APPENDIX B

NOISE IMPACT ASSESSMENT

ACOUSTICS AND AIR

BOGGABRI COAL PROJECT MODIFICATION

NOISE IMPACT ASSESSMENT

REPORT NO. 12083
VERSION G

PREPARED FOR

BOGGABRI COAL PTY LIMITED

WILKINSON MURRAY

DOCUMENT CONTROL

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

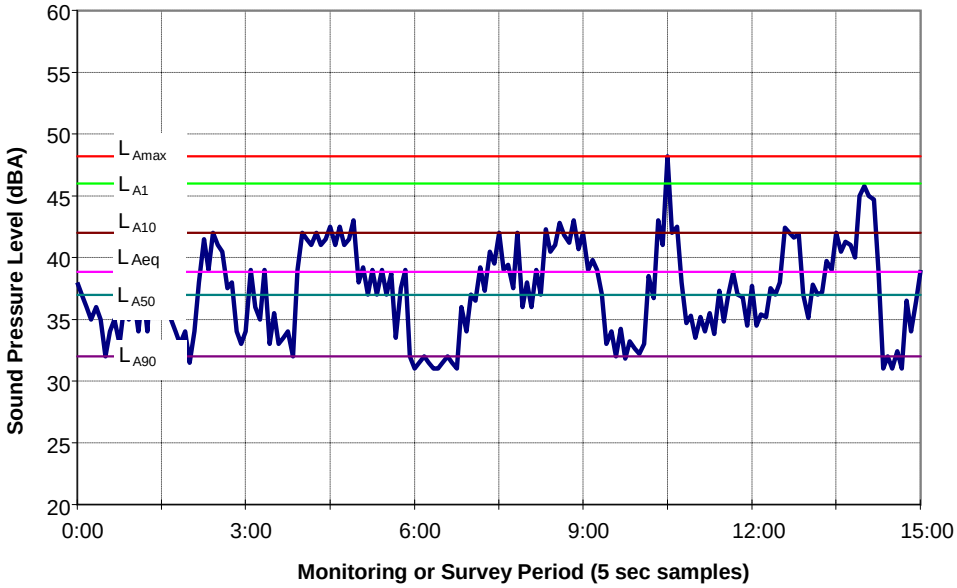
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

This report has been prepared for Boggabri Coal Pty Limited (BCPL). It investigates potential noise impacts associated with the Boggabri Coal Project Modification (the Modification). The Modification involves the receipt, processing and transportation of coal from the Tarrawonga Coal Project at the Boggabri Infrastructure Facilities. These activities were not included in the Continuation of Boggabri Coal Mine Environmental Assessment (Boggabri EA); however, they were assessed as part of the Tarrawonga Coal Project Environmental Assessment (Tarrawonga EA).

2 MODIFICATION DESCRIPTION & SUMMARY OF KEY CHANGES

The Boggabri Coal Mine is located approximately 15 kilometres northeast of Boggabri in the northwest region of New South Wales (NSW). The Boggabri Coal Mine is operated by Boggabri Coal Pty Limited (Boggabri Coal), a wholly owned subsidiary of Idemitsu Australia Resources Pty Limited.

In 2009, Boggabri Coal applied for Project Approval for the Boggabri Coal Project, which was supported by the Boggabri EA (dated December 2010). The Boggabri Coal Project includes upgrades to the Boggabri Infrastructure Facilities, including the construction and use of a coal handling and processing plant (CHPP), by-pass crusher, associated coal stockpiles and private rail loop and spur.

In July 2012, Project Approval was granted for the Boggabri Coal Project by the Planning Assessment Commission (PAC) of NSW under delegation from the NSW Minister for Planning and Infrastructure pursuant to section 75J of the *Environmental Planning and Assessment Act, 1979* (EP&A Act). Under Project Approval 09_0182, the Boggabri Coal Mine is approved to extract up to 8.6 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and transport up to 7 Mtpa of product coal from the site until 31 December 2033.

The adjacent Tarrawonga Coal Mine is owned and operated by Tarrawonga Coal Pty Ltd (TCPL). In March 2011, TCPL submitted a Project Application and Environmental Assessment (Tarrawonga EA) to the DP&I seeking approval under Part 3A of the EP&A Act (Project Application No. 11_0047) for the Tarrawonga Coal Project. A key component of the Tarrawonga Coal Project is the construction and use of a services corridor (including a haul road) linking it to the Boggabri Infrastructure Facilities. Coal trucks would use the services corridor to access the Boggabri Infrastructure Facilities. At these facilities, up to 3 Mtpa of coal from the Tarrawonga Coal Project would be processed and loaded onto trains for off-site transport.

