

MOUNT PLEASANT PROJECT MODIFICATION

Environmental Assessment Report

Prepared for Coal & Allied Operations Pty Limited | October 2010

Volume 2

Supporting Appendices



**COAL
&
ALLIED**

Managed by Rio Tinto Coal Australia



Volume 2 | Appendices

Appendix A - Development consent 92/97

Appendix B - Noise and vibration study

Appendix C - Ecology study



Appendix A

Development consent 92/97

ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979 (UNAMENDED)

**DETERMINATION OF DEVELOPMENT APPLICATION
PURSUANT TO SECTION 91**

I, the Minister for Urban Affairs and Planning, pursuant to Section 101 of the unamended Environmental Planning and Assessment Act, 1979 (“the Act”), determine the development application (“the application”) referred to in Schedule 1 by granting consent to the application subject to the conditions set out in Schedule 2.

The reasons for the imposition of the conditions are to:

- (i) minimise the adverse impact the development may cause through water and air pollution, noise and visual disturbance;
- (ii) provide for environmental monitoring and reporting; and
- (iii) set requirements for infrastructure provision.

Signed

Andrew Refshauge
Minister for Urban Affairs and Planning

Sydney, 22 December 1999 File No. N95/00147

Schedule 1

Application made by: Coal and Allied Operations Pty Ltd (ACN 075 612 216)
 (“the Applicant”).

To: Muswellbrook Shire Council (DA 92/97)

In respect of: Land described in Appendix “1”.

For the following: Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities (“the Development”).

NOTE:

- 1) To ascertain the date upon which the consent becomes effective, refer to section 101(9) of the Act.
- 2) To ascertain the date upon which the consent is liable to lapse, refer to section 99 of the Act.

APPENDIX 1

SCHEDULE OF LAND

Portion 13 DP 750926; Part Portion 12 DP 750926; Portions 73 and 74 DP 750926; Portion 28, 45 DP 750926 Lot 1 DP 313392; Portion 21, 268 and 36 DP 750926 Lots A and B DP 432713; Portions 41 and 72 Lot 1 and 2 DP 915913; Part Lot 19 DP 750926; Portion 42 DP 750926; Portions 15, 16, 26, 43, 71, 177 and Part 35 DP 750926; Lots 14 and 15 DP 2770 Portion 182 and 226; Lots 238, 239, 240 DP 750926; Lot 237 DP 750926; Lot 236 DP 750926; Portions 92, 184, 241 DP 750926; Portion 44, Part Portion 242 DP 750926; Permissive Occupancy 1961/18; Portions 38/39 DP 750926; Part Portions 93 and Lot A DP 174071, Lots 19 and 20 DP 112742; 196, 195, 190, 188, 224, 215, 220, 212, 213, 214, 216, 219, 217, 221, 151, 127, 128, 150, 149, 126, 122, 123, 124, 125 and Part 2 DP 750926 and Closed Roads DP 750926; Portions 147, 211 DP 750926; Portion 146 DP 750926; Portion 181 DP 750926; Portion 251 DP 750926; Lot 1 DP 634490; Lot 2 DP 634490; Lots 90, 91, 261, 262, 253, 254, 256, 257, 273 DP 750926; Lot 1 DP 791576; Lot 2 DP 791576; Lot 3 DP 791576; Lot 132 DP 558246; Part Lot 3 DP 750926; Portions 258, 260, 271 DP 750926; Portion 259 DP 750926; Portions 135, 199 and Part Portion 144 DP 750926, Lot B DP 174011, Lots 17 and 18 DP 112742; Lot 4 DP 801249 and Portions 143 and Part Portions 144 and 145 DP 760926; Portions 269 and 270 DP 750926; Portions 274, 275, 276, 278 and 279 DP 750926; Part Portion 3 DP 750926; Lot 16 DP 255048; Lot 21 DP 554140; Lot 22 DP 554140; Lot 1 DP 544039 Lot 2 DP 629491; Lot 25 Rosebrook Estate; Part Portion 3 DP 750926; Lot 27 DP 745895; Lot 3 DP 629491; Lot 1 DP 213293; Lot 29 DP 731706; Part Portion 3 DP 750926; Lot 1 DP 629491; Crown Reserve 156; Portions 6, 263, 264, 265 DP 750926; Lot 5 DP 801249; Lot 3 DP 801249; Lot 2 DP 801249; Lot 7 DP 821183; Part Portion of Lot 1/3 DP 998477; Part Portion of Lot 8 DP 236668; Part Portion of Lot 7 DP 236668; Part Portion 27; Portion 282 DP 750926; Lot 261 DP 561919; Vol 2802 Fol.28 (Part Portion 35); Lot 7 DP 749716; Lot 6 DP 749716; Lot 50 DP 809718; Lot 51 DP 809718; Lots 1 and 2 DP 706645; Part Portion of Lot 97 DP 750919; Closed and Public Roads within the Development Application Area.

SCHEDULE 2

MOUNT PLEASANT COAL MINE

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DEFINITIONS

AEMR - *Annual Environmental Management Report*

CCC - *Community Consultative Committee*

CPP - *Coal Preparation Plant*

DA - *Development Application*

DA area - *Development Application area which includes the Mine site and rail loop and coal loader, as shown on Figure 66 of Volume 2 of the EIS*

Director-General - *Director-General of the Department of Urban Affairs and Planning*

EIS - *Environmental Impact Statement*

EMR - *Environmental Management Representative*

LALC - *Local Aboriginal Land Council*

Minister - *Minister for Urban Affairs and Planning*

MOP - *Mining Operations Plan*

PM₁₀ - *Fine particles of less than 10 microns*

TSP - *Total Suspended Particulates*

WTC - *Wonnarua Tribal Council*

Government Authorities

Council - *Muswellbrook Shire Council*

DLWC - *Department of Land and Water Conservation*

DMR - *Department of Mineral Resources*

DUAP - *Department of Urban Affairs and Planning*

EPA - *Environment Protection Authority*

NPWS - *National Parks and Wildlife Service*

NSW Agriculture - *New South Wales Agriculture*

RAC - *Rail Access Corporation*

RTA - *Roads and Traffic Authority*

1. GENERAL

1.1 Adherence to terms of EIS, DA, , etc.

The Applicant shall carry out the development of the Mount Pleasant open cut coal mine generally in accordance with the Environmental Impact Statement (EIS) prepared by ERM Mitchell McCotter and certified by Robert McCotter on 5 September 1997, the Applicant's Primary Submission and Submission in Reply to the Commission of Inquiry, and any other relevant documentation submitted by the Applicant for the purposes of the determination of this DA, as may be modified by the conditions set out herein.

1.2 Period of Approval

1. Consent shall operate for a period of 21 years from the date of the granting of the development consent.
2. The date of commencement of construction works, mining and commencement of coal processing operations are to be notified to the Director-General and Muswellbrook Shire Council, at least four weeks prior to commencement of construction works, mining and coal processing operations respectively.
3. If at any time the Director-General is aware of environmental impacts from the proposal that pose serious environmental concerns due to the failure of existing environmental management measures to ameliorate the impacts, the Director-General may order the Applicant to cease the activities causing those impacts until those concerns have been addressed to the satisfaction of the Director-General.

1.3 Dispute Resolution

In the event that the Applicant and the Council, or a Government agency, other than the Department of Urban Affairs and Planning, cannot agree on the specifications or requirements applicable under this consent, other than for Condition 11.2 (relating to section 94 contributions), the matter shall be referred by either party to the Director-General or if not resolved within six months, to the Minister for Urban Affairs and Planning. The Minister's determination of the disagreement shall be final and binding on the parties.

1.4 Security Deposits and Bonds

Security deposits and bonds will be paid as required by DMR under mining lease approval conditions.

1.5 General Administrative Conditions

1. Compliance Report – pre-construction stage:
 - (a) At least one month prior to the commencement of construction (or within such period as otherwise agreed by the Director-General), the Applicant shall submit for the satisfaction of the Director-General, a Compliance Report detailing compliance with all the relevant conditions that apply prior to the commencement of construction.
2. Compliance Report – pre-operation stage:
 - (a) At least one month prior to the commencement of operation (or within such period as otherwise agreed by the Director-General), the Applicant shall submit for the satisfaction of the Director-General, a Compliance Report detailing compliance with all the relevant conditions that apply prior to the

commencement of operation.

3. The Applicant shall advise the Director-General and Council of the date of the granting of the Mining Lease.
4. The Applicant shall negotiate with Council dates of submission to Council of the various reports required under these conditions of consent.

2.

MINE MANAGEMENT

2.1

Mining Operations Plan (MOP)

1. Mining operations, including mining purposes, must be conducted in accordance with a Mining Operations Plan (MOP). The MOP shall be prepared to the satisfaction of DMR, prior to the commencement of mining. The MOP, together with environmental conditions of development consent and other approvals will form the basis for:-
 - (a) ongoing mining operations and environmental management; and
 - (b) ongoing monitoring of the project.
2. The MOP must be prepared in accordance with the guidelines of the Director-General of Mineral Resources current at the time of lodgement.
3. The Plan must be lodged with the Director-General of Mineral Resources:
 - (a) prior to the commencement of operations;
 - (b) subsequently as appropriate prior to the expiry of any current MOP; and
 - (c) in accordance with any direction issued by the Director-General of Mineral Resources.
4. The MOP must present a schedule of proposed mine development for a period of up to seven (7) years and contain diagrams and documentation which identify:
 - (a) area(s) proposed to be disturbed under the MOP;
 - (b) mining and rehabilitation methods to be used and their sequence;
 - (c) areas to be used for disposal of fine rejects/overburden;
 - (d) existing and proposed infrastructure;
 - (e) progressive rehabilitation schedules;
 - (f) areas of particular environmental sensitivity;
 - (g) water management systems (including erosion and sediment controls);
 - (h) proposed resource recovery; and
 - (i) where the mine will cease extraction during the term of the MOP, a closure plan including final rehabilitation objectives and methods; post mining landuse and vegetation; and management of, and options for, the use of the final voids.
5. The DMR may within two (2) months of the lodgement of an MOP, require modification and relodgement.
6. If a requirement in accordance with sub-clause (5) is not issued within two months of the lodgement of an MOP, the lease holder may proceed with implementation of the MOP submitted subject to the lodgement of the required security deposit within the specified time.
7. A copy of the MOP (excluding commercial-in-confidence documentation) shall be forwarded to council and the Director-General within 14 days of acceptance by the DMR.

2.2

Waste

Prior to the commencement of construction works, including the Coal Preparation Plant (CPP), roads, rail line and loading facilities or earthworks, the Applicant shall prepare and implement a Waste Management Plan for the DA area to the satisfaction of the Director-General. The plan shall facilitate waste management on the site and ensure compliance with the Applicant's obligations under the Waste Minimisation and Management Act. The Applicant shall make copies of the Waste Management Plan available to Council and the CCC within fourteen days of approval by the Director-General.

2.3

Limits on Production or Hours of Operation

All heavy earth moving equipment shall not operate on overburden emplacement areas and the fines reject emplacement area, which are not shielded from residences (either by distance from residences or by intervening physical features or structures), and where such operations shall impact, between the hours of 10:00pm and 7:00am.

(Also refer to Condition 2.1, Mining Operations Plan).

3.

LAND AND SITE ENVIRONMENTAL MANAGEMENT

3.1

Appointment of Environmental Officer

1. 'A suitably qualified Environmental Management Representative (EMR) shall be available during construction and mining activity at the site and be present on-site during any critical construction activities as defined in the Annual Environmental Management Plan (AEMP). The AEMP shall be approved by the Director-General prior to the commencement of construction. The EMR shall have responsibility for considering and advising on matters specified in the conditions of approval and compliance with such and facilitation of an induction and training programme for all persons involved with the construction activities. The following information shall be provided to the Director-General:
 - (a) qualifications of the EMR;
 - (b) role and responsibilities of the EMR; and
 - (c) authority of the EMR including details of the Applicant's internal reporting structure. This shall include the authority to stop work immediately if an unacceptable impact on the environment is likely to occur or to require other reasonable steps to be taken to avoid or minimise any adverse impacts.
2. The Applicant shall notify the DMR, EPA, DLWC, NPWS, Council and the CCC (established under Condition 8.7) of the name and contact details of the EMR upon appointment and any changes to that appointment.

3.2

Environmental Management Plans

1. The Applicant shall prepare the following environmental management plans:

Mining Operations Plan - Condition 2.1
Waste Management Plan - Condition 2.2
Archaeology and Cultural Management Plan - Condition 3.3
Flora and Fauna Management Plan - Condition 3.4
Erosion and Sediment Control Management Plan - Condition 3.5
Soil Stripping Management Plan - Condition 3.5
Final Void Management Plan - Condition 3.6
Landscaping and Revegetation Management Plan - Condition 3.8
Land Management Plan - Condition 3.10
Water Management Plan - Condition 4.1
Air Quality Management Plan - Condition 6.1
Blast Management Plan - Condition 6.3
Noise Management Plans - Condition 8.4

2. The management plans are to be revised or updated at least every five years, or as otherwise specified in these conditions, or directed by the Director-General, in consultation with the relevant government authorities. They will reflect changing environmental requirements or changes in technology or operational practices. Changes shall be made and approved in the same manner as the initial environmental management plan. The plans shall also be made publicly available at Council within two weeks of approval of the relevant government agency.

3.3

Heritage Assessment and Management

Aboriginal Heritage

1. The Applicant shall, prior to commencement of construction works:
 - (a) prepare an Archaeology and Cultural Management Plan to identify future salvage, excavation, monitoring and protection of any archaeological sites within the DA area prior to and during development, and to address cultural heritage issues. The plan shall be prepared to the satisfaction of the Director-General, in consultation with the Wonnarua Tribal Council and the NPWS addressing the NPWS requirements for the section 90 consent process under the National Parks and Wildlife Act 1974;
 - (b) engage a Cultural Heritage Officer in consultation with the Wonnarua Tribal Council and the NPWS, who shall be available on site, to be responsible for the collection of artefacts and archaeological material. The Cultural Heritage Officer shall be available during construction as required; and
 - (c) submit to and have approved by NPWS, a Consent to Destroy application under section 90 of the National Parks and Wildlife Act 1974 for Aboriginal archaeological sites proposed to be damaged or destroyed as a result of mining construction and operation.
2. If, during the course of construction, the Applicant becomes aware of any heritage or archaeological material, all work likely to affect the material shall cease immediately and the relevant authorities consulted about an appropriate course of action prior to recommencement of work. The relevant authorities may include NPWS, and the Wonnarua Tribal Council. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.
3. Prior to the commencement of any construction works within the DA area and prior to the lodgement of any application under section 90 of the National Parks and Wildlife Act 1974, the Applicant shall (unless otherwise determined by the Director-General) enter into negotiations with the NPWS and the Wonnarua Tribal Council to identify and reach an agreement on off-site conservation options of comparable biodiversity and archaeological values. The future ownership, management and acquisition, where relevant, of any suitable area identified shall be agreed between the relevant parties. If an agreement cannot be reached between the relevant parties, the matter shall be referred to the Director-General for determination. The decision of the Director-General shall be final.

European Heritage

4. The Applicant shall engage an appropriately qualified person to prepare an oral history of the DA area before local residents are dispersed. This will include an investigation of all buildings and sites within the DA area and the areas that will be affected by the mine. This will be carried out in consultation with a member of Muswellbrook and Upper Hunter Historical Society, who is to be allowed reasonable access to the Applicant's properties for the purpose of assessing European archaeological features. The report shall be made available to the

3.4

Flora and Fauna Assessment and Management

1. Prior to the commencement of construction, the Applicant shall prepare and implement a Flora and Fauna Management Plan for the management of flora and fauna issues in the DA area during mining operations. The Plan shall be prepared by a suitably qualified expert in consultation with Council and to the satisfaction of the Director-General. The Applicant shall make copies of the Flora and Fauna Management Plan available to NPWS, Council and the Community Consultative Committee within fourteen (14) days of approval by the Director-General.
2. The Flora and Fauna Management Plan shall include, but not be limited to:
 - (a) strategies to adequately manage plant and animal communities within the DA area which will be undisturbed by mining operations;
 - (b) a programme for utilisation as animal habitat, some of the timber required to be cut down for mining purposes;
 - (c) strategies to manage the impact of surface water management and sediment control measures on flora and fauna, including the impact of heavy machinery;
 - (d) control of feral species; and
 - (e) weed management.
3. If threatened species are identified on the site during development, through construction or operation of the coal mine, the Applicant shall cease work immediately in the relevant location pending investigation and negotiation of amelioration measures. The Applicant shall engage a suitably qualified person to investigate, address the provisions of the Threatened Species Conservation Act 1995 and identify appropriate amelioration measures.

(Refer also to Condition 3.3(3) regarding the identification of potential off-site conservation options).

3.5

Prevention of Soil Erosion

The Applicant shall prepare the following plans prior to the commencement of construction, in consultation with DLWC and to the satisfaction of the Director-General:

1. An Erosion and Sediment Control Management Plan for the DA area which meets the requirements of the DLWC. The plan shall include, but not be limited to:
 - (a) details of temporary and permanent sediment and erosion control systems to be used during both mine construction and operation;
 - (b) a programme for reporting on the effectiveness of the sediment and erosion control systems and performance against objectives contained in the approved Erosion and Sediment Control Management Plan, and EIS; and
 - (c) details of the installation of sedimentation dams, erosion control and stormwater diversions, as required, to ensure the rail line and balloon loop do not become a source of potential water pollution by stormwater runoff likely to contaminate the Hunter River with coal dust, oil and other pollutants.
2. A Soil Stripping Management Plan for the DA area to the requirements of DLWC which shall include, but not be limited to:

- (a) details of the management of soil stockpiles; and
 - (b) a programme for reporting on the effectiveness of the soil stripping methods and performance against objectives contained in the soil stripping management plan.
3. The Applicant shall make copies of the Erosion and Sediment Control Management Plans and the Soil Stripping Management Plan available to DLWC, DUAP, Council and the Community Consultative Committee within fourteen (14) days of approval.

3.6

Site Rehabilitation Management

Rehabilitation

1. The Applicant shall carry out rehabilitation of all mine areas in accordance with the requirements of the Mining Operations Plan prepared under Condition 2.1 and any Mining Lease granted by the Minister for Mineral Resources.
2. Rehabilitation plans shall be updated and adjusted according to management advances over the area of the mining lease. The rehabilitation plans shall be available to the Council and the Community Consultative Committee for their comment. Rehabilitation plans shall include time frames for proposed rehabilitation of areas used for mining purposes.
3. The Applicant shall contribute to Muswellbrook Council the sum of \$10,000 being a contribution towards the establishment of the Synoptic Plan - Integrated Landscapes for Minesite Rehabilitation Hunter Coalfields identified under Action 6 of the Upper Hunter Cumulative Impact Study and Action Strategy. The Applicant shall contribute \$5,000 within one month of the date of this consent and shall contribute the remaining \$5,000 no later than at the date of the issuing of the Mining Lease.
4. Rehabilitation of mining areas is to be compatible with the Synoptic Plan - Integrated Landscapes for Minesite Rehabilitation Hunter Coalfields.

Final Void Management

5. The Applicant shall, by Year 5 of operations, prepare a Final Void Management Plan to the satisfaction of the Director-General, in consultation with the DMR, DLWC, and Council. The plan shall be reviewed and updated every five (5) years, or as otherwise agreed by the Director-General. The plan shall address, but not be limited to:
 - (a) an investigation of options for the future use of the final voids;
 - (b) a re-examination and validation of groundwater modelling of the potential effects on the local and regional groundwater;
 - (c) programmes for catchment management, including the types of fertilisers used in rehabilitation programmes to ensure that there is little residual risk of nutrient enrichment of final void water; and
 - (d) any licensing requirements under the Water Act.
6. The first Final Void Management Plan may be prepared as a conceptual plan of the void design. The conceptual plan shall be prepared in consultation with DLWC and submitted to DLWC for assessment within six months of preparation.

(Also refer to Conditions 2.1 regarding the mining operations plan and 4 regarding water management)

3.7

Visual Amenity and Landscaping

1. The Applicant shall, prior to commencement of construction works, or within such other period as the Council may require, submit for Council's approval a detailed Landscaping Management Plan prepared by a suitably qualified person. The plan shall include where appropriate, but not be limited to:
 - (a) provision for the establishment of trees and shrubs and/or the construction of mounding or bunding:
 - (i) along the access road to the mine site;
 - (ii) around the water storage dams and coal preparation plant;
 - (iii) at other agreed areas identified as necessary by Council including for the maintenance of satisfactory visual amenity,
 - (b) appropriate erosion control and sediment control practices for earthworks associated with the required landscaping.
 - (c) details of the visual appearance of all buildings, structures, facilities or works (including paint colours and specifications). Buildings and structures shall be designed and constructed and/or renovated so as to blend as far as possible with the surrounding landscape.
 - (d) details, specifications and staged work programmes to be undertaken, maintenance of all landscape works and maintenance of building materials and cladding.

3.8

Bushfire and other Fire Controls

The Applicant shall, prior to the commencement of construction works:

1. Provide adequate fire protection works on site. This shall include one fully equipped fire fighting unit and annual hazard reduction works. Particular attention shall be paid to boundaries of adjoining land holdings.
2. Make available to the Bush Fire Service and Emergency Service when required, water carts and trucks in cases of emergencies, such as bushfires.
3. Submit an annual report on fire management activities to the Muswellbrook Fire Management Committee.

3.9

Relocation of electrical transmission line

The Applicant shall, to the satisfaction of Energy Australia and at its own cost, or by agreement with relevant parties, undertake the relocation and/or construction of any electrical transmission lines including the 66kv power line, which may be required as a result of the proposed development. Such work shall be completed prior to any existing line being affected by mining activity from the Mount Pleasant mine.

3.10

Land Management

1. Prior to commencement of construction works, the Applicant shall prepare a Land Management Plan for all its land holdings within the DA area to provide for proper land management in consultation with DLWC, NSW Agriculture and Council and to the satisfaction of the Director-General. The plan shall include, but not be limited to:
 - (a) pastures and remnant vegetation management;
 - (b) eradication of vermin and noxious weeds as required by the Rural Lands Protection Authority and any other relevant authorities;
 - (c) control of weed infestation on stockpiled material;
 - (d) feral animal control;
 - (e) assessment of the potential for commercial harvesting of standing timber removed from the mine site.

2. The Plan shall be prepared by a technically qualified person(s) within six months of the date of this consent, or as otherwise agreed by the Director-General and updated annually. The Applicant shall make copies of the Land Management Plan available to Council and the Community Consultative Committee within fourteen days of completion.
3. Subject to any requirements of NSW Agriculture, the Applicant shall not decrease the agricultural potential of the land under its control, that is not being mined or rehabilitated.

4.

WATER MANAGEMENT

4.1

Water Management Plan

1. The Applicant shall prepare a Water Management Plan for the management of water impacts of the development to the satisfaction of the Director-General, in consultation with DLWC and Council. The Plan shall be prepared prior to the commencement of construction or road or earthworks and implemented as required. The Water Management Plan shall include, but not be limited to, the following matters:
 - (a) management of the impacts of the development on the quality and quantity of surface water and groundwater within and around the DA area, including water in dirty water dams and clean water diversion dams, including flooding impacts;
 - (b) a strategy to ensure that the quality and quantity of water in Sandy Creek is not significantly affected by the Mount Pleasant mining operation. The strategy shall be approved by DLWC;
 - (c) identification of any possible adverse effects on water supply sources of surrounding downstream land holders as a result of the mining operations, and strategies for the implementation of mitigation measures as necessary;
 - (d) management of the impacts of the development on the quality and quantity of groundwater within two (2) kilometres of the boundary of the DA area, with particular attention to mobilisation of salts and contingency plans for managing any adverse impacts;
 - (e) a programme for reporting on the effectiveness of the water management systems and performance against objectives contained in the approved site water management plan, and EIS;
 - (f) detailed calculations in regard to any works proposed within the flood plain. This calculation shall detail the effect of afflux within the 1 in 100 year flood interval for any properties upstream. A report is to be presented to Council and DLWC within twelve months of commencement of construction;
 - (g) development of a strategy for the decommissioning of water management structures, including dirty water dams and clean water diversion dams, and long term management of the final voids. The strategy for the final voids shall be prepared in accordance with Condition 3.6.
2. The Water Management Plan shall include a mechanism for dispute resolution by the Director-General of the Department of Urban Affairs and Planning where agreement cannot be reached between the Applicant and affected landholders relating to:
 - (a) maintenance of streamflow yield of catchments affected by mining activities;
 - (b) deepening and/or increased operational costs of bores where the water

table has been lowered by mining activities.

3. The Water Management Plan shall be reassessed during year five of operations and approved prior to the end of year five. Thereafter, the Plan shall be reassessed and approved at five-yearly intervals.
4. The Applicant shall not dispose of fine rejects to the southern catchment prior to revision of its plan in year 15, unless otherwise agreed by the Director-General. At this time the need for disposal of rejects to this catchment shall be evaluated and if agreed by EPA, DLWC and Council, may be included in the next plan. Details of compensation water flows to provide for maintenance of water yield for downstream users shall be agreed with DLWC.
5. The approved plan shall be made available to Council and the Community Consultative Committee within fourteen days of its approval.

4.2

Catchment Areas and Watercourses

1. The Applicant shall prepare a strategy for the release of water from on-site sedimentation storage dams to downstream watercourses when water quality goals meet agreed standards, as defined in the reference catchment monitoring programme as determined by DLWC.
2. The Applicant shall install bed control works, batter stabilisation structures, and re-entry flow dissipation fixtures as required by DLWC.

4.3

Water Supply

1. The Applicant shall not extract water for use on the site from unregulated stream flows unless provision is made to substitute extraction of regulated river flow, as specified in licences issued under Part 2 of the Water Act by DLWC.
2. The Applicant shall prepare a strategy for the release of water from on site storages to downstream water users. The Applicant shall identify affected land holders; affected water supply structures; and the quality of water in the catchment or reference catchment of downstream water courses. The strategy shall be reviewed every three years to DLWC's satisfaction, in consultation with Council.
3. Leases or private agreements shall be completed with the relevant landholders for the land required for pipeline infrastructure prior to commencement of water pipeline construction.

4.4

Disposal of Excess Water

1. The Applicant shall dispose of surplus water via the Hunter Salinity Trading Scheme (HSTS) in accordance with the requirements of the HSTS Rulebook and conditions attached to any licence issued by the EPA. The Applicant shall provide all monitoring data to EPA and DLWC on request, and shall supply reports of discharges, storage data and water quality monitoring undertaken to the Community Consultative Committee.
2. The Applicant shall ensure that all disposal waters discharged to the Hunter River under the terms of the Hunter Salinity Trading Scheme shall be restricted to flows contained within the banks of the watercourse leading to the Hunter River.
3. The Applicant shall develop a contingency arrangement for Mount Pleasant coal operations to dispose of excess saline water in a planned and managed manner, to ensure that the mine water management system is not exceeded, with a subsequent unmanaged discharge occurring.

5. HAZARDOUS MATERIALS AND FINES REJECTS MANAGEMENT

5.1 Overburden Emplacement and Management

A review of the fines emplacement area will take place three (3) years after the commencement of production. At the conclusion of a five (5) year period from commencement, the Company and Council shall re-examine the fines emplacement plan, evaluating improved technology and best practice with a view to retaining fines within the active mining areas. Review of the fines emplacement methods is to be undertaken in conjunction with the CCC and DLWC. This may include an independent review by consultants which shall be funded by the Applicant.

5.2 Domestic Waste

The Applicant shall dispose of all solid waste and putrescible matter from the site to the satisfaction of Council.

5.3 Sewage and Associated Waste Management

The Applicant shall install the site sewage treatment facility, and dispose of treated sewage and sillage to the satisfaction of Council.

6. AIR QUALITY, BLAST, NOISE AND LIGHT MANAGEMENT

6.1 Air Quality Management

1. The Applicant shall take all practical steps to manage the mine's operations so that there are no extra exceedances of the ambient air quality goals for total suspended particulates (TSP) of $90 \mu\text{g}/\text{m}^3$ (annual average) and the dust deposition goal of $4 \text{ grams}/\text{m}^2/\text{month}$ (annual average) when measured at any monitoring location specified in the Air Quality Management Plan under sub-clause 2.
2. The Applicant shall prepare and implement an Air Quality Management Plan containing strategies to manage and monitor the mine's contribution to TSP, dust deposition, PM_{10} and $\text{PM}_{2.5}$ in consultation with Council, and to the satisfaction of the Director-General, prior to the commencement of construction. The Applicant shall make copies of the Air Quality Management Plan available to the EPA, Council and the CCC within fourteen days of approval by the Director-General. The Air Quality Management Plan shall contain but not be limited to:

Source identification and control

- (a) identifying all potential sources of dust deposition, total suspended particulates (TSP), PM_{10} and $\text{PM}_{2.5}$ as a result of the Mount Pleasant mining activity, and detailing the remedial action to be taken or management systems to be employed, to minimise emissions of these pollutants from all sources within the mine including drills; disturbed areas; stockpile areas; all trafficable areas including haul roads, light vehicle access roads, the rail loading site and all unsealed roads on the site; rehabilitation of disturbed areas; and modify, where appropriate, out of pit operations;
- (b) providing a programme of research and development and the proposed method of initiation, for advanced controls and management of dust emissions, including fine particle generation (such as tyre and blade abrasion on road materials, overburden and coal, blast conditions and stockpiling, etc.) and the effectiveness of various controls (such as road surface type, watering of roads, application of chemicals, tyre conditions and speed, and blast design) and the implications of this for the various size fractions of dust;

Reactive Management System

- (c) providing details of the reactive management system intended to reduce the day-to-day impacts of dust and fine particles due to the mine's operation, including details of the real-time monitoring and modelling system to be used, the linkages to other similar sources in the area and a description of the operational and other measures to be taken to minimise regional impacts;
 - (d) providing a programme of research to validate and refine emission factors for TSP, dust deposition, PM₁₀ and PM_{2.5} used at the Mount Pleasant mine so that the future modelling of dust emitted by the operation can determine more accurately, the contribution of the development to ambient TSP, dust deposition, PM₁₀ and PM_{2.5} levels, off-site.
- 3. Sub-clauses (a) to (d) above shall be carried out in a manner which is consistent (with ongoing modifications if necessary) with the requirements of any regional air quality management plan approved by the Director-General or other regional air quality management initiative coordinated by the Director-General or other relevant NSW Government agency.
 - 4. The Applicant shall update the Air Quality Management Plan not less than every 5 years after the commencement of mining taking into account the results of air quality monitoring. The Applicant shall provide copies of the Air Quality Management Plan and provide annual progress reports on implementation to the Director-General, DMR, EPA, Council and the CCC.
 - 5. Subject to the acceptability of the design of the reactive management system specified in condition 2(c) and within 12 months of the commencement of operation of the mine, the Applicant shall install an integrated system of reactive controls. This may include operational measures, such as increasing preventative measures or the scheduling of certain operations to times of favourable meteorological conditions in order to minimise dust and PM₁₀ emissions. The system should include the following components:
 - (a) Real time ambient air quality monitoring of PM₁₀ and meteorological conditions around the mine and in Muswellbrook;
 - (b) A telemetry network to link real time monitoring stations with the Mount Pleasant mine control room;
 - (c) A predictive capacity and assessment protocol to trigger the reactive controls according to the relative risk of a high dust episode;
 - (d) A management system that ensures actions taken are logged and reported, assessed as to their effectiveness and the reactive system modified to improve the response;
 - (e) Collaboration with other mines in the area in regard to joint monitoring networks, joint reactive management arrangements and data sharing.

(Also refer to Condition 8.3 for Air Quality Monitoring).

6.2

Dust Acquisition

- 1. If a dwelling is identified in the EIS to be within the area of dust affectation as defined in the attached Schedule, the Applicant shall purchase the whole of the property if requested by the owner. The procedures for acquisition outlined in condition 11.1 shall be followed.
- 2. If a dwelling is not within the area of affectation as defined in sub-clause 1 above then following a dust complaint from the occupier of the dwelling or at other times as directed by the Director-General:
 - (a) independent monitoring of dust levels shall be undertaken at the dwelling;
and

- (b) where monitored dust levels exceed the criteria referred to in condition 6.1(1) as applying to that dwelling, the Applicant shall take one or more of the following actions:
 - (i) introduce additional controls, either on dust emission from individual sources on the site or on site operations or modify mine operations to ensure that the criteria in condition 6.1(1) are achieved;
 - (ii) enter into an agreement with the landowner to provide such other forms of benefit or amelioration as may be agreed between the parties as providing acceptable compensation for the dust levels experienced; or
 - (iii) acquire the dwelling and surrounding property under procedures set out in Condition 11.1.

6.3

Blast Management

1. The Applicant shall, prior to the commencement of mining operations, prepare a Blast Management Plan to the satisfaction of the Director-General. The Plan shall:
 - (a) detail strategies and procedures for ensuring compliance with relevant blasting guidelines for air blast and ground vibration;
 - (b) identify procedures to determine appropriate weather data through taking measurements as soon as practicable prior to blasting and from the data shall predict whether noise levels are likely to be increased above the levels expected under neutral meteorological conditions. The data shall be recorded by the Applicant as part of its monitoring data;
 - (c) identify a programme to monitor all blasts and record the over pressure and peak particle velocity at locations to be agreed by the EPA and DMR. These results are to be made available to the Community Consultative Committee;
 - (d) identify a procedure to consult with residents whose properties are adjacent to the development, to determine the most reasonable and appropriate blasting times for the development. The Applicant shall make available to adjoining landowners information regarding proposed blasting times on the infoline (condition 10.1(4)) two (2) weeks before the event.
2. The Applicant shall make available copies of the Blast Management Plan to the Director-General, EPA, DMR, Council and the Community Consultative Committee within fourteen days of approval by the Director-General.
3. The Applicant shall advise residents via the infoline within two (2) kilometres of the active mining area of future blasting events on a monthly basis, and of any changes to monthly programmes.
4. Blasting shall not take place within 500 metres of a public road while such road is open for traffic. If such blasting is required, then the road shall be closed for up to 10 to 15 minutes.
5. Roads shall not be closed for blasting purposes during the times that a school bus is in the vicinity, except in an emergency.
6. Before the commencement of mining and at any time during mining, upon the written request of the owner of any dwellings or underground irrigation mains located within two (2) kilometres of the areas subject to blasting, the Applicant shall arrange at its own cost, for the inspection by a qualified person agreed to

by both parties, to record the material condition of the dwelling and any mains on the property within fourteen (14) days of receipt of the request. The Applicant shall supply a copy of any inspection report, certified by the person who undertook the inspection, to the relevant property owner within seven (7) days of the receipt of the report.

7.

- (a) Any damage caused by the Applicant's blasting to any dwelling, structure or irrigation mains and/or equipment shall be repaired or replaced by the Applicant to the satisfaction of the owner. The Applicant shall pay reasonable compensation, as agreed to with the owner, because of loss incurred by the owner in relation to crop loss/spoilage and regard to down time.
- (b) In the event that the Applicant and owner cannot agree as to whether any damage to property or loss has occurred or on the amount of compensation or appropriate repair to, or replacement of, property either party may appoint a qualified person, agreed to by both parties who shall determine the matter. The Applicant shall pay for the reasonable cost of this determination. If the Applicant and owner cannot agree on an appropriate qualified person either party may apply to the Director-General to appoint an appropriate qualified person. The decision of the Director-General shall be final.

- 8. Blasting shall be restricted to Monday to Saturday between the hours of 9.00am and 5.00pm, except in emergencies. No blasting shall occur on Sundays or public holidays. Blasting outside of these hours shall be permissible only if agreed in writing by the EPA and Council.
- 9. Blasting shall avoid the occurrence of concurrent blasts with adjoining surface coal mine operations. Concurrent blasts shall not take place, except in emergencies.
- 10. The Applicant shall investigate alternative methods to blasting for extraction of coal and report to DMR each two (2) years from the commencement of mining.

6.4

Noise Control

- 1. For the purposes of determining noise levels under this consent, the noise levels shall be measured at the boundary of the property (or where the boundary of that property is more than 30 metres from a dwelling, then at 30 metres from the dwelling).

Noise Acquisition Levels

- 2. If a dwelling is identified in the EIS to be within the area of noise affectation as defined in the attached Schedule, the Applicant shall, within six months of receipt of a written request from the owners of a dwelling, purchase the whole of the property. The procedures for acquisition outlined in Condition 11.1 shall be followed.

The areas of affectation are those that experience the following noise levels or greater:

- (a) 35dB(A) L_{A10} under non-adverse conditions night-time in the rural areas;
- (b) 37dB(A) L_{A10} under non-adverse conditions night-time in the Muswellbrook urban areas; and
- (c) 40dB(A) L_{A10} under non-adverse conditions day-time in both the rural and Muswellbrook urban areas

Note: "Non-adverse" conditions means calm winds and in the absence of temperature inversions.

3. If a dwelling is not within the area of affectation defined in sub-clause 1 above, then following a noise complaint during either construction or operation from the occupier of the dwelling, or at other times as determined by the Director-General:
 - (a) Independent monitoring of noise levels shall be undertaken at the dwelling, funded by the Applicant;
 - (b) Where monitored noise levels exceed either of the two criteria specified in Table 6.4 below during either daytime or night-time, the Applicant shall take one or more of the following actions:
 - (i) Introduce additional controls, either on noise emission from individual sources on the site or on site operations or modify operations, to ensure that the criteria in Table 6.4 below are achieved;
 - (ii) With the agreement of the landowner, undertake noise control at the dwelling to achieve acceptable internal noise levels;
 - (iii) Enter into an agreement with the landowner or provide such other forms of benefit or amelioration as may be agreed between the parties as providing acceptable compensation for the noise levels experienced; or
 - (iv) Acquire the dwelling under the procedures set out in condition 11.1.

TABLE 6.4

NOISE LEVEL CRITERIA			
Location of Residence	Time	Non-Adverse	Adverse
Muswellbrook Urban Area	Day (0700-2200)	40dB(A) L_{A10}	45dB(A) L_{A10}
	Night (2200-0700)	37dB(A) L_{A10}	42dB(A) L_{A10}
Other Areas	Day (0700-2200)	40dB(A) L_{A10}	45dB(A) L_{A10}
	Night (2200-0700)	35dB(A) L_{A10}	40dB(A) L_{A10}

Note: “Adverse” weather conditions means the presence of winds up to 3 metres per second, and/or temperature inversions of up to 4 degrees C per 100 metres.

Noise Limits

4. As part of the Noise Management Plan(s) to be prepared prior to the commencement of construction (under condition 8.4), the Applicant shall identify the predicted noise levels for the various zones around the DA area. The Noise Management Plan’s predicted noise levels shall be generally consistent with those predicted in the EIS or the Applicant’s Primary Submission to the Commission of Inquiry. These zones to include: Location A representing the zone covering the Kayuga Village; Location B representing the zone covering the Racecourse Road area; Location C representing the zone covering Muswellbrook; Location D representing the zone covering South Muswellbrook; Location E (eg RJ Wingett property) representing the zone covering the area east of the mine; Location F (eg T O’Brien property) representing the zone covering the area north east of the mine; Location G (eg JB Moore property) representing the zone covering the area south west of the mine. It is emphasised that these zones are mutually exclusive.

5. In the event that a landowner or occupier considers that noise from the project at their dwelling is in excess of the noise levels depicted in the Noise Management Plan(s) as per above, and the Director-General, in consultation with the EPA is satisfied that an investigation is required, the Applicant shall:
 - (a) Consult with the landowner and occupants affected to determine their concerns;
 - (b) Make arrangements for appropriate noise investigations, to the satisfaction of the Director-General, to quantify the impact and determine the source of the effect;
 - (c) Modify the mining activity, in accordance with a noise reduction plan prepared as part of the Noise Management Plan(s) if exceedances are demonstrated to result from mine related activity; and
 - (d) Conduct follow-up investigations to the satisfaction of the Director-General, in consultation with the EPA.
6. If, after an opportunity to rectify the situation, continued complaints and monitoring confirm that the noise limits are being exceeded, but are less than the noise acquisition levels, the Applicant shall continue to negotiate with the landowner until an acceptable resolution is reached.

6.5

Light Emissions

The Applicant shall, prepare an engineering report on on-site flood-lighting impacts and vehicular lights from the operation of the mine. The report shall be submitted for Council's approval prior to the commencement of construction. The report shall identify:

- (a) all potential light sources and their impacts upon residences in the vicinity of the mine operations;
- (b) technical measures and work practices necessary to minimise the spillage of light from immediate areas to be illuminated, and to minimise the total night time glow from the operations.

(Refer also to condition 3.8, relating to visual amenity and landscaping)

7.

TRANSPORT AND UTILITIES

7.1

Rail Transport

1. All coal shall be transported from the site by rail, unless otherwise agreed by the Director-General and Council.
2. Prior to the construction of the Mount Pleasant rail loop and rail loader, the Applicant shall obtain the approval of Rail Access Corporation for a rail loop and rail loader to be constructed on the land as defined in the EIS and in accordance with the requirements of that authority and to the licence requirements of the EPA.
3. The Applicant shall enter into an agreement with the Minister for Mineral Resources, in consultation with the operators of the Bengalla Mine, so that if in the future the Bengalla mining operation is to extend further to the west, the Applicant shall undertake to relocate the Mount Pleasant rail loop. Any relocation may require a further approval.

7.2

Road Transport

1. The Applicant shall, as required by Council and/or the RTA:
 - (a) At its own expense construct a bridge to carry the Bengalla Link Road over the proposed Mount Pleasant rail loop, in liaison with the operators of the Bengalla Mine;
 - (b) prior to the closure of Castlerock Road, construct at its own expense, the Mount Pleasant Northern Link Road to Dorset Road;
 - (c) prior to the closure of Wybong Road, construct at its own expense, the Mount Pleasant Western Link Road, from the intersection of the Bengalla Link Road to the intersection of the Mount Pleasant Northern Link Road, generally in accordance with Council's Western Roads Strategy;
 - (d) undertake intersection improvements at the existing junction of Thomas Mitchell Drive and Denman Road that are required as a direct result of the Mount Pleasant mining operations, to ensure that the existing channelisation provides sufficient storage for the projected increase in right turning movements;
 - (e) should the following intersections be required, undertake construction works at:
 - (i) the intersection of the Western Link Road and access to the mine site,
 - (ii) the intersection of the Bengalla Link Road and the Western Link Road,
 - (iii) the intersection of Castlerock/Mount Pleasant Northern Link Road and the Western Link Road,
 - (iv) the intersection of the Mount Pleasant Northern Link Road and Kayuga Road.
2. The Applicant shall contribute an amount, determined by Council to the maintenance costs of the Wybong Road between the mine access and Kayuga Road (including the Rosebrook Bridge) for the period from commencement of construction and concluding with the commencement of the use of the Bengalla Link Road by the Applicant.
3. The Applicant shall contribute no more than 50 percent (as determined by Council and the RTA) of the annual road maintenance costs for the section of the Bengalla Mine Link Road within the 1:100 year flood level.
4. The Applicant shall, in accordance with its proportional usage, either upgrade to new condition or contribute to the extra maintenance of the following:
 - (a) The Bengalla Link Road, from the 1 in 100 flood level to the Mount Pleasant mine access road, following the initial construction phase of the Mount Pleasant mine; and
 - (b) The Mount Pleasant mine access road, should it become a dedicated public road and prior to dedication.

The decision of either upgrade or maintenance shall be mutually agreed between Council and the Applicant.

5. The Applicant shall ensure that as far as possible, the preferred mine access road route as described in the EIS is the only route used by employees and contractors travelling to the mine site from Muswellbrook.
6. The Applicant shall maintain signs and through the infoline established under Condition 10.1(4) give at least 24 hours notice of temporary road closures. The location and wording of the signs are to be approved by Council. A protocol is to be established, in consultation with the emergency service providers and Council, to permit the passage of emergency vehicles during road closures.

7. Should a construction road be proposed, the Applicant shall provide either an overpass or underpass across Wybong Road, or other means of crossing Wybong Road, to Council's satisfaction.

7.3

Provision of Utility Services

The Applicant shall consult with affected service authorities and make arrangements satisfactory to those authorities for the protection or relocation of utility services.

8.

MONITORING/ AUDITING

8.1

Meteorological

The Applicant shall continue to maintain and operate a meteorological station for the life of the mine (in accordance with the relevant Australian Standards and to the satisfaction of the EPA), unless otherwise agreed by the Director-General. The Applicant shall analyse and document the meteorological data on a monthly basis to adequately characterise the site, and shall use the data collected to assist the reactive management system required in sub-clause 2 of Condition 6.1.

8.2

Surface Water and Groundwater

1. The Applicant shall construct and locate:
 - (a) surface water monitoring positions in consultation with DLWC three months prior to the commencement of construction works; and
 - (b) groundwater monitoring positions in consultation with DLWC six months prior to the commencement of construction works. The monitoring sites selected must be of sufficient density to ensure early detection of any deterioration in groundwater quality. This should include monitoring groundwater quality below the fines emplacement and in the alluvial flats between the eastern emplacement area and the Hunter River where leachate mobilisation may result.
2. The Applicant shall prepare a detailed monitoring programme in respect of groundwater and surface water, including water in dirty water dams, and clean water diversion dams, in and around the DA area, during construction works, mine operations and post mine operations to the satisfaction of DLWC. The monitoring programme shall specify mitigation measures should groundwater monitoring demonstrate a significant impact on the depressurisation of the aquifers. It should also specify the length of time monitoring should continue.
3. The monitoring programme during construction works shall be prepared prior to commencement of construction. The monitoring programme during mine operation shall be prepared prior to commencement of mine operation. The monitoring programme relating to post mine operations shall be prepared by year 8 of mine operations.
4. The Applicant shall conduct a water quality monitoring programme in an undisturbed reference catchment as specified by DLWC. The Applicant shall prepare the monitoring programme prior to commencement of construction. The Applicant shall conduct such monitoring before and during the life of the mine. The reference catchment water quality monitoring programme shall be designed and conducted to the satisfaction of DLWC.
5. The results and interpretation of surface water and groundwater monitoring are to be provided by the Applicant in an approved form to the DLWC, EPA, NSW Agriculture, Council and the CCC on a quarterly basis during construction and the first 12 months of mining operations, and thereafter on a six monthly basis. The results are also to be contained and analysed in the Annual Environmental

6. Contingency procedures must be developed to manage any impacts identified by monitoring that the management strategies have failed to predict or control. Remedial action will be required if monitoring results indicate that the agreed standards or performance indicator levels are not being achieved due to failure or ineffectiveness of the management strategies. Restoration action will be required when the remedial action fails, or monitoring results identify severe failure of management strategies to meet agreed standards. In these extreme cases, operations should cease and the affected area remediated to the satisfaction of DLWC. Performance and cut-off criteria for monitoring purposes (including both water quality and aquifer pressure levels) should be clearly outlined in the detailed monitoring programme. The procedure for setting triggers for cut-off criteria and developing response mechanisms is described in the document *"A guide for establishing a groundwater monitoring programme for mine sites within the Hunter Region"* prepared by DLWC.
7. At the end of each five year period from the commencement of mining the Applicant shall provide a report to the Director-General, DLWC, EPA, NSW Agriculture and Council which:
 - (a) presents the results of the monitoring programme;
 - (b) highlights any variances between the predicted impacts shown in the EIS and observed outcomes and provide an explanation of this variance;
 - (c) offers an interpretation of the results;
 - (d) provides revised groundwater inflow predictions; and
 - (e) suggests any proposed changes to the monitoring programme for the following five year period.

8.3

Air Quality and Dust

Air Quality Monitoring Plan

1. The Applicant shall, as part of the Air Quality Management Plan (Condition 6.1) provide the mine's ambient air quality monitoring plan to determine air quality in the zone of affectation of the mine on an ongoing basis and to determine the specific impacts of the mine's development and operation on air quality in the region.
2. The Applicant shall install, maintain and operate (in accordance with the relevant Australian Standard and to the satisfaction of the EPA), at least 12 months before the commencement of mining, the ambient air quality monitors for dust deposition ($\text{grams/m}^2/\text{month}$, annual average), total suspended particulates (TSP) ($\mu\text{g/m}^3$, annual average), PM_{10} ($\mu\text{g/m}^3$, 24-hour and annual averages) and $\text{PM}_{2.5}$ ($\mu\text{g/m}^3$, 24-hour and annual averages), specified in the Air Quality Management Plan.
3. The Applicant shall make provision for independent dust monitoring to be made available for those land owners outside the area of affectation who consider that dust levels from the mine at their residences are in exceedance of the relevant dust criteria ($4\text{g/m}^2/\text{month}$, annual average).
4. Conditions 1 to 3 above shall be discharged in a manner which is consistent (with ongoing modifications if necessary) with the requirements of any regional air quality management initiative coordinated by the Director-General or other relevant NSW Government agency and to the requirements of the Director-General.
5. The Applicant shall participate, to the satisfaction of the Director-General, in regional air quality management initiatives, both by way of financial and infrastructure resources and obligations, in agreement with the Director-

General, and to comply with the outcome of regional air quality management initiatives. Commitments and obligations shall include PM₁₀ and PM_{2.5} monitoring and modelling. The Air Quality Management Plan (Condition 6.1) shall include provisions for reactive controls, including operational measures. This may include scheduling of certain operations to times of favourable meteorological conditions in order to minimise fine particulate concentrations, real time ambient monitoring of fine particles, coupled with meteorological monitoring and simultaneous predictive capacity. The Applicant shall comply with the reasonable requirements of the Director-General in this regard.

6. The Applicant shall provide to the Director-General, EPA, DMR and Council and the Community Consultative Committee, results and analysis of air quality monitoring, with a commentary on its implication for implementation of the Air Quality Management Plan, in the AEMR or as otherwise agreed by the Director-General.

(Also refer to Condition 6.1 regarding Air Quality Management)

8.4 Noise Investigations and Management

1. The Applicant shall, prior to construction, conduct noise investigations at six monthly intervals (unless otherwise agreed by the Director-General) to evaluate, assess and report the L_{A10 (15 minute)} noise emission levels of the mine under adverse weather conditions, except during rain and/or wind speeds greater than 3m/s. The Applicant shall outline the methodologies, including establishing the mine's operating configuration, determining survey intervals, weather conditions, seasonal variations, selecting variations, selecting locations, periods and times of measurements, the design of any noise modelling or other studies, including the means for determining the noise levels emitted by the mining operations.
2. The Applicant shall, prior to construction and commencement of mining operations on the site, develop a Noise Management Plan to the satisfaction of the Director-General, with particular attention to night-time noise (10:00pm to 7:00am). The Noise Management Plan shall:
 - (a) identify noise affected properties and the relevant noise limits consistent with the EIS and any subsequent submissions by the Applicant to the Commission of Inquiry;
 - (b) specify the procedures for a noise monitoring programme for the purpose of undertaking independent noise investigations as specified in Condition 6.4;
 - (c) identify a procedure to notify those property owners and occupiers within the areas of affectation established under Condition 6.4;
 - (d) establish a protocol for handling noise complaints that include recording, reporting and acting on complaints;
 - (e) record appropriate mechanisms for community consultation;
 - (f) record the mitigation measures to be employed on the site to limit noise emissions;
 - (g) specify measures to be taken to document any higher level impacts or patterns of temperature inversions, and detail actions to quantify and ameliorate impacts if they exceed the relevant criteria; and
 - (h) identify longer term strategies directed towards mitigating noise levels that exceed EPA target noise criteria.

3. The Noise Management Plan shall be reviewed and updated as necessary, and not less than annually. Such review shall address the day to day operational and five year strategic elements of the Plan.
4. The Applicant shall make copies of the Noise Management Plan available to the EPA, Council and the CCC within fourteen days of approval, or as otherwise agreed by the Director-General.
5. A summary of noise monitoring results shall be included in the AEMR.
6. The Applicant shall survey and investigate noise reduction measures from plant and equipment at the conclusion of the first 12 months of coal processing operations and set targets for noise reduction in the AEMR, taking into consideration valid noise complaints in the previous year. The Report shall also include remedial measures to achieve compliance with specified noise goals.
7. The Applicant shall arrange independent noise emission investigations as provided in Condition 11.1.

8.5 Control and Monitoring of Blasting

Overpressure

1. The overpressure level from blasting operations on the premises must not:
 - (a) exceed 115dB (linear peak) for more than 5% of the total number of blasts over a period of 12 months; and
 - (b) exceed 120dB (linear peak) at any time,

when measured at any point that is located at least 3.5 metres from any building or structure at any nearby non-company owned residential property or other noise sensitive location such as a school or hospital.

Ground Vibration (ppv)

2. Ground vibration peak particle velocity (ppv) from the blasting operations on the premises must not:
 - (a) exceed 5 mm/s for more than 5% of the total number of blasts over a period of 12 months; and
 - (b) exceed 10 mm/s at any time,

when measured at any point within the grounds of non-company owned noise sensitive locations and within 30 metres of any non-company owned residence or other noise sensitive location such as a school or hospital.
3. Ensure that air blast overpressure and vibration monitoring and control is generally carried out in accordance with the recommendations of Australian Standard AS-2187-1993 or its latest version and ANZECC Guidelines, including compliance with the guideline titled "*Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Vibration*" or its latest version.
4. Determine appropriate weather data by taking measurements as soon as practicable prior to blasting and from the data shall predict whether air blast overpressure levels outside the project area are likely to be increased above the levels expected under adverse meteorological conditions. The data shall be recorded by the Applicant as part of its monitoring data.
5. Monitoring of vibration and blast overpressure and control is to be carried out in accordance with the recommendations of Australian Standard AS-2187-1993,

or the latest relevant standard, and ANZECC Guidelines.

8.6

Fauna and Flora Monitoring

The Applicant shall monitor the effectiveness of measures outlined in the Fauna and Flora Management Plan (condition 3.4). A summary of monitoring results shall be included in the AEMR.

8.7

Cultural Heritage Monitoring

The Applicant shall monitor the effectiveness of measures outlined in the Archaeology and Cultural Management Plan (condition 3.3). A summary of monitoring results shall be included in the AEMR.

8.8

Community Consultative Committee

1. The Applicant shall:

- (a) Participate and co-operate in the establishment by Council of a Community Consultative Committee (CCC) comprising a representative of Council (chair), two (2) representatives of the Applicant including the EMR, and four (4) community representatives to monitor compliance with conditions of this consent and other matters relevant to the operation of the mine during the term of the consent. The Committee should meet six times a year or as otherwise agreed by the Committee. The first meeting shall be held prior to the commencement of construction works.
- (b) Representatives from relevant government authorities may be invited to attend meetings by the Chairperson. The Committee may make comments and recommendations about the implementation of the development and environmental management plans. The Applicant shall ensure that the Committee has access to the necessary plans for such purposes. The Applicant shall consider the recommendations and comments of the Committee and provide a response to the Committee and if required, to the Director-General.

2. The Applicant shall, and at its own expense:

- (a) nominate two (2) representatives to attend all meetings of the Committee.
- (b) provide to the Committee copies of the latest Annual Environmental Management Plan (condition 9.2), and latest water, noise, and air monitoring data, which includes interpretation and discussion by a suitably qualified person. The Committee may require independent assessment of the effectiveness of monitoring procedures.
- (c) promptly provide to the Committee such other information as the Chair of the Committee may reasonably request concerning the environmental performance of the development, the Applicant's response to complaints and status of acquisition where purchase has been requested by an owner.
- (d) provide access for site inspections by the Committee.
- (e) provide meeting facilities for the Committee, and take and distribute minutes of Committee meetings.

3. The Applicant shall establish a trust fund to be managed by the Chair of the Committee to facilitate the functioning of this Committee, and pay \$2000 per annum to the fund for the duration of coal processing operations. The annual payment shall be indexed according to the Consumer Price Index (CPI) at the time of payment. The first payment shall be made by the date of the first Committee meeting.

8.9**Third Party Monitoring/Auditing**

1. Every three years until completion of mining, or as otherwise directed by the Director-General, the Applicant shall conduct an environmental audit of the mining and infrastructure areas of the development in accordance with ISO 14010 - Guidelines and General Principles for Environmental Auditing, and ISO 14011 – Procedures for Environmental Auditing (or the current versions), and in accordance with any specifications of the Director-General. Copies of the report shall be submitted to the Director-General who shall provide a copy to Council and the Community Consultative Committee.
2. The environmental audits shall be conducted by an independent person approved by the Director-General. The reports shall be made available to the Community Consultative Committee, the Director-General and Council.
3. The Applicant shall comply with any reasonable requests of the Director-General in respect to the implementation of any measures arising from the audit, within such time as the Director-General may advise. The Director-General may require additional audits.
4. The Director-General may, after considering any submission made by Council, the DMR, EPA and DLWC on the report, notify the Applicant of the Director-General's reasonable requirements with regard to any recommendations in the report. The Applicant shall comply with those reasonable requirements within such time as the Director-General may reasonably require.

9.**REPORTING****9.1****Reports on Operations**

The Applicant shall report on mine operations in accordance with the Mine Operations Plan (condition 2.1)

9.2

Annual Environmental Management Report (AEMR)

1. The Applicant shall, throughout the life of the mine and for a period of at least five years after the completion of coal processing operations, prepare and submit an Annual Environmental Management Report (AEMR) to the Director-General. The AEMR shall review the performance of the mine against the environmental management plans, the Mining Operations Plan, the conditions of this consent, and other licences and approvals relating to the mine. To enable ready comparison with EIS predictions, diagrams and tables, the report shall include, but not be limited to, the following matters:
 - (a) an annual review of the performance of the project against compliance with the conditions of this consent and statutory approvals;
 - (b) a review of the effectiveness of the environmental management of the mine in terms of EPA, DLWC, DMR, NPWS, NSW Agriculture and Council, requirements;
 - (c) results of all environmental monitoring required under this consent or other approvals, which includes interpretation and discussion by a suitably qualified person;
 - (d) a listing of any variations obtained to approvals applicable to the subject area during the previous year;
 - (e) the outcome of the water budget for the year and the quantity of water used from water storages;
 - (f) rehabilitation report;
 - (g) environmental management targets and strategies for the next year.
2. In preparing the AEMR, the Applicant shall:
 - (a) consult with the Director-General during preparation of each report for any additional requirements;
 - (b) comply with any requirements of the Director-General or other relevant government agency under this consent; and
3. The Applicant shall ensure that copies of the Annual Environmental Management Report are submitted to the Director-General, EPA, DLWC, DMR, NPWS, NSW Agriculture, Council and CCC, and be available for public information at the Council within 14 days of submission to the authorities.
4. The Applicant shall ensure that the first report is completed and submitted within twelve (12) months of this consent, or at a date determined by the Director-General in consultation with the DMR and annually thereafter.

9.3

Public Access to Environmental Reporting

The AEMR Report, minutes from the Community Consultative Committee meetings and results and interpretation of monitoring required by this consent shall be made available at the Muswellbrook Public Library within 14 days after the information is available for public information by the Applicant.

10.

CONSULTATION

10.1

Community Consultation

1. The Applicant at its own expense, shall commission a dedicated telephone hotline that is staffed 24 hours a day, 7 days a week, accessed by an employee of the Applicant responsible for acting immediately on environmental complaints as a result of mining operations. The hotline numbers are to be advertised in the local press. This hotline will receive complaints and enquiries from the community about dust, noise, vibration, blasting, road closures, gas emissions, lighting and any other perceived impact.

- (a) a register will be kept of each complaint received either by phone/fax or personally;
 - (b) the EMR, or a competent person appointed by the Applicant, shall investigate each complaint and accept responsibility for ensuring that any action deemed necessary is undertaken to satisfy such complaint;
 - (c) a written record shall be kept of each complaint received and the action taken to mitigate impact. A copy of the record shall be forwarded to the Council within seven (7) days of the end of each month and a copy will be made available to the members of the Community Consultative Committee prior to each meeting;
 - (d) the EMR shall prepare a written response with an explanation of the problem and the action taken for the information of the complainant;
2. The EMR shall be responsible for the operation of the hotline.
 3. A report of complaints received every six months throughout the life of the project shall be provided to the Director-General, Council, EPA, DMR and the Community Consultative Committee, or as otherwise directed by the Director-General. A summary of this report shall be included in the AEMR.
 4. The Applicant at its own expense, shall commission a dedicated telephone infoline to be provided 24 hours a day seven days a week. The infoline numbers are to be advertised in the local press. The infoline will provide information relating to the blasting schedules, road closures and relevant information relating to the mine's operation.

11.

APPLICANT'S OBLIGATIONS

11.1 Area of Affection – Land Acquisition (including resolution of disputes)

1.
 - (a) The owner of any property on which a dwelling is identified to be in the area of affection for noise and/or air quality established under Conditions 6.2.1 and/or 6.4.2, may at any time after the granting of development consent, request the Applicant to purchase the whole of that property. The Applicant shall purchase the property within six (6) months of the date of the request from the owner.
 - (b) If independent noise and/or dust investigations and monitoring confirm that a dwelling not identified to be in the area of affection is demonstrated to be affected by an exceedance of the noise and/or air quality criteria established under Condition 6.2.2 and/or Condition 6.4.3, then the Applicant shall purchase the affected property if requested to do so by the property owner as though it is a property dealt with under sub-clause 1(a) above.

2.

- (a) In respect of a request to purchase land arising under clause 1, the Applicant shall pay the owner of the property a fair and reasonable acquisition price which shall take into account and provide payment for:
- (i) a sum not less than the market value of the land at the time of this consent, as if the land was unaffected by the Mount Pleasant mine, the subject of this development consent, having regard to:
 - the existing use and permissible use of the land in accordance with the applicable environmental planning instruments at the date of the written request; and;
 - the presence of improvements on the land and/or any Council approved building or structure for which construction commenced prior to the date of this consent;
 - (ii) the owner's reasonable compensation for disturbance allowance and relocation costs within the Local Government Areas of Scone, Muswellbrook or within such other location as may be determined by the Director-General in exceptional circumstances;
 - (iii) the owner's reasonable costs for obtaining legal advice and other relevant expert advice for the purposes of determining the acquisition price of the land and the terms upon which it is to be acquired;

Notwithstanding any other Condition of this consent, the Applicant may, upon request of the owner, acquire any property affected by the project during the period of this consent on terms agreed to between the Applicant and the owner.

