

WAMBO COAL PTY LIMITED



SOUTH BATES EXTENSION MODIFICATION ENVIRONMENTAL ASSESSMENT

APPENDIX I Noise Review



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South Bates Extension Modification Noise Review

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South Bates Extension Modification

Noise Review

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DOCUMENT CONTROL

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1 INTRODUCTION

Wambo Coal Pty Limited (WCPL), a subsidiary of Peabody Energy Australia Pty Limited, owns the Wambo Coal Mine (Wambo), which operates in accordance with Development Consent DA 305-7-2003 (as modified). The existing underground mining and open cut operations are located approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (NSW). Wambo has a maximum approved run-of-mine (ROM) coal production rate of 14.7 million tonnes per annum (Mtpa) and product coal is transported from Wambo by rail.

Recent exploration results and geotechnical investigations have identified that the coal resource in the Whybrow Seam to the north-west of the approved South Bates Underground Mine can be feasibly extracted.

The proposed extension to the approved South Bates Underground Mine is referred to as the South Bates Extension Modification (the Modification) and would result in an extension of the approved Wambo mine life by 7 years (i.e. to 2039). The Modification would not include any change to the approved underground ROM coal production rate of 9.75 Mtpa, and the approved maximum total ROM coal production rate of 14.7 Mtpa. The Modification would not change the open cut mining operations.

SLR Consulting Australia Pty Ltd (SLR) has been engaged by WCPL to review the potential noise impacts from the construction and operation of the Modification.

This assessment has been completed with consideration of the *NSW Industrial Noise Policy* (INP) (Environment Protection Authority [EPA], 2000);

2 APPROVED WAMBO OPERATIONS

2.1 Existing Approvals

With respect to noise emissions, WCPL has approval to operate in accordance with the following approval requirements:

- Wambo Development Consent DA 305-7-2003 (as modified), with the relevant sections attached as **Appendix A1**.
- Environment Protection Licence (EPL) No. 529 (version dated 24 October 2016). The EPL noise criteria are the same as those presented in Development Consent DA 305-7-2003.
- Wambo Rail Loop Development Consent DA 177-8-2004 (as modified), with the relevant sections attached as **Appendix A2**.

In addition, NSW Work Cover Dangerous Goods Licences and/or Occupational Health and Safety legislation describe noise specifications for individual equipment, for health and safety purposes.

2.2 Approved Operations

Mining operations under Development Consent DA 305-7-2003 (as modified) commenced in March 2004 and currently both open cut and underground mining operations are conducted at Wambo. Mining operations are conducted 24 hours per day, seven days per week.

Currently approved open cut mining operations at Wambo involve the extraction of coal from the Whybrow, Redbank Creek, Wambo and Whynot Seams. The open cut is bounded by the United Collieries and the Golden Highway to the north, Wollombi Brook to the east and by uneconomic strip ratios to the south and west. The open cut mining fleet includes excavators, dozers, front end loaders, haul trucks, water trucks, service trucks, graders and drills.

Three underground mines are approved to a maximum ROM coal mining rate of 9.75 Mtpa, as follows:

- North Wambo Underground Mine (Wambo Seam);
- South Bates Underground Mine (Whybrow and Wambo Seams); and
- South Wambo Underground Mine (Arrowfield and Woodlands Hills Seams).

Longwall extraction at the North Wambo Underground Mine was completed in January 2016.

Development of the South Bates Underground Mine commenced in October 2014 and longwall mining commenced in the South Bates (Whybrow Seam) Underground Mine (i.e. longwalls 11 to 13) in February 2016. Subsequently, mining operations will progress to the South Bates (Wambo Seam) Underground Mine, scheduled to commence in June 2017 and be completed in July 2018.

Mining at the approved South Wambo (Arrowfield and Woodlands Hills Seams) Underground Mine will commence after completion of mining the South Bates Underground Mine.

2.3 Interaction of the Approved Operations with the United Wambo Open Cut Coal Mine Project

WCPL and United Collieries have formed a joint venture for the United Wambo Open Cut Coal Mine Project (SSD 15_7142).

The United Wambo Open Cut Coal Mine Project seeks to combine the existing open cut operations at Wambo with a proposed new open cut coal mine at the United Collieries. Wambo's Coal Handling and Preparation Plant (CHPP) and underground operations do not form part of the joint venture, and will continue to be owned and operated by WCPL under DA 305-7-2003.

An assessment of the potential cumulative noise impacts of the United Wambo Open Cut Coal Mine Project and the separate Wambo CHPP and underground operations has been conducted in the *United Wambo Open Cut Coal Mine Project Noise Impact Assessment* (the JV Project NIA) (Umwelt [Australia] Pty Limited [Umwelt], 2016).

2.4 Nearest Residential Receiver Areas

The nearest residential receiver areas in the vicinity of Wambo are shown on the Noise Monitoring Location Plan (refer **Appendix B1**). The nearest privately-owned receivers, relative to the Modification, are located to the northwest near the village of Jerrys Plains, to the east in the village of Warkworth, and to the southeast near the village of Bulga.

2.5 Original and Contemporary Noise Assessments

Report 10-2470-R1 *Wambo Development Project Construction, Operating and Transportation Noise and Blasting Impact Assessment* (Wambo Development Project NIA) dated 11 April 2003 (Richard Heggie Associates, 2003) was prepared for the Wambo Development Project.

As discussed in **Section 2.3**, the JV Project NIA provides a contemporary assessment of the potential cumulative noise impacts of the United Wambo Open Cut Coal Mine Project and the separate Wambo operations (e.g. CHPP and underground operations).

The Wambo Development Project NIA and the JV Project NIA included noise modelling prepared in accordance with the EPA's INP.

The predicted cumulative noise impacts in the JV Project NIA are referenced in this review of the potential cumulative noise impacts.

2.6 Noise Management Strategy

WCPL has adopted an Environmental Management Strategy (EMS) (WCPL, 2009) which establishes the overarching framework for environmental management and monitoring of activities undertaken at Wambo. The EMS has been prepared in accordance with the Development Consent DA 305-7-2003 (as modified) and provides the strategic framework for environmental management at Wambo. Accordingly, WCPL has prepared and implemented the Noise Management Plan (NMP) (WCPL, 2014) in accordance with the EMS.

2.6.1 Noise Control and Management Measures

WCPL implements a range of noise control and management measures at Wambo that includes operational controls, engineering controls, a real-time response protocol, meteorological forecasting and continuous improvement, as described in the NMP, to identify and manage noise impacts aimed to achieve compliance with the approved noise limits.

Design Control Measures

WCPL has designed and implemented a range of mine design features with consideration to the mitigation of noise for its operations. The following is a summary of existing and planned design control measures, including:

- Construction of noise and visual bunds in strategic operational locations, for example:
 - Constructed a noise/visual bund along the southern portion of the product coal stockpile area adjacent to the CHPP; and
 - Constructed a noise/visual bund along the south eastern portion of the rail loop/rail load out area.
- A CHPP with the following design considerations implemented, including:
 - A largely enclosed plant that effectively contains noise generated within the coal processing facility;
 - Conveyor drives that are placed low to the floor level; and
 - Key components for the CHPP were procured with specific noise criteria.
- WCPL owns and manages land around its operation to provide an adequate buffer between sensitive receivers to the south and to the north west (refer **Appendix B**);
- Overburden emplacement areas have been designed to minimise noise impact on sensitive receivers to the west and south;
- Overburden emplacement areas will be designed in a manner to enable mining equipment to operate in protected areas during adverse weather conditions which may increase the propagation of noise emission from WCPL;
- WCPL currently, and will continue to implement low level dumping procedures when conditions indicate possible increase noise propagation and/or when real time noise monitor trigger alarms indicate that possible noise propagation is sourced from the mine complex;
- WCPL constructs noise bunds in strategic operational locations;
- WCPL will investigate where appropriate, the installation of appropriate acoustic barriers around work areas where required (WCPL has implemented this for all Exploration drill rigs which are located close to sensitive receivers);
- The current South Bates Underground Mine ventilation fans and associated conveyors have been installed in pit to mitigate noise propagation; and

- The South Wambo Underground Mine ventilation system will include attenuation measures (i.e. customised high performance silencers together with optimised outlet/louver orientation away from the nearest privately owned receivers) to minimise ventilation system noise emissions.

