

13 May 2025
Reference ID: 54-19

EMM
David Richards
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Dinawan Wind Farm (SSD-50725708)
Noise Impact Assessment - Planning Amendment

Dear David,

The noise impacts of the Dinawan Wind Farm (Application Number SSD-50725708) (the **project**) were assessed in the Echo Acoustics "Dinawan Wind Farm Noise Impact Assessment" with reference ID "54-13" dated 28 May 2024 (the **NIA**).

The NIA determined that the project complied with the relevant Secretary's Environmental Assessment Requirements (**SEARs**) issued on 14 December 2022 and reissued on 22 August 2023. The NIA was based on up to 267 wind turbine generators (**WTGs**), with the WTG being the Vestas V162-6.0 with serrated trailing edges, a hub height of 180m and a rotor diameter of 162m.

Spark Renewables Pty Limited propose to amend the project to modify:

1. the number and locations of WTGs
2. the WTG selection for modelling (including WTG hub height and rotor diameter)
3. the substation locations
4. the eastern Stage 1 construction compound location
5. road upgrades to include the intersections of Kidman Way and Newell Highway, Byrnes Road and West Bomen Road, Eunony Bridge Road and Sturt Highway, and Olympic Highway and Sturt Highway.

This NIA planning amendment (the **amendment**) assesses the above proposed modifications against the SEARs and considers the construction noise associated with borrow pits, the revised construction compound location, the road upgrades, and the amended development corridor and development footprint.

Information is also provided relating to the operational noise associated with the accommodation facility.

A detailed description of the amendments to the project is provided in Chapter 3 of the separate Amendment Report.

Reference should be made to the NIA for the project description (except as varied by the amendment described above), assessment criteria, assessment approach and inputs, noise model details, operational and construction noise management and mitigation, and glossary of terms. All aspects of the NIA remain unchanged other than those aspects specifically noted in this amendment.

WTG Noise

Noise Model

The noise model has been amended to include:

- 200 WTGs, with 84 WTGs in the eastern area (Stage 1) operating concurrently with 116 WTGs in the western area (Stage 2), located as detailed in Appendix A and Appendix B (respectively)
- the WTG being the Vestas V172-7.2 with serrated trailing edges, a hub height of 150m and a rotor diameter of 172m in Mode PO7200 (the **candidate WTG**).

Sound Power Levels

The candidate WTG sound power levels are based on the original equipment manufacturer (**OEM**) noise level data for integer wind speeds (at hub height) from cut-in wind speed to the wind speed of the rated power. The total sound power level data for the candidate WTG is presented in Table 1.

Table 1 Sound Power Levels

Candidate WTG	Integer Hub Height Wind Speed (m/s)	Total Sound Power Level (dB(A))
Vestas V172-7.2MW (PO7200 operating mode) with serrated trailing edges	3	94.6
	4	94.6
	5	95.2
	6	98.6
	7	102.2
	8	105.6
	9 (up to rated power)	106.9

Predicted Noise Levels

Noise level predictions have been made using the Table 1 sound power levels.

The predicted noise levels are provided in Table 2 for each assessment location from the cut-in wind speed to the wind speed at rated power at integer hub height wind speeds. The distance to the closest WTG from each assessment location is also provided in Table 2.

Table 2 Predicted WTG Noise Levels

Assessment Location ID	Closest WTG (m)	A-Weighted base equivalent noise level	Predicted A-Weighted WTG Noise level (dB(A)) for each hub height integer wind speed							Highest predicted WTG C-Weighted Noise Level at any integer wind speed (dB(C))
			3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s to rated power	
R008	5505	35	15	15	16	19	23	26	28	52
R019	2057	35	23	23	23	27	30	34	35	56
R036	3752	35	21	21	21	25	28	32	33	55
R038	5403	35	17	17	17	20	24	28	29	53
R042	1174	Subject to agreement	30	30	31	34	38	41	43	61
R049	4673	35	18	18	18	22	25	29	30	53
R050	7240	35	15	15	15	19	22	26	28	52
R056	7461	35	13	13	13	17	21	24	26	51
R078	5586	35	15	15	15	19	23	26	28	52
R079	7916	35	12	12	12	15	19	23	24	50
R082	5991	35	15	15	15	18	22	26	27	52
R084	2265	Subject to agreement	23	23	24	27	31	34	36	57
R087	7954	35	13	14	14	17	21	24	26	51
R088	5262	35	18	19	19	22	26	29	31	55
R090	4171	35	18	18	19	22	26	29	31	53
R091	3890	35	18	18	19	22	26	29	31	54
R092	6445	35	14	14	14	18	22	25	27	51
R093	2193	Subject to agreement	23	23	24	27	31	34	36	57
R107	6859	35	16	16	16	19	23	26	28	52
R108	4552	35	17	17	18	21	25	28	30	54
R111	5420	35	15	16	16	19	23	26	28	52
R140	6469	35	14	14	14	18	22	25	27	51
R141	6416	35	14	14	15	18	22	25	27	51
R143	3882	35	18	18	18	22	25	29	31	54
R144	4440	35	18	18	18	21	25	29	30	54
R156	1162	Subject to agreement	30	30	30	34	38	41	42	61
R157	5283	35	16	16	16	20	24	27	29	52