In January 2013, Project Approval (11_0047) was granted for the Tarrawonga Coal Project by the PAC under delegation from the NSW Minister for Planning and Infrastructure pursuant to section 75J of the EP&A Act.

The Boggabri EA did not include consideration of the receipt, processing and transportation of coal from the Tarrawonga Coal Project. As such, a modification to the Project Approval (09_0182) for the Boggabri Coal Project is required (the Modification).

The Tarrawonga EA included an assessment of the potential noise impacts associated with the handling and processing of Tarrawonga coal at the Boggabri Infrastructure Facilities.

3 PREVIOUS NOISE ASSESSMENTS

3.1 Continuation of Boggabri Coal Mine Noise Assessment

The assessment of the potential for noise impacts to residences resulting from all activities proposed in the Boggabri EA has been addressed in ***Boggabri Coal Pty Limited Acoustic Impact Assessment – Continuation of Boggabri Coal Mine Environmental Assessment*** by Bridges Acoustics (12 October 2010). In summary, the elements of that report most relevant to the assessment of noise impacts from the Modification are:

- Section 4.2.3 – Meteorological conditions adopted in noise modelling
- Section 4.5 (Tables 7A & 7B) – Predicted total noise levels from Boggabri operations
- Section 4.7 – Discussion of noise impacts from the option to transport coal off-site by rail, rather than by truck.

Operational noise modelling for the Boggabri Coal Project was conducted for years 1, 5, 10 and 21. The modelling indicated that over the 21 year mine life, some privately-owned receivers may experience operational noise levels above the relevant impact assessment criteria.

These impacts were assessed and approved by the Planning Assessment Commission (PAC) subject to the Boggabri Coal Project being managed in accordance with the relevant conditions of Schedule 3 of Project Approval (09_0182).

3.2 Tarrawonga Coal Project Noise Assessment

The assessment of the potential for noise impacts from the Tarrawonga Coal Project has been addressed in ***Tarrawonga Coal Project Environmental Assessment – Noise and Blasting Impact Assessment*** (Wilkinson Murray, November 2011). This report assessed:

- Operational noise associated with the Tarrawonga Coal Project, including the handling, processing and transportation of coal at the upgraded Boggabri Coal Mine Infrastructure Facilities.
- Cumulative impacts associated with the concurrent operation of the Tarrawonga Coal Project (including activities associated with the Modification), Boggabri Coal Project and Maules Creek Coal Project.
- Rail noise associated with existing rail movements, plus proposed rail movements associated with the Tarrawonga Coal Project, Boggabri Coal Project and Maules Creek Coal Project.

Operational noise modelling for the Tarrawonga Coal Project was conducted for years 2, 4, 6 and 16. The assessment concluded that operational noise from the Project (excluding plant associated with the Modification) would exceed relevant noise criteria at three privately-owned residences.

Cumulative noise levels from the Tarrawonga Coal Project (including those activities associated with the Modification), Boggabri Coal Project and Maules Creek Coal Project were predicted to exceed the cumulative noise criteria at two privately-owned receivers.

The assessment of potential noise impacts associated with the transportation by rail of Tarrawonga coal from the Boggabri Infrastructure Facilities concluded that potential increases in rail noise on the Werris Creek Mungindi Railway (between the Boggabri rail spur and Werris Creek) would be minor (i.e. less than 2 dBA), and that the distance from the rail line at which the relevant Australian Rail Track Corporation (ARTC) and NSW Office of Environment and Heritage (OEH) rail noise criteria would be met would increase by a negligible 2 m.

4 KEY CHANGES ASSOCIATED WITH THE MODIFICATION

The following additional plant would be required at the Boggabri Infrastructure Facility for the handling, processing and transportation of Tarrawonga coal:

- 1x Idling Coal Train (including three locomotive engines of the same train);
- 1x Loader (CAT IT38G or Komatsu WA900 or equivalent);
- 1x Dozer (D10R);
- 1x Primary Crusher;
- 2x Coal Rehandling Trucks (CAT 777 or equivalent).

