       | 83,9               | 0,25         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>14,56</b>       | 86,7               | 0,37         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>13,46</b>       | 91,4               | 0,58         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>8,46</b>        | 89,9               | 0,88         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>3,82</b>        | 91,2               | 1,32         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-1,46</b>       | 92,8               | 1,89         | 0,00        | 25,00          |
| 3   | 1900            | 1914                  |                   |                    |                    |              |             |                |
| 3   |                 |                       | 20                | <b>37,36</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>33,52</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>31,11</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>28,97</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>27,73</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>20,95</b>       | 83,9               | 0,21         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>16,26</b>       | 86,7               | 0,31         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>15,18</b>       | 91,4               | 0,48         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>10,24</b>       | 89,9               | 0,73         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>5,67</b>        | 91,2               | 1,09         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>0,49</b>        | 92,8               | 1,57         | 0,00        | 25,00          |
| 4   | 1552            | 1567                  |                   |                    |                    |              |             |                |
| 4   |                 |                       | 20                | <b>39,10</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>35,27</b>       | 68,5               | 0,03         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>32,85</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>30,72</b>       | 77,5               | 0,08         | 5,00        | 11,40          |
| 4   |                 |                       | 50                | <b>29,49</b>       | 82,6               | 0,11         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>22,73</b>       | 83,9               | 0,17         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>18,05</b>       | 86,7               | 0,25         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>17,01</b>       | 91,4               | 0,39         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>12,10</b>       | 89,9               | 0,60         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>7,60</b>        | 91,2               | 0,89         | 0,00        | 21,20          |
| 4   |                 |                       | 200               | <b>2,51</b>        | 92,8               | 1,29         | 0,00        | 25,00          |
| 5   | 1791            | 1805                  |                   |                    |                    |              |             |                |
| 5   |                 |                       | 20                | <b>37,87</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5   |                 |                       | 25                | <b>34,03</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 5   |                 |                       | 32                | <b>31,61</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 5   |                 |                       | 40                | <b>29,48</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 5   |                 |                       | 50                | <b>28,24</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 5   |                 |                       | 63                | <b>21,47</b>       | 83,9               | 0,20         | 4,30        | 16,60          |
| 5   |                 |                       | 80                | <b>16,78</b>       | 86,7               | 0,29         | 3,70        | 19,70          |
| 5   |                 |                       | 100               | <b>15,72</b>       | 91,4               | 0,45         | 3,00        | 21,20          |
| 5   |                 |                       | 125               | <b>10,78</b>       | 89,9               | 0,69         | 1,80        | 20,20          |
| 5   |                 |                       | 160               | <b>6,24</b>        | 91,2               | 1,03         | 0,00        | 21,20          |
| 5   |                 |                       | 200               | <b>1,09</b>        | 92,8               | 1,48         | 0,00        | 25,00          |
| 6   | 2323            | 2334                  |                   |                    |                    |              |             |                |
| 6   |                 |                       | 20                | <b>35,64</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6   |                 |                       | 25                | <b>31,79</b>       | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 6          |                 |                       | 32                | <b>29,37</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>27,22</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>25,97</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>19,18</b>       | 83,9               | 0,26         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>14,46</b>       | 86,7               | 0,37         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>13,35</b>       | 91,4               | 0,58         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>8,35</b>        | 89,9               | 0,89         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>3,71</b>        | 91,2               | 1,33         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-1,58</b>       | 92,8               | 1,91         | 0,00        | 25,00          |
| 7          | 2444            | 2455                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>35,20</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>31,35</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>28,93</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>26,78</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>25,53</b>       | 82,6               | 0,17         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>18,73</b>       | 83,9               | 0,27         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>14,01</b>       | 86,7               | 0,39         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>12,89</b>       | 91,4               | 0,61         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>7,87</b>        | 89,9               | 0,93         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>3,20</b>        | 91,2               | 1,40         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-2,11</b>       | 92,8               | 2,01         | 0,00        | 25,00          |
| 8          | 3525            | 3532                  |                   |                    |                    |              |             |                |
| 8          |                 |                       | 20                | <b>32,04</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>28,17</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>25,73</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>23,56</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>22,29</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>15,45</b>       | 83,9               | 0,39         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>10,68</b>       | 86,7               | 0,57         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>9,46</b>        | 91,4               | 0,88         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>4,30</b>        | 89,9               | 1,34         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>-0,57</b>       | 91,2               | 2,01         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-6,16</b>       | 92,8               | 2,90         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>45,47</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>41,63</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>39,21</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>37,07</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>35,83</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>29,04</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>24,34</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>23,25</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>18,29</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>13,70</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>8,48</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          | 2172            | 2185                  |                   |                    |                    |              |             |                |
| 1          |                 |                       | 20                | <b>36,21</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1          |                 |                       | 25                | <b>32,37</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 1          |                 |                       | 32                | <b>29,95</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 1          |                 |                       | 40                | <b>27,80</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 1          |                 |                       | 50                | <b>26,56</b>       | 82,6               | 0,15         | 4,70        | 13,00          |
| 1          |                 |                       | 63                | <b>19,77</b>       | 83,9               | 0,24         | 4,30        | 16,60          |
| 1          |                 |                       | 80                | <b>15,06</b>       | 86,7               | 0,35         | 3,70        | 19,70          |
| 1          |                 |                       | 100               | <b>13,97</b>       | 91,4               | 0,55         | 3,00        | 21,20          |
| 1          |                 |                       | 125               | <b>8,98</b>        | 89,9               | 0,83         | 1,80        | 20,20          |
| 1          |                 |                       | 160               | <b>4,37</b>        | 91,2               | 1,25         | 0,00        | 21,20          |
| 1          |                 |                       | 200               | <b>-0,88</b>       | 92,8               | 1,79         | 0,00        | 25,00          |
| 2          | 2090            | 2104                  |                   |                    |                    |              |             |                |

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s

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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 2          | 1810            | 1825                  | 20                | <b>36,54</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>32,70</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>30,27</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>28,13</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>26,89</b>       | 82,6               | 0,15         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>20,11</b>       | 83,9               | 0,23         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>15,40</b>       | 86,7               | 0,34         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>14,31</b>       | 91,4               | 0,53         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>9,34</b>        | 89,9               | 0,80         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>4,74</b>        | 91,2               | 1,20         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-0,49</b>       | 92,8               | 1,73         | 0,00        | 25,00          |
| 3          | 1608            | 1623                  | 20                | <b>37,78</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>33,94</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>31,52</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>29,38</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>28,15</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>21,38</b>       | 83,9               | 0,20         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>16,68</b>       | 86,7               | 0,29         | 3,70        | 19,70          |
| 3          |                 |                       | 100               | <b>15,62</b>       | 91,4               | 0,46         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>10,68</b>       | 89,9               | 0,69         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>6,14</b>        | 91,2               | 1,04         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>0,98</b>        | 92,8               | 1,50         | 0,00        | 25,00          |
| 4          | 1956            | 1969                  | 20                | <b>38,80</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>34,96</b>       | 68,5               | 0,03         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>32,55</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>30,41</b>       | 77,5               | 0,08         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>29,18</b>       | 82,6               | 0,11         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>22,42</b>       | 83,9               | 0,18         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>17,74</b>       | 86,7               | 0,26         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>16,69</b>       | 91,4               | 0,41         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>11,78</b>       | 89,9               | 0,62         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>7,27</b>        | 91,2               | 0,92         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>2,17</b>        | 92,8               | 1,33         | 0,00        | 25,00          |
| 5          | 2288            | 2300                  | 20                | <b>37,12</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>33,28</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>30,86</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>28,72</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>27,48</b>       | 82,6               | 0,14         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>20,70</b>       | 83,9               | 0,22         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>16,00</b>       | 86,7               | 0,32         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>14,92</b>       | 91,4               | 0,49         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>9,97</b>        | 89,9               | 0,75         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>5,39</b>        | 91,2               | 1,12         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>0,20</b>        | 92,8               | 1,61         | 0,00        | 25,00          |
| 6          | 2513            | 2523                  | 20                | <b>35,77</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>31,92</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>29,50</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>27,35</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>26,10</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>19,31</b>       | 83,9               | 0,25         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>14,60</b>       | 86,7               | 0,37         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>13,49</b>       | 91,4               | 0,57         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>8,49</b>        | 89,9               | 0,87         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>3,85</b>        | 91,2               | 1,31         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-1,42</b>       | 92,8               | 1,89         | 0,00        | 25,00          |
| 7          |                 |                       | 20                | <b>34,96</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>31,11</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>28,68</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>26,53</b>       | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 7          | 3690            | 3696                  | 50                | <b>25,28</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>18,48</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>13,76</b>       | 86,7               | 0,40         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>12,63</b>       | 91,4               | 0,63         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>7,60</b>        | 89,9               | 0,96         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>2,92</b>        | 91,2               | 1,44         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-2,41</b>       | 92,8               | 2,07         | 0,00        | 25,00          |
| 8          |                 |                       | 20                | <b>31,64</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>27,77</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>25,33</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>23,16</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>21,89</b>       | 82,6               | 0,26         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>15,04</b>       | 83,9               | 0,41         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>10,25</b>       | 86,7               | 0,59         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>9,02</b>        | 91,4               | 0,92         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>3,84</b>        | 89,9               | 1,40         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>-1,06</b>       | 91,2               | 2,11         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-6,69</b>       | 92,8               | 3,03         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>45,54</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>41,69</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>39,27</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>37,13</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>35,89</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>29,11</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>24,40</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>23,32</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>18,35</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>13,76</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>8,55</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          | 1711            | 1727                  | 20                | <b>38,25</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1          |                 |                       | 25                | <b>34,42</b>       | 68,5               | 0,03         | 5,40        | 8,40           |
| 1          |                 |                       | 32                | <b>32,00</b>       | 74,0               | 0,05         | 5,20        | 10,80          |
| 1          |                 |                       | 40                | <b>29,87</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 1          |                 |                       | 50                | <b>28,63</b>       | 82,6               | 0,12         | 4,70        | 13,00          |
| 1          |                 |                       | 63                | <b>21,86</b>       | 83,9               | 0,19         | 4,30        | 16,60          |
| 1          |                 |                       | 80                | <b>17,18</b>       | 86,7               | 0,28         | 3,70        | 19,70          |
| 1          |                 |                       | 100               | <b>16,12</b>       | 91,4               | 0,43         | 3,00        | 21,20          |
| 1          |                 |                       | 125               | <b>11,20</b>       | 89,9               | 0,66         | 1,80        | 20,20          |
| 1          |                 |                       | 160               | <b>6,67</b>        | 91,2               | 0,98         | 0,00        | 21,20          |
| 1          |                 |                       | 200               | <b>1,54</b>        | 92,8               | 1,42         | 0,00        | 25,00          |
| 2          | 1834            | 1849                  | 20                | <b>37,66</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>33,82</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>31,40</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>29,27</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>28,03</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>21,26</b>       | 83,9               | 0,20         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>16,56</b>       | 86,7               | 0,30         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>15,50</b>       | 91,4               | 0,46         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>10,56</b>       | 89,9               | 0,70         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>6,01</b>        | 91,2               | 1,05         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>0,84</b>        | 92,8               | 1,52         | 0,00        | 25,00          |
| 3          | 1825            | 1839                  | 20                | <b>37,71</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>33,87</b>       | 68,5               | 0,04         | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 3   |                 |                       | 32                | <b>31,45</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>29,32</b>       | 77,5               | 0,09         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>28,08</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>21,31</b>       | 83,9               | 0,20         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>16,61</b>       | 86,7               | 0,29         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>15,55</b>       | 91,4               | 0,46         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>10,61</b>       | 89,9               | 0,70         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>6,06</b>        | 91,2               | 1,05         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>0,90</b>        | 92,8               | 1,51         | 0,00        | 25,00          |
| 4   | 1903            | 1915                  |                   |                    |                    |              |             |                |
| 4   |                 |                       | 20                | <b>37,36</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>33,52</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>31,10</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>28,96</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 4   |                 |                       | 50                | <b>27,72</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>20,94</b>       | 83,9               | 0,21         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>16,25</b>       | 86,7               | 0,31         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>15,18</b>       | 91,4               | 0,48         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>10,23</b>       | 89,9               | 0,73         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>5,66</b>        | 91,2               | 1,09         | 0,00        | 21,20          |
| 4   |                 |                       | 200               | <b>0,48</b>        | 92,8               | 1,57         | 0,00        | 25,00          |
| 5   | 2336            | 2346                  |                   |                    |                    |              |             |                |
| 5   |                 |                       | 20                | <b>35,59</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5   |                 |                       | 25                | <b>31,75</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 5   |                 |                       | 32                | <b>29,32</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 5   |                 |                       | 40                | <b>27,18</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 5   |                 |                       | 50                | <b>25,93</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 5   |                 |                       | 63                | <b>19,13</b>       | 83,9               | 0,26         | 4,30        | 16,60          |
| 5   |                 |                       | 80                | <b>14,42</b>       | 86,7               | 0,38         | 3,70        | 19,70          |
| 5   |                 |                       | 100               | <b>13,31</b>       | 91,4               | 0,59         | 3,00        | 21,20          |
| 5   |                 |                       | 125               | <b>8,30</b>        | 89,9               | 0,89         | 1,80        | 20,20          |
| 5   |                 |                       | 160               | <b>3,66</b>        | 91,2               | 1,34         | 0,00        | 21,20          |
| 5   |                 |                       | 200               | <b>-1,63</b>       | 92,8               | 1,92         | 0,00        | 25,00          |
| 6   | 2305            | 2316                  |                   |                    |                    |              |             |                |
| 6   |                 |                       | 20                | <b>35,71</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6   |                 |                       | 25                | <b>31,86</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 6   |                 |                       | 32                | <b>29,44</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 6   |                 |                       | 40                | <b>27,29</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 6   |                 |                       | 50                | <b>26,04</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 6   |                 |                       | 63                | <b>19,25</b>       | 83,9               | 0,25         | 4,30        | 16,60          |
| 6   |                 |                       | 80                | <b>14,54</b>       | 86,7               | 0,37         | 3,70        | 19,70          |
| 6   |                 |                       | 100               | <b>13,43</b>       | 91,4               | 0,58         | 3,00        | 21,20          |
| 6   |                 |                       | 125               | <b>8,43</b>        | 89,9               | 0,88         | 1,80        | 20,20          |
| 6   |                 |                       | 160               | <b>3,79</b>        | 91,2               | 1,32         | 0,00        | 21,20          |
| 6   |                 |                       | 200               | <b>-1,49</b>       | 92,8               | 1,90         | 0,00        | 25,00          |
| 7   | 2670            | 2679                  |                   |                    |                    |              |             |                |
| 7   |                 |                       | 20                | <b>34,44</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7   |                 |                       | 25                | <b>30,59</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 7   |                 |                       | 32                | <b>28,16</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 7   |                 |                       | 40                | <b>26,01</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 7   |                 |                       | 50                | <b>24,75</b>       | 82,6               | 0,19         | 4,70        | 13,00          |
| 7   |                 |                       | 63                | <b>17,95</b>       | 83,9               | 0,29         | 4,30        | 16,60          |
| 7   |                 |                       | 80                | <b>13,21</b>       | 86,7               | 0,43         | 3,70        | 19,70          |
| 7   |                 |                       | 100               | <b>12,07</b>       | 91,4               | 0,67         | 3,00        | 21,20          |
| 7   |                 |                       | 125               | <b>7,02</b>        | 89,9               | 1,02         | 1,80        | 20,20          |
| 7   |                 |                       | 160               | <b>2,31</b>        | 91,2               | 1,53         | 0,00        | 21,20          |
| 7   |                 |                       | 200               | <b>-3,06</b>       | 92,8               | 2,20         | 0,00        | 25,00          |
| 8   | 3906            | 3912                  |                   |                    |                    |              |             |                |
| 8   |                 |                       | 20                | <b>31,15</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8   |                 |                       | 25                | <b>27,27</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 8   |                 |                       | 32                | <b>24,83</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 8   |                 |                       | 40                | <b>22,66</b>       | 77,5               | 0,20         | 5,00        | 11,40          |
| 8   |                 |                       | 50                | <b>21,38</b>       | 82,6               | 0,27         | 4,70        | 13,00          |
| 8   |                 |                       | 63                | <b>14,52</b>       | 83,9               | 0,43         | 4,30        | 16,60          |

