

Monto Coal 2 Pty Ltd

Monto Coal Project Progressive Rehabilitation and Closure Plan

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H & J Enterprises (QLD) Pty Ltd

Sanrus Pty Ltd

Submitter information	
Report Type	Progressive Rehabilitation and Closure Plan
Author(s)	Monto Coal 2 Pty Ltd
Address	Level 15, 40 Creek Street, Brisbane Qld 4000 PO Box 10630, Adelaide Street, Brisbane QLD 4000
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Ryan Pane	0.0	29 03 2024
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1. Project Planning

1.1. Introduction

The Monto Coal Project (MCP) is a proposed open cut coal mine owned by Monto Coal 2 Pty Ltd (Monto Coal) located approximately 6 km south of the town of Monto and 135 km southwest of Gladstone (see **Figure 1**). The MCP is located to the south of the state-controlled Burnett Highway and to the east of the local Kapaldo Road which forms the main access to the site. The Monto-Gayndah Branch Railway corridor runs through the MCP site. The MCP is a joint venture comprising three partners, being Monto Coal (as the majority shareholder), Sanrus Pty Ltd and H & J Enterprises (QLD) Pty Ltd, collectively the MCP Joint Venture (JV). Monto Coal and Sanrus Pty Ltd are subsidiaries of QCoal Pty Ltd (QCoal).

The MCP comprises two tenements, Mining Lease (ML) ML 80101 and Mining Lease Application (MLA) MLA 80175, collectively covering a total of 649.2 ha. Further details on the MCP MLs are provided in **Section 1.1.4**. The MCP is subject to Environmental Authority (EA) EPML00418713, the current version of which is dated 13 January 2022.

Mining has not yet commenced on the MCP. However, once mining commences it will utilise a conventional open-cut mining method to target defined coal resources within the Mulgildie Coal Measures (MCM) within a single pit over an approximately 20-year mine life. Planned activities at the MCP include the mining of waste rock and coal, dumping of waste rock, haulage of ROM coal via haul roads, processing of coal, management of rejects, rehabilitation activities in available areas, and environmental monitoring. Mining will progress subject to relevant EA constraints, resource location and economics. Mine waste will be placed in out-of-pit waste rock dumps until sufficient void space is available within the pits to allow for in-pit dumping via an advancing low wall (i.e. progressive backfilling).

Supporting infrastructure will also be constructed within the MCP, including a Coal Handling and Preparation Plant (CHPP), rejects management system (co-disposal facility), train load-out, Run of Mine (ROM) pad, product stockpile area, heavy vehicle workshop, offices and fuel storage. Other infrastructure on the MCP will include access tracks, haul roads, park-up areas, and water management structures (e.g. dams and drains).

No commencement date for operations on the MCP has been set at the time of submission of this Progressive Rehabilitation and Closure Plan, therefore dates in the plan and associated Progressive Rehabilitation and Closure Plan Schedule reference project years in place of specific years.

1.1.1. Project Ownership

The MCP is held by the following entities comprising the Monto Coal Joint Venture (MCJV):

- Monto Coal 2 Pty Ltd;
- Sanrus Pty Ltd; and
- H & J Enterprises (QLD) Pty Ltd.

Monto Coal Pty Ltd and Sanrus Pty Ltd are wholly-owned subsidiaries of QCoal. The owner and Managing Director of QCoal is Mr Christopher Wallin.

H & J Enterprises (Qld) Pty Ltd's interest in the MCP is subject to a Share and Asset Sale Deed (20 June 2023). The Queensland Revenue Office (QRO) is currently assessing the deed for transfer duty. Under the deed, H&J Enterprises (QLD) Pty Ltd interest will be acquired by Sanrus Pty Ltd. The transfer application to register the change in ownership interests will be lodged after QRO completes its assessment and any relevant duties are paid. Following this, the MCP will be entirely held by QCoal subsidiaries.

