



CHAPTER 16 – NOISE AND VIBRATION

STANMORE ID EXTENSION PTY LTD
ISAAC DOWNS EXTENSION PROJECT

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16. NOISE AND VIBRATION

16.1 Introduction

This chapter describes the aspects of the Isaac Downs Extension Project (the Project) that may result in potential construction and operational noise and vibration emissions, outlines how compliance with the acoustic objectives for the Project will be assessed, identifies potential noise and vibration impacts to sensitive receptors, and provides mitigation measures for potential adverse noise and vibration impacts. Queensland legislation, policies and guidelines relevant to the Project's assessment and management of noise and vibration emissions are explained in the chapter.

This chapter was developed from a detailed Noise and Vibration Impact Assessment completed for the Project, which is provided in **Appendix V**.

16.2 Regulatory Framework

16.2.1 Environmental Protection Act 1994 and Environmental Protection Regulation 2019

The management of Queensland's acoustic environment is addressed under two key pieces of legislation, the overarching *Environmental Protection Act 1994* (EP Act), and the subordinate regulation to the EP Act, the *Environmental Protection Regulation 2019* (EP Regulation).

The EP Act outlines fundamental principles, objectives, and powers related to environmental regulation, including noise and vibration management. The EP Regulation elaborates how the principles and objectives of the EP Act are to be implemented and enforced. The EP Regulation also defines the environmental objective and performance outcomes for Queensland's acoustic environment (Section 16.2.3).

16.2.2 Environmental Protection Policy (Noise) 2019

The Department of Environment, Tourism, Science, and Innovation (DETSI) under legislation has developed Environmental Protection Policies for Queensland that identify and aim to protect, environmental values of the atmosphere and environment that are conducive to the health and well-being of humans and biological integrity. DETSI's Environmental Protection Policy developed for noise in Queensland is the *Environmental Protection (Noise) Policy 2019* (EPP (Noise)).

The purpose of the EPP (Noise) is to achieve the object of the EP Act and subordinate EP Regulation in relation to Queensland's acoustic environment. Specifically, the environmental values to be protected under the EPP (Noise) are the qualities of the acoustic environment that are conducive to:

- Protecting the health and biodiversity of ecosystems.
- Human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to sleep, study, learn or be involved in recreation, including relaxation and conversation.
- Protecting the amenity of the community.

16.2.3 Environmental Objective and Performance Outcomes

The Project's environmental objective and performance outcomes for noise and vibration are derived from the requirements of Schedule 8 of the (EP Regulation) and the terms of reference (ToR) for the Project's environmental impact statement (EIS). Table 16-1 describes where these environmental objectives and performance outcomes are addressed in the EIS.

Table 16-1 Environmental Objective and Performance Outcomes – Noise and Vibration

Requirement	Environmental Objectives and Performance Outcomes	EIS Reference
EP Regulations	The activity will be operated in a way that protects the environmental values of the acoustic environment.	16.5, 16.6, 16.7, 16.8, 16.9
Terms of Reference		
Performance Outcomes		
1 Sound from the activity is not audible at a sensitive receptor, or		Not applicable
2 The release of sound to the environment from the activity is managed so that adverse effects on environmental values, including health and wellbeing and sensitive ecosystems, are prevented or minimised.		16.6, 16.7, 16.8, 16.9 11.5.3.10, 11.6.4

16.2.4 EIS Information Guideline

The EIS assessment has been undertaken in accordance with the EIS information guideline – Noise and vibration¹. The relevant EIS sections where the requirements of this guideline have been addressed are provided in Table 16-2.

Table 16-2 EIS Information Guidelines – Noise and Vibration

Requirement	EIS Reference
Legislation and policy	16.2, 16.4
Environmental values and acoustic environment	16.3
Background noise levels	16.3.2
Impacts	16.5, 16.6, 16.8, 16.9
Avoidance or mitigation of impacts	16.7, 16.9
Commitments and conditions	16.7, 16.9

16.2.5 Noise Impacts Guideline

As a guide for noise impact assessment in Queensland, DETSI has published the ‘Guideline: Application requirements for activities with noise impacts, ESR/2015/1838’ (Noise Impacts Guideline)². The Noise Impacts Guideline outlines the information required to be provided for the Project’s EIS and to support future approval of the Project’s environmental authority (EA). The relevant EIS sections where the requirements of this guideline have been addressed are provided in Table 16-3.

Table 16-3 Noise Impacts Guideline

Requirement	EIS Reference
Relevant environmental law	16.2, 16.4
Environmental values, including sensitive receptors, topography and background noise levels	16.3

¹ https://www.detsi.qld.gov.au/_global/policy-register/policy-register-pdf?getdoc=5305&name=eis-tm-noise-vibration-information-guide.pdf

² https://www.detsi.qld.gov.au/_global/policy-register/policy-register-pdf?getdoc=1838&name=era-gl-noise-impacts.pdf

Requirement	EIS Reference
Potential impacts, including noise sources, emissions, modelling, noise impacts and background creep	16.5, 16.6, 16.8, 16.9
Proposed management practices	16.7, 16.9

16.2.6 Model Mining Conditions Guideline

The Model Mining Conditions Guideline (DESI, 2016) provides a set of model conditions to form general environmental protection commitments given for mining activities, and environmental authority (EA) conditions for resource activities – mining activities, for DETSI to impose as the administering authority under the EP Act.