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 8   |                 |                       | 80                | <b>9,73</b>        | 86,7               | 0,63         | 3,70        | 19,70          |
| 8   |                 |                       | 100               | <b>8,47</b>        | 91,4               | 0,98         | 3,00        | 21,20          |
| 8   |                 |                       | 125               | <b>3,27</b>        | 89,9               | 1,49         | 1,80        | 20,20          |
| 8   |                 |                       | 160               | <b>-1,68</b>       | 91,2               | 2,23         | 0,00        | 21,20          |
| 8   |                 |                       | 200               | <b>-7,36</b>       | 92,8               | 3,21         | 0,00        | 25,00          |
| Sum |                 |                       |                   |                    |                    |              |             |                |
| Sum |                 |                       | 20                | <b>45,48</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>41,64</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>39,21</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>37,07</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>35,83</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>29,05</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>24,35</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>23,26</b>       |                    |              |             |                |
| Sum |                 |                       | 125               | <b>18,29</b>       |                    |              |             |                |
| Sum |                 |                       | 160               | <b>13,70</b>       |                    |              |             |                |
| Sum |                 |                       | 200               | <b>8,49</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 2017            | 2031                  |                   |                    |                    |              |             |                |
| 1   |                 |                       | 20                | <b>36,85</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>33,01</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>30,59</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>28,45</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>27,21</b>       | 82,6               | 0,14         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>20,42</b>       | 83,9               | 0,22         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>15,72</b>       | 86,7               | 0,32         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>14,64</b>       | 91,4               | 0,51         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>9,68</b>        | 89,9               | 0,77         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>5,09</b>        | 91,2               | 1,16         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-0,12</b>       | 92,8               | 1,67         | 0,00        | 25,00          |
| 2   | 2429            | 2440                  |                   |                    |                    |              |             |                |
| 2   |                 |                       | 20                | <b>35,25</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>31,40</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>28,98</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>26,83</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>25,58</b>       | 82,6               | 0,17         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>18,78</b>       | 83,9               | 0,27         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>14,06</b>       | 86,7               | 0,39         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>12,94</b>       | 91,4               | 0,61         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>7,93</b>        | 89,9               | 0,93         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>3,26</b>        | 91,2               | 1,39         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-2,05</b>       | 92,8               | 2,00         | 0,00        | 25,00          |
| 3   | 2840            | 2848                  |                   |                    |                    |              |             |                |
| 3   |                 |                       | 20                | <b>33,91</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>30,05</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>27,62</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>25,47</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>24,21</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>17,39</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>12,65</b>       | 86,7               | 0,46         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>11,50</b>       | 91,4               | 0,71         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>6,43</b>        | 89,9               | 1,08         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>1,68</b>        | 91,2               | 1,62         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>-3,73</b>       | 92,8               | 2,34         | 0,00        | 25,00          |
| 4   | 3232            | 3239                  |                   |                    |                    |              |             |                |
| 4   |                 |                       | 20                | <b>32,79</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>28,93</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>26,50</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>24,33</b>       | 77,5               | 0,16         | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 4   |                 |                       | 50                | <b>23,07</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>16,24</b>       | 83,9               | 0,36         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>11,47</b>       | 86,7               | 0,52         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>10,28</b>       | 91,4               | 0,81         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>5,16</b>        | 89,9               | 1,23         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>0,35</b>        | 91,2               | 1,85         | 0,00        | 21,20          |
| 4   |                 |                       | 200               | <b>-5,16</b>       | 92,8               | 2,66         | 0,00        | 25,00          |
| 5   | 3624            | 3631                  |                   |                    |                    |              |             |                |
| 5   |                 |                       | 20                | <b>31,80</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5   |                 |                       | 25                | <b>27,93</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 5   |                 |                       | 32                | <b>25,49</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 5   |                 |                       | 40                | <b>23,32</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 5   |                 |                       | 50                | <b>22,05</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 5   |                 |                       | 63                | <b>15,20</b>       | 83,9               | 0,40         | 4,30        | 16,60          |
| 5   |                 |                       | 80                | <b>10,42</b>       | 86,7               | 0,58         | 3,70        | 19,70          |
| 5   |                 |                       | 100               | <b>9,19</b>        | 91,4               | 0,91         | 3,00        | 21,20          |
| 5   |                 |                       | 125               | <b>4,02</b>        | 89,9               | 1,38         | 1,80        | 20,20          |
| 5   |                 |                       | 160               | <b>-0,87</b>       | 91,2               | 2,07         | 0,00        | 21,20          |
| 5   |                 |                       | 200               | <b>-6,48</b>       | 92,8               | 2,98         | 0,00        | 25,00          |
| 6   | 3098            | 3106                  |                   |                    |                    |              |             |                |
| 6   |                 |                       | 20                | <b>33,16</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6   |                 |                       | 25                | <b>29,29</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 6   |                 |                       | 32                | <b>26,86</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 6   |                 |                       | 40                | <b>24,70</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 6   |                 |                       | 50                | <b>23,44</b>       | 82,6               | 0,22         | 4,70        | 13,00          |
| 6   |                 |                       | 63                | <b>16,62</b>       | 83,9               | 0,34         | 4,30        | 16,60          |
| 6   |                 |                       | 80                | <b>11,86</b>       | 86,7               | 0,50         | 3,70        | 19,70          |
| 6   |                 |                       | 100               | <b>10,68</b>       | 91,4               | 0,78         | 3,00        | 21,20          |
| 6   |                 |                       | 125               | <b>5,58</b>        | 89,9               | 1,18         | 1,80        | 20,20          |
| 6   |                 |                       | 160               | <b>0,79</b>        | 91,2               | 1,77         | 0,00        | 21,20          |
| 6   |                 |                       | 200               | <b>-4,69</b>       | 92,8               | 2,55         | 0,00        | 25,00          |
| 7   | 3550            | 3557                  |                   |                    |                    |              |             |                |
| 7   |                 |                       | 20                | <b>31,98</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7   |                 |                       | 25                | <b>28,11</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 7   |                 |                       | 32                | <b>25,67</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 7   |                 |                       | 40                | <b>23,50</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 7   |                 |                       | 50                | <b>22,23</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 7   |                 |                       | 63                | <b>15,39</b>       | 83,9               | 0,39         | 4,30        | 16,60          |
| 7   |                 |                       | 80                | <b>10,61</b>       | 86,7               | 0,57         | 3,70        | 19,70          |
| 7   |                 |                       | 100               | <b>9,39</b>        | 91,4               | 0,89         | 3,00        | 21,20          |
| 7   |                 |                       | 125               | <b>4,23</b>        | 89,9               | 1,35         | 1,80        | 20,20          |
| 7   |                 |                       | 160               | <b>-0,65</b>       | 91,2               | 2,03         | 0,00        | 21,20          |
| 7   |                 |                       | 200               | <b>-6,24</b>       | 92,8               | 2,92         | 0,00        | 25,00          |
| 8   | 4608            | 4613                  |                   |                    |                    |              |             |                |
| 8   |                 |                       | 20                | <b>29,72</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8   |                 |                       | 25                | <b>25,83</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 8   |                 |                       | 32                | <b>23,38</b>       | 74,0               | 0,14         | 5,20        | 10,80          |
| 8   |                 |                       | 40                | <b>21,19</b>       | 77,5               | 0,23         | 5,00        | 11,40          |
| 8   |                 |                       | 50                | <b>19,90</b>       | 82,6               | 0,32         | 4,70        | 13,00          |
| 8   |                 |                       | 63                | <b>13,01</b>       | 83,9               | 0,51         | 4,30        | 16,60          |
| 8   |                 |                       | 80                | <b>8,18</b>        | 86,7               | 0,74         | 3,70        | 19,70          |
| 8   |                 |                       | 100               | <b>6,87</b>        | 91,4               | 1,15         | 3,00        | 21,20          |
| 8   |                 |                       | 125               | <b>1,57</b>        | 89,9               | 1,75         | 1,80        | 20,20          |
| 8   |                 |                       | 160               | <b>-3,51</b>       | 91,2               | 2,63         | 0,00        | 21,20          |
| 8   |                 |                       | 200               | <b>-9,36</b>       | 92,8               | 3,78         | 0,00        | 25,00          |
| Sum |                 |                       |                   |                    |                    |              |             |                |
| Sum |                 |                       | 20                | <b>42,71</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>38,85</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>36,42</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>34,26</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>33,01</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>26,19</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>21,45</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>20,30</b>       |                    |              |             |                |

