

Project:

**Elektrownie wiatrowe Galewice**

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2015-03-07 09:10 / 1

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**ENVO**

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Calculated:

2015-03-07 09:10/2.9.285

## DECIBEL - Main Result

**Calculation:** Analiza akustyczna wariant proponowany

### Noise calculation model:

ISO 9613-2 General

### Wind speed:

10,0 m/s

### Ground attenuation:

General, Ground factor: 0,3

### Meteorological coefficient, C0:

0,0 dB

### Type of demand in calculation:

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

### Noise values in calculation:

All noise values are mean values (Lwa) (Normal)

### Pure tones:

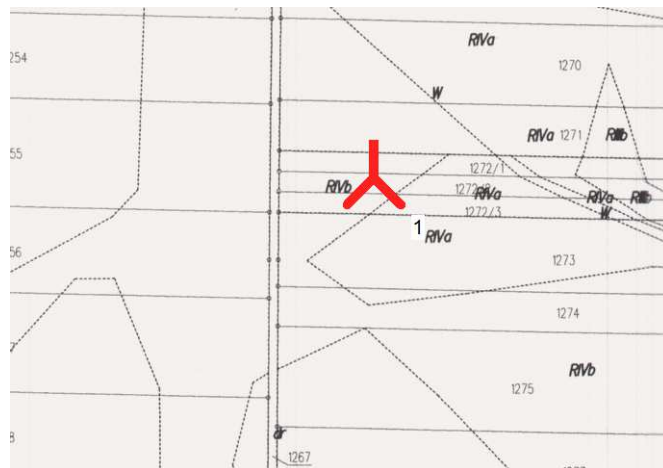
Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m Allow override of model height with height from NSA object

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

0,0 dB(A)



Scale 1:5 000

New WTG

Noise sensitive area

## WTGs

| Geo [deg,min,sec]-WGS84 | Longitude         | Latitude           | Z [m] | Row data/Description | WTG type |           |                  |                   | Noise data         |                |         |       |                  |                 |            |
|-------------------------|-------------------|--------------------|-------|----------------------|----------|-----------|------------------|-------------------|--------------------|----------------|---------|-------|------------------|-----------------|------------|
|                         |                   |                    |       |                      | Valid    | Manufact. | Type-generator   | Power, rated [kW] | Rotor diameter [m] | Hub height [m] | Creator | Name  | Wind speed [m/s] | LwA,ref [dB(A)] | Pure tones |
| 1                       | 18°15'49,48" East | 51°20'08,14" North | 162,0 | E1                   | No       | ENERCON   | E-58/10.58-1 000 | 1 000             | 58,0               | 80,0           | USER    | Level | 10,0             | 100,0           | 0 dB h     |
| 2                       | 18°15'25,27" East | 51°19'57,30" North | 164,6 | E2                   | No       | ENERCON   | E-58/10.58-1 000 | 1 000             | 58,0               | 80,0           | USER    | Level | 10,0             | 100,0           | 0 dB h     |

h) Generic octave distribution used

## Calculation Results

### Sound Level

| Noise sensitive area No. | Name | Geo [deg,min,sec]-WGS84 |                    | Z [m] | Imission height [m] | Demands Noise [dB(A)] | Sound Level From WTGs [dB(A)] | Distance to noise demand [m] | Demands fulfilled ? Noise |
|--------------------------|------|-------------------------|--------------------|-------|---------------------|-----------------------|-------------------------------|------------------------------|---------------------------|
|                          |      | Longitude               | Latitude           |       |                     |                       |                               |                              |                           |
| A                        | RN1  | 18°16'05,51" East       | 51°20'11,68" North | 163,0 | 4,0                 | 40,0                  | 39,6                          | 16                           | Yes                       |
| B                        | RN2  | 18°16'09,36" East       | 51°20'12,85" North | 163,4 | 4,0                 | 40,0                  | 37,6                          | 98                           | Yes                       |
| C                        | RN3  | 18°16'07,96" East       | 51°20'12,87" North | 163,0 | 4,0                 | 40,0                  | 38,1                          | 74                           | Yes                       |
| D                        | RN4  | 18°16'07,84" East       | 51°20'12,89" North | 163,0 | 4,0                 | 40,0                  | 38,2                          | 72                           | Yes                       |
| E                        | RN5  | 18°16'07,41" East       | 51°20'14,53" North | 164,1 | 4,0                 | 40,0                  | 37,8                          | 87                           | Yes                       |
| F                        | RH6  | 18°16'07,71" East       | 51°20'13,60" North | 163,0 | 4,0                 | 40,0                  | 38,0                          | 79                           | Yes                       |

### Distances (m)

| WTG |         |
|-----|---------|
| NSA | 1 2     |
| A   | 329 897 |
| B   | 411 980 |
| C   | 386 956 |
| D   | 385 955 |
| E   | 399 974 |
| F   | 391 964 |

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**DECIBEL - Detailed results****Calculation:** Analiza akustyczna wariant proponowany **Noise calculation model:** ISO 9613-2 General 10,0 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: A RN1**

| WTG |              | Wind speed: 10,0 m/s |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m]   | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 329          | 337                  | <b>39,15</b>       | 100,0           | 0,00    | 61,56     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 897          | 900                  | <b>29,18</b>       | 100,0           | 0,00    | 70,09     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| Sum | 39,57        |                      |                    |                 |         |           |           |          |           |            |        |           |

- Data undefined due to calculation with octave data

**Noise sensitive area: B RN2**

| WTG |              | Wind speed: 10,0 m/s |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m]   | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 411          | 418                  | <b>37,05</b>       | 100,0           | 0,00    | 63,43     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 980          | 983                  | <b>28,24</b>       | 100,0           | 0,00    | 70,85     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| Sum | 37,59        |                      |                    |                 |         |           |           |          |           |            |        |           |

