

MACHEnergy

MOUNT PLEASANT OPERATION
MINE OPTIMISATION
MODIFICATION

**Environmental
Assessment**

31 May 2017

NSW Department of Planning and Environment
GPO Box 39
Sydney NSW 2001

Attention: Oliver Holm,
Executive Director, Resources Assessments and Compliance

Dear Oliver,

RE: MOUNT PLEASANT OPERATION DA92/97 - MODIFICATION 3 ENVIRONMENTAL ASSESSMENT

The enclosed Environmental Assessment for the Mount Pleasant Operation Mine Optimisation Modification has been prepared for MACH Energy Australia Pty Ltd (MACH Energy) by Resource Strategies Pty Ltd.

MACH Energy believes the Environmental Assessment represents an accurate statement of MACH Energy's development intentions and commitments in regard to environmental management and monitoring for the Mount Pleasant Operation Mine Optimisation Modification.

Yours sincerely,



Scott Winter

Mount Pleasant Operation – Managing Director

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1 INTRODUCTION

MACH Energy Australia Pty Ltd (MACH Energy) acquired the Mount Pleasant Operation from Coal and Allied Operations Pty Ltd (Coal & Allied) on 4 August 2016.

The approved Mount Pleasant Operation includes the construction and operation of an open cut coal mine and associated infrastructure located approximately 3 kilometres (km) north west of Muswellbrook in the Upper Hunter Valley of New South Wales (NSW) (Figures 1 and 2).

The Mount Pleasant Operation is currently being constructed by MACH Energy and will operate in accordance with a Development Consent granted by the (then) NSW Minister for Urban Affairs and Planning on 22 December 1999 (Development Consent DA 92/97), as subsequently modified (Section 2.1).

This document is an Environmental Assessment (EA) for a proposed modification to the active Mount Pleasant Operation (the Modification).

1.1 OVERVIEW OF THE MOUNT PLEASANT OPERATION

The Mount Pleasant Operation is located in a significant mining region of the Sydney Basin (Figures 1 and 2) that includes a wide range of existing operational coal mines and a number of proposed coal mining projects.

The Mount Pleasant Operation Mining Leases (MLs) are wholly located within the Muswellbrook Local Government Area (LGA), north west of Muswellbrook (Figure 2).

Kayuga is located immediately to the north east of the mine and the town of Aberdeen is located further north east, in the Upper Hunter LGA, on the eastern side of the Hunter River (Figure 2).

The town of Denman is also located some 18 km to the south west near the confluence of the Hunter and Goulburn Rivers (Figure 2).

When Development Consent DA 92/97 was granted in 1999, the mine was permitted to carry out mining operations for a period of 21 years from the date of the granting of the development consent.

This was reflected by Condition 5, Schedule 2 of Development Consent DA 92/97 that permitted mining operations until 22 December 2020.

Development Consent DA 92/97 was subsequently modified by Coal & Allied in 2011 (Section 2.1). However, the time limit on mining operations was not updated to reflect that mining had not commenced at that time.

The Mount Pleasant Operation was also determined to be a Controlled Action in 2011 and was subsequently approved under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) in 2012 (EPBC 2011/5795). This EPBC Act approval remains in effect until October 2035¹ (i.e. approximately 18 years).

When the Mount Pleasant Operation was purchased by MACH Energy from Coal & Allied, only limited construction activities had been undertaken (e.g. a dam, access tracks, etc.) and no mining operations had been conducted at the site.

Construction of the Mount Pleasant Operation re-commenced in November 2016, and the mine is approved to produce up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal.

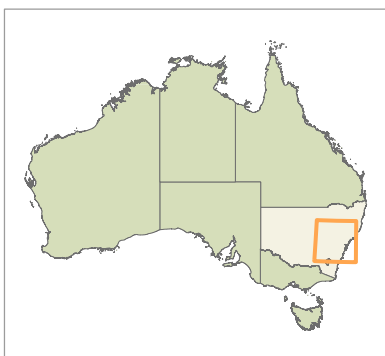
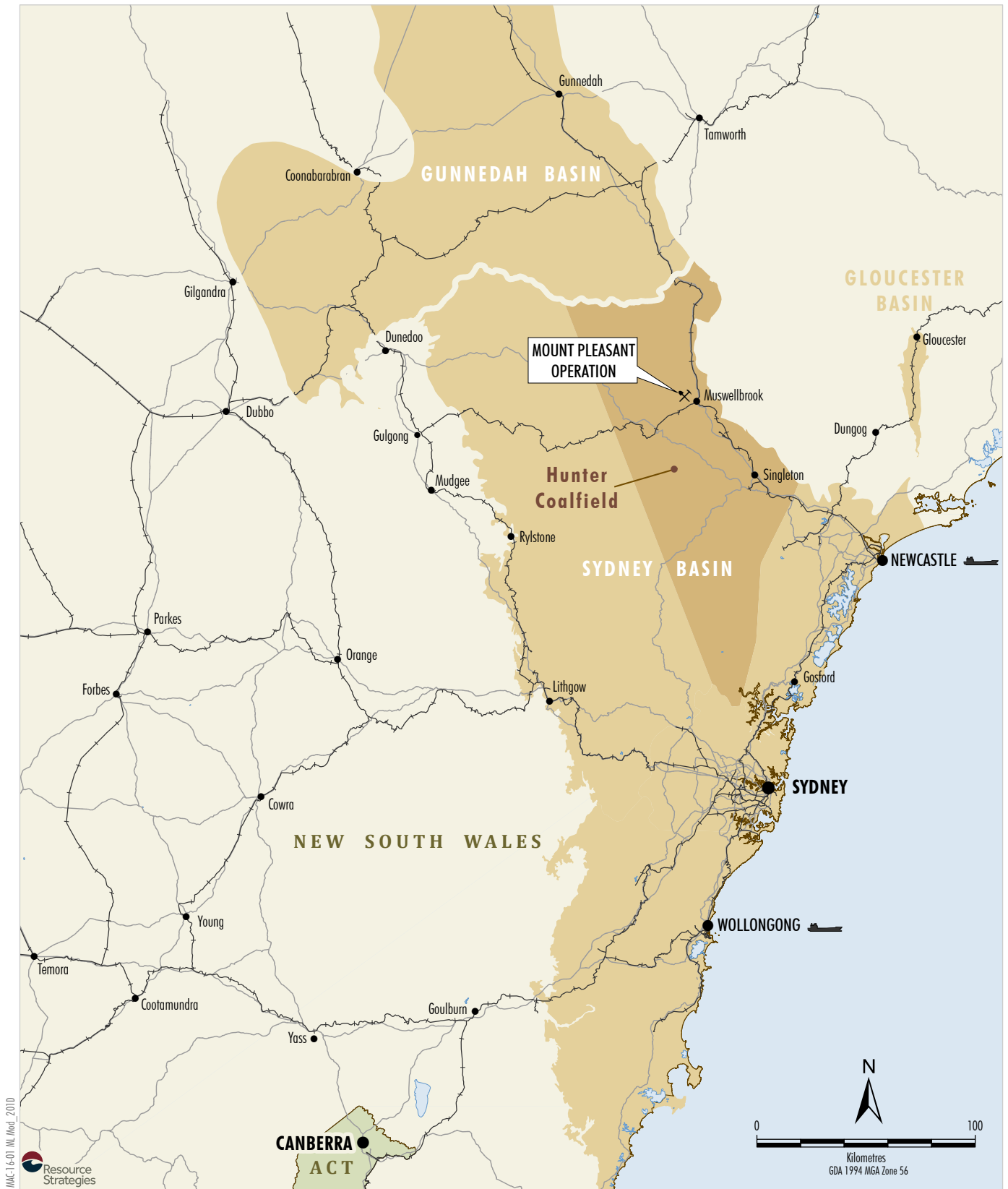
In March 2017 MACH Energy also sought and obtained a minor modification to Development Consent DA 92/97 for the relocation of the South Pit haul road. At this time the Department of Planning and Environment (DPE) made some other minor amendments to contemporise some conditions (Attachment 1).

MACH Energy will commence waste rock and ROM coal mining operations in 2017 in accordance with Development Consent DA 92/97 and Commonwealth Approval EPBC 2011/5795.

Up to approximately nine trains per day of thermal coal products from the Mount Pleasant Operation will be transported by rail to the port of Newcastle for export or to domestic customers for use in electricity generation.

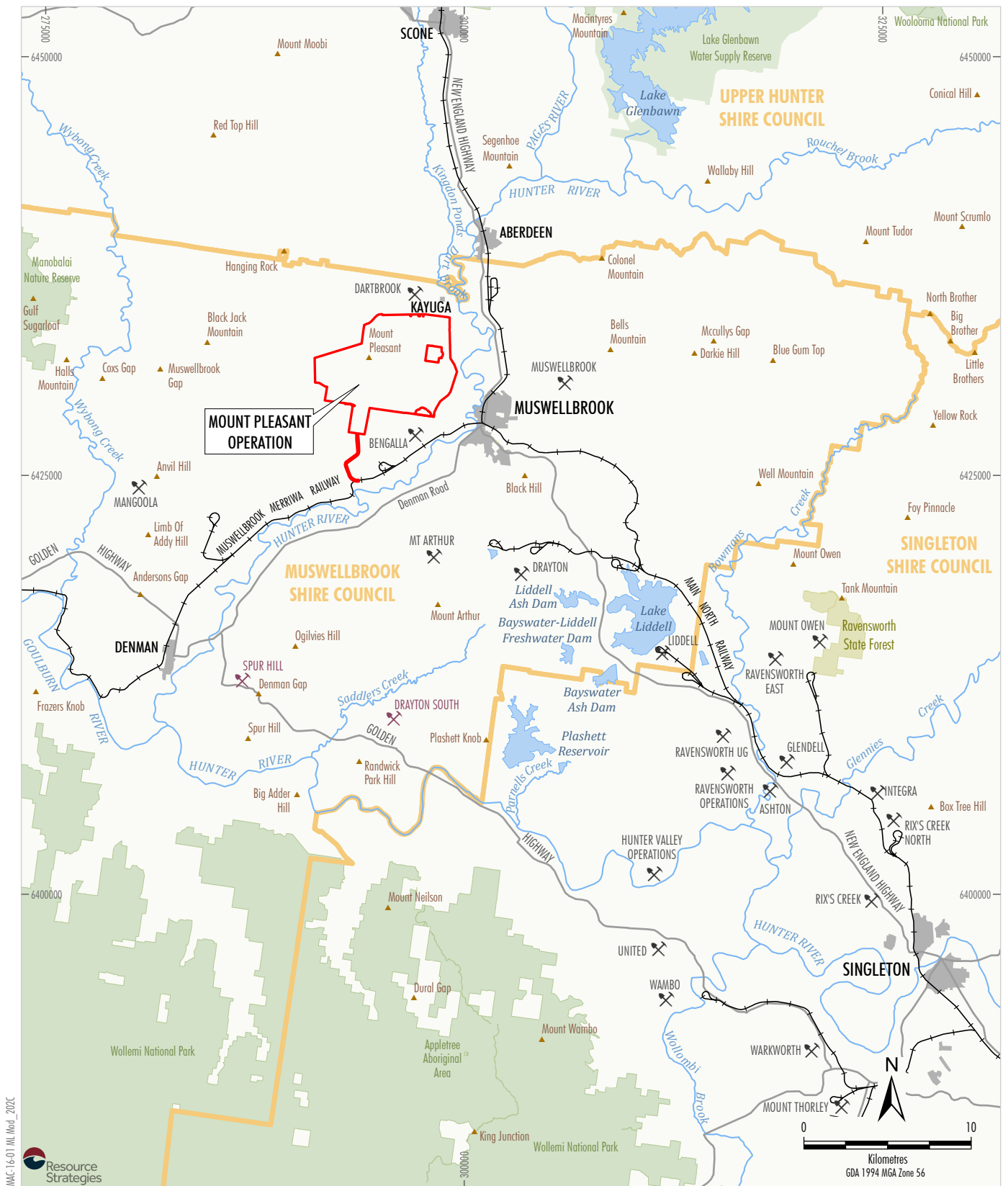
The Mount Pleasant Operation is located to the immediate north of the Bengalla Mine that mines the same geological sequence to the south of Wybong Road (Figure 3).

¹ The Controlled Action Decision was varied on 12 May 2016 to allow for 'substantial commencement' of the development to occur after 1 March 2017 (and before December 2020).



MACHEnergy
 MOUNT PLEASANT OPERATION
 Regional Location

Figure 1



- LEGEND**
- Mining Operation
 - Proposed Mining Operations (Application Lodged)
 - Mining Lease Boundary (Mount Pleasant)
 - Railway
 - Local Government Boundary
 - State Forest
 - National Parks and Wildlife Estate

Source: Geoscience Australia (2006); NSW Division of Resources & Energy (2016);
Land and Property Information (2016)

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MOUNT PLEASANT OPERATION
Project Location

Figure 2

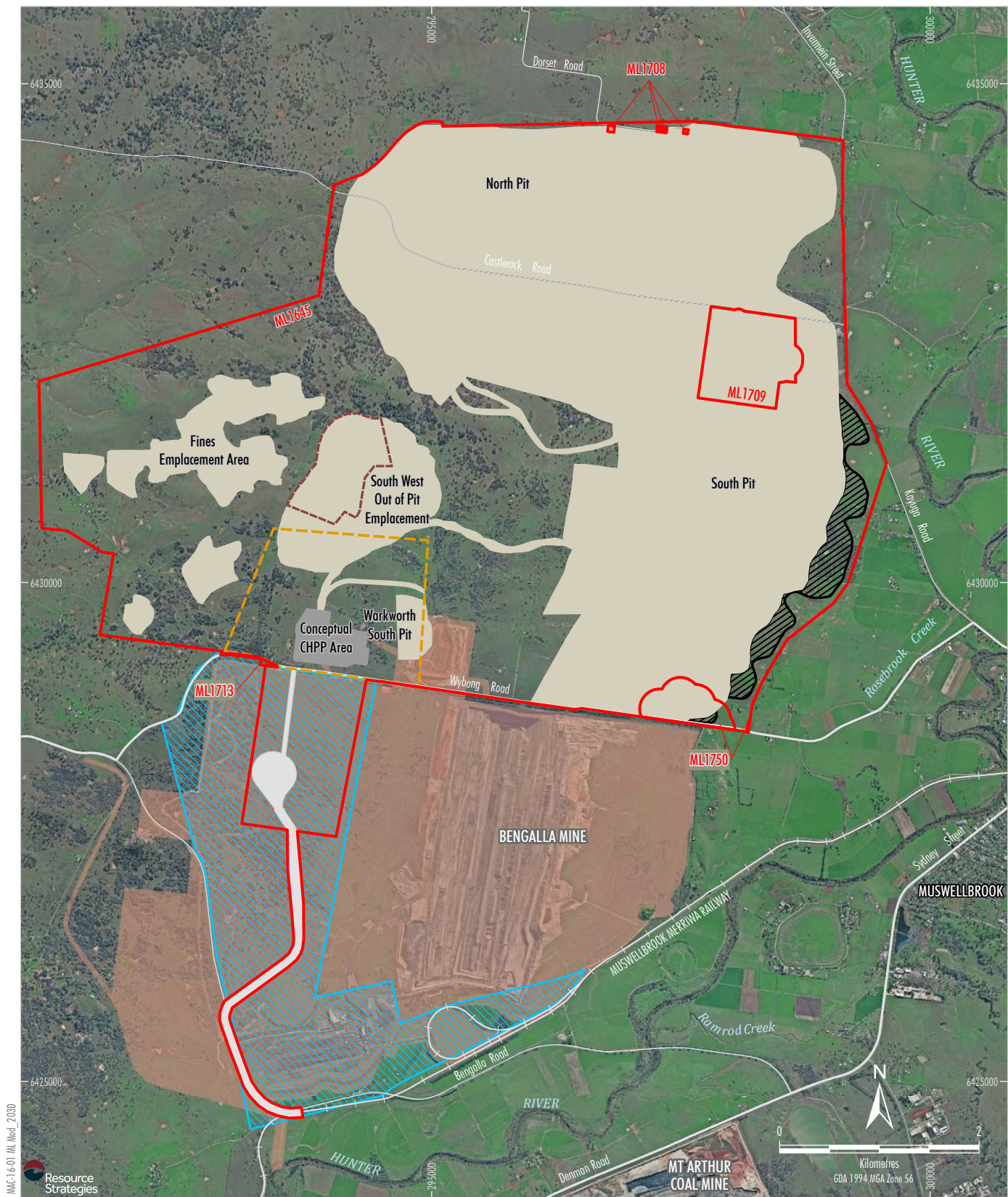


Figure 3

As part of the acquisition of the Mount Pleasant Operation and site, MACH Energy acquired a range of rural properties and lands and may expand its landholdings with additional land purchases over time. Current areas of private and mining company land ownership and verified residences in the vicinity of the Mount Pleasant Operation are shown on Figure 4. A detailed land ownership plan and an ownership list is provided in Attachment 2.

1.2 OVERVIEW OF THE MODIFICATION

The Modification would primarily comprise two components:

- an extension to the time limit on mining operations to provide for open cut mining operations to 22 December 2026 (i.e. modify Condition 5, Schedule 2 of Development Consent DA 92/97 to add six years); and
- extensions to the South Pit Eastern Out of Pit Emplacement (herein described as the emplacement extension), to better align with the underlying topography and facilitate development of a final landform that is more consistent with the characteristics of the local topography.

The additional waste rock capacity provided in the proposed emplacement extension would enable MACH Energy to avoid the need to emplace waste rock material in the approved South West Out of Pit Emplacement.

In addition, the Modification also involves some revisions to the final landform that would remain should mining operations cease at the end of 2026 (at the end of the Modification period) and a revision to the peak construction workforce due to MACH Energy's expedited construction schedule.

Table 1 provides a comparative summary of the currently approved and proposed modified Mount Pleasant Operation.

Figure 3 illustrates the general arrangement of the approved Mount Pleasant Operation and the proposed emplacement extension.

1.3 CONSULTATION FOR THE MODIFICATION

State Government Agencies

MACH Energy consults with relevant State Government agencies on a regular basis in relation to the approved Mount Pleasant Operation and activities on-site.

Department of Planning and Environment

A meeting was held with representatives of the DPE in May 2016 to provide an overview of the proposed Modification to the mine life, discuss environmental assessment requirements and provisional timing for lodgement of the Modification application.

MACH Energy subsequently provided an update on the Modification, including the proposed emplacement extension, and provided an overview of draft results of specialist studies to representatives of DPE in May 2017.

In February 2017 a briefing was provided to representatives of the Resources and Mining Division within DPE (formerly the NSW Division of Resources and Energy [DRE] within the Department of Industry) at a site visit that included discussion of modification to the eastern emplacement and final landforms.

Further consultation with representatives of the Resources and Mining Division within DPE was undertaken in May 2017, where MACH Energy provided a further update on the Modification and the findings of key studies.

Environment Protection Authority

MACH Energy has regularly been in contact with representatives of the NSW Environment Protection Authority (EPA) during 2016 and 2017 in regard to the grant of Environment Protection Licence (EPL) 20850 for the Mount Pleasant Operation and associated environmental monitoring.

Further consultation with representatives of the EPA was undertaken with respect to the proposed Modification in May 2017, where MACH Energy provided an overview of the Modification and draft results of the key specialist studies.

Office of Environment and Heritage

MACH Energy has regularly consulted with representatives of the NSW Office of Environment and Heritage (OEH) during 2016 and 2017 in regard to the management of Aboriginal and historic heritage sites at the Mount Pleasant Operation.

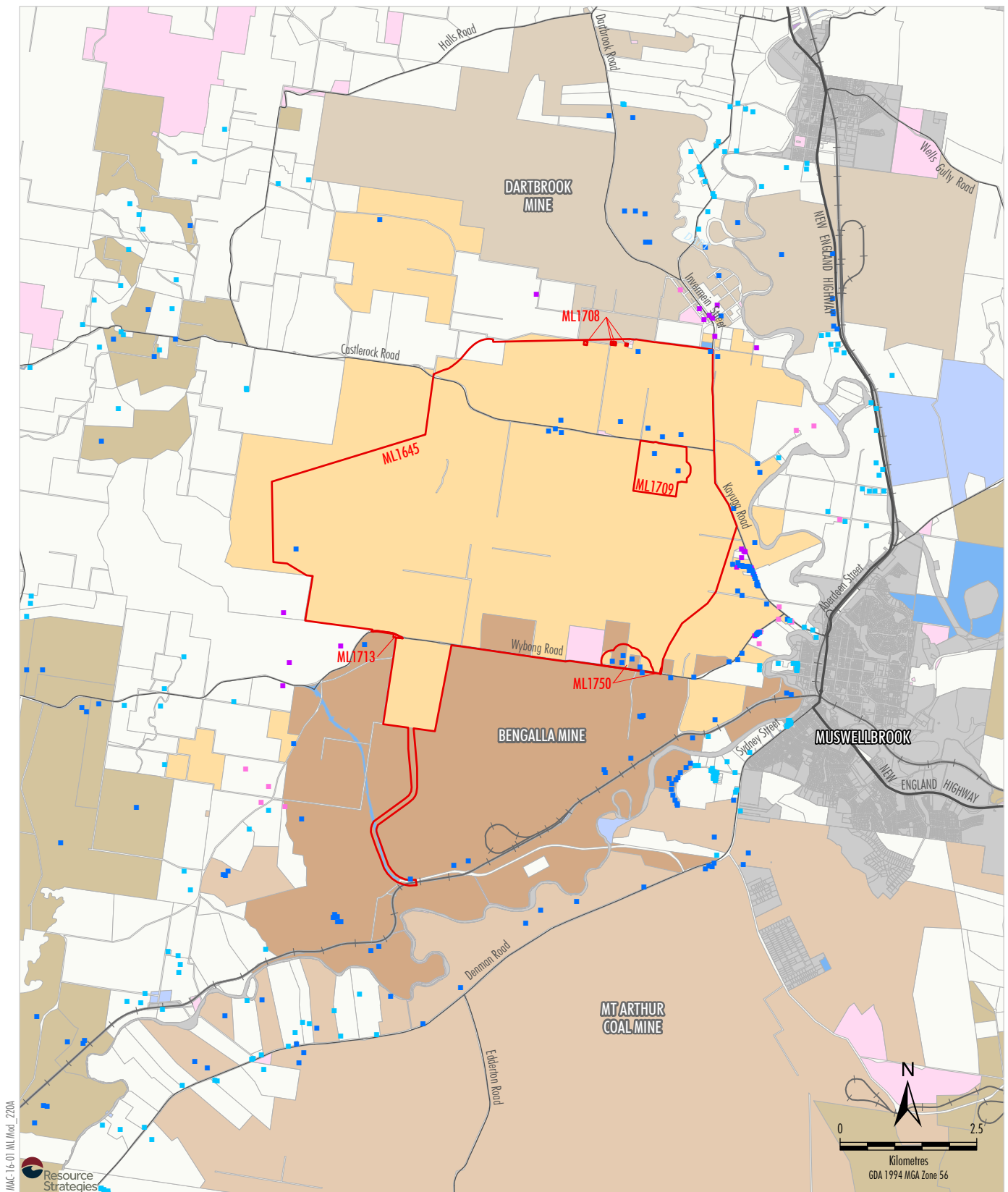


Figure 4

Table 1
Overview of the Approved Mount Pleasant Operation and the Modification

Project Component	Approved Mount Pleasant Operation	Proposed Modification
ROM Coal Production	ROM coal production at a rate of up to 10.5 Mtpa.	Unchanged.
General Waste Rock Management	Waste rock will be placed within mine voids, out-of-pit emplacements and the Fines Emplacement Area and will also be used to construct visual bunds.	Unchanged.
Waste Rock Production	Waste rock removal at a rate of up to approximately 53 million bank cubic metres (Mbcm) per annum.	Unchanged.
Waste Emplacements	Waste rock emplaced both in-pit, and four major out-of-pit emplacement areas located to the east of the open cuts and to south west and north west of the open cuts.	Approximately 67 hectare (ha) extension of the Eastern Out of Pit Emplacement. No waste rock to be emplaced in the South West Out of Pit Emplacement.
Coal Beneficiation	Beneficiation of ROM coal in an on-site Coal Handling and Preparation Plant (CHPP).	Unchanged.
Coal Transport	Coal transport to the Muswellbrook – Ulan Rail Line will be via either (but not both)^: <ul style="list-style-type: none"> a conveyor/service corridor to the Bengalla Mine; or rail via an on-site rail loop and loader facilities, including load-out conveyor and bin. Coal will be transported to the Port of Newcastle for export along the Muswellbrook – Ulan Rail Line and then the Main Northern Railway.	Unchanged.
	An average of three and a maximum of nine laden trains per day leaving the mine.	Unchanged.
Coal Rejects	Coarse rejects will be placed within mined out voids, out-of-pit emplacements and used to build fines emplacement walls. Fine rejects will be stored in the Fines Emplacement Area.	Unchanged.
Project Layout Plan	Appendix 2 of Development Consent DA 92/97 provides the approved layout of the project at Year 20.	Amendment to reflect extension to the Eastern Out of Pit Emplacement and reduction in the South West Out of Pit Emplacement.
Mining Method	Open cut mining incorporating truck and shovel and dragline operations.	Open cut mining method comprising truck and shovel in the Modification period.
Water Supply and Disposal	Water requirements for the mine and CHPP will be met from pit groundwater inflows, catchment runoff and make-up water from the Hunter River. Potable water for the industrial area will be sourced from the Hunter River and treated on-site to the required standards. Surplus water will be discharged into the Hunter River (or its tributaries) in compliance with the Hunter River Salinity Trading Scheme (HRSTS) and an EPL.	Largely unchanged, however, to reduce water demand from the Hunter River, excess mine water may also be sourced from the Bengalla and Dartbrook Mines.
Mine Life	21 years from the date of grant of Development Consent DA 92/97 (i.e. from 22 December 1999 until 22 December 2020).	Extended to 22 December 2026*.
Hours of Operation	Operations are approved to be undertaken 24 hours per day, seven days per week.	Unchanged.
Operational Workforce	Average operational workforce throughout the life of the mine of approximately 330 people, and an estimated peak of approximately 380 people.	Unchanged.
Construction Workforce	A construction workforce of up to approximately 250 people will be required.	Construction workforce is expected to peak at approximately 350 people.

* Remains less than 21 years from commencement of operations.

^ On 23 January 2017 MACH Energy notified the DPE of its intent to transport all coal from the site by rail via an on-site rail loop.

Further consultation with representatives of the OEHL was undertaken with respect to the proposed Modification in May 2017. At this meeting MACH Energy provided an overview of the Modification and the proposed ongoing application of existing biodiversity and heritage management measures to the emplacement extension.

Muswellbrook Shire Council

The Mount Pleasant Operation is wholly located within the Muswellbrook LGA. MACH Energy regularly consults with the Muswellbrook Shire Council (MSC) in relation to mine development, workforce, infrastructure and services to the community.

The Modification was discussed with key staff of the MSC at a number of meetings in 2016.

Further meetings with representatives of the MSC were undertaken in March and May 2017 to provide an update on the draft findings of specialist assessments and to discuss the final landform improvements proposed in the Modification.

Local Community

A Community Consultative Committee (CCC) has been established for the Mount Pleasant Operation in accordance with Development Consent DA 92/97 (Attachment 1). The CCC provides a mechanism for ongoing communication between MACH Energy and the local community.

MACH Energy has also undertaken individual consultation with a number of private landholders and lessees that reside in the vicinity of the mine to discuss the ongoing development of the Mount Pleasant Operation.

In May 2017 MACH Energy provided an overview of the proposed Modification and the associated assessment process to private landholders located in close proximity to the emplacement extension.

Key environmental concerns that were raised during consultation included the emplacement extension and final landform, operational noise, air quality, blasting and traffic. Consideration of the environmental impacts of the Modification, including these issues, is provided in Section 4. A description of the final landform is provided in Section 5.

1.4 STRUCTURE OF THIS DOCUMENT

An outline of the main text sections of this EA is presented below:

Section 1	Provides an overview of the Mount Pleasant Operation, the Modification and the consultation undertaken in relation to the Modification.
Section 2	Provides a description of the existing approved Mount Pleasant Operation.
Section 3	Provides a description of the Modification.
Section 4	Provides an environmental assessment of the Modification and describes the existing MACH Energy environmental management systems and measures that would be available to manage and monitor any potential impacts.
Section 5	Provides a description of the proposed improvements to the final landform that would be facilitated by the Modification.
Section 6	Describes the general statutory context of the Modification and identifies Development Consent conditions and site management documents that would require revision in support of the Modification.
Section 7	Concludes the document.
Section 8	References.

Attachments 1 and 2 and Appendices A to E provide supporting information as follows.

Attachment 1	Consolidated Development Consent
Attachment 2	Relevant Land Ownership Details (List and Insets)
Appendix A	Noise and Blasting Assessment
Appendix B	Air Quality and Greenhouse Gas Assessment
Appendix C	Road Transport Assessment
Appendix D	Biodiversity Assessment
Appendix E	Site Water Balance Review

2 EXISTING MOUNT PLEASANT OPERATION

2.1 APPROVALS HISTORY

NSW Approvals History

The potential environmental impacts associated with the development of the Mount Pleasant Operation were assessed in the Mount Pleasant Mine Environmental Impact Statement (1997 EIS) (ERM Mitchell McCotter, 1997a). The Mount Pleasant Operation was approved under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (the EP&A Act), by the then NSW Minister for Urban Affairs and Planning, on 22 December 1999 following a Commission of Inquiry (Development Consent DA 92/97).

Under Development Consent DA 92/97, Coal & Allied was permitted to extract up to 10.5 Mtpa of ROM coal for a period of 21 years (from the date of the granting of the development consent, i.e. until 2020) using open cut mining methods. The approved mine includes a rail loop, load-out facility and conveyor, connecting the mine to the Muswellbrook – Ulan Rail Line for transport of coal to the Port of Newcastle.

On 19 May 2010, Coal & Allied submitted an application to modify the Minister's consent for the Mount Pleasant Operation under section 75W of the EP&A Act. The modification (Mod 1) was approved on 19 September 2011 and included:

- construction of a conveyor and service corridor to the existing rail facilities at Bengalla Mine, as an alternative to the approved rail loop, load-out facility and conveyor;
- an extension to the development consent boundary to accommodate the proposed conveyor/service corridor;
- relocation of approved mine infrastructure (within a design envelope), rather than the specific locations identified in the 1997 EIS (ERM Mitchell McCotter, 1997a), to provide flexibility during the detailed design and construction of the facilities; and
- contemporising operational noise conditions in the development consent.

In December 2016, MACH Energy submitted an application for a minor modification to Development Consent DA 92/97 to relocate the South Pit Haul Road under section 75W of the EP&A Act.

The South Pit Haul Road Modification (Mod 2) was approved on 29 March 2017.

A copy of the consolidated Development Consent DA 92/97 incorporating Mod 1 and Mod 2 is provided as Attachment 1.

Federal Approvals History

The EPBC Act commenced in 2000, after development consent for the Mount Pleasant Operation was granted.

In June 2010, Coal & Allied submitted a Referral of Proposed Action (EPBC 2010/5529) to the Commonwealth Department of the Environment, Water, Heritage and the Arts that was subsequently withdrawn and was not determined.