- (b) In the event that the Applicant and owner cannot agree upon the acquisition price of the property and/or the terms upon which it is to be acquired, within six (6) months of the date of a request from the owner to the Applicant to purchase the property, then:
- (i) either party may refer the matter to the Director-General who shall request the President for the time being of the Australian Institute of Valuers and Land Economists to appoint an independent valuer who shall, after consideration of any submissions from the owner and Applicant, determine a fair and reasonable acquisition price for the property and/or terms upon which it is to be acquired;
 - (ii) in the event of a dispute regarding outstanding matters that cannot be resolved, the independent valuer shall refer the matter to the Director-General, recommending the appointment of a qualified panel. The Director-General, if satisfied that there is need for a qualified panel, shall arrange for the constitution of the panel. The panel shall consist of:
 - (A) the appointed independent valuer;
 - (B) the Director-General, or her nominee; and/or
 - (C) the President of the Law Society of NSW or his nominee.

The independent valuer, upon receiving advice from the qualified panel shall determine a fair and reasonable acquisition price and/or the terms upon which the property is to be acquired.

- (c) The Applicant shall bear the costs of any valuation or survey assessment requested by the independent valuer, panel, or the Director-General and the costs of the determination referred to in subclauses (a) and (b).

- (d) Upon receipt of a determination pursuant to subclauses (a) and (b) herein, the Applicant shall, within fourteen days offer in writing to acquire the relevant property at a price not less than the acquisition price so determined. Should the Applicant's offer to acquire not be accepted by an owner within six (6) months of the date of such offer, the Applicant's obligations to purchase the property shall cease.
 - (e) In the event, by mutual agreement between the parties, that part only of the property is to be transferred to the Applicant, the Applicant agrees to pay all reasonable costs associated with obtaining Council approval to any plan of subdivision and registration of the plan at the Office of the Registrar-General.
 - (f) This clause does not apply to the holder of an authority under the Mining Act 1992.
3. In respect of a request to purchase any property from the holder of an authority under the Mining Act 1992 arising out of clause 1 the Applicant agrees to negotiate with the holder appropriate acquisition arrangements to the satisfaction of both parties.

11.2

Contributions to Council

The Applicant shall pay a financial contribution to the Council pursuant to Section 94 of the Environmental Planning and Assessment Act 1979 in accordance with the requirements of its Section 94 Contributions Plan.

11.3

Cumulative Impact Assessment

- 1.
 - (a) In the event that the cumulative impact of dust or noise contributed by the operation of the Mount Pleasant development and other nearby coal mining activities, at residences in the vicinity of the mine, is in excess of the noise or dust criteria contained in these conditions of consent, the Applicant shall negotiate with the other mining companies appropriate arrangements to contribute to the amelioration of the impacts of the exceedances of dust emissions or noise.
 - (b) If such cumulative impacts cannot be satisfactorily ameliorated, then the Applicant shall contribute towards the acquisition of the subject affected properties, in proportion to the amount of dust or noise impact.
 - (c) The provisions of this condition specifically apply to cumulative impact existing associated with the operation of the Mount Pleasant development and future coal mining activities in the Muswellbrook area.
- 2. If agreement on appropriate contributions towards acquisition cannot be reached, then the Director-General may appoint an independent panel to resolve the matter. The membership of the independent panel shall be as determined by the Director-General. The independent panel shall determine the responsibilities of each of the mining companies. The decision of the independent panel shall be final and binding on all parties. The responsibilities of the mining companies and the landowner as described in Condition 11.1(2) will apply.

12.

FURTHER APPROVALS AND AGREEMENTS

- 1. The Applicant shall ensure that all statutory requirements including, but not restricted to those set down by the Local Government Act, 1993, Pollution Control Act, 1970, Clean Air Act, 1961, Clean Waters Act, 1970, Noise Control Act, 1975, Protection of the Environment Administration Act 1991, Protection of the Environment Operations Act 1997, National Parks and Wildlife Act 1974 and

all other relevant Legislation, Regulations, Australian Standards, Codes, Guidelines and Notices and to the requirements of Council, the EPA, DMR, NPWS, DLWC, NSW Agriculture, RAC, RTA and other relevant agencies are fully met.

2. The Applicant shall liaise with the Council to monitor local housing demand during the construction stage of the project, and in the event of shortage of rental accommodation as determined by Council, provide additional temporary accommodation facilities for use by its construction workforce.

Notes:

1. **This approval does not relieve the Applicant of the obligation to obtain any other approval under the Local Government Act 1993 as amended, the Ordinance made thereunder including approval of building plans, or any other Act.**
2. **Any acceptable levels relating to noise, dust deposition rates, air blast overpressure and vibration etc, contained in this consent are maximum levels. Other agencies, such as the EPA, may grant approvals/licences for certain aspects of the development, which may include consideration of matters such as noise levels.**

These regulatory processes generally occur after development consent is granted. Some licences (such as Pollution Control Licences) are renewable annually and may require emission levels that are more stringent than those contained in this consent. This may occur where an agency receives additional information indicating that the emission levels approved in the development consent, are not sufficiently stringent to protect social and/or natural environmental quality.

SCHEDULE TO CONDITIONS 6.2.1 AND 6.4.2

PROPOSED MOUNT PLEASANT OPEN CUT COAL MINE

**PRIVATE PROPERTIES WITH DWELLINGS (OTHER THAN THOSE OWNED
BY THE APPLICANT OR OTHER COAL MINES) IDENTIFIED AS LOCATED
IN THE AREAS OF AFFECTATION FOR NOISE AND DUST**

Property EIS No.	Owner	Area (ha)	Land Description
1	Kropp R & J	40.4700	Lot 166, 167 DP750926
2	Lonergan JA	89.0300	Part Lot 1 DP223787
16	Casey GM	270.0000	Lot 86,152-160 DP 750926 + Lot 94 DP 665393
22	Lonergan JA	64.6000	Por 28, 45 DP 750926 Lot 1 DP 313392
25	Fell CM	16.1600	Pt lot 19 DP 750926
27	Casey M	78.3100	Por 16, 26, 71, 43, 177 DP 750926
34	Lonergan PJ	38.0400	Por 92, 184, 241 DP 750926
35	Watts WF & PJ	17.7000	Por 44 pt Por242 DP 750926
47	Farrell R & S	40.0000	Lot 1 DP 791576
48	Farrell M & W	40.0000	Lot 2 DP 791576
50	Yore KJ & GM	81.4100	Lot 164 DP 635272
57	Lecky KG & JA	11.0300	Lot 1 Sect 1 DP 192121
59	Blake TJ	295.4000	Pt Lot 3 DP 750926
63	Bates CF & GP	251.3300	Lot 4 DP 801249, Por 143, pt 144, pt 145 DP 760926
66	Rosebrook P/L	231.1000	Pt Por 3 DP 750926
69	Schiegel JG & FA	12.3400	Lot 2 Sec 1 DP 192121
73	McLean MA & RE	14.7000	Lot 1, 2 DP 745369
75	Hugo D & J	30.7600	Lot 1, 2 DP 780673
77	O'Keefe OJ & ors	14.3000	Lot 21 DP 554140
79	Riley AJ & A	40.1300	Lot 1 DP 544039 Lot 2 DP 629491
80	Sciven G	9.6470	Lot 22 & 23 Sec 3 Rosebrook Estate
82	Ellis N & R	4.7220	Lot 25 Sec 3 Rosebrook Estate
85	Lawrence R & M	4.5180	Lot 3 DP 629491
121	Skippen SE	0.1884	Por 282 DP 750926
130	Moore C & J	0.3678	Lot 51 DP 811580
131	Moore D & P	0.6896	Lot 52 DP 811580
133	Hayes J	3.2420	Lot 4 DP 749716
136	Budden GB & DM	3.8100	Lot 50 DP 809718
137	Budden GG & PE	3.6420	Lot 51 DP 809718
141	Gray ML	3.7250	Lot 42 DP 535882 Lot 1 DP 157288 Lot 121 DP 530440
143	Barry TD	0.6981	Lot 2, 3 DP 210452
146	Chalker BG	0.0670	Lot K DP 38685
148	Gibson JS	0.0670	Lot H DP 38685
149	Wilton BL	0.0733	Lot 41 DP 535882
154	Mather AJ	0.0790	Lot C DP 38685
155	Austin C	0.0853	Lot B DP 38685
156	Collins WF	0.1315	Lot A DP 38685 + adjoining land.
157	Gray RP	0.1081	Lot 1 DP 38679
159	Seaby EA & MD	0.1669	Lot 3, 4 DP 38679
160	Roach FW & YL	0.2087	Lot5, 6, 7 DP 38679
163	Jazipa P/L	0.0784	Lot 11 DP 38679
170	Simpson JM	0.0993	Lot 1 DP 38533
172	George VC & NA	0.0696	Lot 3 DP 38533
174	Galvin RJ	0.0696	Lot 5 DP 38533
183	Parkinson RB & SA	1.2000	Lots 1, 2, 3, 4, 5, & 6 Sec 20 DP 758554
198	Hoath C & N	4.0460	Lots 3, 4, 5 & 6 Sec 28 DP 758554 + P.O. 69/14
201	Paton G	1.1880	Lot 268 DP 567444, Lot 4 Sec 29 DP 758554

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Appendix B

Noise and vibration study

Mount Pleasant Project Modification

Noise and Vibration Assessment

Prepared for Coal & Allied Operations Pty Limited | 27 September 2010

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Mount Pleasant Project Modification

Final

J10004 | Prepared for Coal & Allied Operations Pty Limited | 27 September 2010

Prepared by Najah Ishac

Reviewed by Luke Stewart

Position Director

Position Director

Signature



Signature



Date 27 September 2010

Date 27 September 2010

This Report has been prepared in accordance with the brief provided by the Client and has relied upon the information collected at or under the times and conditions specified in the Report. All findings, conclusions or recommendations contained within the Report are based only on the aforementioned circumstances. Furthermore, the Report is for the use of the Client only and no responsibility will be taken for its use by other parties

Document Control

Version	Date	Prepared by
1	13 May 2010	Najah Ishac
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3	27 May 2010	Najah Ishac
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Executive summary

This noise and vibration study was prepared for Coal & Allied Operations Pty Limited (Coal & Allied) to assess environmental noise emissions resulting from its proposed modifications of the Mount Pleasant Project (the Project).

Mining studies and an environmental impact statement (EIS) were completed in 1997, with a development consent granted in 1999. The Mount Pleasant Project has approval to extract up to 10.5 million tonnes of run-of-mine (ROM) coal per year. It is located approximately four kilometres (km) north-west of Muswellbrook, in the Upper Hunter Valley of New South Wales (NSW).

Coal & Allied has reviewed the Mount Pleasant Project as part of its normal investment decision-making process to ascertain the design and cost of a project that may be constructed and deliver coal to Port by 2014. The design will be generally in accordance with the development consent but certain minor modifications have been identified as necessary for operational effectiveness; these are the subject of this modification. From a noise perspective, the key changes include provision of an optional conveyor/service corridor, to be located in an envelope, as an alternative to the approved rail line and rail loop and loader facilities, including load out conveyor and bin. The other change comprises possible adjustments to the specific location of coal processing infrastructure within an infrastructure envelope. This is to provide flexibility during the detailed design and construction in place of the specific locations detailed in the EIS.

The following noise and vibration impact assessment report adopts the Department of Environment, Climate Change and Water (DECCW) Industrial Noise Policy (INP) to establish project specific noise criteria for the entire project and to address impacts as a consequence of the proposed modifications. The focus of the assessment is therefore on residential locations potentially affected by these modifications. However, at the request of the Department of Planning and DECCW, the study also includes an INP assessment of the approved worst case mine plan, as identified in the EIS, on the broader surrounding community. The main difference in the assessment under the INP policy is the adoption of the Leq noise metric over the L_{10} level, and a more thorough and clear assessment approach for adverse weather conditions.

ES1 Existing environment

Residential properties are located in or around the town of Muswellbrook which lies to the east-south-east of the Mount Pleasant Project, South Muswellbrook and Muswellbrook Racecourse which lie to the south-east, and Kayuga which lies to the north-north-east. Residential properties are also spread along the eastern boundary of the Mount Pleasant Project area and more isolated residences are located further to the east, south-west and south.

Rating background levels (RBL) for the mine surrounds were derived from recent long term unattended noise monitoring, conducted quarterly as part of the site's ongoing baseline surveys, or from published noise assessments for neighbouring mines.

ES2 Impact assessment

ES2.1 Assessment locations

The INP based noise criteria have been derived for residential properties around the site, including the seven monitoring locations defined in the EIS prepared in 1997. A total of 156 privately owned residential assessment locations were identified.

ES2.2 Existing consent limits

The existing consent limits for the site are based on the EIS study, which apply now out dated noise criteria. The Department of Planning has requested an assessment in accordance with the DECCW INP.

ES2.3 Noise and vibration criteria

ES2.3.1 Operational noise criteria

The site has a current consent to mine that includes operational noise limits based on the guidelines that existed in 1997. However, these guidelines have since been superseded by the DECCW's INP in 2000. To bring the project up to current standards for noise assessment, the INP has been used for this assessment.

The DECCW's current sleep disturbance criterion was adopted for this assessment, which is that L_{max} noise from a source should not exceed the existing background noise level by more than 15 dB.

The blast noise and vibration criteria have not changed since the consent was issued. Hence, the consent criteria will apply to the current project. Given that the mining aspect of the current project is substantially the same as the approved operation, the EIS blast noise and vibration assessment remains valid.

ES2.3.2 Construction noise criteria

The aspect of the project to which construction noise criteria would apply is the construction of the optional conveyor/service corridor. All other construction aspects of the project were addressed in the EIS.

The DECCW's Interim Construction Noise Guideline (ICNG) (2009) provides the current and most relevant guidance for construction noise assessment, and was adopted for this assessment.

ES2.4 Assessment against operational noise criteria

ES2.4.1 Methodology

The prediction of noise from operations was undertaken using the Environmental Noise Model (ENM) prediction software. The ENM predicts total noise levels at residences from the concurrent operation of multiple noise sources. The mine plans used for modelling were those used and presented in the EIS for Years 3, 5 and 10, the years where noise impacts are expected to be highest.

The only changes to the modelling, compared to the EIS, is the introduction of the conveyor/service corridor option in lieu of the rail operation, and adjustment to the possible locations of infrastructure within an infrastructure area envelope. Both the conveyor/service corridor and the infrastructure plant were modelled at the western most extremities of their identified envelope areas. Initial assessment results for the conveyor showed that it would produce noise levels that were too high at affected residences if the noise was not mitigated. Accordingly, a cover and a shield on the western side of the conveyor are proposed at locations where the conveyor would be at ground level. Where the conveyor is elevated, it will be completely enclosed. Furthermore, provision for the procurement of the best available technology plant that will include suppression on all mobile equipment is included in this study. Together, these are considered to constitute adoption of all feasible and reasonable mitigation measures for the project.

ES2.4.2 Comparison with project specific noise criteria and property acquisition criteria

The assessment of the proposed modifications found that the conveyor, if constructed, will require a cover and consolidated solid western wall to meet noise criteria for most residences to the west of the Mount Pleasant Project area. With this measure in place, the modelling predicted that one residence would exceed DECCW's operational criteria during calm weather conditions for both day and night periods. For prevailing weather conditions, the modelling predicted that the proposed modifications would introduce impacts at assessment locations to the south-west not previously identified in the EIS. Three additional, or a total of four, residences have been identified where noise levels are predicted to be above acquisition levels that would typically be set by the Department of Planning.

The Mount Pleasant Project has been assessed in its entirety in accordance with the INP, including assessment for adverse weather conditions not previously assessed. Identified in the 1997 EIS and contained in the Schedule to Conditions 6.2.1 and 6.4.2 of the consent, are properties with predicted noise levels above possible acquisition criteria under 'calm' weather conditions. This assessment has found nine properties containing 12 residences are predicted to exceed acquisition criteria during 'adverse' weather conditions. These properties are in addition to those entitled to acquisition upon request listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent. These INP predictions are made on the same mine plan presented in the 1997 EIS, however with considerable additional reasonable and feasible mitigation measures, most notably sound suppression of mobile plant and equipment at a cost of some \$15-20M.

Coal & Allied is committed to working with communities in which they operate and extends the opportunity for upfront acquisition upon request to the four properties identified from the assessment of the proposed conveyor/services corridor (i.e. from the proposed modification) and a further nine properties from the mine that are affected under adverse conditions.

ES2.4.3 Sleep disturbance assessment

The worst case scenario was assessed for sleep disturbance at residential locations where the loudest intermittent noise ($125\text{dB(A)}L_{\text{max}}$ from a haul truck) occurred under prevailing weather conditions. The assessment indicates that predicted noise levels under prevailing weather conditions are within the DECCW's conservative sleep disturbance criterion at the majority of assessment locations shown. Exceedances are predicted for locations 43 to 45 and 135. These locations were also identified as above potential acquisition criteria.

ES2.4.4 Cumulative noise assessment

Ambient noise at assessment locations will also be influenced by adjoining industrial operations. There are two existing mining operations in the area that could contribute to noise at locations sensitive to the project's operations. These are Bengalla Mine to the immediate south and Mount Arthur Mine, south of Bengalla Mine.

The cumulative noise received at residences surrounding the Mount Pleasant Project area was projected for both calm and prevailing weather and for the worst case year of operation each for the Mount Pleasant project, Bengalla Mine and Mount Arthur Mines facilitating a conservative assessment. The results indicate that the project only dominates the noise environment at one assessment location during calm weather. However, during prevailing weather conditions, site noise dominates, or is a significant contributor, at four of the selected assessment locations. This is not unexpected given that these locations were selected on the expectation that they are potentially the most exposed to the project.

ES2.5 Assessment against construction noise criteria

The conveyor/service corridor, if pursued, will be the only construction activity not previously addressed in the EIS. The following statements assume that the conveyor/service corridor will be pursued in lieu of the rail facilities.

The construction hours for will be consistent with the requirements in the DECCW's ICNG of 7am to 6pm Monday to Friday, and 8am to 1pm on Saturdays, with no work on Sundays or public holidays. This will satisfy the main objective of the ICNG.

Based on the concurrent operation of the three or four items of construction equipment, a combined typical emission value of not more than 117dB(A) is predicted. Applying this typical sound power level for construction activity, the predicted construction noise levels were predicted for the closest and potentially the most exposed residences to the conveyor/service corridor as levels are above the 'noise affected' definition. To that end, the ICNG recommends application of all reasonable and feasible work practices and that the proponent should inform all potentially impacted residents of the nature of the work to be carried out, the expected noise levels and duration (unlikely to be not more than six months), as well as contact details.

The DECCW's ICNG suggests that if construction noise exceeds the background noise level by more than 10dB, residences may be considered as 'noise affected'. Predicted results indicate that residents will not be highly noise affected according to the definition in DECCW's ICNG, however, there may be some community reaction.

ES3 Management and monitoring

The Mount Pleasant Project's existing consent conditions include practical management measures and protocols that will continue to be adopted should the proposed modifications obtain approval. These conditions include Condition 6.4 (Noise Control) and Condition 11.1 (Area of Affection- Land Acquisition including resolution of disputes). However, the now outdated L_{10} based noise criteria outlined in Condition 6.4 will be replaced by the INP derived Leq noise criteria. These criteria are referenced as Project Specific Noise Criteria and outlined in Table 6.3 of this report and will form part of the detailed noise monitoring programme for the Mount Pleasant Project.

The following items are believed to constitute relevant feasible and reasonable measures that will be adopted for this project and that have been included in noise modelling:

- plant will operate in less exposed areas during the more sensitive night period (consistent with the EIS);
- a cover and a shield on the western side of the conveyor at locations where the conveyor would be at ground level. Where the conveyor is elevated, it will be completely enclosed; procurement of new and best available technology plant;
- provision of noise suppression on all mobile plant. It anticipated that the noise suppression technology will require in outlay of capital expenditure of between \$15M and \$20M; and
- updating the comprehensive operational noise management plan to include real-time back to base noise monitoring using the best available technology.

i Proposed modifications

In addition to the feasible and reasonable mitigation measures, properties 43, 44, 45 and 263 will be provided with the opportunity of upfront acquisition rights.

ii Broader mine context

Although the mine plan and operations are not changing from those in the EIS, the proponent is committed to the procurement of best available technology plant and mobile equipment including noise suppression on all mobile plant. This is the single most effective management measure that will be adopted. In addition, nine properties containing 12 residences identified in this study to be affected above acquisition levels under 'adverse' weather conditions will be provided with the opportunity for upfront acquisition. This is in addition to those properties in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent identified as affected under 'calm' weather conditions in the 1997 EIS.

iii General and whole of operations

A detailed noise management plan (NMP) will include the appropriate management actions as required under the existing development consent.

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1 Introduction

This report was prepared for Coal & Allied Operations Pty Limited (Coal & Allied) to assess environmental noise emissions resulting from its proposed modifications of Mount Pleasant Project.

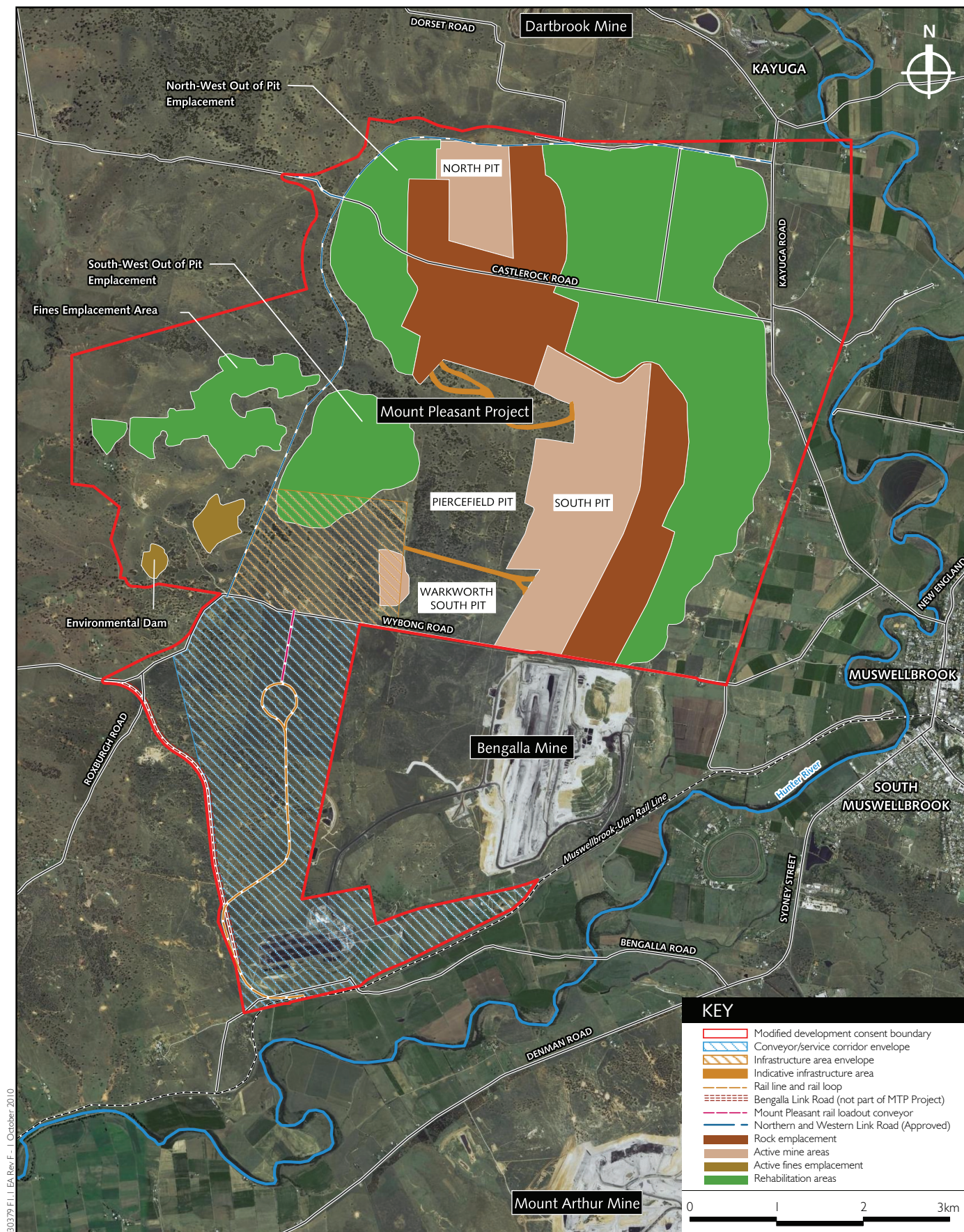
Coal & Allied obtained an Authorisation to Prospect in 1992 (Auth 459) for exploration of the Mount Pleasant resource. Mining studies and an environmental impact statement (EIS) were completed in 1997, with a development consent granted in 1999 under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act), referred to as Development Consent DA 92/97. The consent was for 21 years to 2020.

The Mount Pleasant Project has approval to extract up to 10.5 million tonnes of run-of-mine (ROM) coal per year. It is located approximately four kilometres (km) north-west of Muswellbrook, in the Upper Hunter Valley of New South Wales (NSW). Figure 1 shows the location of the Project with respect to the neighbouring areas of Muswellbrook and other approved mines in the vicinity.

Coal & Allied has reviewed the Mount Pleasant Project as part of its normal investment decision-making process to ascertain the design and cost of a project that may be constructed and deliver coal to Port by 2014. The design will be generally in accordance with the development consent but certain minor modifications have been identified as necessary for operational effectiveness; these are the subject of this modification. From a noise perspective, the key changes include provision of an optional conveyor/service corridor, to be located in an envelope, as an alternative to the approved rail line and rail loop and loader facilities, including load out conveyor and bin. The other change comprises possible adjustments to the specific location of coal processing infrastructure within an infrastructure envelope. This is to provide flexibility during the detailed design and construction in place of the specific locations detailed in the EIS.

The development consent includes operational noise limits based on guidelines that existed in 1997. However, these guidelines have since been superseded by the Department of Environment, Climate Change and Water (DECCW)'s Industrial Noise Policy (INP) in 2000. The main difference in the assessment under the INP policy is the adoption of the Leq noise metric over the L₁₀ level, and a more thorough and clear assessment approach for adverse weather conditions.

The following noise and vibration study assesses the potential impacts from the conveyor/service corridor and possible infrastructure positioning changes within an infrastructure envelope. As requested by the Department of Planning (DoP) and DECCW, the potential noise impacts from the approved worst case Mount Pleasant Project mine plan (as presented in the EIS) on the broader surrounding community has been assessed in accordance with the INP, including assessment for adverse weather conditions to contemporary standards.



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2 Glossary

A number of technical terms are required for the discussion of noise and vibration. These are explained in Table 2.1.

Table 2.1 **Glossary of 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.
DECCW	The NSW Department of Environment, Climate Change & Water.
ECRTN	Environmental Criteria for Road Traffic Noise policy (Published by the Environment Protection Authority (now DECCW) in 1999).
ENM	Environmental Noise Model – Noise prediction software developed by RTA Technology
INP	NSW Industrial Noise Policy (Published by the Environment Protection Authority (now DECCW) in 2000).
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 Leq noise level measured over a contiguous 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. The RBL is used to determine the intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
SI	SI ("Still Isothermal") refers to calm weather conditions (ie. The absence of any wind or temperature gradients).
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.
(σθ) sigma-theta	The standard deviation of horizontal wind fluctuation.

It is useful also to have some appreciation of the scale of decibels, the unit of noise measurement. The following gives some practical indication as to what an average person perceives about changes in noise levels:

- differences of less than approximately 2dB are imperceptible in general, ie, most people would find it difficult to discern which is the louder of two noise sources having levels within 2dB of each other; and
- a difference in noise levels of around 10dB appears as either doubling or halving of loudness.

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3 Properties around the mine and the existing environment

3.1 Modelled assessment locations

The potential noise from mining operations has been predicted for the potentially most exposed privately owned residential assessment locations around the proposed conveyor/service corridor. A second set of predictions are also presented for identified privately owned residences within the broader area, updating the assessment of the entire mine operation to current standards promulgated in the DECCW's INP.

A total of 156 assessment locations were identified and INP based criteria derived. At the time of the assessment, these noise sensitive residences were all privately owned properties. The property numbering presented is a new expanded numbering system capturing a broader range of privately owned residences and is different to the numbering system presented in the 1997 EIS. These properties are illustrated in Figures 3.1a to 3.1d and shown in Table 3.1, along with their corresponding 1997 EIS number where relevant for reference. The previous EIS assessment identified 170 properties and assessed noise at seven representative locations.

The locations of residences were identified by the Proponent using aerial photographic images and, where possible, verified in the field but limited to publicly accessible locations. The locations are regarded as a comprehensive list and those potentially most exposed to noise from the operations. However, it may be possible that some properties may be missed and others incorrectly identified as residences when they are not. This is inherent with the methods that are available for residence mapping.

Table 3.1 Residential assessment locations

Assessment location			MGA coordinates	
No.	Name	EIS No. (1997)	Easting	Northing
4	JIM ROD SCRIVEN	232	299200	6425203
5	MARTIN JOSEPH DRAKE	234	299163	6425532
6	MUSWELLBROOK RACE CLUB LIMITED	250	298604	6426145
7	BERYL DOROTHEA ENGLEBRECHT, JEFFREY NOEL ENGLEBRECHT	235	298473	6426131
19	DOUGLAS PETER ENGLEBRECHT	249	299123	6426787
20	KENNETH BRIAN BARNETT, JOSEPHINE ANNE BARNETT	248	298869	6426833
21	MARK JAMES MCGOLDRICK	247	298806	6426827
23	JABETIN PTY. LIMITED	229	299050	6427372
35	CHRISTOPHER HORNE	74	299982	6428585
43	JONATHON BUCHANAN MOORE	97	292290	6429006
44	JONATHAN BUCHANAN MOORE	Not Listed	291404	6428662
45	BRADLEY ATHOL STRACHAN, TRACEY ELIZABETH STRACHAN	Not Listed	291261	6428282
47	BRUCE LEONARD BATES, MARY LLEWELLYN BATES	96	291279	6429623
67	JUDITH MARY SIMPSON	170	299896	6429209
68	RAYMOND KEITH GOOGE, NOELENE VALETTA GOOGE	72	299977	6429064
74	NIKOLA SORMAZ, MARIA SORMAZ	177	300002	6429277
77	LAWRENCE JAMES PURSER, DOREEN MILLICENT PURSER	Not Listed	300330	6429503
78	WARREN JOHN ADNUM	Not Listed	300623	6429412
79	WARREN JOHN ADNUM, DARREN WARREN ADNUM	Not Listed	300569	6429455
80	WARREN JOHN ADNUM	Not Listed	300555	6429474
82	CHRISTINE KAREN BIRCH	Not Listed	301017	6429175

Table 3.1 Residential assessment locations

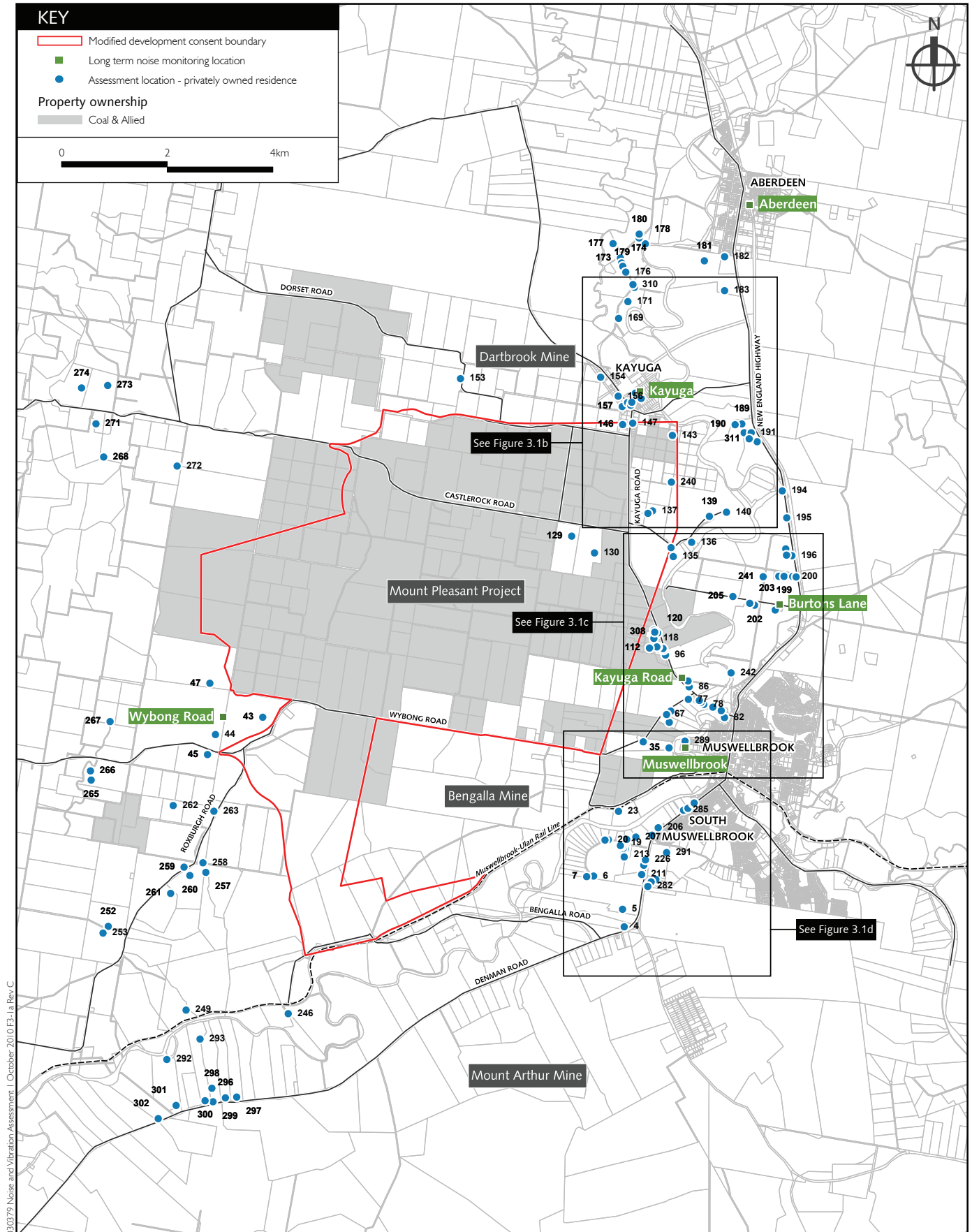
Assessment location			MGA coordinates	
No.	Name	EIS No. (1997)	Easting	Northing
83	LEONARD GEORGE KELMAN, CAROL MAY KELMAN	Not Listed	300955	6429303
84	WALTER JOHN PITMAN	Not Listed	300795	6429366
86	COWTIME INVESTMENTS PTY LIMITED	71	300339	6429740
96	RICHARD PAUL GRAY	157	299879	6430328
101	CYRIL AUSTIN	155	299842	6430422
102	ALAN J. P. S. MATHER	154	299831	6430450
107	BRENDAN LINDSAY WILTON	149	299731	6430479
108	JOHN STEPHEN GIBSON	148	299714	6430479
112	BRENDAN DOUGLAS BARRY	143	299574	6430454
118	JOHN & CHRISTINE HAYES	133	299653	6430636
120	DOUGLAS LLOYD MOORE, PAMELA ANN MOORE	131	299722	6430738
121	CARL MOORE, JENNIFER MAY MOORE	130	299654	6430790
129	RODNEY MICHAEL FARRELL, SYLVIA DIANNE FARRELL	47	298062	6432531
130	MICHAEL JOHN FARRELL	48	298498	6432223
135	KEITH JOSEPH YORE, GEORGINA MASKERY YORE	50	299990	6432183
136	DAVID GEORGE YORE	122	300332	6432458
137	DOUGAL HAMISH HAMILTON MACINTYRE	29	299580	6433036
138	DOUGAL HAMISH HAMILTON MACINTYRE	29	299494	6432987
139	RODNEY WILLIAM UPTON, LOLA PATRICIA UPTON	123	300658	6432953
140	DAPKOS PTY. LIMITED	51	300980	6433039
143	JAMES STEPHEN LONERGAN, NELLIE MARIA LONERGAN	275	299928	6434462
146	COLIN RODNEY HOATH, NERIDA JOAN HOATH	198	298983	6434647
147	MAXWELL JOHN ADNUM, ROBERT GEORGE ADNUM	199	299175	6434679
153	GAVIN MICHAEL CASEY	16	295901	6435451
154	PETER DAVID STANDING, FLORA STANDING	193	298550	6435532
156	JOHN EDWARD LONERGAN, JOHANNA LAMBERTINA LONERGAN	180	298890	6435181
157	REGINALD BRUCE PARKINSON, SHIRLEY ANN PEBERDY	183	298969	6434987
158	JULIEANN MAREE HOATH	187	299069	6435064
159	JOHN ERLE DUCEY, MAYSIE SARAH DUCEY	214	299129	6435015
161	JAMES S. & NELLIE M. LONERGAN	207	299214	6435247
169	CHARLES STANLEY WATTUS	265	298868	6436646
171	CHARLES STANLEY WATTUS	265	299038	6436964
172	RAYMOND LINDSAY THOMPSON, CHERYL ELIZABETH THOMPSON	258	299155	6437236
173	SCOTT ANTONY WALKLATE, LEANNE NICOLE WALKLATE	262	298879	6437783
174	TYRONE JAMES POWER, MARY LILLIAN POWER	262	298904	6437690
175	TYRONE JAMES POWER, MARY LILLIAN POWER	262	298926	6437626
176	RONALD JAMES PAGE, MERRILYN RUTH PAGE	263	298987	6437518
177	FRANK WILLIAM WHEATLEY, HELEN MARY WHEATLEY, SCOTT ANDREW WHEATLEY	261	298735	6438051
178	PAMELA ANN NEELY	259	299346	6438058
179	FRANK WILLIAM WHEATLEY	260	299226	6438168
180	F. A. WHEATLEY & SON PTY LIMITED	260	299226	6438240
181	K.L. & H.R. DAY PTY. LIMITED	257	300468	6437761
182	JOHN GREGORY SADLER, AVERIL JOSEPHINE SADLER	257	300849	6437846
183	K.L. & H.R. DAY PTY. LIMITED	257	300863	6437207
189	THOMAS JAMES O'BRIEN, OLIVE BEVERLEY O'BRIEN	272	301237	6434704
190	THOMAS JAMES O'BRIEN, OLIVE BEVERLEY O'BRIEN	272	301111	6434688
191	JOHN ANDREW FIBBINS, JULIE ELIZABETH FIBBINS	Not Listed	301417	6434542
192	IAN GEORGE INGLE, CATHRYN WENDY INGLE	Not Listed	301286	6434539
193	GEOFFREY MACDONALD SMITH, KATHLEEN LYNETTE SMITH	273	301533	6434376

Table 3.1 Residential assessment locations

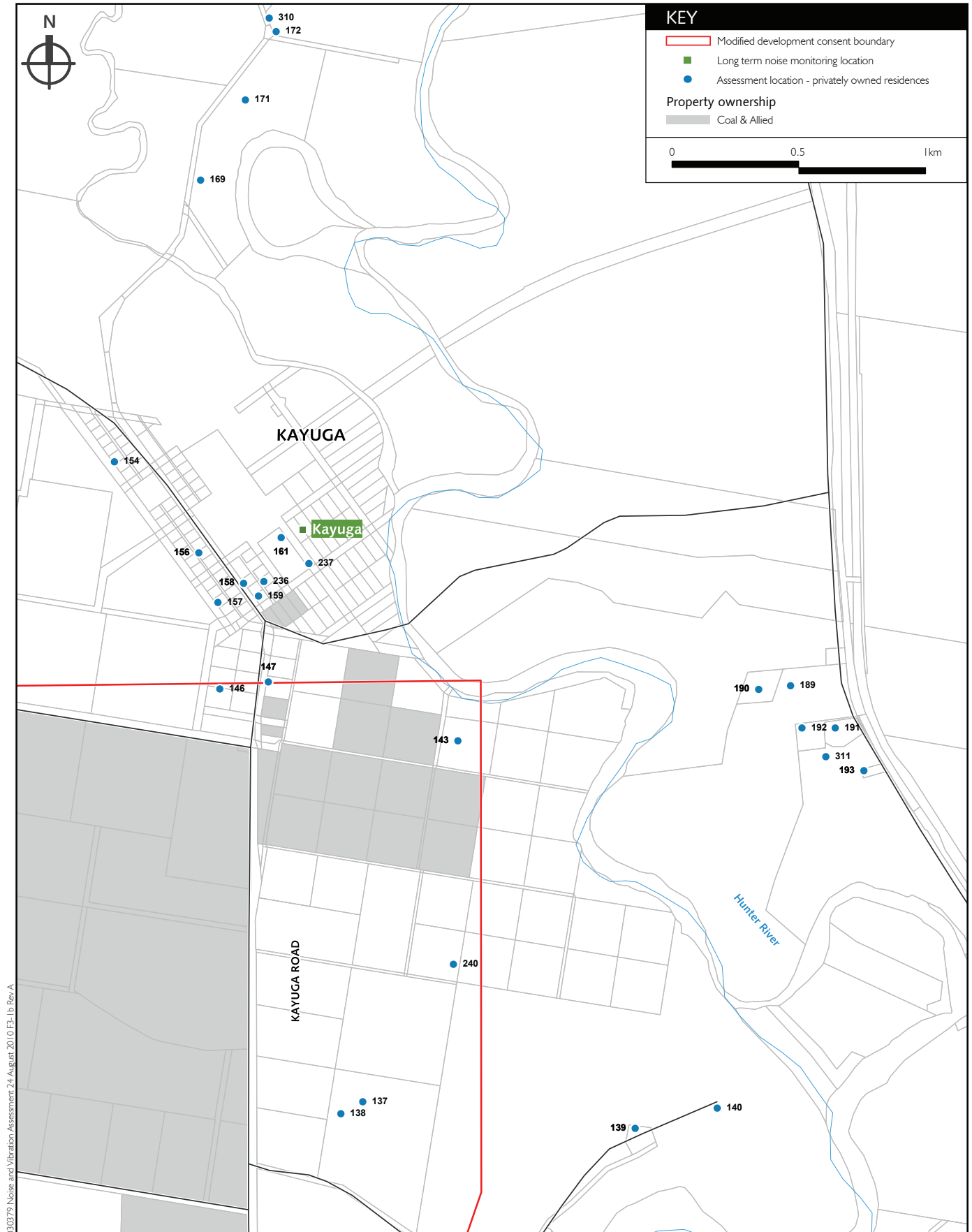
Assessment location			MGA coordinates	
No.	Name	EIS No. (1997)	Easting	Northing
194	TYRONE CHARLES HARRIS, JANINE BEVERLEY ANNE HARRIS	Not Listed	302027	6433461
195	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302121	6432956
196	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302233	6432245
197	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302113	6432371
198	THOMAS JOSEPH GOLDRICK, NORA PATRICIA GOLDRICK	Not Listed	301993	6431851
199	NORMAN ALLEN BURLING, HELEN MARY BURLING	Not Listed	302093	6431851
200	ROBERT EASTON, CHRISTINA ROSEMARY EASTON	Not Listed	302255	6431854
201	NEVILLE BRUCE COLLINS, ROBERT PATRICK COLLINS	Not Listed	302321	6431845
202	ROBERT NEIL RAPHAEL, MARGARET HASLETT RAPHAEL	55	301545	6431298
203	ROBERT FREDERICK MILLARD, MARGO ANNE MILLARD	55	301453	6431332
204	ROBERT NEIL RAPHAEL, MARGARET HASLETT RAPHAEL	Not Listed	301938	6431215
205	DAPKOS PTY LIMITED	54	301132	6431455
206	WALTER JAMES HARDES	Not Listed	299805	6427078
207	SCOTT WILLIAM BARKLEY, KERRY LYN BARKLEY	Not Listed	299388	6426895
208	FRANCIS KELVIN ALMOND, WALTER DAVID GEORGE ALMOND, PETER WILLIAM HUME	Not Listed	299175	6426789
211	JUSTIN PETER DRAKE	Not Listed	299511	6426193
212	DANIEL RUDOLPH TUBB, CAROLINE JOY TUBB	Not Listed	299549	6426367
213	ENGLEBRECHT RACING STABLES PTY. LIMITED	Not Listed	299180	6426554
214	ROSS STANLEY CRIDLAND, JOSEPHINE TERESA CRIDLAND	Not Listed	299186	6426577
215	AMANDA CAROL GOOD	Not Listed	299187	6426610
216	NARELLE JOY KEEVERS	Not Listed	299192	6426637
217	SCOTT MATTHEW BREDDEN	Not Listed	299196	6426666
218	SUSAN YVONNE JOHNSON	Not Listed	299139	6426581
219	GAVIN LESLEY ANDREWS, IAN LESLEY ANDREWS	Not Listed	299140	6426603
220	REBECCA ANN BYRNES, MICHAEL ADAM MOLLER	Not Listed	299147	6426639
221	TREVOR DOUGLAS BARRON	Not Listed	299152	6426677
222	MARK LESLIE SWEENEY, ELIZABETH ANN SWEENEY	Not Listed	299154	6426714
223	MICHAEL CRAIG DOBIE, LESA JOAN DOBIE	Not Listed	299127	6426717
224	JOHN ROBINSON, DOROTHY LYNETTE ROBINSON	Not Listed	299099	6426728
225	JASON ROGER GLEESON, MELANIE RUTH CRANFIELD	Not Listed	299210	6426700
226	JASON ROGER GLEESON, MELANIE RUTH CRANFIELD	Not Listed	299577	6426470
229	CHRISTOPHER HORNE	74	299491	6428687
231	DOUGLAS LAURENCE WICKS, FRED A ROSE WICKS	Not Listed	300535	6429486
236	JOHN ERLE DUCEY, MAYSIE SARAH DUCEY	214	299149	6435073
237	JAMES S. & NELLIE M. LONERGAN	207	299326	6435147
240	DOUGAL HAMISH HAMILTON MACINTYRE	29	299927	6433584
241	COWTIME INVESTMENTS PTY LIMITED	Not Listed	301696	6431837
242	ROBERT NEIL RAPHAEL, MARGARET HASLETT RAPHAEL	Not Listed	301126	6430019
246	MICHAEL THEODOR CHUDYK	103	292887	6423440
249	TREVOR WAYNE ROOTS	Not Listed	290956	6423468
252	RAYMOND MORRIS MERRICK, KATHLEEN FRANCIS MERRICK	Not Listed	289453	6425012
253	RAYMOND MORRIS MERRICK, KATHLEEN FRANCIS MERRICK	Not Listed	289356	6424885
257	PETER GERARD LANE, CATHERINE MARY LANE	269	291276	6426065
258	NEVILLE JOHN ELLIS, RUTH YVONNE ELLIS	Not Listed	291218	6426245
259	MARK ROBERT PEEL	Not Listed	290862	6426156
260	PETER STUART JOHN MURRAY	Not Listed	290976	6425999
261	PETER RAYMOND ELLIS	Not Listed	290620	6425657
262	REGINALD BRUCE PARKINSON, SHIRLEY ANN PARKINSON	Not Listed	290634	6427309
263	RAYMOND ROBERT HAMILTON, JANICE MARY HAMILTON	Not Listed	291404	6427218
265	REGINALD BRUCE & SHIRLEY ANN PARKINSON	Not Listed	289073	6427757

Table 3.1 Residential assessment locations

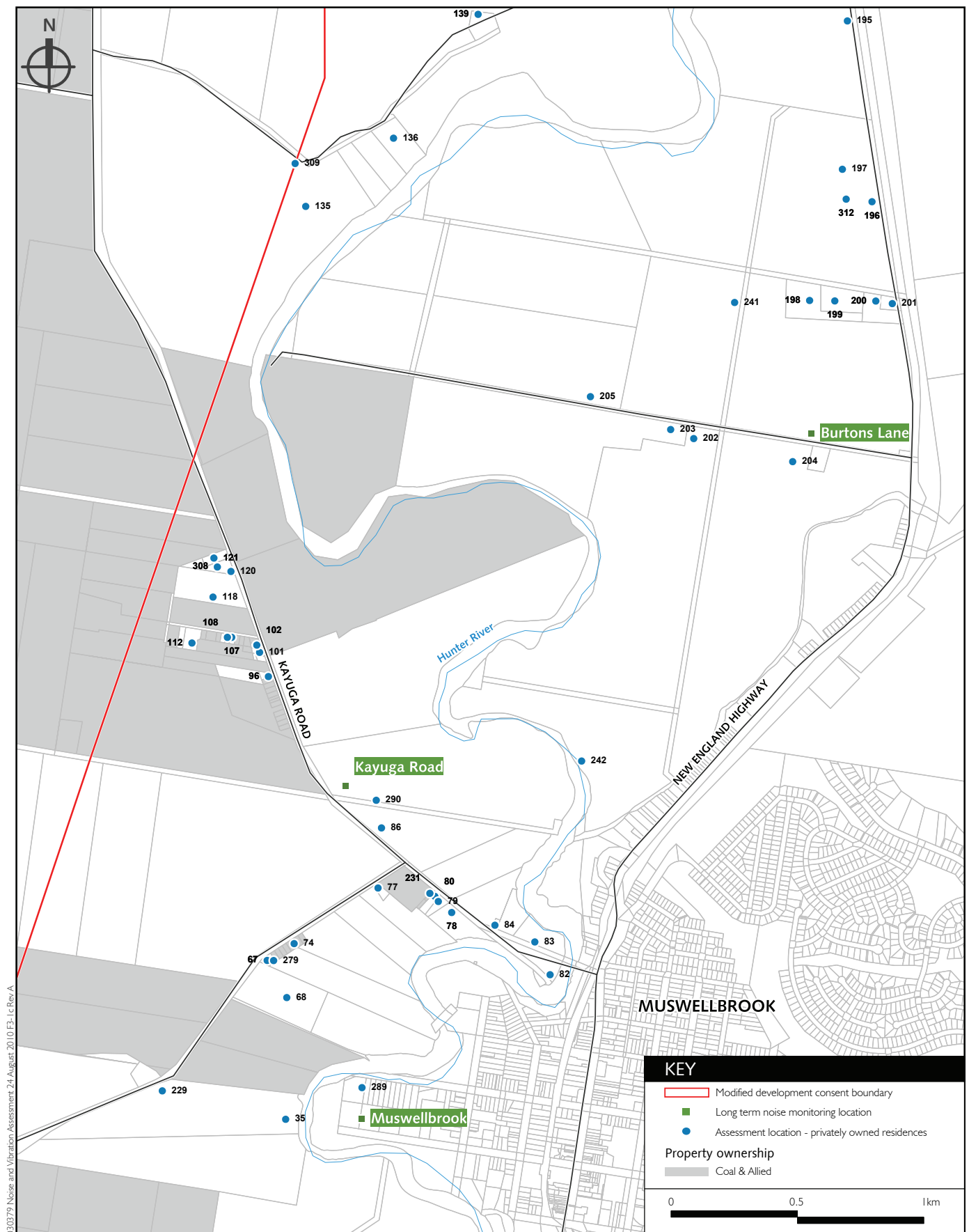
Assessment location			MGA coordinates	
No.	Name	EIS No. (1997)	Easting	Northing
266	REGINALD BRUCE & SHIRLEY ANN PARKINSON	Not Listed	289056	6427928
267	JOHN EDWARD LONERGAN, JOHANNA LAMBERTINA LONERGAN	Not Listed	289407	6428864
268	JOHN DOUGLAS VANDENBERGH	Not Listed	289182	6433840
271	DONALD SCOTT MACDOUGALL, DIANNE ELIZABETH KILGANNON	Not Listed	289024	6434460
272	GRAEME CARL SPARRE	277	290574	6433697
273	IAN JAMES RICHARDS, CHRISTINE MAREE RICHARDS	Not Listed	289230	6435187
274	SEAN LEECE, ELIZABETH LESLEY LEECE	Not Listed	288737	6435130
279	REGINALD BRUCE PARKINSON	171	299922	6429209
280	MONADELPHOUS PROPERTIES PTY LTD	Not Listed	299782	6426105
281	JOHN RICHARD BUCKLEY, JUDITH ANN BUCKLEY	Not Listed	299694	6426057
282	DULCIE JOAN HALLETT, KIM LEE CAMPBELL, JOHN CAMPBELL, SUE ELLEN HALLETT, JAMES EWEN ANDERSON, TREVLYN PETER HALLETT, MELISSA VIVIAN HALLETT	Not Listed	299631	6425971
283	STANLEY RICHARD PHILLIP RAY, RUTH FRANCES RAY	Not Listed	299634	6425997
284	WALTER JAMES HARDES	Not Listed	299691	6426935
285	THE NEW SOUTH WALES GREYHOUND BREEDERS OWNERS & TRAINERS ASSOCIATION LIMITED	Not Listed	300279	6427417
286	THE COUNCIL OF THE MUNICIPALITY OF MUSWELLBROOK	Not Listed	300361	6427455
287	TELSTRA CORPORATION LIMITED	Not Listed	300461	6427543
288	KELVIN IRWIN	Not Listed	300478	6427557
289	ROBERT ALAN LAWMAN, ELIZABETH ANNE LAWMAN	Not Listed	300282	6428716
290	COWTIME INVESTMENTS PTY LIMITED	71	300316	6429848
291	THE COUNCIL OF THE MUNICIPALITY OF MUSWELLBROOK	Not Listed	299974	6426612
292	GEOFFREY ROGER WALSH, MELISSA KAY WALSH	Not Listed	290613	6422532
293	MALCOLM GARRY LATHAM, LYNETTE JEAN LATHAM	Not Listed	291230	6422929
296	JANIS MAUREEN WILD	Not Listed	291733	6421834
297	JULIAN ZAHRA, ELIZABETH ZAHRA	Not Listed	291946	6421853
298	MALCOLM GARRY LATHAM, LYNETTE JEAN LATHAM	Not Listed	291473	6422011
299	JAMES THOMAS LAMBKIN	Not Listed	291501	6421757
300	MALCOLM GARRY LATHAM, LYNETTE JEAN LATHAM	Not Listed	291351	6421772
301	GEOFFREY ROGER WALSH, MELISSA KAY WALSH	Not Listed	290806	6421673
302	MALCOLM JAMES DUNCAN, MARILYN JOY DUNCAN	Not Listed	290472	6421418
305	RITA HELEN ENGLEBRECHT	Not Listed	299175	6426515
308	DOUGLAS LLOYD MOORE, PAMELA ANN MOORE	131	299668	6430755
309	KEITH JOSEPH YORE, GEORGINA MASKERY YORE	50	299945	6432351
310	RAYMOND LINDSAY THOMPSON, CHERYL ELIZABETH THOMPSON	258	299126	6437288
311	GEOFFREY MACDONALD SMITH, KATHLEEN LYNETTE SMITH	273	301382	6434428
312	THOMAS YOUNG, ROBIN KIRKLAND YOUNG	Not Listed	302130	6432254
315	FRANCIS KELVIN ALMOND, WALTER DAVID GEORGE ALMOND, PETER WILLIAM HUME	Not Listed	299215	6426847



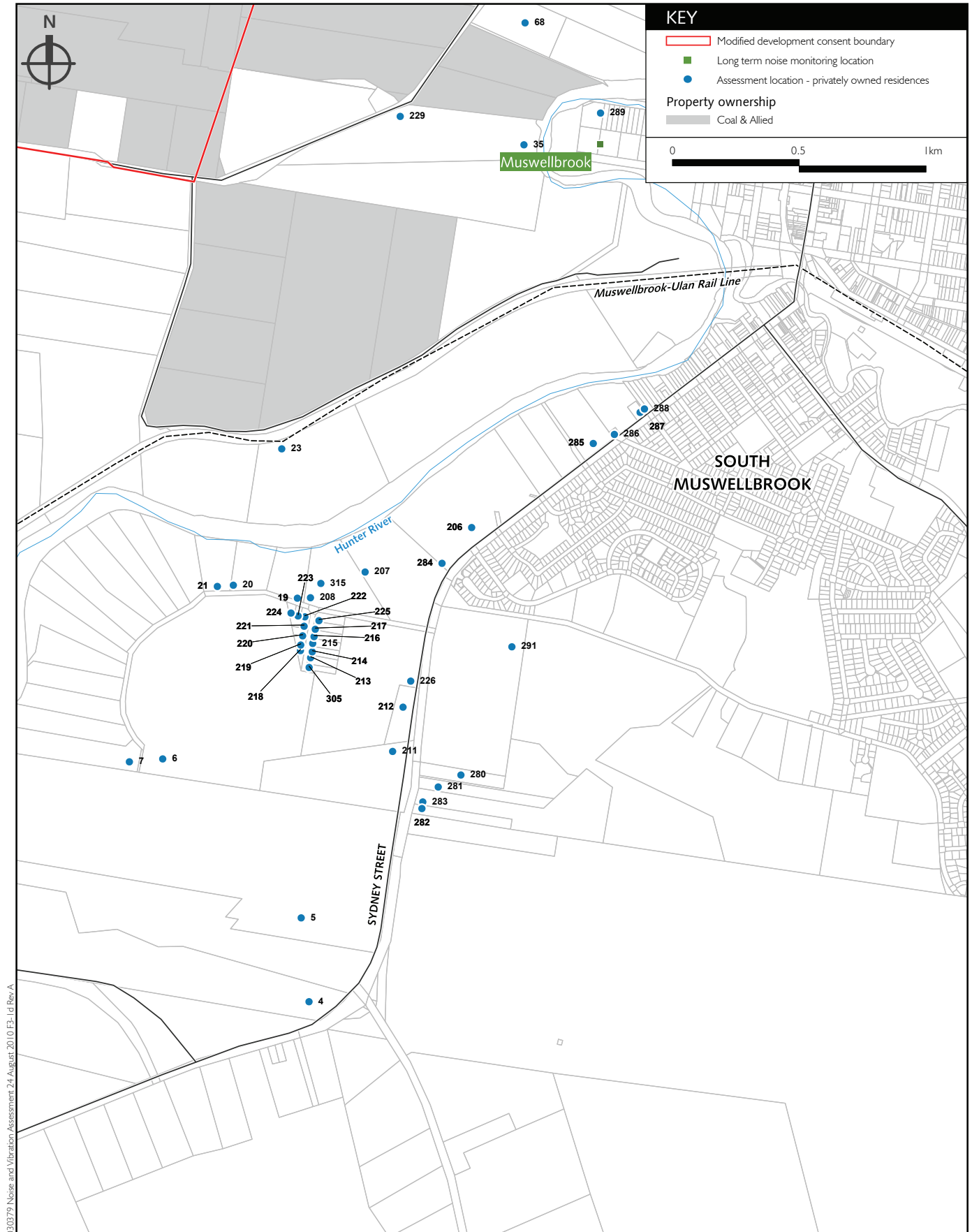
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030379 Noise and Vibration Assessment 24 August 2010 F3 - 1c Rev A



030379 Noise and Vibration Assessment 24 August 2010 F3 - 1d Rev A

3.2 Existing environment

The Mount Pleasant Project's neighbours include the town of Muswellbrook to the east-south-east with its commercial hub and surrounding suburbs. Further south east is South Muswellbrook, which is predominately a residential area. Also to the south east is Muswellbrook Racecourse, which includes residential neighbours. To the north-north-east is the town of Kayuga, and otherwise the site has residential properties spread along its eastern boundary and more isolated residences further afar to the east, south west and south. Refer to Figures 3.1a to 3.1.d.

The EIS prepared in 1997 included long term noise monitoring data at seven representative residential locations. Section 12.1 of the EIS describes the surrounding environment and details the baseline noise survey undertaken at that time. From such data, representative background noise levels were determined for the EIS, similar to how this is now done under the DECCW's INP.

However, for this assessment more recent long term unattended noise monitoring was adopted. This includes monitoring undertaken quarterly as part of the Mount Pleasant Project's ongoing baseline surveys. The most recent long term monitoring data part of these surveys was undertaken in 2009 at several representative residential locations (refer to Figure 3.1a). Another supportive source of suitable background noise monitoring data is found in the Mount Arthur Coal (MAC) Environmental Assessment Noise and Vibration Report (MAC 2009). These sources of data were used and rating background levels (RBL) were determined for this project in accordance with the INP. The RBL values are summarised in Table 3.2 and the approach documented in Appendix A. The RBL values adopted are comparable to the EIS data, granted the differences in the way the INP now requires representative background noise to be determined.

Table 3.2 Representative background noise levels (RBL)

Location		Measured RBL, dB(A) ¹			Source
Name	Relative to Site	Day	Evening ²	Night	
Burtons Lane	Far East (North of Muswellbrook), near the New England Highway	32	37	32	2009 Coal & Allied quarterly data
Aberdeen	North East	32	34	31	2010 Coal & Allied quarterly data
Kayuga	North North East	30	30	30	2010 Coal & Allied quarterly data
Kayuga Road	Near East	35	38	32	2009 Coal & Allied quarterly data
Wybong Road	South West - Conveyor area	30	30	30	2009 Coal & Allied quarterly data
Muswellbrook	South East	36	40	34	2009 Coal & Allied quarterly data
Racecourse Road	South East	38	37	36	Mount Arthur Coal 2009 EA data ³
Yammanie	South East (SE of Racecourse)	34	33	32	Mount Arthur Coal 2009 EA data ³
East Antiene, New England Hwy	SE (Applies to residences near New England Hwy east of site)	36	35	34	Mount Arthur Coal 2009 EA data ³

Notes: 1. Where RBL values below 30dB(A) was measured, the INP's minimum recommended background of 30dB(A) is adopted.

2. As per the INP application notes, where RBL values for the evening are unjustifiably higher than that for the day, the daytime or night time RBL will be adopted for the assessment.

3. Mount Arthur Coal – Consolidated Project Noise and Blasting Impact Assessment (Wilkinson Murray 2009). The raw data was not verified, although the methodology presented in the EA is considered appropriate.

3.3 Existing consent limits

The Mount Pleasant Project's existing consent limits are based on the EIS, which apply now dated noise metrics ($L_{10,15\text{minute}}$). The criteria are summarised in Table 3.3 for non-adverse and adverse conditions. The key difference between the L_{10} metric and the INP's L_{eq} metric (refer to Section 4) is that the former is the average of the maximum noise levels, and is typically higher than the L_{eq} for the same noise source. It is important to note that the impacts for locations potentially affected by the conveyor and infrastructure modifications will be similarly protected under both the previous L_{10} based consent limits and the INP's L_{eq} criteria. This is due to two reasons:

- representative background noise level adopted for potentially affected locations is the minimum possible at 30dB(A), resulting in a limit of 35dB(A) $L_{10,15\text{minute}}$ or 35dB(A) $L_{eq,15\text{minute}}$; and
- character of both the conveyor/service corridor and infrastructure plant noise is relatively constant, which implies that the L_{10} and L_{eq} emission values from such plant is typically the same.

