

Technical Memorandum

17 December 2025

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Project Name	Mount Piper to Wallerawang Transmission Line Project – Submissions Report		
Subject	Detailed noise analysis for Environment Protection Authority submission response (Rev 1)		

1. Introduction and purpose

As part of the response to submissions report for the Mount Piper to Wallerawang Transmission Line Upgrade Project EIS (the project), the NSW Environment Protection Authority (NSW EPA) requested further details of the predicted construction noise impacts during out of hours works periods (OOHW) and how the mitigation approaches outlined in the EIS would '*shift the timing of impacts away from sensitive periods, and/or reduce the magnitude or duration of impacts*'.

During consultation with EPA on 20 October 2025, it was agreed that further assessment would be undertaken for the worst case construction noise impacts during the proposed project construction hours within OOHW Period 1 Day (Figure 2.1) as defined by the Construction Noise and Vibration Guidelines (CNVG) (Saturday afternoon and Sunday daytime periods). Technical Paper 10 – Noise and Vibration Impact Assessment of the EIS identified a number of scenarios where exceedances are predicted at sensitive receivers in the Lidsdale area.

The assessment also included analysis of typical mitigation approaches implemented on Transgrid's similar transmission projects and based on advice from the project's construction contractor. The analysis outlines how the potential reduction in noise levels attributed to each mitigation option would affect the number of impacted receivers identified (see section 4). The assessment also includes a summary of the planned construction hours and explains when contingency work might occur outside those hours if the network operator recalls scheduled outages. Further analysis of construction scenario 6 (structure footing construction using impact piling) has not been undertaken as impact piling is no longer proposed by the construction contractor (refer to the separate Amendment Report (Transgrid, 2025) for further details).

The Technical Memorandum provides the results of the additional assessment, the analysis and information requested by the EPA in their submission.

1.1 Approach

In the EIS and Technical Paper 10 - Noise and Vibration Impact Assessment, the worst-case scenario involved transmission structure footing construction using impact piling methods. Since the EIS exhibition, the project's design has confirmed that no impact piling (scenario 6) is required. Therefore, structure footing construction (scenario 6B) using bored piling methods has been further analysed for the purposes of this assessment and addressing NSW EPA's response.

While scenario 6B is not the construction scenario resulting in the highest number exceedances of Construction Noise Management Level (CNML) in the Lidsdale area (the area most impacted by noise due to the project), this activity was predicted to result in highly intrusive noise levels over 25 dB(A) of the CNML to 7 sensitive receivers and is of longer duration compared to other construction scenarios. Bored

piling activities at transmission structures in proximity to Lidsdale sensitive receivers is programmed to occur over of a maximum 3-month period. For this reason, scenario 6B has been adopted as the worst case scenario to be carried forward for this assessment. Further analysis of construction scenario 6B is presented in section 3.

In comparison, other construction scenarios such as access track upgrades (scenario 3) were predicted to result in noise level exceedances at 17 sensitive receivers, however such works are of shorter duration, about two weeks in any one location. Access track works would move along the track alignment and noise levels would reduce as the works move away from each receiver.

Further details of noise impacts for construction scenarios during the OOHW Period 1 Day are in section 6.1.2 of the Technical Paper 10 - Noise and Vibration Impact Assessment.

2. Proposed project construction hours, contingency working hours and mitigation

As outlined in section 3.5.2 of the EIS, the proposed project construction hours would be from 7am to 6pm Monday to Sunday, shown below in Figure 2.1. In addition to this, compounds would be used from 6pm to 7pm Monday to Friday following the completion of construction work at 6pm. Vehicle movement and cleaning and storage of vehicles and equipment would be the key activities anticipated at compounds during this period. On weekends, construction work would end earlier and compound use would cease at 6pm.

The proposed project construction hours include the following Out of Hours Work (OOHW) periods:

- Period 1 – Day:
 - 7am to 8am Saturday (only for construction tasks that would not exceed CNMLs referred to as 'low impact')
 - 1pm to 8pm Saturday
 - 8am to 6pm Sunday
- Period 1 – Evening:
 - 6pm to 7pm Monday to Friday (use of construction compounds only)
- Period 2 – Night:
 - 7am to 8am Sunday (only for construction tasks that would not exceed CNMLs).

