



## DECIBEL - Main Result

Calculation: NOISE calculation (5 x V150 @166m (Mode P01))

DUTCH RULES FOR NOISE CALCULATION.

The calculation is based on "Reken- en meetvoorschrift windturbines", February 2010

The calculation is based on ISO 9613-2 and assumes uniform directional distribution

The wind distribution is calculated for the Site center from

<http://www.mp.nl/rekentool/>

Wind distributions below 80 m and above 120 m are extrapolated by EMD using logarithmic profile.

Noise values in calculation:  
Total noise values are Lden values

Ground attenuation:

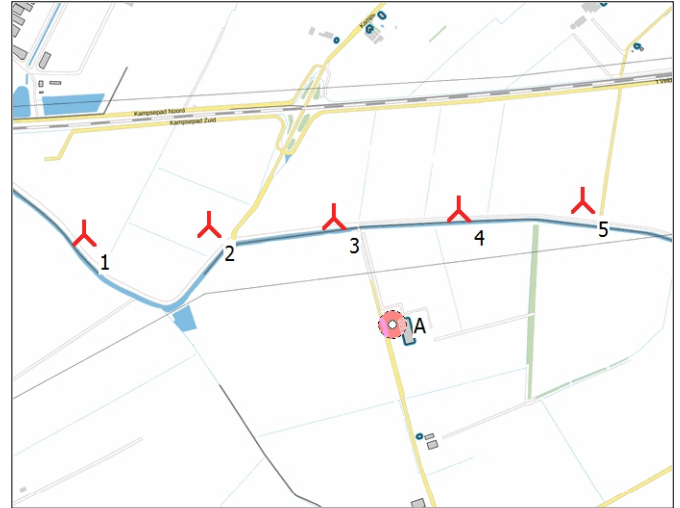
General, terrain specific

Ground factor for porous ground: 1,0

Area object with hard ground: Area object (): REGIONS\_WP

A15-Lingewaard\_1.w2r (2)

Area object with hard ground: hard (AF=0)



All coordinates are in  
Dutch Stereo-RD/NAP 2000

## WTGs

X (east)	Y (north)	Z [m]	Row data/Description	WTG type				Hub height [m]	Setting	Noise data			Wind speed [m/s]	Status	LwA,ref [dB(A)]	Pure tones
				Valid	Manufact.	Type-generator	Power, rated [kW]			Rotor diameter [m]	Creator	Name				
192.319	434.749	9,4	WT1	No	VESTAS	V150-4.20 (SW)-4.000	4.000	150,0	166,0	Day	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,6	Aggregated	100,9	No
										Evening	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,9	Aggregated	101,3	No
										Night	USER	Level 0- Calculated- Mode P01 - 11.02.2016	7,0	Aggregated	101,4	No
192.733	434.778	9,4	WT2	No	VESTAS	V150-4.20 (SW)-4.000	4.000	150,0	166,0	Day	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,6	Aggregated	100,9	No
										Evening	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,9	Aggregated	101,3	No
										Night	USER	Level 0- Calculated- Mode P01 - 11.02.2016	7,0	Aggregated	101,4	No
193.147	434.804	9,4	WT3	No	VESTAS	V150-4.20 (SW)-4.000	4.000	150,0	166,0	Day	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,6	Aggregated	100,9	No
										Evening	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,9	Aggregated	101,3	No
										Night	USER	Level 0- Calculated- Mode P01 - 11.02.2016	7,0	Aggregated	101,4	No
193.561	434.831	9,6	WT4	No	VESTAS	V150-4.20 (SW)-4.000	4.000	150,0	166,0	Day	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,6	Aggregated	100,9	No
										Evening	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,9	Aggregated	101,3	No
										Night	USER	Level 0- Calculated- Mode P01 - 11.02.2016	7,0	Aggregated	101,4	No
193.975	434.858	9,6	WT5	No	VESTAS	V150-4.20 (SW)-4.000	4.000	150,0	166,0	Day	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,6	Aggregated	100,9	No
										Evening	USER	Level 0- Calculated- Mode P01 - 11.02.2016	6,9	Aggregated	101,3	No
										Night	USER	Level 0- Calculated- Mode P01 - 11.02.2016	7,0	Aggregated	101,4	No

## Calculation Results

### Sound level

Noise sensitive area  
No. Name

No.	Name	X (east)	Y (north)	Z [m]	Imission height [m]	Demands Noise [dB(A)]	Sound level From WTGs [dB(A)]	Distance to noise demand [m]	Demands fulfilled ? Noise
A	Noise sensitive point: Dutch - Dutch Lden (1)	193.340	434.448	9,7	5,0	47,00	47,23	-17	No
	A Day						40,42		
	A Evening						40,73		
	A Night						40,91		

### Distances (m)

WTG	A
1	1065
2	691
3	406
4	442
5	756



## DECIBEL - Detailed results

Calculation: NOISE calculation (5 x V150 @166m (Mode P01))Noise calculation model: Dutch 2011

### Calculation Results

Noise sensitive area: A Noise sensitive point: Dutch - Dutch Lden (1)