Special Noise Characteristics

An assessment of tonality has been made by analysing the 1/3 octave band sound power level data for the candidate WTG. This data indicates that the candidate WTG does not have tonal characteristics in close proximity (or an intermediate location). As such, it can be concluded that the candidate WTGs will not be tonal at the assessment locations.

An assessment of low frequency noise has been made by comparing the predicted C-weighted noise levels provided in Table 2 against the NIA criterion of 60 dB(C). The predicted noise levels indicate the NIA criterion of 60 dB(C) will be achieved at all assessment locations without an agreement.

Based on the above, no adjustment is required to be made to the A-Weighted noise levels provided in Table 2 for special noise characteristics.

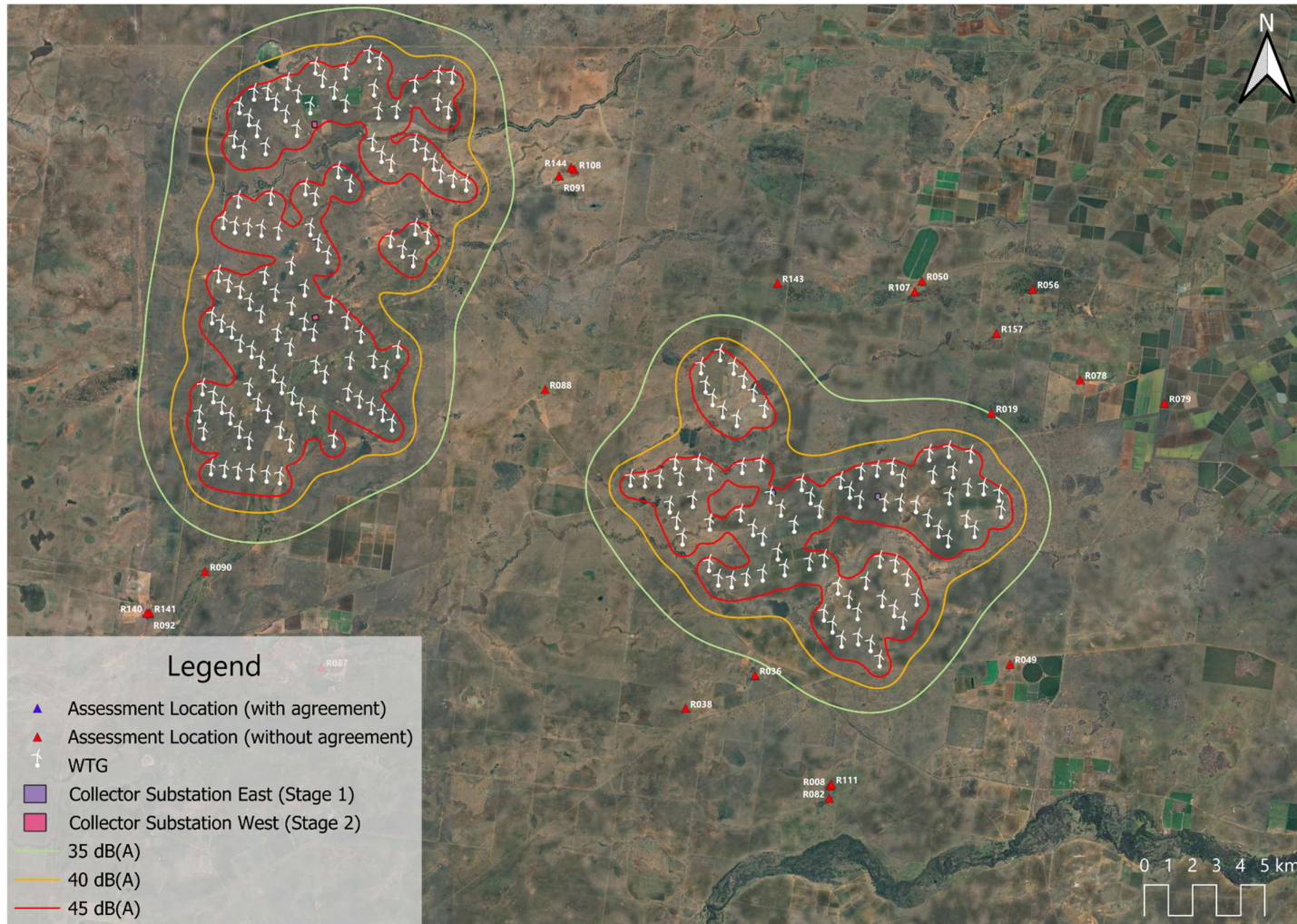
Noise Prediction Summary

The predicted noise levels:

1. achieve the base equivalent noise level of 35 dB(A) for all hub height integer wind speeds at all assessment locations without an agreement.
2. will also achieve the base equivalent noise level of 35 dB(A) for all hub height integer wind speeds at all assessment locations without an agreement for minor ($\pm 10\%$) changes in hub height (with all other elements of the candidate WTG remaining the same).

The noise prediction contours for the operation of the candidate WTG at wind speeds of 9m/s and greater are provided in Figure 1. Figure 1 illustrates the assessment locations and the equivalent noise level contour of 35 dB(A) for the candidate WTG operating at rated power (highest noise level operation).

Figure 1 Candidate WTG Noise Prediction Contours



Ancillary Infrastructure Noise

Noise Model

The noise model has been amended to include the noise from one high voltage transformer with a rating of 300 MVA at each of the four substation locations as detailed in Table 3 below.

