

Winterbourne Wind Farm

Addendum Noise Assessment

S6207C21

September 2024

sonus.

Sonus Pty Ltd
17 Ruthven Ave
Adelaide SA 5000
Phone: +61 (8) 8231 2100
Email: info@sonus.com.au
www.sonus.com.au

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Author : Chris Turnbull, MAAS

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1 INTRODUCTION

A noise assessment has previously been made of the construction and operation of the Winterbourne Wind Farm (the **Project**), which was summarised in Sonus Report S6207C14 (the **Original Report**). Since this time, a minor change to the layout of the Wind Turbine Generators (**WTGs**) has been proposed (the **Revised Layout**).

The noise from the operation of the Revised Layout has been predicted and is summarised in this addendum to the Original Report. The Revised Layout does not alter the assessments of ancillary infrastructure or construction.

2 PROJECT LAYOUT

The coordinates of the 118 WTGs in the Revised Layout are provided in Table 1.

Table 1: Coordinates of WTGs

Turbine ID	Turbine Coordinates (MGA GDA2020 Zone 56)	
	Easting	Northing
B001	375828	6590869
B002A	375631	6590381
B003A	375607	6589817
B004	375275	6589423
B005A	374739	6589367
B006A	374438	6588435
B007A	374015	6588094
B011	368111	6585529
B012A	368617	6585251
B013	369137	6584946
B014	369259	6584381
B015A	370020	6583728
B016A	369686	6583340
B018A	370103	6582648
B019	370091	6582074
B020A	369691	6581508
B021	369712	6580984
B024A	367119	6580875
B025A	368410	6580659
B026A	368356	6580073
B027A	368272	6579563
B028	367018	6580394
B029	367163	6579707
B030	367362	6579162
B032A	368242	6579026
B033A	369430	6578427
B034A	369658	6579480

Turbine ID	Turbine Coordinates (MGA GDA2020 Zone 56)	
	Easting	Northing
B036	368799	6578041
B037	368677	6577562
B038	369072	6577273
B039	369053	6576781
B044	369592	6578929
B045A	369779	6579953
B046	378440	6584091
B047A	378931	6583807
B048A	378856	6583033
B051	380341	6585758
B052	380240	6585140
B053	380324	6584604
B054A	379850	6584469
B056	387034	6586730
B057A	386538	6586232
B060A	386088	6586022
B061	385968	6585507
B062	385649	6584921
B063A	387173	6583064
B064A	387688	6582634
B065A	388036	6582145
B066A	388213	6581686
B068	388994	6581508
B069A	388799	6580925
B070A	389152	6580561
B071A	380100	6580159
B072	380924	6580571

Turbine ID	Turbine Coordinates (MGA GDA2020 Zone 56)	
	Easting	Northing
B073A	380114	6581451
B074A	380621	6581042
B076A	380792	6582266
B078A	381515	6581759
B079A	381805	6581363
B081	382630	6580415
B082A	382719	6579911
B083	381991	6582601
B086A	384465	6582015
B087A	384255	6581497
B088	383962	6581030
B092A	384949	6580575
B093A	385284	6580201
B100A	384121	6578238
B101A	383806	6577836
B102	383689	6577341
B105A	386133	6579765
B107	386685	6579594
B108	386693	6578782
B109A	386515	6578269
B110A	387546	6577822
B111A	386400	6577779
B112A	386396	6577025
B113A	386326	6576502
B115A	386934	6575816
B116A	387375	6577122
B118A	386629	6573857
B119	386566	6573253
B120A	386885	6572842
B121	386483	6572440
B122A	388921	6572161
B123	389233	6571684