Table 3.3 Existing consent noise acquisition limits- $L_{10,15\text{minute}}$

Location of residence	Time	Non-Adverse	Adverse
Muswellbrook Urban Area	Day (0700-2200)	40	45
	Night (2200-0700)	37	42
Other Areas	Day (0700-2200)	40	45
	Night (2200-0700)	35	40

Source: DA 92/97 Condition 6.4.3.

Under the existing consent, those properties affected above 'acquisition levels' during calm weather conditions outlined in the 1997 EIS are entitled to acquisition upon request and will continue to be protected under this acquisition entitlement. The Mount Pleasant development consent provides for a hierarchy of monitoring, mitigation then acquisition measures during operations for those affected during 'adverse' weather conditions. Only those affected above acquisition levels during 'calm' weather conditions are entitled to seek upfront acquisition upon request.

In recent years conditions of development consents/project approvals developed by the DoP now typically entitle residents affected above acquisition criteria during 'adverse' weather conditions to upfront acquisition upon request. As discussed above, an assessment in accordance with the DECCW INP was undertaken on the proposed modifications, namely the optional conveyor and change to infrastructure area. In addition, an INP assessment was undertaken for the entire project approved under the development consent to enable noise monitoring and management of the mine in accordance with contemporary standards.

4 Noise and vibration criteria

4.1 Operational noise

Industrial sites including mines in NSW that are regulated by the DoP or DECCW usually have a set of conditions for operations which include noise limits. These limits are normally derived from operational noise criteria that apply at residences and that are based on guidelines stipulated in the INP or are achievable noise limits following the application of all reasonable and feasible noise mitigation.

The current development consent includes operational noise limits based on the guidelines that existed in 1997. However, these guidelines have since been superseded by the INP in 2000. The INP has been used for this assessment.

The DECCW, in its INP, provides guidelines for assessing industrial facilities, including mines. The INP states with respect to the criteria:

“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 a proposed development. Assessment criteria for sensitive receivers near industry are based on the following objectives:

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

In order to ensure that these objectives are met, two separate criteria are prescribed by the DECCW, namely the intrusiveness criteria and the amenity criteria. A fundamental difference between the intrusiveness and the amenity criteria is that the former is applicable over 15 minutes in any period, while the latter covers the entire assessment period (day, evening and night).

4.1.1 Intrusiveness

The intrusiveness criterion requires that $L_{Aeq,15min}$ noise levels from a newly introduced source during the day, evening and night do not exceed the existing RBL by more than 5dB. This is expressed as:

$$L_{Aeq,15min} \leq RBL + 5 - K$$

where $L_{Aeq,15min}$ is the L_{eq} noise level from the source (i.e. site), measured over a 15 minute period and K is a series of adjustments for various noise characteristics. Where the RBL is less than 30dB(A), a value of 30 dB(A) is used.

Based on the monitoring data obtained from the long term surveys described in Section 3.2, the intrusiveness criteria derived for the site are shown in Table 4.1.

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		Leq,15minute intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
4	232	39	37	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
5	234	39	37	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
6	250	41	39	39	Muswellbrook data
7	235	41	39	39	Muswellbrook data
19	249	41	39	39	Muswellbrook data
20	248	41	39	39	Muswellbrook data
21	247	41	39	39	Muswellbrook data
23	229	41	39	39	Muswellbrook data
35	74	41	39	39	Muswellbrook data
43	97	35	35	35	Wybong Road data
44	Not Listed	35	35	35	Wybong Road data
45	Not Listed	35	35	35	Wybong Road data
47	96	35	35	35	Wybong Road data
67	170	40	37	37	Kayuga Road data
68	72	40	37	37	Kayuga Road data
74	177	40	37	37	Kayuga Road data
77	Not Listed	40	37	37	Kayuga Road data
78	Not Listed	40	37	37	Kayuga Road data
79	Not Listed	40	37	37	Kayuga Road data
80	Not Listed	40	37	37	Kayuga Road data
82	Not Listed	41	39	39	Muswellbrook data
83	Not Listed	41	39	39	Muswellbrook data
84	Not Listed	41	39	39	Muswellbrook data
86	71	40	37	37	Kayuga Road data
96	157	40	37	37	Kayuga Road data
101	155	40	37	37	Kayuga Road data

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		L _{eq,15minute} intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
102	154	40	37	37	Kayuga Road data
107	149	40	37	37	Kayuga Road data
108	148	40	37	37	Kayuga Road data
112	143	40	37	37	Kayuga Road data
118	133	40	37	37	Kayuga Road data
120	131	40	37	37	Kayuga Road data
121	130	40	37	37	Kayuga Road data
129	47	35	35	35	Minimum adopted
130	48	35	35	35	Minimum adopted
135	50	35	35	35	Minimum adopted
136	122	35	35	35	Minimum adopted
137	29	35	35	35	Minimum adopted
138	29	35	35	35	Minimum adopted
139	123	35	35	35	Minimum adopted
140	51	35	35	35	Minimum adopted
143	275	35	35	35	Minimum adopted
146	198	35	35	35	Kayuga Village 2010 Data
147	199	35	35	35	Kayuga Village 2010 Data
153	16	35	35	35	Minimum adopted
154	193	35	35	35	Kayuga Village 2010 Data
156	180	35	35	35	Kayuga Village 2010 Data
157	183	35	35	35	Kayuga Village 2010 Data
158	187	35	35	35	Kayuga Village 2010 Data
159	214	35	35	35	Kayuga Village 2010 Data
161	207	35	35	35	Kayuga Village 2010 Data
169	265	35	35	35	Minimum adopted
171	265	35	35	35	Minimum adopted
172	258	35	35	35	Minimum adopted
173	262	35	35	35	Minimum adopted

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		Leq,15minute intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
174	262	35	35	35	Minimum adopted
175	262	35	35	35	Minimum adopted
176	263	35	35	35	Minimum adopted
177	261	35	35	35	Minimum adopted
178	259	35	35	35	Minimum adopted
179	260	35	35	35	Minimum adopted
180	260	35	35	35	Minimum adopted
181	257	35	35	35	Minimum adopted
182	257	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
183	257	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
189	272	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
190	272	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
191	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
192	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
193	273	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
194	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
195	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
196	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
197	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
198	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
199	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		L _{eq,15minute} intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
200	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
201	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
202	55	37	37	37	Burtons Lane data
203	55	37	37	37	Burtons Lane data
204	Not Listed	37	37	37	Burtons Lane data
205	54	37	37	37	Burtons Lane data
206	Not Listed	41	39	39	Muswellbrook data
207	Not Listed	41	39	39	Muswellbrook data
208	Not Listed	41	39	39	Muswellbrook data
211	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
212	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
213	Not Listed	41	39	39	Muswellbrook data
214	Not Listed	41	39	39	Muswellbrook data
215	Not Listed	41	39	39	Muswellbrook data
216	Not Listed	41	39	39	Muswellbrook data
217	Not Listed	41	39	39	Muswellbrook data
218	Not Listed	41	39	39	Muswellbrook data
219	Not Listed	41	39	39	Muswellbrook data
220	Not Listed	41	39	39	Muswellbrook data
221	Not Listed	41	39	39	Muswellbrook data
222	Not Listed	41	39	39	Muswellbrook data
223	Not Listed	41	39	39	Muswellbrook data
224	Not Listed	41	39	39	Muswellbrook data
225	Not Listed	41	39	39	Muswellbrook data
226	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
229	74	40	37	37	Kayuga Road data

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		Leq,15minute intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
231	Not Listed	40	37	37	Kayuga Road data
236	214	35	35	35	Minimum adopted
237	207	35	35	35	Minimum adopted
240	29	35	35	35	Minimum adopted
241	Not Listed	37	37	37	Burtons Lane data
242	Not Listed	37	37	37	Burtons Lane data
246	103	35	35	35	Minimum adopted
249	Not Listed	35	35	35	Minimum adopted
252	Not Listed	35	35	35	Minimum adopted
253	Not Listed	35	35	35	Minimum adopted
257	269	35	35	35	Minimum adopted
258	Not Listed	35	35	35	Minimum adopted
259	Not Listed	35	35	35	Minimum adopted
260	Not Listed	35	35	35	Minimum adopted
261	Not Listed	35	35	35	Minimum adopted
262	Not Listed	35	35	35	Minimum adopted
263	Not Listed	35	35	35	Minimum adopted
265	Not Listed	35	35	35	Minimum adopted
266	Not Listed	35	35	35	Minimum adopted
267	Not Listed	35	35	35	Minimum adopted
268	Not Listed	35	35	35	Minimum adopted
271	Not Listed	35	35	35	Minimum adopted
272	277	35	35	35	Minimum adopted
273	Not Listed	35	35	35	Minimum adopted
274	Not Listed	35	35	35	Minimum adopted
279	171	40	37	37	Kayuga Road data
280	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
281	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).

Table 4.1 DECCW's INP intrusiveness criteria

Assessment location		L _{eq,15minute} intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
282	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
283	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
284	Not Listed	41	39	39	Muswellbrook data
285	Not Listed	41	39	39	Muswellbrook data
286	Not Listed	41	39	39	Muswellbrook data
287	Not Listed	41	39	39	Muswellbrook data
288	Not Listed	41	39	39	Muswellbrook data
289	Not Listed	41	39	39	Muswellbrook data
290	71	40	37	37	Kayuga Road data
291	Not Listed	39	38	37	MAC EIA Noise Tech Report Section 5.7 (Yammannie data).
292	Not Listed	35	35	35	Minimum adopted
293	Not Listed	35	35	35	Minimum adopted
296	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
297	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
298	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
299	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
300	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
301	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
302	Not Listed	37	36	35	MAC EIA Noise Tech Report Section 5.9 Denman Road data
305	Not Listed	41	39	39	Muswellbrook data
308	131	40	37	37	Kayuga Road data
309	50	35	35	35	Minimum adopted
310	258	35	35	35	Minimum adopted

Table 4.1 **DECCW's INP intrusiveness criteria**

Assessment location		L _{eq,15minute} intrusiveness noise criteria, dB(A)			Basis of criteria
No.	EIS No.	Day	Evening	Night	
311	273	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
312	Not Listed	41	40	39	MAC EIA Noise Report Section 5.12 New England Hwy area data
315	Not Listed	41	39	39	Muswellbrook data

Notes: Where evening RBL values are higher than night, the night time criteria was adopted for the evening period in accordance with the DECCW's INP application notes.

4.1.2 Amenity

The DECCW's amenity criterion requires industrial noise to be within an acceptable level for the particular locality and land use. Where ambient noise is already high, the acoustic environment should not be deteriorated significantly. The strategy behind the amenity criterion is a holistic approach to noise, where all industrial noise (existing and future) received at a given location does not exceed the recommended goals.

Private residences potentially affected by the Mount Pleasant Project are covered by the DECCW's suburban or rural amenity categories. For residences located in and around the areas of Muswellbrook and South Muswellbrook, the suburban category is considered suitable, while those further isolated the rural residential category is suitable. The amenity criteria taken from Table 2.1 of the INP are given in Table 4.2.

Table 4.2 DECCW base amenity criteria

Location	Indicative area	Time period	Recommended $L_{eq,period}$ noise level, dB(A)	
			Acceptable	Maximum
Residential	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45

Source: DECCW INP 2000

4.1.3 Project specific noise criteria

The INP requires that both the intrusiveness and amenity criteria are satisfied. However, the more limiting of the two becomes the project specific noise criteria (PSNC) or operational criteria for this site alone. In this case and for all assessment locations, the intrusiveness criteria are the more limiting of the two and hence the PSNC are those presented earlier in Table 4.1.

4.2 Sleep disturbance criteria

The aforementioned criteria, which consider the average noise emission of a source over 15 minutes, are appropriate for assessing noise from relatively steady-state sources, such as engine noise from mobile plant and other pit equipment. However, noise from sources such as reversing alarms, track plates and the banging of shovel buckets is intermittent (rather than continuous) in nature, and as such, needs to be assessed using the L_1 or L_{max} noise metrics.

The most important impact of such intermittent noises would be to disturb the sleep of nearby residents. While the INP does not specify a criterion for assessing sleep disturbance, DECCW's *Environmental Criteria for Road Traffic Noise* (EPA 1999) policy indicates that levels below 50 to 55 dB(A) inside residences are unlikely to wake sleeping occupants. The likely number of noise events per night should also be

considered. If bedroom windows are open, this corresponds to an external maximum noise level of approximately 60 to 65 dB(A) L_{\max} at a residence. However, this is considerably higher than the DECCW's previous position on sleep disturbance in its *Environmental Noise Control Manual* (EPA, 1994) which recommends that L_1 noise from a source should not exceed the existing background noise level by more than 15dB. For the purpose of this assessment, the descriptors L_{\max} and L_1 may be considered interchangeable. This is the DECCW's current position on sleep disturbance criteria.

As part of the background noise monitoring, it was established that background noise levels for some residences are as low as 30dB(A). As such, the sleep disturbance criterion would be as low as 45 dB(A) L_{\max} for some residences.

The latter more conservative sleep disturbance criterion was adopted for this study, with proposed criteria for the adopted assessment locations listed in Table 4.3.

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L _{max} sleep disturbance criteria, dB(A)
No.	EIS No.	
4	232	47
5	234	47
6	250	49
7	235	49
19	249	49
20	248	49
21	247	49
23	229	49
35	74	49
43	97	45
44	Not Listed	45
45	Not Listed	45
47	96	45
67	170	47
68	72	47
74	177	47
77	Not Listed	47
78	Not Listed	47
79	Not Listed	47
80	Not Listed	47
82	Not Listed	49
83	Not Listed	49
84	Not Listed	49
86	71	47
96	157	47
101	155	47
102	154	47
107	149	47
108	148	47
112	143	47
118	133	47
120	131	47

Table 4.3 **DECCW's sleep disturbance criteria**

Assessment location		Night time L_{\max} sleep disturbance criteria, dB(A)
121	130	47
129	47	45
130	48	45
135	50	45
136	122	45
137	29	45
138	29	45
139	123	45
140	51	45
143	275	45
146	198	45
147	199	45
153	16	45
154	193	45
156	180	45
157	183	45
158	187	45
159	214	45
161	207	45
169	265	45
171	265	45
172	258	45
173	262	45
174	262	45
175	262	45
176	263	45
177	261	45
178	259	45
179	260	45
180	260	45
181	257	45
182	257	49

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L _{max} sleep disturbance criteria, dB(A)
183	257	49
189	272	49
190	272	49
191	Not Listed	49
192	Not Listed	49
193	273	49
194	Not Listed	49
195	Not Listed	49
196	Not Listed	49
197	Not Listed	49
198	Not Listed	49
199	Not Listed	49
200	Not Listed	49
201	Not Listed	49
202	55	47
203	55	47
204	Not Listed	47
205	54	47
206	Not Listed	49
207	Not Listed	49
208	Not Listed	49
211	Not Listed	47
212	Not Listed	47
213	Not Listed	49
214	Not Listed	49
215	Not Listed	49
216	Not Listed	49
217	Not Listed	49
218	Not Listed	49
219	Not Listed	49
220	Not Listed	49
221	Not Listed	49
222	Not Listed	49

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L _{max} sleep disturbance criteria, dB(A)
223	Not Listed	49
224	Not Listed	49
225	Not Listed	49
226	Not Listed	47
229	74	47
231	Not Listed	47
236	214	45
237	207	45
240	29	45
241	Not Listed	47
242	Not Listed	47
246	103	45
249	Not Listed	45
252	Not Listed	45
253	Not Listed	45
257	269	45
258	Not Listed	45
259	Not Listed	45
260	Not Listed	45
261	Not Listed	45
262	Not Listed	45
263	Not Listed	45
265	Not Listed	45
266	Not Listed	45
267	Not Listed	45
268	Not Listed	45
271	Not Listed	45
272	277	45
273	Not Listed	45
274	Not Listed	45
279	171	47
280	Not Listed	47
281	Not Listed	47

Table 4.3 DECCW's sleep disturbance criteria

Assessment location		Night time L_{max} sleep disturbance criteria, dB(A)
282	Not Listed	47
283	Not Listed	47
284	Not Listed	49
285	Not Listed	49
286	Not Listed	49
287	Not Listed	49
288	Not Listed	49
289	Not Listed	49
290	71	47
291	Not Listed	47
292	Not Listed	45
293	Not Listed	45
296	Not Listed	45
297	Not Listed	45
298	Not Listed	45
299	Not Listed	45
300	Not Listed	45
301	Not Listed	45
302	Not Listed	45
305	Not Listed	49
308	131	47
309	50	45
310	258	45
311	273	49
312	Not Listed	49
315	Not Listed	49

An assessment of the potential for sleep disturbance within residences from the Project is presented in Section 6.3.

4.3 Cumulative noise criteria

The total industrial noise at a receptor from all possible industrial sites is required to satisfy the INP's amenity criteria presented earlier in Table 4.1.

4.4 Construction noise criteria

The aspect of the Mount Pleasant Project which will require noise criteria for activities not previously approved is the construction of the conveyor/service corridor option. All other aspects were addressed in the EIS and are therefore not covered herein.

It should be noted that it is accepted practice to adopt operational noise criteria for construction activities at 'brownfield' mine sites since such activities are often indistinguishable from mining type operations. However, the area proposed for the conveyor/service corridor is relatively undeveloped and most sections are geographically separated from the mining activities and given the prevailing wind direction to receptors, is likely to be clearly distinguishable.

The DECCW's *Interim Construction Noise Guideline* (ICNG) (2009) is specifically aimed at managing construction works regulated by the DECCW under the NSW *Protection of the Environment Operations Act 1997* (POEO Act). This provides the current and most relevant guidance for construction noise assessment.

One of the first steps in the ICNG is the identification of sensitive receivers, which include residences, classrooms, hospitals, places of worship and passive and active recreation areas.

Whilst all receivers are important, the most sensitive and those afforded the strictest criteria by the ICNG are residences. For the optional conveyor/service corridor, residences are also the closest and potentially the most impacted from construction activities. Hence, the assessment has focused upon residences. The residences selected for construction assessment are the closest to the proposed conveyor/service corridor and are locations 43, 44, 45, 246, 249, 257 and 263, as shown in Figure 3.1a.

The construction activities will be spread across sections of the potential alignment of the conveyor/service corridor. It is anticipated that works will be completed within six to nine months, and hence any potential impacts will be limited to this period.

4.4.1 Construction times

The primary management measure of the ICNG is that construction be undertaken during daytime hours only, which will be adopted for this project. The ICNG recommends works are restricted to:

- Monday to Friday – 7.00am to 6.00pm;
- Saturday – 8.00am to 1.00pm; and
- no construction work to take place on Sunday and public holidays.

The proposed works will be undertaken between these hours only and hence will satisfy the main objective of the ICNG.

4.4.2 Noise assessment criteria

For major construction developments, the ICNG recommends a quantitative noise assessment approach. Table 4.4 is an extract from the ICNG and relates to residential locations only.

Table 4.4 ICNG residential criteria

Time of day	Management level [L_{Aeq} [15 min]]*	How to apply
Recommended standard hours are Monday to Friday 7.00am to 6.00pm Saturday 8.00am to 1.00pm with no work on Sundays or public holidays	Noise affected RBL + 10dB	<p>The noise affected level represents the point above which there may be some community reaction to noise</p> <p>Where the predicted or measured L_{Aeq} [15 min] is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level</p> <p>The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details</p>
	Highly noise affected 75dB(A)	<p>The highly noise affected level represents the point above which there may be strong community reaction to noise</p> <p>Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account:</p> <ul style="list-style-type: none"> times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times
Outside recommended standard hours	Noise affected RBL + 5dB	<p>A strong justification would typically be required for works outside the recommended standard hours</p> <p>The proponent should apply all feasible and reasonable work practices to meet the noise affected level</p> <p>Where all feasible and reasonable practices have been applied and noise is more than 5dB[A] above the noise affected level, the proponent should negotiate with the community</p> <p>For guidance on negotiating agreements see section 7.2.2</p>

Notes: * Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Source: ICNG 2009.

For other receiver types the ICNG provides the recommendations in Table 4.5 (sourced directly from the ICNG).

Table 4.5 Noise at sensitive land uses (other than residences) using quantitative assessment

Land use	Management level ($L_{Aeq [15 min]}$)
Classrooms at schools and other educational institutions	Internal noise level - 45dB(A)
Hospital wards and operating theatres	Internal noise level - 45dB(A)
Places of worship	Internal noise level - 45dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level - 65dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level - 60dB(A)
Community centres	Depends on the intended use of the centre. Refer to the recommended 'maximum' internal levels in AS2107 for specific uses.

Source: ICNG 2009

For industrial and commercial receivers not covered above, the ICNG provides the following:

"The external noise levels should be assessed at the most-affected occupied point of the premises:

- *industrial premises: external $L_{Aeq [15 min]}$ 75dB(A);*
- *offices, retail outlets: external $L_{Aeq [15 min]}$ 70dB(A); and*
- *other businesses that may be very sensitive to noise, where the noise level is project specific as discussed below.*

The proponent should assess construction noise levels for the project, and consult with occupants of commercial and industrial premises prior to lodging an application where required.

During construction, the proponent should regularly update the occupants of the commercial and industrial premises regarding noise levels and hours of work." (ICNG, 2009).

4.5 Blasting criteria

The blast noise and vibration criteria have not changed since the consent was issued. Hence, the consent criteria will apply to the current Project. Given that the mining aspect of the current Project is substantially the same as the approved operation, the EIS blast noise and vibration assessment remains valid. Accordingly, no further assessment is provided herein.

5 Noise modelling parameters

The prediction of noise from the Mount Pleasant Project's operations was undertaken using the Environmental Noise Model (ENM) prediction software. The ENM predicts total noise levels at residences from the concurrent operation of multiple noise sources. The model included consideration of factors such as the lateral and vertical location of plant, source-to-receiver distances, ground effects, atmospheric absorption, topography of the mine and surrounding area and meteorological conditions. This section outlines the base parameters used in the noise modelling.

The mine plans used for modelling were those used and presented in the EIS for Years 3, 5 and 10. These years represent potential mining operations that could eventuate within the likely consent period sought, which is to end in 2022.

The only changes to the modelling as compared to the EIS comprise the introduction of the conveyor/service corridor option in lieu of the rail operation, and adjustment to the possible locations of the infrastructure area within an infrastructure envelope. Both the conveyor/service corridor and the infrastructure scenarios were modelled at the western most extremities of their identified envelope areas. This approach would produce the worst case noise impact to the closest receivers, which are located west of the conveyor/service corridor and infrastructure envelope. The mine plans and equipment locations are shown in Appendix B of this report.

5.1 Equipment noise levels

Table 5.1 describes the main noise sources associated with the Mount Pleasant Project.

Table 5.1 Main noise sources of the project

Mining activity	Typical plant
Mine	Drills, Shovels, Front-End Loaders, Trucks, Excavators, Dozers, Graders, Draglines, Cable Reelers and Generators for Lighting Sets
Overburden Emplacements, Rejects Emplacement and Haul Roads	Trucks, Dozers, Graders and Generators for Lighting Sets.
Coal Transportation	Trucks and Graders on haul roads. Coal Preparation Plant, Reclaimer, yard and overland Conveyor.

Sound power levels for equipment typically used for in-pit earth-moving and overburden emplacement are listed in Table 5.2. These sound power levels are indicative of the range of noise levels measured at existing mines operated by the proponent. The mining equipment schedule is based on that documented in the EIS.

Table 5.2 **Typical equipment sound pressure levels**

Typical item	Representative $L_{eq,15\text{minute}}$ sound power level, dB(A)
Haul Truck (Komatsu 830E, 730E)	114
Water Cart	116
Drill (SKS, DK40)	119
Shovel (PH5700, XPC)	118
Cable Reeler	116
Dozer	117
Dozer (690 Tiger)	112
Dragline	114
Grader (16G, 24H)	113
FEL- L1850 (Loader)	113
Excavator (3600, 5500)	107
Lighting Plant	104
Coal Preparation Plant	113
Conveyor	83 per linear metre (open), Modelled as covered and shielded to the west
Conveyor Drive Motors (Modelled as shielded to the west)	
280kW	102 (open)
315kW	102 (open)
355kW	103 (open)
500kW	105 (open)

Notes: Refer to Appendix C for spectral data used in noise modelling. The emission levels above are based on site measurements.

6 Predicted operational noise levels

This section presents the results of modelled noise emission levels from the Mount Pleasant Project inclusive of the effect of prevailing meteorological conditions recorded at the site.

Noise modelling was based on three-dimensional digitised ground contours for the surrounding land, mine pits and overburden emplacement areas for three stages of the Mount Pleasant Project (Years 3, 5 and 10). The mine plans represent worst case snapshots and equipment was placed at various locations and heights, representing realistic operating conditions in each of these stages of the mine.

The noise model was configured to predict the total L_{eq} noise levels from mining operations. The results presented assume all plant and equipment to be operating simultaneously and at full power. In practice, such an operating scenario would occur infrequently. The noise predictions presented are therefore worst case.

As described earlier, the main difference between the current Mount Pleasant Project and the approved operation in 1999 is the introduction of the conveyor/service corridor and minor adjustment to the position of infrastructure within a defined envelope. It is therefore expected that receptors nearest these areas (locations 43, 44, 45, 246, 249, 250 to 253, 257, 258, 259, 260, 261, 262 and 263) to the west would be impacted differently to those impacts predicted in the EIS. This is because other receivers are considerably removed from the conveyor, and are relatively much closer to other areas of the mine.

6.1 Predicted noise during calm weather

Operational noise levels to residences were first determined for periods with no wind or temperature gradients, which are termed SI (Still Isothermal) or “calm” conditions. Values for air temperature and relative humidity used in the noise modelling were 20°C and 70 per cent for day, and 10°C and 80 per cent for night periods respectively.

The $L_{eq,15min}$ noise levels at receivers resulting from mining operations during calm conditions for both day and night periods are presented later in Table 6.3.

Notably, operational noise levels were predicted to comply with DECCW’s operational noise limits for most assessment locations during calm meteorological conditions for both day and night periods. The exceptions being locations 43, 129 and 130. The latter two properties are within the lease boundary of the site

6.2 Predicted noise during “prevailing” meteorological conditions

The INP provides guidance on how noise due to varying meteorological conditions is to be assessed. The procedure is based on identifying and combining worst case meteorological conditions at the site (referred to as the “prevailing meteorology”) and assessing the cumulative noise levels against the relevant limits.

During wind and temperature gradient conditions, noise levels at residences may increase or decrease compared with noise during calm conditions. This is due to refraction caused by the varying speed of sound with increasing height above ground. The level of noise received increases when the wind blows from source to receivers or under temperature inversion conditions, and conversely, decreases when the wind blows from receivers to source or under temperature lapse conditions.

In some circumstances, compliance achieved under calm conditions generally results in compliance being achieved under “prevailing meteorological” conditions when higher received noise levels may prevail. Despite the increase in noise at properties caused by adverse winds, ambient noise also increases during such weather conditions (due to wind induced vegetation noise) and mine noise is masked.

6.2.1 Assessment of potential for temperature inversions

The Pasquill Stability Class represents the degree of mixing in the atmosphere, and can be used to gauge the presence and magnitude of temperature inversions. Stability classes range from Class A to Class F. Stability Class A applies under sunny conditions with light winds when dispersion is most rapid. Stability Class D applies under windy and/or overcast conditions when dispersion is moderately rapid and Stability Class F occurs at night when winds are light and the sky is clear. Stability Classes B, C and E represent the presence of intermediate conditions. Temperature inversions may occur during Stability Classes E and F. In particular, Stability Class F generally represents a range of temperature gradients from 1.5°C/100 m up to less than 4°C/100 m.

Records of wind speed, wind direction and sigma-theta (σ_θ - used to approximate Pasquill Stability Classes) were acquired from the McLeans Hill weather station for 2004, operated by MAC. The Air Quality specialists on this project (PAEHolmes) verify this data as being the most complete set available and representative for the site and surrounds.

The Stability Class frequency for the area, as determined from the hourly weather data, is indicated in Table 6.1. The table shows that atmospheric Stability Class F occurs for only 10 per cent of the winter nights in the area. This is well below the DECCW’s 30 per cent threshold where temperature inversions are considered to be a ‘feature’ of an area and therefore does not need to be included in the noise impact assessment. Nonetheless, the prediction of noise impacts in this assessment includes consideration of the effects of a 4°C/100m temperature inversion. This approach is appropriate given the well documented presence of temperature inversions in the area and these are referenced in numerous noise assessments for developments in the Upper Hunter Valley.

Table 6.1 **Atmospheric stability class frequency**

Stability Class	Percentage of occurrence (winter night)
A	0
B	0
C	0
D	51
E	39
F	10
TOTAL	100

Notes: This information is based on winter night analysis for year 2004, as this was the only year available with sigma-theta values.

Source: McLeans Hill automatic weather station, 2004.

6.2.2 Analysis of “prevailing” winds for the area

A detailed analysis of the vector components of wind speed and direction for 2004 was undertaken in accordance with the INP. To that end, the DECCW encourage the use of their “Wind Calculator” program

which is provided on their website, so that a consistent approach to noise modelling is undertaken throughout NSW. This assessment has utilised this programme and accordingly, our analysis is consistent with the DECCW's "Wind Calculator" with respect to 'feature' wind directions. The assessment provides the additional process of determining the upper 10th percentile wind speed for the 'feature' direction. The results of the assessment are summarised in Appendix D.

The wind directions determined to be a 'feature' of the area in accordance with the INP are summarised in Table 6.2. The cumulative total values (represented by arms in the wind roses in Appendix D) indicate wind speed occurrence above the INP 30 per cent threshold, which triggers the requirement for assessment (Section 5.3 of the INP). This is determined by a cumulative arithmetic addition of percentage occurrence values (refer Appendix D).

It is demonstrated in Table 6.2 that the assessable winds occur during the day, evening and night time, and these specific winds are considered a 'feature' of the area according to the INP. Since the evening and night mine operations are the same, and the night time wind data set provides a more statistically valid analysis (covering a 9 hour period as opposed to only 4 hours for the evening), the 'feature' winds occurring during the night were used for noise assessment.

The final set of wind roses in Appendix D demonstrate that a combined wind and temperature inversion (rather than these occurring in isolation) occur significantly less frequently than the DECCW's 30 per cent threshold. Hence, a combined gradient wind and temperature inversion calculation was not required for this assessment.

Table 6.2 Assessable INP wind conditions

Identified weather conditions	Wind direction from north (degrees)	Wind speed (m/s)
DAY PERIODS (7am to 6pm)		
1	CALM	0
2	22.5	1.9
3	45	1.7
4	270	2.4
5	292.5	2.5
6	315	2.4
7	337.5	2.2
8	360	2
NIGHT PERIODS (10pm to 7am)		
1	CALM	0
2	22.5	2.1
3	45	1.9
4	67.5	1.8
5	90	2.4
6	112.5	2.6

Table 6.2 Assessable INP wind conditions

Identified weather conditions	Wind direction from north (degrees)	Wind speed (m/s)
7	157.5	2.3
8	180	1.9
9	202.5	1.6
10	247.5	2.1
11	270	2.3
12	292.5	2.3
13	315	2.2
14	337.5	2.1
15	360	2.3
16	4 degree /100m Inversion	0

6.2.3 Predicted noise level results

The wind conditions in Table 6.2 were used in the modelled predictions of mining noise levels. The prediction of mining noise during periods of ‘prevailing INP meteorology’ is presented in Table 6.3. These data incorporate all “prevailing” INP weather conditions (ie. calm, INP winds and temperature inversions) for day and night operations.

The results presented in Table 6.3 were derived in accordance with the INP assessment methodology and considered the effect of only adverse (prevailing) INP-assessable meteorological conditions and not all possible wind conditions that may be experienced at site.

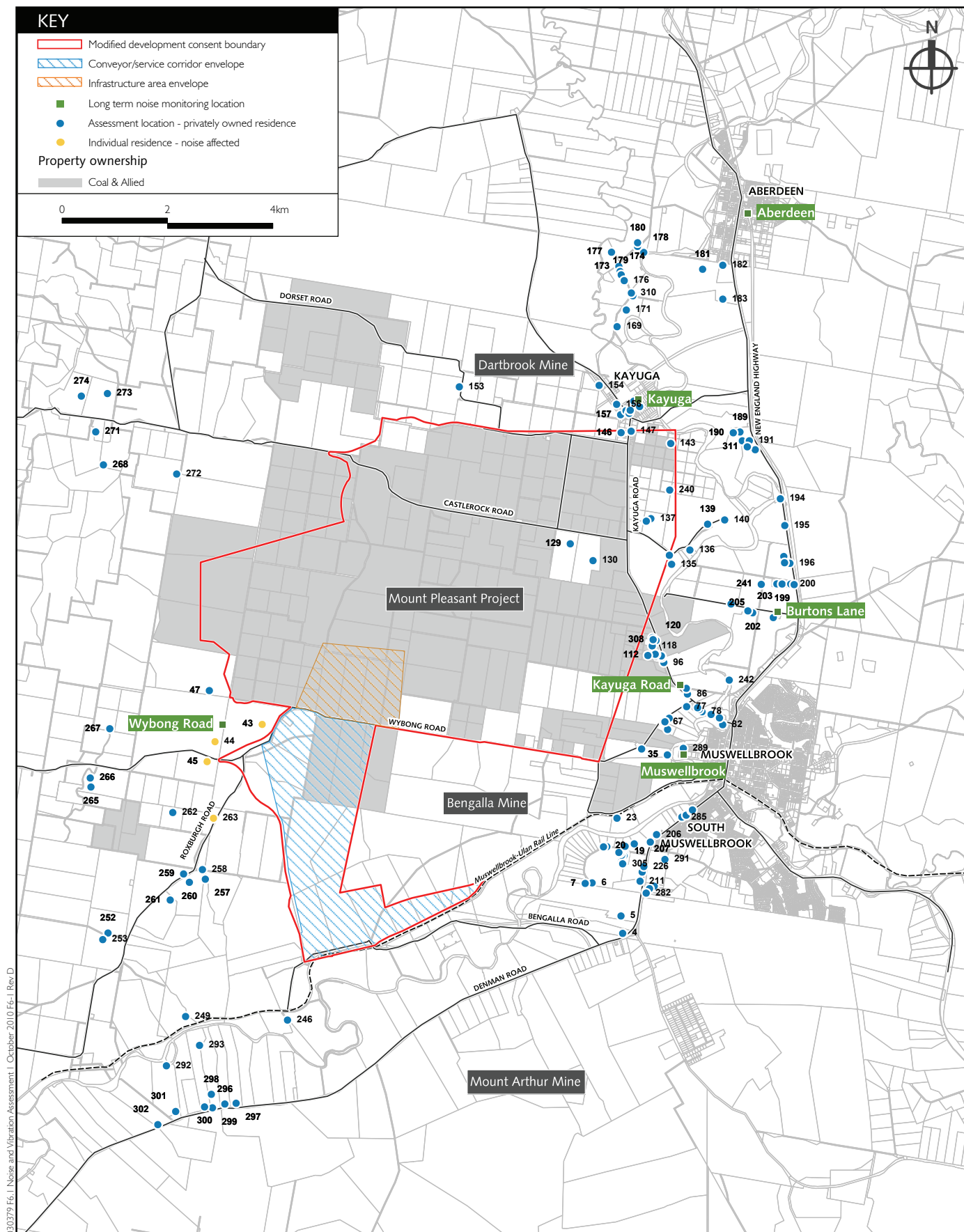
The results demonstrate that the introduction of the proposed conveyor/service corridor and possible reconfiguring of the infrastructure area introduce impacts at four identified assessment locations to the south west. These are locations 43, 44, 45 and 263 where noise levels are predicted to be above possible acquisition levels (indicated in bold text in the table). Of note, each of the four assessment locations comprises one residence only. Beyond these locations further west, noise levels are shown to be below acquisition levels (eg location 257) and no other residences are within the possible acquisition zone due to the introduction of the proposed conveyor. These properties are also shown in Figure 6.1.

Table 6.3 Operational noise at receptors during ‘calm’ and prevailing meteorology – locations closest to conveyor and infrastructure areas (dB(A) Leq,15min)

Receptor	Year 3						Year 5						Year 10						PSNC, L _{eq} ,15min, dB(A)				Possible acquisition criteria, L _{eq} ,15min, dB(A)						
	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Night Calm	Night Mets	Day Calm	Day Mets	Evening/Night	Day Calm	Day Mets	Evening/Night	Day Calm	Day Mets	
43	37	47	33	48	37	47	33	46	37	48	33	49	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40
44	32	43	27	45	32	42	24	43	32	43	25	46	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40
45 ¹	31	40	27	42	31	40	24	40	31	40	30	43	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40
246 ²	22	35	22	38	22	35	21	37	22	35	21	38	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40
249 ¹	19	30	18	32	19	30	17	31	19	31	18	32	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40
257	26	37	26	40	26	36	25	39	26	38	26	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40
263 ¹	31	39	31	42	30	39	29	41	31	41	31	43	35	40	35	40	35	40	35	40	35	40	35	40	35	40	35	40	40

Notes: 1. These properties were NOT listed in the EIS.

2. This property is listed in BMC's consent for acquisition upon request.



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6.3 Predicted noise levels for the broader assessment locations

The Mount Pleasant Project has been assessed in its entirety in accordance with the INP, including assessment for adverse weather conditions in accordance with current practice. The approved Year 10 EIS mine plan was modelled to enable a conservative assessment. The 1997 EIS demonstrated that the proposed Year 10 operations would result in the worst case impacts of the three scenarios that were investigated. In addition, Table 6.3 of this report shows Year 10 to be potentially the worst case for selected assessment locations.

The mine plan and equipment locations modelled are consistent with the EIS. With the application of all reasonable and feasible mitigation measures, impacts to the broader community will be reduced than those described in the EIS. Once the mine is operational, the noise emissions from the general mine pit area for receivers to the north, east and south-east will be consistent with the approved project. Any differences that may be presented by the current study are purely a function of the current INP assessment.

6.3.1 Feasible and reasonable measures

The reference of 'feasible and reasonable' in noise terms is defined within the INP and the key factors include:

- noise mitigation benefit (amount of noise reduction provided, number of people protected);
- cost of mitigation (cost versus benefit);
- community views (aesthetic impacts and community wishes); and
- noise levels for affected land uses (existing and future landuses, and changes in noise levels).

The assessment of the Mount Pleasant Project under the INP will enable noise monitoring and management at the mine in accordance with contemporary standards. The following items constitute relevant feasible and reasonable measures that will be adopted in the operation of the mine and were included in noise modelling:

- plant will operate in less exposed areas during the more sensitive night period, a measure consistent with the EIS;
- a cover and a shield on the western side of the conveyor at locations where the conveyor would be at ground level. Where the conveyor is elevated, it will be completely enclosed; procurement of new and best available technology plant;
- provision of noise suppression on all mobile plant. It anticipated that the noise suppression technology will require an outlay of capital expenditure of between \$15M and \$20M; and
- updating the comprehensive operational noise management plan to include real-time back to base noise monitoring using the best available technology.

6.3.2 Operational noise level predictions

The results of the INP assessment for the approved mine are shown in Table 6.4. The assessment has found that no additional properties outside the calm weather envelope from the 1997 EIS are affected. Refer to Table 12.10 in the EIS and EIS Figure 50.

As previously discussed, properties affected under 'adverse' weather conditions were entitled under the development consent to a hierarchy of monitoring, mitigation then acquisition measures during operations, rather than the right to seek upfront acquisition. Conditions of development consents/project approvals developed by the Department of Planning (DoP) in recent years now typically entitle residents affected above acquisition criteria during adverse weather conditions to upfront acquisition upon request.

Under 'adverse' weather conditions for the daytime assessment period three residences are predicted to experience noise levels above potential acquisition criteria, due to the modelling of the approved mine plan under adverse winds that were not required to be assessed for the EIS in 1997. It should be noted that two of the three residences were previously identified as only one property in the 1997 EIS. Of the properties listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent, seven are predicted to be above the INP noise acquisition criteria for the daytime period during 'adverse' conditions (these properties are currently entitled to acquisition upon request).

Under 'adverse' weather conditions for the night time assessment period, nine properties containing 12 residences are predicted to experience noise levels above potential acquisition criteria, due to the modelling of the approved mine plan under adverse winds that were not required to be assessed for the EIS. It should be noted that six of these residences were previously identified as only three properties in the 1997 EIS. Of the properties listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent, seventeen residences are predicted to be above the INP noise acquisition criteria for the night time period during 'adverse' conditions (these properties are currently entitled to acquisition upon request). It should be noted that four of these residences were previously identified as only two properties in the 1997 EIS. Location 67 was also listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent as a consequence of dust impacts and will continue to be afforded acquisition rights even though the current noise assessment concludes that this location will not be impacted.

Based on the above, a total of nine properties containing 12 residences are predicted to exceed acquisition criteria under 'adverse' weather conditions. These properties are in addition to those that are currently entitled to acquisition upon request under 'calm' weather conditions in the 1997 EIS and 1999 development consent.

Properties predicted to experience noise levels above acquisition criteria are shown in bold text in Table 6.4 and displayed in Figure 6.2.

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, Leq,15min, dB(A)		Possible acquisition criteria, Leq,15min, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
4	21	33	19	34	39	37	44	43
5	19	34	18	34	39	37	44	43
6	20	36	18	37	41	39	46	44
7	20	36	18	37	41	39	46	44
19	23	38	21	38	41	39	46	44
20	23	39	20	39	41	39	46	44
21	23	39	20	39	41	39	46	44
23	24	40	23	40	41	39	46	44
35	25	42	20	41	41	39	46	44
47	29	42	26	44	35	35	40	40
67 ¹	26	43	21	42	40	37	45	42
68	26	43	20	42	40	37	45	42
74	26	43	20	42	40	37	45	42
77	25	42	21	41	40	37	45	42
78	24	41	20	40	40	37	45	42
79	24	41	21	41	40	37	45	42
80	24	41	21	41	40	37	45	42
82	23	39	20	39	41	39	46	44
83	23	39	20	39	41	39	46	44
84	24	40	20	40	41	39	46	44
86	25	42	21	42	40	37	45	42
96 ¹	27	44	22	43	40	37	45	42
101 ¹	25	45	22	45	40	37	45	42
102 ¹	25	45	22	45	40	37	45	42
107 ¹	25	45	22	45	40	37	45	42
108 ¹	24	44	22	44	40	37	45	42
112 ¹	24	44	22	43	40	37	45	42
118 ¹	24	46	23	46	40	37	45	42
120 ¹	24	45	23	46	40	37	45	42
121 ¹	24	46	23	46	40	37	45	42
129 ¹	57	60	57	60	35	35	40	40
130 ¹	57	60	57	60	35	35	40	40
135 ¹	28	44	28	45	35	35	40	40
136	21	30	21	32	35	35	40	40
137	33	43	34	44	35	35	40	40
138	32	43	33	45	35	35	40	40
139	27	38	28	40	35	35	40	40

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, Leq,15min, dB(A)		Possible acquisition criteria, Leq,15min, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
140	26	37	27	39	35	35	40	40
143	28	38	29	41	35	35	40	40
146 ¹	26	39	27	42	35	35	40	40
147	27	38	27	42	35	35	40	40
153 ¹	28	38	30	47	35	35	40	40
154	23	35	25	40	35	35	40	40
156	24	37	26	42	35	35	40	40
157 ¹	25	37	26	41	35	35	40	40
158	24	37	26	42	35	35	40	40
159	26	36	27	41	35	35	40	40
161	24	36	26	41	35	35	40	40
169	21	31	22	36	35	35	40	40
171	20	31	21	35	35	35	40	40
172	21	31	22	34	35	35	40	40
173	19	29	20	33	35	35	40	40
174	19	29	21	33	35	35	40	40
175	20	30	21	34	35	35	40	40
176	20	30	21	34	35	35	40	40
177	18	28	19	33	35	35	40	40
178	19	29	20	32	35	35	40	40
179	19	29	20	32	35	35	40	40
180	19	29	20	32	35	35	40	40
181	18	28	20	31	35	35	40	40
182	20	28	21	30	41	39	46	45
183	20	29	21	32	41	39	46	45
189	24	34	25	37	41	39	46	45
190	24	35	25	37	41	39	46	45
191	24	34	25	37	41	39	46	45
192	24	35	25	37	41	39	46	45
193	24	34	24	37	41	39	46	45
194	22	34	22	36	41	39	46	45
195	23	34	23	36	41	39	46	45
196	22	35	22	37	41	39	46	45
197	22	35	23	37	41	39	46	45

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, Leq,15min, dB(A)		Possible acquisition criteria, Leq,15min, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
198	23	36	23	38	41	39	46	45
199	23	36	23	37	41	39	46	45
200	23	35	23	37	41	39	46	45
201	23	35	23	37	41	39	46	45
202	24	38	23	39	37	37	42	42
203	24	38	23	40	37	37	42	42
204	23	36	22	38	37	37	42	42
205	24	40	24	41	37	37	42	42
206	22	38	22	38	41	39	46	44
207	22	38	21	38	41	39	46	44
208	23	38	22	38	41	39	46	44
211	21	35	19	36	39	37	44	43
212	22	36	20	36	39	37	44	43
213	22	37	19	37	41	39	46	44
214	22	37	20	37	41	39	46	44
215	22	37	20	38	41	39	46	44
216	22	37	20	37	41	39	46	44
217	22	37	21	38	41	39	46	44
218	22	37	19	38	41	39	46	44
219	22	37	20	38	41	39	46	44
220	22	37	20	37	41	39	46	44
221	22	37	21	38	41	39	46	44
222	23	38	21	38	41	39	46	44
223	22	38	21	38	41	39	46	44
224	22	38	21	38	41	39	46	44
225	23	37	21	38	41	39	46	44
226	22	36	21	37	39	37	44	43
229	26	43	21	43	40	37	45	42
231	24	41	21	41	40	37	45	42
236	25	37	27	42	35	35	40	40
237	25	37	26	41	35	35	40	40
240	26	38	26	40	35	35	40	40
241	24	37	24	39	37	37	42	42
242	24	39	22	40	37	37	42	42
249	17	29	17	31	35	35	40	40
252	19	30	18	32	35	35	40	40

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

Receptor	Predicted Noise Levels, dB(A)				PSNC, Leq,15min, dB(A)		Possible acquisition criteria, Leq,15min, dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
253	19	29	18	31	35	35	40	40
258*	26	36	26	40	35	35	40	40
259*	26	35	26	39	35	35	40	40
260*	22	33	22	37	35	35	40	40
261*	21	33	23	37	35	35	40	40
262	19	29	17	35	35	35	40	40
265	18	31	16	34	35	35	40	40
266	18	31	16	35	35	35	40	40
267	19	33	17	35	35	35	40	40
268	20	26	15	32	35	35	40	40
271	16	24	14	31	35	35	40	40
272	18	26	16	36	35	35	40	40
273	16	21	14	30	35	35	40	40
274	16	23	13	29	35	35	40	40
279	26	43	21	42	40	37	45	42
280	21	35	20	35	39	37	44	43
281	20	35	19	35	39	37	44	43
282	20	34	18	35	39	37	44	43
283	20	34	18	35	39	37	44	43
284	22	38	22	38	41	39	46	44
285	22	37	21	38	41	39	46	44
286	22	38	21	38	41	39	46	44
287	22	37	21	37	41	39	46	44
288	22	37	21	37	41	39	46	44
289	24	41	20	40	41	39	46	44
290	25	42	21	42	40	37	45	42
291	21	35	21	35	39	37	44	43
292	13	27	13	29	35	35	40	40
293	13	29	13	31	35	35	40	40
296	17	28	16	29	37	35	42	41
297	17	28	17	30	37	35	42	41
298	15	27	15	29	37	35	42	41
299	16	27	16	29	37	35	42	41
300	16	27	15	29	37	35	42	41
301	14	26	14	28	37	35	42	41
302	14	26	13	27	37	35	42	41

Table 6.4 Operational noise at receptors during 'calm' and prevailing meteorology (dB(A) Leq,15min)

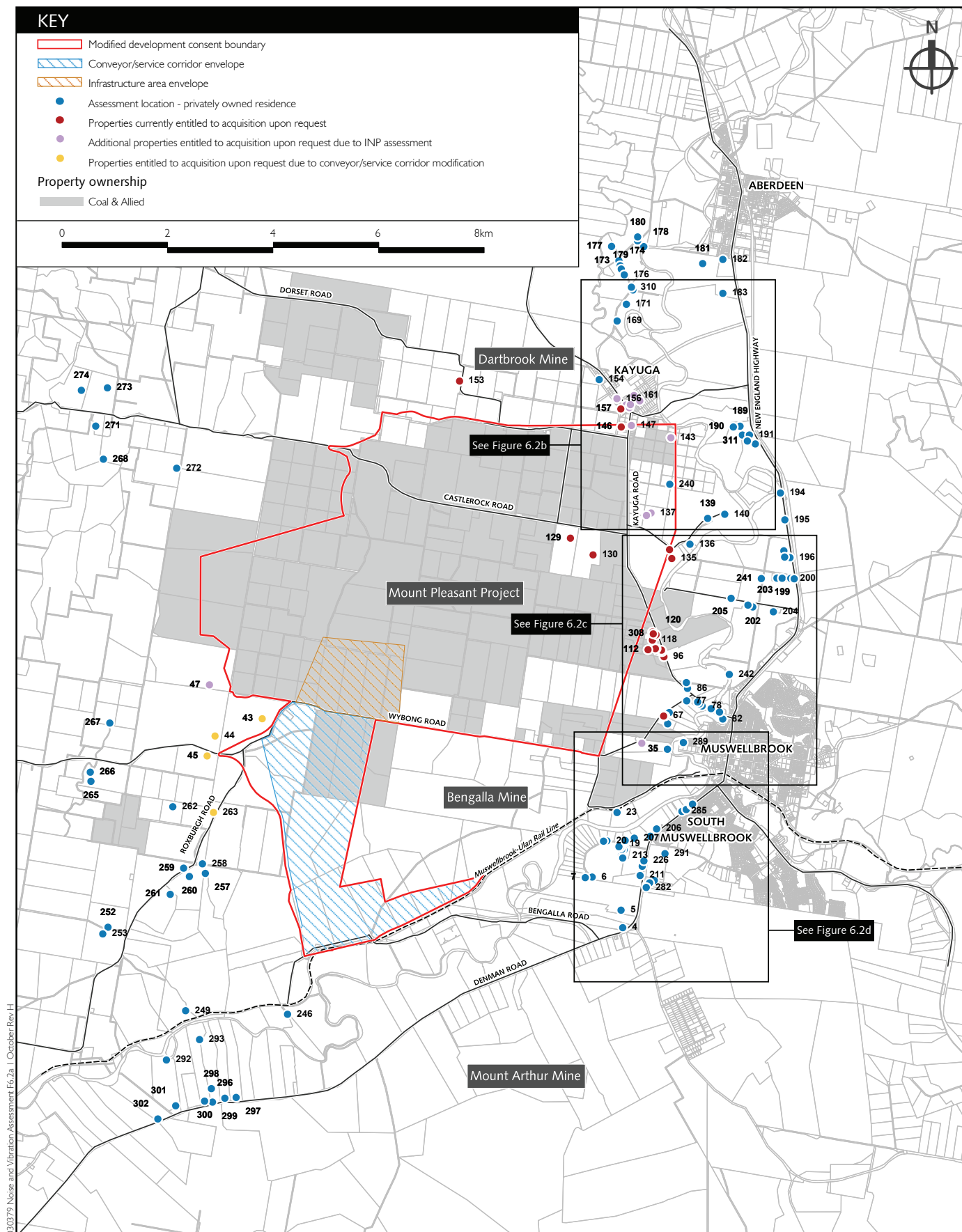
Receptor	Predicted Noise Levels, dB(A)				PSNC, L _{eq,15min} , dB(A)		Possible acquisition criteria, L _{eq,15min} , dB(A)	
	Day Calm	Day Mets	Night Calm	Night Mets	Day	Evening/Night	Day	Evening/Night
305	22	37	19	37	41	39	46	44
308 ¹	24	46	23	46	40	37	45	42
309 ¹	28	44	29	45	35	35	40	40
310	21	30	22	34	35	35	40	40
311	24	35	25	37	41	39	46	45
312	22	36	22	37	41	39	46	45
315	22	38	21	38	41	39	46	44

Notes: 1. These locations were identified as affected in the 1997 EIS and are listed as such in the schedule to Conditions 6.2.1 and 6.4.2 of the site's consent (a total of 17 properties).

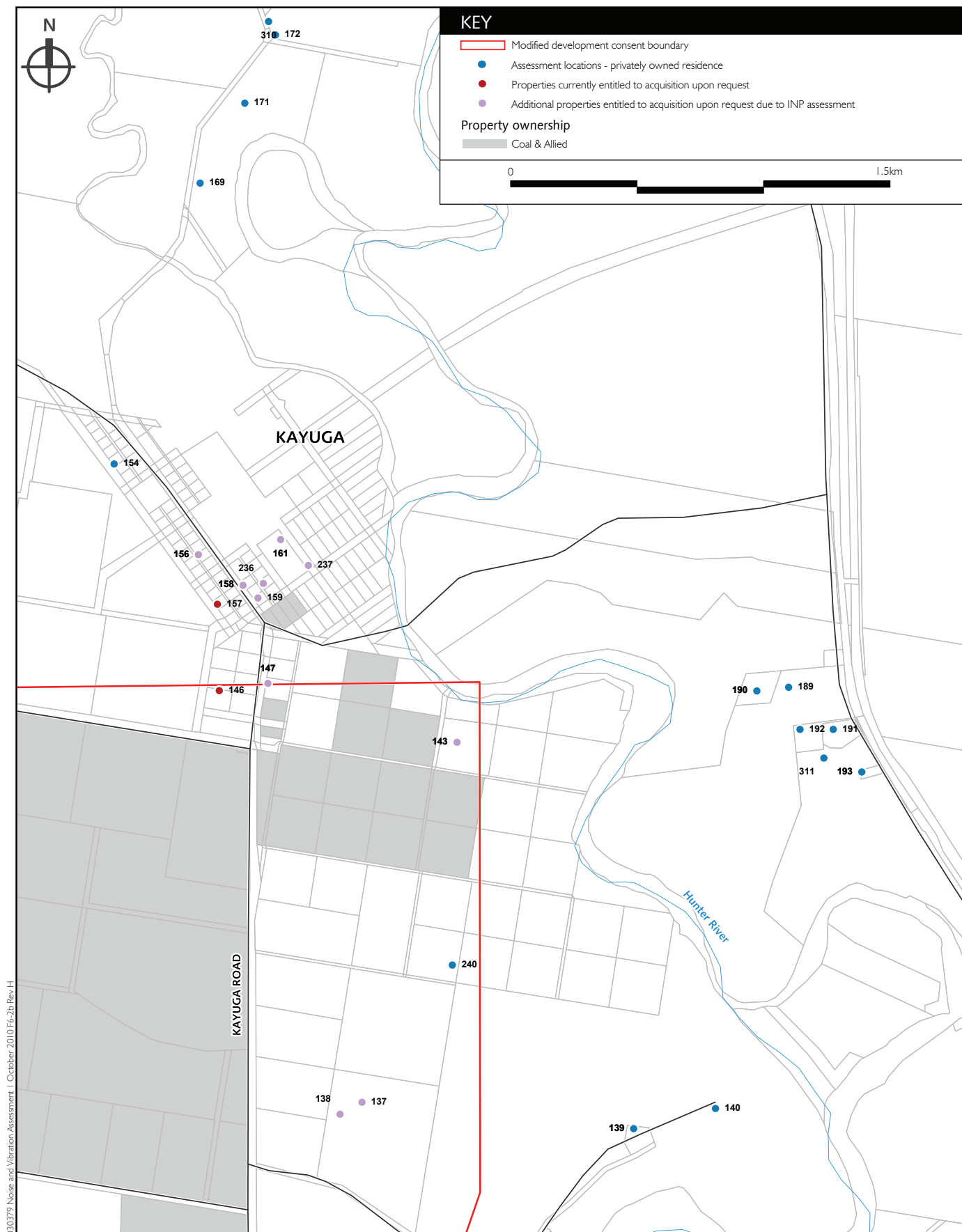
*The predicted noise levels for these locations do not include suppression on mobile plant as it was considered that potential noise from the conveyor will dominate at these properties and mobile plant operating in the mine would not materially alter their results.

There are 28 affected properties comprising 34 residences as summarised following:

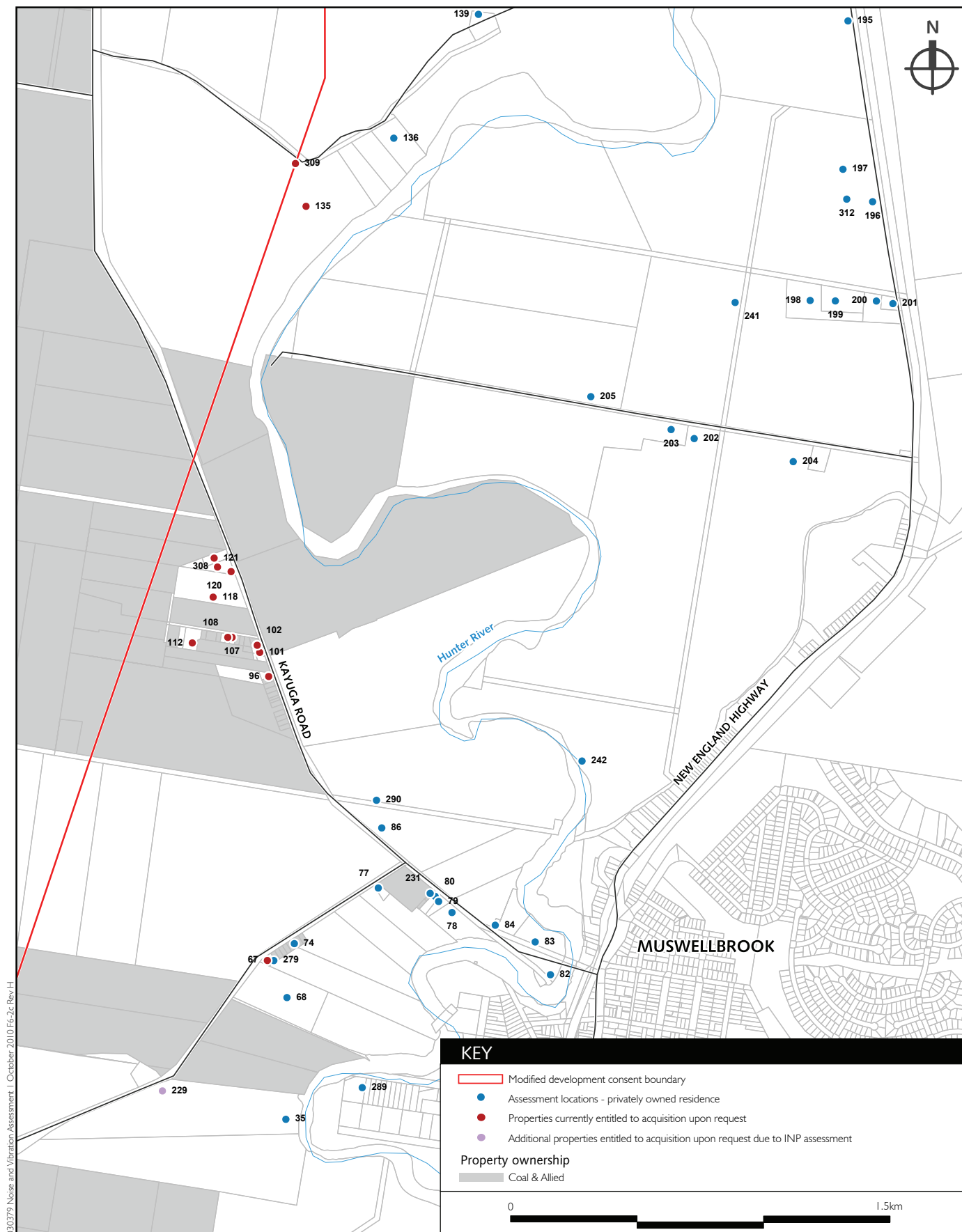
- fifteen properties listed in the schedule to Conditions 6.2.1 and 6.4.2 are affected, however, there are a total of 18 residences on these properties;
- a further four residences (four properties) are affected due to the proposed conveyor/service corridor; and
- a further 12 residences (from nine properties) are affected due to the broader mining operations.



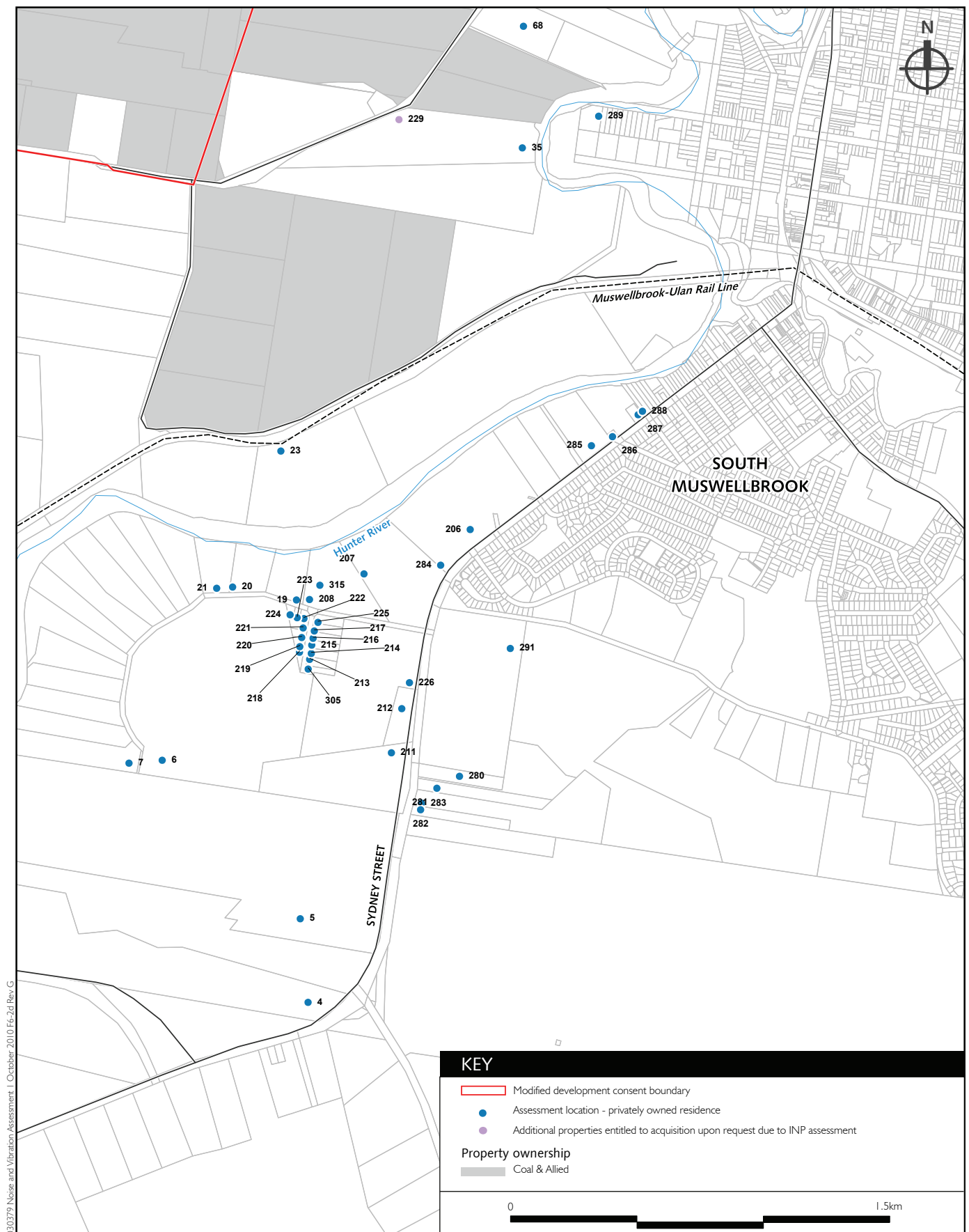
030379 Noise and Vibration Assessment E6.2a | October Rev H



030379 Noise and Vibration Assessment | October 2010 F6-2b Rev H



030379 Noise and Vibration Assessment | October 2010 F6-2c, Rev H



030379 Noise and Vibration Assessment | October 2010 F6-2d Rev G

6.4 Percentage occurrence of noise levels (probability distribution)

The level of mine noise at a given receptor varies and is dependent upon many factors including prevailing weather conditions. It is prudent to gain an understanding of this variation rather than relying on a single predicted noise level for one set of weather conditions as presented earlier.

