

22nd November 2021

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Dear Ms Strong

RE-MODELLING OF NOISE IMPACT ASSESSMENT – BRANDVALLEY WIND ENERGY PROJECT

As per our recent correspondence, please find attached the re-modelling report for the Brandvalley Wind Energy Project near Laingsburg in the Western Cape.

This report is to be viewed as an addendum to the main Noise Impact Report that was issued on the 27th of April 2016 (Version 4 – Report Number 26/7587). The methodologies used to conduct the remodelling, identification of noise sensitive areas and the project description is described in the main report and is not repeated here.

The purpose of this report is to determine if the final project layout will comply with the noise emission limits as described in the previous report. The project parameters have changed as the number of turbines has been reduced to 34 turbines as well as other changes. This has necessitated a remodelling of the layout.

1. Noise Sensitive Areas (NSA)

Table 1 below shows the locations of the Noise Sensitive Areas (NSAs) used in the modelling. Figure 1 shows the NSAs location in relation to the Wind Turbine Generators (WTGs).

Table 1: Noise Sensitive Areas

Description	Latitude	Longitude	Within Project Boundary	Type
NSA 1	32°57'10.38"	20°30'17.97"	Yes	Farmhouse
NSA 2	32°59'17.08"	20°32'52.95"	Yes	Farmhouse
NSA 3	32°59'14.38"	20°33'46.34"	Yes	Farmhouse
NSA 4	32°57'02.30"	20°32'50.34"	Yes	Farmhouse
NSA 5	33°04'25.20"	20°35'33.01"	Yes	Farmhouse
NSA 6	32°58'22.40"	20°36'03.35"	No	Farmhouse
NSA 7	33°06'21.24"	20°32'05.40"	Yes	Farmhouse
NSA 8	33°05'39.20"	20°28'42.36"	Yes	Farmhouse
NSA 9	33°10'03.50"	20°23'38.49"	No	Farmhouse
NSA 10	33°08'30.25"	20°21'09.92"	No	Farmhouse
NSA 11	33°04'12.19"	20°23'36.36"	No	Farmhouse
NSA 12	33°04'42.76"	20°25'16.19"	Yes	Farmhouse
NSA 13	33°04'05.63"	20°25'12.35"	Yes	Farmhouse
NSA 14	33°02'14.53"	20°27'42.38"	Yes	Farmhouse
NSA 15	32°54'52.62"	20°33'09.67"	No	Farmhouse
NSA 16	33°07'02.68"	20°22'49.18"	No	Farmhouse
NSA 17	33°05'09.53"	20°23'36.67"	No	Farmhouse
NSA 18	33°03'29.96"	20°29'22.71"	Yes	Farmhouse
NSA 19	33°06'16.52"	20°25'51.24"	Yes	Farmhouse
NSA 20	33°10'20.42"	20°28'51.51"	No	Farmhouse
NSA 21	33°10'25.14"	20°25'54.65"	No	Farmhouse
NSA 22	32°57'21.98"	20°21'25.27"	Yes	Farmhouse
NSA 23	32°58'30.41"	20°22'07.76"	Yes	Farmhouse
NSA 24	32°57'29.92"	20°16'15.80"	No	Farmhouse
NSA 25	32°53'44.68"	20°19'48.45"	No	Farmhouse
NSA 26	32°52'42.16"	20°27'23.34"	Yes	Farmhouse
NSA 27	32°49'35.62"	20°28'03.60"	No	Farmhouse
NSA 28	33°00'14.10"	20°26'46.16"	Yes	Farmhouse
NSA 29	33°00'15.87"	20°19'04.31"	No	Farmhouse