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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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| Sum        |                 |                       | 125               | <b>15,23</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>10,50</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>5,11</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          | 1911            | 1925                  |                   |                    |                    |              |             |                |
| 1          |                 |                       | 20                | <b>37,31</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1          |                 |                       | 25                | <b>33,47</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 1          |                 |                       | 32                | <b>31,05</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 1          |                 |                       | 40                | <b>28,92</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 1          |                 |                       | 50                | <b>27,68</b>       | 82,6               | 0,13         | 4,70        | 13,00          |
| 1          |                 |                       | 63                | <b>20,90</b>       | 83,9               | 0,21         | 4,30        | 16,60          |
| 1          |                 |                       | 80                | <b>16,20</b>       | 86,7               | 0,31         | 3,70        | 19,70          |
| 1          |                 |                       | 100               | <b>15,13</b>       | 91,4               | 0,48         | 3,00        | 21,20          |
| 1          |                 |                       | 125               | <b>10,18</b>       | 89,9               | 0,73         | 1,80        | 20,20          |
| 1          |                 |                       | 160               | <b>5,61</b>        | 91,2               | 1,10         | 0,00        | 21,20          |
| 1          |                 |                       | 200               | <b>0,43</b>        | 92,8               | 1,58         | 0,00        | 25,00          |
| 2          | 2327            | 2339                  |                   |                    |                    |              |             |                |
| 2          |                 |                       | 20                | <b>35,62</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>31,77</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>29,35</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>27,20</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>25,96</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>19,16</b>       | 83,9               | 0,26         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>14,45</b>       | 86,7               | 0,37         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>13,34</b>       | 91,4               | 0,58         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>8,33</b>        | 89,9               | 0,89         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>3,69</b>        | 91,2               | 1,33         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-1,60</b>       | 92,8               | 1,92         | 0,00        | 25,00          |
| 3          | 2813            | 2822                  |                   |                    |                    |              |             |                |
| 3          |                 |                       | 20                | <b>33,99</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>30,13</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>27,70</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>25,55</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>24,29</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>17,48</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>12,74</b>       | 86,7               | 0,45         | 3,70        | 19,70          |
| 3          |                 |                       | 100               | <b>11,58</b>       | 91,4               | 0,71         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>6,52</b>        | 89,9               | 1,07         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>1,78</b>        | 91,2               | 1,61         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-3,63</b>       | 92,8               | 2,31         | 0,00        | 25,00          |
| 4          | 3268            | 3275                  |                   |                    |                    |              |             |                |
| 4          |                 |                       | 20                | <b>32,70</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>28,83</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>26,40</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>24,23</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>22,97</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>16,14</b>       | 83,9               | 0,36         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>11,37</b>       | 86,7               | 0,52         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>10,18</b>       | 91,4               | 0,82         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>5,05</b>        | 89,9               | 1,24         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>0,23</b>        | 91,2               | 1,87         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>-5,29</b>       | 92,8               | 2,69         | 0,00        | 25,00          |
| 5          | 3612            | 3619                  |                   |                    |                    |              |             |                |
| 5          |                 |                       | 20                | <b>31,83</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>27,96</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>25,52</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>23,35</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>22,08</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>15,23</b>       | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 5          |                 |                       | 80                | <b>10,45</b>       | 86,7               | 0,58         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>9,22</b>        | 91,4               | 0,90         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>4,05</b>        | 89,9               | 1,38         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>-0,83</b>       | 91,2               | 2,06         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-6,44</b>       | 92,8               | 2,97         | 0,00        | 25,00          |
| 6          | 2963            | 2972                  |                   |                    |                    |              |             |                |
| 6          |                 |                       | 20                | <b>33,54</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>29,68</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>27,25</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>25,09</b>       | 77,5               | 0,15         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>23,83</b>       | 82,6               | 0,21         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>17,01</b>       | 83,9               | 0,33         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>12,26</b>       | 86,7               | 0,48         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>11,10</b>       | 91,4               | 0,74         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>6,01</b>        | 89,9               | 1,13         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>1,25</b>        | 91,2               | 1,69         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-4,20</b>       | 92,8               | 2,44         | 0,00        | 25,00          |
| 7          | 3401            | 3409                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>32,35</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>28,48</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>26,05</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>23,88</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>22,61</b>       | 82,6               | 0,24         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>15,77</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>11,00</b>       | 86,7               | 0,55         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>9,80</b>        | 91,4               | 0,85         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>4,65</b>        | 89,9               | 1,30         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>-0,19</b>       | 91,2               | 1,94         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-5,75</b>       | 92,8               | 2,79         | 0,00        | 25,00          |
| 8          | 4335            | 4339                  |                   |                    |                    |              |             |                |
| 8          |                 |                       | 20                | <b>30,25</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>26,36</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>23,92</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>21,73</b>       | 77,5               | 0,22         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>20,45</b>       | 82,6               | 0,30         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>13,57</b>       | 83,9               | 0,48         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>8,76</b>        | 86,7               | 0,69         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>7,47</b>        | 91,4               | 1,08         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>2,20</b>        | 89,9               | 1,65         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>-2,82</b>       | 91,2               | 2,47         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-8,61</b>       | 92,8               | 3,56         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>43,00</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>39,15</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>36,72</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>34,56</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>33,31</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>26,50</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>21,76</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>20,62</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>15,57</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>10,86</b>       |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>5,49</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 1          | 1952            | 1966                  |                   |                    |                    |              |             |                |
| 1          |                 |                       | 20                | <b>37,13</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1          |                 |                       | 25                | <b>33,29</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 1          |                 |                       | 32                | <b>30,87</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 1          |                 |                       | 40                | <b>28,73</b>       | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   |                 |                       | 50                | <b>27,49</b>       | 82,6               | 0,14         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>20,71</b>       | 83,9               | 0,22         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>16,01</b>       | 86,7               | 0,31         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>14,94</b>       | 91,4               | 0,49         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>9,98</b>        | 89,9               | 0,75         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>5,41</b>        | 91,2               | 1,12         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>0,22</b>        | 92,8               | 1,61         | 0,00        | 25,00          |
| 2   | 2359            | 2371                  |                   |                    |                    |              |             |                |
| 2   |                 |                       | 20                | <b>35,50</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>31,65</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>29,23</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>27,08</b>       | 77,5               | 0,12         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>25,83</b>       | 82,6               | 0,17         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>19,04</b>       | 83,9               | 0,26         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>14,32</b>       | 86,7               | 0,38         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>13,21</b>       | 91,4               | 0,59         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>8,20</b>        | 89,9               | 0,90         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>3,55</b>        | 91,2               | 1,35         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-1,74</b>       | 92,8               | 1,94         | 0,00        | 25,00          |
| 3   | 2863            | 2872                  |                   |                    |                    |              |             |                |
| 3   |                 |                       | 20                | <b>33,84</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>29,98</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>27,55</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>25,39</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>24,13</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>17,32</b>       | 83,9               | 0,32         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>12,58</b>       | 86,7               | 0,46         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>11,42</b>       | 91,4               | 0,72         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>6,34</b>        | 89,9               | 1,09         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>1,60</b>        | 91,2               | 1,64         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>-3,82</b>       | 92,8               | 2,36         | 0,00        | 25,00          |
| 4   | 3334            | 3341                  |                   |                    |                    |              |             |                |
| 4   |                 |                       | 20                | <b>32,52</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>28,66</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>26,22</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>24,06</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 4   |                 |                       | 50                | <b>22,79</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>15,96</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>11,19</b>       | 86,7               | 0,53         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>9,99</b>        | 91,4               | 0,84         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>4,85</b>        | 89,9               | 1,27         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>0,02</b>        | 91,2               | 1,90         | 0,00        | 21,20          |
| 4   |                 |                       | 200               | <b>-5,52</b>       | 92,8               | 2,74         | 0,00        | 25,00          |
| 5   | 3659            | 3665                  |                   |                    |                    |              |             |                |
| 5   |                 |                       | 20                | <b>31,72</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5   |                 |                       | 25                | <b>27,84</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 5   |                 |                       | 32                | <b>25,41</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 5   |                 |                       | 40                | <b>23,23</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 5   |                 |                       | 50                | <b>21,96</b>       | 82,6               | 0,26         | 4,70        | 13,00          |
| 5   |                 |                       | 63                | <b>15,11</b>       | 83,9               | 0,40         | 4,30        | 16,60          |
| 5   |                 |                       | 80                | <b>10,33</b>       | 86,7               | 0,59         | 3,70        | 19,70          |
| 5   |                 |                       | 100               | <b>9,10</b>        | 91,4               | 0,92         | 3,00        | 21,20          |
| 5   |                 |                       | 125               | <b>3,92</b>        | 89,9               | 1,39         | 1,80        | 20,20          |
| 5   |                 |                       | 160               | <b>-0,97</b>       | 91,2               | 2,09         | 0,00        | 21,20          |
| 5   |                 |                       | 200               | <b>-6,59</b>       | 92,8               | 3,01         | 0,00        | 25,00          |
| 6   | 2973            | 2982                  |                   |                    |                    |              |             |                |
| 6   |                 |                       | 20                | <b>33,51</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6   |                 |                       | 25                | <b>29,65</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 6   |                 |                       | 32                | <b>27,22</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 6   |                 |                       | 40                | <b>25,06</b>       | 77,5               | 0,15         | 5,00        | 11,40          |
| 6   |                 |                       | 50                | <b>23,80</b>       | 82,6               | 0,21         | 4,70        | 13,00          |
| 6   |                 |                       | 63                | <b>16,98</b>       | 83,9               | 0,33         | 4,30        | 16,60          |
| 6   |                 |                       | 80                | <b>12,23</b>       | 86,7               | 0,48         | 3,70        | 19,70          |
| 6   |                 |                       | 100               | <b>11,06</b>       | 91,4               | 0,75         | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 6   |                 |                       | 125               | <b>5,98</b>        | 89,9               | 1,13         | 1,80        | 20,20          |
| 6   |                 |                       | 160               | <b>1,21</b>        | 91,2               | 1,70         | 0,00        | 21,20          |
| 6   |                 |                       | 200               | <b>-4,24</b>       | 92,8               | 2,45         | 0,00        | 25,00          |
| 7   | 3401            | 3409                  |                   |                    |                    |              |             |                |
| 7   |                 |                       | 20                | <b>32,35</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7   |                 |                       | 25                | <b>28,48</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 7   |                 |                       | 32                | <b>26,05</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 7   |                 |                       | 40                | <b>23,88</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 7   |                 |                       | 50                | <b>22,61</b>       | 82,6               | 0,24         | 4,70        | 13,00          |
| 7   |                 |                       | 63                | <b>15,77</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 7   |                 |                       | 80                | <b>11,00</b>       | 86,7               | 0,55         | 3,70        | 19,70          |
| 7   |                 |                       | 100               | <b>9,80</b>        | 91,4               | 0,85         | 3,00        | 21,20          |
| 7   |                 |                       | 125               | <b>4,65</b>        | 89,9               | 1,30         | 1,80        | 20,20          |
| 7   |                 |                       | 160               | <b>-0,19</b>       | 91,2               | 1,94         | 0,00        | 21,20          |
| 7   |                 |                       | 200               | <b>-5,75</b>       | 92,8               | 2,80         | 0,00        | 25,00          |
| 8   | 4281            | 4286                  |                   |                    |                    |              |             |                |
| 8   |                 |                       | 20                | <b>30,36</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8   |                 |                       | 25                | <b>26,47</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 8   |                 |                       | 32                | <b>24,03</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 8   |                 |                       | 40                | <b>21,85</b>       | 77,5               | 0,21         | 5,00        | 11,40          |
| 8   |                 |                       | 50                | <b>20,56</b>       | 82,6               | 0,30         | 4,70        | 13,00          |
| 8   |                 |                       | 63                | <b>13,69</b>       | 83,9               | 0,47         | 4,30        | 16,60          |
| 8   |                 |                       | 80                | <b>8,87</b>        | 86,7               | 0,69         | 3,70        | 19,70          |
| 8   |                 |                       | 100               | <b>7,59</b>        | 91,4               | 1,07         | 3,00        | 21,20          |
| 8   |                 |                       | 125               | <b>2,33</b>        | 89,9               | 1,63         | 1,80        | 20,20          |
| 8   |                 |                       | 160               | <b>-2,68</b>       | 91,2               | 2,44         | 0,00        | 21,20          |
| 8   |                 |                       | 200               | <b>-8,45</b>       | 92,8               | 3,51         | 0,00        | 25,00          |
| Sum |                 |                       |                   |                    |                    |              |             |                |
| Sum |                 |                       | 20                | <b>42,89</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>39,03</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>36,61</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>34,45</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>33,19</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>26,38</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>21,65</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>20,50</b>       |                    |              |             |                |
| Sum |                 |                       | 125               | <b>15,44</b>       |                    |              |             |                |
| Sum |                 |                       | 160               | <b>10,72</b>       |                    |              |             |                |
| Sum |                 |                       | 200               | <b>5,34</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 2285            | 2297                  |                   |                    |                    |              |             |                |
| 1   |                 |                       | 20                | <b>35,78</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>31,93</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>29,51</b>       | 74,0               | 0,07         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>27,36</b>       | 77,5               | 0,11         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>26,12</b>       | 82,6               | 0,16         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>19,32</b>       | 83,9               | 0,25         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>14,61</b>       | 86,7               | 0,37         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>13,50</b>       | 91,4               | 0,57         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>8,50</b>        | 89,9               | 0,87         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>3,87</b>        | 91,2               | 1,31         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-1,41</b>       | 92,8               | 1,88         | 0,00        | 25,00          |
| 2   | 2658            | 2669                  |                   |                    |                    |              |             |                |
| 2   |                 |                       | 20                | <b>34,47</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>30,62</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>28,19</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>26,04</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>24,79</b>       | 82,6               | 0,19         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>17,98</b>       | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 2          |                 |                       | 80                | <b>13,25</b>       | 86,7               | 0,43         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>12,11</b>       | 91,4               | 0,67         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>7,06</b>        | 89,9               | 1,01         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>2,35</b>        | 91,2               | 1,52         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-3,02</b>       | 92,8               | 2,19         | 0,00        | 25,00          |
| 3          | 3185            | 3193                  | 20                | <b>32,92</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>29,05</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>26,62</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>24,46</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>23,19</b>       | 82,6               | 0,22         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>16,36</b>       | 83,9               | 0,35         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>11,60</b>       | 86,7               | 0,51         | 3,70        | 19,70          |
| 3          |                 |                       | 100               | <b>10,42</b>       | 91,4               | 0,80         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>5,30</b>        | 89,9               | 1,21         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>0,50</b>        | 91,2               | 1,82         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-5,00</b>       | 92,8               | 2,62         | 0,00        | 25,00          |
| 4          | 3678            | 3685                  | 20                | <b>31,67</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>27,80</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>25,36</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>23,19</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>21,91</b>       | 82,6               | 0,26         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>15,07</b>       | 83,9               | 0,41         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>10,28</b>       | 86,7               | 0,59         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>9,05</b>        | 91,4               | 0,92         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>3,87</b>        | 89,9               | 1,40         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>-1,03</b>       | 91,2               | 2,10         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>-6,65</b>       | 92,8               | 3,02         | 0,00        | 25,00          |
| 5          | 3958            | 3964                  | 20                | <b>31,04</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>27,16</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>24,72</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>22,54</b>       | 77,5               | 0,20         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>21,26</b>       | 82,6               | 0,28         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>14,40</b>       | 83,9               | 0,44         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>9,60</b>        | 86,7               | 0,63         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>8,35</b>        | 91,4               | 0,99         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>3,13</b>        | 89,9               | 1,51         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>-1,82</b>       | 91,2               | 2,26         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-7,51</b>       | 92,8               | 3,25         | 0,00        | 25,00          |
| 6          | 3206            | 3215                  | 20                | <b>32,86</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>28,99</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>26,56</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>24,40</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>23,13</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>16,30</b>       | 83,9               | 0,35         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>11,54</b>       | 86,7               | 0,51         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>10,35</b>       | 91,4               | 0,80         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>5,24</b>        | 89,9               | 1,22         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>0,43</b>        | 91,2               | 1,83         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-5,08</b>       | 92,8               | 2,64         | 0,00        | 25,00          |
| 7          | 3602            | 3609                  | 20                | <b>31,85</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>27,98</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>25,54</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>23,37</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>22,10</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>15,26</b>       | 83,9               | 0,40         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>10,48</b>       | 86,7               | 0,58         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>9,25</b>        | 91,4               | 0,90         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>4,08</b>        | 89,9               | 1,37         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>-0,80</b>       | 91,2               | 2,06         | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 7   |                 |                       | 200               | <b>-6,41</b>       | 92,8               | 2,96         | 0,00        | 25,00          |
| 8   | 4335            | 4340                  |                   |                    |                    |              |             |                |
| 8   |                 |                       | 20                | <b>30,25</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8   |                 |                       | 25                | <b>26,36</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 8   |                 |                       | 32                | <b>23,92</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 8   |                 |                       | 40                | <b>21,73</b>       | 77,5               | 0,22         | 5,00        | 11,40          |
| 8   |                 |                       | 50                | <b>20,45</b>       | 82,6               | 0,30         | 4,70        | 13,00          |
| 8   |                 |                       | 63                | <b>13,57</b>       | 83,9               | 0,48         | 4,30        | 16,60          |
| 8   |                 |                       | 80                | <b>8,76</b>        | 86,7               | 0,69         | 3,70        | 19,70          |
| 8   |                 |                       | 100               | <b>7,46</b>        | 91,4               | 1,09         | 3,00        | 21,20          |
| 8   |                 |                       | 125               | <b>2,20</b>        | 89,9               | 1,65         | 1,80        | 20,20          |
| 8   |                 |                       | 160               | <b>-2,82</b>       | 91,2               | 2,47         | 0,00        | 21,20          |
| 8   |                 |                       | 200               | <b>-8,61</b>       | 92,8               | 3,56         | 0,00        | 25,00          |
| Sum |                 |                       |                   |                    |                    |              |             |                |
| Sum |                 |                       | 20                | <b>41,99</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>38,12</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>35,69</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>33,53</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>32,27</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>25,45</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>20,69</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>19,51</b>       |                    |              |             |                |
| Sum |                 |                       | 125               | <b>14,41</b>       |                    |              |             |                |
| Sum |                 |                       | 160               | <b>9,63</b>        |                    |              |             |                |
| Sum |                 |                       | 200               | <b>4,17</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 2506            | 2516                  |                   |                    |                    |              |             |                |
| 1   |                 |                       | 20                | <b>34,98</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>31,13</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>28,71</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>26,56</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>25,31</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>18,51</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>13,78</b>       | 86,7               | 0,40         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>12,66</b>       | 91,4               | 0,63         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>7,63</b>        | 89,9               | 0,96         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>2,95</b>        | 91,2               | 1,43         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-2,38</b>       | 92,8               | 2,06         | 0,00        | 25,00          |
| 2   | 2859            | 2869                  |                   |                    |                    |              |             |                |
| 2   |                 |                       | 20                | <b>33,85</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>29,99</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>27,56</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>25,40</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>24,14</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>17,33</b>       | 83,9               | 0,32         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>12,59</b>       | 86,7               | 0,46         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>11,43</b>       | 91,4               | 0,72         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>6,35</b>        | 89,9               | 1,09         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>1,61</b>        | 91,2               | 1,64         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-3,81</b>       | 92,8               | 2,35         | 0,00        | 25,00          |
| 3   | 3390            | 3397                  |                   |                    |                    |              |             |                |
| 3   |                 |                       | 20                | <b>32,38</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>28,51</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>26,08</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>23,91</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>22,64</b>       | 82,6               | 0,24         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>15,80</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>11,03</b>       | 86,7               | 0,54         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>9,83</b>        | 91,4               | 0,85         | 3,00        | 21,20          |

