MANNERING COLLIERY – MODIFICATION 3
Environmental Assessment

3

Section 75W Modification to MP06_0311

Prepared for LakeCoal Pty Limited
June 2015

LakeCoal

EMM
EMGA Mitchell McLennan

Mannering Colliery - Modification 3

Environmental Assessment |Section 75W Modification to MP06_0311

Prepared for LakeCoal Pty Limited | 2 June 2015

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065

T+61 2 9493 9500
F+61 2 9493 9599
Einfo@emgamm.com

emgamm.com

Mannering Colliery - Modification 3

Final

Report J15017RP4 | Prepared for LakeCoal Pty Limited | 2 June 2015

Prepared by	**John Arnold**	Approved by	**Luke Stewart**
Position	Project manager	Position	Director
Signature		Signature	
Date	2 June 2015	Date	2 June 2015

Document Control

Version	Date	Prepared by	Reviewed by
V1	2 June 2015	John Arnold	Luke Stewart

EMM
EMGA Mitchell McLennan

T +61 (0)2 9493 9500 | F +61 (0)2 9493 9599

Ground Floor | Suite 01 | 20 Chandos Street | St Leonards | New South Wales | 2065 | Australia

emgamm.com

Executive Summary

Executive Summary

Executive Summary

ES1 Introduction

Mannering Colliery (MC) is an underground coal mine located on the southern end of Lake Macquarie approximately 60 kilometres (km) south of Newcastle (Figure E.1). Underground mining commenced at MC in 1960, and since that time has extracted coal from the Great Northern and Fassifern Seams using both the bord and pillar and longwall mining methods.

MC was granted major project approval (MP06_0311) on 12 March 2008, enabling the continued production of up to 1.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 31 March 2018. Coal from MC is transported via a dedicated overland conveyor to Delta Electricity's Vales Point Power Station (VPPS) for domestic energy generation.

This Environmental Assessment (EA) has been prepared to accompany an application to modify MP06_0311 under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to, amongst other things, permit an increase in the ROM coal handing and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa and operation until 30 June 2022 (the proposed modification).

MC is owned by Centennial Mannering Pty Limited, a wholly owned subsidiary of Centennial Coal Company (Centennial). Centennial is in turn a wholly owned subsidiary of Banpu Public Company Limited, which purchased Centennial in 2010. LakeCoal Pty Limited (LakeCoal) became the operator of MC effective 17 October 2013.

It is noted that an underground linkage within the Fassifern Seam is approved between MC and the adjacent Chain Valley Colliery (CVC). CVC operates under State significant development consent (SSD-5465) and is also operated by LakeCoal. A separate modification of SSD-5465 is being sought to, amongst other things, permit an increase in the maximum rate of ROM coal extraction at CVC from 1.5 Mtpa to 2.1 Mtpa. All production beyond the existing limit of 1.5 Mtpa will be sent via MC to VPPS.

MC's project approval boundary and CVC's development consent boundary are shown in Figure E.2.

This EA was prepared by EMGA Mitchell McLennan Pty Limited (EMM) on behalf of the proponent, LakeCoal.

ES2 Statutory approvals framework

MP06_0311 was granted under Part 3A of the EP&A Act. Part 3A was repealed by the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011* (Part 3A Repeal Act). However, transitional provisions were introduced enabling projects approved under Part 3A (transitional Part 3A projects) to continue to be subject to Part 3A of the EP&A Act. Therefore, MP06_0311 is a transitional Part 3A project and the proposed modification may be made under the now repealed Section 75W of the EP&A Act. Section 75W enables a proponent to request the Minister (or Planning Assessment Commission under delegation from the Minister) to modify a project approval granted under Part 3A.

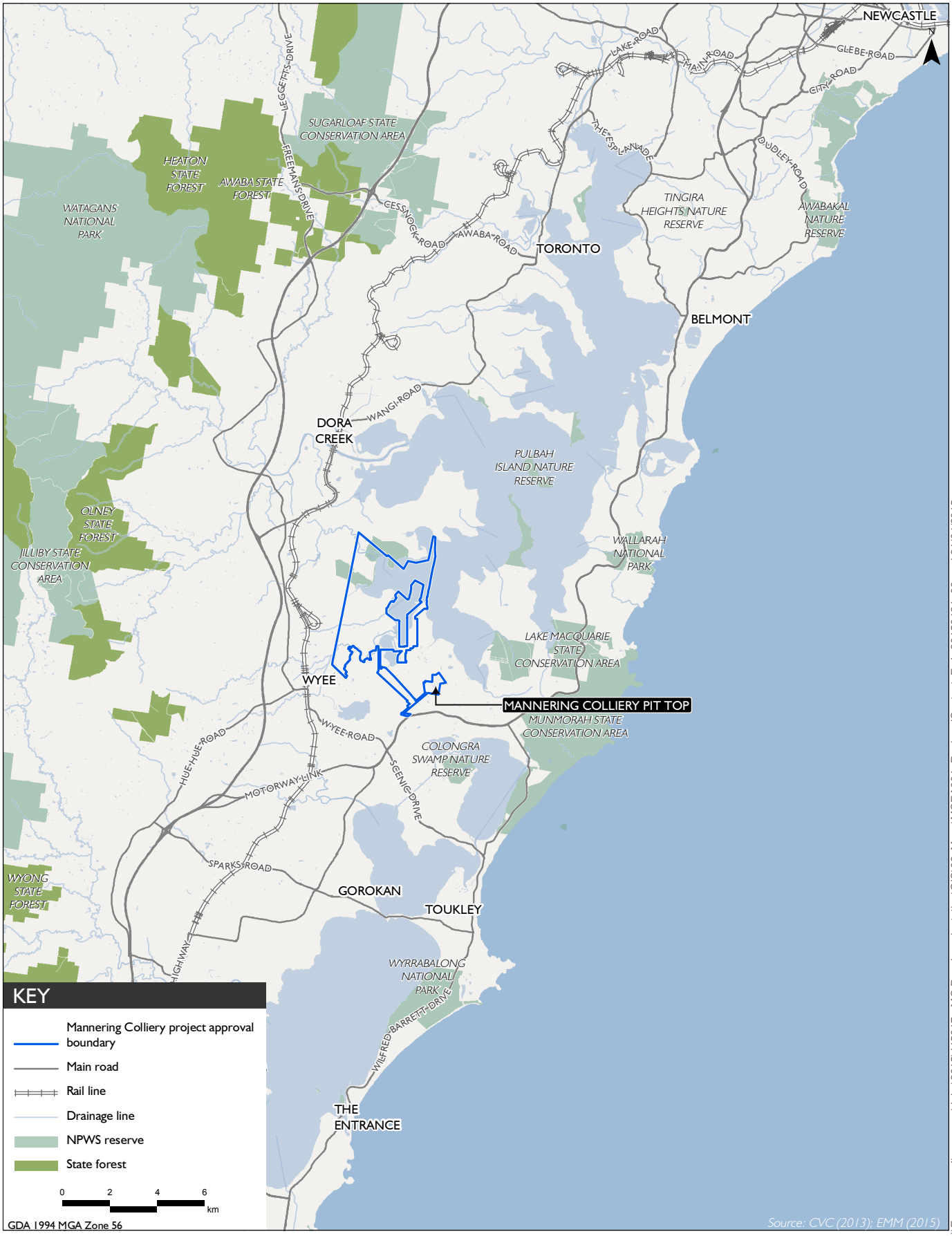
The proposed modification meets the relevant provisions of the following environmental planning instruments:

- State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007;
- State Environmental Planning Policy (Major Development) 2005;
- Wyong Local Environmental Plan 2013; and
- Lake Macquarie Local Environmental Plan 2013.

Consideration has been given to State and Commonwealth legislation relevant to the proposed modification. A variation will be required to MC's existing environment protection licence granted under the *Protection of the Environment Operations Act 1997* to allow for the proposed increase in coal throughput.

It is noted that the proposed modification will not involve any change to the previously approved underground mining at MC and there will be no change to existing surface facilities or infrastructure which have adequate capacity to accommodate the proposal. Therefore, the provisions of the *Mining Act 1992*, the *Work Health and Safety (Mines) Act 2013* and the *Mine Subsidence Compensation Act 1961* are not relevant to the activities associated with the proposed modification.

The proposed modification will not significantly impact threatened species, endangered populations, ecological communities and other matters listed under the *Fisheries Management Act 1994*, the State *Threatened Species Conservation Act 1995*, or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*. A bushfire hazard assessment has been undertaken to ensure that LakeCoal's responsibilities for the prevention and spread of bushfires under the *Rural Fires Act 1997* have been met.



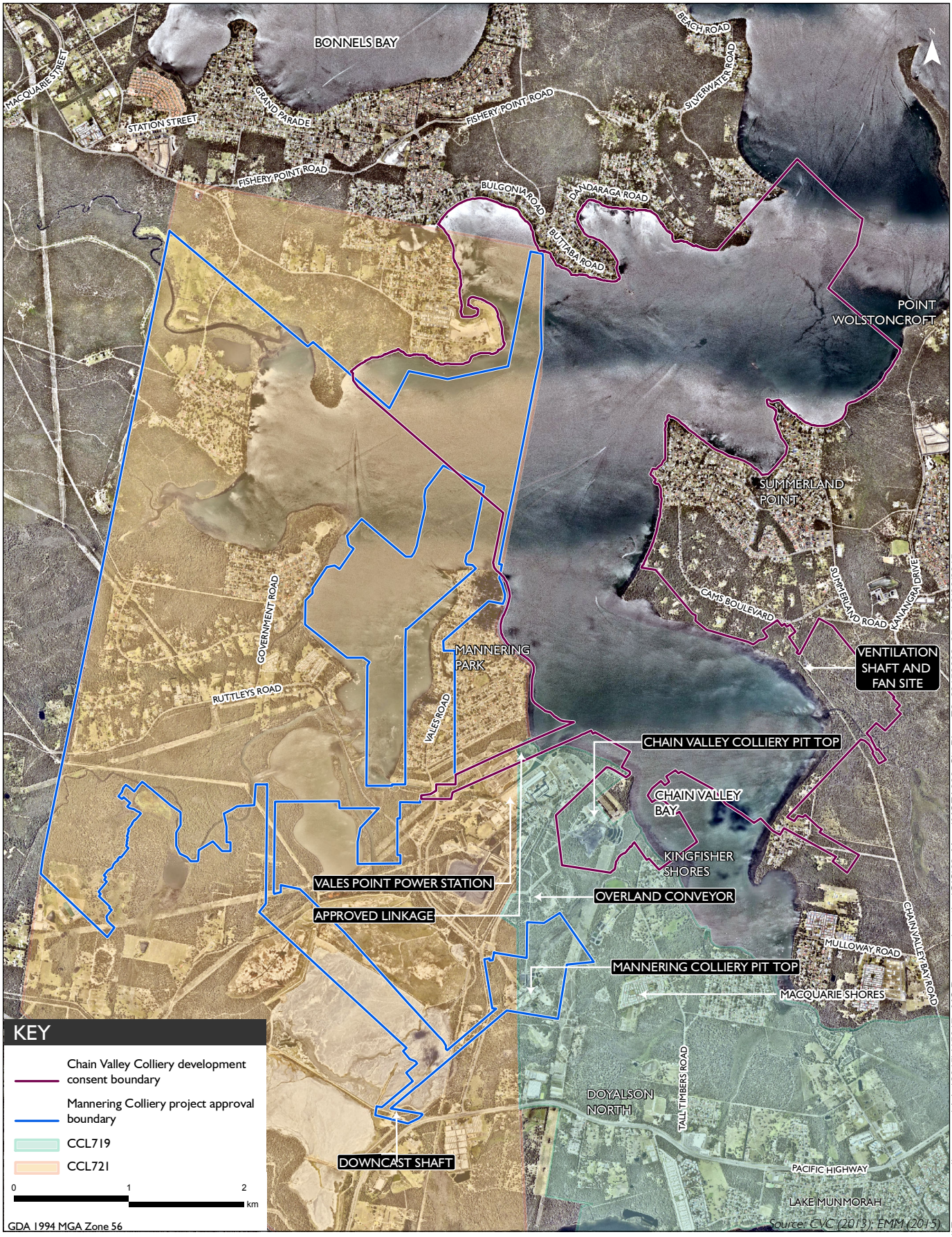
\\Emgammsvr1\emgammJobs\2015\J15017 - MC Panel reorientation\GIS\02_Maps\MCEA001_RegionalContext_E_1_20150421_03.mxd 21/04/2015

EMM
EMGA Mitchell McLennan

Regional context

Mannering Colliery – Modification 3

Figure E.1



EMM
EMGA Mitchell McLennan

Site plan

Mannering Colliery – Modification 3

Figure E.2

ES3 Existing operations

ES3.1 Mannering Colliery

MC's approved operations under MP06_0311 include:

- extraction of up to 1.1 Mtpa of ROM coal from the Fassifern Seam until 31 March 2018;
- first workings only using bord-and-pillar mining methods;
- supply of coal to Delta Electricity's VPPS for domestic energy generation via a dedicated covered overland conveyor;
- employment of 170 full time personnel; and
- operation 24 hours, seven days a week.

MC was placed on care and maintenance in November 2012. In 2013, the owners of MC and CVC entered into an agreement which enables LakeCoal to operate MC until 2022. LakeCoal became the operator of MC effective 17 October 2013.

ES3.2 Chain Valley Colliery

Given the interrelationship between MC and CVC, a brief overview of CVC is provided.

CVC is an underground coal mine located at the southern end of Lake Macquarie, adjacent to and north-east of MC. Underground mining has occurred at CVC since 1962 and, over that time, has used a combination of bord and pillar and miniwall mining methods. CVC has extracted coal from three seams – the Wallarah Seam, the Great Northern Seam and the Fassifern Seam, with current mining activities limited to the Fassifern Seam.

Development Consent SSD-5465 currently allows for underground miniwall mining in the Fassifern Seam at a maximum rate of production of 1.5 Mtpa of ROM coal. All secondary extraction is confined to areas under Lake Macquarie.

Transport of coal from CVC is currently undertaken by trucks with coal deliveries to VPPS transported by private road and coal deliveries to other domestic customers and for export transported by public roads. Once constructed, however, the approved underground linkage between MC and CVC and overland conveyor from MC to VPPS will preferentially be used for the transportation of coal from CVC to VPPS.

A modification of SSD-5465 is also being sought to, amongst other things, increase the maximum rate of ROM coal extraction at CVC from 1.5 Mtpa to 2.1 Mtpa and enable mine design changes, primarily the re-orientation of miniwall panels in CVC's northern mining area. All production beyond the existing limit of 1.5 Mtpa will be sent via MC to VPPS for the duration of the agreement between the owners of MC and CVC.

ES4 The proposed modification

ES4.1 Overview

LakeCoal is seeking approval to modify MP06_0311 under Section 75W of the EP&A Act to permit:

- an increase in the rate of ROM coal handling at, and transport from, MC from 1.1 Mtpa to a maximum of 1.3 Mtpa;
- an extension of the project approval period from 31 March 2018 to 30 June 2022; and
- minor vegetation clearing/disturbance adjacent to some infrastructure at MC's pit top to enable the extension/establishment of asset protection zones (APZs) for bushfire protection purposes.

There will be no changes to the surface infrastructure and no increase in approved employee numbers under the proposed modification. All of the increased coal throughput will be dispatched via the existing overland conveyor to VPPS with no change to surface coal handling activities or any other changes to the approved operations.

ES4.2 Need for the proposed modification

MC has approval to produce 1.1 Mtpa of ROM coal all of which is sold domestically to VPPS. The existing infrastructure at MC allows coal to be transported by overland conveyor to VPPS. Transport is approved to occur 24 hours a day, seven days a week.

MC has approval to operate until 31 March 2018, although it has been on care and maintenance since November 2012. In 2013 the owners of MC and CVC entered into an agreement which enables LakeCoal to operate MC until 30 June 2022. The proposed extension of the project approval period at MC aligns MC's approval with the current agreement with LakeCoal, thereby enabling LakeCoal to operate both collieries in a co-ordinated manner. The extension of project approval period also reflects, in part, the period MC has been on care and maintenance and provides adequate time for strategic planning and assessment of potential mining activities not approved under MP06_0311.

The increase in ROM coal handling and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa will enable all additional coal to be extracted under the proposed CVC modification (600,000 tonnes per annum (tpa)) to be efficiently transferred from CVC to VPPS via MC's conveyors for the duration of the agreement between the owners of MC and CVC. This would provide positive amenity outcomes by enabling the additional coal required at the VPPS to be transported via conveyor as opposed to haulage on internal roads with an attendant greater potential to generate noise and dust. It would also provide for continued operations and associated employment and expenditure beyond 2018 while also facilitating increased production and associated employment at CVC (approximately 60 additional full time jobs as per the current CVC modification).

The proposed extension/establishment of the APZs adjacent to some assets is an outcome of a bushfire management risk assessment and subsequent bushfire hazard assessment completed subsequent to the major bushfires in the immediate vicinity of MC's pit top and CVC's ventilation fan site at Summerland Point on 17 October 2013. Although only minor assets were damaged at MC during this bushfire, the subsequent assessments determined that some modifications to existing APZs, and the extension/establishment of new APZs, were required to afford an appropriate level of bushfire protection for both the employees and assets essential for the continued operation of MC.

ES4.3 Alternatives considered

A number of options were considered during project development as alternatives to the proposed modification. The two main options are outlined below.

1. Do nothing – this option was discounted as, if the proposed modification does not proceed, the only option to transport the additional 600,000 tpa of ROM coal proposed to be extracted at CVC to VPPS would be via the existing approved private haul roads. Consequently, the improved amenity outcomes, operational cost savings and employment benefits that can be achieved with little to no adverse environmental impact, would not be realised. Furthermore, the employment and flow on benefits from operating MC's infrastructure, which would be realised through the development and ongoing use of the underground linkage, would only be achieved to 2018, thereby missing the opportunity to extend these benefits until at least the 30 June 2022.

2. Increase or reduce the limit of ROM coal handling and transport - the proposal to increase the amount of coal handling and transport by 200,000 tpa from 1.1 Mtpa to 1.3 Mtpa has been carefully considered and reflects the foreseeable maximum coal supply obligations to VPPS. It would also maximise the use of MC's existing surface infrastructure whilst minimising the environmental impacts associated with increased extraction at CVC.

The proposed modification is considered the most appropriate option which will have socio-economic and environmental benefits with little or no adverse impacts.

ES4.4 Stakeholder engagement

During development of the proposed modification, consultation was undertaken by LakeCoal in accordance with its Environment and Community Policy. LakeCoal consulted with relevant State and local government agencies, Registered Aboriginal Parties (RAPs), special interest groups, local landholders and members of the local community.

Relevant government agencies, RAPs and special interest groups were either consulted in face to face meetings or sent a letter briefing them on the proposed modification inviting them to meet with LakeCoal to discuss the project further. As of 1 June 2016 only limited feedback had been received and no objections to the proposed modification had been raised.

Consultation with local landholders and members of the local community is ongoing and has to date included the presentation of information specific to the project on MC's and CVC's websites and presentations made to MC and CVC community consultative committees. The broader community will be notified of the project through an advertisement placed in a local newspaper following lodgement of the EA and through the public exhibition process where community members will be invited to comment on the proposed modification.

ES5 Impact assessment

An assessment of the potential environmental, social and economic impacts from the proposed modification was undertaken. A preliminary risk assessment was completed for the proposed modification and all risks were rated as low. Notwithstanding, it was considered that a more detailed assessment of potential noise and air quality impacts was warranted in association with the proposed increased in the throughput of coal; and for bushfire, ecology and Aboriginal cultural heritage impacts in association with extension/establishment of the APZs. All aspects associated with the proposed modification are summarised below.

ES5.1 Noise

A noise impact assessment (NIA) of the proposed modification was prepared by EMM.

Potential noise impacts are limited to those resulting from the increase in the maximum annual rate of coal throughput using MC's existing surface infrastructure and the emissions generated beyond the current approval expiry date. There will not be any change to any other aspect of the surface operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers.

Whilst there will be a minor increase in throughput, this will be within the capacity of the existing plant and historic levels of production and, hence, the additional coal throughput is not predicted to increase noise emissions. Therefore, the change in noise emissions under the proposed modification when compared to the approved development is predicted to be negligible.

Uncertainty in predictions made for the environmental assessment accompanying the application for MP06_0311 was identified during the assessment. As a consequence, the proponent has taken the initiative to reassess the potential noise impacts from MC. The NIA, therefore, provides a contemporary assessment of approved operations, incorporating the proposed modification.

Potential noise emission levels from MC were predicted and compared to both the current approval conditions and the Project Specific Noise Levels (PSNLs) determined from operator attended and unattended noise monitoring. Predicted noise levels at Macquarie Village and Kingfisher Shores are similar to those previously predicted (Bridges Acoustics, 2007) and are below or equal to the noise criteria provided in the current project approval conditions. Noise emission levels at the Pacific Highway residences are predicted to be up to 8 dB above the current project approval conditions and up to 4 dB above the determined PSNLs. The difference between the noise levels conservatively predicted in the NIA and the previous noise assessment (Bridges Acoustics, 2007) is largely due to the different meteorological scenarios considered. The Bridges Acoustics (2007) noise assessment used a different set of prevailing weather conditions and did not consider temperature inversions.

Noise emissions beyond the current project approval period to June 2022 are as predicted above.

It is noted that MC has not received any recent complaints with regard to noise from its neighbours, prior to or during care and maintenance, and did not receive any submissions from the general public relating explicitly to noise during the exhibition of MP06_0311 and subsequent modifications.

Given the predicted exceedances of the relevant noise criteria an investigation into potential at source noise mitigation measures will be prepared by a suitably qualified expert once the care and maintenance program ceases. Consistent with Schedule 3 Condition 2 of MP06_0311, an action plan will be prepared regarding the implementation of any reasonable and feasible at source noise mitigation recommendations identified in the report.

ES5.2 Air quality

An air quality assessment (AQA) of the proposed modification was prepared by Pacific Environment Pty Limited.

The potential impact of the proposed modification as compared to the approved project on air quality is limited to the increase in ROM coal handling and throughput at MC, and the emissions generated beyond the current approval expiry date.

The estimate for total suspended particulate (TSP) matter was based on the previous air quality assessment that accompanied the EA for MP06_0311 and these figures were contemporised. This included adopting a more conservative figure for coal stockpiling during periods of conveyor downtime; a correction of the reclaim capacity of the conveyor system and utilising the current emission factor for bulldozers/front end loaders. Following this, an updated qualitative assessment of the increased coal throughout was completed. Whilst emissions were predicted to increase, the assessment did not predict any measurable change of particulate matter concentrations at potentially sensitive receivers.

No significant changes in predicted air quality impacts to those described and assessed previously and currently adequately managed on-site are predicted under the proposed modification.

Air quality at MC will continue to be managed in accordance with the existing air quality management regime prescribed in MC's air quality management plan. Additional mitigation and management measures are not warranted as a result of the proposed modification.

ES5.3 Bushfire

As described in Section E4.2, a bushfire management risk assessment and subsequent bushfire hazard assessment were completed subsequent to bushfire damage to minor assets at MC in October 2013. The assessments determined that some modifications to existing APZs and the establishment of some new APZs were required to afford an appropriate level of bushfire protection for both the employees and assets essential for the operation of MC. The APZ assessment has been included in this EA as implementation of APZs generally requires vegetation clearing/disturbance which, in turn, has potential for ecological and Aboriginal cultural heritage impacts that require assessment.

Bushfire risks have been assessed in accordance with the NSW Rural Fire Service's (RFS) *Planning for Bush Fire Protection Guideline* (the PBP guideline). The majority of MC is on land mapped as being in the 100 m buffer around category 1 bushfire prone vegetation on the Wyong Bushfire Prone Land Map. Category 1 vegetation comprises areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations.

Based on the location of MC in the Greater Hunter Fire Weather Area, and taking into account the slope class and the predominant bushfire hazard vegetation type at MC, APZs for MC infrastructure have been determined in accordance with the PBP guideline as 25 m. The APZs will include a fire trail if no access around assets currently exists, an inner protection area (IPA) and an outer protection area (OPA). The potential ecological and Aboriginal cultural heritage impacts as a result of the proposed APZs are summarised below.

ES5.4 Ecology

A biodiversity study was completed to assess the impacts on terrestrial ecology resulting from the proposed modification, specifically the vegetation clearing/disturbance required to extend/establish and maintain APZs for bushfire protection purposes. A field survey was undertaken which focused on the areas of the proposed APZs (the survey area).

A total of 30 plant species were recorded during the survey, comprising 22 native and eight exotic species. No threatened flora species were recorded, nor was habitat deemed to be suitable for their occurrence.

There will be minor direct impacts on two native vegetation communities that were recorded in the survey area as a result of the extension/establishment of the APZs, namely the Swamp Oak Swamp Floodplain community (an endangered ecological community (EEC)) and the Smooth barked Apple community. In addition to approximately 0.4 ha of this native vegetation disturbance, approximately 0.32 ha of planted exotic vegetation will be disturbed for bushfire protection purposes. Clearing for bushfire protection purposes will be limited to approximately 0.04 ha of exotic vegetation.

Habitat is limited for fauna species in the survey area given the high level of past disturbance and prevalence of weed species. Fauna in the survey area is restricted to the more mobile species including birds and bats. There are no hollow-bearing trees in the survey area and consequently there will be no loss of shelter habitat.

Overall, the proposed modification will not have a significant impact on native species recorded in the survey area. To the contrary, vegetation clearing/disturbance for bushfire protection will have a positive effect by reducing the bushfire risk to the Swamp Oak Floodplain Forest EEC. The implementation of mitigation and management measures will further reduce potential impacts on native vegetation.

ES5.5 Aboriginal heritage

An Aboriginal cultural heritage assessment (ACHA) of the proposed modification was prepared by EMM.

Potential impact on Aboriginal cultural heritage under the proposed modification is limited to minor vegetation clearing/disturbance around the main MC pit top area to enable the extension/establishment of APZs.

Given the limited size of the area being disturbed, outcomes of preliminary investigations and previous assessments, Aboriginal Heritage Information Management System (AHIMS) database searches, and the minimal potential for impact, it was not considered necessary to undertake a field survey. A copy of the draft ACHA was provided to Aboriginal Parties registered for previous environmental assessments at MC and comments sought.

The ACHA did not identify any Aboriginal heritage items in the areas proposed to be disturbed. The closest recorded item is approximately 1 km to the north-east. This area will not be accessed or impacted during works associated with the proposed modification.

The area to be disturbed has been subject to high levels of past disturbance from the construction of MC's pit top facilities and operational activities. Consideration of the landforms within the proposed disturbance area and previous archaeological investigations indicates that artefacts or subsurface deposits are unlikely.

Overall, the ACHA has identified that there is negligible potential for any unknown Aboriginal heritage items to be impacted by the proposed modification. Activities at MC will continue to be carried out in accordance with MC's existing Aboriginal heritage management regime, which includes management measures for the discovery of unexpected Aboriginal heritage items.

ES5.6 Other environmental aspects

An assessment of other environmental, social and economic aspects was completed commensurate with the outcomes of a risk assessment undertaken for the proposed modification and the negligible levels of projected impacts on each of these aspects.

The proposed modification does not involve any alterations to existing surface infrastructure and, as discussed, disturbance associated with extension/establishment of APZs for bushfire protection purposes is minimal. Therefore, impacts to land based aspects, other than ecology and Aboriginal heritage, such as surface water, visibility, wastes, hazards, rehabilitation, geology and soils are unlikely.

The proposed modification will permit the ongoing employment and expenditure associated with MC through to 30 June 2022. The modification is also directly linked with the production increase proposed at CVC, which will provide additional employment of up to 60 full time equivalent persons, resulting in positive socio-economic benefits. However, the proposed modification will not generate employment above that approved at MC and will not, therefore, result in any changes to traffic or transport.

ES6 Justification and conclusion

LakeCoal is seeking approval to, amongst other things, permit an increase in the ROM coal handing and transport at MC by 200,000 tpa and extend the approved period of mining operations to 30 June 2022.

The proposed modification will not involve any change to the previously approved underground mining at MC and there will be no change to existing surface facilities or infrastructure which have adequate capacity to accommodate the proposal. It is a minor alteration to the approved development and should be approved as:

- it permits the ongoing employment and expenditure associated with MC (and CVC) through to 30 June 2022;
- it enables LakeCoal to operate both MC and CVC in a co-ordinated manner for the duration of its current agreement with Centennial;
- it provides adequate time for strategic planning and assessment of potential mining activities not approved under MP06_0311;
- it enables an increased level of bushfire protection for both the employees and assets essential for the continued operation of MC;
- benefits can be achieved with little to no risk of adverse environmental impact;
- it is aligned with the principles of ESD; and
- it meets all relevant government policies.

Table of contents

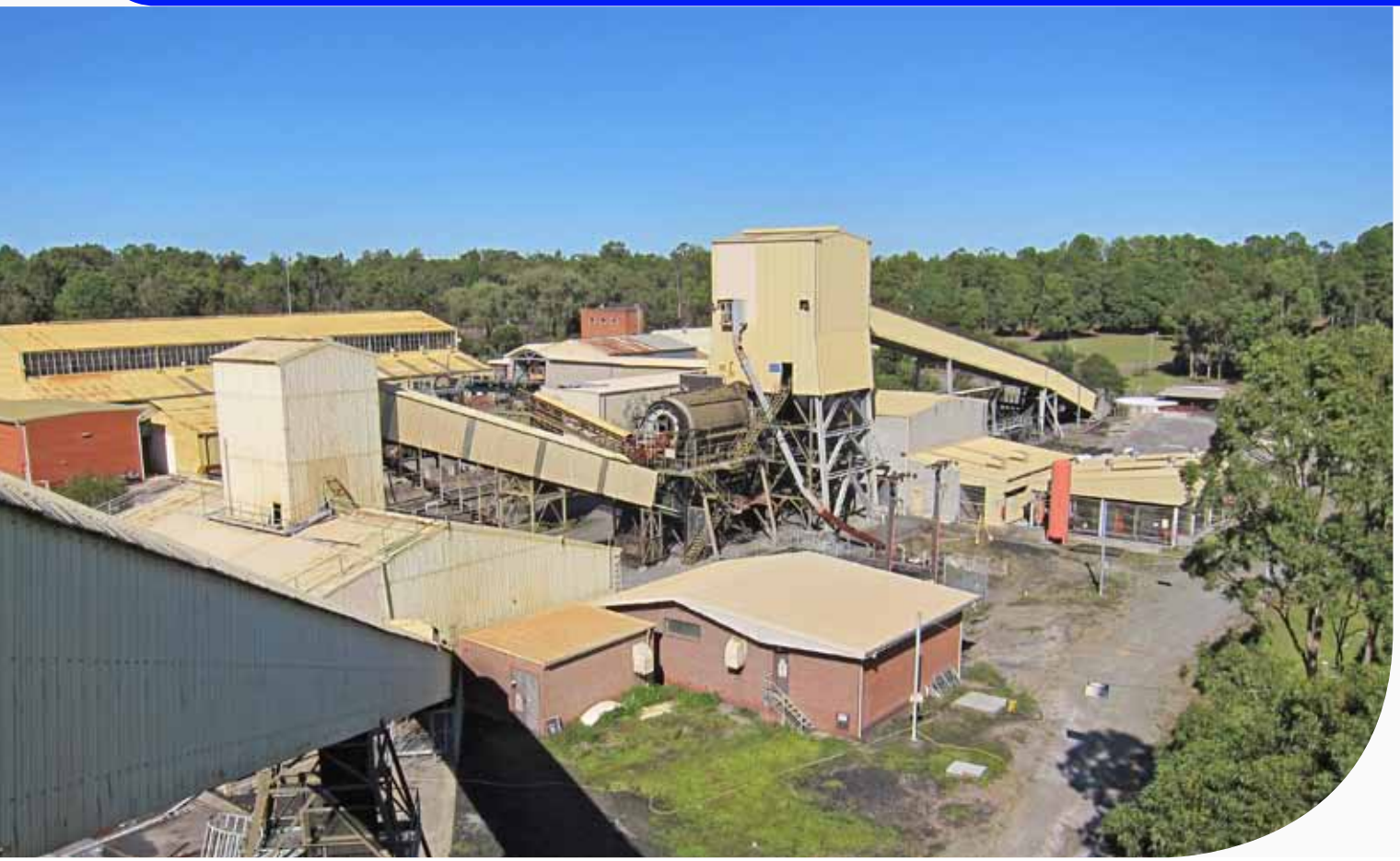


Table of Contents

Table of Contents

Table of Contents *(Cont'd)*

Table of Contents *(Cont'd)*

Appendices

Tables

Tables

Figures

Photographs

Chapter 1

Introduction

Chapter 1 — Introduction

1 Introduction

1.1 Background

Mannering Colliery (MC) is an underground coal mine located on the southern end of Lake Macquarie approximately 60 kilometres (km) south of Newcastle (Figure 1.1). Underground mining commenced at MC in 1960, and since that time has extracted coal from the Great Northern and Fassifern Seams using both the bord and pillar and longwall mining methods.

MC was granted project approval (MP06_0311) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 12 March 2008, enabling the continued production of up to 1.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 31 March 2018 (Appendix A). Coal from MC is transported via a dedicated overland conveyor to Delta Electricity's Vales Point Power Station (VPPS) for domestic energy generation.

This Environmental Assessment (EA) has been prepared to accompany an application to modify MP06_0311 under Section 75W of the EP&A Act to, amongst other things, permit an increase in the ROM coal handing and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa (the proposed modification). The elements of the proposed modification are outlined in Section1.4 and detailed in Section 3.4.

Of relevance to the proposed modification is Chain Valley Colliery (CVC), an underground coal mine also located on the southern end of Lake Macquarie, adjacent to and north-east of MC. The CVC pit top is located approximately 1.1 km north of MC's pit top area (see Figure 1.2). CVC operates under State significant development consent (SSD-5465) and is operated by LakeCoal Pty Limited (LakeCoal). A separate, but related modification of SSD-5465 is also being sought and is described briefly in Sections 1.4 and 3.3.

This EA was prepared by EMGA Mitchell McLennan Pty Limited (EMM) on behalf of the proponent, LakeCoal.

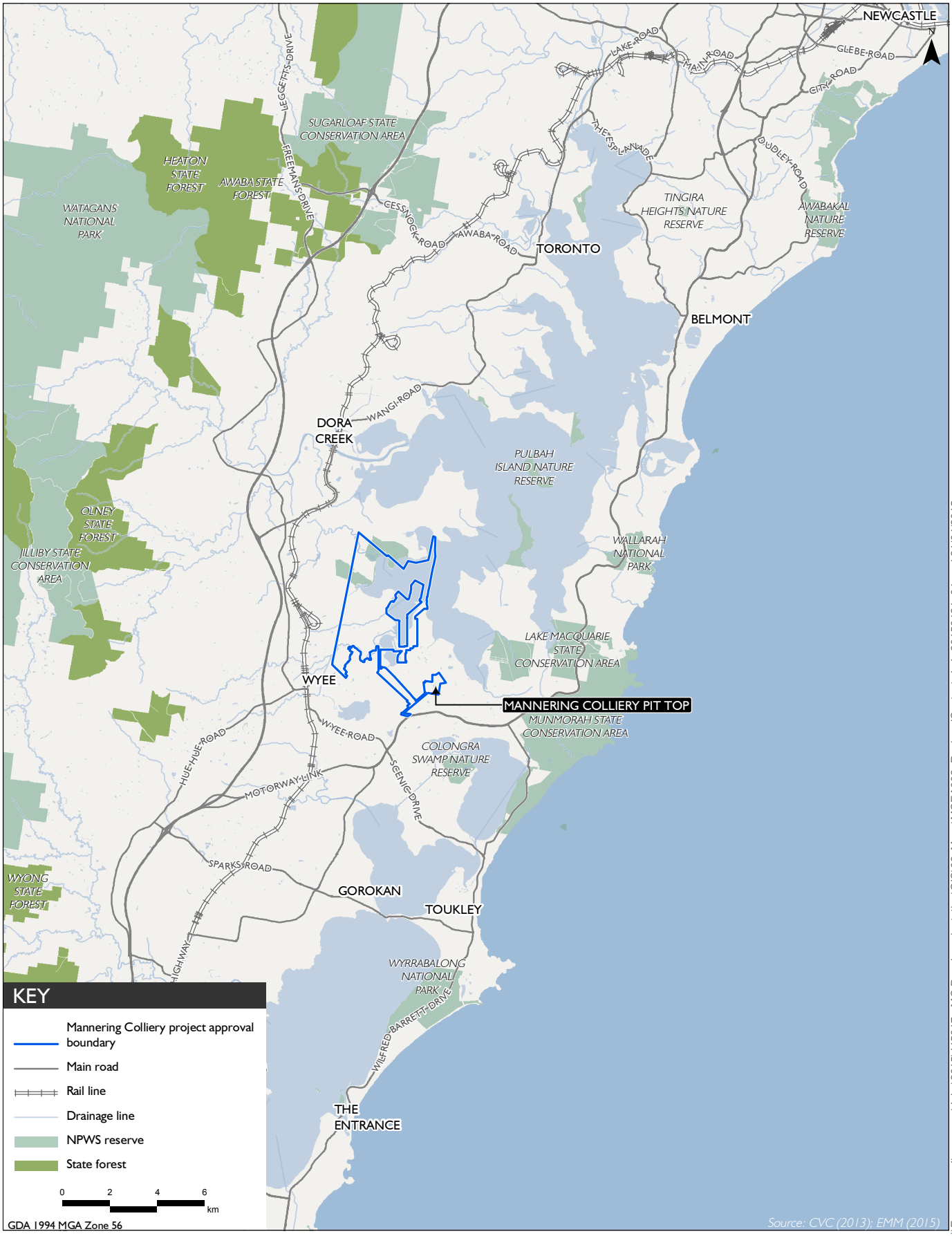
1.2 The proponent

MC is owned by Centennial Mannering Pty Limited, a wholly owned subsidiary of Centennial Coal Company (Centennial). Centennial is in turn a wholly owned subsidiary of Banpu Public Company Limited, which purchased Centennial in 2010. Under an agreement with MC's owners, LakeCoal became the operator of MC effective 17 October 2013.

LakeCoal's contact details are as follows:

LakeCoal Pty Ltd
16 Spitfire Place, Rutherford
NSW 2320
Phone (02) 4358 0800

Further information on MC and its operations can be found at: http://www.manneringmine.com.au.



\\Emgammsvr1\emgammJobs\2015\J15017 - MC Panel reorientation\GIS\02_Maps\MCEA002_RegionalContext_1_1_20150421_04.mxd 21/04/2015

EMM
EMGA Mitchell McLennan

Regional context

Mannering Colliery – Modification 3

Figure 1.1

EMM
EMGA Mitchell McLennan

Site plan

Mannering Colliery – Modification 3

Figure 1.2

1.3 Site and surrounds

MC's pit top area is located within the Wyong local government area (LGA), approximately 3 km south of Mannering Park at the southern extent of Lake Macquarie and west of Chain Valley Bay. The pit top is accessed from Ruttleys Road. Mining operations at MC occur within Consolidated Coal Lease (CCL) 721 and CCL 719.

The closest residential areas to MC's surface facilities (or pit top) are the Macquarie Shores home village, Kingfisher Shores and Chain Valley Bay to the east, and Mannering Park beyond the VPPS to the north. The VPPS lies between MC's pit top and Mannering Park. Elsewhere, the areas to the north, south and west generally comprise industrial facilities and vegetation.

The land subject to the application comprises the land shown in Appendix 1 of MP06_0311 (as modified) with no changes as a result of the proposed modification. A site plan is provided as Figure 1.2.

1.4 The proposed modification

LakeCoal is seeking approval to modify MP06_0311 under Section 75W of the EP&A Act to permit:

- an increase in the rate of ROM coal handling at, and transport from, MC from 1.1 Mtpa to a maximum of 1.3 Mtpa;
- an extension of the project approval period from 31 March 2018 to 30 June 2022; and
- minor vegetation clearing/disturbance adjacent to some infrastructure at MC's pit top to enable the extension/establishment of asset protection zones (APZs) for bushfire protection purposes.

There will be no changes to the surface infrastructure and no increase in approved employee numbers under the proposed modification. The increased coal throughput would all be dispatched via the existing overland conveyor to VPPS with no change to surface coal handling activities or any other changes to the approved operations.

It is noted that an underground linkage within the Fassifern Seam is approved between MC and CVC.

A separate modification of SSD-5465 is being sought to, amongst other things, permit an increase in the maximum rate of ROM coal extraction at CVC from 1.5 Mtpa to 2.1 Mtpa and enable mine design changes, primarily the re-orientation of miniwall panels in CVC's northern mining area. All production beyond the existing limit of 1.5 Mtpa will be sent via MC to VPPS.

1.5 Modification need

MC has approval to produce 1.1 Mtpa of ROM coal all of which is sold domestically to VPPS. The existing infrastructure at MC allows coal to be transported by overland conveyor to VPPS. Transport is approved to occur 24 hours a day, seven days a week.

MC has approval to operate up until 31 March 2018, although it was placed on care and maintenance in November 2012. In 2013 the owners of MC and CVC entered into an agreement which enables LakeCoal to operate MC until 30 June 2022. The proposed extension of the project approval period at MC therefore aligns MC's approval with the current agreement with LakeCoal, thereby enabling LakeCoal to operate both collieries in a co-ordinated manner. The extension of the project approval period also reflects, in-part, the period MC has been on care and maintenance and provides adequate time for strategic planning and assessment of potential mining activities not approved under MP06_0311.

The increase in ROM coal handling and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa will enable all additional coal to be extracted under the proposed CVC modification (600,000 tonnes per annum (tpa)) to be efficiently transferred from CVC to VPPS via MC's conveyors for the duration of the agreement between the owners of MC and CVC whilst also enabling LakeCoal to despatch coal to the export market and other domestic customers at the existing approved rate. This would provide positive amenity outcomes by enabling the additional coal required at the VPPS to be transported via conveyor as opposed to haulage on internal roads with an attendant greater potential to generate noise and dust. It would also support the increased employment at CVC (approximately 60 additional full time jobs as per the current CVC modification application) with associated socio-economic benefits.

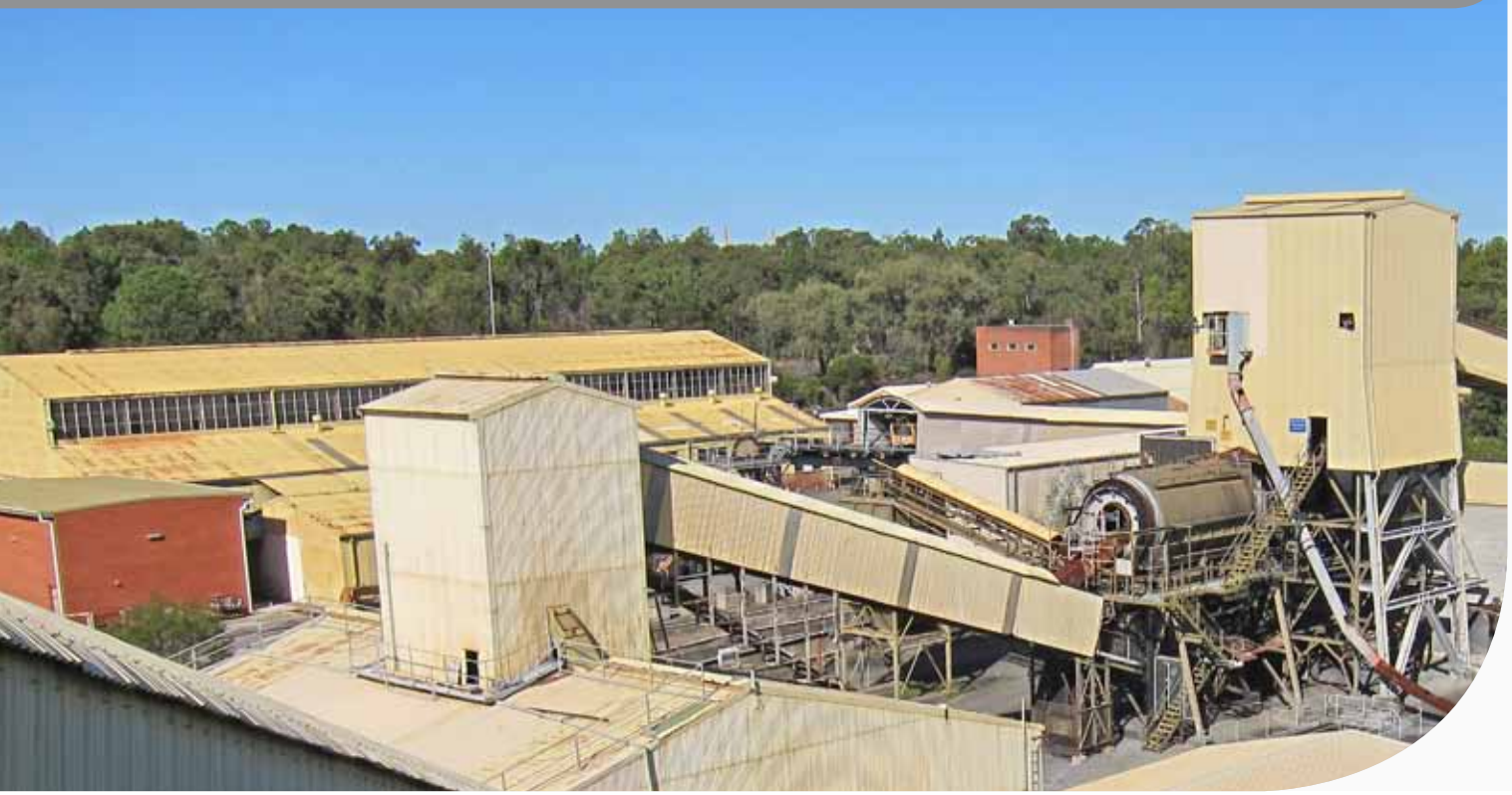
The proposed extension/establishment of the APZs adjacent to some assets is an outcome of a bushfire management risk assessment and subsequent bushfire hazard assessment completed following to the major bushfires in the immediate vicinity of MC's pit top and CVC's ventilation fan site at Summerland Point on 17 October 2013. Although only minor assets were damaged at MC during this bushfire (as shown in Photographs 5.1 to 5.3 – Section 5.4.1), the subsequent assessments determined that some modifications to existing APZs, and the extension/establishment of new APZs, were required to afford an appropriate level of bushfire protection for both the employees and assets essential for the operation of MC.

1.6 Purpose and context

This EA describes the proposed modification, provides an assessment of its potential impacts and details measures that will be implemented to prevent and/or minimise those impacts. This information will be used by the New South Wales Department of Planning and Environment (NSW DP&E), and relevant government agencies, to assess the merits of the proposed modification and make recommendations to the determining authority about whether or not to grant approval.

Chapter 2

Statutory approval framework



Chapter 2 — Statutory approval **framework**

2 Statutory approval framework

2.1 Introduction

This chapter describes the relevant Commonwealth and State legislation and regulatory framework under which the proposed modification has been assessed and will be determined.

2.2 Planning approval history

2.2.1 Major project approval

MP06_0311 was granted by the Minister for Planning in March 2008. Prior to this date, MC operated under Section 74 of the *Mining Act 1992* (Mining Act), which exempted underground mines which had been operating under a mining lease prior to the implementation of the EP&A Act from the provisions of both environmental planning instruments and the EP&A Act. Section 74 of the Mining Act was repealed in December 2005 and an amendment of the NSW Environmental Planning and Assessment Regulation 2009 (EP&A Regulation) meant that an approval under the EP&A Act was required for MC's continued operation.

2.2.2 Modification 1

An application to modify MP06_0311 (Modification 1) was lodged in August 2011. The modification sought approval to:

- extend the underground mining operations within the Fassifern Seam; and
- to employ up to 170 people full time.

Modification 1 was approved by the Planning Assessment Commission (PAC) under delegation from the Minister for Planning in October 2012.

2.2.3 Modification 2

An application to further modify MP06_0311 (Modification 2) was lodged in April 2014 seeking the:

- development and use of up to four first working headings within the Fassifern Seam to connect MC and CVC;
- installation and use of an underground conveyor belt system and ancillary services, enabling ROM coal to be transferred between CVC and MC; and
- use of existing MC infrastructure to transport coal from CVC's underground workings to the VPPS at a rate not greater than 1.1 Mtpa, ie the rate approved under MP06_0311 at that time.

Modification 2 was approved by the Minister for Planning in November 2014.

2.3 State approvals

2.3.1 NSW Environmental Planning and Assessment Act 1979

MP06_0311 was granted under Part 3A of the EP&A Act. Part 3A was repealed by the *Environmental Planning and Assessment Amendment (Part 3A Repeal) Act 2011* (Part 3A Repeal Act). However, transitional provisions were introduced (Schedule 6A of the EP&A Act) enabling 'transitional Part 3A projects' to continue to be subject to Part 3A of the EP&A Act (as in force immediately before the repeal and as modified by the Part 3A Repeal Act). Transitional Part 3A projects include projects that were the subject of an existing approval under Part 3A. Therefore, MP06_0311 is a transitional Part 3A project and the proposed modification may be made under the now repealed Section 75W of the EP&A Act. Section 75W enables a proponent to request the Minister (or Planning Assessment Commission under delegation from the Minister) to modify a project approval granted under Part 3A.

Section 79BA of the EP&A Act requires bushfire assessments of developments on bushfire prone land to conform to the specifications in the Rural Fire Service (RFS) guideline *Planning for Bushfire Protection* (PBP guidelines)(RFS 2006). MC is identified as being on bushfire prone land pursuant to Wyong Shire Council's (WSC) Bushfire Prone Land Map. However, Section 75R(1) of Part 3A of the EP&A Act exempts Major Project applications from having to consider this section, unless otherwise stated. Since MC is a Major Project, it is not strictly required to conform to the specifications in the PBP. Notwithstanding, Section 2.5 of the PBP requires proponents of these sorts of development to 'consult' the PBP when undertaking environmental assessments.

2.3.2 Other state legislation

The following Acts are relevant to the proposed modification. It is noted that the proposed modification will not involve any change to the previously approved underground mining at MC and there will be no change to existing surface facilities or infrastructure, all of which have adequate capacity to accommodate the proposal. Therefore, the provisions of the Mining Act, the *Work Health and Safety (Mines) Act 2013* and the *Mine Subsidence Compensation Act 1961* are not relevant to the activities associated with the proposed modification.

i Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* (TSC Act) aims to conserve biological diversity in NSW through the protection of threatened and endangered flora and fauna species and endangered ecological communities (EECs). The potential impacts of the proposed modification on threatened species and EECs listed under the TSC Act are discussed in Section 5.5.

ii Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is the principal NSW environmental protection legislation and is administered by the Environment Protection Authority (EPA). MC has an existing environment protection licence (EPL) No. 191 issued under the POEO Act which authorises mining for coal at a rate of 1.1 Mtpa and coal works at a scale of 1.1 Mtpa. Accordingly, the proposed modification will require a variation to EPL No. 191 to reflect the increase in the rate of ROM coal throughput.

iii Rural Fires Act 1997

The *Rural Fires Act 1997* provides for the prevention, mitigation and suppression of bush and other fires in NSW. Section 63(2) requires the owners of land to prevent the ignition and spread of bushfires on their land. Bushfire risks have been assessed in Section 5.4 of this EA to determine the extent of APZs to be implemented around MC's pit top infrastructure. The APZs, together with other bushfire management controls, will reduce the risk of MC being impacted during a bushfire, and of adjacent bushland being ignited if a fire occurs at MC's pit top.

2.3.3 Environmental planning instruments

Mining operations at MC are permissible by virtue of Clause 7 of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the Mining SEPP) which states that development for the purposes of underground coal mining is permissible on any land. Clause 12AB of the Mining SEPP identifies non-discretionary development standards for mining. Subclause (1) states that if a proposed development for the purposes of mining satisfies a development standard set out in that clause, the consent authority cannot require more onerous standards for those matters but does not prevent the consent authority granting consent even though any such standard is not complied with. The proposed modification satisfies the non-discretionary development standards for mining as detailed in Table 2.1.

Table 2.1 Assessment of the proposed modification against Mining SEPP non-discretionary development standards for mining

Development standard	Comments on compliance
The development does not result in a cumulative amenity noise level greater than the acceptable noise levels, as determined in accordance with Table 2.1 of the Industrial Noise Policy, for residences that are private dwellings.	The proposed modification will not result in additional noise emissions that will result in a cumulative amenity noise level greater than the acceptable noise levels. See Section 5.2 for further information. Therefore, this development standard is satisfied.
The development does not result in a cumulative annual average level greater than 30 µg/m^3 of PM_{10} for private dwellings.	The proposed modification will not result in additional dust emissions that would result in a cumulative annual average level greater than 30 µg/m^3 of PM_{10} for private dwellings. See Section 5.3 for further information. Therefore, this development standard is satisfied.
Airblast overpressure caused by the development does not exceed: (a) 120 dB (Lin Peak) at any time, and (b) 115 dB (Lin Peak) for more than 5% of the total number of blasts over any period of 12 months, measured at any private dwelling or sensitive receiver.	The proposed modification will not involve blasting.
Ground vibration caused by the development does not exceed: (a) 10 mm/sec (peak particle velocity) at any time, and (b) 5 mm/sec (peak particle velocity) for more than 5% of the total number of blasts over any period of 12 months, measured at any private dwelling or sensitive receiver.	As above.
Any interference with an aquifer caused by the development does not exceed the respective water table, water pressure and water quality requirements specified for item 1 in columns 2, 3 and 4 of Table 1 of the Aquifer Interference Policy for each relevant water source listed in column 1 of that Table.	The proposed modification will not will not involve changes to the approved underground mining and, as a result, no changes to groundwater or aquifers will occur.

MC's pit top is on land zoned SP2 electricity generating works pursuant to the Wyong Local Environmental Plan (LEP) 2013. Mining is not listed as being permissible with or without consent in the SP2 zone and, therefore, mining operations at MC would be prohibited under this LEP. However, as mentioned above, underground mining on any land is permissible under the Mining SEPP. In the event of an inconsistency, Section 36 of the EP&A Act stipulates that there is a general presumption that a State Environmental Planning Policy prevails over an LEP. Therefore, the prohibition under the LEP does not affect permissibility.

2.4 Commonwealth approvals

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) aims to protect matters deemed to be of national environmental significance (NES), namely:

- world heritage properties;
- places listed on the National Heritage Register;
- Ramsar wetlands of international significance;
- threatened flora and fauna species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions (including uranium mining); and
- actions of development for coal seam gas or large coal mining on water resources.

If an action (or proposal) will, or is likely to, have a significant impact on any matters of NES, it is deemed to be a Controlled Action and requires approval from the Commonwealth Environment Minister or the Minister's delegate. To determine whether a proposed action would or is likely to be a Controlled Action, an action may be referred to the Department of the Environment.

The matters of NES that have the potential to be impacted by the proposed modification are restricted to threatened flora and fauna species and ecological communities and water resources. As discussed in Section 5.5.2, the proposed modification will result in the disturbance of approximately 0.35 hectares (ha) of Swamp Oak Floodplain Forest, an EEC, to extend/establish APZs for bushfire protection purposes. Given the minor nature of the disturbance and taking into consideration the protection of the wider EEC that the APZs will afford, the proposed modification is unlikely to significantly impact on these matters of NES. It is unlikely that any other matters of NES will be impacted by the proposed modification. Therefore, a referral to the Department of the Environment is not required.

Chapter 3

Existing project approval and proposed modification

Chapter 3 — Existing project approval and proposed modification

3 Existing project approval and proposed modification

3.1 Approved operations

Operations currently approved under MP06_0311, include:

- extraction of up to 1.1 Mtpa of ROM coal from the Fassifern Seam until 31 March 2018;
- first workings only using bord-and-pillar mining methods;
- supply of coal to Delta Electricity's VPPS for domestic energy generation via a dedicated covered overland conveyor;
- employment of 170 full time personnel; and
- operation 24 hours, seven days a week.

Prior to MC being placed on care and maintenance, coal was extracted at MC using bord-and-pillar mining methods with coal recovery limited to first workings. The bord-and-pillar method involves the cutting of a regular grid of tunnels (headings and cut-throughs) within the coal seam whilst leaving behind the pillars of coal bounded by the headings and cut-throughs to support the overlying strata.

As noted in Section 1.4, an underground linkage, including a maximum of four first working headings and conveyor belt system between MC and the adjacent CVC, was approved in November 2014. The approved underground linkage allows for up to 1.1 Mtpa of ROM coal to be transferred from CVC to VPPS via MC and its conveyors.

The key aspects of MC's approved operations relevant to the proposed modification are considered further below.

3.1.1 Project life

As described in Section 1.5, MC has approval to operate up until 31 March 2018, although it was placed on care and maintenance in November 2012. In 2013 the owners of MC and CVC entered into an agreement which enables LakeCoal to operate MC until 30 June 2022. It was anticipated at that time that the extension to the approval timeframe to allow LakeCoal to operate MC beyond 2018 would form part of a separate application which would also address the future operations associated with the proposed underground linkage to CVC and the longer term operation of MC.

3.1.2 Existing surface infrastructure

Primary surface infrastructure at MC's pit top includes:

- offices, workshops, a bathhouse, stores, a lamp room, diesel and oil storages, fire fighting equipment and water tanks;
- access roads and car parking facilities;
- a nominal 25,000 t product coal stockpile area;
- a coal crushing facility (CCF), with a capacity of 1,200 tonnes per hour (tph);

- conveyors for ROM and product coal transportation;
- a main haulage drift for personnel and materials movement;
- a conveyor drift for coal clearance and secondary access and egress;
- mine ventilation shaft and fans; and
- water management infrastructure.

3.1.3 Product coal transport

The approved operations allow for coal to be transported from the underground workings at MC and/or CVC via a drift conveyor to the on-site CCF for screening and crushing at a total rate of up to 1.1 Mtpa. The coal is then conveyed to a 1,000 t product bin for subsequent transport to the VPPS via a purpose built overland covered conveyor which is operated, maintained and located on land owned by Delta Electricity. In periods when the VPPS is unable to accept coal deliveries due to scheduled maintenance or conveyor break-downs, the coal is temporarily stockpiled within the product coal stockpile area. Once VPPS is again able to accept coal, the stockpiled material is reclaimed, loaded onto the conveyor and dispatched to VPPS.

No coal is transported from MC via road.

3.1.4 Traffic and transport

MC has approval to operate until 31 March 2018 with up to 170 employees. Traffic impacts of up to 170 employees at MC were assessed under Modification 1 and found to be acceptable subject to the completion of upgrade works at the insertion of Ruttleys Road and MC's entrance road. Project approval conditions included a requirement for an upgrade of the intersection to a channelised right turn (CHR) treatment when the number of employees exceeded 130. Shortly after the approval of Modification 1 MC was placed on care and maintenance. DP&E allowed the upgrade works to be deferred but advised that they would need to be completed prior to the recommencement of mining operations.

Project approval conditions for Modification 2 to MP06_0311 required only minor upgrades to the intersection, including the installation of additional sections of safety barrier and maintenance and upgrades to the pavement. However, the project approval conditions were updated to require full upgrade of the intersection to a type CHR treatment once employee numbers at MC reach 70 (a reduction from the previous trigger of 130).

As approximately 20 full time positions will be required at MC to maintain and operate MC's infrastructure to permit coal transport through the mine to VPPS, the upgrade to a CHR intersection will not be triggered by the proposed modification. Notwithstanding, LakeCoal is aware of the requirement within the existing project approval and would undertake the intersection upgrade prior to the workforce once again reaching 70 full time personnel.

WSC has recently undertaken a number of upgrade works at the Ruttleys Road and MC access road intersection, namely:

- tree clearing at various sections to provide a 6.5 metre (m) clear zone;
- the installation of safety barriers along various sections to help prevent vehicles from leaving the road where the clear zone requirements cannot be met;

- improvements of the existing road shoulders by widening and sealing;
- asphalting various sections where required to improve the road surface;
- line marking the road so that it has 3.5 m traffic lanes; and
- the installation of guide posts along the entire length of the road.

These intersection upgrades have been incorporated in a revised 'existing conditions' safety audit commissioned by LakeCoal and prepared by GHD Pty Ltd in April 2015 (Appendix C). The GHD 2015 audit identified the following additional measures for improving traffic safety at the intersection:

- move the hold line on MC's access road further to a point where vehicles are guided to stop and can see approaching traffic in both directions;
- provide advance intersection warning sign type W2-4 (left and right) on Ruttleys Road on the approach to the intersection; and
- request WSC to routinely mow overgrown grass adjacent to the road shoulder and behind the safety barrier for Ruttleys Road.

LakeCoal will consult with WSC and undertake these works while at the same time also request council maintain the road shoulder vegetation as part of its routine maintenance works along Ruttleys Road specifically in the vicinity of the intersection.

3.2 Environmental management

Environmental management at MC is undertaken in accordance with:

- project approval MP06_0311, as modified;
- commitments made in EAs prepared for MC;
- MC's environmental management strategy and associated documents;
- various environmental management plans;
- MC's EPL 191; and
- MC's mining operations plan (MOP).

The existing environmental management processes and procedures are referred to where relevant in the environmental assessment and management chapter (Chapter 5).

3.3 Chain Valley Colliery

Given the interrelationship between MC and CVC, this section gives a brief overview of CVC.

Underground mining has occurred at CVC since 1962 and, over that time, has used a combination of bord and pillar and miniwall mining methods. CVC has extracted coal from three seams – the Wallarah Seam, the Great Northern Seam and the Fassifern Seam, with current mining activities limited to the Fassifern Seam.

Development Consent SSD-5465 currently allows for underground miniwall mining in the Fassifern Seam at a maximum rate of production of 1.5 Mtpa of ROM coal. All secondary extraction is confined to areas under Lake Macquarie.

Transport of coal from CVC is currently undertaken by trucks with coal deliveries to VPPS transported by private road and coal deliveries to other domestic customers and for export transported by public roads. Once constructed, however, the approved underground linkage between MC and CVC and overland conveyor from MC to VPPS will be used preferentially for the transportation of coal from CVC to VPPS.

As described in Section 1.4, a separate modification of SSD-5465 is being sought to, amongst other things, increase the maximum rate of ROM coal extraction at CVC from 1.5 Mtpa to 2.1 Mtpa and enable mine design changes, primarily the re-orientation of miniwall panels in CVC's northern mining area. All production beyond the existing limit of 1.5 Mtpa will be sent via MC to VPPS for the duration of the agreement between the owners of MC and CVC. Should this, or any other agreement between the owners of MC and CVC be terminated prior to 30 June 2022, then coal extraction at CVC will revert to the current approved extraction limit of 1.5 Mtpa, unless otherwise approved.

3.4 The proposed modification

A summary of the current approved operations and a comparison with the equivalent components of the proposed modification is provided in Table 3.1. The individual components of the proposed modification are described in the following sub-sections.

Table 3.1 Current MC approval and proposed modification

Aspect	Current approval	Proposed modification
ROM coal extraction	Extraction of up to 1.1 Mtpa of ROM coal from the Fassifern Seam.	No change.
Mining methods	Bord-and-pillar mining methods where coal recovery is limited to first workings only.	No change.
Project life	Approved until 31 March 2018.	Extension of the project approval by approximately four years until 30 June 2022.
Project approval area	Approximately 1,420 ha.	No change.
Existing surface infrastructure	Utilisation of existing surface infrastructure, including but not limited to the CCF, overland conveyor between MC's pit top area and VPPS, worker's amenities, workshops, offices, carparks, ventilation fans. APZs around some items of surface infrastructure.	No change to surface infrastructure. Minor vegetation clearing/disturbance adjacent to some main infrastructure at MC's pit top to enable the extension/establishment of APZs.
Coal processing	No coal processing other than use of CCF to reduce the top size of ROM coal.	No change.
Water demand and supply	Licensed daily discharge of 4 megalitres (ML). Potable water for use in surface facilities and underground operations supplied by WSC via a direct-metered pipeline.	No change.
Product coal transport	Up to 1.1 Mtpa of ROM coal transported directly to VPPS via a purpose built dedicated overland conveyor which is operated, maintained and located on land owned by Delta Electricity.	Up to 1.3 Mtpa of ROM coal transported directly to VPPS via the overland conveyor (an increase of up to 0.2 Mtpa).

Table 3.1 Current MC approval and proposed modification

Aspect	Current approval	Proposed modification
Hours of operation	24 hours, 7 days a week.	No change.
Mine access	Road access from Ruttleys Road.	No change.
Rehabilitation	Decommissioning of surface facilities and final rehabilitation at completion of operations.	No change.
Employment	Employment of 170 full time personnel.	No change.

3.4.1 Increase in ROM coal handling and transport

The proposed modification seeks approval for an increase in the ROM coal handling and transport from MC from 1.1 Mtpa to a maximum of 1.3 Mtpa.

This increase will allow the foreseeable maximum coal supply from CVC destined for the VPPS (including the 1.1 Mtpa already approved and the additional 200,000 tpa proposed) to be transferred via MC's conveyors.

All existing infrastructure at MC, including the underground belt system, drift conveyor, CCF and surface conveyors have adequate capacity to accommodate the proposed increase of 200,000 tpa in coal throughput.

3.4.2 Extension of the project approval period

The proposed modification seeks approval for an extension of the project approval period from 31 March 2018 to 30 June 2022 to align MC's approval with the current agreement for LakeCoal to operate MC.

3.4.3 Asset protection zones

The proposed modification seeks approval for the potential environmental impacts associated with the minor vegetation clearing/disturbance associated with the extension/establishment of APZs adjacent to some major infrastructure in MC's pit top area, in order to afford increased bushfire protection to both the employees and assets at MC as well as greater protection to the surrounding environment in the event a fire is needed to be contained within the pit top area (refer to Section 1.5).

The bushfire hazard assessment is provided in Section 5.4 and the APZ requirements are shown in Figure 5.6.

3.5 Alternatives considered

3.5.1 Do nothing option

If the proposed modification does not proceed, the transport of the additional 600,000 tpa of ROM coal proposed to be extracted at CVC to VPPS would be via the existing approved private haul roads. Consequently, the improved amenity outcomes and ongoing employment benefits that can be achieved with little to no adverse environmental impact, as described in Chapter 5, would not be realised.

Furthermore, the employment and flow on benefits from operating MC's infrastructure, which would be realised through the development and ongoing use of the underground linkage, would only be achieved to 2018, thereby missing the opportunity to extend these benefits until at least 30 June 2022.

3.5.2 Increase or reduce the limit of ROM coal handling and transport

The proposal to increase the amount of coal handling and transport by 200,000 tpa from 1.1 Mtpa to 1.3 Mtpa has been carefully considered and reflects LakeCoal's foreseeable maximum coal supply obligations to VPPS. It would also maximise the use of MC's existing surface infrastructure whilst minimising the environmental impacts associated with increased extraction at CVC.

Chapter 4

Stakeholder engagement

Chapter 4 — Stakeholder engagement

4 Stakeholder engagement

4.1 Introduction

As stated in its Environment and Community Policy, LakeCoal is committed to communicating and engaging with the community and other stakeholders regarding its activities. Consistent with this commitment, community consultation for MC is ongoing and includes MC's website (manneringmine.com.au), information line (1800687557) and a community consultative committee (CCC).

As outlined in the subsequent sections, consultation has been, and will continue to be, supplemented by activities that relate specifically to the proposed modification. The nature and extent of these stakeholder consultation activities reflect the modest nature and scale of the proposed modification and its potential impacts.

4.2 Consultation with government

A summary of consultation undertaken with government agencies regarding the proposed modification is given in Table 4.1. The outcomes of this consultation are reflected in the proposed modification's scope and matters addressed in this EA.

Table 4.1 Summary of government consultation

Agency	Date and method of consultation	Description of outcomes
DP&E	Face-to-face meeting held on 5 March 2015.	Items discussed during the meeting included project briefing, planning pathway, stakeholder engagement, and matters requiring consideration.
Division of Resources and Energy (DRE)	Briefing letter sent on 17 April 2015.	No response received of 1 June 2015.
Office of Environment and Heritage (OEH)	Briefing letter sent on 17 April 2015.	No response received of 1 June 2015.
Environment Protection Authority	Briefing letter sent on 17 April 2015.	No response received of 1 June 2015.
NSW Office of Water (NOW)	Briefing letter sent on 17 April 2015.	NOW acknowledged receipt of the letter on 23 April and confirmed that no additional information would be required at this stage.
WSC	Briefing letter sent on 17 April 2015. Additional briefings as part of CCC meetings were undertaken on 24 February 2015 and 19 May 2015 (refer Section 4.3).	The proposed modification was discussed at the CCC meetings, with no objections being raised. As of 1 June 2015, no response had been received in regards to the briefing letter.
Lake Macquarie City Council	As above.	As above.