Turbine ID	Turbine Coordinates (MGA GDA2020 Zone 56)	
	Easting	Northing
B127A	391236	6570530
B128	390760	6570151
B129	390556	6569657
B130A	391137	6569349
B131A	391119	6568847
B132A	391112	6568358
B138	386244	6568184
B139A	386502	6567756
B140A	386439	6567165
B141A	386376	6566677
B142A	386495	6566201
B144	387968	6566691
B145	388261	6565947
B146A	388526	6566812
B149A	391248	6567361
B151	393063	6566094
B152A	393577	6565837
B153A	393427	6565305
B154A	394180	6564992
B160	370523	6584164
B161	370454	6583408
B167A	367523	6580075
B168A	381494	6579550
B169	381631	6578923
B170A	381548	6578016
B171	381842	6577595
B172A	369807	6580457
B173	379245	6588702
B174	379266	6588197
B175A	379334	6587681
B176A	375056	6588611
B177	384328	6578748

3 ASSESSMENT METHODOLOGY

NSW Wind Energy: Noise Assessment Bulletin (the **Bulletin**) references the 2009 version of the South Australian *Wind Farms – environmental noise guidelines (SA 2009)* and this was the version used to prepare S6207C14. However, an update to SA 2009 was prepared by the South Australian EPA in 2021 (**SA 2021**), which included some minor changes to the methodology. In particular, SA 2021 includes a change in the methodology for analysing background noise levels, as well as the addition of accepted input parameters for modelling wind turbine noise. The differences between SA 2009 and SA 2021 in the context of the Project are discussed as part of the Submissions Report in relation to noise issues (Sonus Report S6207C16). The discussion includes a supplementary assessment which compares:

- the criteria developed via the different methods within SA 2009 and SA 2021, and
- the results from predictions using both the ISO9613-2 and the CONCAWE noise propagation models

The results indicate that the predicted noise levels, regardless of the noise model used, will achieve the criteria developed in accordance with the methodology of both SA 2009 and SA 2021.

This assessment has been based upon the criteria within SA 2021, and the ISO9613-2 noise propagation model in accordance with the *Good Practice Guide for the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (May 2013) (the **IOA Guide**).

4 ASSESSMENT - DWELLINGS

The noise level from operation of wind turbines has been predicted for all integer wind speeds from cut in to rated power. The following tables provide the predicted noise levels ($L_{Aeq, 10min}$) at dwellings where the highest predicted level is at least 30 dB(A). Predicted noise level contours at the wind speed of 11m/s are provided in Figure 1.

Table 2: Wind Farm Noise Predictions at Involved Dwellings ($L_{Aeq, 10min}$)

Dwelling ID	Hub Height integer wind speeds, 149m AGL								
	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction
Involved Dwellings									
SR005	23	23	25	28	31	33	34	34	33
SR009	23	23	25	28	30	33	33	33	33
SR012	25	25	27	30	33	35	35	35	35
SR031	20	20	22	25	28	30	30	30	30
SR043	22	23	25	28	30	33	33	33	33
SR058	20	20	22	25	28	30	31	31	31
SR061	26	26	28	31	34	36	36	36	36
SR065	34	35	36	40	42	45	45	45	45
SR078	22	23	24	27	30	33	33	33	33
SR079	23	23	25	28	31	33	33	33	33
SR086	25	25	27	30	33	35	36	36	36
SR091	29	30	32	35	37	40	40	40	40
SR100	23	23	25	28	31	33	34	34	33
SR103	26	26	28	31	34	36	37	37	36
SR119	30	30	32	35	38	40	40	40	40
SR120	28	29	31	34	36	39	39	39	39
SR121	26	27	28	32	34	37	37	37	37
SR125	22	22	24	27	30	32	32	32	32
SR136	23	23	25	28	31	33	34	33	33
SR151	25	25	27	30	33	35	36	36	36
SR152	25	25	27	30	33	35	36	36	36
SR160	26	26	28	31	34	36	37	36	36
SR167	22	22	24	27	30	32	33	33	33
SR168	21	21	23	26	29	31	32	32	32
SR170	25	25	27	30	33	35	36	36	36
SR200	23	23	25	28	31	33	34	34	33
SR202	25	25	27	30	33	35	36	36	36
SR212	23	23	25	28	31	33	34	34	33
SR224	19	20	22	25	27	30	30	30	30
SR227	22	22	24	27	30	32	32	32	32
SR228	25	25	27	30	33	35	36	36	36
SR253	23	23	25	28	31	33	34	34	34
SR259	30	30	32	35	38	40	40	40	40

