15 NOISE

15.1 INTRODUCTION

This chapter provides further assessment and information on background noise levels, potential noise impacts, and mitigation and management measures for the Supplementary Environmental Impact Statement (EIS), in response to various submissions on the EIS, legislation changes and refinements/modifications to the Project since the EIS was published. The information presented builds on the EIS Volume 1, Chapter 15 Noise and should be read in conjunction with the EIS chapter.

Chapter 6 Project Operations of the Supplementary EIS provides further details on changes to the Project.

Further detailed information is located in an Addendum to the noise technical report relating to the Supplementary EIS, presented in STR15-1-SV1.5 Addendum to Noise Impact Assessment.

15.2 METHODOLOGY OF ASSESSMENT

15.2.1 LEGISLATION AND GUIDELINES

Relevant legislation and guidelines are discussed in the EIS Volume 1, Chapter 15 Noise, section 15.2.1. The *Environmental Protection (Noise) Policy 2008* (EPP (Noise)) came into effect in January 2009, superseding the *Environmental Protection (Noise) Policy 1997* referenced in the EIS. The EPP (Noise) 2008 is outlined below.

Environmental Protection (Noise) Policy

The object of the *Environmental Protection Act 1994 Reprint No. 8D* (EP Act) recognises that, in decisions under the EP Act, a balance is required between allowing development and protecting the environment. Against the background of achieving that object, the EPP (Noise) identifies the environmental values to be enhanced or protected as follows:

a) the qualities of the acoustic environment that are conductive to protecting the health and biodiversity of ecosystems

b) the qualities of the acoustic environment that are conductive to human health and wellbeing, including by ensuring a suitable acoustic environment for individual to do any of the following:

   i) sleep

   ii) study or learn

   iii) be involved in recreation, including relaxation and conversation.

c) the quality of the acoustic environment that are conductive to protecting the amenity of community.

The EPP (Noise) identifies acoustic quality objectives which indicate when a nominated environmental value is protected or enhanced. Section 8 of the EPP (Noise) 2008 outlines these acoustic quality objectives with an applicable section of the schedule shown in Table 15-1 below. The EPP (Noise) states that it is intended that the acoustic quality objectives be progressively achieved over the long term. This however does not apply to safety and transport noise, for example safety signal noise from a reversing vehicle.

Table 15-1: Acoustic quality objectives

Sensitive receptor	Time of day	Acoustic quality objective at receptor (dBA)			Environmental value
		$L_{Aeq,\ 1hr}$	$L_{A10,\ 1hr}$	$L_{A1,\ 1hr}$	
Dwelling (outdoors)	Daytime and evening	50	55	65	Health and wellbeing
Dwelling (indoors)	Daytime and evening	35	40	45	Health and wellbeing
	Night time	30	35	40	Health and wellbeing in relation to the ability to sleep
Library and educational institution (indoors)	When open for business or when classes being offered	35	—	—	Health and wellbeing
School playground (outdoors)	When the children usually sleep	55	—	—	Health and wellbeing, and community amenity

Sensitive receptor	Time of day	Acoustic quality objective at receptor (dBA)			Environmental value
		$L_{Aeq, 1hr}$	$L_{A10, 1hr}$	$L_{A1, 1hr}$	
Hospital surgery or other medical institution (indoors)	Visiting hours	35	—	—	Health and wellbeing
	Anytime outside visiting hours	30	—	—	Health and wellbeing in relation to the ability to sleep
Commercial and retail activity (indoors)	When the activity is open for business	45	—	—	Health and wellbeing in relation to the ability to converse

Times of day for Table 15-1 are defined in the EPP (Noise) as:

- Day – 7:00 am to 6:00 pm
- Evening – 6:00 pm to 10:00 pm
- Night – 10:00 pm to 7:00 am.

To the extent that it is reasonable to do so, management of noise must be dealt with in the following order of preference:

a) Firstly – avoid

b) Secondly – minimise in the following order of preference

   i) Firstly – orientate an activity to minimise noise

   ii) Secondly – use best available technology.

c) Thirdly – manage.

Section 10 outlines the management intent of controlling background creep for an activity involving noise. To the extent it is reasonable to do so, noise from an activity must not be:

- for noise that is continuous noise measured by L_{A90} – more than nil dBA greater than the existing acoustic environment measured by L_{A90} or
- for noise that varies over time measured by L_{A90} – more than 5 dBA greater than the existing acoustic environment measured by L_{A90}

Noise generated in carrying out the Project varies for the purposes of the EPP (Noise). The measured variable noise is subject to appropriate adjustment for tonal character or intrusiveness.

There are no specific limits or guidelines specified in the EPP (Noise) 2008 which relate to noise generated from construction activities.

Ecoaccess Guideline – Planning for noise control

A detailed description of the *Ecoaccess Guideline – Planning for noise control* procedure is contained in section 2.1.2 of the EIS noise technical report TR 15-1-V1.5. The *Ecoaccess Guideline* was used for assessment purposes in the EIS.

A comparison between the two assessment procedures, that is the EPP (Noise) and the *Ecoaccess Guideline*, showed that both methods can produce low criteria for rural environments with very low existing background noise environments. The *Ecoaccess Guideline* provides a threshold background noise level of 25 dBA with therefore a minimum criterion of L_{eq} 28 dBA. Conversely the EPP (Noise) does not provide a threshold background noise level however a night-time criteria internally of 30 dBA for dwellings as outlined in Table 15-1 above. Without a threshold background noise level or criterion, unreasonable and impractical criteria could result. The *Ecoaccess Guideline* utilises the tenth percentile method to generate the rated background level based on the L_{90} as a descriptor of the background noise level whereas the EPP (Noise) does not provide any guidance on how to calculate the background noise level. The EPP (Noise) is the legally enforceable procedure which has been followed for this assessment with *Ecoaccess Guideline* used as a supplement where no direct guidance is provided by the EPP (Noise)

enHealth Council 2004 report

As discussed in the EIS, Volume 1, Chapter 15 Noise, section 15.2.1, the Project has been assessed in accordance with criteria for various health effects as outlined in the *enHealth Council 2004* report. All the predicted noise levels will be significantly lower than any of the health-based criteria levels.

