

Bango Wind Farm

Supplementary Environmental Noise Assessment

May 2017

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1 INTRODUCTION

An environmental noise assessment for the proposed Bango Wind Farm in New South Wales was conducted and detailed in the Sonus report S3958C9, dated June 2016 (the Principal Assessment).

Since the Principal Assessment, there has been:

- A revision to the wind speed data used for correlation with background noise. Specifically, the background noise data have now been correlated with data derived for the wind mast BAN02 in lieu of wind data from wind mast BAN01. Mast BAN02 was installed after the background noise monitoring campaign, however incorporates anemometers at greater heights than mast BAN01. Given that future post-construction noise correlations will likely consider wind data from mast BAN02, it is appropriate that the pre-construction noise correlations also consider the same mast for direct comparisons; and,
- An update to the proposed wind turbine layout which includes the removal of a number of turbines. The updated wind turbine layout "LO1" incorporates a total of 75 wind turbines.
- Minor corrections to the coordinates of some dwellings.

Therefore this supplementary environmental noise assessment includes:

- A correlation analysis of wind speeds from the two wind masts, BAN01 and BAN02, to determine the relationship between the two wind masts. The result of the analysis was used to derive BAN02 hub height wind speeds based on BAN01 wind speeds;
- Re-correlations of the background noise levels with BAN02 hub height wind speeds;
- Predictions of the noise levels at the updated dwelling locations from the updated turbine layout. The predicted noise levels were compared against noise criteria established based on the background noise levels determined from the correlations above.

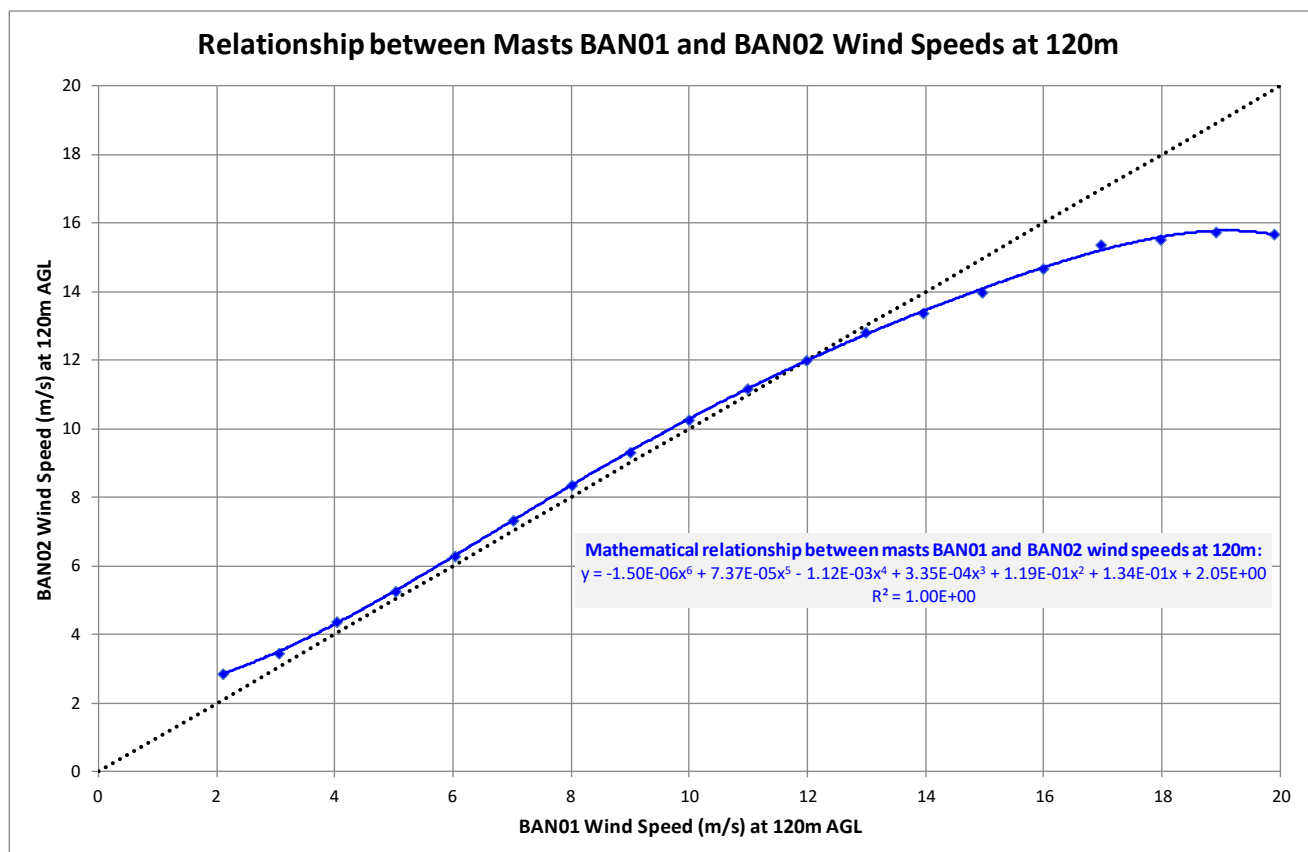
2 CORRELATION OF WIND DATA FROM MASTS BAN01 AND BAN02

Wind mast BAN01 was erected prior to the background noise monitoring campaign in 2012 and incorporates anemometers at heights between 30m and 61m. Wind mast BAN02 was erected in 2013 after the completion of the background noise monitoring and incorporates anemometers at heights between 80m and 98m.

There are no measured wind data available from mast BAN02 during the background noise monitoring campaign period, therefore the data had to be derived based on data from mast BAN01. In order to do so, the mathematical relationship between the two masts was determined.

Wind data collected over a period of approximately two years from the two masts have been analysed. Wind speed measurements at lower positions on the two wind masts were extrapolated to hub height (120m) and correlated. The correlation included in excess of 80,000 10 minute data points.

A bin analysis was performed on the correlation to determine BAN02 wind speed corresponding to BAN01 integer wind speed. Finally, a regression analysis of the resulting points was performed to obtain the mathematical relationship between BAN02 and BAN01 wind speeds, as shown on the plot below.



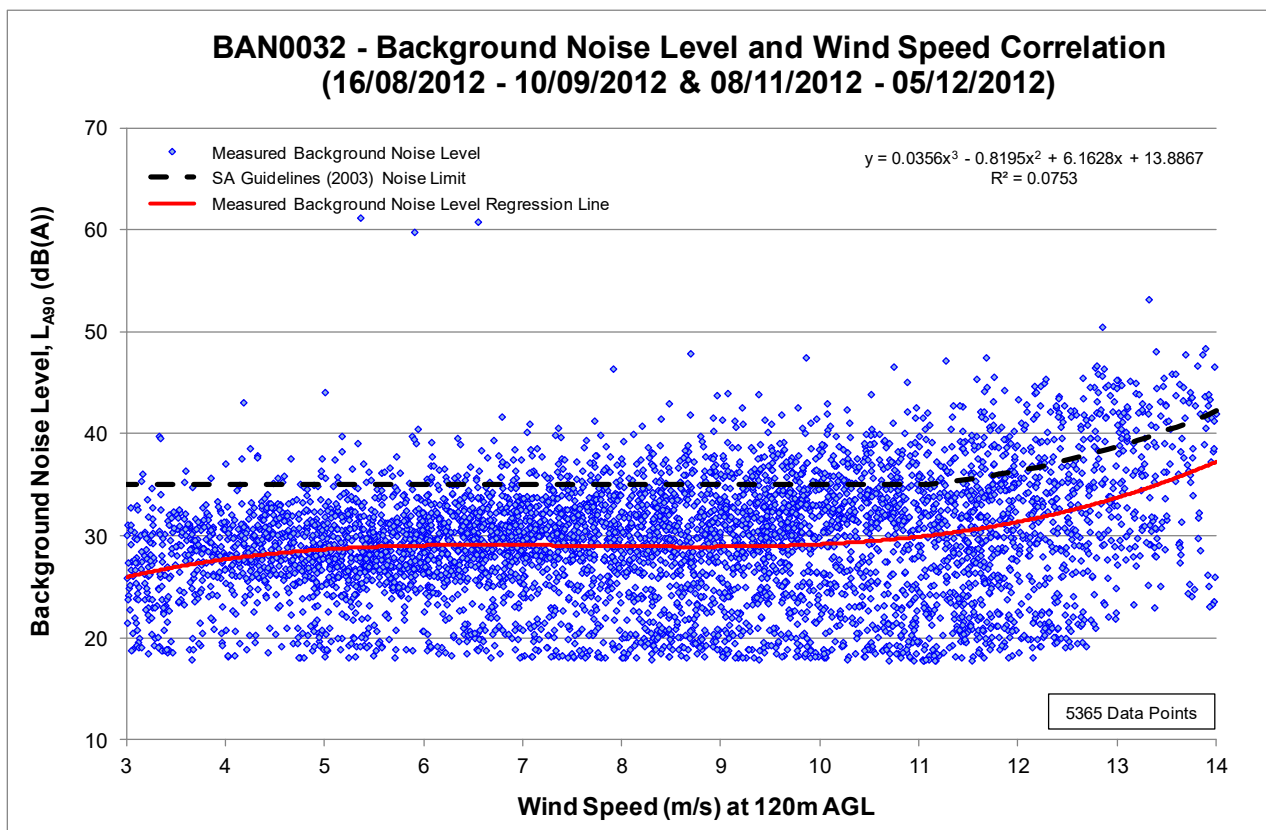
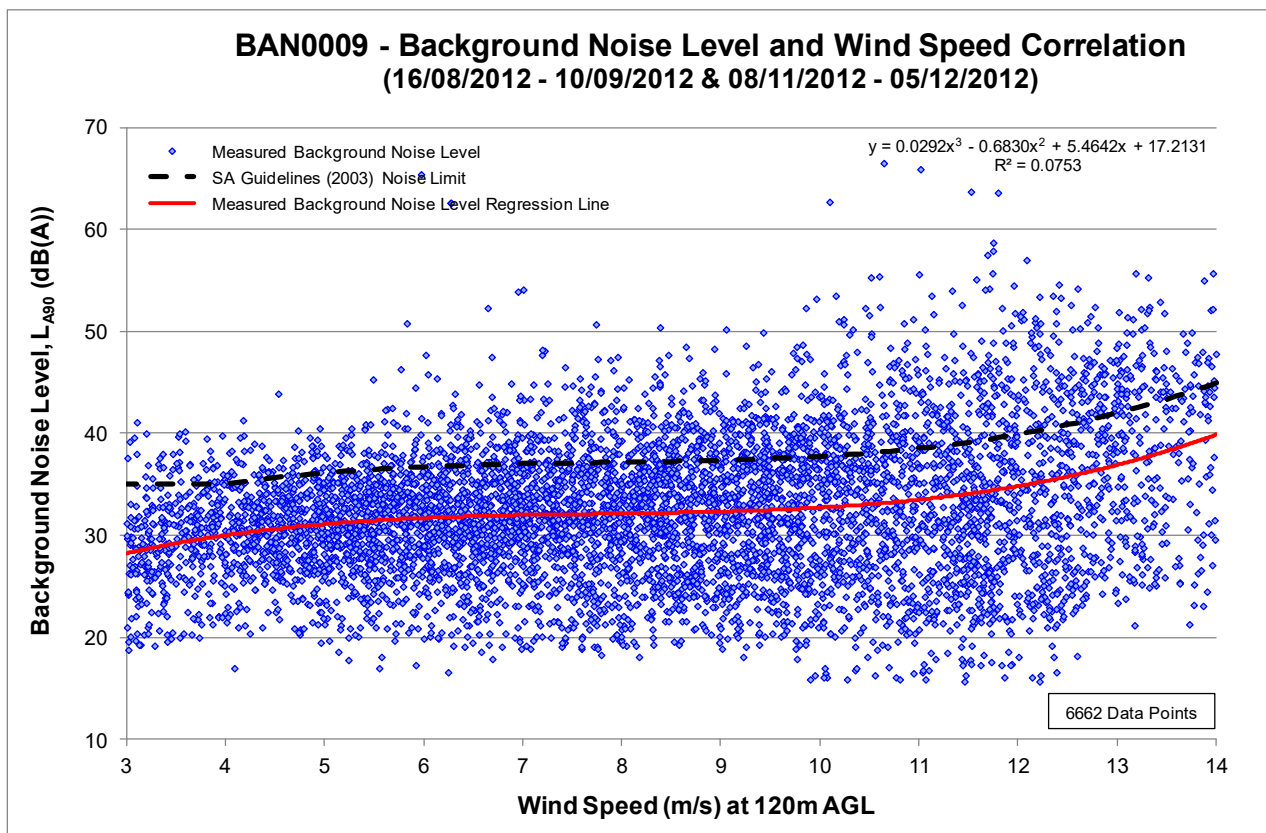
3 CORRELATION OF BACKGROUND NOISE DATA WITH DERIVED MAST BAN02 WIND DATA