The ENM noise model predicts noise levels under various combinations of wind speed and direction and vertical temperature gradient. Hence, the proportion of time during which certain noise levels will be experienced can be inferred from the percentage occurrence of the various combinations of wind speed, wind direction and stability class.

The effect of a representative set of meteorological conditions on the level of noise received at locations 43, 44, 45 and 263 is presented for the Year 10 night operating scenario (mine and conveyor). These locations represent the areas west and potentially most affected by the conveyor operation.

The analysis of meteorological effects involved calculating noise to each of the four assessment locations under the influence of each of 198 meteorological conditions based on a combination of wind speed, wind direction and temperature gradient, and combining these in proportion to the probability of their occurrence. These conditions are derived by adopting sixteen wind directions, six temperature gradients and two 10m elevation wind speed ranges (ie $16 \times 6 \times 2 = 192$). In addition, six calm weather conditions (defined by winds less than 0.4m/s and six stability classes) were included in the calculations. This analysis results in a noise probability distribution for each location as shown in Figure 6.3.

Often a reasonable indicator of noise impact is associated with an industrial noise level present for at least 10 per cent of the time. This is consistent with the intent of the INP.

From Figure 6.3, the 10 per cent exceedance noise level is 48dB(A), 42dB(A), 39dB(A) and 40dB(A) for locations 43, 44, 45 and 263 respectively. These levels compare to an INP-based prediction (see Table 6.3 Year 10 Night Mets results) of 49dB(A), 46dB(A), 43dB(A) and 43dB(A) for these locations. This demonstrates a good correlation between the two methods, with the INP approach being marginally conservative for the four locations.

Other observations of note include that mine noise at all four locations is predicted to be at or below 33dB(A) for 50 per cent of the time (refer to 50 per cent probability in the chart).

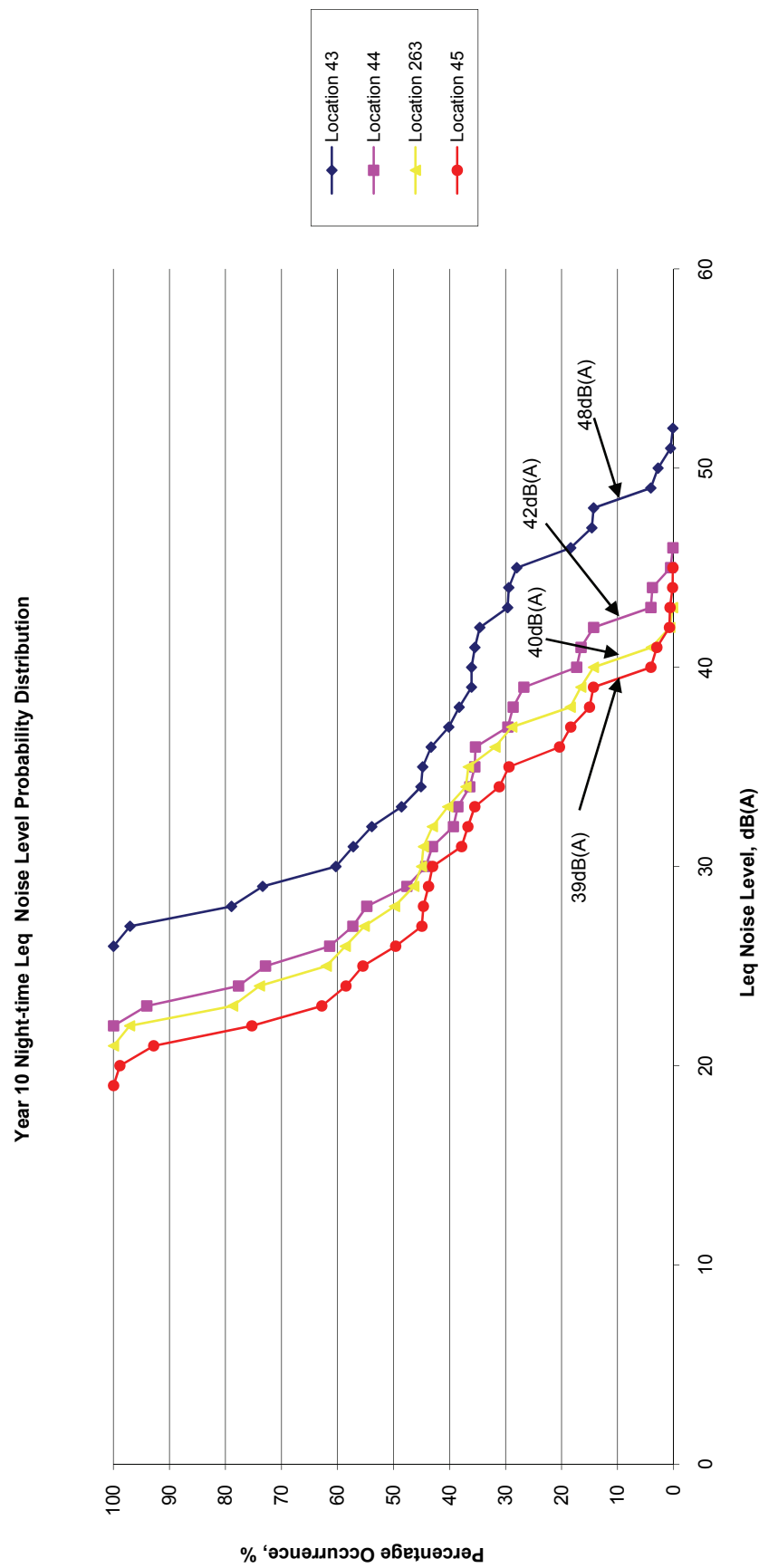


Figure 6.3 Year 10 night time Leq noise level probability distribution

6.5 Sleep disturbance assessment

Sleep within residences may be disturbed by intermittent noises such as banging of shovel gates, bulldozer track plates and reversing alarms of heavy vehicle. Typical noise levels from the loudest of these events are presented in Table 6.5.

Table 6.5 Maximum noise from intermittent sources

Noise source	Measured L_{\max} noise level, dB(A)
Haul Truck	125
Shovel gate banging	120
Bulldozer with reversing alarm	115

Source: EMGA MM file

Table 6.5 indicates that the highest maximum noise levels expected at residences would likely result from haul trucks. The maximum sound power level of unmitigated haul trucks has previously been measured to be typically 125dB(A) L_{\max} . Maximum noise levels at each residence were calculated under “prevailing meteorology” and reported herein.

Table 6.5 summarises the maximum predicted L_{\max} noise levels from trucks under adverse (prevailing) meteorology at the adopted assessment locations based on the typical equipment positions used for mining operations. Predictions were based on a single event, rather than the simultaneous operation of a number of plant items because of the low probability of more than one maximum noise event occurring concurrently. The criteria used to assess sleep disturbance are based on the DECCW’s “background noise level plus 15 dB” for the maximum L_{\max} level (INP, 2000). This results in sleep criteria levels ranging from 45 to 51dB(A) L_{\max} depending on the individual location’s background noise levels as determined through monitoring.

Table 6.6 indicates that predicted noise levels under prevailing weather conditions are within the DECCW’s conservative sleep disturbance criterion for a select set of residences. Exceedances are predicted for locations 43, 44, 45 and 135. These locations were also identified earlier as predicted to experience noise levels above potential acquisition criteria.

Table 6.6 L_{\max} sleep disturbance assessment

Assessment location	Predicted typical L_{\max} noise level during INP weather, dB(A)	Night time L_{\max} criteria, dB(A)
21	44	49
43	52	45
44	49	45
45 ¹	46	45
112	36	47

Table 6.6 Lmax sleep disturbance assessment

Assessment location	Predicted typical Lmax noise level during INP weather, dB(A)	Night time Lmax criteria, dB(A)
135	47	45
156	39	45
190	43	49
202	43	47
246 ²	35	45
249 ¹	32	45
257	38	45
263 ¹	43	45
288	39	49
289	42	49

Notes: 1. These properties were NOT listed in the 1997 EIS.
2. This property is within BMC's acquisition upon request clause.

6.6 Other noise emissions

Currently, there is a number of noise sources located at the Bengalla Rail Spur, such as the CHPP, loading bin, loading of coal onto trains and rail operations. This is consistent with the noise levels from the proposed Mount Pleasant Project modifications operations as only one train can be loaded at any one time. A maximum of five trains would be loaded per day on the Bengalla Rail Spur (Hansen Bailey, 2006). The approved Mount Pleasant Project rail loop is similarly designed to load one train with one waiting to be loaded.

The closest residence (location 246) is approximately 3km southwest from the Bengalla Rail Spur, less than 1km north from the boundary of Mount Arthur Mine and approximately 1.5km south from the proposed conveyor. Location 246 is listed within Bengalla Mine's development consent for acquisition upon request. The operational noise at location 246 from the surrounding mining operations under prevailing weather conditions is predicted as follows:

- Bengalla - 40dB(A) $L_{eq,15minute}$;
- Mount Arthur Mine - <41dB(A) $L_{eq,15minute}$
 - If this wind is prevailing, it will mean that noise from Bengalla Mine and Mount Pleasant Project is reduced due to the direction; and
- Mount Pleasant Project - 38dB(A) $L_{eq,15minute}$
 - Dominated by the conveyor and drive motors which produce 35dB(A));

- **Cumulative Total - <45dB(A) $L_{eq,15minute}$**

The above data demonstrates that the conveyor option (if pursued) would contribute 35dB(A) to the total noise at location 246 and Bengalla Mine would contribute of 40dB(A) for prevailing winds. However, if the approved rail facilities were constructed, it would contribute approximately 40dB(A). Accordingly, the cumulative noise of Bengalla Mine and Mount Pleasant Project at location 246 is predicted to be higher if Mount Pleasant Project were to proceed with the approved rail facilities rather than the proposed conveyor.

In reality the worst case noise at the closest residence is likely to be the result of cumulative noise from Bengalla and Mount Pleasant Project (ie $38 + 40 = 42\text{dB(A)}$) combined from a prevailing wind from the north or Mount Arthur Mine (ie 41dB(A)) from a prevailing wind from the south, given the direction of prevailing winds. Similarly, if the approved Mount Pleasant rail facilities were adopted instead of the proposed conveyor the noise levels at location 246 would be 40dB(A) from the Mount Pleasant Project and 40dB(A) from Bengalla or a total of 43dB(A).

Accordingly, the cumulative noise of Bengalla and Mount Pleasant mines at location 246 is predicted to be higher if Mount Pleasant were to proceed with its approved rail line and loop compared to if the optional conveyor was used instead.

In relation to noise from additional rail movements and loading on the existing Bengalla loop, the movements and loading associated with the respective activities of both Bengalla and the Mount Pleasant Project would not be cumulative as stated previously in this report. The rail loading noise and rail locomotive noise in isolation from all other sources can also be quantified at the closest residence based on current modelling as follows:

- Load bin noise 30dB(A) $L_{eq,15minute}$; and
- Locomotive noise 40dB(A) $L_{eq,15minute}$

The above are worst case $L_{eq,15minute}$ noise levels and are those currently being experienced at location 246 and will not change due to the project since only one train can be loaded at any one time. The locomotive noise is present during rail loading operations, which at present is typically five to 10 hours per day and, subject to the current modification being approved, increasing by a further five to 10 hours a day, given the similar production rates of the two projects. Whilst there is proposed to be more loading operations, the worst case $L_{eq,15minute}$ noise level will remain unchanged from current operations.

The next closest privately owned residence to the existing rail loop is Roots (location 249). The predicted noise levels at this residence and others further south or south west from Bengalla and the Mount Pleasant Project Modification are not expected to be above possible acquisition limits of either operation. Hence, Bengalla's current zone of affectation is highly unlikely to increase as a result of the Mount Pleasant Project.

The conditions in Section 11.3 of the Mount Pleasant consent provides relevant procedures to be followed in the event of cumulative impacts (refer to Appendix A of EA Volume 2).

7 Cumulative noise assessment

The noise ambient at locations in the vicinity of the Mount Pleasant Project will also be influenced by adjoining industrial operations. There are two existing mining operations in the area that could contribute to noise at locations sensitive to the Project's operations. These are Bengalla Mine to the immediate south and Mount Arthur Mine, south of Bengalla Mine. In broad terms, mine noise at a given locality will be influenced by the closer of the mines to that receiver. For example, it is expected that noise from both the Mount Pleasant Project and Bengalla Mine would contribute to received noise at Muswellbrook in a similar way. However, cumulative noise from Mount Pleasant Project and Mount Arthur Mine is unlikely to be significant at the same assessment location given the relative positions of these two mines, Bengalla Mine located in-between and the influence of prevailing weather conditions. To that end, prevailing winds will play a major factor in which of these three main industrial operations will dominate or contribute to the total received noise at any given sensitive location. This is particularly applicable given the north-south alignment of these three contributing mining operations.

The level of noise at residences from each of these surrounding mines was obtained from the following publicly available documents:

- Mount Arthur Coal - Consolidated Project Environmental Assessment of 2009; and
- Bengalla Mining Company Modification to Development Consent Statement of Environmental Effects, 2006.

These assessments predict noise levels at residences under "calm" and adverse (prevailing) weather conditions. It should be noted however that the methods used for adverse (prevailing) weather predictions differ to this assessment. To assess cumulative impacts, the L_{eq} noise levels predicted in this assessment were combined with the L_{eq} noise levels from relevant mining stages of each of the aforementioned assessments, which coincide with the Year 10 night scenario for the Mount Pleasant Project.

Table 7.1 summarises the cumulative noise received at residences surrounding the Mount Pleasant Project. The results are presented for both calm and prevailing weather separately. Also presented (in parentheses) is the respective percentage contribution to the total cumulative noise level from the Project. This demonstrates the dominance or otherwise of the Mount Pleasant Project at the given assessment location. The locations selected are a subset of the previous list shown in Table 6.3 and are considered to represent the potentially worst affected as a result of cumulative noise from the three mines. The cumulative assessment is considered to be conservative due to the fact that the results are for prevailing weather, since worst case winds (for example) for all three mines cannot occur at the same time thus creating worst case impacts at the same assessment location. This conservative approach, whilst not altogether realistic, does provide a suitable ranking order of which of the three mines could be the dominant contributor for that assessment location.

This analysis indicates that the Mount Pleasant Project only dominates the noise environment at one assessment location (location 43, to the west of the conveyor) during calm weather. However, during prevailing weather conditions, Mount Pleasant Project is a significant contributor at four of the selected assessment locations (43, 44, 45 and 289). This is not unexpected given that these locations were selected on the expectation that they are potentially the most exposed to the proposed modifications (ie conveyor/ service corridor and infrastructure area envelopes).

Table 7.1 Cumulative noise assessment (Project Year 10 Night) Leq, dB(A)

Location	Calm weather	Prevailing weather
7	39 (1%)	43 (25%)
21	38 (2%)	43 (40%)
43	34 (63%)	46 (79%)
44	32 (40%)	44 (79%)
45	31 (40%)	41 (79%)
246	30 (10%)	44 (20%)
249	26 (13%)	41 (10%)
257	31 (20%)	42 (50%)
263	32 (40%)	42 (40%)
288	31 (10%)	40 (50%)
289	30 (10%)	42 (63%)
305	37 (2%)	42 (32%)

Notes: The calm weather results for MAC were not available and therefore its contribution under calm weather not included. This is not considered to manifest in any significant implications as noise under calm weather at most nominated locations will not be as influenced by MAC.

8 Construction noise assessment

As discussed earlier, the conveyor/service corridor option, if pursued, will be the only construction activity not previously addressed in the EIS. The construction hours will generally be consistent with the requirements in the DECCW's ICNG of 7am to 6pm Monday to Friday, and 8am to 1pm on Saturdays, with no work on Sundays or public holidays. This will satisfy the main objective of the ICNG. The exceptions would be emergency work or similar or low impact activities where noise is inaudible or less than 5dB above background.

The secondary recommendation in the ICNG relates to construction noise levels at sensitive receivers. The typical construction plant needed is listed below along with representative sound power levels:

- compactors – 107dB(A) $L_{eq,15minute}$;
- graders – 107dB(A) $L_{eq,15minute}$;
- scrapers – 115dB(A) $L_{eq,15minute}$;
- excavators – 111dB(A) $L_{eq,15minute}$;
- backhoes – 107dB(A) $L_{eq,15minute}$;
- Water cart – 110dB(A) $L_{eq,15minute}$;
- road truck – 103dB(A) $L_{eq,15minute}$; and
- rollers – 107dB(A) $L_{eq,15minute}$.

The above items include plant that is similar to what is expected during typical mining operations, although mining has not occurred at the subject site.

The concurrent operation of the above plant will likely be limited to three or four items, resulting in a combined typical emission value of not more than 117dB(A), influenced mostly by use of the noisiest item, the scraper. Applying this typical sound power level for construction activity, Table 8.1 provides the predicted construction noise at the closest and potentially the most exposed residences to the conveyor/service corridor.

As shown previously in Table 4.4, the DECCW's ICNG states that if construction noise exceeds the background noise level by more than 10dB, residences may be considered as 'noise affected', whilst construction noise levels above 75dB(A) at residences are defined as 'highly noise affected'. The results shown in Table 8.1 indicate that residents will not be 'highly noise affected' according to the definition in DECCW's ICNG, however, there may be some receptors may experience levels are above the 'noise affected' definition. To that end, the ICNG recommends application of all reasonable and feasible work practices and that the proponent should inform all potentially impacted residents of the nature of the work to be carried out, the expected noise levels and duration (understood to be not more than six months), as well as provide contact details.

Table 8.1 **Conveyor/service corridor construction noise assessment**

Assessment location	Predicted typical Leq,15minute construction noise level during INP weather, dB(A)	Daytime construction noise criteria, dB(A)	
		Noise affected	Highly noise affected
43	53	40	75
44	52	40	75
45	45	40	75
246	50	40	75
249	41	40	75
257	47	40	75
263	50	40	75

9 Noise management

The existing consent conditions of the Mount Pleasant Project include practical management measures and protocols that will continue to be adopted should the proposed modifications obtain approval. These conditions include Condition 6.4 (Noise Control) and Condition 11.1 (Area of Affection – Land Acquisition including resolution of disputes). However, the now outdated L_{10} based noise criteria outlined in Condition 6.4 will be replaced by the INP derived L_{eq} noise criteria. These criteria are referenced as Project Specific Noise Criteria and outlined in Table 4.1 of this report. As previously stated, the adoption of INP derived noise criteria has been discussed and confirmed with DoP. These new criteria will also form part of the detailed noise monitoring programme for the Mount Pleasant Project.

As part of the existing development consent (Condition 8.4), a Noise Management Plan (NMP) must be prepared prior to commencement of construction. The current quarterly monitoring undertaken around the surrounding areas of the mine will be continued as a component of the NMP. In future, such monitoring will be supplemented to include real time noise and weather data monitoring to aid in the management of any future noise emissions. The real time noise monitors will include stations at Kayuga, Muswellbrook and at a representative site to the south-west.

9.1 Proposed modifications

In addition to the feasible and reasonable mitigation measures outlined earlier which includes cladding the proposed conveyor, properties 43, 44, 45 and 263 will be provided with the opportunity of upfront acquisition rights.

9.2 Broader mine context

Although the mine plan and operations are not changing from those in the EIS, the proponent is committed to the procurement of best available technology plant and mobile equipment including noise suppression on all mobile plant. This is the single most effective management measure that will be adopted.

In addition, nine properties containing 12 residences identified in this study to be affected above acquisition levels under 'adverse' weather conditions will be provided with the opportunity for upfront acquisition. This is in addition to those properties in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent identified as affected under 'calm' weather conditions in the 1997 EIS and 1999 development consent.

9.3 General and whole of operations

The plan will typically include the following aspects:

- identify noise affected properties and relevant noise limits consistent with the Environmental Assessment;
- specify procedures for undertaking independent noise investigations;
- specify protocols for routine, regular attended and unattended noise monitoring of the Project. This would include real time noise monitoring on a permanent basis at Kayuga, Muswellbrook and to the south west of the site;

- outline the procedure to notify property owners and occupiers that could be affected by noise from the mine;
- establish a protocol to handle noise complaints that includes recording, reporting and acting on complaints;
- include appropriate mechanisms for community consultation;
- outline mitigation measures to be employed to limit noise;
- identify longer term strategies to mitigate noise that exceeds the DECCW target noise criteria;
- outline measures to reduce the impact of intermittent, low frequency and tonal noise (including truck reversing alarms); and
- specify measures to document any higher level of impacts or patterns of temperature inversions, and detail actions to quantify and ameliorate enhanced impacts if they occur.

The NMP will be extended to include management of potential noise emissions associated with the construction of the conveyor. The plan will also consider pro-active and predictive modelling and management, and protocols for managing noise during adverse meteorological conditions.

10 Conclusion

10.1 Proposed Modification

The conveyor, if pursued, will require elevated gantries to be enclosed and overland sections to be enclosed along the western side with roofing, to meet noise criteria for most residences to the west of the Mount Pleasant Project area.

The noise assessment indicates that operational noise will comply with DECCW's operational criteria at all assessment locations during calm weather conditions for both day and night periods with the exceptions of assessment location 43, which is located approximately 400m west of the proposed conveyor/service corridor, and locations 129 and 130, which are within the development consent boundary. For prevailing weather conditions, the modelling predicts that the introduction of the proposed conveyor and possible reconfiguration of the infrastructure within an infrastructure envelope introduce impacts at receiver locations to the south-west not previously identified in the EIS. A total of four assessment locations (43, 44, 45 and 263) have been identified where noise levels are predicted to be above possible acquisition levels. Of note, these four assessment locations each comprise one residence only and acquisition beyond these properties to the west is not predicted.

This assessment also concludes that construction of the conveyor will need to be managed to minimise the potential for construction noise nuisance to neighbouring residences.

10.2 Update of noise predictions to INP assessment

The Mount Pleasant Project has been assessed in its entirety in accordance with the INP contemporary noise standards. The differences in the INP assessment compared to that undertaken in the 1997 EIS include the adoption of the Leq noise metric over the L₁₀ level, and a more thorough and clear assessment approach for adverse weather conditions.

The assessment found that the extent of potential impact during 'calm' weather conditions to be similar to that in the 1997 EIS.

The main difference when assessing noise to contemporary standards to that in the 1997 EIS, is the DoP requirements for upfront acquisition of properties affected under 'adverse' weather conditions. While the 1997 EIS gave consideration to such weather conditions, the development consent provided a hierarchy of monitoring, mitigation and then acquisition during operations. Conditions of development consents/project approvals granted in more recent times entitle residences where predictions exceed acquisition criteria during adverse weather conditions to the right to upfront acquisition upon request.

This assessment has found nine properties containing 12 residences are predicted to exceed acquisition criteria during 'adverse' weather conditions. These properties are in addition to those entitled to acquisition upon request listed in the Schedule to Conditions 6.2.1 and 6.4.2 of the development consent due to the 1997 EIS which predicted exceedances under 'calm' weather conditions. These predictions are made on the same mine plan presented in the 1997 EIS, however with considerable additional reasonable and feasible mitigation measures, most notably sound suppression of mobile plant and equipment at a cost of some \$15-20M.

Coal & Allied is committed to working with the in which they operate and extends the opportunity for upfront acquisition upon request to the additional 13 properties, which includes the four properties identified from the assessment of the proposed conveyor/services corridor (i.e. from the proposed modification) and a further nine properties from the mine that are affected under adverse conditions.

References

Bengalla Mining Company Modification to Development Consent Statement of Environmental Effects, (Hansen Bailey 2006).

Environmental Criteria for Road Traffic Noise (EPA 1999).

Environmental Noise Control Manual (Environment Protection Authority, 1994).

Environmental Noise Model (ENM) Windows Version 3.06 (RTA Technology).

Interim Construction Noise Guideline (DECCW, 2009).

Mount Arthur Coal – Consolidated Project Noise and Blasting Impact Assessment (Wilkinson Murray 2009).

NSW Industrial Noise Policy (Environment Protection Authority, 2000).

Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration (Australian and New Zealand Environment and Conservation Council (ANZECC, 1990)).

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Appendix A

Noise monitoring data 2009

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Mount Pleasant Project Quarter 4, 2009 Environmental Noise Monitoring

Reference: 09248_R01.doc

Report Date: 14 January 2010

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EXECUTIVE SUMMARY

Global Acoustics was engaged by Coal and Allied to conduct a noise survey around the site approved for open cut mining and known as the Mount Pleasant Project (MTP), Muswellbrook.

Attended monitoring was conducted on the night of 30/31 October 2009. This monitoring does not provide levels that could be considered representative (being only brief and irregular), however, it will allow, after many surveys, identification of typical noise sources in the area.

Continuous noise logging was conducted between 31 October and 13 November 2009 at six sites.

There are six monitoring locations in total for the Mount Pleasant Project as detailed in the table below.

MONITORING LOCATIONS

Descriptor	Monitoring Location
Burtons Lane	Burtons Lane, Muswellbrook
Aberdeen	Gordon Street, Aberdeen
Muswellbrook	Cnr Brook and Scott Streets, Muswellbrook
Kayuga	Little Acres, Kayuga Road, Kayuga
Kayuga Road	Cnr Kayuga and Wybong Roads, Muswellbrook
Wybong Road	1232 Wybong Road

A combination of traffic on the New England Highway, frogs and insects generally dominated the acoustic environment at most locations.

Continuous noise logging indicated that RBL's logged at night were generally lowest (less than 30 dB) in the more rural monitoring site on Wybong Road.

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1 INTRODUCTION

1.1 BACKGROUND

Global Acoustics was engaged by Coal and Allied to conduct a noise survey around the site approved for open cut mining and known as the Mount Pleasant Project (MTP), Muswellbrook.

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Continuous noise logging was conducted between 31 October and 13 November 2009 at six sites.

The purpose of the survey is to quantify and describe the acoustic environment around the site.

1.2 MONITORING LOCATIONS

There are six monitoring locations in total for the Mount Pleasant Project as detailed in Table 1.1.

Table 1.1 MONITORING LOCATIONS

Descriptor	Monitoring Location
Burtons Lane	Burtons Lane, Muswellbrook
Aberdeen	Gordon Street, Aberdeen
Muswellbrook	Cnr Brook and Scott Streets, Muswellbrook
Kayuga	Little Acres, Kayuga Road, Kayuga
Kayuga Road	Cnr Kayuga and Wybong Roads, Muswellbrook
Wybong Road	1232 Wybong Road

1.3 TERMINOLOGY

Some definitions of terminology, which may be used in this report, are provided in Table 1.2.

Table 1.2 TERMINOLOGY

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{A1}	The noise level which is exceeded for 1 per cent of the time
L_{A10}	The noise level which is exceeded for 10 per cent of the time, which is approximately the average of the maximum noise levels
L_{A90}	The level exceeded for 90 per cent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes
L_{Aeq}	The average noise energy during a measurement period
L_{pk}	The unweighted peak noise level at any instant
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
SEL	Sound exposure level (SEL), the A-weighted noise energy during a measurement period normalised to one second
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
ABL	Assessment background level (ABL), the 10th percentile background noise level for a single period (day, evening or night) of a 24 hour monitoring period
RBL	Rating background level (RBL), the background noise level for a period (day, evening or night) determined from ABL data

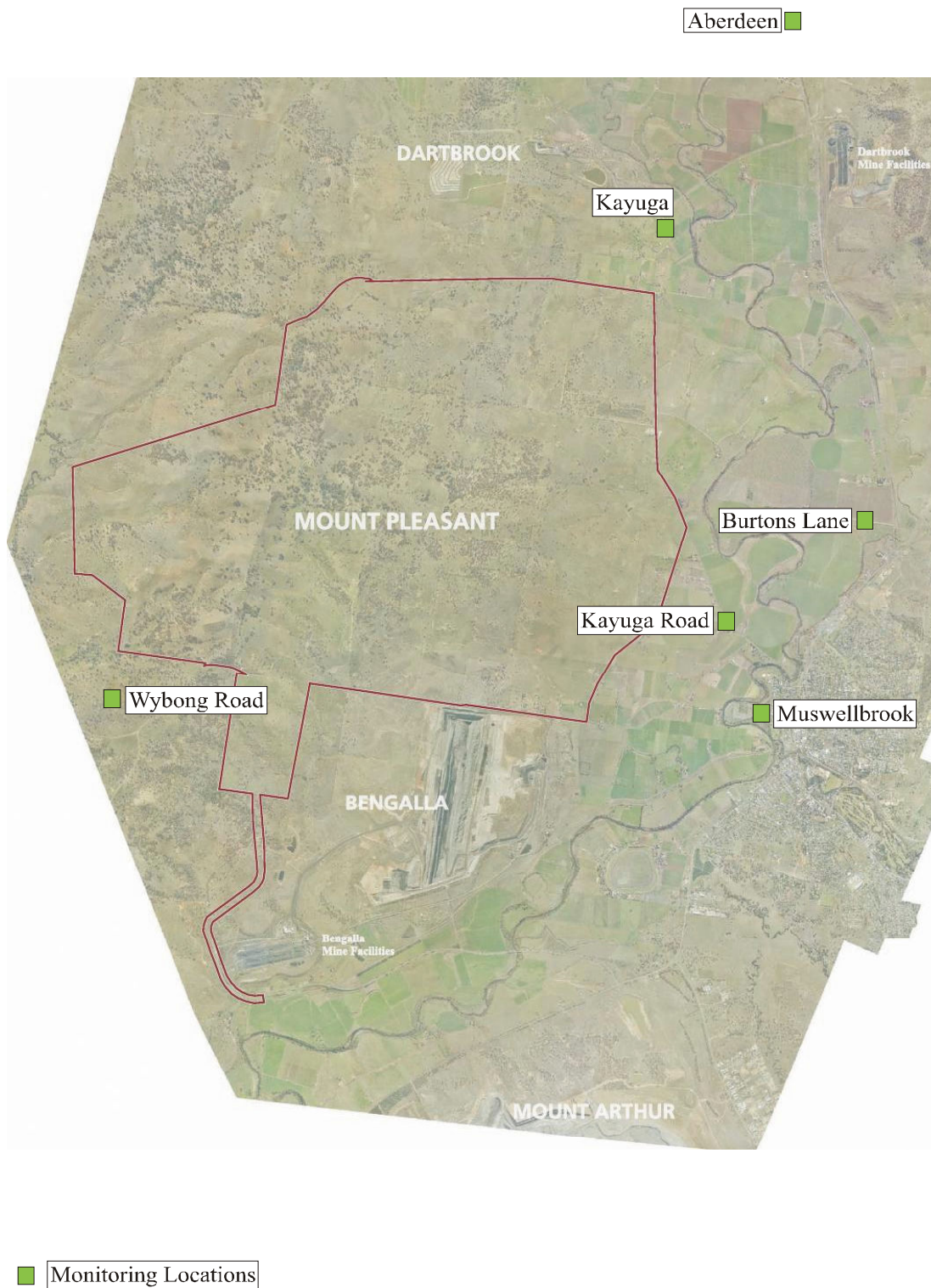


Figure 1 Monitoring Sites

2 METHODOLOGY

2.1 CONTINUOUS NOISE MONITORING

Noise levels were continuously monitored at six locations over approximately 7 days using noise data loggers. The units were configured to provide statistical noise data summaries every 15 minutes.

The equipment used to measure environmental noise levels is listed in Table 2.1.

Table 2.1 MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Ngara S-pack data logger and audio recorder	878007	17/01/2010
Ngara S-pack data logger and audio recorder	878003	20/12/2009
Ngara S-pack data logger and audio recorder	878006	21/01/2010
Rion NC-73 calibrator	11248300	19/03/2010

Calibration certificates are included as Appendix A.

2.2 ATTENDED NOISE MONITORING

Attended monitoring was conducted at three sites in accordance with Department of Environment, Climate Change and Water (DECCW) 'Industrial Noise Policy' (INP) guidelines and Australian Standard AS 1055 'Acoustics, Description and Measurement of Environmental Noise'. Atmospheric condition measurement was also undertaken.

The duration of each measurement was 15 minutes. Monitoring was carried out once at each location during the night period.

The equipment used to measure environmental noise levels are listed in Table 2.2.

Table 2.2 MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level analyser	00370304	22/05/2011
Rion NC-73 calibrator	11248306	05/02/2010

Calibration certificates are included as Appendix A.

3 RESULTS

3.1 CONTINUOUS NOISE MONITORING

Noise data loggers measure all noise sources at the logger location over the measurement period. This will include local noises, for example road traffic, farm machinery, animals, and insects; and also the source of interest, if audible. It is not possible to discern which sources were responsible for the logged levels.

Table 3.1 provides Rating Background Level (RBL) data for each period for the duration of continuous monitoring. These are totals for background noise levels. Logger data graphs are provided as Appendix B.

Table 3.1 RATING BACKGROUND LEVEL (dB) – TOTAL LEVELS

Site	Day	Evening	Night
Burtons Lane	32	37	32
Aberdeen	NA	NA	NA
Kayuga	NA	NA	NA
Kayuga Road	35	38	32
Wybong Road	25	28	27
Muswellbrook	36	40	34

Notes: 1. N/A indicates data is not available for this location.

Assessment Background Levels (ABL's) are provided below for each location for each day of monitoring. These levels pertain to total background noise levels.

3.1.1 Burtons Lane

Table 3.2 shows the ABL's and RBL's for Burtons Lane between 31 October and 6 November 2009. Results shown have been filtered for weather conditions.

Table 3.2 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, BURTONS LANE

Date	Day	Evening	Night
31/10/2009	37	37	30
1/11/2009	32	39	32
2/11/2009	32	36	32
3/11/2009	NA	37	35
4/11/2009	NA	41	31
5/11/2009	NA	NA	35
RBL	32	37	32

Notes: 1. N/A indicates entire period not monitored.

3.1.2 Aberdeen

Due to technical difficulties, data is unavailable for the Aberdeen continuous monitoring location.

3.1.3 Kayuga

Due to technical difficulties, data is unavailable for the Kayuga continuous monitoring location.

3.1.4 Kayuga Road

Table 3.2 shows the ABL's and RBL's for Kayuga Road between 6 and 12 November 2009. Results shown have been filtered for weather conditions.

Table 3.3 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, KAYUGA ROAD

Date	Day	Evening	Night
6/11/2009	NA	36	NA
7/11/2009	39	37	29
8/11/2009	36	39	31
9/11/2009	37	42	32
10/11/2009	31	38	32
11/11/2009	32	39	32
12/11/2009	33	NA	NA
RBL	35	38	32

Notes: 1. N/A indicates entire period not monitored.

3.1.5 Wybong Road

Table 3.2 shows the ABL's and RBL's for Wybong Road between 31 October and 6 November 2009. Results shown have been filtered for weather conditions.

Table 3.4 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, WYBONG ROAD

Date	Day	Evening	Night
31/10/2009	NA	32	26
1/11/2009	25	26	27
2/11/2009	25	26	29
3/11/2009	NA	28	26
4/11/2009	NA	33	24
5/11/2009	NA	NA	33
RBL	25	28	27

Notes: 1. N/A indicates entire period not monitored.

3.1.6 Muswellbrook

Table 3.2 shows the ABL's and RBL's for Muswellbrook between 6 and 13 November 2009. Results shown have been filtered for weather conditions.

Table 3.5 ASSESSMENT BACKGROUND LEVEL (dB) – TOTAL LEVELS FILTERED FOR WEATHER, MUSWELLBROOK

Date	Day	Evening	Night
6/11/2009	NA	36	NA
7/11/2009	40	40	30
8/11/2009	36	40	32
9/11/2009	38	38	33
10/11/2009	34	41	34
11/11/2009	35	41	34
12/11/2009	36	NA	36
RBL	36	40	34

Notes: 1. N/A indicates entire period not monitored.

Graphs of noise logger data are provided in Appendix B. These show that noise levels are generally highest during the day and evening periods. This was particularly noticeable during morning and afternoon traffic peak hours. Our experience is that mining is typically inaudible during those times (particularly day) and so logged levels then would most likely be non-mining.

RBL's logged at night, the period when it is possible that mining noise may contribute to measured levels, were generally lowest (less than 30 dB) in the more rural monitoring site on Wybong Road.

3.2 ATTENDED NOISE MONITORING

Overall noise levels measured at each location during attended measurement are provided in Table 3.6. Discussion as to the noise sources responsible for these measured levels is provided in Chapter 4 of this report.

Table 3.6 MEASURED NOISE LEVELS - QUARTER 4, 2009

Location	Date And Time	L _{A1} dB	L _{A10} dB	L _{Aeq} dB	L _{A90} dB
Burtons Lane	30/10/2009 22:35	46	41	39	35
Aberdeen	30/10/2009 23:39	47	42	39	34
Kayuga	31/10/2009 01:26	43	36	36	33
Kayuga Road	31/10/2009 01:54	41	39	38	36
Wybong Road	31/10/2009 02:37	39	37	35	34
Muswellbrook	31/10/2009 03:38	44	38	36	30

Atmospheric condition data measured at each location are shown in Table 3.7.

Table 3.7 MEASURED ATMOSPHERIC CONDITIONS

Location	Date And Time	Temperature (Degrees C)	Wind Speed (m/sec)	Wind Direction (Degrees)	Cloud Cover (1/8s)
Burtons Lane	30/10/2009 22:35	19	0.2	130	1
Aberdeen	30/10/2009 23:39	18	0.0	-	0
Kayuga	31/10/2009 01:26	18	0.2	130	0
Kayuga Road	31/10/2009 01:54	18	1.3	130	0
Wybong Road	31/10/2009 02:37	17	0.2	130	0
Muswellbrook	31/10/2009 03:38	17	0.3	130	1

Notes: 1. Wind speed and direction measured at 1.8 metres.

4 DISCUSSION

4.1 NOTED NOISE SOURCES

Table 3.6 presents data gathered during attended monitoring. These noise levels are the result of many sounds reaching the sound level meter microphone during monitoring.

From these observations summaries have been derived for each location. The following chapter sections provide these summaries. Statistical 1/3 octave band analysis of environmental noise was undertaken, and Figures 3 to 8 display frequency ranges for various noise sources at each location for L_{A1} , L_{A10} , L_{A90} , and L_{Aeq} . These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz; mining noise is at frequencies less than 1000 Hz (this is typical). Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining; this can be dogs, cows, or, most commonly, road traffic.

It should be noted that the method of summing statistical values up to a cutoff frequency can overstate the L_{A1} result by a small margin but is entirely accurate for L_{Aeq} .

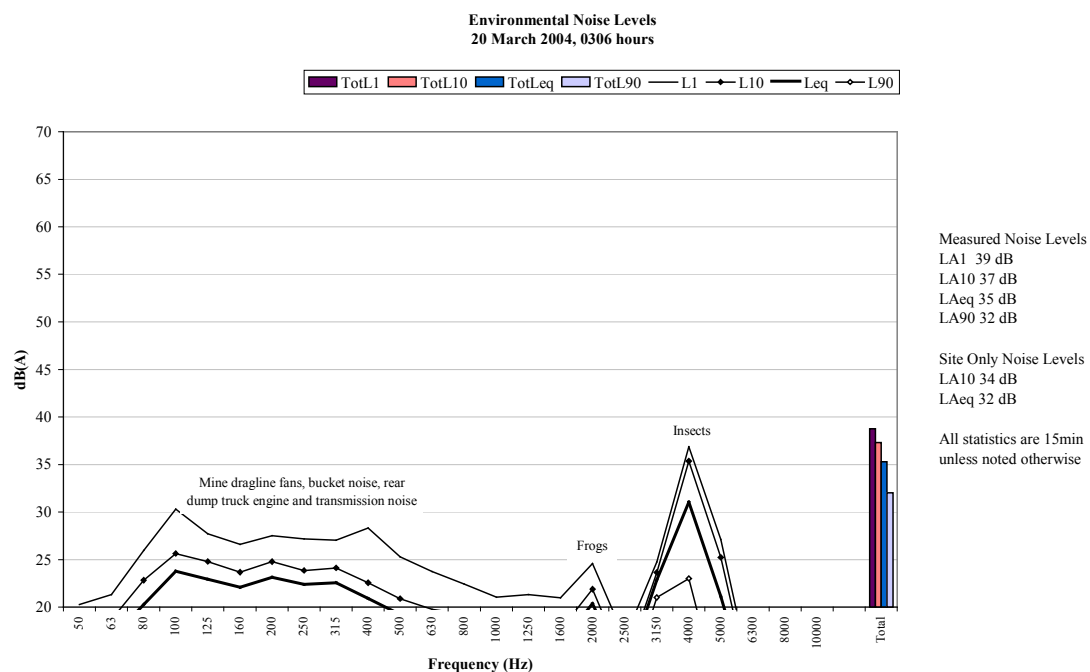


Figure 2 Sample Graph

4.1.1 Burtons Lane, Muswellbrook

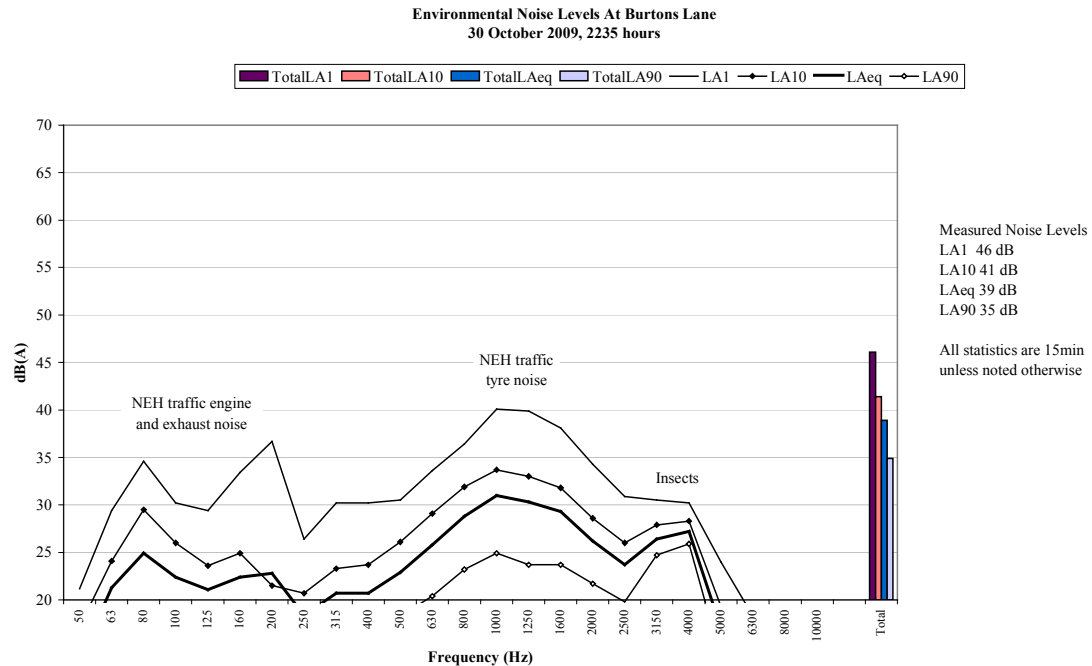


Figure 3 Environmental Noise Levels, Burtons Lane

Tyre noise from traffic on the New England Highway (NEH) dominated the acoustic environment and was primarily responsible for the L_{A1} , L_{A10} and L_{Aeq} and contributed to the measured L_{A90} .

Insects were minor contributors to the measured L_{A10} and L_{Aeq} and were primarily responsible for the measured L_{A90} .

Irrigation sprays and nearby transformer noise was audible throughout the measurement.

4.1.2 Gordon Street, Aberdeen

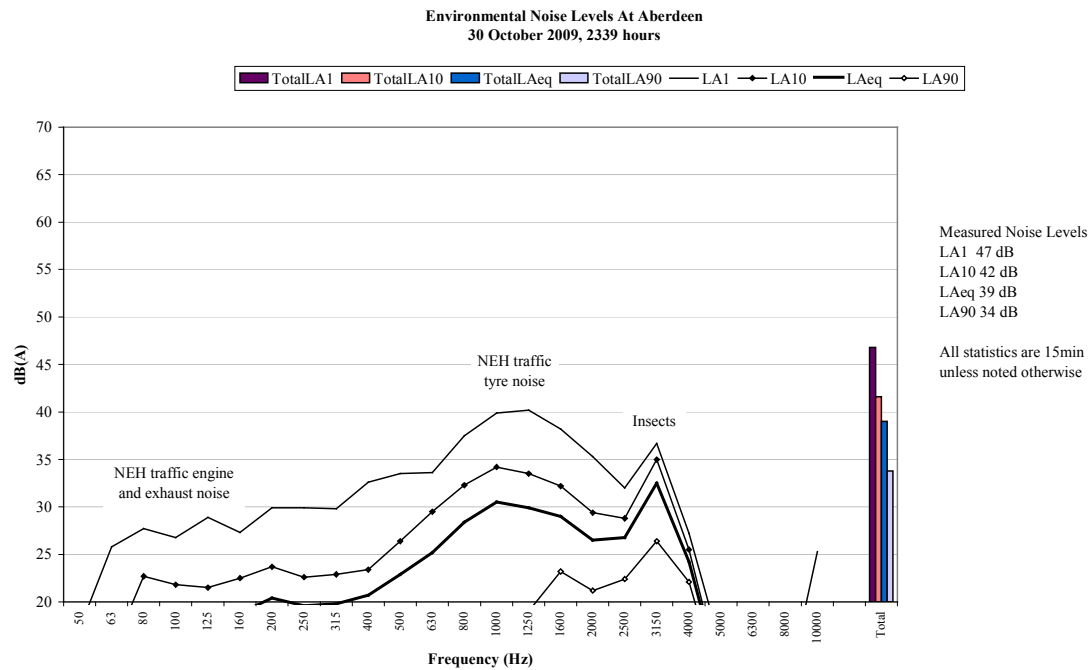


Figure 4 Environmental Noise Levels, Gordon Street, Aberdeen

Traffic on the New England Highway (NEH) generated the measured L_{A1} and contributed to the measured L_{A10} and L_{Aeq} .

Insects contributed to the measured L_{A10} and L_{Aeq} and were primarily responsible for the measured L_{A90} .

A distant pump, dogs and birds were also noted.

4.1.3 Little Acres, Kayuga Road, Kayuga

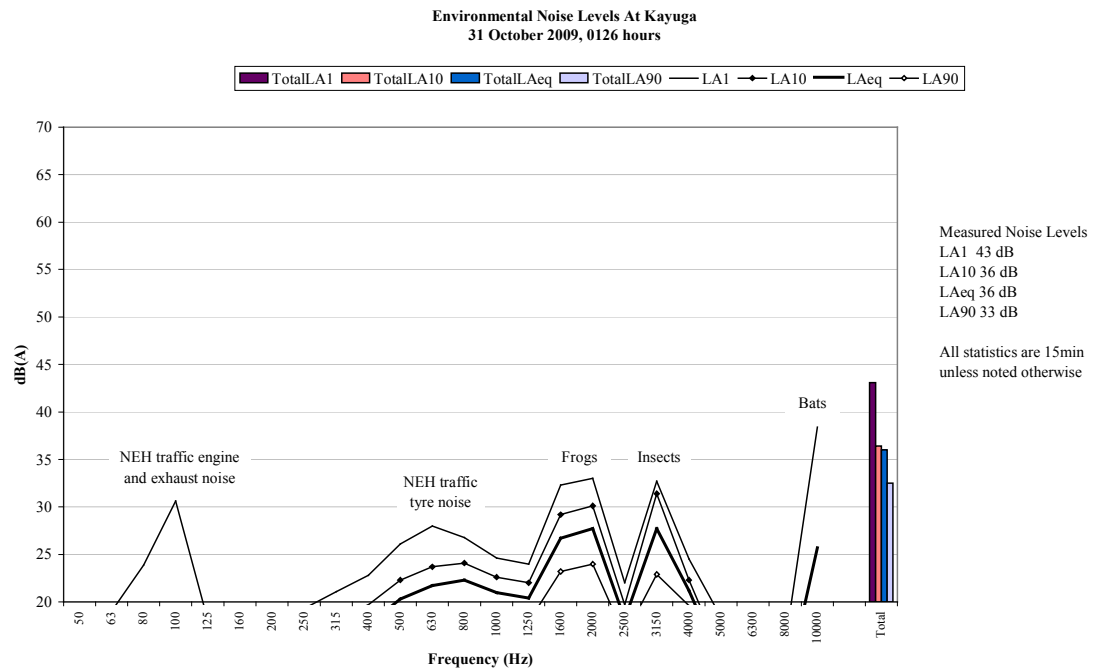


Figure 5 Environmental Noise Levels, Kayuga

Bats were responsible for the measured L_{A1} .

A combination of frogs and insects generated the measured L_{A10} , L_{Aeq} and L_{A90} .

Traffic on the New England Highway (NEH), breeze in foliage and dogs were also noted.

4.1.4 Corner Kayuga and Wybong Roads, Muswellbrook

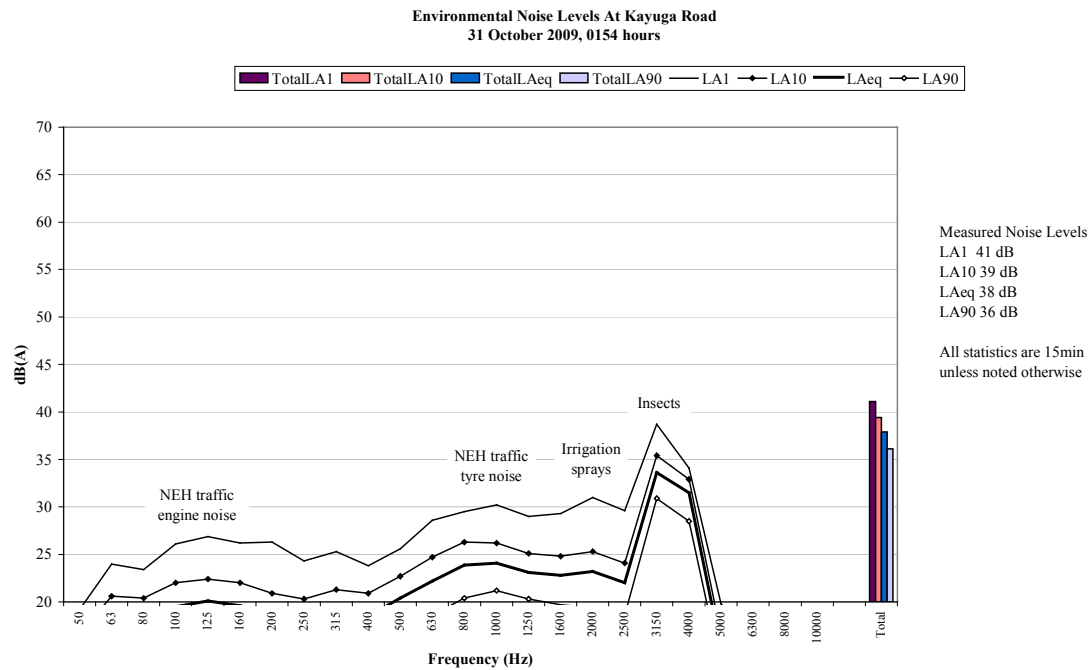


Figure 6 Environmental Noise Levels, Kayuga Road

Insects were responsible for measured levels.

Tyre and engine noise from traffic on the New England Highway (NEH), irrigation sprays, birds, dogs and haul truck engine noise (briefly twice) from Mt Arthur Coal were also noted.

4.1.5 1232 Wybong Road, Muswellbrook

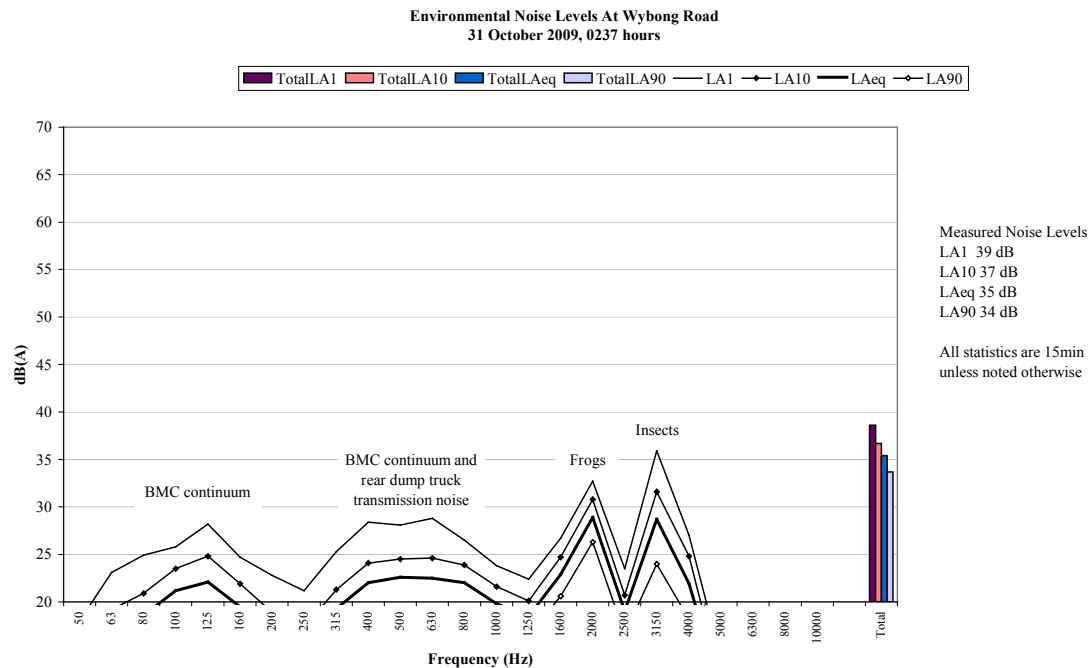


Figure 7 Environmental Noise Levels, Wybong Road

A combination of frogs and insects were responsible for the measured L_{A10} , L_{Aeq} and L_{A90} . Insects generated the measured L_{A1} .

A continuum and rear dump truck transmission noise from Bengalla Mining Company (BMC) was also noted.

4.1.6 Corner Brooks and Scott Streets, Muswellbrook

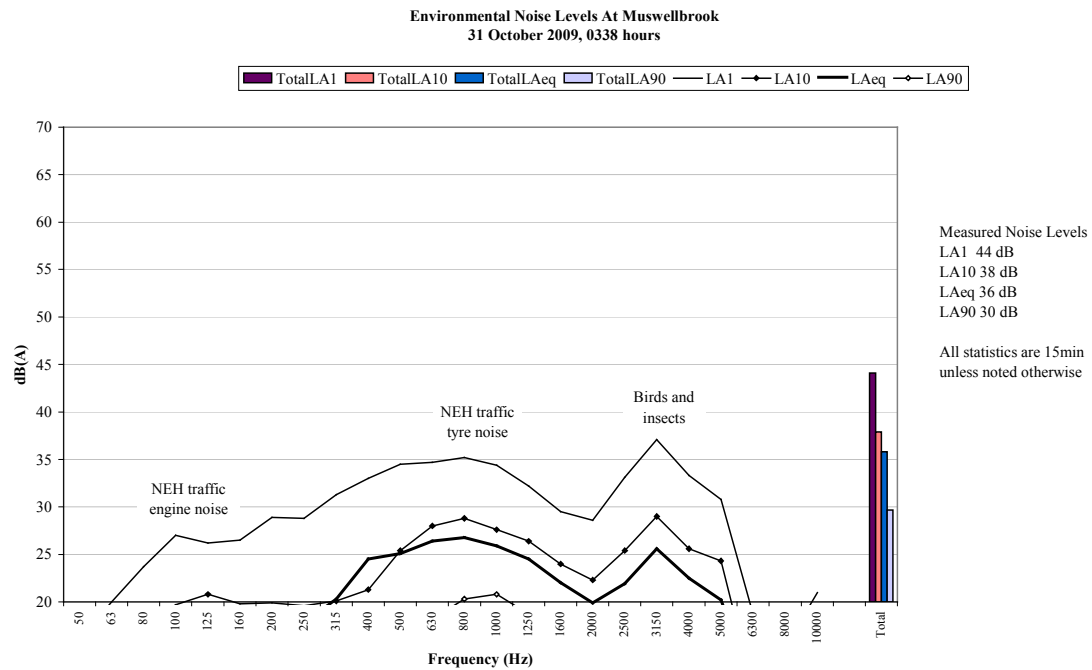


Figure 8 Environmental Noise Levels, Muswellbrook

Traffic engine and tyre noise from the New England Highway (NEH) contributed to the measured L_{A10} and L_{Aeq} and was primarily responsible for the measured L_{A90} .

Birds generated the measured L_{A1} . Birds and insects contributed to the measured L_{A10} and L_{Aeq} .

5 SUMMARY

5.1 SUMMARY

An attended survey to identify noise sources in an area around the approved Mount Pleasant Project (MTP) was undertaken on the night of 30/31 October 2009.

A combination of traffic on the New England Highway, frogs and insects generally dominated the acoustic environment at most locations.

Continuous noise logging was conducted between 31 October and 13 November 2009 at six sites. RBL's logged at night were generally lowest (less than 30 dB) in the more rural monitoring site on Wybong Road.