On 16 December 2010, Coal & Allied submitted a Referral of Proposed Action (EPBC 2011/5795) to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPAC). On 4 February 2011, the SEWPAC determined that the Mount Pleasant Operation was a controlled action and required assessment and approval under the EPBC Act before it could proceed.

Relevant controlling provisions were:

- listed threatened species and communities (sections 18 and 18A); and
- listed migratory species (sections 20 and 20A).

Subsequent to the controlled action decision, Coal & Allied submitted a Public Environment Report (EMGA Mitchell McLennan, 2011), addressing the relevant controlling provisions, to SEWPAC for consideration.

On 29 February 2012, the Mount Pleasant Operation was granted approval, subject to conditions, by the Minister's delegate, under sections 130(1) and 133 of the EPBC Act (EPBC 2011/5795).

The conditions attached to the EPBC Act approval have since been varied on a number of occasions.

2.2 CONSTRUCTION

The majority of the Mount Pleasant Operation facilities will be constructed in accordance with the existing approvals over the course of 2017 and 2018.

Key construction activities will include development of fine rejects and water management infrastructure, electricity network relocations and upgrades, road upgrades, development of a haul road between the South Pit and the mine infrastructure area (MIA), mobile plant assembly, mine access road, ROM pads, CHPP, rail spur, rail loop and rail loading infrastructure.

Additional construction activities will occur as required during the life of the mine and will include progressive development of components such as the Northern Link Road (Section 2.9.12).

2.3 OPEN CUT MINING

The open cuts at the Mount Pleasant Operation comprise four named open cuts (South Pit, North Pit, Warkworth South Pit and Piercefield Pit²) (Figure 3).

The mining operation is approved to use a combination of truck and excavator mining and a dragline to mine coal and waste rock and operate 24 hours per day, seven days per week.

Steady state mining consists of a combination of truck and excavator mining and the operation of a dragline for waste rock removal. Waste rock will initially be placed in major out-of-pit waste emplacements, prior to the backfilling of the mined void behind mining operations, once sufficient space is available for backfill operations.

Coal will be mined with dozers to rip and push the coal followed by truck loading using excavators or front end loaders.

Open cut blasting will be undertaken in accordance with the blast limits described in Development Consent DA 92/97 (Attachment 1) that include limitations on the days, time and frequency of blasts that can be undertaken.

ROM coal will be mined at a rate of up to 10.5 Mtpa and transported by haul trucks along internal haul roads to the ROM pad where it will be directly dumped into the ROM hopper or temporarily stockpiled and then rehandled to the hopper.

2.4 COAL HANDLING AND PREPARATION

ROM coal will be hauled to the ROM dump hopper and either fed to the CHPP or, if quality permits, supplied directly to product stockpiles following sizing (i.e. bypass coal).

A diagram illustrating the planned arrangement of the CHPP and materials handling area is shown on Figure 5. The CHPP will include two coal processing modules with a combined design capacity of approximately 1,500 tonnes per hour (tph). The CHPP will include:

- coal sizing;
- screening;
- de-sliming; and
- washing.

A description of the operation of the CHPP is provided below and shown schematically on Figures 6 and 7. It is noted that the following description is provisional, subject to detailed design.

ROM coal will be reclaimed at a rate of up to 1,800 tph from the 650 tonne (t) ROM bin to the Primary and Secondary Sizers via an apron feeder.

The secondary sized raw coal will then be conveyed to two 500 t surge bins. Raw coal reclaimed from the surge bins undergoes final top size reduction to 50 millimetres (mm), is weighed and transferred to either a product coal stockpile (bypass coal) or one of the two coal processing modules at a rate of approximately 750 tph.

Coal Processing Modules

Sized coal has fine size fractions and slimes removed via de-sliming screens, with fines and slimes fed to the spiral (fine coal) circuit and oversize coarse fractions fed to the dense medium separation circuit.

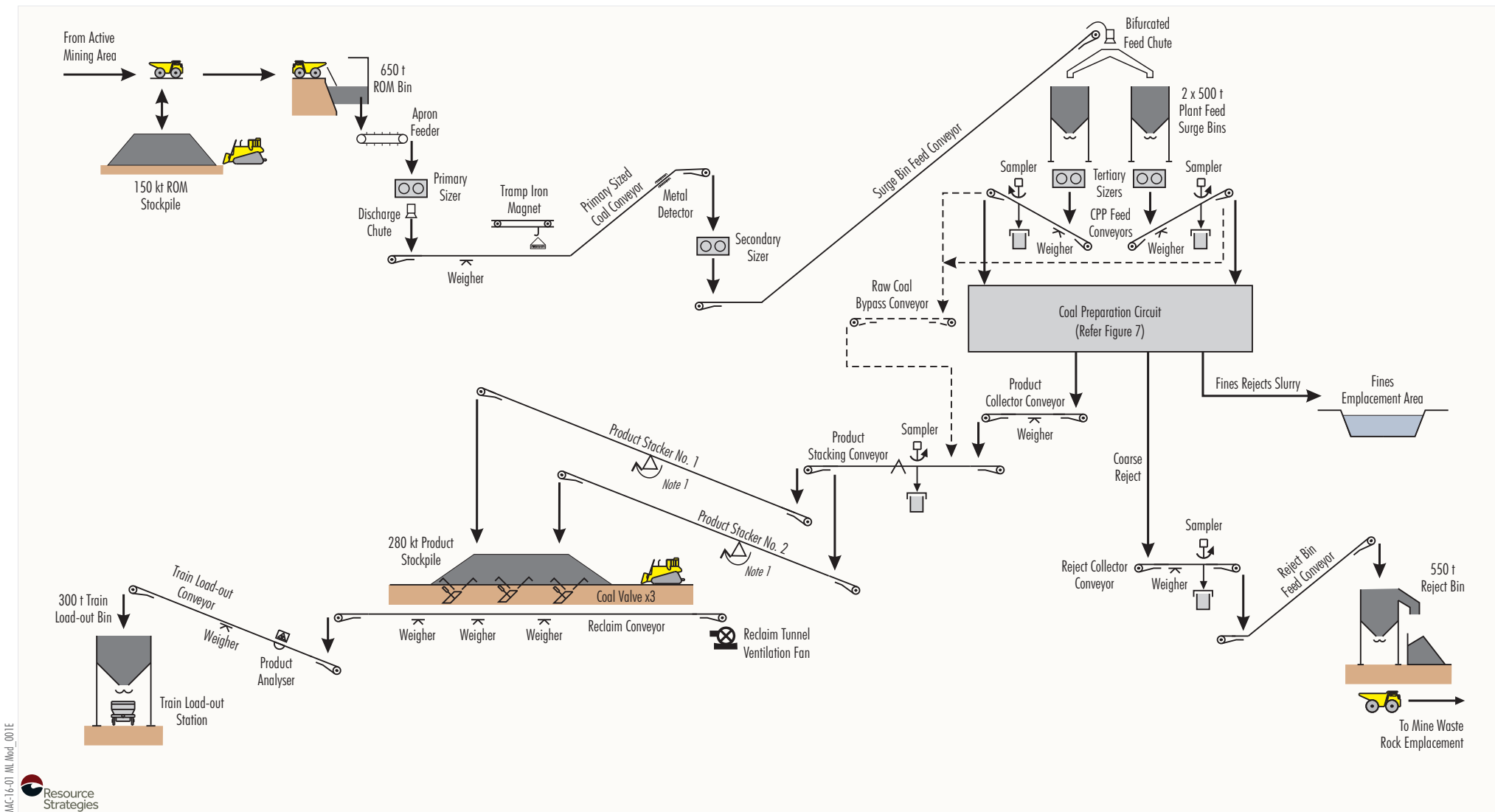
The fine coal circuit will separate coal fines from fine rejects and will comprise cyclones, spirals, centrifuges, a screen and a reject thickener. Fine rejects will be pumped from the thickener to the Fines Emplacement Area.

² The Piercefield Pit is an open cut that was planned to commence early in the development of the Mount Pleasant Operation before being ultimately subsumed by the South Pit.



MACHEnergy
 MOUNT PLEASANT OPERATION
 Provisional General Arrangement of the
 CHPP and Materials Handling Area

Figure 5



Source: MACH Energy (2017); CalibreDRAIV (2016)

Notes

1. Product Stacker No.1 and No.2 are luffing, slewing and telescoping stackers.
2. The Coal Processing Plant includes two modules.

MACHEnergy
MOUNT PLEASANT OPERATION
Materials Handling Schematic

Figure 6

The dense medium separation circuit will comprise a heavy media cyclone and screens to separate washed coal from coarse rejects. Coarse rejects from the CHPP will be disposed as a component of general ROM waste emplacement operations.

The management of coal reject at the Mount Pleasant Operation is discussed in Section 2.7.

Product coal from the CHPP will be conveyed to a product stockpile for subsequent reclaim and loading to trains.

2.5 PRODUCT COAL TRANSPORT

It is noted that the following description is provisional, subject to detailed design.

The Mount Pleasant Operation will have a product coal stockpile with a capacity of approximately 280 kilotonnes.

A train load-out facility with a design loading rate of 4,500 tph will be constructed at the head of the rail loop, to the south of Wybong Road.

Product coal will be reclaimed from the product stockpile using coal valves, which will feed onto a reclaim conveyor in a tunnel located beneath the product coal stockpile. The reclaim conveyor will feed a train load-out conveyor that will pass beneath Wybong Road. Product coal will then be loaded onto trains via a 300 t rail load-out bin.

Laden trains will join the Muswellbrook – Ulan Rail Line from the Mount Pleasant Operation rail loop. From the Muswellbrook – Ulan Rail Line, product coal will be transported on the Main Northern Railway to domestic customers or the Port of Newcastle for export.

Product coal will be loaded onto trains 24 hours per day, seven days per week.

2.6 WASTE ROCK MANAGEMENT

Initially all mined waste rock (including overburden and interburden) will be hauled out of pit to either the Eastern Out of Pit Emplacement, the South West Out of Pit Emplacement or used to construct visual bunds.

The Eastern Out of Pit Emplacement will also form a noise and visual barrier between the South Pit and Muswellbrook, facilitating the mining fleet operating in less exposed areas during the night period.

As mining continues, waste rock will be progressively placed within the mine void once the coal has been mined.

Geochemical characteristics of the waste rock material were tested by the Department of Mineral Resources Development Laboratory (Mountford and Wall, 1995). The only acid forming leachate occurred in samples from the Wynn Seam.

Due to the predicted small proportion of potentially acid forming material, it is expected that operational blending during ROM dumping will produce a non-acid (NAF) forming material within the waste emplacements and backfilled open cut. Any material identified as roof or floor rock from the Wynn Seam will be excluded from the final face of the waste emplacements.

2.7 COAL REJECT MANAGEMENT

CHPP rejects consist of fine rejects (in a slurry) and coarse rejects. Disposal of each reject material is discussed in the following subsections. It is noted that the following description is provisional, subject to detailed design.

2.7.1 Coarse Rejects

Coarse reject will be conveyed from the CHPP to a 550 t bin located north west of the CHPP (Figure 5).

It will then be hauled by truck to the waste emplacements for disposal as a component of general ROM waste emplacement operations.

Coarse rejects will be placed beneath NAF waste material to reduce oxygen movement through the rehabilitated profile and manage its geochemical characteristics (i.e. acid generation potential). This also assists to minimise the potential for spontaneous combustion within the rehabilitated waste emplacements.

2.7.2 Fine Rejects

Fine rejects will be pumped to the Fines Emplacement Area that is located north west of the CHPP (Figure 3). The Fines Emplacement Area was located in this position to minimise potential impacts and avoid viable open cut coal reserves.

The Fines Emplacement Area will be constructed progressively in a series of lifts throughout the life of the operation.

Fine reject will be pumped into the emplacement as a slurry. Excess water will be returned to the mine water management system for reuse on-site.

The Fines Emplacement Area will generally be covered with a layer of NAF waste rock, shaped to blend into the surrounding topography and rehabilitated.

2.8 WATER MANAGEMENT

The Mount Pleasant Operation water management system will be comprised of a number of dams, the open cut and the Fines Emplacement Area, together with a system of pumped transfers and drains.

Figure 8 provides a schematic diagram of the Mount Pleasant Operation water management system. It is noted that the following description is provisional, subject to detailed design.

Water will be required to operate the CHPP, for dust suppression and washdown of mobile equipment. The main water sources for the Mount Pleasant Operation are:

- catchment runoff and infiltration;
- groundwater inflows into the open cut mine void;
- water recovered from the Fines Emplacement Area;
- surface water extraction from the Hunter River; and
- potable water imported to site.

The Mine Water Dam (MWD) will be the main water storage on-site and will supply make-up water to the CHPP. Fine rejects slurry produced by the CHPP will be pumped to the Fines Emplacement Area and water recovered from the Fines Emplacement Area will be pumped back to the MWD.

Any seepage from the Fines Emplacement Area is to be captured in a subsurface seepage collection system located at the toe of the Fines Emplacement Area embankment and will be pumped back to the storage area.

The Fines Emplacement Area strategy described in the 1997 EIS involved the construction of a series of cells beginning in the upper section of the Fines Emplacement Area catchment. Consistent with current engineering practice, MACH Energy has adopted a more contemporary approach to developing the Fines Emplacement Area. This involves construction of the embankment at the downstream end of the Fines Emplacement Area catchment. The embankment would be progressively raised throughout the life of the Mount Pleasant Operation as additional storage capacity is required.

Environmental Dam 1 (ED1) was established downstream of the originally approved upper Fine Rejects cell. However, under the new Fines Emplacement Area strategy ED1 will be subsumed and Environmental Dam 2 (ED2) will be established as a sediment dam for the construction of the Fines Emplacement Area.

Other site water storages include:

- Environmental Dam Mine Infrastructure Area (EDMIA);
- Environmental Dam 3 (ED3);
- Sediment Dam 1 (SD1);
- Sediment Dam 3 (SD3);
- Sediment Dam 4 (SD4);
- High Wall Dam 1 (HWD1);
- High Wall Dam 2 (HWD2); and
- Rail Loop Dam (RLD).

Each of these storages will be pumped back to the water management system.

The MWD will be able to receive water from the Hunter River via Water Access Licences and discharge to the Hunter River in accordance with the HRSTS and EPL 20850 (subject to obtaining relevant secondary approvals).

Two Clean Water Dams (CWD1 and CWD2) will be located in order to direct rainfall runoff from upslope undisturbed areas either off-site or, if required, to either HWD1 or HWD2 to supplement site water supply during periods of low water inventory (subject to harvestable right entitlements or appropriate Water Access Licences).

A water balance model has been developed for the Mount Pleasant Operation.

The water balance model simulates future changes in stored volumes of water on-site in response to inflows (e.g. rainfall-runoff, groundwater inflows, return from the Fines Emplacement Area and pumping from the Hunter River via the water supply pipeline), outflows (evaporation, CHPP make-up, dust suppression usage, licensed discharge to the Hunter River) and pumped transfers within the site.

The water balance modelling is completed over a large number of different daily climate “realisations” compiled from the available rainfall record and includes historical climate events in the water balance model, including high, low and median rainfall periods.

The water balance model is periodically reviewed to inform water management at the Mount Pleasant Operation.

2.9 GENERAL INFRASTRUCTURE

2.9.1 Site Access

The main access to the mine site and administration office is provided from Wybong Road.

A second mine access road is provided for access to the rail corridor and associated infrastructure south of Wybong Road.

In consultation with MSC, there will be continued use of ancillary site accesses from local roads for environmental monitoring, general land management, exploration activities, construction activities and local deliveries.

2.9.2 Mine Service and Construction Roads

Mine service and construction roads will be constructed as required to provide access to facilities such as:

- sediment dams and environmental dams;
- infrastructure (e.g. CHPP);
- the MWD;
- the Fines Emplacement Area;
- explosives storages;
- internal electricity transmission lines;
- open cut and waste emplacement areas; and
- service road access under the relocated 66 kilovolt (kV) transmission line.

These roads will typically be service roads for light vehicles and construction plant only.

2.9.3 Haul Roads

Major haul roads will connect the active mining areas with the MIA and CHPP (Figure 3).

2.9.4 Mine Infrastructure Area

Key infrastructure items that will be located in the MIA include:

- security fence and boom gate security controlled entry;
- an administration building;
- parking for private vehicles;
- training, induction, crib and bathhouse facilities;
- parking area for mine site vehicles;
- a pad for assembly of mining plant;
- a laydown area;
- workshops;
- heavy and light vehicle wash facilities;
- fuel, lube and tyre bays and truck service bays;
- water tanks for the supply of potable water;
- sewage treatment plant;
- 22 kV mains powerline to a substation via the 66 kV supply sub-station located near the CHPP; and
- fibre optic communications link from Wybong Road to the administration building/site office for phones and Information Technology.

The MIA also includes some borrow/stockpile areas for construction materials.

2.9.5 Coal Handling and Preparation Plant

The CHPP area is shown on Figures 3 and 5 and will include:

- coal handling areas (ROM coal pads, ROM dump stations and raw coal stockpiles – including stacking and reclaiming equipment);
- Coal Preparation Plant (two coal processing modules including a washery building, thickener and reagent farm, coarse reject truck load-out bin); and
- product coal stockpiles, reclaim and conveyors.

The CHPP area also includes some construction materials borrow/stockpile areas.

2.9.6 Construction Area

A construction area has been developed adjacent to the main site access and will be maintained during construction. The construction area includes:

- security fence and boom gate security controlled entry;
- an administration building;
- parking for private vehicles;
- bathhouse facilities;
- a pad for assembly of earthmoving and civil plant;
- light vehicle wash facilities;
- fuel bays;
- water tanks for the supply of potable water;
- generators; and
- borrow/stockpile areas.

The construction area may continue to be used as a satellite infrastructure area following establishment of the Mine Infrastructure Area.

2.9.7 Explosive Storage Facilities

Explosive storage facilities will be constructed to service the Mount Pleasant Operation. The explosive storage facilities will include storage sheds, an access road that links to the MIA and active mining area and borrow/stockpile areas for construction.

The explosive storage facilities will be constructed in accordance with *Australian Standard 2187.2:2006 Explosives – Storage, Transport and Use – Use of Explosives*, including separation zone distances between the explosive storage facilities and the MIA and Wybong Road.

A facility for reloading of bulk explosive precursors (Ammonium Nitrate [AN]/AN emulsions) will also be constructed.

2.9.8 Hazardous Materials

Hazardous substances are managed through the Mount Pleasant Operation procedures for site contamination prevention and control.

The Mount Pleasant Operation registers all chemicals used on-site in a central database. The central database contains all information in Safety Data Sheets (SDS) and an inventory of chemicals held on-site. The information is accessible at any computer terminal within the site and provides guidance about storage, use and disposal.

Hazardous and explosive materials are transported and stored on-site in accordance with the *Australian Standard 2187.2:2006 Explosives – Storage, Transport and Use – Use of Explosives*, NSW *Work Health and Safety Act, 2011* and *Work Health and Safety (Mines and Petroleum Sites) Act, 2013*, as well as the NSW *Explosives Act, 2003* and supporting *Explosives Regulation, 2013*.

Mount Pleasant Operation procedures and controls minimise the potential for land and water contamination from the handling, storage and disposal of hazardous substances. Controls include storage within properly sealed containers and controlled areas, banded for medium to long-term storage requirements.

2.9.9 Electricity Supply and Distribution

A 66 kV overhead transmission line runs through the approximate centre of the Mount Pleasant Operation in a north south direction. This line will be removed and relocated to accommodate the Mount Pleasant Operation development activities.

Site power from the relocated transmission line will be transferred via an intake switching station and distributed by overhead or underground cables.

A range of 11 kV overhead electricity transmission lines and underground cabling is present at the Mount Pleasant Operation and will be decommissioned, and where feasible, removed from ML 1645.

Generators are used to supply power during construction of the Mount Pleasant Operation.

2.9.10 Communication Systems

Previous fibre optic services running along Wybong Road were decommissioned by the Bengalla Mine. As a result, fibre cable networks have been re-established for the Mount Pleasant Operation.

2.9.11 Potable Water

Once the water supply pipeline is established, potable water will be pumped from the Hunter River and stored in localised tanks. If required, water will be treated to appropriate potable water standards prior to use.

Potable water may also continue to be delivered to site via trucks by a contractor.

2.9.12 Public Road Relocations

Condition 38, Schedule 3 of Development Consent DA 92/97 requires MACH Energy to construct:

- The Mount Pleasant Northern Link Road to Dorset Road, prior to the closure of Castlerock Road.
- The Mount Pleasant Western Link Road from the intersection of the Bengalla Link Road to the intersection of the Mount Pleasant Northern Link Road, prior to the closure of Wybong Road.

These link roads, or suitable alternatives agreed with MSC and the DPE, will be constructed when required.

2.10 WORKFORCE

The Mount Pleasant Operation has an approved operational workforce of approximately 380 personnel.

The 1997 EIS described that construction and development activities will require up to approximately 250 additional people for a period of up to approximately 18 months.

The operational hours of the Mount Pleasant Operation are 24 hours per day, seven days per week. Nominal shift start and finish times during mining operations are as follows:

- Administration Personnel – 7.00 am to 5.00 pm weekdays.
- Mining Operations Personnel (Day) – 7:00 am to 7.30 pm.
- Mining Operations Personnel (Night) – 7.00 pm to 7.30 am.

These nominal shift times would be subject to periodic review throughout the life of the operation.

2.11 REHABILITATION AND FINAL LANDFORM

Rehabilitation at the Mount Pleasant Operation is undertaken in accordance with the approved Mining Operations Plan (MOP)/Rehabilitation Management Plan and the Rehabilitation Strategy (as updated from time to time).

The final land use goals for the Mount Pleasant Operation are based on the following:

- successful design and rehabilitation of landforms to ensure structural stability, revegetation success and containment of wastes; and
- post-mining land use compatible with surrounding land uses.

The approved conceptual final landform of the Mount Pleasant Operation is an undulating, free draining landform with a post-mining land capability that supports grassland and woodland.

The approved final landform also includes two final voids associated with the North Pit and South Pit open cuts as well as a smaller third final void located in a low lying area between the two larger final voids.

2.12 BIODIVERSITY OFFSET

MACH Energy holds and manages a 13,522 ha biodiversity offset that was established as part of the Mount Pleasant Operation approval under the EPBC Act in 2011 (Coal & Allied, 2015 – *Offset Management Plan Mount Pleasant Project*).

Development Consent DA 92/97 only requires a biodiversity offset for disturbance associated with development of the off-site coal transport conveyor option. At this stage, MACH Energy is not progressing the conveyor option for off-site coal transport and therefore a biodiversity offset is not required under Development Consent DA 92/97.

2.13 ENVIRONMENTAL MANAGEMENT AND MONITORING

MACH Energy has developed an Environmental Management Strategy for the Mount Pleasant Operation (Figure 9).



Notes:

- * In accordance with Condition 29, Schedule 3 of Development Consent (DA 92/97), this Offset Strategy is not required if MACH Energy Australia Pty Ltd does not carry out any development in the conveyor/service corridor.
- ** The approved Mining Operations Plan has been developed to meet the requirements for a Rehabilitation Management Plan (Condition 56, Schedule 3 of Development Consent [DA 92/97]). The Mine Site Rehabilitation Plan (Conditions 19 and 20 of EPBC 2011/5795) may be incorporated into the Mining Operations Plan.

Figure 9

The Environmental Management Strategy includes a number of management plans that were previously developed by Coal & Allied and approved by the relevant regulatory authority (typically DPE). MACH Energy is progressively preparing updated management plans.

Key management plans required under Development Consent DA 92/97 include:

- A Noise Management Plan that details the real-time noise monitoring and management system, noise mitigation measures and a protocol developed with neighbouring mines to minimise cumulative impacts.
- A Blast Management Plan including a road closure management plan and a protocol developed with neighbouring mines to minimise cumulative impacts.
- An Air Quality and Greenhouse Gas Management Plan that details the real-time air quality management system, air quality monitoring network and a protocol developed with neighbouring mines to minimise cumulative impacts.
- An Aboriginal Heritage Management Plan that describes measures that will be implemented to comply with relevant Aboriginal Heritage Impact Permits, manage Aboriginal heritage sites and engage with Aboriginal stakeholders.
- A Biodiversity Management Plan that details measures to manage remnant vegetation and habitat, implement revegetation and regeneration and a program to monitor and report on the effectiveness of biodiversity management measures.
- A Water Management Plan including a Site Water Balance, Erosion and Sediment Control Plan, Surface Water Management Plan, Groundwater Management Plan and a Surface and Ground Water Response Plan.
- A Waste Management Plan including a fines emplacement plan.
- A Rehabilitation Management Plan prepared in accordance with *ESG3: Mining Operations Plan (MOP) Guidelines, September 2013* (DRE, 2013).
- A Rehabilitation Strategy that considers the post-mining final land use and includes a rehabilitation strategy and objectives to achieve the final land use.
- A Landscape Management Plan that describes the measures that will be implemented to manage visual impacts of the Mount Pleasant Operation.

- A Maintenance Management Plan that describes the maintenance measures to be applied to the roads and intersections relevant to the Mount Pleasant Operation.

MACH Energy will continue to implement the existing Coal & Allied management plans until relevant revisions to these plans have been approved by the relevant regulatory authorities.

Where relevant, further discussion of these plans is provided under the relevant sub-sections in Section 4.

2.14 COMMUNITY CONTRIBUTIONS

As part of acquisition of the Mount Pleasant Operation, MACH Energy has maintained the Aboriginal Community Development Fund developed by Coal & Allied. The fund was a community benefit specified in the Native Title Agreement made with the Wonnarua People in 2005.

Since the acquisition, MACH Energy representatives have joined the existing Aboriginal Community Development Fund community members to administer funds, manage its current projects and to seek-out new partnerships. Partnerships formed in 2016 include:

- Many Rivers Microfinance;
- Gundi Programme – St Helier's Correctional Centre;
- Polly Farmer Foundation – Enrichment Centre; and
- Parents and Learning.

MACH Energy is currently preparing a Mount Pleasant Operation community development funding framework, to provide an avenue to support other community development projects throughout the life of the operation.

2.15 COMPLAINTS

Four community complaints were received by the Mount Pleasant Operation in 2016 and related to:

- supplier options;
- closure of roads (Local Council strategy for mines in the area);
- selection process for allocating Aboriginal parties to clearance work; and

- a requested property acquisition outside of the zone of acquisition defined by Development Consent DA 92/97.

No complaints were received in 2016 with respect to noise or air quality emissions associated with construction activities.

2.16 CONSIDERATION OF POTENTIAL INTERACTIONS WITH OTHER NEARBY MINING OPERATIONS

2.16.1 Bengalla Mine

Bengalla Mining Company owns the existing Bengalla Mine, which is an open cut coal mine located immediately south of the Mount Pleasant Operation.

Bengalla Mine is approved to produce up to 15 Mtpa of ROM coal until 28 February 2039 under Development Consent (SSD-5170), as modified.

The Mount Pleasant Operation has a Master Co-operation Agreement with Bengalla Mine which has been developed to manage interactions between the two mining operations.

It is noted that the ultimate extent of the approved Bengalla Mine open cut intersects the Mount Pleasant Operation rail spur that is currently being constructed by MACH Energy.

While the intersection of the Bengalla Mine open cut with the approved rail spur alignment is some years away, MACH Energy is currently conducting engineering studies on various alternative future rail and/or conveyor product transport options.

The engineering studies will identify alternative potentially viable infrastructure arrangements that would provide product coal transport for the life of the Mount Pleasant Operation that are located outside of the approved Bengalla Mine open cut.

Once a preferred product coal transport option has been identified in consultation with Bengalla Mine, MACH Energy will conduct the necessary environmental assessment and submit a modification application seeking approval for the alternative product coal transport facilities.

MACH Energy anticipates that a modification application would be made within 12 months of a preferred product coal transport alternative being selected and obtaining suitable access to the relevant land that is the subject of the product coal transport modification.

Potential cumulative interactions between the Bengalla Mine and the Mount Pleasant Operation, where relevant to this Modification are discussed in Section 4 and the relevant environmental studies (e.g. noise, air quality and road and rail transport).

2.16.2 Mt Arthur Coal Mine

Hunter Valley Energy Coal (a wholly owned subsidiary of BHP) owns the existing Mt Arthur Coal Mine, which is an open cut coal mine located approximately 8 km south of the Mount Pleasant Operation.

The Mt Arthur Coal Mine is approved to mine up to 32 Mtpa of ROM coal until 30 June 2026 under Project Approval (09_0062), as modified.

Potential cumulative interactions between the Mt Arthur Coal Mine and the Mount Pleasant Operation, where relevant to the Modification, are discussed in Section 4 and the relevant environmental studies (e.g. noise, air quality and road and rail transport).

2.16.3 Mangoola Coal

Mangoola Coal Operations Pty. Limited owns and operates Mangoola Coal, which is an open cut coal mine located approximately 8 km west of the Mount Pleasant Operation.

Mangoola Coal is approved to mine up to 13.5 Mtpa of ROM coal for 21 years under Project Approval (06_0014), as modified.

Potential cumulative road and rail traffic interactions between Mangoola Coal and the Mount Pleasant Operation are discussed in Section 4 and the Road Transport Assessment (Appendix C).

Cumulative air quality emissions of Mangoola Coal have also been considered in the Air Quality and Greenhouse Gas Assessment (Appendix B).

2.16.4 Dartbrook Mine

Anglo American plc and Marubeni Coal Pty Ltd collectively own the Dartbrook Mine, which is an approved underground coal mine located immediately north of the Mount Pleasant Operation. The Dartbrook Mine was placed in care and maintenance in 2006.

The Dartbrook Mine is approved to mine up to 6 Mtpa of ROM coal for a period of 21 years.

Anglo American plc and Marubeni Coal Pty Ltd are currently completing the sale of the Dartbrook Mine to Australian Pacific Coal Limited. Australian Pacific Coal Limited has indicated its intent to re-open the underground mine and lodge a new application for an open cut mine.

Potential cumulative interactions between the Dartbrook Underground Mine (including the pit top) and the Mount Pleasant Operation, where relevant to the Modification, are discussed in Section 4 and the relevant environmental studies (e.g. noise, air quality and road transport).

Any future application to undertake open cut mining at the Dartbrook Mine would be subject to a separate assessment process that would be required to consider potential cumulative impacts with the approved Mount Pleasant Operation.

2.16.5 Muswellbrook Coal Mine

Muswellbrook Coal Company (a wholly owned subsidiary of Idemitsu) owns the Muswellbrook Coal Mine which is an open cut and underground coal mine located north east of Muswellbrook.

The Muswellbrook Coal Mine is currently operated as an open cut coal mine that is consented to carry out mining operations to 2022, producing a maximum of 2 Mtpa of product coal.

Potential cumulative interactions between the Muswellbrook Coal Mine and the Mount Pleasant Operation, where relevant to the Modification, are discussed in the relevant environmental studies (e.g. noise and air quality).

2.16.6 Other Regional Operations

A number of other mines are located in the Hunter region. Potential interactions with these mines are typically limited to shared use of the Main Northern Railway, shared use of supporting contractors, contributions to regional background air quality and traffic movements and socio-economic effects on the area (e.g. support industries based in Muswellbrook and other centres in the Hunter Valley).

3 DESCRIPTION OF THE MODIFICATION

3.1 NEED FOR THE MODIFICATION

The proposed Modification involves extending the current limit on the period of permitted mining operations in Development Consent DA 92/97.