With the exception of the two coal rehandling trucks, this additional plant was considered in the Tarrawonga EA Noise Assessment. The inclusion of the two coal rehandling trucks is discussed further in Section 5.2.

In comparison, the Boggabri Coal Project would require approximately 95 plant items during peak production (i.e. year 5), including haul trucks, excavators and dozers. The total sound power level (SWL) of plant required for year 5 of the Boggabri Coal Project is estimated to be 137.2 $dBAL_{Aeq}$.

The addition of the plant listed above for the Modification would result in a negligible increase to the total sound power level of all plant at the Boggabri Coal Mine (i.e. an increase of approximately 0.1 $dBAL_{Aeq}$) (Table 1).

Notwithstanding, potential noise impacts at sensitive receivers are affected by the proximity of individual plant to the receiver and prevailing weather conditions. As such the addition of the plant required for the Modification at the Boggabri Infrastructure Facilities has the potential to alter the following elements of the Boggabri EA Noise Assessment (the relevant section of which is indicated in brackets):

- Prediction of Operational Noise impacts (Section 4.5).
- Prediction of Rail Traffic Noise (on public sections of track) (Section 4.11).
- Prediction of Cumulative Noise Impacts (Section 4.14).

An assessment of the potential noise impacts at privately-owned receivers associated with the Modification is provided in Section 5 below.

Table 1 Sound Power Level Comparison for the Boggabri Coal Project and the Modification

	Plant Item	No. of Plant	Sound Power Level L_{Aeq} (dBA)
Boggabri Coal Project Plant	Cpp, Preparation plant	1	115.9
	FB, ROM feeder breaker	1	109.3
	Sk, Stacker tripper/chute	1	104
	Tr, Transfer station	1	103.4
	B, Truck or train loading bin	1	102.8
	Train (50km/hr) #	1	126
	S, Rope Shovel	1	118.2
	Dr, Drill	8	116.9
	Dz, Dozer	19	115.7
	E, Excavator	6	120.2
	L, Loader	3	117
	G, Grader	6	115.2
	W, Water cart	5	117.2
	Tf, Truck (flat ground)	18	116.8
	Tu, Truck (uphill)	18	119.4
Subtotal (Boggabri Coal Project only)			***137.2***
Modification Plant	Locomotive (idling)	3	97
	Loader	1	117
	Dozer	1	116
	Primary Crusher	1	113
	Coal Rehandling Truck	2	108
Total (Boggabri Coal Project plus Modification)			***137.3***

5 CHANGES IN PREDICTED NOISE IMPACTS

5.1 Changes to the Prediction of Operational Noise Impacts

The Boggabri EA Noise Assessment details the worst case operational noise levels predicted from the Boggabri Coal Project operations under the truck haulage – rather than rail haulage – scenario. These predictions are based on the prevailing regional meteorological conditions (2m/s northerly and southerly winds in combination with a 3°C/100m temperature inversion).

Wilkinson Murray predicted total mining operational noise levels of the Modification (Boggabri Coal Project plus additional plant required at the Boggabri Infrastructure Facility [refer: Section 4]) based on the noise model developed for the Tarrawonga EA Noise Assessment. The modelling software (Environmental Noise Model, ENM) and model parameters (e.g. range of prevailing meteorological conditions) were held consistent across both models.

In contrast to the Boggabri EA Noise Assessment, however, the noise assessment of the Modification was based on coal being transported to the main railway line via the private rail spur, rather than by haul truck. Noise prediction data for the associated rail spur operations was provided by Bridges Acoustics and is presented in Table 2.

Table 2 below presents the typical worst case noise levels predicted at privately-owned receivers located in close proximity to the Boggabri Infrastructure Facilities, for:

- only the items of plant required for the Modification; and
- the Boggabri Coal Project (as predicted in the Boggabri EA [adjusted for off-site transportation of coal by rail]) plus the addition of the items of plant required for the Modification.

Table 2 also presents the incremental increase in predicted worst case operational noise levels from the Boggabri Coal Mine resulting from the Modification.

It can be seen that the worst case incremental increase in the total noise levels predicted in the Boggabri EA Noise Assessment is limited to a negligible 0.2 dB for the closest privately-owned receivers to the Boggabri Infrastructure Facilities. This represents an insignificant change in the predictions of operational noise presented in the Boggabri EA Noise Assessment. Based on the results in Table 2, the Modification would not result in any change to the results and conclusions regarding operational noise impacts presented in the Boggabri EA Noise Assessment.

