Bango Wind Farm

Revised Environmental Noise Assessment

S3958C16

October 2018

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TABLE OF CONTENTS

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).

A supplementary environmental noise assessment was later conducted to consider changes to the Project, which included a revision to the wind speed data used for correlation with background noise; a revision to the proposed wind turbine layout; and minor corrections to the coordinates of some residences. The assessment was detailed in the Sonus report S3958C12, dated May 2017 (the Supplementary Assessment).

Development Consent for the Project (Application Number SSD 6686) was granted on 1 May 2018, and includes a number of Conditions, including environmental noise requirements at residences.

Since Development Consent, further changes have been made to the Project, as follows:

- a revision to the wind turbine layout, comprising 71 wind turbines;
- a consideration of an alternative wind turbine layout, comprising 49 wind turbines; and,
- a different wind turbine model, consisting of GE 5.3-158 wind turbines with 121m hub height.

Therefore, this assessment predicts the noise levels at residences from the two wind turbine layouts based on the GE 5.3-158 wind turbines, and compares them with the relevant noise criteria established in the Development Consent conditions.

2 WIND TURBINE LAYOUTS

The revised primary wind turbine layout, designated as "PL1", comprises 71 wind turbines, whilst the alternative wind turbine layout, designated as "PL2", comprises 49 wind turbines. The coordinates of the wind turbines for each layout are provided in Tables 1 and 2.

Table 1: Coordinates of wind turbines for layout PL1.

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
1	671619	6174752
2	672551	6169350
3	671220	6172726
5	672506	6168805
7	671261	6169917
11	664944	6171739
12	672635	6169746
13	671656	6173805
14	664721	6172733
17	672377	6168142
18	663673	6172786
21	662281	6173305
22	670581	6170580
24	671306	6169580
25	671131	6168379
26	669892	6171233
27	664756	6172455
28	670292	6173495
32	672716	6167943
33	672070	6170045
34	672357	6170336
35	663756	6172505
36	672238	6168457
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	671435	6174584
55	669956	6172305
57	670581	6170855
58	671320	6174118
59	670190	6172964
60	671481	6173130
61	672625	6168300
62	671668	6167651
63	663056	6174030
67	672228	6170536
69	669424	6173514
71	669565	6173814
73	665140	6172054
76	665306	6176655
80	671402	6173443
81	669706	6171830

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
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	6167832
104	664806	6173505
107	672458	6168591
110	671328	6172413
111	671558	6167971
114	663956	6173205
115	664705	6175040
118	664806	6173805
119	662440	6173814
122	672508	6169040

Table 2: Coordinates of wind turbines for layout PL2.

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
18	663673	6172786
22	670581	6170580
24	671306	6169580
27	664756	6172455
32	672716	6167943
33	672070	6170045
34	672357	6170336
35	663756	6172505

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
41	664931	6176230
44	664806	6174230
46	671465	6170340
47	671217	6169267
49	664831	6175855
50	671015	6173890
54	671435	6174584
57	670581	6170855
58	671320	6174118
60	671481	6173130
61	672625	6168300
63	663056	6174030
67	672228	6170535
73	665140	6172054
76	665306	6176655
80	671402	6173443
85	670956	6171280

Turbine ID	Coordinates (UTM WGS84 Z55)	
	Easting	Northing
87	663831	6172255
88	663806	6174730
89	663681	6173030
94	664806	6174530
96	664131	6173380
97	664781	6175530
98	665231	6176430
100	670756	6171080
104	664806	6173505
107	672458	6168591
110	671328	6172413
114	663956	6173205
115	664705	6175039
118	664806	6173805
122	672508	6169040

3 RESIDENCES SURROUNDING THE WIND FARM

Residences located within 4km of the wind farm are listed in Table 3. The status of the land owners (associated or non-associated) of the residences are indicated in the table.

Table 3: Residences within 4km of the wind turbines.