A 21 year limit for the duration of mining operations was imposed on Development Consent DA 92/97 granted in 1999. However, Coal & Allied did not commence mining operations at the site prior to the sale of the Mount Pleasant Operation to MACH Energy (completed in August 2016).

Construction of the Mount Pleasant Operation under MACH Energy ownership re-commenced in November 2016. Mining operations are also planned to commence in 2017.

While it is anticipated that the Mount Pleasant Operation would continue to operate for at least the originally approved 21 year period (subject to obtaining necessary environmental approvals), MACH Energy has limited the Modification period to 2026.

MACH Energy has also included in the Modification application a number of improvements to the Eastern Out of Pit Emplacement and Mount Pleasant Operation final landform.

The proposed changes facilitate a final landform that is more consistent with the natural topography when viewed from Muswellbrook. The additional waste rock capacity provided in the emplacement extension would also negate the need to emplace waste rock in the approved South West Out of Pit Emplacement.

3.2 CONSTRUCTION

The Modification would not involve any material additional construction activities to the approved Mount Pleasant Operation.

It is noted that the approved Mount Pleasant Operation includes the on-site construction and operation of a dragline. This is no longer planned by MACH Energy in the period to 2026, but may occur at some stage in the future.

3.3 OPERATIONS

3.3.1 Open Cut Extent

The proposed Modification would not alter the open cut extent of the approved Mount Pleasant Operation.

3.3.2 Mining Sequence

The planned commencement of mining operations in the south east of the site is generally consistent with the initial development sequence presented in the 1997 EIS.

However, some alteration of the mining sequence would be required as MACH Energy does not currently intend to employ a dragline. A dragline typically requires a long linear open cut to be established in the early stages of the operation.

Figures 10 to 12 illustrate the conceptual development of the Mount Pleasant Operation inclusive of the Modification in the period to 2026.

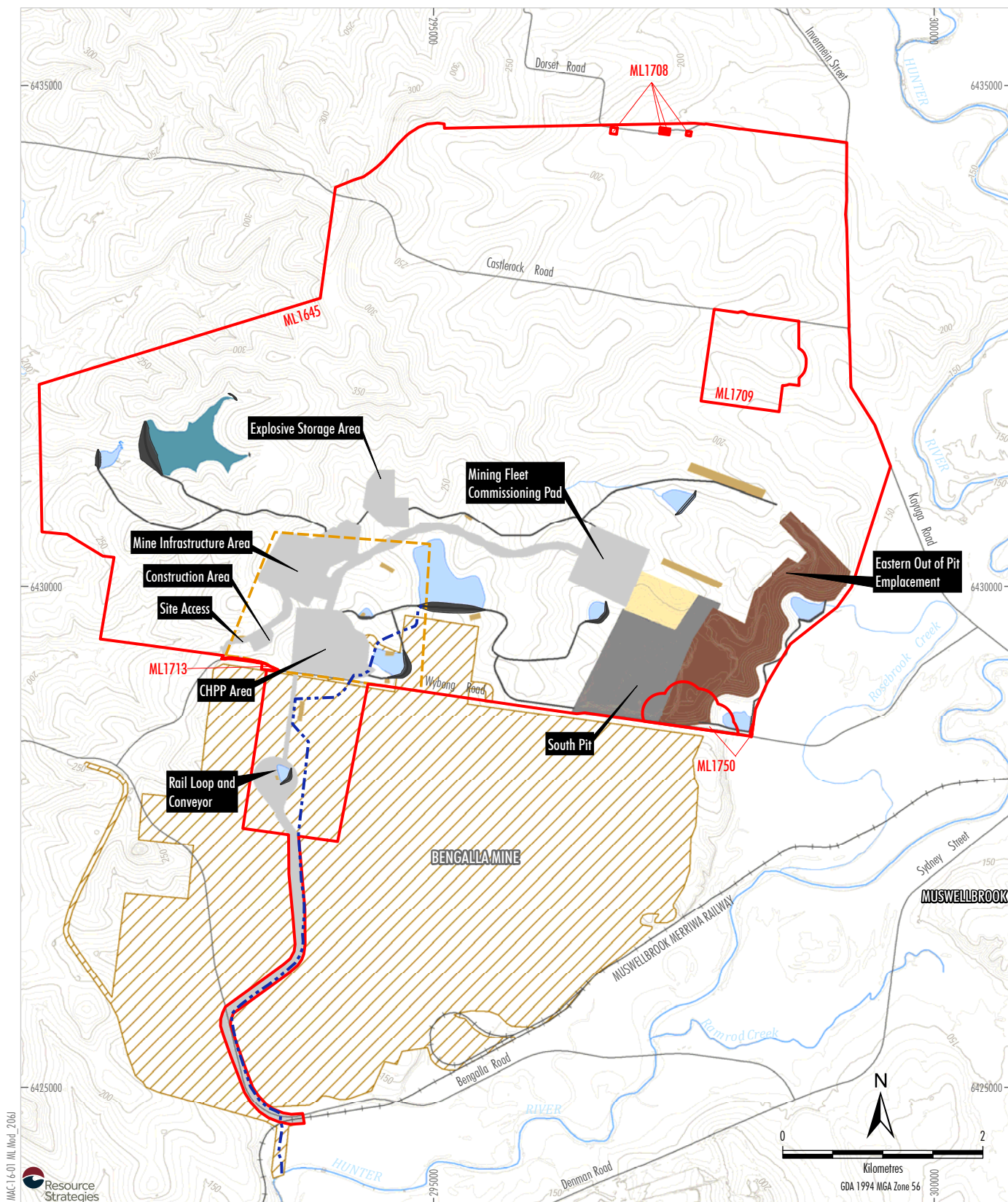
The mining sequence and rate of mining shown on Figures 10 to 12 would vary on the basis of market conditions and customer demand, coal quality or to adapt to currently unforeseen changes to mining conditions.

MACH Energy's planned truck and shovel mining methodology provides potential flexibility to the mining operation to manage noise and air quality emissions which will be a key focus of operations in the first five years.

The sequence of mining and/or the general arrangement may be modified throughout the life of the operation to maintain compliance with the applicable noise and air quality criteria in Development Consent DA 92/97 at the nearest private residences.

Due to the proximity of the operation to private receivers (particularly to the south east), this may necessitate iterative improvements to shutdown planning for adverse weather conditions to maximise mining efficiency while maintaining compliance with air quality and noise criteria at the Mount Pleasant Operation.

This process will be informed by real-time noise and air quality monitoring and use of predictive models to plan both the short-term and medium-term focus of the approved mining operations, and may necessitate iterative alteration to the mining sequence based on adaptive management.



LEGEND

- Mining Lease Boundary
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)
- Infrastructure Area Envelope
- Active Stripping Area
- Active Mining Area
- Active Overburden Emplacement Area
- Infrastructure and Borrow/Stockpile Area
- Topsoil Stockpile
- Access Road
- Indicative Water Pipeline Alignment

- Water Dam
- Fines Emplacement Area

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2017)

MACHEnergy
MOUNT PLEASANT OPERATION
Provisional General Arrangement 2018

Figure 10

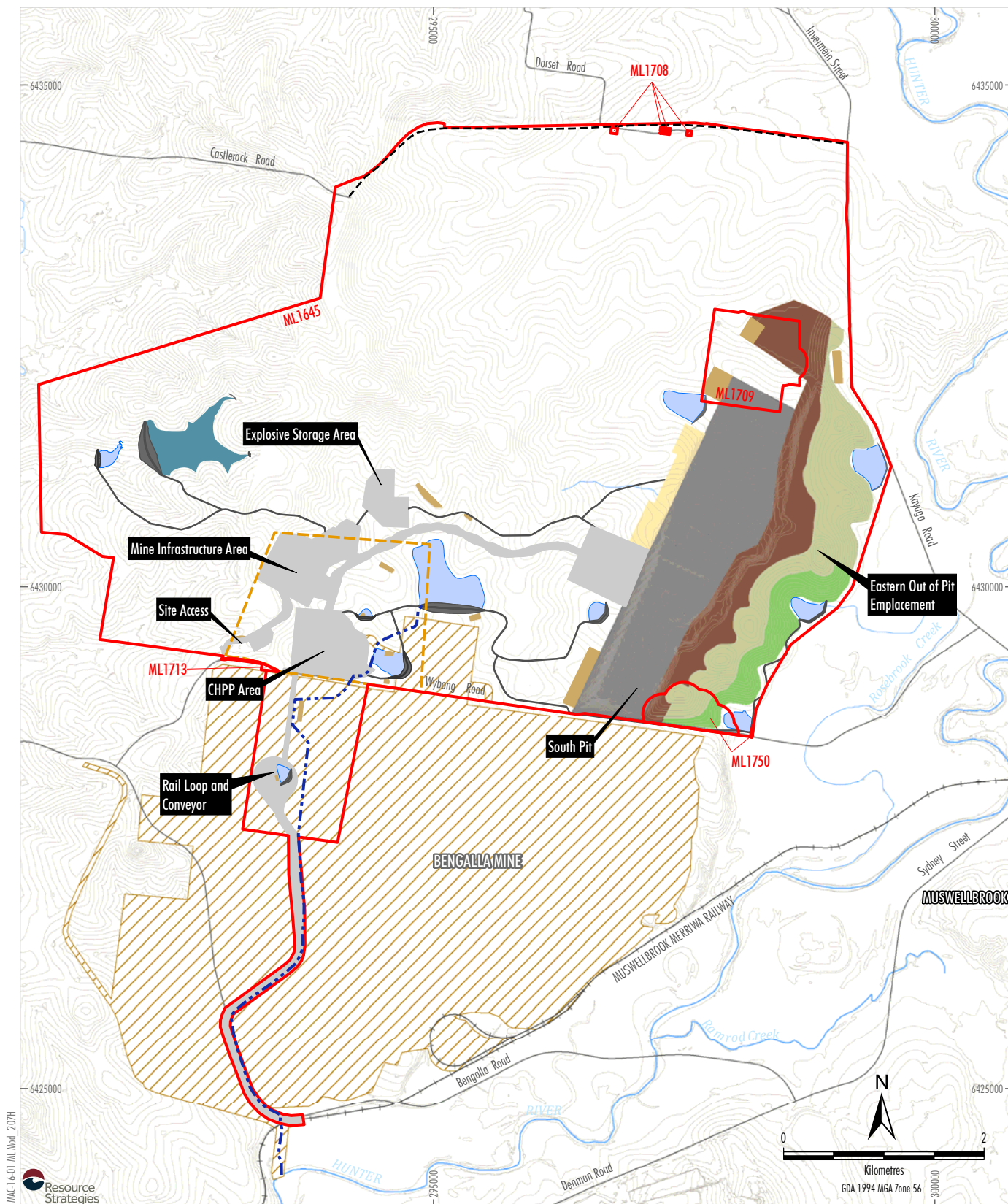


Figure 11

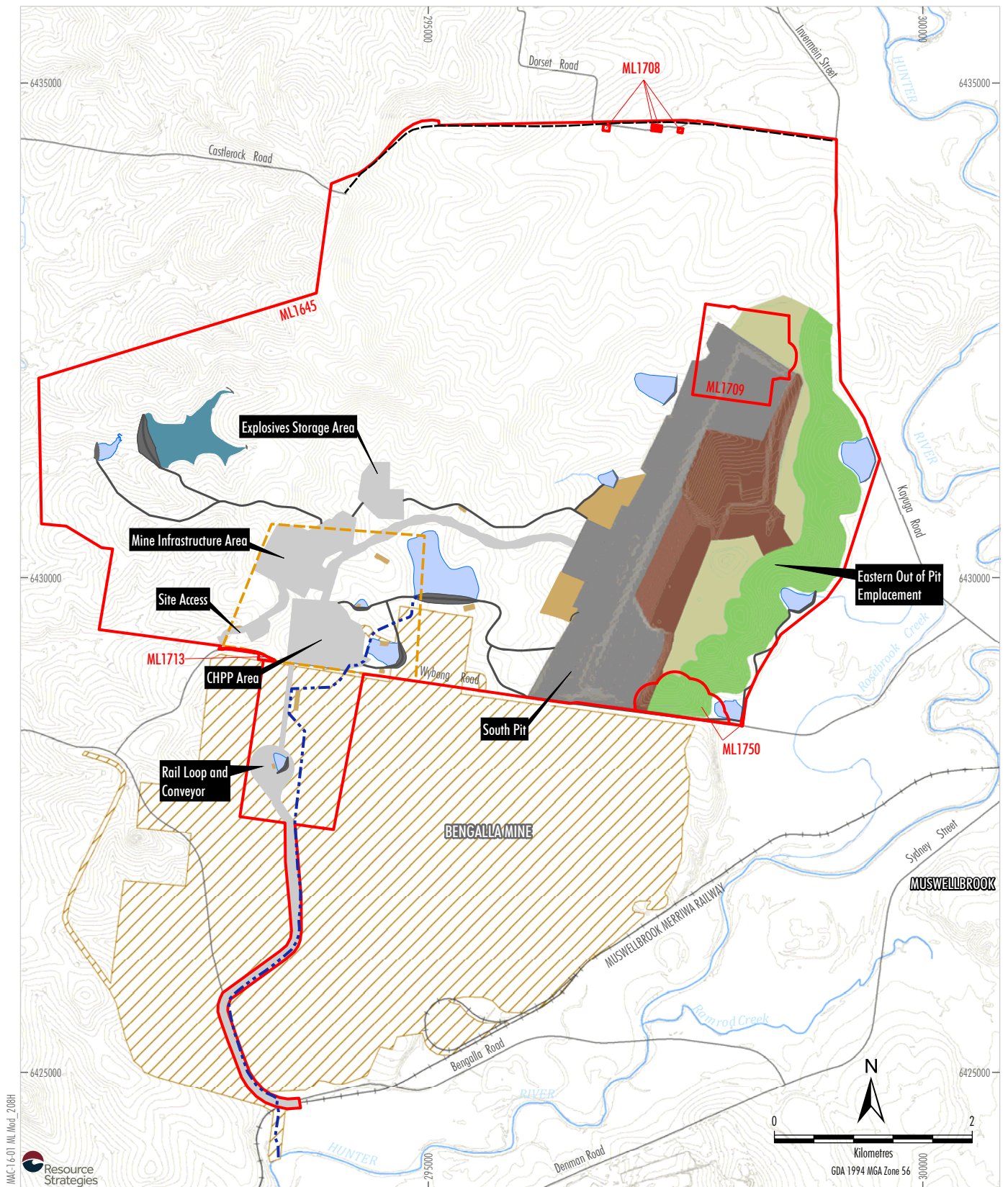


Figure 12

3.3.3 Mine Schedule

A provisional mine schedule for the Mount Pleasant Operation incorporating the Modification from 2017 to 2026 is provided in Table 2. The mining sequence within the approved open cuts would be subject to periodic revision throughout the life of the mine, as described in the MOP (updated from time to time).

The Modification production schedule within the period to 2026 remains within both the total and annual maximum ROM coal and waste rock production levels of the approved Mount Pleasant Operation.

3.3.4 Mobile Fleet

Mining was originally planned to commence as a contract truck and shovel mining operation while a dragline was assembled and commissioned. However, MACH Energy does not currently intend to utilise a large dragline to assist with the mining of overburden/interburden in the period to 2026, and therefore requires some other additional mobile equipment.

More detail on the provisional mobile fleet and associated noise attenuation of this fleet is provided in the Noise and Blasting Assessment (Appendix A).

Throughout the life of the operation the mobile fleet is expected to vary based on equipment availability, mining requirements and advances in technology and noise mitigation that may be employed by MACH Energy to maintain compliance with Development Consent DA 92/97, while maximising mining efficiency.

3.3.5 Coal Handling and Preparation

The Modification would not involve any material change to coal handling and preparation, or coal reject management associated with the approved Mount Pleasant Operation.

3.3.6 Waste Rock Handling and Emplacement

The extent and depth of the approved open cuts would be unchanged by the Modification. The total volume of waste rock to be extracted throughout the life of the Mount Pleasant Operation would therefore be unchanged.

MACH Energy has, however, identified some incremental improvements to the proposed waste emplacement strategy for the Mount Pleasant Operation.

Table 2
Indicative Mine Schedule Incorporating the Modification

Year	Waste Rock (Mbcm)	ROM Coal (Mtpa)	Product Coal (Mtpa)	Coarse Reject (Mtpa)	Fine Reject (Mtpa)
2017	4.74	0.26	0.20	0.03	0.03
2018	15.71	4.06	2.92	0.51	0.63
2019	23.09	7.54	5.54	0.90	1.11
2020	24.58	10.50	7.70	1.25	1.55
2021	31.28	10.50	7.92	1.15	1.43
2022	27.25	10.50	7.77	1.22	1.51
2023	25.34	10.50	7.75	1.23	1.52
2024	27.23	10.50	7.63	1.28	1.59
2025	28.52	10.50	7.80	1.21	1.50
2026	24.07	10.50	7.46	1.36	1.69

The emplacement extension (approximately 67 ha) and avoidance of any waste rock emplacement³ in the approved South West Out of Pit Emplacement would provide operational benefits to MACH Energy in the form of reduced waste rock haulage costs.

3.3.7 Extent of Major Surface Development

The emplacement extension would not materially alter the total surface development of the approved Mount Pleasant Operation. This would be achieved by a reduction in the disturbance area associated with the approved South West Out of Pit Emplacement.

MACH Energy would, however, retain the ability to construct infrastructure in a portion of the South West Out of Pit Emplacement as it is proximal to the MIA and contains a number of construction and infrastructure features that are being implemented under the current MOP.

MACH Energy may still construct some relatively minor and more flexible infrastructure (e.g. light vehicle roads, water management structures and other ancillary infrastructure) within the relinquished portion of the South West Out of Pit Emplacement footprint (Figure 3). However, any such works would avoid the clearing of mature native trees and would be designed to avoid any increase in the total native vegetation cleared by the approved Mount Pleasant Operation.

3.3.8 Supporting Infrastructure

The Modification would not involve the construction of any material additional supporting infrastructure.

3.3.9 Product Coal Transport

The Modification would not involve any material change to the approved Mount Pleasant Operation rates of product coal transport.

Notwithstanding, due to the extension to the mine life, a contemporary assessment of the rail traffic noise associated with the extension of the life of the operation is provided in Appendix A.

3.3.10 Workforce

The Modification would not involve any material change to the operational workforce of the approved Mount Pleasant Operation.

The construction workforce for the Mount Pleasant Operation would also typically remain below approximately 250 people. However, as a result of MACH Energy's expedited construction schedule, the construction workforce is expected to exceed 250 people for approximately 6 months, with a maximum of approximately 350 people anticipated.

3.3.11 Traffic Generation

The Modification would not involve any material change to Mount Pleasant Operation approved road transport movements.

Notwithstanding, due to the proposed extension to the permitted mine life, a contemporary assessment of the road traffic generation associated with the operation in the period to 2026 is provided in Appendix C.

3.4 WATER MANAGEMENT

The Modification would not include any significant changes to the approved water management system at the site.

A review of the water balance of the Mount Pleasant Operation incorporating the Modification was conducted by Hydro Engineering & Consulting (HEC) in 2017 (Appendix E).

The findings of the water balance review indicates that the supply reliability for CHPP and dust suppression demand would exceed 97% under average conditions (Appendix E).

In addition, in order to reduce make-up water demand from the Hunter River over the life of the Mount Pleasant Operation, MACH Energy may also source excess mine water from the adjoining mines (i.e. Dartbrook and Bengalla Mines) for use on-site. Should this water sharing be undertaken, it would be subject to MACH Energy and the other mining operator obtaining all necessary secondary approvals (e.g. EPL variations). In addition, any such water transfers would be via temporary overland pipeline that would be positioned to avoid any additional native vegetation clearance within the Mount Pleasant Operation Development Consent DA 92/97 boundary (e.g. by use of an existing road).

MACH Energy will continue to undertake regular reviews of the water balance, which is inherently highly influenced by site rainfall.

³ Excluding emplacement of waste rock that may be used for the construction of infrastructure.

3.5 FINAL LANDFORM

Final landforms and associated visual impacts in Muswellbrook and the progress of rehabilitation of mine landforms have been recognised as a particular point of interest to the local community and MSC.

The revision to the waste emplacement strategy provides MACH Energy with the opportunity to improve the Mount Pleasant Operation final landform design in comparison to the landform originally approved in 1999.

In particular, MACH Energy has adopted a range of measures to make the final landform more consistent with the natural topography when viewed from Muswellbrook and other key public vantage points as described in Section 4.9.

4 ENVIRONMENTAL ASSESSMENT

4.1 IDENTIFICATION OF KEY ISSUES

The approved open cut extents and the depth of mining at the Mount Pleasant Operation would be unchanged by the Modification (Section 3).

There would also be no increase to the site operational workforce or to the annual maximum or total coal or waste rock that would be produced throughout the life of the operation.

Therefore there would be no material alteration to the approved impacts of the Mount Pleasant Operation on the following environmental aspects:

- coal processing, handling and stockpile management;
- fine and coarse reject management;
- waste rock management and geochemistry;
- groundwater resources (i.e. total groundwater inflows throughout the life of the mine); and
- regional population effects associated with the operation of the mine.

The proposed changes to the approved Mount Pleasant Operation that may have some material effect on the approved environmental impacts of the mine therefore comprise the:

- extension of the duration of the permitted period of mining operations (noting that the Modification is only seeking re-instatement of a portion of the originally approved 21 year duration of mining operations);
- changes associated with MACH Energy's planned truck and shovel mining operation as a dragline is not currently intended to be in use in the period to 2026;
- minor variations to the open cut mining sequence and provisional mine schedule associated with the planned change in mining method; and
- the emplacement extension and final landform improvements.

The short-term increase in construction workforce that is anticipated to occur as a result of MACH Energy's expedited construction schedule would occur well before the operational workforce peaks, and therefore is not expected to result in any material increase in total on-site employment or maximum traffic movements.

On the basis of the above, it can be concluded that potential environmental impacts of the Modification are largely restricted to the following areas:

- potential changes to off-site air, noise or blasting emissions associated with the modified mobile fleet, associated mine sequence/schedule changes and the emplacement extension;
- extension of the duration of the approved operational road transport and rail transport movements (i.e. until 2026); and
- minor amendments to the surface development area of the Mount Pleasant Operation associated with updates to the waste emplacement strategy.

Potential noise, blasting, air quality and transportation changes associated with the Modification are addressed in supporting Appendices A, B and C and the results summarised in the subsections 4.2 to 4.5 below.

In addition, consideration of the potential impacts of the update to the waste emplacement strategy on ecological values is provided in the supporting Appendix D and summarised in Section 4.6.

A range of heritage sites have previously been identified within, or proximal to, the emplacement extension area. Management of these sites in accordance with existing approved management measures is described in Section 4.7.

The operational water balance and site water demand as a result of the Modification open cut mining sequence and schedule incorporating the emplacement extension is described in Appendix E and Section 4.8.

The proposed design of the final landform is discussed in Section 5, and consideration of the potential visual impacts of the landform improvements is provided in Section 4.9.

4.2 OPERATIONAL NOISE

A Noise and Blasting Assessment for the Modification was undertaken by Wilkinson Murray (2017) and is presented in Appendix A.

The operational noise assessment was conducted in accordance with the NSW *Industrial Noise Policy* (INP) (EPA, 2000).

As no material changes to the construction of the Mount Pleasant Operation are proposed for the Modification, no assessment of construction noise is required.

Potential blasting and transport noise impacts of the Mount Pleasant Operation incorporating the Modification are discussed in Sections 4.4 and 4.10.1, respectively.

4.2.1 Background

Noise Measurement and Description

The assessed noise levels presented in Appendix A and summarised in this section are expressed in A-weighted decibels (dBA). The logarithmic dBA scale simulates the response of the human ear, which is more sensitive to mid to high frequency sounds and relatively less sensitive to lower frequency sounds.

Hearing 'nuisance', for most people, begins at noise levels of about 70 dBA, while sustained (i.e. eight hours) noise levels of 85 dBA can cause hearing damage.

Measured or predicted noise levels are expressed as statistical noise exceedance levels (L_{AN}) which are the levels exceeded for a specific percentage (N) of the interval period. For example, L_{A10} is the noise level that is exceeded for 10% of the sampling period and is also considered to be the average maximum noise level.

The equivalent continuous noise level (L_{Aeq}) refers to the steady sound level, which is equal in energy to the fluctuating levels recorded over the sampling period.

Background Noise Levels and Criteria

Given the local setting (i.e. proximity to the township of Muswellbrook, rural landholdings and neighbouring mines) the background noise environment in the vicinity of the Mount Pleasant Operation is complex.

To reflect this complexity, a number of Noise Assessment Groups (NAGs) were adopted in Development Consent DA 92/97 to account for the variance in background noise levels surrounding the Mount Pleasant Operation (Figure 13).

Based on the background levels for each NAG and the predicted noise impacts of the approved Mount Pleasant Operation, general noise criteria for each NAG, and specific higher noise criteria for a selection of proximal private residences, are described in Table 3 of Development Consent DA 92/97.

The criteria in Table 3 of Development Consent DA 92/97 have been applied for the Modification noise assessment (Table 3).

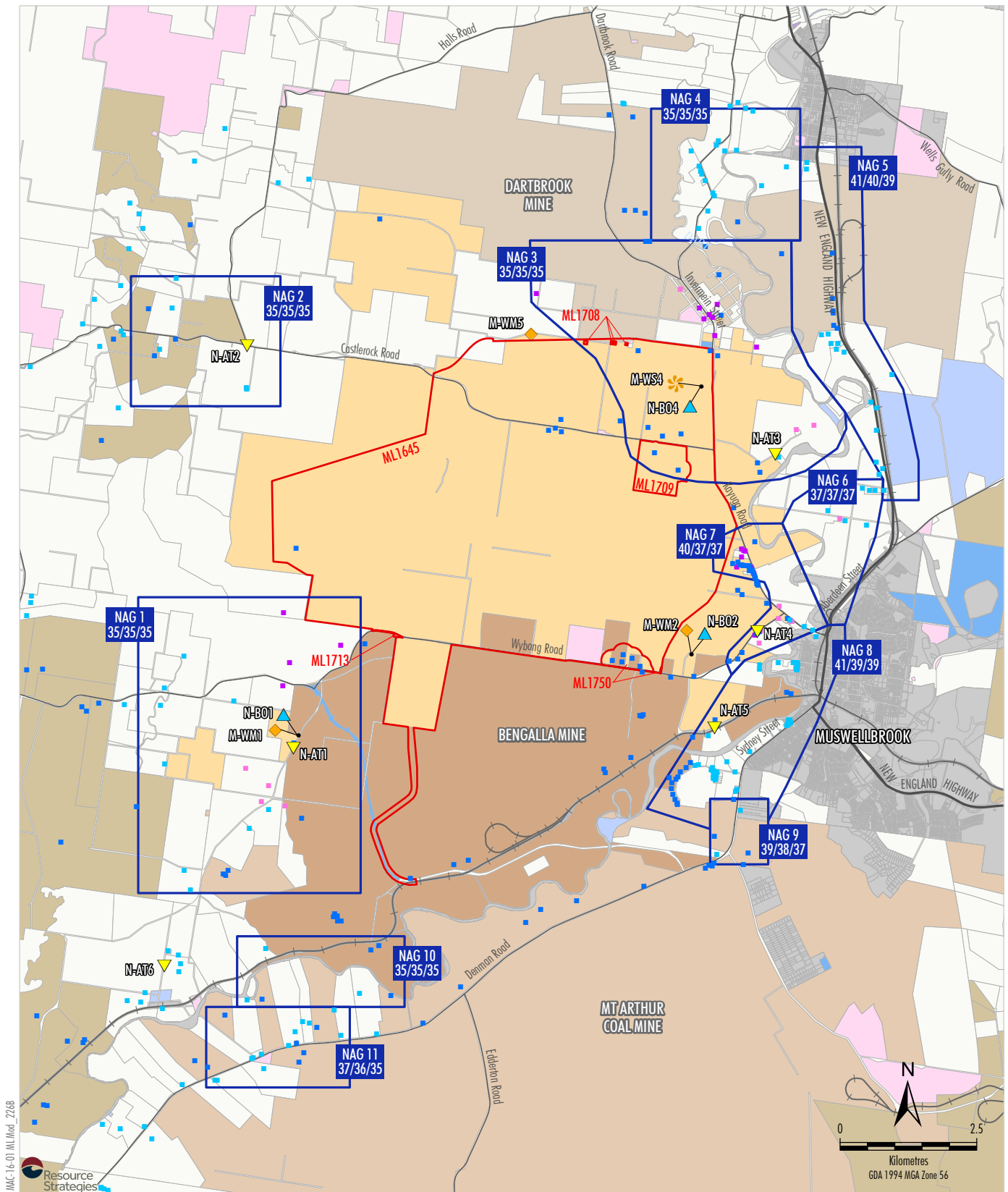
The cumulative noise criteria from Table 5 of Development Consent DA 92/97 are provided in Table 4 and have also been considered.

A dwelling verification exercise has been completed by MACH Energy for the Modification to confirm the presence of habitable dwellings surrounding the Mount Pleasant Operation, and update the land ownership of relevant properties (Section 1.1). Table 3 has been annotated with changes to land ownership and dwelling status based on MACH Energy's dwelling verification exercise.

Noise Monitoring Programme and Noise Management Strategy

MACH Energy has prepared a Noise Management Plan for the Mount Pleasant Operation, which describes the noise monitoring programme and noise management strategies for the approved mine.

The monitoring programme consists of a combination of off-site operator-attended monitoring sites and continuous real-time monitors. Current attended and real-time noise monitoring locations are shown on Figure 13. MACH Energy's initial noise monitoring locations are subject to finalisation of the Noise Management Plan that is currently under review by DPE.



Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017)

- LEGEND**
- Mining Lease Boundary
 - Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
 - Crown
 - Crown/State of NSW
 - The State of NSW
 - Muswellbrook Shire Council
 - Upper Hunter Shire Council
 - Mount Pleasant Controlled
 - Bengalla Controlled
 - Dartbrook Controlled
 - Mt Arthur Controlled
 - Other Mining/Resource Company Controlled
 - Privately Owned Land
 - Mine-owned Dwelling
 - Privately-owned Residence - MPO Acquisition on Request
 - Privately-owned Residence - MPO Mitigation on Request
 - Other Privately-owned Residence
 - Noise Assessment Group (NAG) (DA 92/97)
 - 37/36/35 Default NAG Noise Criteria for Day/Evening/Night
 - ▼ Monitoring Site
 - ▼ Attended Noise
 - ▼ Real-Time Noise
 - ◆ Weather Mast
 - ✻ Weather Station

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Noise Assessment Groups
and Monitoring Locations

Figure 13

Table 3
Development Consent DA 92/97 Noise Criteria (dBA)

Location		Day	Evening	Night	
		L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{A1} (1min)
NAG 1 ¹	260, 261	37	37	37	45
	258 ²	40	40	40	45
	259	39	39	39	45
	All other privately-owned land	35	35	35	45
NAG 2	272	36	36	36	45
	All other privately-owned land	35	35	35	45
NAG 3 ¹	139, 154, 240 ²	40	40	40	45
	241 ²	39	39	39	45
	All other privately-owned land	35	35	35	45
NAG 4	169	36	36	36	45
	All other privately-owned land	35	35	35	45
NAG 5	All privately-owned land	41	40	39	45
NAG 6 ¹	205 ²	41	41	41	45
	203, 242 ²	40	40	40	45
	202	39	39	39	45
	204	38	38	38	45
	All other privately-owned land	37	37	37	45
NAG 7 ¹	68, 74, 279 ²	43	42	42	45
	86, 290 ²	42	42	42	45
	77	42	41	41	45
	79, 80, 231 ³	41	41	41	45
	78 ²	41	40	40	45
	All other privately-owned land	40	37	37	45
NAG 8	35	42	41	41	45
	289	41	40	40	45
	23, 84	40	40	40	45
	All other privately-owned land	41	39	39	45
NAG 9	All privately-owned land	39	38	37	45
NAG 11	All privately-owned land	37	36	35	45
NAG 10 and all other privately-owned land		35	35	35	45

After: Development Consent DA 92/97.