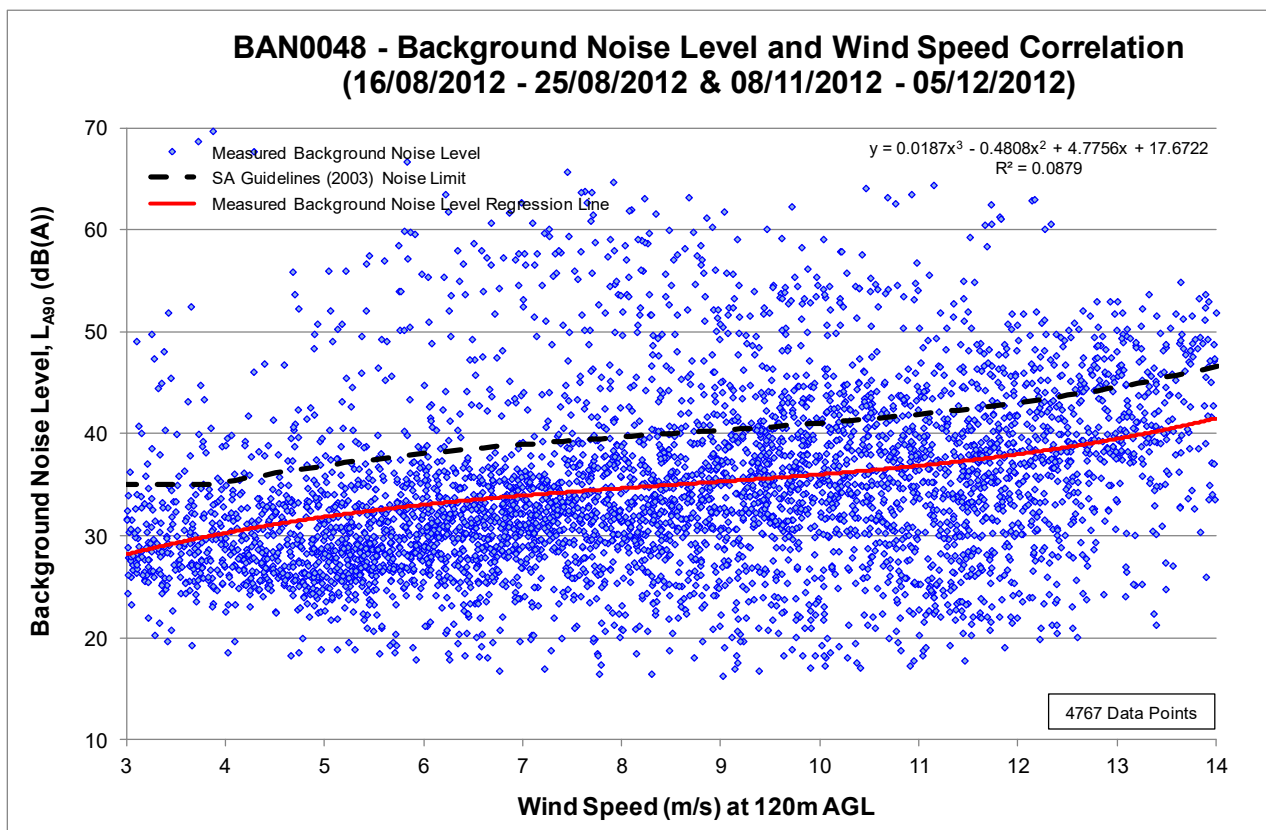
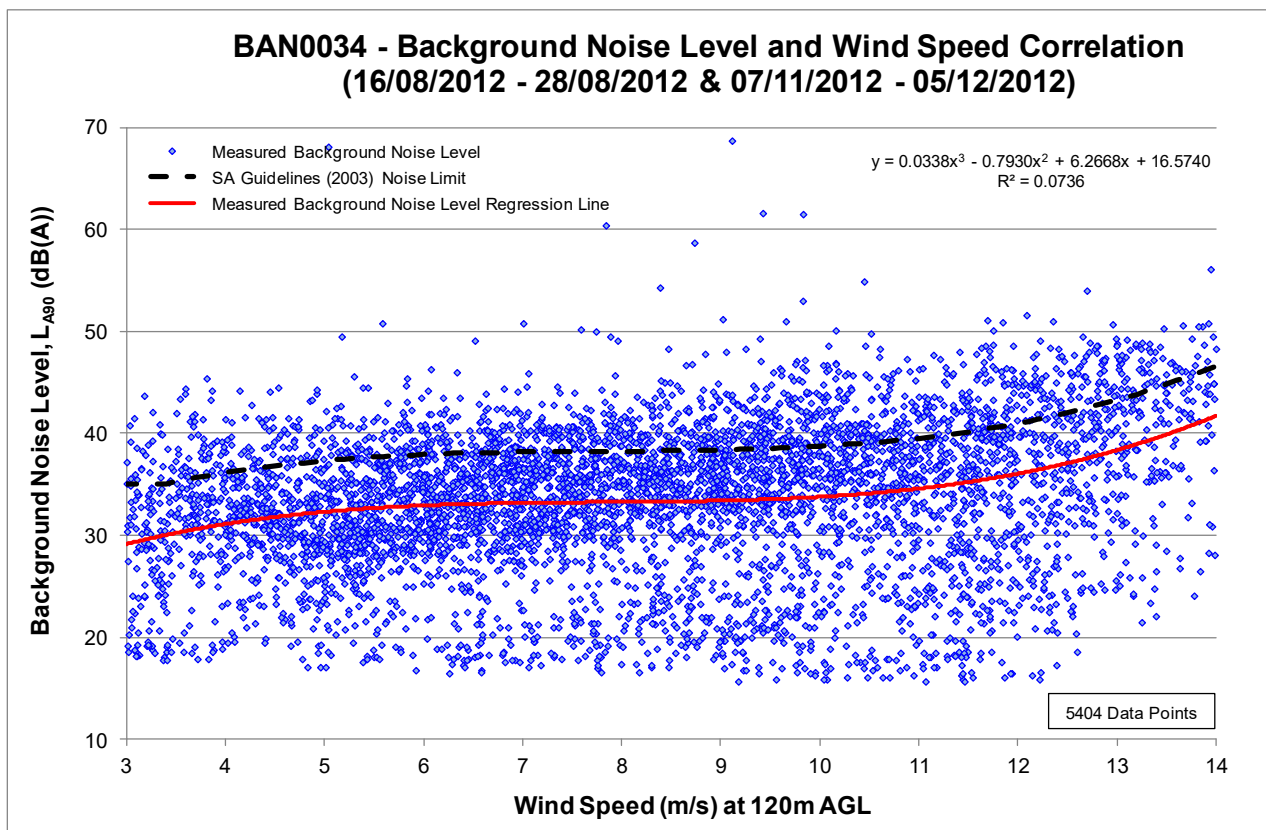
The mathematical relationship between hub height wind speeds from masts BAN02 and BAN01 (as provided in Section 2) has been used to derive BAN02 wind speeds corresponding to the period when background noise monitoring was conducted.