Receiver ID	Coordinates (UTM WGS84 Z55)		Associated Land Owner	Distance (m) to Closest Turbine, PL1	Distance (m) to Closest Turbine, PL2
	Easting	Northing			
BAN020	665722	6178761	No	2147	2147
BAN021	667884	6172737	Yes	1725	2828
BAN026	667373	6168710	No	3292	3713
BAN032	672635	6174096	Yes	1021	1021
BAN035	674957	6174740	No	3339	3339
BAN041	672598	6175449	Yes	1202	1202
BAN042	661039	6169519	No	3909	3909
BAN043	658490	6173393	No	3792	4610
BAN048	674793	6177078	No	3935	3935
BAN055	675055	6165317	Yes	3516	3516
BAN060	668962	6166711	No	2736	3409
BAN062	661390	6169789	No	3470	3470
BAN076	663854	6169306	No	2666	2666
BAN087	668133	6171952	Yes	1538	2682
BAN100	673030	6169297	Yes	482	482
BAN101	666370	6176268	Yes	1132	1132
BAN106	674765	6172626	No	3288	3288
BAN108	660693	6170275	Yes	3421	3711
BAN115	673902	6168649	Yes	1323	1323
BAN117	664596	6169872	Yes	1899	1899
BAN136	674135	6169504	Yes	1519	1519
BAN138	674728	6164928	No	3624	3624
BAN142	670364	6177556	No	3072	3072
BAN144	668769	6167707	No	2456	2902
BAN152	674475	6171888	No	2623	2623
BAN154	667088	6176107	Yes	1865	1865
BAN155	666730	6176414	Yes	1445	1445
BAN158	666936	6175290	Yes	2052	2052
BAN159	667506	6168917	Yes	3195	3496
BAN162	660074	6173884	Yes	2281	2985
BAN164	667492	6168869	Yes	3226	3531
BAN165	667447	6168827	No	3235	3591
BAN166	667440	6168580	No	3438	3724
BAN170	669036	6176903	No	2896	3337
BAN172	670575	6166155	No	1852	2790

Receiver ID	Coordinates (UTM WGS84 Z55)		Associated Land Owner	Distance (m) to Closest Turbine, PL1	Distance (m) to Closest Turbine, PL2
	Easting	Northing			
BAN173	674209	6165923	Yes	2511	2511
BAN176	665662	6180278	No	3641	3641
BAN179	663462	6168501	No	3561	3561
BAN182	660693	6170348	Yes	3357	3672
BAN187	661093	6169533	No	3861	3861
BAN189	660065	6173665	Yes	2245	3013
BAN225	662546	6179407	Yes	3898	3898
BAN235	663846	6169475	No	2516	2516
BAN238	670657	6166162	No	1799	2722
BAN239	666515	6175432	Yes	1626	1626
BAN243	674789	6172958	No	3246	3246
BAN260	661449	6169886	No	3359	3359
BAN276	668769	6167755	No	2444	2878
BAN282	666714	6178407	No	2247	2247

4 NOISE CRITERIA

Development Consent Condition 9 in *Schedule 3 Environmental Conditions – General* states the following operational noise requirements for the wind turbines:

> 9. *The Applicant must ensure that the noise generated by the operation of wind turbines does not exceed the relevant criteria in Table 2 at any non-associated residence.*

Table 2: Noise criteria dB(A)

Residence	***Criteria (dB(A) with Reference to Hub Height Wind Speed (m/s)***									
	3	***4***	***5***	***6***	***7***	***8***	***9***	***10***	***11***	***12***
26, 166	*35*	*35*	*35*	*35*	*35*	*35*	*36*	*38*	*39*	*42*
60	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*37*	*39*
62, 76, 179, 235, 260	*36*	*36*	*36*	*37*	*37*	*37*	*37*	*38*	*38*	*40*
106, 152, 243	*35*	*35*	*36*	*36*	*37*	*37*	*38*	*39*	*40*	*42*
144, 276	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*36*	*37*	*40*
165	*35*	*35*	*35*	*35*	*35*	*35*	*36*	*38*	*39*	*42*
170	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*36*	*38*
282	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*35*	*37*
43	*35*	*35*	*36*	*37*	*37*	*37*	*37*	*38*	*39*	*40*
48	*35*	*35*	*37*	*38*	*39*	*40*	*40*	*41*	*42*	*43*
138	*36*	*36*	*36*	*36*	*37*	*37*	*38*	*39*	*40*	*42*
All other non-associated residences	*The higher of 35 dB(A) or the existing background noise level ($L_{A90(10\text{-}minute)}$) plus 5 dB(A)*									