Works would primarily occur within standard working hours. However, works will need to be undertaken in OOHW periods for the following reasons:

- works in proximity to transmission lines must be completed under outage for worker safety
- works must be completed efficiently as scheduled outages are of a limited duration due to network security and reliability constraints.

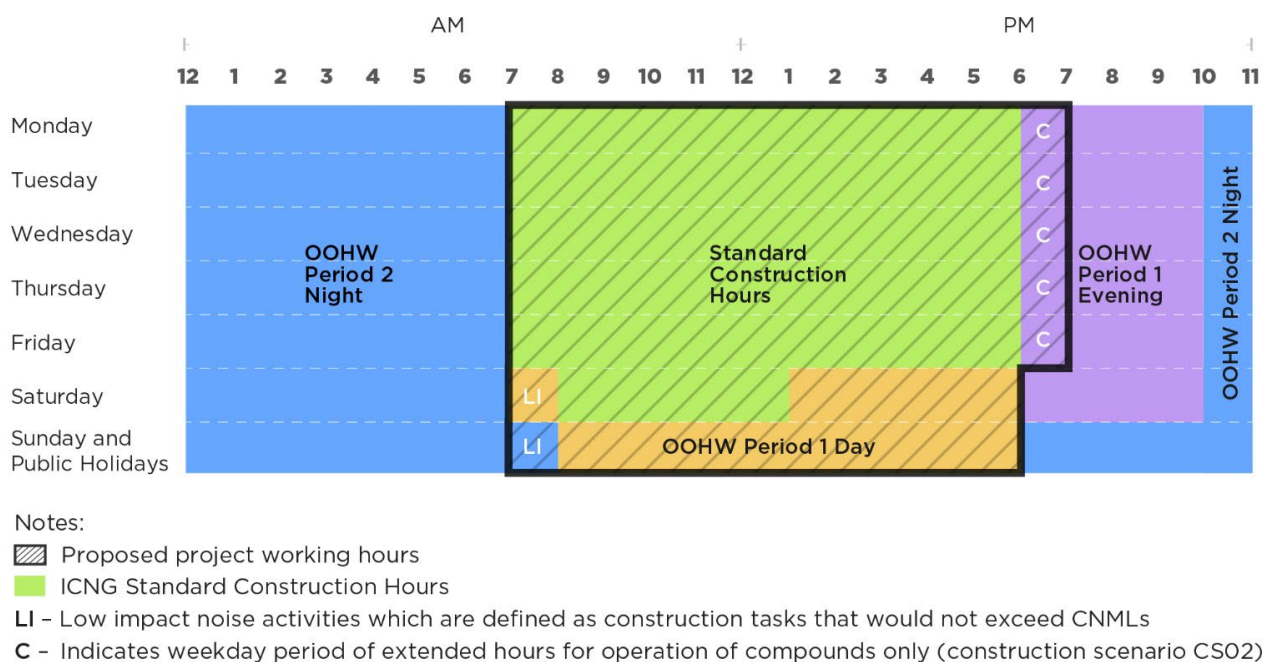


Figure 2.1 Proposed project construction hours

In addition to the proposed project construction hours, construction work may be required in the OOHW Period 1 Evening and Period 2 Night (6pm to 7am Monday to Saturday and to 8am on Sunday) on a contingency basis. Work would be undertaken during OOHW Period 1 Evening and Period 2 Night for the following reasons:

- outage recalls by the network operator
- work within rail corridor shutdown periods scheduled by the rail operator
- to comply with road closure licence requirements from the local road authority.

When a scheduled outage is recalled by the network operator, Transgrid will prioritise the fastest and safest approach to restore power. This may require the completion of works currently in progress to re-energise the transmission line. Construction teams generally have less than 72 hours to complete work and continuous working may be required. This could include OOHW in Period 1 Evening and Period 2 Night.

Outages for major projects are coordinated taking into account other required work on the transmission network and must be approved by the Australian Energy Market Operator (AEMO). This level of coordination helps to minimise the risk of outage recalls. Scheduled outages for the project would occur outside periods of peak energy demand (ie summer and winter). This further minimises the risk of an outage recall.

The scheduled outages for the project would occur outside the periods of peak energy demand, such as summer and winter. The following key aspects govern the project's planning for scheduled outages:

- scheduled outages must be approved by the Australian Energy Market Operator (AEMO), with outages typically scheduled during periods outside of peak energy demand.
- approval from the AEMO for outages during peak energy demand is less likely to be granted.
- construction planning has aligned scheduled outages with the known outage periods for the Central West Orana REZ project to minimise disruption to the network.