Operational Control Measures

WCPL is committed to implementing best practice noise management measures to minimise noise impacts, particularly low frequency noise and traffic noise from its operations. A number of proactive management measures to minimise noise generation from WCPL operations have been implemented, including:

- Regular maintenance of plant and equipment and pre-start up inspections;
- All machinery and potential noise emitting plant and equipment shall be operated by experienced and appropriately trained personnel;
- The installation of an inaudible horn system ("Hornless Horns") across the entire open cut fleet to eliminate the use of audible horns (Note: In cases of emergency, audible horns may be required);
- The installation of reversing "quakers" to mitigate noise propagation from reversing fleet vehicles shall be fitted;
- Positioning of portable generators and/or machinery to take advantage of barriers to mitigate sound travel and/or positioned at the greatest distance from the noise-sensitive area;
- Plant and equipment is turned off or throttled down when not in use;
- Restricting movement of haul trucks on ridgelines or exposed haul routes where their noise may propagate over a wide area, especially at night;
- Scheduling the use of noisy equipment at the least sensitive time of day;
- Orienting equipment so that noise emissions are directed away from any sensitive areas to achieve the maximum attenuation of noise;
- During adverse conditions, heavy vehicle traffic on exposed haul roads and access tracks where noise can propagate off site and potentially cause a noise risk is restricted;
- Where there are several noisy pieces of equipment, scheduling operations so they are used separately rather than concurrently;
- Haul trucks are parked in pit during Crib Breaks;
- During site inductions employees and contractors are provided information and training on:
 - Potential noise impacts on neighbouring residents;
 - Reporting excessive noise to WCPL management;
 - Carry out quiet work practices; and
 - Appropriate standards of behaviour when driving to and leaving site to minimise traffic noise.
- Conduct specific noise management training and noise monitoring for key operational personnel;
- WCPL internal access roads are limited to a maximum speed of 60 kilometres per hour or lower in some areas;
- All new equipment to site, purchased or hired, will be procured in line with the plant and mobile equivalent continuous noise level (LAeq) sound power levels (SWLs) specification in the Wambo Development Project NIA for noise emissions to meet noise criteria at the nearest residences;
- Where feasible, examination of engineering controls including noise attenuation for trucks, drills and diggers, on mobile and stationary equipment that potentially generate significant noise and which may impact on sensitive receivers;

- Key operational personnel to monitor WCPL real-time noise monitoring network to assist in identifying when noise criteria levels are approaching or have exceeded their respective criteria so that proactive measures can be implemented; and
- Non mine related construction activities will generally be undertaken between 7.00 am and 7.00 pm daily. Construction activities may occur outside these hours when WCPL is satisfied that such activities are inaudible at the nearest private residences by a WCPL appointed acoustic specialist.

Continuous Improvement

WCPL is committed to maintaining an awareness of best practice noise mitigation technologies and alternative operating methodologies. WCPL implements noise control and management measures that are found to be feasible, reasonable and effective in the context of a safe and economic mining operation; and where there is a clear community benefit with their application. Available best practice mitigation technologies and alternative operating methodologies are reviewed on an ongoing basis, reported in the Annual Review and considered from the results of Independent Environmental Audits (IEA).

2.6.2 Noise Monitoring Program

The NMP describes the current noise monitoring network, which consists of two operator-attended monitoring sites; two continuous real-time monitoring sites; two off-site operator-attended/real-time monitoring sites; and one on-site Meteorological Station (refer **Appendix B1**). In accordance with the NMP, operator-attended noise monitoring is used for demonstrating compliance with noise criteria, whilst continuous real-time monitoring is used as a noise management tool to assist WCPL to take pre-emptive noise management actions to avoid potential non-compliances.

A summary of recent noise monitoring locations and associated monitoring frequency are presented in **Table 1** together with a cross reference to the Noise Monitoring Location Plan (refer **Appendix B1**).

Table 1 Recent Noise Monitoring Program Summary

Monitoring Location ID ¹	Noise Management Plan Property	Parameter	Frequency
N01	2 - Lambkin	Operator-attended monitoring	Monthly
N03	19a - Kelly	Operator-attended monitoring	Monthly
		Real-time monitoring	Continuous
N16	40 - Muller	Operator-attended monitoring	Monthly
		Real-time monitoring	Continuous
N20	33 - Thelander	Real-time monitoring	Continuous
N21	WCPL (Wambo South Residence)	Real-time monitoring	Continuous
N23	WCPL (Redmanvale Road)	Operator-attended monitoring	Monthly

Note 1: Refer **Appendix B**.

2.6.3 Operator-attended Noise Compliance Results 2015 and 2016

A review of the Annual Review 2015 (WCPL, 2016) indicates that Wambo noise levels complied with relevant noise limits at all monitoring sites during the operator-attended noise monitoring during 2015.

Similarly, a review of the monthly Wambo Coal Mine and Rail Spur - Environmental Noise Monitoring reports for January, February, March, April, May and June 2016 (Global Acoustics, 2016a to 2016f) indicates that noise levels complied with relevant noise limits at all monitoring sites during the operator-attended noise monitoring.

Furthermore, a review of the Wambo Coal Mine & Rail Loop - IEA Report (Hansen Bailey, 2015) Appendix D (page D-15) indicates that the auditor had reviewed both the operator-attended and continuous real-time noise monitoring results for the most recent IEA (i.e. December 2011 to October 2014) and confirmed no exceedances of the relevant noise limits.

2.6.4 Real-time Continuous Noise Monitoring

Real-time noise monitoring is used as a noise management tool (not for compliance purposes). An Exceedance Protocol has been implemented for ongoing performance assessment and to assist in the implementation of pre-emptive management actions to avoid potential non-compliances. The real-time noise monitoring data is reviewed daily in accordance with the Exceedance Protocol presented in Section 5 of the NMP.

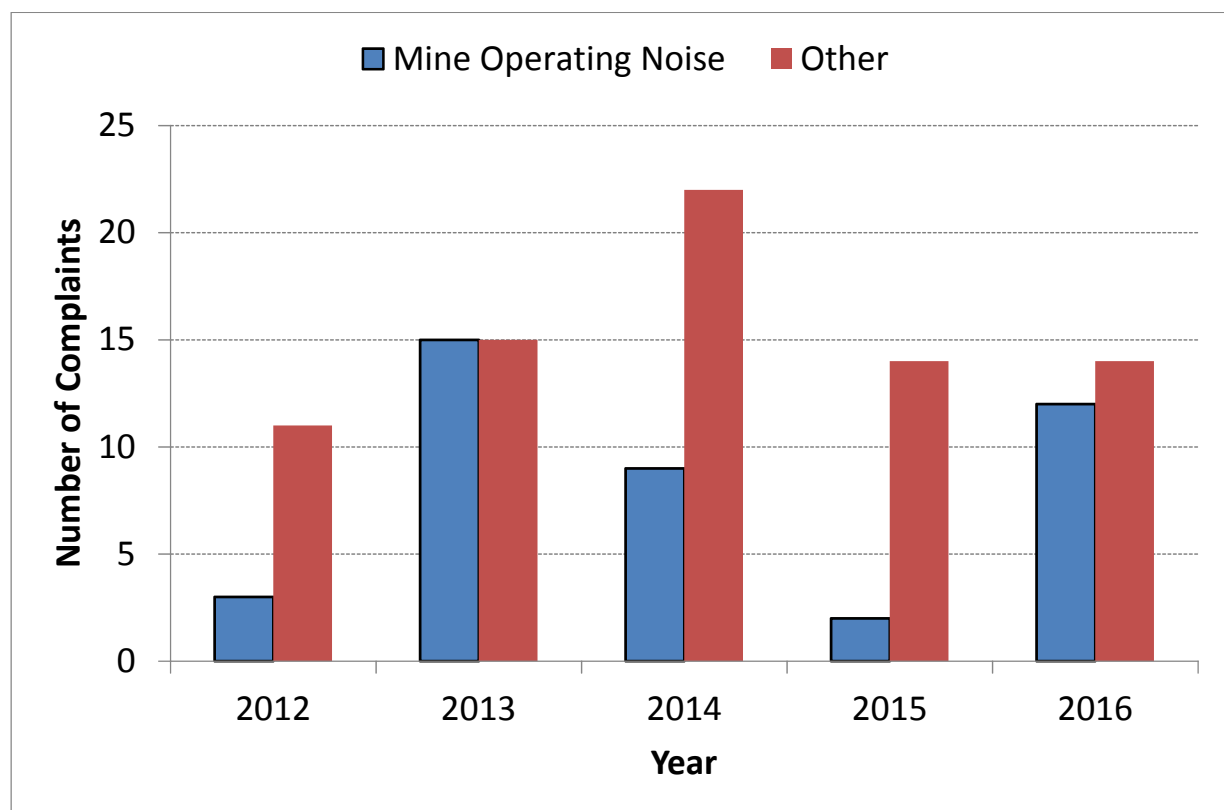
2.7 Noise Complaints Summary

WCPL maintains a complaints register in accordance with the requirements of the Development Consent (DA 305-7-2003). The IEA Report (Hansen Bailey, 2015) indicates that community concerns are well managed and recorded within the Wambo Complaints Register, which is available on the Wambo website.

The IEA Report reported that 75 community complaints have been received by Wambo in the audit period, comprising 14 in 2012, 30 in 2013 and 31 in 2014. During the audit period, the majority of complaints from the community received were in relation to noise and blasting impacts. The number of complaints received in relation to mine operating noise in 2015 was 2 from a total of 16, and in 2016 was 12 from a total of 26 (WCPL, 2016).

A summary of the community complaints register from 2012 to 2016 is presented in **Figure 1**.