Schedule D of the Model Mining Conditions Guideline (DESI, 2016) prescribes the set of model conditions for noise and vibration.

16.3 Existing Environment

During 2025, Stanmore ID Extension Pty Ltd (the proponent), as a subsidiary of Stanmore Resources Ltd (Stanmore), engaged Simpson Engineering Group to conduct ambient noise monitoring for the Project and ViridAu to complete a Noise and Vibration Impact Assessment for the Project (**Appendix V**).

A description of the Project, as assessed in the Noise and Vibration Impact Assessment is provided in **Chapter 4**, which also shows the Project's location.

16.3.1 Noise Sensitive Receptors

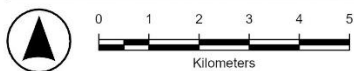
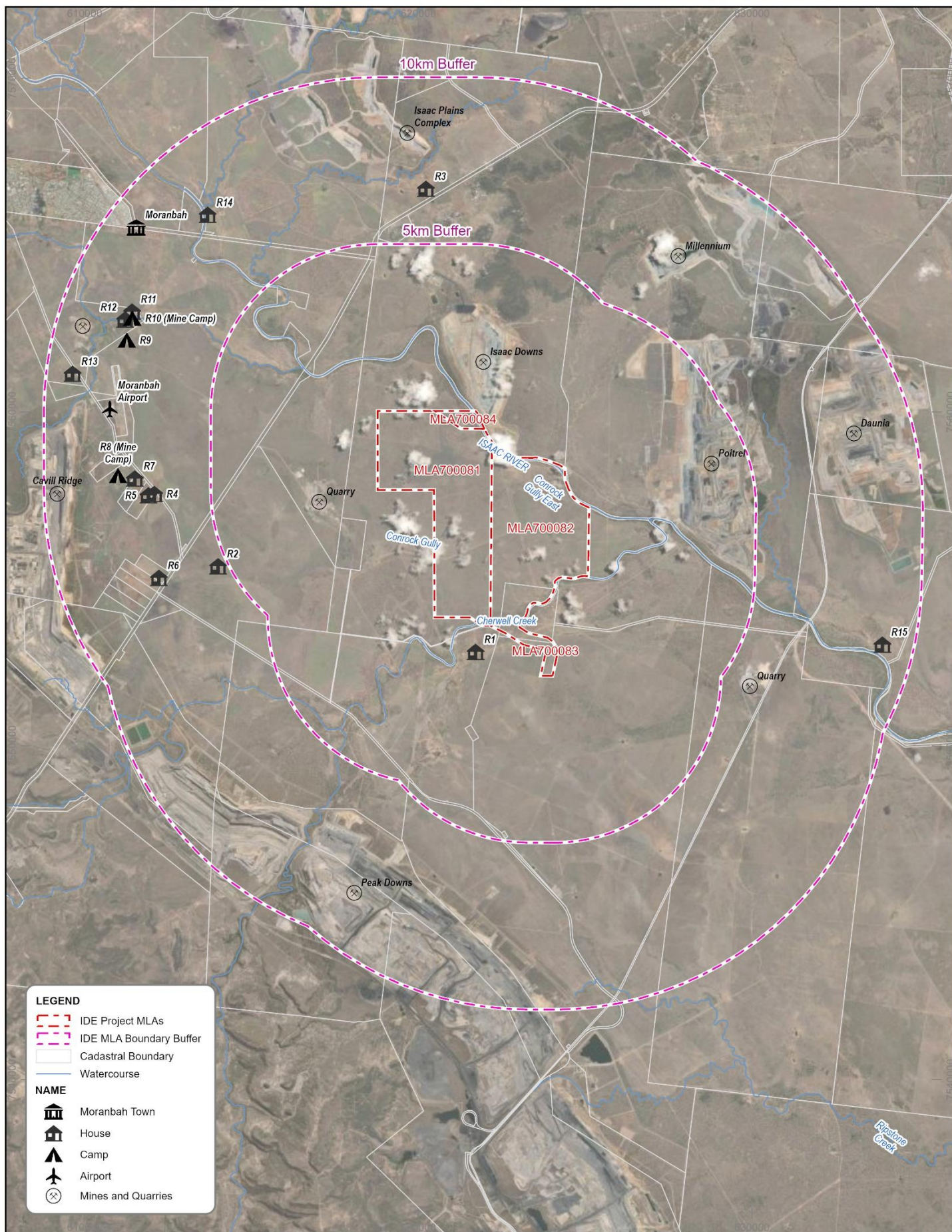
The Project is located within mining lease applications (MLAs) 700081, 700082, 700083 and 700084, and is approximately 15 km southeast of Moranbah. The Project is largely located on Winchester Downs station (Lot 8 SP277834) and overlaps with a State Reserve (Lot 9 GV33), a local road used to access Winchester Downs station, the Isaac River and Cherwell Creek.

