

Project:

Borkowo-Falenta skumulowane

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Calculated:

2014-03-25 07:46/2.8.552

DECIBEL - Main Result**Calculation:** G97 90m skumulowane poprawione**Noise calculation model:**

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,9

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:

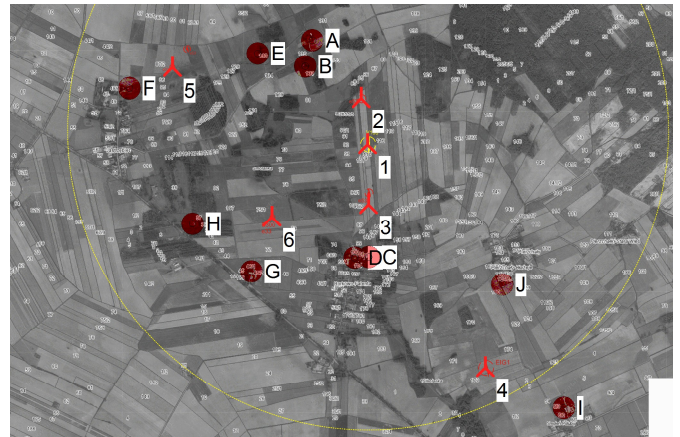
Pure and Impulse tone penalty are added to WTG source noise

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

4,0 m Don't 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 1:50 000

New WTG

Noise sensitive area

WTGs

Geo [deg,min,sec]-WGS84 Longitude	Latitude	Z [m]	Row data/Description	WTG type		Type-generator	Power rated [kW]	Rotor diameter [m]	Hub height [m]	Noise data		Wind speed [m/s]	Status	LwA,ref [dB(A)]	Pure tones
				Valid	Manufact.					Creator	Name				
1 20°45'46,64" East	53°05'30,84" North	159,0	GAMESA G97 2000 97.0 ! hub: 90,...	Yes	GAMESA	G97-2 000	2 000	97,0	90,0	EMD	Level 0 - Estimated - - 07-2012	8,0	User value	105,9	0 dB h
2 20°45'44,72" East	53°05'40,77" North	160,0	ENERCON E-53 800 53.0 ! hub: 73,...	Yes	ENERCON	E-53-800	800	53,0	73,0	EMD	Level 0 - man.spec. - Enercon - 05/2010	8,0	User value	102,5	0 dB h
3 20°45'46,47" East	53°05'17,91" North	152,8	ENERCON E-53 800 53.0 ! hub: 73,...	Yes	ENERCON	E-53-800	800	53,0	73,0	EMD	Level 1 - man.spec. - 750kW/Rev.1.0 - 09/2010	8,0	User value	101,0	0 dB h
4 20°46'26,67" East	53°04'42,31" North	147,1	VESTAS V100-2.0 2000 100.0 ! hub: 49,...	Yes	VESTAS	V100-2.0-2 000	2 000	100,0	120,0	EMD	Level 0 - Mode 0 - - 07-2013	8,0	From other hub height	105,0	0 dB h
5 20°44'37,76" East	53°05'48,25" North	150,4	ENERCON E-33 330 33.4 ! hub: 49,...	Yes	ENERCON	E-33-330	330	33,4	49,9	USER	100 dB	8,0	100,0	0 dB h	
6 20°45'11,94" East	53°05'15,73" North	154,9	ENERCON E-33 330 33.4 ! hub: 49,...	Yes	ENERCON	E-33-330	330	33,4	49,9	USER	100 dB	8,0	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]	Emission height [m]	Demands Noise [dB(A)]	Sound Level From WTGs [dB(A)]	Demands fulfilled ? Noise
		Longitude	Latitude						
A	Noise sensitive point: (1)	20°45'27,86" East	53°05'53,33" North	160,0	4,0	45,0	38,7	Yes	
B	Noise sensitive point: (2)	20°45'25,14" East	53°05'47,78" North	160,0	4,0	45,0	40,3	Yes	
C	Noise sensitive point: (3)	20°45'46,17" East	53°05'06,67" North	150,0	4,0	45,0	40,6	Yes	
D	Noise sensitive point: (4)	20°45'41,13" East	53°05'06,59" North	153,7	4,0	45,0	40,4	Yes	
E	Noise sensitive point: (5)	20°45'08,33" East	53°05'50,76" North	158,3	4,0	45,0	37,2	Yes	
F	Noise sensitive point: (6)	20°44'22,30" East	53°05'44,02" North	150,5	4,0	45,0	38,3	Yes	
G	Noise sensitive point: (7)	20°45'04,13" East	53°05'04,17" North	151,8	4,0	45,0	37,9	Yes	
H	Noise sensitive point: (8)	20°44'43,60" East	53°05'14,66" North	158,5	4,0	45,0	35,7	Yes	
I	Noise sensitive point: (9)	20°46'54,33" East	53°04'33,26" North	140,0	4,0	45,0	36,7	Yes	
J	Noise sensitive point: (10)	20°46'33,42" East	53°05'00,03" North	150,0	4,0	45,0	38,0	Yes	

