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South Coree BESS - Revised Design Review

1 Introduction

Renzo Tonin & Associates was engaged to review the amended South Coree BESS proposal to understand the impact on the predicted construction and operational noise levels in comparison to the EIS report *'South Coree Battery Energy Storage System – Construction & Operational Noise & Vibration Assessment'* (ref. TP185-01F02 r7 dated 17 June 2025) (NVIA).

2 Project Description

This technical memo provides:

- details of the outcomes of operational noise modelling, including noise contour figures and
- predicted noise level tables; and an assessment of construction noise impacts associated with the change to the construction footprint

Review of the updated concept design found that very minor changes are proposed, with the main change being the separation for the batteries has increased from 2.45m to 3.05m, which has pushed all the units and substation closer to Broockmanns Road. The overall footprint of South Coree BESS remains the same.

In addition, the proposed intersection upgrade of the Riverina Highway and Canalla Road and the extension of works at the existing Finley substation will require a construction noise assessment. The extents of the construction works are shown in Figure 2-1.

Figure 2-1 – Construction Works Footprint

3 Operational Noise

Table 3-1 presents the predicted noise levels for the worst-case scenario based on concurrent operation of all the plant and equipment as presented in Table 5-5 of the NVIA. The recommended 7.0 m high noise wall as presented in the technical memo 'South Coree BESS – Noise Wall Option for Receiver R1' (ref. TP185-01F03 r0 dated 24 June 2025) has been included in the remodelling.

Remodelling of the updated concept design showed that the predicted $L_{Aeq,\ 15min}$ operational noise levels comply with the nominated Project Noise Trigger Levels in the NVIA for all identified receivers.

Predicted noise contours for the worst-case scenario based on concurrent operation of all the plant and equipment are shown in Appendix B.

Table 3-1 – Predicted $L_{Aeq,15min}$ Operational Noise Levels at Sensitive Receivers, dB(A)

Receiver Location	Project Noise Trigger Levels			Predicted Operational Noise Levels					Comply? (Yes/No)
				Day[1]		Evening & Night[1]			
	Day	Evening	Night	Calm & Isothermal Conditions	Slight to Gentle Breeze	Calm & Isothermal Conditions	Slight to Gentle Breeze	Moderate Temperature Inversion[2]	
Receiver R1 (associated receiver)	*40*	*35*	*35*	36	39	32	35	35	Yes
Receiver R2	*40*	*35*	*35*	<20	20	<20	<20	<20	Yes
Receiver R3	*40*	*35*	*35*	<20	20	<20	<20	<20	Yes
Receiver R4	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R5	*40*	*35*	*35*	<20	20	<20	<20	<20	Yes
Receiver R6	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R7	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R8	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R9	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R10	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R11	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes
Receiver R12	*40*	*35*	*35*	<20	<20	<20	<20	<20	Yes

Notes: 1. Based on Tesla Megapack units operating at 100% Battery Fan Duty & 60% Power Electronics Fan Duty during the day and at 50% Battery Fan Duty & ~30% Power Electronics Fan Duty during the evening and night periods

2. Applicable for the night time period only

4 Construction Noise

Table 4-1 presents construction noise levels likely to be experienced at the nearby affected receivers based on the construction activities and plant and equipment associated with the proposed BESS project. Table 4-2 presents construction noise levels likely to be experienced at the nearby affected receivers based on the construction activities and plant and equipment associated with the Riverina Highway and Canalla Road intersection upgrade.

It is noted that the predicted noise levels represent a worst case scenario where all plant and equipment are operating for each corresponding construction stage. This worst case scenario would not be typical and is unlikely to occur in practice. The noise level ranges presented in the table represent the noise source being located at the furthest to the closest proximity to each receiver location.

Remodelling of the updated concept design showed that the predicted construction noise levels from the BESS construction works (Table 4-1) remain the same as what was in the NVIA. Construction noise mitigation and management measures nominated the NVIA should be followed.

Predicted construction noise levels from the intersection upgrade (Table 4-2) were found to comply with the Construction Noise Management Level for all receivers. Therefore, no further noise mitigation is required for these works.