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## DECIBEL - Detailed results

**Calculation:** MP Proposal, 8x180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s

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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 3          |                 |                       | 125               | <b>4,69</b>        | 89,9               | 1,29         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>-0,16</b>       | 91,2               | 1,94         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-5,71</b>       | 92,8               | 2,79         | 0,00        | 25,00          |
| 4          | 3889            | 3895                  |                   |                    |                    |              |             |                |
| 4          |                 |                       | 20                | <b>31,19</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>27,31</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>24,87</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>22,70</b>       | 77,5               | 0,19         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>21,42</b>       | 82,6               | 0,27         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>14,56</b>       | 83,9               | 0,43         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>9,77</b>        | 86,7               | 0,62         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>8,52</b>        | 91,4               | 0,97         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>3,31</b>        | 89,9               | 1,48         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>-1,63</b>       | 91,2               | 2,22         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>-7,30</b>       | 92,8               | 3,19         | 0,00        | 25,00          |
| 5          | 4146            | 4152                  |                   |                    |                    |              |             |                |
| 5          |                 |                       | 20                | <b>30,64</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>26,75</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>24,31</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>22,13</b>       | 77,5               | 0,21         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>20,84</b>       | 82,6               | 0,29         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>13,98</b>       | 83,9               | 0,46         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>9,17</b>        | 86,7               | 0,66         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>7,90</b>        | 91,4               | 1,04         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>2,66</b>        | 89,9               | 1,58         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>-2,33</b>       | 91,2               | 2,37         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-8,07</b>       | 92,8               | 3,40         | 0,00        | 25,00          |
| 6          | 3372            | 3379                  |                   |                    |                    |              |             |                |
| 6          |                 |                       | 20                | <b>32,42</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>28,56</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>26,12</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>23,95</b>       | 77,5               | 0,17         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>22,69</b>       | 82,6               | 0,24         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>15,85</b>       | 83,9               | 0,37         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>11,08</b>       | 86,7               | 0,54         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>9,88</b>        | 91,4               | 0,84         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>4,74</b>        | 89,9               | 1,28         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>-0,10</b>       | 91,2               | 1,93         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-5,65</b>       | 92,8               | 2,77         | 0,00        | 25,00          |
| 7          | 3748            | 3754                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>31,51</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>27,63</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>25,20</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>23,02</b>       | 77,5               | 0,19         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>21,75</b>       | 82,6               | 0,26         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>14,90</b>       | 83,9               | 0,41         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>10,11</b>       | 86,7               | 0,60         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>8,87</b>        | 91,4               | 0,94         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>3,68</b>        | 89,9               | 1,43         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>-1,23</b>       | 91,2               | 2,14         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-6,87</b>       | 92,8               | 3,08         | 0,00        | 25,00          |
| 8          | 4404            | 4409                  |                   |                    |                    |              |             |                |
| 8          |                 |                       | 20                | <b>30,11</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>26,22</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>23,78</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>21,59</b>       | 77,5               | 0,22         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>20,30</b>       | 82,6               | 0,31         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>13,43</b>       | 83,9               | 0,49         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>8,61</b>        | 86,7               | 0,71         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>7,31</b>        | 91,4               | 1,10         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>2,04</b>        | 89,9               | 1,68         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>-3,00</b>       | 91,2               | 2,51         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-8,80</b>       | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| Sum |                 |                       | 20                | <b>41,45</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>37,58</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>35,15</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>32,98</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>31,72</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>24,89</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>20,12</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>18,92</b>       |                    |              |             |                |
| Sum |                 |                       | 125               | <b>13,79</b>       |                    |              |             |                |
| Sum |                 |                       | 160               | <b>8,97</b>        |                    |              |             |                |
| Sum |                 |                       | 200               | <b>3,45</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 5008            | 5014                  | 20                | <b>29,00</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>25,10</b>       | 68,5               | 0,10         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>22,65</b>       | 74,0               | 0,15         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>20,45</b>       | 77,5               | 0,25         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>19,15</b>       | 82,6               | 0,35         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>12,25</b>       | 83,9               | 0,55         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>7,39</b>        | 86,7               | 0,80         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>6,04</b>        | 91,4               | 1,25         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>0,69</b>        | 89,9               | 1,91         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>-4,46</b>       | 91,2               | 2,86         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-10,41</b>      | 92,8               | 4,11         | 0,00        | 25,00          |
| 2   | 4719            | 4725                  | 20                | <b>29,51</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>25,62</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>23,17</b>       | 74,0               | 0,14         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>20,98</b>       | 77,5               | 0,24         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>19,68</b>       | 82,6               | 0,33         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>12,79</b>       | 83,9               | 0,52         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>7,96</b>        | 86,7               | 0,76         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>6,63</b>        | 91,4               | 1,18         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>1,32</b>        | 89,9               | 1,80         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>-3,78</b>       | 91,2               | 2,69         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-9,66</b>       | 92,8               | 3,87         | 0,00        | 25,00          |
| 3   | 4665            | 4670                  | 20                | <b>29,61</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>25,72</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>23,27</b>       | 74,0               | 0,14         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>21,08</b>       | 77,5               | 0,23         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>19,79</b>       | 82,6               | 0,33         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>12,90</b>       | 83,9               | 0,51         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>8,07</b>        | 86,7               | 0,75         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>6,75</b>        | 91,4               | 1,17         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>1,44</b>        | 89,9               | 1,77         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>-3,65</b>       | 91,2               | 2,66         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>-9,52</b>       | 92,8               | 3,83         | 0,00        | 25,00          |
| 4   | 4723            | 4728                  | 20                | <b>29,51</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>25,61</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>23,16</b>       | 74,0               | 0,14         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>20,97</b>       | 77,5               | 0,24         | 5,00        | 11,40          |
| 4   |                 |                       | 50                | <b>19,68</b>       | 82,6               | 0,33         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>12,79</b>       | 83,9               | 0,52         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>7,95</b>        | 86,7               | 0,76         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>6,62</b>        | 91,4               | 1,18         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>1,31</b>        | 89,9               | 1,80         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>-3,79</b>       | 91,2               | 2,69         | 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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 4          |                 |                       | 200               | <b>-9,67</b>       | 92,8               | 3,88         | 0,00        | 25,00          |
| 5          | 4376            | 4382                  |                   |                    |                    |              |             |                |
| 5          |                 |                       | 20                | <b>30,17</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>26,28</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>23,84</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>21,65</b>       | 77,5               | 0,22         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>20,36</b>       | 82,6               | 0,31         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>13,49</b>       | 83,9               | 0,48         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>8,67</b>        | 86,7               | 0,70         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>7,37</b>        | 91,4               | 1,10         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>2,10</b>        | 89,9               | 1,67         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>-2,93</b>       | 91,2               | 2,50         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-8,73</b>       | 92,8               | 3,59         | 0,00        | 25,00          |
| 6          | 4181            | 4187                  |                   |                    |                    |              |             |                |
| 6          |                 |                       | 20                | <b>30,56</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>26,68</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>24,24</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>22,05</b>       | 77,5               | 0,21         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>20,77</b>       | 82,6               | 0,29         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>13,90</b>       | 83,9               | 0,46         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>9,09</b>        | 86,7               | 0,67         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>7,82</b>        | 91,4               | 1,05         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>2,57</b>        | 89,9               | 1,59         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>-2,42</b>       | 91,2               | 2,39         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-8,17</b>       | 92,8               | 3,43         | 0,00        | 25,00          |
| 7          | 3843            | 3849                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>31,29</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>27,42</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>24,98</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>22,80</b>       | 77,5               | 0,19         | 5,00        | 11,40          |
| 7          |                 |                       | 50                | <b>21,52</b>       | 82,6               | 0,27         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>14,67</b>       | 83,9               | 0,42         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>9,88</b>        | 86,7               | 0,62         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>8,63</b>        | 91,4               | 0,96         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>3,43</b>        | 89,9               | 1,46         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>-1,50</b>       | 91,2               | 2,19         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-7,16</b>       | 92,8               | 3,16         | 0,00        | 25,00          |
| 8          | 2634            | 2642                  |                   |                    |                    |              |             |                |
| 8          |                 |                       | 20                | <b>34,56</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>30,71</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>28,28</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>26,13</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>24,88</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>18,07</b>       | 83,9               | 0,29         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>13,34</b>       | 86,7               | 0,42         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>12,20</b>       | 91,4               | 0,66         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>7,16</b>        | 89,9               | 1,00         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>2,45</b>        | 91,2               | 1,51         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-2,91</b>       | 92,8               | 2,17         | 0,00        | 25,00          |
| Sum        |                 |                       |                   |                    |                    |              |             |                |
| Sum        |                 |                       | 20                | <b>39,95</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>36,07</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>33,63</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>31,45</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>30,17</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>23,32</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>18,52</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>17,27</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>12,07</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>7,14</b>        |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>1,49</b>        |                    |              |             |                |