Figure 1 Community Complaints Register Summary 2012 to 2016 (as at 20 December)



Source: WCPL (2016) and Hansen Bailey (2015)

All complaints received by WCPL relating to noise were responded to in accordance with the Community Complaints Response procedure, presented in Section 6 of the NMP. Following each noise related complaint the source and noise levels were determined or verified. In some instances, mining operations were altered in response to a complaint lodged with WCPL during adverse weather conditions.

3 PROPOSED MODIFICATION

3.1 South Bates Underground Mine

The approved and modified Wambo General Arrangement Plan is shown in **Appendix C1**. The Modification involves an extension of mining in the Whybrow Seam to the north-west of the existing South Bates Underground Mine to include additional longwall panels.

The approved and modified South Bates Underground Mine layout is shown in **Appendix C2**. The longwalls would primarily use the existing surface infrastructure at the approved South Bates Underground Mine, however the Modification would involve the construction of two new ventilation shafts, gas drainage and other ancillary infrastructure.

3.1.1 Underground Longwall Mining Operations

Access to the modified South Bates Underground Mine would be via the Bates South open cut highwall consistent with the existing South Bates Underground Mine access (refer **Appendices C1 and C2**). Longwall mining would commence in the additional South Bates Underground Mine longwall panels in 2018 and is anticipated to conclude in 2022.

There are no proposed changes to the approved ROM coal production rate from the underground operations, or total ROM coal processing rate through the CHPP.

The Modification would involve an extension of the existing South Bates Underground Mine life by approximately 5 years.

3.1.2 Surface Operations

The Modification would primarily involve use of the existing approved infrastructure at the South Bates Underground Mine, however the Modification would also involve the construction of new surface infrastructure, including:

- ventilation shafts (**Section 3.1.3**);
- gas drainage infrastructure; and
- other ancillary infrastructure (e.g. conveyors, conveyor drives).

The Modification would also initially require the installation of an auxiliary fan and feeder breaker on a temporary basis (up to 3 months). Additional mobile equipment would be required for short periods during the Modification construction works.

ROM coal would be conveyed to the existing South Bates Underground ROM coal stockpile. Loading and haulage from the existing underground ROM coal stockpile to the CHPP, would be undertaken by the existing front-end loader (i.e. CAT 992 or equivalent) and the existing ROM coal haulage fleet (i.e. up to four CAT 789 haul trucks), respectively.

3.1.3 Ventilation System Operations

The Modification would require two new ventilation shafts to support the operation of the modified South Bates Underground Mine (refer **Appendix C2**). The ventilation shaft adjacent Longwall 20 would be used for upcast active (fan) ventilation and the other ventilation shaft adjacent Longwall 22 would be used for downcast passive (no fan) ventilation. The additional ventilation shafts would be located on the surface rather than in the Bates South open cut (refer **Appendix C2**).

The existing South Bates Underground Mine ventilation fans (located in the Bates South open cut) will continue to operate up until late 2018. One of the existing South Bates Underground Mine ventilation fans would remain in-pit while the other fan would be relocated to the upcast active (fan) ventilation adjacent Longwall 20 in late 2018 and operate through to 2022. The Modification would therefore not result in additional ventilation fans operating at the same time.

3.2 Other Approved Underground Operations

The Modification would not alter the approved South Wambo Underground Mine layout or associated surface infrastructure.

The additional South Bates Underground Mine life would however result in a delay to the commencement of the South Wambo Underground Mine. South Wambo Underground Mine longwall mining would commence in 2023 and be completed by 2039. This would result in an extension of the approved Wambo mine life by 7 years (i.e. from 2032 to 2039).

3.3 Wambo Open Cut Operations

The Modification would not alter the approved open cut mining operations.

As discussed in **Section 2.3**, approval for proposed changes to the approved Wambo open cut mining are being sought separately under the United Wambo Open Cut Coal Mine Project.

3.4 Coal Handling, Preparation and Product Coal Rail Transport

The Modification would not alter the approved CHPP or product coal rail transport operations as there would be no increase in the total ROM coal production rate.

The Modification would however increase the operational life of the CHPP and product coal rail transport operations by approximately 7 years. This extension is consistent with the operational life extension being sought and assessed by the JV Project NIA.

3.5 Approved and Proposed Hours of Operation

There would be no change in the approved operating hours of Wambo due to the Modification as presented in **Table 2**.

Table 2 Approved Wambo Coal Mine and Modification Hours of Operation

Activity	Description	Currently Approved ¹	Modification
On-Site	Surface infrastructure construction works	Generally daytime ² (0700 hours to 1800 hours, 7 days per week)	Unchanged
	Underground development works	24 hours, 7 days per week	Unchanged
	Underground and open cut operations, coal handling, preparation and stockpiling	24 hours, 7 days per week	Unchanged
Off-Site	Rail Traffic	24 hours, 7 days per week	Unchanged
	Road Traffic	24 hours, 7 days per week	Unchanged

Note 1: As per Wambo Development Consent DA 305-7-2003 (refer **Appendix A1**).

Note 2: Except construction campaigns for each of the ventilation shafts being 24 hours per day, seven days per week.

3.6 Workforce

The Modification would not result in any additional demand for employees and contractors.

4 REVIEW OF MODIFICATION NOISE IMPACTS

4.1 Construction Noise Impacts

As discussed in **Section 3.1.2**, the Modification would also involve the construction of new surface infrastructure, including ventilation shafts, gas drainage infrastructure, and other ancillary infrastructure (e.g. conveyors, conveyor drives).

The Modification would also initially require the installation of an auxiliary fan and feeder breaker on a temporary basis (up to 3 months).

All construction activities would be conducted inside existing Wambo Mining Leases. Additional, mobile equipment would be required for short periods during the Modification construction works. The number and type of equipment would be expected to vary depending on the activity being undertaken. The construction activities would be generally undertaken during daylight hours.

Drilling of the ventilation shafts would however occur 24 hours per day, seven days per week, while the remainder of development works associated with the ventilation shafts (eg fan installation) would be generally limited to daytime hours.

It is expected that the ventilation shafts would be constructed using the 'blind bore' method. Using this method, the drilling would take place in advance of development workings, with material from the excavation being removed from the top of the shaft. The construction campaigns for each of the ventilation shafts would be limited to a period of approximately 12 weeks.

Noise levels during construction of the ventilation shafts would be managed through the implementation of a number of noise mitigation and management measures, including:

- Implementation of noise mitigation measures (eg enclosing the drilling activities in a temporary acoustic shed and/or erection of temporary noise barriers) in consultation with landowners at relevant receiver locations and/or enter into agreements with landowners at relevant receiver locations;
- Require construction workers to undergo briefings in regard to operating equipment in ways that minimise noise; and
- Ensure that equipment is appropriately maintained and is turned off when not in use.

All construction works would occur within the existing Wambo Mining Leases, and while some of the works would involve short term activities, the application of the EPA's *Interim Construction Noise Guideline* (ICNG) (2009) is not considered appropriate, and any construction related noise would be assessed concurrently with ongoing mining operations. Consequently, a full quantitative assessment of the construction activities in accordance with the ICNG is not considered necessary.

The majority of the construction activities associated with the Modification would be conducted during the daytime and the potential noise impacts associated with these activities would be minor compared to surrounding operations at Wambo. It is expected that the proposed noise mitigation measures would appropriately minimise any potential construction noise impacts associated with the drilling of the ventilation shafts.

4.2 Underground Operating Noise Impacts

Potential noise impacts of the Modification operation would be associated with the following:

- modified surface infrastructure; and
- modified ventilation system.

The Modification would not alter the open cut mining, other underground, CHPP, or product coal rail transport operations and therefore no significant change to existing/approved noise emissions and any associated impacts from these operations are expected as a result of the Modification.

The potential noise impacts from the Modification are further discussed below.

4.2.1 Existing and Modified ROM Coal Handling Activities

ROM coal at the existing South Bates Underground Mine is conveyed to the existing South Bates Underground ROM coal stockpile. Loading and haulage from the existing underground ROM coal stockpile to the CHPP is undertaken by front-end loader (i.e. CAT 992 or equivalent) and the ROM coal haulage fleet (i.e. up to four CAT 789 haul trucks), respectively.

The same ROM coal handling activities would occur for the Modification, however there would be additional ancillary infrastructure (e.g. conveyors, conveyor drives) required. The Modification would also initially require the installation of an auxiliary fan and feeder breaker on a temporary basis (up to 3 months).

A summary of the existing and modified South Bates Underground Mine ROM coal handling activities is provided in **Table 3** together with the associated SWLs.