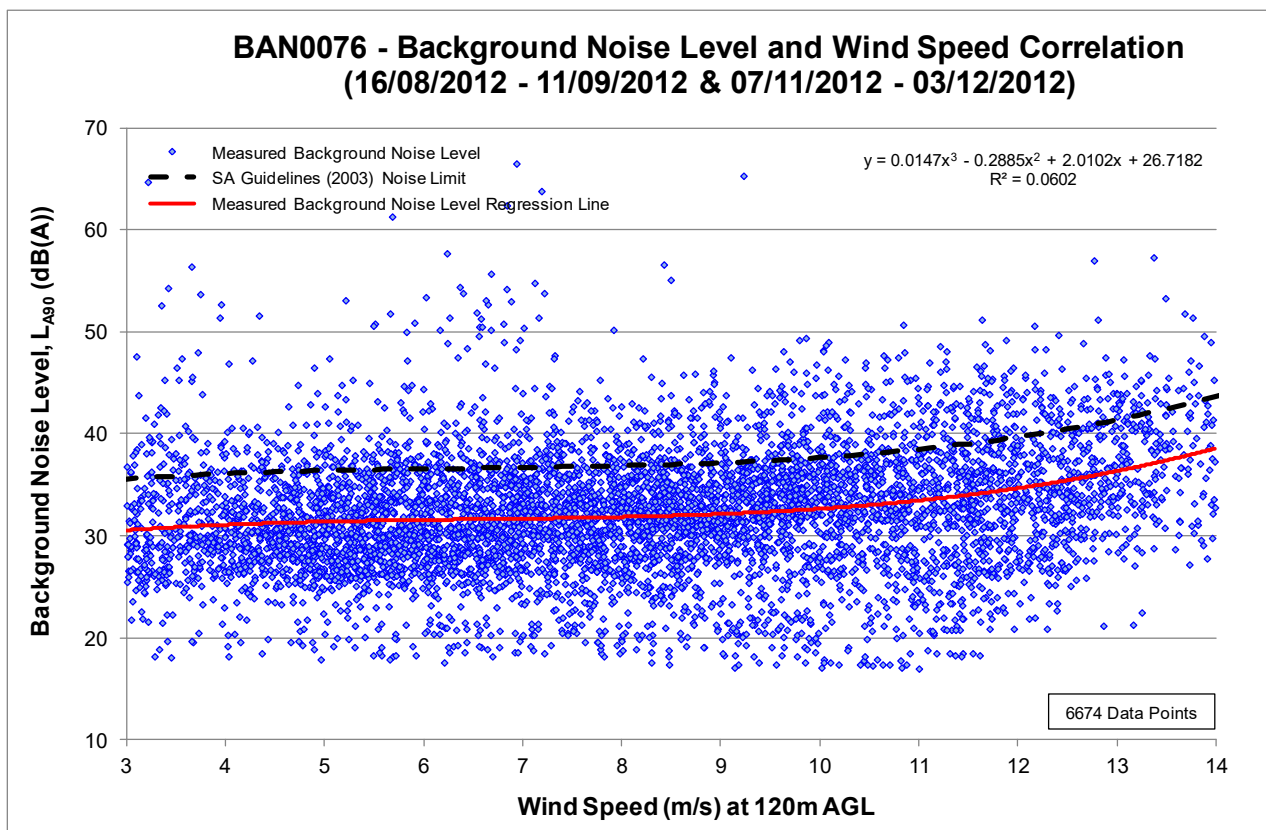
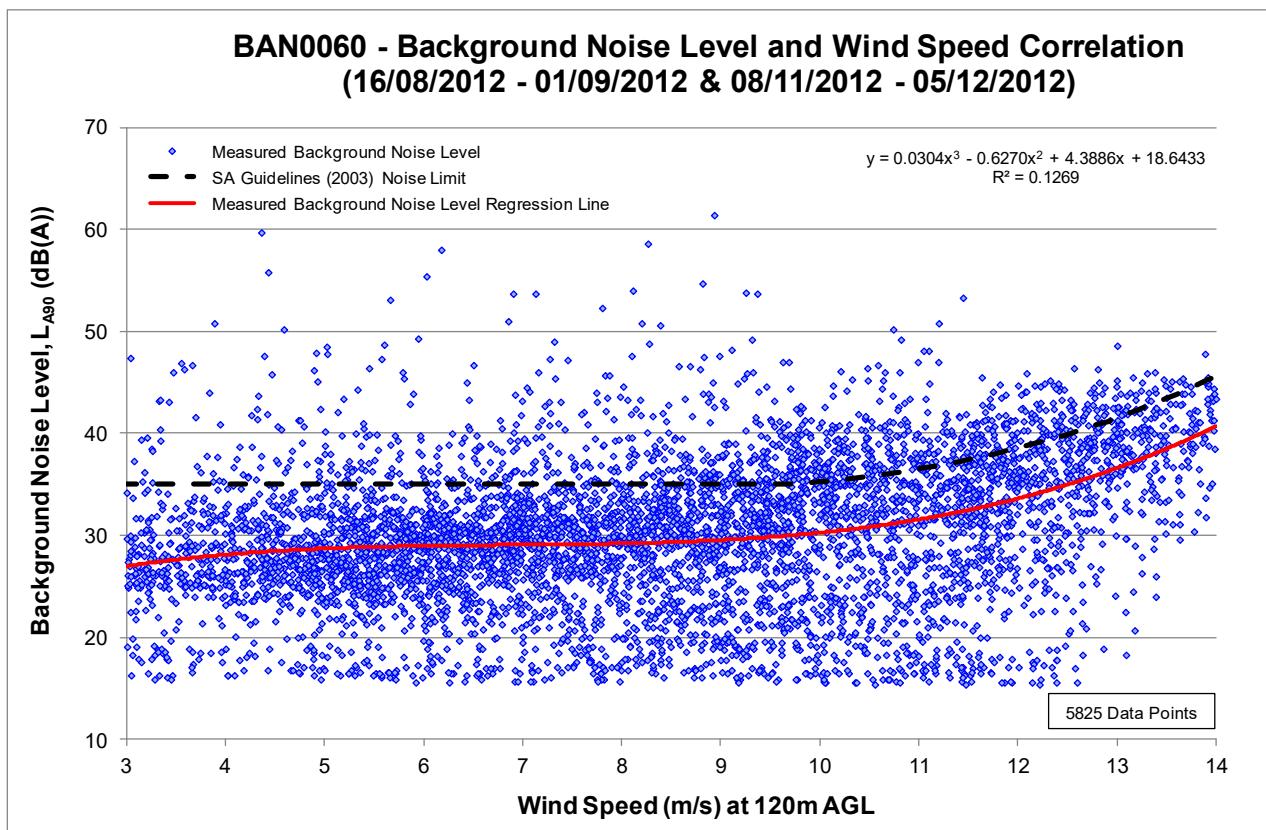
The resultant wind speeds were then correlated with the background noise data. The correlation plots and the derived background noise level at integer wind speeds, for each background noise monitored dwelling are provided below.