4.3 Consultation with community and special interest groups

As noted above, community consultation for MC is ongoing. Information specific to the proposed modification is presented on MC's website (manneringmine.com.au) and presentations related to the proposed modification were made to members of MC's CCC on the 24 February 2015 and the 19 May 2015.

At the CVC CCC meeting held on 24 February 2015, which was also attended by representatives of the MC CCC, LakeCoal identified that approvals would be sought in relation to the aspects that form part of this proposed modification and the proposed CVC modification. No matters were raised by community representatives, WSC or Lake Macquarie City Council representatives during this CCC meeting.

Additional briefing information, consistent with that provided to the government agencies and available on the website was also provided directly to MC CCC members on 21 April 2015. No matters were raised by community members or council representatives subsequent to the provision of this briefing information.

On 19 May 2015 the final MC CCC meeting prior to finalisation of the EA was held. MC CCC members were briefed in further detail on the proposed modification, with similar information being provided to the CVC CCC members at its meeting on the same day. All questions/comments on the proposed modifications were satisfactorily addressed at the meetings.

The broader community will also be notified of the proposed modification through an advertisement placed in a local newspaper following lodgement of the EA and through the public exhibition process where community members will be invited to make comment by way of formal submissions.

Chapter 5

Environmental assessment and management

Chapter 5 — Environmental assessment and management

5 Environmental assessment and management

5.1 Introduction

This chapter assesses the potential environmental, social and economic impacts from the proposed modification. A preliminary risk assessment was completed for the proposed modification (Appendix B). All risks were rated as low. Notwithstanding, it was considered that a more detailed assessment of potential noise and air quality impacts was warranted in association with increased throughput, and of bushfire, ecology and Aboriginal cultural heritage in association with extension/establishment of the APZs. These aspects are addressed below. Other environmental aspects are addressed in Section 5.7.

5.2 Noise

A noise impact assessment (NIA) of the proposed modification was prepared by EMM. The assessment is presented in full in Appendix D and a summary provided below.

It is noted that a NIA (Bridges Acoustics, 2007) was prepared for the EA for MP06_0311. DP&E's assessment report acknowledged that there was uncertainty with regard to the predicted noise levels and actual noise impacts. MC noise emissions were predicted to be significantly above the relevant noise criteria at many neighbouring residences. However, a lack of noise complaints and submissions relating to noise impacts during the exhibition of the EA indicates that noise impacts may not be as significant as the predicted impacts. DP&E's assessment report considered that this could be due to a number of reasons, such as "an error in the predictions...; that noise in the area is masked by the noise from other sources, such as the Vales Point Power Station or the Pacific Highway; or it could be that residents in the area are used to the noise impacts of the colliery."

Notwithstanding the above, the noise limits contained within MP06_0311 were determined based on the highest predicted levels in the Bridges Acoustics (2007) NIA.

Given the uncertainty around the previous predictions, it was decided that the proposed modification provided the opportunity to reassess the potential noise impacts from MC.

Potential noise impacts from the proposed modification itself are limited to an increase in the maximum rate of annual throughput at MC's surface facilities, and the emissions generated beyond the current approval expiry date.

The NIA provides a contemporary assessment of noise emissions from MC as approved, and under the proposed modification.

5.2.1 Existing environment

i Overview

As described in Section 1.3, the nearest residential areas to MC are the Macquarie Shores home village, Kingfisher Shores and Chain Valley Bay to the east, several isolated residences to the south adjacent the Pacific Highway and Mannering Park beyond the VPPS to the north. Elsewhere, the areas to the north, south and west generally comprise industrial facilities and vegetation.

Representative assessment locations (nearby sensitive receivers) considered in the NIA are shown in Figure 5.2. The assessment locations represent those most likely to be affected by the operation of MC and are consistent with those provided in the current approval (MP06_0311). Adherence with noise criteria at these locations would indicate that noise criteria will be met at other surrounding noise-sensitive locations.

Noise emissions from the operation of MC are currently managed in accordance with MC's approved Noise Monitoring Program (Centennial Coal, 2011) which includes quarterly noise monitoring and operator attended surveys at three monitoring locations.

Noise emissions from MC, prior to being placed under care and maintenance, were considered to be in compliance with the noise criteria specified in MP06_0311 for all receiver locations (GSS Environmental 2012). Noise monitoring undertaken on behalf of LakeCoal since late 2013 (ie during care and maintenance) has also demonstrated compliance at all monitoring locations.

The existing acoustic environment (i.e. ambient noise) was quantified by EMM utilising long-term unattended and short-term attended noise monitoring. The locations of ambient noise monitoring used in this assessment are provided in Figure 5.1, and were selected following the identification of noise sensitive receivers. Attended noise measurements were undertaken at eight locations in April 2015, including locations representative of the three unattended noise monitoring locations.

MC was in care and maintenance during the ambient noise monitoring and did not contribute to measured noise levels off site.

The Rating Background Levels (RBL) and ambient $L_{eq,period}$ noise levels derived from EMM's long-term noise monitoring are provided in Table 5.1.

Table 5.1 Summary of measured ambient noise levels

Location	RBL, dB(A)			Ambient (L_{eq}) noise level, dB(A)		
	Day	Evening	Night	Day	Evening	Night
L1	38	38	40	46	46	45
L2	34	34	32	48	46	41
L3	42	42	34	50	50	46

Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods.

The ambient noise environment at each receiver area is summarised as follows:

- L1 Kingfisher Shores: ambient noise levels are dominated by CVC and VPPS. Results of the attended noise survey determined an existing industrial noise level of $L_{Aeq,period}$ 44 dB(A) during the night. Given the constant nature of noise emission levels from CVC and VPPS, it is logical that the day and evening contributions from these industries would be generally consistent to that measured during the night. This is reinforced by the relatively constant ambient L_{eq} measured at this location during day, evening and night-time periods.

- L2 Macquarie Shores Home Village: ambient noise levels are dominated by natural sounds as well as noise from CVC and VPPS. The existing level of industrial noise at this location has been estimated at $L_{Aeq,period}$ 38 dB(A) based on the results of the operator-attended and unattended noise surveys.

- L3 Adjacent Pacific Highway: ambient noise levels are dominated by road traffic from the Pacific Highway particularly during the day and evening periods. It was noted that noise levels from existing industrial operations were generally inaudible at attended monitoring locations in this area (for example, M2 and M3).

ii Assessment criteria

a. Project approval MP06_03111

Noise criteria specified in Condition 1, Schedule 3 of MP06_0311 are provided in Table 5.2.

Table 5.2 MP06_0311 noise criteria

Location	Day	Evening	Night	
	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
4 – di Rocco	49	49	35	49
5 – Keighran	47	47	35	49
6 – Swan	44	44	35	49
7 – Druitt	43	43	43	50
8 – May	46	46	46	50
9 – Jeans	45	45	45	52
11 – Jeans	40	40	40	52
18 – Jeans	43	43	43	52
20 –Knight and all other Chain Valley Bay residences	44	44	44	52

Condition 2 and 3 of Schedule 3 relate to noise mitigation and noise monitoring requirements and have been reproduced as follows.

Noise Mitigation

2. The Proponent shall prepare a report on potential noise mitigation measures for noisy equipment and activities undertaken on the site to the satisfaction of the Secretary. This report must be:

(a) prepared by a suitably qualified acoustic expert;

(b) submitted to the Secretary by the end of September 2008; and

(c) accompanied by an action plan for the implementation of any reasonable and feasible recommendations of the report.

Noise Monitoring

3. The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Secretary. This program must:

(a) be submitted to the Secretary by the end of September 2008; and

(b) include the use of attended noise monitoring measures to monitor the performance of the project.

b. Project specific noise criteria

Industrial sites in NSW are regulated by the local council, DP&E and/or the EPA. Noise limits are derived from application of the NSW Industrial Noise Policy (INP) guidelines (EPA 2000) or noise levels that can be achieved at a specific site following the application of all reasonable and feasible noise mitigation.

The INP guidelines for assessing industrial facilities have been used for this assessment. With respect to the criteria, the guidelines state:

> They are not mandatory, and an application for a noise producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development.

Assessment criteria depend on the existing amenity of areas potentially affected by the subject development. Noise assessment criteria for industry are based on the following objectives:

- protection of the community from excessive intrusive noise; and
- preservation of amenity for specific land uses.

To ensure these objectives are met, the EPA provides two separate criteria: intrusiveness criteria and amenity criteria. A fundamental difference between the intrusiveness and the amenity criteria is the period they relate to:

- intrusiveness criteria — apply over 15 minutes in any period (day, evening or night); and
- amenity criteria — apply to the entire assessment period (day, evening or night).

Detail on the intrusiveness and amenity criteria are given in Sections 4.2.1 and 4.2.2 of Appendix D, respectively.

The NIA was undertaken with reference to the noise criteria specified in Condition 1, Schedule 3 of MP06_0311 as well as the project specific noise levels (PSNLs) determined in accordance with the INP and with reference to the ambient noise monitoring undertaken by EMM.

The PSNLs determined for MC for all relevant assessment periods are indicated in bold in Table 5.3. Note that for locations 9, 11, 18 and 20 both the intrusive and amenity criteria apply during the night.

Table 5.3 Project specific noise levels

Location	Period[1]	Intrusive criteria dB(A), $L_{eq(15\text{-}min)}$	Amenity criteria dB(A), $L_{eq,period}$
4, 5 and 6	Day	**47**	60
	Evening	**47**	50
	Night	**39**	45
7 and 8	Day	**39**	60
	Evening	**39**	50
	Night	**37**	43
9, 11, 18 and 20	Day	**43**	60
	Evening	**43**	49
	Night	**43**	**39**

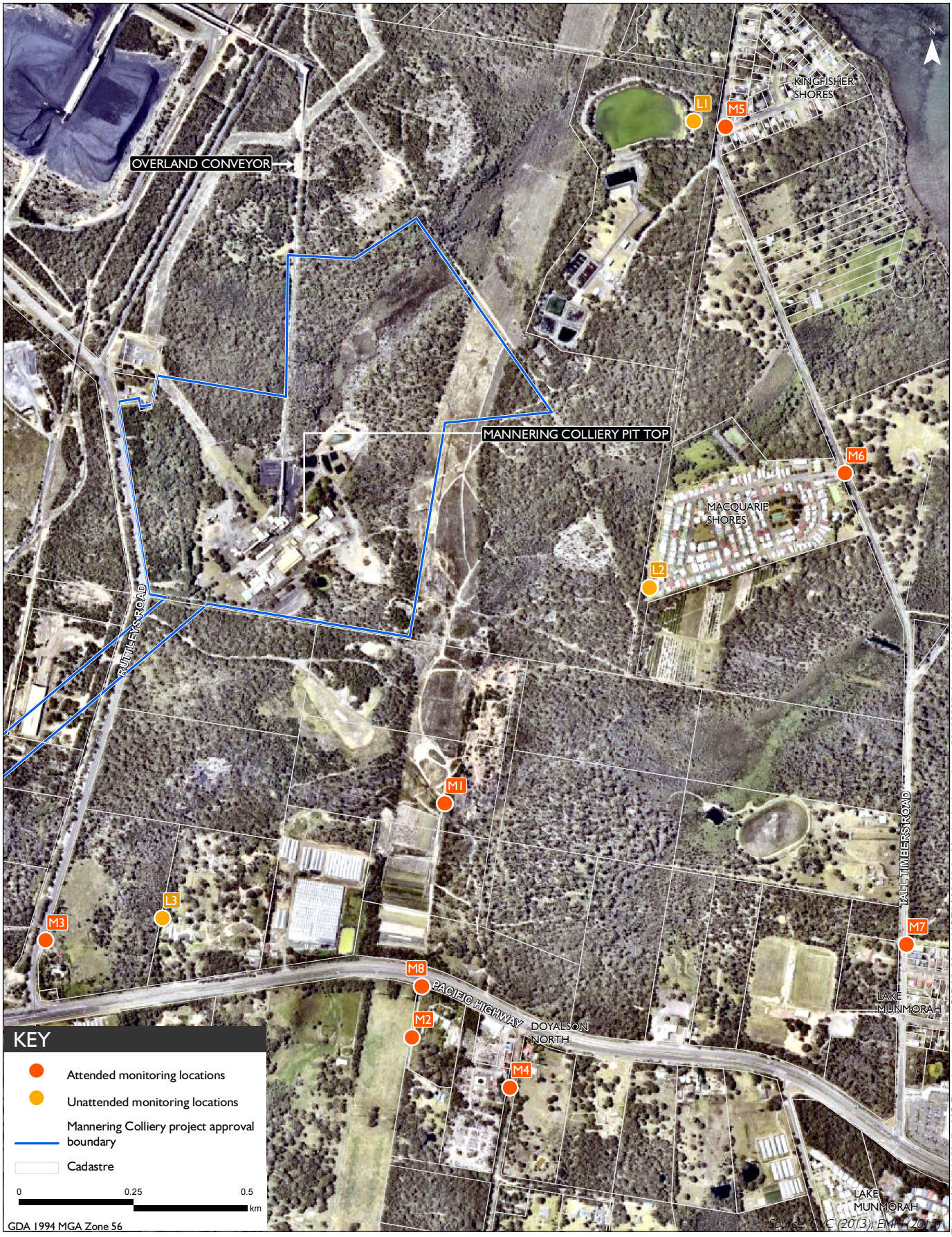
Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods.

5.2.2 Impact assessment

The proposed modification will only involve additional coal throughput using the existing infrastructure and will not change any aspect of the surface operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers. Whilst there will be a minor increase in production, this will be within the capacity of the existing plant and, hence, the increase in the maximum annual rate of coal throughput at MC surface facilities is not predicted to increase noise emissions. Accordingly, the NIA provides a contemporary assessment of approved operations, incorporating the proposed modification.

Predicted noise levels from MC operations at the assessment locations have been calculated based on the meteorological parameters shown in Table 5.4. Prevailing conditions (winds and inversion) based on a detailed analysis of weather data obtained from both the Bureau of Meteorology's (BoM) Automatic Weather Station (AWS) at Cooranbong, NSW (station number 061412) and MC's on-site weather station have been considered, as well as a worst case wind scenario assuming a 3 m/s source to receiver wind.

The use of a worst-case wind scenario provides a conservative assessment: it considers the highest potential noise levels at each assessment location, not just noise emission levels which result from meteorological conditions which are a feature of the area. This conservatism has been applied as it is likely that when noise limits are applied to the Project they would be applicable under winds of speeds up to 3 m/s from all directions.

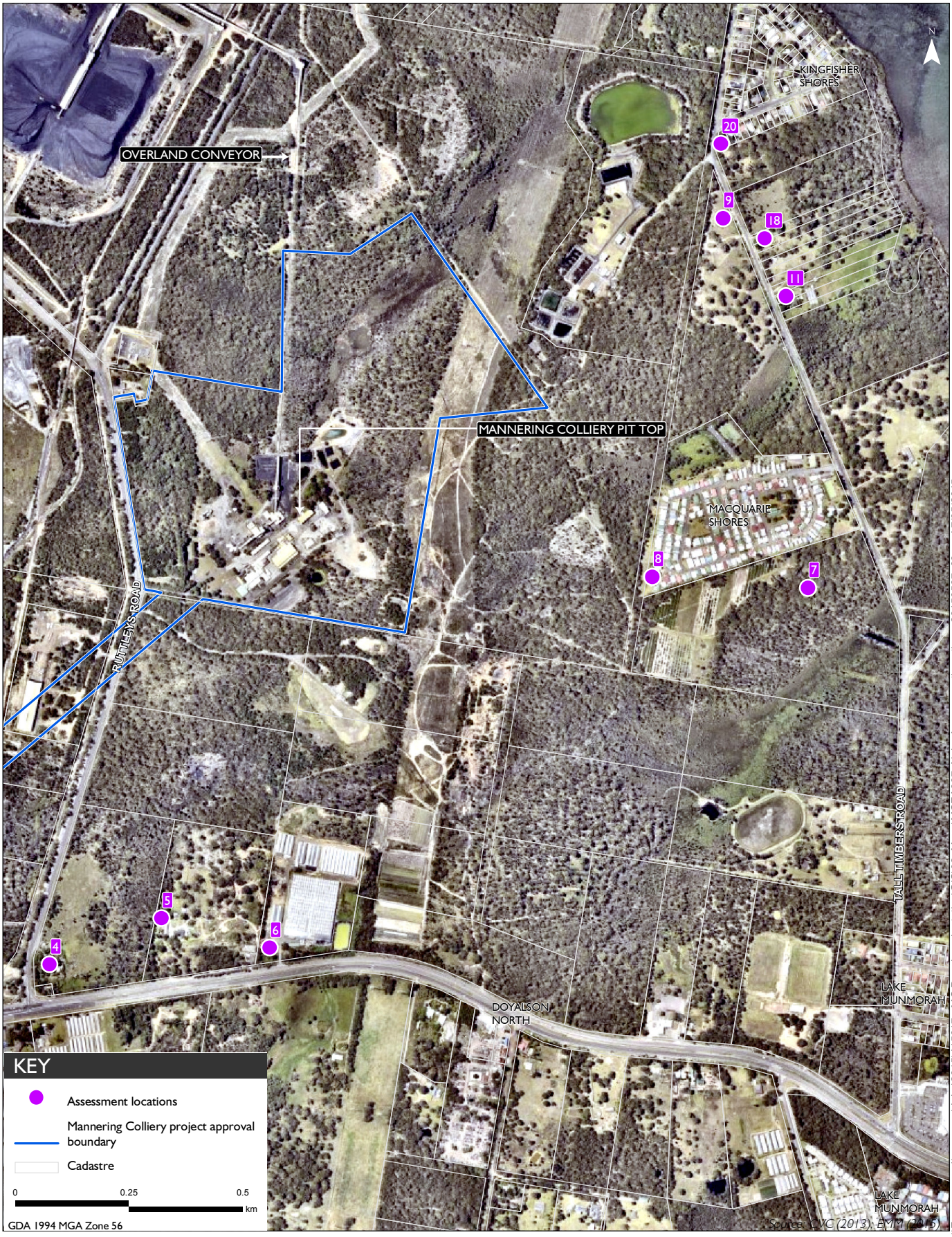


EMM
EMGA Mitchell McLennan

Noise monitoring locations

Mannering Colliery - Modification 3

Figure 5.1



EMM
EMGA Mitchell McLennan

Noise assessment locations

Mannering Colliery - Modification 3

Figure 5.2

Table 5.4 Weather conditions considered in noise modelling

Assessment period	Meteorological condition	Air temperature	Relative humidity	Wind speed[1]	Stability category (temperature gradient)
Day	Calm	20°C	70%	0 m/s	D class
	Wind	20°C	70%	2.3 m/s[2]	D class
Day/Evening	Wind	20°C	70%	3 m/s[3]	D class
Evening	Calm	20°C	70%	0 m/s	D class
	Wind	20°C	70%	2.1 m/s[4]	D class
	Wind	20°C	70%	2.4 m/s[5]	D class
Night	Calm	10°C	90%	0 m/s	D class
	Wind	10°C	90%	2.3 m/s[6]	D class
	Wind	10°C	90%	3 m/s[3]	D class
	Temperature inversion	10°C	90%	0 m/s	F class
	Temp inv + Drainage	10°C	90%	2 m/s[7]	F class

Note *1. Based on the 10th percentile wind speed of all winds present for 30% of the time during the relevant period.*

2. Wind directions considered include 67.5° to 180° (22.5° increments) from north (0°) based on data from Cooranbong BoM AWS.

3. Source to receiver wind direction.

4. Wind directions considered include 67.5° to 135° (22.5° increments) from north (0°) based on data from Cooranbong BoM AWS.

5. Wind directions considered include 225° to 270° (22.5° increments) from north (0°) based on data from Mannering on-site weather station.

6. Wind direction considered is 225° from north (0°) based on data from Mannering on-site weather station.

7. Wind direction considered was 247.5° from north (0°) based on data from Cooranbong BoM AWS.

It is noted that the previously predicted noise levels from the Bridges Acoustics (2007) NIA were used in establishing the noise criteria provided in MP06_0311. However, the Bridges Acoustics (2007) NIA utilised a different set of weather conditions for the purpose of predicting noise emission levels: calm during the day, 3 m/s wind from the north-east during the evening, and 1 m/s wind from the south-west during the night. Based on the meteorological data used within the Bridges Acoustics (2007) NIA, temperature inversions were not determined to be a feature of the area and, in accordance with the INP, were not subsequently assessed. Similarly, the Bridges Acoustics (2007) NIA, though assessing wind effects in accordance with the INP, did not adopt the conservative approach applied in this assessment.

EMM conducted a site visit on 19 March 2015 to undertake noise measurements at MC for the purpose of determining sound power levels of relevant equipment. Due to the nature of the current operations (care and maintenance) it was not possible to effectively measure all relevant equipment. Where direct measurement was not possible, sound power data was obtained from previous surveys at MC when it was fully operational or an EMM database of similar equipment. Sound power data adopted for the noise model are provided in Table 5.5.

The subsequent noise modelling has conservatively assumed that all plant and equipment operate simultaneously.

Table 5.5 Operational plant and equipment sound power levels

Plant and equipment	Sound power level - L_w, $L_{eq(15\text{-}min)}$, dB(A)
Compressors (x2)	106 per compressor[1]
Transfer house	113[2]
Crushing facility	113[2]
Vent fan (x2)	93 per fan[2]
Excavator	106[3]
Dozer (D9 or similar)	113[3]
Storage bin	106[3]
Conveyor – from underground to transfer house	92[1]
Conveyor – transfer house to crushing facility	87[1]
Conveyor – crushing facility to bin	100[1]
Conveyor – belt tensioner	98[1]
Conveyor – opening under bin	85[1]
Conveyor – bin to stockpile area	99[1]
Conveyor – overland conveyor	85 per metre[3]

Notes: *1.Obtained from direct measurement by EMM.*

2. Obtained from the previous report.

3. Obtained from EMM database of similar equipment.

During the site visit it was identified that the noise source most likely to cause sleep disturbance was the conveyor siren. This source was measured by EMM and the maximum noise level of the siren was confirmed to be the same as that presented in Bridges Acoustics (2007) NIA, i.e. L_{max} 122 dB(A).

Predicted noise emission levels from MC at all assessment locations are provided in Table 5.6. All noise emission levels provided are $L_{Aeq(15\text{-}min)}$ unless otherwise noted.

Noise emission levels predicted to be above the existing project approval conditions are indicated by shading. Noise emission levels predicted to be above the determined PSNLs are indicated by bold text.

Table 5.6 Predicted operational noise levels

Assessment location	Period	Predicted operational					Noise criteria, dB(A)	
		Calm	Prevailing wind	Inv	Inv+Dr	Source to receiver wind	MP06_0311	PSNL
4	Day	36	39	n/a	n/a	39	49	47
	Evening	36	39	n/a	n/a	39	49	47
	Night	37	34	**40**	n/a	**40**	35	39
5	Day	39	42	n/a	n/a	42	47	47
	Evening	39	42	n/a	n/a	42	47	47
	Night	**40**	36	**43**	n/a	**43**	35	39
6	Day	38	41	n/a	n/a	41	44	47
	Evening	38	41	n/a	n/a	41	44	47
	Night	39	35	**42**	n/a	**42**	35	39

Table 5.6 Predicted operational noise levels

Assessment location	Period	Predicted operational					Noise criteria, dB(A)	
		Calm	Prevailing wind	Inv	Inv+Dr	Source to receiver wind	MP06_0311	PSNL
gg7	Day	35	31	n/a	n/a	38	43	39
	Evening	35	38	n/a	n/a	38	43	39
	Night	36	**39**	**39**	**39**	**39**	43	37
8	Day	**42**	**42**	n/a	n/a	**45**	46	39
	Evening	**42**	**45**	n/a	n/a	**45**	46	39
	Night	**43**	**46**	**46**	**46**	**46**	46	37
9	Day	37	40	n/a	n/a	40	45	43
	Evening	37	40	n/a	n/a	40	45	43
	Night	38 36 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	45	39 $L_{Aeq,period}$
11	Day	36	38	n/a	n/a	38	40	43
	Evening	36	38	n/a	n/a	38	40	43
	Night	37 35 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	40	39 $L_{Aeq,period}$
18	Day	35	38	n/a	n/a	38	43	43
	Evening	35	38	n/a	n/a	38	43	43
	Night	36 34 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	43	39 $L_{Aeq,period}$
20	Day	36	39	n/a	n/a	39	44	43
	Evening	36	39	n/a	n/a	39	44	43
	Night	37 35 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	44	39 $L_{Aeq,period}$

A discussion of results relevant to each assessment area is provided as follows:

- Adjacent Pacific Highway: noise emission levels at assessment locations 4, 5 and 6 are predicted to be up to 8 dB above the current approval conditions and up to 4 dB above the determined PSNLs. While an exceedance of up to 4 dB is considered to be moderate, it is noted that the difference between predicted noise levels presented in Table 5.6 and those presented in the Bridges Acoustics (2007) NIA is largely due to the different meteorological conditions considered. Importantly, as the proposal does not change the noise generating activities at the site, it is unlikely that there would be any perceptible change in the noise levels from those previously experienced during MC operations. Recommendations with regard to noise mitigation are discussed in Section 5.2.3.

- Macquarie Village: noise emission levels at assessment location 7 are predicted to be up to 2 dB above the relevant PSNL during the night-time period and at assessment location 8 are predicted to be up to 9 dB above the determined PSNLs during day, evening and night. However, MC noise emissions at these locations are predicted to remain in compliance with the current approval conditions.

- Kingfisher Shores: noise emission levels at assessment locations 9, 11, 18 and 20 are predicted to remain below both the determined PSNLs and the current approval conditions.

Noise modelling also demonstrates that L_{max} noise levels associated with the sirens would comply with the relevant sleep disturbance criteria provided in both the current project approval conditions and the PSNLs at all assessment locations.

Noise emissions beyond the current project approval period to June 2022 are as predicted above.

5.2.3 Mitigation and management

MC currently undertakes operational noise monitoring in accordance with the approved Noise Monitoring Program (Centennial Coal, 2011). A review of quarterly noise monitoring reports for the previous three years found that noise emissions from MC are typically inaudible at the nearest residential locations or, if they are audible, are significantly below the relevant noise criteria as specified in MP06_0311, although it is noted that MC has been on care and maintenance for the majority of this period. However, even prior to the commencement of care and maintenance, MC did not receive complaints with regard to noise from their neighbours and has not received any submissions from the general public relating explicitly to noise in regarding to the original assessment for MP06_0311 and subsequent modifications.

When the care and maintenance program ceases and MC once again becomes operational, a report on potential noise mitigation measures will be prepared by a suitably qualified expert. Consistent with Schedule 3 Condition 2 of MP06_0311, an action plan will be prepared regarding the implementation of any reasonable and feasible at source noise mitigation recommendations identified in the report.

5.2.4 Conclusion

As the proposal does not change the noise generating activities at the site, it is unlikely that there would be any perceptible change in the noise levels from that previously experienced during MC operations. Hence, the change in noise emissions under the proposed modification compared to the approved development is assessed as negligible.

The NIA provides a contemporary assessment of the approved operations, incorporating the increased annual coal throughput at MC's surface facilities.

Potential noise emission levels from MC have been predicted and compared to both the current approval conditions and the PSNLs. Predicted noise levels at Macquarie Village (locations 7 and 8) and Kingfisher Shores (locations 9, 11, 18 and 20) are similar to those previously predicted (Bridges Acoustics, 2007) and are below or equal to the noise criteria provided in the current project approval conditions. Noise emission levels at the Pacific Highway residences (location 4, 5 and 6) are predicted to be up to 8 dB above the current project approval conditions and up to 4 dB above the determined PSNLs.

Given the predicted exceedances of the relevant noise criteria an investigation into potential at source noise mitigation measures will be prepared once the care and maintenance program ceases.

5.3 Air quality

An air quality assessment (AQA) of the proposed modification was prepared by Pacific Environment Operations Pty Limited (PE). The assessment is presented in full in Appendix E and a summary is provided below.

5.3.1 Existing environment

i Overview

Existing air quality in the local area is influenced by particulate matter emissions from mining activities, power generation, vehicle movements and other industrial activities.

The potential for particulate matter to disperse and result in impacts on nearby sensitive receivers is dependent on the quantity of particulate matter generated, its size, and the prevailing wind direction and speed. Annual and seasonal windroses of meteorological data used in the assessment, provided in Appendix E, show that in summer the wind is predominantly from the south/south-east and north-east, while in winter the wind is predominantly from the south-west. Autumn and spring experience a combination of these wind conditions. Meteorological data are collected at MC's meteorological station, shown in Figure 5.3.

Nearby sensitive receivers are as described in Section 5.2.1.

Given the relative proximity of CVC to MC, where appropriate, relevant air quality data from CVC was also utilised in the PE (2015) assessment. This includes data from the 2013, PAEHolmes (now PE) AQA (PAEHolmes, 2013) prepared as part of the Environmental Impact Statement to accompany the application for SSD-5465.

ii Assessment criteria

a. Project approval MP06_0311

Condition 16, Schedule 3 of MP06_0311 requires the proponent to ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions do not cause exceedance of the criteria listed in Table 5.7 at any residence on privately-owned land. These criteria are consistent with the EPA Approved Method criteria for deposited dust discussed in the section below.

Table 5.7 MP06_03101 impact assessment criteria

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
TSP	Annual	2g/m^2/month	4g/m^2/month

b. Impact assessment criteria

The air quality criteria relevant to the assessment are outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (the EPA Approved Methods, Department of Environment and Conservation (DEC) 2005b) and summarised in Table 5.8.

Table 5.8 EPA Approved Methods impact assessment criteria

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Total	90µg/m^3
PM_{10}	Annual	Total	30µg/m^3
	24 hour	Total	50µg/m^3
Deposited dust	Annual	Incremental	2g/m^2/month
		Total	4g/m^2/month

Note: 1. µg/m^3 – micrograms per cubic metre.

2. g/m^2/month – grams per square metre per month.

c. NSW DP&E Voluntary Land Acquisition and Mitigation Policy

On 15 December 2014, DP&E released a policy relating to voluntary mitigation and land acquisition criteria for air quality and noise.

The policy sets out voluntary mitigation and land acquisition rights where it is not possible to comply with the relevant EPA impact assessment criteria, even with the implementation of all reasonable and feasible avoidance and/or mitigation measures.

The voluntary mitigation and acquisition criteria are summarised in Table 5.9 and Table 5.10, respectively. The proposed modification has been assessed against these criteria, in addition to the project approval and EPA impact assessment criteria presented in Table 5.7 and 5.8.

Table 5.9 DP&E particulate matter mitigation criteria

Pollutant	Criterion	Averaging period	Application
TSP	90µg/m^3	Annual	Total impact(1)
PM_{10}	30µg/m^3	Annual	Incremental impact(2)
	50µg/m^3	24 hour	Total impact(1)
Deposited dust	2g/m^2/month	Annual	Incremental impact(2)
	4 g/m^2/month	Annual	Total impact(1)

Note: 1.Total (cumulative) impact includes the impact of the proposed modification and all other sources.

2. Zero allowable exceedances of the criterion over the life of the development when impact of the proposed modification considered in isolation.

Table 5.10 DP&E particulate matter acquisition criteria

Pollutant	Criterion	Averaging period	Application[1]
TSP	90 µg/m^3	Annual mean	Total impact[1]
PM_{10}	50 µg/m^3	24-hour average	Incremental impact[2]
	30 µg/m^3	Annual mean	Total impact[1]
Deposited dust	2 g/m^2/month	Annual mean	Incremental impact[2]
	4 g/m^2/month	Annual mean	Total impact[1]

Notes: *1. Voluntary acquisition rights would apply where the proposed modification contributes to exceedances of the acquisition criteria at any residence or workplace on privately-owned land or, on more than 25% of any privately-owned land, and a dwelling could be built on that land under exiting planning controls.*

2. Total (cumulative) impact includes the impact of the proposed modification and all other sources.

3. Up to five allowable exceedances of the criterion over the life of the development when impact of the proposed modification considered in isolation.

Total (cumulative) impact includes the impact of the proposed modification and all other sources, whilst incremental impact refers to the impact of the proposed modification considered in isolation.

iii Existing air quality

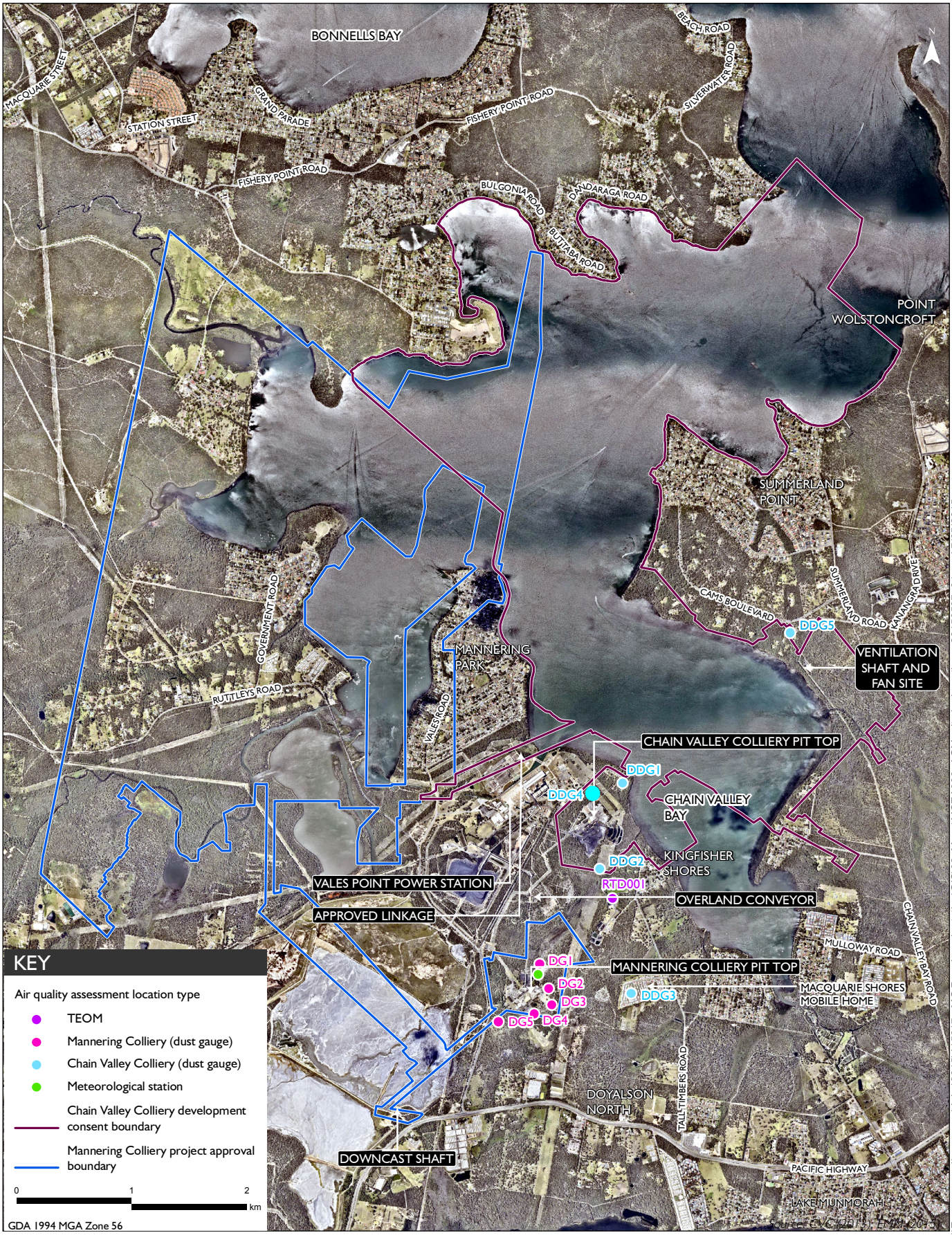
The network of air quality monitoring equipment across MC and CVC sites, shown in Figure 5.3, includes dust deposition gauges and a PM_{10} monitor known as a Tapered Element Oscillating Microbalance (TEOM) in reference to the method of analysis utilised by the monitor.

Measurements of 24-hour average PM_{10} since installation of the TEOM (23 December 2013) show:

- that there have been no exceedances of the 24-hour average PM_{10} criterion of 50 µg/m^3, with the highest recorded concentration being 38.7µg/m^3;
- the annual average PM_{10} value was 14.8 µg/m^3 during 2014 which is well below the annual PM_{10} criterion of 30 µg/m^3; and
- PM_{10} concentrations are generally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating the occurrence of windblown dust, and bushfires.

Insoluble solids deposition levels have been monitored at MC since 2006 and at CVC since 2012. Measurements show:

- no exceedances of the EPA dust deposition criteria of 4 g/m^2/month at MC or CVC since monitoring commenced; and
- across all sites, the annual average dust deposition is 1 g/m^2/month.



EMM
EMGA Mitchell McLennan

Air quality monitoring locations

Mannering Colliery – Modification 3

Figure 5.3

5.3.2 Impact assessment

The potential impact of the proposed modification as compared to the approved development on air quality is limited to the increase in ROM coal handling and throughput at MC, and the emissions generated beyond the current approval expiry date.

A semi-quantitative air quality assessment was undertaken to assess these potential impacts.

Column 1 of Table 5.11 reproduces the estimate of total TSP presented in the 2007 AQA for the continued operations at MC (MP06_0311) prepared by Holmes Air Sciences (HAS) (now Pacific Environment Operations Pty Limited) (HAS, 2007). For the purposes of this assessment, the TSP figures presented in the 2007 assessment were contemporised. This included the adoption of a more conservative figure for coal stockpiling (as a percentage of annual coal production) during periods of conveyor downtime (10% as opposed to 2% previously), a correction of the reclaim capacity of the conveyor system (1200tph as opposed to 2000 tph previously), and revision of the emission factor for bulldozers/front end loaders (FELs) used in the 2007 emissions inventory following its correction by the US EPA in 2010.

The HAS (2007) AQA showed that no exceedances of the relevant criteria were predicted at the nearest private residences and concluded that emissions less than 2 g/s would not produce a measureable change in concentrations of particulate matter at potentially sensitive receivers. The updated results based on the revised assumptions remain well below the 2 g/s emission rate.

Table 5.11 also presents the estimated TSP emissions arising from the proposed modification and shows an increase of 0.22 g/s and 0.37 g/s as a result of the proposed modification, compared with the HAS (2007) AQA predictions with and without the aforementioned revised assumptions. The emission rate, though increasing marginally, is still below the previously-identified 2 g/s and, as a consequence, is not expected to result in any noticeable change in the concentrations of particulate matter at sensitive receivers. The project approval, EPA and DP&E criteria would be met under the proposed modification.

Table 5.11 Estimated annual TSP emissions

	2007 MC AQA	Revised assumptions[1]	Proposed modification[1]
ROM (Mtpa)	1.1	1.1	1.3
Total TSP emissions (kg/yr)	48,304	52,687	59,609
Total TSP emissions (g/s)	1.52	1.67	1.89

Notes: 1. Includes revised stockpiling rate, reclaim rate and FEL emission factor.

5.3.3 Mitigation and management

Air quality at MC will continue to be managed in accordance with the existing air quality management regime prescribed in MC's air quality management plan. Additional mitigation and management measures are not warranted as a result of the proposed modification.

5.3.4 Conclusion

No significant changes in predicted air quality impacts to those described and assessed in the HAS (2007) AQA and currently adequately managed on-site are predicted under the proposed modification.

5.4 Bushfire

As with all rural settings where vegetation is present, there is a risk that bushfires could occur in or near MC. There is therefore a risk that a bushfire could damage buildings and present a hazard to human life. This was brought into focus in October 2013 when MC's pit top area and the nearby CVC ventilation fan site were threatened by a bushfire, which resulted in damage to minor assets at MC (as shown in Photographs 5.1 to 5.3). Accordingly, LakeCoal engaged EMM to assess the risk so that bushfire protection measures, such as APZs, could be determined and implemented at MC.

The APZ assessment has been included in this EA as implementation of APZs generally requires vegetation clearing/disturbance which, in turn, has potential ecological and Aboriginal cultural heritage impacts that require assessment.

This section summarises the bushfire hazard assessment and describes the requisite APZs. Outcomes of the ecological and Aboriginal cultural heritage assessments are provided in Sections 5.5 and 5.6, respectively.

Bushfire risks have been assessed in accordance with the PBP guideline. Although the PBP guideline focuses on protection of habitable buildings on bushfire prone land and the buildings at MC are industrial in nature and are not permanently inhabited by people. The PBP guideline nevertheless represents the standard method for assessing bushfire risks in NSW and has been used in this instance.

The proposed modification does not seek approval for new surface infrastructure. Therefore, approval is not being sought for new buildings, and comprehensive reporting of the bushfire hazard assessment in this EA is not required. Notwithstanding, a bushfire management plan will be prepared for MC which will incorporate the risk assessment procedures and bushfire protection measures in the PBP guideline, RFS (2008) *Bushfire risk management planning guidelines for bushfire management committees* and RFS (2014) *Development planning:* a *guide to developing a bushfire emergency management and evacuation plan*. The preparation of the bushfire management plan is separate to this application.

Photograph 5.1 **MC bushfire damage – southern edge of the main car park**

Photograph 5.2 **MC bushfire damage – storage/laydown area looking south-west**

Photograph 5.3 MC bushfire damage – looking south-west to the main storage/laydown area

5.4.1 Existing environment

According to the PBP guideline classifications, the vegetation surrounding MC comprises forests and forested wetlands, which are described below. The specific vegetation communities are shown in Table 5.12. Forests are particularly vulnerable to bushfire.

The nearest vegetation to structures at MC is in the north-west, approximately 10 m from the upcast vent shaft.

5.4.2 Impact assessment

i Assessment method

Bushfire risks have been assessed in accordance with the PBP guideline. The aim of the PBP guideline is "*to use the NSW development assessment system to provide for the protection of human life (including fire-fighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, onsite amenity and protection of the environment*" (RFS 2006).

The objectives of the PBP guidelines are to:

- afford occupants of any building adequate protection from exposure to a bushfire;
- provide for a defendable space to be located around buildings;
- provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;

- ensure that safe operational access and egress for emergency service personnel and residents is available;
- provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in APZ; and
- ensure that utility services are adequate to meet needs of firefighters (and other assisting in bushfire fighting).

The NSW *Rural Fires Act 1997* requires the owners of land to prevent the ignition and spread of bushfires on their land. The measures adopted in the bushfire management plan for MC will aim to ensure that the risk of bushfire ignition and spread will be as low as reasonably practicable.

Under Section 1.1 of the PBP guideline, MC is categorised as 'other development', that is, development which is not an 'integrated development' such as a residential/rural residential subdivision or as having special fire protection purposes. 'Other development' is required to satisfy the aim and objectives of the PBP guideline. Section 2.5 of the PBP guideline requires proponents of major projects to consult the PBP guidelines when making environmental assessments.

Notwithstanding, bushfire hazards at MC have been assessed in accordance with Appendix 4 of the PBP guidelines (Submission requirements for DAs on bushfire prone land), with the APZ specifications for residential and rural residential subdivision used to determine the APZs: MC buildings are generally non flammable (constructed of brick and metal) and there are large cleared areas near the centre of the pit top area where personnel can evacuate to quickly if there is an imminent bushfire emergency.

ii Asset protection zones

APZs for residential and rural residential subdivision purposes are designed to reduce heat flux at the facade of a building to not more than 29 kW/m^2. APZs provide fire vehicle access, reduce radiant heat, reduce convection winds, reduce ember attack and allow smoke to disperse. APZs are divided into an 'inner protection area' (IPA) and an 'outer protection area' (OPA) for forest vegetation.

APZs were determined using the PBP guideline which compares the PBP bushfire hazard vegetation classification, bushfire weather and slope classes on bushfire prone land to derive their minimum extent. The vegetation communities and slope classes were characterised in accordance with Appendix 4 of the PBP guideline.

a. Bushfire prone land

The majority of MC is on land mapped as being in the 100 m buffer around category 1 bushfire prone vegetation on the Wyong Bushfire Prone Land Map.

Category 1 vegetation comprises areas of forest, woodlands, heaths (tall and short), forested wetlands and timber plantations (RFS 2014).

b. Vegetation

Between 2001 and 2004, Keith (2004) compiled broad scale native vegetation classifications and maps for NSW (the Keith formations) which are used in the PBP guideline to classify bushfire hazard vegetation formations (the PBP classifications). The bushfire hazard classification of the native vegetation was determined based on the PBP classifications and mapping for vegetation surrounding MC.

Vegetation communities surrounding MC and their PBP classifications are shown in Table 5.12 and Figure 5.7 of the ecology section of this report (Section 5.5). Where a mix of vegetation types exists, the type providing the greater hazard predominates. Based on Table A2.1 in the PBP guideline, the predominant bushfire hazard vegetation formations are forests (Figure 5.4).

Table 5.12 Vegetation classifications

Surveyed vegetation communities	PBP classifications
Smooth-barked Apple – Red Bloodwood open forest on coastal plains of the Central Coast, Sydney Basin	Forest
Swamp Oak Swamp Forest fringing estuaries, Sydney Basin and South East Corner Bioregions	Forested wetlands
Planted exotic vegetation	Managed land

There is disturbed vegetation, regarded as managed land, to the east of MC's pit top associated with a TransGrid high voltage powerline easement. This area is not considered further in this assessment as it is sparsely vegetated.

EMM
EMGA Mitchell McLennan

Predominant bushfire hazard vegetation

Mannering Colliery - Modification 3

Figure 5.4

c. Slope

Slope is an important contributor to a bushfire's rate of spread. A bushfire will spread quicker up a steep slope compared to a gradual slope or flat land. Slopes are classified according to the PBP guideline, and are combined with vegetation classes in an area to determine appropriate APZs.

Slopes in and for 100 m around MC were determined using a digital terrain model (1 m height resolution) based on the following PBP classifications:

i) All upslope vegetation (considered 0°);

ii) >0 to 5° downslope vegetation;

iii) >5 to 10° downslope vegetation;

iv) >10 to 15° downslope vegetation; and

v) >15 to 18° downslope vegetation.

The slope classes for 100 m around MC were calculated using the individual buildings as reference points.

The topography of MC is relatively flat, with only the two lowest slope classes identified in the PBP guideline represented: class (i) (all upslope vegetation), south of MC; and class (ii) (any vegetation greater than 0° and up to 5° downslope of a point), north of MC (Figure 5.5).

d. APZs

Based on the location of MC in the Greater Hunter Fire Weather Area (Fire Danger Index 100), the slope class (>0 to 5° downslope vegetation) and the predominant bushfire hazard vegetation type (forest) at MC, APZs for MC infrastructure have been determined in accordance with PBP guideline as 25 m, comprising a 15 m IPA and a 10 m OPA (Figure 5.6). Where not existing, the IPA will also include the establishment of a 4 m wide fire trail around certain MC assets (ie structures and buildings) to enable access for fire fighting vehicles.

Clearing of approximately 0.04 ha of planted exotic vegetation will be required to establish the fire trails within the IPA. No native vegetation will be cleared. Rather, vegetation would be selectively removed to meet APZ canopy cover requirements (primarily canopy cover), which is defined as disturbance for the purposes of bushfire and ecology assessments.

Disturbance of approximately 0.72 ha of vegetation will be required for the extension/establishment and ongoing management of the balance of the APZs beyond the fire trail, comprising:

- Smooth-barked Apple – approximately 0.05 ha;
- Swamp Oak Swamp Forest– approximately 0.35 ha; and
- exotic planted vegetation – approximately 0.32ha.

As described in Section 5.4.3, a bushfire management plan will be prepared that will describe the appropriate measures to manage the proposed fire trails and APZs. The extent of the vegetation proposed to be disturbed is shown in Figure 5.7.

EMM
EMGA Mitchell McLennan

Slope classes

Mannering Colliery - Modification 3

Figure 5.5

EMM
EMGA Mitchell McLennan

Asset protection zones

Mannering Colliery - Modification 3

Figure 5.6

5.4.3 Mitigation and management

APZs will be managed in accordance with the PBP guideline. A bushfire management plan will be prepared that will describe measures to minimise the risk of a bushfire damaging MC infrastructure or activities at MC initiating a bushfire. The measures will include the PBP guideline specifications for electricity, gas and water services as relevant.

The APZs will be maintained in a manner that prevents accumulation of fine flammable debris on the ground so that fuel quantities are reduced, thus lessening flame heights and potential crowning. General maintenance guidelines are described in Appendix 2 of the PBP guideline.

The PBP guideline nominates that APZs should be maintained as follows:

- IPAs
    - canopy cover kept at less than 15% of total surface area and at least 2 m from the roof line of a building;
    - garden beds and shrubs not to be located under trees and sited at least 10 m from any exposed windows or doors; and
    - lower limbs of trees up to 2 m above the ground are removed.
- OPAs
    - canopy cover kept at less than 30% of total surface area; and
    - understorey mowed annually before the fire season (usually September) to remove shrubs and long grasses.

Again, it is noted that the bushfire management plan is separate to the modification process. The proposed modification seeks approval for the potential environmental impacts associated with the extension/establishment of the APZs. Proposed management and mitigation for these impacts, which form part of the statement of commitments for the proposed modification, are provided in Chapter 6.

5.4.4 Conclusion

From the assessment of bushfire risks at MC, it was determined that APZs 25 m wide will be required. Implementation of these APZs will require vegetation clearing of approximately 0.04 ha of planted exotic vegetation and the disturbance of approximately 0.72 ha of vegetation, which comprises approximately 0.4 ha of native vegetation. Assessments of the ecological and Aboriginal cultural heritage impacts of this vegetation clearing/disturbance are provided in Sections 5.5 and 5.6, respectively.

Specifications for the APZs and other bushfire protection measures will be provided in a bushfire management plan to be prepared for MC.

5.5 Ecology

A biodiversity study was completed to assess the impacts on terrestrial ecology resulting from the proposed modification, specifically the vegetation clearing/disturbance required to extend/establish and maintain APZs for bushfire protection purposes.

The study aimed to identify/assess:

- the presence and likely occurrence of threatened terrestrial flora and fauna species listed under the TSC Act and EPBC Act at the site;
- potential impacts on biodiversity as a result of the proposed modification; and
- measures to avoid, minimise and mitigate potential impacts.

5.5.1 Existing environment

i Desktop assessment

A desktop assessment was undertaken to identify key biodiversity values of an area within a 10 km radius of MC's pit top. This included:

- a search of the BioNet Atlas of NSW Wildlife (10 km radius) for previous threatened species records (OEH 2015a);
- a search of the Commonwealth Department of Environment (DoE) Protected Matters Search Tool (10 km radius) for matters of NES, including threatened species records (DoE 2015a); and
- a review of profiles for NSW and Commonwealth listed threatened biodiversity (OEH 2015b; DoE 2015b, RBGDT 2015).

Previous local studies and plans were also reviewed, comprising:

- *Vegetation Survey, Classification and Mapping: Lower Hunter and Central Coast Region* (Lower Hunter and Central Coast Regional Environment Strategy (LHCCREMS) 2000);
- *Flora and Fauna Investigations Vales Point Power Station Perimeter Lands Biodiversity Update* (Ecotone Ecological Consultants 2010);
- *Chain Valley Colliery Biodiversity Management Plan* (EMM and LDO 2014); and
- *Vales Point Power Station Perimeter Lands Biodiversity Surveys* (EMM unpublished data 2013 - 2014).

ii Field survey

A field survey was completed on 8 April 2015 by an EMM senior ecologist. The biodiversity survey focused on the areas proposed to be cleared/disturbed for bushfire protection purposes around MC's pit top area (referred to as the survey area for the purposes of the ecology assessment)(Figure 5.7).

Weather conditions were warm during the survey, with a minimum temperature of 11.9°C and maximum of 23.4°C (BOM 2015). No rain was experienced during the survey.

iii Identification and mapping of vegetation communities

Existing vegetation mapping from *Vegetation Survey, Classification and Mapping: Lower Hunter and Central Coast Region* (LHCCREMS 2000) was verified in the field. The vegetation mapping and community descriptions were used as a guide to identifying plant community and biometric vegetation types present within the survey area.

Floristic and structural vegetation data was collected from 20 x 20 m quadrats and 50 m transects in accordance with the BioBanking Assessment Methodology (OEH 2014). The number of plots and transects was determined by using mapped vegetation communities as stratification units. One plot and transect was completed in the only large patch of native vegetation within the survey area to confirm its composition and condition (Plot 1 - Figure 5.7). This information was also used to identify potential vegetation impacts from the proposed modification.

Given the small size of areas to be cleared/disturbed, the level of past disturbance and modification to the natural environment, four rapid assessments were completed in the areas of vegetation to be cleared/disturbed for bushfire protection purposes (Rapid 1 to Rapid 4 - Figure 5.7). The main canopy, mid and understorey species were recorded during rapid assessments to characterise the vegetation communities present.

iv Targeted threatened flora searches

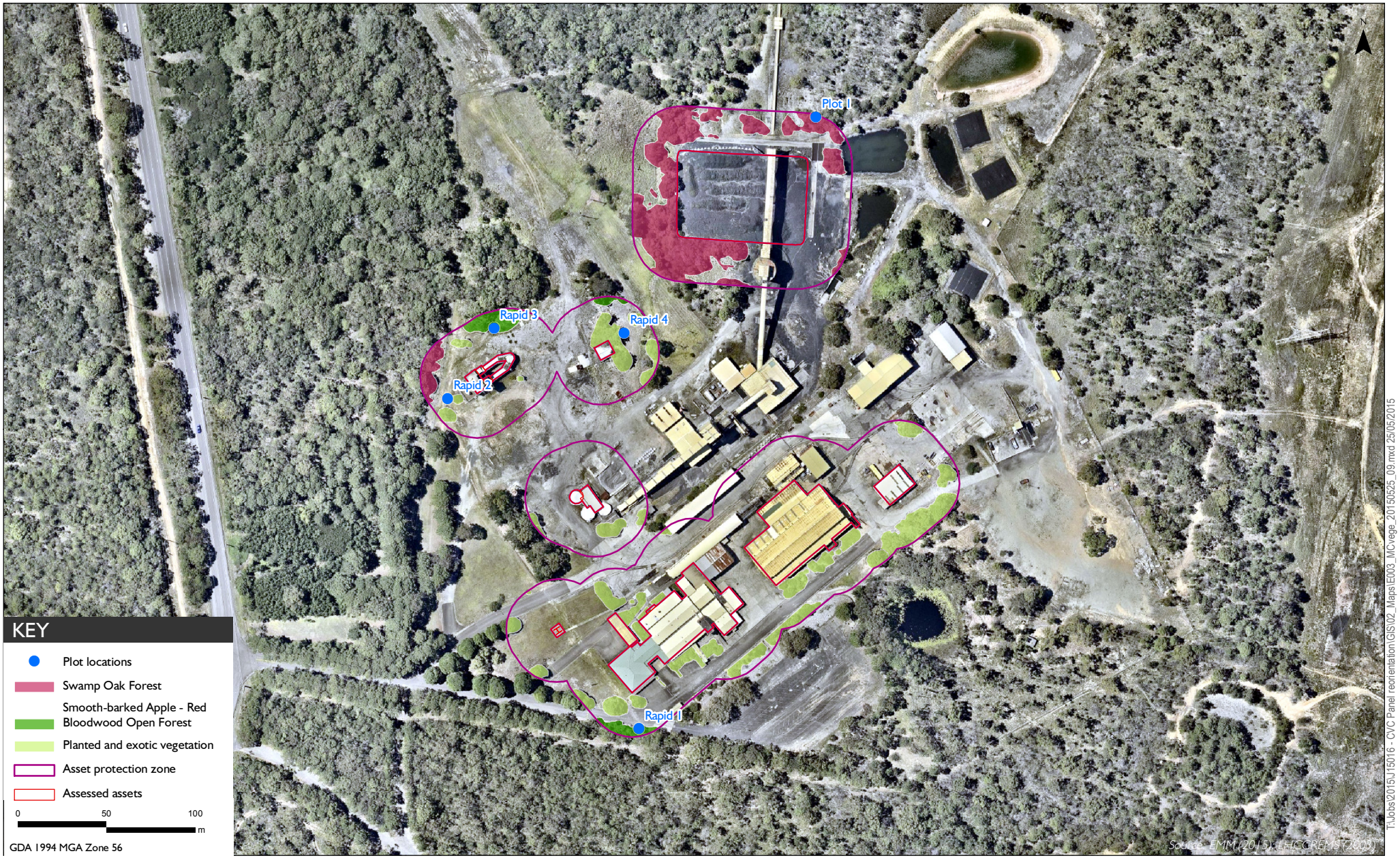
Targeted searches were carried out for threatened flora species previously recorded in or near the survey area that were considered likely to occur. This included searches for:

- Black-eyed Susan (*Tetratheca juncea*);
- Bynoe's Wattle (*Acacia bynoeana*);
- Charmhaven Apple (*Angophora inopina*); and
- Magenta Lilly Pilly (*Syzygium paniculatum*).

Systematic vegetation searches were completed in accordance with Cropper (1993) in areas of suitable habitat for each of the species identified as potentially occurring. A total of two person hours were spent targeting threatened flora species.

v Habitat assessment and opportunistic sightings

Fauna habitat was assessed throughout the survey area. Dedicated searches were undertaken for scats, tracks and other fauna signs at each quadrat location. Opportunistic fauna sightings were also recorded.



EMM
EMGA Mitchell McLennan

Native vegetation communities and plot/assessment locations

Mannering Colliery - Modification 3

Figure 5.7

vi Desktop assessment results

The LHCREMMS (2000) vegetation mapping indicates that the following vegetation types are present in and adjacent to the survey area:

- MU42 Riparian Melaleuca Swamp Woodland; and
- MU30 Coastal Plains Smooth-barked Apple Woodland.

Sixteen threatened ecological communities (TECs), listed under the TSC Act, have been previously recorded in the Wyong subregion of the Hunter-Central Rivers Catchment Management Authority (CMA), in which the survey area occurs. Seven plant, one frog, 24 bird and 12 mammal species listed as threatened under the TSC Act have been recorded in the Atlas of NSW Wildlife (OEH 2015a) as occurring within 10km of the survey area. The Protected Matters Search Tool (DoE 2015a) predicts that 19 threatened plants, two threatened bird, five threatened frog and seven threatened mammal species or their habitat may occur within 10km of the survey area.

Ecotone Ecological Consultants (2010) completed detailed biodiversity surveys of the adjacent CVC pit top area and surrounds, approximately 1 km south-west of MC's pit top. Ecotone recorded the following threatened community and species:

- Swamp Sclerophyll Forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions endangered ecological community (listed under the TSC Act); and
- a Grey-headed Flying-fox (*Pteropus poliocephalus*). Grey-headed Flying-foxes are listed as vulnerable species under the TSC and EPBC Acts.

A migratory species, the White-bellied Sea Eagle (*Haliaeetus leucogaster*) was also recorded proximal to CVC's vent shaft. Scats of the European Red Fox (*Vulpes vulpes*) and Feral Rabbits (*Oryctolagus cuniculus*) have also been recorded near CVC's pit top and vent shaft (EMM unpublished data 2014).

vii Field assessment results

A total of 30 plant species were recorded during the survey, comprising 22 native and eight exotic species. Of the exotic plant species recorded, Crofton Weed (*Ageratina adenophora*) is listed as a Class 4 locally controlled weed in the Wyong LGA. The growth of Class 4 weeds must be managed in a manner that continuously inhibits the ability of the plant to spread and the plant must not be sold, propagated or knowingly distributed.

No threatened flora species were recorded during the survey, nor was habitat deemed to be suitable for their occurrence (Appendix F). Therefore, threatened flora species have not been considered further in this assessment.

Two native vegetation communities were recorded in the survey area. Table 5.13 shows the vegetation communities, their relationship to vegetation types and the dominant plant species in each stratum.

Table 5.13 Vegetation communities in the areas to be cleared/disturbed

Vegetation community	Biometric Vegetation Type/ Plant Community Type	Dominant canopy species	Dominant midstorey species	Dominant understorey species	Condition
Swamp Oak Swamp Forest fringing estuaries, Sydney Basin and South East Corner Bioregions	HU635 PCT1234	Swamp Oak (*Casuarina glauca*), Broad-leaved Paperbark (*Melaleuca quinquenervia*)	-	Blady Grass (*Imperata cylindrica*), Bracken (*Pteridium esculentum*), Crofton Weed (*Ageratina adenophora**)	Low understorey diversity and charred tree stumps as the site has had a recent fire.
Smooth-barked Apple – Red Bloodwood open forest on coastal plains of the Central Coast, Sydney Basin	HU621 PCT1619	Red Bloodwood, Smooth-barked Apple (*Angophora costata*)	Black She-oak, Coffee Bush (*Breynia oblongifolia*),	Bamboo (*Phyllostachys* sp*), Paspalum (*Paspalum distichum**), Whiskey Grass (*Andropogon virginicus**)	The understorey is dominated by exotic species.

Notes: 1. Source: Vegetation community (LHCCREMS 2000), Biometric Vegetation Type (OEH 2012), Plant Community Type (OEH 2015c).
*2. *denotes exotic plant species.*

Plot data from the Swamp Oak Swamp Forest fringing estuaries, Sydney Basin and South East Corner Bioregions vegetation community was compared to the final determination for Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions, an EEC listed under the TSC Act (NSWSC 2004). The Swamp Oak Forest community in the survey area meets the description of Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions for the following reasons:

- it has a dense to sparse tree layer dominated by Swamp Oak (*Casuarina glauca*);
- other trees, including Paperbarks (*Melaleuca* spp.) are present as subordinate trees; and
- the understorey is characterised by a sparse cover of shrubs and a continuous groundcover of forbs, sedges, grasses and leaf litter.

The survey area contains potential habitat for the following threatened fauna groups and species previously recorded within a 10km radius:

- woodland birds: Little Lorikeet (*Glossopsitta pusilla*), Scarlet Robin (*Petroica boodang*) and White-fronted Chat (*Epthianura albifrons*);
- microbats: Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), Eastern Freetail Bat (*Mormopterus norfolkensis*) and Little Bentwing Bat (*M. australis*); and
- Grey-headed Flying-fox (*Pteropus poliocephalus*).

Plot and rapid assessment data was compared to Koala food trees for the Central Coast area (Department of Environment and Climate Change (DECC) 2008). The survey area does not contain any feed tree species, and does not therefore contain potential Koala habitat.

5.5.2 Impact assessment

i Potential direct impacts

a. Loss of native vegetation

No native vegetation will be cleared, although small patches of native vegetation will be disturbed around MC's pit top area for the extension/establishment of APZs for bushfire protection purposes. In accordance with the identified bushfire protection measures (Section 5.4.3), the APZs will be 25 m, comprising an IPA of 15 m (including fire trail establishment) and an OPA of 10 m.

Maintenance requirements described in the PBP guideline for IPAs and OPAs are given in Section 5.4.4.

Trees will only be selectively removed to meet the criteria of 15% cover in the IPA and 30% cover in the OPA. Important structural components of the community (ie large flowering trees) will be prioritised for retention. Therefore, the areas provided in Table 5.14 will only be partially disturbed, and represent a highly conservative total disturbance area.

Table 5.14 Vegetation to be cleared/disturbed for the proposed modification

Vegetation community	TEC	Area to be cleared (ha)	Area to be disturbed (ha)
Smooth-barked Apple Red Bloodwood Open Forest (native)	-	Nil	0.05
Swamp Oak Swamp Forest (native)	Swamp Oak Floodplain Forest EEC	Nil	0.35
Planted exotic	-	0.04	0.32
Total		**0.04**	**0.72**

Notes: EEC – endangered ecological community.

b. Loss of fauna habitat

Habitat is limited for fauna species in the Smooth-barked Apple Red Bloodwood Open Forest, given the level of previous vegetation disturbance and prevalence of weed species. Fauna in the survey area is restricted to the more mobile species including birds and bats. There are no hollow-bearing trees in the survey area and consequently there will be no loss of shelter habitat as a result of the proposed vegetation disturbance. Habitat in the Swamp Oak Swamp Forest is also limited due to vegetation damage from a recent bushfire that has simplified the cover and diversity of native plant species.

Small areas with the following habitat features will be disturbed, namely:

- foraging habitats: flowering and fruiting trees and shrubs;
- shelter habitats: dense groundcover; and
- nesting habitats: dense shrubs that provide nesting opportunities for birds.

c. Fragmentation

Fragmentation will not result from the vegetation clearing/disturbance for the APZs. Vegetation disturbance will involve the selective removal of trees, shrubs and grasses located on the edge of larger patches of native vegetation, and therefore will not disrupt connectivity for fauna species.

d. Threatened biodiversity

Assessments of significance were completed in line with the Section 5A of the EP&A Act (and the EPBC Act where relevant) for the following fauna species and guilds (Appendix F):

- Swamp Oak Floodplain Forest EEC;
- woodland birds: Little Lorikeet, Scarlet Robin and White-fronted Chat;
- microbats: Eastern Bentwing Bat, Eastern Freetail Bat and Little Bentwing Bat; and
- Grey-headed Flying-fox.

Impacts are not predicted to be significant for the Swamp Oak Floodplain Forest EEC given the small area to be impacted, the selective nature of the vegetation disturbance in this area, and the abundance of this community in the adjacent area which will remain unaffected by MC operations.

Impacts are not predicted to be significant for threatened woodland birds, microbats and the Grey-headed Flying-fox as vegetation will be selectively removed from these small areas for the APZs. Breeding habitat is absent for these species, and the removal of foraging habitat (ie shrubs, flowering trees) will not have a significant impact on these species because the areas being disturbed are adjacent to large patches of contiguous and suitable alternative foraging habitat.

e. Key threatening processes (KTPs)

KTPs currently operating in the Smooth-barked Apple Red Bloodwood Open Forest include the '*loss and degradation of native plant and animal habitat by invasion of escaped garden plants'.* This KTP may be exacerbated by the disturbance of native vegetation for the APZs. Bamboo will be controlled in the area prior to vegetation disturbance to minimise the risk of spread.

The KTP, '*high frequency fire resulting in disruption of life cycle processes in plants and animals and loss of vegetation structure and composition*' is operating in the Swamp Oak Swamp Forest, with a recent bushfire simplifying the understorey species in the community. The proposed modification will not exacerbate this KTP as the works are being done to minimise bushfire risk.

KTPs related to introduced species including '*predation by the European Red Fox (Vulpes vulpes*)' and '*competition and grazing by the feral European Rabbit (Oryctolagus cuniculus)*' are also likely to be in operation at the site, as these species have been previously recorded nearby at CVC (EMM unpublished data 2014). Disturbance of native vegetation for the extension/establishment of APZs can lead to an increase in the abundance and extent of these species. As only small patches of native vegetation will be selectively disturbed on the edge of larger patches of native vegetation, it is unlikely that the proposed modification will exacerbate these KTPs.

The KTP '*clearing of native vegetation*' has been considered for the proposed modification. Under the final determination (NSWSC 2011), clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands. Given the small area and the selective nature of native vegetation to be disturbed, the proposed modification does not constitute this KTP.

ii Potential indirect impacts

a. Introduced species

European Red Foxes and Feral Rabbits have been previously recorded in the area (EMM unpublished data 2014). Disturbance of native vegetation for the extension/establishment of APZs can lead to an increase in the abundance and extent of these species. As only small patches of native vegetation will be selectively disturbed on the edge of larger patches of native vegetation, it is unlikely that these species will increase beyond existing levels.

Ground disturbance for the extension/establishment of the APZs may result in increased weed invasion given the presence of invasive weeds such as Bamboo. Ongoing weed maintenance will be completed in accordance with MC's land management plan to minimise the risk of further weed invasion into native vegetation.

b. Noise and dust

Given that the proposed modification generally represents a continuation of existing activities, the potential for noise and dust impacts on biodiversity are not expected to change under the proposed modification.

5.5.3 Mitigation and management

The following environmental safeguards will ensure biodiversity impacts from the proposed modification remain at an acceptable level:

- extension of activities nominated within existing land management plan to include APZ weed management procedures;
- prioritising the retention of larger trees in the APZs where possible; and
- relocation of felled trees adjacent to the APZs to create additional fauna habitat.