Dwelling ID	Hub Height integer wind speeds, 149m AGL								
	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction	Prediction
Involved Dwellings									
SR261	21	22	24	27	29	32	32	32	32
SR267	25	25	27	30	33	35	35	35	35
SR271	22	22	24	27	30	32	32	32	32
SR286	26	26	28	31	34	36	36	36	36
SR288	20	20	22	25	28	30	31	31	31

Table 3: Wind Farm Noise Predictions at Non-Involved Dwellings ($L_{Aeq, 10min}$)

Dwelling ID	Hub Height integer wind speeds, 149m AGL																	
	4 m/s		5 m/s		6 m/s		7 m/s		8 m/s		9 m/s		10 m/s		11 m/s		12 m/s	
	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction	Criterion	Prediction
Non-Involved Dwellings																		
SR004	35	21	35	21	35	23	35	26	35	29	36	31	37	31	38	31	39	31
SR007	35	21	35	21	35	23	35	26	35	29	36	31	37	32	38	32	39	32
SR105	35	21	35	21	35	23	35	26	35	29	36	31	37	32	38	32	39	32
SR107	35	20	35	20	35	22	35	25	35	28	36	30	37	30	38	30	39	30
SR109	35	22	35	22	35	24	35	27	35	30	36	32	37	33	38	33	39	33
SR129	35	20	36	21	36	23	37	26	38	28	39	31	40	31	41	31	41	31
SR216	35	20	35	20	35	22	35	25	35	28	36	30	37	31	38	31	39	31
SR240	37	24	38	24	38	26	39	29	39	32	39	34	40	35	40	35	39	35
SR268	35	21	36	21	36	23	37	26	38	29	39	31	40	32	41	32	41	32
SR272	35	22	36	22	36	24	37	27	38	30	39	32	40	33	41	33	41	33
SR300	35	20	35	20	35	22	35	25	35	28	36	30	37	31	38	31	39	31

The above tables show that the highest predicted noise level is 45 dB(A) at an involved dwelling and 35 dB(A) at a non-involved dwelling.

The highest predicted low frequency noise level ($L_{Ceq, 10min}$) at non-involved dwellings is no more than 54 dB(C) (at SR240), which is less than the 60dB(C) criterion. Table 4 provides the low frequency noise level at the closest non-involved dwellings, being those where the predicted noise level is greater than 30 dB(A) for a hub height wind speed of 11m/s.

Table 4: Wind Farm Noise Predictions at Non-Involved Dwellings ($L_{Ceq, 10min}$)

Dwelling ID	Highest Predicted Noise Level $L_{Aeq, 10min}$ (dB(A))	Highest Predicted Low Frequency Noise Level $L_{Ceq, 10min}$ (dB(C))
SR004	31	52
SR007	32	52
SR105	32	52
SR107	30	51
SR109	33	52
SR129	31	51
SR216	31	51
SR240	35	54
SR268	32	51
SR272	33	52
SR300	31	52

Based on the above, a penalty for excessive low frequency noise is not applicable and no adjustment has been made to the predictions provided above.

Based on the predictions, without any noise mitigation measures, the noise from the 118 WTGs will achieve the operational noise criteria at all dwellings in the vicinity of the wind farm. The conclusions of the Original Report therefore remain valid.