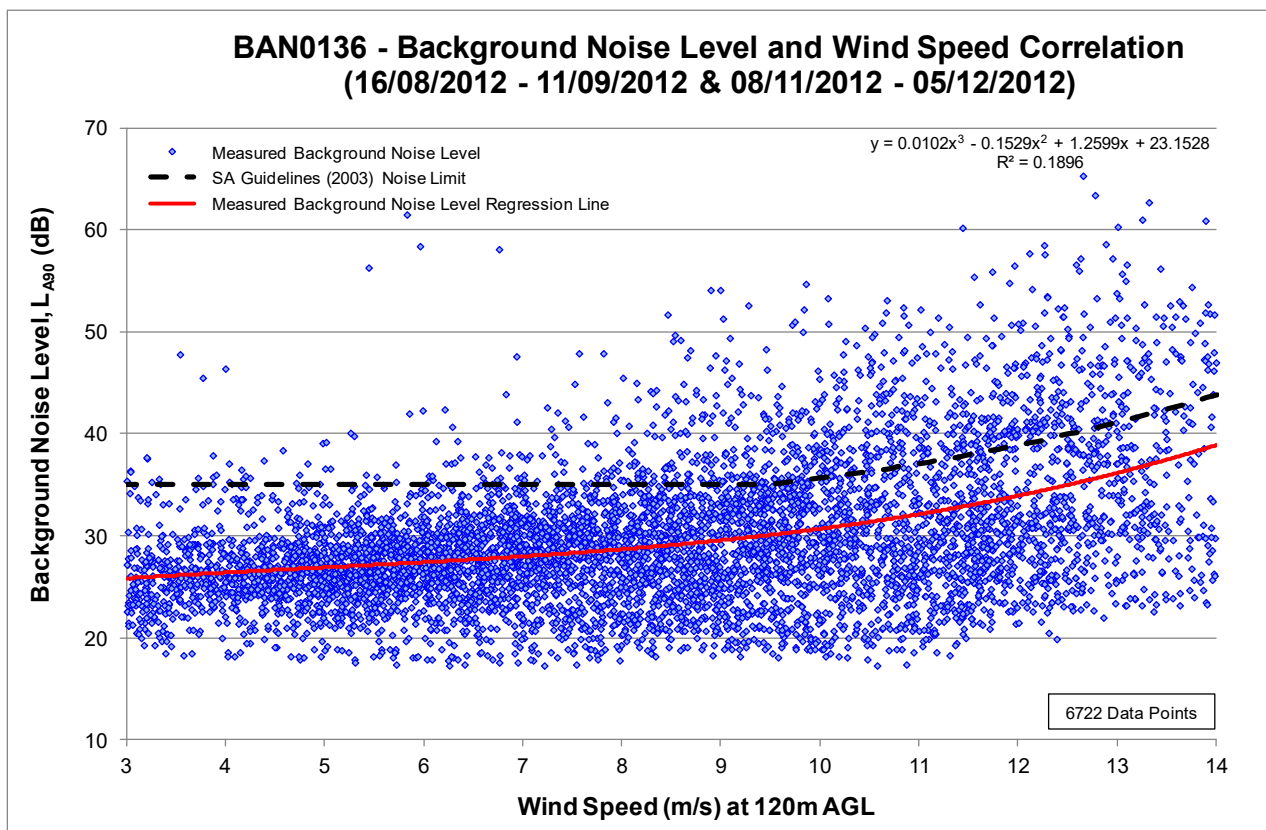
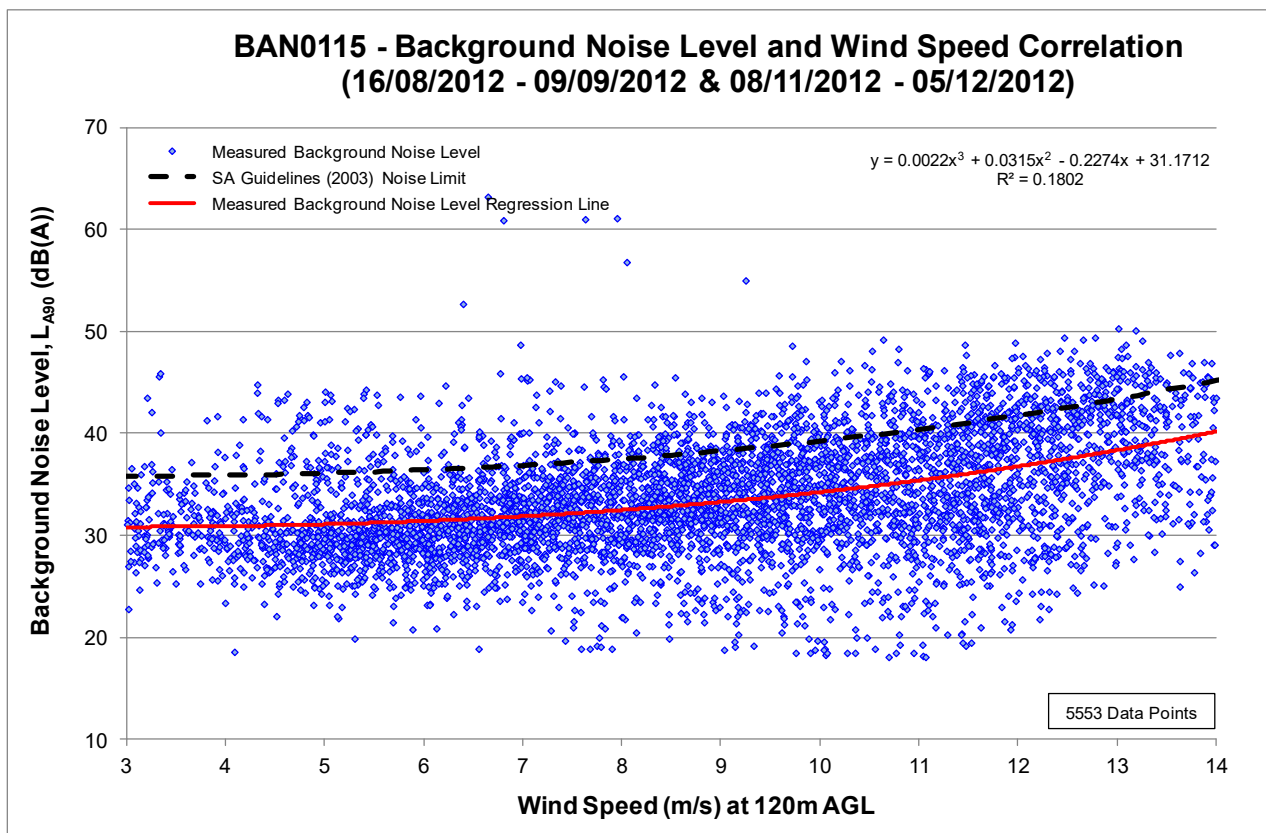
Table 1: Background noise levels by 120m integer wind speed derived for BAN02.

Monitored Dwelling	Coordinates (UTM WGS84 Z55)		Background Noise Level (dB(A)) by 120m AGL Wind Speed (m/s)											
	Easting	Northing	3	4	5	6	7	8	9	10	11	12	13	14
BAN0009	658993	6177998	28	30	31	32	32	32	32	33	34	35	37	40
BAN0032	672635	6174096	26	28	29	29	29	29	29	29	30	31	34	37
BAN0034	658197	6178590	29	31	32	33	33	33	33	34	35	36	38	42
BAN0048	674793	6177078	28	30	32	33	34	35	35	36	37	38	40	42
BAN0060	668962	6166711	27	28	29	29	29	29	30	30	32	34	37	41
BAN0076	663854	6169306	31	31	31	32	32	32	32	33	33	35	36	39
BAN0115	673902	6168649	31	31	31	31	32	32	33	34	35	37	38	40
BAN0136	674135	6169504	26	26	27	27	28	29	30	31	32	34	36	39
BAN0144	668769	6167707	25	26	27	27	28	29	30	31	32	35	37	40
BAN0152	674475	6171888	29	30	31	31	32	32	33	34	35	37	39	42
BAN0155	666694	6176430	23	23	24	24	25	26	27	28	30	32	35	38
BAN0158	666918	6175275	25	26	27	28	29	30	31	32	34	37	41	45
BAN0159	667506	6168917	24	25	27	28	29	30	31	33	34	37	40	43
BAN0170	669036	6176903	25	26	27	27	28	28	29	30	31	33	35	38