15.2.2 ASSESSMENT CRITERIA

Assessment criteria for the assessment conducted for the Supplementary EIS are outlined in detail in section 15.3.1 below.

15.2.3 BACKGROUND NOISE MONITORING

The background noise monitoring locations for the EIS, have been utilised for the Supplementary EIS assessment as detailed in the EIS Volume 1 Chapter 15 Noise, section 15.2.3 and associated Figure 15-1-V1.3.

15.2.4 NOISE MODELLING METHODOLOGY

The methodology behind the noise modelling for the Supplementary EIS is consistent with the EIS approach for the Project as detailed in the EIS Volume 1 Chapter 15 Noise, section 15.2.4.

The noise model used for the EIS, as detailed in the EIS Technical Report TR15-1-V1.5 Noise Impact Assessment takes into account a worse case scenario wind direction from the noise source to the receptor. This accommodates the effect of the prevalent winds from the north during the summer months on noise propagation.

15.3 EXISTING ENVIRONMENT

15.3.1 BACKGROUND DATA

Based on the noise survey data outlined in EIS Volume 1, Chapter 15 Noise, section 15.3.1, the following noise criteria were calculated using the EPP (Noise) controlling background creep procedure for noise that varies over time. Table 15-2 also shows the EPP (Noise) outdoor acoustic quality objectives for dwellings.

Table 15-2: EPP (Noise) generated outdoor criteria

Location	Time of day	RBL (dBA)	Controlling background creep $L_{Aeq,1hour}$ (dBA)	Acoustic quality objectives $L_{Aeq,1hour}$ (dBA)
N1 Nathan Road	Day	26	31	50
	Evening	30	35	50
	Night	18	23	30 (indoor)
N2 Wodonga	Day	25	30	50
	Evening	35	40	50
	Night	19	24	30 (indoor)
N3 Town	Day	26	31	50
	Evening	27	32	50
	Night	24	29	30 (indoor)

The night time levels at N1 Nathan Road and N2 Wodonga are 18 and 19 dBA respectively. The subsequent background creep criteria developed by the EPP (Noise) of $L_{Aeq,1hour}$ 23 and 24 dBA respectively for these locations are impractical to apply given limitations in the accuracy of noise measuring equipment at such low noise levels. The limitation in accuracy relates to the internal electrical noise levels of current sound monitoring equipment. Use of a minimum background noise level can provide reasonable “Controlling background creep” criteria for this Project to protect the amenity of the community.

It is proposed that a threshold background noise level of RBL 30 dBA be set leading to minimum background creep criteria of $L_{Aeq,1hour}$ 35 dBA (based on the EPP (Noise) Background + 5 dB procedure). This approach is consistent with what is considered reasonable generated noise levels for developments in very rural environments such as wind farm developments around Australia assessed against *EPA(SA) Environmental Guidelines: Wind Farms*, as well as industrial developments in NSW (based on the *NSW Industrial Noise*

Policy) and Victoria (based on *SEPP N-1*). Each of these assessment methods provides a base noise limit of L_{Aeq} 35 dBA. The proposed $L_{Aeq,1hour}$ 35 dBA external noise criterion outside a dwelling will also satisfy the EPP (Noise) Acoustic quality objective for indoor night time level of $L_{Aeq,\ ,1hour}$ 30 dBA which assumes a conservative 5 dBA noise reduction across a bedroom facade with a large open window. Table 15-3 below outlines the proposed night criteria based on use of a threshold background noise level as well as satisfying the indoor dwelling Acoustic quality objective based on the above assumption.

In all cases satisfying the night criteria will ensure compliance with the criteria for day and evening periods.

Table 15-3: Proposed night assessment criteria based on threshold background noise level

Location	Time of day	RBL (dBA)	Controlling background creep $L_{Aeq,1hour}$ (dBA)	Acoustic quality objectives $L_{Aeq,1hour}$ (dBA)
N1 Nathan Road	Night	30*	35	35+
N2 Wodonga	Night	30*	35	35+
N3 Town	Night	30*	35	35+

Note * threshold RBL of 30 dBA applied , +- assumes a 5 dBA noise reduction across a bedroom facade with a large open window to satisfy the EPP (Noise) Acoustic quality objective for indoor noise levels for dwellings at night time of L_{Aeq} 30 dBA

15.3.2 SENSITIVE RECEPTORS

Sensitive receptors are discussed in the EIS Volume 1, Chapter 15 Noise, section 15.3.2. Some sensitive receptors previously considered in the EIS have been removed from the assessment due to either acquisition by the WJV or current negotiations with the existing owner with the intent to purchase by the WJV. Table 15-4 shows an updated list of sensitive receptors, their corresponding receptor labels and lot on plan numbers.

Noise impacts to Receptor MLA-374 were not assessed in the EIS. The WJV are undergoing negotiations with the owners of this property with the intent to purchase, and as such it is not considered as a sensitive receptor in the Supplementary EIS.

Figure 15-2-SV1.3 shows the general locations of the updated sensitive receptors located around the MLA areas with Figure 15-3-SV1.3 displaying the sensitive receptors within Wandoan township that represent the most exposed locations. Satisfying noise criteria at these locations will ensure that the remaining receptors in the town will also comply with the assessment criteria.