Appendix

A: Calibration Certificates



Sound Level Meter Test Report

Report Number : 07481.doc

Date of Test : 17/01/2008

Report Issue Date : 08/07/2008

Equipment Tested: ARL Real Time Sound Acquisition System

Model Number: Ngara S-Pack

Serial Number: 878007

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : 8 July 2008



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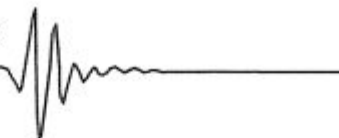
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Sound Level Meter Test Report

Report Number : 07477.doc

Date of Test : 20/12/2007

Report Issue Date : 08/07/2008

Equipment Tested: ARL Real Time Sound Acquisition System

Model Number: Ngara S-Pack

Serial Number: 878003

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : 7 July 2008



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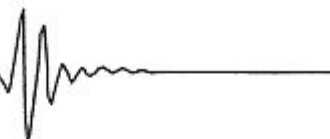
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Sound Level Meter Test Report

Report Number : 07480.doc

Date of Test : 21/01/2008

Report Issue Date : 24/06/2008

Equipment Tested: ARL Real Time Sound Acquisition System

Model Number: Ngara S-Pack

Serial Number: 878006

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : 24 June 2008



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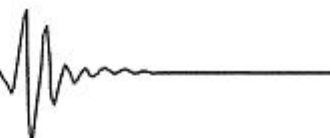
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Acoustic Calibrator Test Report

Report Number : 09095

Date of Test : 19/03/2009

Report Issue Date : 19/03/2009

Equipment Tested: Rion Acoustic Calibrator

Model Number: NC-73

Serial Number: 11248300

Client Name : Acoustic Research Laboratories Pty Ltd

Level 7, Building 2, 423 Pennant Hills Road

Pennant Hills NSW 2120

Contact Name : Katie Fairjones

Tested by : Morgan Rac

Approved Signatory :

Ken Williams

Date : 19 March 2009



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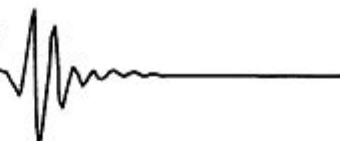
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Sound Level Meter Test Report

Report Number : 09229

Date of Test : 22/05/2009

Report Issue Date : 25/05/2009

Equipment Tested: Rion Sound Level Meter

Model Number: NA-28

Serial Number: 00370304

Client Name : Global Acoustics Pty Ltd

12/16 Huntingdale Drive

Thornton NSW 2322

Contact Name : Amanda Borserio

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : 25/05/2009



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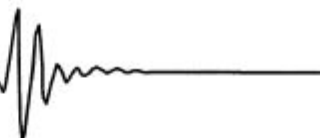
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Acoustic Calibrator Test Report

Report Number : 09031

Date of Test : 05/02/2009

Report Issue Date : 06/02/2009

Equipment Tested: Rion Acoustic Calibrator

Model Number: NC-73

Serial Number: 11248306

Client Name : Global Acoustics Pty Ltd

12/16 Huntingdale Drive

Thornton NSW 2322

Contact Name : Tony Welbourne

Tested by : Morgan Rae

Approved Signatory :

Ken Williams

Date : 6 February 2009



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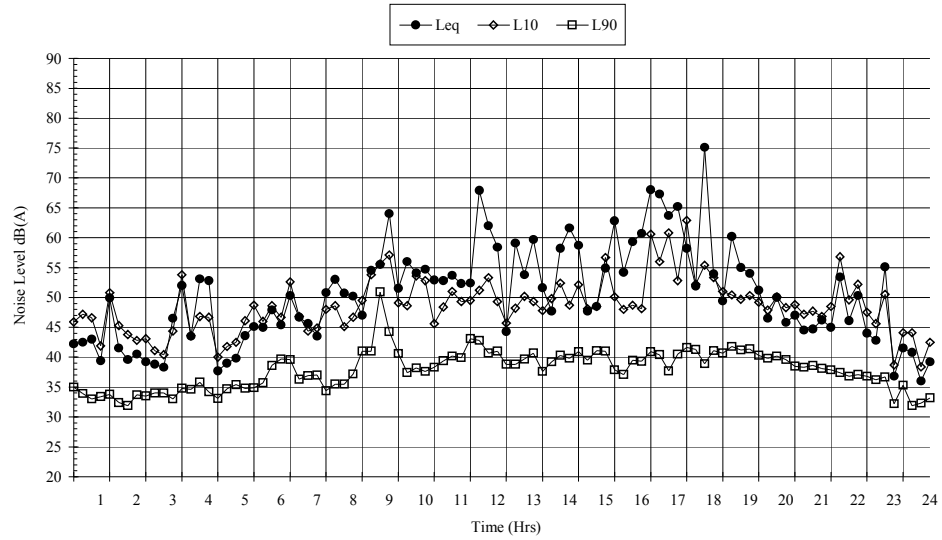
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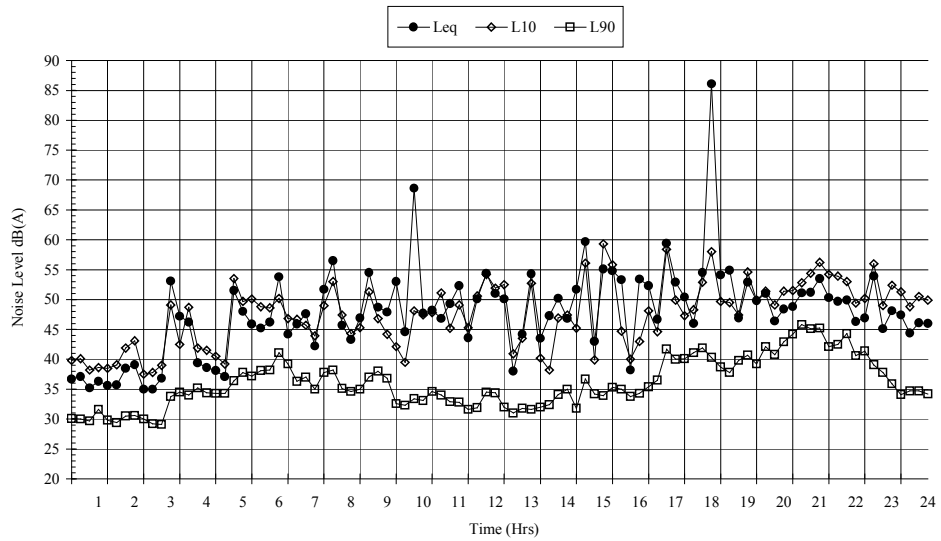
Appendix

B: Logger Data Graphs

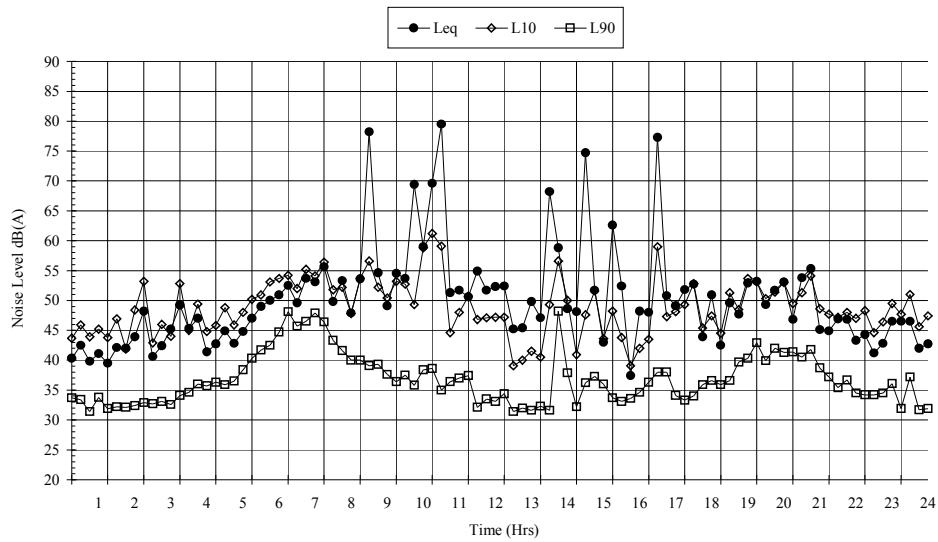
Environmental Noise Levels At Burtons Lane
31/10/2009



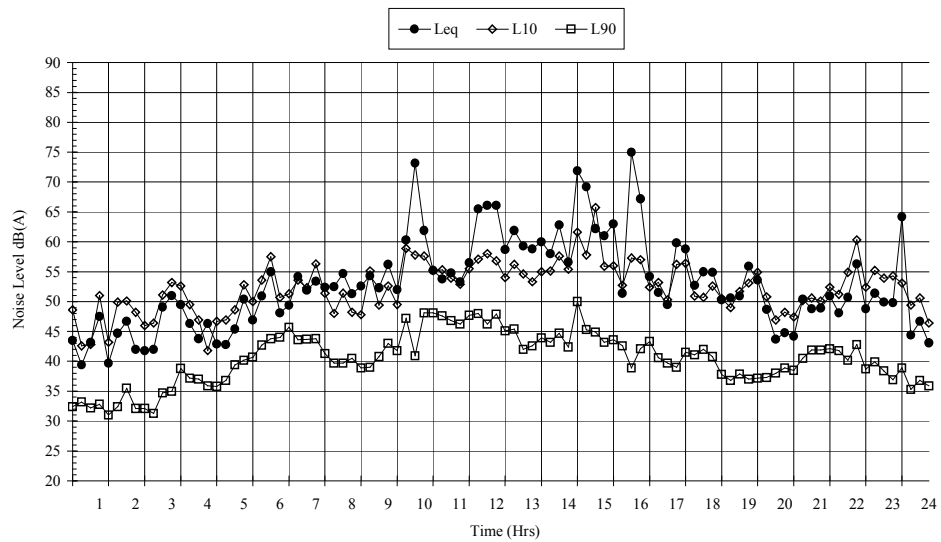
Environmental Noise Levels At Burtons Lane
1/11/2009



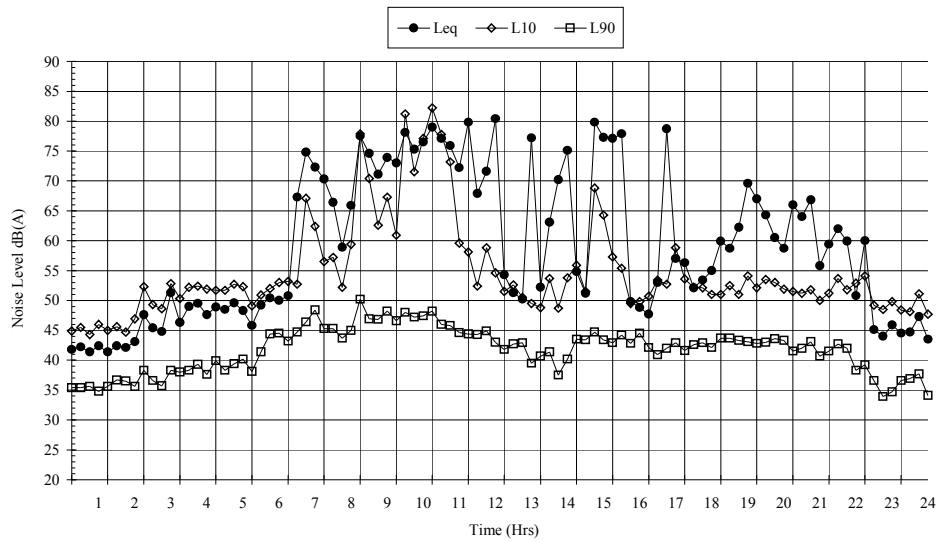
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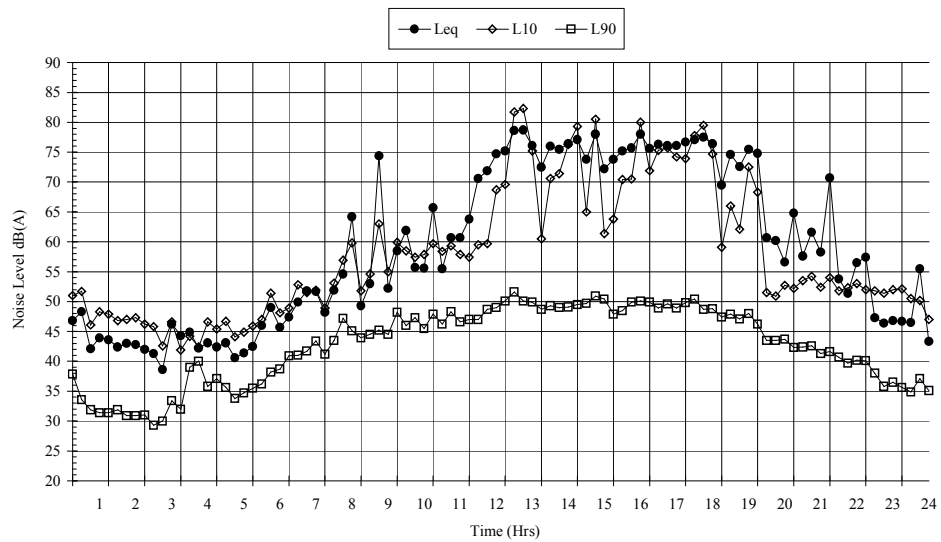
Environmental Noise Levels At Burtons Lane
3/11/2009



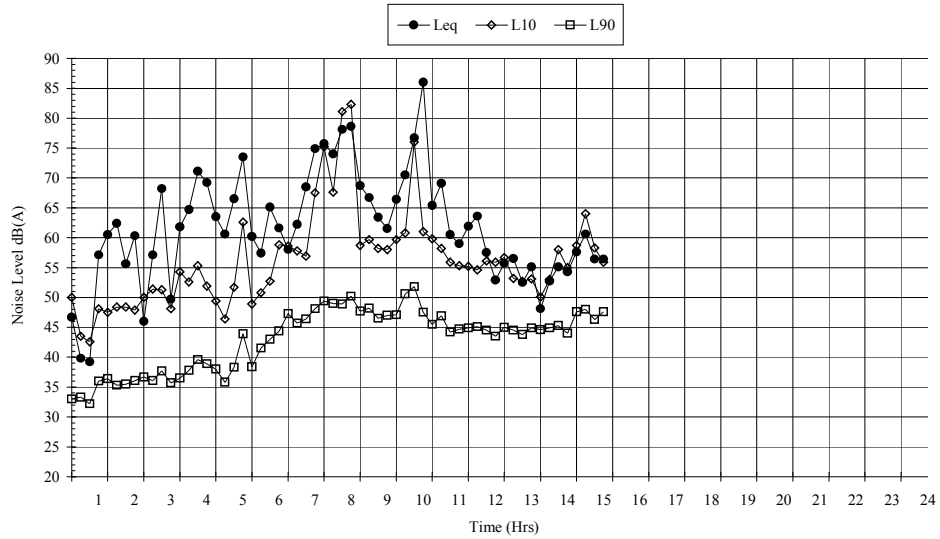
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4/11/2009



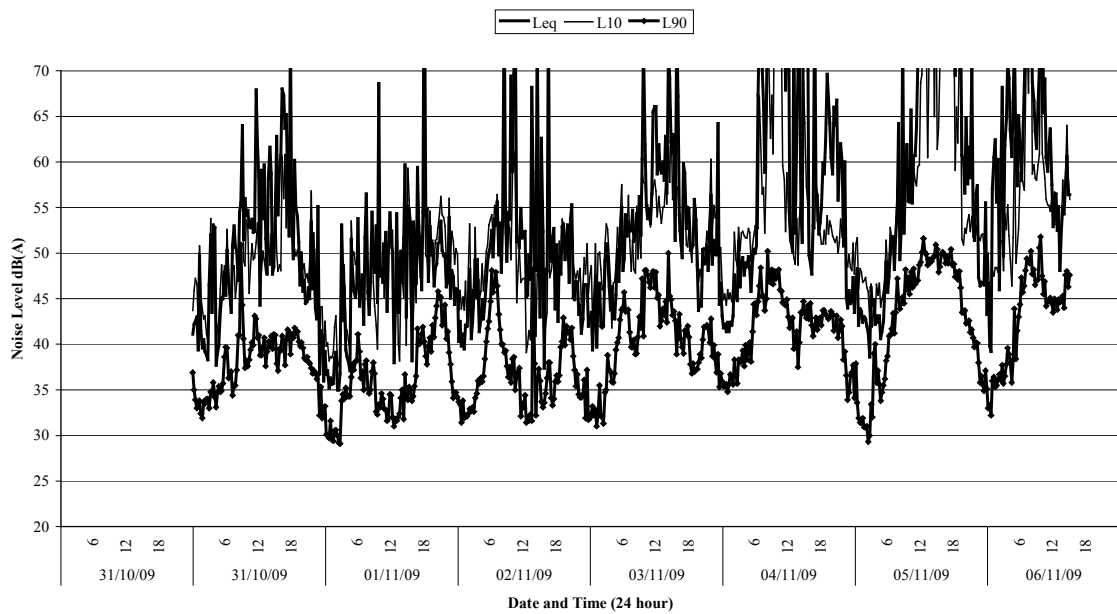
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5/11/2009



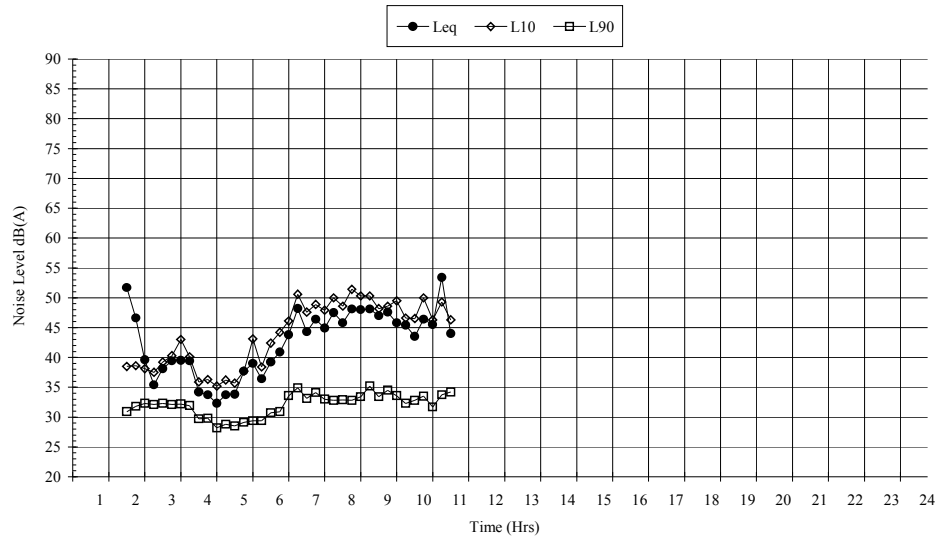
Environmental Noise Levels At Burtons Lane
6/11/2009



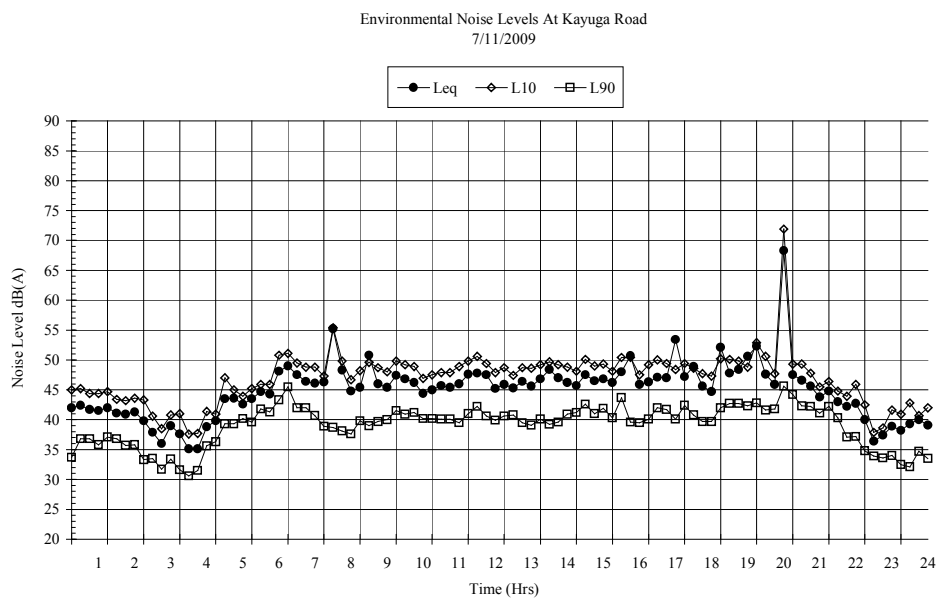
Environmental Noise Levels At Burtons Lane
From 31/10/2009 to 6/11/2009



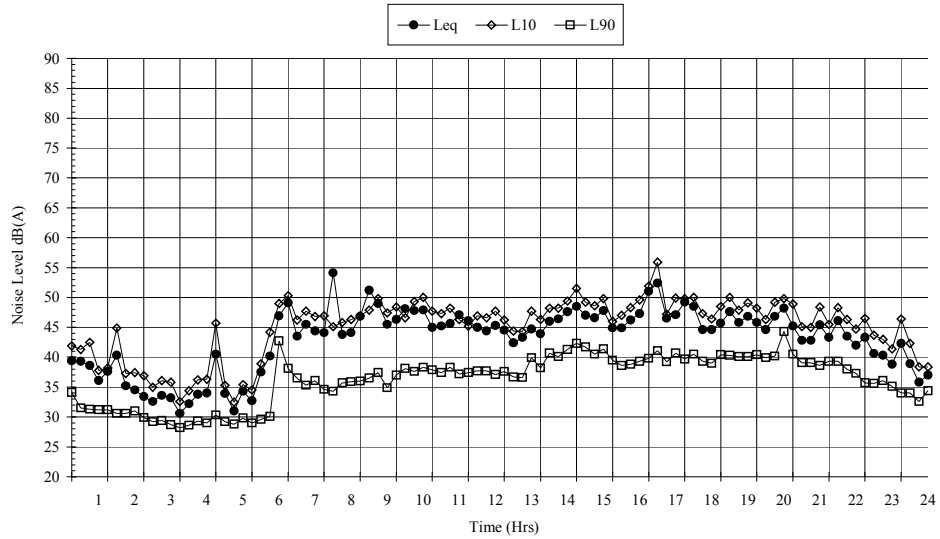
Environmental Noise Levels At Kayuga
31/10/2009



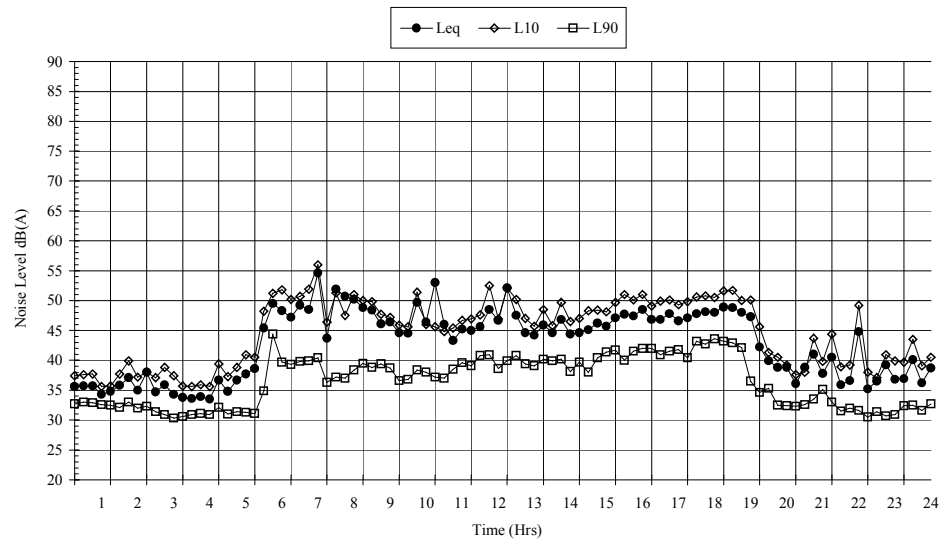
Environmental Noise Levels At Kayuga Road
7/11/2009



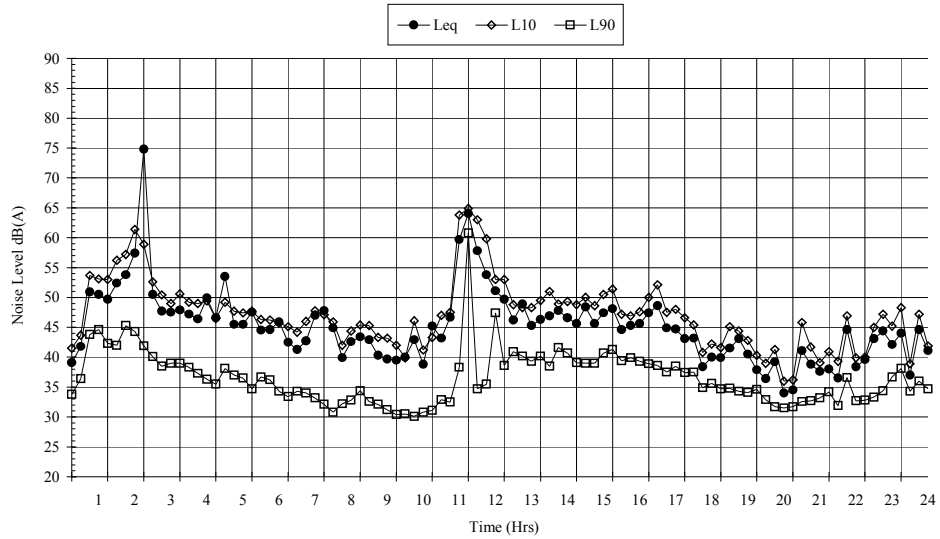
Environmental Noise Levels At Kayuga Road
8/11/2009



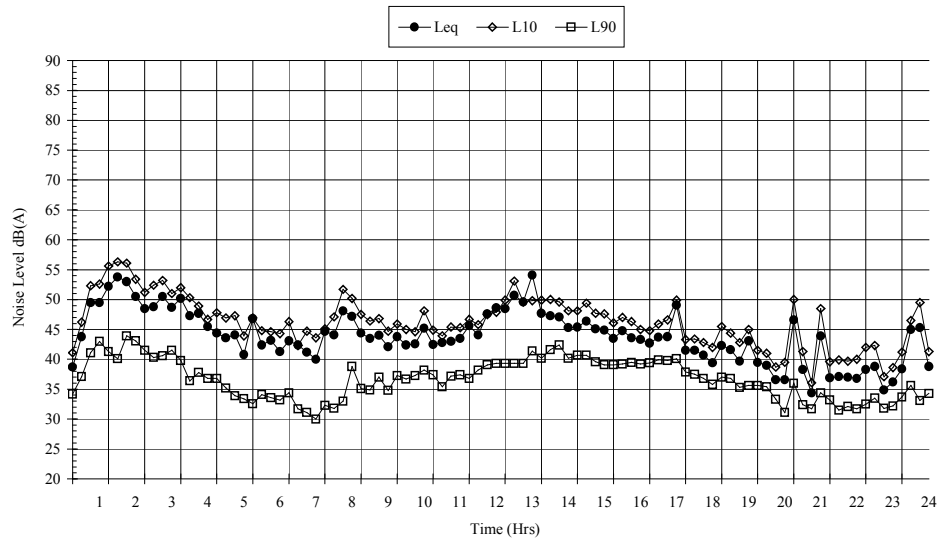
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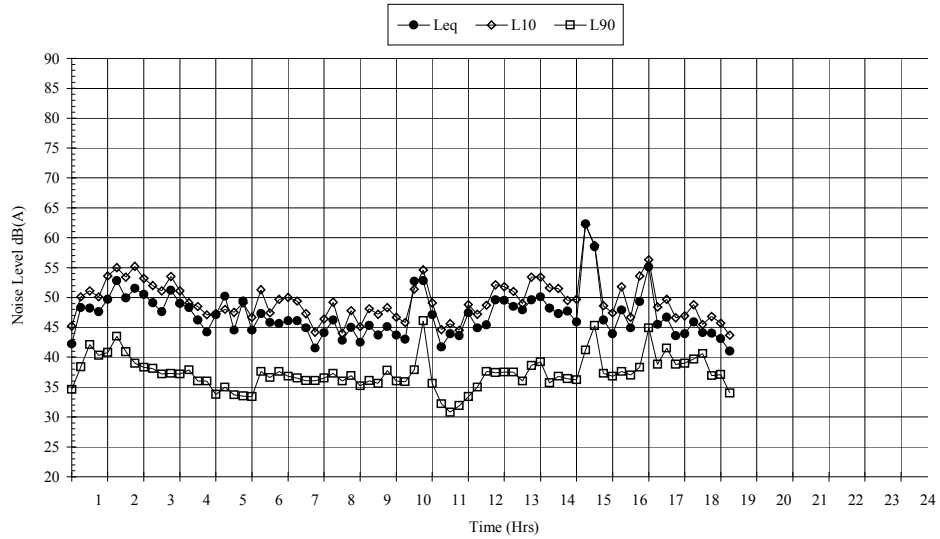
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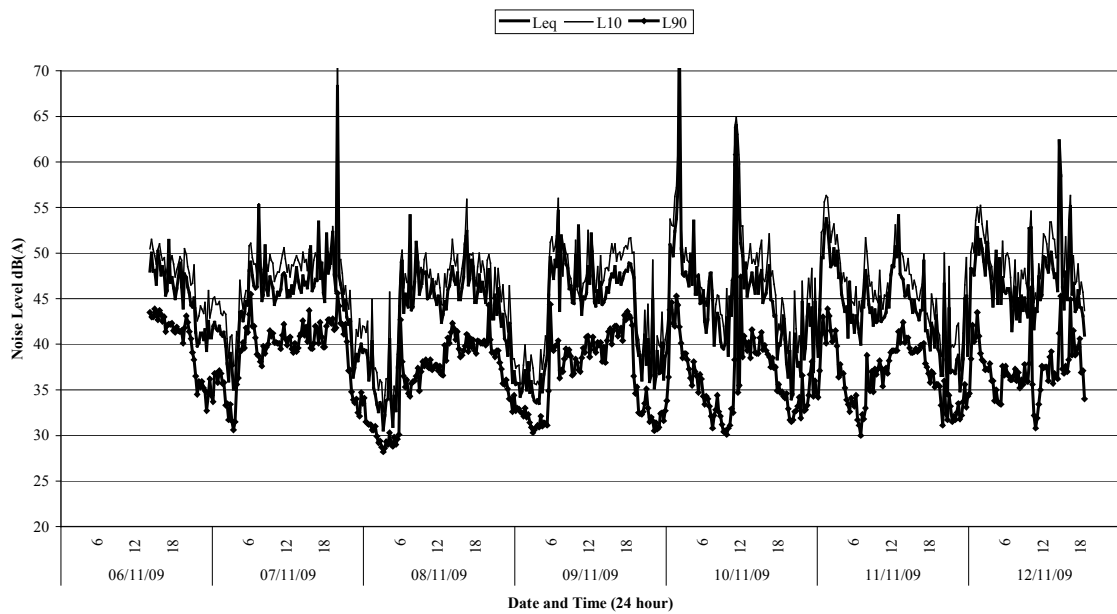
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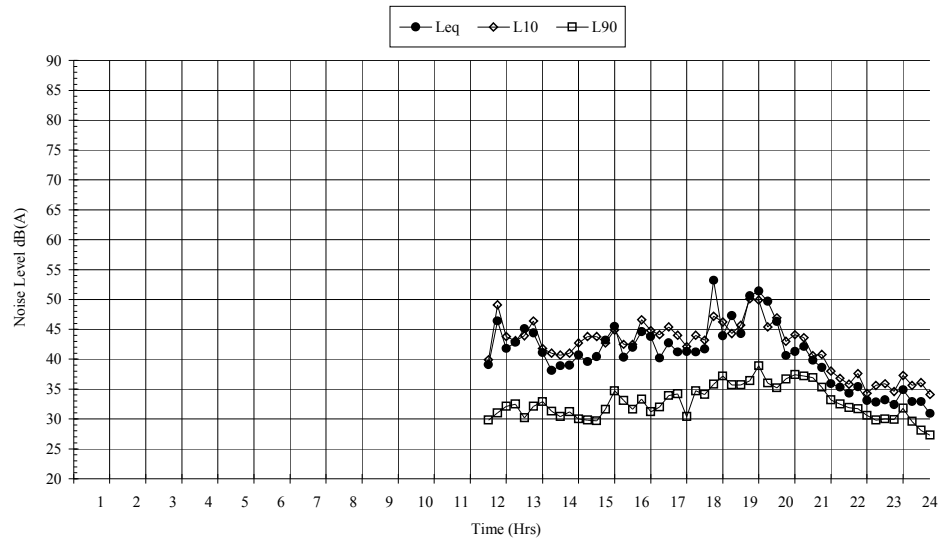
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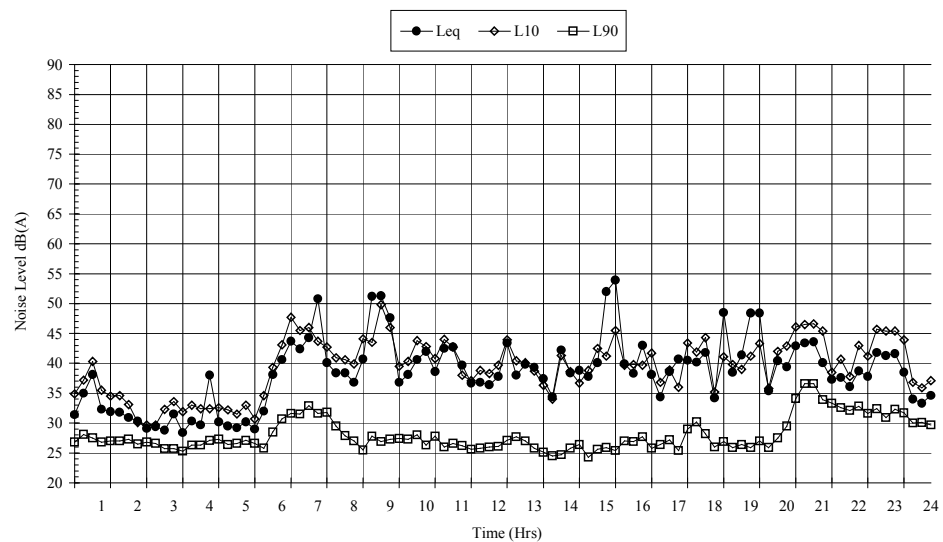
Environmental Noise Levels At Kayuga Road
From 6/11/2009 to 12/11/2009



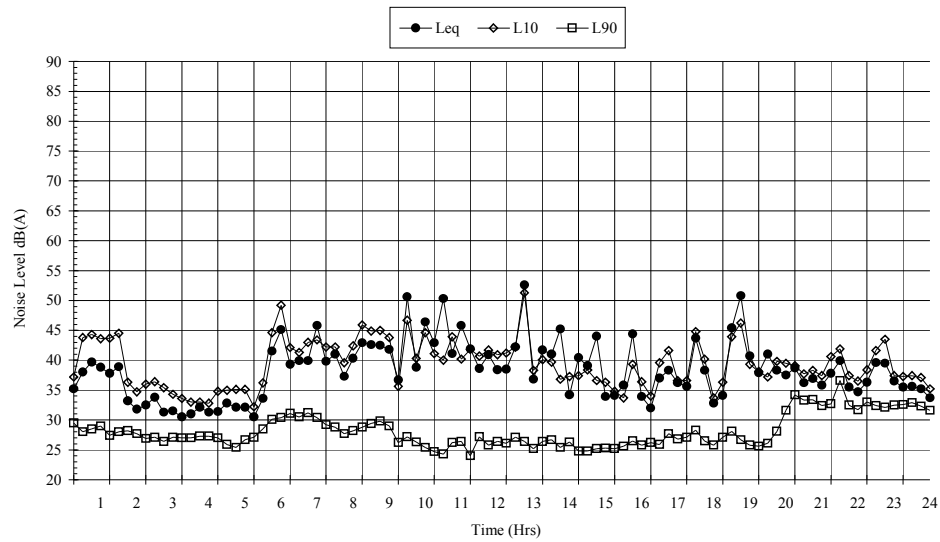
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31/10/2009



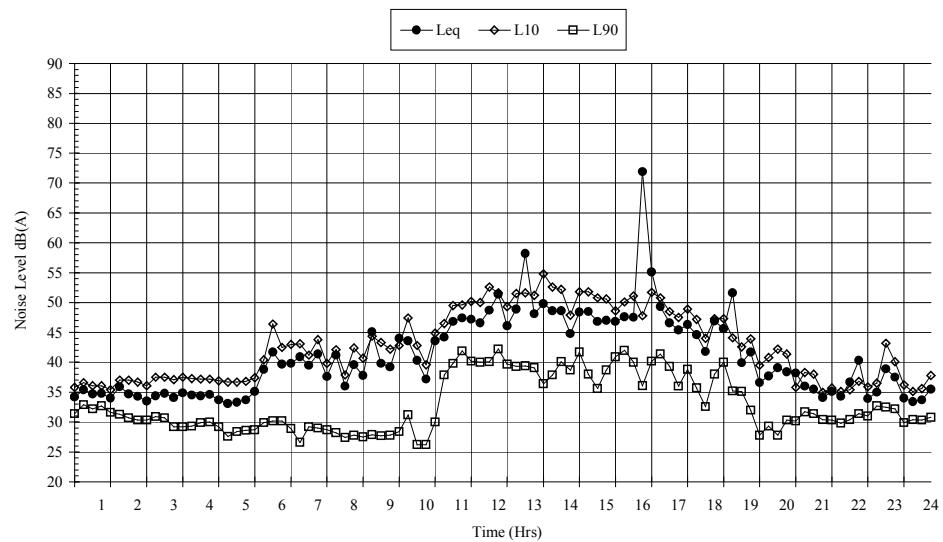
Environmental Noise Levels At Wybong Road
1/11/2009



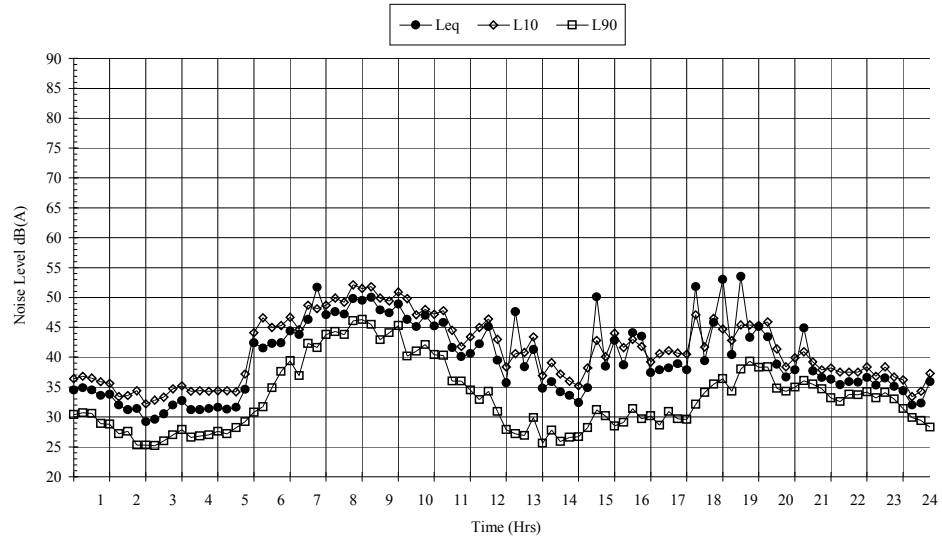
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2/11/2009



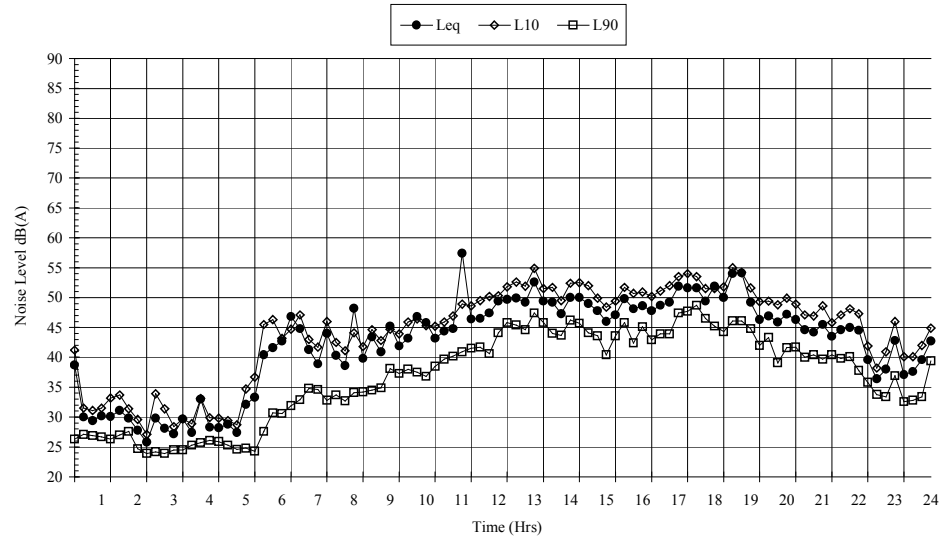
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3/11/2009



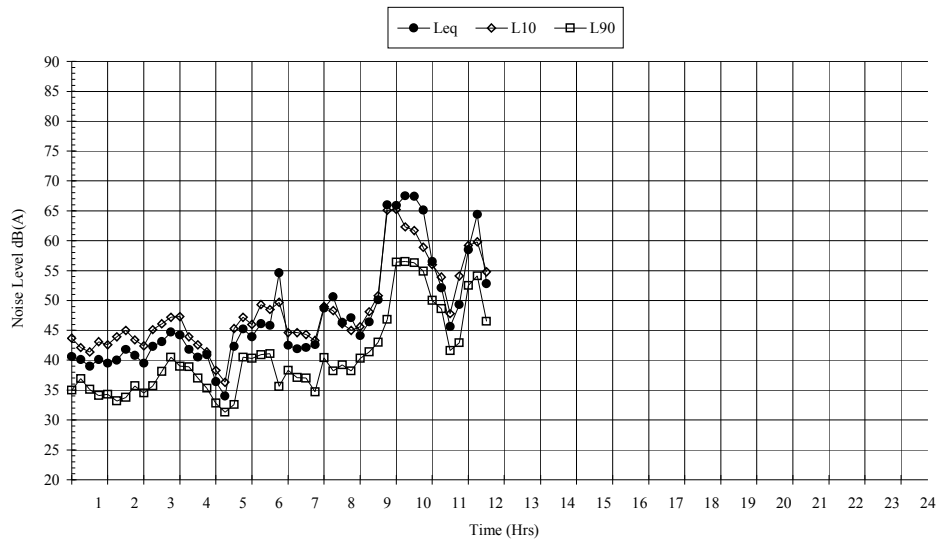
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4/11/2009



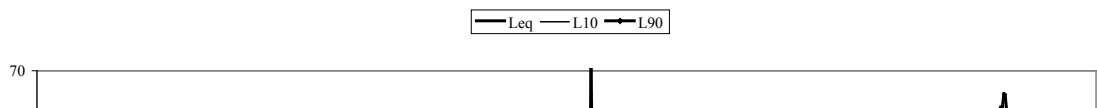
Environmental Noise Levels At Wybong Road
5/11/2009



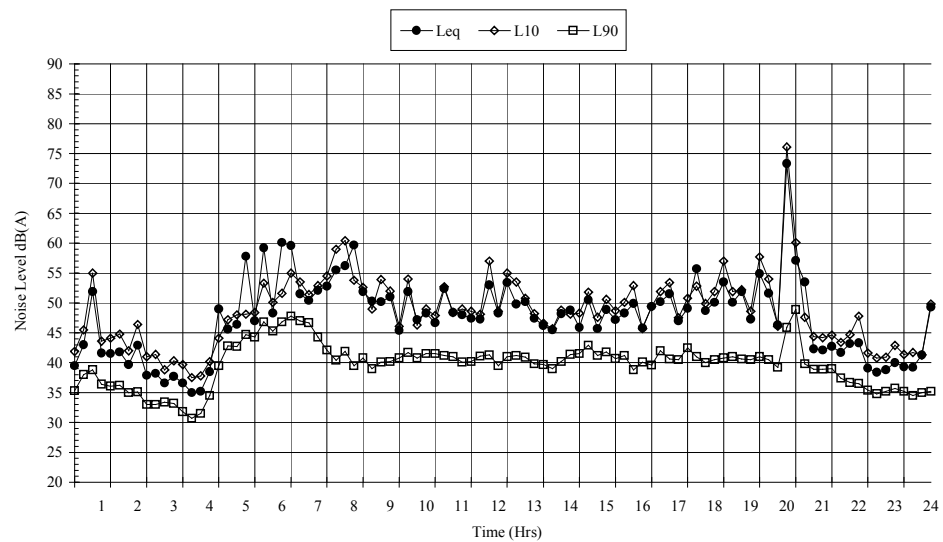
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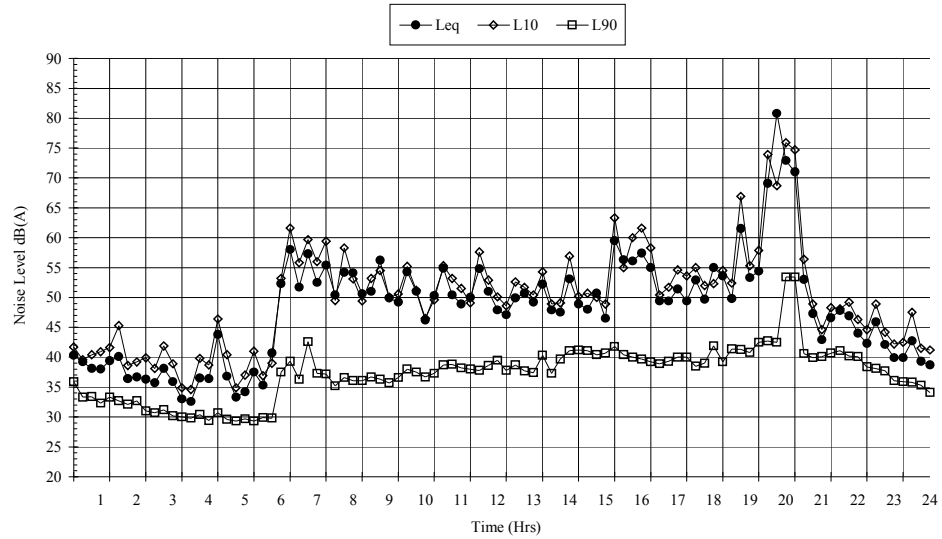
Environmental Noise Levels At Wybong Road
From 31/10/2009 to 6/11/2009



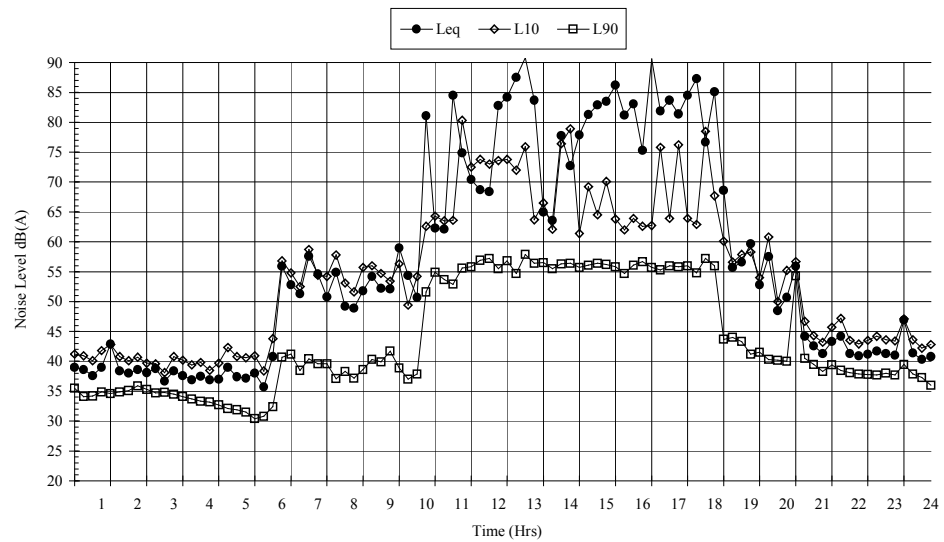
Environmental Noise Levels At Muswellbrook
7/11/2009



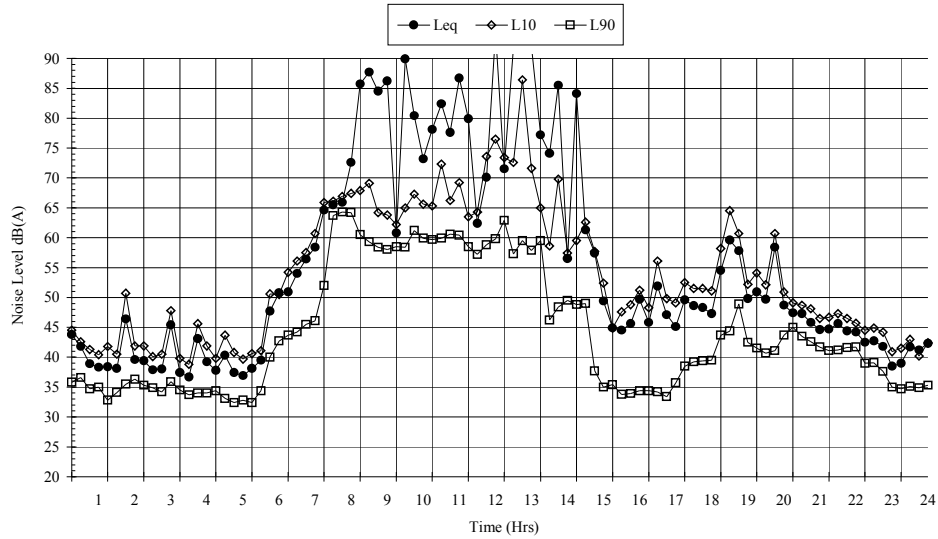
Environmental Noise Levels At Muswellbrook
8/11/2009



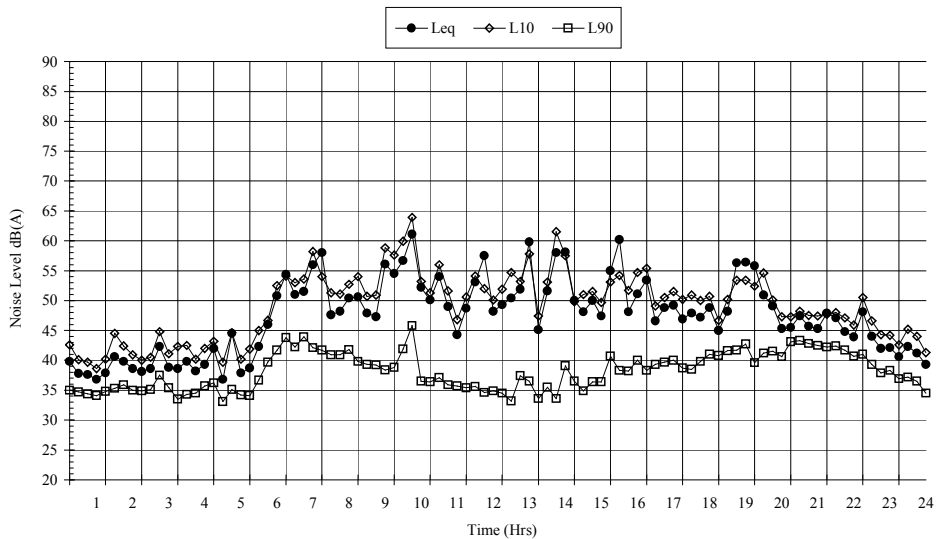
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9/11/2009



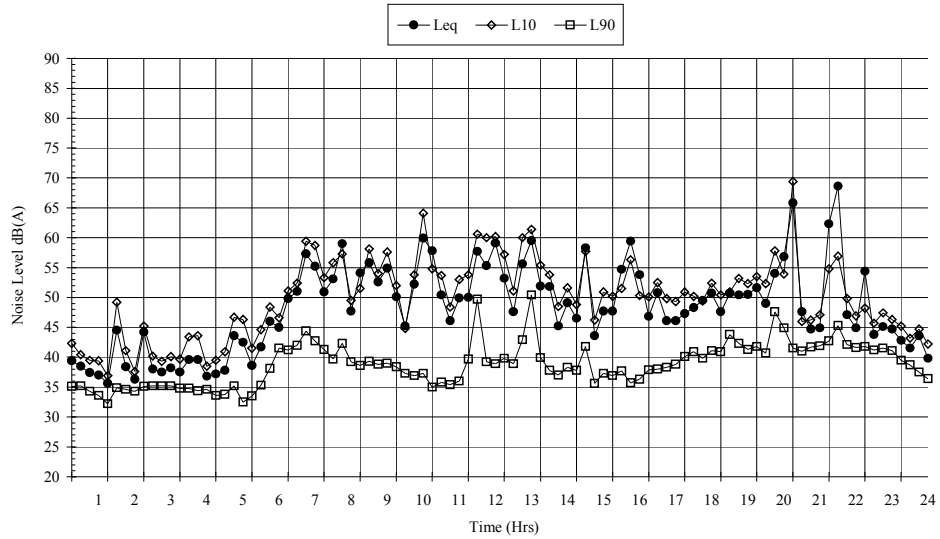
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10/11/2009



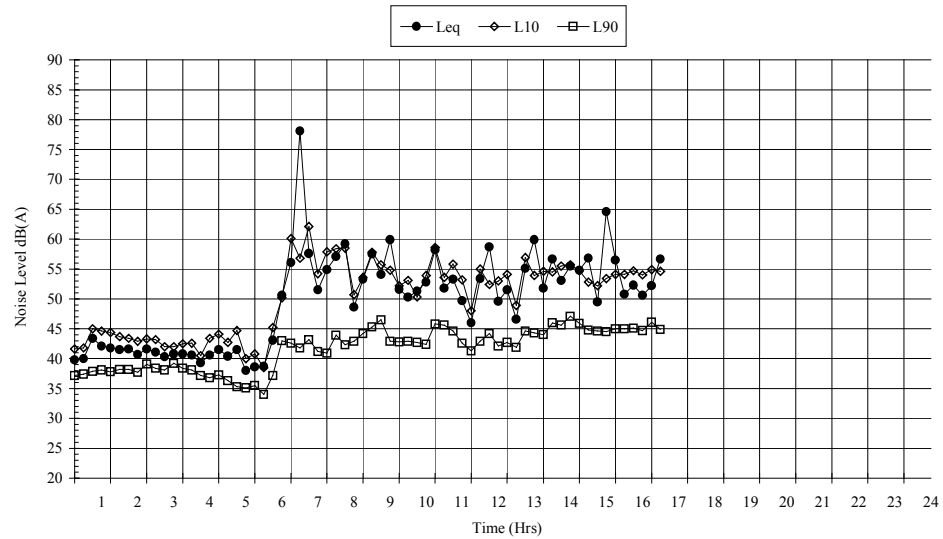
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11/11/2009



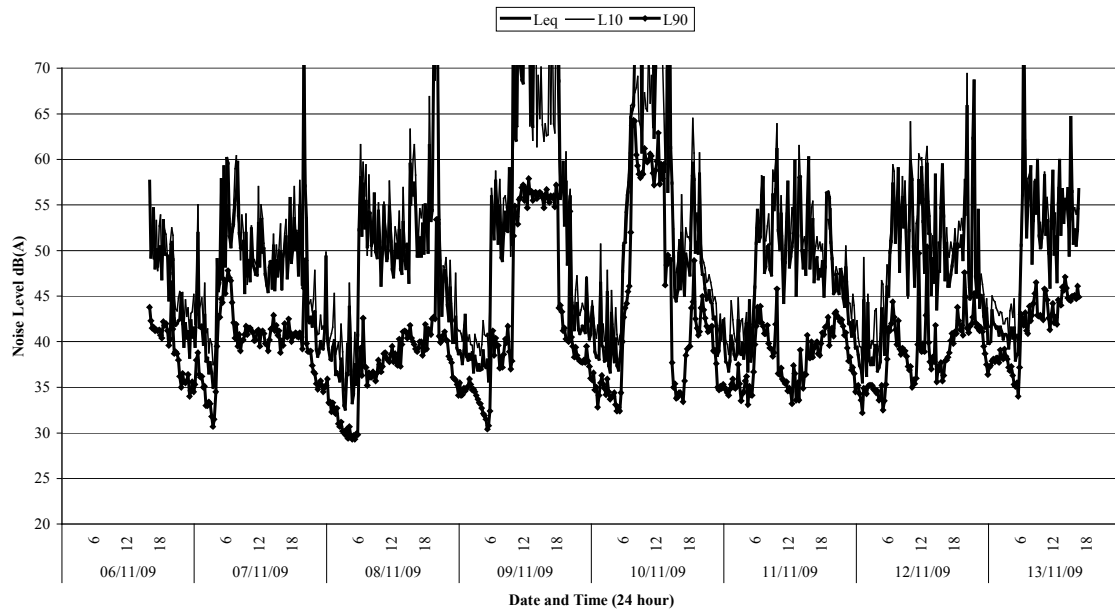
Environmental Noise Levels At Muswellbrook
12/11/2009



Environmental Noise Levels At Muswellbrook
13/11/2009



Environmental Noise Levels At Muswellbrook
From 6/11/2009 to 13/11/2009

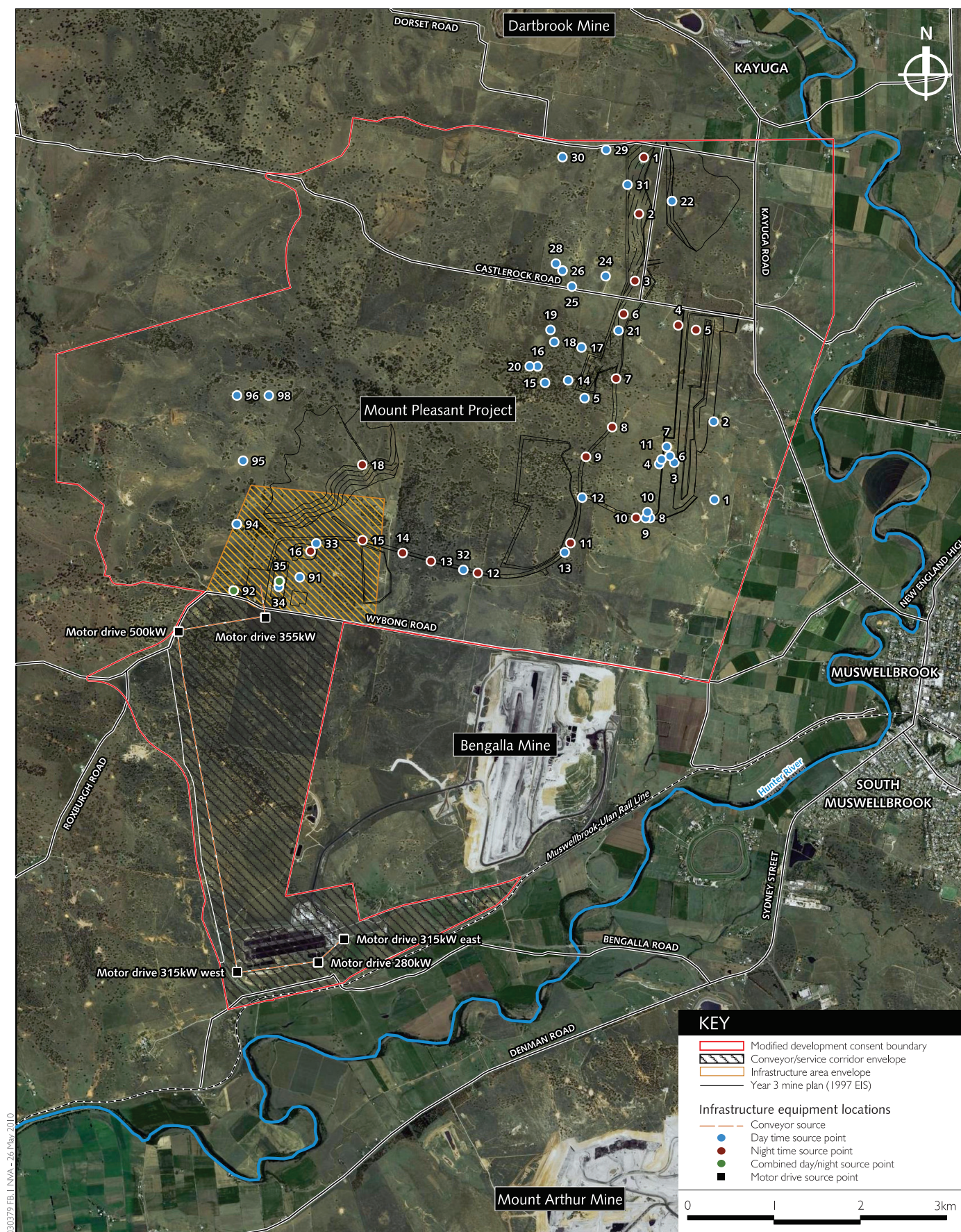


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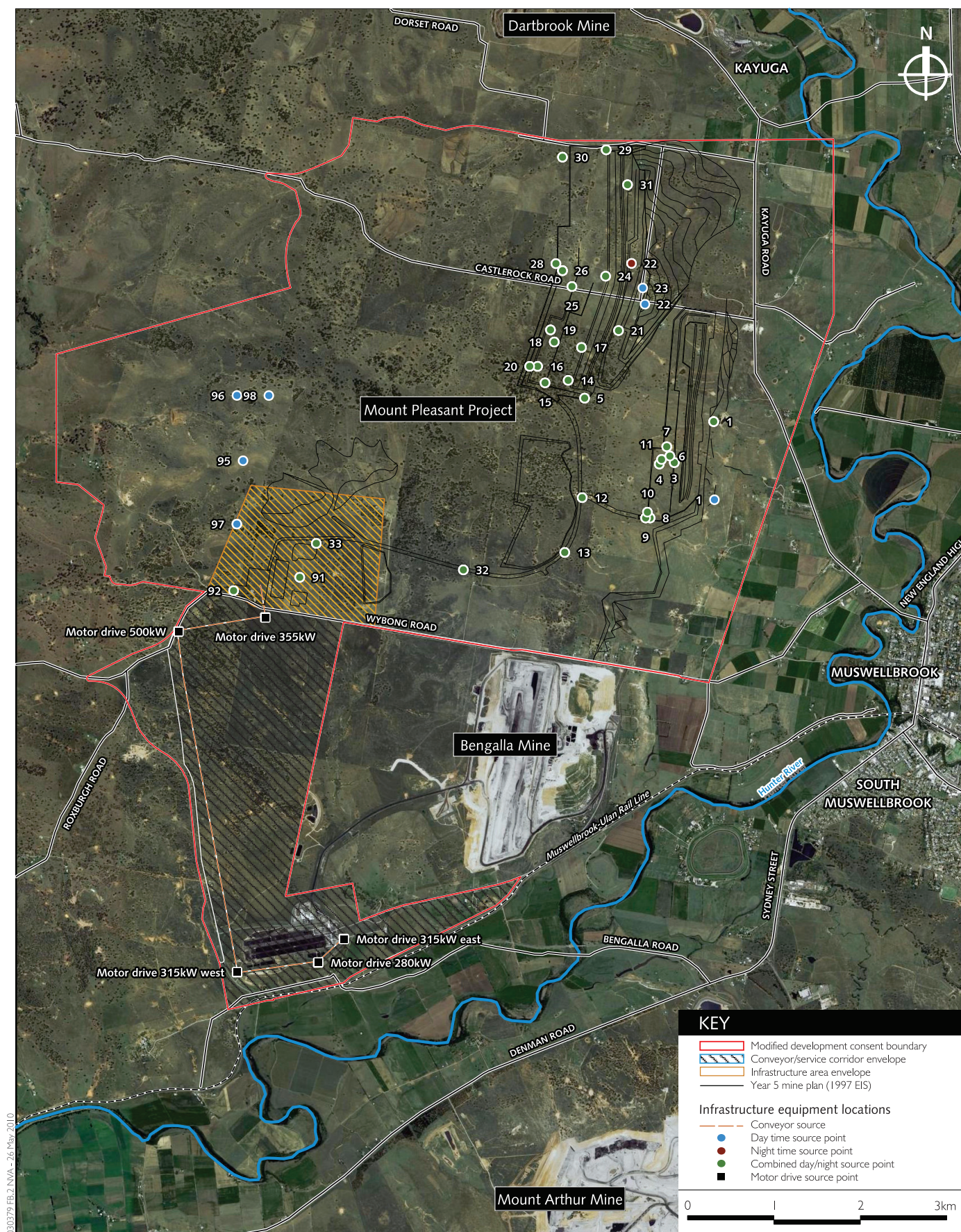
Appendix B