- Data undefined due to calculation with octave data

**Noise sensitive area: C RN3**

| WTG |              | Wind speed: 10,0 m/s |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m]   | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 386          | 394                  | <b>37,65</b>       | 100,0           | 0,00    | 62,90     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 956          | 959                  | <b>28,50</b>       | 100,0           | 0,00    | 70,64     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| Sum | 38,14        |                      |                    |                 |         |           |           |          |           |            |        |           |

- Data undefined due to calculation with octave data

**Noise sensitive area: D RN4**

| WTG |              | Wind speed: 10,0 m/s |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m]   | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 385          | 392                  | <b>37,69</b>       | 100,0           | 0,00    | 62,86     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 955          | 958                  | <b>28,51</b>       | 100,0           | 0,00    | 70,63     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| Sum | 38,19        |                      |                    |                 |         |           |           |          |           |            |        |           |

- Data undefined due to calculation with octave data

**Noise sensitive area: E RN5**

| WTG |              | Wind speed: 10,0 m/s |                    |                 |         |           |           |          |           |            |        |           |
|-----|--------------|----------------------|--------------------|-----------------|---------|-----------|-----------|----------|-----------|------------|--------|-----------|
| No. | Distance [m] | Sound distance [m]   | Calculated [dB(A)] | LwA,ref [dB(A)] | Dc [dB] | Adiv [dB] | Aatm [dB] | Agr [dB] | Abar [dB] | Amisc [dB] | A [dB] | Cmet [dB] |
| 1   | 399          | 406                  | <b>37,33</b>       | 100,0           | 0,00    | 63,18     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| 2   | 974          | 977                  | <b>28,30</b>       | 100,0           | 0,00    | 70,80     | -         | -        | 0,00      | 0,00       | -      | 0,00      |
| Sum | 37,84        |                      |                    |                 |         |           |           |          |           |            |        |           |

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**DECIBEL - Detailed results****Calculation:** Analiza akustyczna wariant proponowany **Noise calculation model:** ISO 9613-2 General 10,0 m/s**Noise sensitive area: F RH6****WTG****Wind speed: 10,0 m/s**

| No. | Distance<br>[m] | Sound distance<br>[m] | 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] | Cmet<br>[dB] |
|-----|-----------------|-----------------------|-----------------------|--------------------|------------|--------------|--------------|-------------|--------------|---------------|-----------|--------------|
| 1   | 391             | 398                   | <b>37,53</b>          | 100,0              | 0,00       | 63,01        | -            | -           | 0,00         | 0,00          | -         | 0,00         |
| 2   | 964             | 967                   | <b>28,41</b>          | 100,0              | 0,00       | 70,71        | -            | -           | 0,00         | 0,00          | -         | 0,00         |

Sum 38,03

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**DECIBEL - Assumptions for noise calculation****Calculation:** Analiza akustyczna wariant proponowany **Noise calculation model:** ISO 9613-2 General 10,0 m/s**Noise calculation model:**

ISO 9613-2 General

**Wind speed:**

10,0 m/s

**Ground attenuation:**

General, Ground factor: 0,3

**Meteorological coefficient, C0:**

0,0 dB

**Type of demand in calculation:**

1: WTG noise is compared to demand (DK, DE, SE, NL etc.)

**Noise values in calculation:**

All noise values are mean values (Lwa) (Normal)

**Pure tones:**

Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m Allow override of model height with height from NSA object

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

0,0 dB(A)

**Octave data required**

Air absorption

|         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|
| 63      | 125     | 250     | 500     | 1 000   | 2 000   | 4 000   | 8 000   |
| [dB/km] | [dB/km] | [dB/km] | [dB/km] | [dB/km] | [dB/km] | [dB/km] | [dB/km] |
| 0,1     | 0,4     | 1,0     | 1,9     | 3,7     | 9,7     | 32,8    | 117,0   |

**WTG:** ENERCON E-58/10.58 1000 58.0 !O!**Noise:** Level

Source Source/Date Creator Edited

Enercon 2015-02-22 USER 2015-02-22 16:17

Noise data at 10m/s are dated from 05-2002.

| Status       | Wind speed<br>[m/s] | LwA,ref<br>[dB(A)] | Pure tones | Octave data  |      |      |      |      |      |      |      |      |      |
|--------------|---------------------|--------------------|------------|--------------|------|------|------|------|------|------|------|------|------|
|              |                     |                    |            |              | 63   | 125  | 250  | 500  | 1000 | 2000 | 4000 | 8000 |      |
|              |                     |                    |            | [dB]         | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] | [dB] |
| From Windcat | 10,0                | 100,0              | No         | Generic data | 81,6 | 88,6 | 92,0 | 94,6 | 94,4 | 91,5 | 86,7 | 77,2 |      |

**NSA:** RN1-A**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40,0 dB(A)**Distance demand:****NSA:** RN2-B**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40,0 dB(A)**Distance demand:****NSA:** RN3-C**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40,0 dB(A)**Distance demand:****NSA:** RN4-D**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 40,0 dB(A)**Distance demand:**

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## **DECIBEL - Assumptions for noise calculation**

**Calculation:** Analiza akustyczna wariant proponowany **Noise calculation model:** ISO 9613-2 General 10,0 m/s

**NSA:** RN5-E

**Predefined calculation standard:**

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

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

**Distance demand:**

**NSA:** RH6-F

**Predefined calculation standard:**

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

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

**Distance demand:**