Table 15-4: Sensitive receptors and Lot on Plan location

Receptor	Lot	Plan	Relevant noise survey location	Receptor type
Cemetery	—	—		Church
MLA-134	34	SP106737	N2 Wodonga	Dwelling
MLA-168	29	SP167183	N2 Wodonga	Dwelling
MLA-175	42	FT505	N2 Wodonga	Dwelling
MLA-188	32	FT444	N2 Wodonga	Dwelling
MLA-199	43	FT506	N2 Wodonga	Dwelling
MLA-239	47	FT466	N2 Wodonga	Dwelling
MLA-240	-	—	N3 Town	Commercial and retail activity
MLA-244	45	FT507	N2 Wodonga	Dwelling
MLA-277	50	FT508	N2 Wodonga	Dwelling
MLA-300	15	FT161	N2 Wodonga	Dwelling
MLA-305	29	FT467	N2 Wodonga	Dwelling
MLA-310	49	FT453	N2 Wodonga	Dwelling
MLA-318	66	FT521	N1 Nathan Road	Dwelling
MLA-355	38	CP899702	N2 Wodonga	Dwelling

Receptor	Lot	Plan	Relevant noise survey location	Receptor type
MLA-356	68	SP137906	N1 Nathan Road	Dwelling
MLA-364	1	RP144130	N1 Nathan Road	Dwelling
MLA-378	1	RP144130	N1 Nathan Road	Dwelling
MLA-397	67	FT873	N1 Nathan Road	Dwelling
MLA-404	15	SP180948	N2 Wodonga	Dwelling
MLA-415	13	FT667	N2 Wodonga	Dwelling
MLA-420	2	FT1019	N2 Wodonga	Dwelling
MLA-434	2	RP147174	—	—
MLA-443	39	FT576	N2 Wodonga	Dwelling
MLA-453	30	FT468	N2 Wodonga	Dwelling
MLA-478	1	RP170166	N3 Town	Dwelling
MLA-484	1	RP110817	N2 Wodonga	Dwelling
MLA-49	14	FT165	N2 Wodonga	Dwelling
MLA-494	28	FT913	N1 Nathan Road	Dwelling
MLA-50	1	SP210618	N2 Wodonga	Dwelling
MLA-505	6	FT788	N2 Wodonga	Dwelling
MLA-520	36	FT981	N1 Nathan Road	Dwelling
MLA-531	6	FT788	N2 Wodonga	—
MLA-556	5	RP900597	N1 Nathan Road	Dwelling
MLA-574	5	RP900597	N1 Nathan Road	Dwelling
MLA-576	3	RP900597	N1 Nathan Road	Dwelling
MLA-579	29	FT130	N1 Nathan Road	Dwelling
MLA-595	38	AB188	N2 Wodonga	Dwelling
MLA-601	22	FT746	N1 Nathan Road	Dwelling
MLA-616	-	—	N3 Town	Dwelling
MLA-640	2	SP106043	N1 Nathan Road	Dwelling
MLA-679	24	FT41	N2 Wodonga	Dwelling
MLA-687	28	FT563	N2 Wodonga	Dwelling
MLA-692	70	FT590	N2 Wodonga	Dwelling
MLA-693	41	CP857459	N2 Wodonga	Dwelling
MLA-695	70	FT590	N2 Wodonga	Dwelling
MLA-706	47	CP868426	N3 Town	Dwelling
MLA-718	162	FT999	N3 Town	Dwelling
MLA-720	72	FT590	N2 Wodonga	Dwelling
MLA-742	52	FT830	N2 Wodonga	Dwelling
Grosmont School	78	FT580	N2 Wodonga	School
Town Centre	—	—	N3 Town	—

Accomodation facility

The accommodation facility has not been treated as a sensitive receptor as it is part of the mine development. However the location and design of the facility will ensure that the EPP(Noise) 2008 outdoor and indoor acoustic quality objectives are met, as well internal noise levels as outlined in *AS2107 'Acoustics- Recommended design sound levels and reverberation times for building interiors'*.

Feedlot

Receptor MLA-531 is a feedlot which is not identified as sensitive receptors in the EP Act, regulations, EPP (Noise) or guidelines, as these have been developed to assess noise impacts on humans. Under the EPP (Noise) the feedlot would be classified as a 'commercial and retail activity' with an indoor acoustic quality objective of 45 dBA. *The Well-being of Farm Animals: Challenges and Solutions* by Benson *et a.l* (2004) outlines some effects of noise levels on livestock. The hearing frequency range of livestock is very similar to that of humans however it extends to 32,000 Hz (compared to 20,000 Hz for humans). This signifies that noise effects on livestock are similar to that of humans with the additional potential effects of ultrasonic noise (high frequency noise). The machinery that will operate for the Project does not emit large levels of high frequency noise, and as such high levels of ultrasonic noise are not expected to be an issue.

Benson *et al* also identifies that annoyance in livestock to noise, shown through adverse reactions by the animals (i.e. movement away from the noise source), was only displayed for steady tone sound and siren-like sounds at 110 and 120 dB. This is a similar reaction as demonstrated by humans to exposure of the same noise levels. These magnitudes of noise will not be experienced by livestock as a result of the Project. It is also noted that '*Livestock do show an amazing ability to habituate to what many people would consider uncomfortable levels of noise… Cattle may habituate to loud, fast moving freight trains to the extent that when they are grazing within 40 m of the tracks, they will not even look up at passing trains.'* (Benson *et al* (2004) p.112)

Given that the noise emissions emitted from the Project will generally be below L_{eq} 50 dBA as defined in the EPP (Noise) Acoustic quality objective for dwellings (outdoors) during daytime and evening, outside the MLA area boundaries, it can be concluded that these noise levels will not have adverse effects on the wellbeing of the animals.

15.4 DESCRIPTION OF PROPOSED DEVELOPMENT

A description of proposed refinements to the mine development is provided in Chapter 6 Project Operations of this Supplementary EIS. Refinements that relate to the noise impact assessment are summarised in this section.

In the EIS, Frank Creek Pit generated the highest noise impacts during its mining for the sensitive receptors in the Wandoan township. A 2 km zone around the western side of the township of Wandoan has been established based on review of EIS submissions and feedback from the local community. Mining will not initially be undertaken in the first years of operation, with the potential for future mining dependent upon the current and ongoing monitoring program results. Mining of Frank Creek Pit is currently proposed only for the north-west and south-west corners of the original pit layout.

Mining of the Woleebee South Pit will no longer occur within the timeframe of this Project.

A new additional, Wubagul Pit, will replace the mining of Frank Creek and Woleebee South Pits, and is proposed to be located at the south eastern portion of the MLA 50230 in the vicinity of Peakes Road and the Leichhardt Highway. The mining methods are to be consistent with the remainder of the mining pits, that is, dragline for overburden then truck and excavator for coal extraction. The creation of this pit has also introduced a new haul road section to access the pit.