## 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 - Residential health guide 2003, indoor - night (RH13)

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 4328            | 4334                  |                   |                    |                    |              |             |                |
| 1   |                 |                       | 20                | <b>30,26</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>26,38</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>23,93</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>21,75</b>       | 77,5               | 0,22         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>20,46</b>       | 82,6               | 0,30         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>13,59</b>       | 83,9               | 0,48         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>8,77</b>        | 86,7               | 0,69         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>7,48</b>        | 91,4               | 1,08         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>2,22</b>        | 89,9               | 1,65         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>-2,81</b>       | 91,2               | 2,47         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-8,59</b>       | 92,8               | 3,55         | 0,00        | 25,00          |
| 2   | 3914            | 3921                  |                   |                    |                    |              |             |                |
| 2   |                 |                       | 20                | <b>31,13</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2   |                 |                       | 25                | <b>27,25</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 2   |                 |                       | 32                | <b>24,82</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 2   |                 |                       | 40                | <b>22,64</b>       | 77,5               | 0,20         | 5,00        | 11,40          |
| 2   |                 |                       | 50                | <b>21,36</b>       | 82,6               | 0,27         | 4,70        | 13,00          |
| 2   |                 |                       | 63                | <b>14,50</b>       | 83,9               | 0,43         | 4,30        | 16,60          |
| 2   |                 |                       | 80                | <b>9,71</b>        | 86,7               | 0,63         | 3,70        | 19,70          |
| 2   |                 |                       | 100               | <b>8,45</b>        | 91,4               | 0,98         | 3,00        | 21,20          |
| 2   |                 |                       | 125               | <b>3,24</b>        | 89,9               | 1,49         | 1,80        | 20,20          |
| 2   |                 |                       | 160               | <b>-1,70</b>       | 91,2               | 2,23         | 0,00        | 21,20          |
| 2   |                 |                       | 200               | <b>-7,38</b>       | 92,8               | 3,21         | 0,00        | 25,00          |
| 3   | 3541            | 3548                  |                   |                    |                    |              |             |                |
| 3   |                 |                       | 20                | <b>32,00</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3   |                 |                       | 25                | <b>28,13</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 3   |                 |                       | 32                | <b>25,69</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 3   |                 |                       | 40                | <b>23,52</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 3   |                 |                       | 50                | <b>22,25</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 3   |                 |                       | 63                | <b>15,41</b>       | 83,9               | 0,39         | 4,30        | 16,60          |
| 3   |                 |                       | 80                | <b>10,63</b>       | 86,7               | 0,57         | 3,70        | 19,70          |
| 3   |                 |                       | 100               | <b>9,41</b>        | 91,4               | 0,89         | 3,00        | 21,20          |
| 3   |                 |                       | 125               | <b>4,25</b>        | 89,9               | 1,35         | 1,80        | 20,20          |
| 3   |                 |                       | 160               | <b>-0,62</b>       | 91,2               | 2,02         | 0,00        | 21,20          |
| 3   |                 |                       | 200               | <b>-6,21</b>       | 92,8               | 2,91         | 0,00        | 25,00          |
| 4   | 3276            | 3282                  |                   |                    |                    |              |             |                |
| 4   |                 |                       | 20                | <b>32,68</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4   |                 |                       | 25                | <b>28,81</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 4   |                 |                       | 32                | <b>26,38</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 4   |                 |                       | 40                | <b>24,21</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 4   |                 |                       | 50                | <b>22,95</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 4   |                 |                       | 63                | <b>16,12</b>       | 83,9               | 0,36         | 4,30        | 16,60          |
| 4   |                 |                       | 80                | <b>11,35</b>       | 86,7               | 0,53         | 3,70        | 19,70          |
| 4   |                 |                       | 100               | <b>10,16</b>       | 91,4               | 0,82         | 3,00        | 21,20          |
| 4   |                 |                       | 125               | <b>5,03</b>        | 89,9               | 1,25         | 1,80        | 20,20          |
| 4   |                 |                       | 160               | <b>0,21</b>        | 91,2               | 1,87         | 0,00        | 21,20          |
| 4   |                 |                       | 200               | <b>-5,31</b>       | 92,8               | 2,69         | 0,00        | 25,00          |
| 5   | 2838            | 2847                  |                   |                    |                    |              |             |                |
| 5   |                 |                       | 20                | <b>33,91</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5   |                 |                       | 25                | <b>30,06</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 5   |                 |                       | 32                | <b>27,63</b>       | 74,0               | 0,09         | 5,20        | 10,80          |
| 5   |                 |                       | 40                | <b>25,47</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 5   |                 |                       | 50                | <b>24,21</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 5   |                 |                       | 63                | <b>17,40</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 5   |                 |                       | 80                | <b>12,66</b>       | 86,7               | 0,46         | 3,70        | 19,70          |
| 5   |                 |                       | 100               | <b>11,50</b>       | 91,4               | 0,71         | 3,00        | 21,20          |
| 5   |                 |                       | 125               | <b>6,43</b>        | 89,9               | 1,08         | 1,80        | 20,20          |
| 5   |                 |                       | 160               | <b>1,69</b>        | 91,2               | 1,62         | 0,00        | 21,20          |
| 5   |                 |                       | 200               | <b>-3,72</b>       | 92,8               | 2,33         | 0,00        | 25,00          |
| 6   | 3246            | 3253                  |                   |                    |                    |              |             |                |
| 6   |                 |                       | 20                | <b>32,75</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6   |                 |                       | 25                | <b>28,89</b>       | 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<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 6   |                 |                       | 32                | <b>26,46</b>       | 74,0               | 0,10         | 5,20        | 10,80          |
| 6   |                 |                       | 40                | <b>24,29</b>       | 77,5               | 0,16         | 5,00        | 11,40          |
| 6   |                 |                       | 50                | <b>23,03</b>       | 82,6               | 0,23         | 4,70        | 13,00          |
| 6   |                 |                       | 63                | <b>16,20</b>       | 83,9               | 0,36         | 4,30        | 16,60          |
| 6   |                 |                       | 80                | <b>11,43</b>       | 86,7               | 0,52         | 3,70        | 19,70          |
| 6   |                 |                       | 100               | <b>10,24</b>       | 91,4               | 0,81         | 3,00        | 21,20          |
| 6   |                 |                       | 125               | <b>5,12</b>        | 89,9               | 1,24         | 1,80        | 20,20          |
| 6   |                 |                       | 160               | <b>0,30</b>        | 91,2               | 1,85         | 0,00        | 21,20          |
| 6   |                 |                       | 200               | <b>-5,21</b>       | 92,8               | 2,67         | 0,00        | 25,00          |
| 7   | 2795            | 2803                  |                   |                    |                    |              |             |                |
| 7   |                 |                       | 20                | <b>34,05</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7   |                 |                       | 25                | <b>30,19</b>       | 68,5               | 0,06         | 5,40        | 8,40           |
| 7   |                 |                       | 32                | <b>27,76</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 7   |                 |                       | 40                | <b>25,61</b>       | 77,5               | 0,14         | 5,00        | 11,40          |
| 7   |                 |                       | 50                | <b>24,35</b>       | 82,6               | 0,20         | 4,70        | 13,00          |
| 7   |                 |                       | 63                | <b>17,54</b>       | 83,9               | 0,31         | 4,30        | 16,60          |
| 7   |                 |                       | 80                | <b>12,80</b>       | 86,7               | 0,45         | 3,70        | 19,70          |
| 7   |                 |                       | 100               | <b>11,65</b>       | 91,4               | 0,70         | 3,00        | 21,20          |
| 7   |                 |                       | 125               | <b>6,58</b>        | 89,9               | 1,07         | 1,80        | 20,20          |
| 7   |                 |                       | 160               | <b>1,85</b>        | 91,2               | 1,60         | 0,00        | 21,20          |
| 7   |                 |                       | 200               | <b>-3,55</b>       | 92,8               | 2,30         | 0,00        | 25,00          |
| 8   | 1998            | 2008                  |                   |                    |                    |              |             |                |
| 8   |                 |                       | 20                | <b>36,95</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8   |                 |                       | 25                | <b>33,11</b>       | 68,5               | 0,04         | 5,40        | 8,40           |
| 8   |                 |                       | 32                | <b>30,69</b>       | 74,0               | 0,06         | 5,20        | 10,80          |
| 8   |                 |                       | 40                | <b>28,55</b>       | 77,5               | 0,10         | 5,00        | 11,40          |
| 8   |                 |                       | 50                | <b>27,31</b>       | 82,6               | 0,14         | 4,70        | 13,00          |
| 8   |                 |                       | 63                | <b>20,53</b>       | 83,9               | 0,22         | 4,30        | 16,60          |
| 8   |                 |                       | 80                | <b>15,83</b>       | 86,7               | 0,32         | 3,70        | 19,70          |
| 8   |                 |                       | 100               | <b>14,74</b>       | 91,4               | 0,50         | 3,00        | 21,20          |
| 8   |                 |                       | 125               | <b>9,78</b>        | 89,9               | 0,76         | 1,80        | 20,20          |
| 8   |                 |                       | 160               | <b>5,20</b>        | 91,2               | 1,14         | 0,00        | 21,20          |
| 8   |                 |                       | 200               | <b>0,00</b>        | 92,8               | 1,65         | 0,00        | 25,00          |
| Sum |                 |                       |                   |                    |                    |              |             |                |
| Sum |                 |                       | 20                | <b>42,46</b>       |                    |              |             |                |
| Sum |                 |                       | 25                | <b>38,61</b>       |                    |              |             |                |
| Sum |                 |                       | 32                | <b>36,18</b>       |                    |              |             |                |
| Sum |                 |                       | 40                | <b>34,02</b>       |                    |              |             |                |
| Sum |                 |                       | 50                | <b>32,76</b>       |                    |              |             |                |
| Sum |                 |                       | 63                | <b>25,94</b>       |                    |              |             |                |
| Sum |                 |                       | 80                | <b>21,20</b>       |                    |              |             |                |
| Sum |                 |                       | 100               | <b>20,04</b>       |                    |              |             |                |
| Sum |                 |                       | 125               | <b>14,96</b>       |                    |              |             |                |
| Sum |                 |                       | 160               | <b>10,21</b>       |                    |              |             |                |
| Sum |                 |                       | 200               | <b>4,80</b>        |                    |              |             |                |

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

Wind speed: 8,0 m/s

### WTG

| No. | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
|-----|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| 1   | 5023            | 5028                  |                   |                    |                    |              |             |                |
| 1   |                 |                       | 20                | <b>28,97</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 1   |                 |                       | 25                | <b>25,07</b>       | 68,5               | 0,10         | 5,40        | 8,40           |
| 1   |                 |                       | 32                | <b>22,62</b>       | 74,0               | 0,15         | 5,20        | 10,80          |
| 1   |                 |                       | 40                | <b>20,42</b>       | 77,5               | 0,25         | 5,00        | 11,40          |
| 1   |                 |                       | 50                | <b>19,12</b>       | 82,6               | 0,35         | 4,70        | 13,00          |
| 1   |                 |                       | 63                | <b>12,22</b>       | 83,9               | 0,55         | 4,30        | 16,60          |
| 1   |                 |                       | 80                | <b>7,37</b>        | 86,7               | 0,80         | 3,70        | 19,70          |
| 1   |                 |                       | 100               | <b>6,02</b>        | 91,4               | 1,26         | 3,00        | 21,20          |
| 1   |                 |                       | 125               | <b>0,66</b>        | 89,9               | 1,91         | 1,80        | 20,20          |
| 1   |                 |                       | 160               | <b>-4,49</b>       | 91,2               | 2,87         | 0,00        | 21,20          |
| 1   |                 |                       | 200               | <b>-10,45</b>      | 92,8               | 4,12         | 0,00        | 25,00          |
| 2   | 4617            | 4623                  |                   |                    |                    |              |             |                |