Winchester Downs station is a pastoral operation with the land within the Project's MLAs primarily used for grazing. The State Reserve is a nominated stock route disconnected from other stock routes in the region and is managed by the owners of Winchester Downs under grazing rights.

Winchester Downs homestead (R01) is the closest sensitive receptor, within approximately 1.2 km of the Project's proposed mining activities. Other sensitive receptors are located within approximately 5 - 10 km of the Project's proposed mining activities. All noise sensitive receptors identified for the Noise and Vibration Impact Assessment are listed in Table 16-4 and shown in Figure 16-1.

Table 16-4 Noise Sensitive Receptors

Receptor	Receptor Description	Coordinates (GDA2020)	
		Easting (m)	Northing (m)
R01	House	621714.4	7552797.5
R02	House	614000.9	7555362.9
R03	House	620228.9	7566671.9
R04	House	612085.4	7557528.0
R05	House	611915.1	7557488.3
R06	House	612226.5	7555013.6
R07	House	611504.9	7557990.9
R08	Mine camp	611001.1	7558081.9
R09	Mine camp	611266.3	7562139.4
R10	Mine camp	611430.9	7562792.9
R11	House	611422.2	7562992.4
R12	House	611214.9	7562753.9
R13	House	609640.4	7561130.4
R14	House	613687.9	7565892.9
R15	House	633907.3	7553014.0
Moranbah	Town	611544.2	7565526.3



Datum: GDA2020 Zone 55
 Scale: See Scale Bar
 Date: 27/02/2026 3:04 PM
 Drawn: Minserv
 Source: Minserv/Stanmore
 File: 20260223 Sensitive Receptors.aprx

DISCLAIMER: Third party data sources are used in this map compilation. Minserv makes no warranty regarding this data's accuracy or currency.



ISAAC DOWNS EXTENSION

Sensitive Receptors

16.3.2 Ambient Noise Monitoring

Ambient noise monitoring was conducted at Winchester Downs homestead (R01) as the closest sensitive noise receptor and is reported as a component of the Noise and Vibration Impact Assessment provided in **Appendix V**.

A summary of the ambient noise monitoring's methodology is as follows:

- Noise measurements were conducted over a two-week period between Thursday 4 July and Thursday 17 July 2025.
- The noise measurement methodology complied with the Noise Measurement Manual V4.01 (DES, 2020).
- The equipment employed for the unattended survey was a Type 1 Norsonic NOR 139 sound level meter. A portable weather station was setup adjacent to the noise logger during the noise monitoring period.

Overall, the weather during the monitoring period was considered ideal with only a few short periods of strong wind speeds greater than 5 m/s. Noise measurements impacted by inclement weather (wind speed greater than 5 m/s or rain greater than 0.2 mm/h) were reviewed by Simpson Engineering Group and data identified as weather-impacted were excluded from the analysis.

A summary of the measured rating background levels (RBLs) is provided in Table 16-5. The highest RBL occurred during the night and may have been due to nearby insect noise and/or household activity at Winchester Downs homestead.

Table 16-5 Background Noise Level Summary – Winchester Downs Homestead, July 2025

Monitoring Location	Rating Background Noise Summary (dB(A))		
	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
R01 Winchester Downs Homestead	24	21	25

16.4 Noise and Vibration Criteria

16.4.1 EPP (Noise) – Acoustic Quality Objectives

The acoustic quality objectives for various sensitive receptors and for different periods of the day and night are provided in Schedule 1 of the EPP (Noise). The relevant acoustic quality objectives applied to the Project's Noise and Vibration Impact Assessment are provided in Table 16-6.

Table 16-6 EPP (Noise) – Schedule 1

Noise Sensitive Receptor	Time of Day	Acoustic Quality Objective (measured at receptor), dB(A)			Environmental Value
		L _{Aeq,adj,1hr}	L _{A10,adj,1hr}	L _{A1,adj,1hr}	
Residence (for outdoors)	Daytime (7am – 6pm) and Evening (6pm – 10pm)	50	55	65	Health and wellbeing

Noise Sensitive Receptor	Time of Day	Acoustic Quality Objective (measured at receptor), dB(A)			Environmental Value
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$	
Residence (for indoors)	Daytime (7am – 6pm) and Evening (6pm – 10pm)	35	40	45	Health and wellbeing
	Night-time (10pm – 7am)	30	35	40	Health and wellbeing, in relation to the ability to sleep

To demonstrate compliance with the residence (for indoors) night-time acoustic quality objective, a correction is required to determine a corresponding outdoor noise level, which considers an appropriate level of attenuation across a facade to indoor areas. The Noise and vibration - EIS information guideline (DESI, 2024) recommends an outdoor to indoor attenuation value of 7 dB, which is appropriate for typical Queensland buildings with open windows.

The relevant EPP (Noise) noise criteria at the most exposed building façade for the Project are provided in Table 16-7.