15.4.4 POWER SUPPLY

Descriptions of the associated power supply infrastructure at the mine site are outlined in this Supplementary EIS, Chapter 6 Project Operations, section 6.6.9.

In addition to the four options outlined in EIS Volume 1 Chapter 15 Noise, section 15.4.4, a 10 MW combined cycle gas fired power station is being considered for construction power supply which would then be utilised as an emergency supply during mine operations. The revised noise assessment for the Supplementary EIS includes the worse case option of utilising an on site 80 MW gas fired power station. The noise emissions from this power station contribute only a small amount to the overall noise emissions from the site. Given the smaller size of this proposed construction power supply, noise impacts from it are considered to be minimal in comparison given its centralised location within the MLA areas with significant distances to the closest receptors.

15.4.9 MINE OPERATIONS

In order to assess the potential noise impacts of the Project over the life of the mine, the noise impact assessment examines six distinct scenarios taking into account various years of operation. Each scenario takes into account a 'snap shot' which shows the number, type and disposition of all operating mining equipment based on the mining schedule during this time. All stationary infrastructure on site such as the CPP, and power generation on site, and the rail spur, are included in the noise emissions during every scenario. Table 15-5 provides a summary of each operating scenario, as were defined in EIS Volume 1 Chapter 1 Introduction, section 1.5.6.

Table 15-5: Operational scenarios

Operational scenario	Description
1	This 'Do Nothing' Scenario assumes that the coal mine is not constructed the for first year (Year 1) of coal mining
2	Assumes construction and operation of the coal mine, examining the first year (Year 1) of coal mining
3	Assumes construction and operation of the coal mine, examining Year 5 of coal mining
4	Assumes construction and operation of the coal mine, examining Year 10 of coal mining
5	Assumes construction and operation of the coal mine, examining Year 20 of coal mining
6	Assumes construction and operation of the coal mine, examining Year 30 of coal mining

Scenario 1

The "Do Nothing" scenario is as provided in the EIS, and does not introduce any new noise sources into the rural area, therefore the existing noise environment will remain unaffected if the Project does not proceed.

Scenario 2 – Year 1

The output during the first year of operation will be approximately 10 Mt of ROM coal due to the ongoing establishment of equipment and processes on site. Mining activities will be carried out in the Austinvale North Pit with the utilisation of only one dragline and three excavators. Table 15-6 shows the proposed schedule of operating equipment for this scenario which is the same as per the original EIS.

Table 15-6: Schedule of operating equipment for Scenario 2

Equipment designation	Mining pit	Haulage road
	Austinvale	
Dragline	1	—
Dozer	5	1
Dump Truck	6	7
Excavator (Medium)	2	—
Excavator (Small)	1	—
Front End Loader	1	—
Grader	—	1
Overburden Drill	3	—
Water Truck	—	1

Scenario 3 – Year 5

This scenario provides a schedule to mine eastern pits located within MLA 50230.

Table 15-7 outlines the updated applicable equipment schedule that will be in operation during Year 5. Operation in Woleebee and Austinvale Pits have remained the same as per the EIS, however mining operations in Frank Creek Pit have been moved to the newly scheduled Wubagul Pit. An additional haul road section has been added to provide access to Wubagul Pit which is located in the south eastern corner of MLA 50230.

Table 15-7: Schedule of operating equipment for Scenario 3

Equipment designation	Mining pit			Haulage roads
	Wubagul	Woleebee	Austinvale	
Dragline	1	1	1	—
Dozer	4	5	5	1
Dump Truck	3	3	3	10
Excavator (Medium)	1	—	1	—
Excavator (Small)	—	1	1	—
Front End Loader	1	1	—	—
Grader	1	—	—	2
Overburden Drill	—	2	1	—
Water Truck	—	—	—	3

Scenario 4 – Year 10

Scenario 4 consists of equipment spread out across all MLA areas, reaching the western boundary of the development with the operation of the initial mining strips at the Turkey Hill Pit. Table 15-8 shows the updated proposed schedule of operating equipment for Year 10. The operating schedule is similar to the EIS with additional placement of two dump trucks and one front end loader (originally in Woleebee Pit) to the south western corner of Frank Creek Pit.

Table 15-8: Schedule of operating equipment for Scenario 4

Equipment designation	Mining pit						Haulage roads
	Turkey Hill	Summer Hill	Mud Creek	Woleebee	Austinvale	Frank Creek	
Dragline	1	1	—	1	—	—	—
Dozer	5	5	—	5	1		2
Dump Truck	6	2	—	2	1	1	15
Excavator (Medium)	1	1	—	—	—	—	—
Excavator (Small)	—	1	—	1	—	—	—
Front End Loader	1	—	—	—	—	1	—
Grader	—	1	—	—	—	—	2
Overburden Drill	2	1	1	1	—	—	—
Water Truck	—	—	—	—	—	—	3

Scenario 5 – Year 20

Scenario 5 will see the mine operate the scheduled equipment across seven mining pits, including five draglines. The equipment will be spread quite evenly across the MLA areas. Table 15-9 shows the updated proposed schedule of operating equipment that will operated for this scenario. The changes to the schedule from the EIS are the addition of three dump trucks to the haulage roads and the movement of one dump truck from Woleebee North Pit to Woleebee Creek Pit.

Table 15-9: Schedule of operating equipment for Scenario 5

Equipment designation	Mining pit							Haulage roads
	Turkey Hill	Summer Hill	Mud Creek	Woleebee North	Woleebee Creek	Austinvale	Leichhardt	
Dragline	1	1	—	2	-	-	1	—
Dozer	4	3	2	5	3	1	3	3
Dump Truck	3	3	3	1	1	1	1	17
Excavator (Medium)	—	—	1	—	—	—	1	—
Excavator (Small)	—	1	—	—	1	—	—	—
Front End Loader	1	—	—	1	—	—	—	—
Grader	—	—	1	—	—	—	—	2
Overburden Drill	1	1	1	2	1	—	1	—
Water Truck	—	—	—	—	—	—	—	3

Scenario 6 – Year 30

Scenario 6 will see the mine operate predominantly in the Woleebee and Wubagul Pits as well as completing mining in pits located at the western end of MLA 50229. Table 15-10 shows the proposed schedule of equipment that will be operating for this scenario. The most significant change in the schedule from the EIS is the shifting of the activities from the Woleeebee South Pit to the Wubagul Pit.