Final approval for an outage is confirmed immediately before commencement of work based on the recall risk. Before a scheduled outage begins, Transgrid will monitor AEMO's recall forecasts. If there is a high risk of an outage recall, Transgrid will adjust construction activities to ensure outage constrained construction work can be completed if a recall occurs. If the risk of an outage recall is too high, the outage may be cancelled. AEMO may also cancel an outage due to major unexpected network constraints not known at the time of approval.

These processes help Transgrid avoid works being commenced under an outage which is likely to be recalled and therefore would reduce the risk of impact to nearby residential receivers during the OOHW Period 1 Evening and Period 2 Night.

3. Timing and duration impact analysis

The construction noise assessment described in Technical Paper 10 – Noise and Vibration Impact Assessment evaluated the worst-case predicted noise impacts across the full project footprint for each of the 10 modelled construction scenarios. This approach provided a basis for identification of the following worst case impacts:

- numbers of impacted noise sensitive receivers for each construction scenario
- the highest predicted noise level for each scenario at each receiver.

In addition to the quantitative assessment undertaken, a discussion of the anticipated duration of impacts for each construction scenario at each location was presented based on the information available at the time. Subsequent analysis has been undertaken based on a more recent, detailed construction program provided by the construction contractor and confirmation that impact piling is no longer being proposed (described in the Amendment Report, Transgrid 2025). The results of this analysis are detailed in section 3.1.

3.1 Analysis results

Detailed analysis of the program was undertaken to show the number of days with construction occurring during OOHW period 1 on each day of the week. Figure 3.1 shows the indicative number of days based on the project program and work arrangements for construction scenario 6B.