Table 16-7 EPP (Noise) – Noise Criteria

Noise Sensitive Receptor	Time of Day	Acoustic Quality Objective (measured at receptor), dB(A)		
		$L_{Aeq,adj,1hr}$	$L_{A10,adj,1hr}$	$L_{A1,adj,1hr}$
Residence (at the building facade)	Daytime and evening	42	47	52
	Night-time	37	42	47

16.4.2 EPP Noise – Background Creep

The EPP (Noise) states that, to the extent it is reasonable to do so, noise must be dealt with in a way that ensures:

- the noise does not have any adverse effect, or potential adverse effect, on an environmental value under this policy
- background creep in an area or place is prevented or minimised.

Background creep is not quantified in the current EPP (Noise), and therefore, guidance was sought from the superseded *Environmental Protection (Noise) Policy 2008*, which states that to the extent that it is reasonable to do so, noise from an activity must not be – for noise that is continuous noise measured by $LA_{90,T}$ - more than nil dB(A) greater than the existing acoustic environment measured by $LA_{90,T}$, or for noise that varies over time measured by $LA_{eq,adj,T}$ more than 5 dB(A) greater than the existing acoustic environment measured by $LA_{90,T}$.

Based on the measured background noise levels detailed in Table 16-5, the threshold background noise level of 30 dB(A) was adopted in accordance with the Model Mining Conditions Guideline (DESI, 2016).

The resultant background creep criteria derived for the Project are detailed in Table 16-8.

Table 16-8 EPP (Noise) – Background Creep Criteria

Noise Sensitive receptor	Background creep criteria, $LA_{eq,adj,1hr}$, dB(A)		
	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
Residence (for outdoors)	35	35	35

16.4.3 Model Mining Conditions Guideline

16.4.3.1 Airbourne Noise

Schedule D, Table D1 of the Model Mining Conditions Guideline (DESI, 2016) details noise limits not to be exceeded at a sensitive place or commercial place. No commercial places were identified in the vicinity of the Project. Therefore, the development of noise criteria for the Project using the Model Mining Conditions Guideline (DESI, 2016) focused on a noise sensitive place.

Based on the measured background noise detailed in Table 16-5, the threshold background noise level of 30 dB(A) was adopted in accordance with the Model Mining Conditions Guideline (DESI, 2016).

Following further application of the Model Mining Conditions Guideline (DESI, 2016), noise criteria were derived for the Project and are detailed in Table 16-9.

Table 16-9 Model Mining Conditions Guideline – Noise Criteria

Noise Sensitive Place						
Noise level dB(A) measured:	Monday to Saturday			Sunday and Public Holidays		
	7 am to 6 pm	6 pm to 10 pm	10 pm to 7 am	9 am to 6 pm	6 pm to 10 pm	10 pm to 9 am
$LA_{eq,adj,15mins}$	35	35	30	35	35	30
$LA_{1,adj,15mins}$	40	40	35	40	40	35

16.4.3.2 Blasting Noise and Vibration

Schedule D, Table D2 of the Model Mining Conditions Guideline (DESI, 2016) details blasting noise and vibration limits not to be exceeded at a sensitive place. The Project's noise and vibration limits for a sensitive place are provided in Table 16-10.

Table 16-10 Model Mining Conditions Guideline – Noise and Vibration Limits

Noise and Vibration Sensitive Place		
Blasting Parameter	7 am to 6 pm	6 pm to 7 am
Airblast overpressure	115 dB(Linear) peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB(Linear) peak at any time	No blasting

Noise and Vibration Sensitive Place		
Blasting Parameter	7 am to 6 pm	6 pm to 7 am
Ground vibration peak particle velocity	5 mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time	No blasting

16.4.4 Low Frequency Noise

Low frequency noise criteria are not detailed in the EP Act, EP Regulation, EPP (Noise) and Model Mining Conditions Guideline (DESI, 2016). Therefore, the Ecoaccess assessment of low frequency noise guideline (EPA, 2004) was adopted for impact assessment purposes.

The Ecoaccess assessment of low frequency noise guideline (EPA, 2004) details an indoor screening criterion of 50 dB(Linear) to avoid complaints of low frequency noise annoyance. Similar to the acoustic quality objectives in Section 16.4.1, an outdoor to indoor attenuation value of 7 dB, which is appropriate for typical Queensland buildings with open windows, was applied. As a result, the Project's low frequency noise outdoor screening criterion is 57 dB(Linear).

16.4.5 Summary – Project Noise and Vibration Criteria

The Project will be operating continuously 24 hours per day, 7 days per week. Activities are repetitive, and therefore, equivalent noise levels over a 15-minute and 1-hour period are expected to be identical. Further details on how the Project's noise and vibration criteria were developed are provided in **Appendix V**.

A summary of the most stringent noise and vibration criteria used for the Project's impact assessment is detailed in Table 16-11.