Distances (m)

NSA	WTG					
	1	2	3	4	5	6
A	778	499	1148	2452	945	1199
B	659	424	1005	2324	881	1020
C	747	1054	347	1065	1808	696
D	756	1058	364	1132	1745	612
E	942	744	1238	2569	574	1085
F	1621	1536	1761	2998	316	1271
G	1142	1360	895	1678	1448	386
H	1275	1394	1174	2162	1044	528
I	2180	2455	1870	586	3439	2313
J	1290	1551	1033	562	2617	1592

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DECIBEL - Detailed results**Calculation:** G97 90m skumulowane poprawione **Noise calculation model:** ISO 9613-2 General 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: A Noise sensitive point: (1)**

WTG		Wind speed: 8,0 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	778	782	34,33	105,8	0,00	68,87	-	-	0,00	0,00	-	0,00
2	499	504	35,60	102,5	0,00	65,04	-	-	0,00	0,00	-	0,00
3	1 148	1 150	25,33	101,0	0,00	72,21	-	-	0,00	0,00	-	0,00
4	2 452	2 454	20,33	105,0	0,00	78,80	-	-	0,00	0,00	-	0,00
5	945	946	26,50	100,0	0,00	70,51	-	-	0,00	0,00	-	0,00
6	1 199	1 200	23,87	100,0	0,00	72,58	-	-	0,00	0,00	-	0,00

Sum 38,74

- Data undefined due to calculation with octave data

Noise sensitive area: B Noise sensitive point: (2)

WTG		Wind speed: 8,0 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	659	664	36,05	105,8	0,00	67,45	-	-	0,00	0,00	-	0,00
2	424	429	37,20	102,5	0,00	63,66	-	-	0,00	0,00	-	0,00
3	1 005	1 007	26,81	101,0	0,00	71,06	-	-	0,00	0,00	-	0,00
4	2 324	2 327	21,00	105,0	0,00	78,33	-	-	0,00	0,00	-	0,00
5	881	882	27,26	100,0	0,00	69,91	-	-	0,00	0,00	-	0,00
6	1 020	1 021	25,66	100,0	0,00	71,18	-	-	0,00	0,00	-	0,00

Sum 40,33

- Data undefined due to calculation with octave data

Noise sensitive area: C Noise sensitive point: (3)

WTG		Wind speed: 8,0 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	747	753	34,73	105,8	0,00	68,54	-	-	0,00	0,00	-	0,00
2	1 054	1 057	27,77	102,5	0,00	71,48	-	-	0,00	0,00	-	0,00
3	347	355	37,59	101,0	0,00	62,00	-	-	0,00	0,00	-	0,00
4	1 065	1 071	30,12	105,0	0,00	71,60	-	-	0,00	0,00	-	0,00
5	1 808	1 809	19,16	100,0	0,00	76,15	-	-	0,00	0,00	-	0,00
6	696	698	29,76	100,0	0,00	67,87	-	-	0,00	0,00	-	0,00

Sum 40,56

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WTG		Wind speed: 8,0 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	756	762	34,61	105,8	0,00	68,64	-	-	0,00	0,00	-	0,00
2	1 058	1 061	27,73	102,5	0,00	71,51	-	-	0,00	0,00	-	0,00
3	364	370	37,18	101,0	0,00	62,36	-	-	0,00	0,00	-	0,00
4	1 132	1 137	29,46	105,0	0,00	72,11	-	-	0,00	0,00	-	0,00
5	1 745	1 746	19,56	100,0	0,00	75,84	-	-	0,00	0,00	-	0,00
6	612	614	31,09	100,0	0,00	66,76	-	-	0,00	0,00	-	0,00
Sum	40,40											