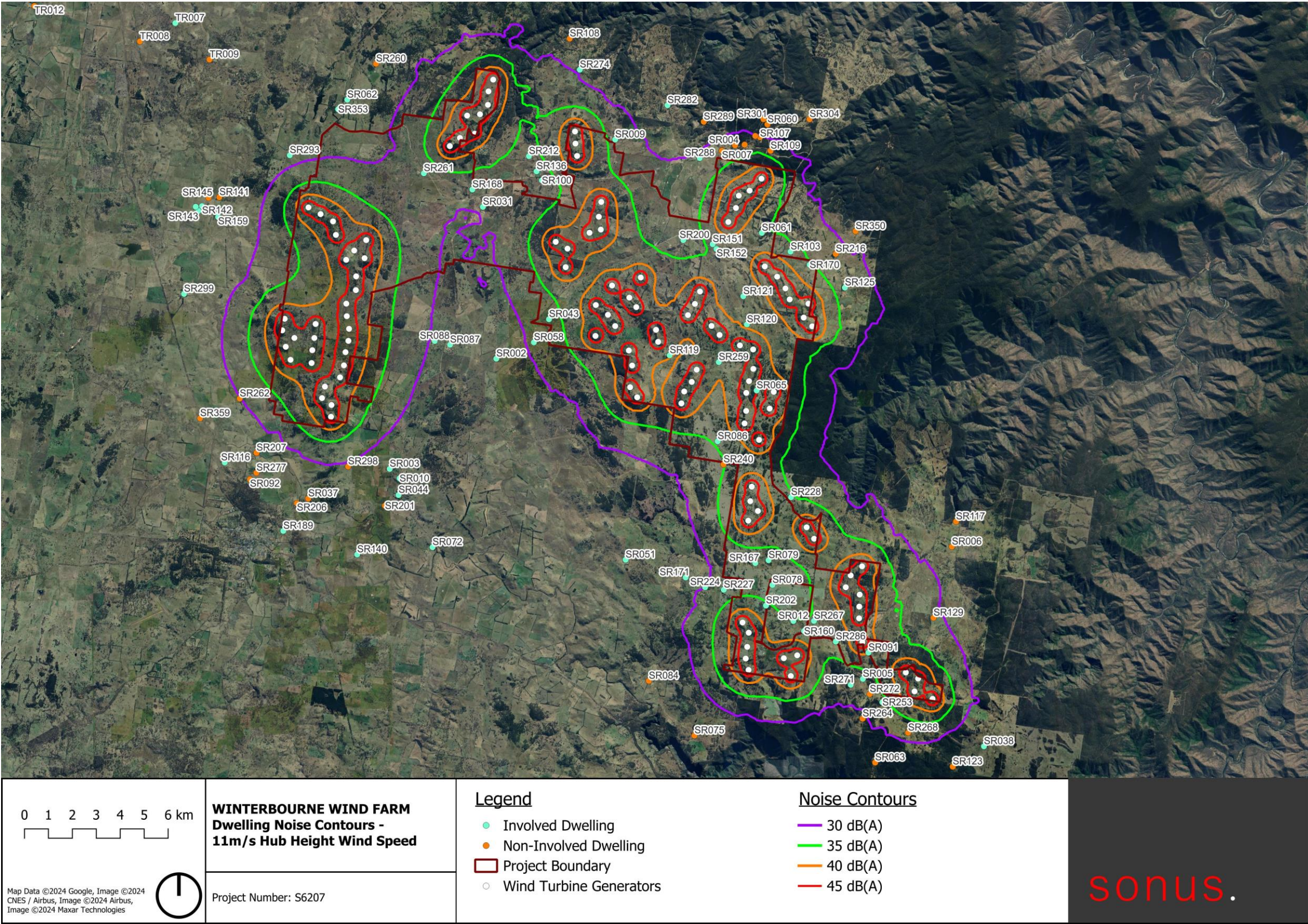


Figure 1: Wind Turbine Generator Noise at Residences for 11m/s Hub Height Wind Speed

5 ASSESSMENT – NATIONAL PARKS

The noise at National Parks has been assessed based upon the Revised Layout. The Original Report showed noise levels within the national park would be 40 dB(A) or less at areas commonly used, such as along walking trails and at lookout locations.

The predictions for the Revised Layout are shown in comparison to the predictions from the Original Report in Figure 2. As can be seen, the predicted noise levels for the Revised Layout are similar or lower at the National Park compared to the predictions within the Original Report. The conclusions in the Original Report related to National Parks therefore remain valid.