Table 16-11 Project Noise and Vibration Criteria – Sensitive Place

Assessment Parameter	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
Airborne noise (outdoors)	$LA_{eq,adj,1hr}$ 35 dB(A)	$LA_{eq,adj,1hr}$ 35 dB(A)	$LA_{eq,adj,1hr}$ 30 dB(A)
Airborne noise (outdoors) – Low Frequency	$L_{Zeq,adj,1hr}$ 57 dB(Linear)	$L_{Zeq,adj,1hr}$ 57 dB(Linear)	$L_{Zeq,adj,1hr}$ 57 dB(Linear)
Airblast overpressure	115 dB(Linear) peak (9 out of 10 consecutive blasts) 120 dB(Linear) peak at any time	No blasting	No blasting

Assessment Parameter	Day 7 am to 6 pm	Evening 6 pm to 10 pm	Night 10 pm to 7 am
Ground-borne vibration	5 mm/second peak particle velocity (9 out of 10 consecutive blasts) 10 mm/second peak particle velocity at any time	No blasting	No blasting

16.5 Noise Modelling

16.5.1 Overview

The noise modelling conducted for the Project's Noise and Vibration Impact Assessment is detailed in **Appendix V**.

The Project's noise model was produced using SoundPLAN v8.2, which enabled the development of detailed 3D models comprising ground contours, noise sources, building footprints and heights, noise barriers and other factors that influence the emission and propagation of noise. The Project's noise model also considered noise sources, receivers and the effect of distance, ground topography, atmospheric attenuation, and obstacles such as barriers and buildings. To predict the Project's noise emissions, SoundPLAN implemented the Conservation of Clean Air and Water Europe algorithm, which was specifically designed for large industrial facilities and incorporates the influence of wind effects and the stability of the atmosphere to account for neutral and adverse weather conditions.

To ensure conservative (worst-case scenario) assessment outputs, development of the Project's noise model also incorporated the following key actions:

- Specific calculation, interpolation and tolerance parameters were applied to the model.
- Prevailing and worst-case meteorological conditions (wind, temperature, humidity and temperature inversions) were determined and incorporated into the model.
- A digital elevation model of the Project area was created for each of the model's assessment years.
- The Project model area was digitised from high resolution aerial photography to determine the areas to be modelled as acoustically 'hard' (i.e. mostly reflective) and acoustically 'soft' (i.e. absorbent).
- The sound power levels of the modelled mining equipment were determined from appropriate sources and incorporated into the model.
- The sound power levels of the modelled mining equipment were corrected to account for usage factors and the load of specific equipment.

Project activities do not include activities that would result in 'upset' noise and vibration.

16.5.2 Modelled Scenarios

Whilst the Project comprises a single open cut pit, the pit development will commence in the south and expand to the north. Waste rock (overburden and interburden) will initially be stockpiled to the south-west of the Project area. As the excavation progresses and pit depth increases, attenuation of mining equipment at the coal floor is expected due to topographic shielding provided by the pit walls.

The selected modelled years are considered the worst-case scenarios over the Project's life for the nearest noise sensitive receptor, Winchester Downs homestead (R01), to the south of the Project area. The Project's noise modelled years are as follows:

- **Year 2029:** The initial year of mining operations that includes in-pit excavation, waste rock transportation and waste rock dump development to the south of the Project area.
- **Year 2034:** The peak year of coal production, waste rock excavation, waste rock transportation, waste rock dump development to the south of the Project area, and in-pit excavation to the north of the Project area.
- **Year 2042:** The final full year of mining operations, with production ramping down.

The proposed mining fleet (generating noise) and their location for each modelled year of operation are provided in Section 4.6 of **Appendix V**.

16.6 Noise Modelling – Predicted Noise Levels

16.6.1 Airbourne Noise

The Project's predicted noise levels for the years 2029, 2034 and 2042 for the night period under neutral and adverse weather conditions are summarised in Table 16-12. In summary, exceedances of the Project's airborne noise criteria are only predicted at Winchester Downs homestead (R01) during the night period. Exceedances of 4 dB(A) to 10 dB(A) are predicted for all the modelled years (2029, 2034 and 2042) under adverse weather conditions for the night period at R01. Exceedances of the Project's airborne noise criteria of up to 4 dB(A) are predicted under neutral conditions for the night period at R01 for years 2029 and 2034.

The Project's mining operations are predicted to comply during the day and evening periods at all noise sensitive receptors for all years (Appendix C of **Appendix V**).

The Project's modelled scenarios deliberately omit noise emissions associated with the construction and commissioning phases (taking place during the first year), as well as mine closure activities. These phases of Project activities will involve fewer mobile fleet units, and therefore, will produce lower noise levels than the operational mining scenarios presented for the worst-case scenario assessments (2029, 2034 and 2042). Since the select scenarios for the Project reflect the highest potential noise impacts, any emissions arising from the construction or closure stages are considered to fall within the bounds of the worst-case assessments (2029, 2034 and 2042).