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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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| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 2          |                 |                       | 20                | <b>29,70</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 2          |                 |                       | 25                | <b>25,81</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 2          |                 |                       | 32                | <b>23,36</b>       | 74,0               | 0,14         | 5,20        | 10,80          |
| 2          |                 |                       | 40                | <b>21,17</b>       | 77,5               | 0,23         | 5,00        | 11,40          |
| 2          |                 |                       | 50                | <b>19,88</b>       | 82,6               | 0,32         | 4,70        | 13,00          |
| 2          |                 |                       | 63                | <b>12,99</b>       | 83,9               | 0,51         | 4,30        | 16,60          |
| 2          |                 |                       | 80                | <b>8,16</b>        | 86,7               | 0,74         | 3,70        | 19,70          |
| 2          |                 |                       | 100               | <b>6,84</b>        | 91,4               | 1,16         | 3,00        | 21,20          |
| 2          |                 |                       | 125               | <b>1,54</b>        | 89,9               | 1,76         | 1,80        | 20,20          |
| 2          |                 |                       | 160               | <b>-3,53</b>       | 91,2               | 2,64         | 0,00        | 21,20          |
| 2          |                 |                       | 200               | <b>-9,39</b>       | 92,8               | 3,79         | 0,00        | 25,00          |
| 3          | 4283            | 4288                  |                   |                    |                    |              |             |                |
| 3          |                 |                       | 20                | <b>30,35</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 3          |                 |                       | 25                | <b>26,47</b>       | 68,5               | 0,09         | 5,40        | 8,40           |
| 3          |                 |                       | 32                | <b>24,03</b>       | 74,0               | 0,13         | 5,20        | 10,80          |
| 3          |                 |                       | 40                | <b>21,84</b>       | 77,5               | 0,21         | 5,00        | 11,40          |
| 3          |                 |                       | 50                | <b>20,55</b>       | 82,6               | 0,30         | 4,70        | 13,00          |
| 3          |                 |                       | 63                | <b>13,68</b>       | 83,9               | 0,47         | 4,30        | 16,60          |
| 3          |                 |                       | 80                | <b>8,87</b>        | 86,7               | 0,69         | 3,70        | 19,70          |
| 3          |                 |                       | 100               | <b>7,58</b>        | 91,4               | 1,07         | 3,00        | 21,20          |
| 3          |                 |                       | 125               | <b>2,32</b>        | 89,9               | 1,63         | 1,80        | 20,20          |
| 3          |                 |                       | 160               | <b>-2,69</b>       | 91,2               | 2,44         | 0,00        | 21,20          |
| 3          |                 |                       | 200               | <b>-8,46</b>       | 92,8               | 3,52         | 0,00        | 25,00          |
| 4          | 4053            | 4058                  |                   |                    |                    |              |             |                |
| 4          |                 |                       | 20                | <b>30,83</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 4          |                 |                       | 25                | <b>26,95</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 4          |                 |                       | 32                | <b>24,51</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 4          |                 |                       | 40                | <b>22,33</b>       | 77,5               | 0,20         | 5,00        | 11,40          |
| 4          |                 |                       | 50                | <b>21,05</b>       | 82,6               | 0,28         | 4,70        | 13,00          |
| 4          |                 |                       | 63                | <b>14,19</b>       | 83,9               | 0,45         | 4,30        | 16,60          |
| 4          |                 |                       | 80                | <b>9,38</b>        | 86,7               | 0,65         | 3,70        | 19,70          |
| 4          |                 |                       | 100               | <b>8,12</b>        | 91,4               | 1,01         | 3,00        | 21,20          |
| 4          |                 |                       | 125               | <b>2,89</b>        | 89,9               | 1,54         | 1,80        | 20,20          |
| 4          |                 |                       | 160               | <b>-2,08</b>       | 91,2               | 2,31         | 0,00        | 21,20          |
| 4          |                 |                       | 200               | <b>-7,79</b>       | 92,8               | 3,33         | 0,00        | 25,00          |
| 5          | 3616            | 3622                  |                   |                    |                    |              |             |                |
| 5          |                 |                       | 20                | <b>31,82</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 5          |                 |                       | 25                | <b>27,95</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 5          |                 |                       | 32                | <b>25,51</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 5          |                 |                       | 40                | <b>23,34</b>       | 77,5               | 0,18         | 5,00        | 11,40          |
| 5          |                 |                       | 50                | <b>22,07</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 5          |                 |                       | 63                | <b>15,22</b>       | 83,9               | 0,40         | 4,30        | 16,60          |
| 5          |                 |                       | 80                | <b>10,44</b>       | 86,7               | 0,58         | 3,70        | 19,70          |
| 5          |                 |                       | 100               | <b>9,21</b>        | 91,4               | 0,91         | 3,00        | 21,20          |
| 5          |                 |                       | 125               | <b>4,04</b>        | 89,9               | 1,38         | 1,80        | 20,20          |
| 5          |                 |                       | 160               | <b>-0,84</b>       | 91,2               | 2,06         | 0,00        | 21,20          |
| 5          |                 |                       | 200               | <b>-6,45</b>       | 92,8               | 2,97         | 0,00        | 25,00          |
| 6          | 3947            | 3954                  |                   |                    |                    |              |             |                |
| 6          |                 |                       | 20                | <b>31,06</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 6          |                 |                       | 25                | <b>27,18</b>       | 68,5               | 0,08         | 5,40        | 8,40           |
| 6          |                 |                       | 32                | <b>24,74</b>       | 74,0               | 0,12         | 5,20        | 10,80          |
| 6          |                 |                       | 40                | <b>22,56</b>       | 77,5               | 0,20         | 5,00        | 11,40          |
| 6          |                 |                       | 50                | <b>21,28</b>       | 82,6               | 0,28         | 4,70        | 13,00          |
| 6          |                 |                       | 63                | <b>14,42</b>       | 83,9               | 0,43         | 4,30        | 16,60          |
| 6          |                 |                       | 80                | <b>9,63</b>        | 86,7               | 0,63         | 3,70        | 19,70          |
| 6          |                 |                       | 100               | <b>8,37</b>        | 91,4               | 0,99         | 3,00        | 21,20          |
| 6          |                 |                       | 125               | <b>3,16</b>        | 89,9               | 1,50         | 1,80        | 20,20          |
| 6          |                 |                       | 160               | <b>-1,79</b>       | 91,2               | 2,25         | 0,00        | 21,20          |
| 6          |                 |                       | 200               | <b>-7,48</b>       | 92,8               | 3,24         | 0,00        | 25,00          |
| 7          | 3495            | 3502                  |                   |                    |                    |              |             |                |
| 7          |                 |                       | 20                | <b>32,11</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 7          |                 |                       | 25                | <b>28,24</b>       | 68,5               | 0,07         | 5,40        | 8,40           |
| 7          |                 |                       | 32                | <b>25,81</b>       | 74,0               | 0,11         | 5,20        | 10,80          |
| 7          |                 |                       | 40                | <b>23,64</b>       | 77,5               | 0,18         | 5,00        | 11,40          |

To be continued on next page...

## DECIBEL - Detailed results

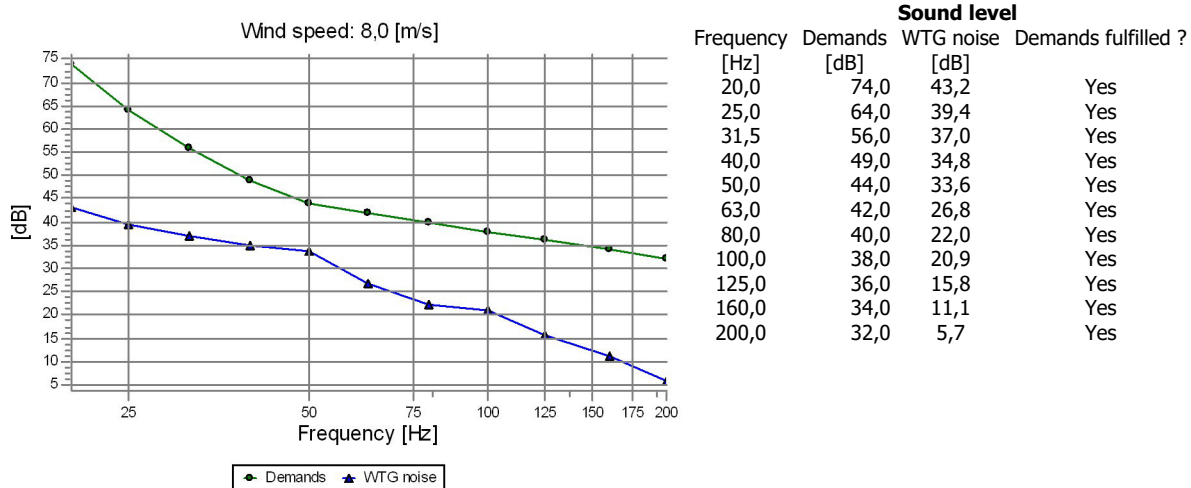
**Calculation:** MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s

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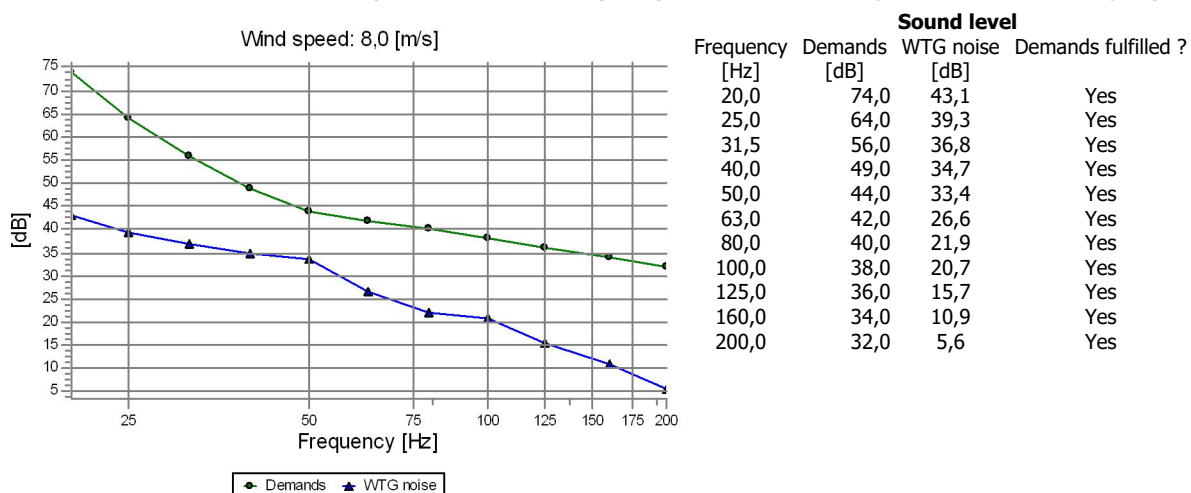
| <b>WTG</b> |                 |                       |                   |                    |                    |              |             |                |
|------------|-----------------|-----------------------|-------------------|--------------------|--------------------|--------------|-------------|----------------|
| No.        | Distance<br>[m] | Sound distance<br>[m] | Frequency<br>[Hz] | Calculated<br>[dB] | LwA,ref<br>[dB(A)] | Aatm<br>[dB] | Agr<br>[dB] | Lsigma<br>[dB] |
| 7          | 2523            | 2532                  | 50                | <b>22,37</b>       | 82,6               | 0,25         | 4,70        | 13,00          |
| 7          |                 |                       | 63                | <b>15,53</b>       | 83,9               | 0,39         | 4,30        | 16,60          |
| 7          |                 |                       | 80                | <b>10,75</b>       | 86,7               | 0,56         | 3,70        | 19,70          |
| 7          |                 |                       | 100               | <b>9,54</b>        | 91,4               | 0,88         | 3,00        | 21,20          |
| 7          |                 |                       | 125               | <b>4,38</b>        | 89,9               | 1,33         | 1,80        | 20,20          |
| 7          |                 |                       | 160               | <b>-0,48</b>       | 91,2               | 2,00         | 0,00        | 21,20          |
| 7          |                 |                       | 200               | <b>-6,06</b>       | 92,8               | 2,87         | 0,00        | 25,00          |
| 8          |                 |                       | 20                | <b>34,93</b>       | 64,5               | 0,00         | 5,60        | 6,60           |
| 8          |                 |                       | 25                | <b>31,08</b>       | 68,5               | 0,05         | 5,40        | 8,40           |
| 8          |                 |                       | 32                | <b>28,66</b>       | 74,0               | 0,08         | 5,20        | 10,80          |
| 8          |                 |                       | 40                | <b>26,51</b>       | 77,5               | 0,13         | 5,00        | 11,40          |
| 8          |                 |                       | 50                | <b>25,25</b>       | 82,6               | 0,18         | 4,70        | 13,00          |
| 8          |                 |                       | 63                | <b>18,45</b>       | 83,9               | 0,28         | 4,30        | 16,60          |
| 8          |                 |                       | 80                | <b>13,73</b>       | 86,7               | 0,41         | 3,70        | 19,70          |
| 8          |                 |                       | 100               | <b>12,60</b>       | 91,4               | 0,63         | 3,00        | 21,20          |
| 8          |                 |                       | 125               | <b>7,57</b>        | 89,9               | 0,96         | 1,80        | 20,20          |
| 8          |                 |                       | 160               | <b>2,89</b>        | 91,2               | 1,44         | 0,00        | 21,20          |
| 8          |                 |                       | 200               | <b>-2,44</b>       | 92,8               | 2,08         | 0,00        | 25,00          |
| Sum        |                 |                       | 20                | <b>40,63</b>       |                    |              |             |                |
| Sum        |                 |                       | 25                | <b>36,76</b>       |                    |              |             |                |
| Sum        |                 |                       | 32                | <b>34,32</b>       |                    |              |             |                |
| Sum        |                 |                       | 40                | <b>32,15</b>       |                    |              |             |                |
| Sum        |                 |                       | 50                | <b>30,87</b>       |                    |              |             |                |
| Sum        |                 |                       | 63                | <b>24,03</b>       |                    |              |             |                |
| Sum        |                 |                       | 80                | <b>19,25</b>       |                    |              |             |                |
| Sum        |                 |                       | 100               | <b>18,02</b>       |                    |              |             |                |
| Sum        |                 |                       | 125               | <b>12,86</b>       |                    |              |             |                |
| Sum        |                 |                       | 160               | <b>7,98</b>        |                    |              |             |                |
| Sum        |                 |                       | 200               | <b>2,40</b>        |                    |              |             |                |