Mine plans and equipment locations

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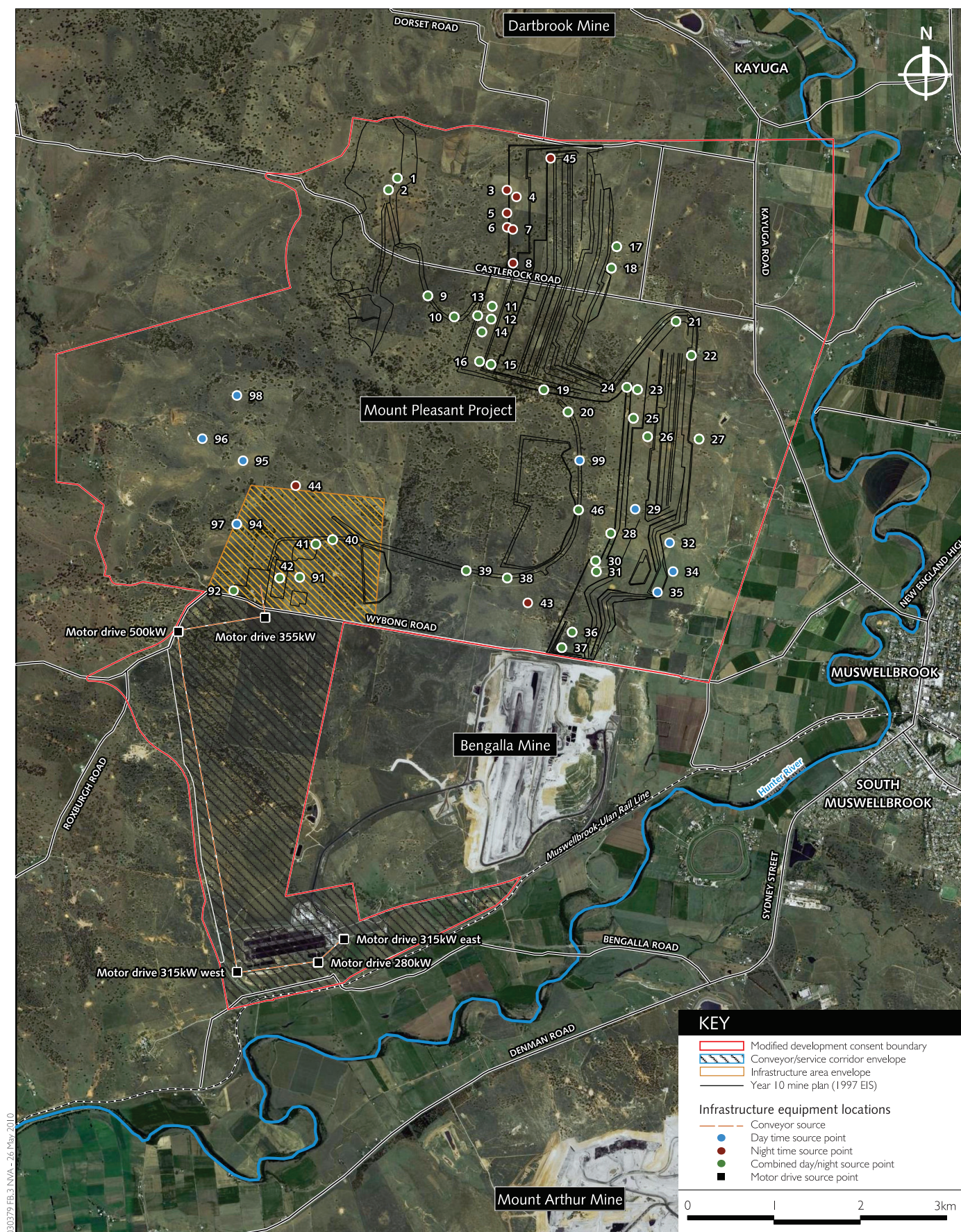


030379 FB, I NVA - 26 May 2010



030379 FB, 2 NVA - 26 May 2010

Year 5 Mine Plan (1997 EIS), Conveyor and Infrastructure Equipment Locations
Mount Pleasant Project Modification - Noise and Vibration Assessment
FIGURE B.2



030279 FB, 3 NVA - 26 May 2010

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Appendix C

Sound power spectral data

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Table C.1 Typical Sound Power Spectral Data, dB

Location	Plant	Octave Band Centre Frequency, Hz										A-Wt Total (dB(A))
		31.5	63	125	250	500	1000	2000	4000	8000	16000	
Conveyor Corridor	Drive280kW	109	107	107	104	100	97	92	87	78	72	102
	Drive315kWeast	109	107	107	104	100	97	92	87	78	72	103
	Drive315kWwest	109	107	107	104	100	97	92	87	78	72	103
	Drive355kW	110	108	108	105	101	98	93	88	79	73	103
	Drive500kW	111	109	109	106	102	99	94	89	80	74	105
	Conveyor (per 60m length - unmitigated)	107	105	105	102	98	95	90	85	76	70	101
Infrastructure Envelope	CPP	0	117	117	115	110	107	102	97	88	0	113
	Stacker Reclaimer	0	112	118	110	108	107	107	104	97	0	113
	Haul Truck	0	108	113	116	111	109	106	100	94	0	114

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Appendix D

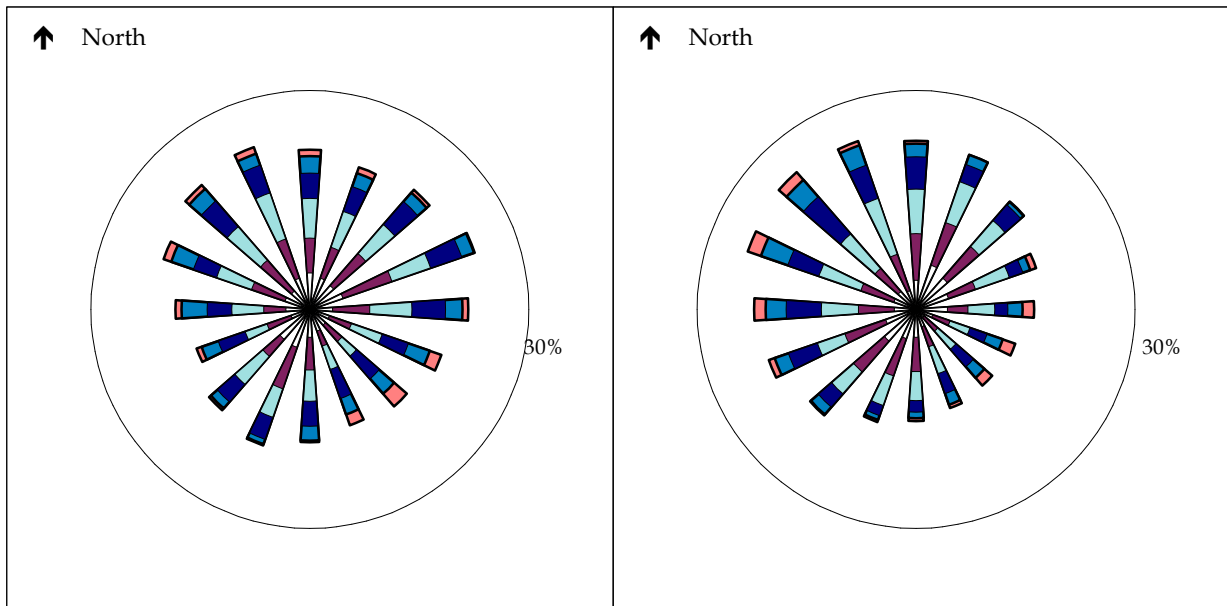
Vector wind rose analysis

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Day

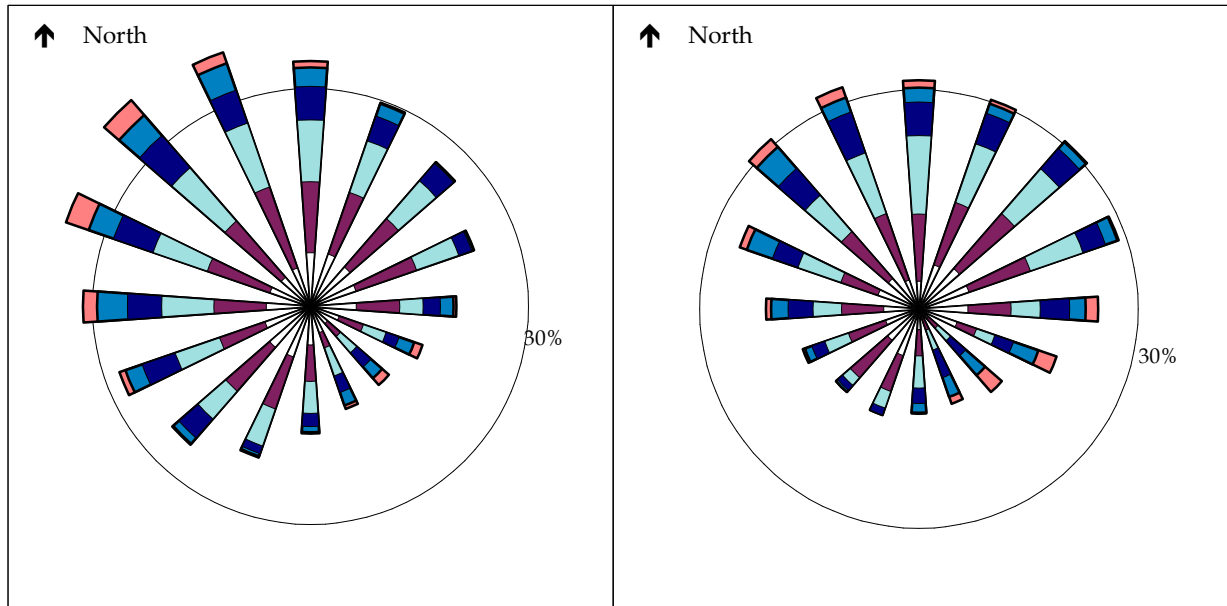
Summer

Spring



Winter

Autumn



□ < 0.5 ■ 0.5 - 1.0 ■ 1.0 - 1.5 ■ 1.5 - 2.0
 ■ 2.0 - 2.5 ■ 2.5 - 3.0 □ > 3

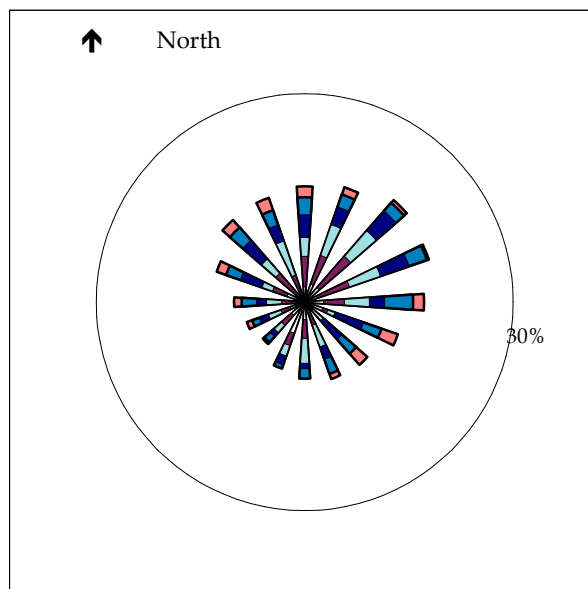
Data Source: McLeans Hill (MAC)

Data Range: Hourly, 01-01-04 to 31-12-04

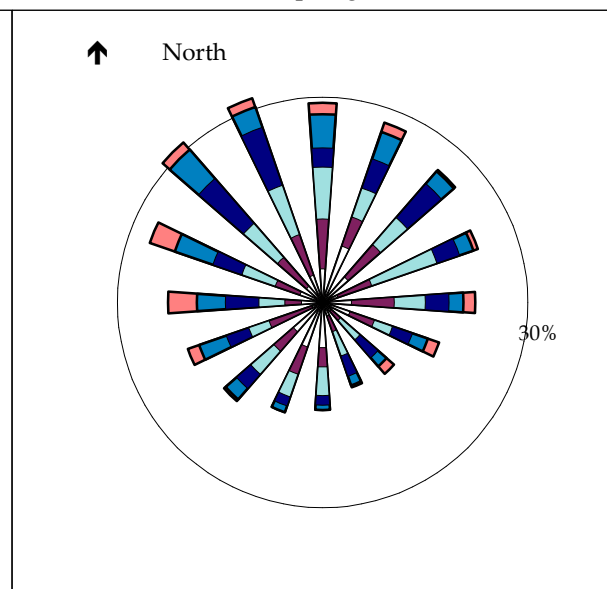
The segments of each arm represent the six valid wind speed classes, with increasing windspeed from the centre outwards. The length of each arm represents the vector components (for each direction) of wind speeds 3m/s or below as a proportion of the total time for the period. The circle represents the 30% occurrence threshold.

Evening

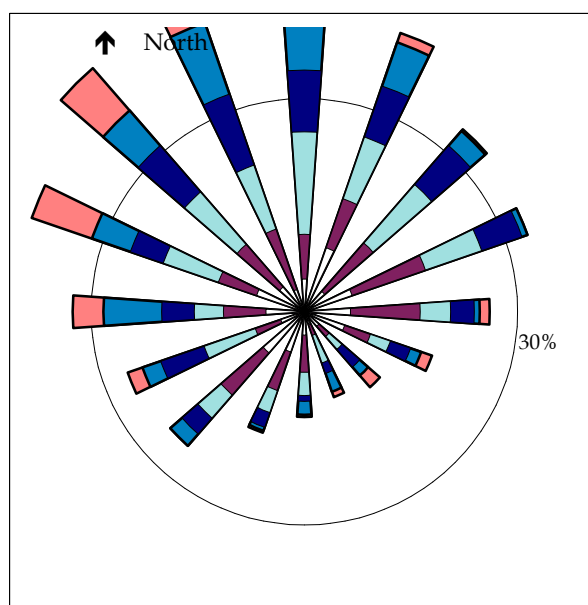
Summer



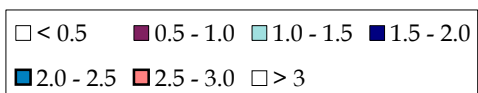
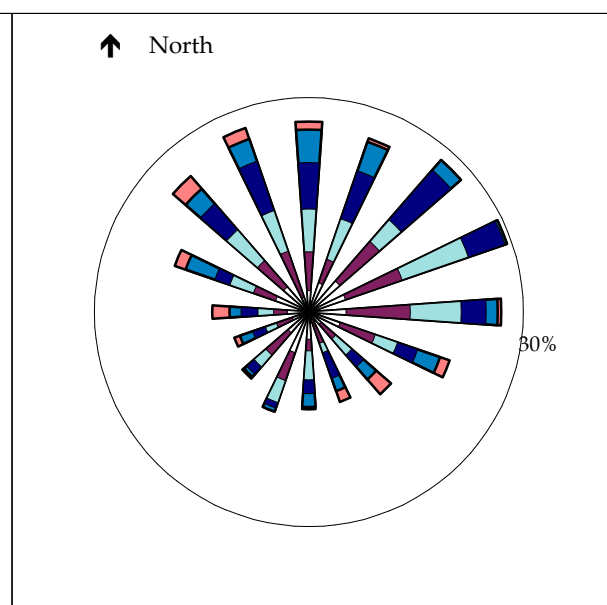
Spring



Winter

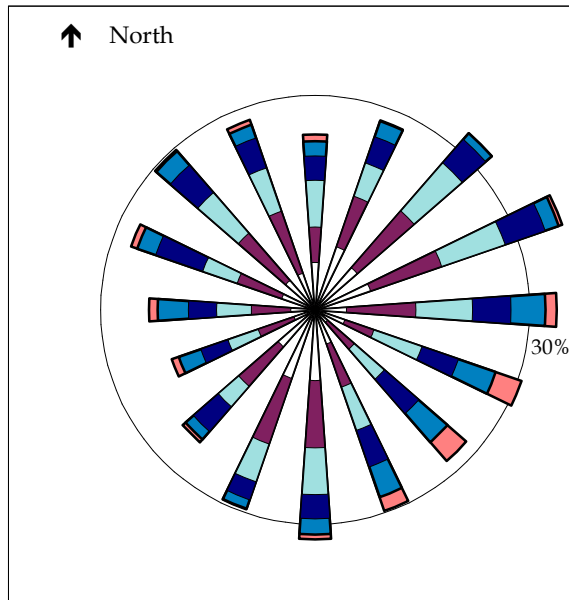


Autumn

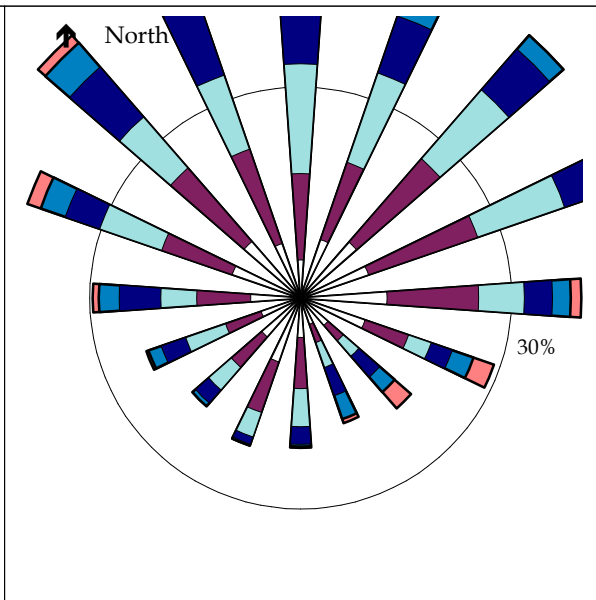


Night

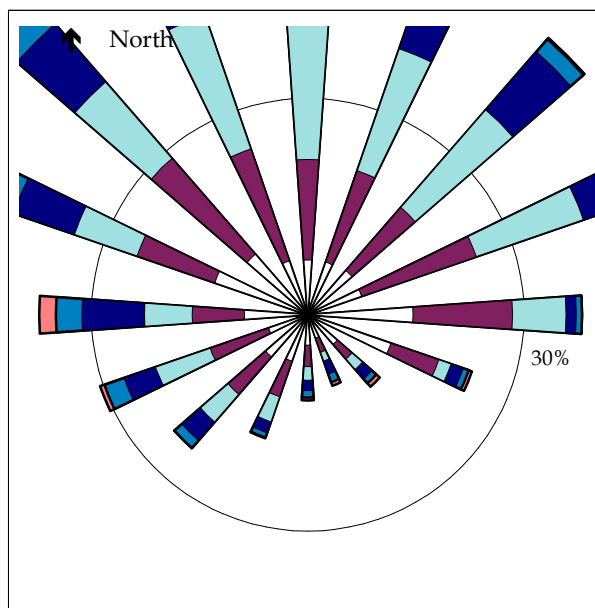
Summer



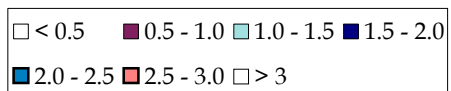
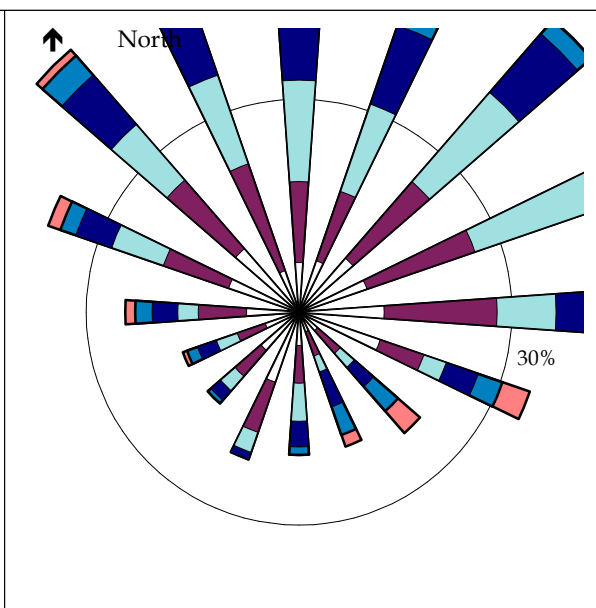
Spring



Winter

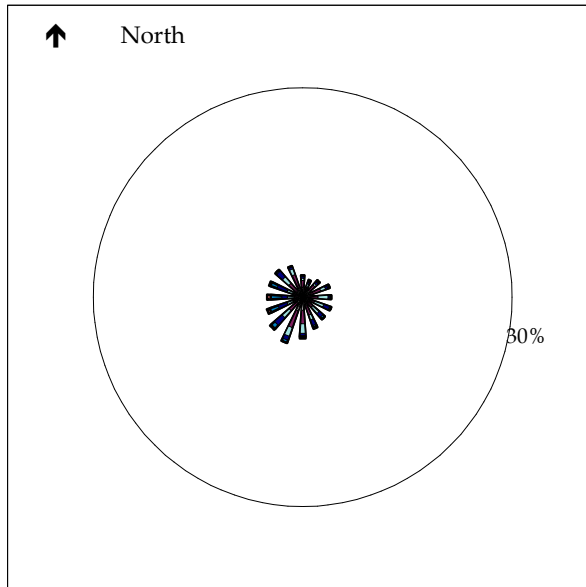


Autumn

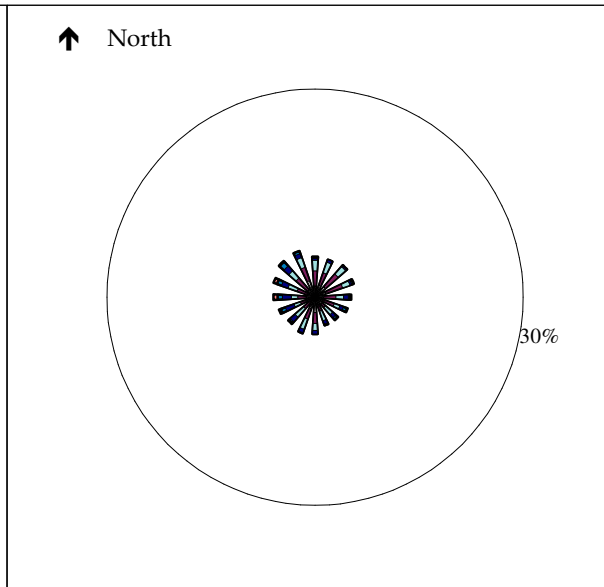


Night - Combined Wind and Inversions

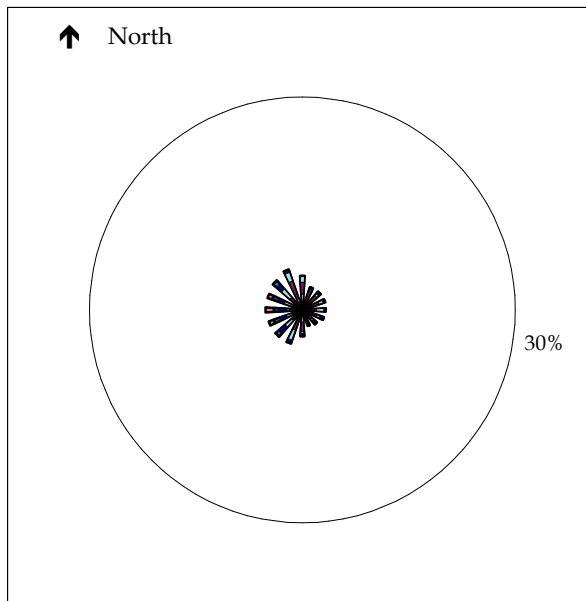
Summer



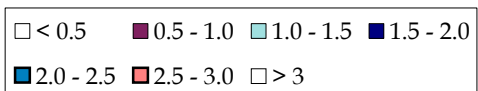
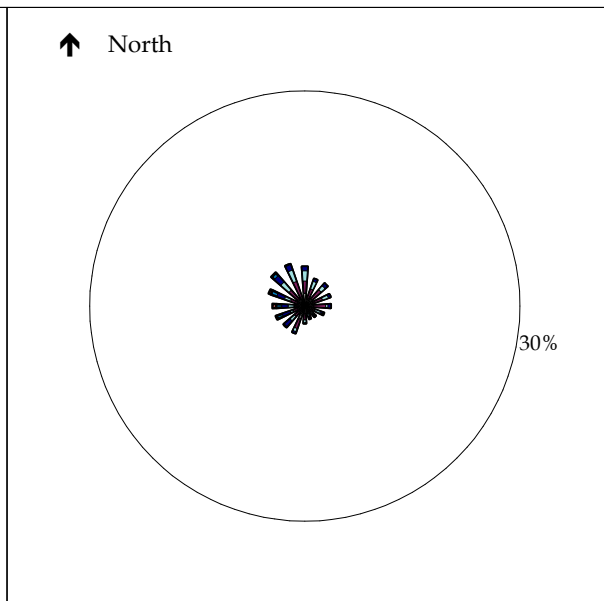
Spring



Winter



Autumn





Appendix C

Ecology study



MOUNT PLEASANT PROJECT MODIFICATION

Ecological Assessment

For:

COAL & ALLIED OPERATIONS PTY LIMITED

September 2010

Final Report

Cumberland Ecology
PO Box 2474, Carlingford Court 2118

Report No. 8124RP5

The preparation of this report has been in accordance with the brief provided by the Client and has relied upon the data and results collected at or under the times and conditions specified in the report. All findings, conclusions or recommendations contained within the report are based only on the aforementioned circumstances. The report has been prepared for use by the Client and no responsibility for its use by other parties is accepted by Cumberland Ecology.

Approved by: David Robertson

Position: Project Director

Signed:



Date: 30 September, 2010

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Executive Summary

INTRODUCTION

Cumberland Ecology has been commissioned by EMGA Mitchell McLennan on behalf of Coal & Allied Operations Pty Limited (Coal & Allied) to prepare an ecological assessment of the proposed Mount Pleasant Project modifications. Coal & Allied is seeking approval to modify the Mount Pleasant Project under section 75W of the New South Wales (NSW) *Environmental Planning and Assessment Act 1979* (EP&A Act). Lands within the Mount Pleasant Project area that would be subject to section 75W modification are referred to hereafter as the “modification areas”.

The purpose of this report is to describe the existing ecological values and to assess the potential impacts from the proposed modifications. Although this report assesses potential impacts to all native flora and fauna, it focuses on species, populations and communities listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act). Any flora and fauna Matters of National Environmental Significance (MNES), as listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), potentially impacted by the Project are assessed in a separate report *Mount Pleasant Project Ecological Matters of National Environmental Significance Impact Assessment* (Cumberland Ecology, 2010) prepared to accompany a referral under the EPBC Act.

METHODS

All available literature pertaining to ecology within the Mount Pleasant Project area was reviewed and relevant data collated. Potential knowledge gaps were identified from previous surveys to guide the design of the field programs for the proposed modifications.

Database analysis was conducted for the locality using both the Department of Environment Climate Change and Water Atlas of NSW Wildlife Database (DECCW, 2009) and Department of Environment, Water, Heritage and Arts Protected Matters Search Tool (DEWHA, 2010). The Atlas search was used to generate records of threatened flora and fauna species listed under the TSC Act within the Muswellbrook Local Government Area and within a 10km radius of the site. The Protected Matters search generated a list of potentially occurring flora, fauna and ecological communities listed under the EPBC Act within a 10km radius of the Mount Pleasant Project area. The lists generated from these databases were initially reviewed against available knowledge of the site to ascertain the likelihood of occurrence of threatened species to assist in designing surveys.

In addition to the surveys conducted for the Mount Pleasant Project Environmental Impact Statement (EIS) (ERM Mitchell McCotter, 1997), the Mount Pleasant Project area has been subject to a series of flora surveys conducted during 2006, 2007, 2008, 2009 and 2010. This data has been used to accurately map vegetation communities, assess seasonal and annual vegetation changes, and to compile a database of plant species found on the site. In the most recent flora surveys in 2010, Cumberland Ecology obtained additional flora data to assess the additional areas not subject to previous survey (eg within the conveyor/service corridor envelope) and to revise existing vegetation mapping to take account of recent name changes to Hunter Valley plant communities.

The 2010 flora surveys of the conveyor/service corridor envelope entailed the use of nested 20m x 20m quadrats inside 20m x 50m quadrats in dominant vegetation communities. This allowed an assessment under the BioBanking Scheme (DECC (NSW), 2008) if required. Targeted fauna surveys have been conducted in the wider Mount Pleasant Project area for the EIS and more recently in 2007 and 2009. The 2010 surveys of the conveyor/service corridor envelope also included an avifauna survey and fauna habitat assessment. The flora and fauna surveys conducted across the broader Mount Pleasant Project area have been undertaken over a range of years, seasons and conditions. Climatic conditions varied significantly with some surveys being conducted in the peak of drought while others were conducted following heavy rains. The resultant flora and fauna data for the subject land is consistent with results from other nearby sites in the upper Hunter Valley and provides a sound scientific basis to measure and predict the potential ecological impacts of the proposed modifications.

RESULTS

Vegetation Types

The landscape of the modification areas have been used for grazing since European settlement as evidenced by the cleared landscapes and continue to be used for these purposes. Notwithstanding this, a high proportion of the Mount Pleasant Project area, and all of the modification areas, has never been cultivated or sown with improved pasture. Consequently, the landscape of the modification areas is largely dominated by scattered patches of woodland of various sizes and ages, and broad expanses of what is referred to in this report as “Derived Native Grassland”, that is grassland dominated by native plants that has been derived from the clearing of the original tree cover.

A number of recognisable open forest, woodland and grassland types occur within the proposed modification areas, but the most abundant native vegetation corresponds to an endangered ecological community (EEC) known under the TSC Act Final Determination as “White box, Yellow Box Blakely's Red Gum Woodland”. For brevity in this report such vegetation is referred to as Box-Gum Grassy Woodland and Derived Native Grassland. This community is not considered to be the critically endangered ecological community (CEEC) listed under the EPBC Act as “White Box-Yellow Box-Blakely's Red Gum Grassy

Woodland and Derived Native Grassland“ as the modification areas are dominated by Grey Box / White Box intergrades which are not included in the EPBC Act Final Determination. Intergrades are “hybrids with hybrids” that have occurred over possibly thousands of years as White Box and Grey Box distributions overlapped in pre-historic times. Currently in the upper Hunter Valley large areas are dominated largely or entirely by intergrades without either parent species present. Extensive testing by Cumberland Ecology with verification by the Royal Botanic Gardens indicated that all 78 specimens tested within and around the Mount Pleasant Project area were intergrades. No pure White Box trees have been identified.

The Box-Gum Grassy Woodland and Derived Native Grassland EEC is a large composite plant community that occurs from Victoria to Southern Queensland and includes a suite of constituent communities. The following variants of the State Box-Gum Grassy Woodlands and Derived Native Grasslands predominate across the modification areas:

- Upper Hunter White Box–Ironbark Grassy Woodland;
- Grey Box/White Box Intergrade Grassy Woodland;
- Grey Box/White Box Intergrade–Spotted Gum Grassy Woodland; and
- Derived Native Grassland (from Box-Gum EEC).

Several other vegetation communities also occur within the modification areas including:

- Central Hunter Ironbark - Spotted Gum Forest (EEC under the TSC Act);
- Narrabeen Footslopes Slaty Box Woodland (EEC under the TSC Act);
- Hunter Floodplain Red Gum Woodland Complex (Preliminary Determined EEC under the TSC Act);
- Upper Hunter Hills Exposed Ironbark Woodland;
- Derived Native Grassland (other forest and woodlands);
- Low Diversity Derived Native Grassland and Exotic Pasture; and
- Tree and Shrub Plantations.

Descriptions are provided of each plant community within this report.

Flora Species

Over 300 flora species have been recorded on the Mount Pleasant Project area of which approximately 75 per cent are native. The flora is dominated by grasses (Poaceae) and other families of herbaceous ground cover plants. This reflects the fact that the forest and woodland communities across the site have a grassy or herbaceous understorey and also

the fact that grasslands are extensive. The majority of plant species detected in the wider Mount Pleasant Project area have been found to occur within the modification areas.

No threatened flora species have been identified within the modification areas.

Fauna Species

The vegetation within the modification areas provides potential habitat for a range of native vertebrate fauna species, including amphibians, reptiles, birds, bats and arboreal and terrestrial mammals. A suite of threatened fauna species has been recorded or are expected to occur within the modification areas and all of these species are predicted to utilise woodland and to a lesser extent grassland habitats within the modification areas. The threatened species detected or considered likely to utilise the modification areas include woodland birds, bats and non-flying mammals as follows:

- Brown Treecreeper (*Climacteris picumnus*) (Vulnerable under the TSC Act);
- Grey-crowned Babbler (*Pomatostomus temporalis*) (Vulnerable under the TSC Act);
- Speckled Warbler (*Pyrrholaemus sagittatus*) (Vulnerable under the TSC Act);
- Diamond Firetail (*Stagonopleura guttata*) (Vulnerable under the TSC Act);
- Varied Sittella (*Daphoenositta chrysoptera*) (Vulnerable under the TSC Act);
- Black-chinned Honeyeater (*Melithreptus gularis*) (Vulnerable under the TSC Act);
- Squirrel Glider (*Petaurus norfolcensis*) (Vulnerable under the TSC Act);
- Spotted-tailed Quoll (*Dasyurus maculatus*) (Vulnerable under TSC Act, Endangered under EPBC Act);
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) (Vulnerable under the TSC Act);
- Large-eared Pied Bat (*Chalinolobus dwyeri*) (Vulnerable under EPBC and TSC Acts);
- Eastern Free-tail Bat (*Mormopterus norfolkensis*) (Vulnerable under the TSC Act);
- Little Bent-wing Bat (*Miniopterus australis*) (Vulnerable under the TSC Act);
- Large-footed Myotis (*Myotis macropus*) (Vulnerable under the TSC Act); and
- Grey-headed Flying-fox (*Pteropus poliocephalus*) (Vulnerable under EPBC and TSC Acts).

These threatened species, which have the potential to occur within suitable habitats in the proposed modification areas, are typical for woodland and grassy open forest remnants in the upper Hunter Valley.

IMPACT ASSESSMENT

The primary impact from the proposed modifications will be the clearing of vegetation. 'Clearing of Native Vegetation' is listed as a Key Threatening Process and has been identified as a direct cause of the decrease in biodiversity (NSW Scientific Committee, 2004c). However, it should be noted that the proposed modifications relate to options of already approved infrastructure and may lead to reductions in clearing as discussed further below, should these options be pursued.

1. An envelope within which to construct an infrastructure area; and
2. An envelope within which to construct a conveyor/service corridor to transport product coal to the Bengalla Rail Spur as an alternative option to the State-approved rail facilities that connect directly to the Muswellbrook – Ulan Rail Line.

A conservative worst case approach to the ecological impact assessment has been adopted in which it has been assumed that:

- the maximum areas of highest quality native vegetation will be cleared within the infrastructure and conveyor/service corridor envelopes; and
- a 30m disturbance area has been included along the entire length of the conveyor/service corridor.

Table S.1 shows the comparative areas and types of vegetation communities to be cleared by the approved rail facilities and specific locations of infrastructure within the infrastructure area (as detailed in the EIS), versus the proposed modification components assuming the worst case alignment of the optional conveyor/service corridor and configuration of infrastructure within the infrastructure envelope. These are termed 'approved disturbance' and 'proposed disturbance' respectively. Approved for the purposes of this report relates to Development Consent DA 92/97.

Under the proposed worst case scenario, the proposed disturbance would require approximately 47.5ha of vegetation clearing compared to approximately 54.8ha of clearing that would be required for the approved project, resulting in a reduction in the clearing requirements by approximately 7.3ha. The proposed worst case scenario (refer to **Figure 6.2**) results in total disturbance of approximately 35.5ha of vegetation communities currently listed under the TSC Act, compared with approximately 41.6ha under the approved disturbance footprint.

Table S.1 VEGETATION COMMUNITIES POTENTIALLY IMPACTED BY APPROVED AND PROPOSED DISTURBANCE

Vegetation community	Approved disturbance (ha)	Proposed disturbance (ha)
Upper Hunter White Box–Ironbark Grassy Woodland (TSC EEC)	-	1.3
White Box/Grey Box Intergrade – Spotted Gum Grassy Woodland (TSC EEC)	-	-
White Box/Grey Box Intergrade Grassy Woodland (TSC EEC)	2	9.1
Central Hunter Ironbark - Spotted Gum - Grey Box Forest (TSC EEC)	-	0.9
Hunter Floodplain Red Gum Woodland Complex (TSC EEC)	0.2	0.2
Tree and Shrub Plantations	1.1	0.8
Upper Hunter Hills Exposed Ironbark Woodland	1.6	4.2
Derived Native Grassland (Box-Gum) (TSC EEC)	39.6	24.0
Grassland (Hunter Floodplain Red Gum Woodland Complex)	0.5	0.6
Grassland (Upper Hunter Hills Exposed Ironbark Woodland)	1.4	1.3
Low Diversity Derived Native Grassland and Exotic Pasture	8.4	5.1
Total	54.8	47.5

The removal of vegetation from within the modification areas is not considered to constitute a significant impact to the fauna that may potentially utilise these areas, due to the highly mobile nature of these species allowing them to be able to continue to forage and breed in the general locality outside the disturbance areas. The proposed disturbance footprint is not considered sufficiently extensive to cause population and/or genetic isolation as a result of fragmentation.

Indirect impacts are a result of secondary processes and often occur around the periphery of a development. They include such things as weed invasion, increases in feral animals, erosion, and changes in habitat connectivity. The potential for indirect impacts that would result from the conveyor/service corridor being preferred to the approved rail facilities and modified configuration of infrastructure within the infrastructure area envelope is considered minimal.

MITIGATION AND OFFSET MEASURES

The DECCW has prepared principles for the use of biodiversity offsets. Foremost among these is the principle that impacts must be avoided first by using prevention and mitigation measures. This principle means that the ecological impacts of proposed developments should be managed as follows:

- Avoid: to the extent possible, developments should be designed to avoid or minimise ecological impacts;
- Mitigate: where certain impacts are unavoidable through design changes, mitigation measures should be introduced to ameliorate the ecological impacts of the proposed development; and
- Compensate: the residual impacts of the project should be compensated for in some way to offset what would otherwise be a net loss of habitat.

This report explains the way these points have been applied to manage the impacts of the Project.

The DECCW has well established principles (DECC 2008) regarding the assessment of potential ecological impacts of proposed developments and how they should be managed. Essentially, these principles can be categorised into: avoid, mitigate, and compensate.

Avoidance

Should the conveyor/service corridor option be pursued, the approved development footprint would reduce by approximately 7.3ha and this reduces the disturbance of vegetation communities currently listed under the TSC Act.

While the exact locations and hence impact areas of the of the required proposed modifications are yet to be finalised, avoidance of impacts to ecological sensitive areas will be considered as part of detailed design process to determine the final location for the infrastructure and conveyor/services corridor. Avoidance of State listed EECs and important fauna/flora habitats, where possible, will be considered high in the hierarchy of parameters when locating this infrastructure; other constraints to location of infrastructure considered will be include logistical, topographic and location of residences. These avoidance measures may enable a reduction in the worst case potential impacts on these EECs and fauna habitat assessed in this report.

Mitigation

Several mitigation measures will be undertaken as a result of the Mount Pleasant Project and associated modification areas. The mitigation measures applicable to the modification area are outlined below.

i Revegetation

Revegetation of disturbed areas below the conveyor/service corridor will be implemented as soon as practically possible with local native ground cover and shrub species to ensure the integrity and continuity of flora and fauna habitat within the area is rapidly re-established. Where practical, topsoil will be translocated from disturbance areas to conserve the native seed bank of local ecological communities.

ii Pre-clearance and Translocation of Threatened Species and Important Habitat Attributes

Mitigation measures include pre-clearance surveys of forest and woodland areas to undergo removal to identify any threatened flora and fauna species or habitat within areas of impact. This provides an opportunity to avoid impacts to flora and fauna of conservation significance during clearing.

Where appropriate important habitat features such as bush-rock and hollow logs will be returned to disturbance areas following clearing in an attempt to reinstate some of the natural habitat structural diversity to encourage fauna use of the area. Details of the rehabilitation of the infrastructure area and conveyor/service corridor (should this option be pursued) upon decommissioning will be provided in the Rehabilitation and Environment Management Plan (REMP).

iii Monitoring and Management

Ecological management and monitoring will be in accordance with Rio Tinto Coal Australia's Health, Safety, Environment and Quality (HSEQ) Management System, which is certified to the international standard ISO:14001(2004). This will incorporate a Flora and Fauna Management Plan (FFMP) for the Mount Pleasant Project, inclusive of the modification areas. Plans and procedures for land use, bushfire management, erosion and sediment control, biodiversity management, disturbance and rehabilitation, and ground disturbance will also be included.

During the construction phase, pre-clearance surveys of relevant forest and woodland areas to be removed will be undertaken, for threatened flora and fauna species. Where practical, threatened species or important habitat attributes (such as sizable logs and salvaged tree hollows) will be relocated.

An ongoing monitoring programme will be implemented for the Mount Pleasant Project, inclusive of the modification areas. Identified monitoring locations associated with the construction and operation of the proposed modifications, will be included in the Annual Environmental Management Report (AEMR).

Details of the rehabilitation of the infrastructure area and conveyor/service corridor (should this option be pursued) upon decommissioning will be provided in the Rehabilitation and Environment Management Plan.

Compensation

The modified Mount Pleasant Project, should the conveyor option be pursued, would have a lesser impact than the approved project by approximately 7.3ha. As a result it is not considered necessary to provide compensatory measures to offset the potential impacts. Any flora or fauna requiring relocation following pre-clearance surveys will be placed in the nearest area of suitable habitat.

CONCLUSION

The landscape of the proposed modification areas has been used for grazing since European settlement and as a result has been heavily cleared and disturbed historically. Notwithstanding this, vegetation communities listed as EECs under the TSC Act are located within the modification areas, including but not limited to; Upper Hunter White Box - Ironbark Grassy Woodland, Grey Box/White Box Intergrade Grassy Woodland, Grey Box/White Box Intergrade Spotted Gum - Grassy Woodland and Derived Native Grassland (from Box-Gum Grassy Woodland).

To provide for flexibility in the detailed design of the infrastructure area and optional conveyor/service corridor, a conservative worst case approach to ecological impact assessment was adopted. Under the worst case scenario, the proposed disturbance comprises approximately 47.5ha of vegetation clearance versus approximately 54.8ha of clearance for the approved disturbances. The proposed worst case scenario would result in total disturbance of approximately 35.5ha of vegetation communities currently listed under the TSC Act compared with approximately 41.6ha under the approved disturbance footprint.

The DECCW principles on management of potential ecological impacts have been considered with the proposed modifications resulting in an approximate 7.3ha reduction in disturbance of vegetation communities, should the conveyor/service corridor option be pursued.

Technically, the proposed modification areas, should the conveyor option be pursued, will entail a slightly decreased ecological footprint and will require a reduction in the forest, woodland and grassland to be cleared that may form habitat for a range of native flora and fauna species.

Further avoidance measures will be considered during the detailed design process. Mitigation measures may include:

- **Threatened Species Management:** any occurrences of threatened flora and fauna species will be translocated to an area of nearby suitable habitat, where

considered appropriate, and nest boxes will be established where necessary to maintain an effective fauna monitoring program at RTCA; and

- Pre-clearance surveys will be conducted within areas to be cleared and threatened flora and fauna detected will be translocated into suitable habitat where appropriate.

Introduction

1.1 Purpose

Cumberland Ecology has been commissioned by EMGA Mitchell McLennan on behalf of Coal & Allied Operations Pty Limited (Coal & Allied) to conduct an ecological assessment of the proposed modification to the Mount Pleasant Project (the Project). An application for development consent for the Mount Pleasant Project was made in 1997 and supported by an Environmental Impact Statement (EIS) (ERM Mitchell McCotter, 1997). On 22 December 1999, the then Minister for Urban Affairs and Planning, granted Development Consent DA 92/97 to Coal & Allied under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the “*Construction and operation of an open cut coal mine, coal preparation plant, transport and rail loading facilities and associated facilities*” at Mount Pleasant. A figurative comparison of the approved project and the proposed modified Mount Pleasant Project can be seen in **Figure 1.1** and **Figure 1.2**. Lands within the Mount Pleasant Project area that could be potentially subjected to impacts under the section 75W modification are referred to hereafter as the “modification areas”.

The purpose of this report is to describe the existing ecological values and to assess the potential impacts from the proposed modifications. Although this report assesses potential impacts to all native flora and fauna, it focuses on species, populations and communities listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act). Any flora and fauna Matters of National Environmental Significance potentially impacted by the Project are assessed in a separate report *Mount Pleasant Project Ecological Matters of National Environmental Significance Impact Assessment* (Cumberland Ecology, 2010) prepared to accompany a referral under the *Environment Protection and Biodiversity Conservation Act 1999*.

Specifically, the objectives of the assessment process for this report are to:

- Describe and map vegetation communities within the modification areas, identifying any listed threatened communities;
- Identify and map the location of threatened flora and fauna species within the modification areas;
- Assess the likelihood that threatened flora and fauna species could occur within modification areas; and

- Describe the types and extent of potential impacts on threatened communities and species arising from the development in the modification areas and provide a comparison to the potential impacts from the approved infrastructure that these options may replace.

1.2 Background

1.2.1 Site Location

The Mount Pleasant Project area is located approximately four kilometres (km) north-west of Muswellbrook in the Upper Hunter Valley of NSW. The Hunter Valley forms part of the Sydney Basin Bioregion, a large and complex area that extends from Batemans Bay in the south to Nelson Bay in the north and includes parts of the Blue Mountains. It incorporates all of the Hunter River Catchment.

The Mount Pleasant Project area is located to the north of and adjacent to Bengalla Mine and south of the township of Dartbrook. The Mount Pleasant Project area is generally bounded by the Muswellbrook – Ulan Rail Line in the south, Logues Lane and Kayuga Rd in the east, Dorset Rd in the north and Sandy Creek in the West.

The modification areas that involve ground disturbance include the infrastructure envelope and the conveyor/service corridor. The infrastructure envelope is located between Wybong Road and the South-west Out-of-Pit Emplacement and encompasses existing approved infrastructure (see **Figure 2.1**). The conveyor/service corridor extends from the south of the proposed infrastructure envelope to the existing Bengalla rail link (see **Figure 2.1**).

1.2.2 Site Description

The Mount Pleasant Project area, including the modification areas, sits on predominantly undulating hills on the western side of the Hunter River and consists of a mosaic of land previously cleared for agriculture and scattered areas of regrowth vegetation. Much of the land is presently used for agricultural purposes and where vegetation is present it typically represents recent regeneration and scattered remnant trees in grasslands. Several small ephemeral drainage lines are scattered throughout the modification areas and ultimately drain into the Hunter River. The general elevation is lowest in the south and rises to form a peak in the north adjacent to Wybong Road.

To the east of the Mount Pleasant Project area is the township of Muswellbrook, while extensive areas of agricultural land lie to the north and west (**Figure 1.1**).

1.2.3 Proposed Project Modifications

The proposed modifications of relevance to this assessment include:

- Provision of an infrastructure envelope for siting the mine infrastructure to provide flexibility during the detailed design and construction of the facilities in place of the specific locations detailed in the EIS; and
- Provision of an optional conveyor/service corridor between the Mount Pleasant Project area and the adjoining Bengalla Mine to the south as an alternative to the approved rail line and rail loop and loader facilities, including loadout conveyor and bin (collectively referred to herein as the rail facilities). Only one of the options (i.e. conveyor/service corridor or the rail facilities) would be constructed. The conveyor/service corridor is within an envelope to provide flexibility during detailed design.

1.3 Terms and Abbreviations

This report uses the terms and abbreviations outlined in **Table 1.1**:

Table 1.1 TERMS AND ABBREVIATIONS USED IN THIS REPORT

Term / Abbreviation	Meaning
AEMR	Annual Environmental Management Report
CMA	Catchment Management Authority;
CEEC	Critically Endangered Ecological Community listed under the EPBC Act;
DA	Development Application;
DECCW	NSW Department of Environment and Climate Change and Water;
DEWHA	Department of Environment, Water, Heritage and the Arts;
DUAP	Department of Urban Affairs and Planning;
EEC	Endangered Ecological Community listed under the TSC Act
EIS	Environmental Impact Statement;
EMS	Environmental Management System;
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i> ;
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> ;
FFMP	Flora and Fauna Management Plan;

Table 1.1 TERMS AND ABBREVIATIONS USED IN THIS REPORT

Term / Abbreviation	Meaning
LGA	Local Government Area;
Locality	The area within 10km of Mount Pleasant Project area;
Modification areas	Lands that are the subject of the proposed modifications;
Mount Pleasant Project (the Project)	The approved Mount Pleasant Mine which is undergoing proposed modifications as per the subject of this report;
Mount Pleasant Project area (the Project area)	The area that all development and mining operational work associated with the Mount Pleasant Project will be conducted within as shown in Figure 1.2 of this report;
Region	Refers to the Interim Biogeographic Regionalisation for Australia (IBRA) Bioregion which the Mount Pleasant Project area sits within; in this case the Sydney Basin Bioregion;
SEPP 44	State Environmental Planning Policy 44 (Koala Habitat Protection);
Threatened flora and fauna	Refers to communities, populations and species listed as Vulnerable or Endangered under the EPBC and TSC Acts; and
TSC Act	NSW <i>Threatened Species Conservation Act 1995</i> .

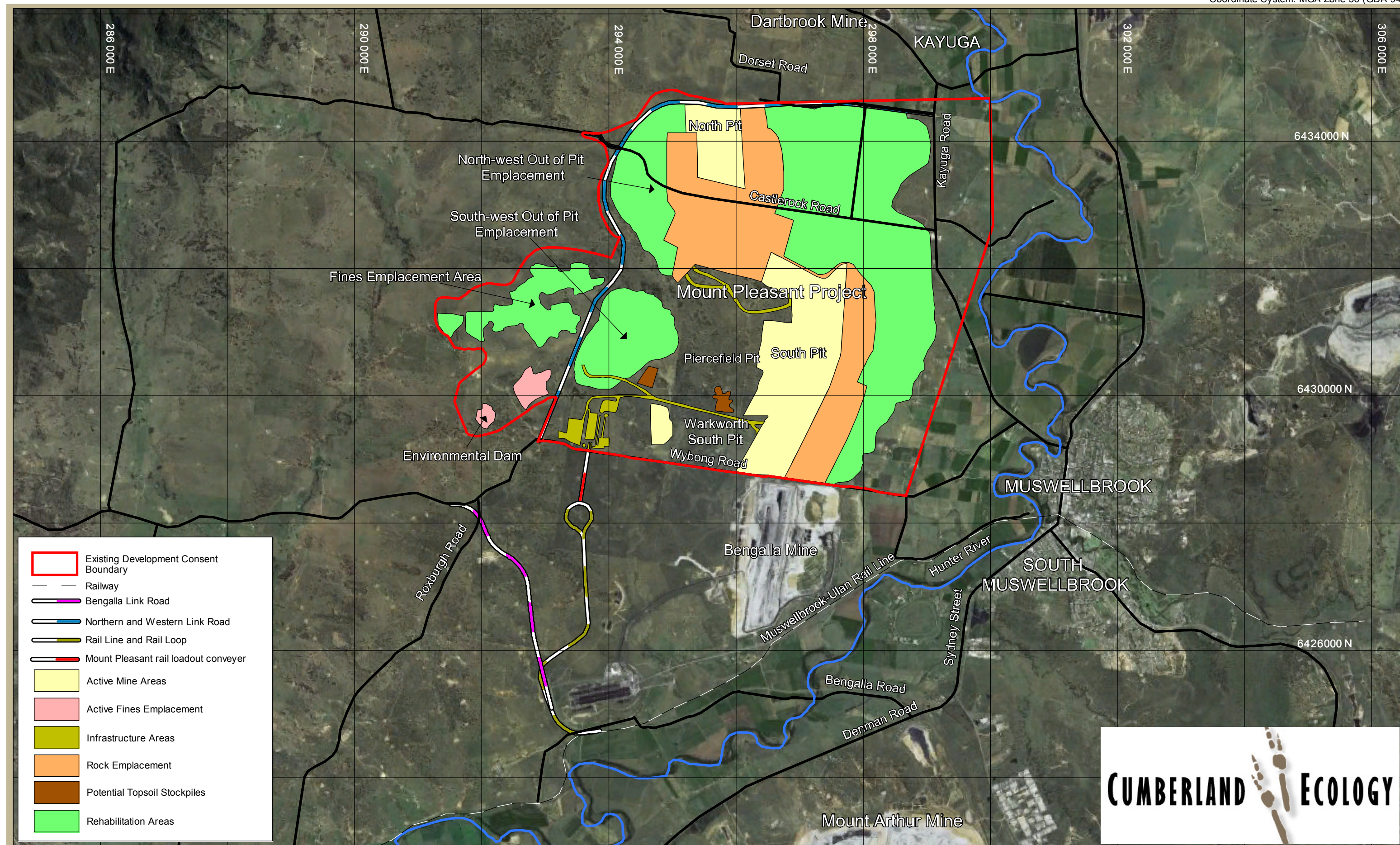


Figure 1.1. Approved Project - Year 20 Mine Plan

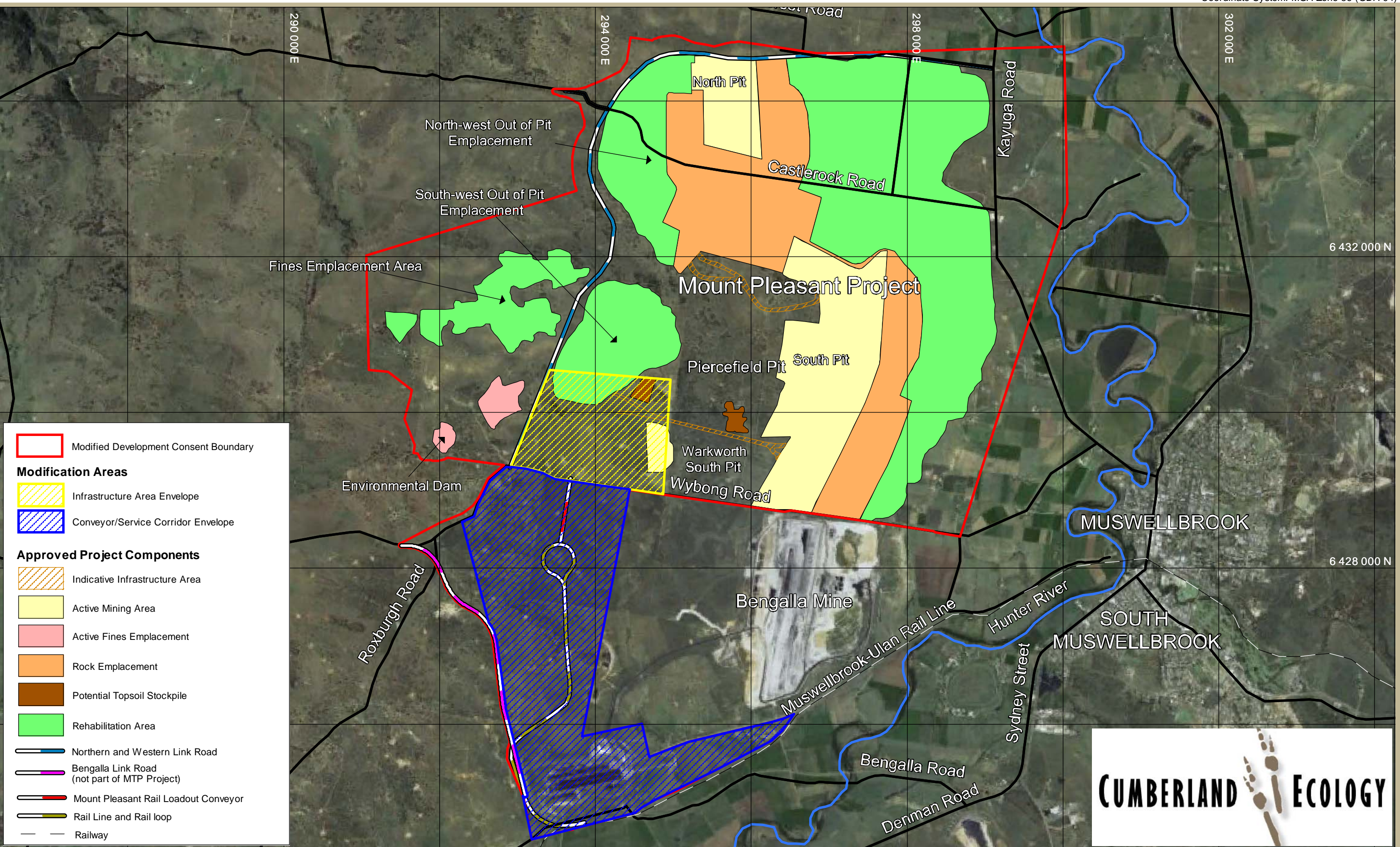


Figure 1.2. Proposed Modified Project

Methodology

2.1 Literature Review

The Mount Pleasant Project area has been extensively studied since the 1990s. For the purposes of this report, all available literature pertaining to ecological aspects within the Mount Pleasant Project area was reviewed. This literature was then analysed in order to:

- Collate all available existing data; and
- Identify any potential gaps in previous surveys to guide the design of the field program for the proposed modification.

The documents reviewed in the desktop assessment are listed in **Table 2.1** below:

Table 2.1 DESKTOP REVIEW DOCUMENTS

Author	Year	Document Title
ERM Mitchell McCotter	1997	Mount Pleasant Mine Environmental Impact Assessment
Cumberland Ecology for Coal & Allied	Nov-06	Proposed Mount Pleasant Open Cut Mine – Flora and Fauna Assessment
Cumberland Ecology for HLA-Envirosciences	May-07	Mount Pleasant Ecology Gap Analysis Report
Cumberland Ecology for Coal & Allied	Oct-07	Mount Pleasant Mine – Survey and Analysis of Box-Gum Grassy Woodland
The Envirofactor for DEWHA	Jun-08	Mount Pleasant Mine – Review of Survey and Analysis Report on Box-Gum Grassy Woodland
Cumberland Ecology for Coal & Allied	Summer 08/09	Mount Pleasant Project – Flora and Fauna Report

2.2 Database Analysis

Database analysis was conducted for the locality using both the Department of Environment Climate Change and Water (DECCW) Atlas of NSW Wildlife Database (DECCW, 2010) and DEWHA Protected Matters Search Tool (DEWHA, 2010). The Atlas search was used to generate records of threatened flora and fauna species listed under the TSC Act within the Muswellbrook LGA and within a 10km radius of the Project area. The Protected Matters search generated a list of potentially occurring flora, fauna and ecological communities listed under the EPBC Act within a 10km radius of the Project area. The lists generated from these databases were initially reviewed against available knowledge of the site to ascertain the likelihood of occurrence of threatened species within the modification areas.

2.3 Vegetation Mapping

Extensive vegetation surveys have been conducted within the Mount Pleasant Project area over several studies across a number of years. This large amount of survey effort has enabled the development of a detailed vegetation map for the Mount Pleasant Project area. Cumberland Ecology conducted additional vegetation surveys to revise and update this existing vegetation mapping in early 2010 and to map sections of the Project area that had previously not been mapped, including the modification areas.

2.4 Flora Survey

Recent flora surveys of the modification areas were undertaken in an effort to determine the type and quality of vegetation as well as to conduct targeted threatened species searches throughout the area. Two nested 20m x 20m quadrats inside 20m x 50m quadrats were completed in the dominant vegetation communities in the conveyor/service corridor envelope on 19 March 2010. This allowed an assessment of these areas under the BioBanking methodology (DECC 2009) in the event that offsets and BioBanking surveys of offset areas were needed.

All vascular plants recorded or collected were identified using keys and nomenclature provided in Harden (Harden 1990-1993). Other references were used to assist identification, particularly for specimens (Brooker and Kleinig, 2006, Richardson *et al*, 2006). Where known, taxonomic and nomenclatural changes have been incorporated into the results, as derived from PlantNET (Botanic gardens Trust, 2010).

To confirm the identity of some dominant tree species for the purposes of identifying the EECs, specimens (leaves, buds, capsules, branches and bark) from more than 100 trees were sent to the Royal Botanic Gardens. This was particularly important to do for “Box” eucalypts because all such trees appeared to exhibit intermediate characteristics between White Box and Grey Box. Some individual trees were problematic to sample as they lacked buds and/or capsules. For this reason, some trees were not identified by the Royal

Botanic Gardens Herbarium. However, 78 Box trees from across the Project area and buffer lands were verified, giving a substantial representative sample.

An extensive amount of previous flora survey has been completed within the Mount Pleasant Project area across a broad temporal range as indicated by the survey reports in **Table 2.2** below and **Figure 2.1**. Vegetation survey has also been undertaken in lands adjacent to the Mount Pleasant Project area. This work provides a substantial database of information relevant to, and providing a solid context for, the flora and fauna of the proposed modification areas.

Table 2.2 FLORA SURVEY EFFORT

Survey	Dates	Survey Effort
ERM Mitchell McCotter	November 1994, July 1995, November 1996 and February 1997 (dates not specified)	General Flora survey , no comment on survey effort
Cumberland Ecology for Coal & Allied	6-7 November, 2006	Eleven 20m x 20m quadrats, targeted flora surveys
Cumberland Ecology for HLA-Envirosciences	7-11 May, 21-25 May, and 28-31 May, 2007	Sixty eight 20m x 20m quadrats within the Mount Pleasant Project area. Fifteen 20m x 20m quadrats outside the Mount Pleasant Project area in the wider locality Random meander, transect and targeted threatened flora searches
The Envirofactor for DEWHA	15-16 March, 2008	Eleven 20m x 50m quadrats
Cumberland Ecology for Coal & Allied	15 December, 2008 and 2-4 February, 2009	Fourteen 20m x 50 m quadrats within the Mount Pleasant Project area and surrounding buffer lands Random meander, transect and targeted threatened flora searches
Cumberland Ecology for Coal & Allied	9-10 March, 2010	Six 20m x 20m quadrats in the buffer lands surrounding Mount Pleasant project area Targeted threatened flora searches
Cumberland Ecology for Bengalla Mine	19 March, 2010	Two 20m x 20m Two nested 20m x 20m quadrats inside 20m x 50m quadrats in proposed modification areas. Random meander, transect and targeted threatened flora searches

2.5 Fauna Survey

An extensive amount of previous fauna survey has been completed within the Mount Pleasant Project area across a broad temporal range as indicated by the survey reports in **Table 2.3** and **Figure 2.2**.

Recent fauna habitat surveys were undertaken in an effort to determine the type of fauna that uses the proposed conveyor /service corridor envelope and the quality of fauna habitat that is present within these areas. Habitat assessments were undertaken throughout the proposed conveyor /service corridor envelope and all incidental species observations were recorded within the area. No separate fauna survey was undertaken in the modification area and is not considered necessary based on the likelihood of occurrence of fauna species within the vegetation communities and the low level of clearing requirements compared to the rail line/loop. **Table C.1** consolidates the survey effort for all techniques across the various survey periods and compares their adequacy against DECCW survey guidelines (DEC, 2004). In summary, it is considered that adequate survey has been completed and that the data collected for the Mount Pleasant Project area is relevant for the proposed modification area.