Table 16-12 Predicted Noise Levels – Night Period

Noise Sensitive Receptor	Description	Predicted noise levels $L_{Aeq,adj,1hr}$, dB(A)					
		Year 2029		Year 2034		Year 2042	
		Neutral	Adverse	Neutral	Adverse	Neutral	Adverse
R01	House	33	39	34	40	28	34
R02	House	<15	18	<15	17	<15	<15
R03	House	<15	<15	<15	<15	<15	17
R04	House	<15	<15	<15	<15	<15	<15
R05	House	<15	<15	<15	<15	<15	<15
R06	House	<15	<15	<15	<15	<15	<15
R07	House	<15	<15	<15	<15	<15	<15

Noise Sensitive Receptor	Description	Predicted noise levels $LA_{eq,adj,1hr}$ dB(A)					
		Year 2029		Year 2034		Year 2042	
		Neutral	Adverse	Neutral	Adverse	Neutral	Adverse
R08	Mine camp	<15	<15	<15	<15	<15	<15
R09	Mine camp	<15	<15	<15	<15	<15	<15
R10	Mine camp	<15	<15	<15	<15	<15	<15
R11	House	<15	<15	<15	<15	<15	<15
R12	House	<15	<15	<15	<15	<15	<15
R13	House	<15	<15	<15	<15	<15	<15
R14	House	<15	<15	<15	<15	<15	<15
R15	House	<15	<15	<15	<15	<15	<15
Moranbah	Town	<15	<15	<15	<15	<15	<15

16.6.2 Low Frequency Noise

The Project's low frequency noise screening criterion of 57 dB(Linear) $L_{Zeq,adj,1hr}$ is compliant at all noise sensitive receptors (Section 4.8.2 of **Appendix V**).

16.7 Proposed Noise Mitigation and Alternative Arrangements

Review of the Project's major noise source contributions at Winchester Downs homestead (R01) indicates that waste rock handling activities (i.e. haulage, dozer on dump or in pit, excavator) control the noise environment for the night period at this receptor.

Potential noise mitigation measures were reviewed collaboratively by the noise specialist (ViridAu) and proponent, including mitigation of the sources (equipment and operations), mitigation of the path from the sources (shielding/bunding) and mitigation at the receptor.

To achieve compliance at night at the Winchester Downs homestead (R01), noise reductions of up to 10 dB(A) are required for all major noise sources modelled (**Appendix V**). A review of noise mitigation solutions developed by mining equipment specialists for dozers, excavators and haul trucks (e.g. bespoke silencer kits from Minetek), and a review of the possible use of alternative mining equipment (e.g. Komatsu or Liebherr haul trucks instead of Caterpillar haul trucks), found that noise reductions of up to 4 dB(A) may be achievable for the mining equipment under investigation as major noise sources. Attenuation of mining equipment noise has been successfully demonstrated at other mine sites in Queensland (e.g. New Acland Coal Mine) (D Genn, pers. comm. 9 February 2026).

Constructing noise bunds, altering operational hours and re-routing mining equipment were not found to be operationally or economically effective.

The proponent will make all reasonable efforts to enter into an 'alternative arrangement' with the owners of Winchester Downs homestead for amenity impacts, which could include property modifications resulting in reductions of up to 10 dB(A) inside homestead buildings. These alternative arrangements would form part of the compensation agreement required with the owners of Winchester Downs for the grant of the MLAs. In accordance with EAs issued for other mining projects, where an 'alternative arrangement' is agreed, a residence covered by an alternative arrangement would not be considered a sensitive receptor.

If required, the proponent will undertake appropriate monitoring in response to noise and/or vibration complaints to assess compliance with the Project's noise and vibration criteria. In addition, the proponent is committed to the timely resolution of all noise and vibration complaints in accordance with the Project's complaints handling procedure. To ensure continuous improvement, reporting procedures involving annual reviews and periodic performance audits of the Project's noise and vibration management will be conducted as future conditions change with the progression of mining, including as required the development of new mitigation measure and/or corrective actions to ensure compliance.

It is noted that the most stringent airborne noise criteria for the Project are derived from the Model Mining Conditions Guideline. This night criterion is at least 5 dB(A) more stringent than background creep, and overall, 5 dB(A) more stringent than the noise limits detailed in 'Appendix 1 Stated conditions' of the Winchester South project – Coordinator-General's evaluation report on the environmental impact statement (DSDILGP, 2023), which includes the same sensitive receptor for the Project, Winchester Downs homestead (R01). Therefore, if a 35 dB(A) L_{Aeq} criterion during the night period was reasonably applied to the Project, it would result in 4 to 5 dB(A) exceedances under adverse conditions only, which could be mitigated through the proposed mining equipment noise attenuation.

Noise or vibration from the Project's mining activities is not expected to materially affect the operation of pastoral activities being conducted on land surrounding the Project.

16.8 Cumulative Impacts

The Project has the potential for cumulative impacts with other mining operations and projects in the local region (Figure 1 of **Appendix V**), as follows:

- Isaac Downs Mine, active open cut coal mine operated by another Stanmore subsidiary
- Isaac Plains Mine, active open cut coal mine operated by another Stanmore subsidiary
- Poitrel Mine, active open cut coal mine operated by another Stanmore subsidiary
- Millennium Mine, inactive open cut coal mine operated by another Stanmore subsidiary
- Eagle Downs Mine, an underground coal mining project proposed by another Stanmore subsidiary that has not commenced mining
- Winchester South Mine, an open cut coal mining project proposed by Whitehaven Coal that has not commenced mining
- Caval Ridge Mine, active open cut mines operated by BM Alliance Coal Operations Pty Ltd (BMA)
- Peak Downs Mine, active open cut mines operated by BMA
- Peak Downs East Mine, active open cut mines operated by BMA
- Moranbah South Mine, an underground coal mine proposed by Anglo Coal and Exxaro that is not approved as yet, has not commenced mining, and possesses an unknown timing for commencement.