Table 4-1 – Predicted $L_{Aeq,15min}$ BESS Construction Noise Levels at Receiver Locations, dB(A)

Plant Item	Plant Description	Predicted $L_{eq,15\ min}$ Construction Noise Levels											
		R1 (associated receiver)	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Noise Management Level		*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*
1	Crane	<20-51	<20-33	<20-28	<20-23	<20-27	<20-20	<20-23	<20-22	<20	<20	<20	<20-27
2	Drum roller	<20-50	<20-32	<20-27	<20-22	<20-26	<20	<20-22	<20-21	<20	<20	<20	<20-26
3	Padfoot roller	<20-50	<20-32	<20-27	<20-22	<20-26	<20	<20-22	<20-21	<20	<20	<20	<20-26
4	Wheeled loader	<20-50	<20-32	<20-27	<20-22	<20-26	<20	<20-22	<20-21	<20	<20	<20	<20-26
5	Dump truck	<20-49	<20-31	<20-26	<20-21	<20-25	<20	<20-21	<20-20	<20	<20	<20	<20-25
6	30t Excavator	<20-48	<20-30	<20-25	<20-20	<20-24	<20	<20-20	<20	<20	<20	<20	<20-24
7	Grader	<20-48	<20-30	<20-25	<20-20	<20-24	<20	<20-20	<20	<20	<20	<20	<20-24
8	Chain trencher	<20-45	<20-27	<20-22	<20	<20-21	<20	<20	<20	<20	<20	<20	<20-21
9	Water truck	<20-45	<20-27	<20-22	<20	<20-21	<20	<20	<20	<20	<20	<20	<20-21
10	Telehandler	<20-39	<20-21	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
11	Forklift	<20-31	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Up to 3 (noisiest) plant operating concurrently		<20-55	<20-37	<20-32	<20-27	<20-31	<20-24	<20-28	<20-26	<20-23	<20-22	<20-22	<20-31

Table 4-2 – Predicted $L_{Aeq,15min}$ Intersection Upgrade Construction Noise Levels at Receiver Locations, dB(A)

Plant Item	Plant Description	Predicted $L_{eq,15\ min}$ Construction Noise Levels											
		R1 (associated receiver)	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12
Noise Management Level		*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*
1	Crane	<20-27	<20-33	<20-23	<20-37	<20-34	<20	<20	<20	<20	<20	<20	<20
2	Drum roller	<20-26	<20-32	<20-22	<20-36	<20-33	<20	<20	<20	<20	<20	<20	<20
3	Padfoot roller	<20-26	<20-32	<20-22	<20-36	<20-33	<20	<20	<20	<20	<20	<20	<20
4	Wheeled loader	<20-26	<20-32	<20-22	<20-36	<20-33	<20	<20	<20	<20	<20	<20	<20
5	Dump truck	<20-25	<20-31	<20-21	<20-35	<20-32	<20	<20	<20	<20	<20	<20	<20
6	30t Excavator	<20-24	<20-30	<20-20	<20-34	<20-31	<20	<20	<20	<20	<20	<20	<20
7	Grader	<20-24	<20-30	<20-20	<20-34	<20-31	<20	<20	<20	<20	<20	<20	<20
8	Chain trencher	<20-21	<20-27	<20	<20-31	<20-28	<20	<20	<20	<20	<20	<20	<20
9	Water truck	<20-21	<20-27	<20	<20-31	<20-28	<20	<20	<20	<20	<20	<20	<20
10	Telehandler	<20	<20-21	<20	<20-25	<20-22	<20	<20	<20	<20	<20	<20	<20
11	Forklift	<20	<20	<20	<20	<204	<20	<20	<20	<20	<20	<20	<20
Up to 3 (noisiest) plant operating concurrently		<20-31	<20-37	<20-28	<20-41	<20-38	<20-21	<20	<20	<20	<20	<20	<20-20

5 Conclusion

A review of the revised concept design has been undertaken. Revised construction and operational noise predictions have been presented and found to be in compliance with nominated criteria for the project. Revised operational noise contours have been presented.