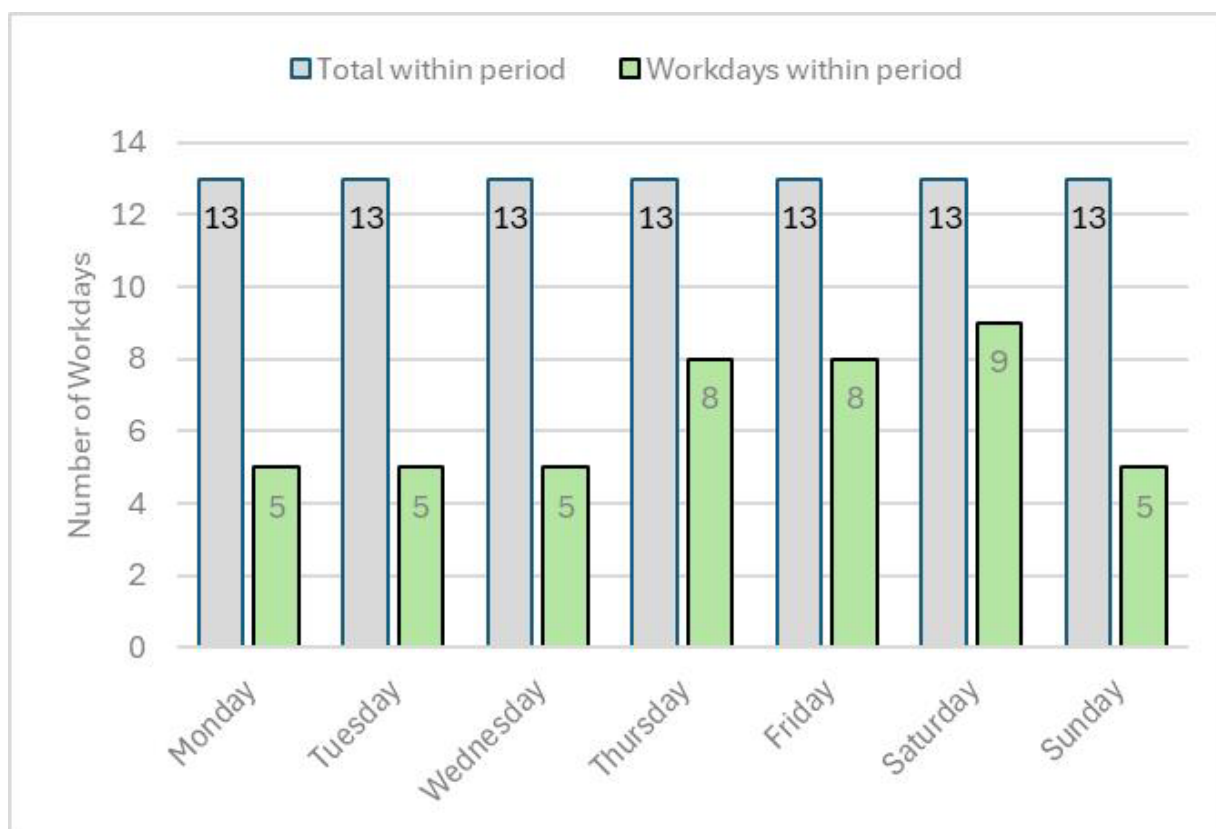


Figure 3.1 Number of work days within indicative 3-month period for scenario 6B

Figure 3.2 shows the predicted noise level exceedance of the CNML for each selected most impacted residential receivers in Lidsdale over an indicative three-month time period coinciding with sequential tower construction activities described in scenario 6B.

Figure 3.2 highlights the predicted noise level exceedances for Saturdays and Sundays within the indicative three-month period. Saturday morning work (until 1pm) and weekday work would be subject to standard construction hours CNMLs.

The period of works shown in Figure 3.2 forms part of a wider construction program but demonstrates how construction scheduling can reduce construction noise impacts to potentially impacted receivers. The commencement of works on a weekend, where shown in Figure 3.2, is linked to other critical sequential works occurring at each location and to factor in the timing of scheduled outages. Key working arrangements to be implemented by the construction contractor (and shown in Figure 3.2) include:

- no works on every second Sunday
- a roster typically involving 20 work-days followed by 8 non-work days (plus travel days) (i.e. 20 days on: 8 days off).

These working arrangements will result in periods of limited or no works during OOHW period 1 Day and a reduction in the number of days on which exceedance of the OOHW period 1 Day criteria would occur.

Figure 3.2 shows that as construction moves further from each receiver, the magnitude of noise level exceedances are reduced. Not all Lidsdale residential receivers in this analysis that are highly noise affected (>75 dBA) would be impacted by every stage of the works.

During the proposed construction working hours, the proposed construction schedule would result in works only occurring for five out of a possible 13 Sundays within the analysed three month period (about 38 per cent). This schedule also means there are no consecutive Sundays where works would occur (refer Figure 3.2). The schedule would also ensure that works on Saturdays is limited to about 9 of 13 Saturdays (about 69 per cent) during the analysed period, with each of these 9 Saturdays resulting in noise level exceedances. Figure 3.2 also shows:

- no more than three consecutive Saturdays would result in noise level exceedances
- about 5 weeks over the three month period where no noise level exceedances are experienced by receivers.