Table 15-10: Schedule of operating equipment for Scenario 6

Equipment designation	Mining pit						Haulage roads
	Summer Hill North	Mud Creek	Woleebee North	Woleebee Creek	Wubagul	Austinvale	
Dragline	1	1	1	1	1	—	—
Dozer	3	3	3	5	4	1	3
Dump Truck	1	4	1	3	1	1	14
Excavator (Medium)	—	1	—	1	—	—	—
Excavator (Small)	1	—	—	1	—	—	—

Equipment designation	Mining pit						Haulage roads
	Summer Hill North	Mud Creek	Woleebee North	Woleebee Creek	Wubagul	Austinvale	
Front End Loader	1	—	1	—	1	—	—
Grader	—	1	—	—	—	—	2
Overburden Drill	1	1	1	2	2	—	—
Water Truck	1	—	—	—	—	—	2

15.5 POTENTIAL IMPACTS

15.5.3 MINE OPERATION

The following assessment of noise impacts is based on the combined noise impact of the CHPP, rail spur, power supply as well as mining equipment.

Scenario 1

The 'Do Nothing' scenario does not introduce any new noise sources into the rural area, therefore the existing noise environment will remain unaffected.

Scenario 2 – Year 1

The results are consistent with the EIS assessment with only small differences in predicted noise levels at some sensitive receptors. The predicted noise levels when using unattenuated sound power level mining equipment will comply with the assessment criteria at all sensitive receptors. Table 15-11 below and Figure 15-4-SV1.3 show the noise levels to be experienced by the sensitive receptors when unattenuated sound power level mining equipment will be operating in Austinvale Pit.

Table 15-11: Predicted Noise Levels for Scenario 2

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Unattenuated sound power	Night
Cemetery	40	—
MLA-134	<15	35
MLA-168	<15	35
MLA-175	<15	35
MLA-188	<15	35
MLA-199	<15	35
MLA-239	23	35
MLA-240	24	35
MLA-244	23	35
MLA-277	27	35
MLA-300	19	35
MLA-305	<15	35
MLA-310	26	35
MLA-318	27	35
MLA-355	23	35

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Unattenuated sound power	Night
MLA-356	31	35
MLA-364	30	35
MLA-378	31	35
MLA-397	28	35
MLA-404	<15	35
MLA-415	<15	35
MLA-420	<15	35
MLA-434	22	—
MLA-443	<15	35
MLA-453	<15	35
MLA-478	22	35
MLA-484	<15	35
MLA-49	<15	35
MLA-494	<15	35
MLA-50	<15	35
MLA-505	18	35
MLA-520	27	35
MLA-531	18	—
MLA-556	<15	35
MLA-574	<15	35
MLA-576	<15	35
MLA-579	<15	35
MLA-595	<15	35
MLA-601	24	35
MLA-616	25	35
MLA-640	<15	35
MLA-679	<15	35
MLA-687	<15	35
MLA-692	<15	35
MLA-693	<15	35
MLA-695	<15	35
MLA-706	26	35
MLA-718	27	35
MLA-720	<15	35
MLA-742	<15	35
Grosmont School	<15	35
Town Centre	24	35

Scenario 3 – Year 5

The overall noise levels predicted using standard (i.e. unattenuated) equipment will exceed the driving night assessment criteria at Receptors MLA-240, MLA-478, MLA-240, MLA-640 and MLA-718. Installation of noise reduction measures, that is meeting noise levels outlined in Table 15-8 of EIS Volume 1 Chapter 15 Noise, section 15.4.1, for the dragline bucket jewellery and mining trucks operating in Wubagul Pit will reduce the emitted noise levels so that mining can occur at all times. The resulting noise contours are shown in Figure 15-5-SV1.3 with the predicted levels shown in Table 15-12.

In comparison to the findings of the EIS assessment, the predicted noise levels in this assessment are lower at the receptors in Wandoan township (MLA-520, MLA-706, MLA-616, MLA-718, MLA-240). This is due to limiting mining activities in Frank Creek to the western corners. Receptors immediately south of Wandoan (MLA-434, MLA-640 and MLA-579) have increased noise impacts due to the proximity of the new Wubagul Pit. Predicted noise at remaining receptors is essentially the same as per the EIS assessment.

Table 15-12: Predicted noise levels for Scenario 3

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Attenuated equipment	Night
Cemetery	40	—
MLA-134	<15	35
MLA-168	<15	35
MLA-175	<15	35
MLA-188	<15	35
MLA-199	<15	35
MLA-239	23	35
MLA-240	34	35
MLA-244	23	35
MLA-277	27	35
MLA-300	22	35
MLA-305	<15	35
MLA-310	26	35
MLA-318	27	35
MLA-355	23	35
MLA-356	32	35
MLA-364	31	35
MLA-378	32	35
MLA-397	28	35
MLA-404	<15	35
MLA-415	<15	35
MLA-420	<15	35
MLA-434	37	—
MLA-443	<15	35
MLA-453	<15	35
MLA-478	35	35
MLA-484	24	35
MLA-49	<15	35
MLA-494	28	35
MLA-50	<15	35
MLA-505	29	35
MLA-520	31	35
MLA-531	27	—
MLA-556	25	35
MLA-574	25	35
MLA-576	25	35
MLA-579	32	35
MLA-595	<15	35

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Attenuated equipment	Night
MLA-601	25	35
MLA-616	32	35
MLA-640	35	35
MLA-679	16	35
MLA-687	<15	35
MLA-692	<15	35
MLA-693	<15	35
MLA-695	<15	35
MLA-706	32	35
MLA-718	33	35
MLA-720	<15	35
MLA-742	<15	35
Grosmont School	<15	35
Town Centre	31	35

Scenario 4 – Year 10

Using standard specification unattenuated equipment, exceedances of the driving night assessment criteria will occur at Receptor MLA-595 because of its close location to the edge of the Turkey Hill Pit (less than 1 km). As well, minor exceedance will occur at Receptor MLA-720 due to the position of the haulage route which brings mining equipment to within 2 km from this receptor.