5.5.4 Conclusion

The impact of creating APZs adjacent to some infrastructure within the pit top area on terrestrial biodiversity has been assessed. The proposed modification will not have a significant impact on threatened biodiversity recorded or predicted to occur. To the contrary, vegetation clearing/disturbance for bushfire protection will have a positive effect on the KTP, '*high frequency fire resulting in disruption of life cycle processes in plants and animals and loss of vegetation structure and composition*' by reducing the bushfire risk to the Swamp Oak Floodplain Forest EEC in the event a fire arose at the MC site. The implementation of proposed safeguards will ensure that biodiversity impacts from the proposed modification are acceptable, without the requirement for offsetting.

5.6 Aboriginal heritage

The following section presents the Aboriginal cultural heritage assessment (ACHA) of the proposed modification.

5.6.1 Existing environment

i Landscape context

MC is located in a region known as the Central Coast Lowlands of NSW. This region is characterised by low lying terrain, alluvial plains and dune fields in coastal areas. The Central Coast Lowlands are dominated by the coastal Macquarie, Tuggerah and Munmorah Lakes.

Climatic conditions in the Lake Macquarie region have been stable for approximately 10,000 years and would have provided a good environment for human habitation. Natural resources, including the flora and fauna that may have provided food and material resources, are linked to the hydrology, geology and soil types in a region.

The geology of the region includes sandstone, interbedded sandstone and siltstone. Caves and overhangs created in sandstone cliffs and boulders may have been used for shelter while Lake Macquarie and the creeks that feed into the lake would have provided an abundance of food resources for Aboriginal people. The soils within the region form part of two soil landscapes: the Doyalson; and the Wyong.

ii Ethno-historical context

Discussions with relevant Aboriginal groups have identified that the Lake Macquarie region is of significance as it is a connection with ancestors and cultural heritage. The evidence of Aboriginal occupation in the landscape is highly valued and is a reminder to the Aboriginal community of their country and spirituality.

The dominant Aboriginal language group for the Lake Macquarie region was that of Awabakal-speaking people, though little was recorded about their territorial boundaries (Tindale 1974). The information recorded did suggest that the Hunter Valley Aboriginal groups, including the Awabakal, had a high level of interaction and intertribal relationships (Tindale 1974).

Extensive information about the Awabakal is available from the writings of L.E Threlkeld who established a mission in 1825 at Toronto on the shores of Lake Macquarie and, for seventeen years, recorded the language, traditions and material culture of the Awabakal people. He also observed the rich food resources of Lake Macquarie including fish, molluscs and wildlife. The Awabakal exploited this resource using canoes, spears, and wood and stone tools (Threlkeld in Gunson 1974).

iii Assessment method

The methods used to identify potential Aboriginal cultural heritage sites and/or values associated with the proposed modification comprised:

- a review of the previous archaeological investigations undertaken at MC and its surrounds;
- consultation with the registered Aboriginal parties (RAPs); and
- conducting an extensive search of the Aboriginal Heritage Information Management System (AHIMS) database to identify previously recorded Aboriginal sites.

Potential impact on Aboriginal cultural heritage under the proposed modification is limited to minor vegetation clearing/disturbance (approximately 0.76 ha) around the main MC pit top area to enable the extension/establishment of APZs. For the purpose of this section, this area is referred to as the 'proposed disturbance area'. The proposed disturbance area is shown in Figure 5.8 as the Asset Protection Zone (proposed).

Given the limited size of the proposed disturbance area, the nature of that disturbance, the outcomes of preliminary investigations including AHIMS searches, and the minimal potential for impact from the above activities, it was not considered necessary to survey the areas being disturbed as part of the proposed modification.

a. Previous archaeological investigations

Extensive previous archaeological studies have been completed in the Lake Macquarie region. These studies have provided information on the types of sites present and their distribution in the landscape. Previous studies in the Lake Macquarie area have identified that Aboriginal subsistence was focused on the estuarine shell beds on the lake margins. There is a strong association with shell midden sites and the lake shore, whereas stone artefact sites are often mixed with midden sites but also distributed adjacent to watercourses in the hinterland of Lake Macquarie.

Table 5.15 Relevant archaeological reports

Report title and author	Overview
Archaeological excavations at Swansea, annual report, Dyall 1975	A midden was excavated in the Swansea area. It contained shell, stone tools and bone. A large number of backed blades were recorded in the stone tool assemblage recovered from the midden. During this excavation, Dyall also excavated twelve burial and cremation sites.
Assessment of the Prehistoric Heritage in the Lake Macquarie Area, Haglund 1986	A review of Aboriginal archaeological sites in the Lake Macquarie area was undertaken with over 150 sites recorded. They included shell middens (48), open campsites (65), rock shelters (some with art) (10), grinding grooves (25), scarred trees (1), quarries (2) and one natural mythological site. As a result of the review, a seasonal model for occupation of the area was devised. The seasonal model suggested winter inland occupation and summer coastal occupation. The estuarine area of Lake Macquarie formed the resource bridge between the hinterland and the coast. The implication from this model is that the sites located along the shore of Lake Macquarie may be small transitory camps between the two main occupation areas.
Archaeological survey of proposed tourist resort 0020 at Summerland Point Lake Macquarie NSW, Brayshaw 1989	A survey of the Lake Macquarie foreshore was undertaken for the proposed development of a resort. The survey identified one midden site, west of Bonny Boy Gully. It contained a thin layer of shell and possible hearthstones. Flaked artefacts were rare or absent.
Archaeological investigation of Morisset Peninsula Sewerage Scheme, Dallas & Navin 1993	A survey of the proposed Morisset sewerage scheme was completed along the Morisset and Sunshine Peninsulas. A number of midden sites were identified, one of which are located within the boundaries of the proposed modification.

Table 5.15 Relevant archaeological reports

Report title and author	Overview
Lake Macquarie Aboriginal Heritage Study Stage 1a, Umwelt 2009a, Lake Macquarie Aboriginal Heritage Study Stage 1b Survey, Umwelt 2009b, Sustainable Management of Aboriginal Cultural Heritage in the Lake Macquarie Local Government Area: Lake Macquarie Aboriginal Heritage Management Strategy, Umwelt 2011	Lake Macquarie City Council commissioned a series of reports to understand the Aboriginal heritage of the Lake Macquarie LGA. A two stage Aboriginal heritage study was completed which involved extensive desktop research to predict site distribution and landscape sensitivity, followed by field investigations to refine the desktop results. Umwelt identified 16 areas which they considered were able to address gaps in knowledge for Aboriginal heritage in the LGA. These 16 areas fell into five landscape groups. 1. Lake foreshore areas, which had an archaeological record of midden sites, artefact scatters and isolated finds. It was considered that these areas were accessed by Aboriginal people due to the fish and shellfish resources available and were stayed at for short periods of time. 2. Major creek catchments, which had an archaeological record of artefact scatters, isolated finds, grinding grooves and scarred trees. These areas were considered to have a high level of cultural sensitivity. It was suggested that places close to both estuarine and freshwater areas would have provided diversity of resources and supported occupation by significant numbers of people. 3. Minor creek catchments, which had an archaeological record of artefact scatters, grinding grooves, middens, rock shelters and Potential Archaeological Deposits (PADs). These areas were considered to contain a diversity of resources. 4. Mountainous inland areas, which had an archaeological record of artefact scatters, grinding grooves, crying trees, burial sites, scarred trees, potholes/water wells, stone arrangements/direction markers, rock shelters and Aboriginal pathways. This area had a large proportion of grinding grooves suggesting it was visited due to its sandstone outcrops. 5. Coastal areas, which had an archaeological record of midden sites. A lack of ground surface visibility made site identification difficult. The Aboriginal Heritage Study was followed in 2011 by an Aboriginal Heritage Management Strategy which provided guidelines for the management of Aboriginal heritage in the LGA. It also identified areas of high conservation value in the Lake Macquarie LGA.
Cultural Heritage Report Wyee Point Reserve, RPS 2010	A due diligence assessment was undertaken in a proposed development over the Wyee Point Reserve. One midden was recorded and the extent of a previously recorded midden was determined.
Cultural Heritage Assessment Mannering Colliery, RPS 2011b	RPS undertook a cultural heritage study for the extension of mining at MC. During the field surveys, two new Aboriginal sites were identified: a midden and a culturally modified tree. In addition, the riparian zone of Wyee Creek was identified as an area of Aboriginal heritage sensitivity. It was recommended that should subsidence exceed 20 mm in areas of Aboriginal or historic heritage sensitivity that works should cease immediately and an assessment of potential impacts on Aboriginal or historic heritage items should be undertaken.
Myuna Colliery Extension of Mining Cultural Heritage Assessment, RPS 2011c	A cultural heritage assessment was undertaken for the extension of mining at Myuna Colliery. The survey identified six new Aboriginal sites with five assessed as of moderate significance and one site assessed as of high significance. The sites included middens, modified trees and cultural sites located on the shores of Lake Macquarie. Management recommendations included the development of an Aboriginal cultural heritage management plan (HMP) and archaeological monitoring if mining was to occur under Aboriginal sites.

Table 5.15 Relevant archaeological reports

Report title and author	Overview
Heritage Impact Assessment Chain Valley Colliery Continuation of Mining, AECOM 2011.	The impact of CVC on historic and Aboriginal heritage was assessed with desktop analysis and fieldwork. Three phases of fieldwork identified five new shell midden sites along the Lake Macquarie foreshore. Along with the new sites, six previously recorded sites were revisited. The potential for minor subsidence impacts on one site was considered as it was located above an area selected for mining first workings. Although subsidence was predicted to be less than 20 mm, monitoring of the site is being undertaken in accordance with the HMP.

b. AHIMS search

An extensive search of the AHIMS register was conducted on 17 August 2014 for an area of 5 km by 5 km encompassing MC (the search area). The search area was sufficient to define the pattern of previously recorded Aboriginal sites in the landscape as it covered adjacent catchments. The search revealed a total of 112 registered sites, the majority of which occurred along the Lake Macquarie foreshore. As shown in Table 5.16, middens were the most common site type recorded and accounted for 59% of the total sites registered. Isolated finds and scarred trees accounted for 14% and 9% of the total sites, respectively. The results of the search are presented in Appendix G and nearby sites are shown in Figure 5.8. No Aboriginal sites were located in the proposed disturbance area.

Table 5.16 AHIMS registered sites within the search area

Site type	Number of sites	Percentage
Isolated find	18	14%
Open camp site	3	3%
Midden	65	59%
Scarred tree	10	9%
Midden/open camp site	3	3%
Unknown	3	3%
Grinding groove	2	2%
Aboriginal place	1	1%
PAD	5	4%
Ochre quarry	1	1%
Aboriginal place/PAD	1	1%
Total	**112**	**100%**

c. Consultation

Detailed Aboriginal heritage consultation has been undertaken for previous MC EAs. Consultation was based on the most up-to-date guidelines at the time including the *Interim Community Consultation Requirements for Applicants* (ICCRs, DEC 2004), the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005a) and the *Aboriginal cultural heritage consultation requirements for proponents* (DECCW 2010). This resulted in the identification of the following Aboriginal parties who registered for previous assessments.

The RAPs for MC are:

- Awabakal Traditional Owners Aboriginal Corporation;
- Awabakal Descendants Traditional Owners Aboriginal Corporation;
- Bahtabah Local Aboriginal Land Council;
- Biriban Local Aboriginal Land Council;
- Guringai Tribal Link Aboriginal Corporation;
- Cacatua Culture Consultants;
- Darkinjung Local Aboriginal Land Council;
- Daniella Chedzey; and
- Wonn 1 Contracting.

A draft version of the ACHA was provided to the RAPs on 13 April 2015 and comments sought. Wonn 1 Contracting provided a response to the ACHA on 1 June 2015 which is contained in Appendix H. The response noted the extent of minor vegetation clearing and requested that should vegetation clearing extend outside of the APZs, a representative of the RAPs must be present during ground surface disturbance. The response also noted that given the length of time (4 years) since the previous Aboriginal heritage assessment at MC, and the numerous storm events that have occurred in that time, sites other than those identified in the AHIMS search may be present. No objections to the proposed modification were raised.

As of 1 June 2015 no other comments had been received in relation to the proposed modification. All groups were sent a copy of the final report. A record of consultation and correspondence with the RAPs is provided in Appendix H.

AHIMS sites and proposed disturbance area

Mannering Colliery - Modification 3

Figure 5.8

5.6.2 Impact assessment

No Aboriginal heritage items have been identified in the proposed disturbance area. The closest item is approximately 1 km to the north-east of the proposed disturbance area. This area will not be accessed or impacted during works.

The area to be cleared/disturbed as a result of APZ extension/establishment has been subject to high levels of disturbance from the construction of MC's pit top facilities and operational activities. There will be no clearing/disturbance of vegetation outside of the APZs. Consideration of the landforms within the proposed disturbance area and of previous archaeological investigations also indicates that artefacts or subsurface deposits are unlikely.

5.6.3 Mitigation and management

Activities at MC will continue to be managed in accordance with MC's Aboriginal cultural heritage management plan (ACHMP). However, given the current ACHMP for MC is integrated with other Centennial sites, a separate ACHMP will be developed for MC.

Consultation with the RAPs will continue to be undertaken in accordance with the consultation requirements prescribed in the approved ACHMP.

5.6.4 Conclusion

This ACHA has identified that there is negligible potential for any unknown Aboriginal heritage items to be impacted by the proposed modification. The closest site is approximately 1 km to the north-east of the proposed APZs and will not be impacted by the proposed modification. No other sites will be impacted by the proposed modification.

5.7 Other aspects

An assessment of the other environmental, social and economic aspects as a consequence of the proposed modification is provided in Table 5.17. This assessment is commensurate with the negligible levels of projected impacts on each aspect arising from the proposed modification.

No specific management measures regarding these aspects are warranted as a result of the proposed modification. Management for these aspects will continue in accordance with project approval requirements, EPL, various approved plans and other elements of the environmental management system as outlined in Section 3.2.

Table 5.17 Other environmental, social and economic aspects

Environmental aspect	Assessment
Surface water	The existing surface water management system has capacity to accommodate any additional pollutants that may be generated as a result of the increased throughput at MC's surface facilities without modification or upgrade. No alterations to surface infrastructure are proposed and disturbance associated with the clearing/disturbance of vegetation for bushfire protection purposes around the main pit top infrastructure is minimal (approximately 0.76 ha). The proposed vegetation clearing/disturbance would be undertaken in a way as to avoid any changes in surface water flows.

Table 5.17 Other environmental, social and economic aspects

Environmental aspect	Assessment
Geology and soils	As described above, the disturbance associated with the clearing/disturbance of vegetation for bushfire protection purposes is minimal (approximately 0.76 ha). There will be no impacts to geology and any impacts on soils as a result of the proposed vegetation clearing/disturbance will be managed in accordance with MC's existing water management plan, which includes an erosion and sediment control plan for management of impacts on soils.
Transport	The proposed modification will not generate additional employment at MC over and above that approved and will not, therefore, result in any changes to traffic or transport. As described in Section 3.1.4, the requirement for upgrade of the Ruttleys Road/MC access road intersection will not be triggered under the proposed modification.
Greenhouse gases	Greenhouse gas emissions directly associated with the proposed modification will be minimal and will be managed in accordance with the existing greenhouse gas and energy efficiency plan (energy savings action plan). Greenhouse gas emissions reporting will continue to be undertaken in accordance with the requirements of the *National Greenhouse and Energy Reporting Act 2007*.
Visibility	The proposed modification does not involve any new surface infrastructure and only minimal vegetation clearing/disturbance requirements in an already highly disturbed area of MC. Therefore, the proposed modification will not result in additional visual impacts. Visual amenity and lighting will continue to be managed in accordance with Schedule 3, Condition 19 of MP06_0311.
Social and economic	The proposed modification will permit the ongoing employment and expenditure associated with MC through to 30 June 2022. This modification is also directly linked with the production increase proposed at CVC, which will provide additional employment of up to approximately 60 full time equivalent persons, resulting in positive socio-economic benefits. As described in Sections 5.2 and 5.3, there will be no significant change in noise or dust amenity impacts under the proposed modification.
Waste management	No production waste or reject material is generated at MC. Non-production waste streams are managed in accordance with Schedule 3, Condition 23 of MP06_0311 and EPL 191. A total waste management system would continue to be implemented throughout the life of the project. The proposed modification will not generate any additional waste streams nor result in any material increase in the volumes of wastes generated at MC.
Hazards/risks	No change to the approved underground mining methods or extraction limits will occur at MC as a result of the proposed modification, with the additional coal throughput to be sourced from CVC and processed and handled through MC's existing infrastructure which has adequate capacity to accommodate the increase. Therefore, the level of hazards and risks will not be increased as a result of the proposed modification. Rather, hazards and risks will be reduced as a result of the additional bushfire protection measures that will be implemented.
Rehabilitation	The mine closure and rehabilitation measures for MC are described in the existing MOP which is currently valid until the 31 March 2018. Mine closure and rehabilitation will be in accordance with Conditions 13 and 15 of Schedule 3 in MP06_0311, with the surface facilities to be rehabilitated to the satisfaction of the Executive Director of Mineral Resources. As the proposed modification does not entail changes to the surface infrastructure and given the minor nature of the bushfire APZ requirements, there will be no impact on mine rehabilitation. The MOP would, however, be updated to reflect the proposed modification.

Chapter 6

Statement of commitments

Chapter 6 — Statement of commitments

6 Statement of commitments

This chapter provides commitments made to negate or minimise potential environmental impacts from the proposed modification. Environmental management under the proposed modification will continue in accordance with the existing environmental management processes of the various approvals, licenses and management plans documented in Section 3.2. Table 6.1 provides commitments specific to the proposed modification, and are additional to those identified in MP06_0311.

Table 6.1 Commitments

Aspect	Commitment
Noise	When the care and maintenance program ceases and MC becomes operational, a report on potential noise mitigation measures will be prepared by a suitably qualified expert. An action plan will be prepared regarding the implementation of any reasonable and feasible at source noise mitigation recommendations based on the outcomes of the report.
Ecology	MC's land management plan will be updated to include the following measures to manage the impacts of vegetation clearing/disturbance associated with the APZ requirements: • weed management procedures; • the retention of large trees as a priority where possible; • felled trees will be relocated adjacent to the APZs to create additional fauna habitat; and • an ecologist will complete a pre-disturbance survey to determine important components of the Swamp Oak Floodplain Forest EEC for retention in the APZs.
Aboriginal heritage	Activities at MC will continue to be managed in accordance with MC's Aboriginal cultural heritage management plan (ACHMP). Given the current ACHMP for MC is integrated with other Centennial sites, a separate ACHMP will be developed for MC.
Rehabilitation	Rehabilitation at MC will be undertaken in accordance with MC's mining operations plan, which will be updated to include any changes as a result of the proposed modification.

Chapter 7

Modification justification and conclusion

Chapter 7 — Modification justification and conclusion

7 Modification justification and conclusion

7.1 Introduction

This chapter considers the proposed modification against the relevant objects of the EP&A Act and provides a justification for its approval.

7.2 Objects of the Environmental Planning and Assessment Act 1979

The relevant objects of the EP&A Act are presented below, followed by a discussion on their application with regard to the proposed modification.

(a) to encourage

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment.

The proposed modification will provide an opportunity to bring about socio-economic benefits by providing for employment at MC above current 'care and maintenance' levels at MC and enabling increased employment at CVC (approximately 60 additional full time jobs as per the current CVC modification application).

The minimal/negligible potential environmental impacts associated with the proposed modification will be managed in accordance with MC's contemporary approval and the additional commitments identified in Table 6.1 of this report.

(ii) the promotion and co-ordination of the orderly and economic use and development of land.

The proposed modification is a minor alteration to an approved coal mine operation which represents an orderly and economic use of a resource approved for extraction for use in domestic power generation. The proposed modification will not impinge on land uses within and surrounding MC.

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats.

The proposed modification will result in minimal (approximately 0.76 ha) vegetation clearing/disturbance for bushfire protection purposes and will not significantly impact on native animals and plants, including threatened species, populations and ecological communities and their habitats.

(vii) ecologically sustainable development.

The principles of Ecologically Sustainable Development (ESD) are outlined in Section 6 of the NSW *Protection of the Environment Administration Act 1991* and Schedule 2 of the Environmental Planning and Assessment Regulation 2000. The consistency of the modification with each of these principles is discussed below.

Precautionary principle:

As described in Section 5.1, a preliminary environmental risk assessment was completed for the proposed modification with all risks rated as low (see Appendix B). Despite this, a more detailed assessment of potential noise and air quality impacts was completed in association with increased throughput, and of bushfire, ecology and Aboriginal cultural heritage in association with the extension/establishment of the APZs.

Assessments were completed in accordance with current government policies and guidelines by leading technical specialists. Where applicable, environmental safeguards have been developed to avoid or minimise any effect on the environment. On this basis, the proposed modification is consistent with the precautionary principle.

Inter-generational equity:

The principle of inter-generational equity puts an onus on society to ensure that the health, diversity and productivity of the environment are maintained, or enhanced, for the benefit of current and future generations. The proposed modification will have negligible potential to adversely affect the health, diversity or productivity of the environment and, therefore, will not adversely impact the current or future generations.

Conservation of biological diversity and maintenance of ecological integrity:

An assessment of the ecological impacts of the proposed modification has been undertaken in this EA. The modification will not significantly impact TECs, important fauna habitats, movement corridors, or potentially present threatened flora or fauna species or populations.

Improved valuation and pricing of environmental resources:

Potential adverse environmental impacts from the proposed modification are limited. It is anticipated that enabling the transportation of additional coal from CVC to the VPPS via MC surface facilities and conveyor will provide for an improved amenity outcome when compared with the truck haulage alternative.

Continued operation of MC, in accordance with MP06_0311 as modified, will ensure that environmental resources are valued both during and post mining.

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

The preparation of this EA has involved engagement with relevant State and local government bodies as described in Chapter 4.

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

The community has been consulted during the preparation of the EA through existing LakeCoal engagement tools and provision of briefing information, and will continue to be involved and consulted through MC's CCC and other mechanisms. The community will also have the chance to comment on the application during the public exhibition process. As of 1 June 2015 no issues of concern had been raised.

7.3 Conclusion

LakeCoal seeks to modify MP06_0311 to permit an increase in the rate of ROM coal throughput at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa and extend the project approval period from 31 March 2018 to 30 June 2022. It also seeks minor vegetation clearing/disturbance adjacent to some infrastructure at MC's pit top to enable the extension/establishment of APZs for bushfire protection purposes.

The proposed modification is a minor alteration to the approved development and should be approved as:

- it permits the ongoing employment and expenditure associated with MC (and CVC) through to 30 June 2022;
- it enables LakeCoal to operate both MC and CVC in a co-ordinated manner for the duration of its current agreement with Centennial;
- it provides adequate time for strategic planning and assessment of potential mining activities not approved under MP06_0311;
- it enables an increased level of bushfire protection for both the employees and assets essential for the continued operation of MC;
- benefits can be achieved with little to no risk of adverse environmental impact;
- it is aligned with the principles of ESD; and
- it meets all relevant government policies.

Further, the proposed modification supports the increased employment at CVC (approximately 60 additional full time jobs) and would enable the proposed coal supply to VPPS to be preferentially transported via conveyor.

Abbreviations

ACHA	Aboriginal cultural heritage assessment
ACHMP	Aboriginal cultural heritage management plan
AHIMS	Aboriginal heritage information management system
AQA	air quality assessment
APZ	asset protection zone
AWS	Automatic weather station
BoM	Bureau of Meteorology
CMA	catchment management authority
Centennial	Centennial Coal Company
CVC	Chain Valley Colliery
CHR	channelised right turn
CCF	coal crushing facility
CCC	community consultative committee
CCL	consolidated coal lease
dB	decibel
DoE	Department of Environment
DEC	Department of Environment and Conservation
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DP&E	Department of Planning & Environment
DRE	Division of Resources and Energy
ESD	ecologically sustainable development
EMM	EMGA Mitchell McLennan Pty Limited
EEC	endangered ecological community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EA	environmental assessment
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPA	Environment Protection Authority
EPL	environment protection licence
FELs	front end loaders
g	gram
ha	hectares
HAS	Holmes Air Science
INP	Industrial Noise Policy
IPA	inner protection area
ICCRs	Interim Community Consultation Requirements for Applicants
KTP	key threatening process
km	kilometre
LakeCoal	LakeCoal Pty Limited

LEP	local environmental plan
LGA	local government area
LHCCREMS	Lower Hunter and Central Coast Regional Environment Management Strategy
MC	Mannering Colliery
Mining Act	*Mining Act 1992*
ML	megalitres
m	metre
Mtpa	million tonnes per annum
MOP	mining operations plan
NES	national environmental significance
NIA	noise impact assessment
NSW	New South Wales
NSWSC	New South Wales Scientific Community
NOW	NSW Office of Water
RFS	NSW Rural Fire Service
OEH	Office of Environment and Heritage
OPA	outer protection area
PE	Pacific Environment Pty Limited
PAC	Planning Assessment Commission
PBP	Planning for Bushfire Protection
PADs	potential archaeological deposits
POEO Act	*Protection of the Environment Operations Act 1997*
PSNL	project specific noise limits
RAPs	registered Aboriginal parties
RBL	Rating background levels
ROM	run-of-mine
s	second
Mining SEPP	State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007
SSD	State significant development
TEOM	tapered element oscillating microbalance
TECs	threatened ecological community
TSC Act	*Threatened Species Conservation Act 1995*
tpa	tonnes per annum
tph	tonnes per hour
TSP	total suspended particulates
VPPS	Vales Point Power Station
WSC	Wyong Shire Council

References

AECOM, 2011, *Heritage Impact Assessment Chain Valley Colliery Continuation of Mining,* report prepared for LakeCoal Pty Limited.

Brayshaw H, 1989, Archaeological *survey of proposed tourist resort 0020 at Summerland Point Lake Macquarie NSW*, report to Bexford Pty Ltd.

Bridges Acoustic 2007, *Mannering Colliery – Environmental Noise Assessment.* Report prepared by Bridges Acoustic for Hansen Bailey Pty Ltd.

Bureau of Meteorology (BoM) 2015, Cooranbong (Lake Macquarie AWS), viewed 8 April 2015, http://www.bom.gov.au/.

Centennial Coal 2011, *Mannering Colliery Noise Monitoring Program.*

Cropper, S 1993*, Management of Endangered Plants*, CSIRO, East Melbourne.

Dallas M, 1986, *Pipeline route between Gwandalan and Mannering Park Sewage Treatment works*, report to the Public Works Department of NSW.

Department of Environment (DoE) 2015a, Protected Matters Search Tool, viewed 6 April 2015, http://www.environment.gov.au/epbc/protected-matters-search-tool.

Department of Environment (DoE) 2015b, Species Profile and Threats Database, viewed 6 April 2015, http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl.

Department of Environment and Climate Change (DECC) 2008, *Recovery Plan for the Koala (Phascolarctoscinereus)*, NSW Government.

Department of Environment and Conservation (DEC) 2004, *Interim Community Consultation Requirements for Applicants*, NSW Government.

Department of Environment and Conservation (DEC) 2005a, *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation*, NSW Government.

Department of Environment and Conservation (DEC) 2005b, *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*, NSW Government.

Department of Environment, Climate Change and Water (DECCW) 2010, *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010,* NSW Government.

Dyall L, 1975, *Archaeological excavations at Swansea*, annual report.

Ecotone Ecological Consultants 2010, *Flora and Fauna Investigations Vales Point Power Station Perimeter Lands Biodiversity Update.* Prepared By Ecotone for Aurecon Australia and Delta Electricity.

EMGA Mitchell McLennan (EMM) 2014, *Vales Point Power Station Perimeter Lands Biodiversity Surveys,* (unpublished). Report prepared by EMM for LakeCoal.

EMGA Mitchell McLennan (EMM) and LDO 2014, *Chain Valley Colliery Biodiversity Management Plan.* Report for LakeCoal.

Environment Protection Authority 2000, *Industrial Noise Policy*.

GHD 2015, *Mannering Colliery Road Safety Audit*. Report prepared by GHD Pty Ltd for LakeCoal Pty Ltd.

GSS Environmental 2012, *Environmental Assessment – Mannering Colliery – Extension of Mine Project.* Report prepared by GSS Environmental for Centennial Mannering Pty Ltd.

Haglund L, 1986, *Assessment of the Prehistoric Heritage in the Lake Macquarie Area*, report to the Lake Macquarie City Council.

Holmes Air Sciences 2007, *Mannering Colliery – Continuation of Mining Environmental Assessment – Air Quality and Greenhouse Gas Impact Assessment.* Report prepared by Holmes Air Sciences for Hansen Bailey Pty Ltd.

Keith, D 2004, *Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT*. NSW Department of Environment and Conservation.

Lower Hunter and Central Coast Regional Environment Management Strategy (LHCCREMS) 2000, Vegetation survey, classification and mapping, Lower Hunter and Central Coast Region v1.2, report to the Lower Hunter and Central Coast Regional Environment Management Strategy.

New South Wales Scientific Committee (NSWSC) 2004, Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions – Endangered Ecological Community Listing, viewed 14 April 2015, www.environment.nsw.gov.au/determinations/SwampOakFloodplainEndSpListing.htm.

New South Wales Scientific Committee (NSWSC) 2011, Clearing of Native Vegetation – Key Threatening Process Listing, viewed 14 April 2015, www.environment.nsw.gov.au/determinations/ClearingNativeVegKTPListing.htm.

Office of Environment and Heritage (OEH) 2012, *Definitions of Vegetation Types for Hawkesbury-Nepean CMA,* NSW Government.

Office of Environment and Heritage (OEH) 2014, *Biobanking Assessment Methodology,* NSW Government.

Office of Environment and Heritage (OEH) 2015a, Atlas of NSW Wildlife, viewed 6 April 2015, www.environment.nsw.gov.au/atlasapp.

Office of Environment and Heritage (OEH) 2015b, Threatened Species Profile Search, viewed 14 April 2015, www.environment.nsw.gov.au/threatenedSpeciesApp/.

Office of Environment and Heritage (OEH) 2015c, VIS Classification 2.1, viewed 13 April 2015, www.environment.nsw.gov.au/NSWVCA20PRapp/LoginPR.aspx.

Pacific Environment (PE) 2015, *Mannering Colliery Approval Modification – Air Quality.* Report prepared by Pacific Environment Limited for EMGA Mitchell McLennan Pty Ltd.

PAEHolmes 2013, *Air Quality Impact Assessment*. Report prepared by PAEHolmes for LakeCoal Pty Ltd.

Royal Botanic Gardens and Domain Trust (RBGDT) 2015, PlantNET – The Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney Australia, viewed 14 April 2015, plantnet.rbgsyd.nsw.gov.au.

RPS 2011a *Cultural Heritage Assessment Mandalong Mine Ventilation Air Methane Abatement Demonstration Project*, report prepared for Centennial Mandalong Pty Ltd.

RPS 2011b *Cultural Heritage Assessment Mannering Colliery*, report prepared for Centennial Mandalong Pty Ltd.

RPS 2011c *Myuna Colliery Extension of Mining Cultural Heritage Assessment,* report prepared for Centennial Mandalong Pty Ltd.

Rural Fire Service (RFS) 2006, *Planning for Bush Fire Protection Guideline*s.

Rural Fire Service (RFS) 2008, *Bush Fire Risk Management Planning Guidelines for Bushfire Management Committees.*

Rural Fire Service (RFS) 2014, *Development Planning: A Guide to Developing a Bush Fire Emergency Management and Evacuation Plan.*

Threlkeld L, in Gunson, N, 1974, *Australian Reminiscences and Papers of L E Threlkeld Missionary to the Aborigines (1824-1859)*, Canberra: Australian Institute of Aboriginal Studies.

Tindale N, 1974, *Aboriginal tribes of Australia, their terrain, environmental controls, distribution, limits, and proper names,* Berkeley: University of California Press.

Umwelt 2009a, *Lake Macquarie Aboriginal Heritage Study Stage 1a,* report to Lake Macquarie City Council.

Umwelt 2009b, *Lake Macquarie Aboriginal Heritage Study Stage 1b Survey*, report to Lake Macquarie City Council.

Umwelt 2011 *Sustainable Management of Aboriginal Cultural Heritage in the Lake Macquarie Local Government Area: Lake Macquarie Aboriginal Heritage Management Strategy,* report prepared for Lake Macquarie City Council.

Appendix A

Project Approval MP06_0311

Appendix A — Project Approval MP06_0311

A

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 5.

These conditions are required to:
- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Project Approval signed by Frank Sartor on 12 March 2008

Frank Sartor MP
Minister for Planning

Sydney 2008

SCHEDULE 1

Application No:	06_0311
Proponent:	Centennial Coal Company Limited
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Mannering Colliery – Continuation of Mining Project

Red text represents Modification 1 of October 2012 (06_0311 MOD 1)
Blue text represents Modification 2 of November 2014 (06_0311 MOD 2)

TABLE OF CONTENTS

DEFINITIONS

Annual review	The review required by Condition 3 of Schedule 5
Affected councils	Wyong Shire Council and Lake Macquarie City Council
Built features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, street, path, walk, or driveway; and any pipeline, water, sewer, telephone, gas or other service main
BCA	Building Code of Australia
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in Schedules 2 to 5 inclusive
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Department	Department of Planning & Environment
DRE	Division of Resources and Energy within the Department of Trade and Investment, Regional Infrastructure and Services
EA	Environmental Assessment titled *Mannering Colliery Environmental Assessment*, dated March 2007, including the response to submissions, dated 27 July 2007
EA (Mod 1)	Environmental Assessment titled *Mannering Colliery – Extension of Mine Project Section 75W Modification to Project Approval 06_0311*, as modified by the associated response to submissions dated 4 September 2012
EA (Mod 2)	Environmental Assessment titled *'Mannering Colliery – Modification 2, Environmental Assessment, Section 75W Modification to MP 06_0311'* dated April 2014, as modified by the associated response to submissions dated 15 September 2014
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the *Protection of the Environment Operations Act 1997*
Evening	The period from 6pm to 10pm
Feasible	Feasible relates to engineering considerations and what is practical to build
First workings	Extraction of coal by bord and pillar workings and the like
Incident	A set of circumstances that: • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this approval
Land	As defined in the EP&A Act, except for where the term is used in the noise and air quality conditions in Schedules 3 and 4 of this approval where it is defined to mean the whole of a lot, or contiguous lots, owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
LMCC	Lake Macquarie City Council
Mining operations	Includes all extraction, processing, handling, storage and transportation of coal carried out on the site
Minister	Minister for Planning, or delegate
Minor	Not very large, important or serious
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water
OEH	Office of Environment and Heritage within the Department of Primary Industries
Privately-owned land	Land that is not owned by a public agency, Vales Point Power Station or a mining company (or its subsidiary)
Proponent	Centennial Coal Company Limited or any other person or company (including LakeCoal Pty Limited) who rely on this approval to carry out the project that is subject to this approval
Project	Mannering Colliery Continuation of Mining Project as amended by EA Mod 1 and EA Mod 2

Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
ROM	Run-of-mine
RMS	Roads and Maritime Services
Second workings	Extraction of coal by pillar extraction methods
Secretary	Secretary of the Department, or nominee
Site	Land referred to in Appendix 1
SMP	Subsidence Management Plan
Statement of Commitments	The Statement of Commitments in Appendix 3
Subsidence	Subsidence of the land surface caused by underground coal mining
WSC	Wyong Shire Council

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Proponent shall implement all practicable measures to prevent and/or minimise any harm to the environment that may result from the construction, operation or rehabilitation of the project.

Terms of Approval

2. The Proponent shall carry out the project generally in accordance with the:
   (a) EA;
   (b) EA (Mod 1);
   (c) EA (Mod 2);
   (d) Statement of Commitments (see Appendix 3); and
   (e) conditions of this approval.

   Notes:
   - *The general layout of the project is shown in Figure 1 of Appendix 2.*
   - *The statement of commitments is reproduced in Appendix 3.*

3. If there is any inconsistency between the above documents, the latter document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.

4. The Proponent shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:
   (a) any reports, plans, programs or correspondence that are submitted in accordance with the conditions of this approval; and
   (b) the implementation of any actions or measures contained in these reports, plans, programs or correspondence.

Limits on Approval

5. Mining operations may take place until 31 March 2018.

   Note: Under this approval, the Proponent is required to rehabilitate the site to the satisfaction of the Secretary and DRE. Consequently this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated to a satisfactory standard.

6. The Proponent shall not extract more than 1.1 million tonnes of ROM coal a year from the site.

7. The Proponent shall ensure all coal produced on the site is transported by overland conveyor to Vales Point Power Station.

Management Plans / Monitoring Programs

8. With the approval of the Secretary, the Proponent may submit any strategy, plan or program required by this consent on a progressive basis.

   To ensure these strategies, plans or programs are updated on a regular basis, the Proponent may at any time submit revised strategies, plans or programs to the Secretary for approval.

   With the agreement of the Secretary, the Proponent may prepare any revised strategy, plan or program without undertaken consultation with all parties under the applicable conditions of this approval.

   Notes:
   - *While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.*
   - *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages and the trigger for updating the strategy, plan or program.*

Structural Adequacy

9. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

Demolition

10. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

Operation of Plant and Equipment

11. The Proponent shall ensure that all plant and equipment used on site is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

Community Enhancement Program

12. The Proponent shall pay the affected councils $0.02 for each tonne of ROM coal produced by the project for the purpose of improving water quality in the Lake Macquarie catchment. This payment shall be:
    (a) shared equally by the affected councils;
    (b) made by the end of March 2009, and at yearly intervals thereafter;
    (c) calculated on the ROM coal produced in the previous calendar year; and
    (d) subject to indexation by the Implicit Price Deflator, as published by the Australian Bureau of Statistics.

SCHEDULE 3
SPECIFIC ENVIRONMENTAL CONDITIONS

NOISE

Noise Impact Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately owned land.

Table 1: Noise limits dB(A)

Day $L_{Aeq(15\ min)}$	***Evening*** $L_{Aeq(15\ min)}$	***Night***		***Location*** (as listed in Appendix 4)
		$L_{Aeq(15\ min)}$	$L_{A1(1\ min)}$	
49	49	35	49	4 – di Rocco
47	47	35	49	5 – Keighran
44	44	35	49	6 – Swan
43	43	43	50	7 – Druitt
46	46	46	50	8 – May
45	45	45	52	9 – Jeans
40	40	40	52	11 – Jeans
43	43	43	52	18 – Jeans
44	44	44	52	20 – Knight and all other Chain Valley Bay residences

However, if the Proponent has a written negotiated noise agreement with any landowner of the land listed in Table 1, and a copy of this agreement has been forwarded to the Department and EPA, then the Proponent may exceed the noise criteria in Table 1 in accordance with the negotiated noise agreement.

Notes:

- *The receiver references in Table 1 are shown in the figure in Appendix 4.*
- *To determine compliance with the $L_{Aeq(15\ minute)}$ noise limits, noise from the project is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary. Where it can be demonstrated that direct measurement of noise from the development is impractical, the Department and EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy). The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.*
- *To determine compliance with the $L_{A1(1\ minute)}$ noise limits, noise from the project is to be measured at 1 metre from the dwelling façade. Where it can be demonstrated that direct measurement of noise from the project is impractical, the Department and EPA may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*
- *These limits apply under the relevant meteorological conditions outlined in the assessment procedures in Chapter 5 of the NSW Industrial Noise Policy.*

Noise Mitigation

2. The Proponent shall prepare a report on potential noise mitigation measures for noisy equipment and activities undertaken on the site to the satisfaction of the Secretary. This report must be:
   (a) prepared by a suitably qualified acoustic expert;
   (b) submitted to the Secretary by the end of September 2008; and
   (c) accompanied by an action plan for the implementation of any reasonable and feasible recommendations of the report.

Noise Monitoring

3. The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Secretary. This program must:
   (a) be submitted to the Secretary by the end of September 2008; and
   (b) include the use of attended noise monitoring measures to monitor the performance of the project.

SUBSIDENCE

4. The Proponent shall limit its coal extraction methods on the site to first workings only, and shall not undertake second workings.

5. Deleted.

SOIL AND WATER

Discharge

6. The Proponent shall only discharge water from the site as expressly provided for by its EPL.

7. The Proponent shall investigate, assess and report on the ecological interactions of minewater discharged from the site with the aquatic ecology of the unnamed creek and wetlands (and associated vegetation) between the minewater discharge point/s and Lake Macquarie. This report must:
   (a) be prepared in consultation with EPA by suitably qualified expert/s whose appointment/s have been approved by the Secretary;
   (b) be submitted to the Secretary by the end of March 2009; and
   (c) assess the probable alterations in the local ecology attributable to previous and proposed minewater discharges and any future cessation of minewater discharge flows.

Water Management Plan

8. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with NOW by suitably qualified expert/s whose appointment/s have been approved by the Secretary;
   (b) be submitted the Secretary by the end of March 2009; and
   (c) include a:
      - Site Water Balance;
      - Erosion and Sediment Control Plan;
      - Surface Water Monitoring Plan; and
      - Groundwater Monitoring Program.

Site Water Balance

9. The Site Water Balance must:
   (a) include details of:
      - sources and security of water supply;
      - water use on site;
      - water management on site; and
   (b) investigate, assess and report on measures to minimise water use by the project, particularly potable water from the Wyong Shire town water supply.

Erosion and Sediment Control

10. The Erosion and Sediment Control Plan must:
   (a) be consistent with the requirements of *Managing Urban Stormwater: Soils and Construction* (Landcom 2004, or its latest version);
   (b) identify activities that could cause soil erosion and generate sediment;
   (c) describe measures to minimise soil erosion and the potential for transport of sediment from the site;
   (d) describe the location, function, and capacity of erosion and sediment control structures; and
   (e) describe what measures would be implemented to monitor and maintain the structures over time.

Surface Water Monitoring Program

11. The Surface Water Monitoring Plan must include:
   (a) detailed baseline data on surface water flows and quality in creeks and other waterbodies that could be affected by the project;
   (b) surface water impact assessment criteria;
   (c) a program to monitor the impact of the project on surface water flows and quality; and
   (d) procedures for reporting the results of this monitoring.

Groundwater Monitoring Program

12. The Groundwater Monitoring Program must include:
    (a) detailed baseline data to benchmark the natural variation in groundwater levels, yield and quality;
    (b) groundwater impact assessment criteria;
    (c) a program to monitor the impact of the project on groundwater levels, yield and quality; and
    (d) procedures for reporting the results of this monitoring.

REHABILITATION

13. The Proponent shall rehabilitate the site to the satisfaction of the Secretary and DRE. Rehabilitation must be substantially consistent with the Rehabilitation Objectives described in the EA, the Statement of Commitments and the following objectives in Table 2 below.

Table 2: Rehabilitation Objectives

Feature	***Objective***
Mine site (as a whole of the disturbed land and water)	Safe, stable and non-polluting, fit for the purpose of the intended post-mining land use(s).
Surface Infrastructure	To be decommissioned and removed, unless the Secretary of the Department of Trade & Investment, Regional Infrastructure & Services agrees otherwise.
Portals and ventilation shafts	To be decommissioned and made safe and stable.
Other land affected by the development	Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: • local native plant species (unless the Secretary of the Department of Trade & Investment, Regional Infrastructure & Services agrees otherwise); and • a landform consistent with the surrounding environment.
Built features damaged by mining operations	Repair to pre-mining condition or equivalent unless: • the owner agrees otherwise; or • the damage is fully restored, repaired or compensated under the *Mine Subsidence Compensation Act 1961.*
Community	Ensure public safety.

13A. The Proponent shall carry out all surface disturbing activities in a manner that, as far as practicable, minimises potential for dust emissions and shall carry out rehabilitation of disturbed areas progressively, as soon as reasonably practicable, to the satisfaction of the DRE.

Land Management Plan

14. The Proponent shall prepare and implement a detailed Land Management Plan for the site to the satisfaction of the Secretary and DRE. This plan must:
    (a) be submitted to the Secretary by the end of September 2008;
    (b) be prepared by suitably qualified expert/s whose appointment/s have been endorsed by the Secretary;
    (c) be prepared in consultation with DRE, OEH and affected councils; and
    (d) include measures to:
        • minimise visual impacts;
        • control weeds, feral pests and access; and
        • manage bushfires; and
    (e) provide details of who is responsible for monitoring, reviewing and implementing the plan.

Rehabilitation Plan

15. The Proponent shall prepare and implement a Rehabilitation Plan for the site to the satisfaction of the DRE. This plan must:
    (a) be submitted within 3 months of approval of Mod 2 for approval by DRE prior to carrying out any disturbing activities of the development, unless otherwise agreed by the Secretary;
    (b) be prepared in accordance with DRE guidelines and in consultation with the Department, OEH, EPA, NOW, WSC and LMCC and the mine's CCC;
    (c) incorporate and be consistent with the rehabilitation objectives in the EA, Statement of Commitments and Table 2 above;

(d) integrate and build on, to the maximum extent practicable, the other management plans required under this approval; and
(e) address all aspects of mine closure and rehabilitation, including post-mining land use domains, rehabilitation objectives, completion criteria and rehabilitation monitoring and management.

Note: The approved Mining Operations Plan (which will become the REMP once the Mining Act Amendments have commenced) required as a condition of the Mining Lease(s) issued in relation to this project, will satisfy the requirements of this condition for a Rehabilitation Plan.

AIR QUALITY

Impact Assessment Criteria

16. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the development do not cause exceedances of the criteria listed in Table 3 at any residence on privately-owned land.

Table 3: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m^2/month	4 g/m^2/month

Note: Deposited dust is assessed as insoluble solids as defined by Standards Australia, 1991, AS/NZS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Monitoring

17. The Proponent shall prepare and implement an Air Quality Monitoring Program for the project to the satisfaction of the Secretary. This program must:
(a) be submitted to the Secretary by the end of September 2008; and
(b) use dust deposition gauges to monitor the performance of the project.

HERITAGE

Heritage Management Plan

18. The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Secretary. This Plan must:
(a) be prepared in consultation with any relevant Aboriginal stakeholders;
(b) be submitted, prior to 31 March 2013, for approval to the Secretary;
(c) include consideration of the Aboriginal and non-Aboriginal cultural context and significance of the site;
(d) detail the responsibilities of all stakeholders; and
(e) include programs/procedures and management measures for:
- dealing with previously unidentified Aboriginal objects (excluding human remains), including any need to halt works in the vicinity, assessment of significance, determination of appropriate mitigation measures (by a qualified archaeologist in consultation with Aboriginal stakeholders), re-commencement of works, notifying OEH, and registering the new site(s) in the OEH AHIMS register;
- dealing with any human remains which may be discovered, including halting of works in the vicinity; notifying NSW Police, OEH, the Department and Aboriginal stakeholders; and not re-commencing any works in the vicinity unless authorised;
- heritage induction for construction personnel (including procedures for keeping records of inductions);
- ongoing Aboriginal consultation and involvement (including procedures for keeping records of this);
- appropriate identification, management, conservation and protection of both Aboriginal and non-Aboriginal heritage items identified on the site; and

- dealing with previously unidentified non-Aboriginal heritage items which may be discovered during the project.

VISUAL

19. The Proponent shall:
    (a) ensure no outdoor lights shine above the horizontal;
    (b) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*;
    (c) take all practicable measures to mitigate off-site lighting impacts from the project; and
    (d) minimise the visual impacts of the project,
    to the satisfaction of the Secretary.

TRANSPORT

Monitoring of Coal Transport

20. The Proponent shall keep records of the amount of coal transported from the site each year, and include these records in the Annual Review.

Ruttleys Road Intersection

21. The Proponent shall:
    (a) complete a road safety audit of the intersection of Ruttleys Road and Mannering Colliery Access Road by the end of March 2009;
    (b) provide copies of this audit to RMS, WSC and the Secretary within one month of its completion; and
    (c) within 3 months of approval of Mod 2, install additional sections of guardrail (safety barrier) on the eastern side of Ruttleys Road between the Mannering Colliery access road and existing sections of guardrail further to the north;
    (d) be responsible for the maintenance and upkeep of the pavement of the Ruttleys Road/Mannering Colliery access road intersection whilst the site is used for mining purposes or until the intersection is upgraded to a Type CHR intersection treatment; and
    (e) prior to the number of workers (direct employees and contractors) at Mannering Colliery exceeding 70, the Proponent shall upgrade the Ruttleys Road/Mannering Colliery access road intersection to a Type CHR treatment in accordance with Construction Certificate SCC/69/2011 issued by WSC, or later updated versions of this Construction Certificate;
    to the satisfaction of the Secretary.

GREENHOUSE AND ENERGY EFFICIENCY

22. The Proponent shall prepare and implement a Greenhouse and Energy Efficiency Plan for the project to the satisfaction of the Secretary. This plan must:
    (a) be prepared in consultation with EPA and generally in accordance with the *Guidelines for Energy Savings Action Plans* (DEUS 2005, or its latest version);
    (b) be submitted to the Secretary for approval by the end of September 2008;
    (c) include a program to monitor greenhouse gas emissions and energy use generated by the project;
    (d) include a framework for investigating and implementing measures to reduce greenhouse gas emissions and energy use at the site; and
    (e) describe how the performance of these measures would be monitored over time.

WASTE

23. The Proponent shall:
    (a) monitor the amount of waste generated by the project;
    (b) investigate ways to minimise waste generated by the project;
    (c) implement reasonable and feasible measures to minimise waste generated by the project; and
    (d) report on waste management and minimisation in the Annual Review,
    to the satisfaction of the Secretary.

SCHEDULE 4
ADDITIONAL PROCEDURES

INDEPENDENT REVIEW

1. If a landowner considers the project to be exceeding the impact assessment criteria in schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.

   If the Secretary is satisfied that an independent review is warranted, the Proponent shall within 2 months of the Secretary's decision:
   (a) consult with the landowner to determine his/her concerns;
   (b) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to conduct monitoring on the land, to:
   - determine whether the project is complying with the relevant impact assessment criteria in schedule 3; and
   - identify the source(s) and scale of any impact on the land, and the project's contribution to this impact; and
   - give the Secretary and landowner a copy of the independent review.

2. If the independent review determines that the project is complying with the relevant impact assessment criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.

3. If the independent review determines that the project is not complying with the relevant impact assessment criteria in schedule 3, and that the project is primarily responsible for this non-compliance, then the Proponent shall:
   (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the project complies with the relevant criteria; and
   (b) conduct further monitoring to determine whether these measures ensure compliance.

   If the additional monitoring referred to above subsequently determines that the project is complying with the relevant criteria in schedule 3, or the Proponent and landowner enter into a negotiated agreement to allow these exceedances, then the Proponent may discontinue the independent review with the approval of the Secretary.

4. If the independent review determines that the relevant criteria in schedule 3 are being exceeded, but that more than one project is responsible for this non-compliance, then the Proponent shall, together with the relevant project/s:
   (a) take all reasonable and feasible measures, in consultation with the landowner, to ensure that the relevant criteria are complied with; and
   (b) conduct further monitoring to determine whether these measures ensure compliance; or
   (c) secure a written agreement with the landowner and other relevant projects to allow exceedances of the criteria in schedule 3,
   to the satisfaction of the Secretary.

   If the additional monitoring referred to above subsequently determines that the projects are complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Secretary.

5. If the landowner disputes the results of the independent review, either the Proponent or the landowner may refer the matter to the Secretary for resolution.

   If the matter cannot be resolved within 21 days, the Secretary shall refer the matter to an Independent Dispute Resolution Process.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, MONITORING, AUDITING AND REPORTING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall revise and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:
   (a) be submitted for approval to the Secretary prior to 30 June 2013;
   (b) provide the strategic framework for the environmental management of the project;
   (c) identify the statutory approvals that apply to the project;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
   (e) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance; and
      - respond to emergencies; and
   (f) include:
      - copies of any strategies, plans and programs approved under the conditions of this approval; and
      - a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
   (a) detailed baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
      - any relevant limits or performance measures/criteria;
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project;
      - effectiveness of any management measures (see (c) above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;
   (f) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedances of the impact assessment criteria and/or performance criteria; and
   (g) a protocol for periodic review of the plan.

   Note: The Secretary may waive some of these requirements if they are unnecessary for particular management plans.

Annual Review

3. By the end of February 2013, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:
   (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current financial year;
   (b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the:

- the relevant statutory requirements, limits or performance measures/criteria;
- requirements of any plan or program required under this approval;
- the monitoring results of previous years; and
- the relevant predictions in the EA and EA (Mod 1) and EA (Mod 2);

(c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
(d) identify any trends in the monitoring data over the life of the project;
(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
(f) describe what measures will be implemented over the current financial year to improve the environmental performance of the project.

Revision of Strategies, Plans and Programs

4. Within 3 months of:
(a) the submission of an annual review under Condition 3 above;
(b) the submission of an incident report under Condition 6 below;
(c) the submission of an audit under Condition 8 below; or
(d) any modification to the conditions of this approval (unless the conditions require otherwise),
the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Secretary.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

Community Consultative Committee

5. The Proponent shall continue to operate a Community Consultative Committee (CCC) for the project in accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and to the satisfaction of the Secretary.

Notes:
- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval; and*
- *In accordance with the guideline, the Committee should be comprised of an independent chair and appropriate representation from the Proponent, Councils and the local community.*

REPORTING

Incident Reporting

6. The Proponent shall notify, at the earliest opportunity, the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incidents associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

7. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

INDEPENDENT ENVIRONMENTAL AUDIT

8. By the end of March 2013 and every three years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
(b) include consultation with the relevant agencies;

(c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals); and

(d) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in any field specified by the Secretary.

9. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

10. The Proponent shall:

(a) make copies of the following publicly available on its website:

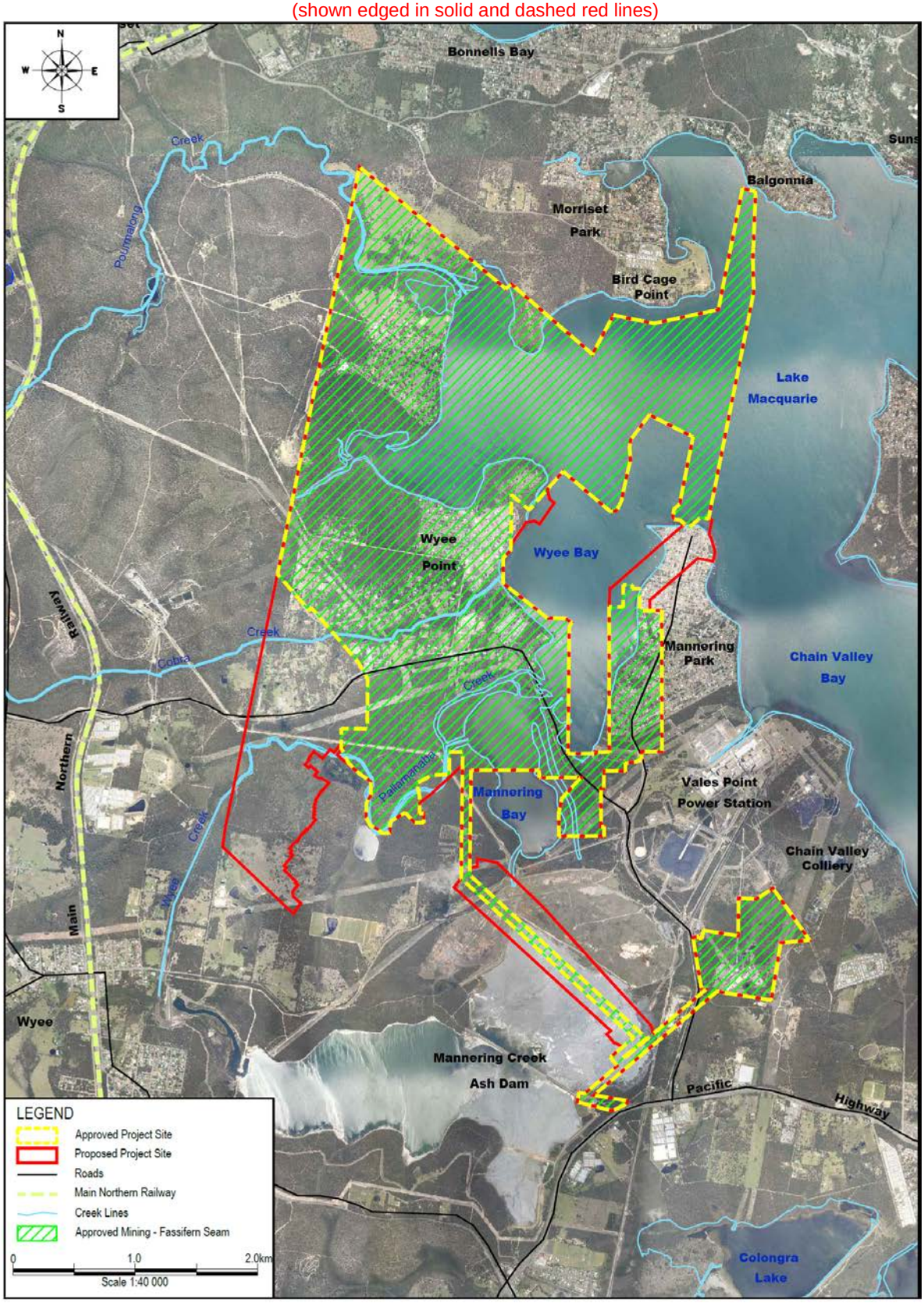
- the documents referred to in condition 2 of Schedule 2;
- all relevant statutory approvals for the project;
- all approved strategies, plans and programs required under the conditions of this approval;
- a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any approved plans or programs required under the conditions of this or any other approval;
- a complaints register, which is to be updated on a monthly basis;
- minutes of CCC meetings;
- the annual reviews required under this approval;
- any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit; and
- any other matter required by the Secretary; and

(b) keep this information up-to-date,

to the satisfaction of the Secretary.

APPENDIX 1: PROJECT LAND

Mannering Colliery – Land to which the Project Approval applies
(shown edged in solid and dashed red lines)



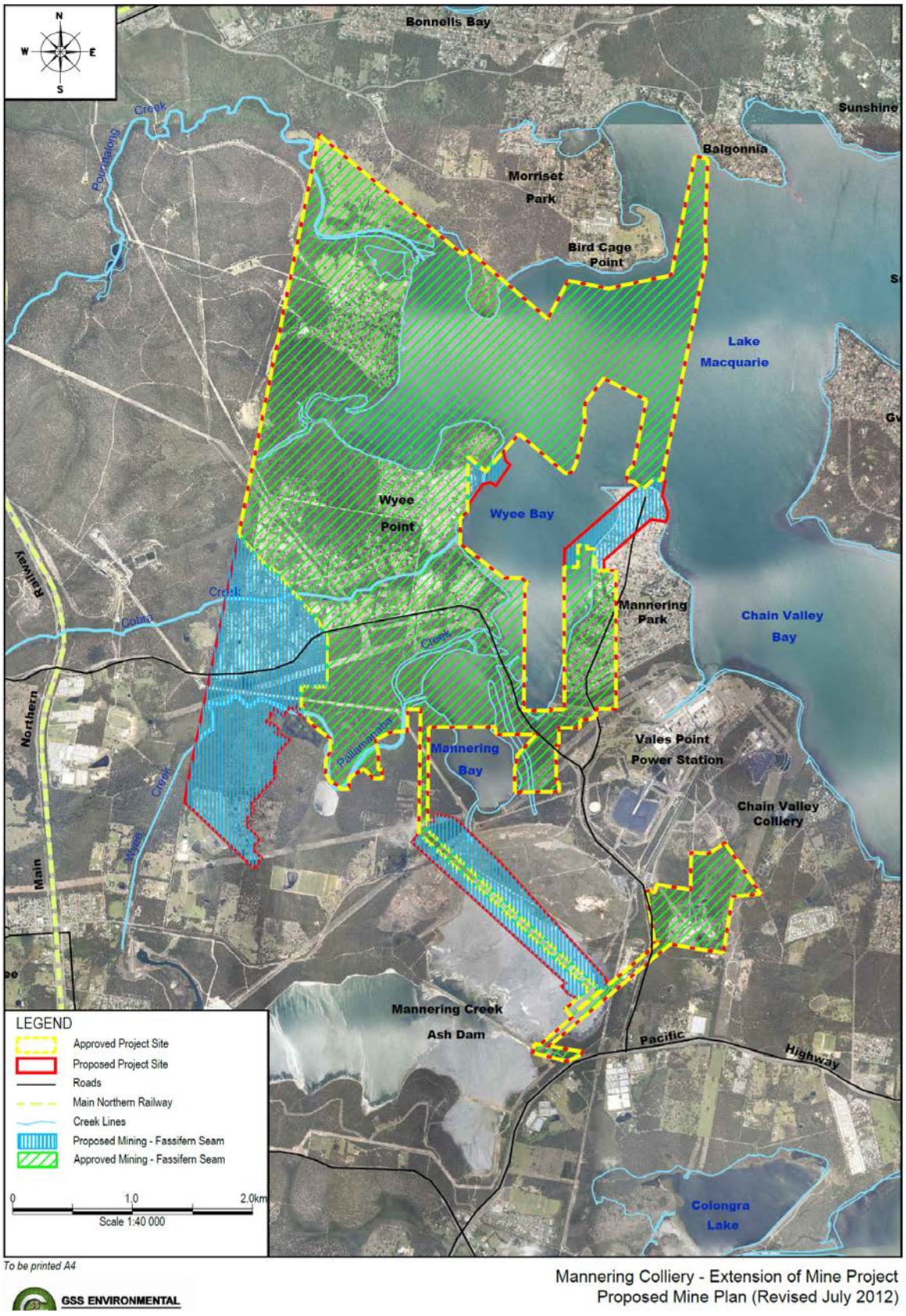


***Figure 1**: Revised Mine Plan for Fassifern Seam*

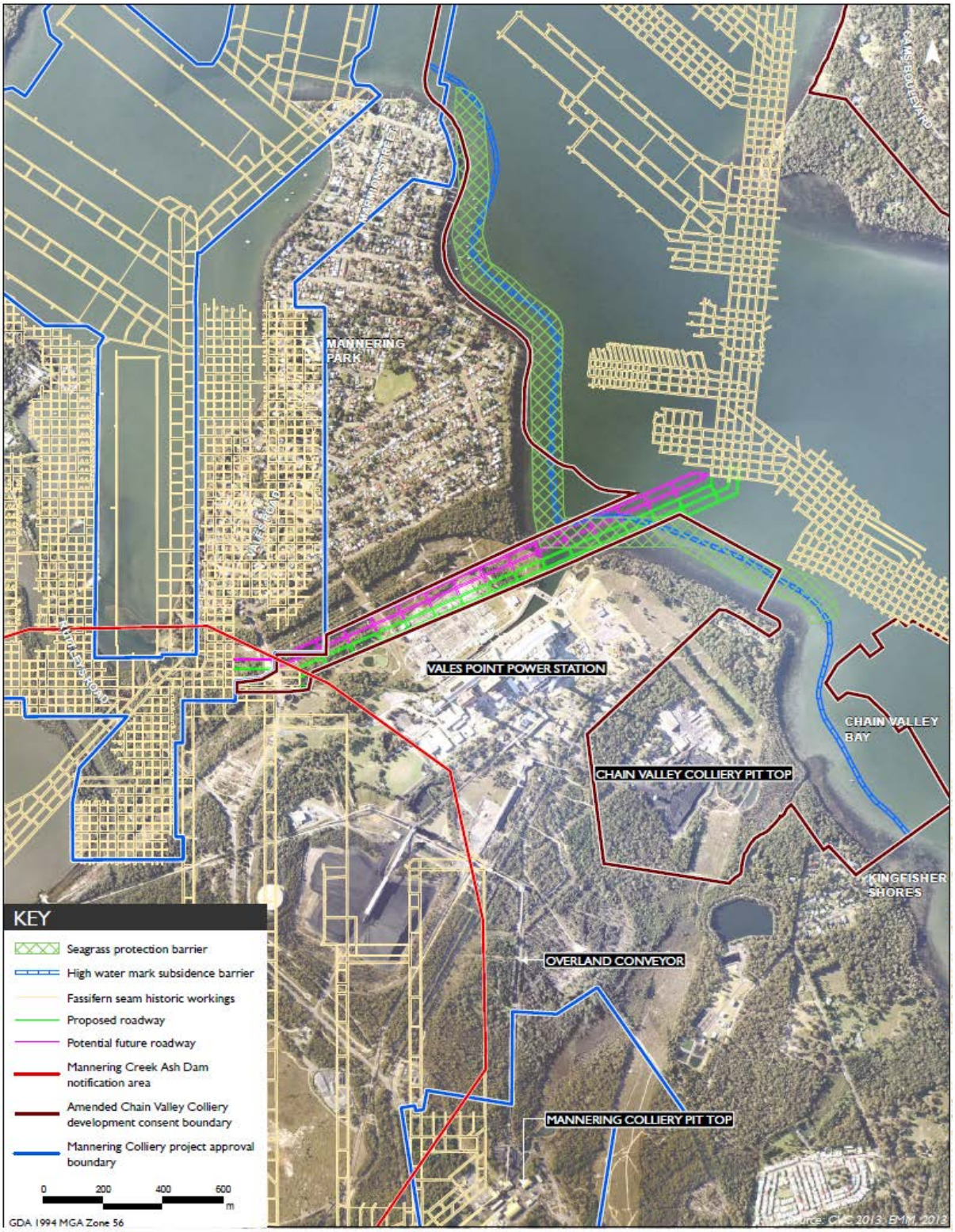


Figure 2: *Location of the underground linkage to Chain Valley Colliery*

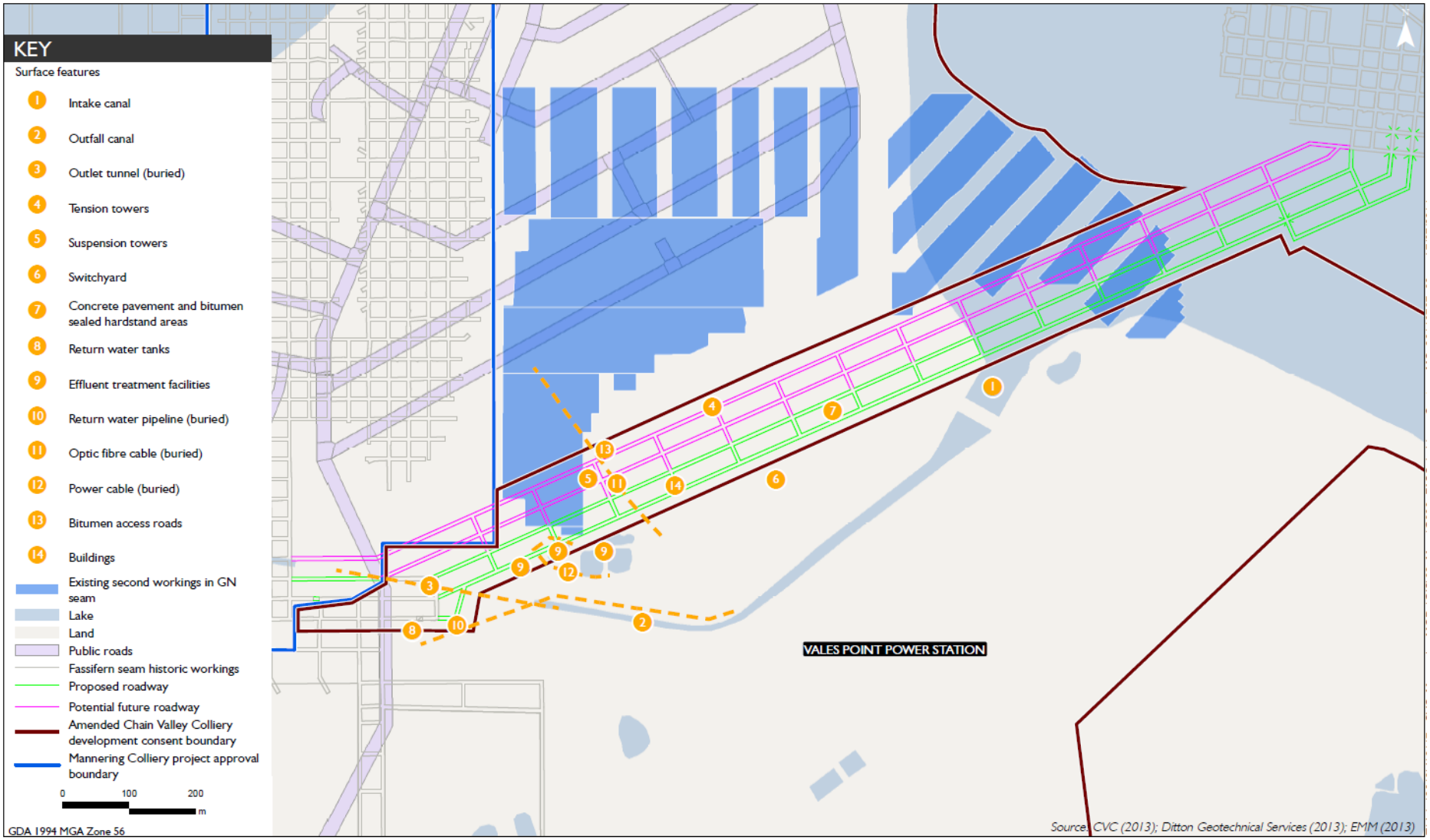


Figure 3: *Location of the underground link and surface infrastructure*

APPENDIX 3: STATEMENT OF COMMITMENTS

Revised Statement of Commitments (August 2012)

Table 2 - *Revised Statement of Commitments*

Subsidence
Mining to be limited to the approved bord-and-pillar method where coal recovery is limited to first workings only.
Monitoring of the existing subsidence monitoring marks will continue and additional subsidence monitoring marks will be installed above the proposed mining areas to measure the subsidence and verify that subsidence is within the predicted levels.
If it is identified that subsidence levels are greater than the predicted maximum of 20 millimetres, the DTIRIS Minerals Division will be consulted to determine appropriate management and mitigation actions.
Water Management
The water level within the sediment pond system will be monitored and kept at a relatively low operating level, such that the ponds can provide a detention function in a significant rainfall event.
A visual assessment of the unnamed creek will be undertaken every 6 months to monitor stability and erosion.
Where practicable, underground water levels will be recorded to monitor changes in the level of water stored in underground depressions and to verify that the rate of extraction is sufficient.
The extraction of underground water from the mine workings will be undertaken in accordance with the Bore License (20BL172016) issued under the Water Act 1912.
To enable on-going assessment of the quality of water discharged, the existing monitoring program will be maintained for the life of the Project with the following enhancements: • An assessment of the surrounding catchments summarising land uses and other background information to characterise an appropriate water quality; and • Annual monitoring of heavy metals at the monitoring location identified as 'Downstream'.
Terrestrial Ecology
If monitoring indicates that mine-induced subsidence levels exceed 20 millimetres, a review will be undertaken to identify any potential impacts to terrestrial ecology.
Aquatic Ecology
If monitoring indicates that mine-induced subsidence levels exceed 20 millimetres, a review will be undertaken to identify any potential impacts to aquatic ecology.
Aboriginal Heritage
If monitoring indicates that mine-induced subsidence levels exceed 20 millimetres, a review will be undertaken to identify any potential impacts to cultural heritage in consultation with OEH.
All relevant Centennial Mannering staff and contractors will be made aware of their statutory obligations for Aboriginal cultural heritage under the NP&W Act as part of the existing mine induction process.