The noise impacts presented in the Boggabri EA Noise Assessment were assessed and approved by the PAC subject to the Boggabri Coal Project being managed in accordance with the relevant conditions of Schedule 3 of Project Approval (09_0182). These conditions include property acquisition rights, or the right to request noise mitigation measures (e.g. double glazing), for all privately-owned receivers predicted to be exposed to operational noise levels above 35 dBA $L_{Aeq(15\ minute)}$.

Table 2 Assessment of Incremental Increase in Operational Noise levels Predicted in Boggabri Coal Noise Impact Assessment due to Boggabri Modification

Receivers		Continuation of Boggabri Coal Mine Predicted Noise Levels[1] ($L_{Aeq,15\ minute}$)						Predicted Noise Levels from the Modification Plant only ($L_{Aeq,15\ minute}$)[2]		Predicted Noise Levels – Continuation of Boggabri Coal Mine plus Modification ($L_{Aeq,15\ minute}$)		Max. Increment in Noise Levels due to the Modification (dB)	
ID[3]	Property Name	Worst Case Predictions (coal haulage via private haul road)		Noise Contribution of Rail Haul (only) & Road Haul (only)		Amended Worst Case Predictions (coal haulage via private rail spur)[4]		Worst Case Predictions					
		Day	Eve / Night	Rail Only	Road Only	Day	Eve / Night	Day	Eve / Night	Day	Eve / Night	Day	Eve / Night
23	Gooboobindi	33.8	37.0	38.5	34.6	38.2	39.6	1.4	10	38.2	39.6	0.0	0.0
27	Gooboobindi	35.9	37.5	38.4	36.1	38.3	39.3	0.6	8.9	38.3	39.3	0.0	0.0
32	Billabong	30.5	36.0	31.9	30.9	31.6	36.3	4.1	19.3	31.6	36.4	0.0	0.1
33	Brighton	27.4	35.0	27.7	27.5	27.6	35.0	6.0	19.1	27.6	35.1	0.0	0.1
43	Roma	31.0	37.4	31.6	31.1	31.5	37.5	5.0	23.5	31.5	37.7	0.0	0.2
44	Glenhope	29.8	36.5	30.3	29.8	30.3	36.6	3.0	22.0	30.3	36.8	0.0	0.2
52	Jeralong	28.9	40.5	25.2	26.0	28.5	40.5	12.5	28.3	28.6	40.7	0.1	0.2
54	Tarrawonga	30.5	42.0	21.3	24.1	30.0	42.0	12.7	30.1	30.1	42.2	0.1	0.2
68	Goonbri (north)	33.4	39.5	10.7	13.4	33.4	39.5	11.6	20.7	33.4	39.6	0.0	0.1
79	Northam	25.6	36.2	21.3	22.3	25.2	36.2	5.5	21.8	25.2	36.3	0.0	0.1
86	Kyalla	25.0	37.7	17.1	19.6	24.4	37.7	6.5	23.5	24.5	37.8	0.1	0.1
90	Barbers Lagoon	26.9	35.8	23.6	23.9	26.8	35.8	8.5	23.5	26.8	36.0	0.0	0.2

[1] Source: Boggabri Coal Acoustic Impact Assessment (Bridges Acoustics – 12 October 2010).
[2] Worst case noise predictions based on all meteorological conditions presented in Boggabri EA Noise Assessment (Bridges Acoustics – 12 October 2010).
[3] ID labelling consistent with Boggabri EA. Refer to Appendix A for locations.
[4] Noise levels calculated for each receiver based on "Worst Case Predictions (coal haul via private haul road)" minus "Road Only" plus "Rail Only" (note: logarithmic addition/subtraction).

5.2 Changes to the Prediction of Cumulative Noise Impacts

The Tarrawonga EA Noise Assessment (Wilkinson Murray, 2011) assessed cumulative noise impacts from the concurrent operation of the Tarrawonga Coal Project, Boggabri Coal Mines and Maules Creek Coal Project. The cumulative noise assessment presented in Table 6-5 of the Tarrawonga EA Noise Assessment included the noise from 6 of the 8 plant proposed for the Modification (Section 4.0) – only the two coal rehandling trucks were not included, as they were not proposed at the time of the 2011 assessment.