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
06.05.2026	Generate memo	-	0	W. Chan	-	W. Chan
13.05.2026	Update	-	1	W. Chan	-	W. Chan
15.05.2026	Update for client comment	-	2	W. Chan	-	W. Chan
29.05.2026	Update Figure 2-1	-	3	W. Chan	-	W. Chan
File Path: R:\AssocSydProjects\TP151-TP200\TP185 wc South Coree BESS\1 Docs\TP185-01F05 Tech Memo (r2).docx						

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of every day sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz), but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Predicted Operational Noise Contours

Figure 5-1 – Predicted $L_{Aeq,15\ minute}$ Operational Noise Contours (Ground Floor) – Day (standard meteorological conditions)

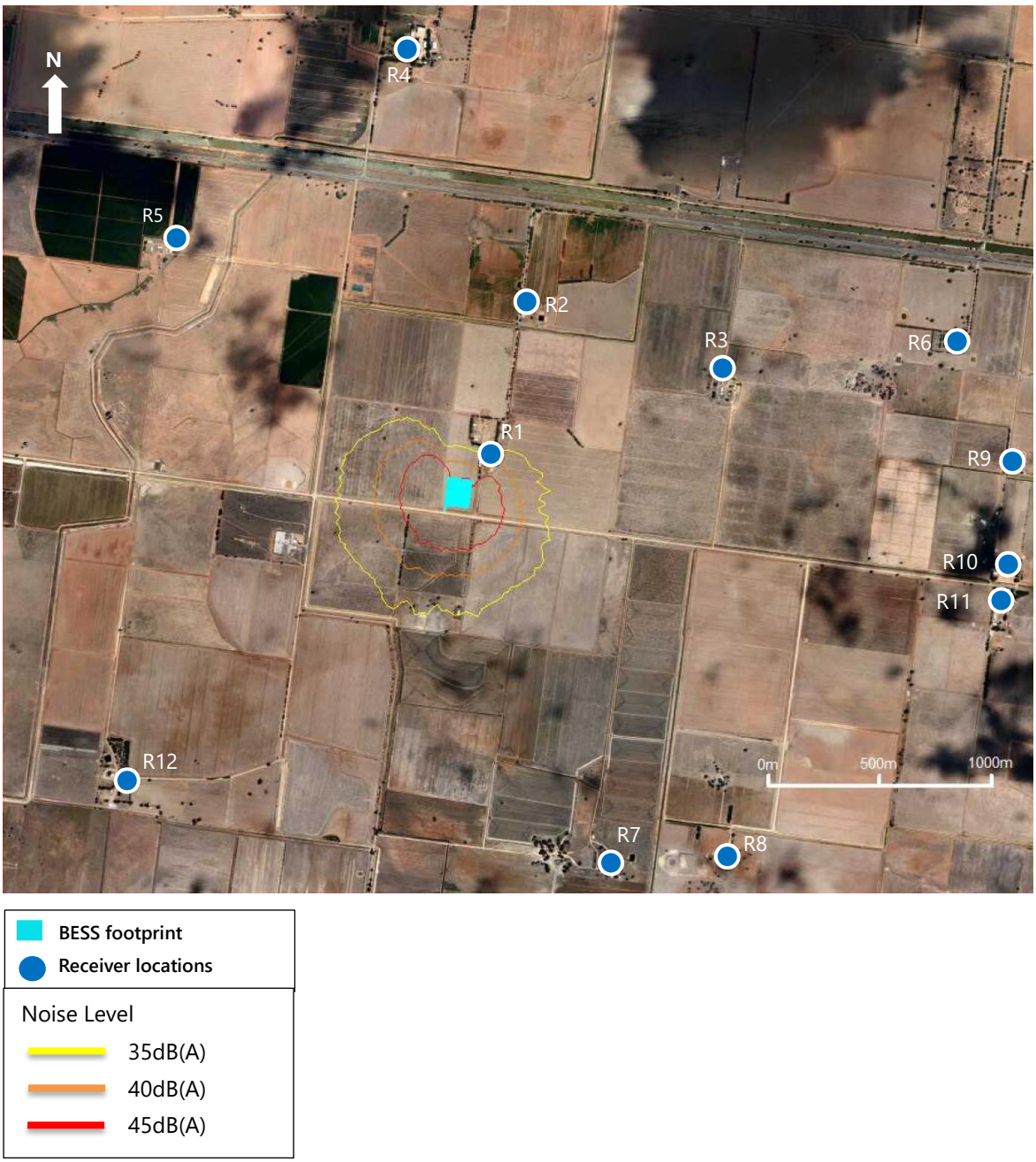

Figure 5-2 – Predicted $L_{Aeq,15\ minute}$ Operational Noise Contours (Ground Floor) – Day (slight to gentle breeze)