A review of the nearest sensitive receptors and their locations relative to the surrounding mines indicated that only the nearest receptor R01 has the potential to be cumulatively impacted by noise from the Project and other proposed projects (i.e. Eagle Downs Mine, Winchester South Mine and the Peak Downs Continuation project) and ongoing mine operations (i.e. Poitrel Mine, Peak Downs Mine and Caval Ridge Mine). Other projects and mine operations (i.e. IDM, IPM, Millennium Mine and Moranbah South Mine) are not predicted to result in cumulative impacts due to timing of operations not coinciding with the Project.

The cumulative noise assessment for the nearest noise sensitive receptor, Winchester Downs homestead (R01), is based on the following documentation:

- Those projects and ongoing mining operations identified above.
- The Project's predicted noise levels presented in Section 16.6.

- Caval Ridge Mine - Horse Pit Extension Project, Noise and Vibration Impact Assessment (SLR, 2021), which includes predicted levels for the Caval Ridge Mine, Peak Downs Mine and Poitrel Mine.
- Assessment Report under the *Environmental Protection Act 1994* – Eagle Downs Coal Mine project (DERM, 2010), which includes predicted levels for the Eagle Downs Mine.
- Winchester South project, Environmental Impact Statement, Attachment 14, Additional Information, Noise and Vibration (Renzo Tonin and Associates, 2022), which includes predicted levels for the Winchester South Mine.

It is noted that in the absence of detailed modelling for the same years of operations, the worst-case scenarios for each mine are considered as part of the cumulative noise assessment. Consequently, it is assumed that the worst-case cumulative 1 hour impact involves other mines operating concurrent to the Project's nominated 1 hour worst-case operation.

The cumulative noise impact assessment results for the nearest noise sensitive receptor, Winchester Downs homestead (R01), based on a worst-case scenario, are presented in Table 16-13.

Table 16-13 Predicted Worst-case Cumulative Noise Levels – Winchester Downs Homestead (R01)

Mine	Predicted L_{Aeq} , dB(A)
Project	40
Caval Ridge Mine	22
Peak Downs Mine	22
Eagle Downs Mine	26
Winchester South Mine	31
Poitrel Mine	22
Cumulative impact	41

In summary, the cumulative noise impact assessment demonstrates that the cumulative noise levels from the Project and the surrounding mines and proposed projects, under a worst-case scenario, are predicted to exceed the relevant noise criterion of 30 dB(A) L_{Aeq} . The Project is the primary noise contributor at the Winchester Downs homestead (R01).

16.9 Blasting

The open cut mining methods for the Project include drilling and blasting of pre-strip overburden, overburden / interburden, and the pit floor for geotechnical stability, allowing for in-pit dumping.

The Project's blasting and ground vibration assessment (**Appendix V**) was conducted in accordance with *Australian Standard AS 2187.2:2006 Explosives – Storage and use – Part 2 Use of explosives* (AS2187.2:2006).

Two specific methodologies based on AS2187.2:2006 were applied to derive the predicted effective charge mass per delay (MIC) to achieve compliance with the Project's airblast overpressure and ground vibration criteria. These methodologies are described in Section 7.1 of **Appendix V**.

The MIC to achieve compliance with the airblast overpressure and ground-borne vibration criteria at various distances from the blasting area, based on a set of potential blasting conditions for the operations, are detailed in Table 16-14, which included a charge mass per delay of 1,960 kg. This indicative maximum

explosive charge is based on the site constants (a well-controlled blast event and assumed environmental conditions as per the Standard).

Table 16-14 Predicted MIC at Various Distances to Achieve Compliance with the Airblast Overpressure Criterion

Distance (m)	Effective charge mass per delay (kg)			
	Airblast Methodology 1 AS 2187.2:2006 ($\alpha = -1.45$ $K_a = 12.7$)	Airblast Methodology 2 Rix's Creek Coal Mine	Ground-borne vibration	Worst-case
1,000	483	412	1,129	412
1,250	943	908	1,764	908
1,500	1,630	1,732	2,540	1,630
1,750	2,588	2,988	3,457	2,588
2,000	3,864	4,793	4,515	3,864
2,250	5,501	7,271	5,714	5,501
2,500	7,546	10,556	7,054	7,054
2,750	10,044	14,789	8,536	8,536
3,000	13,040	20,121	10,158	10,158

During mining operations, blasting may take place anywhere within the Project's active pit area. The closest distance between the Project's pit and the nearest sensitive receptor of concern, Winchester Downs homestead (R01), is approximately 1,400 m. All other identified sensitive receptors are too distant to experience adverse impacts from the Project's blasting (i.e. R02-R15 and Moranbah township).