Table 3 Existing and Modified ROM Coal Handling Activities SWLs (dBA re 1pW) ¹

Component	Type ²	SWL per Item ³	Existing		Modified	
			Number of Items ³	SWL	Number of Items ³	SWL
Drift Conveyor (S6)						
Conveyor drive (Primary)	350 kW	101 dBA per item	1	101 dBA	1	101 dBA
Conveyor drive (Secondary)	350 kW	101 dBA per item	0	-	1	101 dBA
Conveyor	3,500 tph	Underground	1	-	1	-
ROM Coal Conveyor (S2)						
Conveyor drive (Primary)	600 kW	103 dBA per item	1	103 dBA	1	103 dBA
Existing Conveyor	3,500 tph	110 dBA per 100 m	1 (686 m)	118 dBA	1 (686 m)	118 dBA
Conveyor Extension	3,500 tph	110 dBA per 100 m	0	-	1 (220 m)	113 dBA
Transfer Tower	3,500 tph	109 dBA per item	0	-	1	109 dBA
Temporary Plant						
Auxiliary Fan		114 dBA per item	0	-	1	114 dBA
Feeder Breaker		113 dBA per item	0	-	1	113 dBA
Loading and Haulage						
Front-end Loader	CAT 992	121 dBA per item	1	121 dBA	1	121 dBA
Haul Trucks	CAT 789	123 dBA per item	4	129 dBA	4	129 dBA

Note 1: dBA = A-weighted decibels, pW = picowatt.

Note 2: kW = kilowatt, tph = tonnes per hour.

Note 3: m=metres.

4.2.2 Existing and Modified Ventilation System Noise Mitigation Requirements

As discussed in **Section 3.1.3**, the two existing South Bates Underground Mine ventilation fans will continue to operate up until late 2018. One of these existing South Bates Underground Mine ventilation fans would remain in-pit and the other fan would be relocated to the upcast active (fan) ventilation adjacent Longwall 20 in late 2018 and operate through to 2022. The other ventilation shaft adjacent Longwall 22 would be used for downcast passive (no fan) ventilation. The Modification would therefore not result in additional ventilation fans operating at the same time.

The Modification ventilation shafts would range from approximately 3,200 m to 3,800 m to the nearest privately-owned receivers located to the northwest of the Modification (**Appendix B1**), approximately 1,800 m closer by comparison to existing South Bates Underground Mine ventilation fans. The new ventilation fan would however be located on the surface rather than in the Bates South open cut (refer **Appendix C2**).

A summary of the existing and modified ventilation systems is presented in **Table 4**, together with the indicative noise mitigation requirements and associated SWLs.

Table 4 Existing and Modified Ventilation System SWLs and Indicative Noise Mitigation (dBA re 1pW)

Existing				Modified			
Year	Type	Mitigation	SWL	Year	Type	Mitigation ¹	SWL
Current to 2018	2 Fans	Located in mine void, Evasee outlet upward	131 dBA	2018 to 2022	1 Fan	Located in mine void, Evasee outlet upward	128 dBA
					Upcast Fan	Evasee outlet upward	128 dBA
					Downcast	Passive	104 dBA
Total Existing SWL			131 dBA	Total Modified SWL			131 dBA

As shown in **Table 4**, the modified ventilation system would include noise attenuation to minimise noise emissions.

4.2.3 Existing and Modified South Bates Underground Mine Sound Power Levels

The potential for machinery to emit noise is quantified as the SWL expressed in dBA re 1 pW. At the receiver, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 micropascals. In general terms, any variation in mine site LAeq SWL would produce a similar variation in the intrusive (LAeq(15minute)) SPL at the receiver.

A summary of the existing and modified South Bates Underground Mine fixed plant (and temporary plant) and mobile equipment are presented in **Table 5** together with the associated SWLs.

Table 5 Existing and Modified South Bates Underground Mine SWLs (dBA re 1pW)¹

Component	Type ²	Existing SWL	Modified SWL
Drift Conveyor (S6)			
Conveyor drive (Primary)	350 kW	101 dBA	101 dBA
Conveyor drive (Secondary)	350 kW	-	101 dBA
Conveyor	3,500 tph	-	-
ROM Coal Conveyor (S2)			
Conveyor drive (Primary)	600 kW	103 dBA	103 dBA
Existing Conveyor (686 m)	3,500 tph	118 dBA	118 dBA
Conveyor Extension (220 m)	3,500 tph	-	113 dBA
Transfer Tower	3,500 tph	-	109 dBA
Temporary Plant			
Auxiliary Fan	-	-	114 dBA
Feeder Breaker	-	-	113 dBA
Ventilation System			
Total Ventilation System	-	131 dBA	131 dBA ³
Loading and Haulage			
Front-end Loader	CAT 992	121 dBA	121 dBA
Haul Trucks	CAT 789	129 dBA	129 dBA
TOTAL		133.5 dBA	133.7 dBA

Note 1: dBA = A-weighted decibels, pW = picowatt.

Note 2: kW = kilowatt, tph = tonnes per hour.

Note 3: Refer to **Section 4.2.2** for modified ventilation system indicative noise mitigation requirements.

As shown in **Table 5**, existing South Bates Underground Mine total SWL is 134 dBA and remains generally unaltered (i.e. <1 dBA) by the Modification.

In view of the foregoing marginal SWL variations arising from the Modification, together with the extent of the existing off-site environmental noise compliance (refer **Section 2.6.2**), it is reasonable to conclude that the Modification would have minimal potential to alter the existing intrusive ($L_{Aeq}(15\text{minute})$), amenity ($L_{Aeq}(\text{period})$) and maximum noise levels at the nearest privately-owned receivers in the vicinity of Wambo.

5 REVIEW OF MODIFICATION CUMULATIVE NOISE IMPACTS

5.1 Cumulative Operating Noise

5.1.1 Background

This section provides an assessment of the potential cumulative noise impacts of the Modification. The assessment has been based on the contemporary cumulative noise assessment prepared for the United Wambo Open Cut Coal Mine Project and the separate Wambo CHPP and underground operations (i.e. the JV Project NIA – **Section 2.3**).

5.1.2 Cumulative Sound Power Levels

The JV Project NIA included four representative assessment scenarios across the life of the United Wambo Open Cut Coal Mine Project (i.e. 2019, 2023, 2028 and 2033). Each scenario included the United Wambo Open Cut Coal Mine Project and the separate Wambo CHPP and underground operations.

The Modification would result in the following changes to the operations assessed in the JV Project NIA:

- the modified South Bates Underground Mine operations would continue for an additional five years (i.e. until 2022); and
- the commencement of the South Wambo Underground Mine would be delayed due to the extension of the South Bates Underground Mine life (i.e. mining would commence in 2023 and be completed by 2039).

SLR has reviewed the SWLs of the noise generating mobile fleet and plant for the United Wambo Open Cut Coal Mine Project and the separate Wambo CHPP and underground operations included in JV Project NIA (Appendix E) and revised them to incorporate the Modification for each of the assessment scenarios. These SWLs are presented in **Appendix D** and summarised in **Table 6**.

Table 6 JV Project and Modified Wambo SWLs (dBA re 1pW)

	2019				2023				2028				2033			
	No Modification		The Modification ^{1,2}		No Modification		The Modification ¹		No Modification		The Modification ¹		No Modification		The Modification ¹	
	No	SWL	No	SWL	No	SWL	No	SWL	No	SWL	No	SWL	No	SWL	No	SWL
JV Project Open Cut Operations																
24 hour Operations	87	142.3	83	142.2	81	141.3	81	141.3	78	140.2	78	140.2	74	139.5	74	139.5
Difference relative to no Modification	-	-	-4	0.1	-	-	0	0.0	-	-	0	0.0	-	-	0	0.0
Wambo CHPP Operations																
24 hour Operations	21	128.0	21	128.0	21	128.0	21	128.0	21	128.0	21	128.0	21	128.0	21	128.0
Difference relative to no Modification	-	-	0	0.0	-	-	0	0.0	-	-	0	0.0	-	-	0	0.0

South Wambo Underground Mine																
24 hour Operations	13	124.2	0	0.0	15	128.4	13	124.2	17	130.4	15	128.4	17	130.4	17	130.4
Difference relative to no Modification	-	-	-13	-124.2	-	-	-2	-4.2	-	-	-2	-2.1	-	-	0	0.0
South Bates Underground Mine																
24 hour Operations	0	0.0	16	133.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Difference relative to no Modification	-	-	+16	+133.7	-	-	0	0.0	-	-	0	0.0	-	-	0	0.0
Adjusted Total SWL																
24 hour Operations	121	142.6	120	142.9	117	141.7	115	141.5	116	140.9	114	140.8	112	140.2	112	140.2
Difference relative to no Modification	-	-	-1	+0.3	-	-	-2	-0.2	-	-	-2	-0.1	-	-	0	0.0

Note 1: Green figures represent a decrease or no change to the number of items and or SWL.

Note 2: Red figures represent an increase to the number of items and or SWL.

5.1.3 Cumulative Noise Impacts

Based on the estimated SWLs presented in **Table 6**, the following observations are made:

- In 2019, the total cumulative SWL is 143 dBA and remains generally unaltered (i.e. <1 dBA) by the Modification;
- In 2023, the total cumulative SWL is 142 dBA and remains generally unaltered (i.e. <1 dBA) by the Modification;
- In 2028, the total cumulative SWL is 141 dBA and remains generally unaltered (i.e. <1 dBA) by the Modification; and
- In 2033, the total cumulative SWL is 140 dBA and remains generally unaltered (i.e. <1 dBA) by the Modification.