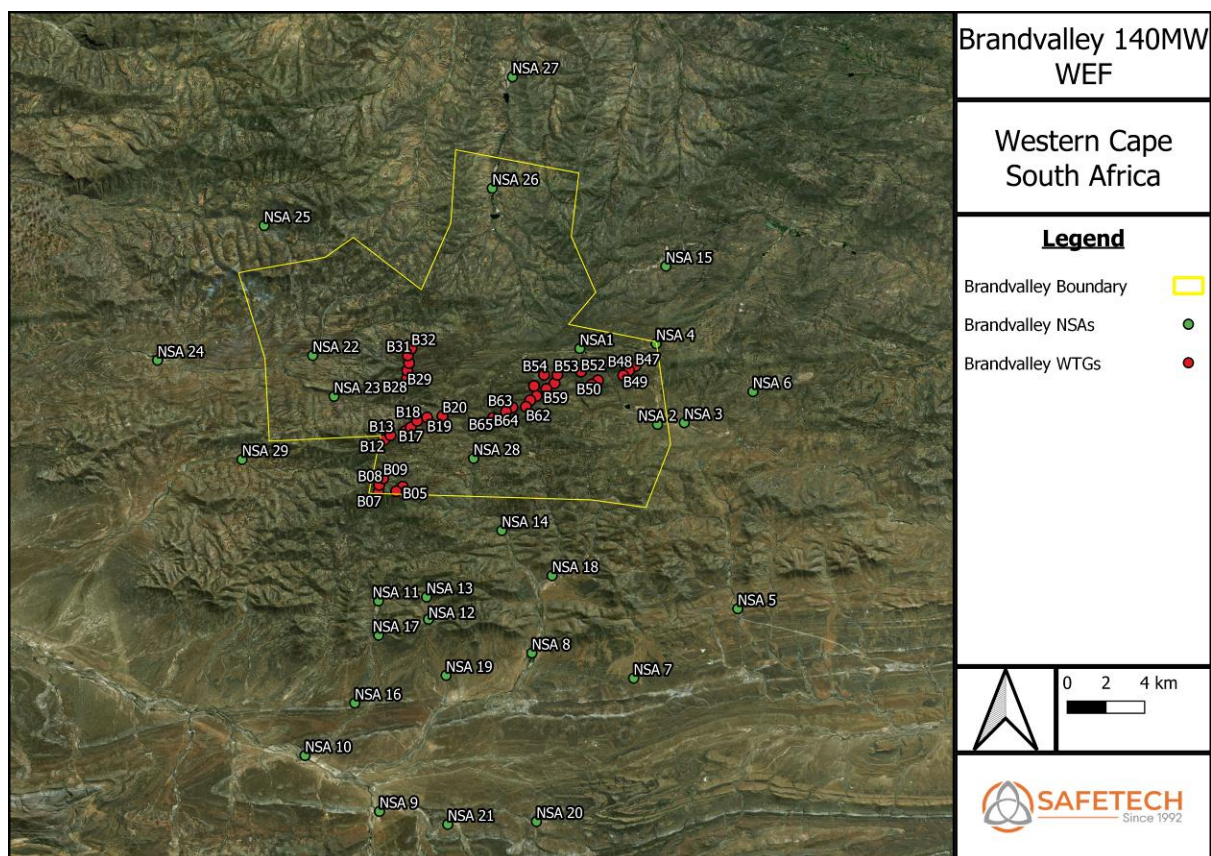


Figure 1: Proposed Development Layout

2. Wind Turbine Generators (WTG)

The wind turbine generators that were modelled are described in Table 2 below. The final turbine specifications have not been confirmed. The worst-case scenario has therefore been assessed.

Table 2: Proposed Turbine Specifications

Parameter	New Specifications for Brandvalley WEFS	Previously Approved for Brandvalley WEF
Turbine Generation Capacity	7 MW	Not specified (140MW – with 58 turbines)
Hub Height	125m	Up to 125m
Rotor Diameter	180m	Up to 160 m
Blade Length	90m	Up to 80 m
Max upper tip height	215m	Not specified

The details of the turbines used for modelling purposes are shown in Table 3 below.

Table 3: Turbine Specifications used for the Assessment

Manufacturer	ENERCON
Type / Version	E-126
Rated Power	7.5MW
Rotor Diameter	180m
Tower	Tubular
Grid Connection	50 Hz
Maximum Sound Power Level	108.5dB
Hub Height	125m

*Sound Power Level dB(A) reference to 1pW from WindPro 3.2 Catalogue

The sound power levels at lower and higher wind speeds as stated above were interpolated from the published data. The actual sound power levels may be less than those stated above when type certification of the selected turbine is completed. The levels used in the re-modelling are thus a worst-case scenario.

