

Project: **Kappel Noise 11 2008** Description: **Map shows noise by 6 m/s windspeed**

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 Licensed user: **DONG Energy**  
 Kraftværksvej 53  
 DK-7000 Fredericia  
 79 23 33 33  
 Vindkraftanalyse/PAUBS  
 Calculated: 03/02/2009 13:10/2.6.0.235

**DECIBEL - Main Result**

**Calculation:** Noise 0209 - 7 WTG 5.0-8.0 MW

**DANISH RULES FOR NOISE CALCULATION.**

The calculation is based on the "Bekendtgørelse nr. 1518 af 14. dec 2006" from the Danish Environmental Agency.

The noise impact from WTGs are not allowed to exceed the following limits: (Wind speeds in 10 m height)

- 1) At outdoor areas maximum 15 m from neighbor settlements in the open land.
    - a) 44 db(A) at wind speed 8 m/s.
    - b) 42 db(A) at wind speed 6 m/s.
  - 2) At outdoor areas in residential or recreational areas.
    - a) 39 db(A) at wind speed 8 m/s in residential areas.
    - b) 37 db(A) at wind speed 6 m/s in residential areas.
- If a WTG has pure tones in the noise emission, a penalty of 5 dB is added.



Scale 1:50,000  
 New WTG Noise sensitive area

**WTGs**

S34Neg				WTG type			Noise data			First wind speed	LwaRef	Last wind speed	LwaRef	Pure tones	Octave data		
East	North	Z	Row data/Description	Valid	Manufact.	Type-generator	Power, rated	Rotor diameter	Hub height	Creator	Name	[m/s]	[dB(A)]	[m/s]	[dB(A)]		
		[m]					[kW]	[m]	[m]								
1	-169,698	37,321	0.9 DF126/5000	Yes	REpower	5 M-5,000	5,000	126.0	93.0	USER	Level 0 - guaranteed - 108.6 oct.dB(A) - 02/2009	6.0	107.4	8.0	108.6	No	Yes
2	-169,518	37,065	1.0 DF140/6000	Yes	DONG FUTURE	140/6000-6,000	6,000	140.0	100.0	USER	Level 0 - guaranteed - 109.2 oct.dB(A) - 02/2009	6.0	108.0	8.0	109.2	No	Yes
3	-169,262	36,830	1.5 DF160/8000	Yes	DONG FUTURE	160/8000-8,000	8,000	160.0	110.0	USER	Level 0 - guaranteed - 110.3 oct.dB(A) - 02/2009	6.0	109.1	8.0	110.3	No	Yes
4	-168,954	36,668	0.0 DF140/6000	Yes	DONG FUTURE	140/6000-6,000	6,000	140.0	100.0	USER	Level 0 - guaranteed - 109.2 oct.dB(A) - 02/2009	6.0	108.0	8.0	109.2	No	Yes
5	-168,687	36,556	0.0 DF126/5000	Yes	REpower	5 M-5,000	5,000	126.0	93.0	USER	Level 0 - guaranteed - 108.6 oct.dB(A) - 02/2009	6.0	107.4	8.0	108.6	No	Yes
6	-168,949	37,194	2.5 DF126/5000	Yes	REpower	5 M-5,000	5,000	126.0	93.0	USER	Level 0 - guaranteed - 108.6 oct.dB(A) - 02/2009	6.0	107.4	8.0	108.6	No	Yes
7	-168,569	36,994	0.0 DF126/5000	Yes	REpower	5 M-5,000	5,000	126.0	93.0	USER	Level 0 - guaranteed - 108.6 oct.dB(A) - 02/2009	6.0	107.4	8.0	108.6	No	Yes

**Calculation Results**

**Sound Level**

Noise sensitive area			S34Neg			Demands			Sound Level			Demands fulfilled ?		
No.	Name	East	North	Z	Imission height	Wind speed	Noise	From WTGs	Noise	From WTGs	Noise	From WTGs	Noise	From WTGs
				[m]	[m]	[m/s]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]	[dB(A)]
	A Sommerhuse	-170,159	38,614	0.0	1.5	6.0	37.0	36.8	Yes					
	A					8.0	39.0	38.4	Yes					
	B Ålehoved Nord	-169,196	38,293	3.4	1.5	6.0	42.0	40.7	Yes					
	B					8.0	44.0	42.2	Yes					
	D Ved Riddertofte	-167,945	36,225	2.5	1.5	6.0	42.0	42.1	No					
	D					8.0	44.0	43.5	Yes					
	E Gottesgabe	-167,861	37,549	5.0	1.5	6.0	42.0	41.1	Yes					
	E					8.0	44.0	42.5	Yes					