An Aboriginal Cultural Heritage Management Plan (ACHMP) will be developed and implemented for the identified Aboriginal heritage items within the Project Site in consultation with the relevant Aboriginal stakeholders. If additional sites are identified they will be assessed for cultural significance and be incorporated into the ACHMP.
In the unlikely event that skeletal remains are identified, the NSW Police Coroner will be contacted to determine if the material is of Aboriginal origin. If determined to be Aboriginal, contact will be made with the OEH, a suitably qualified archaeologist and representatives of the relevant Aboriginal stakeholder groups to determine an action plan for the management of the skeletal remains and formulate management recommendations if required.
European Heritage
If monitoring indicates that mine-induced subsidence levels exceed 20 millimetres, a review will be undertaken to identify any potential impacts to non-indigenous heritage.
All relevant Centennial Mannering staff and contractors will be made aware of their statutory obligations for European cultural heritage under the Heritage Act 1977 as part of the existing mine induction process.
If, during the course of development works, significant non-indigenous cultural heritage material is uncovered within the Project Site, the Heritage Branch of OEH will be notified and any required monitoring or management strategies instigated.
Air Quality
A review of dust management strategies and mitigation measures will be undertaken against the best practice dust mitigation measures identified in the NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (Katestone Environmental Pty Ltd 2011), which was prepared for OEH. The review will identify any additional dust management practices that are reasonable and feasible for implementation at Mannering Colliery and will be undertaken generally in accordance with any requirements of a pollution reduction program that may be imposed by the OEH on the Manning Colliery EPL in the future.
Traffic
Centennial Mannering will upgrade the Rutleys Road - Mannering Colliery Access Road intersection to improve safety and operational efficiency.
Socio-Economic
Centennial Mannering is committed to on-going community consultation and will continue to engage the community for the purposes of providing information relating to on-going operations and the Extension of Mine Project.
Rehabilitation
The Mining Operations Plan will be amended to reflect the proposed modification and will include integrated rehabilitation and environmental management.
Monitoring
The Environmental Monitoring Program will be reviewed and updated, as required, to incorporate the commitments made in the Environmental Assessment and any additional consent conditions.

APPENDIX 4: NOISE ASSESSMENT LOCATIONS

Private Property Surrounding Mannering
(Location of ID numbers are shown on following figure)

ID	Owner	ID	Owner	ID	Owner
1	Energy Australia	**27**	H Gleeson	**53**	H & J Beukers
2	Alcevski Investments	**28**	C Stead & M Garner	**54**	A Taylor-Stewart
3	Eaton & Sons Pty Ltd	**29**	A O'Keefe	**55**	G Kettles
4	O & J di Rocco	**30**	P Groen	**56**	R & E Brokenshire
5	A & M Keighran	**31**	M Parkin	**57**	B & S Fowler
6	Swan HydroPonics Pty Ltd	**32**	I Maclaren	**58**	B Sneddon
7	R Druitt	**33**	P Kranz	**59**	J & P Hanson
8	D & M May	**34**	T & V Wilding	**60**	L Crook & L Kelly
9	L F Jeans	**35**	G Williams	**61**	P & G Becker
10	L & J Jeans	**36**	P & C Byrnes	**62**	B Clover & R Alaban
11	L & J Jeans	**37**	G Holmes	**63**	T & O Becker
12	L & J Jeans	**38**	R & B Croucher	**64**	R Harris & D Kingsford
13	L & J Jeans	**39**	R & C Calvert	**65**	N Singleton
14	L & J Jeans	**40**	T & D Stolz	**66**	M Smith
15	L & J Jeans	**41**	A & S Whitbread	**67**	D & B Johnston
16	L & J Jeans	**42**	B Kelly	**68**	R & B Amos
17	L & J Jeans	**43**	L Preston	**69**	H & C Strand
18	L & J Jeans	**44**	G Bain	**70**	PhystonPty Ltd
19	L & J Jeans	**45**	C Clarke	**71**	R Howland
20	E & K Knight	**46**	W Carpenter	**72**	R & D Shannon
21	Jonita Homes Pty Ltd	**47**	S Mackay	**73**	P & B Williams
22	W & D Buchmasser	**48**	R Allen	**74**	P Batten
23	P McKee	**49**	S Jopp	**75**	G & A Dyer
24	J Farrell	**50**	P & M Davie	**76**	S Harrison & N Robertson
25	P Kretchmer & E Castle	**51**	D Olsen		
26	A Mearns	**52**	D Poulson & K Toope		

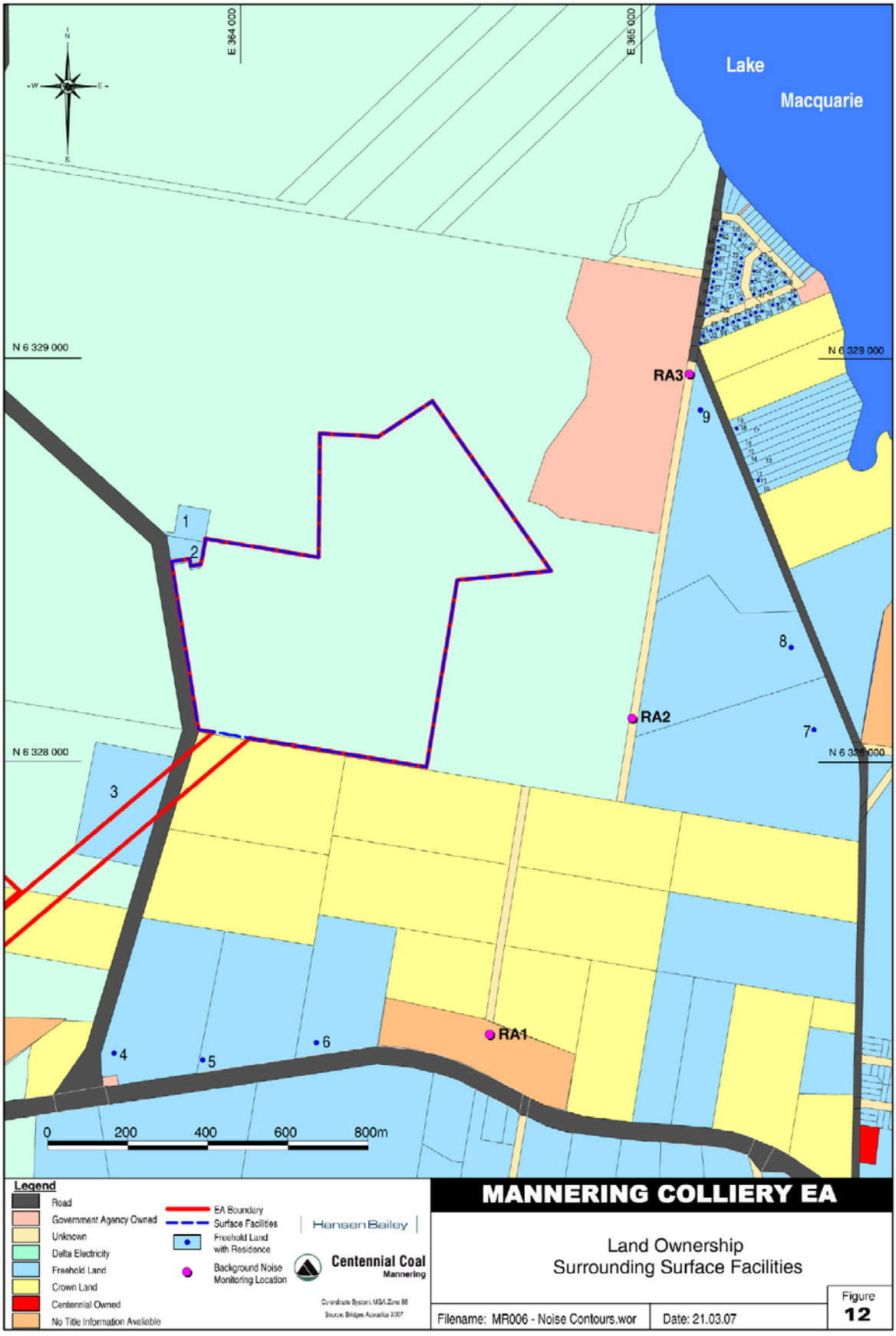
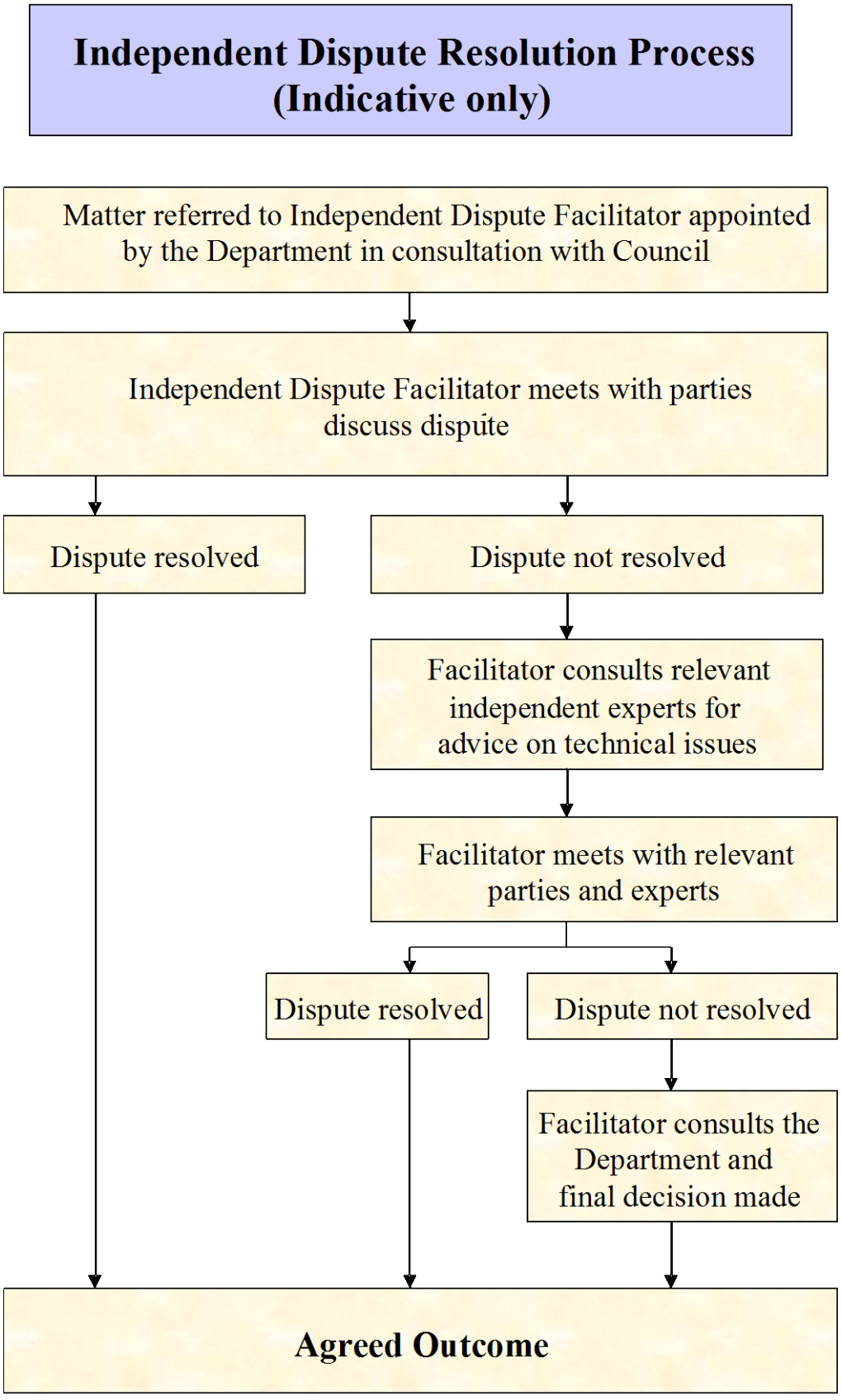


Figure 3: Land Ownership (noise assessment locations)

APPENDIX 5:

INDEPENDENT DISPUTE RESOLUTION



Appendix B

Preliminary risk assessment

Appendix B — Preliminary risk assessment

B

B.1 Methodology

An environmental risk assessment was undertaken for the proposed modification. It should be noted that the risk assessment and ranking applied relate only to the incremental change from the proposed modification compared to the approved development and does not reflect the overall environmental risks related to each aspect considered.

The risk assessment was undertaken using two variables, namely:

- the potential severity or consequences of the impact; and
- the likelihood of the impact occurring.

The variables were evaluated, assuming that appropriate mitigation measures would be in place.

The following definitions were applied.

Severity or consequences of impact:

- Minor: Near-source confined and promptly reversible impact on-site with little or no off-site impact expected.
- Medium: Near source confined and short-term reversible impact on-site with little promptly reversible off-site impact.
- Serious: Near-source confined and medium-term recovery impact on-site with near-source and short-term reversible off-site impact.
- Major: Impact that is unconfined and requiring long-term recovery, leaving residual damage on-site with near-source confined and medium-term recovery of off-site impacts.
- Catastrophic: Impact that is widespread and unconfined and requiring long-term recovery, leaving major residual damage on-site with off-site impact that is unconfined and requiring long-term recovery and leaving residual damage.

Likelihood of impact:

- Rare: Impact that is very unlikely to occur during the lifetime of the project.
- Unlikely: Impact that is unlikely to occur during the lifetime of the project.
- Possible: Impact that may occur during the lifetime of the project.
- Likely: Impact that may occur frequently during the lifetime of the project.
- Almost Certain: Recurring event during the lifetime of the project.

Table B.1 below shows the risk matrix used to identify environmental risks that were used to determine priorities for the EA. In each case, a score of 1 to 5 is given for the consequence and likelihood of impact and the scores are added to determine environmental risk. There are four classes of environmental risk utilised in this assessment, as indicated below:

- Low: Risks that are below the risk acceptance threshold and do not require active management. Certain risks could require additional monitoring.
- Moderate: Risks that lie on the risk acceptance threshold and require active monitoring. The implementation of additional measures could be used to reduce the risk further.
- High: Risks that exceed the risk acceptance threshold and require proactive management. Includes risk for which proactive actions have been taken, but further risk reduction is impractical.
- Critical: Risks that significantly exceed the risk acceptance threshold and need urgent and immediate action.

Table B.1 Environmental assessment matrix

		Consequence				
		1 Minor	2 Medium	3 Serious	4 Major	5 Catastrophic
Likelihood of Impact	5 Almost Certain	6 (Moderate)	7 (High)	8 (Critical)	9 (Critical)	10 (Critical)
	4 Likely	5 (Moderate)	6 (High)	7 (High)	8 (Critical)	9 (Critical)
	3 Possible	4 (Low)	5 (Moderate)	6 (High)	7 (Critical)	8 (Critical)
	2 Unlikely	3 (Low)	4 (Low)	5 (Moderate)	6 (High)	7 (Critical)
	1 Rare	2 (Low)	3 (Low)	4 (Moderate)	5 (High)	6 (High)

Results

The results of the environmental risk assessment are provided in Table B.2. All risks were rated low.

Table B.2 Environmental risk rating

Environmental attribute	Likelihood	Consequence	Risk rating
Noise			
Increased noise emissions at sensitive receptors due to increased coal throughput	2 (Unlikely)	2 (Medium)	4 (Low)
Changes to surface infrastructure such as specifications of plant/machinery, including overland conveyor, resulting in an increase in noise emissions	1 (Rare)	1 (Minor)	2 (Low)
Air quality and greenhouse gases			
Operational dust impacts at sensitive receptors due to increased coal throughput	2 (Unlikely)	2 (Medium)	4 (Low)
Impacts from increase in greenhouse gas emissions	1 (Rare)	1 (Minor)	2 (Low)
Ecology			
Impacts on native vegetation from extension/establishment of APZs	3 (Likely)	1 (Minor)	4 (Low)
Aboriginal heritage			
Impacts on Aboriginal heritage from extension/establishment of APZs	2 (Unlikely)	1 (Minor)	3 (Low)
Surface water			
Changes to surface water management system such as increase pollutant load	3 (Possible)	1 (Minor)	4 (Low)
Socio-economic			
General amenity impacts on local community	1 (Rare)	1 (Minor)	2 (Low)
Waste management			
Additional waste generation	1 (Rare)	1 (Minor)	2 (Low)
Traffic and transport			
Increase in traffic on public roads	1 (Rare)	1 (Minor)	2 (Low)

Appendix C

Road safety audit

Appendix C — Road safety audit

C

LakeCoal

Mannering Colliery
Road Safety Audit

April 2015

Table of contents

Table index

Figure index

1. Background

LakeCoal have engaged GHD P/L to undertake an 'existing conditions' road safety audit of the intersection of Ruttleys Road and the entry to the Mannering Colliery.

1.1 Purpose of this report

This report has been prepared to document any safety deficiencies identified during the existing conditions road safety audit conducted onsite in both day and night time conditions.

1.2 Project location

The existing intersection is located on Ruttleys Road between the Pacific Highway, Doyalson North to the south and Mannering Park to the north. The intersection is with a private road to the Mannering Colliery and is located on the outside of a curve in Ruttleys Road.

The location of the existing intersection is shown below in Figure 1-1.

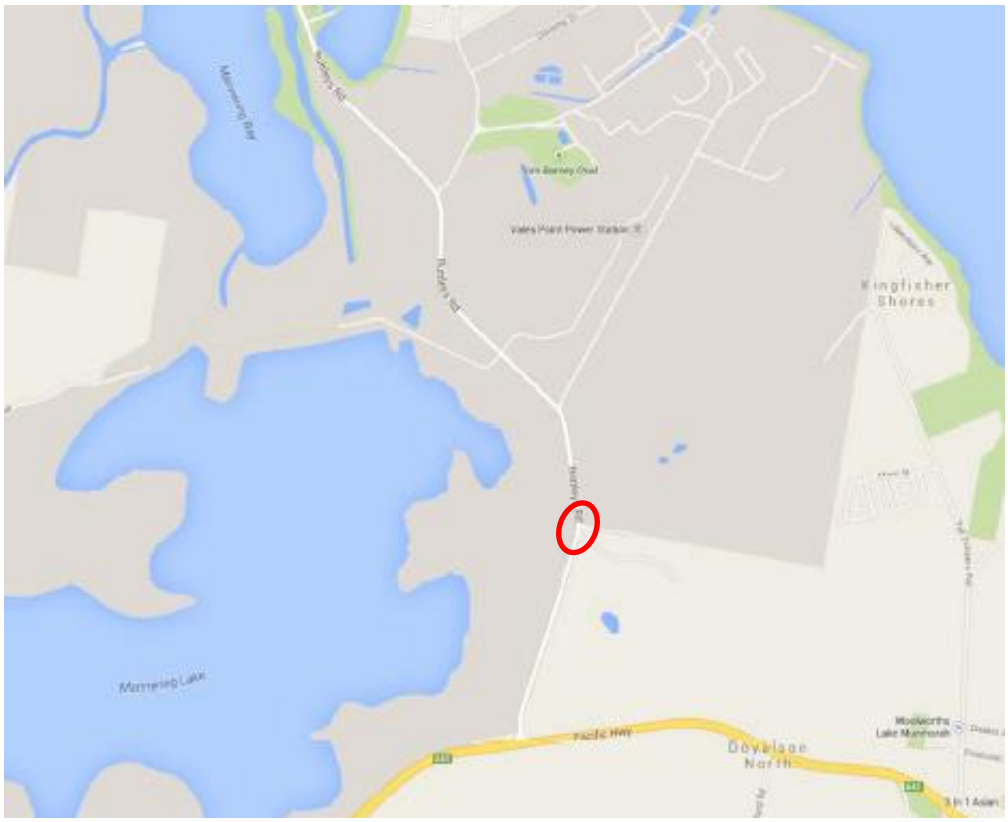


Figure 1-1 Locality plan

2. Objectives, process and evaluation criteria

A road safety audit is “a formal examination of a future road or traffic project or an existing road in which an independent, qualified examiner reports on the project's accident potential and safety performance” (Austroads 2002). In this case it is the examination of existing conditions at an intersection between a public and private road.

2.1 Process of the road safety audit

The road safety audit followed a standard practice in identifying safety related issues. Normal practise during a road safety audit is for a site visit during both daylight and night conditions to occur. Standard issues such as sight distance, speed zones, lighting, safety barriers, approach road alignment, delineation, line marking and signage, intersection layout and conditions (amongst others) are assessed with respect to safety. The audit is structured around a standard checklist provided in the Austroads “Guide to Road Safety: Part 6 – Road Safety Audits” and RMS’s Guidelines for Road Safety Audit Practices, July 2011”.

2.2 Criteria used to assess the levels of risk

Risk levels have been assigned for each deficiency identified along the route by the audit team and are based on the criteria set out in the Austroads guide. These risk levels have been determined based on the deficiency’s frequency and severity. Definitions of the different levels of frequency and severity have been reproduced in Table 2-1 and Table 2-2 from Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009.

Table 2-1 Summary of frequency descriptions

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 2-2 Summary of severity descriptions

Severity	Description
Catastrophic	Likely multiple deaths
Serious	Likely death or serious injury
Minor	Likely minor injury
Limited	Likely trivial injury or property damage only

Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009, provides definitions for four different levels of risk, namely, “intolerable”, “high”, “medium” or “low”. Extracts of the risk assessment matrix from Austroads are provided in Table 2-3.

Table 2-3 Summary of levels of risk

Severity	Frequency			
	Frequent	Probable	Occasional	Improbable
Catastrophic	Intolerable	Intolerable	Intolerable	High
Serious	Intolerable	Intolerable	High	Medium
Minor	Intolerable	High	Medium	Low
Limited	High	Medium	Low	Low

It is noted that as a consequence of the Austroads guide not adopting a more objective risk ratings process, the risk rating reported in all Road Safety Audits are subjective. As a result, the audit findings can be skewed towards reporting risks as “high” and “intolerable”. Care should be taken by the appropriate decision maker when using these results to justify an outcome.

Of the four possible risk ratings levels (i.e. Intolerable, high, medium or low) a description of their priority are defined below in Table 2-4.

Table 2-4 Priority of levels of risk

Level of risk	Description of priority to risk rating
Intolerable	A significant road safety risk requiring immediate or urgent attention.
High	A high road safety risk requiring immediate or urgent attention.
Medium	A road safety risk that may lead to crashes and that requires attention as soon as reasonably practicable.
Low	A lower road safety risk that requires attention. Remedial action may be carried out on a non-urgent basis, such as in conjunction with routine road maintenance or other planned work.

3. Audit team, administration and supporting material

3.1 Road safety audit team

The road safety audit team was comprised of the following:

Audit Team Leader:	Graeme Robinson – over 40 years of experience in design, project management and review of road projects to RMS and Council standards and is an accredited Level 3 Lead Road Safety Auditor. Auditor ID: RSA-02-0122 Level of Certification: 3
Audit Team Member:	Donal McCarthy - Senior Road Designer with over 20 years of experience in the design of road infrastructure and is an accredited Level 2 Road Safety Auditor. Auditor ID: RSA-02-0827 Level of Certification: 2

3.2 Startup meeting

No face to face startup meeting was held prior to commencing the audit. However, telecons and emails were exchanged with LakeCoal's Project Manager prior to carrying out the audit to gain and understanding of existing intersection demand by Colliery traffic.

GHD's current understanding of the intersection and colliery operation is as follows:

- The Mannering Colliery is currently operating under 'care and maintenance' with day shifts only
- Infrequent traffic movements in and out of the Colliery
- The existing private road at this intersection is the only current access to the Mannering Colliery
- Some heavy vehicle deliveries to the Colliery, but generally infrequent.

3.3 Site inspection and audit

3.3.1 Time and date

A day-time site visit and audit was undertaken on Wednesday 25 March 2015 from 16:30 hours to 17:30, followed by a night time inspection later that night from 20:30 hours to 21:00.

3.3.2 Weather conditions

The weather condition during the day time audit was clear and dry. During the night time audit, the weather was clear with a dry road surface.

3.3.3 Limit of audit area

The road safety audit was limited to the intersection and all three approaches to the intersection.

3.3.4 Onsite observations

The following observations were noted whilst onsite:

- The intersection is within a sign posted speed zone of 80 kph
- The intersection is located on a curve in Ruttleys Road – private road to the Colliery is on the outside of the curve – easterly direction
- Existing signage present to advise road users of formal entry to the Mannering Colliery
- One lane in both directions along Ruttleys Road, generally 3.5 metres in width with 2.0 metre sealed shoulders on both sides
- Private road to Colliery is sealed with kerb and gutter both sides
- At the time of the audit traffic was constant in both directions along Ruttleys Road with the occasional bus and heavy vehicle
- Traffic movement in and out of the Colliery was very light with only one light vehicle movement noted (exiting Colliery)
- No pedestrian or cyclist movements noted, however the sealed shoulders are marked for cyclist use
- No street lighting or flag lighting is provided on Ruttleys Road at the intersection, however a single pole and lamp is provided just inside the fenceline on the private road
- High voltage power lines and poles on the eastside of Ruttleys Road and adjacent the intersection - poles protected by safety barrier.
- Overtaking along Ruttleys Road is not permitted through the intersection.

Figure 3-1 View to north of intersection

Figure 3-2 View to the east into the private road to Colliery

3.4 References

A number of relevant standards or guidelines were referenced as part of the audit. These are as follows;

- RMS Guidelines for Road Safety Audit Practices, July 2011
- Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009
- Austroads Guide to Road Design Series, 2009
- Standards Australia “AS 1742 Series 2003: Manual of uniform traffic control devices”, 2003

3.5 Limitations of audit

In carrying out the road safety audit a number of areas were not included or considered. These are as follows:

- Existing speed zone review
- Traffic volumes, modelling and intersection warrants
- Review of crash history for past 5 years
- Existing stormwater drainage regime
- Demand for additional bus stops or facilities
- Demand for pedestrian crossing facilities

4. Road safety audit findings

4.1 Position of hold line for stop sign

Road safety category: delineation

Vehicles exiting the private road from the Colliery are controlled by a stop sign located on the left had side of the road adjacent the end of the masonry fence. A hold line is provided further out from the stop sign to indicate to exiting vehicles where to stop so as to observe approaching traffic on Ruttleys Road. Refer Figure 4-1 below.

When vehicles stop at the hold line they cannot see approaching vehicles, particularly to the right towards Mannering Park. The sight line is blocked by the presence of the safety barrier and power poles. Exiting vehicles would have to move forward until they can see approaching vehicles and safe to exit the side road. Vehicles exiting without moving forward cautiously and checking for approaching vehicles could believe it is safe to exit and risk a collision with a vehicle passing through the intersection.

Suggestion: Move hold line further out to a point where vehicle is guided to stop and can see approaching traffic in both directions. The location appears to be around the existing join in asphaltic concrete pavement. Refer Figure 4-2 and 4-3 below. This work could be undertaken as part of future maintenance or upgrade works for the intersection.

Risk Rating	Severity:	minor
	Likelihood:	improbable
	Risk:	low

Figure 4-1 View to west of stop sign and hold line

Figure 4-2 View to south from proposed hold line location

Figure 4-3 View to north from proposed hold line location

4.2 Advance warning signage for intersection

Road safety category: delineation

The approaches to the intersection have advance warning signs for the curve through the intersection, but no advance warning sign is provided to warn of the 'T' intersection and the presence of traffic movement in and out of the Colliery. Refer Figure 4-4 below.

It is appreciated that the intersection is with a private road to the Colliery and that a warrant for an advance warning sign may not apply. However, the intersection layout is quite formal in layout with the provision of a wide sealed and formal entry, Colliery signage and break in centreline linemarking on Ruttleys Road.

Suggestion: Provide advance warning sign type W2-4 (left and right) on approaches to the intersection. This work could be undertaken as part of future maintenance or upgrade works for the intersection. Providing advance warning signage in conjunction with having the hold line for the stop sign in a more appropriate position (refer finding 4.1 above) would enhance the overall safety of the intersection.

Risk Rating	Severity:	minor
	Likelihood:	improbable
	Risk:	low

Figure 4-4 View to south of approach to intersection

4.3 Existing vegetation on western approach to intersection

Road safety category: vegetation

At the time of the onsite inspection and audit, vegetation on the left hand side of the western approach to the intersection appeared overgrown. Refer Figure 4-4 above.

The presence of overgrown vegetation could impede the sight line into the side road for SB vehicles and for exiting vehicles from the private road. This may result in seeing an exiting or approaching vehicle too late and potential for vehicle collision.

Suggestion: Wyong Shire Council be contacted and requested to mow overgrown grass adjacent road shoulder and behind safety barrier for Ruttleys Road. Consideration could also be given to trimming the existing trees in the vicinity of the power pole to assist in providing sight line into the side road.

Risk Rating	Severity:	minor
	Likelihood:	improbable
	Risk:	low

5. Summary of findings

Table 5-1 Summary of road safety audit findings

Item	Finding	Road safety category	Risk
4.1	Position of hold line for stop sign	Delineation	Low
4.2	Advance warning signage for intersection	Delineation	Low
4.3	Existing vegetation on western approach to intersection	Landscaping	Low

6. Audit statement

We, the undersigned, have undertaken an existing conditions road safety audit in accordance with Austroads Guide to Road Safety, Part 6: Road Safety Audits. An assessment of the existing intersection between Ruttleys Road and the private road to Mannering Colliery was undertaken for the purpose of identifying any features which could potentially impair road safety.

Whilst every care and due diligence has been taken to identify potential safety concerns and suitable recommendations as detailed in this report, we do not warrant that every safety issue has been identified.

The problems identified have been noted in this report and readers are urged to seek further specific technical advice on matters raised and not rely solely on the report.

Signed: ..... Dated: 8 April 2015

Graeme Robinson, GHD Pty Ltd, Newcastle

Auditor ID: RSA-02-0122

Signed: pp ..... Dated: 8 April 2015

Donal McCarthy, GHD Pty Ltd, Newcastle

Auditor ID: RSA-02-0827

This report: has been prepared by GHD for LakeCoal and *may only be used and relied on by LakeCoal for the purpose agreed between GHD and the LakeCoal as set out in section 1.0 of this report.*

GHD otherwise disclaims responsibility to any person other than LakeCoal arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

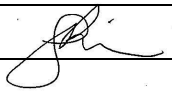
The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD

Level 3 GHD Tower 24 Honeysuckle Drive Newcastle NSW 2300
PO Box 5403 Hunter Region Mail Centre NSW 2310
T: (02) 4979 9999 F: (02) 4979 9988 E: ntlmail@ghd.com

g:\22\16316\WP\109240.docx

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	D McCarthy	G Robinson		S Jamieson		08/04/2015

www.ghd.com

Appendix D

Noise impact assessment

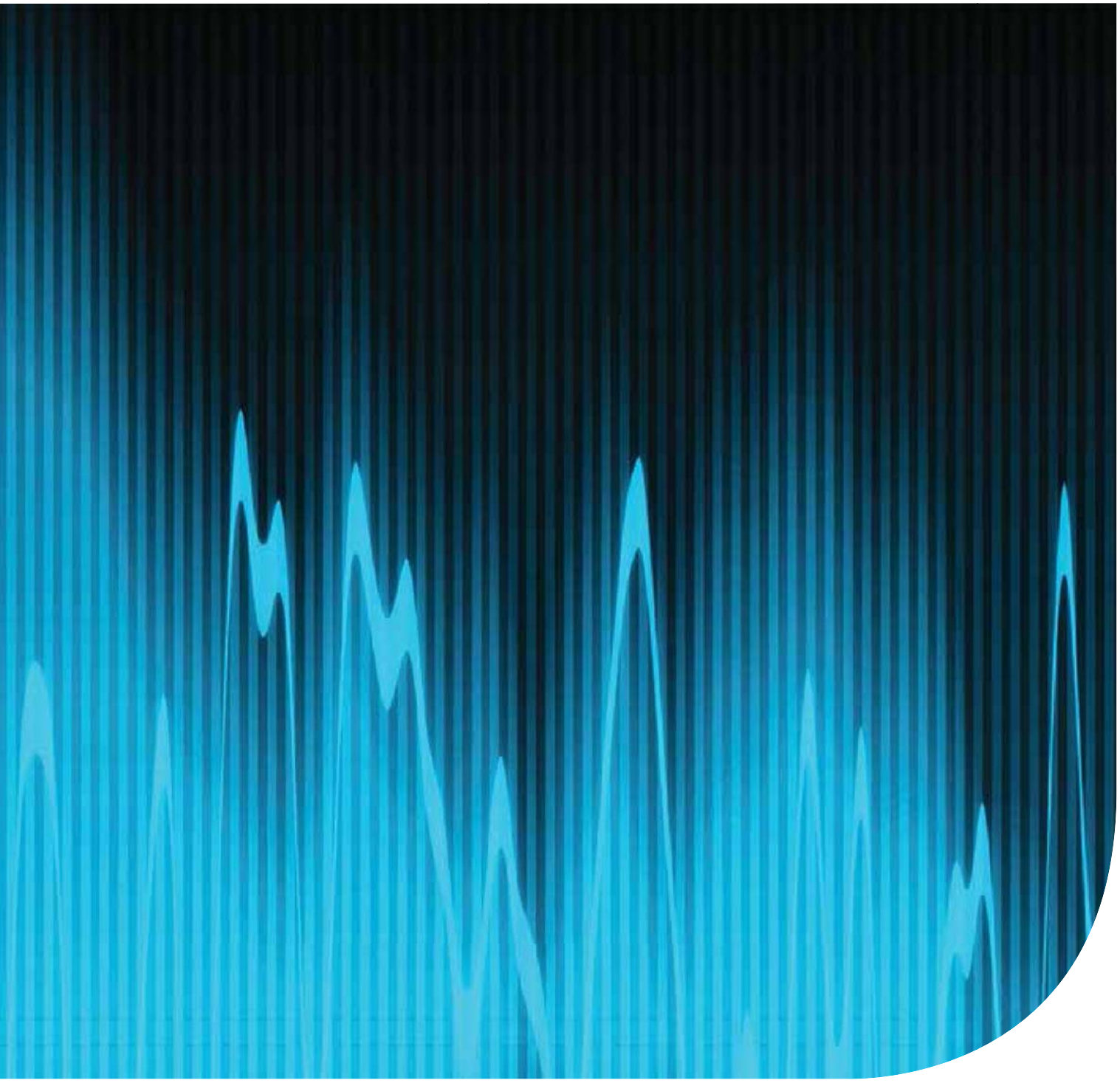
Appendix D — Noise impact assessment

D

Mannering Colliery - Modification 3

Noise Impact Assessment

Prepared for LakeCoal Pty Limited | 7 May 2015



Planning + Environment + Acoustics

Mannering Colliery - Modification 3

Noise Impact Assessment

Prepared for LakeCoal Pty Limited | 7 May 2015

Level 5, 21 Bolton Street
Newcastle NSW 2300

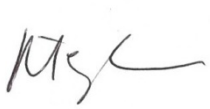
T +61 (0)2 4927 0506
F +61 (0)2 4926 1312
E info@emgamm.com

emgamm.com

Mannering Colliery - Modification 3

Final

Report J15017RP1 | Prepared for LakeCoal Pty Limited | 7 May 2015

Prepared by	**Katie Teyhan**	Approved by	**Najah Ishac**
Position	Manager Acoustics – Newcastle	Position	Director
Signature		Signature	
Date	7 May 2015	Date	7 May 2015

Document Control

Version	Date	Prepared by	Reviewed by
Draft	20 April 2015	Katie Teyhan	Najah Ishac
Final Draft	4 May 2015	Katie Teyhan	Daniel Weston
Final	7 May 2015	Katie Teyhan	Najah Ishac

EMM
EMGA Mitchell McLennan

T +61 (0)2 4927 0506 | F +61 (0)2 4926 1312

Level 5 | Suite 01 | 21 Bolton Street | Newcastle | New South Wales | 2300 | Australia

emgamm.com

Table of Contents

Appendices

Tables

Figures

1 Introduction

Mannering Colliery (MC) is an underground coal mine located on the southern side of Lake Macquarie approximately 60 km south of Newcastle. Underground mining commenced at MC in 1960, and since that time has extracted coal from the Great Northern and Fassifern coal seams using both the bord and pillar and longwall mining methods. A site plan is provided in Figure 1.1.

MC was granted project approval (MP06_0311) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 12 March 2008, enabling the continued production of up to 1.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 31 March 2018. Coal from MC is transported via a dedicated overland conveyor to Delta Electricity's Vales Point Power Station (VPPS) for domestic energy generation.

EMGA Mitchell McLennan Pty Ltd (EMM) has been engaged by LakeCoal to prepare a Noise Impact Assessment (NIA) to accompany an application to modify MP06_0311 under Section 75W of the EP&A Act to, amongst other things, permit an increase in the ROM coal handing and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa (the proposed modification). The elements of the proposed modification are outlined in Section 2.

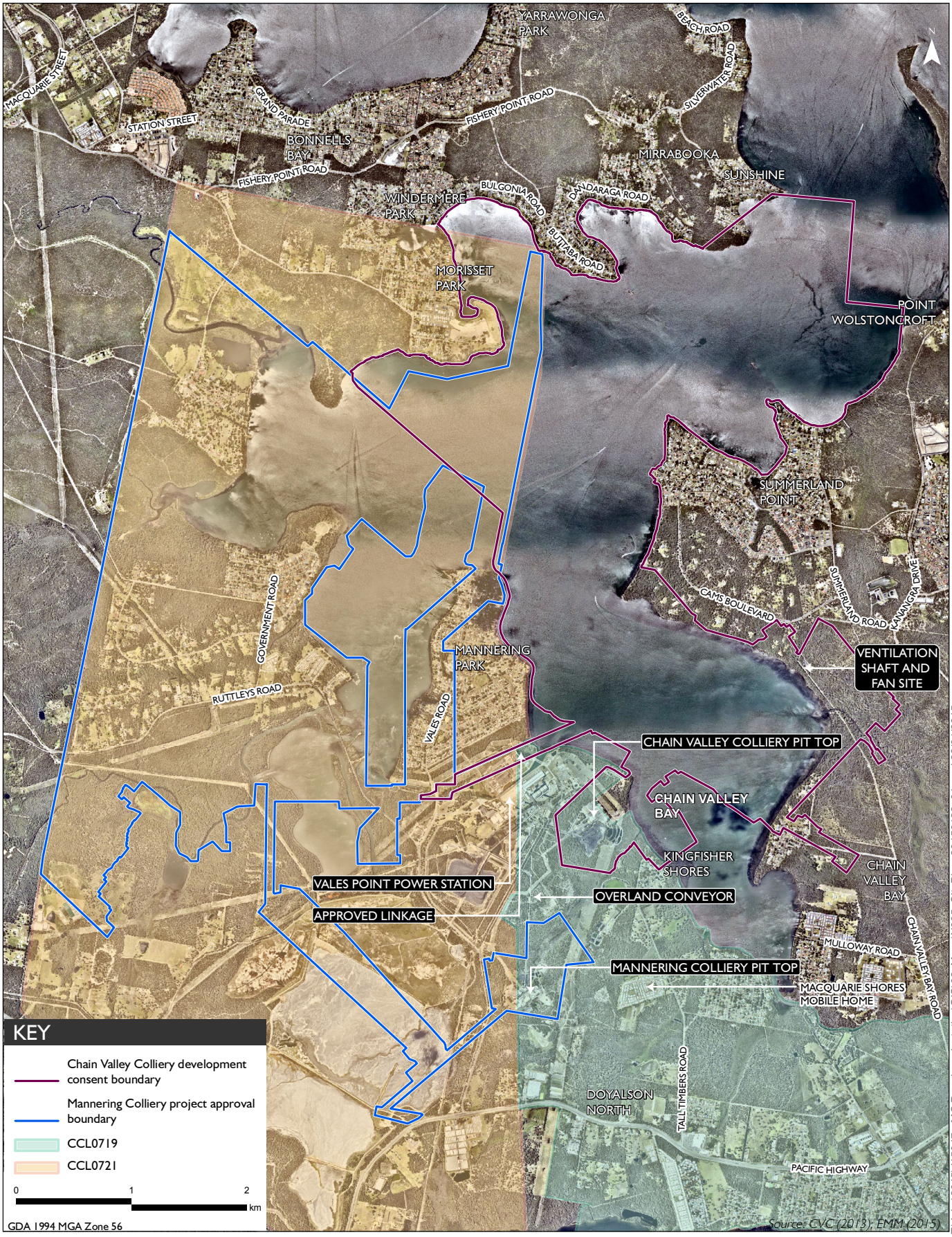
MC is owned by Centennial Mannering Pty Limited, a wholly owned subsidiary of Centennial Coal Company (Centennial). Centennial is in turn a wholly owned subsidiary of Banpu Public Company Limited, which purchased Centennial in 2010. LakeCoal became the operator of MC effective 17 October 2013.

It is noted that a Noise Impact Assessment (Bridges Acoustics, 2007) was prepared for the previous Development Application resulting in project approval MP06_0311. The Department of Planning's Environmental Assessment Report acknowledged that there was uncertainty with regard to the predicted noise levels compared to actual noise impacts. That is, MC noise emissions were predicted to be significantly above the relevant noise criteria at many neighbouring residences. The Environmental Assessment Report states that "*It could be due to an error in the predictions; it could be that noise in the area is masked by the noise from other sources, such as the Vales Point Power Station or the Pacific Highway; or it could be that residents in the area are used to the noise impacts of the colliery.*" Notwithstanding this, the noise limits contained within MP06_0311 were determined based on the highest predicted levels in the Noise Impact Assessment (Bridges Acoustics, 2007).

Given the uncertainty around the previous predictions, it was decided that the proposed modification provided an opportunity to reassess the potential noise impacts from MC. Potential noise impacts from the proposed modification itself are limited to an increase in intensification of activities from the increased maximum rate of annual throughput at the MC surface facilities, and the emissions generated beyond the current approval expiry date.

An environmental risk assessment was undertaken for the proposed modification and identified noise emissions from MC as a potential risk for the proposed modification. Hence, this NIA has been prepared to provide a contemporary evaluation of the potential impact on MC noise emissions as a result of the proposed increased throughput.

A number of technical terms are required for the discussion of noise. These are explained in Appendix A.



Site plan

Mannering Colliery – Modification 3 Noise Impact Assessment

Figure 1.1

2 Project description

2.1 Site and surrounds

MC's pit top area is located within the Wyong local government area (LGA), approximately 3 km south of Mannering Park at the southern extent of Lake Macquarie and west of Chain Valley Bay. The pit top is accessed from Ruttleys Road. Mining operations at MC occur within Consolidated Coal Lease (CCL) 721 and CCL 719.

As shown in Figure 1.1, the closest residential areas to MC's surface facilities (or pit top) are the Macquarie Shores mobile home village, Kingfisher Shores and Chain Valley Bay to the east, and Mannering Park beyond the VPPS to the north. The VPPS lies between MC's pit top and Mannering Park. The areas to the north, south and west generally comprise industrial facilities and vegetation.

2.2 The proposed modification

LakeCoal is seeking approval to modify MP06_0311 under Section 75W of the EP&A Act to permit:

- an increase in the rate of ROM coal handling at, and conveyor transport from, MC from 1.1 Mtpa to a maximum of 1.3 Mtpa;
- an extension of the project approval period from 31 March 2018 to 30 June 2022; and
- minor vegetation disturbance adjacent to some infrastructure at MC's pit top to enable the establishment and/or extension of asset protection zones (APZs) for bushfire management purposes.

The proposed increase in the rate of ROM coal handling will allow all coal from CVC destined for the VPPS, including the 1.1 Mtpa already approved and the additional 200,000 tonnes per annum (tpa), to be transferred via MC's conveyors to VPPS following construction of the approved underground linkage within the Fassifern Seam between MC and the adjacent Chain Valley Colliery (CVC). All existing infrastructure at MC, including the underground belt system, drift conveyor, CCF, surface conveyors have adequate capacity to accommodate the proposed increase.

CVC's development consent boundary as approved under Development Consent SSD-5465 is shown in Figure 1.1.

A separate modification of SSD-5465 is being sought to, amongst other things, permit an increase in the maximum rate of ROM coal extraction at CVC from 1.5 Mtpa to 2.1 Mtpa and enable mine design changes, primarily involving the re-orientation of miniwall panels in CVC's northern mining area and minor amendments to the development consent boundary.

All production beyond the existing limit of 1.5 Mtpa will be sent via MC to VPPS.

2.3 Modification need

MC has approval to produce 1.1 Mtpa of ROM coal all of which is sold domestically to VPPS. The existing infrastructure at MC allows coal to be transported by overland conveyor to VPPS. Transport is approved to occur 24 hours a day, seven days a week.

MC has approval to operate up until 31 March 2018, although it was placed on care and maintenance in November 2012. In 2013 the owners of MC and CVC entered into an agreement which enables LakeCoal to operate MC until 2022. The proposed extension of the project approval period at MC aligns MC's approval with the current agreement with LakeCoal, thereby enabling LakeCoal to operate both collieries in a co-ordinated manner. The extension of project approval period also reflects, in part, the period MC has been on care and maintenance and provides adequate time for strategic planning and assessment of potential mining activities not approved under MP06_0311.

The increase in ROM coal handling and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa will enable all additional coal to be extracted under the proposed CVC modification (600,000 tpa) to be efficiently transferred from CVC to VPPS via MC's conveyors for the duration of the agreement between the owners of MC and CVC. This would provide positive amenity outcomes by enabling the additional coal required at the VPPS to be transported via conveyor as opposed to haulage on internal roads with an attendant greater potential to generate noise and dust. It would also provide for employment at MC beyond the current approved limit for mining operations (31 March 2018) and by enabling higher levels of production at CVC, it would also support the additional employment proposed at CVC (60 full time jobs as per the current CVC modification application).

2.4 Approved operations

A summary of the current approved MC operations (approved under MP06_0311, as modified) is provided in Table 2.1 together with a comparison to the proposed modification.

Table 2.1 Current MC approval and proposed modification

Aspect	Current approval	Proposed modification
ROM coal extraction	Extraction of up to 1.1 Mtpa of ROM coal from the Fassifern seam.	No change.
Mining methods	Bord-and-pillar mining methods where coal recovery is limited to first workings only.	No change.
Project life	Approved until 31 March 2018.	Extension of the project approval by approximately four years until 30 June 2022.
Project approval area	Approximately 1,420 ha.	No change.
Existing surface infrastructure	Utilisation of existing surface infrastructure, including but not limited to the coal crushing facility, overland conveyor between MC's pit top area and VPPS, worker's amenities, workshops, offices, carparks, ventilation fans.	No change to surface infrastructure other than the establishment and/or extension of APZs around aspects of MC's pit top infrastructure.
Coal processing	No coal processing other than use of CCF to reduce the top size of ROM coal.	No change.
Water demand and supply	Licensed daily discharge of 4 megalitres (ML). Potable water for use in surface facilities and underground operations supplied by Wyong Shire Council via a direct-metered pipeline.	No change.

Table 2.1 Current MC approval and proposed modification

Aspect	Current approval	Proposed modification
Product coal transport	Up to 1.1 Mtpa of ROM coal transported directly to VPPS via a purpose built dedicated overland conveyor which is operated, maintained and located on land owned by Delta Electricity.	Up to 1.3 Mtpa of ROM coal transported directly to VPPS via overland conveyor (an increase of up to 0.2 Mtpa).
Hours of operation	24 hours, 7 days a week.	No change.
Mine access	Road access from Ruttleys Road.	No change.
Rehabilitation	Decommissioning of surface facilities and final rehabilitation at completion of operations.	No change.
Employment	Employment of 170 full time personnel.	No change.

It is noted that coal extracted at MC does not require washing or additional treatment. As a result, ROM coal production equates to product coal production from MC.

3 Existing environment

3.1 Existing MC noise emissions

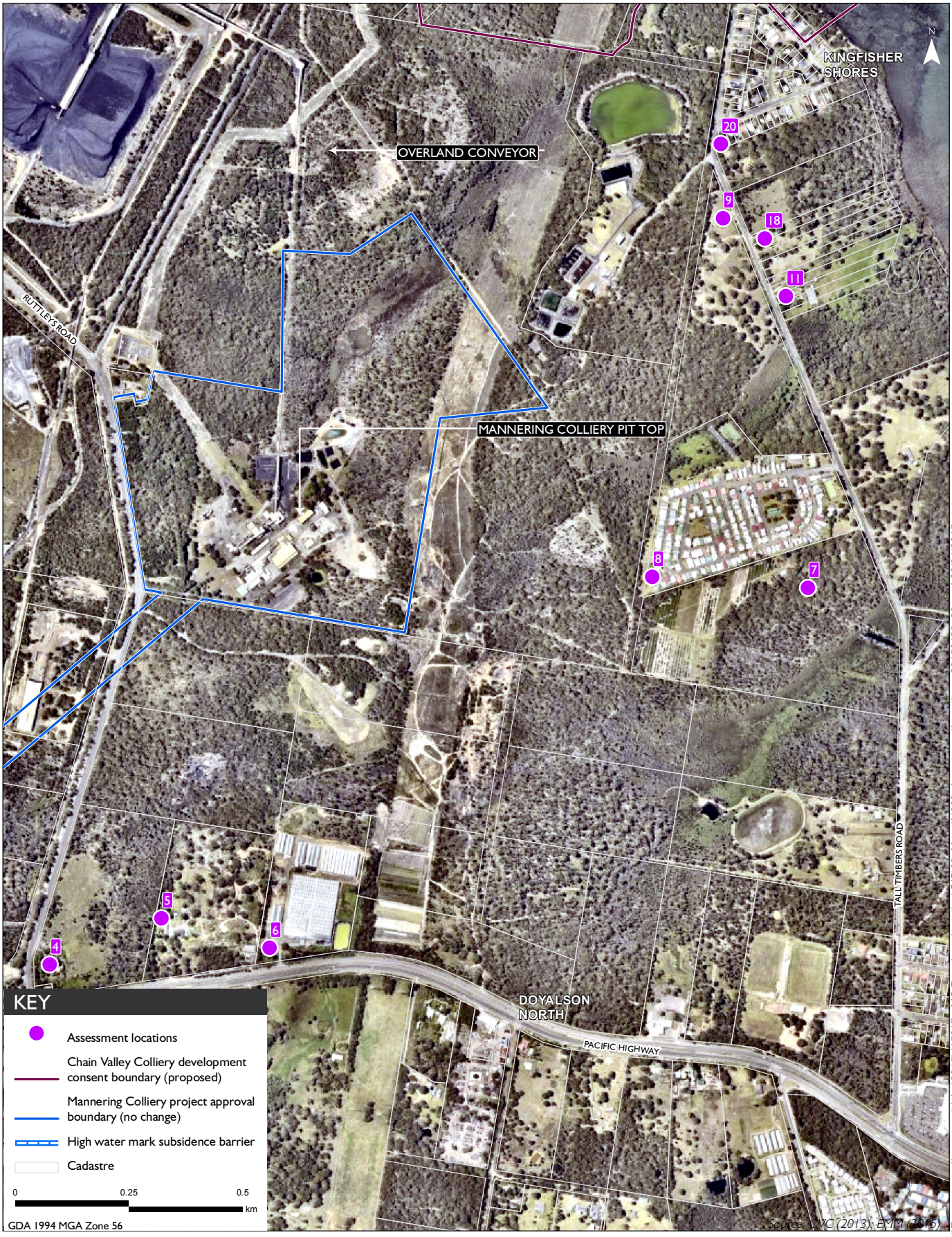
Noise emissions from MC operations are currently managed in accordance with the approved Noise Monitoring Program (Centennial Coal, 2011) which includes quarterly noise monitoring and operator attended surveys at three monitoring locations. Noise emissions, prior to MC being placed under care and maintenance, were considered to be in compliance with the noise criteria specified in MP06_0311 for all receiver locations (GSS Environmental 2012). Noise monitoring undertaken on behalf of LakeCoal since late 2013 (ie during care and maintenance) confirmed compliance at all monitoring locations.

The proposed modification will only involve additional coal throughput on the existing infrastructure and will not change any aspect of the surface operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers.

3.2 Assessment Locations

The nearest residential areas to MC are the Macquarie Shores mobile home village, Kingfisher Shores and Chain Valley Bay to the east, several isolated residences to the south adjacent the Pacific Highway and Mannering Park beyond the VPPS to the north. The areas to the north, south and west generally comprise industrial facilities and vegetation.

Representative assessment locations considered in the noise assessment are shown in Figure 3.1. The assessment locations represent those most likely to be affected by MC operations and are consistent with those nominated in the current approval (MP06_0311). Adherence with noise criteria at these locations would indicate that noise criteria will be met at other surrounding noise-sensitive locations.



EMM
EMGA Mitchell McLennan

Noise assessment locations

Mannering Colliery - Modification 3 Noise Impact Assessment

Figure 3.1

3.3 Existing ambient noise levels

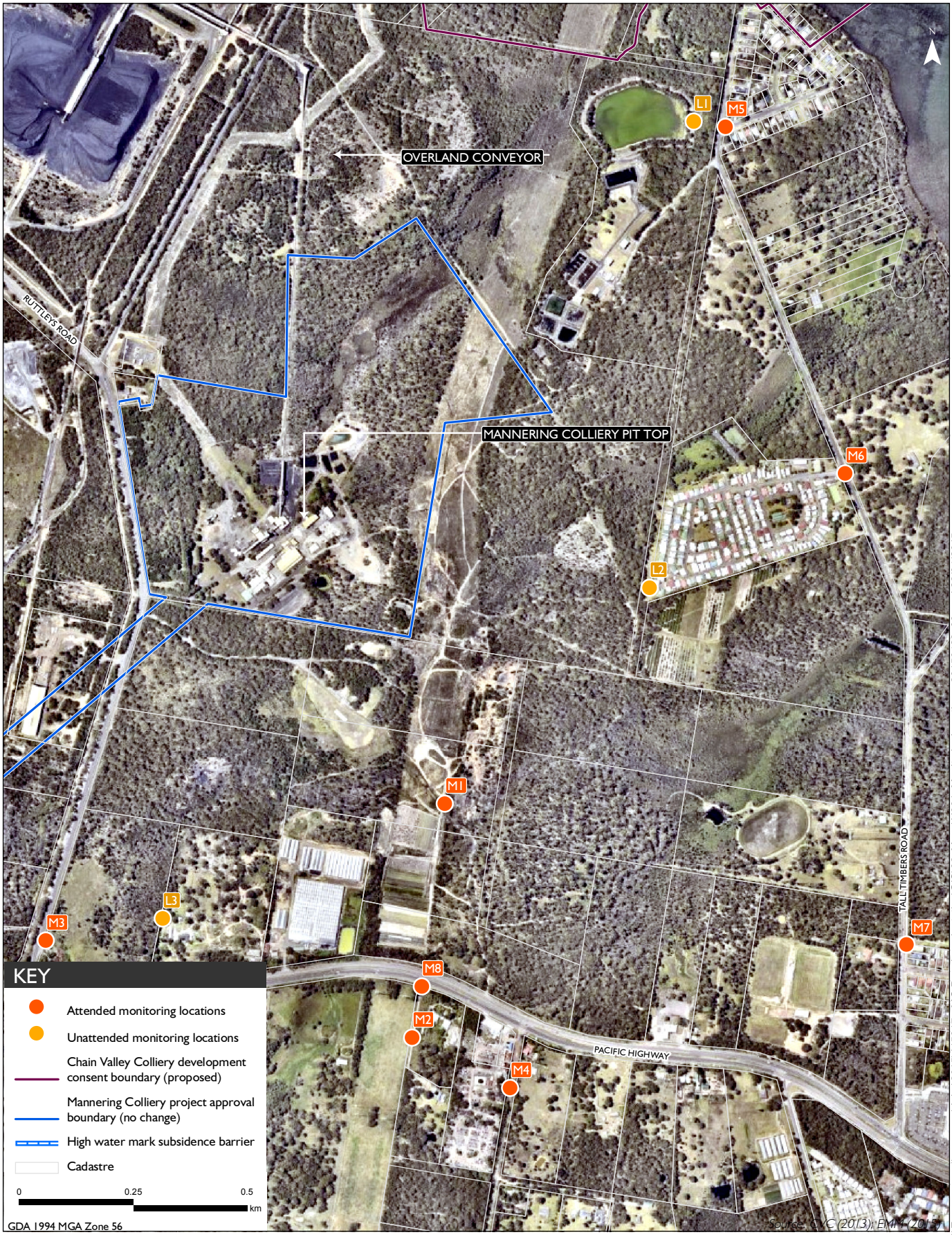
A key element in assessing environmental noise impact from industry is to quantify the existing ambient acoustic environment, including any existing industrial noise where present.

The existing acoustic environment (ie ambient noise) was characterised by long-term unattended and short-term attended noise monitoring. The locations of ambient noise monitoring used in this assessment are provided in Figure 3.2.

Attended noise measurements were undertaken at eight locations in April 2015, including locations representative of the unattended noise monitoring locations.

The attended noise surveys were conducted using a Brüel and Kjær Type 2250 one-third octave hand-held sound level meter (s/n 2759405). Field calibration of the instrument was undertaken before and after the survey using a Brüel and Kjær type 4230 calibrator with the variation in calibrated levels not greater than ±0.5dB. Attended measurements were conducted in general accordance with Australian Standard (AS) 1055-1997 *Description and Measurement of Environmental Noise,* Parts 1, 2 and 3. Meteorological conditions throughout the attended surveys generally consisted of winds at 1 m/s to 2 m/s from the north to north-east with some cloud cover. There were no winds above 5 m/s or rain events during the attended surveys. A summary of the results of the attended measurements is presented in Table 3.1.

MC was in care and maintenance during the ambient noise monitoring and consequently did not contribute to measured noise levels off site.



EMM
EMGA Mitchell McLennan

Site locality and noise monitoring locations

Mannering Colliery - Modification 3 Noise Impact Assessment

Figure 3.2

Table 3.1 Attended noise monitoring summary

Location	Date	Start time / period	Measurement result, dB(A)			Comments
			L_{eq}	L_{90}	L_{max}	
M1 Fire-track approx 380m north of Pacific Hwy	1/4/2015	15:15 Day	44	41	62	Highway traffic dominant Powerstation or CVC Wind in trees Model plane Estimated existing industrial noise Leq,15min <40 dB(A)
M2 210 Pacific Hwy approx 140m from road	1/4/2015	15:45 Day	53	48	70	Southbound Highway traffic dominant Local traffic Wind in trees Model plane No industrial noise discernible
M3 Corner Ruttleys Road / Pacific Hwy approx 150m from Hwy	1/4/2015	16:15 Day	66	52	87	Traffic on Ruttleys Road dominant Insects Traffic on Pacific Highway No industrial noise discernible
M3 Corner Ruttleys Road / Pacific Hwy approx 150m from Hwy	2/4/2015	02:45 Night	53	42	71	Highway and Ruttleys Road traffic CVC and powerstation Insects Estimated existing industrial noise Leq,15min 36 dB(A)
M4 Basford Street approx 145m from Pacific Hwy	2/4/2015	11:00 Day	51	44	75	Highway traffic dominant Local traffic Birds and insects Wind in trees Model plane No industrial noise discernible
M5 Kingfisher Shores	2/4/2015	00:45 Night	45	44	58	CVC and powerstation Insects Local traffic Estimated existing industrial noise Leq,15min 44 dB(A)
M6 Entry gate to Macquarie Village	2/4/2015	01:15 Night	41	39	53	CVC and powerstation Insects Estimated existing industrial noise Leq,15min 40 dB(A)
M7 Cnr Deakin Ave / Tall Timbers Road	2/4/2015	01:45 Night	50	35	77	CVC and powerstation Insects Wind in trees Pacific Hwy traffic Local traffic Estimated existing industrial noise Leq,15min 34 dB(A)
M8 Entry gate to 210 Pacific Hwy	2/4/2015	02:15 Night	59	39	82	Highway traffic CVC and powerstation Insects and frogs Estimated existing industrial noise Leq,15min <40 dB(A)

Long-term noise monitoring was completed by EMM at three locations (refer Figure 3.2) during March and April 2015 as described in Table 3.2.

Table 3.2 Noise logging details

Ref	Location	Logger type , s/n	Start date	Stop date
L1	Mannering Park Sewage treatment plant, east of north dam adjacent to Kingfisher Shores residences	Ngara 878113	19/3/2015	10/4/2015
L2	In south-western corner of Macquarie Village behind resident at 138 Pine Place	ARL EL316 130209	19/3/2015	2/4/2015
L3	Pacific Highway residence, behind house on western fence line	Ngara 87809F	20/3/2015	2/4/2015

The Rating Background Levels (RBL) and ambient $L_{eq,period}$ noise levels derived from EMM's long-term noise monitoring are summarised in Table 3.3. The daily noise data and charts from EMM's noise logging are provided in Appendix B. The noise logger data was analysed in accordance with the INP, whereby data was excluded where rainfall and/or winds of greater than 5 m/s were recorded. This analysis was completed using weather data from the Bureau of Meteorology's Automatic Weather Station (AWS) at Cooranbong, NSW. An analysis was also conducted using weather data obtained from the on-site weather station at MC with no change in calculated levels.

Table 3.3 Summary of measured ambient noise levels

Location	RBL, dB(A)			Ambient (L_{eq}) noise level, dB(A)		
	Day	Evening	Night	Day	Evening	Night
L1	38	38	40	46	46	45
L2	34	34	32	48	46	41
L3	42	42	34	50	50	46

Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods.

The ambient noise environment at each receiver area is summarised as follows:

- L1 Kingfisher Shores: ambient noise levels here are dominated by CVC and VPPS. Results of the attended noise survey determined an existing industrial noise level of $L_{Aeq,period}$ 44 dB(A) during the night. Given the constant nature of noise emission levels from CVC and VPPS, it has been assumed the day and evening contributions from these industries would be the same as that measured during the night.

- L2 Macquarie Village: ambient noise levels here are dominated by natural sounds as well as noise from the CVC and VPPS. The existing level of industrial noise at this location has been estimated at $L_{Aeq,period}$ 38 dB(A) based on the results of the operator-attended and unattended noise surveys.

- L3 Adjacent Pacific Highway: ambient noise at these locations is dominated by road traffic from the Pacific Highway particularly during the day and evening periods. It was noted that noise levels from existing industrial operations were generally inaudible at attended monitoring locations in this area (eg M2 and M3).

3.4 Meteorology

Noise propagation over distance can be significantly affected by the prevailing weather conditions. Of most interest are source to receiver winds, the presence of temperature inversions and drainage flow effects, as these conditions can enhance received noise levels. To account for these phenomena, the INP specifies meteorological analysis procedures to determine the prevalent weather conditions that enhance noise propagation in a particular area, with a view to determining whether they can be described as a feature of the project area.

3.4.1 Wind

Wind has the potential to increase noise impacts at a receiver when it is light and stable, and blows from the direction of the noise source. As the wind strength increases, the noise produced by the wind usually obscures noise from most industrial and transport sources.

The NSW INP requires that winds of speeds up to 3 m/s with an occurrence greater than 30% of the time during any period (day, evening or night) in any season be assessed.

Detailed analysis of winds was undertaken using weather data from the Bureau of Meteorology's (BoM) Automatic Weather Station (AWS) at Cooranbong, NSW (station number 061412) as well as data obtained from MC's on-site weather station. The Cooranbong BoM weather station is located approximately 15 km north-west of the subject site. There is another BoM AWS located at Norah Head which is nearer to the subject site at approximately 12 km south-east. Data from this AWS was not considered representative of that experienced in the vicinity of MC since it is located in an exposed coastal position.

The prevailing winds analysis was undertaken in accordance with INP methodologies and considered weather data over a two year period (April 2013 to April 2015). The analysis determined the following prevailing winds based on the respective weather data sets:

- Cooranbong BoM: winds during the day and evening ranging from north-north-easterly to southerly.
- Mannering on-site: winds during the evening and night ranging from south-west to westerly.

Predicted noise levels from MC operations at the nearest residential receptors have been calculated based on the meteorological parameters shown in Table 3.4.

3.4.2 Temperature inversions

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions generally occur during the night-time and early morning periods during the winter months. For a temperature inversion to be a significant characteristic of the area and require consideration in accordance with the INP (EPA, 2000) it needs to occur for approximately 30% of the total night-time during winter, or about two nights per week.

The frequency of occurrence of temperature inversions was determined based on sigma-theta data obtained from both weather stations considered. Analysis of both sets of data found that temperature inversions may occur for greater than 30% of the night-time period and, as such, has been considered in the prediction and assessment of noise emissions from MC.

3.4.3 Drainage winds

Topography around MC is relatively flat with a gentle downhill slope to the north and north-east.

The INP states that a default wind drainage value should be applied where sources are at a higher altitude than the assessment location with no intervening topography. To provide a conservative assessment approach drainage winds have been considered during the night-time period in the direction from MC to the assessment locations in Kingfisher Shores.

3.4.4 Modelled meteorological conditions

Predicted noise levels from MC operations at the assessment locations have been calculated based on the meteorological parameters shown in Table 3.4. Prevailing conditions (winds and inversion) based on the detailed weather data analysis described previously have been considered as well as a worst case wind scenario assuming a 3 m/s source to receiver wind.