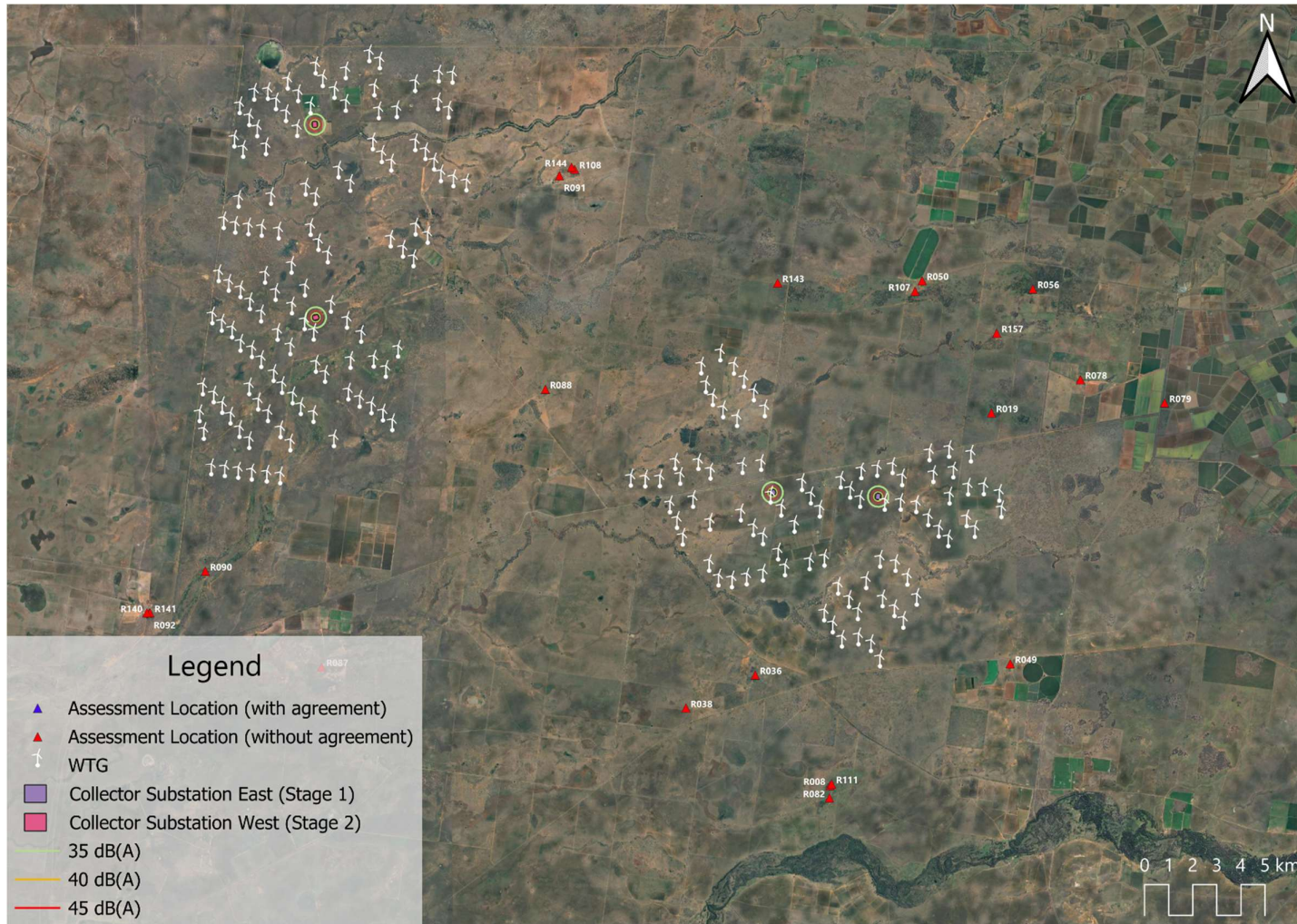
Table 3 Substation Locations

Substation ID	Centrepoint Co-ordinates (MGA Zone 55)	
	Easting	Northing
East 1	377230	6123425
East 2	381620	6123255
West 1	358215	6138723
West 2	358253	6130718

Predicted Noise Levels

The noise level from the transformers is predicted to be less than 15 dB(A) at the assessment locations. Noise level contours of the predictions are provided in Figure 2, which indicate that the ancillary infrastructure noise levels are well below the trigger noise level criterion of 35 dB(A) at all assessment locations.

Figure 2 Ancillary Infrastructure Noise Prediction Contours



Construction Noise

The construction noise model has been updated to include the noise from the borrow pits, and to account for the revised eastern Stage 1 construction compound, WTG layout, development footprint and development corridor (the **revised construction activity**).

Sound Power Levels

The noise from the borrow pits has been based on the following cumulative sound power level provided in Table 4.

Table 4 Construction Equipment Sound Power Levels

Construction Stage or ancillary activity	Construction Hours	Equipment	Cumulative Sound Power Level
Borrow Pit	Standard hours	Excavator Truck Front end loader Water truck	116 dB(A)

Predicted Noise Levels