The JV Project NIA (Section 6.6 and Appendix H) assesses the potential cumulative noise impact of the JV Project and the separate Wambo CHPP and underground operations. The JV Project NIA (Appendix H) identifies Year 2019 of the cumulative operation as being representative of the typical worst case scenario, which is generally consistent with total SWLs analysis presented in **Table 6**. The JV Project NIA (Appendix H) Figures H1 to H4 presents the predicted daytime, evening and night-time cumulative operation noise impact under various weather conditions.

The JV Project NIA (Appendix H) states; “The results in Figures H1 to H4 indicate the noise levels from the combined operation of United and Wambo are below the respective daytime, evening and night-time cumulative noise level criteria for mitigation rights of 50 dB(A) and 45 dB(A) at all privately owned properties in the region surrounding the the Project except within Warkworth village”.

In view of the foregoing negligible SWL variations resulting from the Modification, it is reasonable to conclude that the Modification would have minimal potential to alter the cumulative operation intrusive (LAeq(15minute)), amenity (LAeq(period)), and maximum noise levels at the nearest privately-owned receivers in the vicinity of JV Project and Wambo. Hence the cumulative operation outcomes presented JV Project NIA (Section 6.6 and Appendix H) remain unaltered by the Modification.

5.2 Road Traffic Noise

The Modification would result in the continued generation of vehicle trips to and from Wambo for an additional 7 years from 2032 to 2039. The traffic generated during the additional operating years would be expected to be similar to that currently generated as the Modification would not result in any additional demand for employees and contractors (**Section 3.6**).

Therefore, other than an extension of duration, any road traffic noise impacts remains generally unaltered by the Modification. Given the above, no specific road noise assessment in accordance with the EPA's *NSW Road Noise Policy* (RNP) (2011) is considered necessary.

Wambo Development Consent DA 305-7-2003 (as modified) (refer **Appendix A1**) Schedule 4, Condition 8(a) (Operating Conditions) sets out requirements in relation to minimising the traffic noise impacts in the vicinity of Wambo. In accordance with the consent conditions, the NMP, Section 3.2 (Operational Control Measures) includes staff inductions, driver behaviour standards and quiet work procedures specifically in relation to the minimising potential traffic noise impacts.

5.3 Rail Traffic Noise

As discussed in **Section 3.3**, the Modification would not alter the CHPP or product coal rail transport operations as there would be no increase in the maximum ROM coal production rate. The Modification would extend these operations by 7 years to 2039. So other than an extension of duration, any rail traffic noise impacts remains generally unaltered by the Modification. Given the above, no assessment in accordance with the EPA's *Rail Infrastructure Noise Guideline* (RING) (2013) is considered necessary for the Modification.

Wambo Development Consent DA 177-8-2004 (as modified) (refer **Appendix A2**) Schedule 4, Condition 6 (Rail Noise) and Condition 7 (Noise Monitoring), sets out requirements in relation to minimising the rail noise impacts in the vicinity of Wambo. In accordance with the consent conditions, the NMP, Section 3.2.1 (Rail Noise) and Section 5.1 (Noise Monitoring Network) include approved rail noise monitoring and management procedures. These rail noise monitoring and management procedures would continue to be implemented for the Modification.

6 SUMMARY OF FINDINGS

6.1 Construction Noise Impacts

Construction and development activities required to support the Modification, including modifications to the existing surface infrastructure layout (refer **Appendices C1 and C2**), would occur progressively in parallel with ongoing mining operations. The majority of the construction activities would be conducted during the daytime and the potential noise impacts associated with these activities would be minor compared to surrounding operations at Wambo. It is expected that the proposed noise mitigation measures would appropriately minimise any potential construction noise impacts associated with the short term drilling campaigns of the ventilation shafts 24 hours per day, seven days per week.

6.2 Operating Noise Impacts

The existing South Bates Underground Mine total SWL is 134 dBA and remains generally unaltered (i.e. <1 dBA) by the Modification. In view of the foregoing marginal SWL variations arising from the Modification, together with the extent of the existing off-site environmental noise compliance (refer **Section 2.6.2**), it is reasonable to conclude that the Modification would have minimal potential to alter the existing intrusive (LAeq(15minute)) and amenity (LAeq(period)) noise levels at the nearest privately-owned receivers in the vicinity of Wambo.

6.3 Cumulative Noise Impacts

The cumulative SWLs for the representative operational scenarios assessed in the JV Project NIA would remain unaltered (i.e. <1 dBA) by the Modification. In view of the foregoing negligible SWL variations resulting from the Modification, it is reasonable to conclude that the Modification would have minimal potential to alter the cumulative operation intrusive (LAeq(15minute)), amenity (LAeq(period)), and maximum noise levels at the nearest privately-owned receivers in the vicinity of JV Project and Wambo. Hence the cumulative operation outcomes presented JV Project NIA (Section 6.6 and Appendix H) remain unaltered by the Modification.

6.4 Road and Rail Noise Impacts

Similarly, other than an extension of duration, any road and rail traffic noise impacts remains generally unaltered by the Modification.

6.5 Recommendations

Notwithstanding the above outcomes of this noise review, it recommended that WCPL update the NMP to include a requirement for a ventilation system acoustical design review prior to the construction of the modified ventilation system (upcast fan only).

7 REFERENCES

Department of Environment, Climate Change and Water, 2011, *NSW Road Noise Policy*.

Environment Protection Authority, 2000, *NSW Industrial Noise Policy*.

Environment Protection Authority, 2009, *Interim Construction Noise Guideline*.

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Hansen Bailey, 2015, *Wambo Coal Mine & Rail Loop - Independent Environmental Audit Report*.

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Umwelt (Australia) Pty Ltd, 2016, *United Wambo Open Cut Coal Mine Project Noise Impact Assessment*.

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Wambo Coal Pty Limited, 2014, *Noise Management Plan*.

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WAMBO DEVELOPMENT CONSENT DA 305-7-2003 (AS MODIFIED)

SCHEDULE 4
SPECIFIC ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

- Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant **must** acquire the land in accordance with the procedures in conditions 9-11 of schedule 5:

Table 1: Land subject to acquisition upon request

2 – Lambkin	23A & B - Kannar
13C - Skinner	31A,B,C & D - Fisher
19A & B – Kelly	51 – Hawkes
22 – Henderson	56 - Haynes

Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1 of the EIS for the Wambo Development Project. Lands titled 23A & B – Kannar, 31A,B,C & D – Fisher, 51 – Hawkes and 56 – Haynes have been acquired and are now mine-owned.

¹NOISE

Noise Impact Assessment Criteria

- The Applicant **must** ensure that the noise generated by the Wambo Mining Complex does not exceed the noise impact assessment criteria presented in Table 9.

Table 9: Noise impact assessment criteria dB(A)

Day <i>L_{Aeq}(15 minute)</i>	Evening/Night <i>L_{Aeq}(15 minute)</i>	Night <i>L_{A1}(1 minute)</i>	Land Number
35	41	50	94 – Curlewis
35	40	50	3 – Birrell
			4B – Circosta
			15B - McGowen/Caslick
			16 – Cooper
			23C – Kannar
			25 – Fenwick
			28A & B – Garland
			33 -Thelander/O'Neill
35	39	50	39 – Northcote
			40 – Muller
			254A – Algie
			5 – Strachan
			6 - Merrick
35	38	50	7 - Maizey
			37 - Lawry
			48 - Ponder
			1 - Brosi
			17 - Carter
			18 - Denney
			38 - Williams
			49 - Oliver
			63 - Abrocuff
			75 - Barnes
			91 - Bailey

¹ Incorporates EPA GTAs

WAMBO DEVELOPMENT CONSENT DA 305-7-2003 (AS MODIFIED)

Day <i>L_{Aeq}(15 minute)</i>	Evening/Night <i>L_{Aeq}(15 minute)</i>	Night <i>L_{A1}(1 minute)</i>	Land Number
35	37	50	27 - Birralee
			43 - Carmody
			137 - Woodruff
			163 - Rodger/Williams
			246 - Bailey
35	36	50	13B - Skinner
			178 - Smith
			188 - Fuller
			262A, B & C - Moses
35	35	50	All other residential or sensitive receptors, excluding the receptors listed in condition 1 above

Notes:

- Noise generated by the Wambo Mining Complex is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy

Land Acquisition Criteria

- If the noise generated by the Wambo Mining Complex exceeds the criteria in Table 10, the Applicant **must**, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 9-11 of schedule 5.