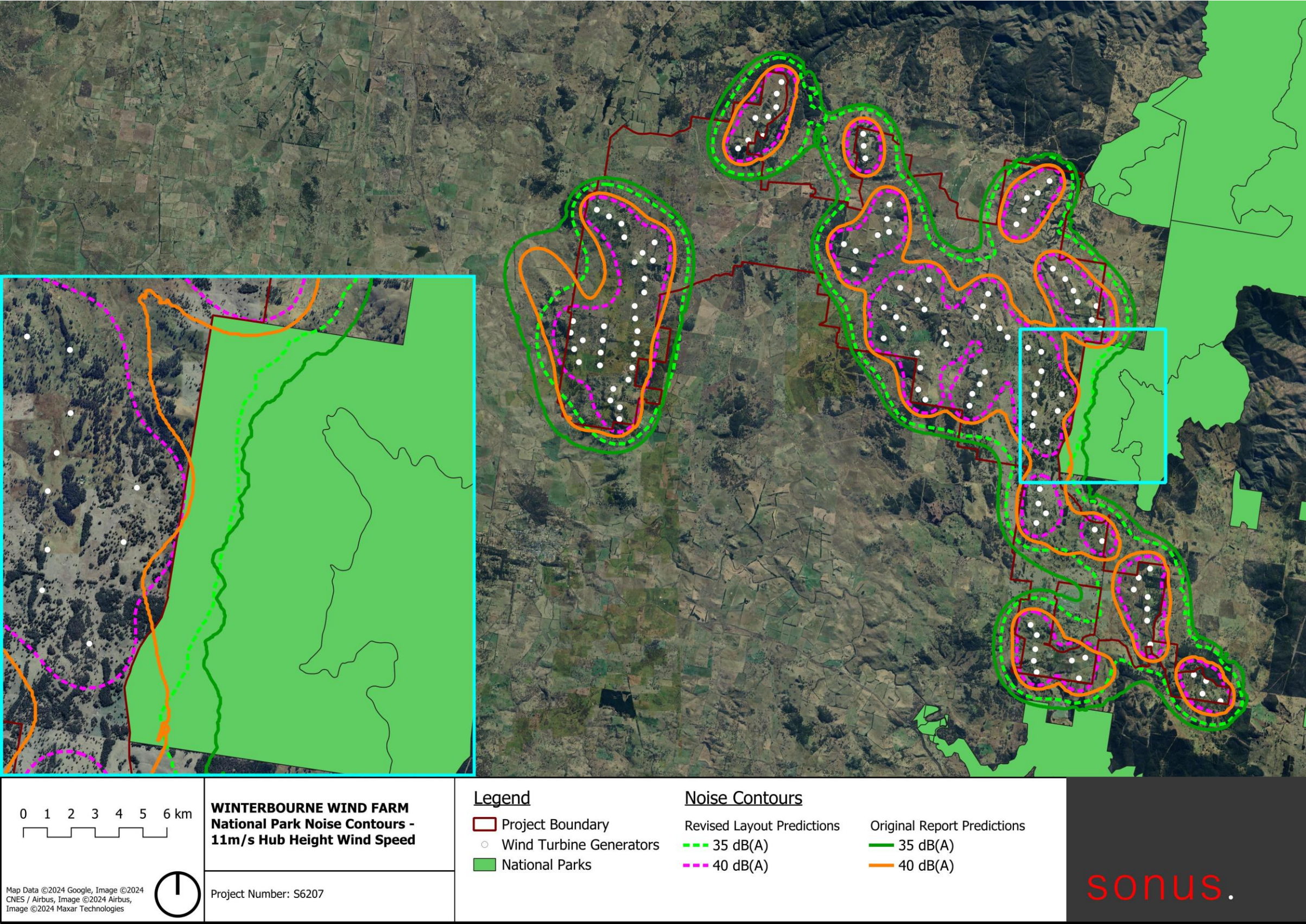


Figure 2: Wind Turbine Generator Noise within National Parks for 11m/s Hub Height Wind Speed