> *Noise generated by the operation of the wind turbines is to be measured in accordance with the relevant requirements of the Department's Wind Energy: Noise Assessment Bulletin (2016) (or its latest version), and the provisions in Appendix 5.*
>
> *However, these criteria do not apply if the Applicant has an agreement with the relevant owner/s of these residences to generate higher noise levels, and the Applicant has advised the Department in writing of the terms of this agreement.*

Condition 9 provides specific noise criteria for wind turbine noise at non-associated residences which are consistent with the noise criteria considered in the Supplementary Assessment. The noise criteria above have been used in this assessment for non-associated residences, as summarised in Table 4.

There are no specific noise requirements in the Development Consent Conditions for associated residences. Therefore, the predicted noise levels are provided without reference to criteria.

Table 4: Noise criteria at non-associated residences.

Residence ID	Representative Logging Location	Noise Criterion (dB(A)) at Integer Hub Wind Speed (m/s)									
		3	4	5	6	7	8	9	10	11	12
Non-Associated Residences											
BAN020	BAN170	35	35	35	35	35	35	35	35	36	38
BAN026	BAN159	35	35	35	35	35	35	36	38	39	42
BAN035	BAN048	35	35	37	38	39	40	40	41	42	43
BAN042	BAN076	36	36	36	37	37	37	37	38	38	40
BAN043	BAN009	35	35	36	37	37	37	37	38	39	40
BAN048	BAN048	35	35	37	38	39	40	40	41	42	43
BAN060	BAN060	35	35	35	35	35	35	35	35	37	39
BAN062	BAN076	36	36	36	37	37	37	37	38	38	40
BAN076	BAN076	36	36	36	37	37	37	37	38	38	40
BAN106	BAN152	35	35	36	36	37	37	38	39	40	42
BAN138	BAN115	36	36	36	36	37	37	38	39	40	42
BAN142	BAN170	35	35	35	35	35	35	35	35	36	38
BAN144	BAN144	35	35	35	35	35	35	35	36	37	40
BAN152	BAN152	35	35	36	36	37	37	38	39	40	42
BAN165	BAN159	35	35	35	35	35	35	36	38	39	42
BAN166	BAN159	35	35	35	35	35	35	36	38	39	42
BAN170	BAN170	35	35	35	35	35	35	35	35	36	38
BAN172	BAN060	35	35	35	35	35	35	35	35	37	39
BAN176	BAN155	35	35	35	35	35	35	35	35	35	37
BAN179	BAN076	36	36	36	37	37	37	37	38	38	40
BAN187	BAN076	36	36	36	37	37	37	37	38	38	40
BAN235	BAN076	36	36	36	37	37	37	37	38	38	40
BAN238	BAN060	35	35	35	35	35	35	35	35	37	39
BAN243	BAN152	35	35	36	36	37	37	38	39	40	42
BAN260	BAN076	36	36	36	37	37	37	37	38	38	40
BAN276	BAN144	35	35	35	35	35	35	35	36	37	40
BAN282	BAN155	35	35	35	35	35	35	35	35	35	37

5 PREDICTED NOISE LEVELS

The noise from the wind turbines has been predicted to the surrounding residences based on:

- the wind turbine layouts, PL1 and PL2, as summarised in Section 2;
- the GE 5.3-158 wind turbines with 121m hub height for both layouts. The total sound power level input of the wind turbine model is provided in Table 5; and,
- the CONCAWE sound propagation model with the same inputs and assumptions as the Principal Assessment.