Additional noise modelling conducted for the Modification, which included the two coal rehandling trucks, demonstrated that the Modification would not change the results of the cumulative noise assessment conducted for the Tarrawonga EA.

On this basis, the cumulative noise assessment for the Modification would be consistent with results of the cumulative noise assessment conducted for the Tarrawonga EA, which concluded that (Wilkinson Murray, 2011):

- *cumulative noise levels resulting from the concurrent operation of the Project and the adjacent Boggabri Coal Continuation and Maules Creek Coal Projects would comply with the night-time recommended maximum amenity criterion (45 dBA) at all receivers and with the night-time recommended acceptable amenity criterion (40 dBA) for all but two privately-owned receivers. Exceedance of this criterion would likely occur at receiver 43* [Boggabri ID 52] *(1 dB exceedance) and receiver 45* [Boggabri ID 54] *(5 dB exceedance).*
- *Receivers 43 and 45* [Boggabri ID's 52 and 54] *are identified as falling within the Project's Noise Affectation Zone and are also within the Boggabri Coal Continuation Project's Noise Affectation Zone.*

5.3 Changes to the Prediction of Noise from Rail Traffic (on Public Track)

The Modification would generate at most, an additional four rail movements per day along the Werris Creek Mungindi Railway and Main Northern rail line to the Port of Newcastle. These rail movements would be associated with the transportation of Tarrawonga coal from the Boggabri Coal Mine via the private Boggabri rail spur.

An assessment of rail noise associated with these rail movements along the Werris Creek Mungindi Railway between the private Boggabri rail spur and Werris Creek was undertaken in the Tarrawonga EA Noise Assessment. The assessment included existing rail movements (e.g. from existing coal mines, passenger trains and other freight trains) and proposed rail movements (e.g. from the Boggabri Coal Project and Maules Creek Coal Project).

Beyond Werris Creek, rail movements associated with the Modification would represent less than 10% of total rail movements, and therefore, in accordance with OEH requirements for the geographic extent of rail noise assessment for rail traffic generating development, rail noise impacts associated with the Modification have not been assessed beyond Werris Creek.

The ARTC operates the Werris Creek Mungindi Railway. The ARTC's Environment Protection Licence 3142 details rail noise goals. In addition, the OEH's "Environment Assessment Requirements for Rail Traffic – Generating Developments" details rail noise criteria.

The relevant rail noise goals/criteria are for the Modification is as follows:

- ARTC rail noise goals:
    - $L_{Aeq,9\ hour}$ = 60 dBA;
    - $L_{Aeq,15\ hour}$ = 65 dBA; and
    - L_{Amax} = 85 dBA.
- OEH rail noise criteria:
    - $L_{Aeq,24\ hour}$ 60 dBA; and
    - Maximum Pass-by L_{Amax} (95th percentile) 85 dBA.

Consistent with the conclusions and results of the Tarrawonga EA Noise Assessment, rail movements associated with the Modification would result in the following potential rail noise impacts:

- The maximum increase in distance from the track to meet the ARTC criteria as a result of the Modification rail movements, compared with the existing/approved plus proposed movements, would be 1 m for daytime operations and 2 m for operations at night.
- The maximum increase in distance from the track to meet the OEH criteria as a result of the Modification rail movements, compared with the existing/approved plus proposed movements, would be 2 m for 24 hour operations.
- There would be no change in the maximum passby noise.

6 CONCLUSION

This report assesses the potential noise impacts associated with the Modification. The Modification involves the receipt, processing and transportation of Tarrawonga coal at the Boggabri Infrastructure Facilities. These activities were not assessed in the Boggabri EA (although they were assessed as part of the Tarrawonga EA).

Only minor additional plant would be required for the Modification (i.e. for the handling, processing and transportation of Tarrawonga coal at the Boggabri Infrastructure Facilities). The increase in noise at any privately-owned receiver from this additional plant would be negligible in the context of the total level of operational noise predicted from the Boggabri Coal Project.