The turbine positions are as follows:

Table 4: WTG Positions

Turbine Number	Latitude	Longitude
B58	32° 58' 08.40" S	20° 29' 27.67" E
B65	32° 59' 05.99" S	20° 27' 24.87" E
B05	33° 01' 01.20" S	20° 24' 24.80" E
B06	33° 01' 08.39" S	20° 24' 11.91" E
B07	33° 01' 12.00" S	20° 23' 36.20" E
B08	33° 00' 57.59" S	20° 23' 37.78" E
B09	33° 00' 46.79" S	20° 23' 45.81" E
B12	32° 59' 41.99" S	20° 23' 48.04" E
B13	32° 59' 34.80" S	20° 24' 00.39" E
B16	32° 59' 27.59" S	20° 24' 29.37" E
B17	32° 59' 24.00" S	20° 24' 40.82" E
B18	32° 59' 09.59" S	20° 24' 53.53" E
B19	32° 59' 05.99" S	20° 25' 13.40" E
B20	32° 59' 02.40" S	20° 25' 44.11" E
B28	32° 58' 01.19" S	20° 24' 33.37" E
B29	32° 57' 46.80" S	20° 24' 33.87" E
B30	32° 57' 36.00" S	20° 24' 37.58" E
B31	32° 57' 21.60" S	20° 24' 35.06" E

Turbine Number	Latitude	Longitude
B32	32° 57' 10.80" S	20° 24' 42.22" E
B47	32° 57' 39.59" S	20° 32' 08.84" E
B48	32° 57' 46.80" S	20° 31' 56.27" E
B49	32° 57' 54.00" S	20° 31' 44.47" E
B50	32° 58' 04.80" S	20° 30' 54.17" E
B51	32° 58' 11.99" S	20° 30' 41.47" E
B52	32° 57' 50.39" S	20° 30' 20.41" E
B53	32° 57' 54.00" S	20° 29' 33.18" E
B54	32° 57' 54.00" S	20° 29' 06.71" E
B56	32° 58' 11.99" S	20° 28' 46.66" E
B59	32° 58' 19.20" S	20° 29' 11.39" E
B60	32° 58' 30.00" S	20° 28' 51.74" E
B61	32° 58' 37.19" S	20° 28' 39.10" E
B62	32° 58' 47.99" S	20° 28' 30.57" E
B63	32° 58' 47.99" S	20° 28' 03.50" E
B64	32° 58' 55.19" S	20° 27' 50.94" E

3. Modelling Results

The masking effect of the wind noise will mitigate the impact. The results are based on NO wind noise masking, which in reality rarely occurs. The maximum noise rating limit as per SANS 10103:2008 is 35dB(A) at night and 45 dB(A) for day/night i.e., 24 hours. The cumulative effect of developing both the Brandvalley and Rietkloof Wind Energy Projects was modelled using the ENERCON E-126 7500.

The new turbine layout was modelled in WindPro 3.2 using the above data. The results area as follows:

Table 5: Modelling Results

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact	
NSA1	3	33,6	33,7	
	4	34,1	34,2	
	5	34,6	34,7	
	6	35,1	35,2	
	7	35,6	35,7	
	8	37,1	37,2	
	9	38,1	38,2	
	10	39,1	39,2	
	11	40,1	40,2	
	12	41,1	41,2	
	NSA 2	3	23,1	28,8
		4	23,6	29,3
5		24,1	29,8	
6		24,6	30,3	
7		25,1	30,8	
8		26,6	32,3	
9		27,6	33,3	
10		28,6	34,3	
11		29,6	35,3	
12		30,6	36,3	
NSA 3		3	19,2	24,7
		4	19,7	25,2
	5	20,2	25,7	
	6	20,7	26,2	
	7	21,2	26,7	
	8	22,7	28,2	
	9	23,7	29,2	
	10	24,7	30,2	
	11	25,7	31,2	
	12	26,7	32,2	
	NSA 4	3	29,0	29,1
		4	29,5	29,6
5		30,0	30,1	
6		30,5	30,6	
7		31,0	31,1	
8		32,5	32,6	
9		33,5	33,6	
10		34,5	34,6	
11		35,5	35,6	
12		36,5	36,6	
NSA 5		3	0,0	18,6
		4	0,0	19,1