- Data undefined due to calculation with octave data

Noise sensitive area: E Noise sensitive point: (5)

WTG		Wind speed: 8,0 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	942	946	32,29	105,8	0,00	70,51	-	-	0,00	0,00	-	0,00
2	744	747	31,52	102,5	0,00	68,47	-	-	0,00	0,00	-	0,00
3	1 238	1 240	24,48	101,0	0,00	72,87	-	-	0,00	0,00	-	0,00
4	2 569	2 571	19,74	105,0	0,00	79,20	-	-	0,00	0,00	-	0,00
5	574	575	31,76	100,0	0,00	66,20	-	-	0,00	0,00	-	0,00
6	1 085	1 085	24,99	100,0	0,00	71,71	-	-	0,00	0,00	-	0,00
Sum	37,24											

- Data undefined due to calculation with octave data

Noise sensitive area: F Noise sensitive point: (6)

WTG		Wind speed: 8,0 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	1 621	1 624	26,17	105,8	0,00	75,21	-	-	0,00	0,00	-	0,00
2	1 536	1 538	23,51	102,5	0,00	74,74	-	-	0,00	0,00	-	0,00
3	1 761	1 763	20,40	101,0	0,00	75,92	-	-	0,00	0,00	-	0,00
4	2 998	3 000	17,75	105,0	0,00	80,54	-	-	0,00	0,00	-	0,00
5	316	319	37,64	100,0	0,00	61,08	-	-	0,00	0,00	-	0,00
6	1 271	1 272	23,20	100,0	0,00	73,09	-	-	0,00	0,00	-	0,00
Sum	38,34											

- Data undefined due to calculation with octave data

Noise sensitive area: G Noise sensitive point: (7)

WTG		Wind speed: 8,0 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	1 142	1 146	30,17	105,8	0,00	72,18	-	-	0,00	0,00	-	0,00
2	1 360	1 362	24,92	102,5	0,00	73,68	-	-	0,00	0,00	-	0,00
3	895	898	28,06	101,0	0,00	70,06	-	-	0,00	0,00	-	0,00
4	1 678	1 681	24,96	105,0	0,00	75,51	-	-	0,00	0,00	-	0,00
5	1 448	1 448	21,72	100,0	0,00	74,22	-	-	0,00	0,00	-	0,00
6	386	389	35,70	100,0	0,00	62,79	-	-	0,00	0,00	-	0,00
Sum	37,90											

- Data undefined due to calculation with octave data

Noise sensitive area: H Noise sensitive point: (8)

WTG		Wind speed: 8,0 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	1 275	1 278	28,94	105,8	0,00	73,13	-	-	0,00	0,00	-	0,00
2	1 394	1 396	24,63	102,5	0,00	73,90	-	-	0,00	0,00	-	0,00
3	1 174	1 176	25,08	101,0	0,00	72,41	-	-	0,00	0,00	-	0,00
4	2 162	2 165	21,90	105,0	0,00	77,71	-	-	0,00	0,00	-	0,00
5	1 044	1 044	25,41	100,0	0,00	71,38	-	-	0,00	0,00	-	0,00
6	528	530	32,60	100,0	0,00	65,48	-	-	0,00	0,00	-	0,00

WindPRO is developed by EMD International A/S, Niels Jernesvej 10, DK-9220 Aalborg O, Tel. +45 96 35 44 44, Fax +45 96 35 44 46, e-mail: windpro@emd.dk

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DECIBEL - Detailed results**Calculation:** G97 90m skumulowane poprawione **Noise calculation model:** ISO 9613-2 General 8,0 m/s**Noise sensitive area: I Noise sensitive point: (9)**

WTG		Wind speed: 8,0 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	2 180	2 182	22,60	105,8	0,00	77,78	-	-	0,00	0,00	-	0,00
2	2 455	2 457	17,85	102,5	0,00	78,81	-	-	0,00	0,00	-	0,00
3	1 870	1 872	19,68	101,0	0,00	76,45	-	-	0,00	0,00	-	0,00
4	586	599	36,33	105,0	0,00	66,54	-	-	0,00	0,00	-	0,00
5	3 439	3 439	11,36	100,0	0,00	81,73	-	-	0,00	0,00	-	0,00
6	2 313	2 314	16,26	100,0	0,00	78,29	-	-	0,00	0,00	-	0,00
Sum	36,71											