Installation of attenuation measures as outlined in Table 15-8 of EIS Volume 1 Chapter 15 Noise, section 15.4.1, to tracked dozers, mining trucks, dragline bucket jewellery and dragline body as well as water trucks operating in Turkey Hill Pit will reduce noise levels to within assessment criteria for all operations under worst case meteorological conditions as shown in Figure 15-6-SV1.3 and Table 15-13.

In comparison to the findings of the EIS assessment, the predicted noise levels at the sensitive receptors are essentially the same. However less exceedances have been predicted due to some previous receptors being purchased by the WJV as well as implementation of the assessment criteria based on the EPP (Noise). Compared to the EIS noise technical attenuation measures are similar in the Turkey Hill Pit however there is no requirement to conduct acquisition negotiations of MLA-595.

Table 15-13: Predicted noise levels for Scenario 4

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Attenuated equipment	Night
Cemetery	39	—
MLA-134	17	35
MLA-168	19	35
MLA-175	22	35
MLA-188	17	35
MLA-199	17	35
MLA-239	23	35
MLA-240	27	35
MLA-244	23	35
MLA-277	27	35
MLA-300	22	35
MLA-305	23	35

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Attenuated equipment	Night
MLA-310	25	35
MLA-318	26	35
MLA-355	24	35
MLA-356	30	35
MLA-364	29	35
MLA-378	29	35
MLA-397	27	35
MLA-404	24	35
MLA-415	<15	35
MLA-420	<15	35
MLA-434	25	—
MLA-443	<15	35
MLA-453	19	35
MLA-478	26	35
MLA-484	21	35
MLA-49	23	35
MLA-494	<15	35
MLA-50	28	35
MLA-505	30	35
MLA-520	27	35
MLA-531	31	—
MLA-556	<15	35
MLA-574	<15	35
MLA-576	15	35
MLA-579	<15	35
MLA-595	35	35
MLA-601	23	35
MLA-616	28	35
MLA-640	18	35
MLA-679	18	35
MLA-687	25	35
MLA-692	27	35
MLA-693	26	35
MLA-695	25	35
MLA-706	28	35
MLA-718	27	35
MLA-720	31	35
MLA-742	24	35
Grosmont School	20	35
Town Centre	27	35

Scenario 5 – Year 20

Without noise attenuating measures, the modelling predicts that no exceedances of the assessment criteria will occur at any of the sensitive receptors. Table 15-14 and Figure 15-7-SV1.3 show the resulting noise levels at all of the sensitive receptors, Heightened noise levels will be experienced at the Cemetery, and receptors MLA-378 and MLA-520 due to the operation of Leichhardt Pit.

In comparison to the findings of the EIS assessment, the predicted noise levels at the sensitive receptors are essentially the same. However, fewer exceedances have been predicted due to some previous receptors being purchased by the WJV as well as implementation of the assessment criteria based on the EPP (Noise).

Table 15-14: Predicted noise levels for Scenario 5

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Unattenuated sound power	Night
Cemetery	42	—
MLA-134	21	35
MLA-168	20	35
MLA-175	23	35
MLA-188	21	35
MLA-199	22	35
MLA-239	27	35
MLA-240	29	35
MLA-244	25	35
MLA-277	28	35
MLA-300	25	35
MLA-305	29	35
MLA-310	26	35
MLA-318	27	35
MLA-355	28	35
MLA-356	31	35
MLA-364	33	35
MLA-378	33	35
MLA-397	28	35
MLA-404	27	35
MLA-415	17	35
MLA-420	19	35
MLA-434	26	—
MLA-443	21	35
MLA-453	25	35
MLA-478	28	35
MLA-484	15	35
MLA-49	25	35
MLA-494	<15	35
MLA-50	30	35
MLA-505	22	35
MLA-520	34	35
MLA-531	22	—
MLA-556	19	35
MLA-574	20	35

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Unattenuated sound power	Night
MLA-576	20	35
MLA-579	<15	35
MLA-595	29	35
MLA-601	26	35
MLA-616	31	35
MLA-640	19	35
MLA-679	<15	35
MLA-687	23	35
MLA-692	28	35
MLA-693	25	35
MLA-695	25	35
MLA-706	31	35
MLA-718	30	35
MLA-720	28	35
MLA-742	27	35
Grosmont School	22	35
Town Centre	29	35

Scenario 6 – Year 30

There will be a minor exceedance of the assessment criteria using standard unattenuated equipment at Receptor MLA-640 from the activities at Wubagul Pit. Implementing reduced noise dragline bucket jewellery and mining trucks operating in this pit will ensure compliance with the assessment criteria. This is a new exceedance when compared to the EIS assessment which is due to the activities at the new Wubagul Pit.

Previously, exceedances were also predicted at MLA-505 and MLA-552, however with no activities in Woleebee South Pit in the updated mining schedule, incident noise levels at MLA-505 comply with the assessment criteria while receptor MLA-552 has been purchased by the WJV. The increased noise levels at MLA-355, MLA-453 and MLA-305 are due to the revised location of some equipment in the Mud Creek Pit when compared to the EIS assessment.

Attenuated equipment (dragline bucket, tracked dozers and mining trucks) at the Summer Hill North Pit, could still be required to control noise to within allowable limits in this area which will be indicated by monitoring results at Receptor MLA-693 as the equipment progresses north in the pit.

The predicated noise levels utilising attenuated equipment in Wubagul Pit, that is meeting noise levels outlined in Table 15-8 of EIS Volume 1 Chapter 15 Noise, section 15.4.1, are shown in Figure 15-8-SV1.3 and Table 15-15 which will satisfy the assessment criteria all sensitive receptors.