Notes:

¹ The Mod 1 EA predicted maximum noise levels of 40 dBA at Receiver 257 (located in NAG 1), 39 dBA at Receiver 140 (located in NAG 3), 38 dBA at Receiver 198 (located in NAG 6) and 42 dBA at Receiver 83 (located in NAG 7). While these predictions are not reflected in Table 3, Receivers 257 and 140 are entitled to noise mitigation upon request under Development Consent DA 92/97.

² MACH Energy has established that these receivers are no longer present/inhabited.

³ MACH Energy has established that Receiver 231 is now an uninhabited mine-owned property.

- To identify the locations referred to in Table 3, see Attachment 2; and
- Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW INP.

Table 4
Cumulative Noise Criteria (dBA) $L_{Aeq}(\text{period})$

Location	Day	Evening	Night
NAG 8, 9	55	45	40
All other privately-owned land	50	45	40

After: Development Consent DA 92/97.

Note: Cumulative noise is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW INP.

In accordance with the Noise Management Plan, operator-attended noise monitoring is used for demonstrating compliance with noise impact assessment criteria. Continuous real-time monitoring (which measures both mine and other noise sources) is used as a noise management tool to assist MACH Energy with implementing proactive and reactive noise management actions to minimise potential noise impacts from the Mount Pleasant Operation at private residences.

The noise management strategy for the Mount Pleasant Operation includes the following:

- operating mobile equipment in less exposed areas during the evening and night;
- the use of noise attenuation on all major mobile plant;
- procurement of contemporary technology fixed plant; and
- implementation of additional proactive and reactive mitigation measures based on the predictive modelling system and real-time monitoring.

The real-time monitoring triggers are set at levels designed to maintain compliance with Development Consent DA 92/97 criteria. The protocol for responding to real-time noise monitoring triggers is described in the Noise Management Plan.

4.2.2 Environmental Review

Operational Noise Modelling

The Environmental Noise Model was used by Wilkinson Murray (2017) to simulate the Mount Pleasant Operation incorporating the Modification using noise source information (i.e. indicative sound power levels and locations) to predict resultant noise levels at relevant receiver locations.

The Environmental Noise model is recommended by the INP (EPA, 2000) and has been previously accepted by the NSW EPA for use in environmental noise assessments (Appendix A).

The model considers meteorological effects, surrounding terrain, the distance from source to receiver and noise attenuation. The locations of modelled receivers (i.e. dwellings) are shown in summary on Figure 13 and in detail in Attachment 2.

Assessment of Meteorological Conditions

The INP generally directs the use of a simple set of adverse meteorological data in the assessment of noise impacts (EPA, 2000). However, for noise modelling in this and other projects, Wilkinson Murray (2017) has adopted the approach of predicting noise levels at nearby receivers for a range of meteorological conditions based on meteorological data obtained from the locality.

A 10th percentile exceedance noise level is calculated (i.e. the level that is exceeded for 10% of all assessed meteorological conditions), which is then compared with relevant criteria. The meteorological conditions are assessed for the day, evening and night across all seasons (i.e. summer, autumn, winter and spring) and include noise-enhancing conditions such as temperature inversions and source to receiver winds (Appendix A).

The noise modelling completed for the Modification is based on meteorological data sourced from on-site monitoring, other local meteorological monitoring (NSW OEH monitors) and regional Bureau of Meteorology monitoring stations.

Prognostic meteorological model data from The Air Pollution Model (TAPM) and the surface observations were input into the CALMET meteorological model (Todoroski Air Sciences, 2017). Two extracts from the model were used to characterise the varying meteorological conditions experienced in the vicinity of the Mount Pleasant Operation. One extract was used for modelling potential noise impacts to receivers to the east, while another extract was used for modelling potential impacts to receivers to the west (Appendix A).

Details of the analysis of meteorological conditions modelled and the locations where each CALMET extract were applied are provided in Appendices A and B.

Noise Modelling Scenarios

Three operational scenarios of the Modification were assessed for potential noise impacts (Appendix A):

- 2018 – representative of when 24 hour mining operations commence and activities are proximal to Muswellbrook;
- 2021 – representative of peak mining activity for the Mount Pleasant Operation in the Modification period; and
- 2025 – representative of when mining activity is near peak level and the active pit and waste emplacement areas are close to full extent in the Modification period.

The operational scenarios were selected in consideration of maximum potential noise emissions (e.g. to account for the maximum mobile equipment fleet and proximity to sensitive receivers) to evaluate the potential impacts at the nearest privately-owned receivers in the Modification period.

Identification of Reasonable and Feasible Mitigation

Wilkinson Murray (2017) conducted an assessment of reasonable and feasible noise mitigation measures for the Modification, particularly in relation to evening and night-time operations.

A number of iterative steps were undertaken to develop noise mitigation measures for the Modification, including the following (Appendix A):

1. Review of previous noise assessments in the context of the Modification and contemporary noise assessment practice, including previously proposed mitigation measures and noise management commitments.
2. Positioning mobile equipment during the evening and night-time to optimise the shielding provided by the developing waste emplacement landforms (particularly the Eastern Out of Pit Emplacement for receivers to the south east and east).
3. Preliminary noise modelling of various scenarios representative of the likely maximum noise emissions from the Mount Pleasant Operation incorporating the Modification to identify the potential for noise exceedances.

4. Evaluation of various combinations of additional noise management and mitigation measures that could be employed in response to either predicted adverse conditions (i.e. proactive measures based on the predictive noise and meteorological forecasting system) or real-time monitoring triggers, to assess the relative effectiveness of these measures in further reducing potential noise impacts under specific adverse weather conditions.
5. Review of the effectiveness of these measures and assessment of their feasibility by MACH Energy.

Proactive Noise Management

A range of reasonable and feasible mitigation measures would be available to MACH Energy in addition to the operational controls incorporated into the modelling (i.e. optimised operational shielding and use of noise attenuated major mobile plant). In practice, these measures would be employed as required throughout the life of the Mount Pleasant Operation in order to maintain compliance with the relevant criteria in Development Consent DA 92/97.

Additional proactive/reactive mitigation scenarios considered and adopted in the noise modelling ranged from shutting down a single item of mobile plant (e.g. a drill) to shutting down a series of items that are co-operatively engaged in a specific mining activity (e.g. one waste removal haul fleet, including haul trucks, dozers, excavator and drill) (Appendix A).

For evening and night-time operations in 2018, this form of noise mitigation would reduce noise levels by approximately 4 dBA at some of the nearest privately-owned receivers under the relevant adverse conditions (Appendix A).

Analysis of the frequency of meteorological conditions that would result in exceedances at the most affected receivers indicates that noise mitigation of this scale would be required for only approximately 5% of 2018 (Appendix A). MACH Energy identified that this frequency of additional noise mitigation could be accommodated by the Modification schedule.

Less intensive noise mitigation measures, such as temporarily pausing the use of a small number of particularly exposed mobile equipment during adverse conditions, would also easily be accommodated in the Modification schedule.

Predicted Noise Levels

Project-only Noise Emissions

With the continued implementation of the adopted controls (i.e. operational shielding, use of noise attenuated major mobile plant and contemporary fixed plant) and the proactive and reactive measures described above, all privately-owned receivers are predicted to achieve the relevant criteria described in Development Consent DA 92/97, with the exception of Receiver 136 (Appendix A).

Investigation into this receiver's noise criteria indicates Receiver 136 should have been afforded acquisition upon request rights in Development Consent DA 92/97 based on 2010 noise modelling predictions for the neighbouring properties (Appendix A).

The predicted Modification noise levels are therefore considered consistent with those described in the Mod 1 EA, and the Modification would not materially change the approved noise envelope of the Mount Pleasant Operation (Appendix A).

Indicative contours of 10th percentile noise predictions for the assessed scenarios are presented on Figure 14 to Figure 16. These figures also present simplified NAGs for the Mount Pleasant Operation consistent with Wilkinson Murray recommendations (Appendix A).

Suggested Amendments to Development Consent DA 92/97 Criteria

As described above, the noise assessment completed for the Modification has identified an anomaly regarding Receiver 136.

Suggested amendments to Development Consent DA 92/97 regarding Receiver 136, and some additional amendments, such as those based on the dwelling verification exercise completed by MACH Energy would be required (Section 6).

Cumulative Noise Emissions

Cumulative noise impacts resulting from the concurrent operation of the Mount Pleasant Operation incorporating the Modification and the Bengalla Mine, the Mt Arthur Coal Mine and the Dartbrook Mine (should it re-commence) were assessed against the cumulative noise criteria in Development Consent DA 92/97 (reproduced in Table 4) (Appendix A).

The methodology used for cumulative assessment was to logarithmically add the respective day, evening and night-time predictions during adverse meteorological conditions of the four mines for key receivers and compare the overall noise levels against the relevant criteria. This approach is inherently conservative as the chance of maximum noise emissions from each mine coinciding with adverse weather conditions is unlikely.

The conservative assessment indicated that, in the absence of proactive and reactive mitigation measures, cumulative noise levels from concurrent operation of the four mines would comply with the relevant criteria at all but five privately-owned receivers (Appendix A).

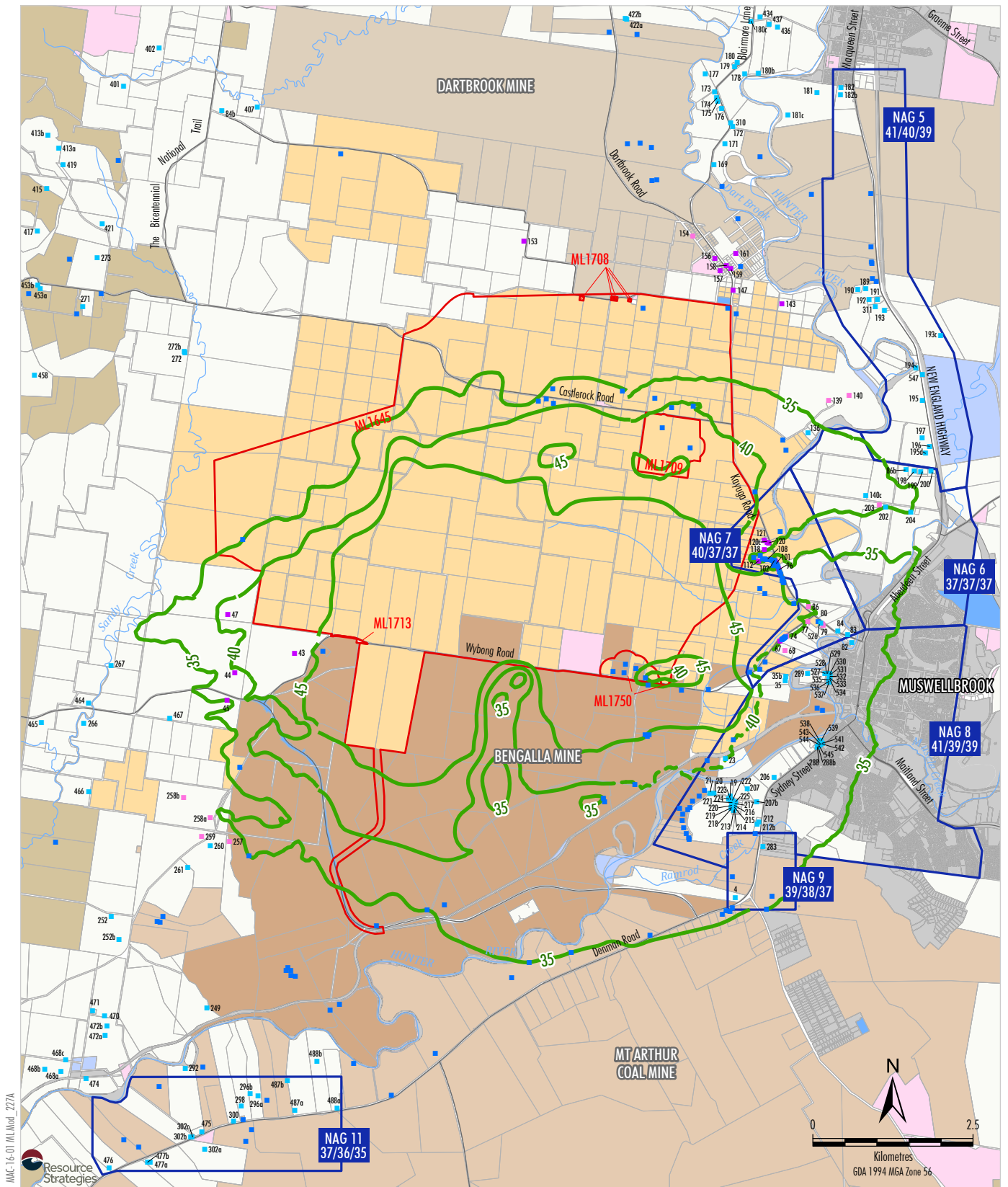
Exceedances at three receivers to the south east of the Mount Pleasant Operation (receivers 20, 21 and 23) are predicted to be negligible (1 decibel [dB]), and could be avoided with the implementation of the proactive and reactive mitigation measures described above to comply with relevant intrusive criteria (Appendix A).

Predicted cumulative exceedances at two receivers located a significant distance south of the Mount Pleasant Operation (receivers 488a and 488b) result from the combined noise predicted to be generated by the Mt Arthur Coal Mine and Bengalla Mine. Noise emitted from the Mount Pleasant Operation was found not to materially contribute to the predicted cumulative noise levels at these receivers (Appendix A).

It is noted that the identified potential cumulative noise exceedances (in the absence of further noise controls) are well under the cumulative acquisition noise criteria provided in Development Consent DA 92/97 (Appendix A).

Vacant Land Assessment

Wilkinson Murray (2017) has completed a vacant land assessment in accordance with contemporary policy and concluded that no additional properties are likely to exceed the relevant criteria based on potential impacts on vacant land (Appendix A).



LEGEND

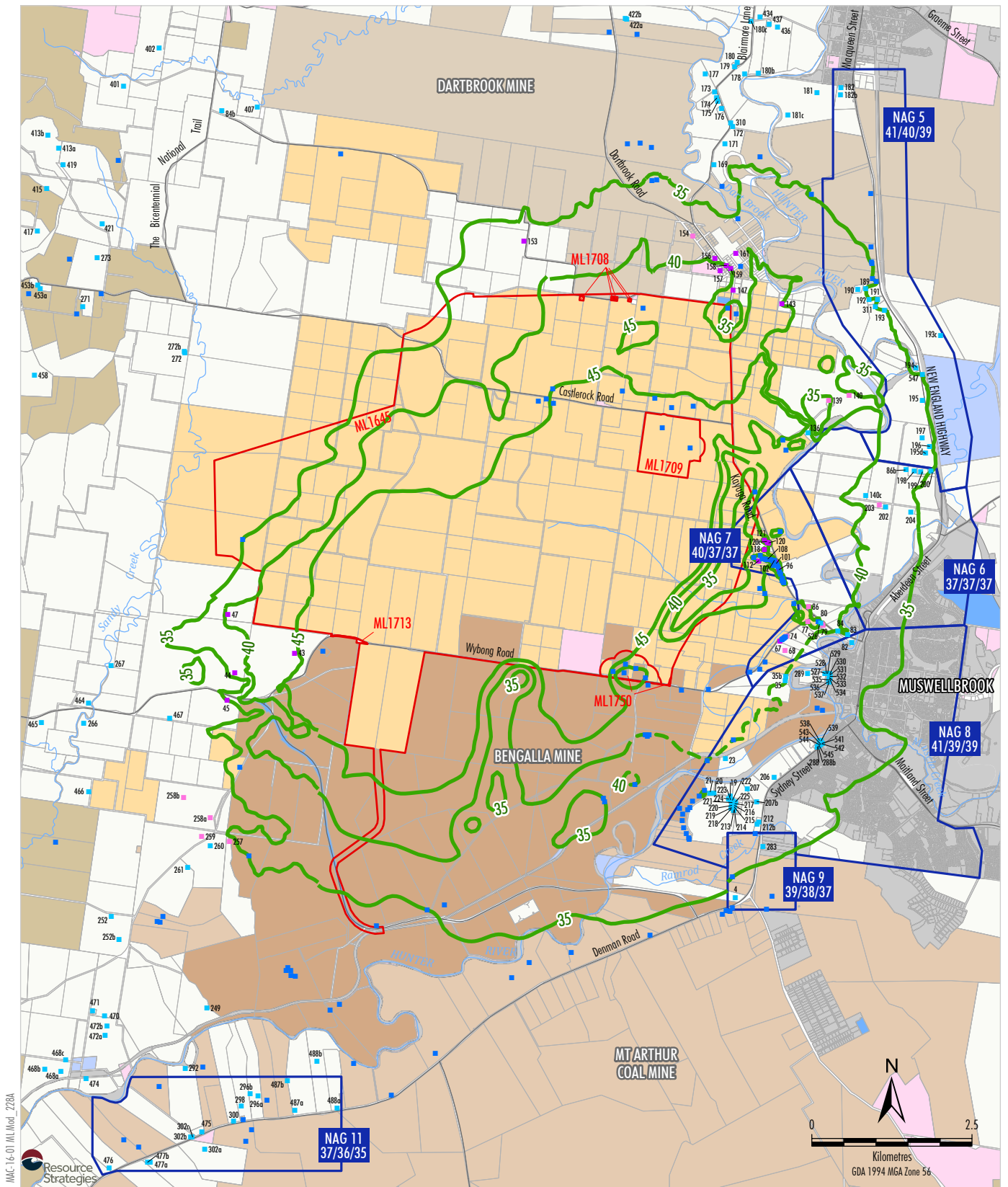
- Mining Lease Boundary
- Mine-owned Dwelling
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- Revised Noise Assessment Group (NAG)
- Default NAG Noise Criteria for Day/Evening/Night
- Evening P10 Intrusive L_{Aeq} (15 minute) Noise Contour
- Evening P10 Intrusive L_{Aeq} (15 minute) Noise Contour (with implementation of proactive and reactive mitigation measures)

- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- Crown/State of NSW
- The State of NSW
- Muswellbrook Shire Council
- Upper Hunter Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Wilkinson Murray (2017)

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Predicted Noise Level Contours
2018

Figure 14



LEGEND

- Mining Lease Boundary
- Mine-owned Dwelling
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- Revised Noise Assessment Group (NAG)
- Default NAG Noise Criteria for Day/Evening/Night
- Evening P10 Intrusive L_{Aeq} (15 minute) Noise Contour
- Evening P10 Intrusive L_{Aeq} (15 minute) Noise Contour (with implementation of proactive and reactive mitigation measures)













- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- Crown/State of NSW
- The State of NSW
- Muswellbrook Shire Council
- Upper Hunter Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Wilkinson Murray (2017)

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MOUNT PLEASANT OPERATION
Predicted Noise Level Contours
2021

Figure 15



- | | |
|---|--|
|  | Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1 |
|  | Crown |
|  | Crown/State of NSW |
|  | The State of NSW |
|  | Muswellbrook Shire Council |
|  | Upper Hunter Shire Council |
|  | Mount Pleasant Controlled |
|  | Bengalla Controlled |
|  | Dartbrook Controlled |
|  | Mt Arthur Controlled |
|  | Other Mining/Resource Company Controlled |
|  | Privately Owned Land |

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MOUNT PLEASANT OPERATION
Predicted Noise Level Contours
2025

Figure 16

Sleep Disturbance

Wilkinson Murray (2017) has conducted an assessment of potential sleep disturbance impacts. A sleep disturbance criterion of $L_{A1(1min)}$ 45 dBA applies to privately-owned receivers in the vicinity of the Mount Pleasant Operation (excepting those subject to acquisition upon request) as shown in Table 3.

All privately-owned receivers where sleep disturbance criteria apply are predicted to receive $L_{A1(1min)}$ noise levels below the criterion from the Mount Pleasant Operation incorporating the Modification (Appendix A).

4.2.3 Mitigation Measures

MACH Energy would continue to implement the noise mitigation and management measures, and predictive and real-time noise management system and associated response protocols, detailed in the Noise Management Plan for the Mount Pleasant Operation.

The Noise Management Plan would be reviewed and, if required, revised to reflect any changes to Development Consent DA 92/97 that arise from the Modification (e.g. simplification of NAGs).

4.3 DUST AND PARTICULATE MATTER

An Air Quality and Greenhouse Gas Assessment for the Modification was undertaken by Todoroski Air Sciences (2017) and is presented as Appendix B. The assessment was conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (Approved Methods) (EPA, 2016).

As no material changes to the construction of the Mount Pleasant Operation are proposed for the Modification, no assessment of potential air quality impacts of construction is required.

Potential blasting impacts and greenhouse gas emissions associated with the Modification are discussed in Sections 4.4 and 4.10.2 respectively.

4.3.1 Background

Air Quality Criteria

Concentrations of Particulate Matter

Mining activity at the Mount Pleasant Operation has the potential to generate particulate matter (e.g. dust) emissions in the form of:

- total suspended particulate matter (TSP);
- particulate matter with an aerodynamic diameter less than or equal to 10 micrometres (PM_{10}) (a subset of TSP); and
- particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometres ($PM_{2.5}$) (a subset of TSP and PM_{10}).

Relevant health-based air quality impact assessment criteria for TSP, PM_{10} and $PM_{2.5}$ are specified by the EPA in the Approved Methods (EPA, 2016), and are provided in Table 5. Development Consent DA 92/97 air quality criteria for TSP and PM_{10} are also provided in Table 5.

It is important to note that the updated Approved Methods was gazetted in January 2017. The updates included reducing the annual average impact assessment criteria for PM_{10} from 30 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$) to 25 $\mu\text{g}/\text{m}^3$ and the inclusion of impact assessment criteria for $PM_{2.5}$.

Table 5
Criteria for Particulate Matter Concentrations

Pollutant	Averaging Period	Impact Assessment Criteria	
		Development Consent DA 92/97	Approved Methods
TSP	Annual	90 $\mu\text{g}/\text{m}^3$ ^a	90 $\mu\text{g}/\text{m}^3$ ^a
PM_{10}	Annual	30 $\mu\text{g}/\text{m}^3$ ^a	25 $\mu\text{g}/\text{m}^3$ ^a
	24-hour	50 $\mu\text{g}/\text{m}^3$ ^b	50 $\mu\text{g}/\text{m}^3$ ^a
$PM_{2.5}$	Annual	-	8 $\mu\text{g}/\text{m}^3$ ^a
	24-hour	-	25 $\mu\text{g}/\text{m}^3$ ^a

After: Development Consent DA 92/97 and Approved Methods (EPA, 2016).

Notes:

- Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
- Incremental increase in concentrations due to the development on its own.

These updates to general impact assessment criteria are not related to, or reflected in, the criteria specified in Development Consent DA 92/97 and therefore are not relevant to evaluating compliance for the approved Mount Pleasant Operation, or neighbouring mining operations.

Dust Deposition

Particulate matter has the potential to cause nuisance (amenity) effects when it is deposited on surfaces.

The amenity criteria for the maximum increase in dust deposition, as specified by the EPA in the Approved Methods (EPA, 2016) and the criteria in Development Consent DA 92/97, are provided in Table 6. It is noted that the impact assessment criteria in the Approved Methods (EPA, 2016) and Development Consent DA 92/97 are consistent.

Table 6
Criteria for Dust Deposition (Insoluble Solids)

Averaging Period	Maximum Increase in Deposited Dust Level	Maximum Total Deposited Dust Level
Annual	2 g/m ² /month	4 g/m ² /month

After: Development Consent DA 92/97 and Approved Methods (EPA, 2016).

g/m²/month = grams per square metre per month.

Environment Protection Licence 20850

Air quality criteria and other air quality related conditions stipulated in EPL 20850 are generally consistent with those described in Development Consent DA 92/97.

However, EPL 20850 also includes additional conditions requiring the majority of dust generating activity at the Mount Pleasant Operation to be ceased under a specific combination of adverse weather conditions and measured PM₁₀ levels at the Muswellbrook NW Upper Hunter Air Quality Monitoring Network (UHAQMN) monitor.

EPL 20850 will therefore further constrain the dust generating potential of the Mount Pleasant Operation in addition to the protection provided by the criteria within Development Consent DA 92/97. The EPL conditions have therefore been considered when developing the air quality monitoring programme and air quality management strategy for the Mount Pleasant Operation.

Air Quality Monitoring Programme and Air Quality Management

MACH Energy has prepared an Air Quality and Greenhouse Gas Management Plan for the Mount Pleasant Operation. The Plan describes the air quality monitoring programme and air quality management strategies for the approved mine.

The monitoring programme consists of a combination of dust deposition gauges, High Volume Air Samplers (HVAS) and continuous real-time Palas Fidas monitors. Locations of air quality monitoring locations are shown on Figure 17. MACH Energy's initial air quality monitoring locations are subject to finalisation of the Air Quality and Greenhouse Gas Management Plan that is currently under review by DPE.

While all air quality monitoring is used for demonstrating compliance with air quality impact assessment criteria, continuous real-time monitoring is also used as an air quality management tool to assist MACH Energy with implementing proactive and reactive dust management actions to minimise potential air quality impacts from the Mount Pleasant Operation.

The air quality management strategy for the Mount Pleasant Operation, as described in the Air Quality and Greenhouse Gas Management Plan, includes the following:

- implementation of general dust mitigation measures (e.g. haul road watering) as part of operations to minimise potential dust emissions;
- predictive meteorological and air quality forecasting to guide daily operations;
- real-time air quality management including the implementation of additional proactive and reactive dust mitigation measures to avoid potential non-compliances;
- implementation of preventative measures to reduce the potential for spontaneous combustion events (e.g. effective stockpile management); and
- implementation of preventative measures to reduce the potential for blast fumes.

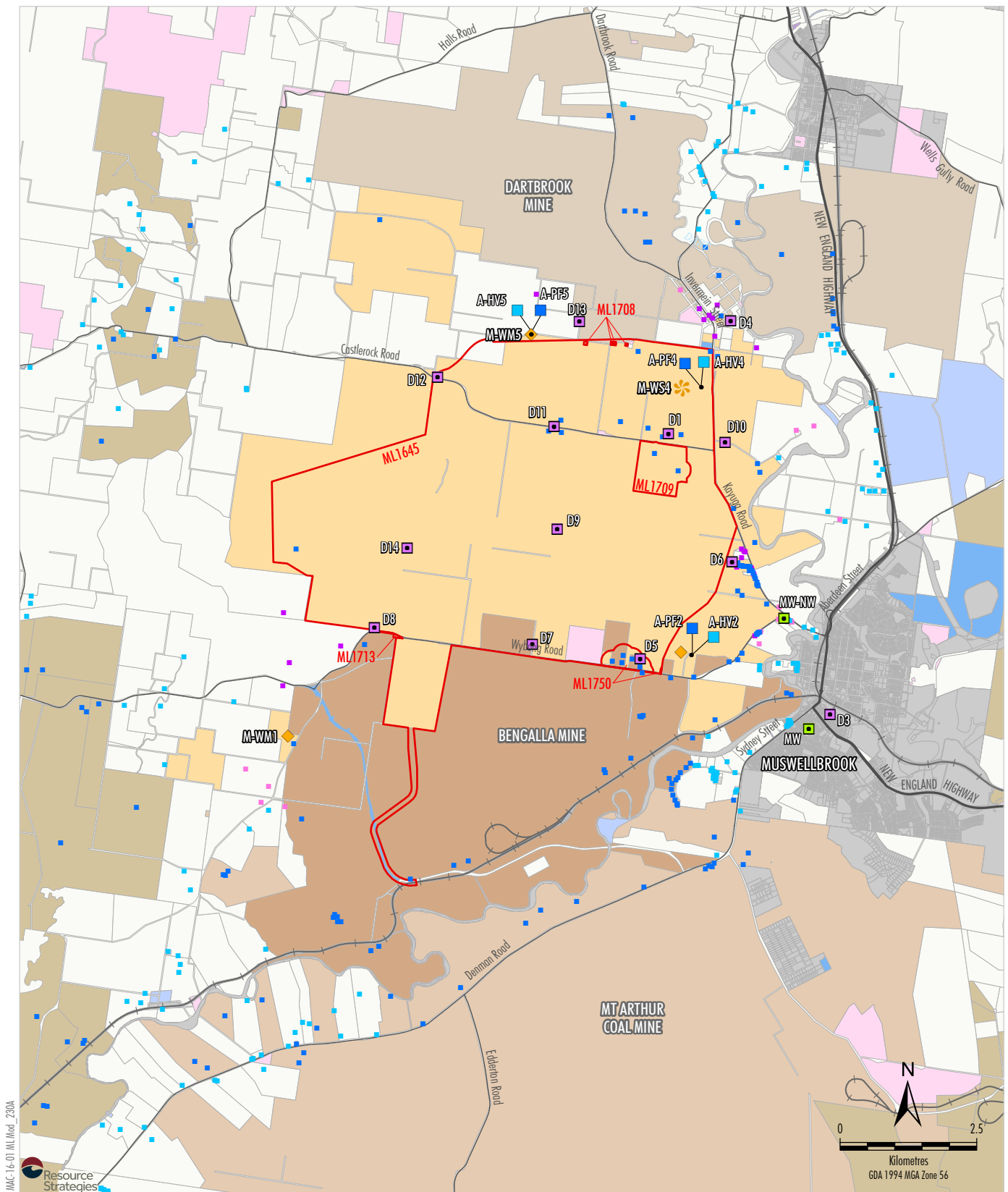


Figure 17

Existing Air Quality

TSP, PM₁₀, PM_{2.5} and dust deposition data are collected by a number of air quality monitors in the vicinity of the Mount Pleasant Operation and the wider area, including monitors operated by MACH Energy, neighbouring mines, and by the NSW OEH as part of the UHAQMN.

Todoroski Air Sciences (2017) reviewed data from over 50 air quality monitors, and a detailed discussion of the background levels of each pollutant is provided in Appendix B. In summary:

- all TSP monitors recorded annual average TSP concentrations below the criterion of 90 µg/m³ for the period 2012 to 2015;
- with the exception of one monitor, all PM₁₀ monitors recorded annual average PM₁₀ concentrations below the new criterion of 25 µg/m³ for the period 2012 to 2015 (the recorded level of 26 µg/m³ was below the relevant criterion at the time, 30 µg/m³);
- the recorded maximum 24-hour average concentrations of PM₁₀ exceed the relevant criterion of 50 µg/m³ at times during the period 2012 to 2015;
- the recorded annual average and maximum 24-hour average PM_{2.5} concentrations exceeded the relevant criteria (8 µg/m³ and 25 µg/m³ respectively) in Muswellbrook (due to use of wood heaters in residential areas); and
- dust deposition levels are generally below the relevant criterion of 4 g/m²/month, and are typically highest near mining activity.