Table 5: GE5.3-158 total sound power level input to noise model.

Total Sound Power Level (dB(A)) at Integer Hub Wind Speed (m/s)									
3	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
93.8	93.8	94.5	97.6	101.0	103.9	106.0	106.0	106.0	106.0

The predicted noise levels at non-associated residences were compared with the relevant noise criteria (as provided in Section 4) and summarised in Tables 6(a) and 6(b) for layouts PL1 and PL2, respectively. The predicted noise levels at associated residences are provided in Tables 7(a) and 7(b) for layouts PL1 and PL2, respectively.

A predicted noise level contour map corresponding to 9 m/s wind speed (results in the highest noise levels) for each wind turbine layout are provided below.

Based on the predictions, the noise from both layouts, PL1 and PL2, will comply with the noise criteria at all non-associated residences.

Table 6(a): Predicted noise levels (PL1) and relevant criteria at non-associated residences.

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	
		Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction
Non- Associated Residences																					
BAN020	BAN170	35	19	35	19	35	20	35	23	35	26	35	29	35	30	35	30	36	30	38	30
BAN026	BAN159	35	19	35	19	35	20	35	23	35	26	35	28	36	30	38	30	39	30	42	30
BAN035	BAN048	35	16	35	16	37	17	38	20	39	23	40	26	40	27	41	27	42	27	43	27
BAN042	BAN076	36	12	36	12	36	13	37	16	37	19	37	22	37	23	38	23	38	23	40	23
BAN043	BAN009	35	11	35	11	36	13	37	16	37	18	37	21	37	22	38	22	39	22	40	22
BAN048	BAN048	35	12	35	12	37	14	38	16	39	19	40	21	40	23	41	23	42	23	43	23
BAN060	BAN060	35	19	35	19	35	21	35	24	35	26	35	29	35	30	35	30	37	30	39	30
BAN062	BAN076	36	15	36	15	36	17	37	20	37	23	37	25	37	27	38	27	38	27	40	27
BAN076	BAN076	36	19	36	19	36	20	37	23	37	26	37	28	37	30	38	30	38	30	40	30
BAN106	BAN152	35	19	35	19	36	20	36	23	37	26	37	29	38	30	39	30	40	30	42	30
BAN138	BAN115	36	14	36	14	36	16	36	19	37	21	37	24	38	25	39	25	40	25	42	25
BAN142	BAN170	35	15	35	15	35	17	35	20	35	22	35	25	35	27	35	27	36	27	38	27
BAN144	BAN144	35	21	35	21	35	22	35	25	35	28	35	31	35	32	36	32	37	32	40	32
BAN152	BAN152	35	21	35	21	36	23	36	26	37	28	37	31	38	32	39	32	40	32	42	32
BAN165	BAN159	35	19	35	19	35	20	35	23	35	26	35	29	36	30	38	30	39	30	42	30
BAN166	BAN159	35	18	35	18	35	20	35	23	35	26	35	28	36	30	38	30	39	30	42	30
BAN170	BAN170	35	19	35	19	35	20	35	23	35	26	35	28	35	30	35	30	36	30	38	30
BAN172	BAN060	35	23	35	23	35	24	35	27	35	30	35	33	35	34	35	34	37	34	39	34
BAN176	BAN155	35	12	35	12	35	13	35	16	35	19	35	21	35	23	35	23	35	23	37	23
BAN179	BAN076	36	15	36	15	36	16	37	19	37	22	37	24	37	26	38	26	38	26	40	26
BAN187	BAN076	36	14	36	14	36	15	37	18	37	21	37	23	37	25	38	25	38	25	40	25
BAN235	BAN076	36	20	36	20	36	21	37	24	37	27	37	29	37	31	38	31	38	31	40	31
BAN238	BAN060	35	23	35	23	35	24	35	28	35	31	35	33	35	35	35	35	37	35	39	35
BAN243	BAN152	35	18	35	18	36	19	36	22	37	25	37	28	38	29	39	29	40	29	42	29
BAN260	BAN076	36	16	36	16	36	17	37	20	37	23	37	25	37	27	38	27	38	27	40	27
BAN276	BAN144	35	21	35	21	35	22	35	26	35	28	35	31	35	32	36	32	37	32	40	32
BAN282	BAN155	35	19	35	19	35	20	35	23	35	26	35	28	35	30	35	30	35	30	37	30