WTG No.	Distance [m]	Sound distance [m]	Lden(year)		L Annual mean		Evening Wind speed [m/s]	Night Wind speed [m/s]	Night [dB(A)]	Wind speed [m/s]
			Calculated [dB(A)]	Day [dB(A)]	Day [dB(A)]	Evening [dB(A)]				
1	1.065	1.077	34,04	27,23	6,6	27,55	6,9	27,72	7,0	
2	691	710	38,39	31,58	6,6	31,89	6,9	32,07	7,0	
3	406	436	43,37	36,56	6,6	36,87	6,9	37,05	7,0	
4	442	471	42,15	35,34	6,6	35,65	6,9	35,83	7,0	
5	756	773	37,26	30,44	6,6	30,76	6,9	30,94	7,0	
Sum	47,23									



## DECIBEL - Assumptions for noise calculation

Calculation: NOISE calculation (5 x V150 @166m (Mode P01))

Noise calculation model:

Dutch 2011

Wind speed:

Aggregated

Ground attenuation:

General, terrain specific

Ground factor for porous ground: 1,0

Area object with hard ground: Area object (): REGIONS\_WP A15-Lingewaard\_1.w2r (2)

Area type with hard ground: hard (AF=0)

Meteorological coefficient, CO:

5,0 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: 0,0 dB(A)

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

5,0 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)

## Setup for Lden calculation

Variant	Name	From hour	To hour	Hours	Penalty [dB]	Days per year
1	Day	7	19	12	0	365
2	Evening	19	23	4	5	365
3	Night	23	7	8	10	365

Octave data required

Air absorption

63 [db/km]	125 [db/km]	250 [db/km]	500 [db/km]	1.000 [db/km]	2.000 [db/km]	4.000 [db/km]	8.000 [db/km]
0,1	0,3	0,8	1,6	2,9	6,2	19,0	67,0

WTG: VESTAS V150-4.20 (SW) 4000 150.0 !O!

Noise: Level 0- Calculated- Mode P01 - 11.02.2016

Source Source/Date Creator Edited  
Manufacturer 13-7-2016 USER 12-12-2017 21:07  
Document no.:  
DMS 0053-3713 V02  
Blades with serrated trailing edge

Status	Wind speed [m/s]	Frequency Day [%]	Frequency Evening		Frequency Night [%]	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	3,0	8,8	7,4	7,0	91,1	No	71,9	79,6	84,4	86,2	85,1	81,2	74,3	64,5	
From Windcat	4,0	10,8	10,0	9,6	91,3	No	71,9	79,7	84,6	86,5	85,4	81,2	74,2	64,0	
From Windcat	5,0	11,8	11,9	11,5	93,2	No	73,8	81,7	86,5	88,4	87,3	83,1	76,0	65,8	
From Windcat	6,0	11,8	12,6	12,5	96,4	No	77,1	84,9	89,7	91,6	90,5	86,3	79,2	69,0	
From Windcat	7,0	11,0	12,3	12,3	99,9	No	80,8	88,5	93,2	95,0	93,9	89,8	82,8	72,7	
From Windcat	8,0	9,6	11,0	11,2	103,3	No	84,2	91,9	96,6	98,4	97,3	93,2	86,3	76,2	
From Windcat	9,0	7,9	9,1	9,4	104,9	No	85,9	93,6	98,2	100,0	98,9	94,8	87,9	78,0	
From Windcat	10,0	6,2	7,0	7,3	104,9	No	86,0	93,6	98,2	100,0	98,9	94,9	88,0	78,2	
From Windcat	11,0	4,5	5,0	5,3	104,9	No	86,2	93,6	98,2	100,0	98,9	94,9	88,2	78,6	
From Windcat	12,0	3,2	3,3	3,5	104,9	No	86,3	93,6	98,2	99,9	98,9	95,0	88,4	78,9	
From Windcat	13,0	2,1	2,0	2,2	104,9	No	86,4	93,7	98,2	99,9	98,9	95,1	88,6	79,2	
From Windcat	14,0	1,3	1,1	1,2	104,9	No	86,5	93,7	98,2	99,9	98,9	95,1	88,6	79,4	
From Windcat	15,0	0,8	0,6	0,7	104,9	No	86,6	93,7	98,2	99,9	98,9	95,1	88,7	79,5	
From Windcat	16,0	0,4	0,3	0,3	104,9	No	86,7	93,8	98,2	99,9	98,9	95,2	88,8	79,7	
From Windcat	17,0	0,2	0,1	0,1	104,9	No	86,7	93,8	98,1	99,8	98,9	95,2	88,9	79,8	
From Windcat	18,0	0,1	0,1	0,1	104,9	No	86,8	93,8	98,1	99,8	98,9	95,2	89,0	79,9	
From Windcat	19,0	0,1	0,0	0,0	104,9	No	86,8	93,8	98,1	99,8	98,9	95,3	89,1	80,1	

Project:  
WP A15-Lingewaard

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Calculated:  
12-12-2017 22:55/3.1.617



## DECIBEL - Assumptions for noise calculation

Calculation: NOISE calculation (5 x V150 @166m (Mode P01))