4.3.2 Environmental Review

Dispersion Modelling

The EPA approved CALPUFF/CALMET modelling system was used by Todoroski Air Sciences (2017) to simulate the Mount Pleasant Operation incorporating the Modification (Appendix B).

Assessment of Meteorological Conditions

The dispersion modelling completed for the Modification is based on meteorological data sourced from on-site monitoring, other local meteorological monitoring (NSW OEH monitors) and regional Bureau of Meteorology monitoring.

Prognostic meteorological model data from TAPM and the surface observations were input into the CALMET meteorological model (Appendix B).

Meteorology for the period 2012 to 2015 was reviewed to identify a representative year for modelling. Following review of the meteorological data, the 2015 calendar year was selected as the representative year, and was used for the modelling. Details of the analysis of meteorological conditions modelled is provided in Appendix B.

Air Quality Modelling Scenarios

Three operational scenarios of the Modification were assessed for potential air quality impacts (Appendix B):

- 2018 – representative of when 24-hour mining operations commence and activities are proximal to Muswellbrook;
- 2021 – representative of peak mining activity for the Mount Pleasant Operation in the Modification period; and
- 2025 – representative of when mining activity is near peak level and the active pit and waste emplacement areas are close to full extent in the Modification period.

The operational scenarios were selected in consideration of maximum potential dust emissions (e.g. to account for the maximum material movements and proximity to sensitive receivers) to evaluate the potential impacts at the nearest privately-owned receivers throughout the life of the Mount Pleasant Operation incorporating the Modification.

Overall, the Modification would not result in any increases to the emissions of the approved Mount Pleasant Operation (Appendix B).

Compliance with Development Consent DA 92/97 Air Quality Criteria

No exceedances of Development Consent DA 92/97 criteria were predicted at any privately-owned receivers in 2018, 2021 or 2025 for annual average dust deposition levels (both incremental and total impact), cumulative annual average TSP concentrations or incremental 24-hour average PM₁₀ concentrations (Appendix B).

Three privately-owned receivers are predicted to experience annual average PM₁₀ concentrations above the Development Consent DA 92/97 criterion (30 µg/m³) due to the cumulative contributions from the Mount Pleasant Operation incorporating the Modification, other nearby mining operations (including the Bengalla Mine and the Mt Arthur Coal Mine) and background levels, namely receivers 43, 488a and 488b (Appendix B).

In each case, the estimated background levels (including other mines) exceed the criterion, irrespective of whether the Mount Pleasant Operation is active (Appendix B).

It is also noted that these receivers are already subject to acquisition upon request as follows:

- Receiver 43 – Mount Pleasant Operation (Noise), Mt Arthur Coal Mine [receiver 264] (Air) and Bengalla Mine [receiver 168] (Air and Noise) (if no longer subject to acquisition upon request for the Mount Pleasant Operation).
- Receivers 488a and 488b – Mt Arthur Coal Mine [receivers 210 and 211] (Air and Noise) and Bengalla Mine [receivers 118 and 119] (Air and Noise) (if no longer subject to acquisition upon request for the Mt Arthur Coal Mine).

Figures 18 to 20 show 24-hour average PM_{10} concentrations for 2018, 2021 and 2025 for the Mount Pleasant Operation including the Modification only (i.e. excluding background sources). Additional air quality contour plots are provided in Appendix B.

EPA Impact Assessment Air Quality Criteria

24-Hour Average $PM_{2.5}$

The EPA contemporaneous assessment method was applied by Todoroski Air Sciences (2017) to analyse the potential maximum cumulative 24-hour average $PM_{2.5}$ concentrations arising from the Mount Pleasant Operation incorporating the Modification.

With the implementation of proactive and reactive air quality management measures, no privately-owned receivers were predicted to experience additional days in a year above the EPA cumulative 24-hour impact assessment criterion (Appendix B).

Annual Average $PM_{2.5}$

No privately-owned receivers are predicted to experience annual average $PM_{2.5}$ concentrations above the EPA impact assessment criterion ($8 \mu\text{g}/\text{m}^3$) due to the cumulative contributions from the Mount Pleasant Operation incorporating the Modification, other nearby mining operations (including the Bengalla Mine and the Mt Arthur Coal Mine) and background levels (Appendix B).

24-Hour Average PM_{10}

The EPA contemporaneous assessment method was applied by Todoroski Air Sciences (2017) to analyse the potential maximum cumulative 24-hour average PM_{10} concentrations arising from the Mount Pleasant Operation incorporating the Modification.

With the implementation of proactive and reactive air quality management measures, no privately-owned receivers were predicted to experience additional days in a year above the EPA cumulative 24-hour impact assessment criterion (Appendix B).

Annual Average PM_{10} (Recently Reduced Criterion)

While it is not a criterion under Development Consent DA 92/97, Todoroski Air Sciences also assessed potential cumulative PM_{10} levels against the reduced ($25 \mu\text{g}/\text{m}^3$) criterion.

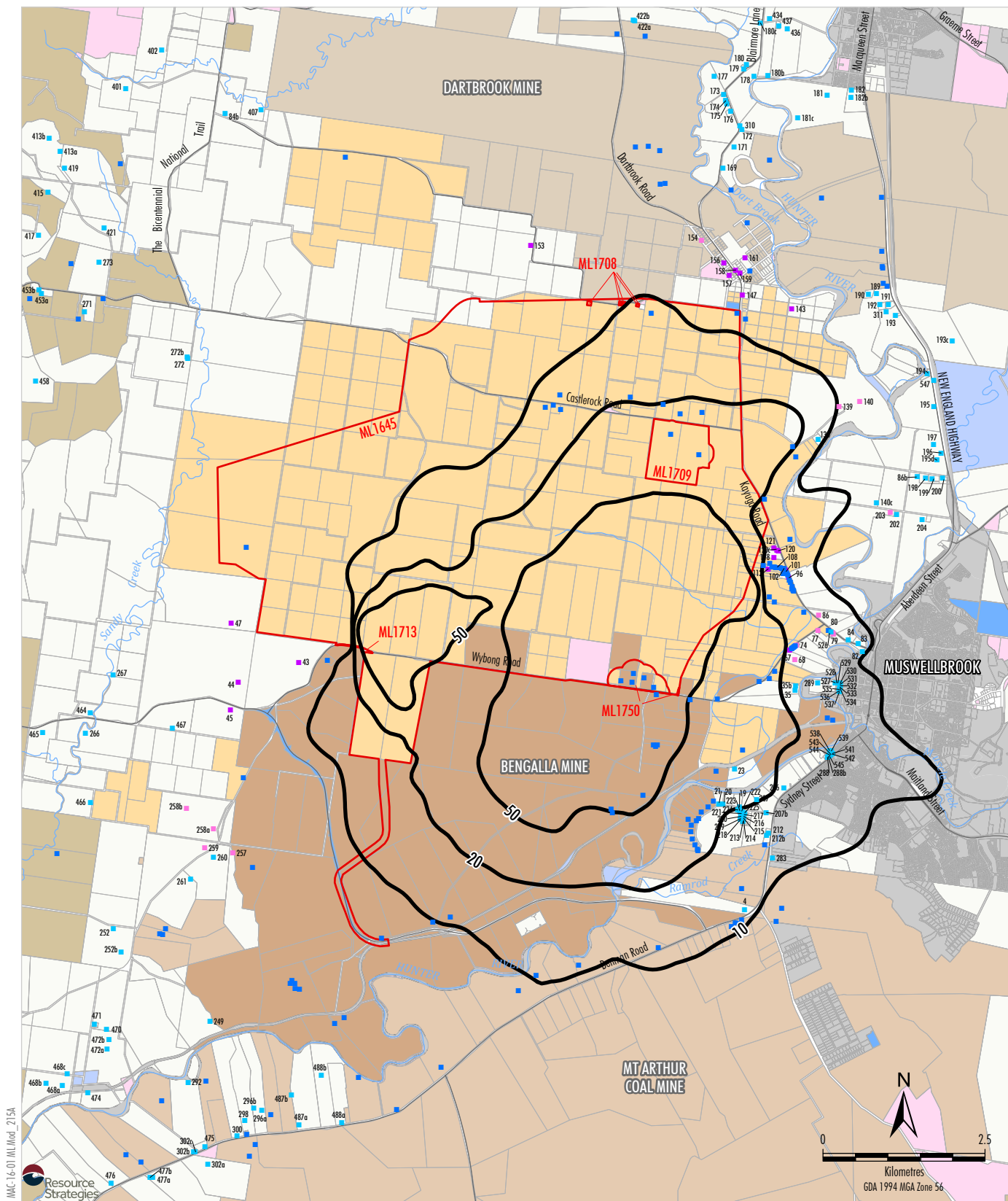
In addition to the three privately-owned receivers predicted to experience cumulative annual average PM_{10} concentrations above the Development Consent DA 92/97 criterion of $30 \mu\text{g}/\text{m}^3$, up to six other privately-owned receivers (4, 6, 20, 21, 487a and 487b) are predicted to experience cumulative annual average PM_{10} concentrations above the new EPA impact assessment criterion ($25 \mu\text{g}/\text{m}^3$) (Appendix B).

For two of these receivers (487a and 487b), the estimated background levels (including other mines) exceed the criterion, irrespective of whether the Mount Pleasant Operation is active (Appendix B).

The predicted exceedances are generally marginal (i.e. 1 to $2 \mu\text{g}/\text{m}^3$ above the new criterion that does not currently apply to the Mount Pleasant Operation or neighbouring mines).

Todoroski Air Sciences (2017) notes that the cumulative assessment includes a number of conservative assumptions and methods, including:

- dispersion modelling without the effect of rainfall removing/reducing dust emissions;
- sourcing emission rates of other mines from publically available air quality assessments, which typically assume maximum approved/proposed extraction rates (i.e. it is highly unlikely that each nearby mine would operate at maximum extraction rates concurrently); and



LEGEND

- Mining Lease Boundary
- Mine-owned Dwelling
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- 24-hour PM₁₀ Air Quality Contour (µg/m³)

- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- Crown/State of NSW
- The State of NSW
- Muswellbrook Shire Council
- Upper Hunter Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

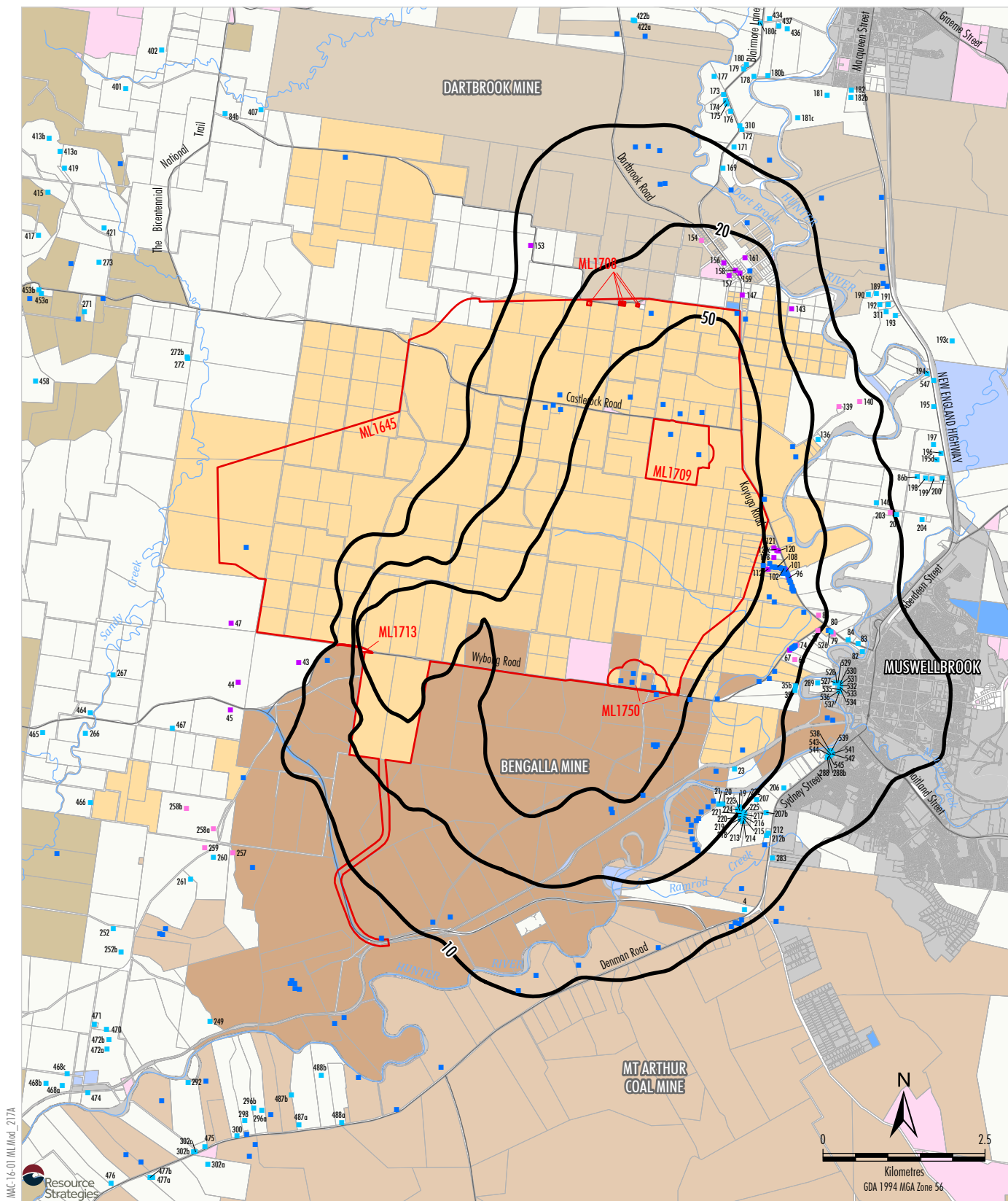
Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Todoroski Air Sciences (2017)

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MOUNT PLEASANT OPERATION

24-hour Average PM₁₀ Concentration for 2018

Figure 18



LEGEND

- Mining Lease Boundary
- Mine-owned Dwelling
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- 24-hour PM₁₀ Air Quality Contour (µg/m³)

- Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
- Crown
- State of NSW
- Muswellbrook Shire Council
- Upper Hunter Shire Council
- Mount Pleasant Controlled
- Bengalla Controlled
- Dartbrook Controlled
- Mt Arthur Controlled
- Other Mining/Resource Company Controlled
- Privately Owned Land

Source: NSW Land & Property Information (2016); NSW Division of Resources & Energy (2017); Todoroski Air Sciences (2017)

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MOUNT PLEASANT OPERATION

24-hour Average PM₁₀ Concentration for 2025

Figure 20

- emissions have been included for the proposed Drayton South Coal Project, which was refused by the NSW Planning Assessment Commission in February 2017 (site now being acquired by another resource company).

It is also noted that the effects of management of short-term impacts (e.g. proactive and reactive mitigation measures such as partial or full-site shutdowns or additional watering) have not been incorporated into the estimates of cumulative annual average concentrations. Short-term air quality management throughout the year has the potential to materially reduce the cumulative annual average concentrations of PM₁₀ at privately-owned receivers.

Vacant Land Assessment

Todoroski Air Sciences (2017) has conducted a vacant land assessment in accordance with contemporary policy and concluded that no additional properties are likely to exceed the criteria based on potential impacts on vacant land (Appendix B).

4.3.3 Mitigation Measures, Management and Monitoring

MACH Energy would continue to implement the air quality mitigation and management measures, and predictive and real-time air quality management system and associated response protocols, detailed in the Air Quality and Greenhouse Gas Management Plan for the Mount Pleasant Operation.

The Air Quality and Greenhouse Gas Management Plan would be reviewed and, if required, revised to reflect any changes to Development Consent DA 92/97 that arise from the Modification.

4.4 BLASTING

The Modification does not include any extension to the approved Mount Pleasant Operation open cut pits. However, a Noise and Blasting Assessment was undertaken by Wilkinson Murray (2017) to assess potential blast designs and confirm the blast management measures that may be required with MACH Energy's mining method. The blasting assessment is presented in Appendix A.

4.4.1 Background

Blasting Criteria

Ground vibration and airblast levels which cause human discomfort are generally lower than the recommended structural damage limits. Therefore, compliance with the lowest applicable human comfort criteria generally means that the potential to cause structural damage to buildings is minimal.

Blasting criteria for the Mount Pleasant Operation are provided in Development Consent DA 92/97 and are provided in Table 7.

4.4.2 Environmental Review

Predicted Blasting Emissions

Blast sizes at the Mount Pleasant Operation would range up to a maximum instantaneous charge (MIC) of approximately 1,600 kilograms (kg).

No exceedances of vibration and airblast criteria are predicted to occur at any privately-owned receiver, with the implementation of reduced blast MIC (where required due to proximity) to maintain compliance at the nearest receivers (Appendix A). Relevant MIC adjustments are provided in Appendix A. In addition, no exceedances of the airblast and vibration criteria are predicted at either historic heritage sites or public infrastructure with the implementation of blast MIC management measures (Appendix A).

Table 7
Development Consent DA 92/97 Blasting Criteria

Location	Airblast Overpressure (dB[Lin Peak])	Ground Vibration (mm/s)	Allowable exceedance
Residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
Historic heritage sites	-	10	0%
All public infrastructure	-	50	0%

Source: Development Consent DA 92/97.

dB[Lin Peak] = Peak linear decibels; mm/s = millimetres per second.

Flyrock

Flyrock is any material ejected from the blast site by the force of the blast. Flyrock would be managed by appropriate blast design and blast execution in accordance with best practice blast management procedures. These procedures are described in the Blast Management Plan (Section 4.4.3).

Blast Fumes

As described in the Blast Management Plan, MACH Energy will develop a Blast Fume Management Strategy prior to blasting in the open cuts. The strategy will consider a number of factors and practices to minimise blast fumes, including blast design, sleep time, explosives quality and ground condition.

4.4.3 Mitigation Measures, Management and Monitoring

MACH Energy would continue to implement the blast management measures detailed in the Blast Management Plan for the Mount Pleasant Operation incorporating the Modification.

The Blast Management Plan would be reviewed and, if required, revised for the Modification to reflect any changes to Development Consent DA 92/97.

4.5 ROAD TRANSPORT

The Modification would not result in an increase to the approved operational workforce or maximum traffic generated by the Mount Pleasant Operation.

Notwithstanding, GHD (2017) has undertaken an assessment of the potential impact of the proposed Modification on the local road transport network (Appendix C). The assessment considers the potential cumulative road transport impacts of the Mount Pleasant Operation in the context of other mining developments and background traffic growth in the modified operational period to 2026.

The maximum anticipated modified construction workforce (350 people) would remain lower than the maximum approved operational workforce (380 people) and would occur in the next 12 to 18 months. Background traffic in this period would be materially lower than in 2026, when operational traffic movements have been evaluated. Therefore, potential impacts of the construction workforce short-term peak would be lower than the peak operational impacts modelled by GHD (2017) for the Modification.

4.5.1 Background

The key roads of relevance to the Mount Pleasant Operation are summarised in Table 8.

Table 8
Key Roads of Relevance to the Operation

Road	Summary
New England Highway	Connects between Newcastle and Brisbane as an inland route running parallel to the Pacific Highway and passes through several regional population centres including Maitland, Singleton, Muswellbrook and Tamworth.
Denman Road	Denman Road is a State Road connecting to Sydney Street at Muswellbrook and continuing west to Golden Highway at Denman.
Thomas Mitchell Drive	A local road connecting between Denman Road and New England Highway, bypassing Muswellbrook to the south. It provides access to the Muswellbrook Industrial Estate as well as the Mt Arthur Coal Mine.
Wybong Road	A local road connecting between Kayuga Road, at Muswellbrook, and Golden Highway at Sandy Hollow. Wybong Road connects to Bengalla Road at a give-way controlled junction with an altered alignment where Bengalla Road – Wybong Road (west) forms the major road.
Bengalla Road (referred to as Bengalla Link Road in Development Consent DA 92/97)	Connects between Wybong Road and Denman Road. Along with the western portion of Wybong Road, Bengalla Road forms the preferred route for heavy vehicle traffic, including mine traffic, to the New England Highway south of Muswellbrook (via Thomas Mitchell Drive).
Kayuga Road	A local road connecting between New England Highway (via Aberdeen Street) and the town of Kayuga, approximately 4 km north of Muswellbrook. The southern portion of Kayuga Road provides a link between Muswellbrook and the eastern end of Wybong Road.

In accordance with Condition 38, Schedule 3 of Development Consent DA 92/97, MACH Energy is currently undertaking minor upgrades to Wybong Road from Bengalla Road to the Mount Pleasant Operation mine access. These include upgrades to the intersection of Wybong Road and Bengalla Road to accommodate B-Double turning movements.

Condition 38, Schedule 3 of Development Consent DA 92/97 also requires MACH Energy to construct two link roads to the north and west of the site when Castlerock Road and Wybong Road are closed, respectively (Section 2.9.12).

The primary access routes to the site are as follows:

- Denman Road, Bengalla Road and Wybong Road (west of the mine access) for employees and contractors travelling from Muswellbrook, as required by Condition 42, Schedule 3 of Development Consent DA 92/97.
- Thomas Mitchell Drive, Denman Road, Bengalla Road and Wybong Road (west of the mine access) for employees and contractors travelling from south of the site on the New England Highway.
- Kayuga Road and Wybong Road (east of the mine access) for employees and contractors travelling from north of the site (e.g. Kayuga, Aberdeen and Scone).
- Wybong Road (west of Bengalla Road and the mine access) for employees and contractors travelling from west of the site (e.g. contractors travelling from Mangoola Coal).

Heavy vehicle deliveries typically come from Muswellbrook or south of the site and use the same routes as employees and contractors.

The primary access to the mine site is located on Wybong Road approximately 1.5 km east of the intersection with Bengalla Road (Section 2.9.1).

4.5.2 Environmental Review

GHD (2017) has investigated the potential cumulative traffic and road network impacts of the Mount Pleasant Operation in the context of other mining developments and background traffic growth in the modified operational period to 2026.

The assessment considers the potential cumulative impacts from the approved Bengalla Mine, Mt Arthur Coal Mine, Mangoola Coal and Dartbrook Mine. Existing traffic from these mines is where relevant also included in the existing background traffic counts. Expected future traffic generated by approved expansions at these mines has also been considered, where relevant.

Existing Traffic Volumes

Total weekday traffic volumes were obtained from a number of sources including the *Muswellbrook Mine Affected Roads, Stage 1 – Road Network Plan* (Cardno, 2015), prepared for MSC. The counts are based on a range of traffic surveys undertaken in 2012, 2013 and 2016.

Specific daily traffic counts for the Modification assessment were undertaken on Thomas Mitchell Drive (near Denman Road) and Kayuga Road (west of Wybong Road) in November 2016 (Appendix C). Turning movement surveys were also undertaken at the following intersections (Appendix C):

- Wybong Road/Bengalla Road;
- Bengalla Road/Denman Road;
- Thomas Mitchell Drive/Denman Road; and
- Wybong Road/Kayuga Road.

Comparison of previous and recent traffic survey data indicates a reduction in traffic on a number of roads relevant to the Mount Pleasant Operation. Of particular note is a significant reduction in the level of traffic using Thomas Mitchell Drive, with daily traffic volumes in 2016 reducing by over 40% compared to those in 2013. This is primarily considered to be a result of recent mine closures and personnel reductions at a number of mines in the Hunter Valley (Appendix C).

Changes in Background Traffic Volumes in the Modified Operational Period

The Road Transport Assessment has considered the potential cumulative traffic and road network impacts of the Mount Pleasant Operation in 2026, when background traffic is anticipated to reach its maximum.

Traffic volumes on relevant roads were forecast to 2026 by applying a nominal background traffic growth rate of 1.0% per annum on all roads, with the exception of Thomas Mitchell Drive, which is expected to attract a growth rate of 1.45% per annum. These rates are consistent with the analysis provided in the *Muswellbrook Mine Affected Roads, Stage 1 – Road Network Plan* (Cardno, 2015) (Appendix C).

In addition to background traffic growth, the following approved mine expansions were considered in the forecast future traffic growth (Appendix C):

- Bengalla Mine expansion from 450 full-time equivalent (FTE) employees (current) to approximately 900 FTE employees.
- Mangoola Coal expansion from 300 FTEs (current) to approximately 540 FTEs.

Australian Pacific Coal Limited has indicated it intends to re-open the underground Dartbrook Mine and lodge an application for future open cut mining.

The Dartbrook Mine's contribution to traffic on the roads relevant to the Mount Pleasant Operation is anticipated to be negligible given Condition 72(f)(ii) of Development Consent (DA 231-07-2000) requires all Dartbrook Mine personnel to access the site via the New England Highway and the western access road constructed for the mine (Appendix C).

Potential Impacts in the Modified Operational Period

Traffic generated by the Mount Pleasant Operation has been estimated based on the approved mine operations and personnel, and benchmarked against neighbouring mines within the surrounding area (Appendix C).

SIDRA Intersection modelling has been undertaken of the approved Mount Pleasant Operation traffic volumes during the revised operational period (2026). This modelling indicates that traffic generated by the Mount Pleasant Operation during peak periods would not adversely impact on the operation of key intersections in 2026 (Appendix C).

Review of the crash history for relevant roads does not suggest any particular road safety deficiencies which might be exacerbated by the extension of the life of the approved Mount Pleasant Operation (Appendix C).

4.5.3 Mitigation Measures, Management and Monitoring

MACH Energy will continue to encourage employees and contractors travelling from Muswellbrook to travel to site via Denman Road, Bengalla Road and Wybong Road (west of the mine access) to minimise traffic using the Kayuga Road bridge.

MACH Energy is also developing a Maintenance Management Plan in consultation with MSC to maintain the roads and intersections between the Bengalla Mine main entrance and the main Mount Pleasant Operation access.

MACH Energy will also undertake a range of road upgrades, in consultation with MSC, as required by Conditions 38 and 39, Schedule 3 of Development Consent DA 92/97.

4.6 BIODIVERSITY

A Biodiversity Assessment for the Modification was undertaken by Hunter Eco (2017) and is presented in Appendix D. Appendix D also includes the results of targeted threatened flora species surveys undertaken by Eco Logical Australia (2017).

4.6.1 Background

Various flora and fauna studies have been undertaken at the Mount Pleasant Operation, including:

- *Mount Pleasant Mine Environmental Impact Statement* (ERM Mitchell McCotter, 1997a).
- *Mount Pleasant Project Modification Environmental Assessment Report* (EMGA Mitchell McLennan, 2010a).
- *Mount Pleasant Project Referral of Proposed Action* (Rio Tinto Coal Australia, 2010).
- *Mount Pleasant Project Mount Pleasant Project Referral of Proposed Action - EPBC No 2011/5795* (EMGA Mitchell McLennan, 2010b).
- *Mount Pleasant Upper Hunter Strategic Assessment BCAM Project Biodiversity Assessment Report* (Cumberland Ecology, 2015).
- *Mount Pleasant Operation (DA 92/97) – South Pit Haul Road Modification* (MACH Energy Australia Pty Ltd, 2017a).

Based on these studies, vegetation across the project area is a combination of exotic pastures, derived grassland, previous plantings (both native and exotic), scattered mature trees and patches of woodland. There has been significant disturbance of natural communities from agricultural practices with some areas, particularly in the east (including parts of the emplacement extension), sufficiently disturbed to be identified as non-native vegetation (Appendix D).

Fauna habitat across the project area has similarly been impacted by agricultural practices. Notwithstanding, some fauna habitat values remain, mostly within woodland areas and where mature trees are present (Appendix D).

Of the native vegetation remaining at the Mount Pleasant Operation, some communities represent Threatened Ecological Communities listed under the NSW *Threatened Species Conservation Act, 1995* (TSC Act) and EPBC Act. Threatened communities relevant to the Modification are described in Section 4.6.2.

Documents that currently relate to managing biodiversity at the Mount Pleasant Operation include the Biodiversity Management Plan, MOP, Rehabilitation Management Plan, Landscape Management Plan and internal MACH Energy ground disturbance procedures.

Key biodiversity management measures in these guidance documents include:

- Vegetation clearance procedures including habitat tree identification, ecological supervision during felling and additional fauna mitigation measures as required.
- Native seed collection for use in rehabilitation.
- Progressive rehabilitation.

In addition, while not required for the Development Consent DA 92/97, MACH Energy holds and manages a 13,522 ha biodiversity offset that was established as part of the Mount Pleasant Operation approval under the EPBC Act in 2011 (Coal & Allied, 2015 – *Offset Management Plan Mount Pleasant Project*).

4.6.2 Environmental Review

The Modification requires disturbance of native vegetation associated with the emplacement extension (Table 9). MACH Energy may also make other project layout refinements as a result of ongoing detailed engineering design. Therefore, allowance for some additional clearing has also conservatively been incorporated.

As part of the Modification, MACH Energy is relinquishing its approval to emplace waste rock within the South West Out of Pit Emplacement footprint (Figure 3) and to restrict the area in the South West Out of Pit Emplacement footprint used for major infrastructure (Sections 3.3.6 and 3.3.7).

Tables 9, 10 and 11 present the relative areas of native vegetation present within the extensions and also the northern portion of the South West Out of Pit Emplacement footprint being relinquished via this Modification. Vegetation mapping is provided on Figure 21.

In relation to fauna values, the emplacement extension area (Figure 3) provides limited habitat opportunities. Other than an area of rehabilitation/plantings (approximately 15 years old), trees are generally entirely absent from the emplacement extension area with derived grasslands the only native vegetation community present (Figure 21) (Appendix D).

In contrast, the northern portion of the South West Out of Pit Emplacement footprint being relinquished contains 17 ha of native woodland with mature trees providing foraging, nesting and roosting habitat for threatened fauna (Appendix D).

In summary, when comparing the area to be disturbed and the area being relinquished⁴, the Modification would have the following ecological gains (Appendix D):

- 4 ha less native vegetation disturbed (65 ha versus 61 ha).
- 24 ha less TSC Act listed threatened ecological community disturbed (53 ha versus 29 ha).
- More abundant and complex fauna habitat being retained (i.e. 17 ha of native woodland vegetation in the area being relinquished compared to the majority of the Modification disturbance area being exotic pasture, grassland areas and rehabilitation/plantings approximately 15 years old).

On the basis of the above, the Modification is considered to result in a net biodiversity gain without a biodiversity offset and therefore assessment under the Framework for Biodiversity Assessment is not required (Appendix D).

⁴ Relinquishment excludes more flexible and relatively minor infrastructure such as light vehicle roads, disturbance associated with water management structures and other ancillary infrastructure.

Table 9
Comparison of Native Vegetation Communities

Vegetation Community		Status*		Area to be Disturbed (ha) ^	Northern Portion of South West Out of Pit Emplacement (ha)
		TSC Act	EPBC Act		
Narrow-leaved Ironbark (PCT 1605)	Derived Native Grassland	-	-	31	7
	Grassy Woodland	-	CEEC ¹	1	5
White Box (PCT 483)	Derived Native Grassland	EEC ²	CEEC ²	29	41
	Grassy Woodland	EEC ²	CEEC ²	-	12
Total				61	65

Source: Appendix D.

Note: Excludes existing disturbance and non-native vegetation such as in dams, exotic pastures and plantations.
EEC = Endangered Ecological Community, CEEC = Critically Endangered Ecological Community.