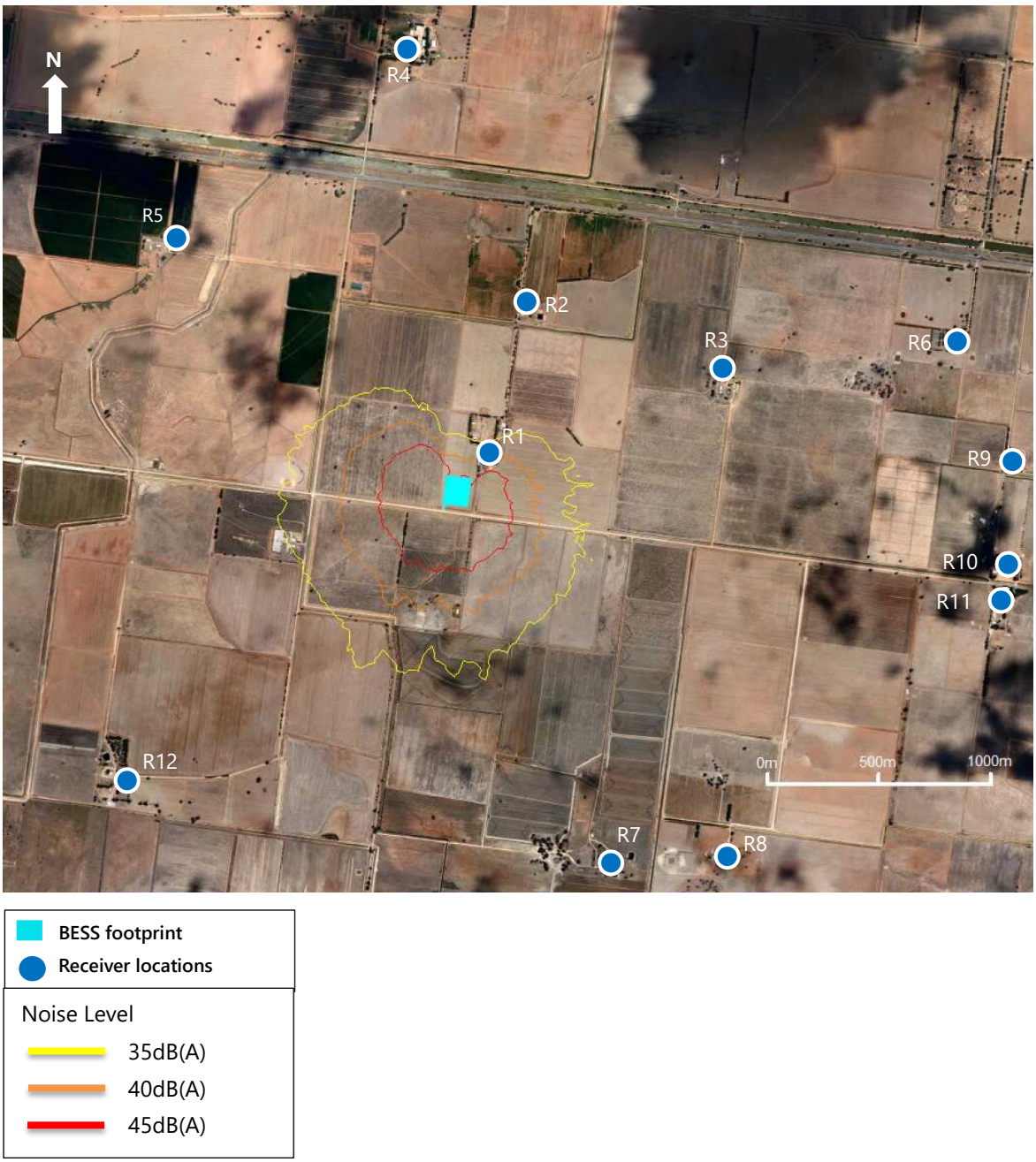

Figure 5-3 – Predicted $L_{Aeq,15\ minute}$ Operational Noise Contours (Ground Floor) – Evening & Night (standard meteorological conditions)