Table 3.4 Weather conditions considered in noise modelling

Assessment period	Meteorological condition	Air temperature	Relative humidity	Wind speed[1]	Stability category (Temperature gradient)
Day	Calm	20°C	70%	0 m/s	D class
	Wind	20°C	70%	2.3 m/s[2]	D class
Day/Evening	Wind	20°C	70%	3 m/s[3]	D class
Evening	Calm	20°C	70%	0 m/s	D class
	Wind	20°C	70%	2.1 m/s[4]	D class
	Wind	20°C	70%	2.4 m/s[5]	D class
Night	Calm	10 °C	90%	0 m/s	D class
	Wind	10 °C	90%	2.3 m/s[6]	D class
	Wind	10 °C	90%	3 m/s[3]	D class
	Temperature inversion	10 °C	90%	0 m/s	F class
	Temp inv + Drainage	10 °C	90%	2 m/s[7]	F class

Note *1: Based on the 10th percentile wind speed of all winds present for 30% of the time during the relevant period.*

2: Wind directions considered include 67.5 ° to 180° (22.5° increments) from north (0°) based on data from Cooranbong BoM AWS.

3. Source to receiver wind direction.

4: Wind directions considered include 67.5 ° to 135° (22.5° increments) from north (0°) based on data from Cooranbong BoM AWS.

5. Wind directions considered include 225 ° to 270° (22.5° increments) from north (0°) based on data from Mannering on-site weather station.

6. Wind direction considered is 225° from north (0°) based on data from Mannering on-site weather station.

7. Wind direction considered was 247.5° from north (0°) based on data from Cooranbong BoM AWS.

It is noted that the previous noise assessment (Bridges Acoustics, 2007) utilised a different set of prevailing weather conditions for the purpose of predicting noise emissions levels; calm during the day, 3 m/s wind from the north east during the evening and 1 m/s wind from the south west during the night. The presence of a temperature inversion was not considered.

4 Noise criteria

4.1 Project approval MP06_0311

Noise criteria specified in Condition 1, Schedule 3 of MP06_0311 are provided in Table 4.1.

Table 4.1 MP06_0311 Noise criteria

Location	Day	Evening	Night	
	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
4 – di Rocco	49	49	35	49
5 – Keighran	47	47	35	49
6 – Swan	44	44	35	49
7 – Druitt	43	43	43	50
8 – May	46	46	46	50
9 – Jeans	45	45	45	52
11 – Jeans	40	40	40	52
18 – Jeans	43	43	43	52
20 –Knight and all other Chain Valley Bay residences	44	44	44	52

Condition 2 and 3 of Schedule 3 relate to noise mitigation and noise monitoring requirements and have been reproduced as follows:

Noise Mitigation

2. The Proponent shall prepare a report on potential noise mitigation measures for noisy equipment and activities undertaken on the site to the satisfaction of the Secretary. This report must be:

(a) prepared by a suitably qualified acoustic expert;

(b) submitted to the Secretary by the end of September 2008; and

(c) accompanied by an action plan for the implementation of any reasonable and feasible recommendations of the report.

Noise Monitoring

3. The Proponent shall prepare and implement a Noise Monitoring Program for the project to the satisfaction of the Secretary. This program must:

(a) be submitted to the Secretary by the end of September 2008; and

(b) include the use of attended noise monitoring measures to monitor the performance of the project.

4.2 Project specific noise criteria

Industrial sites in NSW are regulated by the local council, DP&E and/or the EPA. Noise limits are normally derived from operational noise criteria applied at assessment locations and based on INP guidelines (EPA 2000) or noise levels that can be achieved at a specific site following the application of all reasonable and feasible noise mitigation.

The INP guidelines for assessing industrial facilities have been used for this assessment. With respect to the criteria, the guidelines state:

> They are not mandatory, and an application for a noise producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development.

Assessment criteria depend on the existing amenity of areas potentially affected by the subject development. Noise assessment criteria for industry are based on the following objectives:

- protection of the community from excessive intrusive noise; and
- preservation of amenity for specific land uses.

To ensure these objectives are met, the EPA provides two separate criteria: intrusiveness criteria and amenity criteria. A fundamental difference between the intrusiveness and the amenity criteria is the period they relate to:

- intrusiveness criteria — apply over 15 minutes in any period (day, evening or night); and
- amenity criteria — apply to the entire assessment period (day, evening or night).

4.2.1 Intrusiveness

The intrusiveness criteria require that $L_{eq(15\text{-}min)}$ noise levels from MC during the relevant operational periods (i.e. day, evening and night) do not exceed the RBL by more than 5 dB. The adopted RBL utilised for determination of the intrusive criteria are based on the ambient noise monitoring results presented in Table 3.3.

Table 4.2 presents the intrusive noise criteria determined for the assessment locations.

Table 4.2 Intrusive noise criteria

Location	Period[1]	Adopted RBL, dB(A)	Intrusive criteria dB(A), $L_{eq(15\text{-}min)}$
4, 5 and 6	Day	42	47
	Evening	42	47
	Night	34	39
7 and 8	Day	34	39
	Evening	34	39
	Night	32	37
9, 11, 18 and 20	Day	38	43
	Evening	38	43
	Night	38[2]	43

Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8am to 6pm Sundays and public holidays; Evening: 6 pm to 10 pm; Night: all remaining periods.

2. In accordance with the INP Application Notes, the RBL for evening has been adopted for the night period since the measured RBL during the night was higher than that measured for evening.

4.2.2 Amenity

The assessment of amenity is based on noise criteria specific to the land use. The criteria relate only to industrial noise and exclude road or rail noise. Where the measured existing industrial noise approaches recommended amenity criteria, it needs to be demonstrated that noise levels from new industry will not contribute to existing industrial noise.

Residential assessment locations have been categorised in the INP (EPA 2000) urban amenity category in accordance with the INP definition of an urban receiver type, i.e. an area with an acoustical environment that is dominated by 'urban hum' or industrial noise sources and is located near commercial or industrial districts. The corresponding recommended amenity criteria for MC are given in Table 4.3. It is noted that relevant adjustments to the acceptable recommended noise amenity level have been applied to the evening and night-time periods at Kingfisher Shores and Macquarie Village residences to account for the existing level of industrial noise in these areas (refer Table 3.1 and Table 3.3).

Table 4.3 Amenity criteria

Assessment location	Indicative area	Time period	Recommended noise level dB(A), $L_{eq,period}$	
			Acceptable	Maximum
4, 5 and 6	Urban	Day	60	65
		Evening	50	55
		Night	45	50
7 and 8	Urban	Day	60	65
		Evening	50	55
		Night	45	50
9, 11, 18 and 20	Urban	Day	60	65
		Evening	49	54
		Night	39	44

Source: INP (EPA 2000).

4.2.3 Project specific noise level

The project-specific noise levels (PSNLs) are generally the more stringent of either the intrusive or amenity criteria. However, where the amenity criteria is lower than the intrusive criteria it does not automatically follow that the amenity criteria would be more stringent due to the relative time periods over which they apply. Where this situation arises it is necessary to demonstrate that both the amenity and intrusive criteria can be achieved.

The PSNLs determined for MC for all relevant assessment periods are indicated in bold in Table 4.4. Note that for locations 9, 11, 18 and 20 both the intrusive and amenity criteria apply during the night.

Table 4.4 Project specific noise levels

Location	Period[1]	Intrusive criteria dB(A), $L_{eq(15\text{-}min)}$	Amenity criteria dB(A), $L_{eq,period}$
4, 5 and 6	Day	**47**	60
	Evening	**47**	50
	Night	**39**	45
7 and 8	Day	**39**	60
	Evening	**39**	50
	Night	**37**	43
9, 11, 18 and 20	Day	**43**	60
	Evening	**43**	49
	Night	**43**	**39**

Note: 1. Day: 7 am to 6 pm Monday to Saturday; 8 am to 6 pm Sundays and public holidays; evening: 6 pm to 10 pm; night is the remaining periods.

4.3 Sleep disturbance assessment

The Project will operate during the night-time period from 10 pm to 7 am. Therefore assessment of sleep disturbance is required in accordance with the INP and associated application notes.

The INP Application Notes (last updated June 2013) recognise that the current sleep disturbance criteria is not ideal. The assessment of potential sleep disturbance is complex and poorly understood and the EPA believes that there is insufficient information to determine a suitable alternative criteria.

In the interim, the INP guideline suggests that the $L_{A1(1min)}$ level of 15 dBA above the RBL is a suitable screening criteria for sleep disturbance for the night-time period. Guidance regarding potential for sleep disturbance is also provided in the NSW Road Noise Policy (RNP). The RNP calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The RNP acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the RNP provides the following conclusions from the research on sleep disturbance:

- maximum internal noise levels below 50 to 55 dBA are unlikely to awaken people from sleep; and
- one or two noise events per night, with maximum internal noise levels of 65 to 70 dBA, are not likely to affect health and wellbeing significantly.

It is commonly accepted by acoustic practitioners and regulatory bodies that a facade including a partially open window will reduce external noise levels by 10 dB(A). Therefore, external noise levels in the order of 60 to 65 dB(A) calculated at the facade of a residence are unlikely to cause sleep disturbance affects. Similarly, the World Health Organisation (WHO) *Guidelines for Community Noise* (WHO 1999) suggest that levels below 45 dB(A) inside homes are unlikely to wake sleeping occupants.

The descriptors L_{max} and L_1 may be considered interchangeable which is accepted by the EPA.

5 Operational noise modelling and assessment

5.1 Overview

The proposed modification will only involve additional coal throughput on the existing infrastructure and will not change any aspect of the surface operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers. Hence, the change in noise levels associated with the proposed modification compared to the approved development is predicted to be negligible. Notwithstanding this, noise emissions from MC operations have been assessed to provide a contemporary assessment of approved operations, incorporating the proposed modification.

5.2 Noise modelling methodology

This section presents the methods and assumptions used to model noise emissions from MC operations.

Noise modelling was based on three-dimensional digitised ground contours of the surrounding land. Noise predictions were carried out using Brüel and Kjær Predictor Version 8.14 noise prediction software. 'Predictor' calculates total noise levels at assessment locations from the concurrent operation of multiple noise sources. The model has considered factors such as:

- the lateral and vertical location of plant;
- source to assessment location distances;
- ground effects;
- atmospheric absorption;
- topography of the Project site and surrounding area; and
- applicable meteorological conditions (refer to Section 3.4).

Plant and equipment was modelled at locations and heights representing activities during MC operations. Assumed locations of acoustically significant plant and equipment are shown in Figure 5.1.

EMM conducted a site visit on 19 March 2015 to undertake noise measurements at the MC for the purpose of determining sound power levels of relevant equipment. Due to the nature of the current operations (care and maintenance) it was not possible to effectively measure all relevant equipment. Where direct measurement was not possible sound power data has been obtained from previous site surveys when the site was fully operational (eg *Noise Impact Assessment Report J0130-10-R1* prepared by Bridges Acoustics dated 21 March 2007) or an EMM database of similar equipment. Sound power data adopted for the noise model are provided in Table 5.1. The noise modelling conservatively assumed that all plant and equipment will be operating concurrently.

It is important to note that the rock breaker assessed in the previous noise assessment (Bridges Acoustics, 2007) will not be in use at MC once operations recommence. Notwithstanding this, the sound power level of the transfer house has been conservatively assumed to be equal to that of the rock breaker (113 dB(A)), which included the transfer house, as provided in the Bridges Acoustics report.

Table 5.1 Operational plant and equipment sound power levels

Plant and equipment	Sound power level - L_w, $L_{eq(15\text{-}min)}$, dB(A)
Compressors (x2)	106 per compressor[1]
Transfer house	113[2]
Crushing facility	113[2]
Vent fan (x2)	93 per fan[2]
Excavator	106[3]
Dozer (D9 or similar)	113[3]
Storage bin	106[3]
Conveyor – from underground to transfer house	92[1]
Conveyor – transfer house to crushing facility	87[1]
Conveyor – crushing facility to bin	100[1]
Conveyor – belt tensioner	98[1]
Conveyor – opening under bin	85[1]
Conveyor – bin to stockpile area	99[1]
Conveyor – overland conveyor	85 per metre[3]

Notes: *1.Obtained from direct measurement by EMM.*

2. Obtained from the previous report.

3. Obtained from EMM database of similar equipment

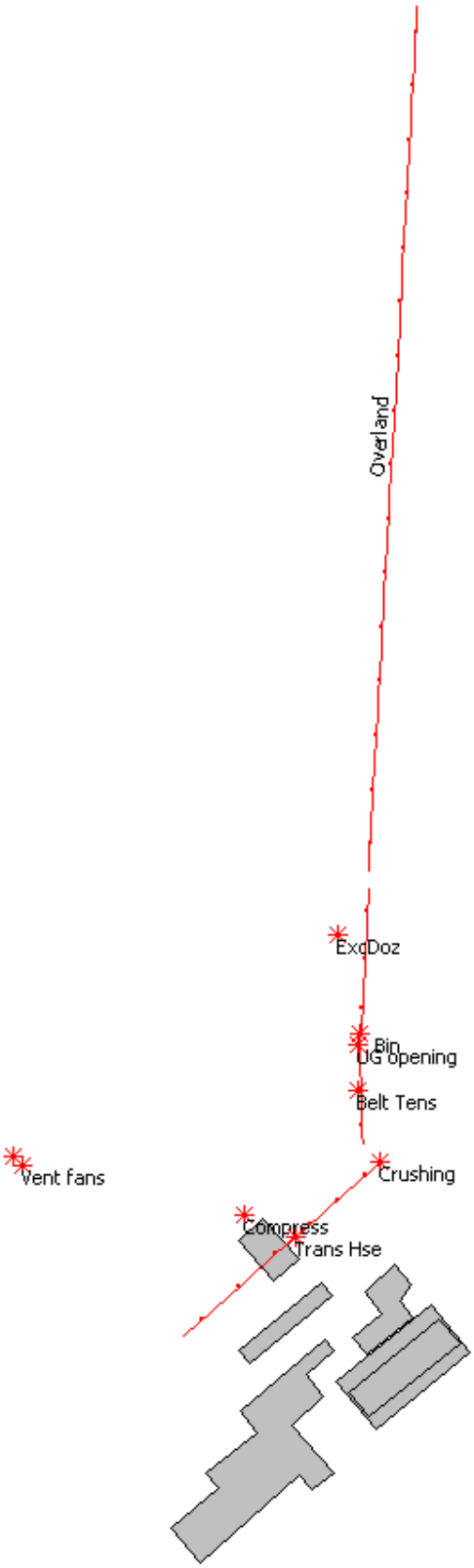


Figure 5.1 Modelled locations of plant and equipment

During the site visit it was identified that the noise source most likely to cause sleep disturbance was the conveyor siren. This source was measured by EMM and the maximum noise level of the siren was confirmed to be the same as that presented in the previous noise report; L_{max} 122 dB(A).

In assessing sleep disturbance, this L_{max} noise level was used as input to the computer model. Predictions were made at the assessment locations under calm and prevailing weather conditions during the night-time period. The use of the L_{max} noise level provides a worst-case prediction since the $L_{1(1minute)}$ noise level of a noise event is likely to be less than the L_{max}.

5.3 Noise modelling results and discussion

5.3.1 Operational noise levels

Predicted noise emission levels from MC at all assessment locations are provided in Table 5.2. All noise emission levels provided are $L_{Aeq(15\text{-}min)}$ unless otherwise noted. Noise contours are also provided in Appendix C for calm and temperature inversion scenarios.

Based on previous experience it is expected that the amenity noise level from a mining development would be typically 2 to 5 dB below the intrusive noise level. To provide a conservative assessment approach the predicted amenity level ($L_{Aeq,period}$) from MC has been assumed to be 2 dB lower than the predicted intrusive noise level ($L_{Aeq(15\text{-}min)}$).

The predicted noise level provided for assessment location 8 is the highest predicted across the entire Macquarie Village site and representative of the noise level received by the western-most residences.

Noise levels have been predicted based on the meteorological conditions provided in Table 3.4.

Noise emission levels predicted to be above the existing Project Approval conditions are indicated by shading. Noise emission levels predicted to be above the determined PSNLs are indicated by bold text.

Table 5.2 Predicted operational noise levels

Assessment location	Period	Predicted operational					Noise criteria, dB(A)	
		Calm	Prevailing Wind	Inv	Inv+Dr	Source to receiver wind	MP06_0311	PSNL
4	Day	36	39	n/a	n/a	39	49	47
	Evening	36	39	n/a	n/a	39	49	47
	Night	37	34	**40**	n/a	**40**	35	39
5	Day	39	42	n/a	n/a	42	47	47
	Evening	39	42	n/a	n/a	42	47	47
	Night	**40**	36	**43**	n/a	**43**	35	39
6	Day	38	41	n/a	n/a	41	44	47
	Evening	38	41	n/a	n/a	41	44	47
	Night	39	35	**42**	n/a	**42**	35	39
7	Day	35	31	n/a	n/a	38	43	39
	Evening	35	38	n/a	n/a	38	43	39
	Night	36	**39**	**39**	**39**	**39**	43	37
8	Day	**42**	**42**	n/a	n/a	**45**	46	39
	Evening	**42**	**45**	n/a	n/a	**45**	46	39
	Night	**43**	**46**	**46**	**46**	**46**	46	37
9	Day	37	40	n/a	n/a	40	45	43
	Evening	37	40	n/a	n/a	40	45	43
	Night	38 36 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	41 39 $L_{Aeq,period}$	45	39 $L_{Aeq,period}$
11	Day	36	38	n/a	n/a	38	40	43
	Evening	36	38	n/a	n/a	38	40	43
	Night	37 35 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	40	39 $L_{Aeq,period}$
18	Day	35	38	n/a	n/a	38	43	43
	Evening	35	38	n/a	n/a	38	43	43
	Night	36 34 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	39 37 $L_{Aeq,period}$	43	39 $L_{Aeq,period}$
20	Day	36	39	n/a	n/a	39	44	43
	Evening	36	39	n/a	n/a	39	44	43
	Night	37 35 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	40 38 $L_{Aeq,period}$	44	39 $L_{Aeq,period}$

A discussion of results relevant to each assessment area is provided as follows:

- **Adjacent Pacific Highway**: noise emission levels at assessment locations 4, 5 and 6 are predicted to be up to 8 dB above the current approval conditions and up to 4 dB above the determined PSNLs during the night-time period. An exceedance of up to 4 dB is considered to be moderate. Recommendations with regard to noise mitigation are discussed further in Section 6.

- **Macquarie Village**: noise emission levels at assessment location 7 are predicted to be up to 2 dB above the relevant PSNL during the night-time period and at assessment location 8 are predicted to be up to 9 dB above the determined PSNLs during day, evening and night. However, MC noise emissions at these locations are predicted to remain in compliance with the current approval conditions.

- **Kingfisher Shores**: noise emission levels at assessment locations 9, 11, 18 and 20 are predicted to remain below both the determined PSNLs and the current approval conditions.

  It is noted that the difference between predicted noise levels presented in Table 5.2 and those presented in the previous noise assessment (Bridges Acoustics, 2007) is largely due to the different meteorological scenarios considered.

5.4 Sleep disturbance assessment

The highest predicted L_{max} noise level associated with operation of the conveyor sirens at any of the assessment locations was 47 dB(A) at location 8 (Macquarie Village) for prevailing meteorological conditions. This satisfies the EPA's strict background plus 15 dB(A) target at all locations (the lowest being 47 dB(A) at this location).

Noise modelling demonstrates that L_{max} noise levels associated with the sirens would comply with the relevant sleep disturbance criteria provided in both the current Project Approval and the PSNLs at all assessment locations.

5.5 Cumulative noise assessment

Potential cumulative noise impacts from existing and successive developments are considered by the INP procedures by ensuring that the appropriate noise criteria are established with a view to maintaining acceptable noise amenity levels. Therefore, the cumulative impact of the Project with existing industrial noise sources has been assessed in the determination of the acceptable amenity levels at the assessment locations.

The proposed modification will only involve additional coal throughput on existing infrastructure and will not change any aspect of the surface operations or road traffic generation which have the potential to generate noise emissions at potentially sensitive receivers. Subject to the approval of this modification and the equivalent modification of the CVC approval, noise emissions from CVC will be reduced through the use of MC's existing surface conveyor to transport coal to VPPS. Therefore, the proposed modification will result in a positive impact with respect to cumulative noise.

6 Noise management and mitigation

MC currently undertakes operational noise monitoring in accordance with the approved Noise Monitoring Program (Centennial Coal, 2011). A review of quarterly noise monitoring reports for the previous three years found that noise emissions from MC are typically inaudible at the nearest residential locations or, if they are audible, are significantly below the relevant noise criteria as specified in MP06_0311.

Even prior to the commencement of Care and Maintenance, MC did not receive complaints with regard to noise from their neighbours and have not received any submissions from the general public regarding noise in relation to the most recent previous application to modify the existing approval.

When the Care and Maintenance program ceases and MC once again becomes operational, a report on potential noise mitigation measures will be prepared by a suitably qualified expert. An action plan will be prepared based on the outcomes of the report regarding the implementation of any reasonable and feasible noise mitigation recommendations.

7 Conclusion

EMM has prepared a NIA to accompany an application to modify MP06_0311 under Section 75W of the EP&A Act to, amongst other things, permit an increase in the ROM coal handing and transport at MC from 1.1 Mtpa to a maximum of 1.3 Mtpa.

The NIA has been prepared to provide a contemporary evaluation of the potential impact on MC noise emissions as a result of the proposed increased throughput. The change in noise levels associated with the proposed modification compared to the approved development is predicted to be negligible.

Potential noise emission levels from MC have been predicted and compared to both the current approval conditions and the PSNLs.

- **Adjacent Pacific Highway**: noise emission levels at assessment locations 4, 5 and 6 are predicted to be up to 8 dB above the current approval conditions and up to 4 dB above the determined PSNLs during the night-time period. An exceedance of up to 4 dB is considered to be moderate.

- **Macquarie Village**: noise emission levels at assessment location 7 are predicted to be up to 2 dB above the relevant PSNL during the night-time period and at assessment location 8 are predicted to be up to 9 dB above the determined PSNLs during day, evening and night. However, MC noise emissions at these locations are predicted to remain in compliance with the current approval conditions.

- **Kingfisher Shores**: noise emission levels at assessment locations 9, 11, 18 and 20 are predicted to remain below both the determined PSNLs and the current approval conditions.

Noise modelling demonstrates that L_{max} noise levels associated with the sirens would comply with the relevant sleep disturbance criteria provided in both the current Project Approval and the PSNLs at all assessment locations.

It is noted that MC currently undertakes operational noise monitoring in accordance with the approved Noise Monitoring Program (Centennial Coal, 2011) and that noise emissions from MC are typically inaudible at the nearest residential locations or, if they are audible, are significantly below the relevant noise criteria as specified in MP06_0311.

Even prior to the commencement of Care and Maintenance, MC did not receive complaints with regard to noise from their neighbours and have not received any submissions from the general public regarding noise in relation to the most recent previous application to modify the existing approval.

When the Care and Maintenance program ceases and MC once again becomes operational, a report on potential noise mitigation measures will be prepared by a suitably qualified expert. An action plan will be prepared based on the outcomes of the report regarding the implementation of any reasonable and feasible noise mitigation recommendations.

Appendix A

Acoustic terminology

A number of technical terms are required for the discussion of noise and vibration. These are explained in Table A.1.

Table A.1 Glossary of acoustic terms

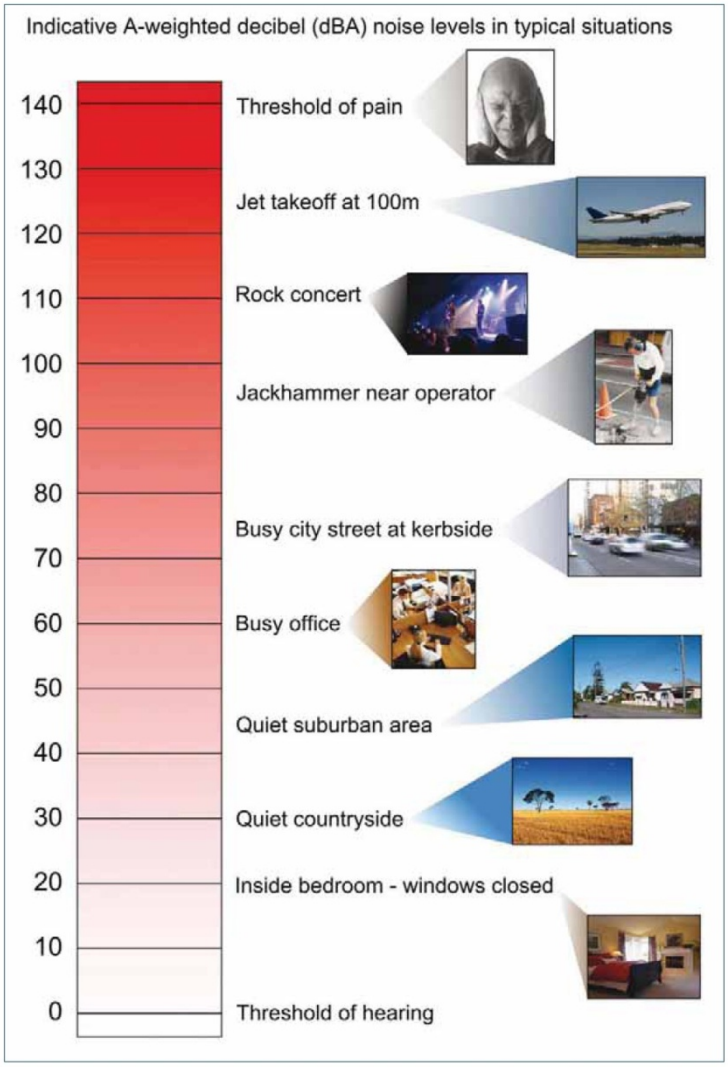
Term	Description
dB(A)	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
L_1	The noise level exceeded for 1% of a measurement period.
L_{10}	A noise level which is exceeded 10% of the time. It is approximately equivalent to the average of maximum noise levels.
L_{90}	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
L_{eq}	It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period. The $L_{eq,15min}$ descriptor refers to an L_{eq} noise level measured over a 15 minute period.
L_{max}	The maximum root mean squared sound pressure level received at the microphone during a measuring interval.
RBL	The Rating Background Level (RBL) is an overall single value background level representing each assessment period over the whole monitoring period.
Sound power level	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental property of the source and is independent of the surrounding environment.
Temperature inversion	A positive temperature gradient. A meteorological condition where atmospheric temperature increases with altitude.

It is also useful to have an appreciation of decibels, the unit of noise measurement. Table A.2 gives an indication as to what an average person perceives about changes in noise levels.

Table A.2 Perceived change in noise level

Change in sound level (dB)	Perceived change in noise
1–2	typically indiscernible
3	just perceptible
5	noticeable difference
10	twice (or half) as loud
15	large change
20	four times as loud (or quarter) as loud

Examples of common noise levels are provided in Figure A.1.

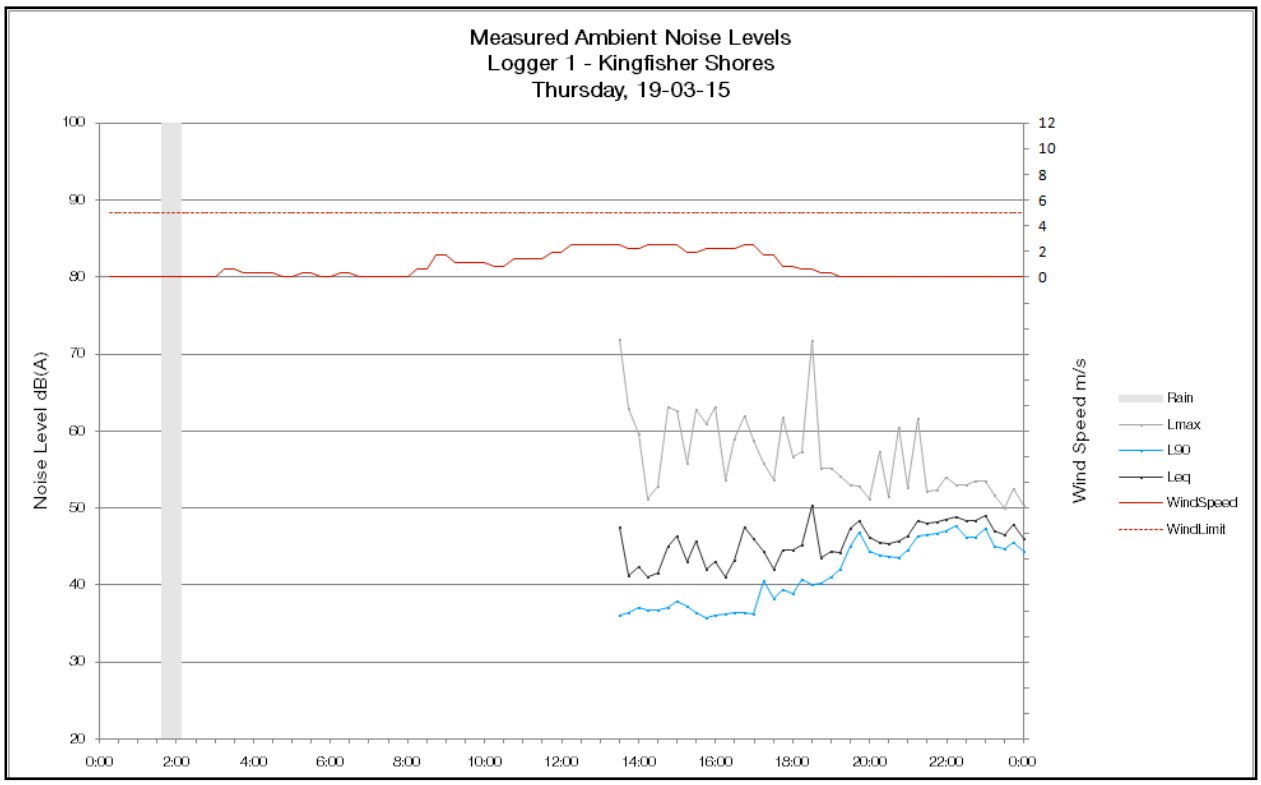


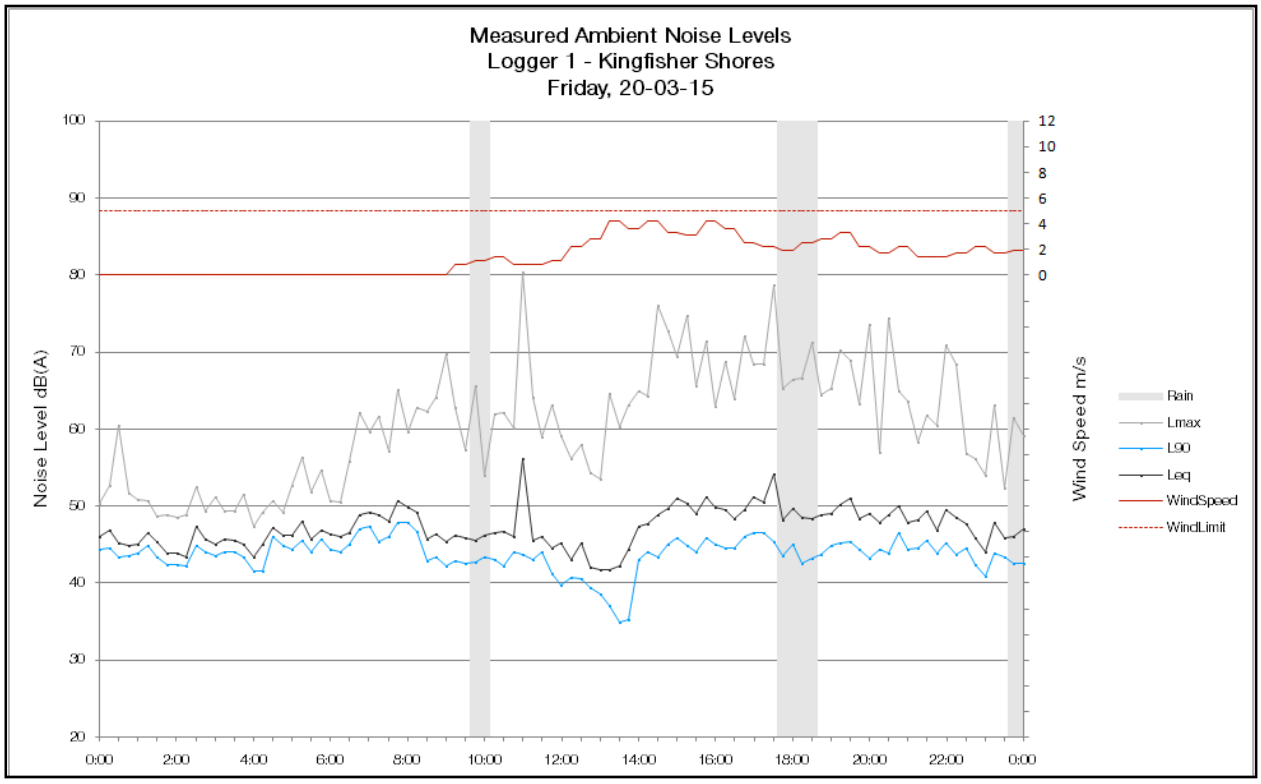
Source: *Road Noise Policy (Department of Environment, Climate Change and Water (DECCW) 2011).*

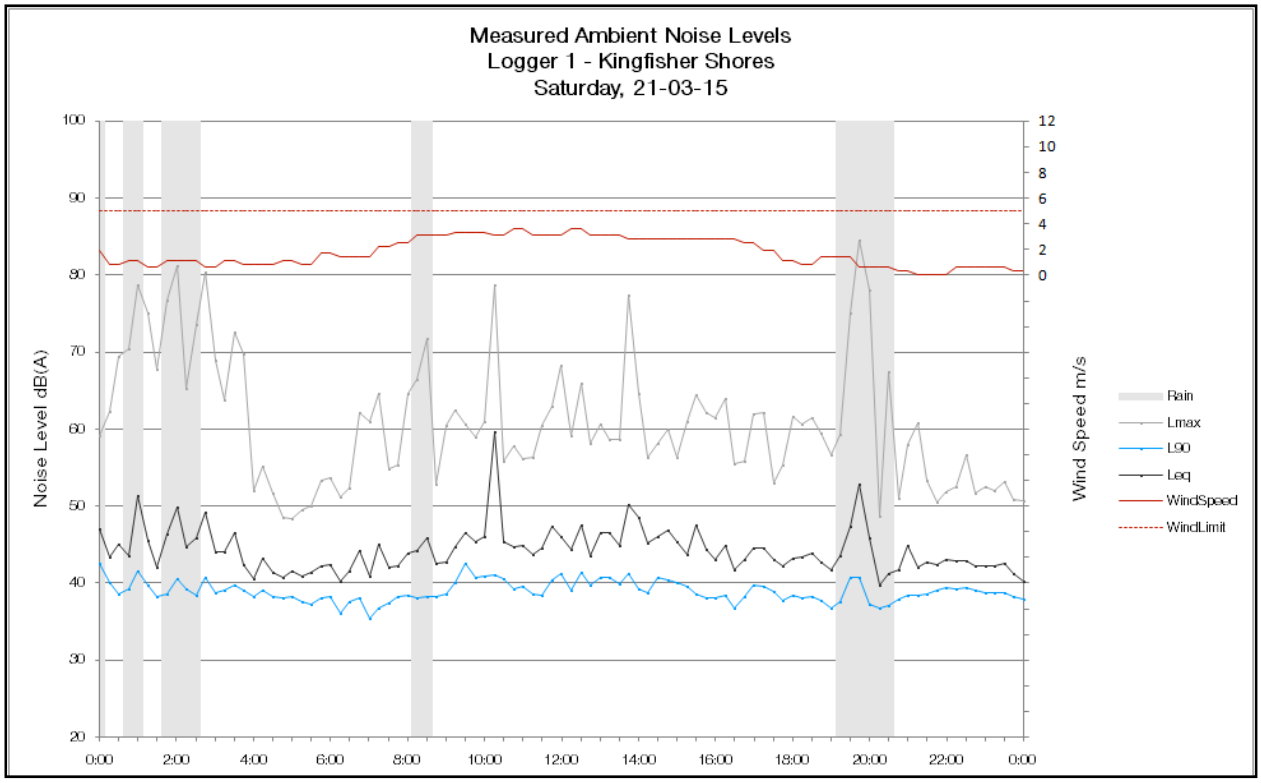
Figure A.1 Common noise levels

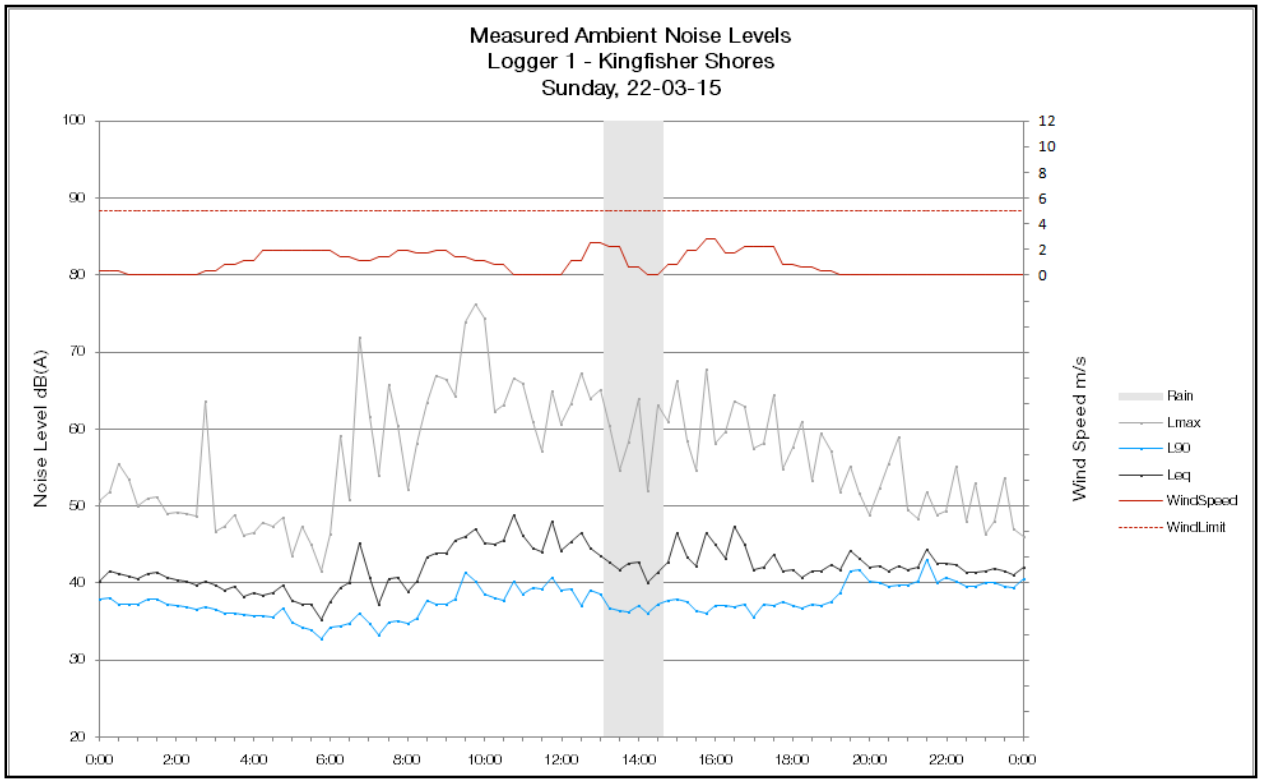
Appendix B

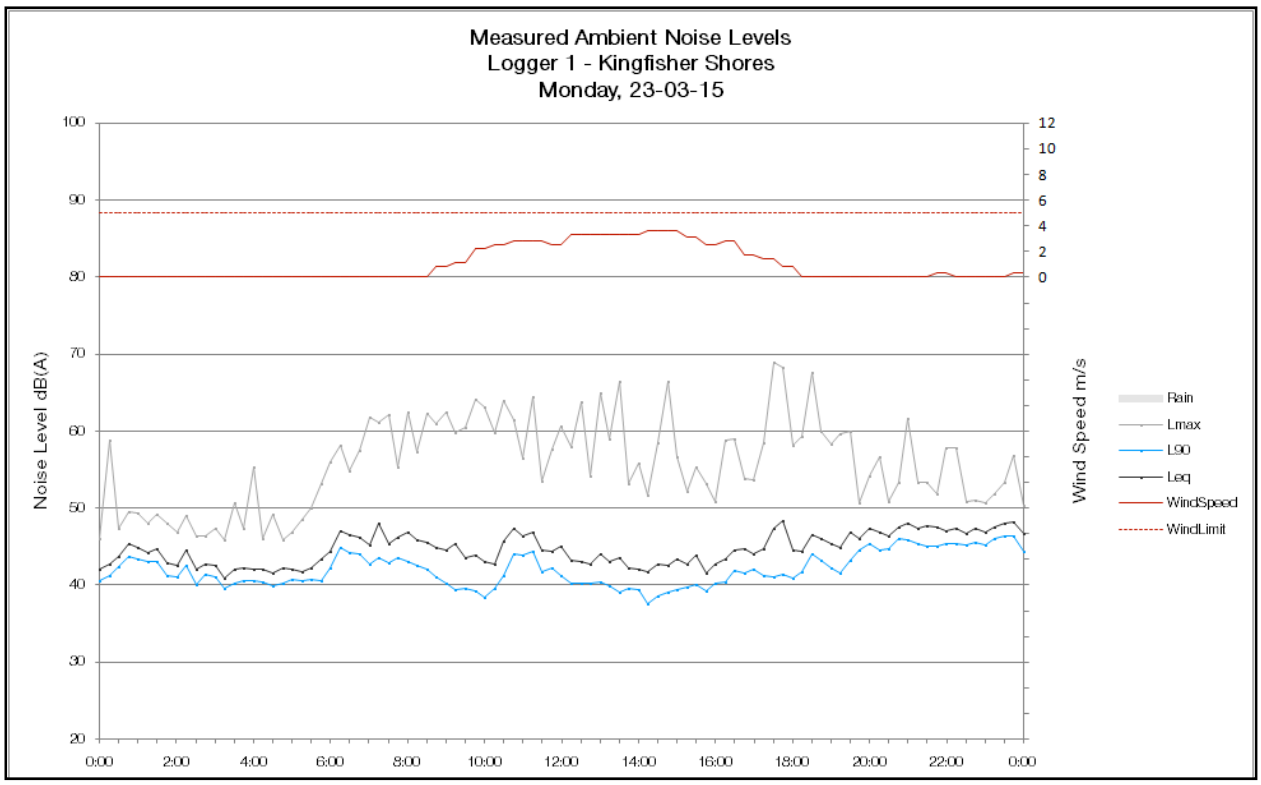
Ambient noise logging charts

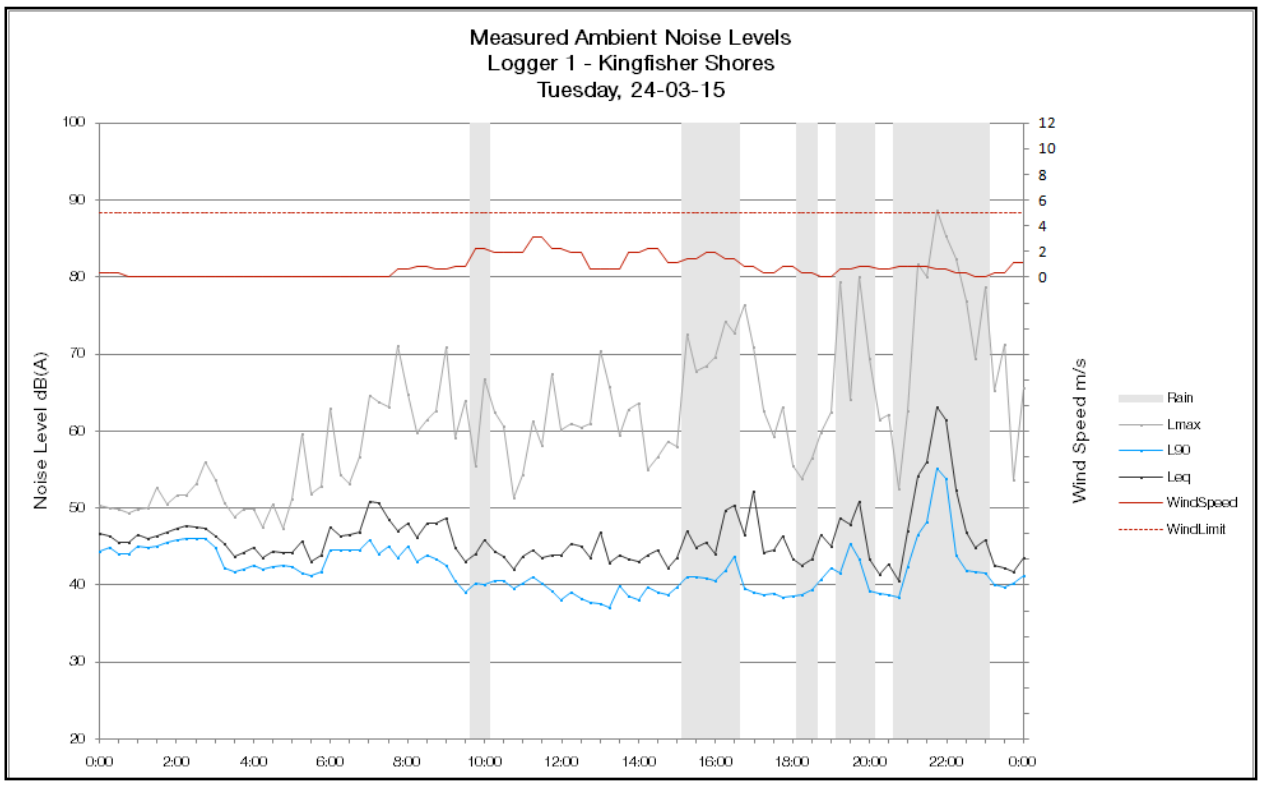

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Thursday, 19-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

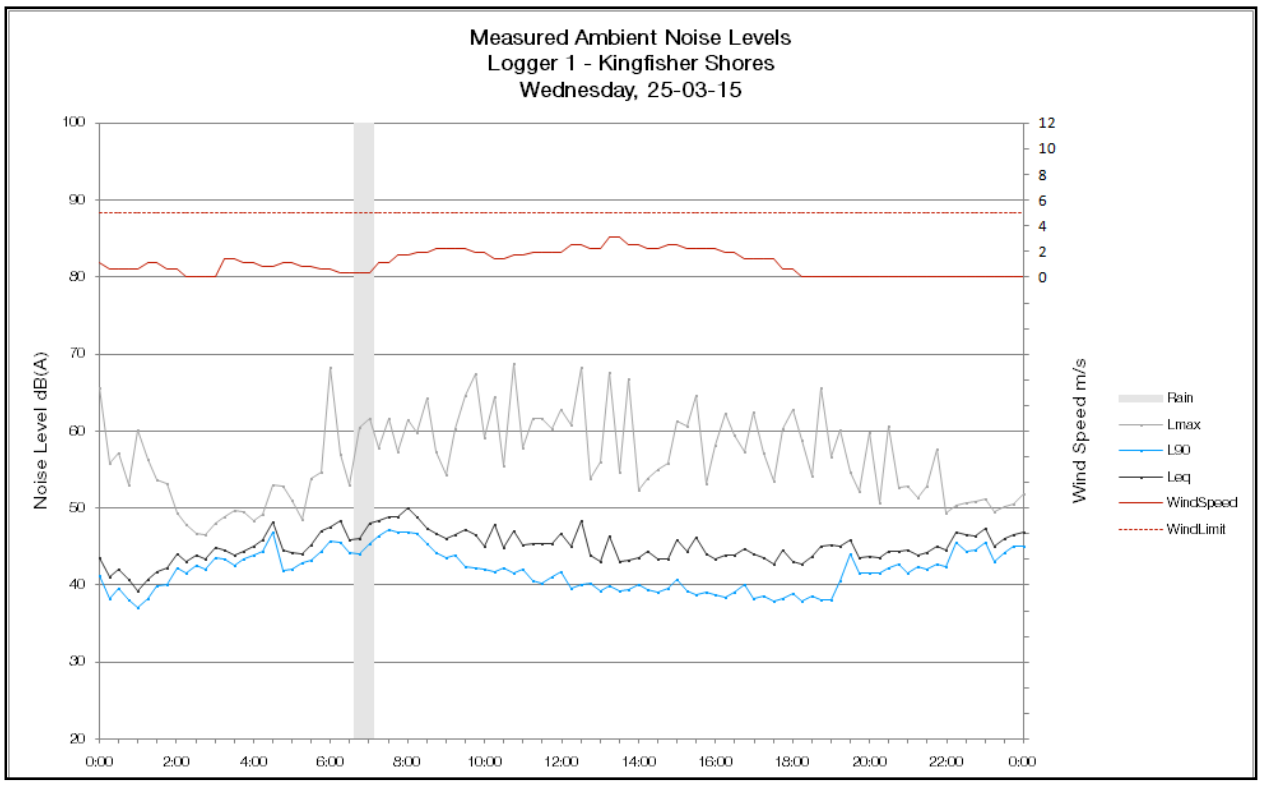

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Friday, 20-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

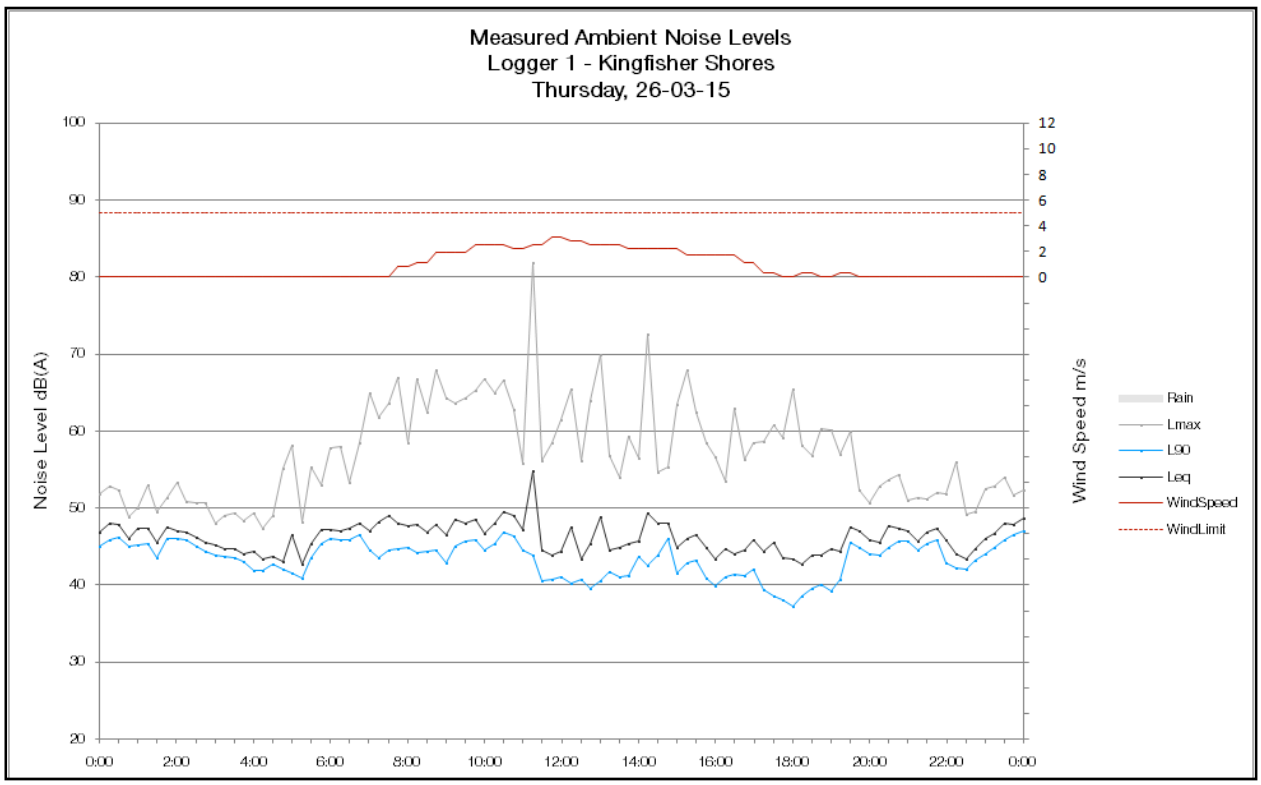

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Saturday, 21-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

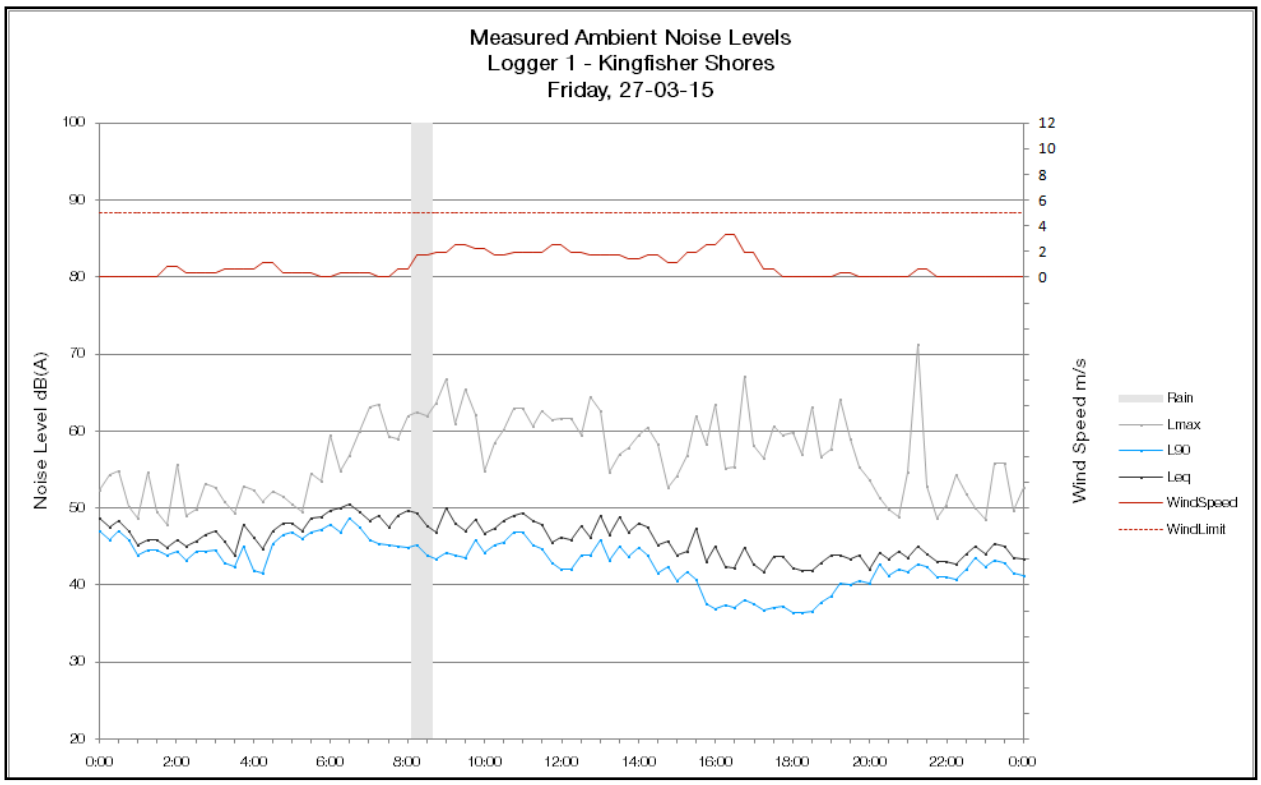

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Sunday, 22-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

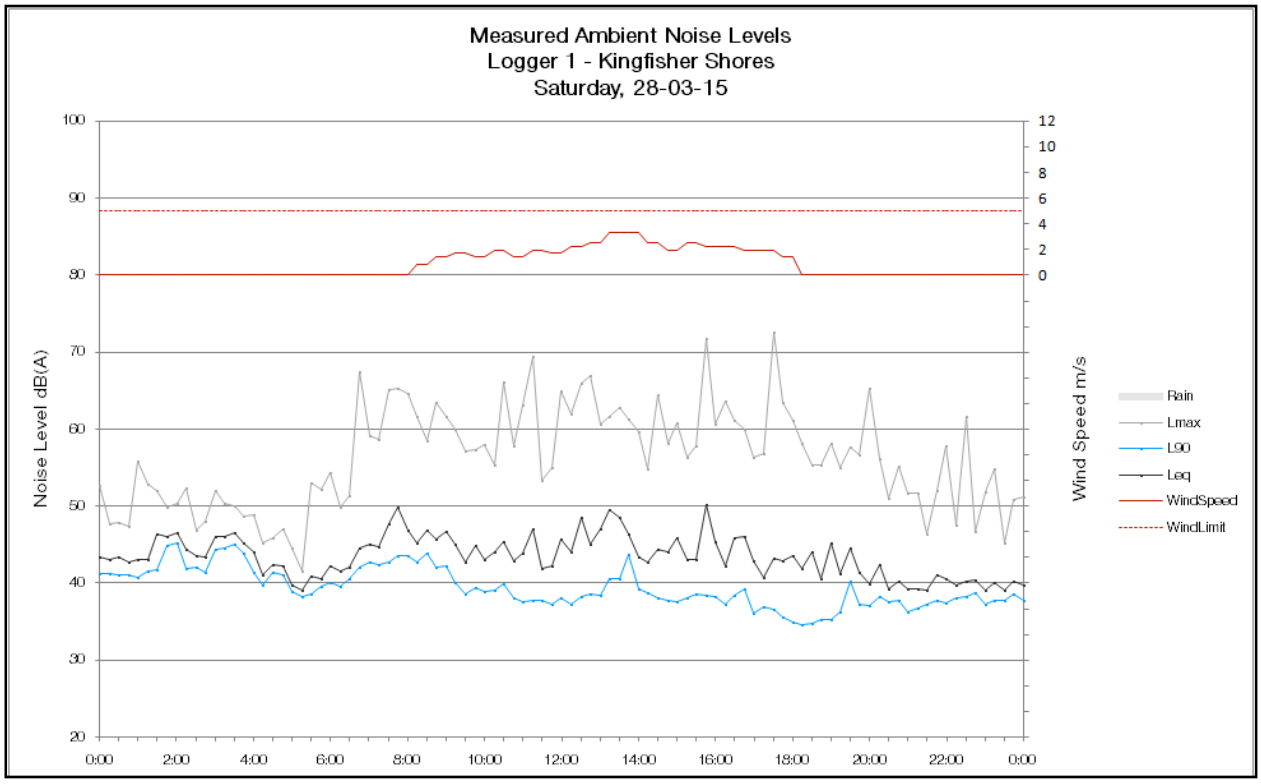

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Monday, 23-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

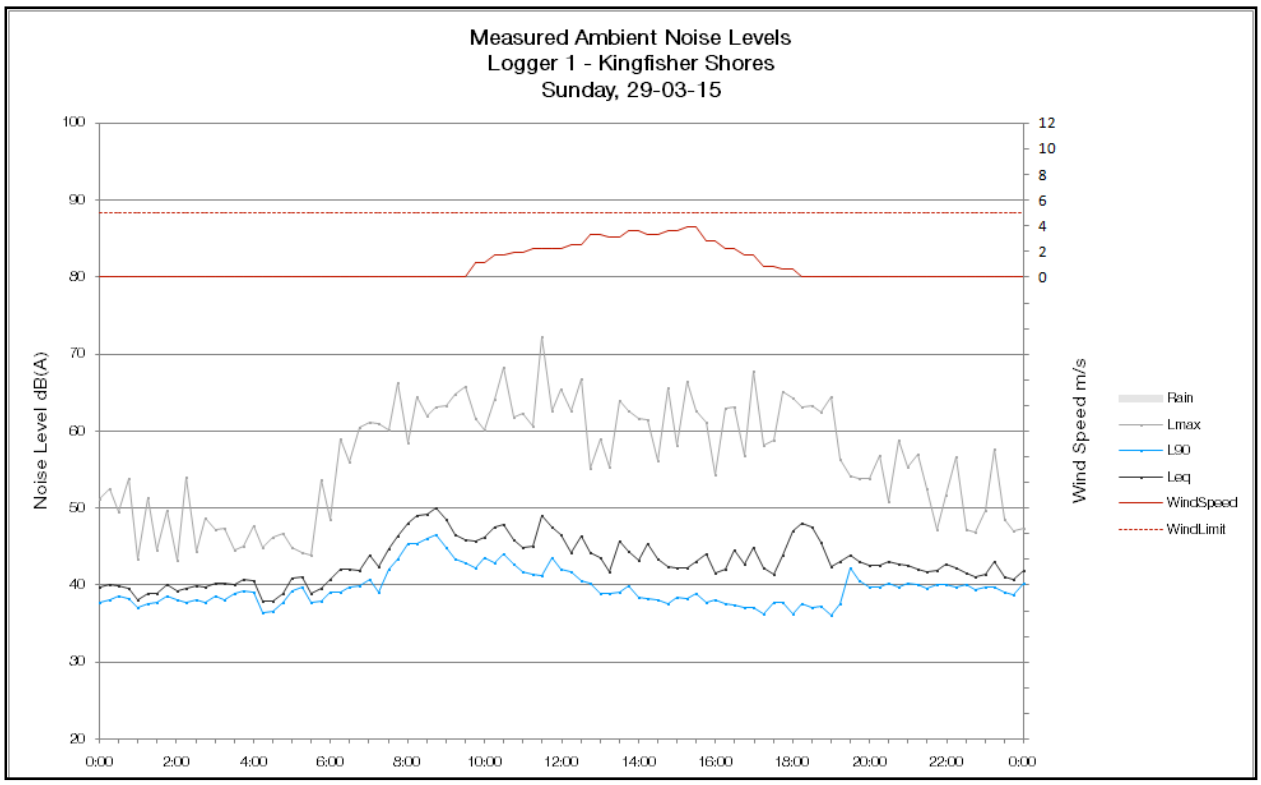

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Tuesday, 24-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

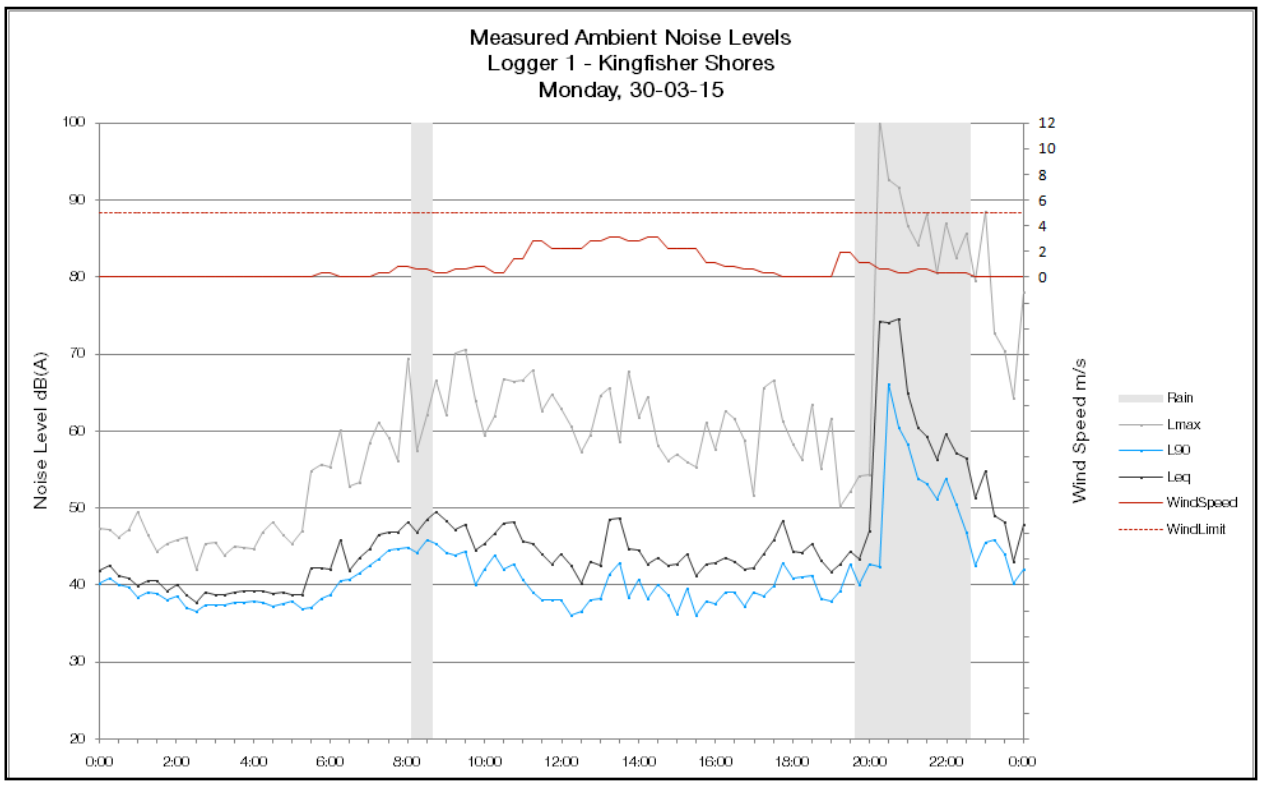

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Wednesday, 25-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

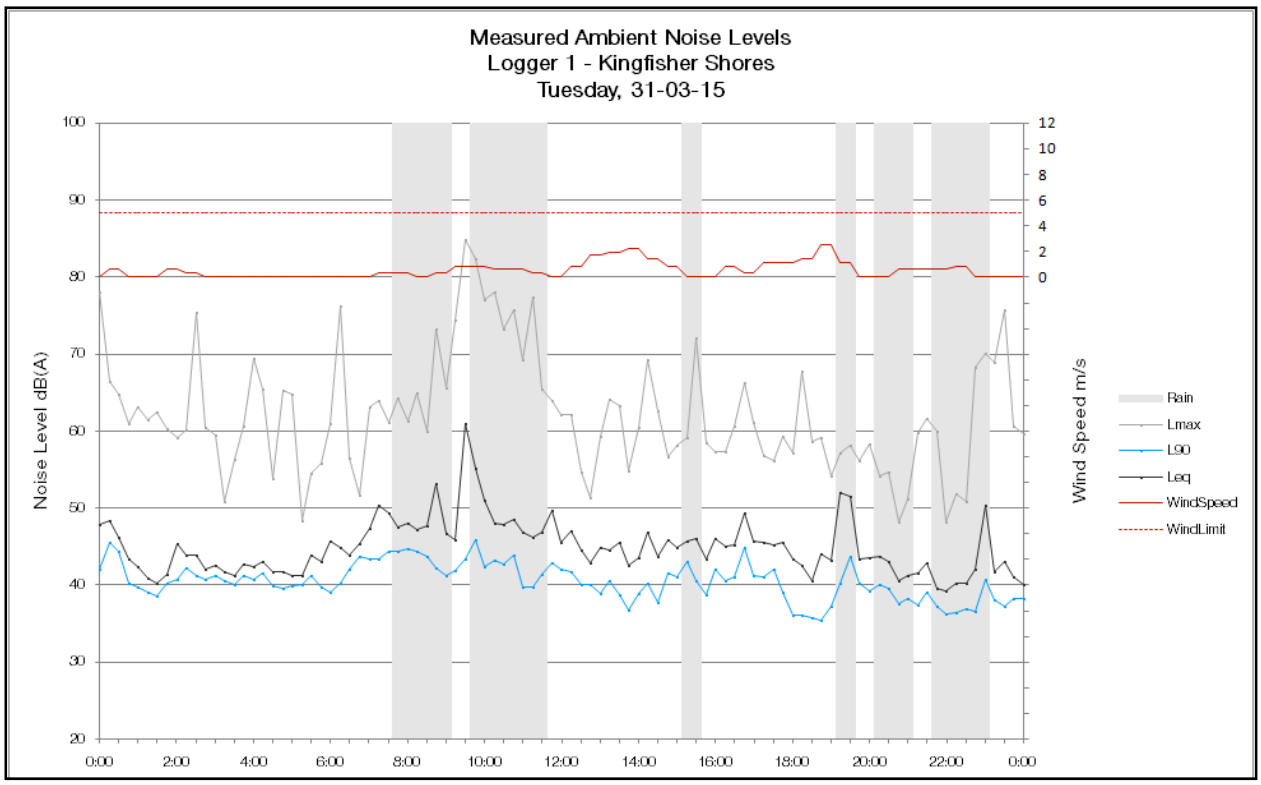

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Thursday, 26-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