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]
Aggregated, Day	166,0	6,6	100,9	No	82,1	89,6	94,3	96,1	95,0	90,9	84,1	74,3
Aggregated, Evening	166,0	6,9	101,3	No	82,4	89,9	94,6	96,4	95,3	91,2	84,4	74,6
Aggregated, Night	166,0	7,0	101,4	No	82,6	90,1	94,7	96,5	95,5	91,4	84,6	74,8

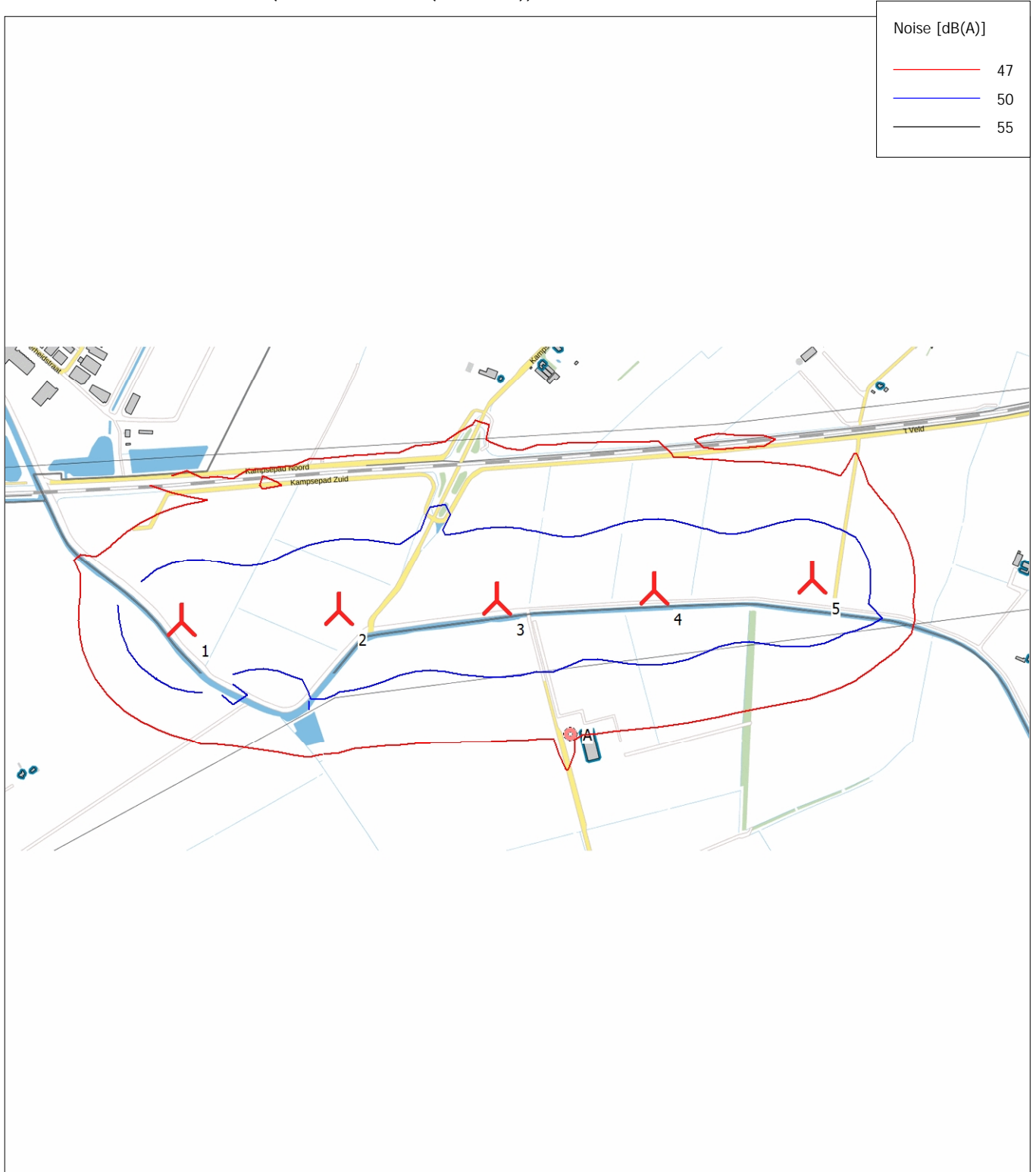
NSA: Noise sensitive point: Dutch - Dutch Lden (1)-A  
Predefined calculation standard: Dutch Lden  
Immission height(a.g.l.): Use standard value from calculation model

Noise demand: 47,0 dB(A)  
No distance demand



## DECIBEL - Map Aggregated

Calculation: NOISE calculation (5 x V150 @166m (Mode P01))



Noise [dB(A)]	
	47
	50
	55

Map: BAG kaart , Print scale 1:15.000, Map center Dutch Stereo-RD/NAP 2000 East: 193.147 North: 434.803  
New WTG Noise sensitive area   
Noise calculation model: Dutch 2011. Wind speed: Aggregated  
Height above sea level from active line object