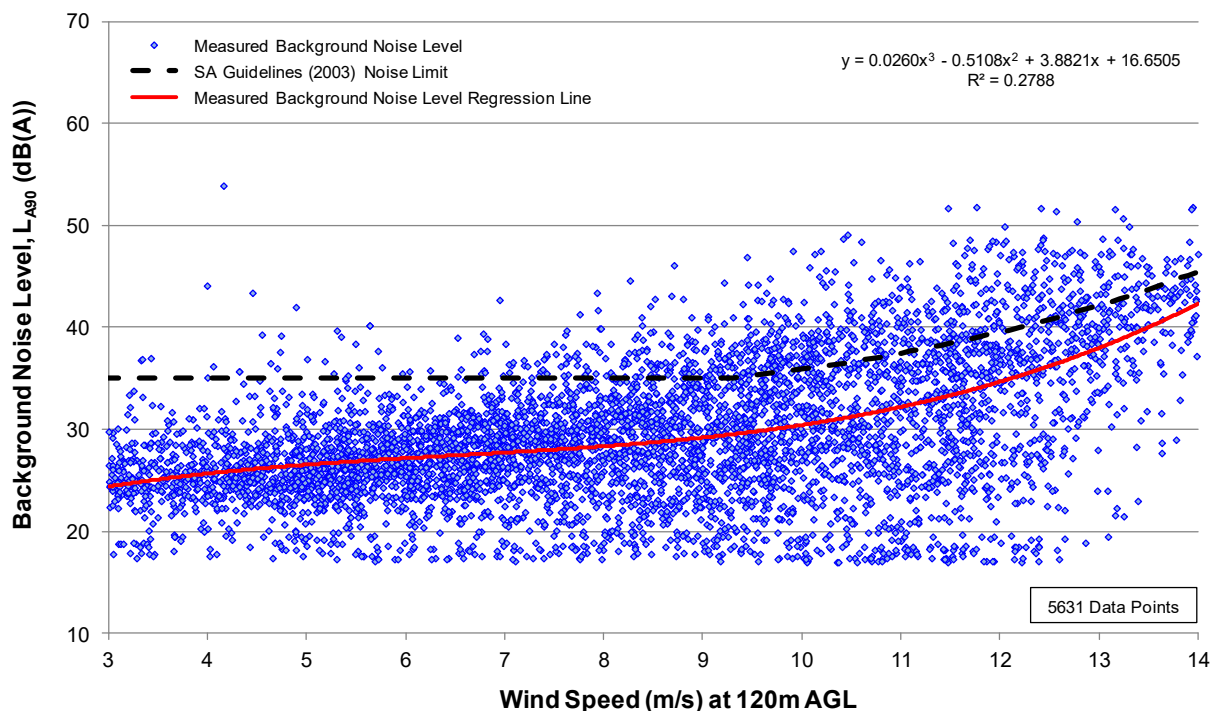




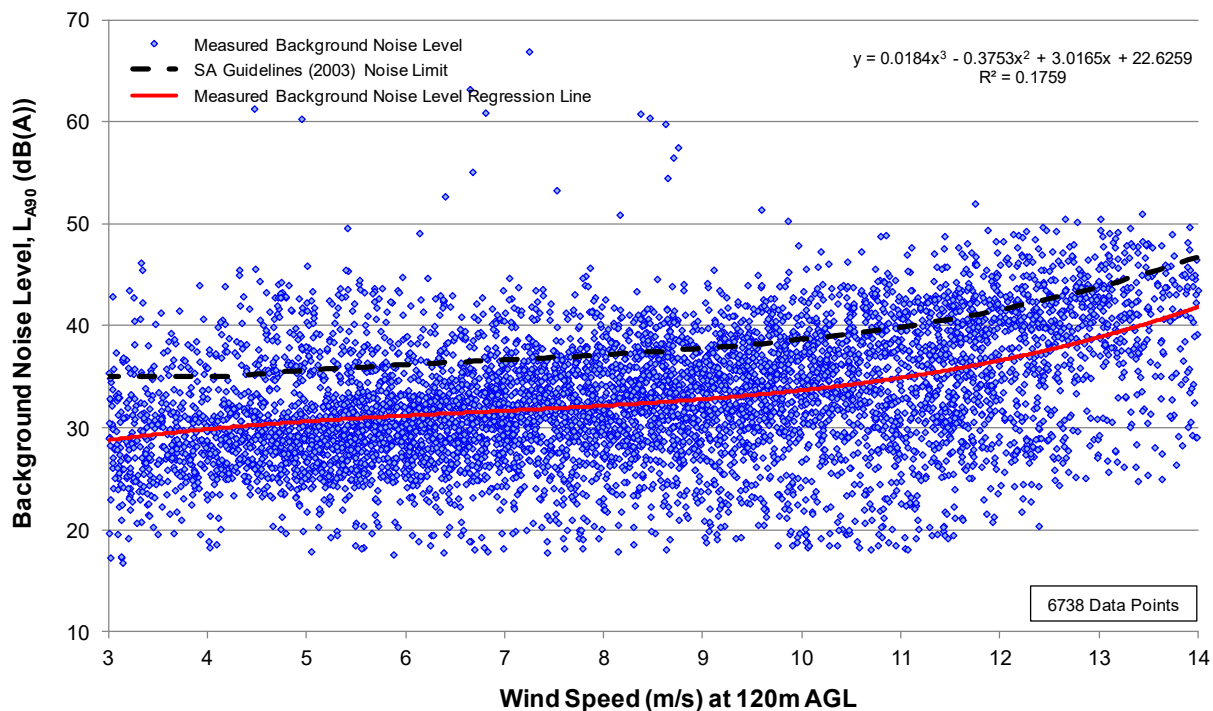




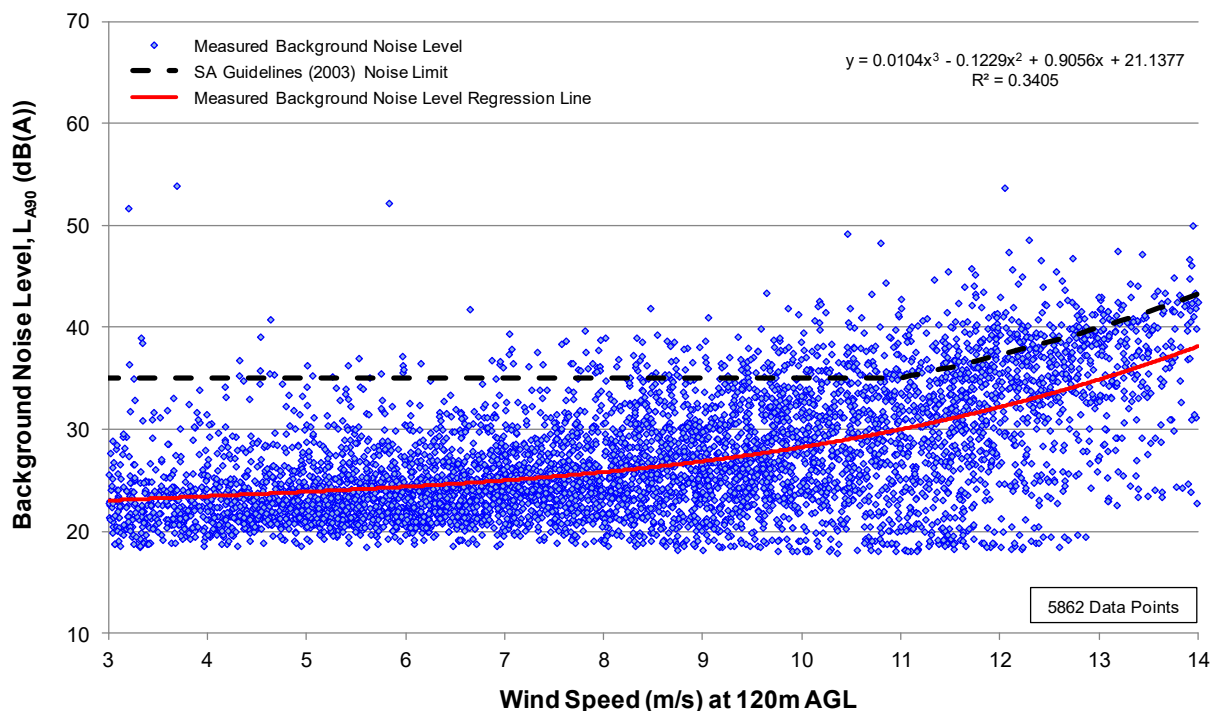
BAN0144 - Background Noise Level and Wind Speed Correlation (16/08/2012 - 10/09/2012 & 08/11/2012 - 05/12/2012)



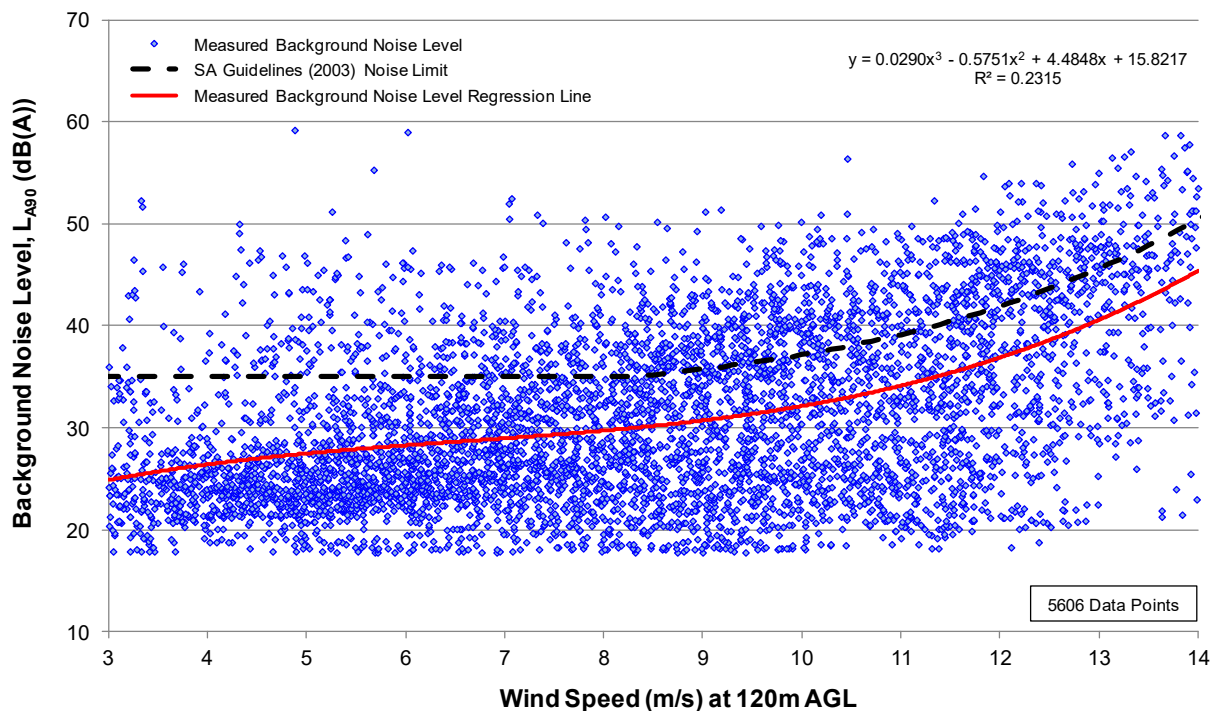
BAN0152 - Background Noise Level and Wind Speed Correlation (16/08/2012 - 11/09/2012 & 08/11/2012 - 05/12/2012)