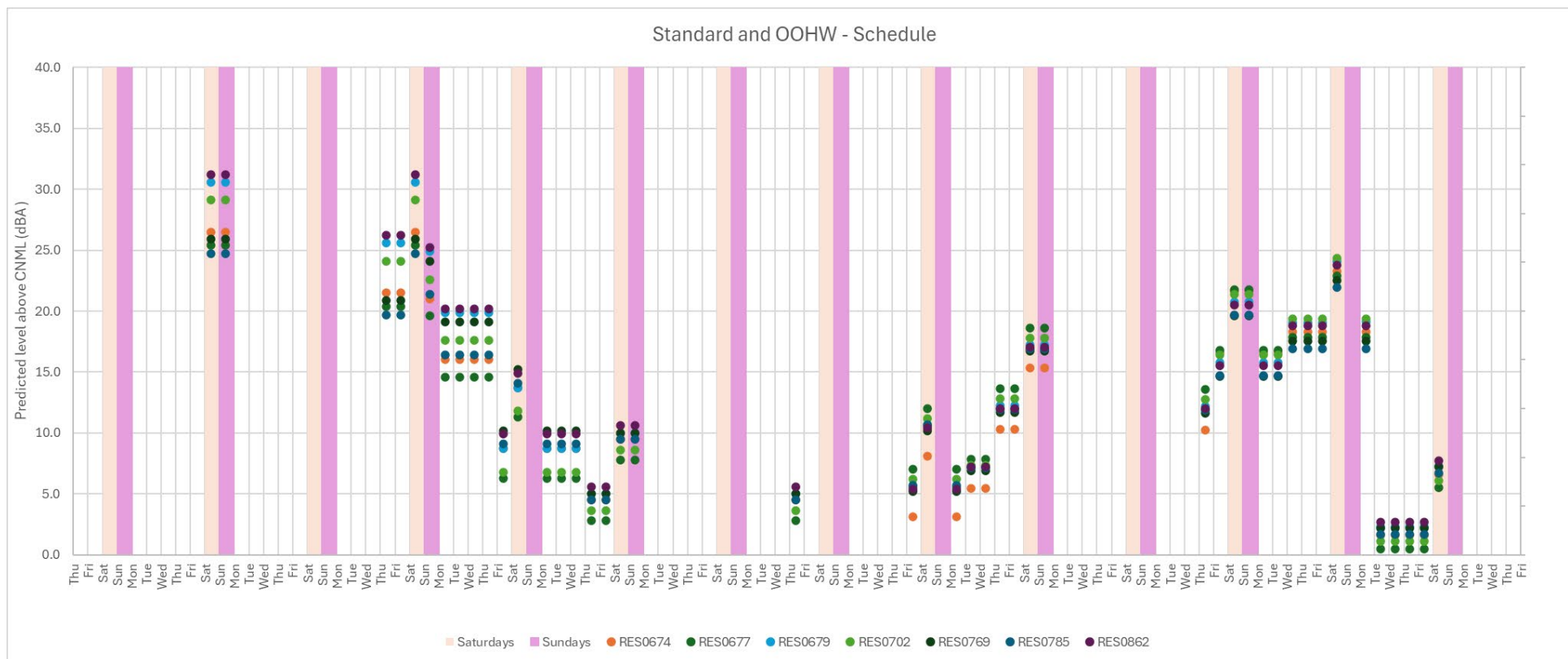


Figure 3.2 *Predicted noise level exceedances at Lidsdale residential receivers (scenario 6B) based on the project program and working arrangements over a 3-month period*

3.2 Assessment of impacts

Table 3.1 summarises the number of days of predicted worst-case construction noise level exceedances at each of the Lidsdale receivers within the analysed three month period for construction scenario 6B. The timing of when exceedances are predicted for each receiver are shown in Figure 3.2.

As presented in Figure 3.1, Transgrid would only be working on 5 out of the 13 Sundays within the indicative three month period analysed. As shown in Table 3.1, the highest noise level exceedances on Sundays (>25 dBA above the CNML) only occur on up to two Sundays out of a possible 13 Sundays within the indicative three month period. Where reasonable and feasible, this may be further reduced by implementation of the additional noise mitigation measures discussed further in section 4.

Table 3.1 Number of predicted CNML exceedance days within the indicative 3-month period for scenario 6B

Work period	Number of days in 3-month period	Predicted level above CNML (dBA)	Lidsdale residential receivers						
			RES0674	RES0677	RES0679	RES0702	RES0769	RES0785	RES0862
Weekdays	65	0 to 10	15	15	15	15	11	15	15
		>10 to 20	14	14	14	14	18	16	10
		>20	2	2	2	2	2	0	6
		Total	31	31	31	31	31	31	31
OOHW Period 1 Day - Saturday	13	0 to 5	0	0	0	0	0	0	0
		>5 to 15	3	4	4	4	3	4	4
		>15 to 25	3	3	3	3	4	5	3
		>25	2	2	2	2	2	0	2
		Total	8	9	9	9	9	9	9
OOHW Period 1 Day - Sunday	13	0 to 5	0	0	0	0	0	0	0
		>5 to 15	1	1	1	1	1	1	1
		>15 to 25	3	3	3	3	3	4	2
		>25	1	1	1	1	1	0	2
		Total	5	5	5	5	5	5	5

4. Mitigation to reduce magnitude of impacts

4.1 Identified mitigation options

Table 4.1 outlines standard mitigation options and their estimated noise reduction that are typically used to reduce construction noise impacts, including during OOHW periods. The practicality and reasonableness of these measures to mitigate the predicted impacts is also described.

Table 4.1 Example of standard mitigation options to reduce construction noise

Mitigation Measure Examples	Estimated Noise Reduction	Practicality / Reasonableness
Quieter equipment selection	1–10 dB(A)	Highly practical; modern machinery is quieter and often more efficient.