The construction noise model has been updated to include the revised construction activity and is summarised in Table 5 for predicted construction noise levels that result in *noise affected* levels at the assessment locations. The road upgrades at the intersections of Kidman Way and Newell Highway, Byrnes Road and West Bomen Road, the Eunony Bridge Road and Sturt Highway and the Olympic Highway and Sturt Highway are in the vicinity of different assessment locations to those considered in the NIA and are assessed separately below.

Table 5 Predicted Construction Noise Levels

Construction Stage or ancillary activity (location of construction)	Distances to be Highly Noise Affected >75 dB(A)	Distances to be Noise Affected During Standard Hours >45 dB(A)	Distances to be Noise Affected Outside Standard Hours >35 dB(A)	Assessment Locations Predicted to be Noise Affected During Construction	Noise Level at Closest Assessment Location(s) and Corresponding Separation Distance
Road upgrades (Road upgrades are proposed on Kidman Way, McLennons Bore Road, Wilson Road, Fernbank Road and Goolgumbra Road)	Less than 100m	Less than 1300m	NA	R019 (standard hours)	Less than 49 dB(A) 1000m from activity
				R079 (standard hours)	Less than 69 dB(A) 175m from activity
				R088 (standard hours)	Less than 51 dB(A) 800m from activity
Concrete Batching (Construction compounds)	Less than 85m	Less than 1200m	Less than 2250m	R019 (outside standard hours from the Stage 1 eastern construction compound)	Less than 39 dB(A) 1850m from the Stage 1 eastern construction compound