Table 6(b): Predicted noise levels (PL2) and relevant criteria at non-associated residences.

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	
		Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction
Non- Associated Residences																					
BAN020	BAN170	35	19	35	19	35	20	35	23	35	26	35	29	35	30	35	30	36	30	38	30
BAN026	BAN159	35	16	35	16	35	17	35	20	35	23	35	25	36	27	38	27	39	27	42	27
BAN035	BAN048	35	15	35	15	37	16	38	19	39	22	40	25	40	26	41	26	42	26	43	26
BAN042	BAN076	36	11	36	11	36	12	37	15	37	18	37	21	37	22	38	22	38	22	40	22
BAN043	BAN009	35	9	35	9	36	11	37	14	37	16	37	19	37	20	38	20	39	20	40	20
BAN048	BAN048	35	11	35	11	37	12	38	15	39	18	40	20	40	22	41	22	42	22	43	22
BAN060	BAN060	35	15	35	15	35	17	35	20	35	23	35	25	35	27	35	27	37	27	39	27
BAN062	BAN076	36	14	36	14	36	16	37	19	37	22	37	24	37	26	38	26	38	26	40	26
BAN076	BAN076	36	18	36	18	36	19	37	22	37	25	37	27	37	29	38	29	38	29	40	29
BAN106	BAN152	35	18	35	18	36	19	36	23	37	25	37	28	38	29	39	29	40	29	42	29
BAN138	BAN115	36	12	36	12	36	13	36	16	37	19	37	21	38	23	39	23	40	23	42	23
BAN142	BAN170	35	14	35	14	35	15	35	18	35	21	35	23	35	25	35	25	36	25	38	25
BAN144	BAN144	35	18	35	18	35	19	35	22	35	25	35	27	35	29	36	29	37	29	40	29
BAN152	BAN152	35	20	35	20	36	22	36	25	37	28	37	30	38	32	39	32	40	32	42	32
BAN165	BAN159	35	16	35	16	35	18	35	21	35	23	35	26	36	27	38	27	39	27	42	27
BAN166	BAN159	35	16	35	16	35	17	35	20	35	23	35	25	36	27	38	27	39	27	42	27
BAN170	BAN170	35	16	35	16	35	18	35	21	35	23	35	26	35	27	35	27	36	27	38	27
BAN172	BAN060	35	18	35	18	35	19	35	22	35	25	35	27	35	29	35	29	37	29	39	29
BAN176	BAN155	35	12	35	12	35	13	35	16	35	19	35	21	35	23	35	23	35	23	37	23
BAN179	BAN076	36	14	36	14	36	15	37	18	37	21	37	23	37	25	38	25	38	25	40	25
BAN187	BAN076	36	13	36	13	36	14	37	17	37	20	37	22	37	24	38	24	38	24	40	24
BAN235	BAN076	36	19	36	19	36	20	37	23	37	26	37	28	37	30	38	30	38	30	40	30
BAN238	BAN060	35	18	35	18	35	19	35	22	35	25	35	28	35	29	35	29	37	29	39	29
BAN243	BAN152	35	17	35	17	36	18	36	21	37	24	37	27	38	28	39	28	40	28	42	28
BAN260	BAN076	36	15	36	15	36	16	37	19	37	22	37	24	37	26	38	26	38	26	40	26
BAN276	BAN144	35	18	35	18	35	19	35	22	35	25	35	27	35	29	36	29	37	29	40	29
BAN282	BAN155	35	18	35	18	35	20	35	23	35	26	35	28	35	30	35	30	35	30	37	30

Table 7(a): Predicted noise levels (PL1) and relevant criteria at associated residences.