## DECIBEL - Detailed results, graphic

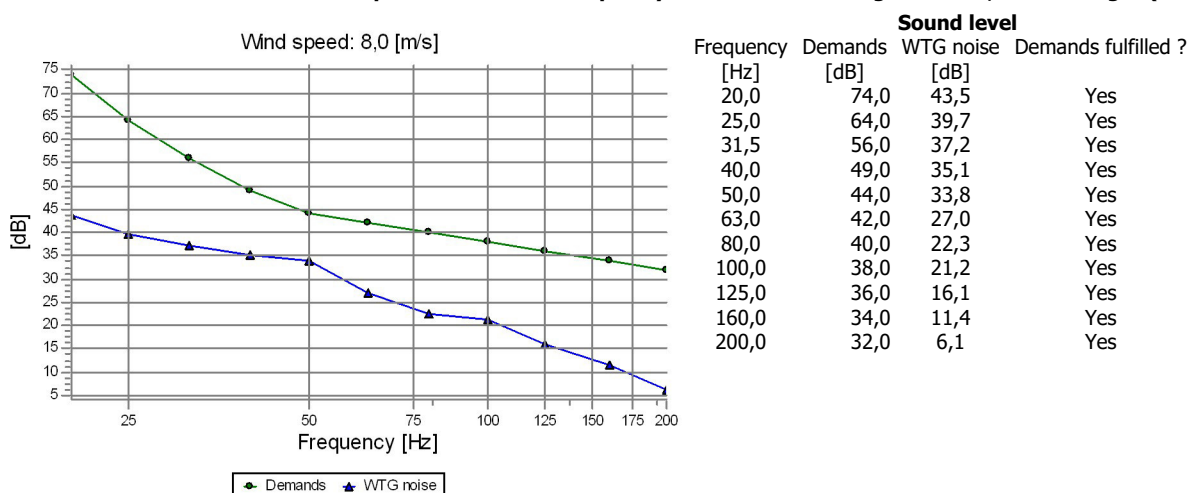
**Calculation:** MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s  
**HH01 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (HH01)**



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



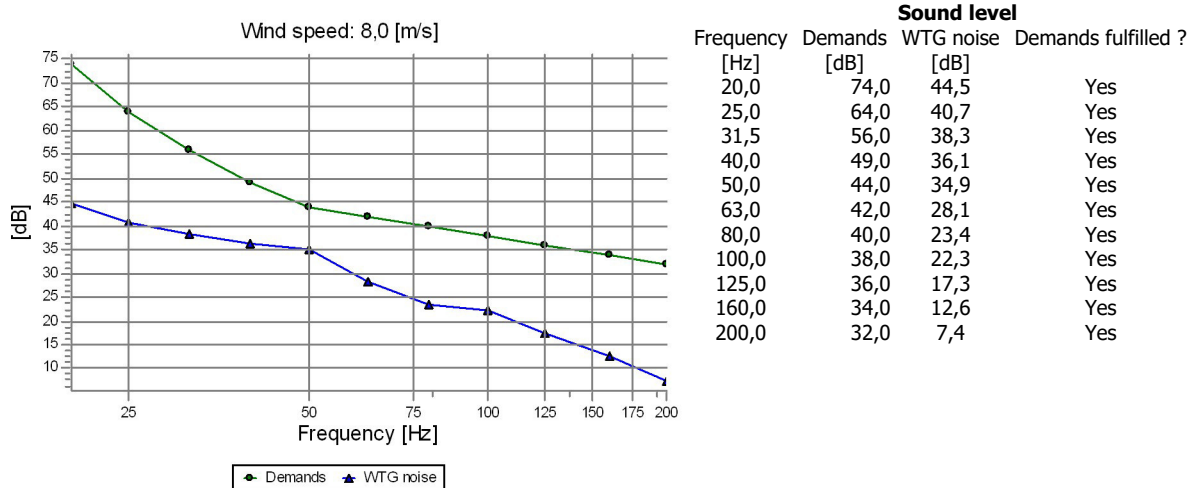
### RH01 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH01)



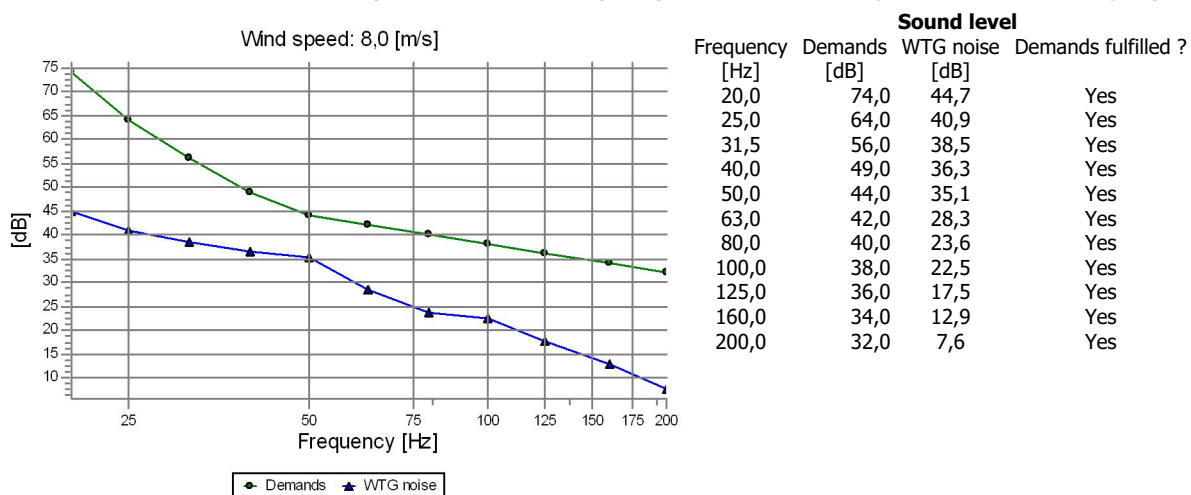


## DECIBEL - Detailed results, graphic

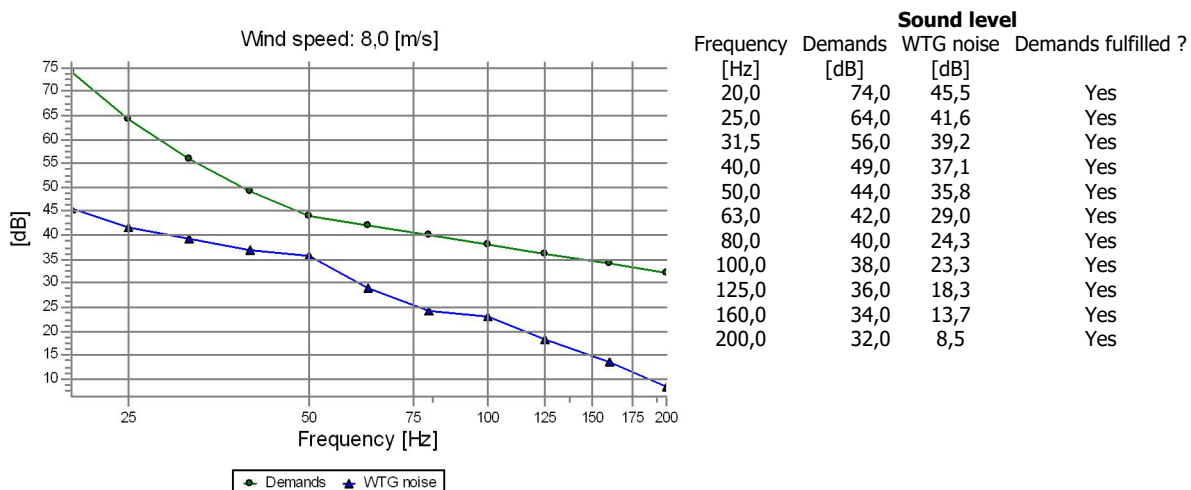
**Calculation:** MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s  
**RH02 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH02)**



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

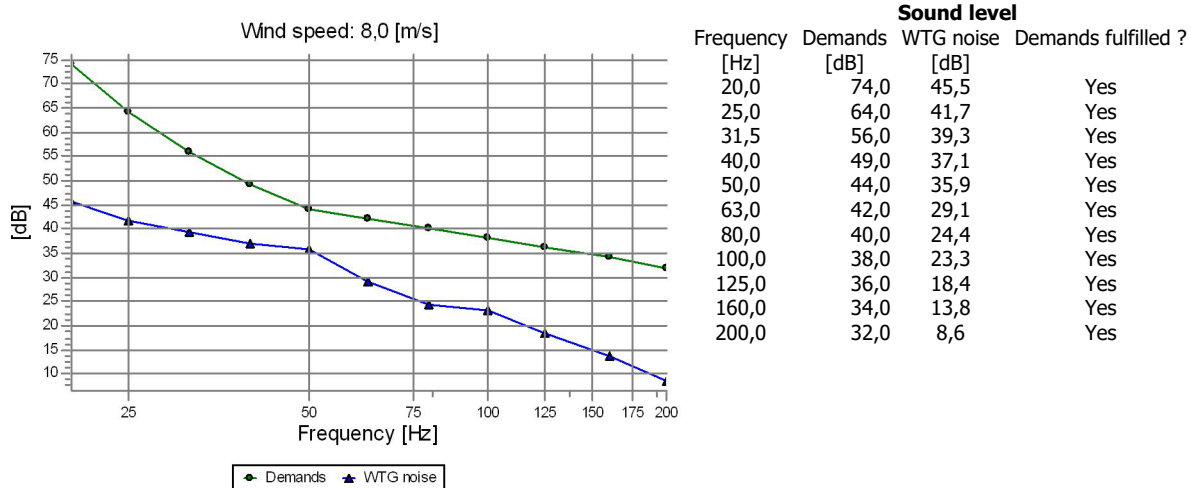


### RH04 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH04)

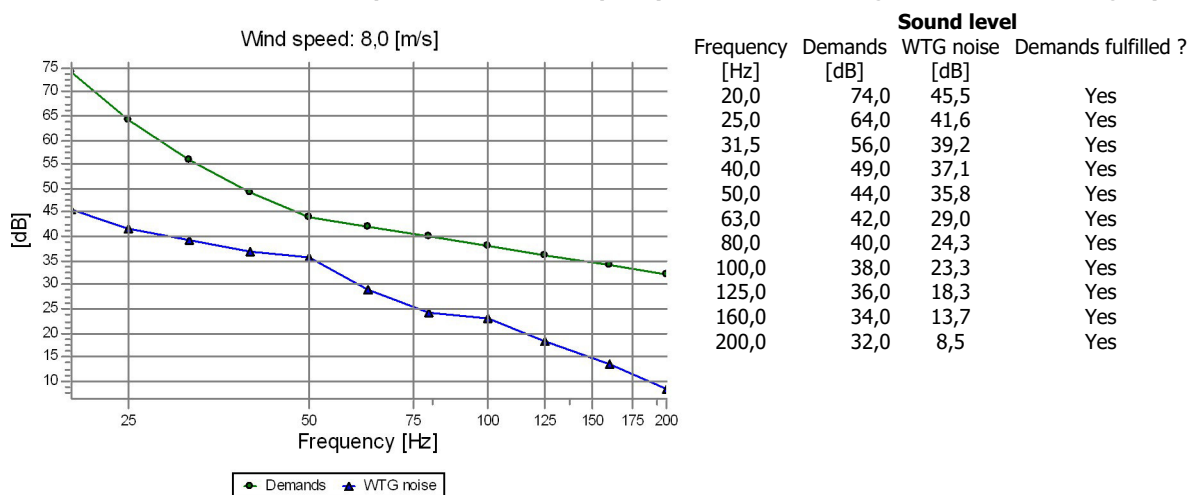


## DECIBEL - Detailed results, graphic

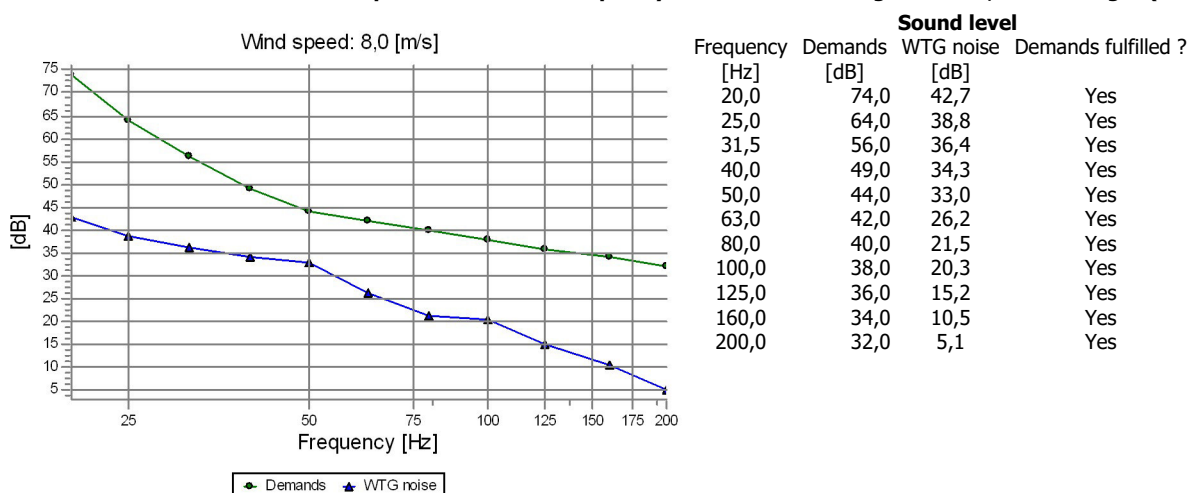
**Calculation:** MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s  
**RH05 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH05)**