**Distances (m)**

WTG	A	B	D	E
1	1373	1094	2068	1851
2	1677	1270	1784	1726
3	1997	1465	1450	1575
4	2289	1643	1102	1404
5	2531	1810	813	1292
6	1866	1127	1396	1145
7	2270	1443	991	900

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**DECIBEL - Assumptions for noise calculation****Calculation:** Noise 0209 - 7 WTG 5.0-8.0 MW**Noise calculation model:**

Danish 2007

**Wind speed:**

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

**Terrain reduction:**

1.5 dB(A) Onshore

**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 are added to demand: 5.0 m/s

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

1.5 m Don't allow override of model height with height from NSA object

**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]	[db/km]
	0.1	0.4	1.0	2.0	3.6	8.8	29.0	104.5

**WTG:** REpower 5 M 5000 126.0 !O!**Noise:** Level 0 - guaranteed - 108.6 oct.dB(A) - 02/2009

Source Source/Date Creator Edited

PAUBS 03/02/2009 USER 03/02/2009 12:27

Status	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	6.0	107.4	No	88.1	94.0	98.8	102.5	102.8	97.9	92.3	81.6
From Windcat	8.0	108.6	No	91.7	96.7	100.9	103.5	103.6	98.7	92.4	82.2

**WTG:** DONG FUTURE 140/6000 6000 140.0 !O!**Noise:** Level 0 - guaranteed - 109.2 oct.dB(A) - 02/2009

Source Source/Date Creator Edited

PAUBS 03/02/2009 USER 03/02/2009 12:35

Status	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	6.0	108.0	No	88.7	94.6	99.4	103.1	103.4	98.5	92.9	82.2
From Windcat	8.0	109.2	No	92.3	97.3	101.5	104.1	104.2	99.3	93.0	82.8

**WTG:** DONG FUTURE 160/8000 8000 160.0 !O!**Noise:** Level 0 - guaranteed - 110.3oct.dB(A) - 02/2009

Source Source/Date Creator Edited

PAUBS 03/02/2009 USER 03/02/2009 12:35

Status	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	6.0	109.1	No	89.8	95.7	100.5	104.2	104.5	99.6	94.0	83.3
From Windcat	8.0	110.3	No	93.4	98.4	102.6	105.2	105.3	100.4	94.1	83.9

**NSA:** Sommerhuse-A**Predefined calculation standard**Residential areas**Imission height(a.g.l.):**Use standard value from calculation model

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**DECIBEL - Assumptions for noise calculation****Calculation:** Noise 0209 - 7 WTG 5.0-8.0 MW**Noise demand:**6.0 [m/s] 8.0 [m/s]  
37.0 dB(A) 39.0 dB(A)**Distance demand:**0.0 m**NSA:** Ålehed Nord-B**Predefined calculation standard**Open land**Imission height(a.g.l.):**Use standard value from calculation model**Noise demand:**6.0 [m/s] 8.0 [m/s]  
42.0 dB(A) 44.0 dB(A)**Distance demand:**0.0 m**NSA:** Ved Riddertofte-D**Predefined calculation standard**Open land**Imission height(a.g.l.):**Use standard value from calculation model**Noise demand:**6.0 [m/s] 8.0 [m/s]  
42.0 dB(A) 44.0 dB(A)**Distance demand:**0.0 m**NSA:** Gottesgabe-E**Predefined calculation standard**Open land**Imission height(a.g.l.):**Use standard value from calculation model**Noise demand:**6.0 [m/s] 8.0 [m/s]  
42.0 dB(A) 44.0 dB(A)**Distance demand:**0.0 m