Table 15-15: Predicted noise levels for Scenario 6

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Attenuated equipment	Night
Cemetery	39	—
MLA-134	<15	35
MLA-168	23	35
MLA-175	26	35
MLA-188	23	35
MLA-199	22	35
MLA-239	28	35
MLA-240	29	35

Receptor	Predicted noise $L_{eq\ (1\ hour)}$ (dBA)	Assessment criteria $L_{eq\ (1\ hour)}$ (dBA)
	Attenuated equipment	Night
MLA-244	24	35
MLA-277	27	35
MLA-300	29	35
MLA-305	28	35
MLA-310	26	35
MLA-318	26	35
MLA-355	33	35
MLA-356	30	35
MLA-364	29	35
MLA-378	29	35
MLA-397	27	35
MLA-404	23	35
MLA-415	18	35
MLA-420	21	35
MLA-434	30	—
MLA-443	23	35
MLA-453	31	35
MLA-478	29	35
MLA-484	22	35
MLA-49	17	35
MLA-494	26	35
MLA-50	21	35
MLA-505	27	35
MLA-520	27	35
MLA-531	32	—
MLA-556	19	35
MLA-574	20	35
MLA-576	20	35
MLA-579	28	35
MLA-595	16	35
MLA-601	23	35
MLA-616	28	35
MLA-640	29	35
MLA-679	18	35
MLA-687	30	35
MLA-692	29	35
MLA-693	32	35
MLA-695	27	35
MLA-706	28	35
MLA-718	28	35
MLA-720	26	35
MLA-742	29	35
Grosmont School	24	35
Town Centre	28	35

Impacts on specific sensitive receptors

Potential impacts from the mining activities were assessed by modelling based on site specific and Project specific information as discussed in EIS Volume 1, Chapter 15 Noise, section 15.2.4, and was conducted using a virtual model of the development during operating scenarios. The noise levels in Wandoan township and surrounding sensitive receptors were shown on Figures 15-4-V1.3 to 15-7-V1.3, with updated noise contours from the revised mine plan shown in Figure 15-4-SV1.3 to 15-8-SV1.3. The noise predictions show that noise levels within Wandoan will be within the EPP (Noise) developed assessment criteria of 35 dBA $L_{eq,\ 1\ hour}$. This increase in background noise levels compared to existing noise conditions within Wandoan township will be just perceivable, including at the Wandoan Tennis Courts which will not hinder holding a conversation between players.

As stated in Volume 1, Chapter 15 Noise, Table 15-4, the EPP (Noise) developed noise criteria for dwellings is $L_{eq,\ 1\ hour}$ 35 (dBA) at night. This criterion applies to properties such as 'Grosmont', identified as MLA-199. Section 15.5.3 of the Supplementary EIS predicts noise levels at various sensitive receptors, with MLA-199 predicted to experience no exceedances of the night-time criteria for all scenarios assessed with predicted noise levels at this receptor being significantly lower than the criteria throughout the operation of the mine.

The noise emissions from the mine will comply with the EPP (Noise) Acoustic quality objectives as set out in Table 15-1 for the indoor and outdoor criteria applicable to the Grosmont State School, as shown in Figures 15-4-SV1.3 to Figures 15-8-SV1.3. No additional building insulation (such as improved glazing) is required to comply with the internal noise criteria as the internal noise levels will be sufficiently attenuated using standard existing building construction.

15.6 MITIGATION MEASURES

15.6.1 CONSTRUCTION

As no specific construction noise and vibration criteria are specified by the EPA guidelines or policies, best practice processes and methods will be implemented to manage the construction noise to minimise disturbance to sensitive receptors. Given there are no significant differences between the construction impacts between the Supplementary EIS and EIS assessments, the appropriate mitigation measures are consistent with EIS Volume 1 Chapter 15 Noise, section 15.6.1.

15.6.2 OPERATIONS

As discussed in section 15.3.2, the accommodation facility has not been treated as a sensitive receptor, as it is part of the mine development. However the location and design of the facilities will ensure that EPP(Noise) 2008 outdoor and indoor acoustic quality objectives are met, as well internal noise levels as outlined in *AS2107 'Acoustics-Recommended design sound levels and reverberation times for building interiors'*.

Section 15.5.3 of this Supplementary EIS details the sensitive receptors at which noise levels are likely to exceed noise criteria, based on refinements and modifications to the Project since the publication of the EIS. The EIS Volume 1, Chapter 15 Noise, section 15.6.2 and Supplementary EIS section 15.6.2 detail the mitigation measures to be undertaken for sensitive receptors at which noise levels exceed.

Generally the recommendations relating to operational noise mitigation strategies have been changed to those specified in EIS Volume 1 Chapter 15 Noise, section 15.6.2 due to the implementation of the new version of EPP (Noise). The driving night assessment criterion of 35 dBA based on the Acoustic quality objective and controlling background creep (as per Table 15-3) has allowed for less aggressive noise attenuation strategies for this project while still maintaining a reasonable background noise level for protecting the amenity of the community. The subsequent sections outline recommended noise attenuation measures associated with each modelled scenario.

Triggers for management actions

As described in the EIS, Volume 1, Chapter 15 Noise, section 15.6.2, the WJV will implement a combination of noise management activities that include the use of lower noise and noise attenuated machinery as well as noise monitoring. Management actions will be triggered when a complaint is raised, if the noise from the mining operations is above allowable noise criteria in the Environmental Authority. This approach is the most practical in implementing noise mitigation measures given the mobility of the mining equipment and limitations of the noise modelling.

If, following investigation, the noise level emitted from the mine is identified to exceed the operational criteria by more than 5 dBA at a sensitive receptor, further mitigation measures will be considered by the Proponent in consultation with the sensitive receptor owner.

Noise monitoring

Noise monitoring will be conducted as discussed in the EIS Chapter 15 Noise, section 15.6.2, plus the addition of the following measures as outlined in Table 15-16 below.

Table 15-16:Additional monitoring requirements for mining operations

Location	Monitor type	Monitoring duration
Receptor MLA-520 Receptor MLA-640	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period	One month before the commencement of mining at Wubagul Pit and at monthly intervals during the operation of Frank Creek and Wubagul Pits
Receptor MLA-720 Receptor MLA-595	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period	Monthly during the operation of Turkey Hill Pit
Receptor MLA-305	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period	Monthly once mining of the northern 50% of Summer Hill Pit is completed
Receptor MLA-693	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period	Monthly during operation of Summer Hill North Pit.
Receptor MLA-355	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period	Monthly once mining of the northern 50% of Mud Creek Pit is completed
Receptor MLA-300	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period	Monthly once mining of the northern 50% of Woleebee Creek Pit is completed

Management strategies as outlined in Chapter 15 Noise of the EIS will be undertaken if noise criteria are exceeded at the monitoring locations.