* Threatened ecological community status under the TSC Act and/or EPBC Act (current as at 6 April 2017).

^ Includes the emplacement extension and some provision for project layout refinements to account for detailed engineering since the 1997 EIS (ERM Mitchell McCotter, 1997a).

¹ Generally equates to Central Hunter Valley Eucalypt Forest and Woodland (EPBC Act) (Appendix D).

² White Box Yellow Box Blakely's Red Gum Woodland (TSC Act)/White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (EPBC Act).

Table 10
Comparison of Native Woodland and Grassland

Vegetation Community Condition	Area to be Disturbed (ha) ^	Northern Portion of South West Out of Pit Emplacement (ha)
Derived Native Grassland	60	48
Grassy Woodland	1	17
Total	61	65

Source: Appendix D.

Note: Excludes existing disturbance and non-native vegetation such as in dams, exotic pastures and plantations.

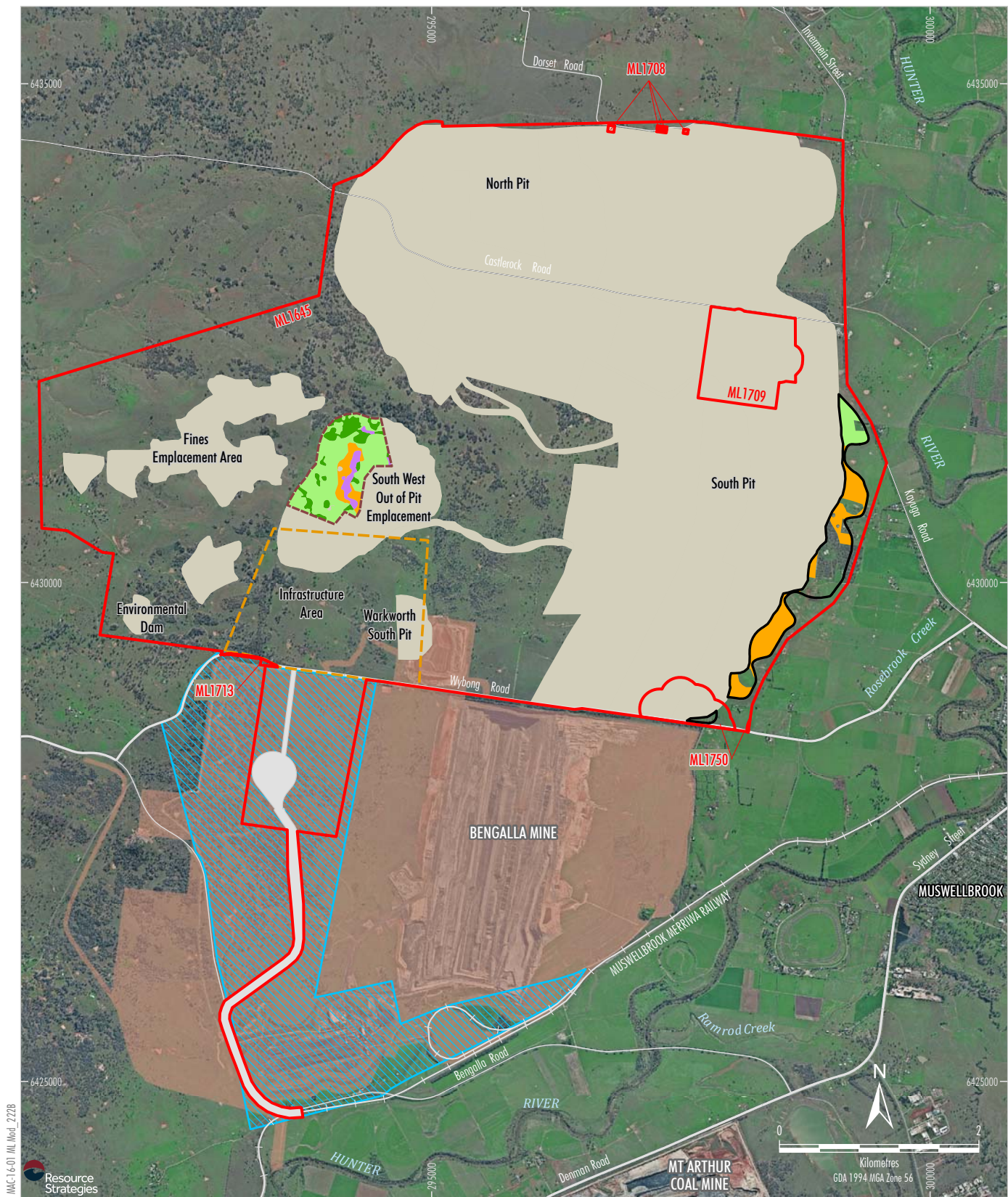
^ Includes the emplacement extension and some provision for project layout refinements to account for more detailed engineering since the 1997 EIS (ERM Mitchell McCotter, 1997a).

Table 11
Comparison of TSC Act Listed Threatened Ecological Communities

Threatened Ecological Community		Area to be Disturbed (ha) ^	Northern Portion of South West Out of Pit Emplacement (ha)
White Box Yellow Box Blakely's Red Gum Woodland	Derived Native Grassland	29	41
	Grassy Woodland	-	12
Total		29	53

Source: Appendix D.

^ Includes the emplacement extension and some provision for project layout refinements to account for detailed engineering since the 1997 EIS (ERM Mitchell McCotter, 1997a).



LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- Indicative Offsite Coal Transport Infrastructure
- Approximate Extent of Approved Surface Development (1997 EIS Year 20)*
- Emplacement Extension
- Area Relinquished for Overburden Emplacement and Major Infrastructure#
- Conveyor/Services Corridor Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

Native Vegetation Communities

- Narrow-leaved Ironbark (Grassy Woodland) PCT 1605
- Narrow-leaved Ironbark (Derived Native Grassland) PCT 1605
- White Box (Grassy Woodland) PCT 483
- White Box (Derived Native Grassland) PCT 483

Notes: * Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.

Relinquishment excludes more flexible and relatively minor infrastructure such as light vehicle roads, disturbance associated with monitoring, water management structures and other ancillary infrastructure.

Source: NSW Land & Property Information (2016); NSW Division of Resources & Energy (2016); Department of Planning and Environment (2016); Hunter Eco (2017); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION
Vegetation Communities

Figure 21

4.6.3 Mitigation Measures, Management and Monitoring

The management of biodiversity at the Mount Pleasant Operation would continue in accordance with existing procedures (Section 4.6.1). The Modification does not require any changes to the current procedures.

In addition, while not required for the Development Consent DA 92/97, MACH Energy holds and manages a 13,522 ha biodiversity offset that was established as part of the Mount Pleasant Operation approval under the EPBC Act in 2011 (Coal & Allied, 2015 – *Offset Management Plan Mount Pleasant Project*).

4.7 HERITAGE

4.7.1 Background

Aboriginal Heritage

The management of Aboriginal heritage at the Mount Pleasant Operation is undertaken in accordance with:

- Aboriginal Heritage Impact Permit (AHIP) #C0002092 (issued 23 December 2011).
- AHIP #C0002053 (issued 24 November 2016).
- An approved Aboriginal Cultural Heritage Management Plan.

An Aboriginal Heritage Site Database for the Mount Pleasant Operation is maintained by MACH Energy. The Aboriginal Heritage Site Database is based on numerous archaeological surveys and assessments undertaken at the Mount Pleasant Operation. Previous investigations undertaken at the Mount Pleasant Operation and immediate surrounds include (but are not limited to):

- Aboriginal cultural heritage assessments and archaeological surveys (Rich, 1995; ERM Mitchell McCotter, 1996; ERM Mitchell McCotter, 1997b).
- Various technical advice reports (Scarp Archaeology, 2009, 2010a, 2010b, 2011; Nur-Run-Gee Pty Ltd, 2007; Roberts, 2007; McCardle Cultural Heritage Management, 2007; HLA-Envirosciences Pty Limited, 2007).
- Various salvage reports (Environmental Resources Management Australia, 2007; ENSR Australia, 2008).

- Ongoing salvage, investigations and Aboriginal heritage management activities at the Mount Pleasant Operation.

Based on the level of land disturbance, limited ground exposure, landforms and topography, previous studies have concluded that the Mount Pleasant Operation Development Consent DA 92/97 boundary (including the emplacement extension area) was generally of low archaeological potential.

Notwithstanding, approximately 1,397⁵ Aboriginal heritage sites have been identified within the Development Consent DA 92/97 boundary, including artefact scatters, isolated finds, potential archaeological deposits, scarred trees and stone sources.

Historic Heritage

A detailed historic heritage study was undertaken by Veritas Archaeology & History Service (2014) for the Mount Pleasant Operation. This study identified some 55 historic heritage sites within the Development Consent DA 92/97 boundary and immediate surrounds.

The identified sites including a lime kiln, sandstone quarry, sheds, stockyards and fences, windmills, hut sites, school and church sites, a butter factory, a slaughter house, a surveyor's mark, farm and house sites, homesteads and a cemetery; ranging in antiquity from the 1830s to 1970s.

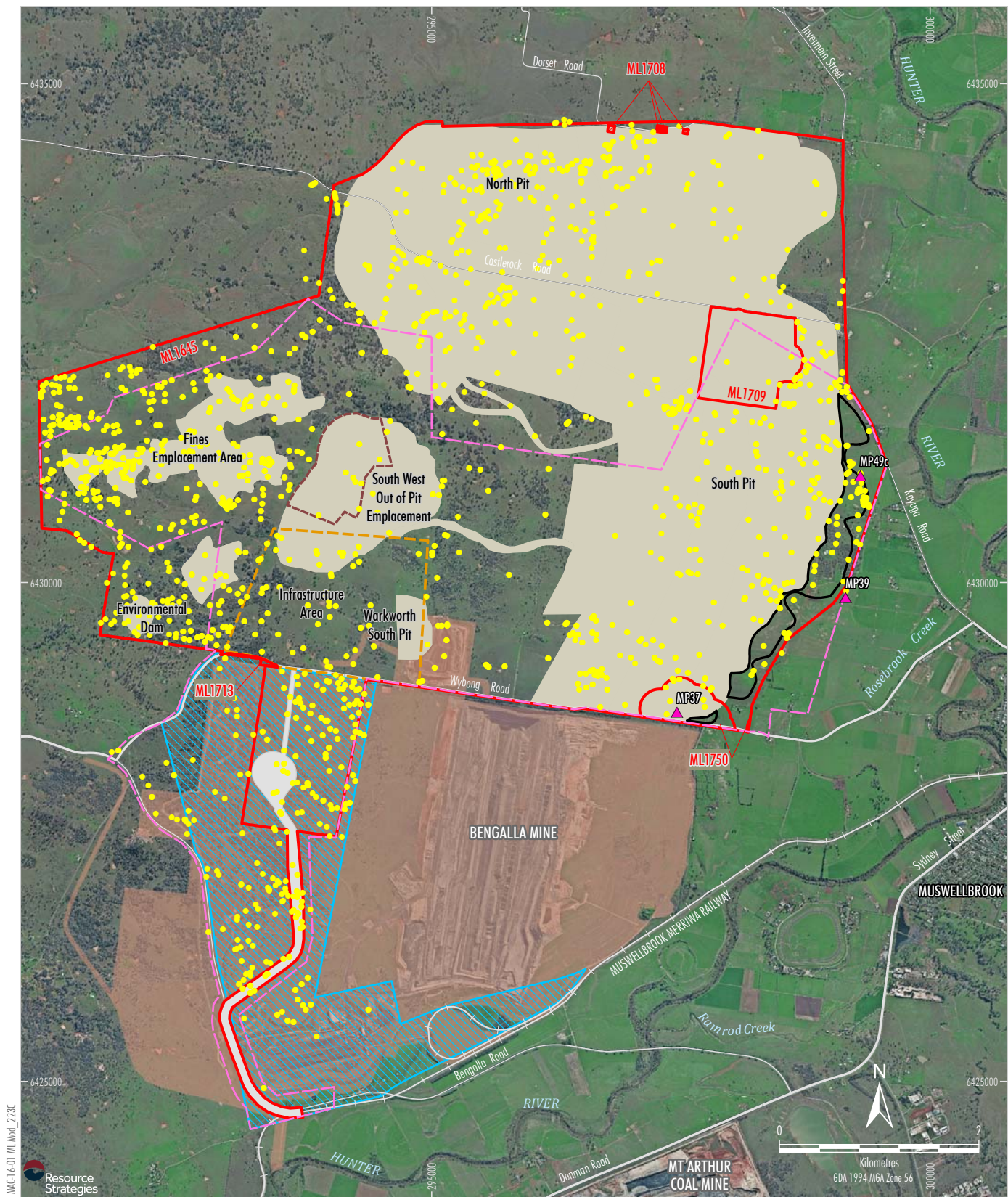
All of the identified sites were considered to be of some local heritage significance. Several sites in the surrounding area are also listed on the *Muswellbrook Local Environmental Plan 2009* as being of local significance, including the Negoa Homestead. There are no sites listed on the *Muswellbrook Local Environmental Plan 2009* within the Development Consent DA 92/97 boundary.

4.7.2 Environmental Review

Aboriginal Heritage

Approximately 74 known Aboriginal heritage sites have been previously recorded within the emplacement extension area, including isolated finds or artefact scatters (Figure 22). None of these sites have been identified as being of particular archaeological or cultural significance.

⁵ As a result of previous assessments and ongoing archaeological salvage investigations under relevant AHIPs at the Mount Pleasant Operation, approximately 618 previously recorded Aboriginal heritage sites have been subject to salvage/management to date.



LEGEND

- Mining Lease Boundary
- Infrastructure Area Envelope
- Indicative Offsite Coal Transport Infrastructure
- Approximate Extent of Approved Surface Development (1997 EIS Year 20)*
- Emplacement Extension
- Area Relinquished for Overburden Emplacement and Major Infrastructure#
- Conveyor/Services Corridor Envelope
- Bengalla Mine Approved Disturbance Boundary (SSD-5170)

- AHIP #C0002053
- Aboriginal Heritage Site
- ▲ Historic Heritage Site

Notes: * Excludes some project components such as water management infrastructure, infrastructure within the Infrastructure Area Envelope, offsite coal transport infrastructure, road diversions, access tracks, topsoil stockpiles, power supply, temporary offices, other ancillary works and construction disturbance.

Relinquishment excludes more flexible and relatively minor infrastructure such as light vehicle roads, disturbance associated with monitoring, water management structures and other ancillary infrastructure.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
Orthophoto: MACH Energy (Aug 2016)

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MOUNT PLEASANT OPERATION
Relevant Aboriginal and
Historic Heritage Sites

Figure 22

Notwithstanding, Aboriginal community representatives have expressed the view that cultural heritage material and sites of all types are of cultural significance as they provide a tangible link to their ancestry and to Country (Central Queensland Cultural Heritage Management, 2010).

Historic Heritage

There are no historic heritage sites previously recorded within the emplacement extension area (Figure 22).

However, there are several sites in close proximity to the emplacement extension area, including (Veritas Archaeology and Heritage Service, 2014):

- Site MP49c – the potential location of a dairy, however very little evidence remains on the surface (e.g. concrete, sandstone blocks, mortar etc.) (former Dairy Site).
- Site MP37 – “Berrywood Homestead”, a twentieth century homestead and outbuildings (Berrywood).
- Site MP39 – “Rosebrook Quarry”, an area formerly quarried for local sandstone (former Rosebrook Quarry).

The former Dairy Site is located approximately 10 metres (m) from the emplacement extension, while Berrywood and the former Rosebrook Quarry are located more remote from the emplacement extension area (Figure 22).

Although Berrywood and the former Dairy Site are not located within the proposed emplacement extension, they will be disturbed by the approved Mount Pleasant Operation for open cut mining and development of ancillary infrastructure.

The former Rosebrook Quarry is located outside the Development Consent DA 92/97 boundary and would not be impacted by the emplacement extension.

4.7.3 Mitigation Measures, Management and Monitoring

Aboriginal Heritage

The management of all Aboriginal heritage sites located within the emplacement extension would be undertaken consistent with the requirements of AHIP #C0002053 and the relevant approved Aboriginal Heritage Management Plan for the Mount Pleasant Operation.

Consistent with current site procedures and the approved Aboriginal Cultural Heritage Management Plan and AHIP #C0002053, if any previously unrecorded Aboriginal cultural heritage sites are identified during the course of construction, disturbance works in that area would cease until the site has been recorded. Any new Aboriginal heritage sites would be managed in accordance with management measures for similar previously identified sites.

Historic Heritage

Berrywood and the former Dairy Site are already to be disturbed by the approved Mount Pleasant Operation. The sites will be subject to management measures required by the relevant approved historic heritage management strategy.

The former Rosebrook Quarry may also be subject to indirect impacts associated with mining (e.g. through ground vibration), however, this would be unchanged by the emplacement extension.

Blasting management measures are provided in Section 4.4.3.

4.8 WATER RESOURCES

The Modification would not result in a material change to the groundwater and surface water impacts of the approved Mount Pleasant Operation, given the Modification would not:

- significantly alter the approved general arrangement of the Mount Pleasant Operation;
- significantly increase the development area of the mine;
- increase the approved annual maximum ROM coal and waste rock production rates; or
- include any significant changes to the approved water management system at the site.

The Modification would result in some minor changes to catchment excision associated with the Mount Pleasant Operation as a result of the proposed emplacement extension and the delay in the development of the North Pit.

Contemporary site water balance modelling and water management system design for the Mount Pleasant Operation (incorporating the Modification) has been undertaken by HEC (2017) and is presented in Appendix E.

4.8.1 Background

Water resources in the vicinity of the Mount Pleasant Operation are regulated under the following water sharing plans:

- *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009;*
- *Water Sharing Plan for the Hunter Regulated River Water Source 2016;* and
- *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016.*

The water sharing plans contain various rules applying to water resources in the vicinity of the Mount Pleasant Operation, including licence dealing rules, water supply works approval rules, water allocation account rules and access rules for rivers, creeks and aquifers.

Groundwater System

Consistent with the relevant water sharing plans, the two key groundwater systems in the vicinity of the Mount Pleasant Operation are (PPK Environment & Infrastructure, 1997):

- Alluvial groundwater system – associated with the alluvial plains of the Hunter River and its tributaries.
- Hard (fractured and porous) rock groundwater system – including the Permian aged Wittingham Coal measures.

The Mount Pleasant Operation coal resource is located in the Permian Wittingham Coal measures of the Singleton Supergroup. Lithologies comprise mostly sandstones, siltstones and coal measures with minor conglomerates and tuffs. Coal seams amenable to open cut mining occur in eight correlated seams and include the Upper Piercefield (Warkworth) Seam to the lowermost Edderton Seam (PPK Environment & Infrastructure, 1997).

The coal seams are recognised as the main aquifer zones within the hard rock groundwater system, providing storage and transmission within cleats and joints (PPK Environment & Infrastructure, 1997).

The interburden is mainly comprised of sandstones and siltstones with very low permeabilities and porosities, which limits the rate of groundwater transmission. The interburden zones often act as aquitards, effectively impeding or constraining the vertical exchange of groundwaters (PPK Environment & Infrastructure, 1997).

Higher aquifer pressures within the coal measures and a regional gradient towards the alluvium result in pressure driving groundwater movement towards the Hunter River. It is likely groundwater seeps naturally from the hard (fractured and porous) rock groundwater system into the alluvial groundwater system (PPK Environment & Infrastructure, 1997).

The hard (fractured and porous) rock groundwater system is considered 'less productive' under the NSW Aquifer Interference Policy (AIP). The exception to this is the 'highly productive' Liverpool Ranges Basalt, which is about 8 km from the Mount Pleasant Operation.

Surface Water Drainage Network

The Mount Pleasant Operation is located within the Hunter Catchment. The Hunter Catchment has an overall size of 21,500 square kilometres, and includes the city of Newcastle and the major towns of Singleton and Muswellbrook. The Hunter River is the main drainage feature within the catchment, rising on the northern side of the Barrington Tops (Mount Royal Range) and flowing south and then east through Muswellbrook and Singleton, before draining to the Pacific Ocean at Newcastle.

The Hunter River contains a number of significant tributaries upstream of Muswellbrook, including the Pages and Isis Rivers, as well as the Middle, Dart, Stewarts, Moonan and Rouchel Brooks.

The Hunter River is defined as a 'Major Regulated River', meaning that it contains a number of water storages along its length which supplement its flow (Department of Primary Industries – Water, 2016). These water storages include the Glenbawn Dam and the Glennies Creek Dam.

The local drainage network is generally characterised by steep gullies which drain from the surrounding hills into the flat alluvial plains adjacent the Hunter River.

In the vicinity of the Mount Pleasant Operation, the Hunter River flows in a southerly direction. There are a number of ephemeral drainage lines which traverse the Mount Pleasant Operation area and drain into the Hunter River.

Bengalla Mine's Dry Creek Project

The Bengalla Mine's Dry Creek Project diverts the unnamed drainage line that drains the south of the Mount Pleasant Operation area (commonly referred to as Dry Creek).

The Dry Creek Project includes a clean water dam north of Wybong Road, a pump station and pipeline used to direct water around the Bengalla Mine and a protective contour levee to release water from the pipeline into an unnamed tributary of the Hunter River.

Water Management

The mine water management system at the Mount Pleasant Operation is described in Section 2.8.

Water management at the Mount Pleasant Operation is undertaken in accordance with the Water Management Plan, which includes the following sub-plans:

- Site Water Balance;
- Erosion and Sediment Control Plan;
- Surface Water Management Plan;
- Groundwater Management Plan; and
- Surface and Ground Water Response Plan.

The locations of Mount Pleasant Operation surface water and groundwater monitoring sites are shown on Figure 23. MACH Energy's surface water and groundwater monitoring sites are subject to finalisation of a Water Management Plan that is currently under review by DPE and relevant consultees.

4.8.2 Environmental Review

The Modification would result in some minor changes to catchment excision associated with the Mount Pleasant Operation as a result of the emplacement extension.

The emplacement extension would result in a small, temporary reduction (2.9%) of the total existing catchment area of three small tributary streams (including Rosebrook Creek) that drain eastwards to the Hunter River (Appendix E).

The catchment excision associated with the emplacement extension is not anticipated to result in an increase to the total maximum excised catchment associated with the Mount Pleasant Operation (at any one time), due to the delay to the commencement of the approved North Pit. Therefore, any potential incremental impacts from the Modification on the Hunter River catchment would be negligible (Appendix E).

The contemporary site water balance modelling undertaken by HEC (2017) predicted the (Appendix E):

- reliability of water supply;
- risk of (unlicensed) external spill occurring from site mine water storages; and
- risk of accumulation of excess water in the open cuts during the life of the Modification.

The outcomes of this modelling are not materially different to the outcomes of the water management system modelling presented in the 1997 EIS (ERM Mitchell McCotter, 1997a).

Importantly, no overflows were simulated from the Fines Emplacement Area or the MWD into the receiving environment (Appendix E).

4.8.3 Mitigation Measures, Management and Monitoring

Water Management Plan

Water management at the Mount Pleasant Operation would continue to be undertaken in accordance with an approved Water Management Plan.

The Water Management Plan would be reviewed, and if necessary, revised to incorporate the Modification.

Contemporary Groundwater Modelling

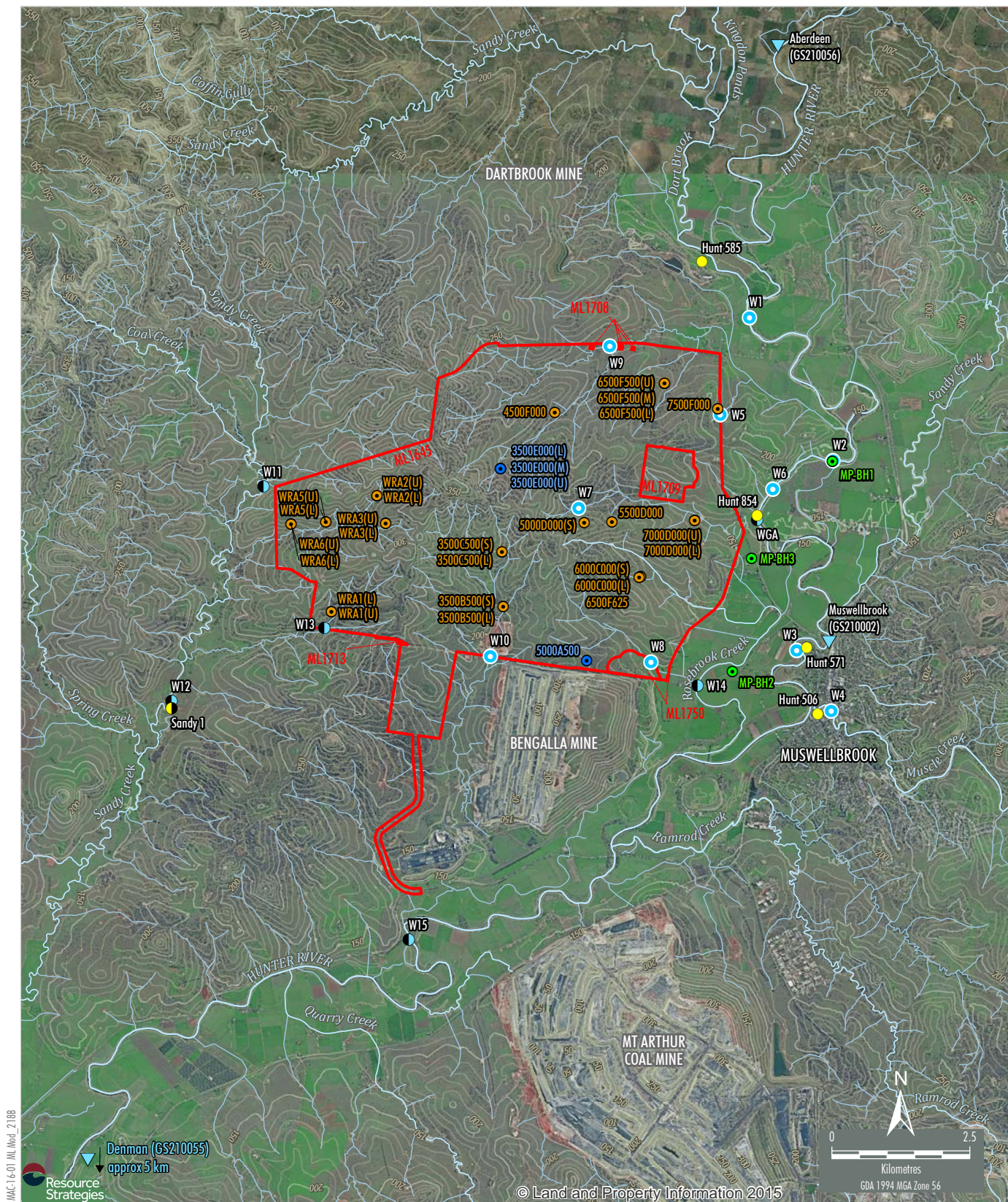
HydroSimulations has been engaged by MACH Energy to undertake contemporary groundwater modelling for the approved Mount Pleasant Operation in accordance with the Water Management Plan.

The contemporary groundwater model will be consistent with the *Australian Groundwater Modelling Guidelines* prepared by the National Water Commission in June 2012 (Barnett *et al.*, 2012).

The Groundwater Management Plan will be updated to include the outcomes of the contemporary groundwater modelling, once the modelling is complete.

Water Licensing

MACH Energy is required to hold water access licences to account for groundwater inflows, incidental groundwater take and groundwater pumped for water supply from aquifers regulated by the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources 2009* and *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*.



LEGEND

- Mining Lease Boundary
- Contour (10 m Intervals)
- ▼ DPI Water Gauging Station
- Surface Water Monitoring
- Surface Water Monitoring Site
- New Surface Water Monitoring Site
- Stream Health Monitoring Site
- New Stream Health Monitoring Site
- Groundwater Monitoring
- Standpipe
- Standpipe - Alluvium
- Standpipe - Historical

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); NSW Department of Primary Industries - Water (2016); Bengalla Mining Company (2015); Mangool Coal Operations Pty Ltd (2014)

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MOUNT PLEASANT OPERATION
Surface Water and Groundwater
Monitoring Locations

Figure 23

MACH Energy's groundwater licensing requirements will ultimately be determined by the contemporary groundwater modelling being undertaken by HydroSimulations. In the interim, the Water Management Plan presents conservative estimates of MACH Energy's initial groundwater licensing requirements.

MACH Energy will also maintain surface water licences under the *Water Sharing Plan for the Hunter Regulated River Water Source 2016* to account for any water pumped from the Hunter River.

4.9 VISUAL

The emplacement extension and other proposed changes to the final landform would alter the views of the Mount Pleasant Operation, particularly when viewed from Muswellbrook and other local vantage points.

The modified landform is intended to improve the overall appearance of the Mount Pleasant Operation landform by incorporating the following concepts:

- the final landform surface of the upper lifts on the eastern side of the emplacement would be varied to break up the horizon line when viewed from the east; and
- the toe of the emplacement would be extended to better align with the underlying topography.

For potentially sensitive viewpoints to the south and west, the Modification would also reduce visual impacts associated with the approved South West Out of Pit Emplacement, that would no longer be constructed as a component of the Modification.

An assessment of the incremental changes to visual impacts as a result of the Modification of the Eastern Out of Pit Emplacement is provided in the following sub-sections.

4.9.1 Background

A Visual Assessment was prepared for the 1997 EIS by Geoffrey Britton and Associates (1997) and described the visual impacts of the Mount Pleasant Operation in the context of the sensitivity of surrounding viewpoints.

Key potential viewpoints included a number of private dwellings, local roads and main travel routes (New England Highway and Main Northern Railway).

Since the Visual Assessment was prepared, a number of changes to the visual catchment have occurred, including the development of the Bengalla Mine, the continued expansion of Muswellbrook and the acquisition of a number of local private landholdings by resource companies.

The Visual Assessment described that the sensitivity of each of the viewpoints can be determined based on (Geoffrey Britton and Associates, 1997):

- vantage point (i.e. views of the Mount Pleasant Operation available from the location);
- number of viewers using the vantage point; and
- permanence of viewers (i.e. residents of area or transitory).

The Visual Assessment ranked the sensitivity of the viewpoints based on these aspects.

An additional factor not previously considered by Geoffrey Britton and Associates (1997) is the extent to which the viewer has become accustomed to significant modifications to the landscape and existing industrialisation in the region. For the purposes of this Modification, the approved Mount Pleasant Operation forms part of this approved or existing development.

Typical visual sensitivity levels for a variety of viewpoint types are provided in Table 12.

The contemporary approach to evaluation of potential visual impacts considers the level of visual modification of the development, in the context of the visual sensitivity of relevant surrounding land use areas. Levels of visual impact resulting from visual modification and sensitivity are illustrated in Table 13.

The sensitivity of the viewpoints originally assessed by Geoffrey Britton and Associates (1997) have been evaluated against the criteria in Table 12 and the matrix in Table 13. The resulting sensitivity is presented in Table 14 and compared to the findings of Geoffrey Britton and Associates (1997).

Cognisant of the changes to the visual catchment that have occurred since the Mount Pleasant Operation was approved, MACH Energy has selected a number of contemporary viewpoints that remain generally representative of the viewpoints originally assessed in 1997 (Table 14 and Figure 24).