- Data undefined due to calculation with octave data

Noise sensitive area: J Noise sensitive point: (10)

WTG		Wind speed: 8,0 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	1 290	1 293	28,80	105,8	0,00	73,23	-	-	0,00	0,00	-	0,00
2	1 551	1 553	23,40	102,5	0,00	74,82	-	-	0,00	0,00	-	0,00
3	1 033	1 036	26,49	101,0	0,00	71,31	-	-	0,00	0,00	-	0,00
4	562	573	36,78	105,0	0,00	66,16	-	-	0,00	0,00	-	0,00
5	2 617	2 617	14,77	100,0	0,00	79,36	-	-	0,00	0,00	-	0,00
6	1 592	1 592	20,61	100,0	0,00	75,04	-	-	0,00	0,00	-	0,00
Sum	38,02											

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DECIBEL - Assumptions for noise calculation**Calculation:** G97 90m skumulowane poprawione **Noise calculation model:** ISO 9613-2 General 8,0 m/s**Noise calculation model:**

ISO 9613-2 General

Wind speed:

8,0 m/s

Ground attenuation:

General, Ground factor: 0,9

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 Don't 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: GAMESA G97 2000 97.0 !O!**Noise:** Level 0 - Estimated - - 07-2012

Source	Source/Date	Creator	Edited
Manufacturer	2012-07-30	EMD	2013-07-18 10:08

Based on document GD161807-en, Rev.0.

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]	
User value	90,0	8,0	105,8	No	Generic data	87,4	94,4	97,8	100,4	100,2	97,3	92,5	83,0

WTG: ENERCON E-53 800 53.0 !-!**Noise:** Level 0 - man.spec. - Enercon - 05/2010

Source	Source/Date	Creator	Edited
Enercon	2010-05-01	EMD	2012-07-13 16:49

According to specification SIAS-04-SPL E-53 OM I Rev1_0-ger-ger.doc

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]	
User value	73,3	8,0	102,5	No	Generic data	84,1	91,1	94,5	97,1	96,9	94,0	89,2	79,7

WTG: ENERCON E-53 800 53.0 !-!**Noise:** Level 1 - man.spec. - 750kW/Rev.1.0 - 09/2010

Source	Source/Date	Creator	Edited
Enercon	2010-09-01	EMD	2011-01-13 12:29

According to Enercon specification SIAS-04-SPL E-53 red Rev1_0-ger-ger.doc

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]	
User value	73,0	8,0	101,0	No	Generic data	82,6	89,6	93,0	95,6	95,4	92,5	87,7	78,2

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Source	Source/Date	Creator	Edited
Manufacturer	2013-07-12	EMD	2013-08-19 13:48

Based on Document no.: 0035-8703 V02 2013-07-12.

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]	
From other hub height	120,0	8,0	105,0	No	Generic data	86,6	93,6	97,0	99,6	99,4	96,5	91,7	82,2

WTG: ENERCON E-33 330 33.4 !-!**Noise:** 100 dB

Source	Source/Date	Creator	Edited
	2013-12-08	USER	2013-12-08 19:51

Status	Hub height [m]	Wind speed [m/s]	LwA,ref [dB(A)]	Pure tones	Octave data								
					63 [dB]	125 [dB]	250 [dB]	500 [dB]	1000 [dB]	2000 [dB]	4000 [dB]	8000 [dB]	
From Windcat	49,9	8,0	100,0	No	Generic data	81,6	88,6	92,0	94,6	94,4	91,5	86,7	77,2

NSA: Noise sensitive point: (1)-A**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (2)-B**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (3)-C**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (4)-D**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (5)-E**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (6)-F**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:**

Project:

Borkowo-Falenta skumulowane

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ENERKO / biuro@enerko.pl

Calculated:

2014-03-25 07:46/2.8.552

DECIBEL - Assumptions for noise calculation**Calculation:** G97 90m skumulowane poprawione **Noise calculation model:** ISO 9613-2 General 8,0 m/s**NSA:** Noise sensitive point: (7)-G**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (8)-H**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (9)-I**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:****NSA:** Noise sensitive point: (10)-J**Predefined calculation standard:****Imission height(a.g.l.):** Use standard value from calculation model**Noise demand:** 45,0 dB(A)**Distance demand:**

Project:

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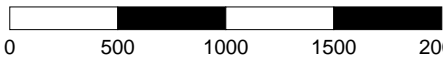
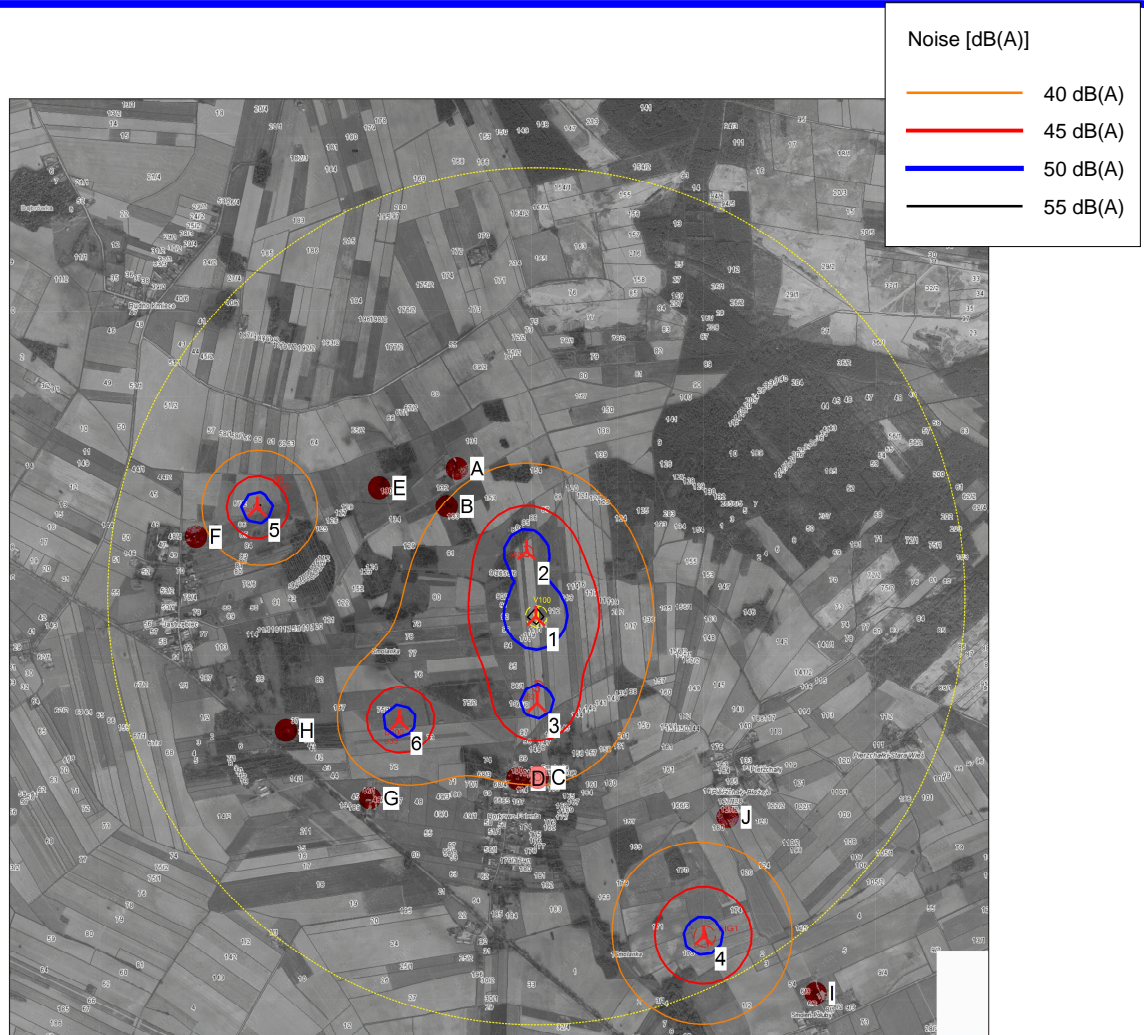
ENERKO / biuro@enerko.pl

Calculated:

2014-03-25 07:46/2.8.552

DECIBEL - Map 8,0 m/s

Calculation: G97 90m skumulowane poprawione Noise calculation model: ISO 9613-2 General 8,0 m/s



Map: mapa do 2 skumulowanego , Print scale 1:35 000, Map center Geo WGS84 East: 20°45'32,29" East North: 53°05'15,28" North

New WTG

Noise sensitive area

Noise calculation model: ISO 9613-2 General. Wind speed: 8,0 m/s

Height above sea level from active line object