Receiver ID	Representative Logging Location	Predicted 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
BAN021	BAN158	26	26	28	31	34	36	38	38	38	38
BAN032	BAN032	30	30	31	34	37	40	41	41	41	41
BAN041	BAN032	26	26	27	30	33	36	37	37	37	37
BAN055	BAN115	15	15	16	19	22	24	26	26	26	26
BAN087	BAN159	27	27	29	32	35	37	39	39	39	39
BAN100	BAN115	36	36	37	40	44	46	48	48	48	48
BAN101	BAN155	28	28	29	32	35	38	40	40	40	40
BAN108	BAN076	15	15	16	19	22	24	26	26	26	26
BAN115	BAN115	30	30	31	34	37	39	41	41	41	41
BAN117	BAN076	23	23	24	27	30	32	34	34	34	34
BAN136	BAN136	27	27	28	31	34	37	39	39	39	39
BAN154	BAN155	24	24	25	28	31	33	35	35	35	35
BAN155	BAN155	25	25	26	30	33	35	37	37	37	37
BAN158	BAN158	25	25	26	29	32	34	36	36	36	36
BAN159	BAN159	19	19	21	24	27	29	31	31	31	31
BAN162	BAN009	19	19	20	23	26	28	30	30	30	30
BAN164	BAN159	19	19	21	24	26	29	30	30	30	30
BAN173	BAN115	19	19	20	24	27	29	31	31	31	31
BAN182	BAN076	15	15	17	19	22	25	26	26	26	26
BAN189	BAN009	19	19	20	23	26	28	30	30	30	30
BAN225	BAN009	13	13	14	17	20	22	24	24	24	24
BAN239	BAN158	26	26	27	30	33	36	38	38	38	38

Table 7(b): Predicted noise levels (PL2) and relevant criteria at associated residences.

Receiver ID	Representative Logging Location	Predicted 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
BAN021	BAN158	21	21	22	25	28	31	32	32	32	32
BAN032	BAN032	29	29	30	34	37	39	41	41	41	41
BAN041	BAN032	25	25	27	30	33	35	37	37	37	37
BAN055	BAN115	12	12	14	17	19	22	23	23	23	23
BAN087	BAN159	21	21	22	25	28	31	32	32	32	32
BAN100	BAN115	36	36	37	40	43	46	48	48	48	48
BAN101	BAN155	28	28	29	32	35	38	39	39	39	39
BAN108	BAN076	14	14	15	18	21	23	25	25	25	25
BAN115	BAN115	28	28	30	33	36	38	40	40	40	40
BAN117	BAN076	21	21	23	26	29	31	33	33	33	33
BAN136	BAN136	26	26	27	31	34	36	38	38	38	38
BAN154	BAN155	23	23	24	27	30	33	35	35	35	35
BAN155	BAN155	25	25	26	29	32	35	37	37	37	37
BAN158	BAN158	24	24	25	28	31	34	35	35	35	35
BAN159	BAN159	17	17	18	21	24	26	28	28	28	28
BAN162	BAN009	15	15	17	20	23	25	27	27	27	27
BAN164	BAN159	16	16	18	21	24	26	28	28	28	28
BAN173	BAN115	17	17	18	21	24	26	28	28	28	28
BAN182	BAN076	14	14	15	18	21	23	25	25	25	25
BAN189	BAN009	15	15	17	20	23	25	27	27	27	27
BAN225	BAN009	12	12	14	16	19	22	23	23	23	23
BAN239	BAN158	26	26	27	30	33	36	37	37	37	37