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

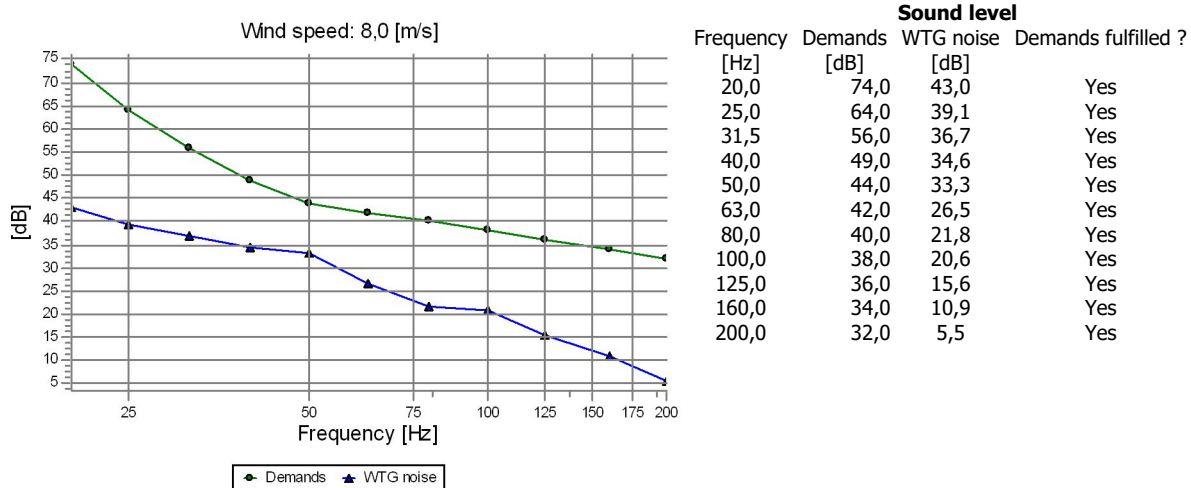


### RH07 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH07)

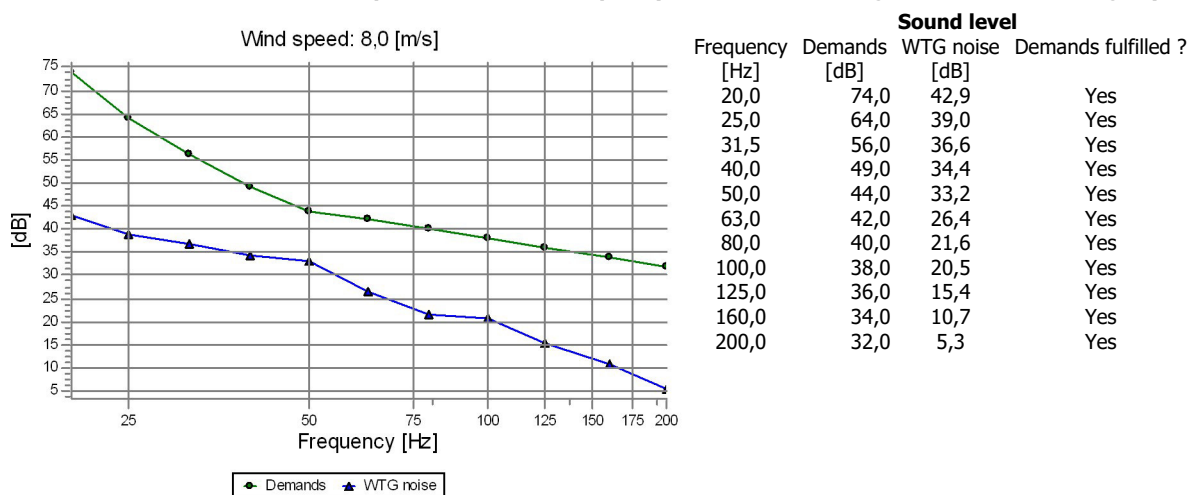


## DECIBEL - Detailed results, graphic

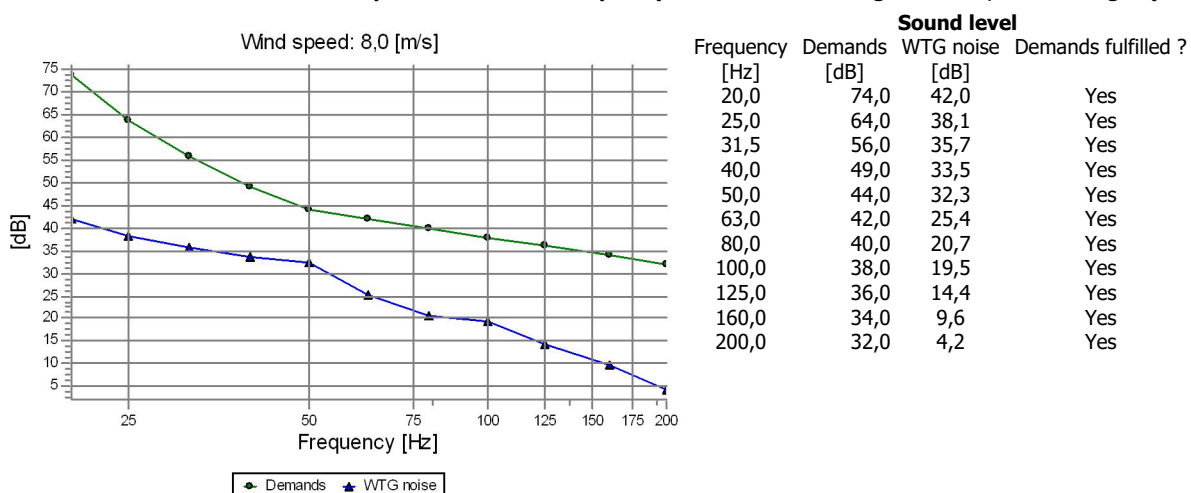
**Calculation:** MP Proposal, 8xF180 @210m, expected 1-3 octave band performance, LF indoor **Noise calculation model:** Finland Low frequency 8,0 m/s  
**RH08 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH08)**



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

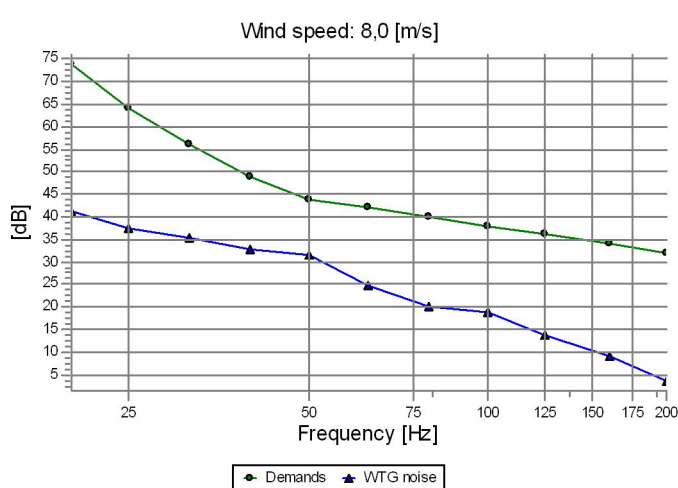


### RH10 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH10)



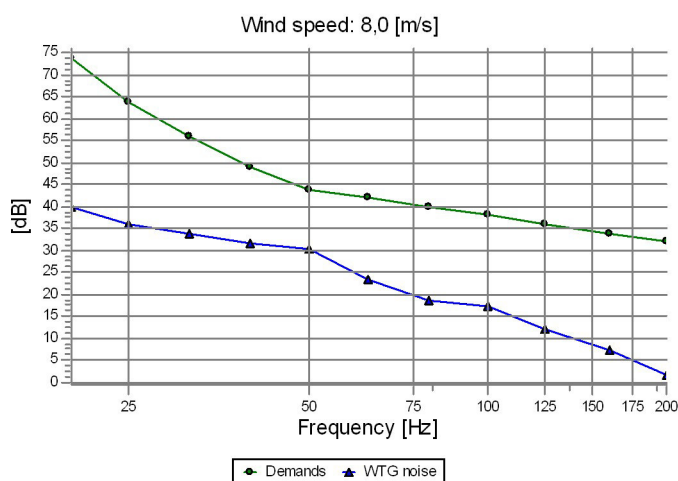
## DECIBEL - Detailed results, graphic

**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 - Residential health guide 2003, indoor - night (RH11)**



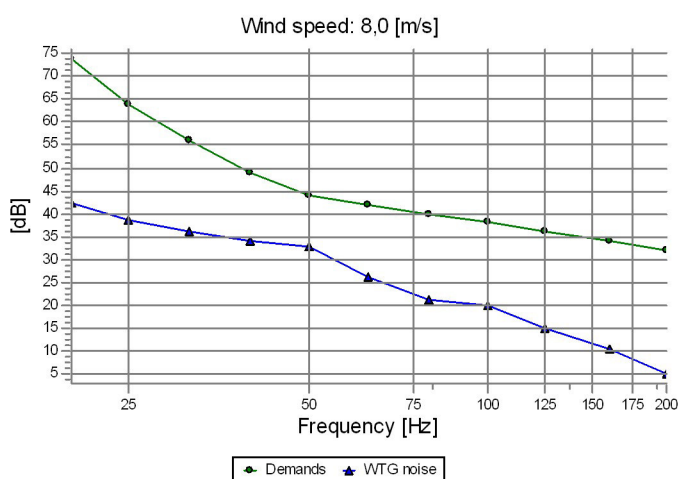
| Sound level    |              |                |                     |
|----------------|--------------|----------------|---------------------|
| Frequency [Hz] | Demands [dB] | WTG noise [dB] | Demands fulfilled ? |
| 20,0           | 74,0         | 41,5           | Yes                 |
| 25,0           | 64,0         | 37,6           | Yes                 |
| 31,5           | 56,0         | 35,2           | Yes                 |
| 40,0           | 49,0         | 33,0           | Yes                 |
| 50,0           | 44,0         | 31,7           | Yes                 |
| 63,0           | 42,0         | 24,9           | Yes                 |
| 80,0           | 40,0         | 20,1           | Yes                 |
| 100,0          | 38,0         | 18,9           | Yes                 |
| 125,0          | 36,0         | 13,8           | Yes                 |
| 160,0          | 34,0         | 9,0            | Yes                 |
| 200,0          | 32,0         | 3,5            | Yes                 |

### RH12 Noise sensitive point: Finnish low frequency - Residential 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         | 36,1           | Yes                 |
| 31,5           | 56,0         | 33,6           | Yes                 |
| 40,0           | 49,0         | 31,5           | Yes                 |
| 50,0           | 44,0         | 30,2           | Yes                 |
| 63,0           | 42,0         | 23,3           | Yes                 |
| 80,0           | 40,0         | 18,5           | Yes                 |
| 100,0          | 38,0         | 17,3           | Yes                 |
| 125,0          | 36,0         | 12,1           | Yes                 |
| 160,0          | 34,0         | 7,1            | Yes                 |
| 200,0          | 32,0         | 1,5            | Yes                 |

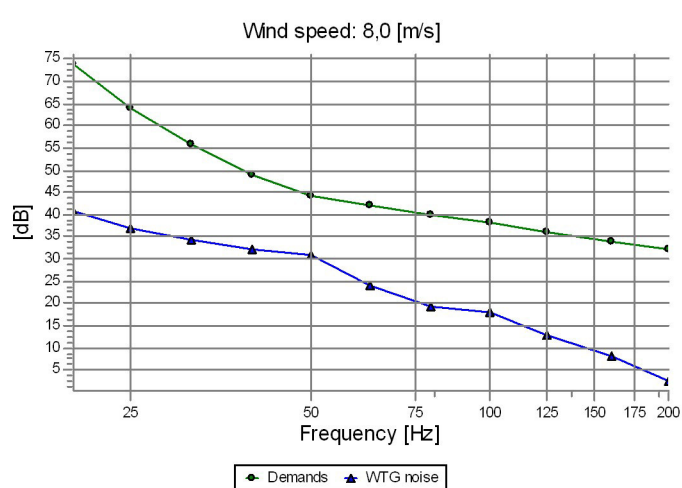
### RH13 Noise sensitive point: Finnish low frequency - Residential health guide 2003, indoor - night (RH13)



| 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                 |

## 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 - Residential 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         | 36,8           | 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         | 12,9           | Yes                 |
| 160,0          | 34,0         | 8,0            | Yes                 |
| 200,0          | 32,0         | 2,4            | Yes                 |

## 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 | 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 |
|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
| [dB]    | [dB]    | [dB]    | [dB]    | [dB]    | [dB]    | [dB]    | [dB]     | [dB]     | [dB]     | [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  | 9.7.2019    | USER    | 31.3.2021 7.59 |
| assuming N163 5.7 MW, without serrations |             |         |                |

| Status       | Hub height | Wind speed | LWA,ref | 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 |
|--------------|------------|------------|---------|---------|---------|---------|---------|---------|---------|---------|----------|----------|----------|----------|
|              | [m]        | [m/s]      | [dB(A)] | [dB]    | [dB]    | [dB]    | [dB]    | [dB]    | [dB]    | [dB]    | [dB]     | [dB]     | [dB]     | [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 - Residential health guide 2003, indoor - night**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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 - Residential health guide 2003, indoor - night**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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



## 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 - Residential health guide 2003, indoor - ni**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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 - Residential health guide 2003, indoor - ni**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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 - Residential health guide 2003, indoor - ni**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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 - Residential health guide 2003, indoor - ni**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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 - Residential health guide 2003, indoor - ni**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

**Emission 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 - Residential health guide 2003, indoor - ni**

**Predefined calculation standard:** Residential health guide 2003, indoor - night

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

**Uncertainty margin:** Use default value from calculation model

### Noise demand:

## 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 - Residential 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 - Residential 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 - Residential 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 - Residential 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 - Residential 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 - Residential 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

**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 - Residential 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 - Residential 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**



## 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