Table 10: Land acquisition criteria dB(A)

Day/Evening/Night <i>L_{Aeq}(15 minute)</i>	Property
43	94 - Curlewis
	23C – Kannar
	254A - Algie
40	All other residential or sensitive receptor, excluding the receptors listed in condition 1 above

Note: Noise generated by the Wambo Mining Complex is to be measured in accordance with the notes presented below Table 9 above. **Property 23C – Kannar has been acquired and is now mine-owned.**

Operating Conditions

- The Applicant **must**:
 - implement best management practice to minimise the operational, low frequency and traffic noise of the Wambo Mining Complex;
 - operate a comprehensive noise management system for the Wambo Mining Complex that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this consent;
 - maintain the effectiveness of noise suppression equipment (if fitted) on plant at all times and ensure defective plant is not used operationally until fully repaired;
 - ensure that noise attenuated plant (if used) is deployed preferentially in locations relevant to sensitive receivers;
 - minimise the noise impacts of the Wambo Mining Complex during meteorological conditions when the noise limits in this consent do not apply;
 - co-ordinate the noise management for the Wambo Mining Complex with the noise management at nearby mines (including HVO South, HVO North and Mt Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex, to the satisfaction of the [Secretary](#).

WAMBO DEVELOPMENT CONSENT DA 305-7-2003 (AS MODIFIED)

Noise Management Plan

9. The Applicant **must** prepare a Noise Management Plan for the Wambo Mining Complex to the satisfaction of the [Secretary](#). This plan must:
- be prepared in consultation with the EPA, and submitted to the [Secretary](#) for approval by the end of June 2013;
 - describe the measures that would be implemented to ensure:
 - best management practice is being employed;
 - the noise impacts of the Wambo Mining Complex are minimised during meteorological conditions when the noise limits in this consent do not apply; and
 - compliance with the relevant conditions of this consent;
 - describe the proposed noise management system in detail;
 - include a monitoring program that:
 - uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the Wambo Mining Complex;
 - adequately supports the proactive and reactive noise management system for the Wambo Mining Complex;
 - includes a protocol for determining exceedances of the relevant conditions in this consent;
 - evaluates and reports on the effectiveness of the noise management system for the Wambo Mining Complex;
 - provides for the annual validation of the noise model for the Wambo Mining Complex; and
 - include a protocol that has been prepared in consultation with the owners of nearby mines (including HVO South, HVO North and Mount Thorley Warkworth mines) to minimise the cumulative noise impacts of these mines and the Wambo Mining Complex.

The Applicant must implement the approved management plan as approved from time to time by the Secretary.

²METEOROLOGICAL MONITORING

10. The Applicant **must** establish a permanent meteorological station at a location approved by the EPA, and to the satisfaction of the [Secretary](#), to monitor the parameters specified in Table 11, using the specified units of measure, averaging period, frequency, and sampling method in the table.

Table 11: Meteorological monitoring

Parameter	Units of measure	Averaging period	Frequency	Sampling method ¹
Lapse rate	°C/100m	1 hour	Continuous	Note ²
Rainfall	mm/hr	1 hour	Continuous	AM-4
Sigma Theta @ 10 m	°	1 hour	Continuous	AM-2
Siting	-	-	-	AM-1
Temperature @ 10 m	K	1 hour	Continuous	AM-4
Temperature @ 2 m	K	1 hour	Continuous	AM-4
Total Solar Radiation @ 10m	W/m ²	1 hour	Continuous	AM-4
Wind Direction @ 10 m	°	1 hour	Continuous	AM-2
Wind Speed @ 10 m	m/s	1 hour	Continuous	AM-2

¹ NSW EPA, 2001, *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW*.

² Incorporates EPA GTA

WAMBO RAIL LOOP DEVELOPMENT CONSENT DA 177-8-2004 (AS MODIFIED)

SCHEDULE 4 GENERAL ENVIRONMENTAL CONDITIONS

ACQUISITION UPON REQUEST

- Upon receiving a written request for acquisition from the landowner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 1-3 of schedule 5.

Table 1: Land subject to acquisition upon request

19 - L Kelly	55 - E & C Burley
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Note: For more information on the numbering and identification of properties used in this consent, see Attachment 1A and Attachment 1B of the SEE for the Alterations to the Wambo Development Project – Rail and Train Loading Infrastructure.

- While the land listed in Table 1 is privately owned, the Applicant shall implement all practicable measures to ensure that the impacts of the development comply with the predictions in the SEE, and the relevant conditions in this consent, at any residence on this land, to the satisfaction of the Director-General.

NOISE

Noise Impact Assessment Criteria

- The Applicant shall ensure that noise generated by the development, combined with noise generated by any development in the Wambo Mining Complex, does not exceed the noise criteria provided in Table 2, unless higher noise criteria are specified in the consent for the Wambo Coal Mine (DA 305-7-2003).

Table 2: Noise impact assessment criteria dB(A)

Day <i>L_{Aeq}(15 minute)</i>	Evening/Night <i>L_{Aeq}(15 minute)</i>	Night <i>L_{A1}(1 minute)</i>	Land Number
35	35	50	All private residential or sensitive receptors, excluding the receptors listed in Table 1

Notes:

- Noise generated by the project is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions), of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedance of the criteria must be systemic.

Construction Hours

- The Applicant shall ensure that all construction work is carried out from 7 am to 6 pm Monday to Saturday (inclusive) and 8 am to 6 pm Sundays and Public Holidays.

Operating Hours

- The Applicant shall:
 - take all practicable measures to minimise train movements at the development on Friday evening (6 pm-9 pm) and Sunday morning (9 am-12 am);
 - report on the implementation and effectiveness of these measures, to the satisfaction of the Director-General.

Rail Noise

- The Applicant shall seek to ensure that its rail spur is only accessed by locomotives that are approved to operate on the NSW rail network in accordance with noise limits L6.1 to L6.4 in RailCorp's EPL (No. 12208) and ARTC's EPL (No. 3142) or a Pollution Control Approval issued under the former Pollution Control Act 1970.

Noise Monitoring

- The Applicant shall monitor the noise generated by the development, and noise generated by the Wambo Mine, in general accordance with the Noise Management Plan for the Wambo Mining Complex and the NSW Industrial Noise Policy.
- By 31 May 2012, the Applicant shall review and update the Noise Management Plan for the Wambo Mining Complex, including a noise monitoring protocol for evaluating compliance with the criteria in condition 3 above.
- During the first 12 months of operation of the Rail Refuelling Facility, the Applicant must conduct attended noise monitoring at the nearest private receptor during refuelling events, no less often than every three months.