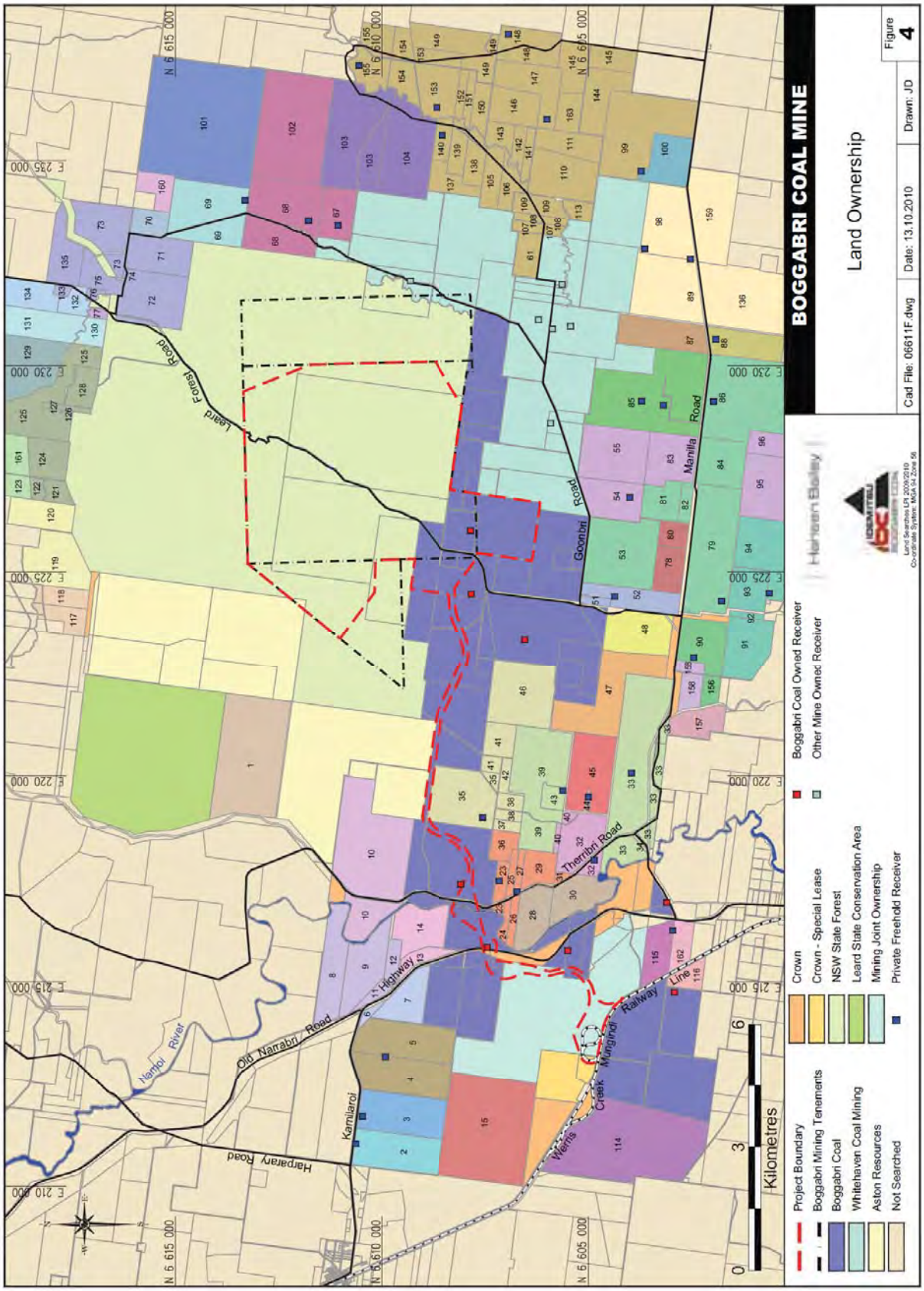
This assessment concludes that the Modification would not change the predicted noise impacts at privately-owned receivers that were reported in the Boggabri EA. The noise impacts predicted in the Boggabri EA have been assessed and approved by the PAC subject to the Boggabri Coal Project being managed in accordance with the relevant conditions of Schedule 3 of Project Approval (09_0182).

Noise impacts from the Boggabri Coal Mine will be managed using a best practice real-time noise monitoring system in accordance with the requirements of the Project Approval (09_0182) for the Boggabri Coal Project.

APPENDIX A

RECEIVER LOCATION PLANS FROM BOGGABRI & TARRAWONGA PROJECT APPROVALS

LAND OWNERSHIP



LAND OWNERSHIP PLAN