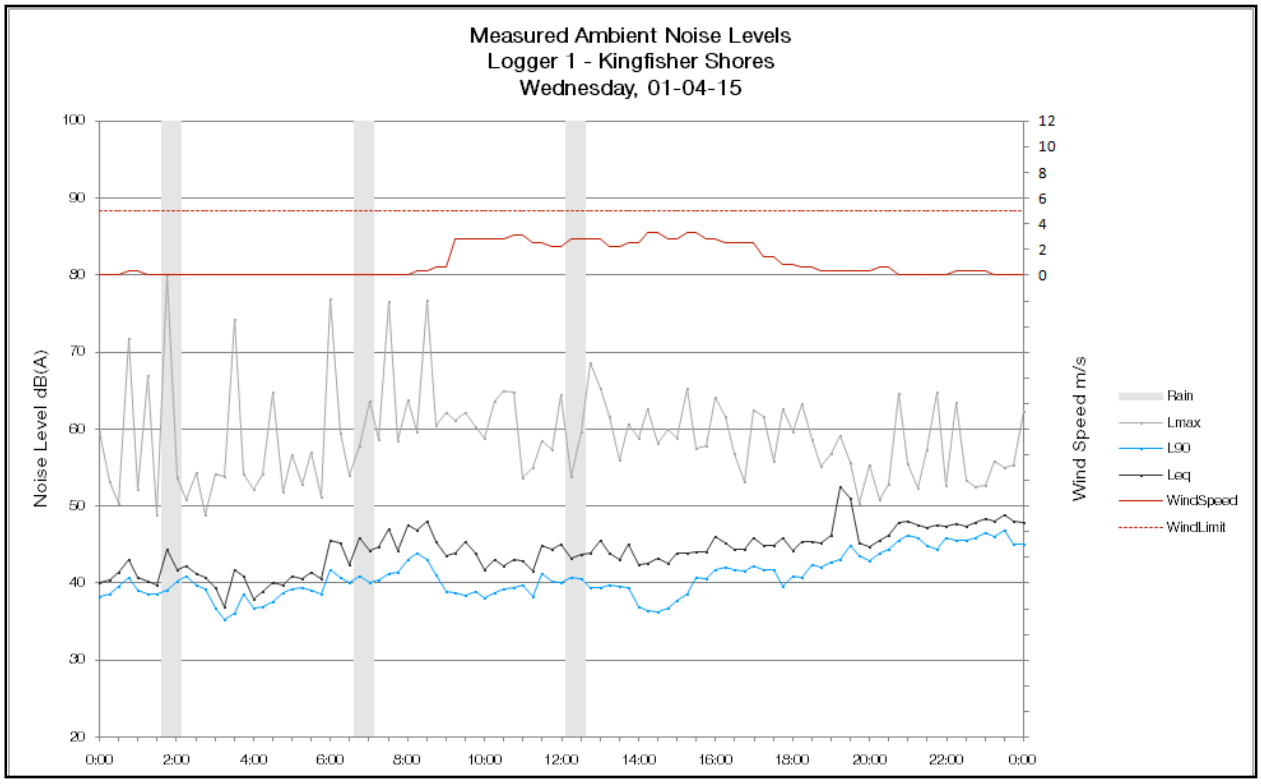

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Friday, 27-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

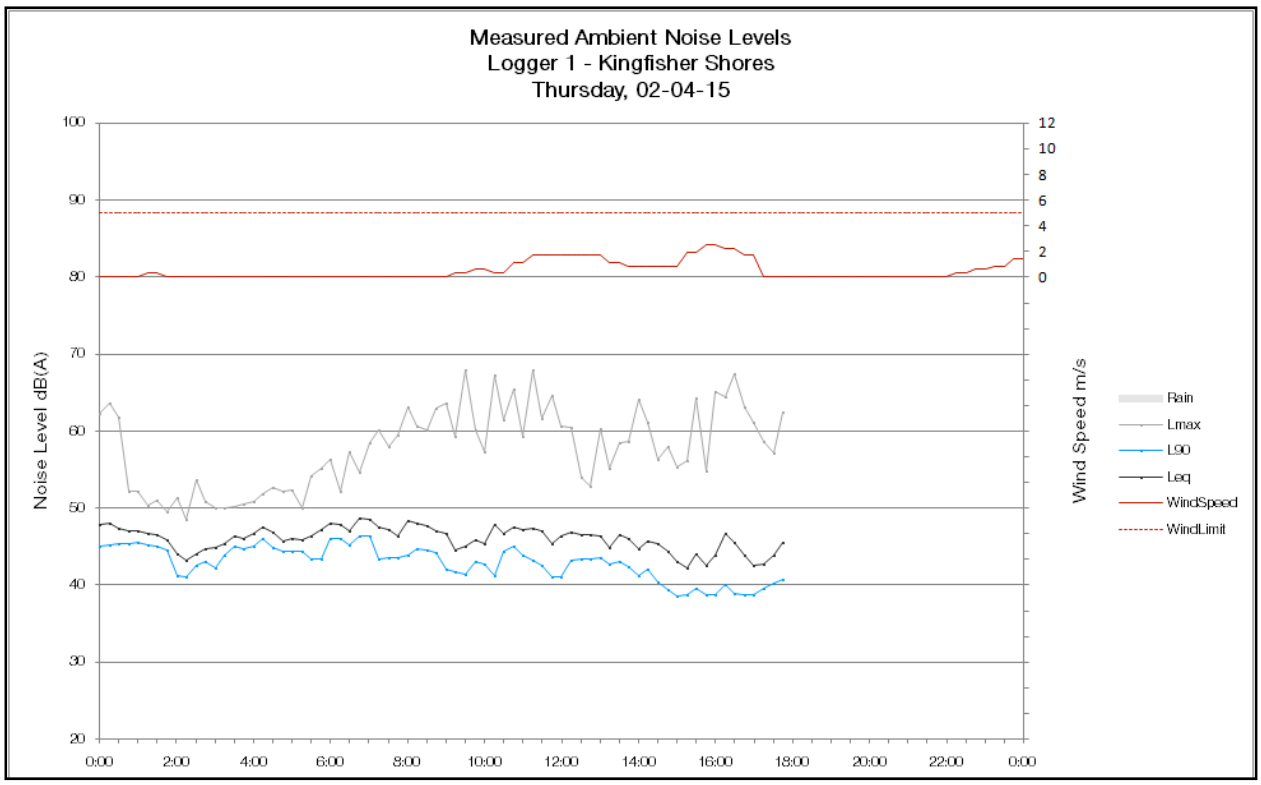

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Saturday, 28-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

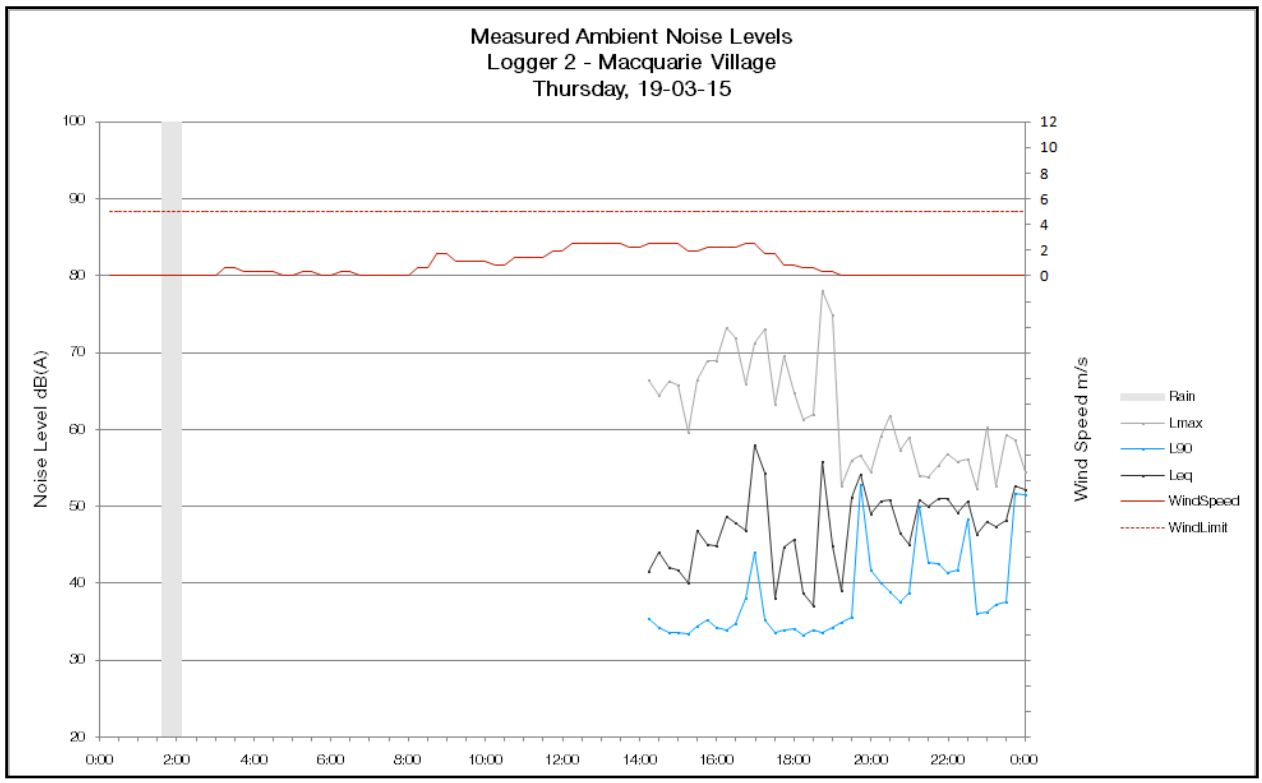

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Sunday, 29-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

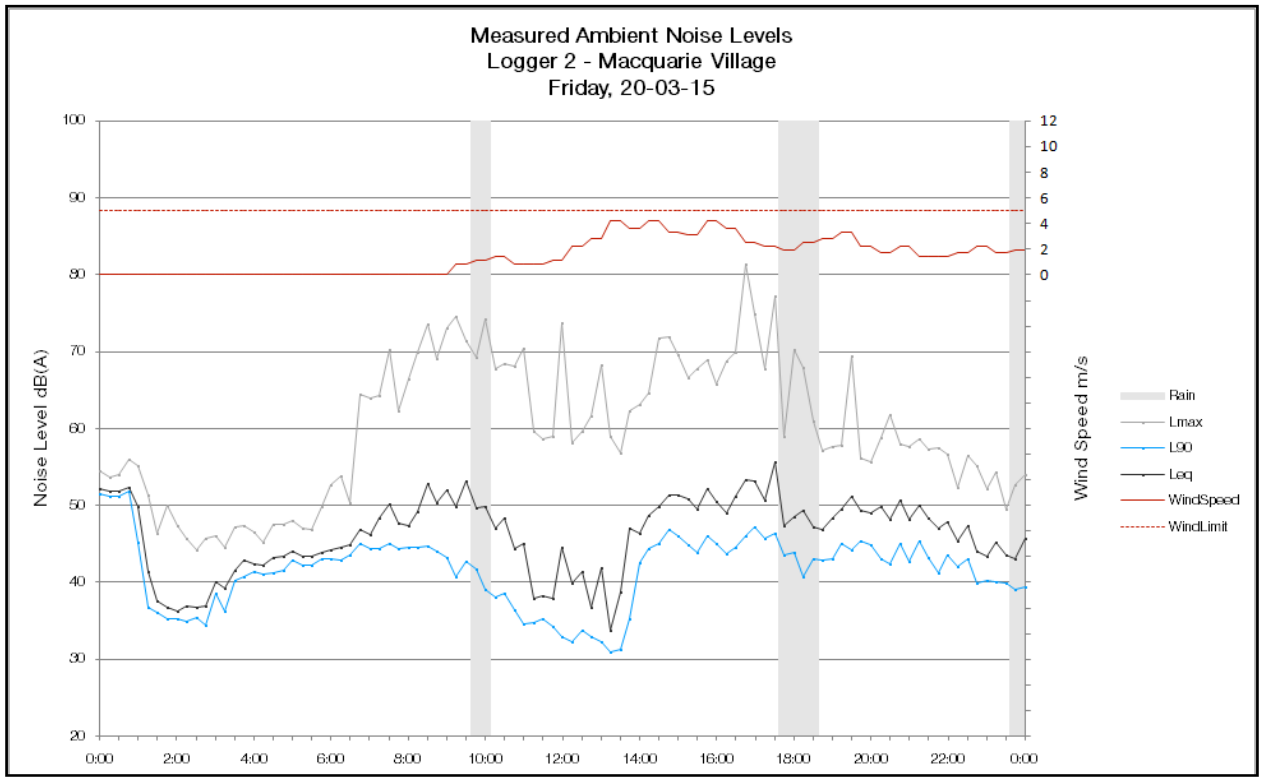

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Monday, 30-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

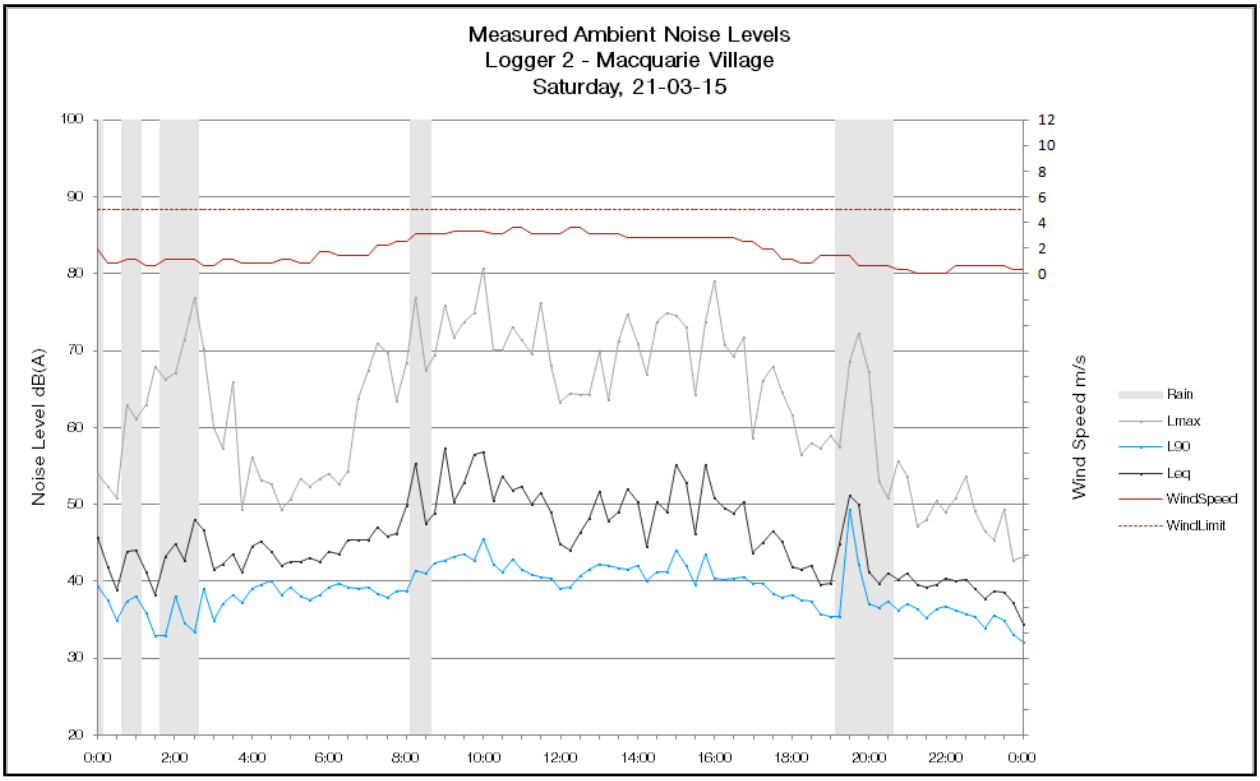

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Tuesday, 31-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

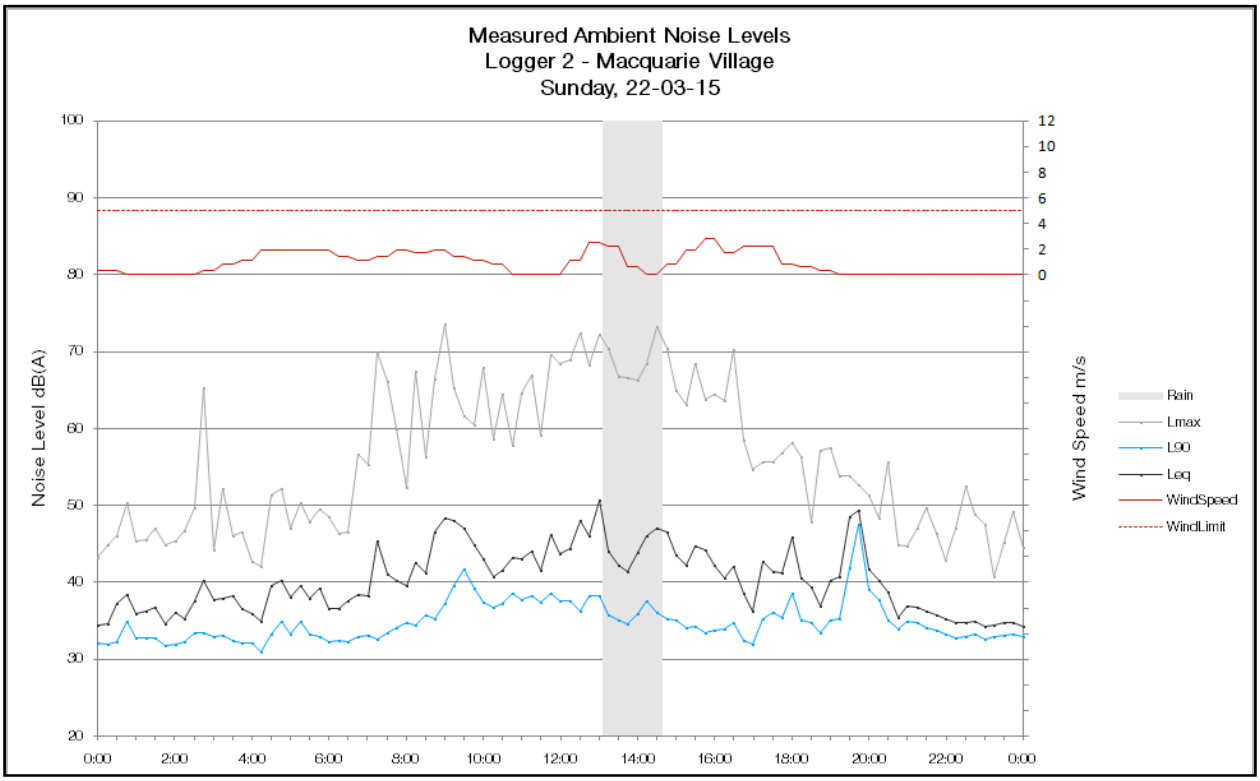

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Wednesday, 01-04-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

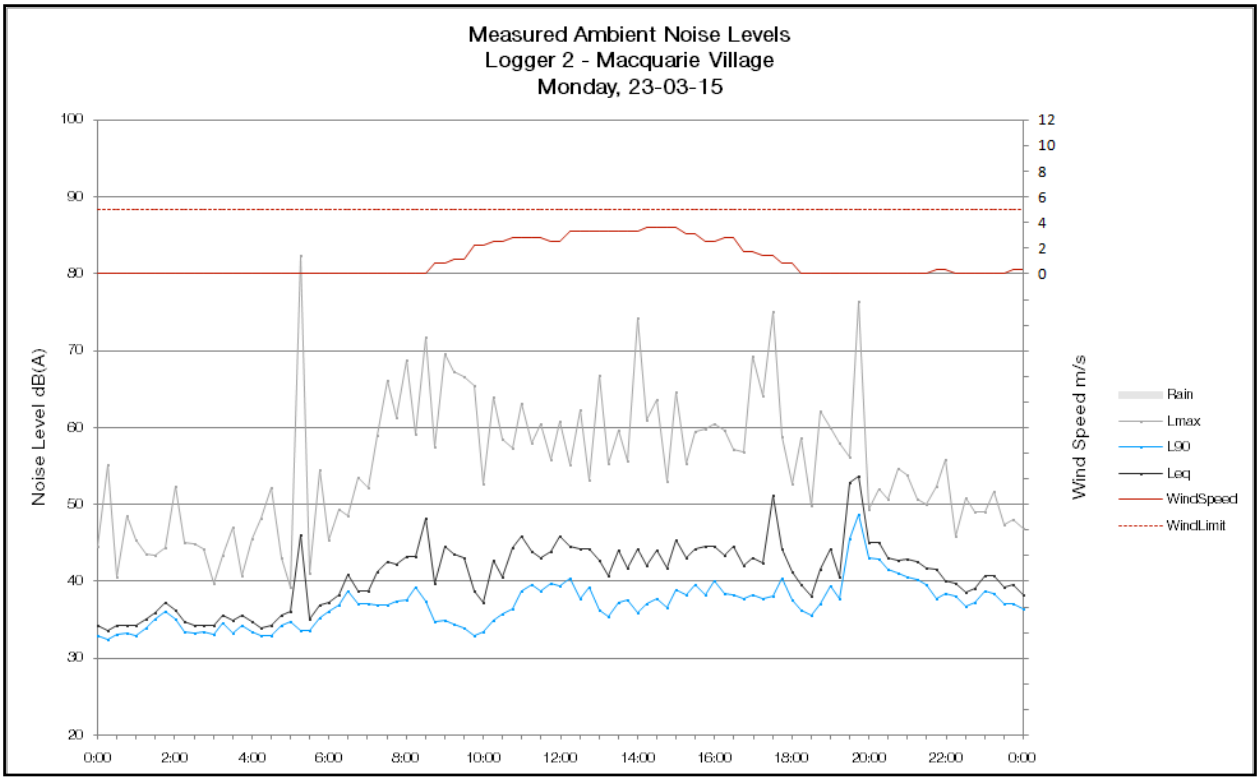

Measured Ambient Noise Levels
Logger 1 - Kingfisher Shores
Thursday, 02-04-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

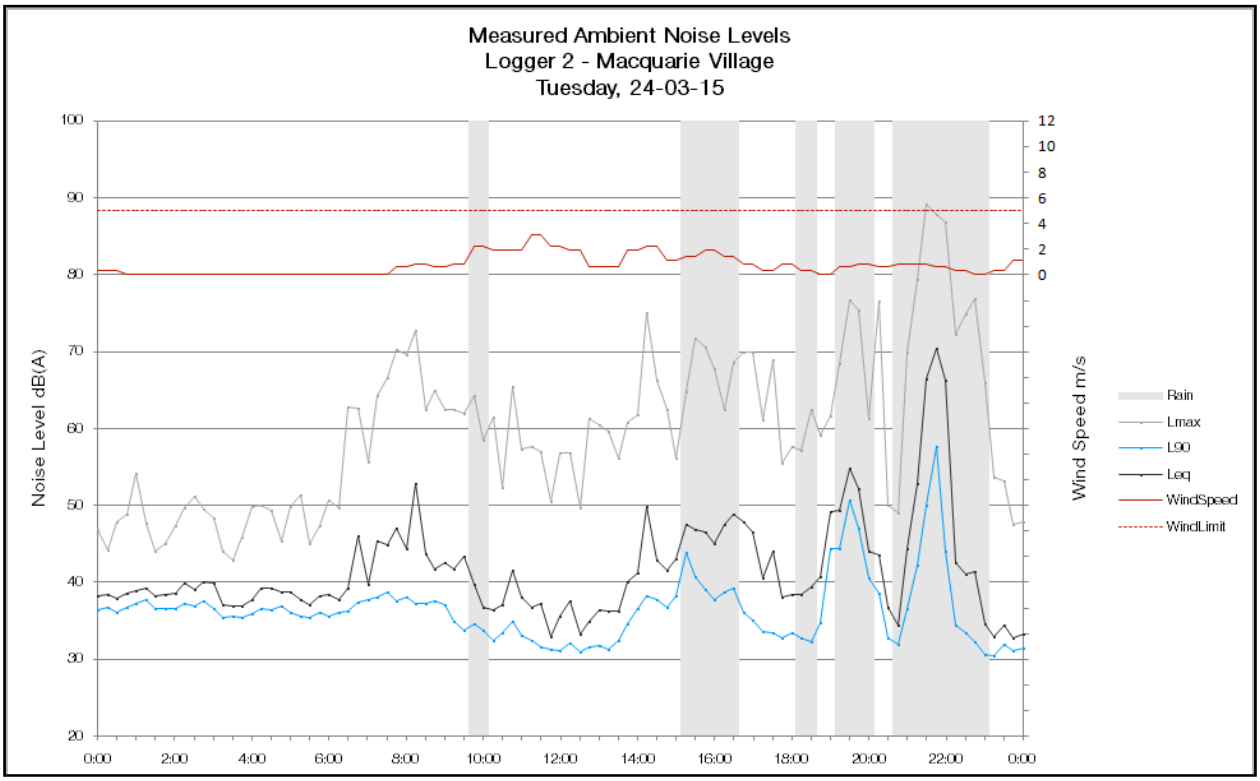

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Thursday, 19-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

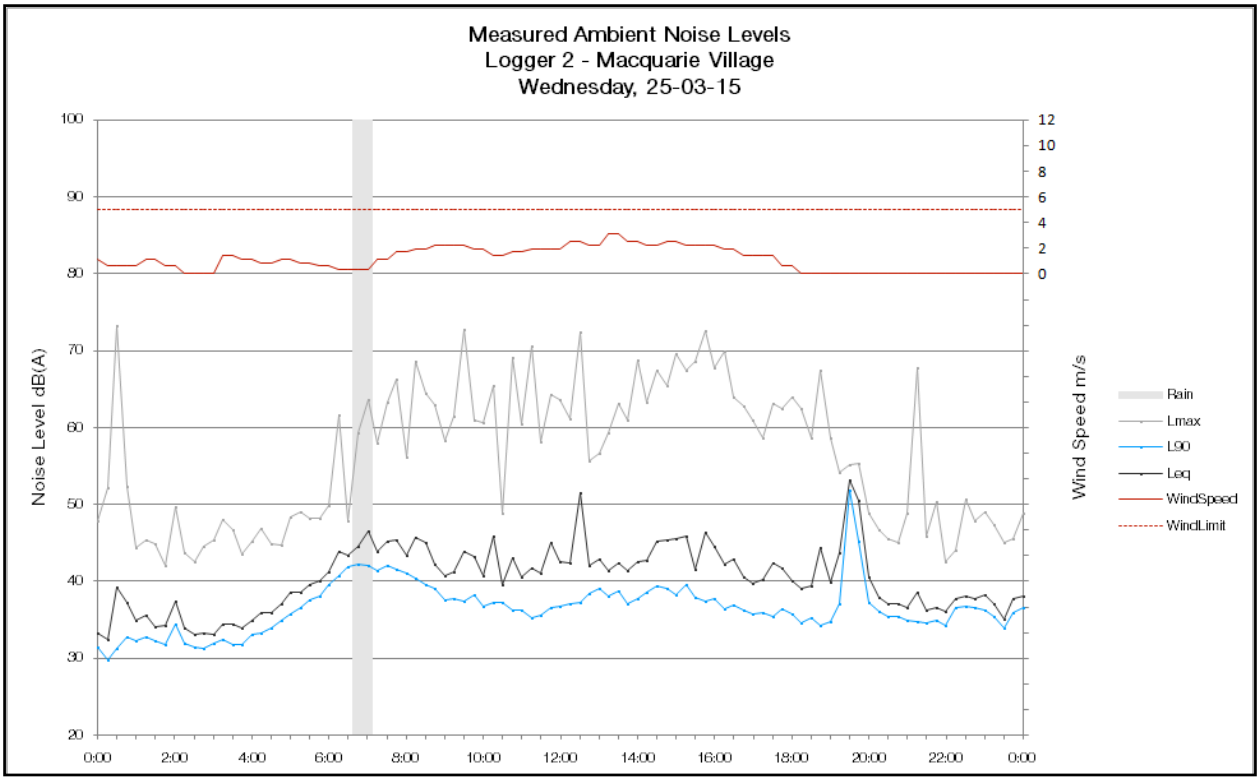

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Friday, 20-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

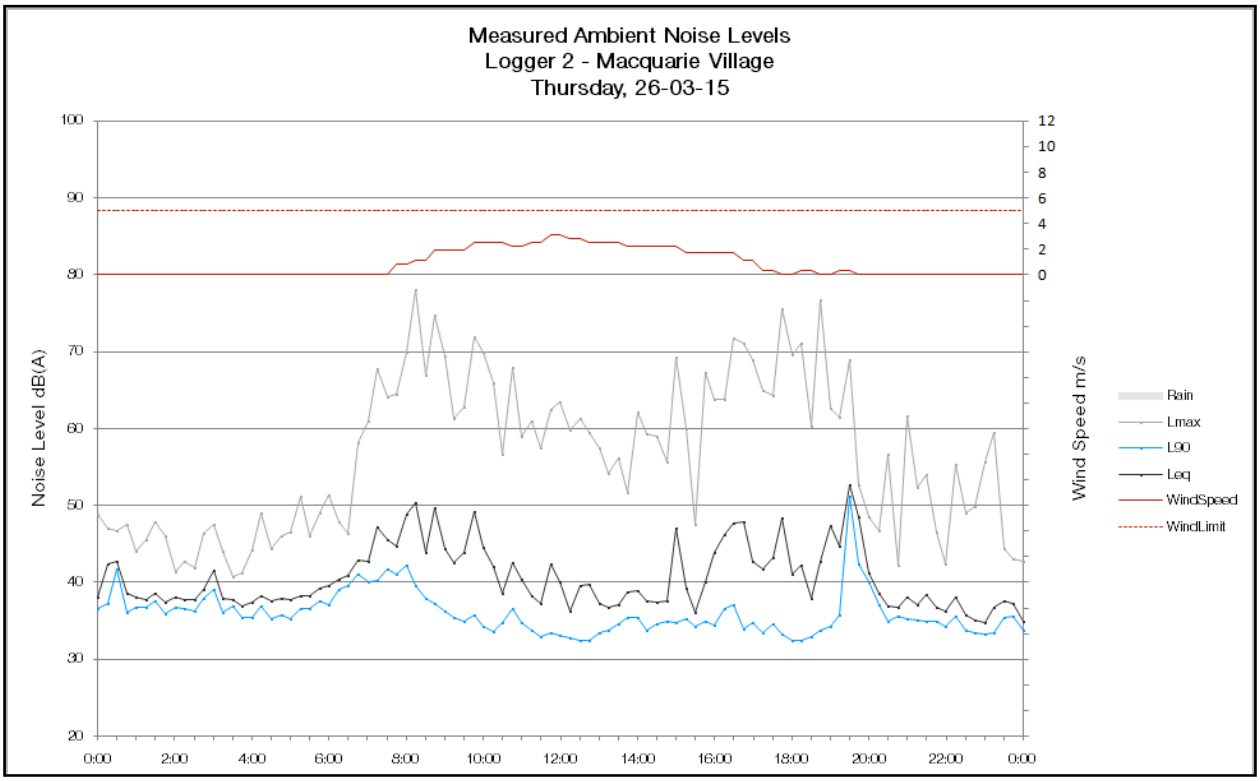

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Saturday, 21-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

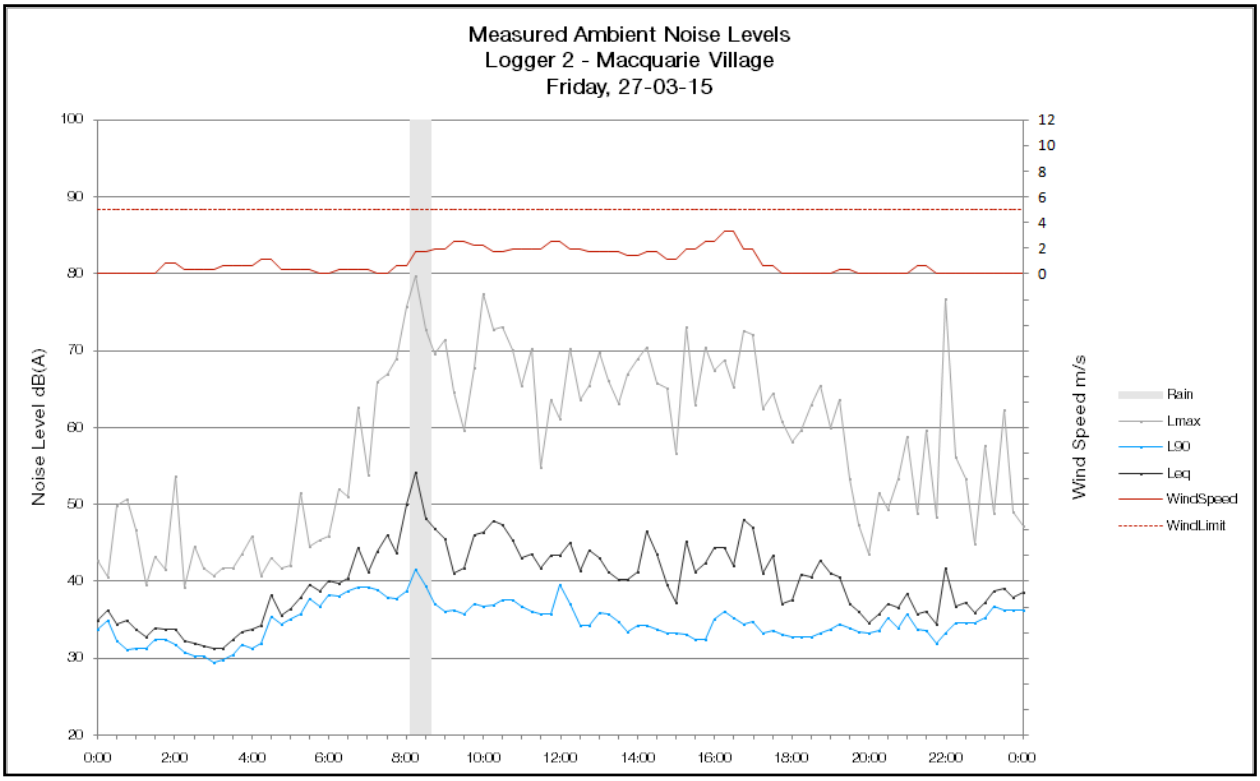

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Sunday, 22-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

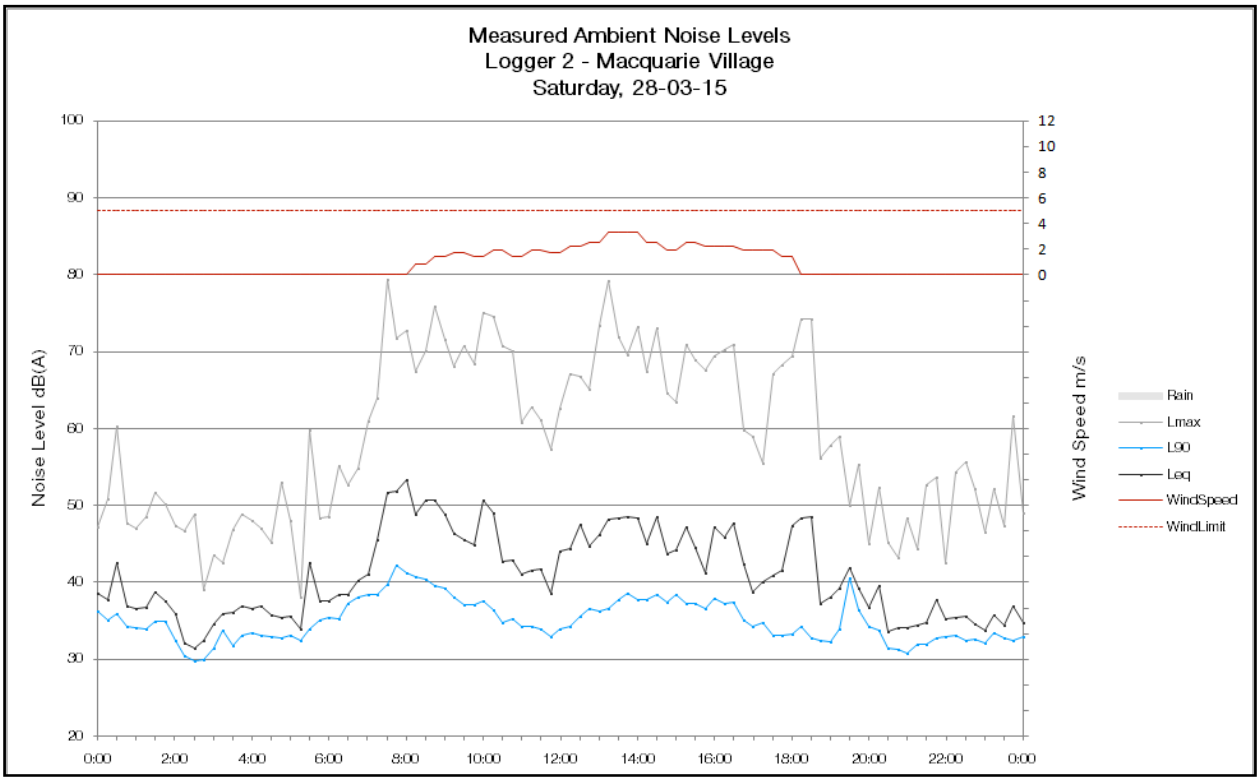

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Monday, 23-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

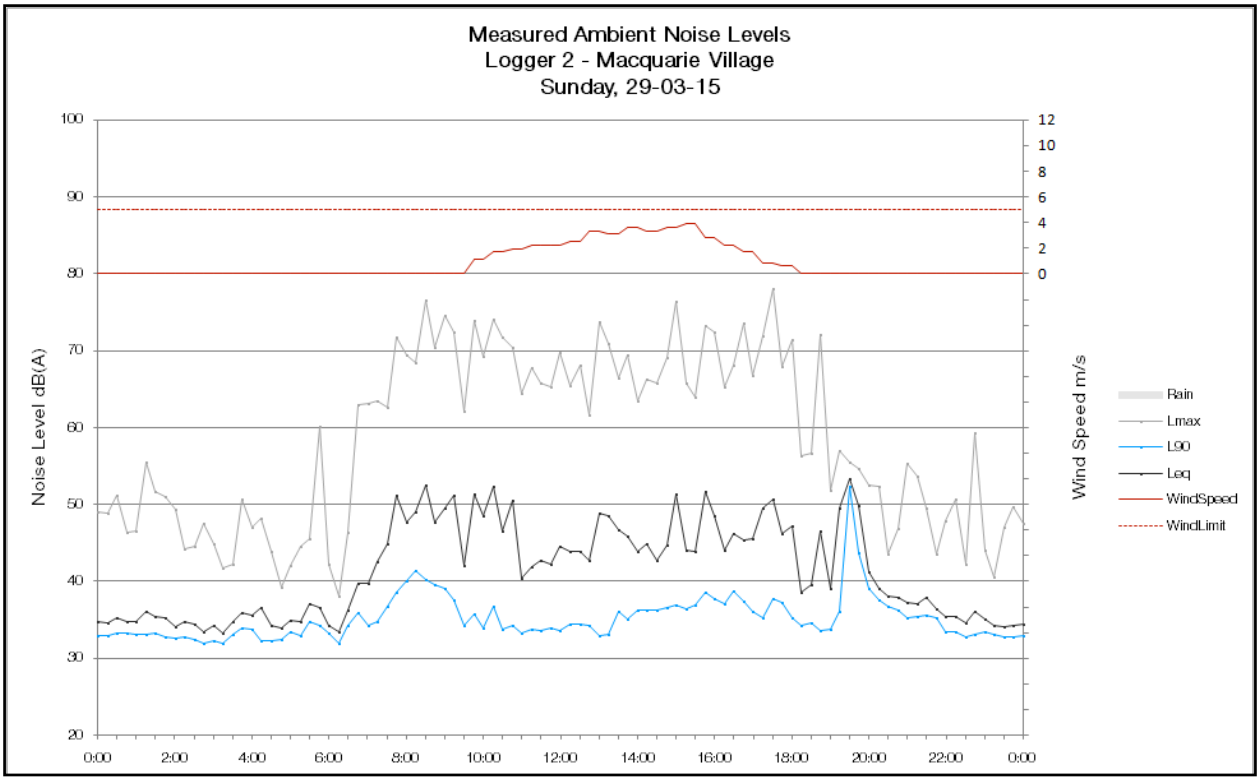

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Tuesday, 24-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

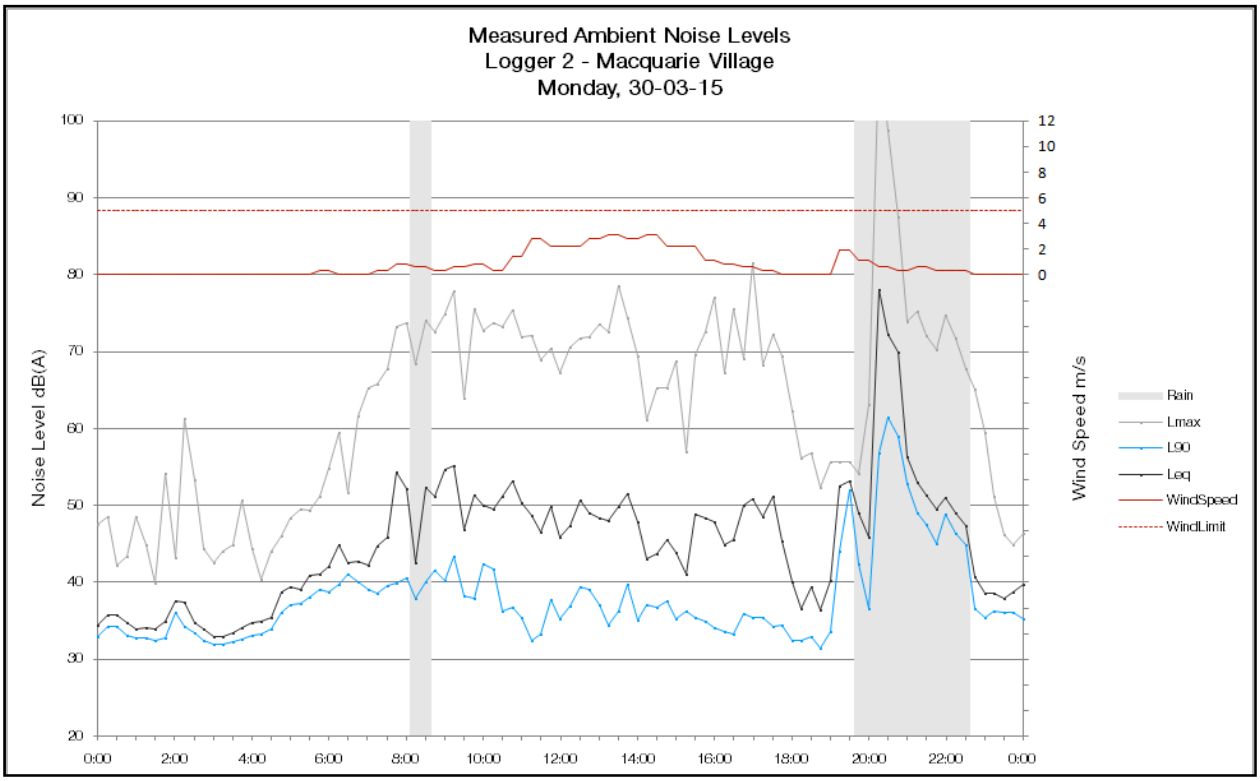

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Wednesday, 25-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

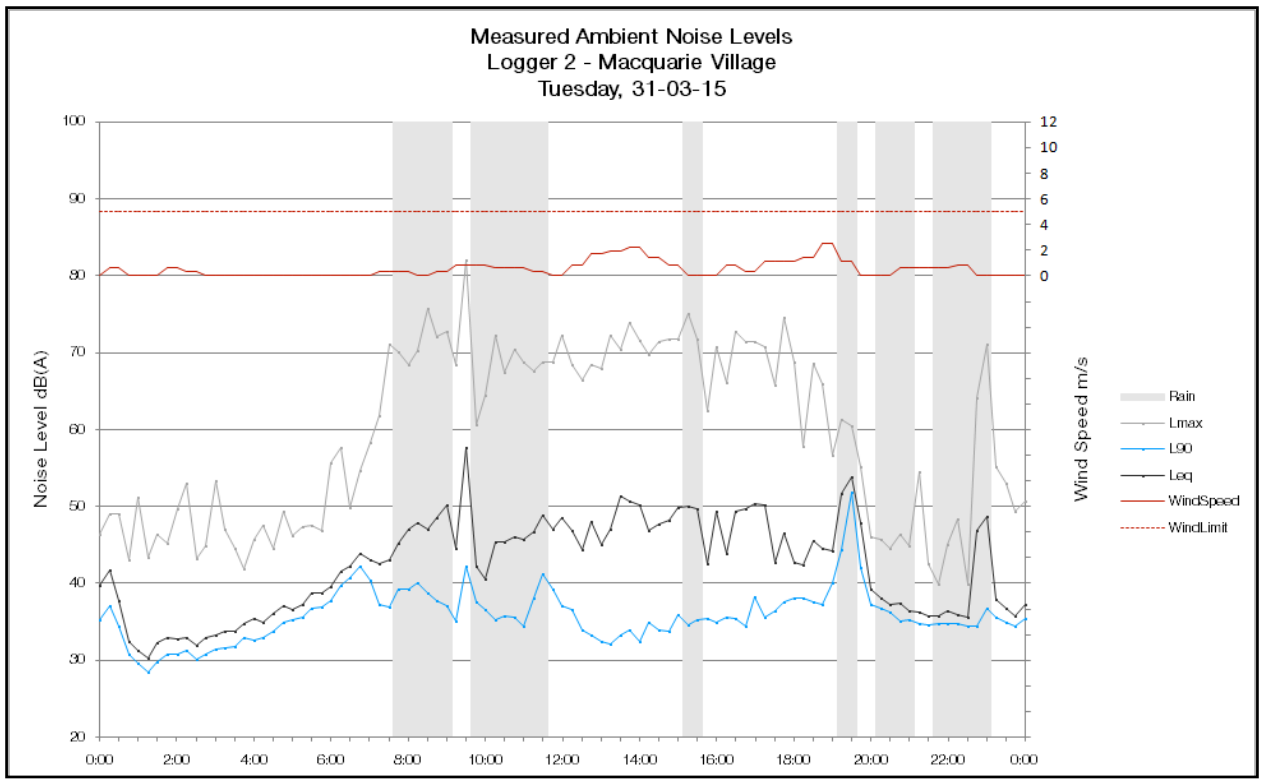

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Thursday, 26-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

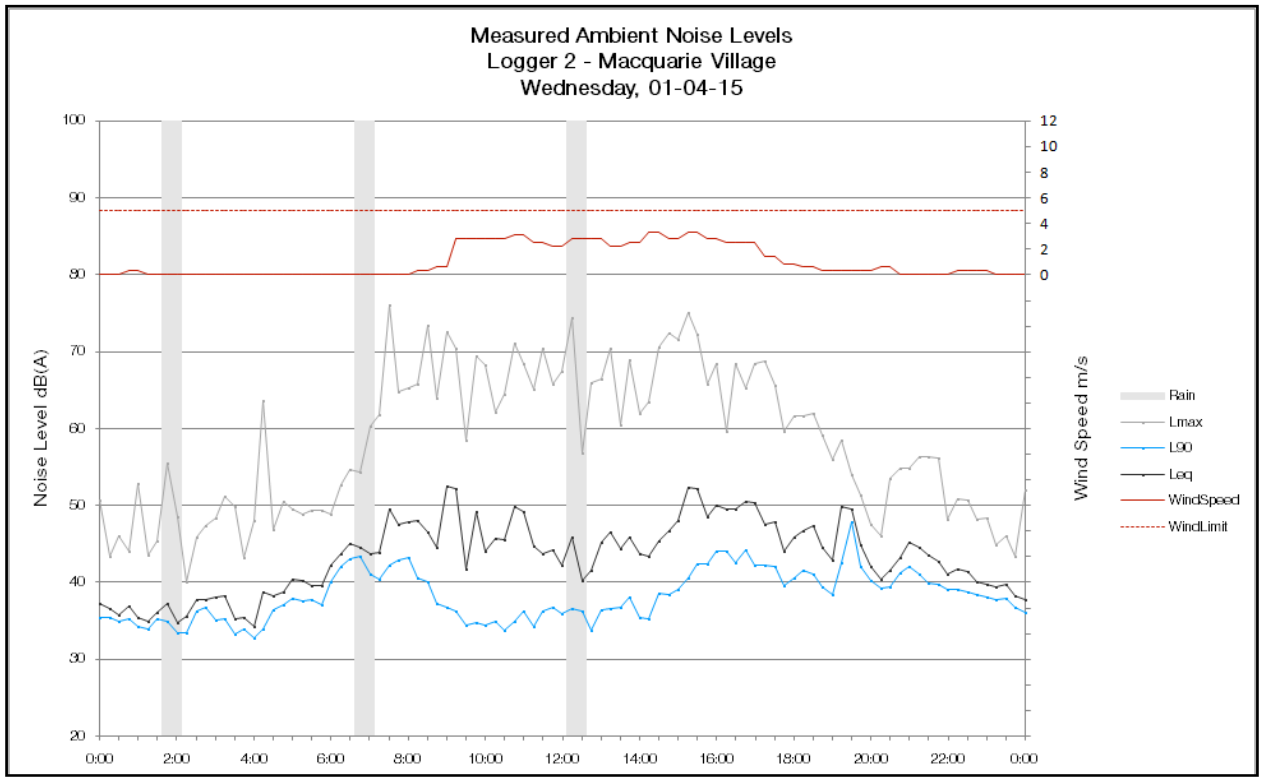

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Friday, 27-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

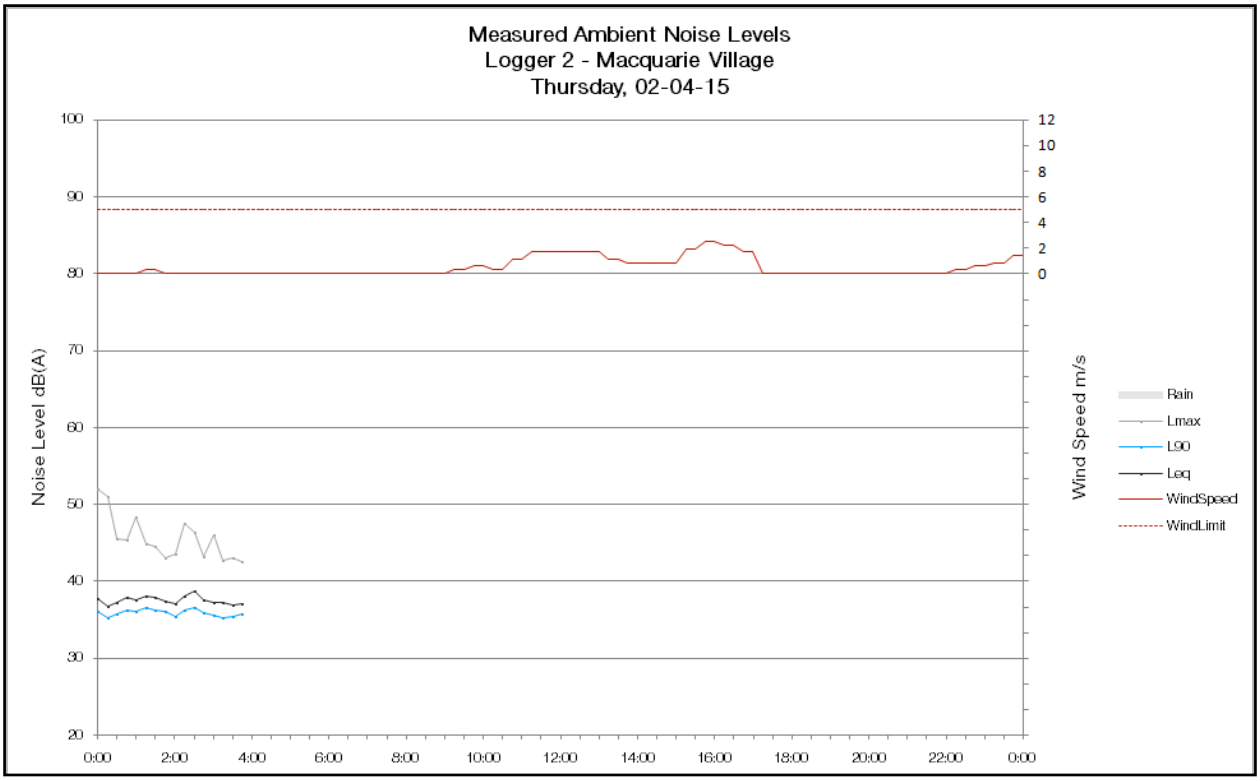

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Saturday, 28-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

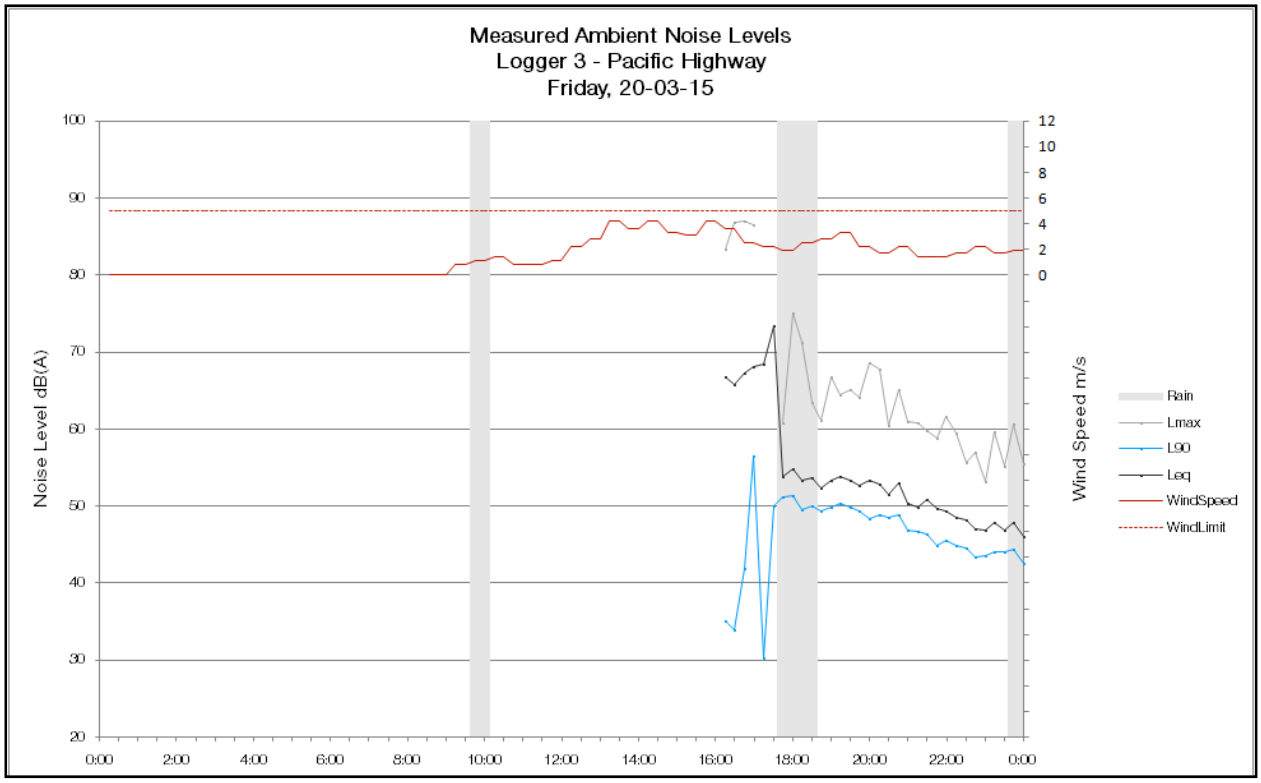

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Sunday, 29-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

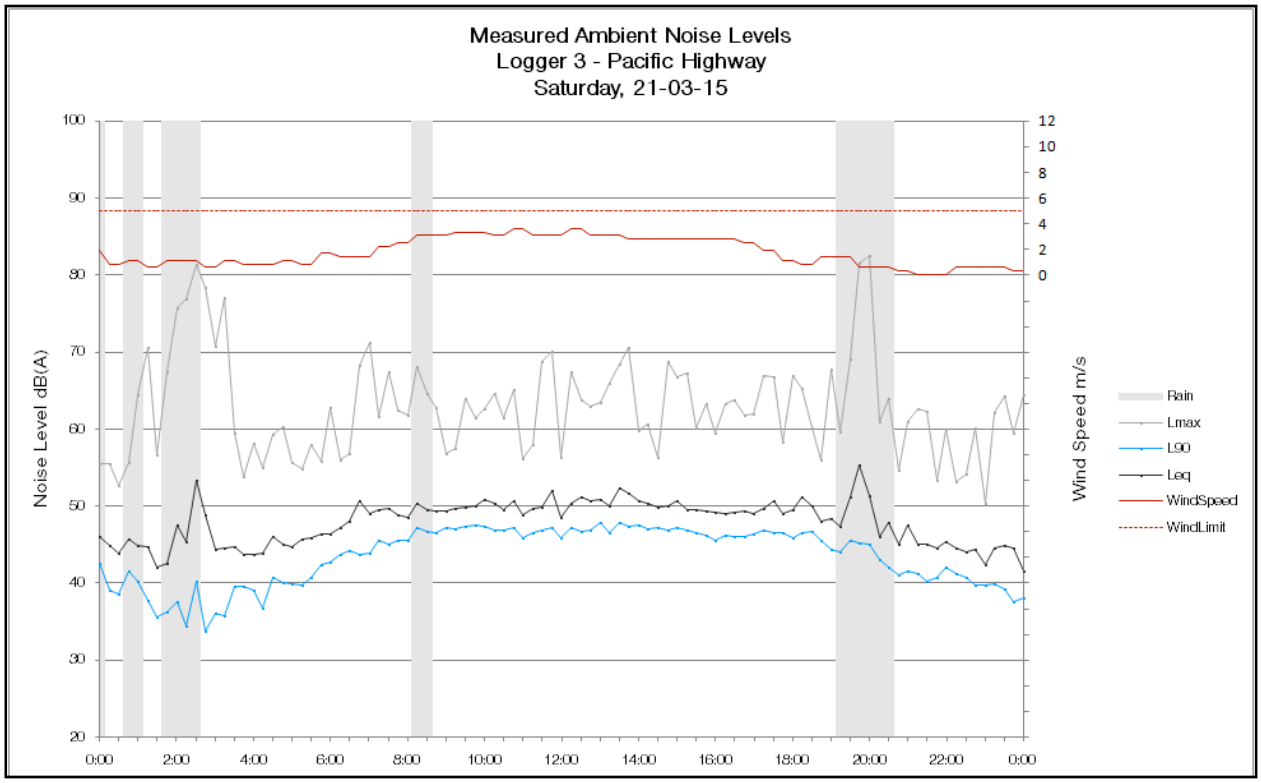

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Monday, 30-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

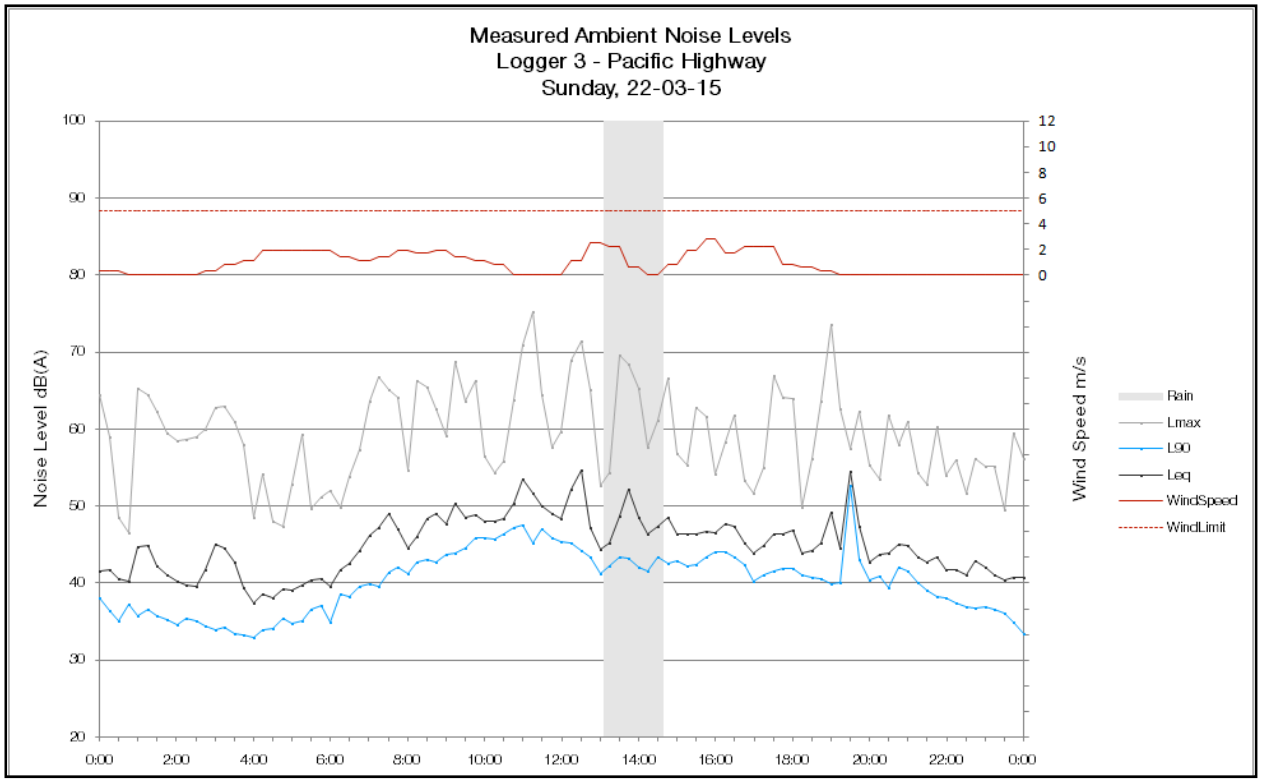

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Tuesday, 31-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

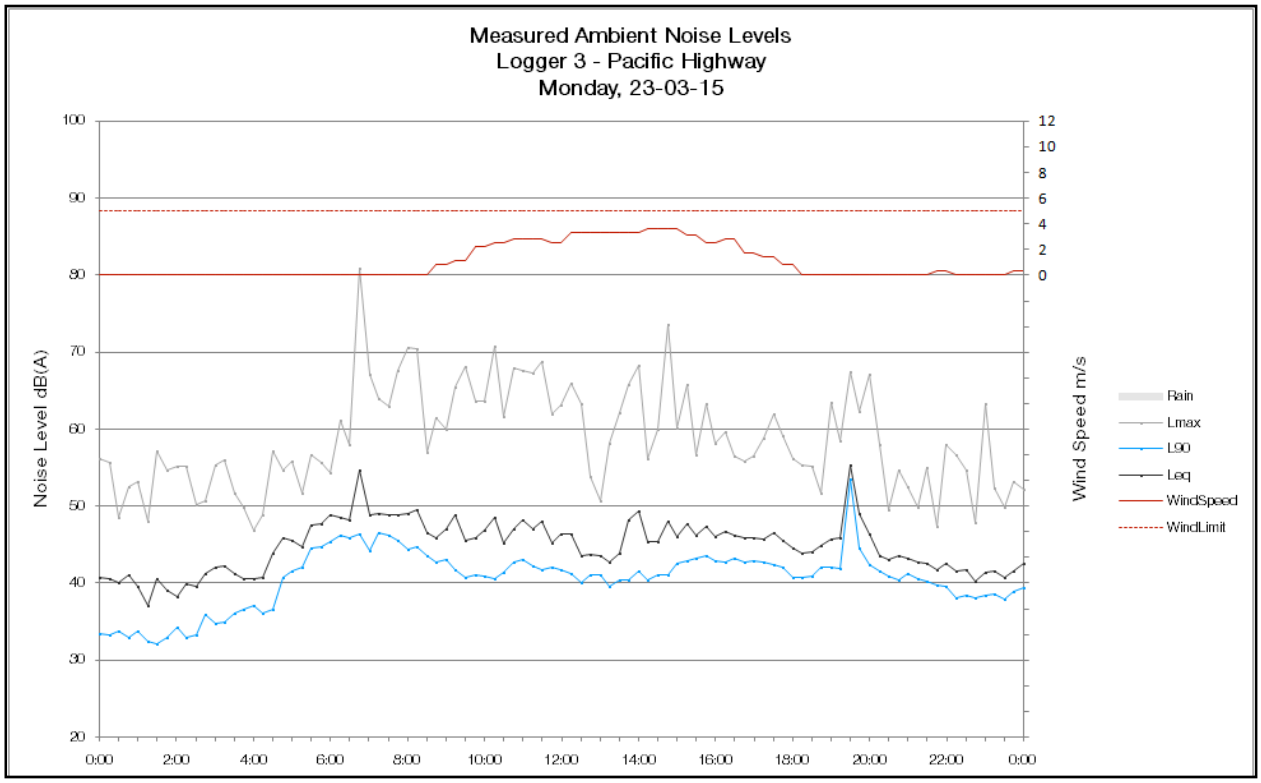

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Wednesday, 01-04-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

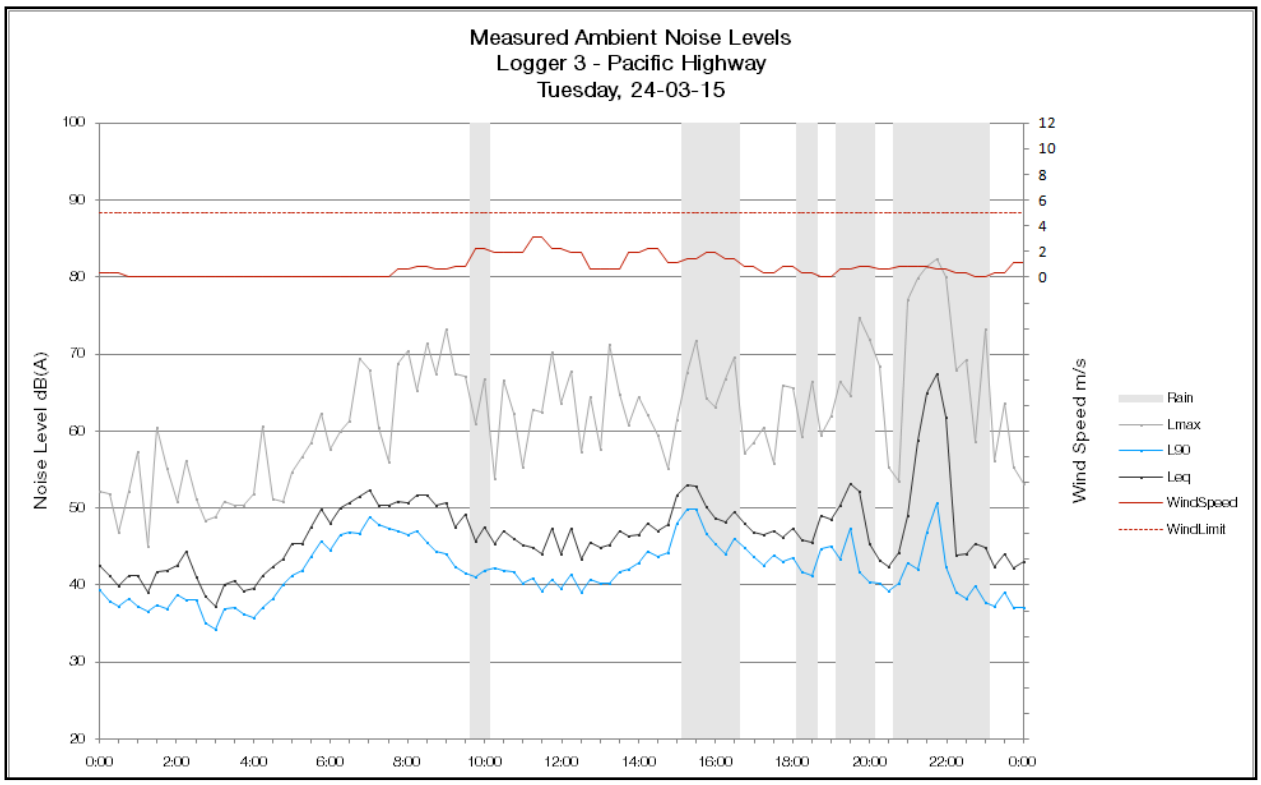

Measured Ambient Noise Levels
Logger 2 - Macquarie Village
Thursday, 02-04-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