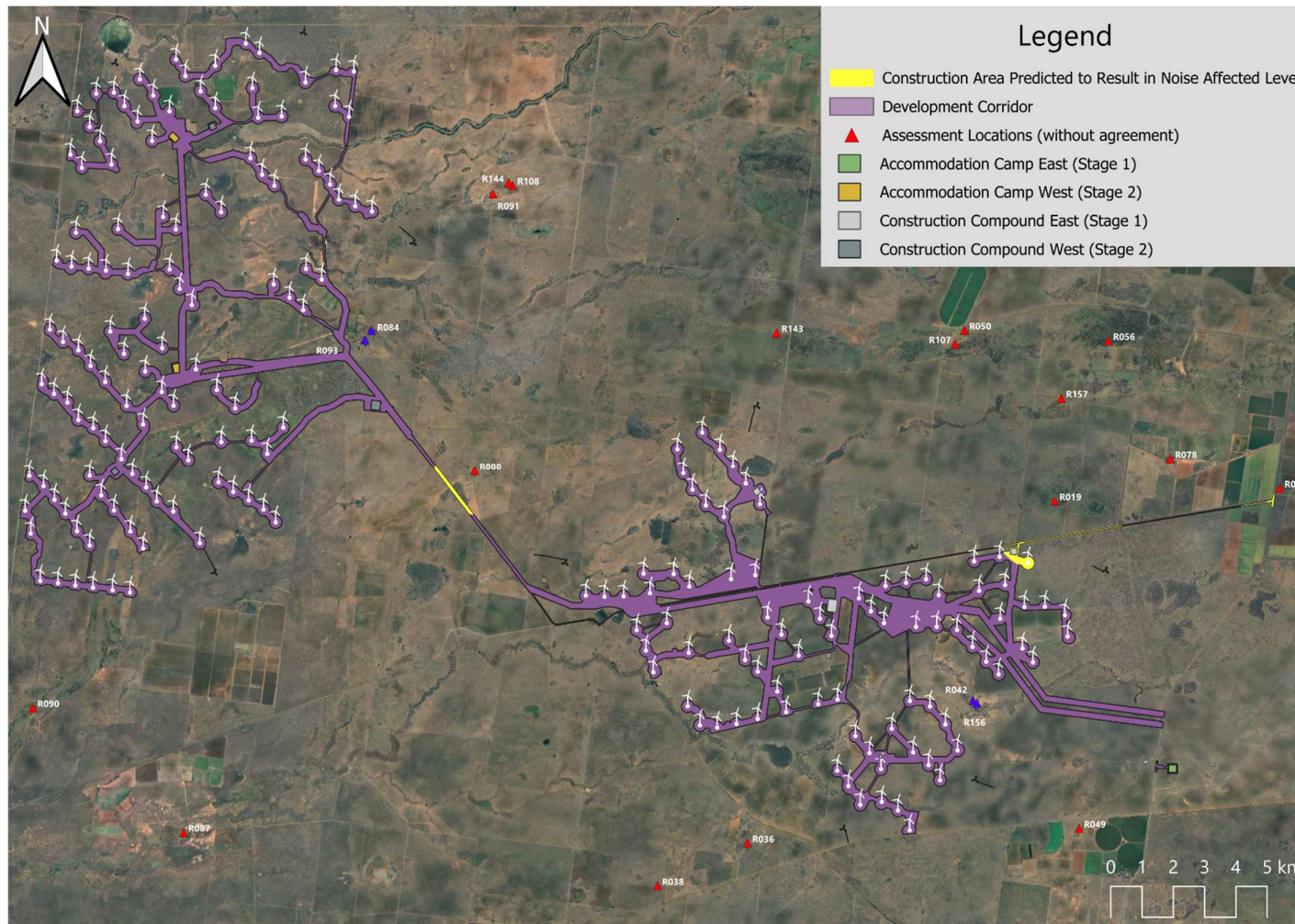
Construction Stage or ancillary activity (location of construction)	Distances to be Highly Noise Affected >75 dB(A)	Distances to be Noise Affected During Standard Hours >45 dB(A)	Distances to be Noise Affected Outside Standard Hours >35 dB(A)	Assessment Locations Predicted to be Noise Affected During Construction	Noise Level at Closest Assessment Location(s) and Corresponding Separation Distance
Concrete Pour	Less than 60m	Less than 1100m	Less than 2100m	R019 (outside standard hours for concrete pours at WTG T117)	Less than 36 dB(A) R019 is 2050m from Stage 1 WTG T117. All other WTGs are at greater distances than 2100m
Transmission Line Installation	Less than 75m	Less than 1100m	NA	R088 (standard hours)	Less than 49 dB(A) R088 is 800m from the transmission line
WTG Installation, Commissioning and Testing (WTG sites)	Less than 80m	Less than 1100m	Less than 2250m	R019 (outside standard hours for installation of WTG T117)	Less than 38 dB(A) R019 is 2050m from Stage 1 WTG T117. All other WTGs are at greater distances than 2250m
Borrow Pit	Less than 75m	Less than 1100m	NA	Nil	Less than 35 dB(A) There are no assessment locations not subject to an agreement within 1100m