Table 12
Typical Viewpoint Sensitivity

Use Area	Foreground (Local Setting)		Middleground (Sub-Regional Setting)		Background (Regional Setting)
	0 - 0.5 km	0.5 - 1 km	1 - 2.5 km	2.5 - 5 km	> 5 km
Natural Area – Recreation	H	H	H	M	L
Residential – Rural	H	H	H	M	L
Residential – Township	H	H	H	M	L
Tourist Roads	H	M	M	L	L
Other Main Roads	M	L	L	L	L
Local Roads	L	L	L	L	L
Industrial Areas	L	L	L	L	L

Source: After EDAW Australia (2006).

Note: H - High, M – Moderate, L – Low.

Table 13
Visual Impact Matrix

		Viewer Sensitivity			
		H	M	L	
Visual Modification	H	H	H	M	
	M	H	M	L	
	L	M	L	L	
	VL	L	VL	VL	

VL = Very Low

L = Low

M = Moderate

H = High

Source: EDAW Australia (2006).

Table 14
Summary of Approved Visual Impacts

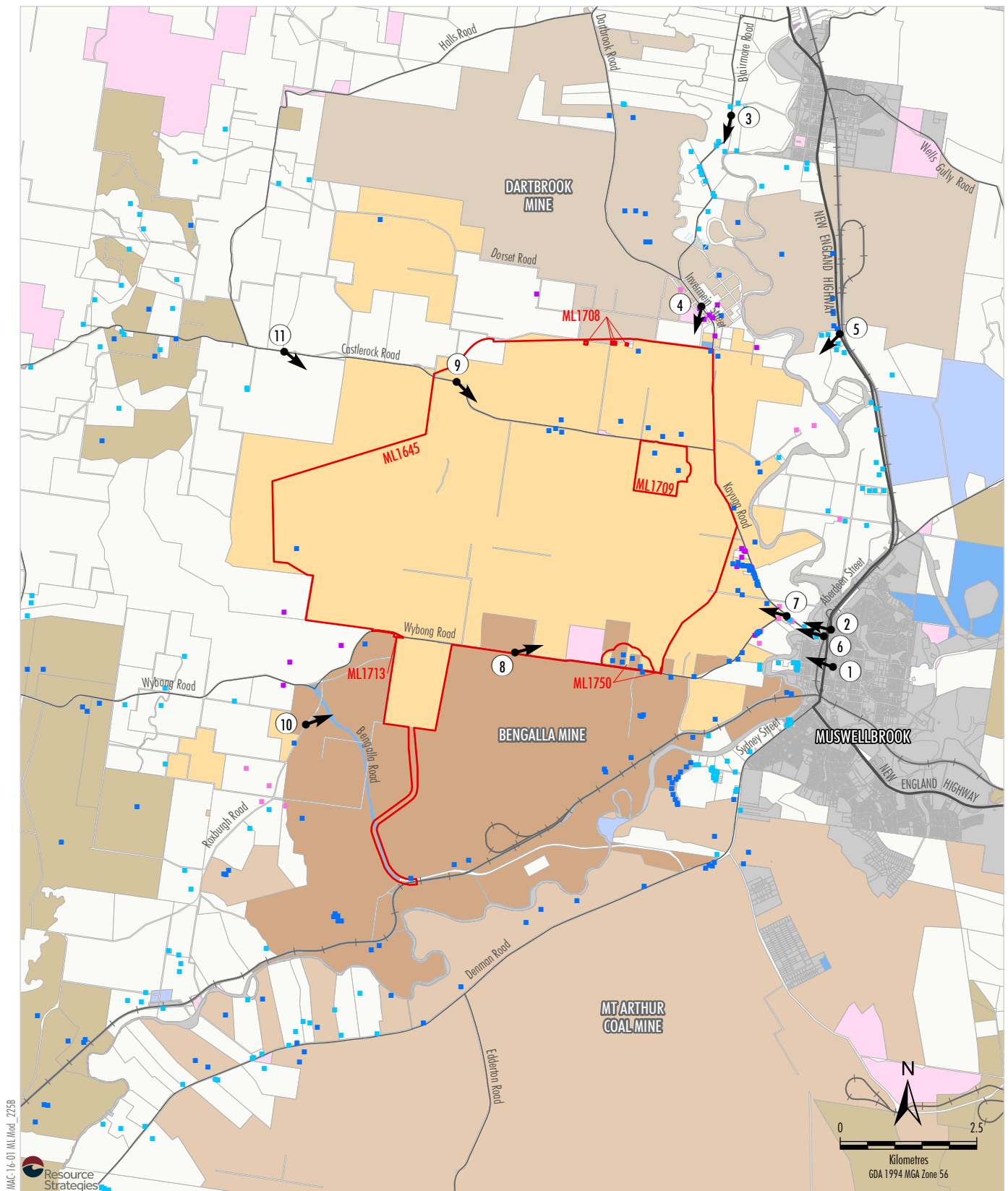
Original Viewpoint	Viewer Sensitivity	Approved Visual Impact ¹	Contemporary Evaluation of Approved Impact	Representative Viewpoint ²
Muswellbrook	High	High	High	1 and 2
Aberdeen	Moderate	High	High	3 ³
Kayuga	High	High	High	4
New England Highway	Moderate	High	High	5
Main Northern Railway	Moderate	High	High	6
Floodplain	High	High	High	7 ⁴
Kayuga Road	Low	High	Moderate	7 ⁴
Wybong Road	Low	High	Moderate	8
Castlerock Road	Low	High	Moderate	9
Roxburgh Road	Low	Medium	Low	10
Western Properties	High	High	High	11
Dorset Road	Low	High	Moderate	4
Denman Road	Low	High	Moderate	7 ⁴

¹ Maximum anticipated visual impact (with mitigation measures) as presented in Geoffrey Britton and Associates (1997).

² Locations shown on Figure 24.

³ Location on Blairmore Road considered to be representative of views from Aberdeen (viewpoint located 1.5 km west of Aberdeen).

⁴ Location at intersection of Kayuga and Wybong Road considered to be representative of views from Kayuga Road and local properties located on the floodplain. It also provides a conservative representation of potential views from Denman Road.



- LEGEND**
- Mining Lease Boundary
 - Muswellbrook and Upper Hunter LEPs Zones B2, B5, IN1, SP2, R2, R5, RE1, RE2 and W1
 - Crown
 - Crown/State of NSW
 - The State of NSW
 - Muswellbrook Shire Council
 - Upper Hunter Shire Council
 - Mount Pleasant Controlled
 - Bengalla Controlled
 - Dartbrook Controlled
 - Mt Arthur Controlled
 - Other Mining/Resource Company Controlled
 - Privately Owned Land

- Mine-owned Dwelling
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- ➔ Viewpoint Location

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017)

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Selected Representative Viewpoints

Figure 24

Rural Landscapes

Two rural landscape areas classified by the National Trust of Australia (NSW) are located in the vicinity of the Mount Pleasant Operation. Whilst outside of these areas, the approved Mount Pleasant Operation will be visible from both rural landscape areas.

Momeroi-Scone Rural Landscape

The highest parts of the approved North Pit waste emplacement (300 m Australian Height Datum [AHD]) would be visible from the Momeroi-Scone rural landscape.

The North Pit (and associated waste emplacement) would not be developed during the life of the Modification.

Muswellbrook-Jerrys Plains Rural Landscape

The Muswellbrook-Jerrys Plains rural landscape is located south of the site.

During the Modification period, views of the Mount Pleasant Operation would be obscured from most of the rural landscape area by the Bengalla Mine, Mt Arthur Coal Mine and other intervening topography. However, the approved Mount Pleasant Operation may be visible from the north east corner of the Muswellbrook-Jerrys Plains rural landscape area (i.e. from Wybong Road). This represents a very small portion of the total Muswellbrook-Jerrys Plains rural landscape area and this is not anticipated to be changed by the Modification.

4.9.2 Environmental Review

The Modification would alter the approved visual impacts as summarised in Table 14 in the following ways:

- Delay to the commencement of the approved North Pit would result in some approved Mount Pleasant Operation mine landforms not being visible at some viewpoints during the life of the Modification.
- The emplacement extension would bring the Eastern Out of Pit Emplacement landform closer to proximal receivers in the east.
- The proposed alterations to the landform design (Section 5) would improve the final, long-term views of the landform from Muswellbrook and other local vantage points.

The representative viewpoints described in Table 14 were identified by VPA (Visual Planning and Assessment) in April 2017. A series of photographs were taken at each representative viewpoint.

Following the site inspection, the following analysis was undertaken to determine how each viewpoint might be affected by the Modification:

- Review of topographical data and aerial photographs to identify intervening topography and/or vegetation that would screen views.
- Review of computer-generated model renders of the Mount Pleasant Operation landform from select viewpoints.

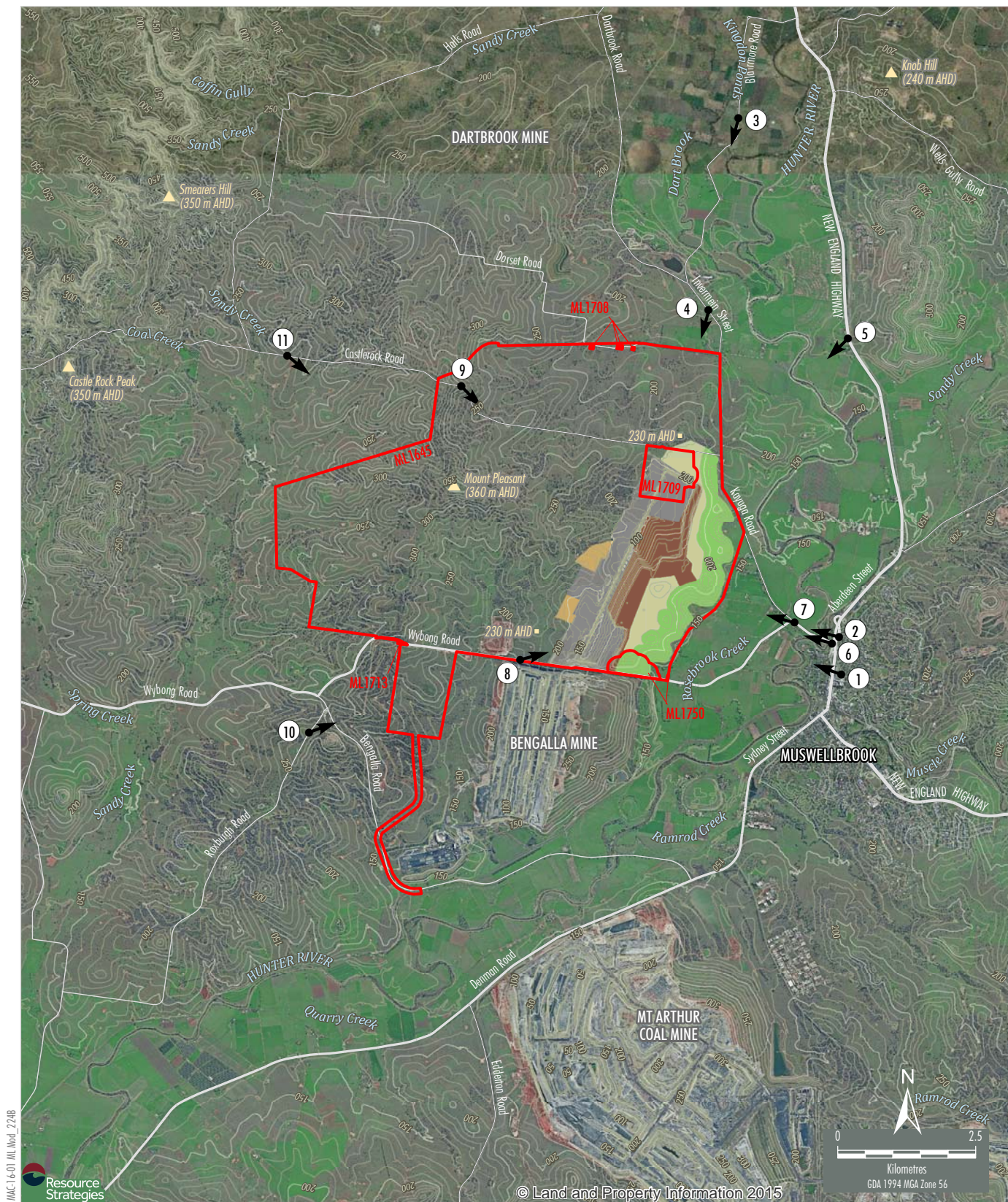
The ridgeline associated with Mount Pleasant (the main ridgeline), which has a maximum elevation of 360 m AHD, provides a screen for views of the approved and proposed mine landforms from the western viewpoints in the Modification period (Viewpoints 9, 10 and 11) (Figure 25).

Review of photographs and computer generated model renders also indicates that the mine landforms would not be visible from receivers in Aberdeen and Kayuga (Viewpoints 3 and 4) during the life of the Modification. This is a result of an intervening vegetated ridgeline (230 m AHD) that would screen views from the viewpoints as they are located at much lower elevations. The development of the North Pit and associated waste emplacement landform would however be visible from these viewpoints (i.e. post 2026).

Similarly, a small ridge located immediately west of the final void screens views of the 2026 final landform along most of Wybong Road (including Viewpoint 8). Sections of Wybong Road to the east of the ridge line would have views of the mine landforms.

Based on the above, during-mining and post-mining, visual simulations have been prepared for the following viewpoints in order to characterise views of the Modified mine landforms from Muswellbrook and other local vantage points:

- Viewpoint 7: Characteristic of views from the rural properties located on the floodplain, Wybong Road (east of the ridge) and Kayuga Road (Figures 26 and 27).



LEGEND

- Mining Lease Boundary
- Contour (10 m Intervals)
- Viewpoint Location
- 2025 Mine Landform
- Active Mining Area
- Active Overburden Emplacement Area
- Topsoil Stockpile
- Initial Rehabilitation
- Established Rehabilitation

Source: NSW Land & Property Information (2016); NSW Division of Resources & Energy (2017); NSW Department of Primary Industries - Water (2016); Bengalla Mining Company (2015); Mangool Coal Operations Pty Ltd (2014)

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MOUNT PLEASANT OPERATION
Visual Catchment Features

Figure 25

- Viewpoint 5: View from New England Highway, characteristic of views from the highway and rural properties further north east (Figures 28 and 29).
- Viewpoint 1: View from Hill Street in Muswellbrook (Figures 30 and 31).

Viewpoint 7

Geoffrey Britton and Associates (1997) determined that high visual impacts would occur at rural properties on the floodplain due to the development of the Eastern Out of Pit Emplacement (including the initial development of the outer face) and the initial development of the active mining areas.

The rural properties on the floodplain are considered to have a high visual sensitivity, given they house residents (i.e. permanence) and there are a number of properties scattered across the floodplain (i.e. number of viewers).

The emplacement extension would bring the eastern face of the waste emplacement closer to some receivers during mining. However, these receivers were already assessed as having a high level of visual impact as a result of the approved Mount Pleasant Operation. Therefore, the increased proximity of the Mount Pleasant Operation to these receivers is not anticipated to result in changes to their visual impact classification.

The Modification landform improvements would however, further reduce the visual impacts at these nearby receivers following rehabilitation by improving visual integration of the final landform with surrounding landscape topography and vegetation patterns and textures.

Viewpoint 5

Geoffrey Britton and Associates (1997) determined that high visual impacts would occur to people travelling on the New England Highway as a result of the approved Mount Pleasant Operation.

People travelling on the New England Highway are transitory and therefore would not be exposed to the visual impacts for any significant length of time. Notwithstanding, the New England Highway has been assigned a moderate viewer sensitivity as it is used by tourists.

The approved impacts of the Mount Pleasant Operation would not be fully realised during the Modification, given the North Pit (and associated waste emplacement) would not be developed during the Modification period. Therefore, less modified landscape would be visible from Viewpoint 5 during the life of the Modification.

The proposed landform improvements would further reduce the visual impact of the Mount Pleasant Operation for people travelling on the New England Highway, following rehabilitation.

Viewpoint 1

Viewpoints 1 (Hill Street) and 2 (View Place) are both located in Muswellbrook. Viewpoint 1 has been selected for the visual simulations given a number of residents would frequently visit the nearby shopping centre on Hill Street. It is also considered to provide a conservative representation of potential visual impacts for people travelling north west on the New England Highway on approach into Muswellbrook.

The approved visual impact and viewer sensitivity of receivers in Muswellbrook were both determined to be high (Geoffrey Britton and Associates, 1997). Since preparation of the 1997 EIS, residents of Muswellbrook may have become more accustomed to significant modifications to the landscape due to the ongoing development of the Bengalla and Mt Arthur Coal Mines. However, tourists visiting Muswellbrook may not be accustomed to views of mine operations. Given the high concentration of residents with views of the approved Mount Pleasant Operation, Muswellbrook is considered to have a high viewer sensitivity.

Similar to the rural properties on the floodplain, there will be clear views of the Mount Pleasant Operation from certain parts of Muswellbrook (in particular the development of the Eastern Out of Pit Emplacement). As a result, visual impacts of the approved Mount Pleasant Operation are high.

During mining, the visual impacts of the Mount Pleasant Operation incorporating the Modification would be largely unchanged in Muswellbrook. However, the landform improvements have been specifically targeted at improving views of the final landform from Muswellbrook and other local vantage points (post-mining). As a result, the proposed landform improvements would further reduce the visual impacts following rehabilitation, by improving visual integration of the final landform with surrounding landscape topography and vegetation patterns and textures.

4.9.3 Mitigation and Management Measures

Landform Design

MACH Energy proposes to incorporate macro-relief concepts into the Mount Pleasant Operation 2026 final landform as a component of the Modification (Section 5).



LEGEND
 Initial Rehabilitation
 Established Rehabilitation





LEGEND
 Established Rehabilitation





LEGEND
 Initial Rehabilitation
 Established Rehabilitation

EXISTING VIEW



LANDFORM STATUS



LANDFORM SIMULATION



LEGEND
Established Rehabilitation





LEGEND
 Initial Rehabilitation
 Established Rehabilitation





LEGEND
 Established Rehabilitation



The 2026 final landform surface of the upper lifts on the eastern side of the emplacement would be varied to break up the horizon line when viewed from the east.

The modified eastern face of the 2026 final landform would include a number of spurs and valleys. The high points on the 2026 final landform have been designed to align with these spurs to further improve the more natural appearance of the landform from viewpoints to the north east and south east, where views of the mine landform are most prominent during the life of the Modification.

Rehabilitation

MACH Energy would prioritise construction of the lower batters of the waste emplacement to the final landform profile, and the early revegetation of these batters to progressively minimise visual impacts in Muswellbrook and other locations to the east.

Consistent with MSC's recommendations for the Bengalla Mine final landform, the eastern face of the Mount Pleasant Operation 2026 final landform would be revegetated with native tree species. This would allow the landform to assimilate with the open woodland communities within the surrounding environment and also be consistent with the revegetation of the eastern face of the Bengalla Mine landform.

4.10 OTHER ENVIRONMENTAL ASPECTS

4.10.1 Transport Noise

Rail Noise

Although the Modification does not propose any changes to coal export via rail (i.e. maximum or average daily rail movements), the Modification does include an extension of the mine life, and associated rail movements. The continuation of approved rail noise impacts has therefore been considered by Wilkinson Murray (2017).

Review of existing, approved and proposed rail movements on the Muswellbrook-Ulan Rail Line indicates the continued rail movements associated with the Modification would result in increases in noise levels of less than 0.5 dB, and therefore does not warrant further consideration in accordance with the NSW *Rail Infrastructure Noise Guideline* (EPA, 2013) (Appendix A).

Road Noise

Although the Modification does not propose any material changes to local road usage (i.e. additional workforce or deliveries), the Modification does include the extension of the mine life, and associated road usage (Table 1). The continuation of approved road noise impacts has therefore been considered by Wilkinson Murray (2017).

The continuation of traffic associated with the Modification is expected to have potential for road noise impacts on Wybong Road (between Bengalla Road and Kayuga Road) and Kayuga Road (north of Wybong Road) (Appendix A).

Along Wybong Road, the continuation of Mount Pleasant Operation traffic is expected to result in road noise increases of less than 2 dB. As such, the potential increases in road noise due to the Modification represent a minor impact barely perceptible to the average person in accordance with the NSW *Road Noise Policy* (Department of Environment, Climate Change and Water, 2011) (Appendix A).

Along Kayuga Road, some road noise impacts are predicted, with the increase greater than 2 dB due to the continuation of the Mount Pleasant Operation. However, all privately-owned receivers where such increases are predicted are already subject to acquisition upon request under Development Consent DA 92/97 due to operational noise predictions for the Mount Pleasant Operation (Appendix A).

It is important to note that the predicted increases in road noise are merely a continuation of the impacts associated with the approved Mount Pleasant Operation (i.e. there is no predicted increase in road noise levels in comparison to the approved Mount Pleasant Operation road noise up to December 2020).

4.10.2 Greenhouse Gas Emissions

While the Modification does not include any additional coal or waste rock extraction and would not materially affect the approved greenhouse gas emissions of the Mount Pleasant Operation, a contemporary greenhouse gas emissions inventory for the Mount Pleasant Operation incorporating the Modification had been prepared by Todoroski Air Sciences (2017) and is presented in Appendix B.

In accordance with the *National Greenhouse Accounts Factors* (Commonwealth Department of the Environment and Energy, 2016), direct greenhouse gas emissions are referred to as Scope 1 emissions, and indirect emissions are referred to as Scope 2 and Scope 3 emissions.

The major sources of greenhouse gas emissions associated with the Mount Pleasant Operation include:

- the combustion of diesel during mining operations (Scopes 1 and 3);
- the combustion of fuel oil (Scopes 1 and 3);
- fugitive emissions of methane from the exposed coal seams (Scope 1);
- off-site generation of electricity that is consumed at the Mount Pleasant Operation (Scopes 2 and 3); and
- transport and end-use (combustion) of product coal (Scope 3).

Annual average Scope 1 and 2 emissions for the Mount Pleasant Operation incorporating the Modification are estimated to be approximately 0.22 million tonnes of carbon dioxide equivalent (Mt CO₂-e), which is approximately 0.04% of the estimated greenhouse gas emissions for Australia during 2014 (Appendix B).

Greenhouse gas abatement measures undertaken at the Mount Pleasant Operation are generally focused on reducing fuel usage, through optimisation of haul roads, minimising rehandling and maintaining fleet in good operating order.

Greenhouse gas emissions from the Mount Pleasant Operation would continue to be monitored and where relevant reported annually in accordance with MACH Energy's obligations under the National Greenhouse and Energy Reporting System (Section 6.1.3).

4.10.3 Hazard and Risk

It is considered that the Modification would not change the existing potential risks identified in the previous assessments for the Mount Pleasant Operation. The proposed activities associated with the Modification (e.g. open cut mining and waste emplacement activities) are consistent with the approved mine and would not significantly alter the risk profile of the operation.

Notwithstanding, environmental management plans and monitoring programmes would be reviewed, and where necessary, revised to include the Modification and manage any associated environmental risks.

4.10.4 Socio-Economics

The Modification would not involve any material change to the operational workforce of the approved Mount Pleasant Operation of up to approximately 380 people.

The Modification also would not involve any additional production of coal relative to the originally approved mine.

Given the contraction of the Hunter Valley coal industry that has been observed in the last decade and the closure of some nearby operations, it is anticipated that the Mount Pleasant Operation will provide important employment and business opportunities for the industry.

These employment and business opportunities in the Muswellbrook LGA and the wider Hunter Valley region would be extended by approximately six years, should the Modification be approved.

Over the course of the period from December 2020 to December 2026 MACH Energy also estimates that approximately 46 Mt of product coal would be produced by the Mount Pleasant Operation. This incremental production would be valued at over \$4.5 Billion based on MACH Energy coal price and exchange rate estimates, and is anticipated to generate significant associated royalties to the State of NSW (i.e. >\$350M).

5 FINAL LANDFORM

When Development Consent DA 92/97 was granted in 1999, the mine was permitted to carry out mining operations for a period of 21 years from the date of the granting of the development consent (i.e. until 22 December 2020).

Mining will commence in 2017 and will be conducted for approximately 10 years if the Modification is approved. Significant open cut coal reserves are available if mining is subsequently approved to continue past 2026 (i.e. subject to separate assessment and approval). MACH Energy has developed a conceptual final landform diagram for Year 2038 if mining activities were to continue beyond the Modification operational period. This would be subject to separate assessment and approval and will therefore be presented in future modifications or State Significant Development applications.

The 2038 conceptual final landform will expand on the same macro-relief concepts as the 2026 final landform (Section 5.1.1) and incorporate slope gradients such that micro-relief concepts can be applied in future (e.g. when the landform is presented in more detail for an application to extend the mine life beyond 2026).

The conceptual final landforms discussed in the following subsections therefore are limited to the Modification period (i.e. to 2026).

5.1 2026 CONCEPTUAL FINAL LANDFORM

MACH Energy is aware of the level of local interest or concern with respect to the shape and form of Mount Pleasant Operation final mine landforms and the progress of rehabilitation/revegetation.

In consultation with the MSC, MACH Energy has therefore developed the following design principles for the modified Mount Pleasant Operation final landform:

- the emplacement landform would be designed to look less “engineered” when viewed from Muswellbrook (i.e. incorporation of macro-relief to avoid simple blocky forms);
- surface water drainage from the waste emplacement landform would incorporate micro-relief to increase drainage stability and avoid major engineered drop structures where practical;

- the final void (and associated drainage network) would be shaped to reflect a less engineered profile that is more consistent with the surrounding natural environment; and
- MACH Energy would progressively develop and revegetate the final landform, to reduce visual impacts in Muswellbrook and other local vantage points.

The following subsections provide further discussion on these principles.

To maximise the topographic shielding of the evening and night-time mining operations, daytime only construction of the outer parts of the Eastern Out of Pit Emplacement would be prioritised to advance ahead of the open cut development.

5.1.1 Macro-Relief

MACH Energy proposes to incorporate the following macro-relief concepts into the Mount Pleasant Operation final landform as a component of the Modification:

- the final landform surface of the upper lifts on the eastern side of the emplacement would be varied to break up the horizon line when viewed from Muswellbrook and other local vantage points; and
- the toe of the emplacement would be extended to better align with the underlying topography.

As a result of the variation in the toe, the eastern face of the final landform would include a number of spurs and valleys. The high points on the final landform have been designed to align with these spurs to further improve the more natural appearance of the landform from viewpoints to the north east and south east.

The waste emplacement would, in the period to 2026, remain at a lower elevation than the approved Mount Pleasant Operation North Pit waste emplacement as well as the neighbouring Bengalla Mine waste emplacement, both of which are approved to a final elevation of approximately 300 m AHD.

A visual simulation of the proposed final landform from Muswellbrook is provided on Figure 31.

5.1.2 Micro-Relief

The objective of the modified final landform is to develop drainage features in the post-mine landform that mitigate erosion potential. This would be achieved by incorporating micro-relief into the drainage design.

The NSW Mineral Council's *Rehabilitation by Design Practice Notes* (2007) and Department of Environment, Climate Change and Water's *Managing Urban Stormwater Soils and Construction Volume 2E Mines and Quarries* (2008) provide principles for the construction of stable batter slopes. These principles include:

- Use of a combination of convex and concave outer batters to convey runoff (i.e. as opposed to fixed slope batters).
- Appropriately spaced benches to reduce the velocity of runoff.
- Gentler slope gradients.

MACH Energy has considered these principles in developing the conceptual final landform shown on Figure 32.

In particular, MACH Energy would implement the following measures to increase the stability of the final landform:

- Establish bench drains where necessary to convey runoff from batter slopes to sub-catchment drainage lines.
- Maximise the number of sub-catchments to reduce the catchment area of individual constructed drainage lines.
- Establish meandering drainage lines that increase the total drainage length and therefore result in gentler stream bed gradients.
- Where practical, design drainage lines to generally produce a concave stream bed profile.
- Establish native tree cover on the outer face of the Eastern Out of Pit Emplacement and in final landform drainage features to promote stability of the final landform.

The final landform drainage lines would be designed to accommodate natural erosive processes. This would be achieved through consideration of key erosional and geomorphic characteristics such as nature of bed material (e.g. particle size), presence of rock outcrops, bed features (such as cascades, pool and riffle zones) as well as bed and bank vegetation.

Geomorphic features would be incorporated into the design of the relevant final landform drainages. This would also be informed by investigation into the physical characteristics of waste rock and soil materials at the Mount Pleasant Operation for provision of appropriate rock, sub-soil and topsoil material for use on outer batters and in drainage features.

Throughout the life of the Modification, the conceptual final landform may be revised to reflect the outcomes of the above investigations, in consultation with the MSC and relevant NSW Government agencies.

Any updates to the final landform, as well as detailed performance indicators and completion criteria, would be documented in the relevant MOP.

5.1.3 Final Void

MACH Energy's proposed variations to the final landform has not significantly altered the 1997 EIS final void concepts. However, over the period of mining that is the subject of this Modification, only the South Pit would be developed (i.e. the North Pit is not planned to be developed by MACH Energy until post-2026) (Figures 10 to 12).

In the event that mining did not proceed past 2026, the final landform would involve a range of earthworks to push down areas of the final highwalls and low-walls; the outcome being a single void remaining in the south with a relatively natural looking shape (Figure 32).

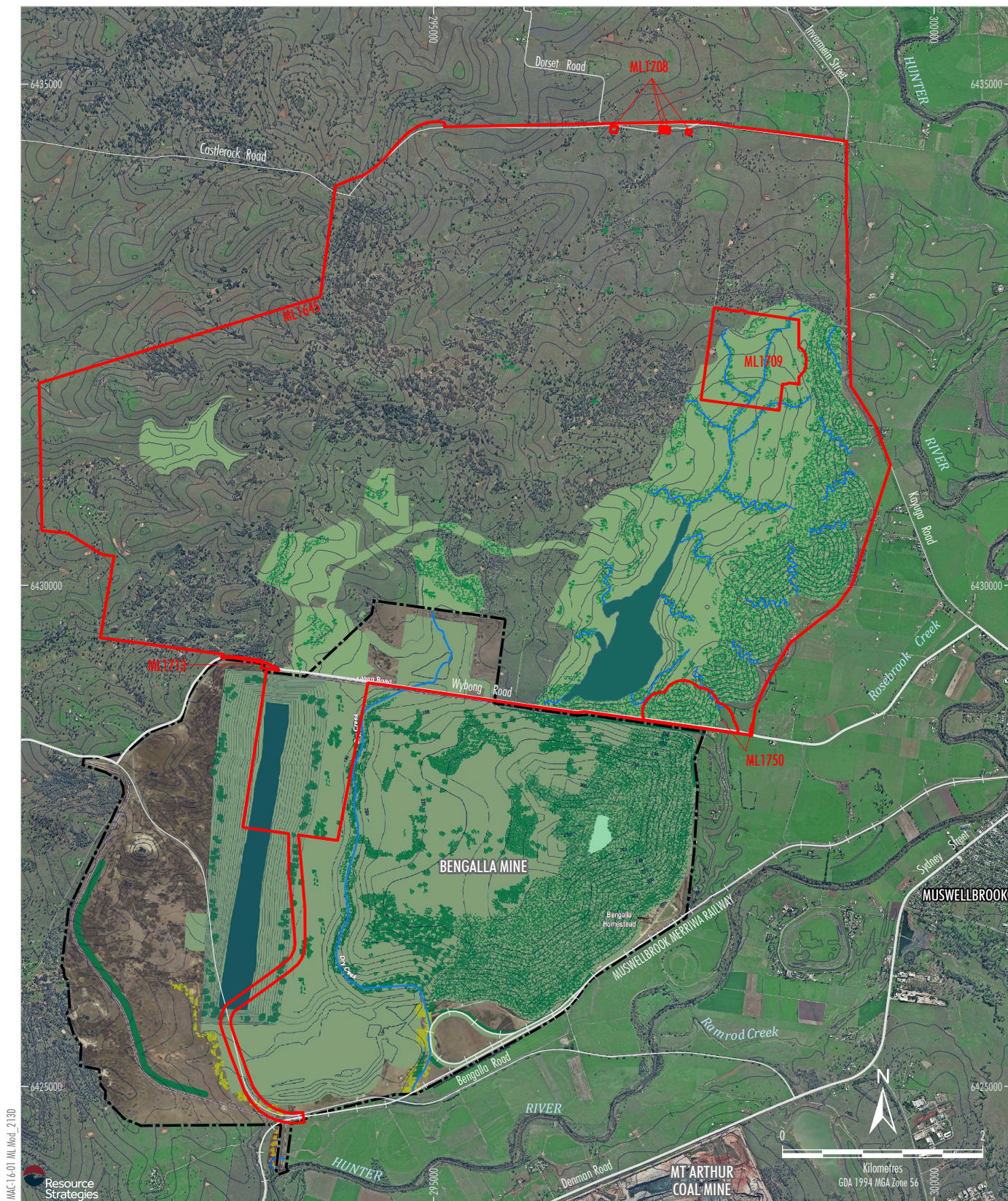
The final void catchment would incorporate batter slope and drainage principles described in Section 5.1.2.