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact
	5	0.0	19,6
	6	0.0	20,1
	7	0.0	20,6
	8	0.0	22,1
	9	0.0	23,1
	10	0.0	24,1
	11	0.0	25,1
	12	0,2	26,1
NSA 6	3	8,9	13,1
	4	9,4	13,6
	5	9,9	14,1
	6	10,4	14,6
	7	10,9	15,1
	8	12,4	16,6
	9	13,4	17,6
	10	14,4	18,6
	11	15,4	19,6
	12	16,4	20,6
NSA 7	3	0.0	23,7
	4	0.0	24,2
	5	0.0	24,7
	6	0.0	25,2
	7	0.0	25,7
	8	0.0	27,2
	9	0.0	28,2
	10	0.0	29,2
	11	0.0	30,2
	12	0.0	31,2
NSA 8	3	0.0	24,1
	4	0.0	24,6
	5	0,4	25,1
	6	0,9	25,6
	7	1,4	26,1
	8	2,9	27,6
	9	3,9	28,6
	10	4,9	29,6
	11	5,9	30,6
	12	6,9	31,6
NSA 9	3	0.0	0.0
	4	0.0	0.0
	5	0.0	0.0
	6	0.0	0.0
	7	0.0	0.0
	8	0.0	0.0
	9	0.0	0.0
	10	0.0	0.0
	11	0.0	0.0

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact
	12	0.0	0.0
NSA 10	3	0.0	0.0
	4	0.0	0.0
	5	0.0	0.0
	6	0.0	0.0
	7	0.0	0.0
	8	0.0	0.0
	9	0.0	0.0
	10	0.0	0.0
	11	0.0	0.0
	12	0.0	0.0
NSA 11	3	12,3	13,0
	4	12,8	13,5
	5	13,3	14,0
	6	13,8	14,5
	7	14,3	15,0
	8	15,8	16,5
	9	16,8	17,5
	10	17,8	18,5
	11	18,8	19,5
	12	19,8	20,5
NSA 12	3	8,8	12,2
	4	9,3	12,7
	5	9,8	13,2
	6	10,3	13,7
	7	10,8	14,2
	8	12,3	15,7
	9	13,3	16,7
	10	14,3	17,7
	11	15,3	18,7
	12	16,3	19,7
NSA 13	3	12,2	14,6
	4	12,7	15,1
	5	13,2	15,6
	6	13,7	16,1
	7	14,2	16,6
	8	15,7	18,1
	9	16,7	19,1
	10	17,7	20,1
	11	18,7	21,1
	12	19,7	22,1
NSA 14	3	15,6	28,5
	4	16,1	29,0
	5	16,6	29,5
	6	17,1	30,0
	7	17,6	30,5
	8	19,1	32,0

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact
	9	20,1	33,0
	10	21,1	34,0
	11	22,1	35,0
	12	23,1	36,0
NSA 15	3	12,3	12,8
	4	12,8	13,3
	5	13,3	13,8
	6	13,8	14,3
	7	14,3	14,8
	8	15,8	16,3
	9	16,8	17,3
	10	17,8	18,3
	11	18,8	19,3
	12	19,8	20,3
NSA 16	3	0,0	0,0
	4	0,0	0,2
	5	0,0	0,7
	6	0,0	1,2
	7	0,0	1,7
	8	0,7	3,2
	9	1,7	4,2
	10	2,7	5,2
	11	3,7	6,2
	12	4,7	7,2
NSA 17	3	6,9	8,3
	4	7,4	8,8
	5	7,9	9,3
	6	8,4	9,8
	7	8,9	10,3
	8	10,4	11,8
	9	11,4	12,8
	10	12,4	13,8
	11	13,4	14,8
	12	14,4	15,8
NSA 18	3	7,4	29,0
	4	7,9	29,5
	5	8,4	30,0
	6	8,9	30,5
	7	9,4	31,0
	8	10,9	32,5
	9	11,9	33,5
	10	12,9	34,5
	11	13,9	35,5
	12	14,9	36,5
NSA 19	3	0,6	9,2
	4	1,1	9,7
	5	1,6	10,2

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact
	6	2,1	10,7
	7	2,6	11,2
	8	4,1	12,7
	9	5,1	13,7
	10	6,1	14,7
	11	7,1	15,7
	12	8,1	16,7
NSA 20	3	0.0	0,2
	4	0.0	0,7
	5	0.0	1,2
	6	0.0	1,7
	7	0.0	2,2
	8	0.0	3,7
	9	0.0	4,7
	10	0.0	5,7
	11	0.0	6,7
	12	0.0	7,7
NSA 21	3	0.0	0.0
	4	0.0	0.0
	5	0.0	0.0
	6	0.0	0.0
	7	0.0	0.0
	8	0.0	0.0
	9	0.0	0.0
	10	0.0	0.0
	11	0.0	1,0
	12	0.0	2,0
NSA 22	3	17,7	17,7
	4	18,2	18,2
	5	18,7	18,7
	6	19,2	19,2
	7	19,7	19,7
	8	21,2	21,2
	9	22,2	22,2
	10	23,2	23,2
	11	24,2	24,2
	12	25,2	25,2
NSA 23	3	23,2	23,2
	4	23,7	23,7
	5	24,2	24,2
	6	24,7	24,7
	7	25,2	25,2
	8	26,7	26,7
	9	27,7	27,7
	10	28,7	28,7
	11	29,7	29,7
	12	30,7	30,7