The revised construction activity has marginally different results in comparison to those presented in Table 14 of the NIA but not of a scale to change the outcomes of the NIA, being that assessment locations R019, R079, and R088 remain *noise affected* for select construction stages and/or ancillary activities.

An indication of the (limited) area where construction activity result in assessment locations being *noise affected* is shown in Figure 3 below (refer to areas in the vicinity of R019, R079 and R088). Figure 3 is an update of Figure 7 of the NIA to account for the revised construction compound location, WTG layout, development footprint and development corridor.

The NIA includes a draft *Construction Noise Management Plan Framework* for finalisation during the detailed design stage of the project when the construction activities, processes, and staging locations are finalised by the construction team. The inclusion of borrow pits and the amendments to the construction compound location, WTG layout, development footprint and development corridor do not result in any changes to the draft *Construction Noise Management Plan Framework* in the NIA.

Figure 3 Construction Area Predicted to Result in Noise Affected Levels



Road Upgrades

To facilitate delivery of project infrastructure, additional road upgrade requirements have been identified at:

- Kidman Way and Newell Highway intersection, Bundure NSW
- Byrnes Road and West Bomen Road intersection, Bomen NSW
- Eunony Bridge Road and Sturt Highway intersection, East Wagga Wagga NSW
- Olympic Highway and Sturt Highway intersection, Wagga Wagga NSW.

Road upgrades at these intersections are anticipated to be limited to an extension to the existing sealed road to facilitate the turning movements of oversize overmass (**OSOM**) vehicles. This work may require the removal of existing road infrastructure (e.g. concrete guttering). The length of time over which road upgrades will occur at each intersection and construction hours will be confirmed post approval in consultation with the relevant road authorities. If works are proposed outside of standard hours, this will be to avoid disruption to existing motorists and to reduce the overall duration of disruption to identified sensitive land uses. It is anticipated that road upgrade works will require the use of plant and equipment, including but not limited to, trucks, front end loaders, graders, planers, vibratory rollers and water trucks.

There are no sensitive land uses within proximity of the proposed upgrade works at the intersection of Kidman Way and Newell Highway and the intersection of Byrnes Road and West Bomen Road and therefore construction noise impacts have not been assessed further at these intersections.

There are three sensitive land uses within proximity of the proposed upgrade works at the intersection of Eunony Bridge Road and Sturt Highway (two dwellings and a motel). Predicted noise levels, which conservatively assume that all equipment operates continuously at full capacity, indicate that these three assessment locations will be *highly noise affected* (i.e. noise predictions exceeding 75 dB(A)) during and outside of standard hours). Once further information is available on construction duration and timing, Spark Renewables will engage with these assessment locations to discuss:

- total construction time
- what works are expected to be noisy
- the duration of these works
- what is being done to minimise noise
- when respite periods will occur
- ongoing communication and complaint methods.

There are residential areas within approximately 300m and 400m to the west and east respectively of the proposed upgrade works at the intersection of the Olympic Highway and Sturt Highway. Predicted noise levels, which conservatively assume that all equipment operates continuously at full capacity, indicate that the residential areas to both the west and east will be *noise affected* (i.e. noise predictions exceeding 45 dB(A) during standard hours and 35 dB(A) outside of standard hours).