¹ Incorporates OEH GTA

LOCATIONS OF METEOROLOGICAL, NOISE AND BLAST MONITORING SITES

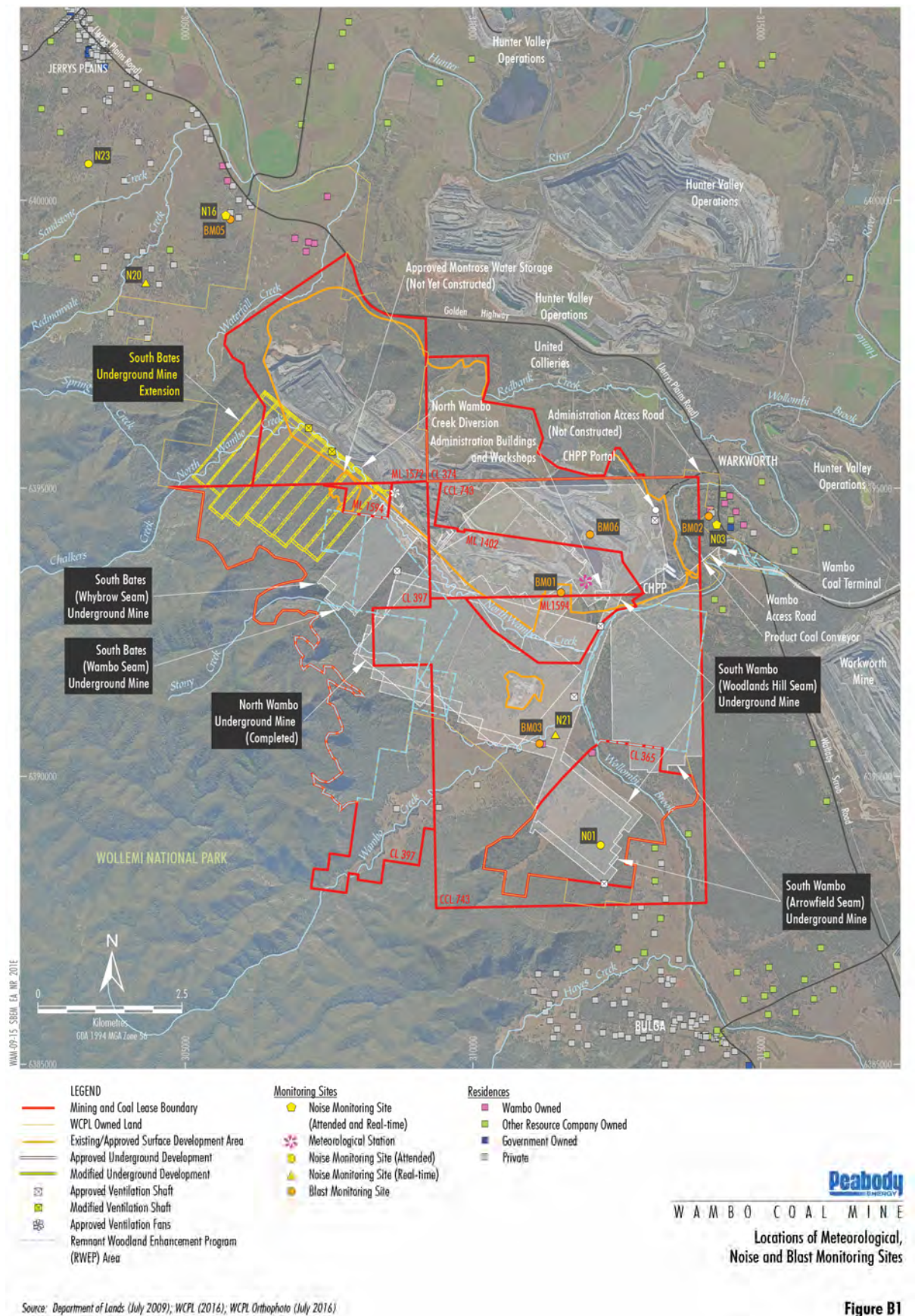


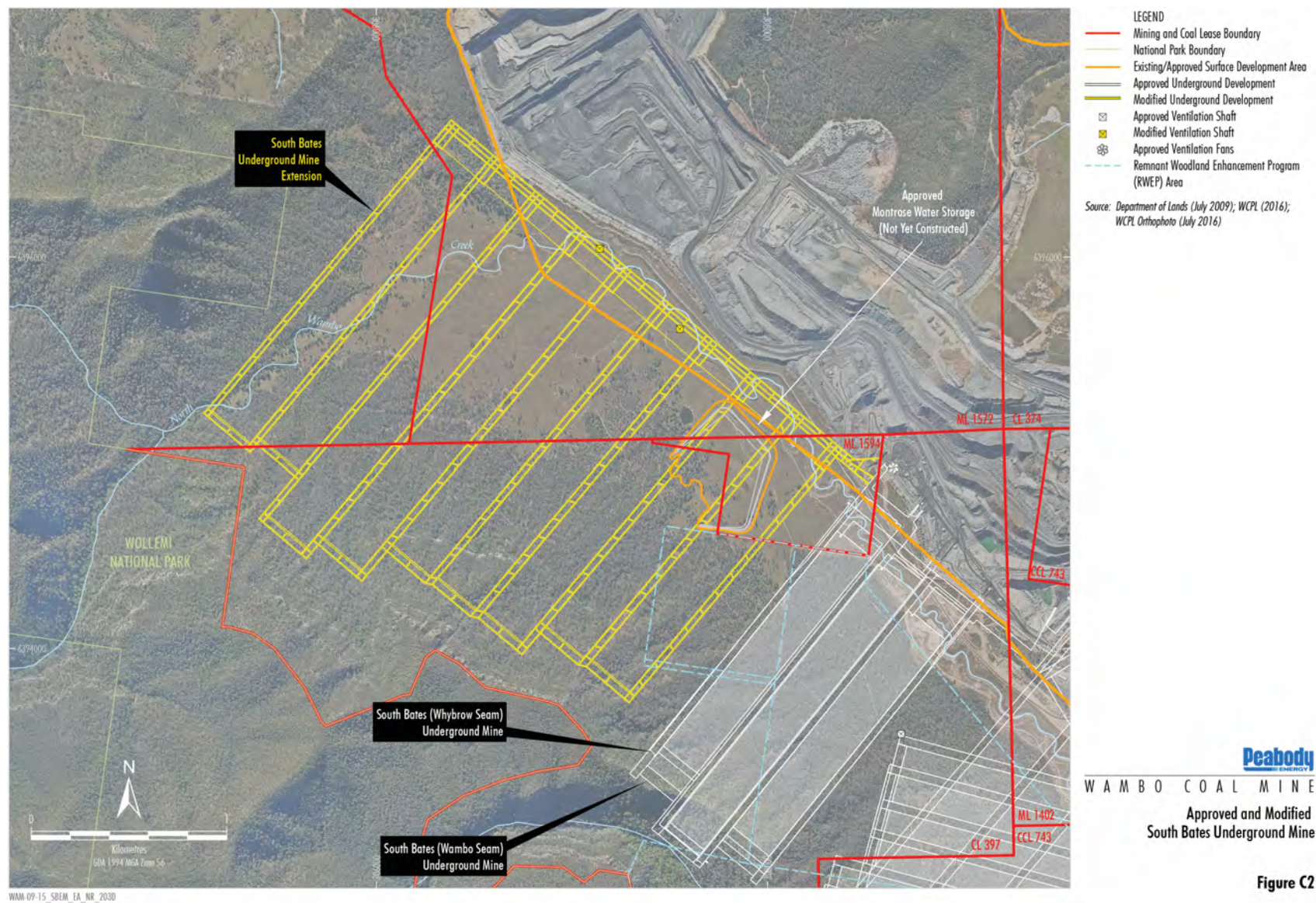
Figure B1

Appendix C2

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APPROVED AND MODIFIED SOUTH BATES UNDERGROUND MINE



COMPARATIVE MOBILE EQUIPMENT, FIXED PLANT AND TOTAL SOUND POWER LEVELS

Description	Equipment	Type/ Capacity	Year 2019 JV Project plus Wambo CHPP plus Modification 12 (Year 2019) and without the Modification				Year 2019 JV Project plus Wambo CHPP plus less Modification 12 (Year 2019 plus the Modification				Year 2023 JV Project plus Wambo CHPP plus less Modification 12 (Year 2023) plus Modification 12 (Year 2019)				Year 2028 JV Project plus Wambo CHPP plus less Modification 12 (Year 2028) plus Modification 12 (Year 2023)				Year 2033 JV Project plus Wambo CHPP plus less Modification 12 (Year 2033) plus Modification 12 (Year 2028)			
			No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL
Wambo Open-Cut Operations	Excavators	PC5500 Excavator	2	122	-	125	2	122	-	125	0	0	-	-	0	0	-	-	0	0	-	-
		EX2500 Excavator	1	117	-	117	1	117	-	117	1	117	-	117	1	117	-	117	1	117	-	117
		EX5600 Excavator	0	0	-	-	0	0	-	-	1	119	-	119	1	119	-	119	2	119	-	122
	Haul Trucks	789D Truck	5	120	-	127	5	120	-	127	5	120	-	127	5	120	-	127	5	120	-	127
		793F Truck	7	121	-	129	7	121	-	129	6	121	-	129	6	121	-	129	8	121	-	130
	Dozers	CAT D10 Dozer	0	0	-	-	0	0	-	-	1	124	-	124	0	0	-	-	5	124	-	131
		CAT D11 Dozer	5	127	-	134	5	127	-	134	4	127	-	133	4	127	-	133	0	0	-	-
		Wheel dozer	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112
		Rehab Dozer	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127
		Prestrip Dozer	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127
	FEL	FEL	1	114	-	114	1	114	-	114	1	114	-	114	1	114	-	114	1	114	-	114
	Graders	24M Grader	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111
		16M Grader	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111
	Water Trucks	Water Cart	1	115	-	115	1	115	-	115	1	115	-	115	1	115	-	115	1	115	-	115
	Service Trucks	Service Truck	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112
	Blast Hole Drills	Drill Rig	2	114	-	117	2	114	-	117	1	114	-	114	1	114	-	114	2	114	-	117
Subtotal Wambo Open-Cut			32	-	-	137	32	-	-	137	29	-	-	137	28	-	-	137	33	-	-	136
United Open-Cut Operations	Excavators	EX2500 Excavator	2	117	-	120	2	117	-	120	2	117	-	120	2	117	-	120	2	117	-	120
		EX5600 Excavator	3	119	-	124	3	119	-	124	3	119	-	124	3	119	-	124	2	119	-	122
	Haul Trucks	789D Truck	8	120	-	129	8	120	-	129	8	120	-	129	9	120	-	130	9	120	-	130
		930E Truck	10	128	-	138	10	128	-	138	5	128	-	135	0	0	-	-	0	0	-	-
		793F Truck	7	121	-	129	3	121	-	126	12	121	-	132	13	121	-	132	9	121	-	130
	Dozers	CAT D10 Dozer	10	124	-	134	10	124	-	134	7	124	-	132	8	124	-	133	7	124	-	132
		Wheel dozer	2	112	-	115	2	112	-	115	2	112	-	115	2	112	-	115	2	112	-	115
		Rehab Dozer	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127
		Prestrip Dozer	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127	0	0	-	0
	Graders	24M Grader	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111
		16M Grader	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111
	Water Trucks	Water Cart	3	115	-	120	3	115	-	120	3	115	-	120	3	115	-	120	3	115	-	120
	Service Trucks	Service Truck	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112
	Blast Hole Drills	Drill Rig	3	114	-	119	3	114	-	119	3	114	-	119	3	114	-	119	2	114	-	117
Subtotal United Open-Cut			55	-	-	141	51	-	-	141	52	-	-	139	50	-	-	138	41	-	-	137