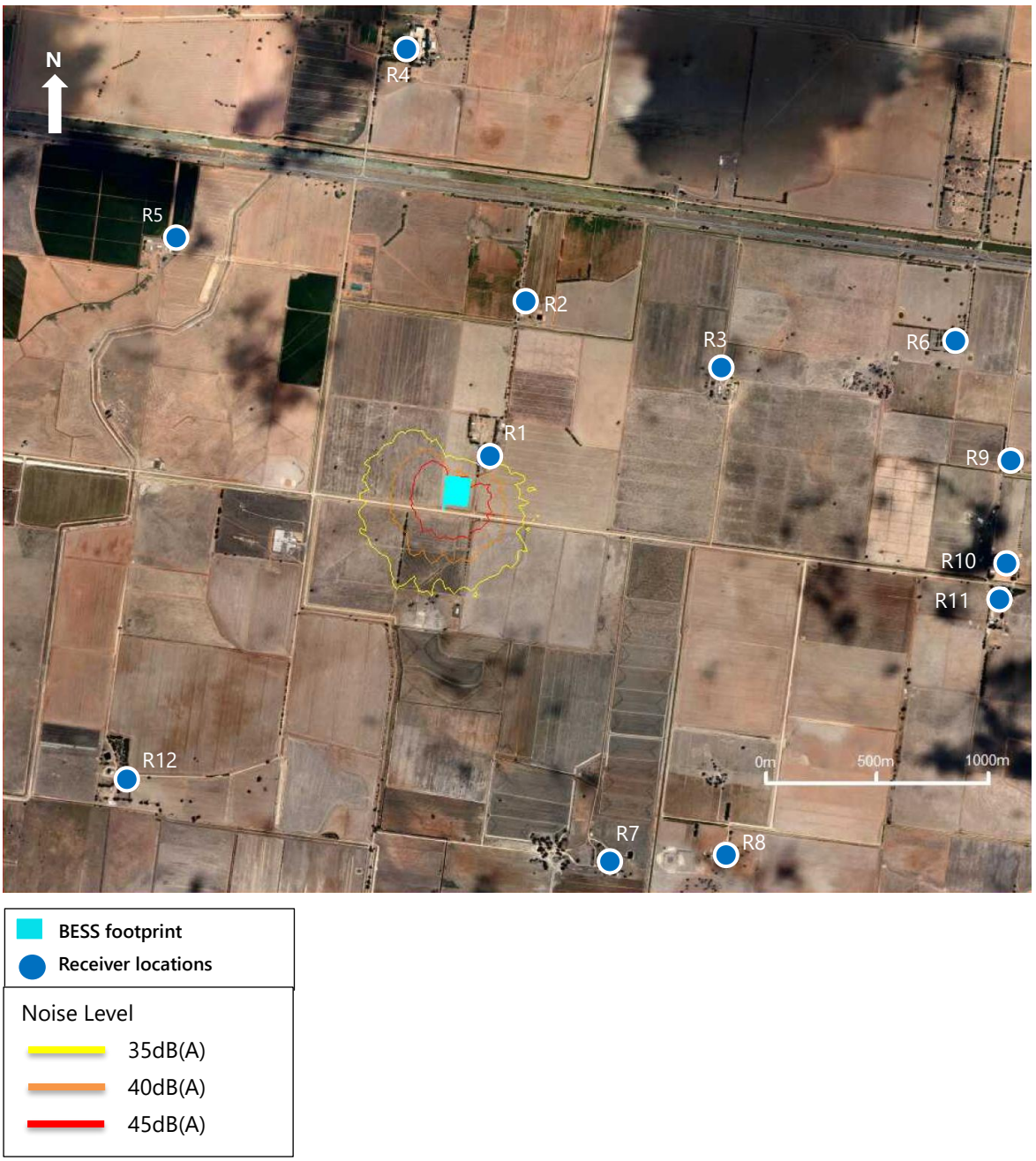

Figure 5-4 – Predicted $L_{Aeq,15\ minute}$ Operational Noise Contours (Ground Floor) – Evening & Night (slight to gentle breeze)