Construction noise management measures will therefore need to be implemented for the road upgrade works at the intersection of the Olympic Highway and Sturt Highway in a *Construction Noise Management Plan*. As noted previously, the NIA includes a draft *Construction Noise Management Plan Framework* for finalisation during the detailed design stage of the project when the construction activities are finalised. The draft *Construction Noise Management Plan Framework* already includes road upgrade works.

In addition to the engagement with the assessment locations as outlined above, the proposed road upgrade works at the intersection of Eunony Bridge Road and Sturt Highway will be addressed by the construction noise management plan.

The construction noise management plan will be implemented for the duration of the road upgrade works and will include a description of all feasible and reasonable work practices that can be implemented to reduce noise impacts.

Noise From Worker Accommodation Facilities

Noise generated during the construction of the workers accommodation facilities (as shown in Figure 3) has been considered as part of the NIA.

The closest sensitive receivers to the workers accommodation facilities are:

- R049 (approximately 3.4 km south-west of the accommodation facility proposed for Stage 1)
- R088 and R091 (approximately 10 km east of the accommodation facilities proposed for Stage 2).

The construction of the workers accommodation facilities has been assessed as part of the site mobilisation and compound establishment stage in the NIA. The equipment to construct the workers accommodation facilities as referenced in the NIA includes a forklift, bulldozer, bobcat, excavator, truck, front end loader, grader, vibratory roller, and water truck.

The NIA predictions assume the continuous and concurrent operation of the equipment during the site mobilisation and compound establishment stage. Noise levels are predicted to be 35 dB(A) at a separation distance of 3.4 km to R049, which includes all works required to facilitate construction of the accommodation facility occurring concurrently.

The NIA accordingly concludes that the construction of the workers accommodation facility achieves the *noise affected* management level for construction activity outside of standard hours.

During the operation of the accommodation facility, noise will primarily be generated by light vehicle movements, site servicing requirements (including mechanical and electrical plant such as air conditioning units), equipment deliveries, waste collection and occupant noise while on-site.

The noise generated from the operation of the accommodation facility will be much less than the noise generated from the concurrent use of all equipment to construct the accommodation facility.

The NIA indicates the noise trigger level of 35 dB(A) derived from the *NSW Noise Policy for Industry 2017* is the same as that derived as a *noise affected* management level for construction activity outside of standard hours. Therefore, where the NIA indicates the construction of the accommodation facility achieves the noise affected management level at distances of 3.4 km, the noise from the operation of the accommodation facility will easily achieve the noise trigger level from the *NSW Noise Policy for Industry 2017*.

Based on the separation distance and potential noise-generating activities at the accommodation facilities, noise generated during the operation and construction of the accommodation facilities is predicted to comply with all relevant noise criteria, including the *NSW Noise Policy for Industry 2017* and the *Interim Construction Noise Guidelines* respectively during the day, evening, and night periods.

Once the project is operational, the accommodation facilities will be decommissioned. Therefore, there will not be any noise impacts associated with the accommodation facility during operation of the project.

Please do not hesitate to call me if you have any questions.

Sincerely



Mathew Ward

Director

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Appendix A: Eastern WTGs (Stage 1)

WTG ID	Co-ordinates (MGA Zone 55)	
	Easting	Northing
T3	371344	6123711
T5	371943	6123676
T8	372553	6123686
T10	372971	6122610
T11	373191	6124411
T12	373265	6121957
T14	373395	6123787
T15	373503	6121265
T17	374271	6128402
T18	373931	6122830
T20	374153	6124400
T22	374463	6127622
T24	374655	6124000
T25	374634	6121886
T27	374600	6120181
T28	374753	6127090
T30	374991	6119572
T31	375065	6128943
T33	375180	6126585
T36	375545	6119498
T37	375630	6128388
T38	375758	6126219
T41	375987	6124237
T42	375918	6122274
T43	376047	6127846
T44	376159	6119616
T45	376435	6121658
T48	376458	6127288

WTG ID	Co-ordinates (MGA Zone 55)	
	Easting	Northing
T49	376760	6124362
T50	376838	6121284
T51	376838	6119778
T52	376909	6126626
T54	377152	6123011
T56	377465	6120651
T58	377597	6122467
T61	377749	6119994
T64	378147	6121797
T69	378456	6123527
T70	378772	6120250
T71	378825	6122974
T72	379197	6122428
T73	379379	6118125
T74	379389	6120395
T77	379735	6117632
T78	379959	6119233
T79	380071	6123626
T81	380115	6117037
T82	380409	6118690
T83	380457	6123209
T85	380777	6118178
T86	380803	6117131
T87	380874	6122830
T88	381123	6119464
T89	380923	6124014
T91	381321	6116858
T92	381696	6116224