COMPARATIVE MOBILE EQUIPMENT, FIXED PLANT AND TOTAL SOUND POWER LEVELS

Description	Equipment	Type/ Capacity	Year 2019 JV Project plus Wambo CHPP plus Modification 12 (Year 2019) and without the Modification				Year 2019 JV Project plus Wambo CHPP plus less Modification 12 (Year 2019 plus the Modification				Year 2023 JV Project plus Wambo CHPP plus less Modification 12 (Year 2023) plus Modification 12 (Year 2019)				Year 2028 JV Project plus Wambo CHPP plus less Modification 12 (Year 2028) plus Modification 12 (Year 2023)				Year 2033 JV Project plus Wambo CHPP plus less Modification 12 (Year 2033) plus Modification 12 (Year 2028)			
			No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL
Wambo Coal Handling and Preparation Plant (CHPP)	ROM Hopper	United/Montrose ROM Hopper	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111	1	111	-	111
	ROM Conveyor 1	ROM Conveyor 1	1	84	-	84	1	84	-	84	1	84	-	84	1	84	-	84	1	84	-	84
	ROM Conveyor 1 - Transfer Tower	ROM Conveyor 1 - TT	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112	1	112	-	112
	ROM Bin	ROM Bin	1	89	-	89	1	89	-	89	1	89	-	89	1	89	-	89	1	89	-	89
	Reject Conveyor	Reject Conveyor	1	84	-	84	1	84	-	84	1	84	-	84	1	84	-	84	1	84	-	84
	CHPP Building Operating	CHPP Building Operating	1	113	-	113	1	113	-	113	1	113	-	113	1	113	-	113	1	113	-	113
	Reject Bin	Reject Bin	1	89	-	89	1	89	-	89	1	89	-	89	1	89	-	89	1	89	-	89
	Clean Coal Conveyor 1	Clean Coal Conveyor 1	1	87	-	87	1	87	-	87	1	87	-	87	1	87	-	87	1	87	-	87
	Clean Coal Conveyor 1 - Transfer Tower	Clean Coal Conveyor 1 - TT	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109
	Clean Coal Conveyor 2	Clean Coal Conveyor 2	1	87	-	87	1	87	-	87	1	87	-	87	1	87	-	87	1	87	-	87
	Clean Coal Conveyor 2 - Transfer Tower	Clean Coal Conveyor 2 - TT	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109
	Clean Coal Conveyor 3	Clean Coal Conveyor 3	1	88	-	88	1	88	-	88	1	88	-	88	1	88	-	88	1	88	-	88
	Clean Coal Conveyor 4	Clean Coal Conveyor 4	1	88	-	88	1	88	-	88	1	88	-	88	1	88	-	88	1	88	-	88
	Clean Coal Conveyor 4 - Transfer Tower	Clean Coal Conveyor 4 - TT	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109
	Clean Coal Conveyor 5	Clean Coal Conveyor 5	1	97	-	97	1	97	-	97	1	97	-	97	1	97	-	97	1	97	-	97
	Clean Coal Conveyor 5 - Transfer Tower	Clean Coal Conveyor 5 - TT	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109	1	109	-	109
	Product Bin	Product Bin	1	89	-	89	1	89	-	89	1	89	-	89	1	89	-	89	1	89	-	89
	Clean Coal Conveyor 5 - Drive	Clean Coal Conveyor 5 - Drive	1	113	-	113	1	113	-	113	1	113	-	113	1	113	-	113	1	113	-	113
	Dozer Product Coal	Dozer Product Coal	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127	2	124	-	127
Train Loading	Train Loading	1	114	-	114	1	114	-	114	1	114	-	114	1	114	-	114	1	114	-	114	
Subtotal Wambo Coal Handling and Preparation Plant (CHPP)			21	-	-	128	21	-	-	128	21	-	-	128	21	-	-	128	21	-	-	128
South Wambo Underground Mine (Woodlands Hill and Arrowfield Seams)	Shaft Fan	Fan 1	1	114	-	114	-	-	-	-	1	114	-	114	1	114	-	114	1	114	-	114
		Fan 2	0	0	-	-	-	-	-	-	0	0	-	-	1	114	-	114	1	114	-	114
		Fan 3	0	0	-	-	-	-	-	-	0	0	-	-	0	0	-	-	1	114	-	114
	Bleeder Fan	Bleeder 1	0	0	-	-	-	-	-	-	0	0	-	-	1	126	-	126	1	126	-	126
		Bleeder 2	0	0	-	-	-	-	-	-	0	0	-	-	0	0	-	-	1	126	-	126
	Compressor	Compressor House	1	99	-	99	-	-	-	-	1	99	-	99	1	99	-	99	1	99	-	99
	Transfer Tower	Transfer Tower 1	1	109	-	109	-	-	-	-	1	109	-	109	1	109	-	109	1	109	-	109
		Transfer Tower 2	1	105	-	105	-	-	-	-	1	105	-	105	1	105	-	105	1	105	-	105
	Pit Conveyor	Pit Conveyor	1	112	114	113	-	-	-	-	1	112	114	113	1	112	114	113	1	112	114	113
		Pit Conveyor - Drive	1	98	-	98					1	98	-	98	1	98	-	98	1	98	-	98
	Ramp Conveyor	Ramp Conveyor	1	112	733	121	-	-	-	-	1	112	733	121	1	112	733	121	1	112	733	121
		Ramp Conveyor - Drives	3	103	-	108					3	103	-	108	3	103	-	108	3	103	-	108
	FEL	Stockpile FEL	1	113	-	113	-	-	-	-	1	113	-	113	1	113	-	113	1	113	-	113
	Haul Trucks	Truck 1 CAT 789	1	115	-	115	-	-	-	-	1	115	-	115	1	115	-	115	1	115	-	115
Truck 2 CAT 789		1	115	-	115	-	-	-	-	1	115	-	115	1	115	-	115	1	115	-	115	
Subtotal South Wambo Underground Mine			13	-	-	124	0	-	-	0	13	-	-	124	15	-	-	128	17	-	-	130

COMPARATIVE MOBILE EQUIPMENT, FIXED PLANT AND TOTAL SOUND POWER LEVELS

Description	Equipment	Type/ Capacity	Year 2019 JV Project plus Wambo CHPP plus Modification 12 (Year 2019) and without the Modification				Year 2019 JV Project plus Wambo CHPP plus less Modification 12 (Year 2019 plus the Modification				Year 2023 JV Project plus Wambo CHPP plus less Modification 12 (Year 2023) plus Modification 12 (Year 2019)				Year 2028 JV Project plus Wambo CHPP plus less Modification 12 (Year 2028) plus Modification 12 (Year 2023)				Year 2033 JV Project plus Wambo CHPP plus less Modification 12 (Year 2033) plus Modification 12 (Year 2028)			
			No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL	No. Items	SWL per Item or SWL/100m	Length	Total SWL
South Bates Underground Mine	Drift Conveyor (S6)	Conveyor Drive (P) 350 kW	-	-	-	-	1	101	-	101	-	-	-	-	-	-	-	-	-	-	-	-
		Conveyor Drive (S) 350 kW	-	-	-	-	1	101	-	101	-	-	-	-	-	-	-	-	-	-	-	-
		Conveyor (Underground)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	ROM Coal Conveyor (S2)	Conveyor Drive (P) 600kW	-	-	-	-	1	103	-	103	-	-	-	-	-	-	-	-	-	-	-	-
		Conveyor (686 m)	-	-	-	-	1	110	686m	118	-	-	-	-	-	-	-	-	-	-	-	-
		Conveyor Extension (220m)	-	-	-	-	1	110	220m	113	-	-	-	-	-	-	-	-	-	-	-	-
		Transfer Tower	-	-	-	-	1	109	-	109	-	-	-	-	-	-	-	-	-	-	-	-
	Temporary Plant	Auxiliary Fan on surface	-	-	-	-	1	114	-	114	-	-	-	-	-	-	-	-	-	-	-	-
		Feeder breaker on Surface	-	-	-	-	1	113	-	113	-	-	-	-	-	-	-	-	-	-	-	-
	Ventilation System	Existing Fan	-	-	-	-	1	128	-	128												
		Shaft No 1 Upcast Fan	-	-	-	-	1	128	-	128	-	-	-	-	-	-	-	-	-	-	-	-
		Shaft No.2 Downcast	-	-	-	-	1	104	-	104	-	-	-	-	-	-	-	-	-	-	-	-
	FEL	Stockpile FEL CAT992 (23t)	-	-	-	-	1	121	-	121	-	-	-	-	-	-	-	-	-	-	-	-
	Haul Trucks	CAT 789 Trucks	-	-	-	-	4	123	-	129	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal South Bates Underground Mine			0	-	-	0	16	-	-	134	0	-	-	0	0	-	-	0	0	-	-	0
TOTAL SWL - JV Project plus Harmonisation Modification plus Underground Operations			121	-	-	143	120	-	-	143	115	-	-	142	114	-	-	141	112	-	-	140