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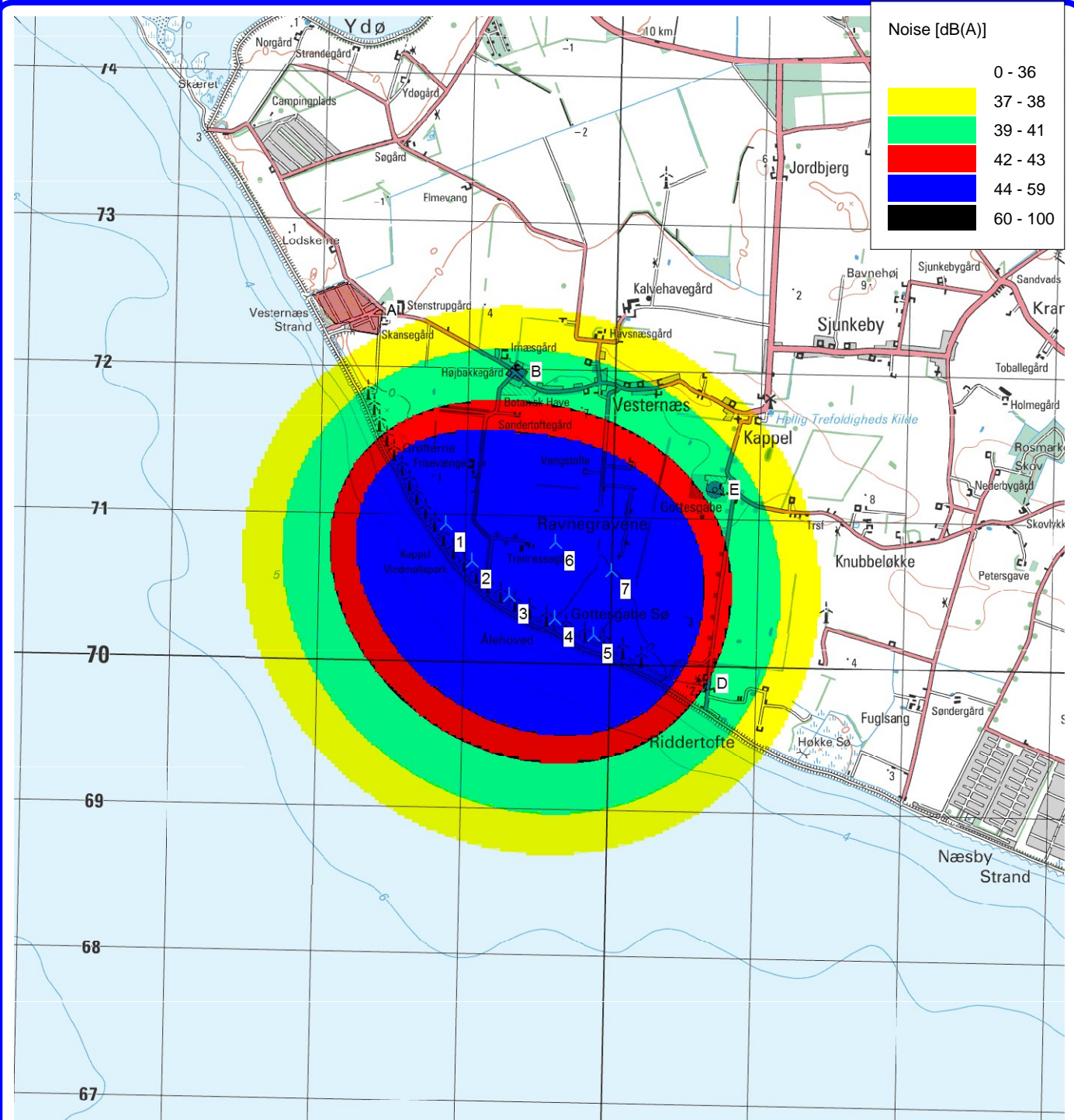
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**DECIBEL - KMS map: DISC01.IT**

Calculation: Noise 0209 - 7 WTG 5.0-8.0 MW File: DISC01.IT



0 500 1000 1500 2000 m

Map: Dannemare 1411 III, Print scale 1:40,000, Map center System 34 Neg X(Jylland DK) East: -169,055 North: 37,010  
 Noise calculation model: Danish 2007. Wind speed: 6.0 m/s

- ▲ New WTG
  - Noise sensitive area
  - 37.0 dB(A)
  - 39.0 dB(A)
  - 42.0 dB(A)
  - 44.0 dB(A)
  - 60.0 dB(A)
- Height above sea level from active line object