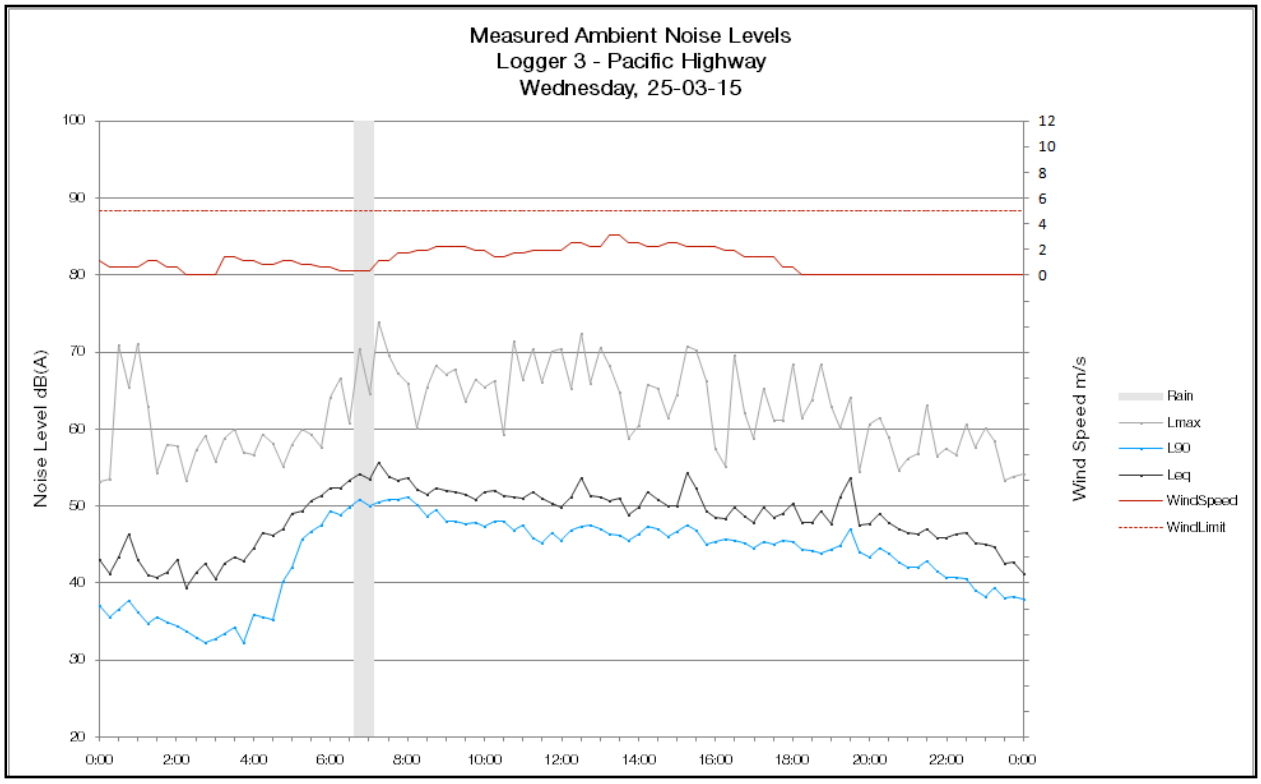

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Friday, 20-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

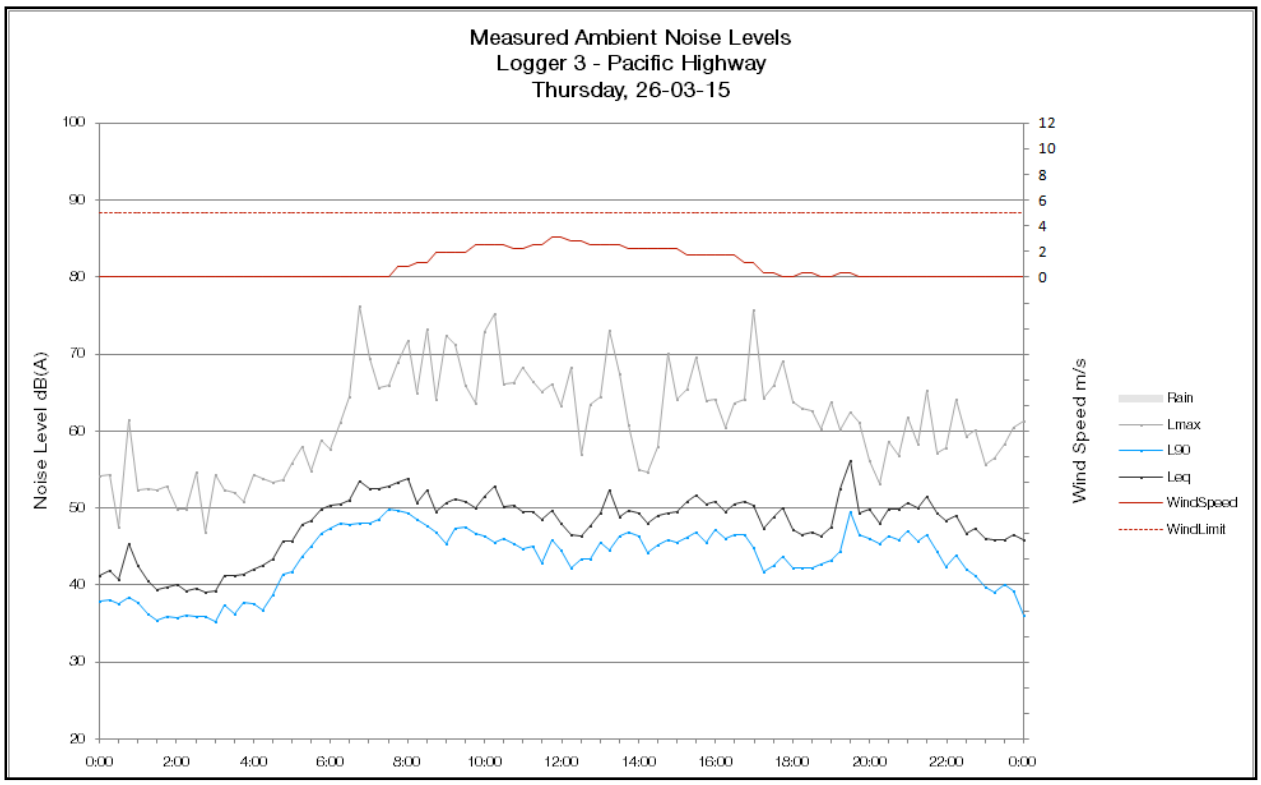

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Saturday, 21-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

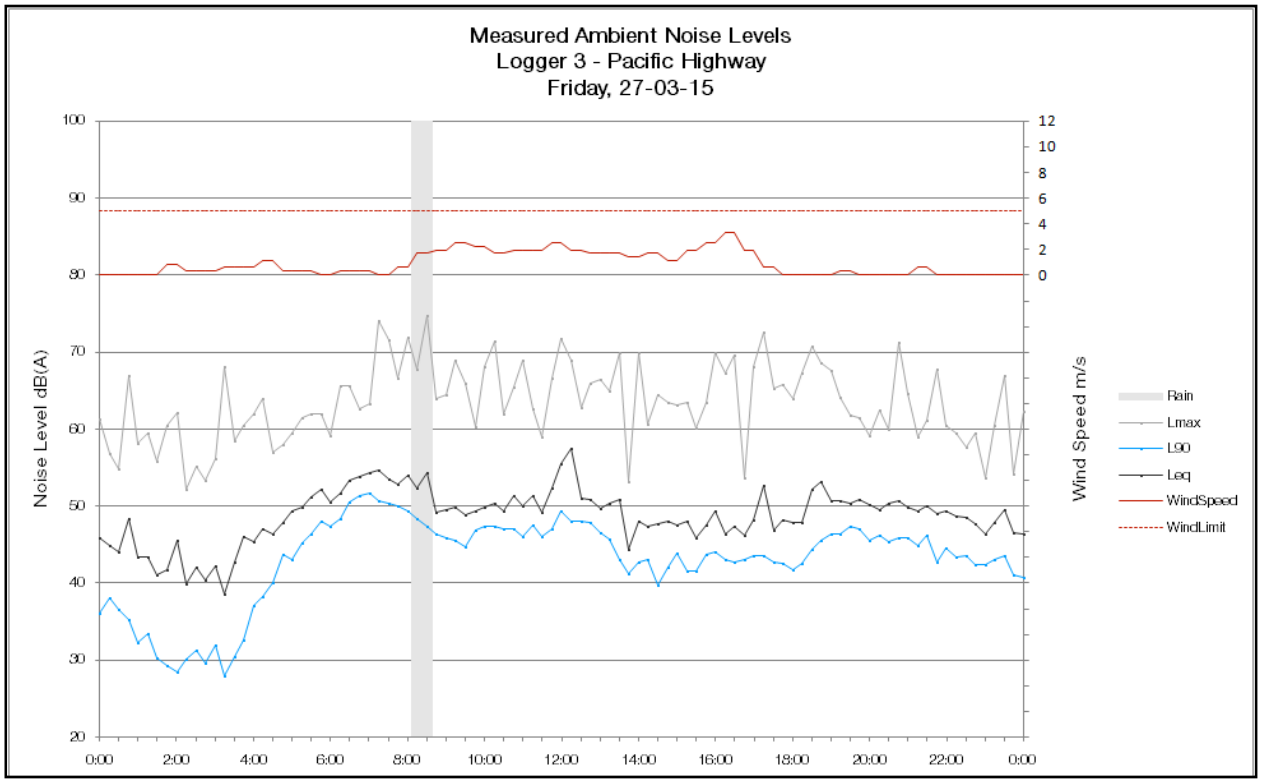

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Sunday, 22-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

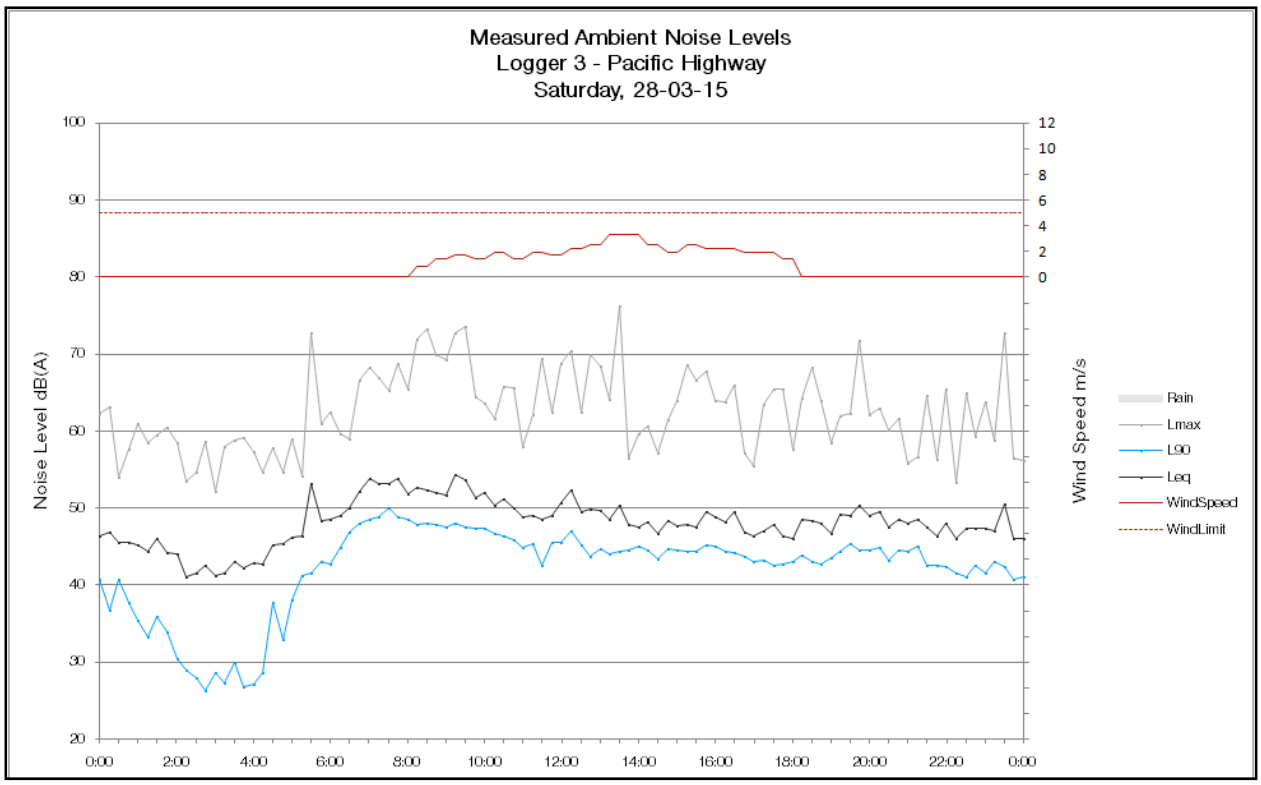

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Monday, 23-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

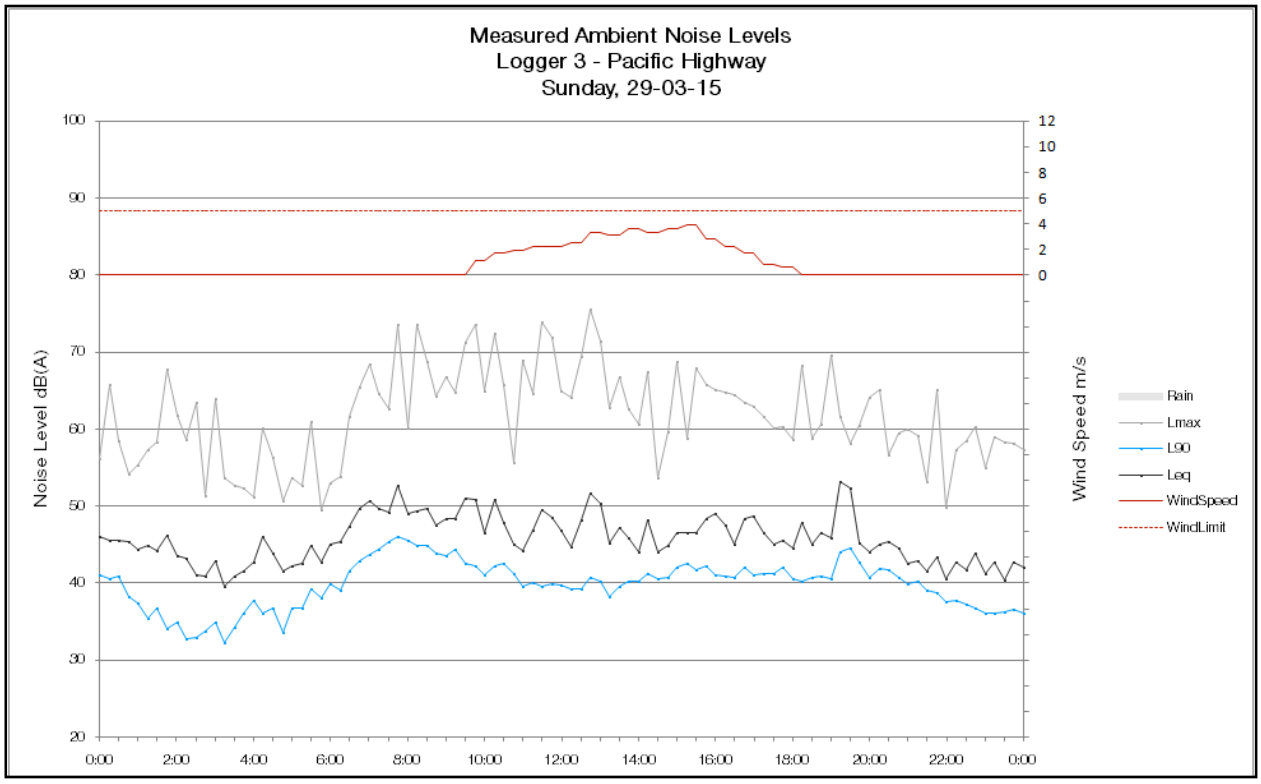

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Tuesday, 24-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

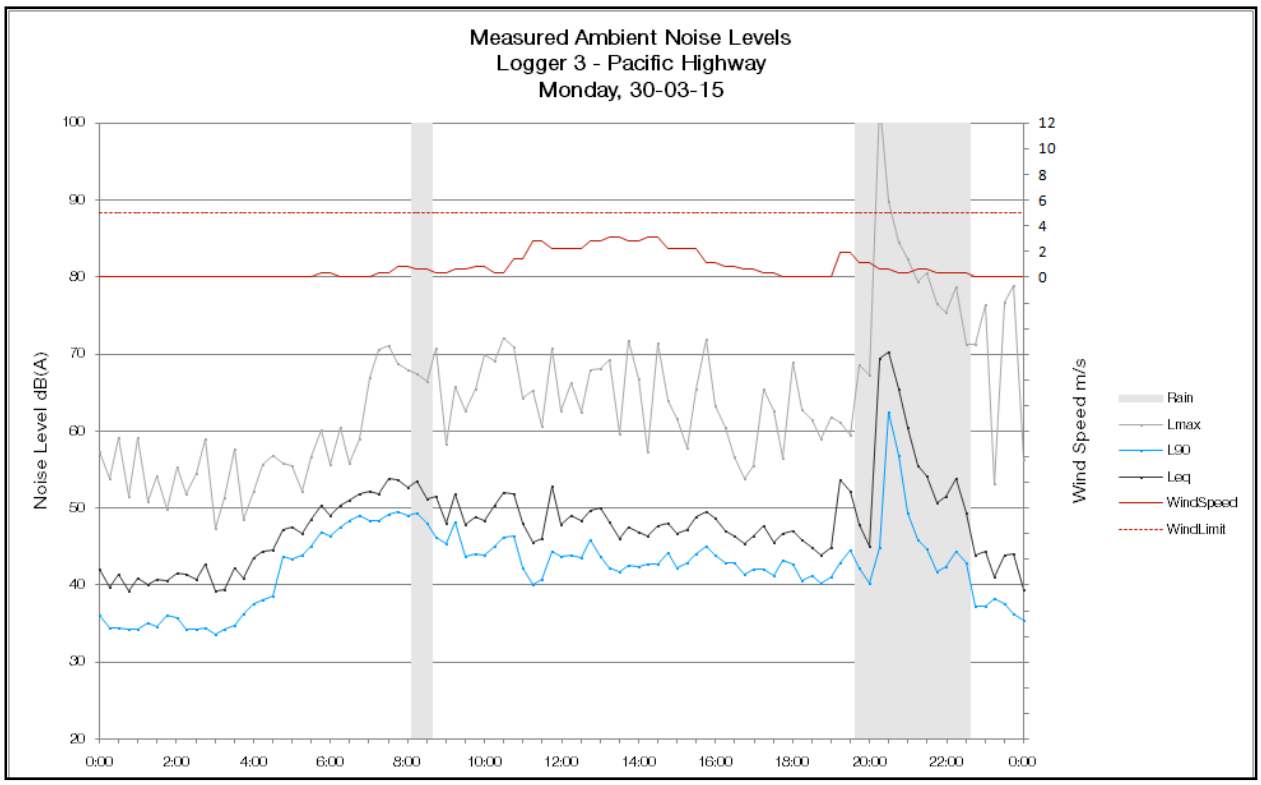

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Wednesday, 25-03-15
Noise Level dB(A)
Wind Speed m/s
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

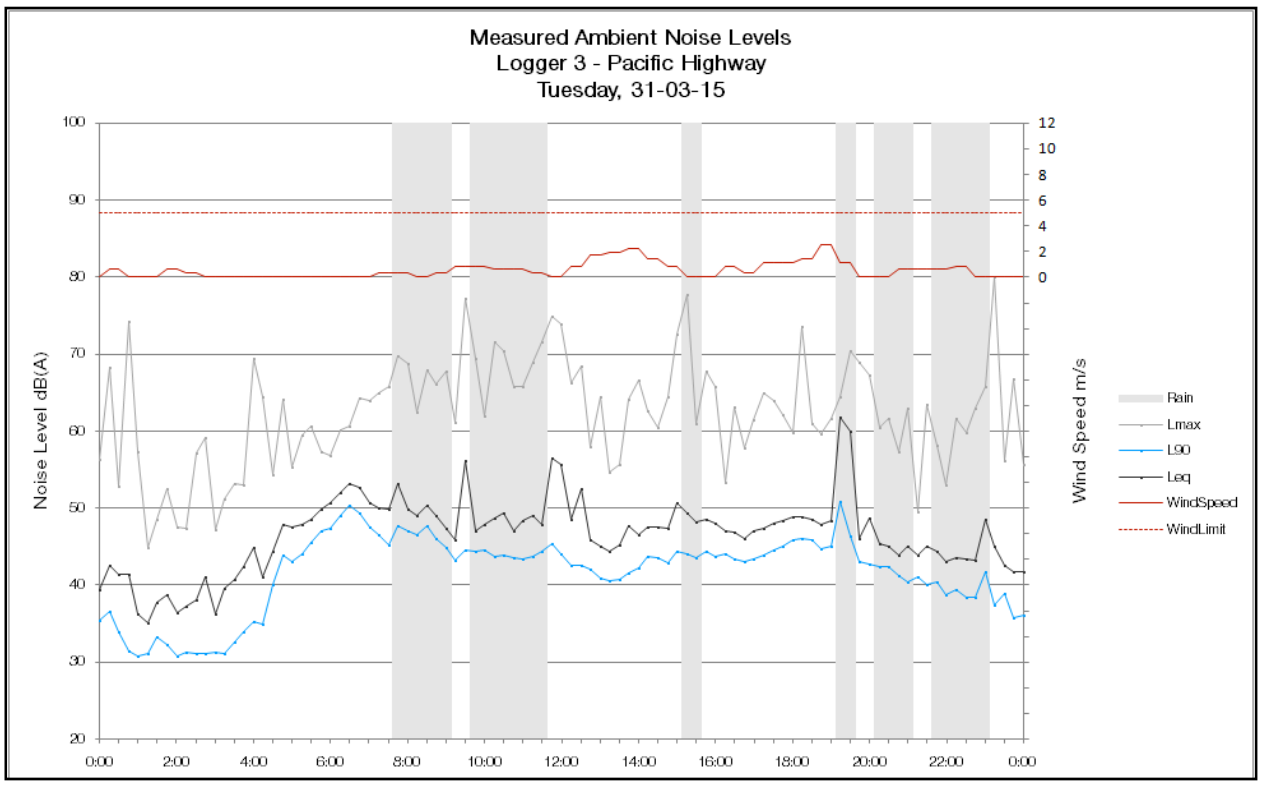

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Thursday, 26-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

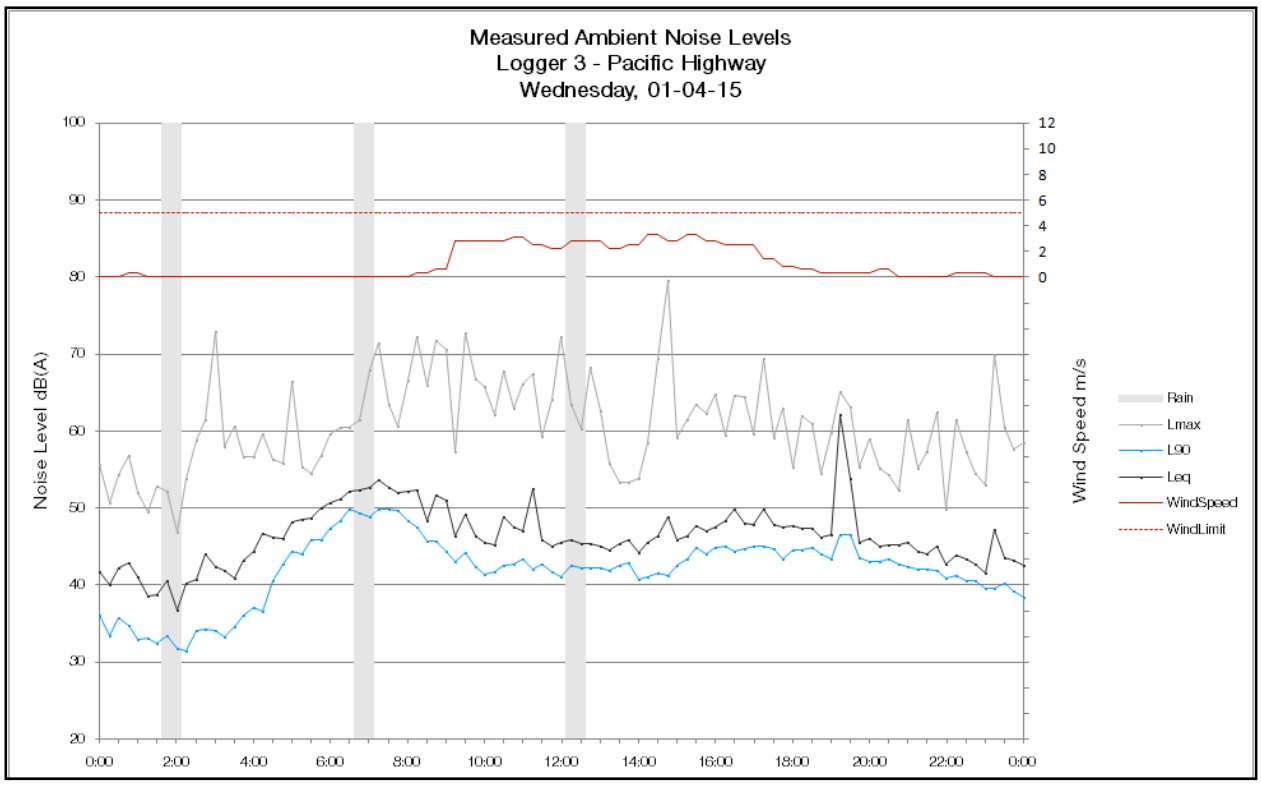

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Friday, 27-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

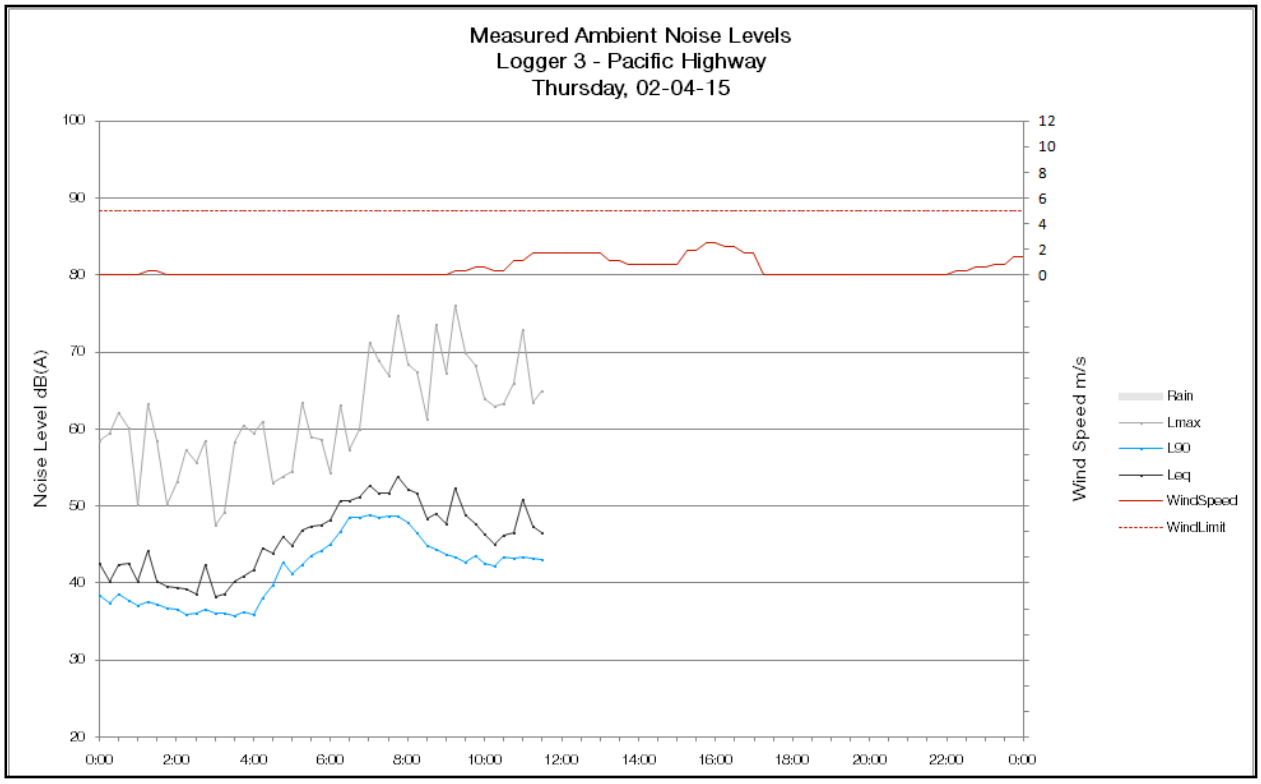

Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Saturday, 28-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Sunday, 29-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Monday, 30-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Tuesday, 31-03-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Wednesday, 01-04-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit


Measured Ambient Noise Levels
Logger 3 - Pacific Highway
Thursday, 02-04-15
Noise Level dB(A)
Wind Speed m/s
100
90
80
70
60
50
40
30
20
12
10
8
6
4
2
0
0:00
2:00
4:00
6:00
8:00
10:00
12:00
14:00
16:00
18:00
20:00
22:00
0:00
Rain
Lmax
L90
Leq
WindSpeed
WindLimit

Appendix C

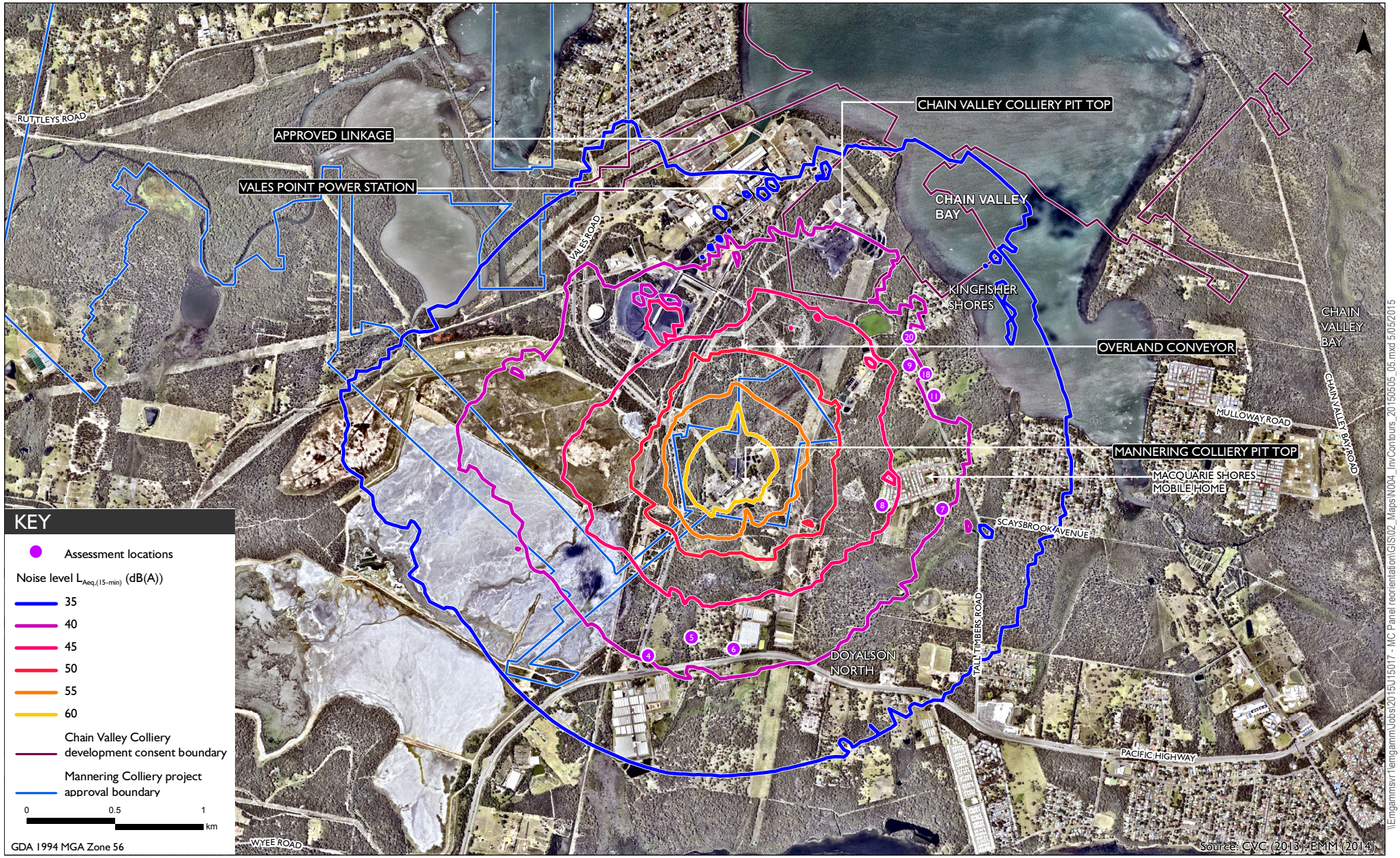
Noise contours

EMM
EMGA Mitchell McLennan

Day - calm conditions

Mannering Colliery – Modification 3 Noise Impact Assessment

Appendix C1



EMM
EMGA Mitchell McLennan

Night - inversion conditions

Mannering Colliery – Modification 3 Noise Impact Assessment

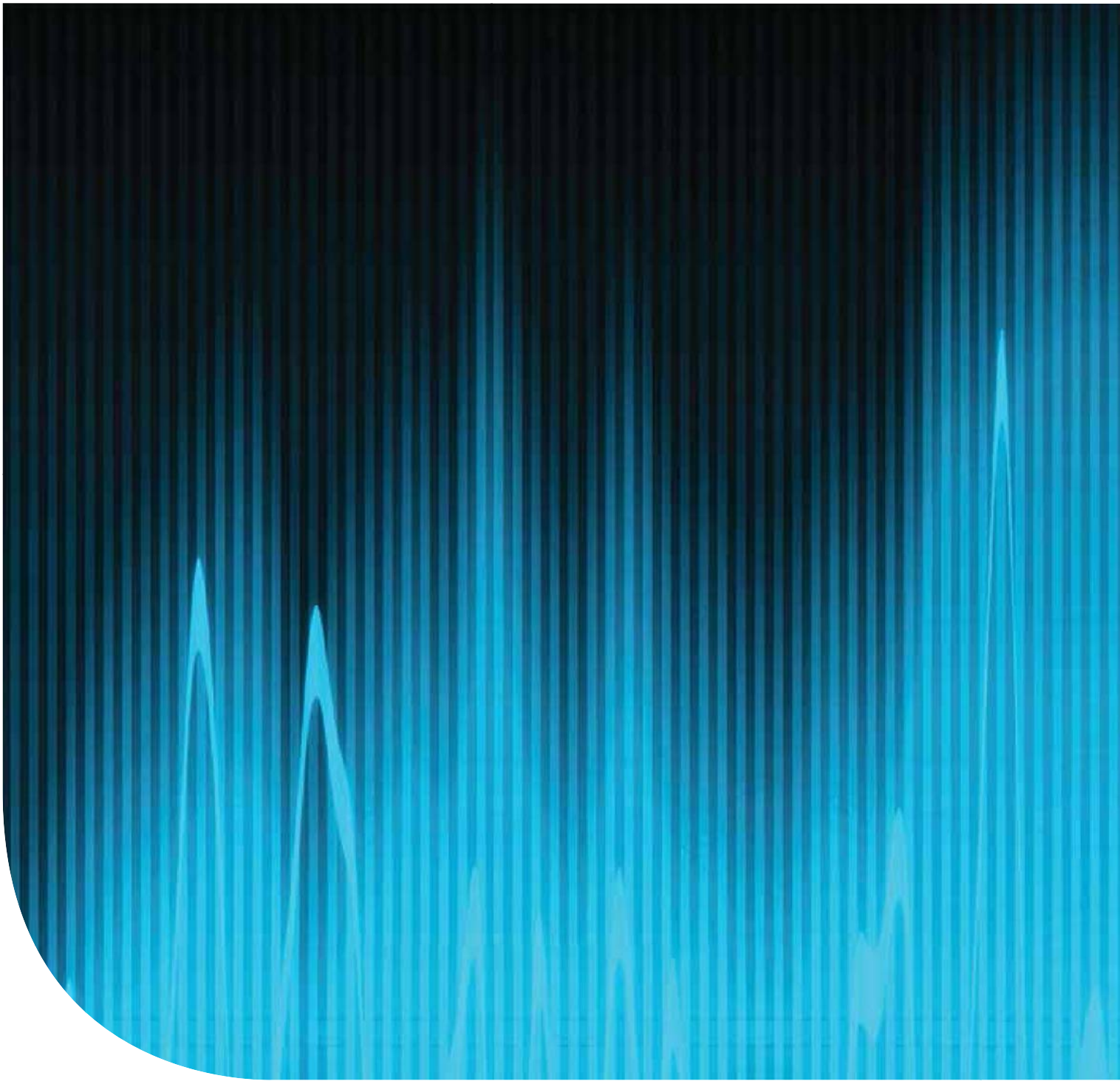
Appendix C2

EMM
EMGA Mitchell McLennan

SYDNEY
Ground floor, Suite 1, 20 Chandos Street
St Leonards, New South Wales, 2065
T 02 9493 9500 F 02 9493 9599

NEWCASTLE
Level 5, 21 Bolton Street
Newcastle, New South Wales, 2300
T 02 4927 0506 F 02 4926 1312

BRISBANE
Suite 1, Level 4, 87 Wickham Terrace
Spring Hill, Queensland, 4000
T 07 3839 1800 F 07 3839 1866



Appendix E

Air quality assessment

Appendix E — Air quality assessment

E

Pacific Environment Limited

Consulting • Technologies • Monitoring • Toxicology

6 May 2015

John Arnold
EMGA Mitchell McLennan

Sent via email: jarnold@emgamm.com

RE: MANNERING COLLIERY APPROVAL MODIFICATION – AIR QUALITY

Dear John,

1 INTRODUCTION

Mannering Colliery (MC) is an underground coal mine located at the southern end of Lake Macquarie, approximately 60 km south of Newcastle. MC is owned by Centennial but has been operated by LakeCoal Pty Ltd (LakeCoal) since October 2013 under commercial agreement with Centennial.

MC was granted project approval (MP06_0311) under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 12 March 2008 for the continued production of up to 1.1 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until 31 March 2018 (see Appendix A).Coal from MC is transported via a dedicated overland conveyor to Delta Electricity's Vales Point Power Station (VPPS) for domestic energy generation.

Pacific Environment has been engaged by EMGA Mitchell McLennan Pty Ltd (EMM) on behalf of LakeCoal to complete a semi-quantitative air quality assessment for a modification to the MC project approval (the proposed modification).

It is noted that an underground linkage is approved between MC and the adjacent Chain Valley Colliery (CVC), which operates under Development Consent SSD-5465, within the Fassifern Seam workings.

A separate modification of SSD-5465 is being sought to, amongst other things, increase the maximum rate of ROM coal extraction at CVC from 1.5 Mtpa to 2.1 Mtpa and enable mine design changes, primarily the re-orientation of miniwall panels in CVC's northern mining area. All production beyond the existing limit of 1.5 Mtpa will be sent via MC to VPPS. Accordingly, there will be no change to CVC surface infrastructure nor to the maximum coal haulage on public roads under the proposed modification. It is anticipated that the modification to SSD-5465 will be assessed concurrently with the proposed modification.

Given the relative proximity of CVC to MC, where appropriate, relevant air quality data from CVC has been utilised in this assessment. This includes data from the 2013, PAEHolmes (now Pacific Environment Limited) air quality assessment (AQA) (**PAEHolmes, 2013**) prepared as part of the Environmental Impact Statement to accompany the application for SSD-5465.

The location of MC and its project approval boundary is illustrated in **Figure 1.1**. The CVC development consent boundary is also shown.

Pacific Environment Limited
Suite 1, Level 1, 146 Arthur St
North Sydney,NSW 2060

(ASX: PEH) ABN: 42 122 919 948
www.pacific-environment.com
Ph: +61 2 9870 0900

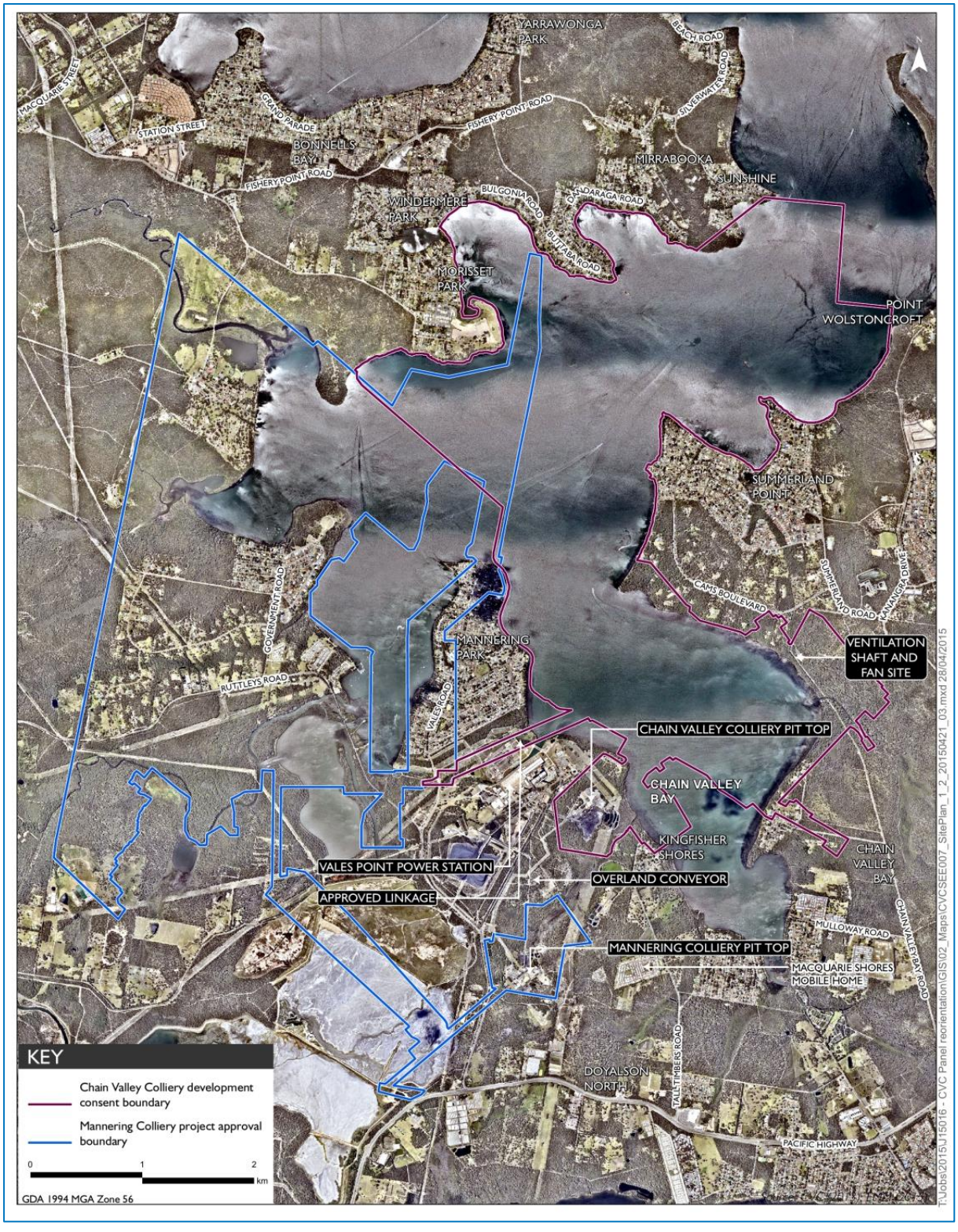


Figure 1.1: Approved operational boundaries for CVC and MC

2 PROPOSED MODIFICATION

LakeCoal seeks approval to modify MP06_0311 under Section 75W of the EP&A Act to allow for:

- an increase in the rate of ROM coal handling at, and transport from, MC from 1.1 Mtpa to a maximum of 1.3 Mtpa;
- an extension of the project approval period from 31 March 2018 to 30 June 2022; and
- minor vegetation clearance and disturbance adjacent to some infrastructure at MC's pit top to enable the establishment and/or extension of asset protection zones (APZs) for bushfire management purposes.

There will be no changes to the surface infrastructure and no increase in employee numbers under the proposed modification. The increased coal throughput would all be dispatched via the existing overland conveyor to VPPS with no change to surface coal handling activities or any other changes to the approved operations.

The potential impact of the proposed modification as compared to the approved development is limited to the increase in ROM coal handling and transport from MC and the emissions generated beyond the current approval expiry date.

3 PREVIOUS STUDIES

In 2007, Holmes Air Sciences (now Pacific Environment Limited) prepared an Air Quality Assessment (AQA) for the continued operations at MC (**HAS, 2007**) which assessed the potential air quality impacts from a maximum annual coal production, processing and handling rate of 1.1 Mtpa. The estimated emissions were less than 2 g/s and not expected to produce a noticeable or measureable change in the concentration of particulate matter in the residential areas in close proximity of the mine.

In 2012 a modification was sought for an extension of underground mining operations which did not alter the surface operations or life of the mine. This assessment stated that on this basis, air quality emissions were not expected to increase or alter noticeably from those previously assessed and approved under PA 06_0311 (**GSS Environmental, 2012**).

4 ASSESSMENT CRITERIA

4.1 EPA Impact Assessment Criteria

Table 4.1 summarises the air quality assessment criteria for concentrations of particulate matter that are relevant to this study.

Table 4.1:EPA impact assessment criteria for particulate matter concentrations

Pollutant	Averaging period	Criteria	Agency
PM_{10}	24-hour	50 µg/m³	EPA impact assessment criteria (cumulative) Ambient Air-NEPM reporting goal, allows five exceedances per year for events such as bushfires and dust storms
	Annual mean	30 µg/m³	EPA impact assessment criteria (cumulative)
TSP	Annual mean	90 µg/m³	National Health and Medical Research Council (cumulative)

Note: µg/m³ – micrograms per cubic metre

Table 4.2 shows the maximum acceptable increase in dust deposition over the existing dust levels from an amenity perspective. These criteria for dust fallout levels are set to protect against nuisance impacts.

Table 4.2:EPA criteria for dust deposition (insoluble solids)

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m²/month	4 g/m²/month

Note: g/m²/month – grams per square metre per month

4.2 NSW Department of Planning and Environment Voluntary Land Acquisition and Mitigation Policy

On 15 December 2014, DP&E released a policy relating to voluntary mitigation and land acquisition criteria for air quality and noise (**DP&E, 2014**).

The policy sets out voluntary mitigation and land acquisition rights where it is not possible to comply with the relevant EPA impact assessment criteria, even with the implementation of all reasonable and feasible avoidance and/or mitigation measures.

The voluntary mitigation and acquisition criteria are summarised in **Table 4.3** and **Table 4.4**, respectively. The proposed modification has been assessed against these criteria, in addition to the EPA impact assessment criteria discussed in **Section4.1**.

Table 4.3: DP&E particulate matter mitigation criteria

Pollutant	Criterion	Averaging Period	Application
TSP	90 µg/m³	Annual mean	Total impact(a)
PM_{10}	50 µg/m³	24-hour average	Incremental impact(b)
	30 µg/m³	Annual mean	Total impact(a)
Deposited dust	2 g/m²/month	Annual mean	Incremental impact(b)
	4 g/m²/month	Annual mean	Total impact(a)

Note:

(a) Total (cumulative) impact includes the impact of the proposed modification and all other sources

(b) Zero allowable exceedances of the criterion over the life of the development and impact of the proposed modification considered in isolation.

Table 4.4: DP&E particulate matter acquisition criteria

Pollutant	Criterion	Averaging Period	Application(a)
TSP	90 µg/m³	Annual mean	Total impact(a)
PM_{10}	50 µg/m³	24-hour average	Incremental impact(b)
	30 µg/m³	Annual mean	Total impact(a)
Deposited dust	2 g/m²/month	Annual mean	Incremental impact(b)
	4 g/m²/month	Annual mean	Total impact(a)

Notes:

(a) Voluntary acquisition rights apply where the Project contributes to exceedances of the acquisition criteria at any residence or workplace on privately-owned land or, on more than 25% of any privately-owned land, and a dwelling could be built on that land under exiting planning controls.

(b) Total (cumulative) impact includes the impact of the proposed modification and all other sources

(c) Up to five allowable exceedances of the criterion over the life of the development and impact of the proposed modification considered in isolation.

Total (cumulative) impact includes the impact of the Project and all other sources, whilst incremental impact refers to the impact of the Project considered in isolation.

5 EXISTING ENVIRONMENT

5.1 Existing Air Quality

Air quality monitoring data collected in the area surrounding MC operations since 2006 and CVC operations since 2012 have been reviewed for the proposed modification. Insoluble solids deposition levels are monitored monthly at five different locations at each of MC and CVC. Since December 2013, CVC has also operated a Tapered Element Oscillating Microbalance (TEOM) station which measures PM_{10}. The locations of the various monitoring sites are shown in **Figure 5.1** as is the meteorological station located at MC. Meteorological conditions are discussed in **Section 5.2.**

The air quality monitors measure the existing dust deposition and particulate concentrations due to emissions from all sources that contribute to dust in the air. These sources include emissions from MC's and CVC's operations, from the neighbouring VPPS and other anthropogenic sources, as well as natural emission sources in the area. These data are discussed in **Section 5.1.1** and **Section 5.1.2**.

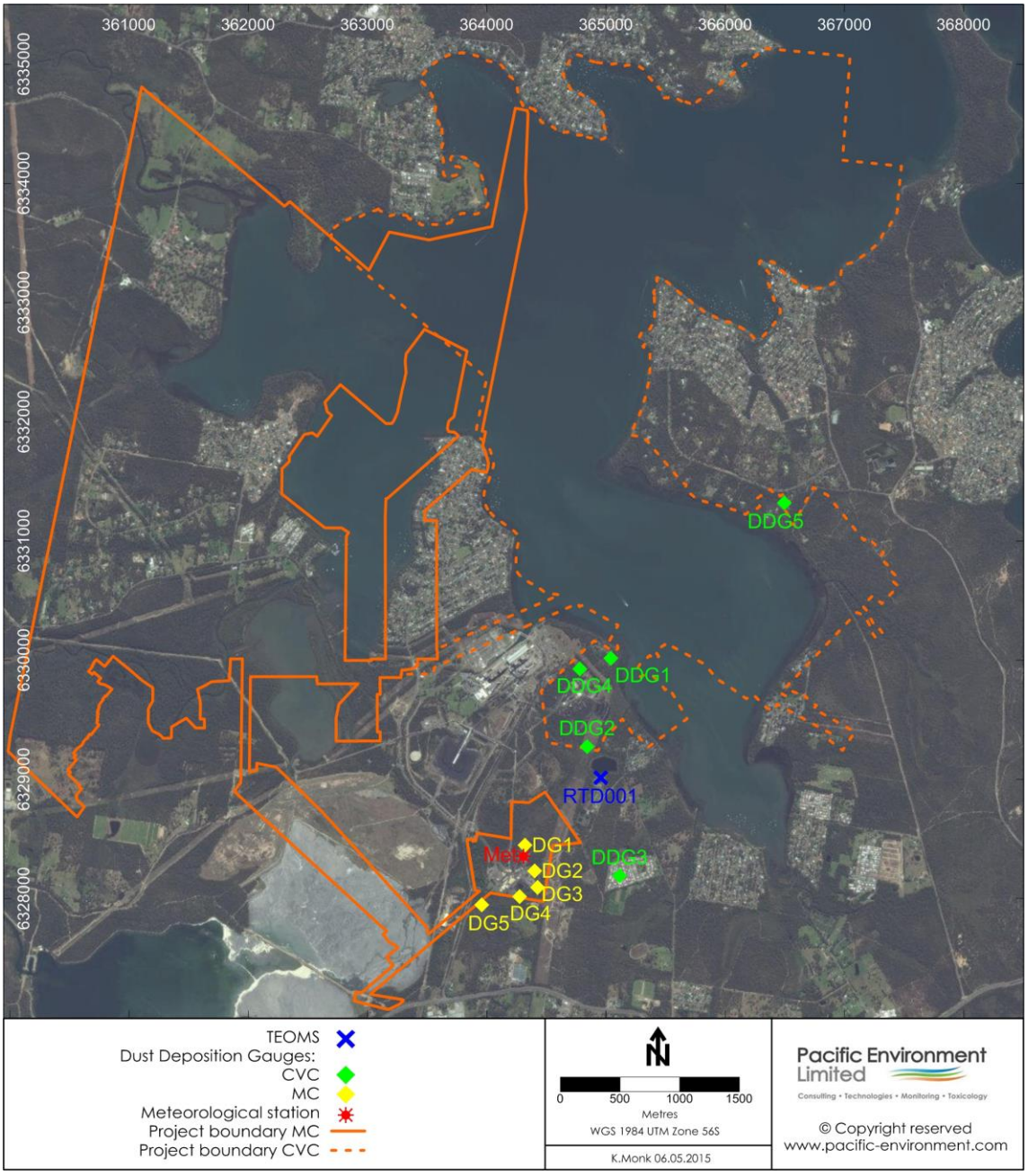


Figure 5.1: Air Quality Monitoring Network

5.1.1 PM_{10} Concentration

The 24-hour average PM_{10} measurements since 23 December 2013(when the instrument was installed), are presented in **Figure 5.2**. **Figure 5.2**shows a seasonal variation with elevated measurements occurring in the warmer months when the area is drier and also when bushfires and dust storms can often occur. Since the installation of the TEOM there have been no exceedances of the 24-hour average PM_{10} criterion of 50 µg/m^3. The maximum recorded 24-hour average PM_{10} concentration during the monitoring period was 38.7µg/m^3.

The annual average PM_{10} value was 14.8 µg/m^3 during 2014 which is well below the annual PM_{10} criterion of 30 µg/m^3.

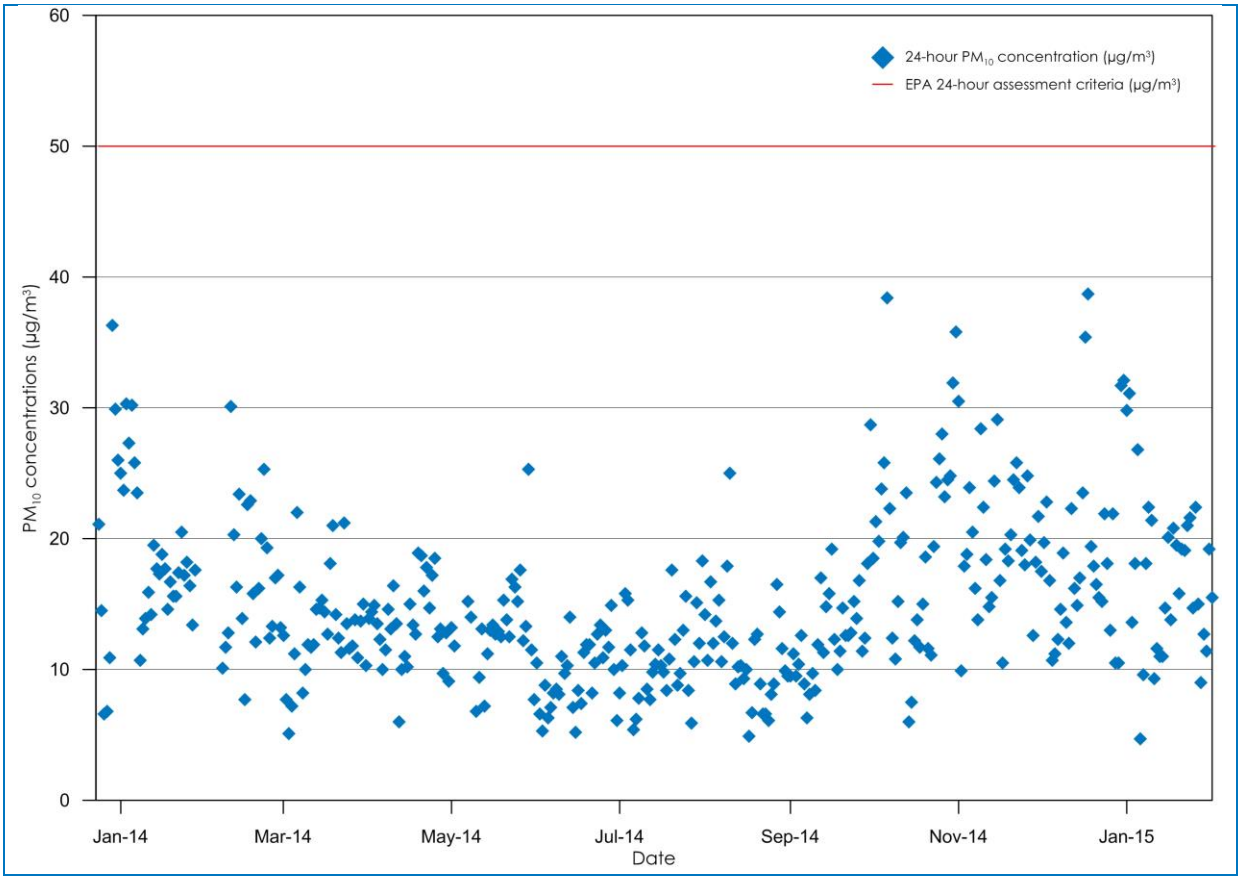


Figure 5.2: 24-hour average PM_{10} TEOM measurements

5.1.2 Dust Deposition

Table 5.1 summarises the insoluble solids deposition levels monitored at MC since 2006 and CVC since 2012. Samples affected by any potential contaminating influences such as bird droppings have been excluded from the averages of the reported dust deposition.

There have been no exceedances of the EPA dust deposition criteria of 4 g/m^2/month at the MC or CVC dust deposition gauges since their installation, with the annual average dust deposition at individual sites ranging from 0.6 g/m^2/month to 2.2 g/m^2/month. Across all sites, the annual average dust deposition is 1 g/m^2/month.

Table 5.1:Annual average (insoluble solids) deposition levels (g/m²/month)

	Mannering					Chain Valley				
Year	DG1	DG2	DG3	DG4	DG5	DDG1	DDG2	DDG3	DDG4	DDG5
2006	0.8	1.0	1.0	0.7	0.9	-	-	-	-	-
2007	0.9	0.7	1.2	1.1	0.9	-	-	-	-	-
2008	1.0	0.8	0.9	1.0	0.6	-	-	-	-	-
2009	1.9	1.3	1.4	1.4	1.2	-	-	-	-	-
2010	2.7	0.7	2.0	0.8	0.5	-	-	-	-	-
2011	0.8	0.6	0.7	0.6	0.8	-	-	-	-	-
2012	0.6	0.5	0.5	0.5	0.6	1.2	0.9	3.5	2.8	-
2013	1.1	0.7	0.8	0.7	0.7	0.8	1.0	2.1	2.0	1.0
2014	0.6	0.6	0.6	0.7	0.6	1.2	1.1	1.1	1.1	1.0
Average	**0.8**	**0.6**	**0.6**	**0.6**	**0.6**	**1.0**	**1.0**	**2.2**	**1.9**	**1.0**

5.2 Dispersion Meteorology

Meteorological data are collected at the Mannering meteorological station (see location in **Figure 5.1**). The 2013 AQA for the CVC EIS (**PAEHolmes 2013**) used meteorological data from this station for the period May 2011 to April 2012. Windroses for that period and 2014 are presented in **Figure 5.3**.

A review of **Figure 5.3** shows that on an annual basis, the most common winds are from the south-west and, to a lesser extent, the south-southeast and north-east, and that very few winds originate from the north-west quadrant. During summer, winds are predominantly from the south-east and north-east, while in the cooler winter months winds are predominantly from the south-west. Spring and autumn winds include both south-westerlies and north-easterlies. A comparison of wind roses for 2014 and the modelling period used in the 2013 AQA show consistent patterns, albeit with a higher frequency of northeasterly and east-northeasterly winds during summer for the 2014 period and a lesser westerly component during winter.

The average annual winds speeds are 1.8 m/s while calm periods (i.e. periods with wind speeds below 0.5m/s) occur up to around 15 % on an annual basis.

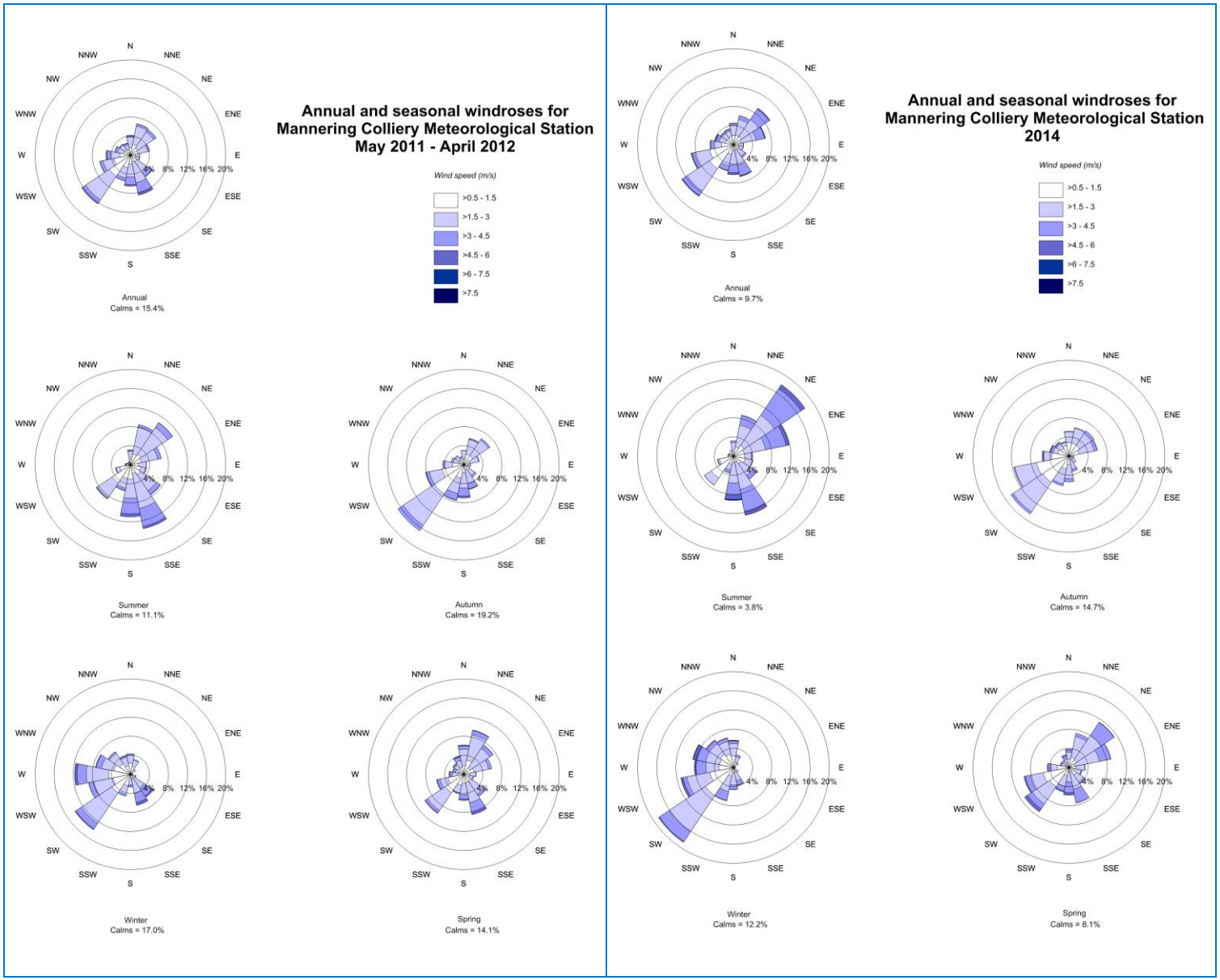


Figure 5.3: Windroses for MC meteorological station May 2011- April 2012 (left) and 2014 (right)

6 QUALITATIVE ASSESSMENT

MC has been in 'care and maintenance' since November 2012. Since October 2013, LakeCoal has been the operator of MC under a commercial arrangement with Centennial and coal production activities have yet to be undertaken. MC is currently approved to extract, process and handle 1.1 Mtpa of ROM, with all coal to be despatched to VPPS via overland conveyor for use in domestic electricity generation. Under the proposed MC modification, this annual rate would increase to a maximum of 1.3 Mtpa.

HAS, 2007 assessed air quality and greenhouse gas impacts arising from a continuation of mining operations at a rate of 1.1 Mtpa until 2018. As part of the proposed modification, a maximum of 1.3 Mtpa of coal from CVC destined for VPPS would be sent via Mannering MC, resulting in an increase of 0.2 Mtpa of coal throughput not currently approved under MC's Project Approval (MP 06_0311).

Table6.1 reproduces the estimate of total TSP presented in the 2007MC AQA. It should be noted that the 2007 MC AQA assumed that 2% of the annual coal production would require stockpiling to account for periods when the overland conveyor was unable to transfer coal directly to the power station due to conveyor downtime or periods of reduced demand at VPPS, e.g. during maintenance. LakeCoal has however opted to use a more conservative figure for coal stockpiling of 10%.The 2007 AQA also identified a 2,000 tph feed rate of the reclaimer which is inconsistent with the nominal 1,200 tph capacity of the conveyor system used at the site. In 2010, the US EPA's emission factor for Bulldozers/Front End Loaders (FELs) operating on coal was also corrected[a]. In order to reflect these three changes, the emissions inventory prepared for the 2007 AQA has been updated, with revised annual TSP emission totals presented in column 3 of **Table 6.1**. Column 3 shows that the two changes to the inventory, together with the updated emission factor for FELs on the stockpiles, resulted in an approximate 10% increase of in total emissions compared to those presented in the 2007 AQA.

HAS 2007concluded that emissions less than 2 g/s would not produce a noticeable or measureable change in the concentrations of particulate matter in the residential areas within close proximity of the mine. The amended total emission presented in Column 3 is still less than the 2 g/s emission rate.

The last column of **Table 6.1** presents estimated TSP emissions for MC with the revised stockpiling and reclaim rates and FEL emission factor, together with the increased processing, handling and despatch rate sought under the MC modification and shows a 13% increase in total emission of TSP per year. The emission rate, though increasing marginally, is still below the previously-identified 2 g/s and, as a consequence, is not expected to result in any noticeable change in the concentrations of particulate matter at nearby residences.

Table 6.1: Estimated annual TSP emissions

	MC 2007	MC revised assumptions*	MC additional ROM
ROM	1.1	1.1	1.3
Total TSP Emissions (kg/yr)	48,304	52,687	59,609
Total TSP Emissions (g/s)	1.52	1.67	1.89

* stockpiling of 10% of ROM and reclaiming at a rate of 1,200tpa.

The original AQA showed that no exceedances of the relevant criteria were predicted at the nearest private residences. The analysis of emissions above has shown that the proposed modification is not likely to result in any significant increases in total emissions at MC. The proposed modification is therefore not likely to result in any measureable changes to predicted ground level concentrations at sensitive receptors and, as such, is not expected to change the conclusions in the original assessment.

[a]In 2011 a typographical error in the emission factor for FELs (**US EPA 1985**AP42 Chapter 11.9 – Table 11.9.2) was corrected. The equation was originally shown as being$35.6 \times \frac{s^{1.2}}{M^{1.4}}$ and the correct emission factor is$35.6 \times \frac{s^{1.2}}{M^{1.3}}$

7 CONCLUSIONS

This report has investigated the likely effects on air quality from the proposed modification.

There are not anticipated to be any significant changes to particulate emission inventory or mine footprints due to the proposed modification, to that described and assessed in the MC EA air quality impact assessment (**HAS, 2007**).

In view of the above, it is anticipated that the proposed modification may be managed to ensure that adverse air quality impacts do not occur at the nearest sensitive receptors.

Please do not hesitate to contact me should you require any further information.