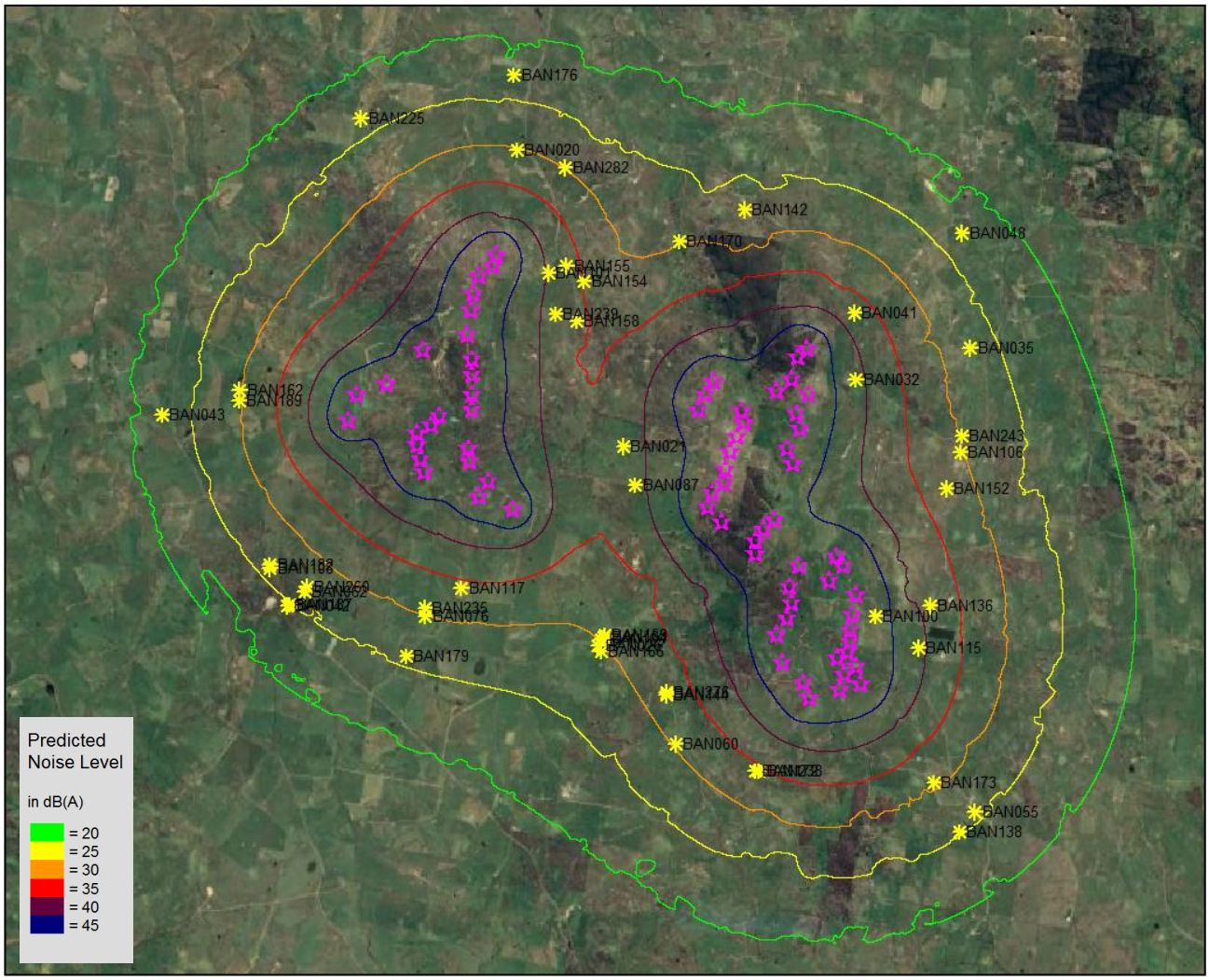

Figure 1: Predicted noise level contours at 9m/s wind speed from layout PL1.