As an example of a coal mine in close proximity to a community, the Bengalla Coal Mine in the Hunter Valley, NSW is located near the town of Muswellbrook. The report by Mills *et al* (2000) highlights how the implementation of noise attenuation measures and a successive monitoring and management program can ensure compliance with environmental noise criteria to minimise impacts on the sensitive receptors.

Table 15-17 outlines monitoring measures that were previously outlined in the EIS, Chapter 15 Noise, section 15.6.2, however are no longer required due to sensitive receptors being purchased or under negotiations with the WJV, as well as changes in operating schedule.

Table 15-17:Monitoring requirements no longer required for mining operations

Location	Monitor duration	Reason
Receptor MLA-706	One month before the commencement of mining at Frank Creek Pit and at monthly intervals during the operation of Frank Creek Pit	Due to changes in scheduled operations of Frank Creek Pit
Receptor MLA-728	Monthly during the operation of Turkey Hill Pit	Receptor under negotiations to purchase or are purchased by the WJV
Receptor MLA-459	Monthly once mining of the northern 50% of Summer Hill Pit is completed	Receptor under negotiations to purchase or are purchased by the WJV
Receptor MLA-552	Monthly during operation of Woleebee Creek Pit	Receptor under negotiations to purchase or are purchased by the WJV
Receptor MLA-712	Monthly during operation of Summer Hill North Pit	Receptor under negotiations to purchase or are purchased by the WJV

Mining operations

Noise mitigation measures during operation will be conducted as discussed in the EIS Chapter 15 Noise, section 15.6.2, with the addition of the following measures which have been recommended based on the predicted noise levels during worst case meteorological conditions to satisfy noise criteria during all times of day:

- noise attenuated mining trucks to satisfy overall noise levels outlined for operations in Wubagul Pit
- acoustic treatment will be applied to dragline buckets operating in Wubagul Pit due to their proximity to sensitive receptors
- acoustic treatment will be applied to tracked dozers, mining trucks, dragline bucket jewellery and dragline body as well as water trucks operating in Turkey Hill Pit due to their proximity to sensitive receptors.

The following mitigation measures were outlined in the EIS and are no longer required either due to change in the operational schedule or due to the WJV purchasing or negotiating the purchase of the affected sensitive receptors as well as implementation of the assessment criteria based on the EPP (Noise):

- installation of resilient pads and coatings on all dragline buckets
- a meteorological forecasting system will be implemented to allow site management to allow night time mining of Frank Creek Pit during only optimal weather periods (i.e. calm or non source to receptor wind conditions and no occurrence of atmospheric stability). The system would be based on on-site weather station measurements
- no dragline operations will be carried out in the Frank Creek Pit unless monitoring of weather conditions and noise levels indicate that acceptable noise levels will be achieved at sensitive receptors
- installation of acoustic treatment to dragline body in Leichhardt Pit
- consult with the landowner of the abattoir (MLA-740 and MLA-741) prior to the commencement of mining in Frank Creek Pit with a view to reaching agreement on appropriate mitigation
- based on monitoring data if night time levels exceed criteria, operations in Frank Creek Pit will be limited to day time only in the area towards the eastern edge of pit coming closer to the Wandoan township
- consult with landowner of receptor MLA-505 prior to commencement of mining in Woleebee South Pit with a view to reaching agreement on appropriate mitigation arrangements
- consult with landowner of receptor MLA-595 prior to commencement of mining in Turkey Hill Pit with a view to reaching agreement on appropriate mitigation arrangements
- noise attenuated overburden drills, excavators, tracked dozers, mining trucks and water trucks will be used for operations in Woleebee Creek Pit to meet acceptance criteria
- acoustic treatment will be applied to draglines operating in Woleebee Creek Pit due to their proximity to sensitive receptors.

Operations associated with the movement of trains will not be limited or restricted during, at or after funeral services or other activities at the Wandoan Cemetery. Noise attenuation as part of normal operational practices of the Project will be implemented as outlined in the EIS, but will not specifically relate to funeral services at the Wandoan Cemetery. Volume 1, Chapter 16 Vibration, section 16.6.2 covers mitigation measures relating to blasting activities and the Wandoan Cemetery, and includes that the WJV will liaise with the managers of the Cemetery and seek community feedback via the Community Reference Group to manage the nuisance impact of blasts to those visiting the cemetery.

Proactive/predictive noise management

In addition to the noise management measures listed in Volume 1, Chapter 15, section 15.6.2 of the EIS, the following management measures will also be undertaken:

- upon request by property owners, the Wandoan Joint Venture will install double glazed windows on dwellings, schools, businesses and community facilities, within 2 km of the boundary of the MLA areas. Ongoing upkeep and maintenance of any double glazed windows installed is up to the property owner/s and not the responsibility of the Wandoan Joint Venture.

Noise management plan

The noise levels outlined in Table 15-3 should be implemented into the noise management plan to control background noise creep to minimise the impacts on the existing noise environment.

Attenuated noise levels

The EIS Volume 1, Chapter 15 Noise stated that noise attenuation will be implemented, including noise specifications for mining equipment that will be provided in procurement tender documentation for the Project presented in section 15.6.2.

During noise impact assessment, receptors at which noise criteria would be exceeded during the operation of the mine with unattenuated machinery were identified. However, as the WJV commits to using attenuated equipment, these unattentuated noise levels will not occur.

15.7 RESIDUAL IMPACTS

The residual impacts are the same as per the EIS Volume 1, Chapter 15 Noise, section 15.7. Recommended purchases in the EIS of receptors MLA-505 and the abattoir (MLA-740 and MLA-741) have already occurred.

15.8 REFERENCES

AS2107:2000 'Acoustics-Recommended design sound levels and reverberation times for building interiors'

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