Mitigation Measure Examples	Estimated Noise Reduction	Practicality / Reasonableness
Use of acoustic temporary barriers	1–10 dB(A)	Effective when placed near noise sources; requires space and budget. Likely best at compounds where location is fixed and work is not at height.
Use of shrouds and shielding on equipment	3–15 dB(A)	For stationary equipment or large equipment with discrete noise sources (eg: pumps, generators). Similar results can be achieved through careful placement of equipment 'shielding'.
Site layout optimisation (e.g., locating noisy equipment away from receptors, placing/parking unused vehicles and objects in the path of noise propagation)	1–5 dB(A)	Practical with early planning; increases separation distance between source and receiver or provides temporary barrier shielding effects

The selection of mitigation would be undertaken by the construction contractor within the Construction Noise and Vibration Management Plan required by mitigation measure NV1. This further assessment would include evaluation of the preferred mitigation options based on the location of works, activity being undertaken and situation-specific basis for practicality and reasonableness.

4.2 Analysis of mitigation effectiveness

Figure 4.1 outlines the results of the analysis of the number of sensitive receivers exceeding the CNMLs for the OOHW Period 1 Day, based on applying a five or 10 dBA reduction which could be achieved by the identified mitigation examples for the following construction scenarios:

- CS01 – Site establishment
- CS02 – Construction compounds
- CS03 – Access track upgrades
- CS04 – Vegetation clearance
- CS05 – Earthworks and civil works
- CS06B – Structure footing construction (bored piling)
- CS07 – Structure assembly and erection
- CS08 – Stringing transmission line
- CS09 – Demobilisation/rehabilitation.

The results outlined in Figure 4.1 are for all the sensitive receivers considered as part of Technical Paper 10 – Noise and vibration assessment.

Figure 4.2 provides a similar overview for the OOHW Period 1 Evening/ Period 2 Night for the following construction scenarios, which may potentially occur when contingency works are being undertaken during outage recall periods:

- CS02 - Construction compounds
- CS07 - Structure assembly and erection
- CS08 - Stringing transmission line.

Table 4.2 provides a more detailed analysis of the sensitive receivers predicted to be impacted including a breakdown of the noise level exceedance bands.

As shown in Figure 4.1 and Figure 4.2, a 5 dBA reduction (through use of one or a collection of mitigation measures) would generally result in at least a halving of the number of receivers that would potentially be impacted.