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact	
NSA 24	3	0,0	0,0	
	4	0,0	0,0	
	5	0,0	0,0	
	6	0,0	0,0	
	7	0,0	0,0	
	8	0,0	0,0	
	9	0,7	0,8	
	10	1,7	1,8	
	11	2,7	2,8	
	12	3,7	3,8	
	NSA 25	3	0,0	0,0
		4	0,4	0,5
5		0,9	1,0	
6		1,4	1,5	
7		1,9	2,0	
8		3,4	3,5	
9		4,4	4,5	
10		5,4	5,5	
11		6,4	6,5	
12		7,4	7,5	
NSA 26		3	4,3	4,6
		4	4,8	5,1
	5	5,3	5,6	
	6	5,8	6,1	
	7	6,3	6,6	
	8	7,8	8,1	
	9	8,8	9,1	
	10	9,8	10,1	
	11	10,8	11,1	
	12	11,8	12,1	
	NSA 27	3	0,0	0,0
		4	0,0	0,0
5		0,0	0,0	
6		0,0	0,0	
7		0,0	0,0	
8		0,0	0,0	
9		0,0	0,0	
10		0,0	0,0	
11		0,0	0,0	
12		0,0	0,0	
NSA 28		3	27,1	30,0
		4	27,6	30,5
	5	28,1	31,0	
	6	28,6	31,5	
	7	29,1	32,0	
	8	30,6	33,5	
	9	31,6	34,5	

Receiver	Wind Speed m/s	Brandvalley WEF Only (dB(A))	Brandvalley and Rietkloof Cumulative Impact
	10	32,6	35,5
	11	33,6	36,5
	12	34,6	37,5
NSA 29	3	9,3	9,4
	4	9,8	9,9
	5	10,3	10,4
	6	10,8	10,9
	7	11,3	11,4
	8	12,8	12,9
	9	13,8	13,9
	10	14,8	14,9
	11	15,8	15,9
	12	16,8	16,9

*Night Limit = 35dB(A) Day/Night Limit = 45dB(A).

4. Discussion

The results above indicate that the 24-hour 45 dB(A) limit for day/night operations will not be exceeded at any of the noise sensitive areas.

The results above indicate that the 35 dB(A) limit for night operations will be slightly exceeded at NSA 1 and NSA 14 due to the operation of the Brandvalley Wind Energy Farm. The limit will be exceeded at high wind speeds where wind noise masking is likely to occur, therefore no community response in terms of noise complaints is expected.

The 35 dB(A) night guideline limit will be exceeded at six noise sensitive areas (NSA 1, NSA 2, NSA 4, NSA 14, NSA 18, and NSA 28) if both the Brandvalley and Rietkloof Wind Energy Farms are developed. It is highly likely that, at the high wind speeds when the limits will be exceeded, the wind noise will provide a masking effect and no community response is expected. The impact at NSA 1 is from the Brandvalley turbines and not the Rietkloof turbines.

The modelling results present the worst case scenario as no wind noise masking is considered. It is recommended that the current ambient noise levels at the affected NSA's be measured on a long-term basis before operations commence to determine the actual ambient sound under different weather conditions. This information can then be used to determine the masking effect that any wind noise may have and if any operational mitigation measures should be considered.

5. Impact Statement

The overall environmental impact of the changes made to the project scope is rated as low as reflected in Table 6 below. The impact rating methodology was supplied by the client.

Table 6: Operational Impact Significance Statement

Nature of impact	Temporal Scale	Spatial Scale	Severity of Impact	Risk or Likelihood	Overall Significance
WITHOUT MITIGATION					
Impact of the operational noise on the surrounding environment (Including the cumulative impacts)	Short Term (1)	Local (1)	Slight (1)	Unlikely (1)	Low (4)
WITH MITIGATION					
Impact of the operational noise on the surrounding environment	Short Term (1)	Local (1)	Slight (1)	Probable (1)	Low (4)

Please feel free to contact us should you have any further requirements. Assuring you of our best attention at all times.

Yours sincerely



Dr BRETT WILLIAMS