Once mining operations cease, groundwater inflows to the final void would no longer be collected and pumped out. As a result, the final void would gradually fill with water. Inflows into the final void would comprise incident rainfall, runoff within the final void catchment area and groundwater.

The design of the final void would be refined as required to ensure that the final void would not spill to the environment and would provide a groundwater sink.

5.1.4 Revegetation

MACH Energy would prioritise construction of the lower batters of the waste emplacement to final landform profile and the early revegetation of these batters to progressively minimise visual impacts in Muswellbrook and other locations to the east.



Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); Department of Planning and Environment (2016); MACH Energy (2017)
 Orthophoto: MACH Energy (Aug 2016)

- LEGEND**
- Mt Pleasant Mining Lease Boundary
 - Final Void
 - Final Rehabilitation
 - Bengalla Mine Conceptual Final Landform *
 - Project Boundary (Appendix 2 of Development Consent SSD-5170) (Dated 23 December 2016)
 - Dry Creek
 - Final Void Lake
 - Rehabilitation
 - Rehabilitation Class III
 - Indicative Tree Screens (or equivalent)
 - Treed Rehabilitation
 - Indicative Restorative Area

* Digitised from Appendix 9 of Development Consent (SSD-5170) and amended in the Mount Pleasant Operation CHPP area.

MACHEnergy
 MOUNT PLEASANT OPERATION
 Conceptual Final Landform
 (2026)

Figure 32

To facilitate the more rapid establishment of these final landform profiles, MACH Energy would construct the outer batters of the eastern face of the waste emplacement in 10 m lifts that also facilitate the construction of more variable compound slopes.

Consistent with MSC's recommendations for the Bengalla Mine final landform, the eastern face of the Mount Pleasant Operation final landform would be revegetated with native tree species. This would allow the landform to assimilate with the open woodland communities within the surrounding environment over time and also be consistent with the revegetation of the eastern face of the Bengalla Mine landform.

As described in the Landscape Management Plan (Coal and Allied, 2012) flora species endemic to the local area will be preferentially used for rehabilitation, except where seed supply may be a limiting factor. In this case, other appropriate native species which have performed well in the region will also be considered. Based on seed supply and suitability, flora species to be used in rehabilitation may also include those typical of the NSW listed *White Box Yellow Box Blakely's Red Gum Woodland* endangered ecological community.

The rehabilitation program at the Mount Pleasant Operation will focus on research and management practices that are designed to enhance rehabilitation success.

Where relevant, MACH Energy would implement management practices described in the *Draft National Recovery Plan – White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland* (Department of Environment, Climate Change and Water NSW, 2010) (i.e. community equivalent to the NSW *White Box Yellow Box Blakely's Red Gum Woodland* endangered ecological community).

Further detail regarding the revegetation strategy is provided in the MOP, including performance indicators and completion criteria, rehabilitation implementation strategies and planned rehabilitation monitoring and research.

6 STATUTORY CONTEXT

The Mount Pleasant Operation was approved under Part 4 of the EP&A Act by the NSW Minister for Urban Affairs and Planning, in December 1999 (Development Consent DA 92/97).

Clause 12 of Schedule 6A of the EP&A Act provides that section 75W of Part 3A of the EP&A Act continues to apply to modifications of development consents referred to in clause 8J(8) of the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) following the repeal of Part 3A in October 2011.

The Mount Pleasant Operation Development Consent is a development consent that falls within clause 8J(8) of the EP&A Regulation because it is a consent granted by the Minister under section 101 of the EP&A Act.

Therefore, section 75W of the EP&A Act continues to apply to modifications to the Mount Pleasant Operation Development Consent DA 92/97, notwithstanding its repeal.⁶

As outlined in Section 1.3, MACH Energy consulted with the DPE in May 2016 and May 2017 with regards to seeking the necessary approvals for the Modification and based on this consultation, this EA has been prepared under section 75W of the EP&A Act.

Section 75W of the EP&A Act states:

75W Modification of Minister's approval

(1) In this section:

Minister's approval means an approval to carry out a project under this Part, and includes an approval of a concept plan.

Modification of approval means changing the terms of a Minister's approval, including:

- (a) revoking or varying a condition of the approval or imposing an additional condition of the approval, and
- (b) changing the terms of any determination made by the Minister under Division 3 in connection with the approval.

- (2) The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.
- (3) The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.
- (4) The Minister may modify the approval (with or without conditions) or disapprove of the modification.

....

6.1 GENERAL STATUTORY CONSIDERATIONS

6.1.1 State Legislation

Environmental Planning and Assessment Act, 1979

The EP&A Act and EP&A Regulation set the framework for planning and environmental assessment in NSW. As noted above, the Modification is to be assessed under section 75W (Part 3A) of the EP&A Act.

Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

- (a) to encourage:
 - (i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,
 - (ii) the promotion and co-ordination of the orderly and economic use and development of land,
 - (iii) the protection, provision and co-ordination of communication and utility services,
 - (iv) the provision of land for public purposes,
 - (v) the provision and co-ordination of community services and facilities, and

⁶ Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply for the Mount Pleasant Operation. The description and quotations of relevant references to clauses of Part 3A in this document are to Part 3A as it was in force immediately prior to its repeal on 1 October 2011.

- (vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*
- (vii) *ecologically sustainable development, and*
- (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The Modification is considered to be generally consistent with the objects of the EP&A Act, because it is a Modification which:

- incorporates:
 - development of the State's mineral resources (i.e. coal resources) in a manner that minimises environmental impacts through the implementation of the Mount Pleasant Operation Environmental Management Strategy (Section 2.13) and other measures (Sections 4 and 5);
 - measures to minimise potential amenity impacts associated with noise, blasting, air quality and visual impacts on surrounding land uses (Sections 4.2 to 4.4 and 4.9);
 - continued employment and other socio-economic benefits to the community (Section 4.10.4);
- promotes the orderly economic use and development of land as the Modification mine life extension remains within the originally approved 21 year operational life of the Mount Pleasant Operation;
- would support the ongoing provision of community services and facilities through contributions to State royalties, State taxes, Commonwealth tax revenue and MACH Energy's voluntary contributions to community initiatives (Sections 2.14 and 4.10.4);
- remains largely consistent with the development area of the approved mine, and the range of measures for the protection of the environment, including the protection of native plants and animals, threatened species and their habitats;

- incorporates relevant ecologically sustainable development considerations through:
 - implementation of an adaptive management approach by implementing real-time noise and air quality controls;
 - adoption of high standards for environmental and occupational health and safety performance;
 - assessment of potential greenhouse gas emissions associated with the Mount Pleasant Operation, incorporating the Modification;
- is an application under section 75W of the EP&A Act that would be determined by the Minister for Planning and Environment, however consultation with the MSC and a range of stakeholders has been undertaken and issues raised have been considered and addressed where relevant (Section 1.3); and
- involves public involvement and participation through the public exhibition of this EA document and DPE assessment of the Modification in accordance with the requirements of the EP&A Act.

Other State Legislation

In addition to the EP&A Act, the following NSW Acts may be applicable to the Mount Pleasant Operation, incorporating the Modification:

- *Aboriginal Land Rights Act, 1983;*
- *Contaminated Land Management Act, 1997;*
- *Crown Lands Act, 1989;*
- *Dams Safety Act, 1978;*
- *Dams Safety Act, 2015;*
- *Dangerous Goods (Road and Rail Transport) Act, 2008;*
- *Explosives Act, 2003;*
- *Fisheries Management Act, 1994;*
- *Heritage Act, 1977;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974;*
- *Native Vegetation Act, 2003;*
- *Noxious Weeds Act, 1993;*
- *Protection of the Environment Operations Act, 1997 (PoEO Act);*
- *Roads Act, 1993;*

- *Threatened Species Conservation Act, 1995;*
- *Water Management Act, 2000;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Other approvals required to support the Modification are anticipated to include revisions to the MOP prepared under the conditions of the mining leases to address the mine life extension and delay to the use of a dragline.

Relevant licences or approvals required under these Acts would continue to be obtained for the Mount Pleasant Operation as required. Key plans, licences and agreements that would require revision to incorporate the Modification are outlined in Section 6.3.

Additional detail on the likely requirements under the Mining Act is provided in the sub-section below.

Mining Act, 1992

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions of mining leases, including requirements for the submission of a MOP prior to the commencement of operations, and subsequent Annual Environmental Management Reports (or Annual Reviews).

The current MOP (MACH Energy, 2017b) would require revision to reflect the revised duration of mining and delay in the planned use of a dragline as a result of the Modification (Section 6.3).

6.1.2 Environmental Planning Instruments

State environmental planning policies and local environmental plans that may be relevant to the Modification are discussed below.

Muswellbrook Local Environmental Plan 2009

The Mount Pleasant Operation is located wholly within the Muswellbrook LGA and is covered by the *Muswellbrook Local Environmental Plan 2009* (MLEP).

Clause 2.3(2) of the MLEP relevantly provides:

The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.

As outlined above, the consent authority for the Modification is the Minister for Planning.

Under the MLEP, the Development Application area of the approved Mount Pleasant Operation includes land zoned as RU1 – Primary Production (across the majority of the Development Application Area) and E3 – Environmental Management (central areas south of Castle Rock Road).

The use of these lands for the Modification would be largely unchanged.

State Environmental Planning Policies

State Environmental Planning Policy (State and Regional Development) 2011

The *State Environmental Planning Policy (State and Regional Development) 2011* is not relevant to this Modification under section 75W of the EP&A Act, as the Modification does not constitute State significant development, State significant infrastructure, critical State significant infrastructure or a development application that would be determined by a joint regional planning panel.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) consolidates the various environmental planning instruments that previously controlled mining activities.

Clause 5(3) of the Mining SEPP gives it primacy where there is an inconsistency between the provisions of the Mining SEPP and the provisions of any other environmental planning instrument (except the *State Environmental Planning Policy No. 14 [Coastal Wetlands]* and *State Environmental Planning Policy No. 26 [Littoral Rainforest]*).

Clause 2

Clause 2 sets out the aims of the Mining SEPP as follows:

- (a) *to provide for the proper management and development of mineral, petroleum and extractive material resources for the purpose of promoting the social and economic welfare of the State, and*
- (b) *to facilitate the orderly and economic use and development of land containing mineral, petroleum and extractive material resources, and*
- (b1) *to promote the development of significant mineral resources, and*

- (c) *to establish appropriate planning controls to encourage ecologically sustainable development through the environmental assessment, and sustainable management, of development of mineral, petroleum and extractive material resources.*
- (d) *to establish a gateway assessment process for certain mining and petroleum (oil and gas) development:*
...

Clause 7

Clause 7(1) of the Mining SEPP states that development for any of the following purposes may be carried out only with development consent:

- (a) *underground mining carried out on any land,*
- (b) *mining carried out:*
 - (i) *on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or*
 - (ii) *on land that is, immediately before the commencement of this clause, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999,*

The Modification is on land where agriculture is permissible under the MLEP.

Clause 12

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, the consent authority must:

- (a) *consider:*
 - (i) *the existing uses and approved uses of land in the vicinity of the development, and*
 - (ii) *whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*
 - (iii) *any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and*

- (b) *evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and*
- (c) *evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).*

Land use in the vicinity of the Mount Pleasant Operation is characterised by a combination of coal mining operations, agricultural land uses and the commercial, industrial and residential areas of the towns of Muswellbrook and Aberdeen.

Land use in the Mount Pleasant Operation Development Application area primarily comprises a combination of approved mining activities, mining related infrastructure, public roads, remnant vegetation, cleared grazing land and areas of cropping land on the alluvial landforms adjacent to the Hunter River.

The majority of the Development Application area of the approved Mount Pleasant Operation is located on MACH Energy-owned land (Figure 4).

The proposed Modification would not materially change impacts on surrounding land uses from the Mount Pleasant Operation as originally approved, as it is largely limited to an extension to the approved duration of mining to reflect the delay in commencement of the approved mining operations and some incremental amendments to the approved mine layout.

The Modification would, however, allow for the extraction of more coal reserves within the approved open cuts than would be the case if mining was to cease in December 2020.

MACH Energy would, where practicable, continue to implement a range of measures to avoid or minimise any potential incompatibility of the Mount Pleasant Operation with existing and future land uses in the approved Development Application area.

This would be achieved through the implementation of the Mount Pleasant Operation Environmental Management System (Section 2.13).

Clause 14

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

- (a) *that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
- (b) *that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
- (c) *that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programmes or guidelines concerning greenhouse gas emissions.

The potential impacts of the Modification on groundwater and surface water resources are limited due to the fact that the mine would continue to be largely limited to the approved surface disturbance areas of the approved mine. However, consideration of the potential impacts of the Modification on surface and groundwater resources is provided in Section 4.8, including measures to minimise potential impacts which are described in Section 4.8.3.

The Modification is not expected to have any additional impacts on threatened species and biodiversity as the total native vegetation disturbance of the Mount Pleasant Operation would not increase (Section 4.6).

Greenhouse gas abatement measures and a quantitative assessment of potential Scope 1, 2 and 3 greenhouse gas emissions of the Mount Pleasant Operation inclusive of the Modification is described in the Air Quality and Greenhouse Gas Assessment (Appendix B) and summarised in Section 4.10.2.

Clause 15

Clause 15 of the Mining SEPP requires that:

- (1) *Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*
- (2) *Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*
- (3) *The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

The Modification would allow for the extraction of coal reserves that can be economically mined with open cut mining methods and have previously been approved for extraction at the Mount Pleasant Operation. These coal reserves otherwise would not be available for extraction due to the current restriction on the operational life of the Mount Pleasant Operation under Development Consent DA 92/97.

It is in MACH Energy's financial interest to maximise the efficiency of coal recovery and minimise the generation of coal reject which requires disposal.

Clause 16

Clause 16(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining that involves the transport of materials, the consent authority must consider whether or not the consent should be issued subject to conditions that do any one or more of the following:

- (a) *require that some or all of the transport of materials in connection with the development is not to be by public road,*
- (b) *limit or preclude truck movements, in connection with the development, that occur on roads in residential areas or on roads near to schools,*

- (c) *require the preparation and implementation, in relation to the development, of a code of conduct relating to the transport of materials on public roads.*

Mount Pleasant Operation product coal would continue to be transported from site by rail.

The primary public road network transport routes to and from the Mount Pleasant Operation include potential routes that are adjacent to rural areas, industrial/commercial areas, residential areas and schools.

As the maximum production rate at the Mount Pleasant Operation would not change as a result of the Modification and the Modification would not result in any additional demand for operational employees/contractors, there would be no change in the maximum daily operational vehicle movements.

Notwithstanding, a Road Transport Assessment has been conducted for the Modification (Appendix C) to examine the continuation of the approved traffic movements of the Mount Pleasant Operation and is summarised in Section 4.5.

The Road Transport Assessment concluded no significant impacts on the performance, capacity, efficiency and safety of the road network are expected to arise as a result of the Modification.

No specific traffic management or mitigation measures are considered to be warranted due to the extension of the Mount Pleasant Operation life due to the Modification.

Clause 17

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development.

In particular, the consent authority must consider whether conditions of the consent should:

- (a) *require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*
- (b) *require waste generated by the development or the rehabilitation to be dealt with appropriately, or*

- (c) *require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or*

- (d) *require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

At the cessation of mining at the Mount Pleasant Operation, a rehabilitation programme would be implemented (Section 2.11) and this would be maintained for the Modification.

The management of waste rock and coal reject material is discussed in Sections 2.6 and 2.7.

One of the key Mount Pleasant Operation rehabilitation objectives is the creation of safe, stable, adequately drained post-mining landform consistent with the surrounding landscape (Section 2.11).

As a component of the Modification, MACH Energy proposes a number of improvements to the final landform of the Mount Pleasant Operation in comparison to the landform originally approved in 1999 (Section 5).

MACH Energy's MOP will comply with the Rehabilitation Management Plan requirement in Condition 56, Schedule 3 of Development Consent DA 92/97.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development

Clause 13 of the *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* relevantly requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

- (c) *in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
- (d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application)...*

The Modification would not significantly alter the consequences or likelihood of a hazardous event occurring at the Mount Pleasant Operation (Section 4.10.3), as the operational activities on-site would be largely unchanged from the mine as previously approved.

Operations at the Mount Pleasant Operation would continue to be carried out in accordance with the site's safety and environmental management systems to mitigate the risk of hazardous events.

Notwithstanding, environmental management plans and monitoring programs would be reviewed, and if necessary, revised by MACH Energy to include the Modification.

State Environmental Planning Policy No. 55 (Remediation of Land)

State Environmental Planning Policy No. 55 (Remediation of Land) (SEPP 55) aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of a site for its proposed use.

A consent authority must consider the following under clause 7(1):

- (a) *whether the land is contaminated, and*
- (b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
- (c) *if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Further, under clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

The Modification does not involve a 'change of use' because the Modification would involve the continued open cut mining and associated activities within the existing mining tenements held by MACH Energy.

6.1.3 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act, 1999

The objective of the EPBC Act is to provide for the protection of those aspects of the environment that are of *national environmental significance*. Proposals that are likely to have a significant impact on a matter of national environmental significance are defined as a controlled action under the EPBC Act.

The nine matters of national environmental significance are:

- world heritage properties;
- national heritage places;
- wetlands of international importance (also called 'Ramsar' wetlands);
- nationally threatened species and ecological communities;
- migratory species;
- Commonwealth marine areas;
- the Great Barrier Reef Marine Park;
- nuclear actions; and
- a water resource, in relation to coal seam gas development and large coal mining development.

Proposals that are, or may be, a controlled action are required to be referred to the Commonwealth Minister for the Environment to determine whether the proposal requires assessment and approval under the EPBC Act.

On 29 February 2012, the Mount Pleasant Operation (EPBC No 2011/5795) was granted approval, subject to conditions, by the Minister's delegate, under sections 130(1) and 133 of the EPBC Act (Section 2.1).

The EPBC Act approval extends to 28 October 2035 and therefore the proposed Modification mine life is already consistent with the duration of operations currently permitted under the EPBC Act approval.

The Modification does not involve any significant increase in the development footprint of the Mount Pleasant Operation and hence would have no significant impact on nationally threatened species and ecological communities, migratory species or water resources (Sections 4.6 and 4.8).

Based on the above, there would be no significant impact on matters of national environmental significance as a result of the Modification.

It is therefore considered that there is no need to refer the Modification to the Commonwealth Minister for the Environment.

National Greenhouse and Energy Reporting Act, 2007

The *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) introduced a single national reporting framework for the reporting and dissemination of corporations' greenhouse gas emissions and energy use. The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

As it develops a portfolio of projects in Australia MACH Energy may trigger the threshold for reporting under the NGER Act at some time during the life of the Mount Pleasant Operation. If this does occur, MACH Energy would accordingly report its energy use and greenhouse gas emissions from its enterprises.

6.2 NSW GOVERNMENT POLICY

Strategic Regional Land Use Policy

As part of the Strategic Regional Land Use Policy, the NSW Government introduced a Gateway Process for the upfront assessment of the impacts of State Significant mining and coal seam gas proposals on Strategic Agricultural Land (NSW Government, 2012a).

The Strategic Regional Land Use Policy and the Gateway Process only applied to new State Significant Development applications or modifications for mining projects located outside of existing ML areas (NSW Government, 2012a).

The Modification is wholly contained within MACH Energy's existing mining tenements and therefore the Gateway Process does not apply to the assessment of the Modification.

Aquifer Interference Policy

The AIP (NSW Government, 2012b) has been developed by the NSW Government as a component of the NSW Government's Strategic Regional Land Use Policy. The AIP applies State-wide and details water licence and impact assessment requirements.

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP will also enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The *Water Management Act, 2000* defines an aquifer interference activity as that which involves any of the following:

- *the penetration of an aquifer;*
- *the interference with water in an aquifer;*
- *the obstruction of the flow of water in an aquifer;*
- *the taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations; and*
- *the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.*

The AIP requires all water taken by aquifer interference activities to be accounted for within the extraction limits set by the relevant Water Sharing Plan.

The Water Sharing Plans relevant to groundwater resources for the Mount Pleasant Operation are the *Water Sharing Plan for the Hunter Unregulated and Alluvial Water Sources, 2009* and the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources, 2016*.

As the Modification would not change the approved open cut extent and maximum rate of mining, impacts on groundwater resources arising from the Modification would be negligible. It therefore follows that the Modification would fall within the Level 1 minimal impact criteria under the AIP, when compared to the approved impacts of the Mount Pleasant Operation.

MACH Energy is required to implement an approved Surface and Groundwater Response Plan.

The draft Surface and Groundwater Response Plan includes:

- processes to deal with groundwater-related complaints;
- response protocols in the event that a groundwater trigger level is exceeded; and

- contingency measures in the event that an investigation conclusively attributes an adverse impact to an existing groundwater supply user to the Mount Pleasant Operation.

Appropriate contingency measures for an impact on a groundwater supply user may include:

- deepening the affected groundwater supply;
- construction of a new groundwater supply; or
- provision of a new alternative water supply.

6.3 PLANS, LICENCES AND AGREEMENTS THAT REQUIRE REVISION

Development Consent Conditions

Condition 5, Schedule 2 of Development Consent DA 92/97 (Attachment 1) stipulates limits of approval as follows:

The Applicant may carry out mining operations on the site until 22 December 2020.

MACH Energy is seeking to amend Condition 5, Schedule 2 of Development Consent DA 92/97 as a component of the Modification to read:

The Applicant may carry out mining operations on the site until 22 December 2026.

Schedule 3 of Development Consent DA 92/97 (Attachment 1) provides land acquisition, noise impact assessment criteria, air quality criteria and a list of residences that may request air quality or noise mitigation measures. These tables would require revision to reflect recent changes in land ownership and associated minor updates to address previous noise assessment inconsistencies identified in the Noise and Blasting Assessment (Appendix A). It is also anticipated that these tables would be updated to reflect contemporary NSW Government policy with respect to vacant land noise and air quality criteria.

Appendices of the Development Consent DA 92/97 may also require revision, including:

- Update of Appendix 2 (Project Layout Plan) to reflect the addition of the emplacement extension and relinquishment of a portion of the South West Out of Pit Emplacement.

- Updates to Appendices 5 and 6 (i.e. Receiver Location Plans and Noise Assessment Groups) to reflect recent changes to land ownership and revisions to the NAGs as recommended by Wilkinson Murray (Appendix A).
- Update of Appendix 7 (Conceptual Final Landform) to reflect MACH Energy's proposed improvements to the final landform.

Mount Pleasant Operation Planning Agreement

The life of the Mount Pleasant Operation would be extended by the Modification, but this would still remain within the duration of operational mining that was originally approved.

In addition, the Mount Pleasant Operation operational workforce would not require any augmentation for the Modification (Section 3.3.10).

As a result, no changes to the existing Mount Pleasant Operation Planning Agreement with the MSC are required, as it is indexed to the Consumer Price Index.

Management/Monitoring Plans

Some management plans (e.g. the Noise Management Plan and Air Quality Management Plan) may require revision to reflect changes to land ownership, updated environmental management measures or changes to Development Consent conditions resulting from the Modification.

Mining Operations Plan (Rehabilitation Management Plan)

The current MOP may require revision to reflect the revised duration of approved mining operations, the proposed delay to the use of an on-site dragline and amendments to the mine landforms as a result of the Modification.

7 CONCLUSION

The Mount Pleasant Operation was originally approved in 1999 to mine some 197 Mt of ROM coal over a 21 year life.

However, coal mining operations were not commenced at the site under the ownership of Coal & Allied. The Mount Pleasant Operation was acquired by MACH Energy from Coal & Allied in August 2016.

On-site construction of the Mount Pleasant Operation re-commenced under MACH Energy's ownership in November 2016. The mine is being developed as an open cut mine with on-site coal processing and transport of product coal by rail, consistent with the project as approved.

The Modification does not propose any increase to the approved rates of coal and waste rock production or alteration to the extent of the approved open cut pits.

The Modification would however provide continuation of significant coal production and employment and business opportunities in the Muswellbrook LGA and the wider Hunter Valley for approximately six years (i.e. from 2020 to 2026), should it be approved

In order to assess the potential environmental impacts of the proposed Modification a number of environmental reviews were completed.

A summary of the key findings of these environmental reviews and key commitments with respect to managing potential impacts is provided in Table 15. These reviews indicate that the Mount Pleasant Operation environmental management and monitoring measures being applied by MACH Energy could continue to be applied to minimise the potential impacts on existing environmental values and the nearest private dwellings.

The Modification therefore would not significantly increase potential environmental impacts in comparison to the approved Mount Pleasant Operation.

Table 15
Key Outcomes of the Environmental Review

Environmental Aspect	Summary of Environmental Assessment Conclusions	Key Management, Mitigation or Monitoring Measures for the Modification
Operational Noise	<p>With the implementation of MACH Energy's noise management measures (including noise attenuated major mobile plant) the noise envelope of the Mount Pleasant Operation incorporating the Modification would effectively be unchanged from the approved mine.</p> <p>Contemporary noise modelling has identified one private dwelling where an update to noise criteria/status is required to address an apparent inconsistency in the previous assessments. The noise assessment conducted for the Modification indicates that this private residence is in the noise affectation zone (i.e. should be afforded acquisition upon request rights).</p>	<p>MACH Energy would continue to position mobile equipment during the evening and night-time to optimise the noise shielding provided by the developing Eastern Out of Pit Emplacement.</p> <p>Real-time noise controls (e.g. mobile fleet stand-downs) would also be implemented as required under relevant adverse meteorological conditions to maintain compliance with applicable Development Consent DA 92/97 noise impact assessment criteria.</p> <p>MACH Energy would continue to implement the real-time noise management system and associated response protocols in the Noise Management Plan. The Noise Management Plan would be reviewed, and if necessary, revised to incorporate the Modification.</p>
Dust and Particulate Matter	Air quality modelling indicates that no additional exceedances of applicable Development Consent DA 92/97 air quality criteria are predicted to arise at any privately-owned residences as a result of the Modification.	The real-time air quality monitoring system and response protocols detailed in the Air Quality and Greenhouse Gas Management Plan would continue to be implemented, including proactive and reactive management measures. The Air Quality and Greenhouse Gas Management Plan would be reviewed, and if necessary, revised to incorporate the Modification.
Road Transport	Traffic modelling indicates that traffic generated by the Mount Pleasant Operation (incorporating the Modification) during peak periods would not adversely impact on the operation of key intersections.	<p>MACH Energy would continue to encourage employees and contractors to minimise traffic using the Kayuga Road bridge.</p> <p>MACH Energy would also undertake road upgrades in consultation with MSC as required by Conditions 38 and 39, Schedule 3 of Development Consent DA 92/97.</p>

Table 15 (continued)
Key Outcomes of the Environmental Review

Environmental Aspect	Summary of Environmental Assessment Conclusions	Key Management, Mitigation or Monitoring Measures for the Modification
Biodiversity	<p>The Modification requires disturbance of some native vegetation associated with the emplacement extension. However, as part of the Modification, MACH Energy would no longer emplace waste rock within the approved South West Out of Pit Emplacement footprint.</p> <p>The emplacement extension area provides limited habitat opportunities. The South West Out of Pit Emplacement footprint contains native woodland with mature trees providing foraging, nesting and roosting habitat for threatened fauna.</p>	<p>The Modification is considered to result in a small net biodiversity gain and therefore consideration of biodiversity offset requirements is not warranted.</p> <p>Notwithstanding, key biodiversity management measures at the Mount Pleasant Operation would continue to be implemented for the Modification, including vegetation clearance procedures and the implementation of progressive rehabilitation.</p>
Heritage	<p>Previous Mount Pleasant Operation heritage assessments have identified a number of Aboriginal heritage sites within the proposed emplacement extension that are within the extent of AHIP #C0002053.</p> <p>Three historic heritage sites of some local heritage significance have also been identified in the vicinity of the emplacement extension. Two of these would be disturbed by the approved Mount Pleasant Operation. The third would not be disturbed by the Modification.</p>	<p>The management of all Aboriginal heritage sites located within the emplacement extension would be undertaken consistent with the requirements of AHIP #C0002053 and the relevant approved Aboriginal Heritage Management Plan for the Mount Pleasant Operation.</p>
Water Resources	<p>The Modification would not result in a material change to the groundwater and surface water impacts of the approved Mount Pleasant Operation.</p> <p>The outcomes of contemporary site water balance modelling undertaken for the Modification are not materially different to the outcomes of water management system modelling undertaken for the approved Mount Pleasant Operation.</p>	<p>Water monitoring and management at the Mount Pleasant Operation would continue to be undertaken in accordance with an approved Water Management Plan.</p> <p>MACH Energy will maintain appropriate groundwater and surface water licences in accordance with the relevant water sharing plans.</p>
Visual/Final Landform	<p>The Modification would bring the Eastern Out of Pit Emplacement landform closer to proximal receivers in the east.</p> <p>However, the Modification would also result in a reduction in visual impacts for some receivers associated with not constructing the approved South West Out of Pit Emplacement.</p> <p>Proposed modifications to the landform design would also improve the views of the landform from Muswellbrook and other local vantage points, following rehabilitation.</p>	<p>MACH Energy proposes to incorporate macro-relief in the final landform as a component of the Modification. The upper lifts on the Eastern Out of Pit Emplacement would be varied to break up the horizon line when viewed from the east. The higher points would align with spurs and valleys in the eastern face that would further improve visual outcomes for Muswellbrook and other local vantage points.</p> <p>The modified final landform would also be designed to mitigate erosion potential by incorporating micro-relief.</p> <p>MACH Energy would prioritise construction of the lower batters of the waste emplacement to final landform profile and the early revegetation of these batters with native tree species to progressively minimise visual impacts.</p>

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