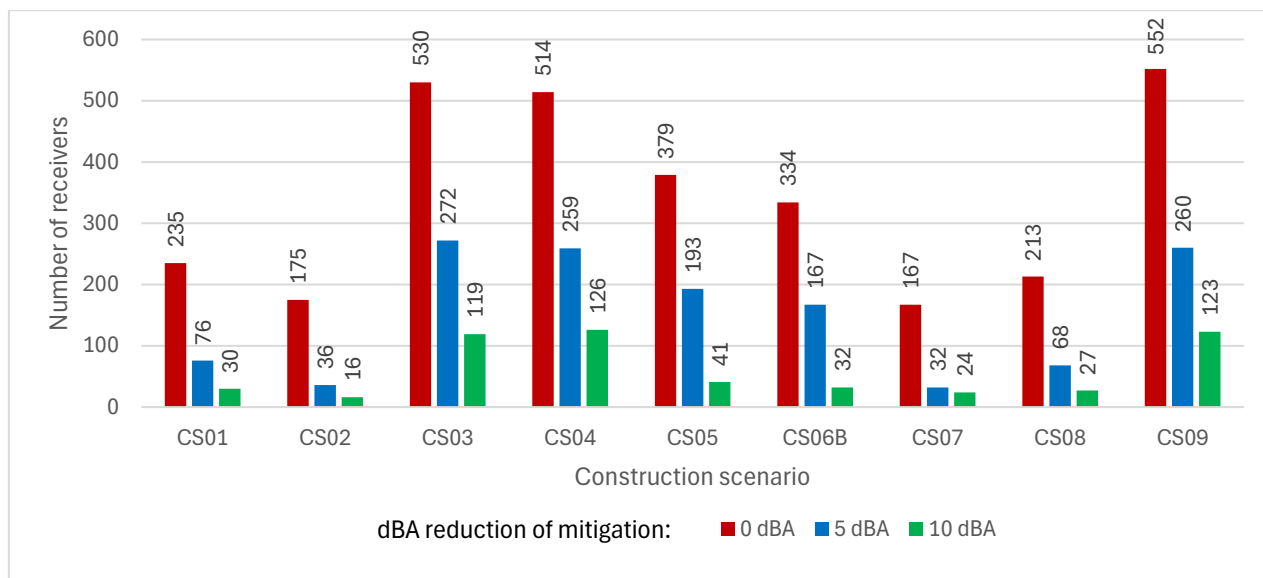


Figure 4.1 Effectiveness of construction noise mitigation at reducing numbers of impacted receivers during OOHW Period 1 Day

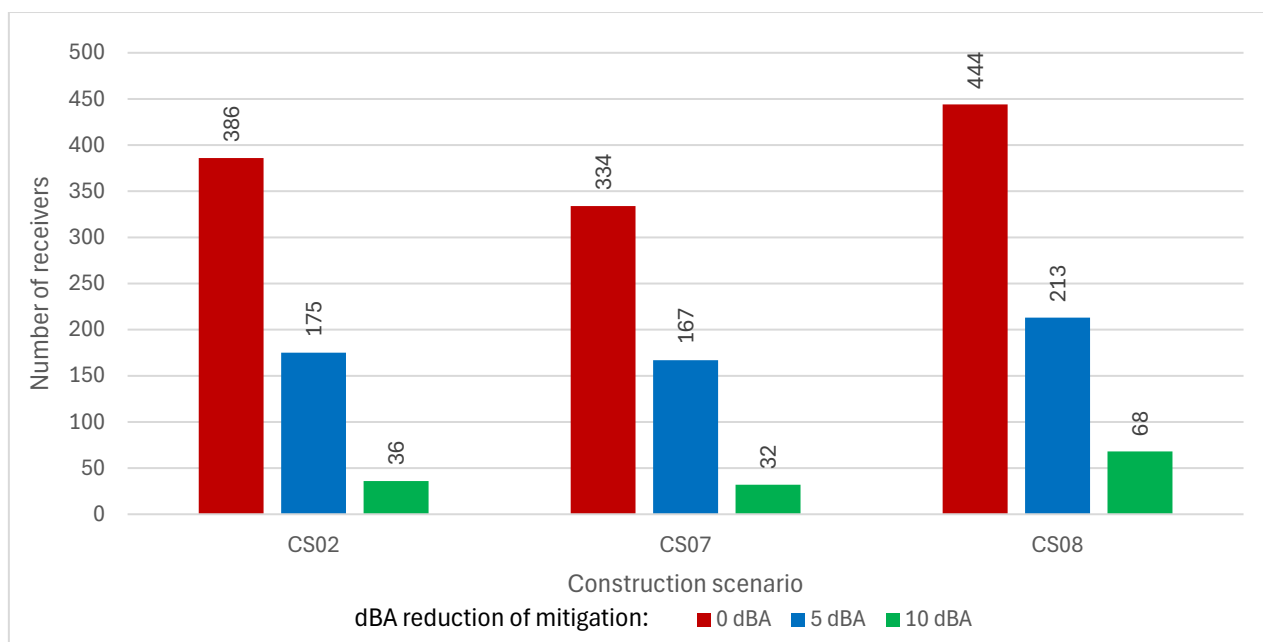


Figure 4.2 Effectiveness of construction noise mitigation at reducing numbers of impacted receivers during OOHW Period 1 Evening/Period 2 Night

Table 4.2 Effectiveness of standard construction noise mitigation at reducing numbers of impacted receivers during OOHW periods