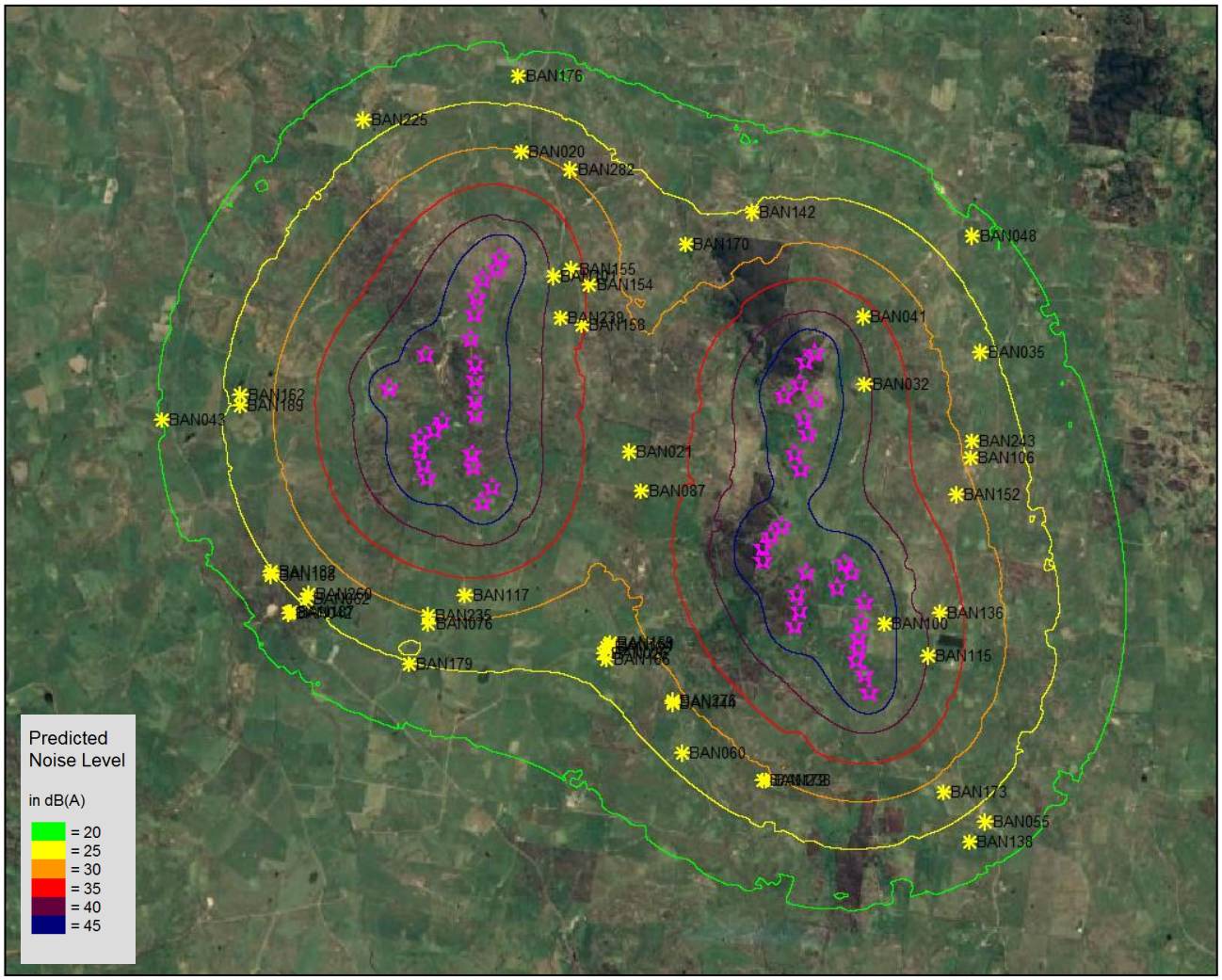

Figure 2: Predicted noise level contours at 9m/s wind speed from layout PL2.