Table 2.3 FAUNA SURVEY EFFORT

Survey	Dates	Technique	Survey Effort
ERM Mitchell McCotter	21 - 24 November 1994, 20 - 21 July 1995 and 30 November 1995	Amphibians	
		Targeted habitat active search	No details reported
		Reptiles	
		Targeted habitat active search	No details reported
		Diurnal Birds	
		Bird point counts	At least 4 hours, actual time not reported
		Nocturnal Birds	
		Spotlighting	3 nights
		Call playback	3 nights
		Non-flying Mammals	
		Cage traps	3 trap nights
		Terrestrial Elliot traps	150 trap nights
		Hair tubes	151 trap nights
		Spotlighting	3 nights
		Search for scats and signs	Throughout survey period
		Bats	
		Ultrasonic call recording	2 nights
Cumberland Ecology	16 - 20 October and	Amphibians	

Table 2.3 FAUNA SURVEY EFFORT

Survey	Dates	Technique	Survey Effort
for Coal & Allied	6 - 9 November 2006	Night call playback	Targeted calls to Green and Golden Bell Frog.
		Night habitat search of damp and watery sites	Calls noted at 3 dams
		Night watercourse search	Searches in surrounding aquatic veg
		Catch and release	Tadpoles caught and identified
		Opportunistic	Frog calls recorded during field surveys
		Reptiles	
			30 minutes
		Opportunistic	Reptiles recorded between quadrats
		Diurnal Birds	
		Area search	18 hours
		Nocturnal Birds	
		Habitat search	1.5 hours
		Spotlighting	10 hours (2 hours for 5 nights)
		Non-flying Mammals	
		Terrestrial hair tubes	1500 trap nights
		Arboreal hair tubes	1500 trap nights
		Spotlighting	10 hours (2 hours for 5 nights)
		Call playback	Squirrel Glider (30-45 minutes at given sampling points for 3 nights)
		Bats	
		Ultrasonic call recording	2 units for 10 nights
Cumberland Ecology for Coal & Allied	2-11 February 2009	Amphibians	
		Systematic day habitat search	2 hours
		Night habitat search of damp and watery sites	2 hours
		Night watercourse search	2 hours
		Reptiles	

Table 2.3 FAUNA SURVEY EFFORT

Survey	Dates	Technique	Survey Effort
Cumberland Ecology for Bengalla Mine	15 – 17 February 2010	Habitat search	x 30 minutes (across 5 separate days)
		Pitfall traps with drift nets	150 trap nights (12 traps for 8 nights, 6 traps for 5 nights, 6 traps for 4 nights)
		Spotlighting	2.5 hours (across five separate nights)
		Diurnal Birds	
		Area search	3 days
		Water source census	30 minutes
		Nocturnal Birds	
		Call playback	6 nights (30 minutes each night, 1 site per night)
		Day habitat search	Throughout survey period
		Non-flying Mammals	
		Terrestrial Elliott traps	350 trap nights
		Arboreal Elliott traps	510 trap nights
		Pitfall traps with drift nets	150 trap nights
		Terrestrial Hair tubes	600 trap nights
		Arboreal hair tubes	600 trap nights
		Spotlighting on foot	10 hours (5 x 2 hours per night)
		Spotlighting from vehicle	5 hours (5 x 1 hours per night)
		Call playback	6 nights
		Search for scats and signs	5 hours
		IR cameras	12 survey nights
		Collection of predator scats	Throughout survey period
		Bats	
		Harp trapping	6 trap nights
		Ultrasonic call recording	7 nights
		Trip lining	1 night
		Amphibians	
		Habitat Assessment	3 days
		Spotlighting	2 hours

Table 2.3 FAUNA SURVEY EFFORT

Survey	Dates	Technique	Survey Effort
		Reptiles	
		Habitat Assessment	3 days
		Spotlighting	2 hours
		Diurnal Birds	
		Habitat Assessment	3 days
		Area Search	3 days
		Targeted bird transects	4 hours
		Nocturnal Birds	
		Habitat Assessment	3 days
		Spotlighting	2 hours
		Non-flying Mammals	
		Habitat Assessment	3 days
		Spotlighting	2 hours
		IR cameras	15 Survey nights
		Bats	
		Ultrasonic call recording	4 nights

2.6 Adequacy of Surveys

As indicated in **Table 2.2** and **Table 2.3** extensive flora and several fauna surveys have been conducted throughout the Project area and surrounds in an effort to determine the quality and nature of the vegetation and ecological values of the area. These surveys were conducted over a range of seasons and conditions, ensuring that all seasonal and climatic limitations to the successful detection of flora and fauna groups were minimised. Climatic conditions varied significantly with some surveys being conducted during severe drought conditions, whilst other surveys were conducted following heavy rains.

The most recent flora and fauna surveys were undertaken to supplement existing survey data. Overall, given the understanding of the type and nature of flora and fauna within the Project area, it is considered that the level of flora and fauna survey conducted within the modification areas is adequate to assess the likelihood of threatened species to occur within the proposed modification areas and any potential impacts that may occur as a result of these impacts.

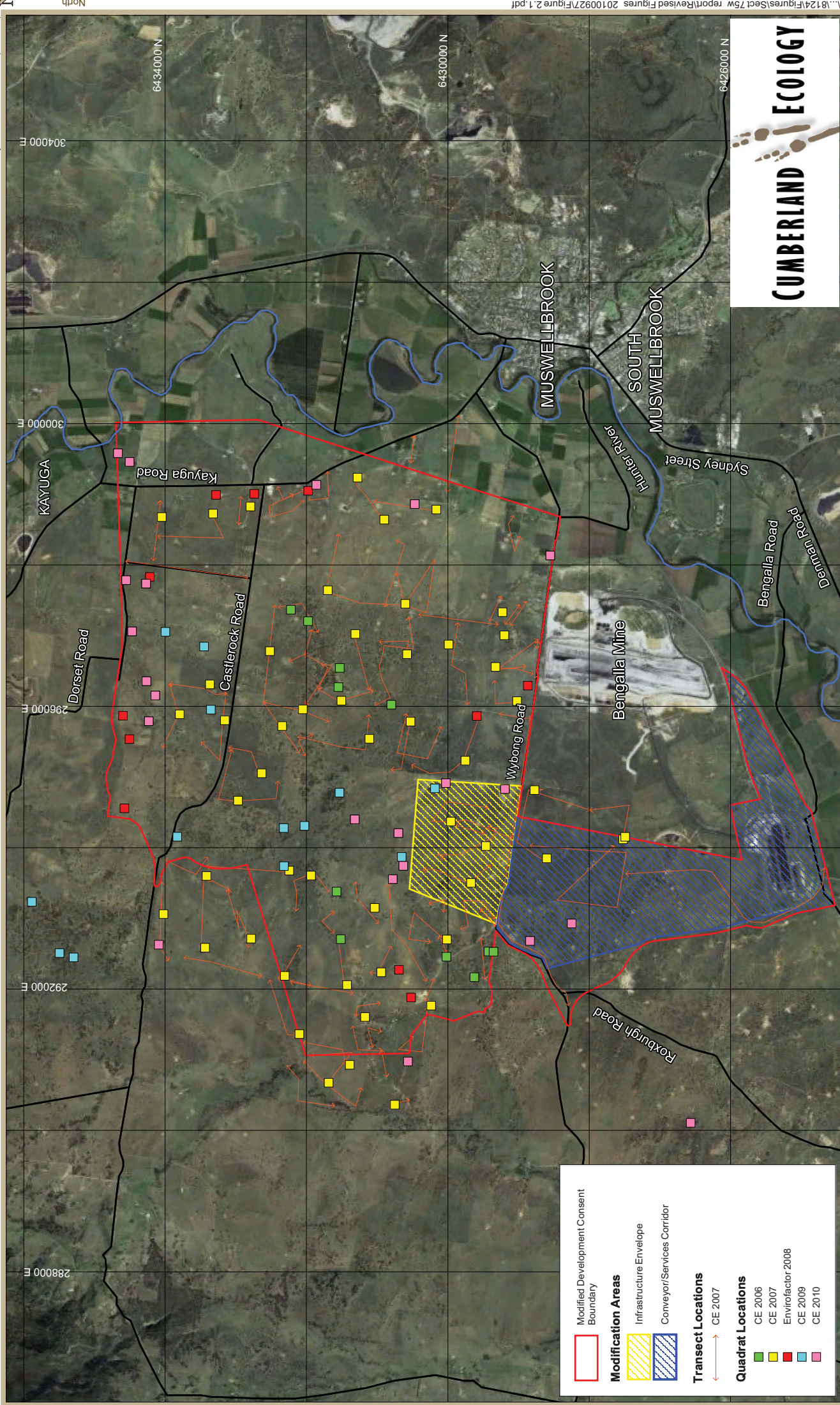
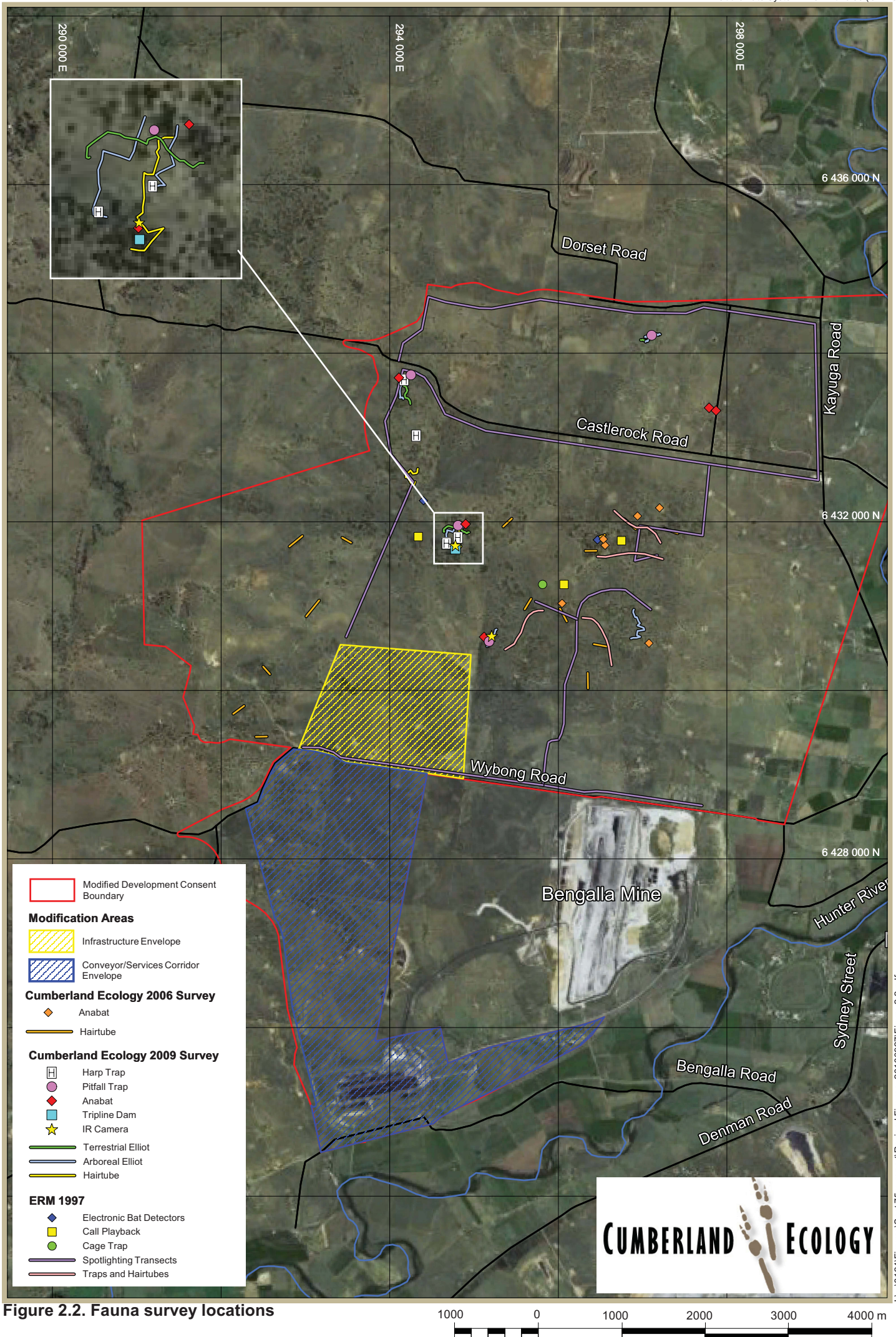


Figure 2.1. Flora survey locations



Results

3.1 Introduction

The vegetation across the Central Hunter Valley has been mapped by the Hunter-Central Rivers Catchment Management Authority (CMA) (Peake, 2006) across the entire central Hunter Valley and this mapping includes the Mount Pleasant Project area. Additional mapping studies have been conducted across the Mount Pleasant Project area as part of vegetation studies commissioned by Coal & Allied, these studies have been conducted at a finer and more accurate scale across the Project area and adjacent areas only, providing a more detailed picture of vegetation than the regional mapping of Peake .

The vegetation communities that occur within the modification areas are shown in **Figure 3.1**. The conservation status and area of each community within the modification areas is provided in **Table 3.1**. Where appropriate, the names used to describe these communities follow those used in the CMA mapping study.

The predominant vegetation element within the modification areas is grassland that has been derived from the clearing of the original woodland and forest communities. This grassland is dominated by a variety of native grass and forb species however at certain locations many exotic species are also present, as is typical of grazing lands. The vegetation within the modification areas also includes hybrid variants of the State listed Box-Gum Grassy Woodland and Derived Native Grassland. This community is not considered to be the critically endangered ecological community (CEEC) listed under the EPBC Act as "White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland" as the modification areas are dominated by Grey Box / White Box intergrades which are not included in the EPBC Act Final Determination. Intergrades are "hybrids with hybrids" that have occurred over possibly thousands of years as White Box and Grey Box distributions overlapped in pre-historic times. Currently in the upper Hunter Valley, large areas are dominated largely or entirely by intergrades without either parent species present. Extensive testing by Cumberland Ecology with verification by the Royal Botanic Gardens indicated that all 78 specimens tested within and around the Project area were intergrades. No pure White Box trees have been identified.

Table 3.1 AREAS OF VEGETATION CLEARED FOR APPROVED AND MODIFIED INFRASTRUCTURE COMPONENTS OF THE PROJECT

Vegetation Community	Approved Rail Facilities (ha)	Approved Infrastructure (ha)	Worst Case Conveyor (ha)	Worst case Modified Infrastructure (ha)
Upper Hunter White Box/–Ironbark Grassy Woodland (EEC)	-	-	1.3	-
White Box/Grey Box Intergrade – Spotted Gum Grassy Woodland (EEC)	-	-	-	-
White Box/Grey Box Intergrade Grassy Woodland (EEC)	1.6	0.4	0.1	9.0
Central Hunter Ironbark - Spotted Gum - Forest (EEC)	-	-	0.9	-
Hunter Floodplain Red Gum Woodland Complex (EEC)	0.2	-	0.2	-
Tree and Shrub Plantations	-	1.1	0.8	-
Upper Hunter Hills Exposed Ironbark Woodland	1.6		4.2	-
Derived Native Grassland (Box – Gum)(EEC)	14.9	24.7	4.2	19.8
Grassland (Hunter Floodplain Red Gum Woodland Complex)	0.5	-	0.6	-
Grassland (Upper Hunter Hills Exposed Ironbark Woodland)	1.4	-	1.3	-
Low Diversity Derived Native Grassland and Exotic Pasture	3.4	5.0	2.7	2.4
<i>Total</i>	23.6	31.2	16.3	31.2
Grand Total		54.8		47.5

3.2 Box-Gum Grassy Woodlands and Derived Native Grasslands

3.2.1 Upper Hunter White Box-Ironbark Grassy Woodland

Status: Endangered Ecological Community (TSC Act)

This is an open woodland community that occurs on gently undulating slopes and hills on clay and earth soils. Canopy species characteristic of this community include *Eucalyptus crebra* (Narrow-leaved Ironbark), *Eucalyptus albens x moluccana* (White Box/ Grey Box intergrade) and *Eucalyptus moluccana x albens* (Grey Box/White Box intergrade). Other

canopy species that occur within this community include, *Brachychiton populneus* ssp. *populneus* (Kurrajong) and *Corymbia maculata* (Spotted Gum).

Common understorey species include *Notelaea microcarpa* var. *microcarpa* (Native Olive), *Myoporum montanum* (Water bush), and *Maireana microphylla* (Small-leaved Bluebush). The groundcover is diverse and is generally dominated by grasses and forbs, such as *Aristida ramosa* (Three-awned Wiregrass), *Cymbopogon refractus* (Barbed Wire Grass), *Austrostipa verticillata* (Slender Bamboo Grass), *Chloris ventricosa* (Windmill Grass), *Austrodanthonia fulva* (Wallaby Grass), *Cynodon dactylon* (Couch Grass), *Calotis lappulaccea* (Yellow Burr-daisy), *Dichondra repens* (Kidney Weed), *Desmodium varians* (Variable Tick-trefoil) and *Einadia nutans* (Climbing Saltbush).

This community is concentrated in the conveyor/services corridor envelope portion of the modification areas and is present as scattered occurrences in the central-eastern portion of the Mount Pleasant Project area (**Figure 3.1**). Areas where *Eucalyptus albens* x *moluccana* (White Box/Grey Box intergrades) dominate grades quickly into grassy woodlands dominated by *Eucalyptus moluccana* x *albens* (Grey Box/White Box intergrades).



Photograph 3.1 **Upper Hunter White Box–Ironbark Grassy Woodland**

3.2.2 Grey Box/White Box Intergrade Grassy Woodland

Status: Endangered Ecological Community (TSC Act)

This variant is similar to Upper Hunter White Box–Ironbark Grassy Woodland except for the lack of *Eucalyptus albens* x *moluccana* (White Box/Grey Box intergrades) and minor

concentrations of *Eucalyptus crebra* (Narrow-leaved Ironbark). The associated other trees, shrubs and ground covers are similar to that described above for the Upper Hunter White Box–Ironbark Grassy Woodland and, the Grey Box/White Box Intergrade Grassy Woodland community corresponds to the description of Box-Gum Grassy Woodland under the TSC Act scientific determinations (NSW Scientific Committee, 2004a).

This community occurs in scattered occurrences across the modification areas (**Figure 3.1**).



Photograph 3.2 **Grey Box/White Box intergrade open woodland within the Mount Pleasant Project area**

3.2.3 Grey Box/ White Box Intergrade–Spotted Gum Grassy Woodland

Status: Endangered Ecological Community (TSC Act)

This community is similar in structure and make-up to that described above apart from the regular occurrence of *Corymbia maculata* (Spotted Gum) and the observation that *Corymbia maculata* (Spotted Gum) tends to be associated with *Eucalyptus moluccana* x *albens* (Grey Box/White Box intergrade) rather than *Eucalyptus crebra* (Narrow-leaved Ironbark).

The understorey layers generally contain the shrub species *Notelaea microcarpa* var. *microcarpa*, *Acacia decora* (Western Golden Wattle), *Cassinia arcuata* (Sifton Bush),

Breynia oblongifolia (Coffee Bush) and *Dodonaea viscosa* (Hop Bush). Typical forbs and grasses include *Goodenia paniculata* (Branched Goodenia), *G. ovata* (Hop Goodenia), *Ozothamnus diosmifolium* (White Dogwood), *Brunoniella australis*, *Glycine tabacina* (Variable Glycine), *Wahlenbergia stricta* (Austral Bluebell), *Calotis cuneifolia* (Purple Burr-daisy), *Dianella longifolia* (syn. *D. laevis*), *Sida corrugata*, *Swainsona galegifolia* (Smooth Darling Pea), *Bothriochloa macra*, *Aristida ramosa* (Three-awned Wiregrass), *Chloris truncata* (Windmill Grass), *Lomandra filiformis* (Wattle Mat-rush), *Themeda australis* (Kangaroo Grass) and *Dichelachne micrantha* (Shorthair Plumegrass).

Peake recorded a variant of his Upper Hunter Grey Box/White Box intergrade Grassy Woodland community that contained Spotted Gum and considered that more sampling was required to determine whether this represented a community in its own right (Peake, 2006). Analysis of this community within the Mount Pleasant Project area indicates that this community variant corresponds to the description of State (NSW Scientific Committee, 2004a) as the under-storey consists of species that are indicative of the community.

This community is restricted to the northwest of the modification areas in the infrastructure envelope (**Figure 3.1**).



Photograph 3.3

Grey Box/White Box Intergrade-Spotted Gum open woodland within the Mount Pleasant Project area

3.2.4 Derived Native Grassland

Status: Endangered Ecological Community (TSC Act)

Derived grassland (also known as secondary grassland or understorey) is an expression of the ecological community that develops when the tree canopy cover of the grassy woodland is removed or suffers dieback, and natural regeneration is prevented. The understorey of derived grassland remains relatively intact. Much of the grassland in the modification areas and adjacent land has historically been derived from the clearing of trees and shrubs to create pasture for livestock long before mining commenced. As such, the floristic composition of this community can vary according to the forest or woodland community from which it originated as well as being influenced by slope, aspect, soil and underlying geology.

The derived grassland identified within the modification areas, whilst predominantly native in composition, is a degraded community that has been affected to varying degrees across its extent by past clearing and grazing practices. Broadly, the original native understorey would have been dominated by palatable grasses such as *Themeda australis* (Kangaroo Grass) and various species of the genus *Austrodanthonia*. (Wallaby Grass), with a high frequency of herbaceous plants. Most areas of native derived grassland are now dominated by less palatable grasses including *Aristida* spp. and *Austrostipa* spp., with very minor proportions of Kangaroo Grass and Wallaby Grasses and a lower frequency of herbs present.

Within the modification areas this community conforms to the TSC Act listing for Box-Gum Grassy Woodland and native Derived Grassland (NSW Scientific Committee, 2004a). These are areas of native grassland characterised by an assemblage of understorey species that is representative of the understorey that typifies Box-Gum Grassy Woodland, namely Upper Hunter White Box–Ironbark Grassy Woodland. These areas of grassland are derived from the clearing of canopy trees of these communities.

Based upon the cumulative results of several seasons of survey, a high proportion of the Derived Grassland within the modification areas appears to be derived from areas historically dominated by the *Eucalyptus moluccana* x *albens* intergrades (Grey Box/White Box intergrades), which is defined as a dominant of the State Box-Gum Grassy Woodland.

This community occurs throughout the modification areas (**Figure 3.1**).



Photograph 3.4 **Derived Native Grassland formed from the clearing of Upper Hunter White Box Intergrade-Ironbark Grassy Woodland. This grassland type predominates across the Mount Pleasant modification areas.**

3.3 Other Forests, Woodland and Grasslands

3.3.1 Central Hunter Ironbark - Spotted Gum Forest

Status: Endangered Ecological Community (TSC Act)

Central Hunter Ironbark – Spotted Gum – Forest is an open forest/woodland community that is dominated by *Eucalyptus crebra* and *Corymbia maculata*. The community conforms to the TSC Act listed EEC Central Hunter Ironbark - Spotted Gum – Grey Box Forest (NSW Scientific Committee, 2009) but does not conform to the Commonwealth or State listed EECs due to the obvious lack of *Eucalyptus albens* (NSW Scientific Committee, 2004a, Threatened Species Scientific Committee, 2006).

The understorey assemblage is generally in conformity with surrounding woodland/forest communities although the shrub layer where present is dominated by *Acacia paradoxa* (Kangaroo Apple) and *Notelaea microcarpa* (Native Olive). The understorey is dominated by *Austrostipa verticillata* (Slender Bamboo Grass), *Aristida ramosa* (Three-awned Wiregrass), and *Bothriochloa decipiens*. Forb diversity is moderately high and includes

like *Dichondra repens* (Kidney Weed), *Chrysocephalum apiculatum*, *Glycine tabacina* (Variable Glycine) and *Sida corrugata*.

As with many other areas of woodland and forest in the Mount Pleasant Project area, shrub diversity is low and the shrub stratum is absent in many places. However, this occurrences of this community more recently been released from grazing allowing the regeneration of a shrub layer.

This community occupies a small isolated pocket in the northeast portion of the conveyor/service corridor envelope (**Figure 3.1**).



Photograph 3.5 **Ironbark – Spotted Gum Forest in the modification areas**

3.3.2 Narrabeen Footslopes Slaty Box Woodland

Status: Endangered Ecological Community (TSC Act)

Narrabeen Footslopes Slaty Gum Woodland typically occupies hot, dry locations in the Central Hunter and its distribution is strongly influenced by underlying geology (Peake 2006). This open woodland is dominated by the tree species *Eucalyptus dawsonii* (Slaty Box) and, *Allocasuarina luehmannii* (Buloak). The shrub layer is generally absent but where present is dominated by *Maireana microphylla* (Small-leaf Bluebush) and the exotic *Lycium ferocissimum* (African Boxthorn).

The groundcover within this community is generally sparse with relatively low species richness. The level of exotics depend upon location with dominant species such as *Cynodon dactylon* (Couch Grass), *Pennisetum clandestinum* (Kikuyu), *Sida rhombifolia* (Paddys Lucerne), *Polygonum aviculare* (Wire Weed), *Modiola caroliniana* and *Galenia pubescens* (Galenia) dominating in exotic areas. Where natives dominate variable proportions of *Sporobolus creber* (Rats Tail Grass), *Chloris ventricosa* (Windmill Grass), *Bothriochloa macra* (Red Leg Grass) and *Aristida* spp. are present.

This community occurs within in one small isolated area within the southeast corner of the conveyor/service corridor envelope (**Figure 3.1**).

3.3.3 Hunter Floodplain Red Gum Woodland Complex

Status: Endangered Ecological Community (TSC Act)

The community exists as occasional scattered occurrences of *Eucalyptus tereticornis* (Forest Red Gum) and more commonly *Angophora floribunda* (Rough-barked Apple). *Casuarina cunninghamiana* (River Oak) and shrub species that generally typify this community are not present in this area, having been cleared for agriculture and subjected to ongoing grazing and weed invasion. A small portion of this community is dominated by *Eucalyptus melliodora* (Yellow Box). The understory component of this community is similar to the previously grazed understory species as described for the communities above. The understorey is dominated by native spear grasses (i.e. *Austrostipa verticillata* (Slender Bamboo Grass) and *Austrostipa scabra* ssp. *scabra*). An assemblage of native forbs are present but in low frequencies. Where Yellow Box occurs, this community has been too highly modified to correspond to the EPBC Act listed EEC Box-Gum grassy woodland. The derived grassland form of this community occurs at the edges of the woodland vegetation.

Hunter Floodplain Red Gum Woodland Complex occurs within the conveyor/services corridor envelope in an ephemeral creek network that is most likely inundated with water following heavy rain events (**Figure 3.1**).

3.3.4 Upper Hunter Hills Exposed Ironbark Woodland

Status: Not listed.

This is an open forest community that often occurs on drier north-facing slopes receiving high solar radiation and is characterised by the ubiquitous presence of *Eucalyptus crebra* (Narrow-leaved Ironbark). Other canopy species that can occur in low numbers include *Eucalyptus moluccana* x *albans* (Grey Box/White Box intergrades), *Angophora floribunda* (Rough-barked Apple) and *Brachychiton populneus* ssp. *Populneus* (Kurrajong).

The understorey strata varies depending upon location from sparse and lacking a shrub layer to a complex ground cover with several shrub species. The shrub species where present include *Allocasuarina leuhmannii* (Buloak) *Maireana microphylla* (Small-leaf

Bluebush), *Bursaria spinosa* (Blackthorn), *Acacia paradoxa* (Kangaroo Apple) and *Notelaea microcarpa* (Native Olive). The ground layer is dominated by grasses such as *Aristida jerichoensis* (Jericho Grass), *Austrostipa verticillata* (Slender Bamboo-grass) and to a lesser extent *Cymbopogon refractus* (Barbed-wire Grass) as well as *Bothriocloa decipiens*. Common forbs include *Dichondra repens* (Kidney Weed), *Chrysocephalum apiculatum*., *Glycine tabacina* (Variable Glycine) and *Einadia trigonos*. The derived grassland form of this community occurs at the edges of the woodland vegetation.

This community occurs within the central portion of the conveyor/services corridor envelope and the northeast corner of the infrastructure envelope (**Figure 3.1**).



Photograph 3.6 **Upper Hunter Hills Exposed Ironbark Woodland in the Mount Pleasant Project area**

3.3.5 Spotted Gum Forest

Spotted Gum Forest occurs in the infrastructure envelope (**Figure 3.1**) as a linear stand of *Corymbia maculata* over grassy understorey. It fringes a larger patch of vegetation dominated by *Eucalyptus crebra*. This patch of forest occurs near the southern boundary and is proximate to a homestead, farm sheds and a cattle feeding paddock. Much of the vegetation near these buildings shows signs of moderate to heavy disturbance including erosion, trampling and grazing by cattle, soil disturbance by pigs, and weed invasion.

The shrub layer is very sparse and is typically comprised of hardy species like *Maireana microphylla* and *Solanum* spp. Signs of invasion from *Lycium ferrocissimum* are evident. The ground storey is dominated by *Austrostipa verticillata*, which is a native grass species that typically dominate in areas of pasture unimproved grassland impacted by years of grazing. Other grazing resistant native forbs present include a number of *Einadia* spp. and *Lepidium pseudohyssopifolium*. A low diversity of other herb species is present (e.g. *Calotis lappulacea*, *Vittadinia cuneata*, *Glycine tabacina*); however these species occur in low frequencies and with patchy distributions. The understorey appears to be consistent across the entire area of this community.

3.3.6 Low Diversity Derived Native Grassland and Exotic Pasture

Status: Not listed.

Some portions of the modification areas are comprised of derived native grasslands of low diversity. The low diversity is attributable to more intensive agricultural usage. Many of the native grasses and herbs that occur in the aforementioned derived native grasslands occur, but at much lower abundance and diversity. However, native herbs are in low abundance, particularly grazing sensitive native herbs.

Hardy native grasses such as grasses like *Aristida* spp. and *Austrostipa* spp. predominate in these areas and the more palatable native grasses like *Themeda australis* (Kangaroo Grass) and *Cymbopogon refractus* (Barbed Wire Grass) are largely absent. The low growing cosmopolitan grass *Cynodon dactylon* (Couch Grass) is often abundant in this grassland community, particularly where there has been heavy grazing by livestock. It commonly occurs with *Sida rhombifolia* (Paddys Lucerne) and *Medicago* spp (Medics).

On the old Hunter River floodplain landscapes, where soils have been ploughed for cultivation, almost no native ground cover vegetation remains. On such areas the main species comprise exotic pasture grasses and weeds.

This community occurs as scattered patches throughout the modification areas and is widespread in the east of Mount Pleasant Project area (**Figure 3.1**).



Photograph 3.7 **Low Diversity Derived Native Grassland & Exotic Pasture**

3.3.7 *Tree and Shrub Plantations*

Status: Not listed.

Along some of the margins of the infrastructure envelope and conveyor/services corridor envelope, tree and shrub plantations have been created as a screen to future mining operations (see **Figure 3.1**). These plantations consist of a variety of local native tree and shrub species including many from the Box-Gum Grassy Woodland community. The plantations are relatively young in age and generally consist of trees and shrubs less than 15 years of age. Some of the plantations have been created over derived native grassland and now provide habitat for a range of woodland fauna, including birds, bats and reptiles. Some of the threatened birds that are known to occur on the Mount Pleasant Project area, including Speckled Warbler and Grey-crowned Babbler, are likely to make use of such plantation areas as they can occur in relatively young woody vegetation surrounded by grassland.



Photograph 3.8 **Tree plantings within the Mount Pleasant Project area**

3.4 Flora

3.4.1 Introduction

Several flora surveys have been conducted within various portions of the Mount Pleasant Project area over a number of years. A total flora species list from all surveys conducted across the Mount Pleasant Project area is provided in **Appendix A**. This appendix includes species not previously identified in the modification areas but are considered to have high potential to occur. More than 300 flora species have been recorded within the Mount Pleasant Project area; with over 75 per cent of the species being native. The vegetation within the modification areas is consistent with the floristics of the vegetation in the remainder of the Mount Pleasant Project area.

3.4.2 Database Review

Database searches of listed threatened flora species were undertaken over an area 10km from an approximate centre of the Mount Pleasant Project area to take into account the transient nature of fauna and to capture records from similar habitats. The results of the search are tabulated in **Table 3.3** with an assessment of their likelihood of occurrence of

the species within the modification areas. Some additional species were also discussed if recorded from within the Muswellbrook LGA and if habitat assessment indicated that there was potential for these species to occur.

Table 3.2 LIKELIHOOD OF OCCURRENCE OF THREATENED FLORA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
Fabaceae (Mimosoideae)	<i>Acacia pendula</i> population in the Hunter catchment	Weeping Myall population in the Hunter Catchment	E2	-	Typically occurs on heavy soils, sometimes on the margins of small floodplains, but also in more undulating locations.	Possible. Not recorded during extensive surveys of Mount Pleasant project area. Suitable habitat within the modification areas and Mount Pleasant Project area.
Myrtaceae	<i>Eucalyptus camaldulensis</i> population in the Hunter catchment	River Red Gum population in the Hunter catchment	E2	-	Forms stands of woodland and open woodland on the major floodplains of the Hunter and Goulburn rivers, especially in areas where water impoundment occurs after flood. May occur with <i>Eucalyptus tereticornis</i> , <i>Eucalyptus melliodora</i> ; <i>Casuarina cunninghamiana</i> subsp. <i>cunninghamiana</i> and <i>Angophora floribunda</i> .	Possible but unlikely due to specific habitat requirements. Not recorded within the Mount Pleasant project area but know occurrences in adjacent areas. Sub-optimal habitat within the modification areas and Mount Pleasant Project area. Potential to occur in low lying wet areas.
Orchidaceae	<i>Cymbidium canaliculatum</i> population in the	N/A	E2	-	Grows in the hollows of trees in dry sclerophyll forest or woodland; north from the Hunter Valley, chiefly in inland districts, west to New Angledool.	Present. At least four specimens have been recorded within the Mount

Table 3.2 LIKELIHOOD OF OCCURRENCE OF THREATENED FLORA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
Hunter Catchment						Pleasant Project area but no known occurrences within the modification areas. Suitable habitat within the modification areas.
	<i>Diuris tricolour</i>	Pine Donkey Orchid	V	V	Found in sclerophyll vegetation on flats or small rises, on a range of substrates including sandy or loamy soils derived from granite, porphyry, laterite or alluvium.	Possible. Not recorded during any surveys of Mount Pleasant project area. Known to occur within nearby Mount Arthur Coal Offset areas. Suitable habitat within the modification areas and Mount Pleasant Project areas.
	<i>Digitaria porrecta</i>	Finger Panic Grass	E1	E	Native grassland, woodlands or open forest with a grassy understorey, on richer soils. Often found along roadsides and travelling stock routes where there is light grazing and occasional fire.	Possible. Not recorded during any surveys of Mount Pleasant project area. Suitable habitat within the modification areas and Mount Pleasant Project areas.

Table 3.2 LIKELIHOOD OF OCCURRENCE OF THREATENED FLORA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
Rhamnaceae	<i>Pomaderris reperta</i>	Denman Pomaderris	E1	-	Very restricted area of occupation. Prefers woodland in association with <i>Eucalyptus crebra</i> , <i>Eucalyptus blakelyi</i> , <i>Notelaea microcarpa</i> , and <i>Allocasuarina littoralis</i> . Associated soil is a sandy loam on sandstone or conglomerate.	Unlikely. Suitable habitat within the modification areas and Mount Pleasant Project areas. Unlikely to occur due to restricted range.
Santalaceae	<i>Thesium australe</i>	Austral Toadflax, Toadflax	V	V	Occurs in grassland or grassy woodland. Often found in damp sites in association with Kangaroo Grass (<i>Themeda australis</i>).	Possible. Not recorded during any surveys of the Mount Pleasant Project area. Suitable habitat within the modification areas and Mount Pleasant Project area.

Key to conservation status

E = Endangered species under the and EPBC Act

E1 = Endangered species under the TSC Act

E2 = Endangered population under the TSC Act

V = Vulnerable species under the TSC and EPBC Acts

Key to Likelihood

Present – Observed during surveys

Likely – Suitable habitat; found within the locality

Possible – Suitable habitat; not recorded within the locality/region

OR – Sub-optimal habitat; may use infrequently

Unlikely – no suitable habitat present; no known records in the locality

3.4.3 Threatened Species

Based on **Table 3.2**, no TSC Act listed threatened flora species have been found within the proposed modification areas however one species is considered likely to occur and these are further discussed below. The EPBC Act listed Vulnerable species *Bothriocloa biloba* (Lobed-blue Grass) has been recorded in numerous locations adjacent to and within the modification area but will be discussed in no further detail here as the species was delisted from the TSC Act due to its relatively high abundance across the State (NSW Scientific Committee, 2004b).

i. Species likely to occur within the modification areas

a. Tiger Orchid, (*Cymbidium canaliculatum*)

While not recorded with the modification area this species is considered to have a high potential to occur. Four individuals of the epiphytic Tiger Orchid, (*Cymbidium canaliculatum*) have been recorded within the Mount Pleasant Project area while recent surveys of lands adjacent to the Mount Pleasant Project area identified an additional three occurrences of this species. *Cymbidium canaliculatum* forms part of an Endangered Population in the Hunter Catchment as listed under the TSC Act.



Photograph 3.9

Tiger Orchid located on the trunk of a Grey Box/White Box Intergrade within the Mount Pleasant Project area

3.5 Fauna

The primary fauna habitats located within the modification areas include:

- Woodland communities (such as Upper Hunter White Box-Ironbark Grassy Woodland);
- Derived native grassland; and,
- Permanent and ephemeral water bodies such as dams and creeks.

Key habitat features recorded during the survey periods include:

- Ephemeral riparian environments suitable for fauna species dependant on these habitats (e.g. amphibians);
- Ground cover, leaf litter, fallen timber and rocky outcrops suitable as shelter for small terrestrial fauna species;
- Tree hollows suitable as shelter and breeding habitat for a range of hollow-dependant fauna;
- Blossom-producing trees suitable as foraging habitat for a range of nectarivores; and
- Primary and secondary Koala feed tree species.

Features such as bush rock, fallen logs, leaf litter and ground vegetation, which provide shelter for many of the small to medium sized terrestrial fauna species known from the wider locality, were generally limited within the modification areas but can be found to some degree in most of the woodland communities within the modification areas. Generally, the types of terrestrial native species using the modification areas are likely to be restricted to those that are common and well-adapted to disturbed woodland and agricultural areas.

Introduced (feral) fauna species are prevalent throughout the Mount Pleasant Project area, and this trend is likely to continue throughout the modification areas. Signs of foxes, cats and dogs were observed; and all are a threat to native fauna through predation. Rabbits and introduced mice and rats are abundant throughout the Mount Pleasant Project area.

The mature living trees and stags that remain in forest and woodland communities within the modification areas provide a number of small to medium-sized tree hollows for fauna species dependant on this resource as shelter and breeding habitat. However large hollows in tall trees that provide breeding and shelter habitat, particularly for large forest owls and large gliders, are relatively scarce. The scarcity of these larger hollows can be attributed to the regenerating nature of the vegetation following past agricultural uses throughout the area.

All open forest and woodland vegetation communities within the modification areas would provide suitable foraging habitat for a wide range of nectarivorous birds during blossom periods. *Eucalyptus moluccana x albens* (Grey Box/White Box intergrade) were in heavy bud and mistletoe plants (*Amyema sp.*) were in heavy flower during the early months of 2010. It is likely that a number of nectar-dependant bird species would be attracted to the modification areas during the blossoming periods of dominant trees.

Feed trees for the Koala occur throughout the modification areas. The most widespread feed tree for the Koala within the modification areas is *Eucalyptus moluccana x albens* (Grey Box/White Box intergrade).

3.5.1 Database Review

Database searches of listed threatened fauna species were undertaken over an area 10km from an approximate centre of the disturbance area to take into account the transient nature of fauna and to capture records from similar habitats. The results of the search are tabulated in **Table 3.4** with an assessment of their likelihood of occurrence within the modification areas. Some additional species were also discussed if recorded from within the Muswellbrook LGA and where the habitat assessment indicated that there was potential for these species to occur.

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
Amphibians						
Hylidae	<i>Litoria booroolongensis</i>	Booroolong Frog	E	E	Live along permanent streams with some fringing vegetation cover such as ferns, sedges or grasses.	Unlikely. No suitable habitat within the modification areas.
Aves						
Accipitridae	<i>Circus assimilis</i>	Spotted Harrier	V	-	Occurs throughout the Australian mainland, except in densely forested or wooded habitats of the coast, escarpment and ranges. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands.	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Project area.
	<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	Lives within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for	Possible. Not recorded during any Mount

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
					timbered watercourses.	Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Cacatuidae	<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	In summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In winter, may occur at lower altitudes in drier more open eucalypt forests and woodlands, and often found in urban areas. Move to lower altitudes in winter, preferring more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. Favours old growth attributes for nesting and roosting.	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Calyptrorhynchus lathamii</i>	Glossy Black-Cockatoo	V	-	Forages on mostly she-oaks but also eucalypts, native cypress and brigalow in forests, woodlands and timbered watercourses, nesting in large hollows, high off the ground	Unlikely. No suitable habitat within the modification areas.
Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	-	Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands; can also be found occasionally on inter-tidal shorelines, mangrove margins and	Unlikely. No suitable habitat within the modification areas.

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
Climacteridae	<i>Climacteris picumnus</i>	Brown Treecreeper	V	-	estuaries. Dry forest, woodlands and scrubs, paddocks, stumps and margins of denser wooded areas	Likely. Recorded within the Mount Pleasant Project area. Likely to occur throughout all woodland areas within the modification areas and Mount Pleasant Project area.
Estrildidae	<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	Found in grassy eucalypt woodlands, including Box-Gum Grassy Woodlands and Snow Gum <i>Eucalyptus pauciflora</i> Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities.	Likely. Recorded within the Mount Pleasant Project area. Likely to occur throughout all woodland areas within the modification areas and Mount Pleasant Project area.
Meliphagidae	<i>Grantiella picta</i>	Painted Honeyeater	V	-	Inhabits Boree, Brigalow and Box-Gum Grassy Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater	V	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. Feeding territories are large making the species locally nomadic.	modification areas and Mount Pleasant Project area. Present. Recorded during recent surveys of the modification areas. Likely to forage infrequently across the modification areas during canopy blossom periods.
	<i>Xanthomyza phrygia</i>	Regent Honeyeater	E	E	Inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	-	-	Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and <i>Acacia</i> woodland.	Likely. Recorded within the Mount Pleasant Project area. Likely to occur throughout all

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
						woodland areas within the modification areas and Mount Pleasant Project area.
Pardalotidae	<i>Pyrrholaemus saggitatus</i>	Speckled Warbler	V	-	Inhabits a range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area.	Present. Recorded during recent surveys of the modification areas. Likely to occur within all wooded areas within the modification areas.
Petroicidae	<i>Melanodryas cucullata cucullata</i>	Hooded Robin	V	-	Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	Likely. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Petroica boodang</i>	Scarlet Robin	V	-	Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in	Likely. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
					wetlands and tea-tree swamps. Scarlet Robin habitat usually contains abundant logs and fallen timber: these are important components of its habitat. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees	throughout the modification areas and Mount Pleasant Project area.
Pomatostomidae	<i>Pomatostomus temporalis</i>	Grey-crowned Babbler	V	-	Inhabits open Box-Gum Grassy Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains	Present. Recorded during recent surveys of modification areas. Likely to occur throughout all woodland areas within the modification areas and Mount Pleasant Project area.
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	Mostly occur in dry, open eucalypt forests and woodlands. Gregarious, usually foraging in small flocks, often with other species of lorikeet. They feed primarily on nectar and pollen in the tree canopy, particularly on profusely-flowering eucalypts, but also on a variety of other species including Melaleuca and mistletoes. Nest hollows typically occur in living, smooth-barked eucalypts.	Likely. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
	<i>Lathamus discolor</i>	Swift Parrot	E	E	Migrates irregularly to the locality in the winter to forage on winter-flowering tree species such as Swamp Mahogany and Spotted Gum	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Neophema pulchella</i>	Turquoise Parrot	V	-	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Rostratulidae	<i>Rostratula australis</i>	Australian Painted Snipe	V	E	Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber	Unlikely. No suitable habitat within the modification areas.
Strigidae	<i>Ninox connivens</i>	Barking Owl	V	-	Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During	Possible. Not recorded during any Mount Pleasant surveys.

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
					the day they roost along creek lines, usually in tall understorey trees with dense foliage such as <i>Acacia</i> and <i>Casuarina</i> species, or the dense clumps of canopy leaves in large <i>Eucalypts</i>	Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Ninox strenua</i>	Powerful Owl	V	-	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	V	-	Forests, open woodlands, farmlands with large trees, timbered watercourses, paperbark woodlands, caves; nest in hollow eucalypts, bare sand or earth of caves	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
Mammals						
Dasyuridae	<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline	Likely. Not recorded during any Mount Pleasant surveys but several recent records in the vicinity of the project area. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	-	Roosts in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows.	Likely. Possible record using Anabat detection within Mount Pleasant Project area in recent surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Molossidae	<i>Mormopterus</i>	Eastern	V	-	Occurs in dry sclerophyll forest and woodland east of the	Likely. Recorded within

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
	<i>norfolkensis</i>	Freetail-bat			Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures	Mount Pleasant Project area. Likely to occur throughout all woodland areas within the modification areas and Mount Pleasant Project area.
Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	V	-	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils	Unlikely. No suitable habitat within the modification areas.
	<i>Petaurus norfolkensis</i>	Squirrel Glider	V	-	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia mid-storey.	Likely. Recorded within Mount Pleasant Project area. Suitable habitat throughout all woodland areas within the modification areas and Mount Pleasant Project area.
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Rainforest, mangroves, paperbark swamps, wet/dry sclerophyll forests	Likely. Recorded adjacent to Mount Pleasant Project area. Suitable habitat

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
						throughout all woodland areas within the modification areas and Mount Pleasant Project area.
Phascolarctidae	<i>Phascolarctos cinereus</i>	Koala	V	-	Inhabit eucalypt woodlands and forests. 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.	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
Vespertilionidae	<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Found in well-timbered areas containing gullies. Roosts in caves, crevices in cliffs and old mine workings frequenting low to mid-elevation dry open forest and woodland close to these features	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Falsistrellus</i>	Eastern	V	-	Prefers moist habitats, with trees taller than 20 m. Generally	Likely. Possible record

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
	<i>tasmaniensis</i>	False Pipistrelle			roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings	using Anabat detection within study areas in recent surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Miniopterus australis</i>	Little Bent-wing Bat	V	-	Prefer well timbered areas including rainforest, wet and dry sclerophyll forest, <i>Melaleuca</i> swamps and coastal forests. Roosting in caves and eat insects	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bent-wing Bat	V	-	Prefers forested valleys but also found in rainforests, wet/dry sclerophyll forests, monsoon forests, open woodlands, paperbark forests & open grasslands. Roosting in caves or tunnels.	Likely. Not recorded within modification areas but known to occur within Mount Pleasant Project area. Likely to occur throughout all woodland areas within the

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
	<i>Myotis adversus</i>	Large-footed Myotis	V	-	Most habitats near water, including mangroves, paperbark swamps, riverine monsoon forest, rainforest, wet and dry sclerophyll forest, open woodland and River red gum woodland	modification areas and Mount Pleasant Project area. Likely. Recorded within mount Pleasant Project area. Likely to occur in areas adjacent to wetland and waterway areas within the modification areas and Mount Pleasant Project area.
	<i>Nyctophilus timoriensis</i>	Eastern Long-eared Bat	V	V	Inhabits a variety of vegetation types, including mallee, bulloke Allocasuarina leuhmanni and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Scoteanax rueppellii</i>	Greater Broad-nosed	V	-	Cool temperate to tropical moist forests, woodland and rainforest. Prefer moist gullies within mature coastal forest or	Likely. Possible record using Anabat detection

Table 3.3 LIKELIHOOD OF OCCURRENCE OF THREATENED FAUNA SPECIES WITHIN THE MODIFICATION AREAS

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	Habitat Requirements	Presence of Suitable Habitat and Likelihood of Occurrence
		Bat			rainforest. May roost in tree hollows and feed along forest edges or streams.	within mount Pleasant Project area. Suitable foraging habitat throughout the modification areas and Mount Pleasant Project area.
	<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V	-	A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings	Possible. Not recorded during any Mount Pleasant surveys. Suitable foraging habitat throughout the modification areas and Project area.

Key to conservation status

CE = Critically endangered species under the TSC Act

E = Endangered species under the TSC Act

V = Vulnerable species under the TSC Act

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Key to Likelihood

Present – Observed during surveys

Likely – Suitable habitat; found within the locality

Possible – Suitable habitat; not recorded within the locality/region

OR – Sub-optimal habitat; may use infrequently

Unlikely – no suitable habitat present; no known records in the locality

3.5.2 Threatened species

A small number of TSC Act listed threatened species have been recorded within the proposed modification areas, while other species known to occur within the area are considered highly likely to utilise the habitat within the modification areas. These species are discussed in more detail below.

i. Threatened species known to occur

a. Speckled Warbler

The Speckled Warbler was recorded at three locations within the modification area between during the February 2010 surveys. The species lives in a wide range of *Eucalyptus* dominated communities that have a grassy understorey, often on rocky ridges or in gullies with fallen timber. This species prefers relatively large undisturbed remnants of woodland and hence much of the Project area is considered unsuitable for this species confining it to woodland remnants. It is however expected to occur throughout all of the wooded modification areas.

b. Grey-crowned Babbler

A family of Grey-crowned Babblers was recorded at one location within the modification areas during the 2010 surveys. The species inhabits open Box-Gum Grassy Woodlands, Box-Cypress-pine and open Box Woodlands on alluvial plains (NSW Scientific Committee, 2001b). It is likely that there is more than one family group of this species present within the modification areas, however the highly altered nature of the vegetation within the modification areas renders much of the habitat unsuitable for this species due to lack of understorey and ground structure. It is however expected to occur throughout the wooded modification areas.

c. Black-chinned Honeyeater

A small group (approximately six to eight) of this species was recorded from within the proposed conveyor/services corridor envelope feeding on flowering mistletoe during February 2010 surveys. The species occupies a number of forest and woodland habitats, but requires large areas of intact habitat with nectar-producing trees (NSW Scientific Committee, 2001a). Given the large home-range required for this species, it is likely that Black-chinned Honeyeaters forage across the wooded areas of the proposed modification areas on occasions during blossoming periods of dominant canopy and mistletoe species.

ii. Threatened species considered likely to occur

a. Woodland Birds

The following birds are listed as Vulnerable under the TSC Act and are considered likely to occur within the modification areas despite not being recorded in recent surveys. It is

considered likely that all of these species would occur throughout all of the more heavily wooded locations within the modification areas at least occasionally.

- Brown Treecreeper (*Climacteris picumnus*);
- Varied Sittella (*Daphoenositta chrysoptera*);
- Diamond Firetail (*Stagonopleura guttata*);
- Hooded Robin (*Melanodryas cucullata*);
- Little Lorikeet (*Glossopsitta pusilla*) and
- Scarlet Robin (*Petroica boodang*).

iii. Mammals

No threatened mammals have been known to occur within the modification areas however some species are considered likely to occur. It is considered likely that all of the species, listed below, at some stage, would occur throughout all of the more heavily wooded locations within the modification areas.

Potential roosting and breeding habitat is restricted to forest and woodland areas for some of the microchiropteran bats, it is possible for these species to forage across all grasslands within the modification areas.

a. Spotted-tailed Quoll (*Dasyurus maculatus*)

The Spotted-tailed Quoll (*Dasyurus maculatus*) is listed as Vulnerable under the TSC Act. Several records exist for this species within the Muswellbrook LGA including records close to the Mount Pleasant Project area in 2004 (DECC (NSW), 2007). The species creates dens in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields or rocky-cliff faces and males of the species are known to have extensive home ranges up to 3500 ha. The species was not found during surveys of the Project area and no den sites were located during the habitat assessments. However, due to the proximity of records in the locality, it is considered possible that the species could forage occasionally in the modification areas.

b. Squirrel Glider (*Petaurus norfolcensis*)

A pair of Squirrel Gliders (*Petaurus norfolcensis*) was observed feeding in *Corymbia maculata* (Spotted Gum) within the Mount Pleasant Project area during 2009 surveys (**Figure 3.2**). It is considered likely that the species could forage throughout the modification areas also. The Squirrel Glider is listed as Vulnerable under the TSC Act.

c. Grey-headed Flying-fox (*Pteropus poliocephalus*)

A single Grey-headed Flying-fox (*Pteropus poliocephalus*) was recorded flying in a north westerly direction adjacent to the Mount Pleasant Project area during 2009 surveys and is likely to occur intermittently throughout the modification areas. It is most likely that this individual is a member of the Grey-headed Flying-fox colony located within Burdekin Park, Singleton. While no other Grey-headed Flying-fox individuals have been recorded within the Mount Pleasant Project area it is considered likely that the species could forage throughout the modification areas. The species is listed as Vulnerable under the EPBC and TSC Acts.

d. Microchiropteran Bats

Several microchiropteran bat species, listed below, were recorded from within the Mount Pleasant Project area through various survey methods. All of these species are considered likely to at least forage within the modification areas.

- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) (Vulnerable under the TSC Act).
- Eastern Free-tail Bat (*Mormopterus norfolkensis*) (Vulnerable under the TSC Act);
- Large-footed Myotis (*Myotis macropus*) (Vulnerable under the TSC Act);
- Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*) (Vulnerable under the TSC Act);
- Greater Broad-nosed Bat (*Scoteanax rueppellii*) (Vulnerable under the TSC Act); and
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) (Vulnerable under the TSC Act).

3.5.3 General Fauna Species

A range of habitat is available across the modification areas for amphibians, reptiles, birds and mammals. A full list of fauna species recorded across the Mount Pleasant Project in all surveys from 1994 area is provided in **Appendix B**. This appendix includes species not previously identified in the modification areas but are considered to have high potential to occur.

i. Amphibians

Little amphibian habitat occurs in the modification areas and no threatened species have been found within them. Some intermittent drainage lines within the modification areas would create temporary pools following heavy rain and provide suitable foraging and breeding habitat for a different suite of amphibian species. Habitat assessments of the

modification areas indicated that they would not provide suitable habitat for any State listed threatened amphibian species.

ii. Reptiles

The long grazing history within the modification areas is likely to have led to a decreased abundance of reptiles. A number of common species are likely to occur within the modification areas as these areas provide some suitable woodland habitat for reptiles known to occupy this locality. No threatened reptile species have been recorded within the Mount Pleasant Project area or modification areas.

iii. Birds

Habitat assessments and previous surveys indicate that the modification areas provide suitable foraging, shelter and breeding habitat for a range of common bird species as well as to threatened species listed under the TSC Act. The modification areas provide abundant habitat for woodland and grassland-dependant species, as well as limited habitat for species dependant on open forest communities.

The modification areas support a number of small dams and ephemeral water courses, some of the dams supporting aquatic vegetation. However, habitat assessment of the modification areas indicate that they do not provide suitable habitat for the majority of bird species dependant on wetland habitat and only common, adaptable wetland birds were recorded during surveys.

The habitat assessments and surveys also indicate that the modification areas provide suitable foraging habitat for a range of common diurnal raptors and potential foraging habitat for some threatened species. However, the large nest trees within riparian habitats required by some species for nesting were largely absent from within the modification areas. The modification areas also provide suitable foraging habitat for a range of forest and woodland-dependant owls. The absence of large hollow-bearing trees and dense riparian vegetation is likely to limit the suitability of nesting and roosting habitat within the Project area for these species.

Three birds that are listed as Vulnerable under the TSC Act have been recorded within the modification areas and four more are known to occur within the Mount Pleasant Project area. These additional four species are considered likely to occur within the modification areas. Further details on these threatened species are outlined in **Section 3.5.3** below.

iv. Mammals

a. Terrestrial Mammals

Habitat assessment indicates that the modification areas have undergone clearing in the past and therefore much of the open forest and woodland vegetation that now occurs

within these areas is regrowth, although some scattered old-growth trees have been retained. As a result, the complexity of habitat structure required by some terrestrial mammals has been removed however, some of the remaining mature trees and stags provide small to medium sized hollows suitable as shelter habitat for small arboreal mammals.

Terrestrial mammal fauna within the modification areas has continually been reported as containing a high proportion of exotic pest species, with the vast majority of small terrestrial mammals sighted and trapped across all surveys being exotic. Such a pattern is expected to be continuous throughout the modification areas.

The native terrestrial fauna is dominated by macropod species. The species recorded are generally more resilient to disturbance and are able to traverse larger areas of cleared land to migrate back into regenerating communities such as those within the modification areas.

b. Arboreal Mammals

Only three arboreal mammals have been recorded within the Mount Pleasant Project area. These were, the Common Brushtail Possum (*Trichosurus vulpecula*), Sugar Glider (*Petaurus breviceps*) and Squirrel Glider (*Petaurus norfolkensis*). The Squirrel Glider is listed as a vulnerable species under the TSC Act. It is expected that all three of these species would be found in the modification areas.

v. Bats

A number of microbat species are known to occur in the locality of the Mount Pleasant Project area; including some that are threatened under the TSC Act. To date none of these species have been recorded within the modification areas but many are considered likely to occur. Although each of these bat species has specific habitat requirements for roosting and breeding, many are able to utilise a variety of forest, woodland and grassland communities as foraging habitat. A total of 12 microbat species were positively identified within the Project area, with a further two or three species with calls that were not able to be positively identified from ultrasonic call analysis. At least six threatened microbat species have been positively identified from the surveys conducted within the Mount Pleasant Project area with potential for an additional threatened species depending on ambiguities in call analysis. All of these species are listed as Vulnerable under the TSC Act and all have potential to occur within the modification areas.

Habitat assessments indicated that a number of hollow-bearing dead and living trees within the modification areas would provide suitable roosting and breeding habitat for non cave-dependant species. These threatened species are discussed in more detail below.

A single Grey-headed Flying-fox was recorded adjacent to the Mount Pleasant Project area during 2009 surveys. This species feeds on blossoming canopy and mid-story trees

and has potential to forage within all trees within the modification areas, during blossoming periods. This species is listed as vulnerable under the TSC Act.

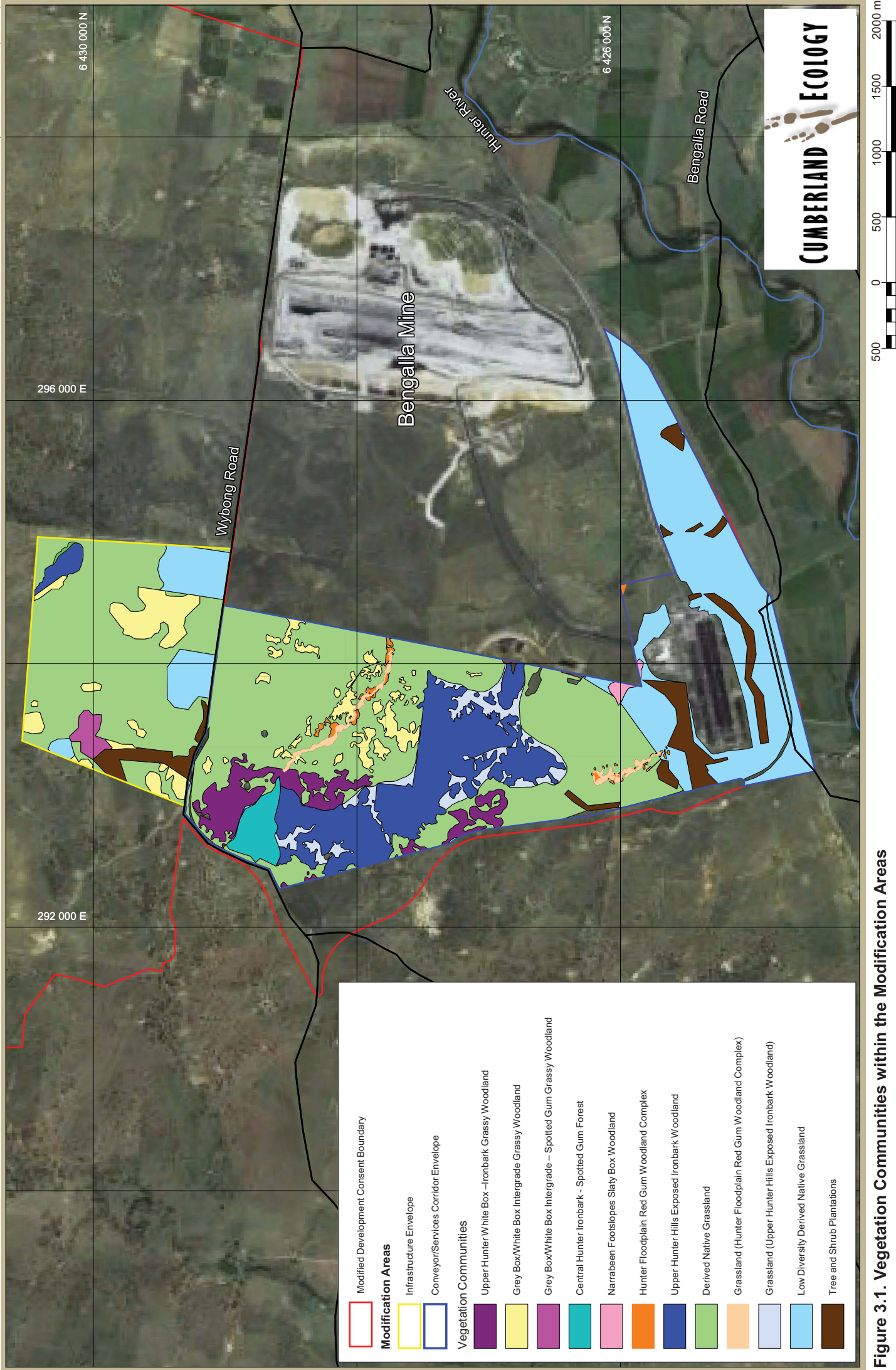


Figure 3.1. Vegetation Communities within the Modification Areas

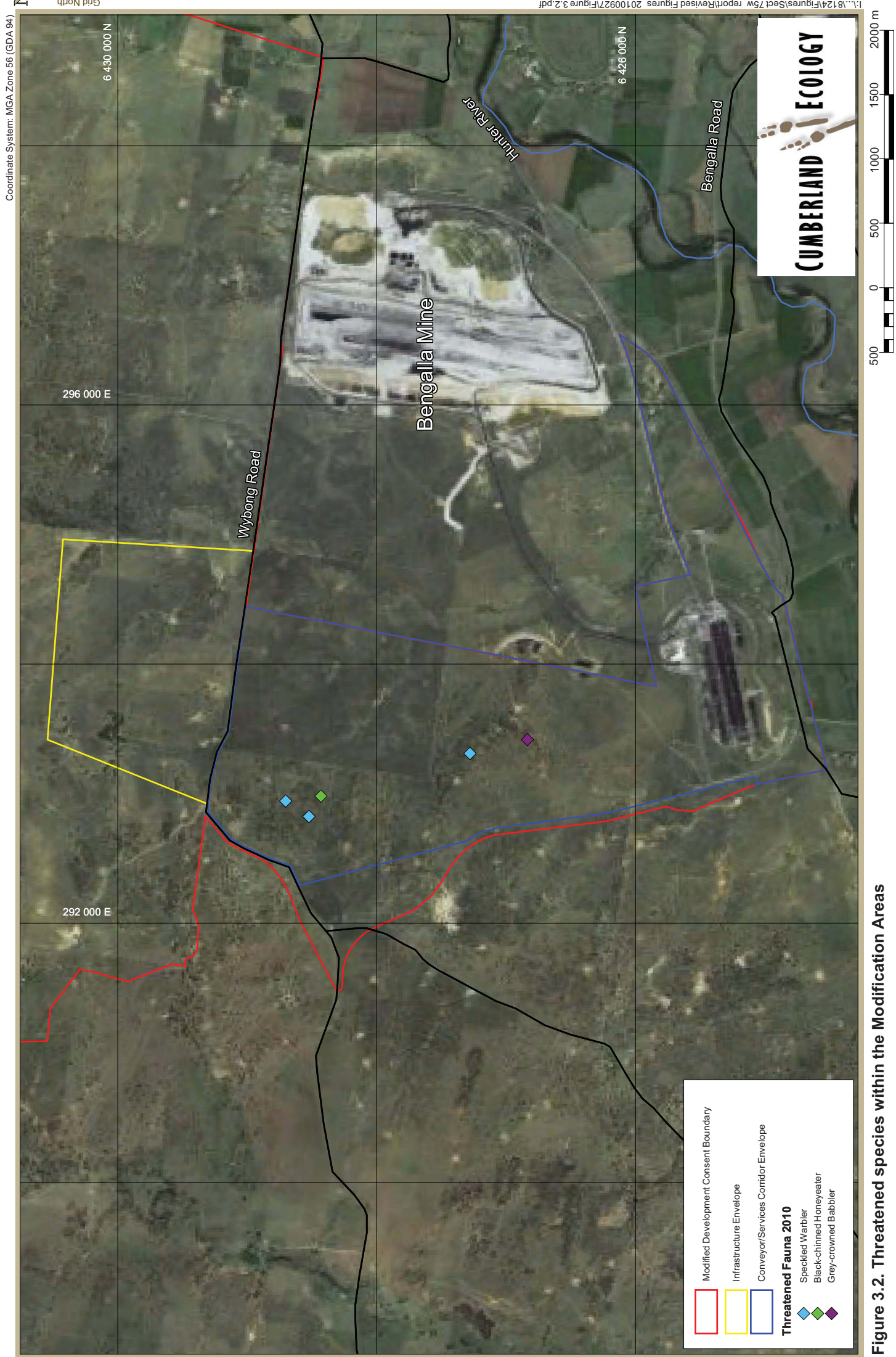


Figure 3.2. Threatened species within the Modification Areas

Impact Assessment

4.1 Introduction

This chapter discusses the potential impacts of the proposed modifications to State protected ecological communities and threatened flora and fauna species.