	Noise level above CNMLs ¹	Site establishment			Construction compounds			Access track upgrades			Vegetation clearing			Earthworks & civil works			Structure footing construction (Bored Piling)			Structure assembly and erection			Stringing transmission line			Demobilisation / rehabilitation		
		CS01			CS02			CS03			CS04			CS05			CS06B			CS07			CS08			CS09		
Mitigation reduction levels (dBA) ³ (see Figure 4.1 and Figure 4.2)		0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10	0	5	10
Outside of standard hours – Period 1 Day (CNML of 40 dBA)																												
Total number of exceedances		235	76	30	175	36	16	530	272	119	514	259	126	379	193	41	334	167	32	167	32	24	213	68	27	552	260	123
Number of sensitive receivers per perception category	1 to 5 dBA	119	45	10	125	16	16	231	109	64	221	99	69	167	130	14	141	126	7	125	7	11	116	39	5	250	95	91
	5 to 15 dBA	96	21	17	50	20	0	244	130	38	236	125	36	185	46	19	168	28	18	29	18	11	75	18	18	270	140	18
	15 to 25 dBA	17	10	3	0	0	0	38	26	12	36	25	15	19	14	8	18	11	7	11	7	2	18	11	4	18	19	12
	>25 dBA	3	0	0	0	0	0	17	7	5	21	10	6	8	3	0	7	2	0	2	0	0	4	0	0	14	6	2
Outside of standard hours – Period 1 Evening / Period 2 Night (CNML of 35 dBA) (see Figure 4.2)																												
Total number of exceedances		-	-	-	386	175	36	-	-	-	-	-	-	-	-	-	-	-	-	334	167	32	444	213	68	-	-	-
Number of sensitive receivers per perception category	1 to 5 dBA	-	-	-	190	125	16	-	-	-	-	-	-	-	-	-	-	-	-	139	125	7	209	116	39	-	-	-
	5 to 15 dBA	-	-	-	176	50	20	-	-	-	-	-	-	-	-	-	-	-	-	170	29	18	206	75	18	-	-	-
	15 to 25 dBA	-	-	-	20	0	0	-	-	-	-	-	-	-	-	-	-	-	-	18	11	7	18	18	11	-	-	-
	>25 dBA	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	7	2	0	11	4	0	-	-	-

Notes:

1. These categories are established in Technical Report 10 - Noise and Vibration Impact Assessment section 2.2.2, Table 2.5.
2. Shaded cells indicate works to be conducted during an outage recall only and would otherwise be avoided where possible.
3. Mitigation reduction of 0 dBA means no mitigation applied and is consistent with the EIS. The results from applying 0 dBA, 5 dBA and 10 dBA mitigation reduction levels are shown in Figure 4.1 and Figure 4.2 with the same colour coding provided for ease of reference.

5. Summary

In response to a number of queries raised by the NSW Environment Protection Authority (NSW EPA) regarding out-of-hours construction noise impacts, further analysis has been undertaken to:

- Outline the indicative timing and duration of predicted construction noise level exceedances of the CNML during OOHW Period 1 day for Lidsdale residential receivers
- Outline the potential effectiveness of standard mitigation approaches in reducing construction noise level exceedances for all sensitive receivers from nine construction scenarios.

The construction contractor proposes a roster consisting of 20 consecutive workdays followed by 8 days off (including travel days), with the additional measure of not scheduling work every second Sunday. With these arrangements in place, construction activities would occur on only five out of 13 Sundays within a representative three-month timeframe, thereby minimising the amount of work carried out during OOHW Period 1 Day.

The analysis also demonstrates how the level of noise exceedances of the CNML for scenario 6B (bored piling for structure footings) would change for Lidsdale sensitive receivers now that impact piling is not proposed (refer to Table 5.5 of the Amendment Report (Transgrid, 2025) and as the works progress along the linear project alignment. The key findings of the assessment based on the analysed three month period are:

- works would only occur for five out of a possible 13 Sundays (about 38 per cent).
- no work would occur over consecutive Sundays.
- works on Saturdays would be limited to about nine of 13 Saturdays (about 69 per cent) during the analysed period, with each of these nine Saturdays resulting in noise level exceedances.
- no more than three consecutive Saturdays would result in noise level exceedances.
- no noise level exceedances are experienced by receivers for about 5 weeks over the three month period.

Analysis was also undertaken to assess the potential benefits of applying standard mitigation options, such as noise attenuation measures. Implementing measures that achieve a 5 dBA reduction in noise could result in at least a 50 per cent reduction in the number of sensitive receivers impacted by noise level exceedance during construction. Further reductions in the number of impacted sensitive receivers can be achieved with more advanced mitigation, as a 10 dB decrease could substantially lower the number of affected receivers by up to 90 per cent depending on the construction scenario.

This additional analysis demonstrates the effectiveness of noise mitigation in minimising impacts to sensitive receivers. The outcomes of this analysis will be applied to the construction contractor's Construction Noise and Vibration Management Plan and the out-of-hours work protocol.