Khalia Monk
Senior Consultant – Air Quality
Pacific Environment Limited

Judith Cox
Principal Consultant – Air Quality
Pacific Environment Limited

8 REFERENCES

GSS Environmental (2012), 'Environmental Assessment – Mannering Colliery – Extension of Mine Project', prepared by GSS Environmental on behalf of Centennial Mannering Pty Ltd, January 2012

Holmes Air Science (2007), 'Mannering Colliery - Continuation of Mining Environmental Assessment - Air Quality and Greenhouse Gas Impact Assessment', prepared by Holmes Air Sciences for Hansen Bailey Pty Ltd, March 2007.

PAEHolmes (2013), 'Chain Valley Colliery Mining Extension 1 Project – Air Quality and Greenhouse Gas Impact Assessment', prepared by PAEHolmes for EMGA Mitchell McLennan Pty Ltd, February 2013.

US EPA (1985 and updates), 'Compilation of Air Pollutant Emission Factors', AP-42, Fourth Edition United States Environmental Protection Agency, Office of Air and Radiation Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711

Appendix F

Assessment of significance

Appendix F — Assessment of significance

F

F.1 Threatened species habitat assessment

The likelihood of occurrence for each threatened species previously recorded within 10 km of MC's pit top was assessed against the criteria in Table F.1.

Table F.1 Assessment criteria

Likelihood	Description	Further assessment required?
Recorded	The species was observed in the site during the current survey.	Yes
High	It is highly likely that a species inhabits the site due to the presence of suitable habitat, and has been recorded recently in the surrounding area.	Yes
Moderate	Potential habitat is present in the site, although it has not been recorded recently in the site and surrounds. The species is unlikely to be dependent (ie. for breeding) on habitat within the site.	Yes
Low	It is unlikely that the species inhabits the site, and may be an occasional visitor. Habitat similar to the site is widely distributed in the local area, meaning that the species is not dependent (ie. for breeding) on it.	No
None	Suitable habitat is absent from the site.	No

The results of the assessment are presented in Table F.2.

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
FLORA						
Biconvex Paperbark *Melaleuca biconvex*	PMST	V	V	Not recorded within a 10 km radius of the survey area. Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Flowering occurs over just 3-4 weeks in September and October. This species re-sprouts following fire.	Low	No
Black-eyed Susan *Tetratheca juncea*	NPWS Atlas	V	V	Several records from the surrounding area (EMM unpublished data 2014) and within 10 km of the survey area. Black-eyed Susan is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. While some studies show the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers well-drained sites below 200m elevation and annual rainfall between 1000 - 1200mm. The preferred substrates are sandy skeletal soil on sandstone, sandy-loam soils, low nutrients; and clayey soil from conglomerates, pH neutral. It usually spreads via underground stems which can be up to 50 cm long. Consequently, individual plants may be difficult to identify. It also reproduces sexually but this requires insect pollination. Large populations of this species are particularly important.	Low	No
Bynoe's Wattle *Acacia bynoeana*	NPWS Atlas	E	V	Several records within 10 km of the survey area. Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.	Low	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Camfield's Stringybark *Eucalyptus camfieldii*	PMST	V	V	Not known from within 10 km of the survey area. Occurs in poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas. Associated species frequently include stunted species of Narrow-leaved Stringybark (*E. oblonga*), Brown Stringybark (*E. capitellata*) and Scribbly Gum (*E. haemastoma*). Population sizes are difficult to estimate because its extensive lignotubers may be 20 m across. A number of stems arise from these lignotubers giving the impression of individual plants. Flowering period is irregular with flowers recorded a various times throughout the year. Poor response to too frequent fires.	Low	No
Charmhaven Apple *Angophora inopina*	NPWS Atlas	V	V	Several records within 10 km of the survey area. This species is a member of the *A. bakeri* complex. None of the related species are known from the same area as *A. inopina*, although A. bakeri does occur sporadically in the ranges to the west, and near Kurri Kurri. Occurs most frequently in four main vegetation communities: (i) *Eucalyptus haemastoma–Corymbiagummifera–Angophora inopina* woodland/forest; (ii) *Hakea teretifolia–Banksia oblongifolia* wet heath; (iii) *Eucalyptus resinifera–Melaleuca sieberi–Angophora inopina* sedge woodland; (iv) *Eucalyptus capitellata–Corymbiagummifera–Angophora inopina* woodland/forest. Ecological knowledge about this species is limited. Is lignotuberous, allowing vegetative growth to occur following disturbance. However, such vegetative reproduction may suppress the production of fruits/seeds, necessary for the recruitment of new individuals to a population, and the time between such disturbance and the onset of sexual reproduction is not known. Flowering appears to take place principally between mid-December and mid-January, but is generally poor and sporadic. Preliminary experiments indicate that neither pollination nor seed viability are limiting factors in the life cycle.	Low	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Earp's Gum *Eucalyptus parramattensis* subsp. *decadens*	PMST	V	V	Not known from within 10 km of the survey area. There are two separate meta-populations of E. parramattensis subsp. decadens. The Kurri Kurri meta-population is bordered by Cessnock—Kurri Kurri in the north and Mulbring—Abedare in the south. It generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high.It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. In the Kurri Kurri area, *E. parramattensis* subsp. *decadens* is a characteristic species of 'Kurri Sand Swamp Woodland in the Sydney Basin Bioregion', an endangered ecological community under the TSC Act. This species flowers from November to January.	None	No
Heath Wrinklewort *Rutidosis heterogama*	PMST	V	V	Not known from within 10 km of the survey area. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	None	No
Illawarra Greenhood *Pterostylis gibbosa*	PMST	E	E	Not known from within 10 km of the survey area. All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Hunter region, the species grows in open woodland dominated by Narrow-leaved Ironbark (*E. crebra*), Forest Red Gum (*E. tereticornis*) and Black Cypress Pine (*Callitrisendlicheri*). The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place). As with many other greenhoods, male fungus gnats are believed to be the pollinator. The Illawarra Greenhood can survive occasional burning and grazing because of its capacity to reshoot from an underground tuber.	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Leafless Tongue Orchid *Cryptostylis hunteriana*	NPWS Atlas	V	V	Several records from the Delta Electricity Perimeter Lands (EMM unpublished data 2014). The larger populations of these species typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi*), Red Bloodwood (*Corymbiagummifera*) and Black Sheoak (*Allocasuarinalittoralis*); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*). Little is known about the ecology of the species; being leafless it is expected to have limited photosynthetic capability and probably depends upon a fungal associate to meet its nutritional requirements from either living or dead organic material. In addition to reproducing from seed, it is also capable of vegetative reproduction and thus forms colonies which can become more or less permanent at a site.	None	No
Magenta Lilly Pilly *Syzygium paniculatum*	NPWS Atlas	E	V	Two records within 10 km of the survey area. On the central coast, the Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	None	No
Omeo's Storksbill *Pelargonium* sp. Striatellum	PMST	E	E	Not known from within 10 km of the survey area. Omeo's Storksbill has a specific habitat that is usually just above the high-water level of irregularly inundated or ephemeral lakes, in the transition zone between surrounding grasslands or pasture and the wetland or aquatic communities. It sometimes colonises exposed lake beds during dry periods. It occurs in habitats that are mostly or wholly included in the two Endangered Ecological Communities (EECs): 'Natural Temperate Grassland of the Southern Tablelands of NSW and the Australian Capital Territory' and 'Upland Wetlands of the New England Tablelands (New England Tableland Bioregion)' and the 'Monaro Plateau (South Eastern Highlands Bioregion)', as listed under the EPBC Act.	None	No
Rough Doubletail *Diuris praecox*	NPWS Atlas	V	V	One record within 10 km of the survey area. Rough Doubletail grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter.	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Siah's Backbone *Streblus pendulinus*	PMST	-	E	Not known from within 10 km of the survey area. Siah's Backbone occurs from Cape York Peninsula to Milton, south-east New South Wales (NSW), as well as Norfolk Island. On the Australian mainland, Siah's Backbone is found in warmer rainforests, chiefly along watercourses. The altitudinal range is from near sea level to 800 m above sea level. The species grows in well developed rainforest, gallery forest and drier, more seasonal rainforest.	None	No
Small-flower Grevillea *Grevillea parviflora* subsp. *parviflora*	PMST	V	V	Not known from within 10 km of the survey area. Small-flower Grevillea occurs in a range of vegetation types from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in the Hunter in Kurri Sand Swamp Woodland. However, other communities occupied include Corymbiamaculata - Angophora costata open forest in the Dooralong area, in Sydney Sandstone Ridgetop Woodland at Wedderburn and in Cooks River / Castlereagh Ironbark Forest at Kemps Creek. Often occurs in open, slightly disturbed sites such as along tracks. Plants are capable of suckering from a rootstock and most populations demonstrate a degree of vegetative spread, particularly after disturbance such as fire.	None	No
Thick-lipped Spider Orchid *Caladenia tessellata*	PMST	E	V	Not known from within 10 km of the survey area. Thick-lipped Spider Orchid is generally found in grassy sclerophyll woodland on clay loam or sandy soils, though the population near Braidwood is in low woodland with stony soil. The single leaf regrows each year. Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	None	No
Variable Midge Orchid *Genoplesium insigne*	NPWS Atlas	E	CE	Two records from within 10 km of the survey area. Variable Midge Orchid grows in patches of Kangaroo Grass (*Themedaaustralis*) amongst shrubs and sedges in heathland and forest. Associated vegetation at Chain Valley Bay is described as dry sclerophyll woodland dominated by Scribbly Gum (*Eucalyptus haemastoma*), Red Bloodwood (*Corymbiagummifera*), Smooth-barked Apple (*Angophora costata*) and Black She-oak (*Allocasuarinalittoralis*). Fewer than twenty plants are recorded from three localities, while the number of plants present at the fourth locality (Chain Valley Bay) is not known. Flowering period is September to October.	Low	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Wyong Sun Orchid *Thelymitra adorata*	PMST	CE	CE	Not known from within 10 km of the survey area. Currently known from a few localised occurrences in the area bounded by the towns of Wyong, Warnervale and Wyongah on the New South Wales Central Coast, within the Wyong Local Government Area. Occurs from 10-40 m a.s.l. in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. The vegetation type in which the majority of populations occur (including the largest colony) is a Spotted Gum - Ironbark Forest with a diverse grassy understorey and occasional scattered shrubs.	None	No
FAUNA - Birds						
Barking Owl *Ninox connivens*	NPWS Atlas	V	-	One record within 10 km of the survey area. The Barking Owl inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. This species roosts in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as *Acacia* and *Casuarina* species.	Low	No
Black Bittern *Ixobrychus flavicollis*	NPWS Atlas	V	-	Two records within 10 km of the survey area. The Black Bittern inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves.	Low	No
Black Falcon *Falco subniger*	NPWS Atlas	V	-	One record within 10 km of the survey area. The Black Falcon is found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas. Black Falcons nest along tree-lined creeks and rivers of inland drainage systems.	Low	No
Black-faced Monarch *Monarcha melanopsis*	PMST	-	Mi	Not known from within 10 km of the survey area. The Black-faced Monarch occurs mainly in rainforest ecosystems but sometimes is found in nearby open eucalypt forests in gullies with a dense, shrubby, or patchy understorey.	None	No
Black-necked Stork *Ephippiorhynchus asiaticus*	NPWS Atlas	E	-	Black-necked Storks are mainly found on shallow, permanent, freshwater terrestrial wetlands, and surrounding marginal vegetation, including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters, as well as extending into adjacent grasslands, paddocks and open savannah woodlands.	Low	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Brown Treecreeper (eastern subspecies) *Climacteris picumnus victoriae*	NPWS Atlas	V	-	Two records from within 10 km of the survey area. The Brown Treecreeper is found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range. The Brown Treecreeper mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey. Fallen timber is an important habitat component for foraging.	Low	No
Cattle Egret *Ardea ibis*	NPWS Atlas	-	Mi	Not known within 10 km of the survey area. The Cattle Egret occurs in tropical and temperate grasslands, wooded lands and terrestrial wetlands.	None	No
Diamond Firetail *Stagnopleura guttata*	NPWS Atlas	V	-	One record within 10 km of the survey area. The Diamond Firetail is found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (*Eucalyptus pauciflora*) Woodlands. The species also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities.	None	No
Eastern Bristlebird *Dasyornis brachypterus*	PMST	E	E	Not known within 10 km of the survey area. Habitat of the Eastern Bristlebird is characterised by dense, low vegetation including heath and open woodland with a heathy understorey; in northern NSW, this species occurs in open forest with tussocky grass understorey; all of these vegetation types are fire prone.	Low	No
Eastern Osprey *Pandion cristatus*	NPWS Atlas	V	-	Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	None	No
Fork-tailed Swift *Apus pacificus*	NPWS Atlas	-	MI	One record within 10 km of the survey area. In Australia, the Fork-tailed Swift mostly occurs over inland plains but sometimes above foothills or in coastal areas. This species can also occur over cliffs and beaches and also over islands and sometimes well out to sea.	Low	No
Gang-gang Cockatoo *Callocephalon fimbriatum*	NPWS Atlas	V	-	One record within 10 km of the survey area. In summer, the Gang-gang Cockatoo is generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, they may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas.	Low	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Glossy Black-Cockatoo *Calyptorhynchus lathami*	NPWS Atlas	V	-	Several records within 10 km of the survey area. The Glossy Black Cockatoo inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of She-oak species, particularly Black She-oak (*Allocasuarinalittoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur.	Low	No
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*	NPWS Atlas	V	-	One record within 10 km of the survey area. Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Birds are generally unable to cross large open areas. Live in family groups that consist of a breeding pair and young from previous breeding seasons. Feed on invertebrates, either by foraging on the trunks and branches of eucalypts and other woodland trees or on the ground, digging and probing amongst litter and tussock grasses. Build and maintain several conspicuous, dome-shaped stick nests about the size of a football. A nest is used as a dormitory for roosting each night. Nests are usually located in shrubs or sapling eucalypts, although they may be built in the outermost leaves of low branches of large eucalypts. Nests are maintained year round, and old nests are often dismantled to build new ones. Breed between July and February. Territories range from one to fifty hectares (usually around ten hectares) and are defended all year. Territorial disputes with neighbouring groups are frequent and may last up to several hours, with much calling, chasing and occasional fighting.	None	No
Little Eagle *Hieraaetus morphnoides*	NPWS Atlas	V	-	One record within 10 km of the survey area. The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW. This species occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used.	Low	No
Little Lorikeet *Glossopsitta pusilla*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. It forages primarily in the canopy of open *Eucalyptus* forest and woodland, yet also finds food in *Angophora, Melaleuca* and other tree species. Riparian habitats are particularly used by this species, due to higher soil fertility and hence greater productivity.	**High**	**Yes**

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Masked Owl *Tyto novaehollandiae*	NPWS Atlas	V	-	Three records within 10 km of the survey area. The Masked Owl lives in dry eucalypt forests and woodlands from sea level to 1,100 m. Its diet typically consists of tree-dwelling and ground mammals, especially rats.	Low	No
Powerful Owl *Ninox strenua*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. In NSW, the Powerful Owl is widely distributed throughout the eastern forests from the coast inland to tablelands, with scattered, mostly historical records on the western slopes and plains. This species roosts by day in dense vegetation comprising species such as Turpentine (*Syncarpiaglomulifera)*, Black She-oak (*Allocasuarinalittoralis)*, Blackwood (*Acacia melanoxylon)*, Rough-barked Apple (*Angophora floribunda)*, Cherry Ballart (*Exocarpuscupressiformis)*and a number of eucalypt species.	Low	No
Rainbow Bee-eater *Merops ornatus*	NPWS Atlas	-	Mi	Two records within 10 km of the survey area. The Rainbow Bee-eater is distributed across much of mainland Australia, and occurs on several near-shore islands. It is not found in Tasmania, and is thinly distributed in the most arid regions of central and Western Australia. It usually occurs in open, cleared or lightly-timbered areas that are often, but not always, located in close proximity to permanent water. The Rainbow Bee-eater is also common in cleared and semi-cleared habitatsie farmland.	Low	No
Regent Honeyeater *Anthochaera phrygia*	NPWS Atlas	CE	E	Several records within 10 km of the survey area. The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. These birds are also found in drier coastal woodlands and forests in some years. Every few years non-breeding flocks are seen foraging in flowering coastal Swamp Mahogany (*Eucalyptus robusta*) and Spotted Gum (*Corymbiamaculata*) forests, particularly on the central coast and occasionally on the upper north coast. Birds are occasionally seen on the south coast.	Low	No
Rose-crowned Fruit Dove *Ptilinopus regina*	NPWS Atlas	V	-	Several records within 10 km of the survey area. Rose-crowned Fruit-doves occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful. They are shy pigeons, not easy to see amongst the foliage, and are more often heard than seen. They feed entirely on fruit from vines, shrubs, large trees and palms, and are thought to be locally nomadic as they follow the ripening of fruits. Some populations are migratory in response to food availability - numbers in north-east NSW increase during spring and summer then decline in April or May.	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Rufous Fantail *Rhipidura rufifrons*	PMST	-	Mi	Not known from within 10 km of the survey area. In east and south-east Australia, the Rufous Fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts such as Tallow-wood (*Eucalyptus microcorys*), Mountain Grey Gum (*E. cypellocarpa*), Narrow-leaved Peppermint (*E. radiata*), Mountain Ash (*E. regnans*), Alpine Ash (*E. delegatensis*), Blackbutt (*E. pilularis*) or Red Mahogany (*E. resinifera*); usually with a dense shrubby understorey often including ferns.	None	No
Satin Flycatcher *Myiagra cyanoleuca*	PMST	-	Mi	Not known from within 10 km of the survey area. The Satin Flycatcher is widespread in eastern Australia and vagrant to New Zealand (Blakers et al. 1984; Coates 1990). Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	None	No
Scarlet Robin *Petroica boodang*	NPWS Atlas	V	-	Recorded from the Vales Point Power Station Perimeter Lands. In NSW, the Scarlet Robin occurs from the coast to the inland slopes.This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat.	**High**	**Yes**
Sooty Owl *Tyto tenebricosa*	NPWS Atlas	V	-	One record within 10 km of the survey area. The Sooty Owl occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.	None	No
Spectacled Monarch *Monarcha trivirgatus*	PMST	-	Mi	Not known from within 10 km of the survey area. The Spectacled Monarch prefers thick understorey in rainforests, wet gullies and waterside vegetation, as well as mangroves.	None	No
Speckled Warbler *Chthonicola sagittata*	NPWS Atlas	V	-	One record from within 10 km of the survey area. The Speckled Warbler lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy.	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Superb Fruit Dove *Ptilinopus superbus*	NPWS Atlas	V	-	Two records within 10 km of the survey area. Lives mainly within rainforests but will feed in adjacent mangroves or eucalypt forests. Nests are well hidden within the rainforest habitat and are built in trees from 10 to 30m off the ground. The nest consists of a flimsy structure of twigs, constructed in the fork of a branch. Feeding on pittosporums, Lilly Pillies, blackberries and isolated figs. Typically distributed along eastern Queensland and southern New Guinea, but also found as far south as Tasmania in low numbers.	Low	No
Swift Parrot *Lathamus discolor*	NPWS Atlas	E	E	Multiple records from within 10 km of the survey area. The Swift Parrot migrates to the Australian south-east mainland between March and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations.	Low	No
Turquoise Parrot *Neophema pulchella*	NPWS Atlas	V	-	One record within 10 km of the survey area. Inhabiting the steep, rocky ridges and gullies, hills, river-flats, valleys and nearby plains of the Great Dividing Range, the Turquoise Parrot is found in open forest and eucalyptus woodlands with a low shrub understorey and grassy ground-cover. Generally, distribution of the species is patchy, determined by areas of suitable habitat and ranges from north-eastern Victoria through NSW to south-eastern Queensland. Individuals generally breed from August to January, usually nesting less than two metres above the ground. Nests may be located in hollows of small trees, dead eucalyptus or in holes or stumps, fence posts or even logs lying on the ground.	Low	No
Varied Sittella *Daphoenositta chrysoptera*	NPWS Atlas	V	-	Multiple records within 10km of the site. Recorded in the Vales Point Power Station Perimeter Lands (EMM unpublished data 2014). The Varied Sittella inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. This species feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy.	Low	No
White-bellied Sea Eagle *Haliaeetus leucogaster*	NPWS Atlas	-	Mi	Previously recorded in the surrounding area (EMM unpublished data 2014). The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the sea-shore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. The habitats occupied by the sea-eagle are characterised by the presence of large areas of open water (larger rivers, swamps, lakes and the sea).	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
White-fronted Chat *Epthianura albifrons*	NPWS Atlas	V	-	One record within 10 km of the survey area. Gregarious species, usually found foraging on bare or grassy ground in wetland areas, singly or in pairs. They are insectivorous, feeding mainly on flies and beetles caught from or close to the ground. Have been observed breeding from late July through to early March, with 'open-cup' nests built in low vegetation. Nests in the Sydney region have also been seen in low isolated mangroves. Nests are usually built about 23 cm above the ground (but have been found up to 2.5 m above the ground).	**Moderate**	**Yes**
White-throated Needletail *Hirundapus caudacutus*	NPWS Atlas	-	Mi	Several records within 10 km of the survey area. The White-throated Needletail occurs in open forest, rainforest, heathland, grassland and swamps. The species breeds in wooded lowlands and sparsely vegetated hills, as well as mountains covered with coniferous forests.	Low	No
FAUNA - Frogs						
Giant Barred Frog *Mixophyes iteratus*	PMST	E	E	Not known from within 10 km of the survey area. Found on forested slopes of the escarpment and adjacent ranges in riparian vegetation, subtropical and dry rainforest and wet sclerophyll forests. This species is associated with flowing streams with high water quality, though habitats may contain weed species. They occur amongst deep, damp leaf litter in rainforests, moist eucalypt forest and nearby dry eucalypt forest, at elevations below 1000 m. They breed around shallow, flowing rocky streams from late spring to summer. Females lay eggs onto moist creek banks or rocks above water level, from where tadpoles drop into the water when hatched. Their distribution occurs along the coast and ranges from south-eastern Queensland to the Hawkesbury River in NSW. North-eastern NSW, particularly the Coffs Harbour-Dorrigo area, is now a stronghold.	None	No
Giant Burrowing Frog *Heleioporus australiacus*	PMST	V	V	Not known from within 10 km of the survey area. The Giant Burrowing Frog is found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. They spend more than 95% of their time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat, the Giant Burrowing Frog burrows below the soil surface or in the leaf litter.	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Green and Golden Bell Frog *Litoria aurea*	PMST	E	V	Not known from within 10 km of the survey area. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.)* or spikerushes (*Eleocharis spp*.). Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusiaholbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region occur in highly disturbed areas, such as brick pitts, landfill areas, disused industrial sites and cleared lands. Formerly distributed from the NSW north coast near Brunswick Heads, southwards along the NSW coast to Victoria where it extends into east Gippsland. Records from west to Bathurst, Tumut and the ACT region. Since 1990 there have been approximately 50 recorded locations in NSW, most of which are small, coastal, or near coastal populations. These locations occur over the species' former range, however they are widely separated and isolated. Large populations in NSW are located around the metropolitan areas of Sydney, Shoalhaven and mid north coast (one an island population). There is only one known population on the NSW Southern Tablelands.	Low	No
Littlejohns Tree Frog *Litoria littlejohni*	PMST	V	V	Not known from within 10 km of the survey area. The Littlejohn's Tree Frog has a distribution that includes the plateaus and eastern slopes of the Great Dividing Range from Watagan State Forest (90 km north of Sydney) south to Buchan in Victoria. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground.	None	No
Stuttering Frog *Mixophyes balbus*	PMST	E	V	Not known from within 10 km of the survey area. The Stuttering Frog is restricted to the eastern slopes of the Great Divide, from the Cann River catchment in far East Gippsland, Victoria, to tributaries of the Timbarra River near Drake, New South Wales. They are found in association with permanent streams through temperate and sub-tropical rainforest and wet sclerophyll forest, rarely in dry open tableland riparian vegetation.	None	No
Wallum Froglet *Crinia tinnula*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. Wallum Froglets are found in wallum swamps and associated low land meandering watercourses on coastal plains. This species is primarily restricted to coastal areas of southern Queensland and northern New South Wales and is thought to be confined to acid paperbark swamps and a range of habitats from heath plains to rainforests. The species is a late winter breeder and breeds in low (acidic) pH areas.	None	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
FAUNA -Mammals						
Brush-tailed Rock Wallaby *Petrogale penicillata*	PMST	E	V	Not known from 10 km of the survey area. In NSW the Brush-tailed Rock Wallaby occurs from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. This species occupies rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges, often facing north. The Brush-tailed Rock Wallaby browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	None	No
Eastern Bentwing Bat *Miniopterus schreibersii oceanensis*	NPWS Atlas	V	-	Multiple records from within 10 km of the survey area. Eastern Bentwing Bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat for this species, but they also use derelict mines, storm-water tunnels, buildings and other man-made structures. The Eastern Bentwing Bat forms discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young.	**High**	**Yes**
Eastern Cave Bat *Vespadelus troughtoni*	NPWS Atlas	V	-	One record within 10 km of the survey area. The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. Little is known of the biology, feeding, breeding and behaviour of this species. They are usually found in dry open forest and woodland, near rocky cliffs or overhangs. It has been recorded roosting in disused mine workings and caves, and is occasionally found in wet eucalypt forest and rainforest.	Low	No
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	NPWS Atlas	V	-	Four records within 10 km of the survey area. The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania. This species prefers moist habitats, with trees taller than 20 m, generally roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Low	No
Eastern Freetail Bat *Mormopterus norfolkensis*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. The Eastern Freetail-Bat is found along the east coast from south Queensland to southern NSW. The Eastern Freetail Bat occurs in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. This species roosts mainly in tree hollows but will also roost under bark or in man-made structures.	**High**	**Yes**

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Greater Broadnosed Bat *Scoteanax rueppellii*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m. This species utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest.	Low	No
Grey-headed Flying-fox *Pteropus poliocephalus*	NPWS Atlas	V	V	Multiple records within 10 km of the survey area. Grey-headed Flying foxes occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy.	**High**	**Yes**
Koala *Phascolarctos cinereus*	NPWS Atlas	V	V	Two records within 10 km of the survey area. In NSW, the koala mainly occurs on the central and north coast with some populations in the west of the Great Dividing Range. The Koala inhabits eucalypt woodlands and forests. They feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	None	No
Large-eared Pied Bat *Chalinobus dwyeri*	PMST	V	V	Not known within 10 km of the survey area. The Large-eared Pied Bat roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidonariel*), frequenting low to mid-elevation dry open forest and woodland close to these features.	None	No
Little Bentwing Bat *Miniopterus australis*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. The Little Bentwing Bat is distributed on the East coast and ranges of Australia from Cape York in Queensland to Wollongong in NSW. It is generally found in well-timbered areas. Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats.	**Moderate**	**Yes**

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
Long-nosed Potoroo *Potorous tridactylus tridactylus*	PMST	V	V	Not known within 10 km of the survey area. The Long-nosed Potoroo inhabits coastal heaths and dry and wet sclerophyll forests. A dense understorey with occasional open areas is an essential part of this species' habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas.	Low	No
New Holland Mouse *Pseudomys novaehollandiae*	NPWS Atlas	-	V	Six records from the nearby Munmorah State Conservation Area. The New Holland Mouse is known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes. It is a social animal, living predominantly in burrows shared with other individuals.	None	No
Southern Myotis *Myotis macropus*	NPWS Atlas	V	-	Multiple records within 10 km of the survey area. The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers. They generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Southern Myotis forage over streams and pools catching insects and small fish by raking their feet across the water surface.	Low	No
Spotted-tailed Quoll *Dasyurus maculatus maculatus*	NPWS Atlas	V	E	Three records within 10 km of the survey area. The Spotted-tailed Quoll inhabits a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Individual animals use hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces as den sites.	Low	No
Squirrel Glider *Petaurus norfolcensis*	NPWS Atlas	V	-	Previously recorded from the Vales Point Power Station Perimeter Lands. Inhabits dry sclerophyll forest and woodland where it is absent from the dense coastal ranges. Forages on pollen and nectar and the gum that acacias produce. Also eats sap from gums and the green seeds of the Golden Wattle. Associated with dry hardwood forest and woodlands. Habitats typically include gum-barked and high nectar-producing species, including winter flowering species. The presence of hollow-bearing eucalypts is a critical habitat value. The Squirrel Glider is sparsely distributed along the east coast and immediate inland districts from western Victoria to north Queensland.	Low	No

Table F.2 Threatened species recorded or with the potential to occur within 10 km of the survey area

Species	Source	Status		Habitat requirements	Likelihood of occurrence	Further assessment required?
		TSC Act	EPBC Act			
FAUNA - Reptiles						
Broad-headed Snake *Hoplocephalus bungaroides*	PMST	E	V	Not known from within 10 km of the survey area. The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. It shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	None	No

F.2 Significant impact criteria in accordance with the TSC Act

Section 5A of the *Environment Planning and Assessment Act 1979* provides the criteria that must be considered in the assessment of the significance of potential impacts on all threatened species listed under the TSC Act. Assessment of Significance (known as the seven-part test) is made up of the following seven questions:

1. In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

2. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

3. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

    a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

    b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

4. In relation to the habitat of a threatened species, population or ecological community:

    a) the extent to which habitat is likely to be removed or modified as a result of the action proposed;

    b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

    c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

5. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

6. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan; and

7. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

Assessments of significance are undertaken in accordance with *Threatened species assessment guidelines: The assessment of significance* (DEC 2007).

F.2.1 Assessments of significance

Communities and species requiring additional assessment, as identified in Table F.2 and which are listed as threatened under the TSC Act, were assessed using the seven-part test. Seven-part tests have been prepared in accordance with the criteria presented in Section F.1. Assessments have been undertaken for guilds of species or communities which have similar habitat requirements. The results of tests have been tabulated for ease of reading and are presented in the following sections.

i Swamp Oak Floodplain Forest EEC

Swamp Oak Floodplain Forest is listed as an endangered ecological community under the TSC Act. The community is associated with grey-black clay loams and sandy loams where the groundwater is saline or sub-saline, on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains (NSWSC 2004).

Swamp Oak Swamp Forest, which is representative of Swamp Oak Floodplain Forest EEC in the survey area, is adjacent to the pit top area. Up to 0.35 ha of the community in this area will be disturbed by the proposed bushfire protection works.

An assessment of impact criteria has been completed to assess potential impacts of the proposed modification on this threatened ecological community (Table F.3).

Table F.3 Assessment of impact criteria for Swamp Oak Floodplain Forest EEC

Criteria	Discussion
1: Life cycle of threatened species	N/A
2: Life cycle of endangered population	N/A
3: EEC extent of removal and modification	The local extent of Swamp Oak Floodplain Forest covers approximately 7.65ha at MC. The occurrence starts in the APZs and extends north for approximately 300m along a drainage line. Large areas of this community also occur throughout the locality along creek lines and the edge of Chain Valley Bay. Approximately 0.35ha of Swamp Oak Floodplain Forest will be disturbed for the APZ. The disturbance will involve selective vegetation disturbance with important structural components of the community (ie large trees) being retained where possible. Construction of the APZs represents partial disturbance to only4.6% of this local occurrence, and therefore is unlikely to adversely affect the local occurrence.
4: Habitat removal, fragmentation, isolation and importance	Approximately 0.35 ha of Swamp Oak Floodplain Forest will be disturbed for APZ maintenance, representing disturbance to 4.6% of the local occurrence. The APZs will not fragment the local occurrence, as disturbance will occur on its southern edge, while the rest of the patch will remain. The patch to be disturbed is important as 95% of Swamp Oak Floodplain Forest has been cleared in the Hunter-Central Rivers CMA area; however it is in poorer condition than adjacent patches as it has been subject to a recent hot fire.
5: Critical habitat	Critical habitat has not been declared for Swamp Oak Floodplain Forest EEC.
6: Consistency with recovery or threat abatement plans	Swamp Oak Floodplain Forest EEC does not have a recovery plan. The management objectives for the community are to maximise the extent of occurrence and condition of the ecological community across NSW. As the modification will only disturb approximately 4.6% of the local occurrence, and large, higher quality patches of the community are known to occur in the surrounding area, the modification will not interfere with the community's recovery.

Table F.3 Assessment of impact criteria for Swamp Oak Floodplain Forest EEC

Criteria	Discussion
7: Key threatening processes	The key threatening process, '*high frequency fire resulting in disruption of life cycle processes in plants and animals and loss of vegetation structure and composition*' is operating in the Swamp Oak Swamp Forest, as a recent fire has simplified the understorey species in the community. The modification will not exacerbate this key threatening process as the works are being done to minimise bushfire risk. The impacts on key threatening processes '*clearing of native vegetation*' have also been considered for the modification. Under the final determination (NSWSC 2011), clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands. Given the small area to be disturbed and the selective nature of vegetation disturbance, the proposed modification will not result in this key threatening process.
Conclusion	The proposed modification will not have a significant impact on Swamp Oak Floodplain Forest EEC as: • a small part of the local occurrence will be disturbed; • an ecologist will complete a pre-disturbance survey to determine important components of the community for retention in the APZ; and • larger, high quality remnants of the community are present and protected in the surrounding area.

ii Woodland birds: Little Lorikeet (*Glossopsitta pusilla*), Scarlet Robin (*Petroica boodang*) and White-fronted Chat (*Epthianura albifrons*)

The **Little Lorikeet** is listed as a vulnerable species under the TSC Act. The species forages primarily in the canopy of open Eucalyptus forest and woodland, yet also finds food in Angophora, Melaleuca and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Nest hollows are located at heights of between 2 m and 15 m, mostly in living, smooth-barked eucalypts. Hollow openings are very small, approximately 3 cm in diameter (OEH 2015). It has high site fidelity with nesting areas, which are usually in proximity to feeding areas. However, nomadic movements, following food availability are common (OEH 2015).

The **Scarlet Robin** is listed as a vulnerable species under the TSC Act. It lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs and usually contains abundant logs and fallen timber as these are important components of its habitat. This species was recorded from the Vales Point Power Station Perimeter Lands (Ecotone Ecological Consultants 2010) and suitable foraging habitat is present in the survey area. However breeding habitat is not present as the Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range and eastern coastal regions; this species is occasionally found up to 1,000 m in altitude (OEH 2015).

The **White-fronted Chat** is listed as a vulnerable species under the TSC Act. In NSW, it mainly occurs in the southern half of the state in damp open habitats along the coast. Along the coast, it is predominantly found in saltmarsh vegetation but also in open grasslands and low shrubs bordering wetlands (OEH 2015). Therefore, the Swamp Oak Swamp Forest provides potential habitat for the species.

An assessment of impact criteria under Part 5a of the EP& A Act has been completed to assess potential impacts of the proposed modification to threatened woodland birds (Table F.4).

Table F.4 Seven part test for the threatened woodland birds

Criteria	Discussion
1: Life cycle of threatened species	Breeding habitat is absent from the survey area for the Little Lorikeet, Scarlet Robin and White-fronted Chat, therefore their life cycle will not be adversely impacted by the modification. However, the survey area represents potential foraging habitat for the species. Foraging habitat in these areas is not considered critical to the three species during their respective breeding seasons, and therefore their life cycle will not be impacted by the proposed modification.
2 : Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3: EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4: Habitat removal, fragmentation, isolation and importance	Foraging habitat is widely distributed within the survey area and surrounds. Up to 0.35 ha of Swamp Oak Swamp Forest representing potential foraging habitat for the White-fronted Chat and up to 0.05 ha of Smooth-barked Apple Red Bloodwood Woodland representing potential foraging habitat for the Little Lorikeet and Scarlet Robin will be disturbed for the bushfire protection works. The works will not fragment habitat for threatened woodland birds as they are highly mobile species and continuous vegetation in surrounding areas will be retained.
5: Critical habitat	Critical habitat has not been declared for any of these threatened woodland birds.
6: Consistency with recovery or threat abatement plans	No recovery plan, threat abatement plan or priority action statement exists for these threatened woodland birds. Identified recovery actions (OEH 2015) include the protection of roosting sites from damage or disturbance. Breeding habitat is absent for the three species, therefore the works do not interfere with their recovery.
7: Key threatening processes	The impacts on key threatening processes '*clearing of native vegetation*' have been considered for the modification. Under the final determination (NSWSC 2011), clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands. Given the small area of native vegetation to be disturbed and the selective nature of disturbance, the proposed modification will not result in this key threatening process.
Conclusion	The proposed bushfire protection works are not expected to result in significant impacts on threatened woodland birds as: • there will only be a minor reduction in available foraging habitat; • only a small amount of potential breeding habitat will be removed; and • foraging and breeding resources are abundant in the wider locality.

iii Microbats: Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*), Eastern Freetail Bat (*Mormopterus norfolkensis*) and Little Bentwing Bat (*Miniopterus australis*)

The **Eastern Bentwing Bat** is listed as a vulnerable species under the TSC Act. Habitat (non-breeding) is present for this species in eucalypt woodland and open grasslands (Churchill 2008). This species migrates to maternity roosts in limestone caves in October and gives birth from December to January. Females leave maternity sites in March to seek out cold caves for winter hibernation. Eastern Bentwing Bats roost in other caves and road culverts for the remainder of the year.

The **Eastern Freetail Bat** is listed as a vulnerable species under the TSC Act. The species occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures (OEH 2015).

The **Little Bentwing Bat** is listed as a vulnerable species under the TSC Act. It occurs in moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests and Banksia scrub. Generally found in well-timbered areas. The species roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats (OEH 2015).

Breeding habitat is absent for the three species from the survey area, however potential foraging habitat is available in the Smooth-barked Apple – Red Bloodwood Open Forest. Potential foraging habitat is also available in the Swamp Oak Swamp Forest for the Little Bentwing Bat.

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts of the proposed modification on threatened microbats (Table F.5).

Table F.5 Assessment of impact criteria for the threatened microbats

Criteria	Discussion
1: Life cycle of threatened species	Breeding habitat is absent from the survey area for the Eastern Bentwing Bat, Eastern Freetail Bat and Little Bentwing Bat, therefore their life cycle will not be adversely impacted by the proposed modification. The survey area represents potential foraging habitat for the species. Foraging habitat in these areas is not considered critical to the three species during their respective breeding seasons and, therefore, their life cycle will not be impacted by the proposed modification.
2: Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3: EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4: Habitat removal, fragmentation, isolation and importance	Foraging habitat is widely distributed within and surrounding the survey area. Up to 0.05 ha of Eastern Bentwing Bat and Eastern Freetail Bat potential foraging habitat and 0.35 ha of potential foraging habitat for the Little Bentwing Bat will be disturbed for the proposed bushfire protection works. The works will not fragment habitat for threatened microbats as they are a highly mobile species and continuous vegetation in surrounding areas will be retained.
5: Critical habitat	Critical habitat has not been declared for any of these threatened microbats.
6: Consistency with recovery or threat abatement plans	No recovery plan, threat abatement plan or priority action statement exists for these threatened microbats. Identified recovery actions (OEH 2015b) include the protection of roosting sites from damage or disturbance. As breeding habitat is absent from the area and will not be disturbed, the modification will not interfere with these species recovery.
7: Key threatening processes	The impacts on key threatening processes 'clearing of native vegetation' have also been considered for the modification. Under the final determination (NSWSC 2011), clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands. Given the small area of native vegetation to be disturbed and the selective nature of disturbance, the proposed modification will not result in this key threatening process.
Conclusion	The proposed bushfire protection works are not expected to result in significant impacts on threatened microbats as: • there will be no disturbance of breeding habitat; • there will only be a minor reduction in available foraging habitat; and • foraging resources are abundant in the wider locality.

iv Grey-headed Flying Fox (*Pteropus poliocephalus*)

The **Grey-headed Flying Fox** is listed as a vulnerable species under the TSC Act. This species is known to inhabit rainforest, forest and woodlands, heaths and swamps, as well as urban gardens where there is an abundance of nectar and pollen (OEH 2015). The survey area provides potential foraging habitat in the canopy of scattered flowering eucalypt and melaleuca trees and the species has been recorded in the surrounding area (EMM unpublished data 2014). Breeding and roosting habitat is absent from the survey area.

An assessment of impact criteria under Section 5a of the EP&A Act has been completed to assess the potential impacts of the proposed modification on the Grey-headed Flying Fox (Table F.6).

Table F.6 Assessment of impact criteria for the Grey-headed Flying Fox

Criteria	Discussion
1. Life cycle of threatened species	Breeding and roosting habitat is absent from the survey area for this species, therefore its life cycle is unlikely to be affected. Additionally, the area to be disturbed does not contain winter flowering eucalypt species that are an important resource for these species when food is in short supply.
2. Life cycle of endangered population	This question refers to endangered populations, therefore is not relevant to this assessment.
3. EEC extent and modification	This question refers to TECs, therefore is not relevant to this assessment.
4. Habitat removal, fragmentation, isolation and importance	Breeding or roosting habitat for the Grey-headed Flying Fox is absent from the survey area. Up to 0.05 ha of potential foraging habitat will be disturbed by the proposed bushfire protection works. The works will not fragment habitat for the Grey-headed Flying-fox as they are a highly mobile species and continuous vegetation in surrounding areas will be retained.
5. Critical habitat	Critical habitat has not been listed for this threatened species.
6. Consistency with recovery or threat abatement plans	Action statements for this species aim to ensure the species is secure in the wild in NSW and that its geographic range in NSW is extended or maintained. Objectives for recovery of this species include reducing the impact of threatening process and stopping its decline within its range and conserving the functional role of the species in seed dispersal and pollination. The proposed bushfire protection works will not interfere with these objectives as only a small patch of potential foraging habitat will be disturbed.
7. Key threatening processes	The impacts on key threatening processes 'clearing of native vegetation' have also been considered for the modification. Under the final determination (NSWSC 2011), clearing is defined as the destruction of a sufficient proportion of one or more strata (layers) within a stand or stands of native vegetation so as to result in the loss, or long term modification, of the structure, composition and ecological function of stand or stands. Given the small area of native vegetation to be disturbed and the selective nature of disturbance, the proposed modification will not result in this key threatening process.
Conclusions	Vegetation disturbance for proposed bushfire protection works will not have a significant impact on the Grey-headed Flying Fox as: • there will only be a minor reduction in available foraging habitat; • foraging resources are abundant in the wider locality; and • no breeding or roosting habitat will be removed.

F.3 Significant impact criteria in accordance with the EPBC Act

The following sections provide the criteria that must be considered in the assessment of all threatened species listed under the EPBC Act. There are separate criteria for each listing category under the EPBC Act, in accordance with *'EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance'* (DEH 2006).

F.3.1 Significant impact criteria for vulnerable species

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species;
- reduce the area of occupancy of an important population;
- fragment an existing important population into two or more populations;
- adversely affect habitat critical to the survival of a species;
- disrupt the breeding cycle of an important population;
- modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline;
- result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species habitat;
- introduce disease that may cause the species to decline; or
- interfere substantially with the recovery of the species.

F.3.2 Assessments of impact criteria

Assessments of impact criteria have been prepared for species listed under the EPBC Act, in accordance with the criteria above.

i Vulnerable mammals: Grey-headed Flying Fox (*Pteropus poliocephalus*)

See Section F.2.1(iv) for a description of the Grey-headed Flying Fox. An assessment of significance has been completed to assess potential impacts of the proposed modification on this threatened species (Table F.7).

Table F.7 Assessment of significance for the Grey-headed Flying Fox

Criteria	Discussion
1: Long-term decrease of an important population	The survey area does not contain an important population of the Grey-headed Flying Fox.
2: Reduce area of occupancy of an important population	The survey area does not contain an important population of the Grey-headed Flying Fox.
3: Fragment an existing population	The survey area does not contain an important population of the Grey-headed Flying Fox.
4: Adversely affect critical habitat	The survey area is not considered critical habitat to the Grey-headed Flying Fox as it is a highly mobile species and these areas form only a small portion of their home range. The survey area does not contain maternity camps for breeding.
5: Disrupt the breeding cycle of an important population	The survey area does not provide breeding habitat for an important population of this species.
6: Decrease availability or quality of habitat	The proposed bushfire protection works may cause a minor reduction in available foraging habitat for the species in the locality. However, as vegetation disturbance will only be minor when considering the amount of habitat in the locality, this is not expected to decrease the availability or quality of habitat such that the species would decline.
7: Result in invasive species	The proposed bushfire protection works are not expected to increase the threat of invasive species to the Grey-headed Flying Fox. Weed control will be completed prior to vegetation disturbance for the APZs to minimise the risk of weed invasion.
8: Introduce disease	Grey-headed Flying Fox is known to be susceptible to the Australian Bat Lyssavirus (ABL), however only a small proportion of flying foxes actually carry the disease. The proposed modification will not remove any breeding habitat for this species and will only cause minor disturbance to potential foraging habitat. As a result, the proposed modification is not expected to increase the likelihood, introduction, or spread of this disease.
9: Interfere with the recovery of the species	Recovery actions for the Grey-headed Flying Fox include reducing the impact of threatening process on this species and stopping its decline throughout the species' range, conserving the functional roles of the species in seed dispersal and pollination, improving the standard of information available in order to increase community knowledge of the species and reducing the impact of negative public attitude on the species. The proposed modification does not interfere with these activities and are not expected to interfere with the recovery of the Grey-headed Flying Fox as only a small patch of potential foraging habitat is being removed.
Conclusion	The proposed modification is not expected to result in significant impacts on the Grey-headed Flying Fox as: • only a small area of potential foraging habitat will be removed; • breeding habitat will be not be removed; and • they are a highly mobile species with alternative foraging resources nearby.

F.4 References

Churchill S 2008, *Australian Bats: second edition,* Reed New Holland Publishers, Crows Nest.

Department of Environment and Conservation (DEC) 2007, *Threatened species assessment guidelines: The assessment of significance,* Department of Environment and Conservation NSW, Hurstville.

Ecotone Ecological Consultants 2010, *Flora and Fauna Investigations Vales Point Power Station Perimeter Lands Biodiversity Update,* report to Aurecon Australia and Delta Electricity.

New South Wales Scientific Committee (NSWSC) 2004, *Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions – endangered ecological community listing,* www.environment.nsw.gov.au/determinations/SwampOakFloodplainEndSpListing.htm, viewed 14 April 2015.

New South Wales Scientific Committee (NSWSC) 2011, *Clearing of native vegetation – key threatening process listing,* www.environment.nsw.gov.au/determinations/ClearingNativeVegKTPListing.htm, viewed 14 April 2015.

Office of Environment and Heritage (OEH) 2015, *Threatened Species Profile Search,* www.environment.nsw.gov.au/threatenedSpeciesApp/, viewed 14 April 2015.

Appendix G

AHIMS search results

Appendix G— AHIMS search results

G

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-7-0131	Summerland Point;	AGD	56	366820	6332970	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	Helen Brayshaw					**Permits**		
45-7-0138	Bonny Boy Gully;	AGD	56	366820	6332970	Open site	Valid	Shell : -, Artefact : -	Midden	1846
	Contact	**Recorders**	Helen Brayshaw					**Permits**		
45-7-0144	Windemere Ck 1;	AGD	56	363000	6334600	Open site	Valid	Shell : -, Artefact : -	Midden	2237,102219
	Contact	**Recorders**	Anne Lloyd					**Permits**		
45-7-0151	M4;Balcolyn Street;	AGD	56	364620	6337170	Open site	Valid	Shell : -, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0154	M7 Fishery Point	AGD	56	366050	6334500	Open site	Valid	Shell : 2, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin,Umwelt (Australia) Pty Limited					**Permits**	597	
45-7-0157	M10 Casuarina Point Reserve	AGD	56	366300	6334990	Open site	Valid	Shell : -, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**	597	
45-7-0158	M11;Lakeview Road, Bardens Bay;	AGD	56	363500	6334110	Open site	Valid	Shell : -, Artefact : -	Midden	2685,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**	598	
45-7-0159	M12;Bulgonia Road, Bardens Bay;	AGD	56	363950	6334850	Open site	Valid	Shell : -, Artefact : -	Midden	2685,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**	611	
45-7-0161	M1;Hungary Point public reserve;	AGD	56	361610	6336400	Open site	Valid	Shell : -, Artefact : -	Midden	2685,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0162	M2;Hungary Point Public Reserve;	AGD	56	361700	6336350	Open site	Valid	Shell : -, Artefact : -	Midden	2685,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0163	M3;Crusader Camp, Yarrawonga Point;	AGD	56	363900	6336850	Open site	Valid	Shell : -, Artefact : -	Midden	2685,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0164	M6;Silverwater;	AGD	56	366050	6336100	Open site	Valid	Shell : -, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0166	M8;Dandaraga Road, Sugar Bay;	AGD	56	365300	6334500	Open site	Valid	Shell : -, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0167	M9;Camp Brightwaters;	AGD	56	363500	6334880	Open site	Valid	Shell : -, Artefact : -	Midden	2685,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0171	M13;Balcolyn;	AGD	56	364620	6337170	Open site	Valid	Shell : -, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0172	M5;Beach Road, Boat Harbour;	AGD	56	365500	6336580	Open site	Valid	Shell : -, Artefact : -	Midden	2685
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0173	BB1;Fullers Creek, Bonnells Bay;	AGD	56	360800	6336100	Open site	Valid	Shell : -, Artefact : -	Midden	2693,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-7-0174	BB2;Freshwater Creek, Bonnells Bay;	AGD	56	361100	6335990	Open site	Valid	Artefact : -	Isolated Find	2693,102219
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists,Kerry Navin					**Permits**		
45-7-0176	Gwandalan;	AGD	56	367200	6333300	Open site	Valid	Shell : -, Artefact : -	Midden	2465,102129
	Contact	**Recorders**	Tom Griffiths					**Permits**		
45-7-0177	Camp Kanangra;	AGD	56	369500	6331500	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	Mr.David Lambert,Mr.Gavin Newton					**Permits**		
45-7-0178	Hembula Creek - Scarred Tree 1&2;HC-ST 1&2;	AGD	56	366800	6330400	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	**Recorders**	Mr.Gavin Newton					**Permits**		
45-7-0179	Black Neds Point;	AGD	56	365150	6331450	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0181	Chain Valley Bay 1	AGD	56	366150	6329600	Open site	Valid	Shell : -, Artefact : -	Midden	101093
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0182	Chain Valley Bay 2;	AGD	56	366120	6330950	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0183	Diamond Drill Pt. North;	AGD	56	368050	6333200	Open site	Valid	Artefact : -, Shell : -	Midden	102129
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0184	Gwandalan;	AGD	56	368500	6331800	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0186	Pt Wolstonecraft 1;	AGD	56	368350	6334200	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0187	Pt Wolstonecraft 2;	AGD	56	367490	6336250	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0189	Sandy Beach 1;	AGD	56	364950	6331450	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0191	Publah Island 3;	AGD	56	368250	6337850	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0201	Nord 1 (N1)	AGD	56	369600	6332600	Open site	Valid	Shell : -, Artefact : -	Midden	3022
	Contact	**Recorders**	Iain Stuart					**Permits**	698	
45-7-0207	The Hole 1 (TH1)	AGD	56	361820	6329800	Open site	Valid	Artefact : -	Open Camp Site	3697,101093
	Contact	**Recorders**	Kerry Navin,Mr.Kelvin Officer,P Saunders					**Permits**		
45-7-0208	Pipers Point;	AGD	56	363200	6338550	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0213	Wangi Wangi Point;	AGD	56	368450	6338750	Open site	Valid	Shell : -, Artefact : -	Midden	

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0214	Sunshine Park;	AGD	56	365900	6335650	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
14-7-0149	Gwandalan	AGD	56	368000	6333300	Open site	Valid	Shell : -, Artefact : -	Midden	102129
	Contact	**Recorders**	Tom Griffiths					**Permits**		
45-7-0233	Sunshine 2	AGD	56	365924	6335524	Open site	Valid	Shell : -		
	Contact Koompahtoo LALC	**Recorders**	Umwelt (Australia) Pty Limited					**Permits**		
45-7-0234	Sinshine Park , Sunshine	AGD	56	365895	6335284	Open site	Valid	Potential Archaeological Deposit (PAD) : 3		
	Contact	**Recorders**	Umwelt (Australia) Pty Limited					**Permits**		
45-7-0235	Winding creek 1	AGD	56	365997	6336449	Open site	Valid	Artefact : 2		
	Contact	**Recorders**						**Permits**		
45-3-3435	RPS HSO MwP1	AGD	56	359424	6334225	Open site	Valid	Shell : -, Potential Archaeological Deposit (PAD) : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd-Blacktown					**Permits**		
45-7-0290	Gwandalan 1	AGD	56	368088	6329979	Open site	Valid	Shell : -		
	Contact	**Recorders**	Doctor.Tim Owen,ERM Australia Pty Ltd-Pyrmont					**Permits**		
45-7-0285	RPS PW 1	GDA	56	367769	6335969	Open site	Valid	Potential Archaeological Deposit (PAD) : -, Shell : -, Stone Arrangement : -, Modified Tree (Carved or Scarred) : -, Aboriginal Ceremony and Dreaming : -		
	Contact Awabakal LALC	**Recorders**	RPS Australia East Pty Ltd -Hamilton					**Permits**		
45-7-0287	RPS MP 1	GDA	56	364930	6336689	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact Awabakal LALC	**Recorders**	RPS Australia East Pty Ltd -Hamilton					**Permits**		
45-7-0316	RPS Wyee Point 2	GDA	56	362237	6331450	Open site	Valid	Shell : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Ms.Laraine Nelson					**Permits**		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-7-0317	RPS MP1	AGD	56	364930	6336689	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Ms.Laraine Nelson					**Permits**		
45-7-0292	RPS MP2	GDA	56	366342	6336208	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Ms.Laraine Nelson					**Permits**		
45-7-0293	RPS MP3	GDA	56	365058	6335017	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Ms.Laraine Nelson					**Permits**		
45-7-0190	Wyee Point	AGD	56	362398	6331810	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	L.M Nelson,RPS Australia East Pty Ltd -Hamilton,Ms.Laraine Nelson					**Permits**		
45-7-0291	RPS HSO M1	GDA	56	361555	6331952	Open site	Valid	Shell : -		
	Contact Koompahtoo LALC	**Recorders**	RPS Australia East Pty Ltd -Hamilton,Ms.Laraine Nelson					**Permits**		
45-7-0226	K 4 Koompahtoo	AGD	56	360390	6334990	Open site	Valid	Artefact : -	Isolated Find	99218,102219
	Contact	**Recorders**	William Smith					**Permits**		
45-3-3165	K 1 Koompahtoo	AGD	56	359490	6332490	Open site	Valid	Artefact : -	Open Camp Site	99218,102219
	Contact	**Recorders**	William Smith					**Permits**		
45-7-0225	K 3 Koompahtoo	AGD	56	360650	6334900	Open site	Valid	Artefact : -	Isolated Find	99218,102219
	Contact	**Recorders**	William Smith					**Permits**		
45-6-2516	Pipers Point Rocky Point;	AGD	56	363450	6339000	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	Bonhomme Craib & Associates					**Permits**		
45-7-0079	Crangan Bay;Stranger Gully;	AGD	56	368450	6330750	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	ASRSYS					**Permits**		
45-7-0086	Pulbar Island	AGD	56	368947	6336560	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	Glen Morris					**Permits**		
45-7-0087	Pulbar Island	AGD	56	368661	6337195	Open site	Valid	Artefact : -, Shell : -	Midden,Open Camp Site	
	Contact	**Recorders**	Unknown Author					**Permits**		
45-7-0089	Bonnells Bay;	AGD	56	361832	6335693	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	ASRSYS					**Permits**		
45-7-0090	Dora Creek;	AGD	56	362950	6338410	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	ASRSYS					**Permits**		
45-7-0001	Morisset Hospital	AGD	56	361550	6332450	Open site	Valid	Shell : -, Artefact : -	Midden	1263,102219
	Contact	**Recorders**	L.M Nelson,A.J Barrett					**Permits**		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-7-0002	Goat Island;Dora Creek;	AGD	56	361438	6337149	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	Richard Wright					**Permits**		
45-7-0003	Vales Point;Lake Macquarie;	AGD	56	363738	6331615	Open site	Valid	Shell : -, Artefact : -	Midden	102219
	Contact	**Recorders**	Wyong Shire Council					**Permits**	730	
45-3-1553	Wyee Bay;Ruttleys Road;	AGD	56	362540	6330400	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	Val Attenbrow,Glen Morris					**Permits**		
45-7-0262	SJOG 7	GDA	56	364036	6333848	Open site	Valid	Grinding Groove : 6		
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
45-7-0263	SJOG 6	GDA	56	364026	6333875	Open site	Valid	Shell : -		
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
45-7-0242	Bonnells Bay PAD	AGD	56	362150	6335830	Open site	Not a Site	Potential Archaeological Deposit (PAD) : -		102219
	Contact S Scanlon	**Recorders**	Insite Heritage Pty Ltd					**Permits**	2234,2389	
45-7-0236	Fig Tree Point 1	AGD	56	365421	6337201	Open site	Valid	Shell : -		
	Contact	**Recorders**	Umwelt (Australia) Pty Limited					**Permits**		
45-7-0237	Jonny's Point 2	AGD	56	365997	6336449	Open site	Valid	Shell : -		
	Contact	**Recorders**	Umwelt (Australia) Pty Limited					**Permits**		
45-7-0238	Jonny's Point 1	AGD	56	365992	6336253	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Umwelt (Australia) Pty Limited					**Permits**		
45-7-0239	MP 1	AGD	56	362100	6334400	Open site	Valid	Potential Archaeological Deposit (PAD) : -		102219
	Contact T Russell	**Recorders**	Mrs.Angela Besant					**Permits**	2115	
45-7-0240	Dora Creek (Stingaree Road)	AGD	56	360613	6337218	Open site	Valid	Artefact : 3, Shell : -		102219
	Contact Searle	**Recorders**	Mrs.Angela Besant					**Permits**	2215	
45-7-0243	WWSS3-2	AGD	56	360438	6337770	Open site	Valid	Potential Archaeological Deposit (PAD) : -		100134,102219
	Contact S Scanlon	**Recorders**	AECOM Australia Pty Ltd (previously HLA-Envirosciences)					**Permits**	2273	
45-7-0253	Gwandalan 2	GDA	56	367386	6331169	Open site	Valid	Shell : -		
	Contact	**Recorders**	Doctor.Tim Owen					**Permits**		
45-7-0254	gwanddalan 1	GDA	56	368088	6329979	Open site	Valid	Shell : -		
	Contact	**Recorders**	Doctor.Tim Owen					**Permits**		
45-3-3166	K 2 Koompahtoo	AGD	56	359840	6332530	Open site	Valid	Artefact : -	Isolated Find	99218,102219
	Contact	**Recorders**	William Smith					**Permits**		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-7-0264	Lake Macquarie State Conservation Area-Point Wolstoncroft	GDA	56	367788	6335542	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Darkinjung LALC					**Permits**		
45-7-0255	Trinity Point GG2 (Catherine Hill Bay)	GDA	56	363618	6333664	Open site	Valid	Grinding Groove : -		102219
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
45-7-0256	Trinity Point Scarred Tree 2 (Catherine Hill Bay)	GDA	56	363749	6333815	Open site	Valid	Modified Tree (Carved or Scarred) : -		102219
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
45-7-0257	Trinity Point Ochre (Catherine Hill Bay)	GDA	56	363958	6333791	Open site	Valid	Ochre Quarry : -		102219
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
45-7-0258	Trinity Point IF1 (Catherine Hill Bay)	GDA	56	363730	6333744	Open site	Valid	Artefact : -		102219
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**		
45-7-0338	RPS GWANDALAN IF1	GDA	56	368263	6331126	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	RPS					**Permits**		
45-7-0320	RPS Mannering 1	GDA	56	363449	6331411	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Ms.Laraine Nelson					**Permits**		
45-7-0321	RPS Mannering 2	GDA	56	363401	6331331	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Ms.Laraine Nelson					**Permits**		
45-7-0339	CV 001	GDA	56	364943	6329478	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mrs.Rebecca Newell,EMGA Mitchell McLennan					**Permits**		
45-3-0334	Tiembula Creek Midden;Tiembula Creek;	AGD	56	366730	6330420	Open site	Valid	Shell : -, Artefact : -	Midden	1076
	Contact	**Recorders**	Mary Dallas Consulting Archaeologists					**Permits**		
45-3-1140	Morisset;	AGD	56	359290	6335970	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	116,102219
	Contact	**Recorders**	Helen Brayshaw					**Permits**		
45-7-0227	St Johns 1	AGD	56	363680	6333520	Open site	Valid	Artefact : -		100896,102219
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**	1947	
45-7-0228	St Johns 2	AGD	56	363720	6333820	Open site	Valid	Artefact : -		100896,101024,102219
	Contact	**Recorders**	Mrs.Angela Besant					**Permits**	1947	
45-7-0230	K3 KOOMPAHTOO	AGD	56	360650	6334900	Open site	Valid	Artefact : -		102219
	Contact	**Recorders**	Stephen Griffen					**Permits**		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
45-7-0080	Mannering Park;	AGD	56	364780	6328890	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	101093
	Contact	**Recorders**	ASRSYS					**Permits**		
45-7-0088	Pulbah Island 2	AGD	56	368445	6337000	Open site	Partially Destroyed	Aboriginal Ceremony and Dreaming : -	Aboriginal Place,Natural Mythological (Ritual)	
	Contact	**Recorders**	Kate Sullivan					**Permits**	1615	
45-7-0219	Pulbah Island 4	AGD	56	368500	6337000	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	Unknown Author					**Permits**		
45-7-0188	Pulbah Island 3	AGD	56	368250	6337850	Open site	Valid	Shell : -, Artefact : -	Midden	
	Contact	**Recorders**	L.M Nelson					**Permits**		
45-7-0244	St Johns 3	AGD	56	363560	6333600	Open site	Valid	Artefact : 1		100896,102219,102504
	Contact T Russell	**Recorders**	Mrs.Angela Besant					**Permits**	2845,2846	
45-7-0268	CV-04-09	GDA	56	368381	6331136	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0269	CV-06-09	GDA	56	368061	6328867	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0270	CV-07-09	GDA	56	367043	6331305	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0271	CV-08-09	GDA	56	366587	6330975	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0272	CV-09-09	GDA	56	366650	6330868	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0273	CV-10-09	GDA	56	366875	6330868	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0274	CV-12-09	GDA	56	367290	6330372	Open site	Valid	Artefact : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0275	CV-14-09	GDA	56	367468	6330191	Open site	Valid	Shell : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0276	CV-15-09	GDA	56	366304	6329303	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	**Recorders**	Mr.Geordie Oakes					**Permits**		
45-7-0277	CV-16-09	GDA	56	366335	6329635	Open site	Valid	Shell : 1		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref Number : J14053

Client Service ID : 132174

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status	SiteFeatures	SiteTypes	Reports
	Contact	Recorders	Mr.Geordie Oakes					Permits		
45-7-0278	CV-17-09	GDA	56	366273	6329369	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	Contact	Recorders	Mr.Geordie Oakes					Permits		
45-7-0279	CV-18-10	GDA	56	367003	6333279	Open site	Valid	Shell : 1		
	Contact	Recorders	Mr.Geordie Oakes					Permits		
45-7-0280	CV-19-10	GDA	56	366988	6333151	Open site	Valid	Shell : 1		
	Contact	Recorders	Mr.Geordie Oakes					Permits		
45-7-0281	CV-20-10	GDA	56	365588	6331434	Open site	Valid	Shell : 1		
	Contact	Recorders	Mr.Geordie Oakes					Permits		
45-7-0282	CV-21-10	GDA	56	366221	6331192	Open site	Valid	Shell : -		
	Contact	Recorders	Mr.Geordie Oakes					Permits		
45-7-0340	Nords Wharf 1	GDA	56	369821	6331865	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Aaron Fogel					Permits		
45-7-0341	Nords Wharf 2	GDA	56	369858	6331788	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Aaron Fogel					Permits		
45-7-0342	Nords Wharf 3	GDA	56	369788	6331822	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Aaron Fogel					Permits		
45-7-0343	Nords Wharf 4	GDA	56	369861	6331731	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr.Aaron Fogel					Permits		

Report generated by AHIMS Web Service on 17/04/2014 for Rebecca Newell for the following area at Datum :GDA, Zone : 56, Eastings : 359462 - 369462, Northings : 6328206 - 6338206 with a Buffer of 1000 meters. Additional Info : due diligence assessment. Number of Aboriginal sites and Aboriginal objects found is 112

Appendix H

RAP correspondence

Appendix H — RAP correspondence

H

Ground Floor, Suite 01, 20 Chandos Street
St Leonards, NSW, 2065
PO Box 21
St Leonards, NSW, 1590

T +61 2 9493 9500
F +61 2 9493 9599
E info@emgamm.com

www.emgamm.com

14 April 2015

<<RAP ADDRESS>>

Re: Mannering Colliery Modification 3 - Aboriginal heritage consultation

Dear <<RAP CONTACT>>,

LakeCoal has engaged EMGA Mitchell McLennan Pty Limited (EMM) to prepare an Environmental Assessment (EA) to accompany an application to modify the Mannering Colliery (MC) major project approval (MP06_0311).

The proposed modification to MP06_0311 seeks:

- an increase in the rate of run-of-mine (ROM) coal handling at, and transport from, MC from 1.1 million tonnes per annum (mtpa) to a maximum of 1.3 mtpa;
- an extension of the project approval period from 31 March 2018 to 31 December 2021; and
- minor vegetation clearing around the MC pit top infrastructure to enable the establishment of an asset protection zone (APZ).

As part of the EA a draft Aboriginal cultural heritage assessment (ACHA) has been prepared in accordance with NSW Office of Environment and Heritage (OEH) guidelines, including the *Aboriginal Cultural Heritage: Standards & Guidelines Kit* (NPWS 1997), and the *Draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation* (DEC 2005). A copy of the draft ACHA is attached for your consideration. Please note - the ACHA forms a chapter of the EA. Accordingly, the introductory chapter and the draft ACHA chapter of the EA are both included.

As you are a previously registered Aboriginal stakeholder, we seek your views on the proposed modification, including your views on the cultural values of this area and the proposed management recommendations of the draft ACHA. Written comments should be sent to the address on the letterhead above, or by email to rnewell@emgamm.com before 1 May 2015.We look forward to receiving your feedback and continuing to consult with you regarding Aboriginal heritage aspects of the proposed modification.

Please do not hesitate to contact me on 9493 9500 if there are any queries in this matter.

Yours sincerely

Rebecca Newell
Archaeologist
rnewell@emgamm.com

Wonn1
Entity of Kauwul Pty Ltd

619 Main Road Glendale, 2285

PHONE: 0249547751 Mobile: 0402146193

ABN: 27 153 953 363

1 June 2015

Ms R Newell
Archaeologist
EMGA Mitchell McLennan
PO Box 21
ST. LEONARDS NSW 1590
Email: rnewell@emgamm.com

Dear Rebecca

RE: MANNERING COLLIERY MODIFICATION 3 – ABORIGINAL HERITAGE CONSULTATION

Thank you for your letter dated 14 April 2015 requesting comments on the proposed modification 3 and the draft (brief) ACHA for the Review of Environmental Effects submission.

In section 1.4 (The proposed modification) – bullet point 3 identifies the "minor vegetation clearing around the MC pit top infrastructure to enable the establishment of asset protection zone (APZ)." There is no indication in the draft ACHA to the extent of this 'minor vegetation clearing' – should the area extend beyond the 'yellow and black' lines drawn on the map in Figure 1 – a representative of the Aboriginal stakeholders must be present during ground surface disturbance including the removal of tree vegetation.

It has been four years since the last study has been undertaken within the Mannering Colliery precinct with numerous storm events and because of the high significance of the Lake Macquarie region generally, any future ground disturbance could uncover subsurface cultural heritage objects and material that had not previously been found. Just undertaking an "extensive search of the AHIMS register" does not mean that sites are not present.

We that you for the opportunity to participate in the consultation process and fieldwork on this project and look forward to working with you again in the future.

Kind regards

Suzie Worth for
Arthur C Fletcher
Wonn1 (Kauwul Pty Ltd)

EMM
EMGA Mitchell McLennan

www.emgamm.com

SYDNEY
Ground Floor, Suite 1, 20 Chandos Street
St Leonards NSW 2065
T 02 9493 9500 F 02 9493 9599

NEWCASTLE
Level 5, 21 Bolton Street
Newcastle NSW 2300
T 02 4927 0506 F 02 4926 1312

BRISBANE
Suite 1, Level 4, 87 Wickham Terrace
Spring Hill Queensland 4000
T 07 3839 1800 F 07 3839 1866

Lake Coal