The assessment provides the comparative areas and types of vegetation communities to be cleared by the approved rail facilities and specific locations of infrastructure within the infrastructure area (as detailed in the EIS) versus the proposed modification components assuming worst case alignment of the conveyor/service corridor and configuration of infrastructure within the infrastructure envelope (refer to **Figure 1.2**). These are termed 'approved disturbance' and 'proposed disturbance' respectively. Approved for the purposes of this report relates to Development Consent DA 92/97.

The potential impacts of the proposed modifications on vegetation communities have been discussed under direct and indirect impacts. Direct impacts are caused as a primary result of clearing. Indirect impacts are a result of secondary processes and often occur around the periphery of a development. They include such things as weed invasion, increases in feral animals, erosion, and changes in habitat connectivity.

4.2 Vegetation Communities

4.2.1 Direct Impacts

The primary impact from the proposed modifications will be the clearing of vegetation. 'Clearing of Native Vegetation' is listed as a Key Threatening Process and has been identified as a direct cause of the decrease in biodiversity (NSW Scientific Committee, 2004a). However, it should be noted that the proposed modifications relate to options of already approved infrastructure and may lead to reductions in clearing.

A conservative worst case approach to the ecological impact assessment has been adopted in which it has been assumed that:

- the maximum areas of highest quality native vegetation will be cleared within the infrastructure and conveyor/service corridor envelopes; and

- a 30m disturbance area has been included along the entire length of the conveyor/service corridor.

As a result a worst case development scenario for the modification areas that maximises impact upon woodland firstly followed by grasslands. The conveyor/services corridor as opposed to the rail facility proposed in the previous project, will result in a reduction of impact area of approximately 7.3ha. A comparison of the approved disturbance to the proposed disturbance within the modification areas can be seen in **Table 4.1** below while the worst case scenario identified for the infrastructure and conveyor/services corridor can be seen in **Figure 4.1**.

Table 4.1 COMPARISON OF DISTURBANCE FOOTPRINTS OF THE APPROVED AND PROPOSED PROJECTS

Modification Area	Approved disturbance (ha)	Proposed disturbance (ha)
Infrastructure Area	31.2	~31.2
Rail Facilities and Conveyor/Service Corridor	23.6	~16.3
Total	54.8	47.5

The proposed modifications are seeking approval to locate the Project infrastructure and the conveyor/service corridor (if this option is pursued) within envelopes identified in **Figure 1.2**. As described above, in an attempt to quantify impacts on vegetation a worst case scenario has been developed. However, in reality the clearing of forest and woodland vegetation within these envelopes will be avoided or reduced, where possible, through detailed design.

Avoidance of listed EECs and important fauna/flora habitats, where possible, will be considered high in the hierarchy of parameters to be considered in locating this infrastructure; other constraints to location of infrastructure considered will include logistical, topographic and location of residences. These avoidance measures may enable a reduction in the worst case potential impacts on these EECs and fauna habitat.

Table 4.2 shows the comparative areas and types of vegetation communities to be disturbed by the approved rail facilities and specific locations of infrastructure within the infrastructure area (as detailed in the EIS), versus the proposed modification components assuming worst case alignment of the conveyor/service corridor and configuration of infrastructure within the infrastructure envelope (refer to **Figure 4.1**).

Under the worst case scenario, the total modification area footprint would entail approximately 47.5ha of vegetation clearance, versus approximately 54.8ha of clearance for the approved project resulting in a reduced impact if approximately 7.3ha in comparison to the approved project. Accordingly, it is not considered necessary to provide as a compensatory offset measure to ameliorate these impacts.

Table 4.2 VEGETATION COMMUNITIES POTENTIALLY IMPACTED BY APPROVED AND PROPOSED DISTURBANCE

Vegetation Community	Approved Disturbance (ha) [Infrastructure and Rail Facility]	Modified Disturbance (ha) [Infrastructure and Conveyor]
Upper Hunter White Box-Ironbark Grassy Woodland	-	1.3
Grey Box/White Box Intergrade – Spotted Gum Grassy Woodland	-	-
Grey Box/White Box Intergrade Grassy Woodland	2.0	9.1
Central Hunter Ironbark - Spotted Gum - Grey Box Forest	-	0.9
Hunter Floodplain Red Gum Woodland Complex	0.2	0.2
Tree and Shrub Plantations	1.1	0.8
Upper Hunter Hills Exposed Ironbark Woodland	1.6	4.2
Derived Native Grassland (Box-Gum)	39.6	24.0
Grassland (Hunter Floodplain Red Gum Woodland Complex)	0.5	0.6
Grassland (Upper Hunter Hills Exposed Ironbark Woodland)	1.4	1.3
Low Diversity Derived Native Grassland and Exotic Pasture	8.4	5.1
Total	54.8	47.5

4.2.2 Indirect Impacts

As with the currently approved infrastructure, clearing associated with the proposed modifications would lead to an increased impact from edge effects on adjacent areas of vegetation. Edge effects can have an adverse affect upon the habitat of the retained communities by reducing the quality and integrity of the community. The edges of the retained vegetation may be impacted by micro-climate changes (e.g. increased sunlight, air temperature and soil temperature) resulting in changes in species composition and increased weed invasion. Other edge effects resulting from habitat fragmentation can include increased susceptibility to infection, such as infection of native plants by the fungus *Phytophthora cinnamoni*.

The modification of abiotic factors necessary for vegetation survival (such as surface water drainage patterns and nutrient loads) through the construction of 'hard-stand' areas, could also impact the retained vegetation communities. Changes to drainage lines can affect the integrity, structure and composition of surrounding habitat and thus, have secondary impacts on the vegetation communities that rely on them.

The clearing of vegetation may lead to the fragmentation of the communities within the modification areas. Fragmentation of the vegetation community will reduce patch size and

potentially increase the edge to area ratio. Any increase to this ratio would result in an increased potential of edge effects occurring. The fragmentation of communities within the Project area also has the potential to impact ecological communities on both a local and regional scale. Fragmentation of a community can result in the isolation of vegetation patches both locally and regionally. Isolation of patches can decrease the amount of genetic exchange between remaining patches of vegetation by severing the small-scale potential genetic transfer mechanisms such as seed dispersal by ants and reproductive root suckering.

4.3 Flora

4.3.1 General

The proposed modifications relate to options of already approved infrastructure and may lead to reductions in clearing by approximately 7.3ha. The retained vegetation adjacent to the proposed modification areas may also be indirectly impacted due to:

- Increased runoff, erosion and sedimentation;
- Hydrological changes (e.g. increased/decreased storm water runoff from the roads and mining infrastructure);
- Weed invasion; and
- Long and short-term edge effects resulting from the clearing of vegetation (e.g. changes in light filtration).

The impact of clearing on the threatened flora species that have been recorded or have potential to occur within the modification areas is outlined in **Section 4.3.2** below.

4.3.2 Threatened Plant Species

The threatened flora species known or considered to have the potential to occur within the modification areas are similar to those within the approved disturbance area. Given there will be a reduction in clearing (if the conveyor/service corridor option is pursued), the potential for impacts on threatened flora species is likely to be less. Appropriate mitigation measures will be implemented as a result of the proposed modifications in an attempt to minimise impacts upon these species.

4.4 Fauna

4.4.1 Fauna Habitat

The proposed modifications (provided the conveyor/service corridor option is pursued) would result in a reduction of clearing of similar habitats that occur within the approved disturbance. Considering this, potential impact on fauna habitat is likely to be less. Mitigation measures are proposed such as pre-clearance surveys and re-establishment of vegetation following impacts (refer **Chapter 5** below). Clearing associated with the proposed conveyor/services corridor will be limited to a width of 30m which is not considered to be a significant barrier to the movement of fauna species and therefore the conveyor is considered unlikely to result in a significant impact upon fauna movement patterns or cause fragmentation and genetic isolation of fauna populations.

4.4.2 Threatened Fauna Species

Numerous threatened species have been recorded or are considered likely to occur within the modification areas as described in **Chapter 3**. The vegetation within the proposed modification areas is not considered to constitute habitat critical to the survival of any of the species. The proposed conveyor/services corridor will be a maximum of 30m wide and will require the clearing of approximately 16ha of forest woodland and grassland compared with approximately 23ha under the approved project. While this habitat may be utilised by many of the threatened species listed above, the removal of a 30m corridor of vegetation is not considered to constitute a significant impact as the highly mobile nature of these species will allow them to be able to continue to forage and breed in the area. A maximum width of clearing of the 30m conveyor/service corridor is not considered extensive enough to cause population and/or genetic isolation as a result of fragmentation even for species such as the squirrel glider.

Measures to mitigate the potential impacts on threatened fauna species are described in **Chapter 5** below.

4.4.3 Koala Habitat

The proposed modification areas will potentially require the clearing of Koala habitat. The area contains known primary *Eucalyptus tereticornis* (Forest Red Gum) secondary feed trees *Eucalyptus moluccana* x *albans* (Grey Box/White Box intergrades), although the primary feed tree species has not been recorded within the conveyor/services corridor. Although compared to the approved project, the proposed modifications would result in the clearing of 25.5ha of potential habitat, due to the presence of these secondary feed trees an assessment is required under State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) and the approved Recovery Plan (DECC (NSW), 2008b).

The SEPP 44 has been prepared to assist in the conservation of the Koala. The aim of SEPP 44 is to encourage the proper conservation and management of areas of natural

vegetation that provide habitat for Koalas. Schedule 1 lists the LGAs which are covered by SEPP 44, and Schedule 2 lists the feed tree species for the Koala. The Mount Pleasant Project falls within Muswellbrook LGA which is listed under Schedule 1 and schedule 2 lists *Eucalyptus albens* (White Box) as a primary feed tree. An approved Recovery Plan for the Koala has been prepared by (then) DECC (2008b). Within this plan, management areas have been delineated across NSW.

Assessments of potential impacts on Koala habitat have been made according to each of these documents below.

i. Approved Recovery Plan for the Koala (DECC (NSW) 2008b)

Koalas occur in the Muswellbrook LGA but have not been recorded within the modification areas. The approved Koala Recovery Plan (DECC (NSW), 2008b) divides NSW into a series of Koala Management Areas and the Upper Hunter Valley has forest and woodland that is intermediate between two of these areas, the Central Coast and the Northern Tablelands.

The Koala Recovery Plan mentions a suite of trees that are primary and secondary feed trees for Koalas in each management area. The proposed modification areas contain forest and woodland vegetation that includes *Eucalyptus moluccana* x *albens* (Grey Box/White Box intergrades). Both of these species are listed as secondary feed trees in the recovery plan.

The Recovery Plan provides two systems to categorise Koala habitat, which are both based upon the abundance of primary and secondary feed tree species:

- Option 1: Within the first category system the proposed conveyor/services corridor is considered Secondary Habitat (Class B) as the primary food tree species absent and secondary feed species are present. According to this category, the proposed conveyor/services corridor is capable of supporting a viable, low density population of Koalas.
- Option 2: Within the second category system, the proposed conveyor/services corridor is considered Secondary Habitat (Class C) as primary food tree species are absent and secondary feed species comprise less than 30% of the overstorey trees. According to this classification, the proposed conveyor/services corridor is considered capable of supporting a low-density Koala population.

ii. State Environmental Planning Policy No. 44 – Koala Habitat Protection

The intent of SEPP 44 is to foster conservation and management of areas of natural vegetation that provide habitat for the Koala to ensure permanent free-living populations over their present range and to reverse the current trend of population decline.

The proposed modification areas is subject to assessment under SEPP 44 because the land occurs in a LGA listed in Schedule 1 of the policy. All development applications that are in a SEPP 44 LGA and impacting areas one hectare or greater, including adjoining lands on the same holding, are required to be assessed under SEPP 44.

Assessment under SEPP 44 is based on an initial determination of whether the land constitutes potential Koala habitat. This is determined by assessing whether the eucalypt species present in Schedule 2 constitute 15% or more of the total number of trees in the upper or lower strata of the tree component. If potential Koala habitat is present, the area must be further assessed to determine if the land is core Koala habitat. The species listed in Schedule 2 present within the proposed conveyor/services corridor envelope is *Eucalyptus albens* (White Box). While the majority of suitable feed trees within the optional conveyor/services corridor are *Eucalyptus moluccana* x *albens* (Grey Box/White Box intergrades) it is considered appropriate that the area be regarded as potential Koala habitat.

Given that potential Koala habitat occurs in the optional conveyor/services corridor envelope; the policy requires that it must be determined whether the area forms core Koala habitat under the definition of SEPP 44. Core Koala habitat is defined under this legislation as

"an area of land with a resident population of Koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population".

It is unlikely that a resident population of Koalas occurs within the proposed modification areas; as no evidence of Koala use was observed during extensive field surveys since prior to 1997. There are also no historical or anecdotal records of Koalas from within the Mount Pleasant Project area and only one koala record from within 10km of the Project area (DECCW, 2010). The modification areas are not considered to be core Koala habitat as defined under SEPP 44; hence the preparation of a Koala Plan of Management is not required. SEPP 44 therefore does not place any constraints on the proposed modifications.

4.5 Streams and Wetlands

While some small ephemeral streams, periodically damp areas and farm dams will be impacted as a result of the proposed modifications, there will be minimal increased impacts upon such habitats as a result of the proposed modifications. As a result it is considered that no additional mitigation or offsetting requirements on streams and wetlands are required.

4.6 Wildlife Corridors

The vegetation in and around the modification areas is highly fragmented and has been heavily impacted by past agricultural land use. As a result the vegetation currently in the locality consists of a mosaic of areas of regrowth with the occasional old growth tree and scattered trees throughout grazing lands. This pattern in the vegetation produces little to no wildlife corridors and distinct areas of regrowth vegetation which on the larger scale are largely isolated from other areas of vegetation. The proposed modifications are not likely to have a significant impact upon fauna movement on a local or regional scale.

On a local scale the proposed conveyor/services corridor (if pursued) would fragment the vegetation through the clearing of a 30m (maximum width) corridor through of the vegetation. This corridor is not considered to be large enough to impact on the flora and fauna species of the area to cause isolation of populations, reduction in fauna movements or the reduction in the transfer of flora propagules. Re-establishment of understory species will ensure the latter two processes continue following construction of the conveyor. Again, should the conveyor/service corridor option be pursued, the approved development footprint would reduce by approximately 7.3ha and this reduces the disturbance of vegetation communities and potential impacts to wildlife corridors.

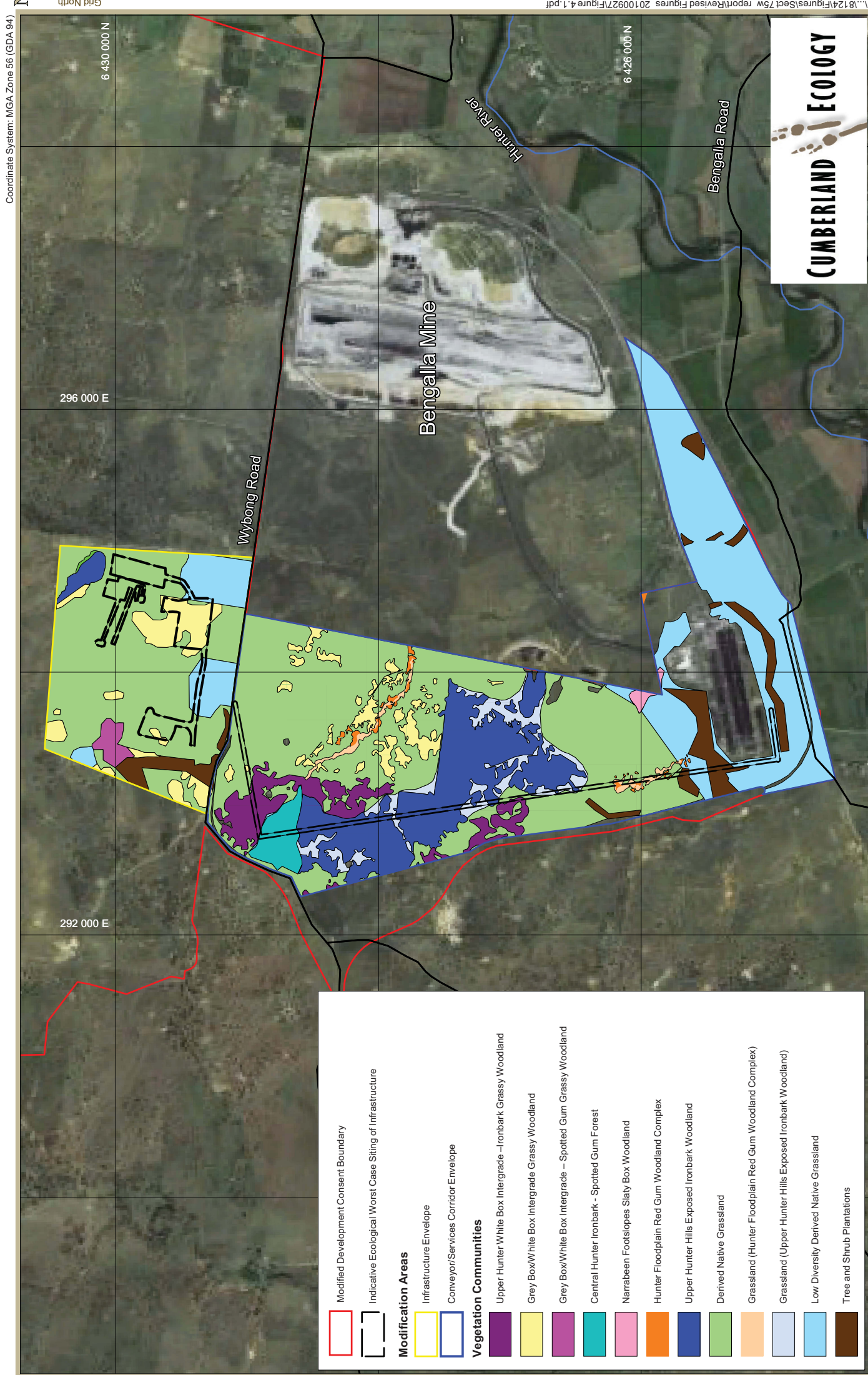


Figure 4.1. Worst case scenario of infrastructure and conveyor corridor

Mitigation Measures

5.1 Introduction

The DECCW has prepared principles for the use of biodiversity offsets DECC (NSW) (2008a). Foremost among these is the principle that impacts must be avoided first by using prevention and mitigation measures. This principle means that the ecological impacts of proposed developments should be managed as follows:

- Avoid: to the extent possible, developments should be designed to avoid or minimise ecological impacts;
- Mitigate: where certain impacts are unavoidable through design changes, mitigation measures should be introduced to ameliorate the ecological impacts of the proposed development; and
- Compensate: the residual impacts of the project should be compensated for in some way to offset what would otherwise be a net loss of habitat.

This chapter explains the way these points have been applied to manage the potential impacts of the Project.

5.2 Avoidance Measures

Avoidance measures are difficult for mining projects such as coal mines because mineral resources occur in fixed locations. Notwithstanding this the design of the approved Project was examined to see if changes to the footprint could be made to avoid potential impacts. Should the conveyor/service corridor option be pursued, the approved development footprint would reduce by approximately 7ha and therefore reduces the disturbance of vegetation communities currently listed under the TSC Act.

While the finalised locations and hence impact areas of the of the proposed modifications are yet to be finalised, avoidance of EECs and important fauna/flora habitats, where possible, will be considered high in the hierarchy of parameters to be considered in locating this infrastructure; other constraints to location of infrastructure considered will include logistical, topographic and location of residences. These avoidance measures

may enable a reduction in the worst case potential impacts on these EECs and fauna habitat.

5.3 Mitigation Measures

5.3.1 *Revegetation*

Revegetation of impacted areas will occur across the proposed modification areas where appropriate and will be implemented as soon as practically possible following impact. Revegetation will use locally sourced native plant species and where practical, topsoil will be translocated from impact areas to conserve the native seed bank of local ecological communities. This will:

- Maintain or re-establish connectivity following clearing and where the disturbance is no longer required;
- Maintain the quality and diversity of native growth in revegetation areas;
- Maximise the establishment of a diversity of native species, particularly the understorey species that maintain the ecological function of native vegetation communities; and
- Expediently replace habitat for native flora and fauna.

Details of the rehabilitation of the infrastructure area and conveyor/service corridor (should this option be pursued) upon decommissioning will be provided in the Rehabilitation and Environment Management Plan (REMP).

5.3.2 *Pre-clearance and Translocation of Threatened Species and Important Habitat Attributes*

Mitigation measures will include pre-clearance surveys of forest and woodland areas to be cleared to identify any threatened flora and fauna species or habitat within areas of impact. This process will be implemented for all clearing associated with the proposed modifications and provide an opportunity to avoid impacts to flora and fauna of conservation significance during clearing. Where it is practical, threatened species or important habitat attributes (such as sizeable logs and salvaged tree hollows) will be relocated to impacted areas to re-establish fauna habitat value within the impacted areas.

Any individuals of the threatened flora or fauna identified in areas to be cleared will be relocated to the nearest available suitable habitat, where relocation is considered appropriate.

5.3.3 Monitoring and Management

Ecological management and monitoring will be in accordance with Rio Tinto Coal Australia's Health, Safety, Environment and Quality (HSEQ) Management System, which is certified to the international standard ISO:14001(2004). The HSEQ Management System includes an environmental policy, a series of regulatory required management plans, a monitoring programme and environmental standards and procedures. It will incorporate a Flora and Fauna Management Plan (FFMP) for the Mount Pleasant Project, inclusive of the modification areas, as required under Condition 3.4 of the development consent. Plans and procedures for land use, bushfire management, erosion and sediment control, biodiversity management, disturbance and rehabilitation, and ground disturbance will also be included.

During the construction phase, pre-clearance surveys of relevant forest and woodland areas to be removed will be undertaken, for threatened flora and fauna species. Where practical, threatened species or important habitat attributes (such as sizable logs and salvaged tree hollows) will be relocated.

An ongoing monitoring programme, as per Condition 8.6 of the development consent, will be implemented for the Mount Pleasant Project, inclusive of the modification areas. Results of the monitoring will be assessed against performance criteria and key performance indicators to determine if the management objectives are being met. The monitoring programme will be regularly reviewed to ensure it remains effective. Identified monitoring locations associated with the construction and operation of the proposed modifications, will be included in the AEMR as per Condition 8.6 of the development consent.

Details of the rehabilitation of the infrastructure area and conveyor/service corridor (should this option be pursued) upon decommissioning will be provided in the Rehabilitation and Environment Management Plan.

5.4 Compensatory Measures

The modified Mount Pleasant Project will have a lesser impact than the approved project by approximately 7.3ha. As a result it is not considered necessary to provide Biodiversity Management Areas as a compensatory measure to offset any impacts. Any flora or fauna requiring relocation following pre-clearance surveys will be placed in the nearest area of suitable habitat.

Table 5.1 SUMMARY OF PROPOSED ECOLOGICALLY RELEVANT MITIGATION MEASURES

Mitigation Measures	General Ecological Benefits
Dust minimisation	Control of dust reduces the indirect impacts on vegetation condition and the habitat quality for all native species at Mount Pleasant.
Noise minimisation	Minimisation of noise benefits fauna by reducing the potential for disturbance of animals in habitat patches around the mine.
Weed control	Weed control helps to protect the integrity of native vegetation within the Mount Pleasant Project area and maintains or improves the quality of habitat for plant and animal species.
Feral animal control	Feral animal control helps to control foxes, rabbits and other feral animals that are key threats to many wildlife species.
Rehabilitation of disturbed areas	Rehabilitation of disturbed areas restores forest and woodland cover to disturbed areas and adds habitat for flora and fauna in the long term.
Linkage and integration of rehabilitation areas with existing vegetated areas to improve ecological function and provide habitat	Increases the viability of the scattered patches of habitat that occur across the lease area, connecting them and facilitating movement of native species between patches.
Creation of habitat corridors linking isolated remnant vegetation stands	Increases the viability of the scattered patches of habitat that occur across the lease area, connecting them and facilitating movement of native species between patches.

Table 5.1 SUMMARY OF PROPOSED ECOLOGICALLY RELEVANT MITIGATION MEASURES

Mitigation Measures	General Ecological Benefits
Management of surface water, erosion and sedimentation	Protects the integrity of the landscape.
Ongoing monitoring and maintenance of all revegetation works and habitat enhancement activities	Maintains the viability of the rehabilitated areas in the long term and provides feedback data that can be used for adaptive management.
Pre-clearance inspections and tree felling procedures	Provides an opportunity to avoid impacts to arboreal fauna during clearing and/or enables relocation of fauna to secure areas of vegetation.
Relocation of salvaged tree hollows and (where required) the establishment of nest boxes in adjacent vegetation communities.	Makes efficient use of tree hollows that could otherwise be destroyed. Replaces tree hollows that are to be lost from clearing operations by establishing nest boxes within secure habitat. This maintains the number of tree hollows on site in the short to medium term.
Ongoing monitoring of native flora and fauna across the Mount Pleasant Project area including the modification areas	Provides data for ongoing adaptive management of threatened and regionally significant flora and fauna.

Conclusion

The landscape of the proposed modification areas has been used for grazing since European settlement and as a result has been heavily cleared and disturbed historically. Notwithstanding this, vegetation communities listed as EECs under the TSC Act are located within the modification areas, including but not limited to; Upper Hunter White Box - Ironbark Grassy Woodland, Grey Box/White Box Intergrade Grassy Woodland, Grey Box/White Box Intergrade Spotted Gum Grassy Woodland and Derived Native Grassland (from Box-Gum Grassy Woodland),

To provide for flexibility in the detailed design of the infrastructure area and optional conveyor/service corridor, a conservative worst case approach to ecological impact assessment was adopted. Under the worst case scenario, the total modification area footprint would comprise approximately 47.5ha of vegetation clearance, versus approximately 54.8ha of clearance for the approved rail facilities and infrastructure area. The proposed worst case scenario would result in total disturbance of approximately 35.5ha of vegetation communities currently listed under the TSC Act compared with approximately 41.6ha under the approved disturbance footprint.

The DECCW principles on management of potential ecological impacts have been considered with the proposed modifications providing options that may result in an approximate 7.3ha reduction in disturbance of vegetation communities, should the conveyor/service corridor option be pursued.

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Appendix A

Flora Species List

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
Trees						
Anacardiaceae	<i>Schinus molle</i> *		x			
Arecaceae	<i>Phoenix canariensis</i> *		x			
Casuarinaceae	<i>Allocasuarina luehmannii</i>	x	x			
Loranthaceae	<i>Amyema sp.</i>	x				
	<i>Dendrophthoe vitellina</i>	x				
Myrtaceae	<i>Corymbia maculata</i>	x	x		x	x
	<i>Eucalyptus albens x moluccana</i>				x	
	<i>Eucalyptus moluccana x albens</i>	x	x		x	x
	<i>Eucalyptus blakelyi</i>	x	x			
	<i>Eucalyptus crebra</i>	x	x		x	x
	<i>Eucalyptus melliodora</i>		x			x
	<i>Eucalyptus moluccana</i>		x			
	<i>Eucalyptus moluccana x albens</i>	x	x		x	x
	<i>Eucalyptus sp.</i>		x		x	
	<i>Eucalyptus tereticornis</i>				x	
Rutaceae	<i>Geijera salicifolia</i>	x				
Sterculiaceae	<i>Brachychiton populnea</i>	x	x		x	x
Shrubs						
Apocynaceae	<i>Gomphocarpus fruticosus</i> *		x		x	x
Asteraceae	<i>Cassinia arcuata</i>	x	x			
	<i>Cassinia cunninghamii</i>	x				
	<i>Cassinia quinquefaria</i>				x	
	<i>Xanthium spinosum</i> *		x			x
Celastraceae	<i>Maytenus silvestris</i>		x			
Chenopodiaceae	<i>Atriplex semibaccata</i>		x	x		x
	<i>Atriplex sp.</i>		x			
	<i>Atriplex suberecta</i>			x		
	<i>Chenopodium sp.</i>		x			
	<i>Maireana decalvans</i>			x		
	<i>Maireana enchylaenoides</i>			x		
	<i>Maireana microphylla</i>	x	x		x	x
	<i>Sclerolaena birchii</i>	x			x	

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Sclerolaena divaricata</i>			x		
	<i>Sclerolaena sp.</i>		x			
Euphorbiaceae	<i>Phyllanthus virgatus</i>	x	x		x	x
Fabaceae	<i>Acacia leucoclada ssp leucoclada</i>		x			
	<i>Acacia paradoxa</i>	x	x		x	x
	<i>Acacia salicina</i>		x			
	<i>Acacia sp.</i>	x			x	
	<i>Indigofera australis</i>	x	x			
	<i>Zornia dyctiocarpa</i>	x	x			
	<i>Neptunia gracilis</i>		x			x
Luzuriagaceae	<i>Eustrephus latifolius</i>		x			
Malvaceae	<i>Abutilon oxycarpum</i>		x			
Myoporaceae	<i>Myoporum montanum</i>		x			
Myrtaceae	<i>Melaleuca armillaris</i>		x			
	<i>Melaleuca styphelioides</i>		x			
Oleaceae	<i>Notelaea microcarpa</i>	x	x		x	x
	<i>Notelaea microcarpa v. microcarpa</i>					x
	<i>Olea europea ssp africana*</i>		x			
Pittosporaceae	<i>Bursaria spinosa</i>	x	x			x
Rubiaceae	<i>Canthium odoratum</i>		x			
Solanaceae	<i>Lycium ferosissimum*</i>	x	x		x	x
	<i>Solanum americanum</i>			x		
	<i>Solanum brownii</i>					x
	<i>Solanum cinereum</i>	x	x	x		x
	<i>Solanum nigrum*</i>		x		x	x
	<i>Solanum opacum</i>				x	
	<i>Solanum sp.</i>				x	
	<i>Solanum stelligerum</i>	x	x			
Stackhousiaceae	<i>Stackhousia viminea</i>	x	x		x	x
Thymelaeaceae	<i>Pimelea curviflora</i>	x	x		x	
	<i>Pimelea curviflora var. sericea</i>					x
Herbs - Ferns and Allies						

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
Adiantaceae	<i>Cheilanthes distans</i>		x			x
	<i>Cheilanthes sieberi</i>	x	x	x	x	x
Herbs - Dicots						
Acanthaceae	<i>Brunoniella australis</i>	x	x		x	x
	<i>Rostellularia adscendens</i>	x	x	x	x	x
Aizoaceae	<i>Galenia pubescens*</i>	x	x	x	x	x
Amaranthaceae	<i>Alternanthera denticulata</i>					x
	<i>Alternanthera nana</i>		x			
	<i>Alternanthera nodiflora</i>		x			
	<i>Alternanthera pungens*</i>		x			
	<i>Gomphrena celosioides*</i>					x
	<i>Centella asiatica</i>				x	
Apiaceae	<i>Ciclospermum leptophyllum*</i>		x			
	<i>Conium maculatum</i>		x			
	<i>Daucus glochidiatus</i>			x	x	
	<i>Foeniculum vulgare</i>	x				x
	<i>Hydrocotyle laxiflora</i>		x	x	x	
	<i>Aster subulatus</i>					x
Asteraceae	<i>Asteraceae sp.</i>		x		x	
	<i>Bidens pilosa*</i>		x		x	
	<i>Bidens subalternans</i>		x			
	<i>Brachycome sp.</i>		x			x
	<i>Calotis cuneifolia</i>				x	
	<i>Calotis lappulacea</i>	x	x	x	x	x
	<i>Carthamus lanatus*</i>	x	x	x	x	x
	<i>Chrysocephalum apiculatum</i>	x	x	x	x	x
	<i>Chrysocephalum semipapposum</i>				x	x
	<i>Cirsium vulgare*</i>		x		x	x
	<i>Conyza bonariensis*</i>			x		
	<i>Conyza sp.*</i>		x		x	x
	<i>Cotula australis</i>	x	x			
	<i>Crassula sp.</i>	x				
	<i>Cymbonotus lawsonianus</i>		x	x		

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Cymbopogon refractus</i>	x	x	x	x	x
	<i>Cynodon dactylon</i> *		x	x	x	x
	<i>Euchiton gymnocephalus</i>			x		
	<i>Euchiton sphaericus</i>				x	
	<i>Glossogyne tannensis</i>	x	x		x	x
	<i>Gnaphalium sp.</i>				x	
	<i>Gnaphalium sphaericum</i>			x		
	<i>Hypochaeris microcephala</i> *		x			
	<i>Hypochaeris radicata</i> *		x		x	x
	<i>Lactuca saligna</i> *				x	
	<i>Podolepis jaceoides</i>					x
	<i>Schkuhria pinnata var abrotanoides</i> *		x			
	<i>Senecio madagascariensis</i> *	x	x	x	x	x
	<i>Senecio quadridentatus</i>				x	
	<i>Silybum marianum</i>		x			
	<i>Solenogyne bellioides</i>	x	x		x	
	<i>Solenogyne bellioides/dominii</i>		x			
	<i>Soliva sp.</i> *		x		x	
	<i>Sonchus asper</i> *				x	
	<i>Sonchus oleraceus</i> *	x	x		x	
	<i>Tagetes minuta</i> *					x
	<i>Taraxacum officinale</i> *		x		x	
	<i>Vernonia cinerea</i>		x		x	x
	<i>Veronica plebiea</i>	x	x		x	x
	<i>Vittadinia spp.</i>	x	x		x	x
	<i>Vittadinia cuneata</i>		x	x	x	x
	<i>Vittadinia cuneifolia</i>	x	x			
	<i>Vittadinia muelleri</i>			x		
	<i>Vittadinia pterochaeta</i>			x		
Boraginaceae	<i>Cynoglossum australe</i>					x
	<i>Heliotropium amplexicaule</i> *		x			
Brassicaceae	<i>Brassica sp.</i> *		x			
	<i>Lepidium bonariense</i> *		x		x	
	<i>Lepidium pseudohyssopifolium</i>		x		x	x

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
Campanulaceae	<i>Lepidium sp.</i>	x	x			
	<i>Lepidium virginicum</i>		x			
	<i>Wahlenbergia communis</i>		x			
	<i>Wahlenbergia gracilis</i>		x		x	
	<i>Wahlenbergia sp</i>		x	x		
Caryophyllaceae	<i>Wahlenbergia stricta</i>				x	
	<i>Cerastium glomeratum*</i>		x			
	<i>Paronychia brasilliana</i>	x			x	
	<i>Petrorrhagia dubia</i>				x	
	<i>Petrorrhagia nanteuillii</i>	x				
Chenopodiaceae	<i>Polycarpon tetraphyllum</i>	x			x	
	<i>Spergularia rubra*</i>		x	x		
	<i>Stellaria media</i>		x			
	<i>Chenopodium carinatum</i>			x		
	<i>Chenopodium glaucum</i>		x			
	<i>Chenopodium pumilio</i>		x			
	<i>Einadia hastata</i>			x	x	x
	<i>Einadia nutans</i>	x	x	x	x	x
	<i>Einadia nutans ssp linifolia</i>		x	x		
	<i>Einadia nutans/polygonoides</i>		x		x	x
	<i>Einadia polygonoides</i>					x
	<i>Einadia trigonos</i>	x	x		x	x
	<i>Enchylena tomentosa</i>		x			x
	<i>Salsola tragus</i>			x		
Clusiaceae	<i>Hypericum Gramineum</i>				x	
	<i>Hypericum Perforatum</i>				x	
Convolvulaceae	<i>Dichondra repens</i>	x	x	x	x	x
Euphorbiaceae	<i>Chamaesyce dallachyana</i>			x		
	<i>Chamaesyce drummondii</i>	x	x		x	x
	<i>Chamaesyce sp.</i>		x			
Fabaceae	<i>Desmodium varians</i>	x	x		x	x
	<i>Medicago polymorpha*</i>				x	x
	<i>Trifolium dubium*</i>				x	
	<i>Desmodium brachypodum</i>	x	x			x

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Medicago sativa</i> *					x
	<i>Medicago sp.</i> *	x	x			
	<i>Pultenaea sp.</i>			x		
	<i>Swainsona galegifolia</i>				x	
	<i>Trifolium repens</i> *		x		x	
	<i>Trifolium sp.</i> *				x	
Gentianaceae	<i>Centaurium erythraea</i>				x	
	<i>Centaurium sp.</i>		x			
Geraniaceae	<i>Erodium crinitum</i>	x	x	x		
	<i>Geranium solanderi</i>			x	x	x
	<i>Geranium sp.</i>		x			
	<i>Pelargonium australe</i>					x
	<i>Pelargonium sp.</i>			x		
Goodeniaceae	<i>Goodenia pinnatifida</i>			x		
	<i>Goodenia rotundifolia</i>					x
Lamiaceae	<i>Ajuga australis</i>	x	x		x	
	<i>Marrubium vulgare</i>				x	
	<i>Mentha satureioides</i>		x	x	x	x
	<i>Salvia verbenaca</i> *	x	x			
Linaceae	<i>Linum trigynum</i> *				x	
Lobeliaceae	<i>Pratia purpurascens</i>				x	x
Malvaceae	<i>Malva parviflora</i> *		x			
	<i>Modiola caroliniana</i> *		x		x	x
	<i>Sida corrugata</i>	x	x	x	x	x
	<i>Sida cunninghamii</i>	x	x			x
	<i>Sida filiformis</i>					x
	<i>Sida rhombifolia</i> *	x	x	x	x	x
	<i>Sida sp.</i>					x
Myoporaceae	<i>Eremophila debilis</i>	x	x	x	x	x
Myrsinaceae	<i>Anagallis arvensis</i> *	x	x	x	x	x
Nyctaginaceae	<i>Boerhavia dominii</i>					x
Oxalidaceae	<i>Oxalis corniculata</i>		x			
	<i>Oxalis exilis</i>		x		x	
	<i>Oxalis perennans</i>		x	x	x	x

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Oxalis sp.</i>	x	x		x	
Phyllanthaceae	<i>Poranthera microphylla</i>				x	x
Plantaginaceae	<i>Plantago debilis</i>	x	x		x	x
	<i>Plantago gaudichaudii</i>				x	
	<i>Plantago lanceolata*</i>	x	x		x	x
Polygonaceae	<i>Polygonum aviculare*</i>		x			
	<i>Polygonum plebeium</i>			x		
	<i>Rumex brownii</i>	x	x	x	x	x
Portulacaceae	<i>Portulaca oleracea</i>		x			x
Rosaceae	<i>Acaena sp.</i>		x			
	<i>Rosa rubiginosa*</i>		x			
Rubiaceae	<i>Asperula conferta</i>	x	x	x	x	x
	<i>Psyrdrax odoratum</i>				x	
	<i>Richardia stellaris*</i>	x	x			x
Scrophulariaceae	<i>Verbascum virgatum*</i>		x			
Urticaceae	<i>Urtica dioica*</i>				x	
Verbenaceae	<i>Glandularia aristigera*</i>			x		
	<i>Verbena officinalis*</i>				x	
	<i>Verbena bonariensis</i>					x
	<i>Verbena bonariensis/rigida</i>				x	
	<i>Verbena rigida</i>					x
	<i>Verbena sp.*</i>		x			x
	<i>Verbena tenuisecta*</i>		x			
Zygophyllaceae	<i>Tribulus terrestris*</i>					x
Viscaceae	<i>Notothixos cornifolius</i>		x			
Herbs - Monocots						
Anthericaceae	<i>Arthropodium milleflorum</i>				x	
	<i>Arthropodium sp.</i>	x	x			
	<i>Dichopogon fimbriatus</i>				x	
	<i>Tricoryne simplex</i>		x			
Asphodelaceae	<i>Asphodelus fistulosus*</i>				x	
	<i>Bulbine sp.</i>			x		
Cactaceae	<i>Opuntia spp.*</i>	x	x			

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Opuntia stricta</i> *					x
Cyperaceae	<i>Carex inversa</i>		x	x	x	x
	<i>Cyperus gracilis</i>	x	x		x	x
	<i>Cyperus sp.</i>					x
	<i>Fimbristylis dichotoma</i>		x			x
	<i>Scleria mackaviensis</i>	x	x			
Hypoxidaceae	<i>Hypoxis hygrometrica</i>					x
Iridaceae	<i>Romulea rosea</i> *		x			
Juncaceae	<i>Juncus subsecundus</i>				x	
Lomandraceae	<i>Lomandra filiformis</i>			x		
	<i>Lomandra filiformis ssp coriacea</i>	x	x			
	<i>Lomandra filiformis ssp filiformis</i>				x	x
	<i>Lomandra multiflora</i>	x	x	x	x	x
	<i>Lomandra sp.</i>				x	
Orchidaceae	<i>Cymbidium canaliculatum</i>		x			
Phormiaceae	<i>Dianella longifolia</i>		x		x	
	<i>Dianella revoluta</i>					x
	<i>Dianella sp.</i>				x	
Poaceae	<i>Aristida jerichoensis</i> †				x	
	<i>Aristida ramosa</i>	x	x	x	x	x
	<i>Aristida sp.</i>		x			x
	<i>Aristida vagans</i>		x			
	<i>Austrodanthonia bipartita</i>			x		
	<i>Austrodanthonia caespitosa</i>					x
	<i>Austrodanthonia fulva</i>				x	
	<i>Austrodanthonia racemosa</i>	x	x		x	
	<i>Austrodanthonia sp.</i>	x				x
	<i>Austrodanthonia tenuior</i>		x			
	<i>Austrostipa aristiglumis</i>			x		
	<i>Austrostipa scabra</i>				x	x
	<i>Austrostipa sp.</i>				x	
	<i>Austrostipa verticillata</i>			x	x	x
	<i>Axonopus fissifolius</i> (syn. <i>A. affinis</i>)*				x	
	<i>Bothriochloa biloba</i>		x	x	x	

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Bothriochloa decipiens</i>					X
	<i>Bothriochloa decipiens/macra</i>	X	X	X	X	
	<i>Bothriochloa macra</i>					X
	<i>Bromus catharticus</i> *				X	X
	<i>Chloris acicularis</i>		X			
	<i>Chloris truncata</i>		X	X	X	X
	<i>Chloris ventricosa</i>	X	X	X	X	X
	<i>Danthonia linkii</i>		X			
	<i>Dichanthium sericeum</i>		X	X	X	X
	<i>Dichelachne micrantha</i>		X			
	<i>Dichelachne sp.</i>				X	X
	<i>Digitaria brownii</i>		X	X		
	<i>Digitaria divaricatissima</i>		X	X		
	<i>Digitaria sp.</i>	X	X		X	
	<i>Echinochloa crus-gali</i> *					X
	<i>Echinochloa sp.</i>					X
	<i>Ehrharta erecta</i>	X				
	<i>Eleusine tristachya</i> *					X
	<i>Elymus scaber</i>	X	X		X	
	<i>Enteropogon acicularis</i>	X	X			
	<i>Eragrostis leptostachya</i>	X	X	X		X
	<i>Eragrostis sp.</i>		X			
	<i>Eriochloa pseudoacrotricha</i>		X	X		
	<i>Eulalia aurea (syn. E. fulva)</i>					X
	<i>Lachnagrostis filiformis</i>				X	X
	<i>Microlaena stipoides</i>	X	X		X	X
	<i>Panicum effusum</i>		X		X	X
	<i>Panicum queenslandicum</i>		X			
	<i>Panicum sp.</i>			X		
	<i>Paspalidium aversum</i>		X			
	<i>Paspalidium distans</i>				X	X
	<i>Paspalidium gracile</i>		X			
	<i>Paspalidium sp.</i>	X				
	<i>Paspalum dilatatum</i> *		X		X	X

Table A.1 FLORA SPECIES RECORDED IN THE MOUNT PLEASANT PROJECT AREA

Family	Species	2006 CE	2007 CE	2008 Envirofactor	2009 CE	2010 CE
	<i>Paspalum sp.</i>					x
	<i>Pennisetum clandestinum</i>		x			
	<i>Pennisetum villosum</i>		x			
	<i>Poa sieberiana</i>	x				x
	<i>Poa sp.</i>				x	
	<i>Poaceae spp.</i>	x				x
	<i>Setaria parviflora</i> (syn. <i>S. gracilis</i>)*					x
	<i>Sorghum sp.</i>					x
	<i>Sporobolus creber</i>	x	x	x	x	x
	<i>Sporobolus sp.</i>				x	x
	<i>Stipa scabra</i>	x	x			
	<i>Stipa verticillata</i>	x	x			
	<i>Themeda australis</i>				x	
Vines/Creepers						
Bignoniaceae	<i>Pandorea pandorana</i>		x			
Commelinaceae	<i>Commelina cyanea</i>		x			x
Convolvulaceae	<i>Convolvulus erubescens</i>		x	x	x	x
Fabaceae	<i>Glycine clandestina</i>			x	x	x
	<i>Glycine microphylla</i>		x			x
	<i>Glycine sp.</i>	x	x			
	<i>Glycine tabacina</i>	x	x		x	x
	<i>Hardenbergia violacea</i>				x	

*denotes exotic species

Appendix B

Fauna Species List

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
Amphibians								
Hylidae	<i>Litoria latopalmata</i>	Broad-palmed Frog	P				x	
Myobatrachidae	<i>Crinia signifera</i>	Common Eastern Froglet	P			x		
	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog	P				x	
Aves								
Acanthizidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill	P			x	x	x
	<i>Acanthiza lineata</i>	Striated Thornbill	P			x		
	<i>Acanthiza nana</i>	Yellow Thornbill	P			x	x	x
	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill	P			x	x	x
	<i>Gerygone fusca</i>	Western Gerygone	P			x		
	<i>Gerygone albogularis</i>	White-throated Gerygone	P				x	x
	<i>Smicromis brevirostris</i>	Weebill	P			x	x	x
Accipitridae	<i>Accipiter fasciatus</i>	Brown Goshawk	P				x	
	<i>Aquila audax</i>	Wedge-tailed Eagle	P		x	x	x	
	<i>Elanus axillaris</i>	Black-shouldered Kite	P		x		x	
	<i>Haliastur sphenurus</i>	Whistling Kite	P				x	

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owlet-nightjar	P				X	
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra	P		X	X	X	
	<i>Todiramphus sanctus</i>	Sacred Kingfisher	P			X	X	
Anatidae	<i>Anas gracilis</i>	Grey Teal	P		X			
	<i>Anas superciliosa</i>	Pacific Black Duck	P			X		
	<i>Chenonetta jubata</i>	Australian Wood Duck	P		X	X	X	
	<i>Egretta novaehollandiae</i>	White-faced Heron	P		X	X	X	
Artamidae	<i>Artamus cyanopterus</i>	Dusky Woodswallow	P			X	X	
	<i>Cracticus nigrogularis</i>	Pied Butcherbird	P		X	X	X	X
	<i>Cracticus torquatus</i>	Grey Butcherbird	P			X	X	X
	<i>Gymnorhina tibicen</i>	Australian Magpie	P		X	X	X	X
	<i>Strepera graculina</i>	Pied Currawong	P				X	X
Cacatuidae	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	P		X	X	X	X
	<i>Eolophus roseicapillus</i>	Galah	P		X	X	X	X
	<i>Nymphicus hollandicus</i>	Cockatiel	P				X	
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	P			X	X	X
	<i>Coracina tenuirostris</i>	Cicadabird	P			X		
	<i>Lalage sueurii</i>	White-winged Triller	P			X	X	
Charadriidae	<i>Vanellus miles</i>	Masked Lapwing	P			X	X	

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
	<i>Vanellus tricolor</i>	Banded Lapwing	P		x			
Climacteridae	<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V				x	
	<i>Cormobates leucophaea</i>	White-throated Treecreeper	P			x	x	x
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon	P		x	x	x	x
	<i>Phaps chalcoptera</i>	Common Bronzewing	P				x	
Coraciidae	<i>Eurystomus orientalis</i>	Dollarbird	P			x	x	x
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Chough	P		x	x	x	
Corvidae	<i>Corvus coronoides</i>	Australian Raven	P		x	x	x	x
	<i>Corvus mellori</i>	Little Raven	P				x	
	<i>Cacomantis pallidus</i>	Pallid Cuckoo	P			x		x
	<i>Cacomantis variolosus</i>	Brush Cuckoo	P					x
	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo	P			x		
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird	P			x	x	
	<i>Grallina cyanoleuca</i>	Magpie-lark	P			x	x	x
	<i>Myiagra inquieta</i>	Restless Flycatcher	P				x	
	<i>Myiagra rubecula</i>	Leaden Flycatcher	P			x	x	
	<i>Rhipidura albiscapa</i>	Grey Fantail	P		x	x	x	x
	<i>Rhipidura leucophrys</i>	Willie Wagtail	P		x	x	x	x
	<i>Neochmia temporalis</i>	Red-browed Finch	P			x		

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
Falconidae	<i>Stagonopleura guttata</i>	Diamond Firetail	V				x	
	<i>Taeniopygia bichenovii</i>	Double-barred Finch	P			x	x	
	<i>Falco berigora</i>	Brown Falcon	P			x	x	
	<i>Falco cenchroides</i>	Nankeen Kestrel	P		x	x	x	
	<i>Falco longipennis</i>	Australian Hobby	P				x	
	<i>Falco peregrinus</i>	Peregrine Falcon	P				x	
	<i>Falco subniger</i>	Black Falcon	P				x	
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow	P		x	x	x	
	<i>Hirundo rustica</i>	Barn Swallow	P	M	x			
	<i>Petrochelidon ariel</i>	Fairy Martin	P			x		
	<i>Petrochelidon nigricans</i>	Tree Martin	P			x	x	
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren	P		x	x	x	x
Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater	P			x		
	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	P				x	
	<i>Manorina melanocephala</i>	Noisy Miner	P		x	x	x	x
	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater	P			x	x	x
	<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater	V					x
	<i>Philemon corniculatus</i>	Noisy Friarbird	P			x	x	x
	<i>Anthus novaeseelandiae</i>	Australasian Pipit	P			x	x	

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	V			x		
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole	P			x		x
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler	P			x	x	
Pardalotidae	<i>Chthonicola sagittata</i>	Speckled Warbler	P			x	x	x
	<i>Pardalotus punctatus</i>	Spotted Pardalote	P			x	x	
	<i>Pardalotus striatus</i>	Striated Pardalote	P			x	x	x
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin	P				x	
	<i>Microeca fascinans</i>	Jacky Winter	P				x	
	<i>Petroica goodenovii</i>	Red-capped Robin	P			x		x
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth	P		x		x	
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe	P				x	
Pomatostomidae	<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V			x		
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot	P				x	x
	<i>Aprosmictus erythropterus</i>	Red-winged Parrot	P					x
	<i>Cacatua sanguinea</i>	Little Corella	P			x		
	<i>Glossopsitta concinna</i>	Musk Lorikeet	P				x	x
	<i>Platycercus adscitus eximius</i>	Eastern Rosella	P		x	x	x	
	<i>Platycercus elegans</i>	Crimson Rosella	P				x	
	<i>Psephotus haematonotus</i>	Red-rumped Parrot	P				x	

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook	P				x	
	<i>Tyto alba</i>	Barn Owl	P		x		x	
Sturnidae	<i>*Sturnus tristis</i>	Common Myna	U		x		x	x
	<i>*Sturnus vulgaris</i>	Common Starling	U			x	x	
Sylviidae	<i>Cincloramphus mathewsi</i>	Rufous Songlark	P				x	
Threskiornithidae	<i>Platalea flavipes</i>	Yellow-billed Spoonbill	P		x			
	<i>Threskiornis aethiopicus</i>	Sacred Ibis	P	M	x			
Turnicidae	<i>Turnix varia</i>	Painted Button-quail	P				x	
Zosteropidae	<i>Zosterops lateralis</i>	Silvereve	P				x	
Mammals								
Canidae	<i>Canis lupus familiaris*</i>	Dog	U			x		
	<i>Vulpes vulpes*</i>	Fox	U		x	x	x	x
Dasyuridae	<i>Antechinus flavipes</i>	Yellow-footed Antechinus	P				x	
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tailed Bat	V				x	
Felidae	<i>Felis catus*</i>	Cat	U			x		
Leporidae	<i>Lepus capensis*</i>	Brown Hare	U		x		x	
	<i>Oryctolagus cuniculus*</i>	Rabbit	U		x	x	x	x
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo	P		x	x	x	x

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
	<i>Macropus rufogriseus</i>	Red-necked Wallaby	P			x	x	
	<i>Macropus robustus</i>	Common Wallaroo	P				x	x
	<i>Wallabia bicolor</i>	Swamp Wallaby	P				x	
Molossidae	<i>Mormopterus "Species 4"</i>	Undescribed Freetail Bat	P			x		
	<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V			x		
	<i>Tadarida australis</i>	White-striped Freetail-bat	P			x	x	
Muridae	<i>Mus musculus*</i>	House Mouse	U			x	x	
	<i>Rattus fuscipes</i>	Bush Rat	P				x	
	<i>Rattus rattus*</i>	Black Rat	U			x	x	
Petauridae	<i>Petaurus breviceps</i>	Sugar Glider	P		x		x	
	<i>Petaurus norfolcensis</i>	Squirrel Glider	V				x	
Pteropodidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V			x	
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum	P		x	x	x	
Tachyglossidae	<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	P		x			
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	P			x	x	
	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	P			x	x	
	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V				x ^p	
	<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V			x	x	
	<i>Myotis macropus</i>	Large-footed Myotis	V				x	

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
	<i>Nyctophilus sp.</i>	Unidentified Long-eared bat	P			x	x	
	<i>Scotorepens orion</i>	Eastern Broad-nosed Bat	P			x		
	<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V				x ^p	
	<i>Vespadelus regulus</i>	Southern Forest Bat	P			x		
	<i>Vespadelus sp.</i>	Unidentified Forest Bat	P				x	
	<i>Vespadelus vulturnus</i>	Little Forest Bat	P			x	x	
Reptiles								
Agamidae	<i>Pogona barbata</i>	Bearded Dragon	P			x	x	x
Elapidae	<i>Furina diadema</i>	Red-naped Snake	P				x	
	<i>Pseudechis porphyriacus</i>	Red-bellied Black Snake	P			x		
	<i>Pseudonaja textilis</i>	Eastern Brown Snake	P			x		
Scincidae	<i>Acritoscincus platynota</i>	Red-throated Skink	P			x		
	<i>Carlia tetradactyla</i>	Southern Rainbow-skink	P			x	x	
	<i>Cryptoblepharus virgatus</i>	Cream-striped Shinning-skink	P			x	x	
	<i>Egernia striolata</i>	Tree Skink	P			x	x	x
	<i>Lampropholis delicata</i>	Dark-flecked Garden Sunskink	P			x		
	<i>Morethia boulengeri</i>	South-eastern Morethia Skink	P				x	
	<i>Saiphos equalis</i>	Three-toed Skink	P			x		

Table B.1 FAUNA SPECIES RECORDED WITHIN THE MOUNT PLEASANT PROJECT AREA

Family	Scientific Name	Common Name	TSC Act Status	EPBC Act Status	CE 1997	CE 2006	CE 2009	CE 2010
	<i>Tiliqua scincoides</i>	Eastern Blue-tongue	P			x	x	
Varanidae	<i>Varanus varius</i>	Lace Monitor	P			x	x	x

Notes:

V = Vulnerable under the TSC and EPBC Acts

P = Protected under the TSC Act

M = Migratory under the EPBC Act

U = Unprotected under legislation

Appendix C

Survey effort within the Mount Pleasant
Project area in comparison to DECCW
threatened species survey guidelines

Table C.1 MINIMUM RECOMMENDED DEC (2004) FAUNA SURVEY REQUIREMENTS AND TOTAL FAUNA SURVEY EFFORT WITHIN MOUNT PLEASANT PROJECT AREA

Survey Technique	Minimum DEC (2004) effort required for wooded regions of the Mount Pleasant Project area (~900ha)	Total survey effort for the wooded regions of the Mount Pleasant Project area (900ha)
Amphibians		
Systematic day habitat search	1 hour	5 hours
Night habitat search of damp and watery sites	2 x 30 minutes on 2 separate nights	5 hours (over 4 separate nights)
Nocturnal call playback	At least one playback on each of two separate nights	3 nights
Night watercourse search	Two hours per 200m of water body edge	2 hours
<i>Adequacy of Survey for Amphibians</i>		Yes
Reptiles		
Habitat search	10 x 30 minute searches (2 x 30 minutes on 5 separate days)	18 x 30 minute searches (across 8 separate days)
Pitfall traps with drift nets	120 trap nights (30 traps for 4 nights)	150 trap nights
Spotlighting	10 x 30 minutes (2 x 30 minutes on 5 separate days)	2.5 hours (across five separate nights)
<i>Adequacy of Survey for Reptiles</i>		Yes, given the potential threatened fauna likely to occur in the Mount Pleasant Project area
Diurnal Birds		
Area search	Species-time curve approach	7 days with species-time curve approach + an

Table C.1 MINIMUM RECOMMENDED DEC (2004) FAUNA SURVEY REQUIREMENTS AND TOTAL FAUNA SURVEY EFFORT WITHIN MOUNT PLEASANT PROJECT AREA

Survey Technique	Minimum DEC (2004) effort required for wooded regions of the Mount Pleasant Project area (~900ha)	Total survey effort for the wooded regions of the Mount Pleasant Project area (900ha)
Water source census	A 20-minute census at dawn or dusk, for each identified water source	additional 4 hours 30 minutes at one well-forested water source
<i>Adequacy of Survey for Diurnal Birds</i>		Yes
Nocturnal Birds		
Call playback	Species dependant; up to 8 separate nights per site	9 nights (30 minutes each night, 1 site per night)
Day habitat search	Throughout survey period	Throughout survey period
<i>Adequacy of Survey for Nocturnal Birds</i>		Yes
Non-Flying Mammals		
Small Elliott traps	1000 trap nights (250 traps over 4 nights)	500 trap nights
Large Elliott traps	1000 trap nights (250 traps over 4 nights)	-
Arboreal Elliott traps	240 trap nights (60 traps across 4 nights)	510 trap nights
Wire cage traps	240 trap nights (60 traps across 4 nights)	3 nights
Pitfall traps with drift nets	240 trap nights (60 traps across 4 nights)	150 trap nights
Terrestrial Hair tubes	800 trap nights (200 hairtubes for 4 nights)	3,001 trap nights
Arboreal hair tubes	1,200 trap nights (300 hairtubes for 4 nights)	1,350 trap nights
Spotlighting on foot	10 x 1 hour (2 x 1 hour on 5 separate nights)	20 hours (10 x 2 hours per night on 10 separate nights) + 3 additional nights

Table C.1 MINIMUM RECOMMENDED DEC (2004) FAUNA SURVEY REQUIREMENTS AND TOTAL FAUNA SURVEY EFFORT WITHIN MOUNT PLEASANT PROJECT AREA

Survey Technique	Minimum DEC (2004) effort required for wooded regions of the Mount Pleasant Project area (~900ha)	Total survey effort for the wooded regions of the Mount Pleasant Project area (900ha)
Spotlighting from vehicle	10 x 1 hour (2 x 1 hour on 5 separate nights)	5 hours (5 x 1 hours per night)
Call playback	10 sites for 2 nights each	9 nights
Search for scats and signs	2.5 hours	3 hours
IR cameras	-	12 survey nights
Collection of predator scats	Throughout survey period	Throughout survey period
<i>Adequacy of Survey for Non-flying Mammals</i>		<i>Yes, given the potential threatened fauna likely to occur in the Mount Pleasant Project area</i>
Bats		
Harp trapping	40 trap nights	48 trap nights
Ultrasonic call recording	20 sites for 2 nights each	14 nights
Trip lining	-	-
Day habitat search	Throughout survey period	Throughout survey period
<i>Adequacy of Survey for Bats</i>		<i>Yes given the number of harp trapping nights undertaken within the Mount Pleasant Project area</i>