WTG ID	Co-ordinates (MGA Zone 55)	
	Easting	Northing
T93	381702	6120349
T94	381802	6118709
T95	381581	6124117
T97	381896	6122710
T98	382343	6120176
T99	382298	6118303
T100	382218	6124232
T101	382557	6122713
T103	382665	6117820
T104	382621	6123726
T105	382835	6119603
T106	383205	6122616
T107	383224	6118773
T108	383753	6124803
T109	383702	6122072
T110	383913	6123864
T111	384140	6121600
T112	384588	6122970
T113	384535	6121198
T114	384568	6124943
T115	384743	6124048
T116	385299	6122028
T117	385477	6124748
T118	385358	6123346
T119	385636	6121582
T120	386013	6123353
T123	386655	6123083
T125	386743	6122403

Appendix B: Western WTGs (Stage 2)

WTG ID	Co-ordinates (MGA Zone 55)	
	Easting	Northing
T1	353429	6126420
T3	353563	6127533
T4	353606	6125688
T6	353912	6124178
T7	353957	6130482
T9	354016	6127202
T10	354221	6132224
T11	354350	6130172
T12	354367	6126765
T13	354431	6134426
T14	354476	6124106
T15	354638	6131830
T17	354779	6129896
T18	354713	6126323
T19	354874	6137810
T20	355049	6135315
T21	354912	6134235
T22	355033	6124034
T23	355096	6139192
T24	355086	6125765
T25	355130	6129340
T26	355128	6131564
T27	355239	6137383
T28	355492	6138695
T29	355457	6134171
T31	355490	6125309
T32	355490	6127541
T33	355519	6131066
T34	355597	6123961
T35	355604	6129081
T36	355700	6139749
T37	355822	6138236
T38	355862	6126906
T39	355986	6130556
T40	355991	6128667
T41	356010	6134107
T42	356149	6132162
T43	356187	6137491
T44	356265	6139786

WTG ID	Co-ordinates (MGA Zone 55)	
	Easting	Northing
T45	356222	6123880
T46	356268	6126425
T47	356398	6135430
T48	356505	6128090
T49	356601	6139354
T51	356587	6131449
T52	356669	6129790
T53	356713	6133999
T54	356778	6123809
T55	356793	6125756
T56	356855	6127591
T57	357018	6138864
T58	357091	6140209
T60	357198	6129197
T61	357249	6132574
T62	357265	6130889
T63	357296	6127162
T64	357200	6125211
T67	357485	6138244
T68	357523	6139692
T69	357634	6126715
T71	357793	6130236
T72	357807	6131633
T73	357837	6135819
T75	358041	6139187
T76	358044	6134144
T78	358170	6129796
T79	358161	6126390
T80	358245	6135420
T81	358261	6128468
T82	358250	6140841
T83	358366	6133522
T87	358643	6128052
T88	358547	6140314
T89	358755	6133007
T90	358886	6130956
T92	359009	6125382
T94	359033	6139825
T97	359202	6136529

WTG ID	Co-ordinates (MGA Zone 55)	
	Easting	Northing
T101	359503	6140643
T102	359503	6139288
T103	359552	6130296
T104	359608	6127324
T105	359698	6128633
T106	359690	6135970
T111	360078	6127018
T113	360142	6129713
T119	360479	6141349
T120	360571	6126750
T121	360625	6137696
T122	360691	6139927
T123	360665	6128680
T127	360874	6138982
T128	360917	6141050
T129	361000	6137164
T130	361047	6126454
T131	361164	6128260
T133	361369	6133664
T134	361392	6136813
T137	361434	6126047
T139	361626	6139026
T141	361677	6129097
T142	361878	6133241
T145	362315	6132846
T147	362385	6140110
T148	362390	6137656
T149	362403	6134160
T150	362813	6137288
T152	362906	6133817
T153	363171	6136856
T155	363336	6139357
T156	363365	6140507
T158	363454	6136372
T160	363777	6139010
T161	363974	6136160
T162	363936	6140456
T164	364515	6135991