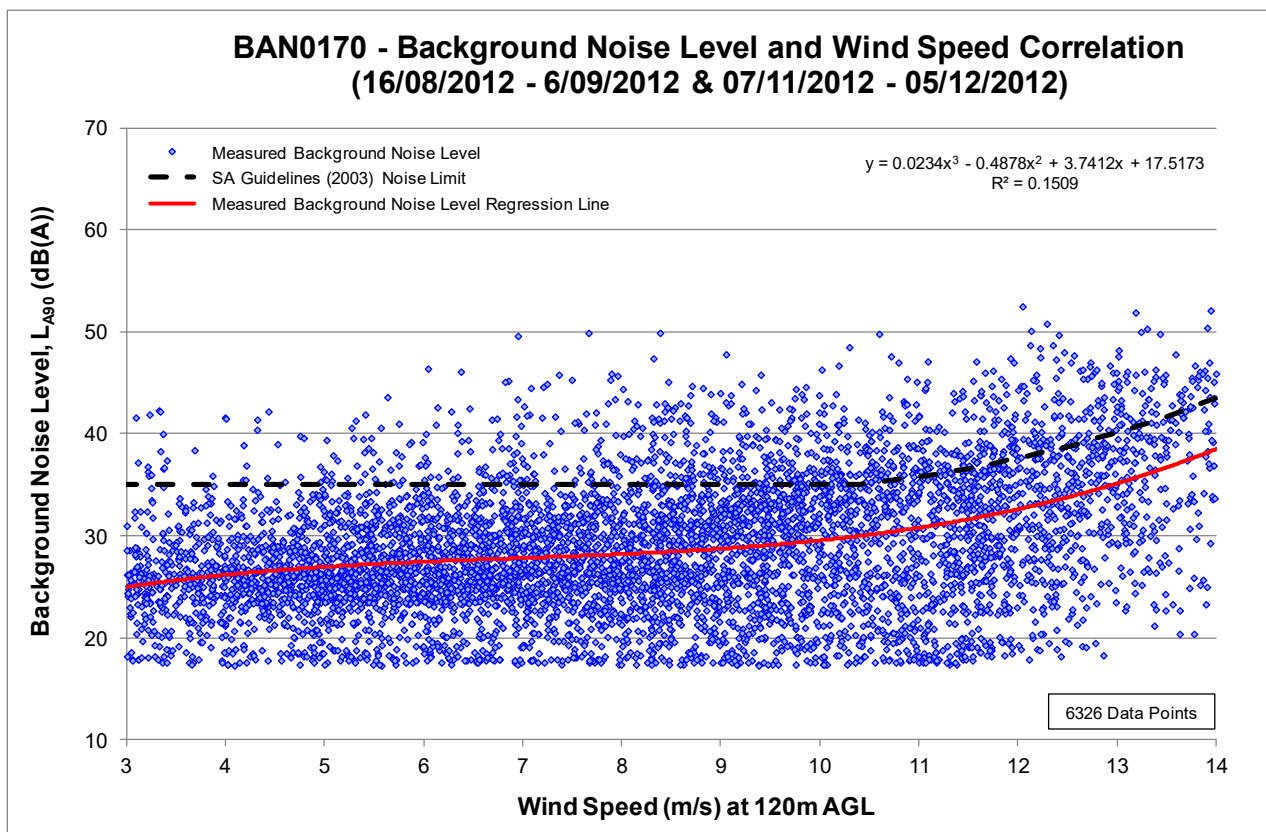
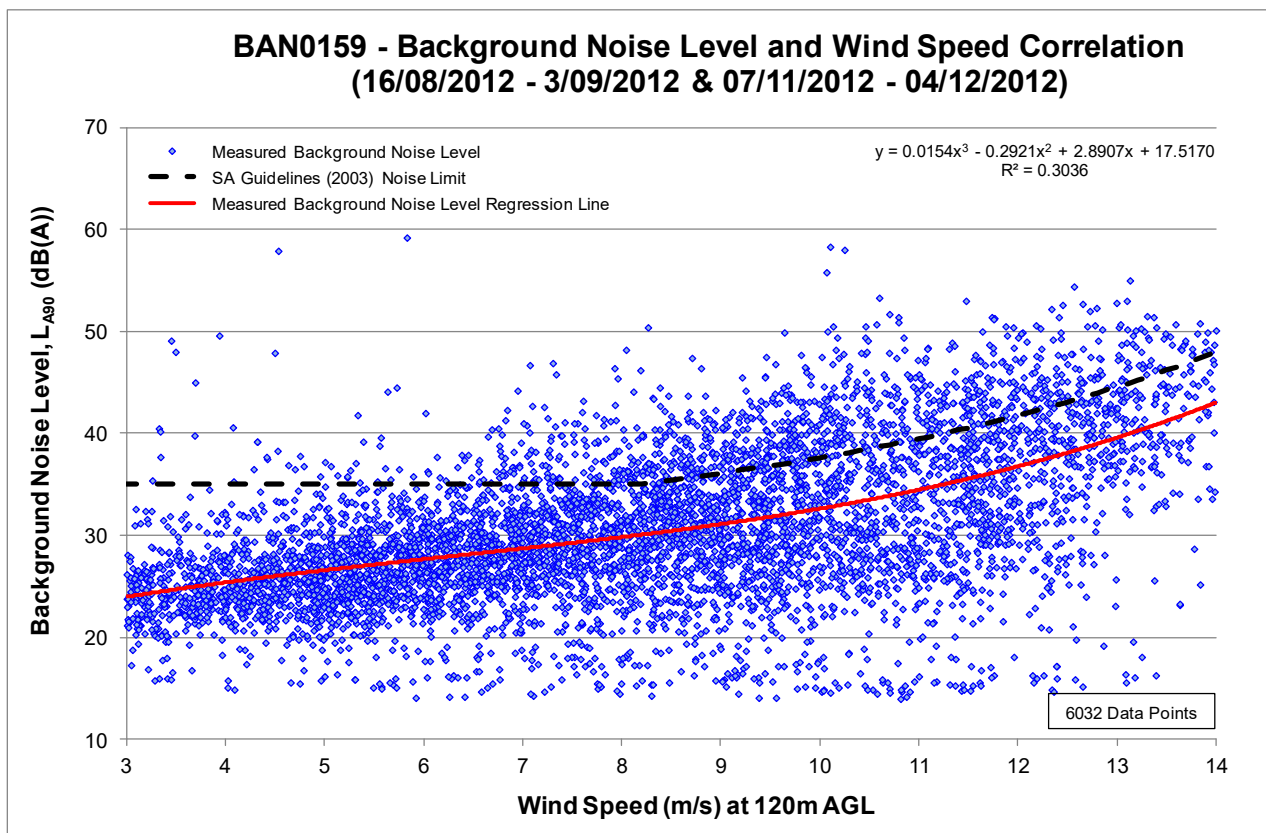


BAN0155 - Background Noise Level and Wind Speed Correlation (16/08/2012 - 01/09/2012 & 07/11/2012 - 05/12/2012)



BAN0158 - Background Noise Level and Wind Speed Correlation (16/08/2012 - 31/08/2012 & 07/11/2012 - 05/12/2012)





4 PREDICTED NOISE LEVEL FROM THE UPDATED TURBINE LAYOUT

The turbine layout has been updated and includes the removal of a number of wind turbines. The updated turbine layout “LO1” has a total of 75 wind turbines, at the coordinates provided in Table 1.

Table 2: Coordinates of turbines associated with turbine layout LO1.

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
1	671618	6174752
2	672551	6169350
3	671220	6172725
5	672506	6168805
7	671261	6169917
11	664944	6171739
12	672635	6169745
13	671656	6173805
14	664721	6172733
17	672377	6168142
18	663601	6172799
19	664006	6171605
21	662281	6173305
22	670581	6170580
24	671306	6169580
25	671131	6168379
26	669892	6171233
27	664756	6172455
28	670262	6173541
32	672716	6167943
33	672070	6170045
34	672357	6170336
35	663756	6172505
36	672238	6168456
41	664931	6176230

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
44	664806	6174230
45	671006	6168951
46	671465	6170340
47	671217	6169267
48	669615	6171540
49	664831	6175855
50	671015	6173890
53	670056	6172655
54	671370	6174593
55	669956	6172305
57	670581	6170855
58	671287	6174189
59	670190	6172964
60	671481	6173130
61	672625	6168300
62	671668	6167651
63	663056	6174030
65	663781	6172005
67	672228	6170535
69	669424	6173513
71	669565	6173814
72	663856	6171405
73	665140	6172054
76	665306	6176655
79	663431	6171805

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
80	671402	6173443
81	669706	6171830
83	669931	6172005
85	670956	6171280
86	665621	6171497
87	663831	6172255
88	663806	6174730
89	663681	6173030
91	669715	6174088
94	664806	6174530
95	670351	6173243
96	664131	6173380
97	664781	6175530
98	665231	6176430
100	670756	6171080
102	672301	6167831
104	664806	6173505
107	672458	6168591
110	671328	6172413
111	671558	6167971
114	663956	6173205
115	664704	6175039
118	664806	6173805
119	662440	6173814
122	672508	6169040

Dwellings that are located within 5km of the wind turbines are identified in Table 3.

Table 3: Dwellings within 5km of the wind turbines.

Receiver ID	Coordinates (UTM WGS84 Z55)		Type	Land Owner Status	Distance to Closest Turbine (m)
	Easting	Northing			
BAN0020	665655	6178818	House	Involved	2191
BAN0021	667892	6172720	House	Involved	1725
BAN0022	676792	6171940	House	Not Involved	4701
BAN0025	676000	6175941	House	Not Involved	4540
BAN0026	667373	6168710	House	Not Involved	3292
BAN0032	672635	6174096	House	Involved	1021
BAN0035	675013	6174765	House	Not Involved	3395
BAN0041	672598	6175449	House	Involved	1203
BAN0042	661105	6169530	House	Not Involved	3254
BAN0043	658490	6173393	House	Not Involved	3792
BAN0048	674793	6177078	House	Not Involved	3936
BAN0055	675055	6165317	House	Involved	3517
BAN0056	658577	6171343	House	Not Involved	4192
BAN0060	668962	6166711	House	Not Involved	2736
BAN0062	661390	6169789	House	Not Involved	2869
BAN0064	674960	6178313	School	Not Involved	4884
BAN0075	661597	6167901	House	Not Involved	4169
BAN0076	663854	6169306	House	Not Involved	2099
BAN0087	668133	6171952	House	Involved	1538
BAN0096	659218	6175919	House	Involved	3849
BAN0100	673030	6169297	House	Involved	482
BAN0101	666370	6176268	House	Neighbour Agreement	1132
BAN0105	675804	6175406	House	Not Involved	4237
BAN0106	674765	6172626	House	Not Involved	3288
BAN0108	660693	6170275	House	Involved	3136
BAN0111	672994	6179558	House	Not Involved	4999
BAN0115	673902	6168649	House	Neighbour Agreement	1324
BAN0117	664596	6169872	House	Involved	1702
BAN0119	663003	6180058	House	Involved	4109
BAN0126	660701	6169270	House	Not Involved	3725
BAN0128	676659	6168997	House	Not Involved	4081
BAN0129	677616	6169758	House	Not Involved	4981
BAN0135	675341	6163994	House	Not Involved	4742
BAN0136	674135	6169504	House	Neighbour Agreement	1519
BAN0138	674728	6164928	House	Not Involved	3625
BAN0139	674830	6177838	House	Not Involved	4454
BAN0140	674863	6178411	House	Not Involved	4891
BAN0141	671520	6179339	House	Not Involved	4588
BAN0142	670364	6177556	House	Not Involved	3072
BAN0144	668769	6167707	House	Not Involved	2456