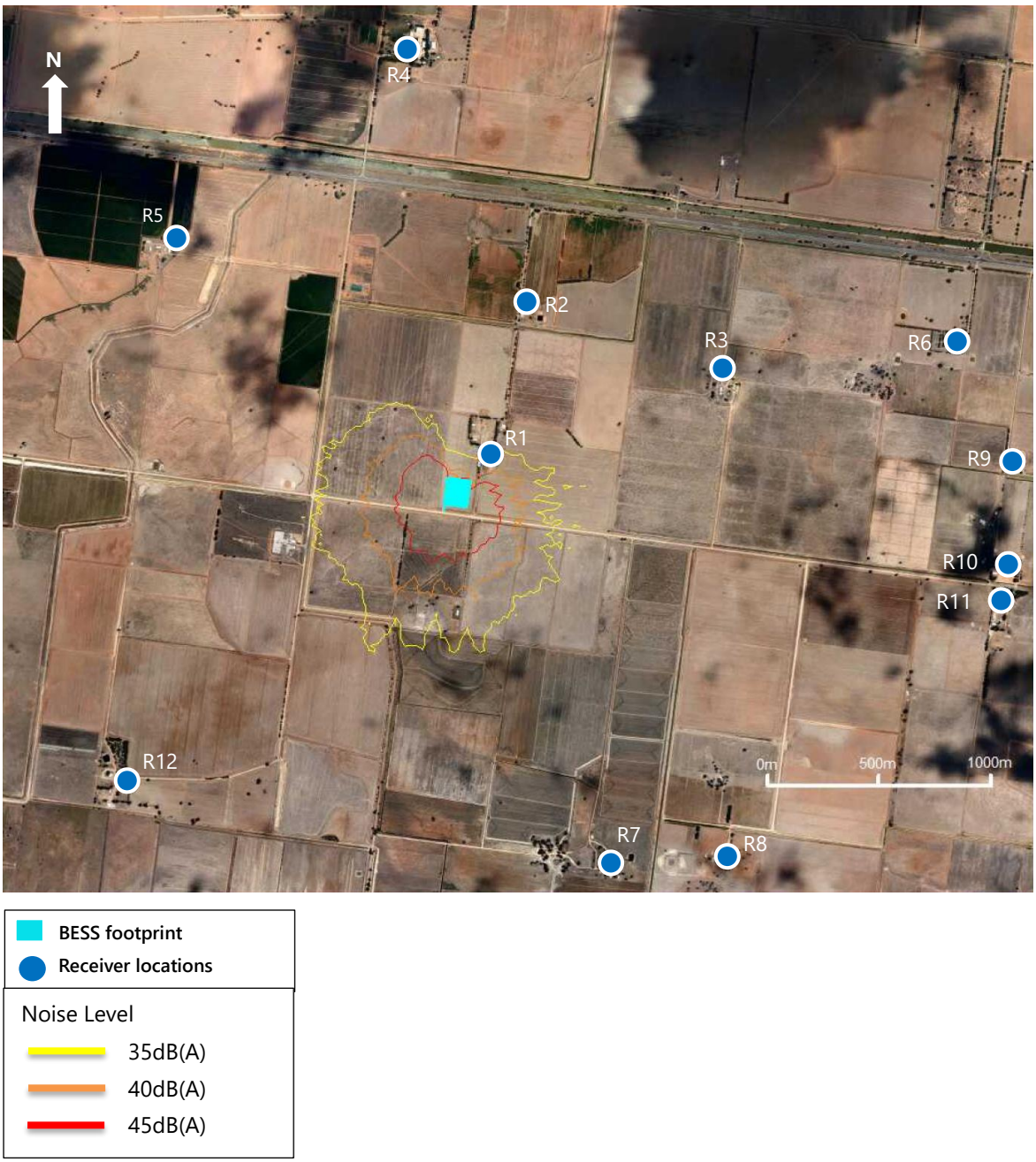

Figure 5-5 – Predicted $L_{Aeq,15\ minute}$ Operational Noise Contours (Ground Floor) – Evening & Night (moderate temperature inversion)