Potential airblast overpressure and ground vibration impacts will be considered as a part of each blast design. To reduce the risk of exceedances at R01, as the Project's mining operations progress to the south of the pit area (e.g. within 1,600 m of Winchester Downs homestead (R01), or the southern 200 m of the pit extent), the standard set of blast conditions may be modified based on operational experience, including changes to the adopted charge mass per delay used to inform Table 16-14.

Industry best practices will also be applied through the blast design and execution processes to achieve compliance with the Project's airblast overpressure and ground vibration criteria. As required, airblast overpressure and ground vibration monitoring will be conducted during the Project's mining operations to demonstrate compliance, to assist blast management, and if required, to manage blasting complaints.

16.10 Conclusion

The Project's Noise and Vibration Impact Assessment was conducted to:

- identify potential noise and vibration impacts from the proposed mining operations over the life of the Project at the nearest noise sensitive receptors
- develop mitigation strategies for the identified potential noise and vibration impacts to minimise the risk of non-compliance with the operational noise and vibration criteria.

In relation to the Project's operational noise, exceedances of the Project's airborne noise criteria are only predicted at Winchester Downs homestead (R01) during the night period. Exceedances of 4 dB(A) to 10

dB(A) are predicted for all the modelled years (2029, 2034 and 2042) under adverse weather conditions for the night period at R01. Exceedances of up to 4 dB(A) are predicted under neutral conditions for the night period at R01 for years 2029 and 2034. The Project's operations are predicted to comply with the applicable noise criteria for the day and evening periods at all receptors for all operational years.

The modelled mining scenarios reflect the highest potential noise impacts, and therefore, any noise emissions arising from construction or closure stages are considered to fall within the bounds of the worst-case operational assessment.

The Project's low frequency noise is predicted to comply with the low frequency noise screening criterion at all sensitive receptors.

A review of the nearest sensitive receptors and their locations relative to the Project and surrounding proposed projects and mines indicated that only the nearest noise sensitive receptor, Winchester Downs homestead, would potentially be subject to cumulative noise impacts. At this receptor, noise from the Project is considered the primary contributor.

Industry best practices will also be applied through the blast design and execution processes to achieve compliance with the Project's airblast overpressure and ground vibration criteria. As required, airblast overpressure and ground vibration monitoring will be conducted during the Project's mining operations to demonstrate compliance, to assist blast management, and if required, to manage blasting complaints.

Potential noise mitigation measures for the Project were reviewed collaboratively by the noise specialist and proponent, including mitigation of the sources (equipment and operations), mitigation of the path from the sources (shielding/bunding) and mitigation at the receptor. A review of noise mitigation solutions for mining equipment found that noise reductions of up to 4 dB(A) may be achievable. Constructing noise bunds, altering operational hours and re-routing mining equipment were not found to be operationally or economically effective.

The proponent will make all reasonable efforts to enter into an 'alternative arrangement' with the owners of Winchester Downs homestead for amenity impacts, which could include property modifications resulting in reductions of up to 10 dB(A) inside homestead buildings. These alternative arrangements would form part of the compensation agreement required with the owners of Winchester Downs homestead required for granted of the MLAs.

If required, the proponent will undertake appropriate monitoring in response to noise and/or vibration complaints to assess compliance with the Project's noise and vibration criteria. In addition, the proponent is committed to the timely resolution of all noise and vibration complaints in accordance with the Project's complaints handling procedure.

In summary, with the application of the proposed mitigation measures outlined in this chapter, the environmental objective and performance outcomes for noise and vibration will be achieved over the life of the Project.

16.11 References

Department of Environment and Resource Management (DERM) 2010, 'Assessment Report under the *Environmental Protection Act 1994* – Eagle Downs Coal Mine Project (Proposed by Bowen Central Coal Management Pty Ltd), Queensland Government, Brisbane.

Department of Environment and Science (DES) 2020, Noise Measurement Manual V4.01', Queensland Government, Brisbane.

Department of Environment, Science and Innovation (DESI) 2016, 'Guideline Mining - Model mining conditions (ESR/2016/1936 • Version 6.03)', Queensland Government, Brisbane.

Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) 2023 'Winchester South project – Coordinator-General's evaluation report on the environmental impact statement (November 2023)', Queensland Government, Brisbane.

Environmental Protection Agency (EPA) 2004, 'Ecoaccess Guideline for the Assessment of Low Frequency Noise', Proceedings of the Acoustic 2004 Conference, Queensland Government, Brisbane.

Renzo Tonin and Associates 2022, 'Winchester South Project, Environmental Impact Statement, Attachment 14, Additional Information, Noise and Vibration', Queensland Government, Brisbane.

SLR Consulting Australia Pty Ltd (SLR) 2021, 'Caval Ridge Mine - Horse Pit Extension Project, Noise and Vibration Impact Assessment', Supporting information to an EA Amendment Application, BM Alliance Coal Operations Pty Ltd, Brisbane.

Standards Australia 2006, Australian Standard AS 2187.2:2006 Explosives – Storage and use – Part 2 Use of explosives', <https://store.standards.org.au/product/as-2187-2-2006>.