Receiver ID	Coordinates (UTM WGS84 Z55)		Type	Land Owner Status	Distance to Closest Turbine (m)
	Easting	Northing			
BAN0152	674475	6171888	House	Not Involved	2623
BAN0154	667088	6176107	House	Neighbour Agreement	1864
BAN0155	666694	6176430	House	Neighbour Agreement	1406
BAN0158	666918	6175275	House	Neighbour Agreement	2045
BAN0159	667506	6168917	House	Involved	3195
BAN0160	659484	6176196	House	Involved	3796
BAN0161	659100	6172993	House	Involved	3196
BAN0162	660074	6173884	House	Involved	2282
BAN0164	667492	6168869	House	Involved	3226
BAN0165	667447	6168827	House	Not Involved	3235
BAN0166	667440	6168580	House	Not Involved	3438
BAN0170	669036	6176903	House	Not Involved	2896
BAN0172	670575	6166155	House	Neighbour Agreement	1853
BAN0173	674209	6165923	House	Involved	2512
BAN0175	675807	6176676	House	Not Involved	4610
BAN0176	665662	6180278	House	Not Involved	3640
BAN0177	664441	6167689	House	Not Involved	3762
BAN0179	663462	6168501	House	Not Involved	2931
BAN0181	661493	6168919	House	Not Involved	3430
BAN0182	660693	6170348	House	Involved	3102
BAN0186	663765	6166945	House	Not Involved	4461
BAN0187	661093	6169533	House	Not Involved	3260
BAN0189	660065	6173665	House	Involved	2245
BAN0212	674876	6178540	House	Not Involved	4996
BAN0215	674828	6178554	House	Not Involved	4976
BAN0217	674575	6178684	House	Not Involved	4920
BAN0225	662546	6179407	House	Involved	3898
BAN0235	663846	6169475	House	Not Involved	1930
BAN0238	670657	6166162	House	Not Involved	1800
BAN0243	674789	6172958	House	Not Involved	3245
BAN0260	661457	6169844	House	Not Involved	2782
BAN0274	674876	6178488	House	Not Involved	4957
BAN0276	668772	6167753	Cottage	Not Involved	2441
BAN0280	664102	6166698	New Cabin	Not Involved	4713
BAN0282	666714	6178407	New House	Not Involved	2248

The noise from the wind turbines has been predicted to the dwellings above based on the GE3.4-130 turbine, and the same sound propagation model and inputs as the Principal Assessment.

The predicted noise levels were compared with noise criteria established in accordance with the methodology in the Principal Assessment, which considered the SA Wind Farm Noise Guidelines and WHO Guidelines. The noise criteria have been based on the background noise levels in Table 1.

The predicted noise levels and the resultant noise criteria are summarised in Table 4. Predicted noise level contours corresponding to 10 m/s wind speed (results in the highest noise levels) are provided in Figure 1.

Table 4: Predicted noise levels and relevant criteria.

Receiver ID	Representative Logging Location	Noise Level (dB(A)) at Integer Wind Speed																							
		3m/s		4m/s		5m/s		6m/s		7m/s		8m/s		9m/s		10m/s		11m/s		12m/s		13m/s		14m/s	
		Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction
BAN0020	BAN0170	45	22	45	22	45	23	45	25	45	29	45	31	45	33	45	33	45	33	45	33	45	33	45	33
BAN0020	BAN0170	45	22	45	22	45	23	45	25	45	28	45	31	45	33	45	33	45	33	45	33	45	33	45	33
BAN0021	BAN0158	45	30	45	30	45	30	45	33	45	36	45	39	45	40	45	40	45	40	45	40	46	40	50	40
BAN0022	BAN0152	35	17	35	17	36	17	36	20	37	23	37	26	38	27	39	27	40	27	42	27	44	27	47	27
BAN0025	BAN0048	35	15	35	15	37	16	38	18	39	21	40	24	40	25	41	25	42	25	43	25	45	25	47	25
BAN0026	BAN0159	35	23	35	23	35	23	35	25	35	29	35	31	36	33	38	33	39	33	42	33	45	33	48	33
BAN0032	BAN0032	45	33	45	33	45	33	45	36	45	39	45	42	45	43	45	43	45	43	45	43	45	43	45	43
BAN0035	BAN0048	35	20	35	20	37	20	38	23	39	26	40	29	40	30	41	30	42	30	43	30	45	30	47	30
BAN0041	BAN0032	45	29	45	29	45	29	45	32	45	35	45	38	45	39	45	39	45	39	45	39	45	39	45	39
BAN0042	BAN0076	36	20	36	20	36	20	37	23	37	26	37	29	37	30	38	30	38	30	40	30	41	30	44	30
BAN0043	BAN0009	35	16	35	16	36	16	37	19	37	22	37	25	37	26	38	26	39	26	40	26	42	26	45	26
BAN0048	BAN0048	35	16	35	16	37	17	38	19	39	22	40	25	40	26	41	26	42	26	43	26	45	26	47	26
BAN0055	BAN0115	45	19	45	19	45	19	45	21	45	25	45	27	45	29	45	29	45	29	45	29	45	29	45	29
BAN0056	BAN0009	35	15	35	15	36	15	37	18	37	21	37	24	37	25	38	25	39	25	40	25	42	25	45	25
BAN0060	BAN0060	35	23	35	23	35	23	35	26	35	29	35	32	35	33	35	33	37	33	39	33	42	33	46	33
BAN0062	BAN0076	36	22	36	22	36	22	37	24	37	28	37	30	37	32	38	32	38	32	40	32	41	32	44	32
BAN0064	BAN0048	35	13	35	13	37	14	38	16	39	19	40	22	40	23	41	23	42	23	43	23	45	23	47	23
BAN0075	BAN0076	36	16	36	16	36	17	37	19	37	22	37	25	37	26	38	27	38	27	40	26	41	26	44	26
BAN0076	BAN0076	36	25	36	25	36	25	37	28	37	31	37	34	37	35	38	36	38	35	40	35	41	35	44	35
BAN0087	BAN0159	45	31	45	31	45	31	45	33	45	37	45	40	45	41	45	41	45	41	45	41	45	41	48	41
BAN0096	BAN0009	45	16	45	16	45	17	45	19	45	23	45	25	45	27	45	27	45	27	45	27	45	27	45	27
BAN0100	BAN0115	45	39	45	39	45	39	45	42	45	45	45	48	45	49	45	50	45	50	45	50	45	50	45	50
BAN0101	BAN0155	45	31	45	31	45	31	45	34	45	37	45	40	45	41	45	42	45	41	45	41	45	41	45	41
BAN0105	BAN0048	35	16	35	16	37	17	38	19	39	23	40	25	40	27	41	27	42	27	43	27	45	27	47	27
BAN0106	BAN0152	35	23	35	23	36	23	36	26	37	29	37	32	38	33	39	33	40	33	42	33	44	33	47	33
BAN0108	BAN0076	45	21	45	21	45	21	45	23	45	27	45	29	45	31	45	31	45	31	45	31	45	31	45	31
BAN0111	BAN0048	35	13	35	13	37	14	38	16	39	19	40	22	40	23	41	23	42	23	43	23	45	23	47	23

Receiver ID	Representative Logging Location	Noise Level (dB(A)) at Integer Wind Speed																							
		3m/s		4m/s		5m/s		6m/s		7m/s		8m/s		9m/s		10m/s		11m/s		12m/s		13m/s		14m/s	
		Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction
BAN0115	BAN0115	45	33	45	33	45	33	45	36	45	39	45	42	45	43	45	43	45	43	45	43	45	43	45	43
BAN0117	BAN0076	45	28	45	28	45	29	45	31	45	34	45	37	45	39	45	39	45	39	45	39	45	39	45	39
BAN0119	BAN0009	45	15	45	15	45	16	45	18	45	21	45	24	45	26	45	26	45	26	45	26	45	26	45	26
BAN0126	BAN0076	36	18	36	18	36	18	37	21	37	24	37	27	37	28	38	28	38	28	40	28	41	28	44	28
BAN0128	BAN0136	35	19	35	19	35	19	35	21	35	25	35	27	35	29	36	29	37	29	39	29	41	29	44	29
BAN0129	BAN0136	35	16	35	16	35	16	35	18	35	22	35	24	35	26	36	26	37	26	39	26	41	26	44	26
BAN0135	BAN0115	36	14	36	14	36	15	36	17	37	20	37	23	38	25	39	25	40	25	42	25	43	25	45	25
BAN0136	BAN0136	45	30	45	30	45	31	45	33	45	36	45	39	45	41	45	41	45	41	45	41	45	41	45	41
BAN0138	BAN0115	36	18	36	18	36	19	36	21	37	24	37	27	38	28	39	29	40	29	42	28	43	28	45	28
BAN0139	BAN0048	35	14	35	14	37	15	38	17	39	20	40	23	40	24	41	24	42	24	43	24	45	24	47	24
BAN0140	BAN0048	35	13	35	13	37	14	38	16	39	19	40	22	40	23	41	23	42	23	43	23	45	23	47	23
BAN0141	BAN0170	35	14	35	14	35	15	35	17	35	20	35	23	35	25	35	25	36	25	38	25	40	25	43	25
BAN0142	BAN0170	35	19	35	19	35	19	35	22	35	25	35	28	35	29	35	30	36	29	38	29	40	29	43	29
BAN0144	BAN0144	35	25	35	25	35	25	35	28	35	31	35	34	35	35	36	35	37	35	40	35	42	35	45	35
BAN0152	BAN0152	35	25	35	25	36	25	36	28	37	31	37	34	38	35	39	35	40	35	42	35	44	35	47	35
BAN0154	BAN0155	45	27	45	27	45	27	45	30	45	33	45	36	45	37	45	38	45	37	45	37	45	37	45	37
BAN0155	BAN0155	45	29	45	29	45	29	45	32	45	35	45	38	45	39	45	39	45	39	45	39	45	39	45	39
BAN0158	BAN0158	45	28	45	28	45	28	45	31	45	34	45	37	45	38	45	39	45	38	45	38	46	38	50	38
BAN0159	BAN0159	45	23	45	23	45	24	45	26	45	29	45	32	45	34	45	34	45	34	45	34	45	34	48	34
BAN0160	BAN0009	45	17	45	17	45	17	45	20	45	23	45	26	45	27	45	27	45	27	45	27	45	27	45	27
BAN0161	BAN0009	45	18	45	18	45	19	45	21	45	24	45	27	45	29	45	29	45	29	45	29	45	29	45	29
BAN0162	BAN0009	45	23	45	23	45	23	45	25	45	29	45	31	45	33	45	33	45	33	45	33	45	33	45	33
BAN0164	BAN0159	45	23	45	23	45	24	45	26	45	29	45	32	45	33	45	34	45	34	45	34	45	33	48	33
BAN0165	BAN0159	35	23	35	23	35	23	35	26	35	29	35	32	36	33	38	33	39	33	42	33	45	33	48	33
BAN0166	BAN0159	35	22	35	22	35	23	35	25	35	29	35	31	36	33	38	33	39	33	42	33	45	33	48	33
BAN0170	BAN0170	35	22	35	22	35	23	35	25	35	29	35	31	35	33	35	33	36	33	38	33	40	33	43	33
BAN0172	BAN0060	45	26	45	26	45	27	45	29	45	32	45	35	45	37	45	37	45	37	45	37	45	37	46	37
BAN0173	BAN0115	45	23	45	23	45	23	45	26	45	29	45	32	45	33	45	33	45	33	45	33	45	33	45	33
BAN0175	BAN0048	35	15	35	15	37	15	38	17	39	21	40	23	40	25	41	25	42	25	43	25	45	25	47	25
BAN0176	BAN0155	35	16	35	16	35	16	35	19	35	22	35	25	35	26	35	26	35	26	37	26	40	26	43	26
BAN0177	BAN0076	36	18	36	18	36	19	37	21	37	24	37	27	37	29	38	29	38	29	40	29	41	29	44	29
BAN0179	BAN0076	36	21	36	21	36	21	37	24	37	27	37	30	37	31	38	31	38	31	40	31	41	31	44	31
BAN0181	BAN0076	36	19	36	19	36	19	37	22	37	25	37	28	37	29	38	29	38	29	40	29	41	29	44	29
BAN0182	BAN0076	45	21	45	21	45	21	45	24	45	27	45	30	45	31	45	31	45	31	45	31	45	31	45	31
BAN0186	BAN0076	36	16	36	16	36	16	37	19	37	22	37	24	37	26	38	26	38	26	40	26	41	26	44	26

Receiver ID	Representative Logging Location	Noise Level (dB(A)) at Integer Wind Speed																							
		3m/s		4m/s		5m/s		6m/s		7m/s		8m/s		9m/s		10m/s		11m/s		12m/s		13m/s		14m/s	
		Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction
BAN0187	BAN0076	36	20	36	20	36	20	37	23	37	26	37	29	37	30	38	30	38	30	40	30	41	30	44	30
BAN0189	BAN0009	45	23	45	23	45	23	45	25	45	29	45	31	45	33	45	33	45	33	45	33	45	33	45	33
BAN0212	BAN0048	35	13	35	13	37	13	38	16	39	19	40	22	40	23	41	23	42	23	43	23	45	23	47	23
BAN0215	BAN0048	35	13	35	13	37	13	38	16	39	19	40	21	40	23	41	23	42	23	43	23	45	23	47	23
BAN0217	BAN0048	35	13	35	13	37	14	38	16	39	19	40	22	40	23	41	23	42	23	43	23	45	23	47	23
BAN0225	BAN0009	45	17	45	17	45	17	45	19	45	23	45	25	45	27	45	27	45	27	45	27	45	27	45	27
BAN0235	BAN0076	36	26	36	26	36	26	37	29	37	32	37	35	37	36	38	36	38	36	40	36	41	36	44	36
BAN0238	BAN0060	35	27	35	27	35	27	35	29	35	33	35	35	35	37	35	37	37	37	39	37	42	37	46	37
BAN0243	BAN0152	35	21	35	21	36	22	36	24	37	28	37	30	38	32	39	32	40	32	42	32	44	32	47	32
BAN0260	BAN0076	36	22	36	22	36	22	37	25	37	28	37	31	37	32	38	32	38	32	40	32	41	32	44	32
BAN0274	BAN0048	35	13	35	13	37	13	38	16	39	19	40	22	40	23	41	23	42	23	43	23	45	23	47	23
BAN0276	BAN0144	35	25	35	25	35	25	35	28	35	31	35	34	35	35	36	35	37	35	40	35	42	35	45	35
BAN0280	BAN0076	36	15	36	15	36	16	37	18	37	21	37	24	37	26	38	26	38	26	40	26	41	26	44	26
BAN0282	BAN0155	35	22	35	22	35	23	35	25	35	28	35	31	35	33	35	33	35	33	37	33	40	33	43	33

Based on the predictions, the noise from layout LO1 will comply with the criteria established in accordance with the SA Guidelines with a base level of 35 dB(A), at all non-involved dwellings except at BAN238. To achieve the requirements of the SA Guidelines at BAN238, an agreement with the landholder will need to be established (it is understood that this is currently being negotiated), otherwise the wind farm layout will need to be modified (removal of the two closest turbines, or relocation of the turbines) such that the predicted noise levels at all non-involved dwellings achieve the established criteria.

At involved dwellings, the external noise levels provided by the WHO Guidelines will be achieved with the exception of BAN0100. At this dwelling, the WHO Guidelines can be achieved by assessing the acoustic performance of the facade and considering potential acoustic treatment if required. This treatment might take the form of mechanical ventilation to allow windows to be closed and/or sealing any gaps around doors and windows.

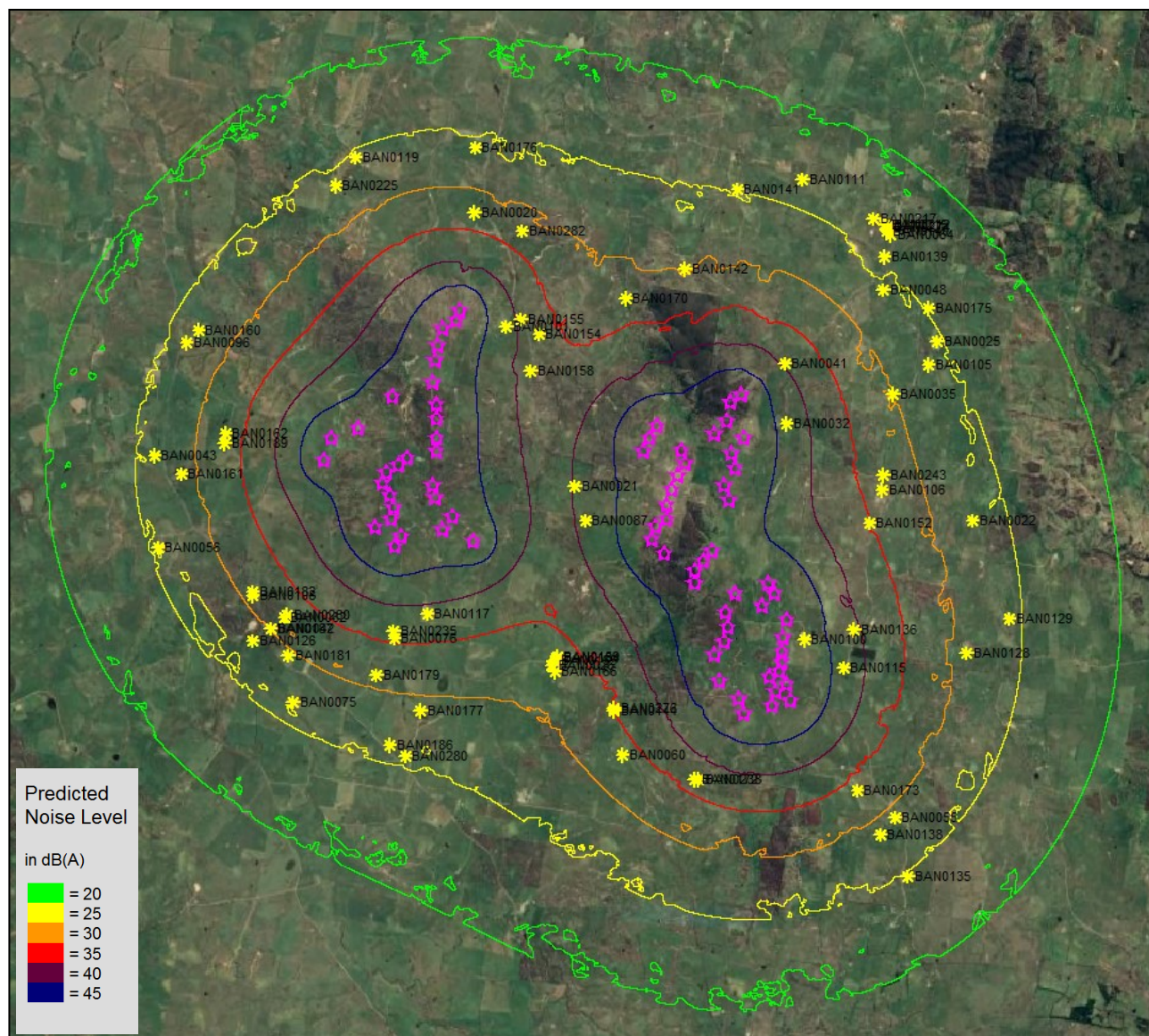


Figure 1: Predicted noise level contours at 10m/s wind speed.