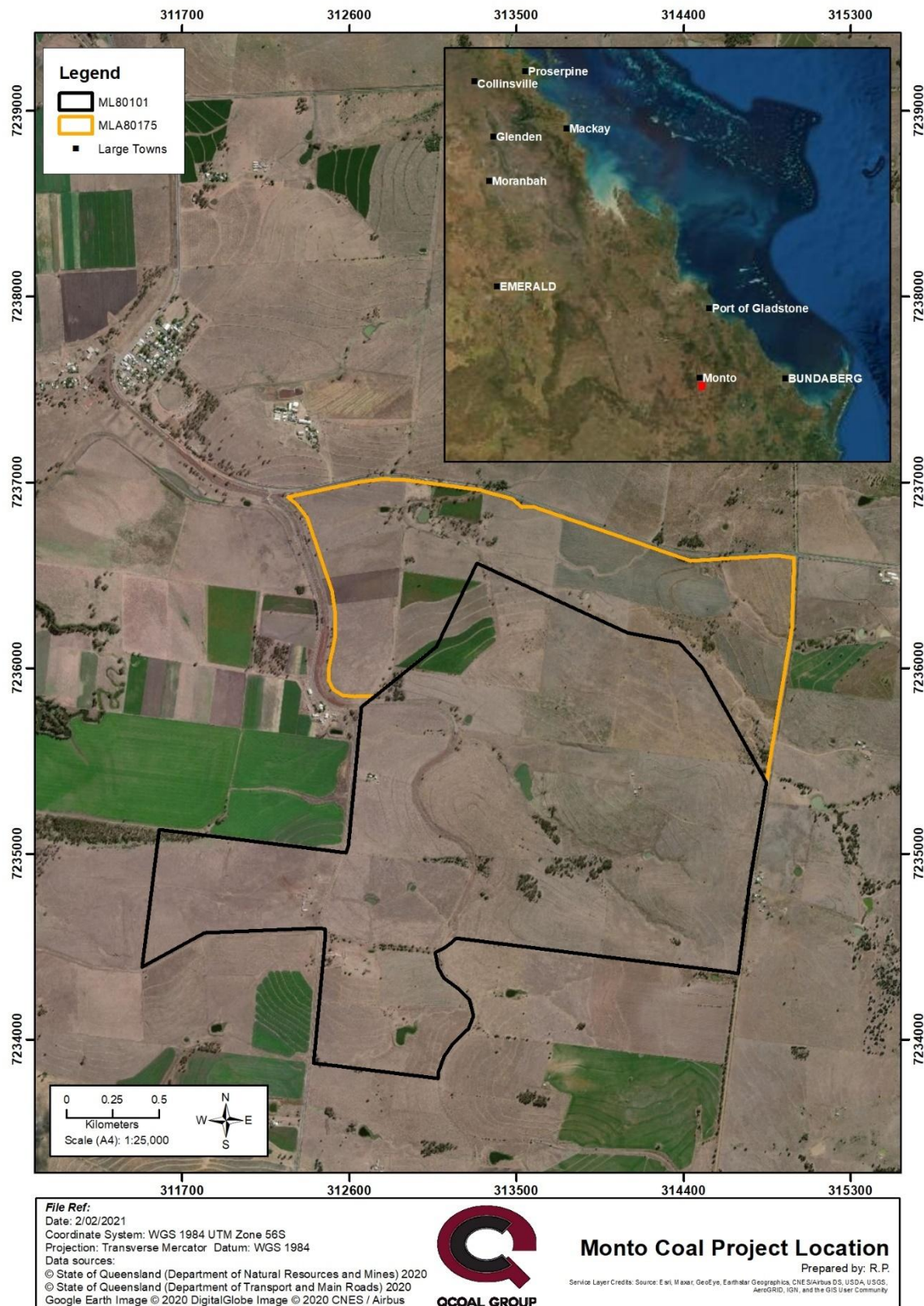


Figure 1 – MCP Regional Location

1.1.2. Progressive Rehabilitation and Closure Plan Legislation and Guideline

The *Mineral and Energy Resources (Financial Provisioning) Act 2018* (MERFP Act) was passed by the Queensland Parliament on 30 November 2018 which, amongst other changes, amended the *Environmental Protection Act 1994* (EP Act). One of the key changes introduced by this legislation was to add the requirement for new and existing mines to develop and submit a Progressive Rehabilitation and Closure Plan detailing how rehabilitation will be planned, scheduled and progressed to bring mine-disturbed land to a stable condition, as defined in Section 111A of the EP Act:

111A Meaning of stable condition

*Land is in a **stable condition** if –*

- (a) the land is safe and structurally stable; and*
- (b) there is no environmental harm being caused by anything on or in the land; and*
- (c) the land can sustain a post-mining land use.*

A Progressive Rehabilitation and Closure Plan must address the requirements in sections 126C and 126D of the EP Act, pursuant to section 754 of the EP Act. Further guidance on the required content is contained in the *Guideline Progressive Rehabilitation and Closure Plans* (ESR/2019/4964) (DES, 2021) (PRCP Guideline).

The Progressive Rehabilitation and Closure Plan comprises two components (as required by the EP Act):

- The Progressive Rehabilitation and Closure Plan (PRC Plan), which provides rehabilitation planning information including:
 - site characteristics;
 - pre-mining conditions;
 - post-mining land-uses (PMLUs);
 - community consultation;
 - rehabilitation methodology and criteria;
 - a risk assessment; and
 - a monitoring program.
- The Progressive Rehabilitation and Closure Plan Schedule (PRCP Schedule), which:
 - allocates all mine disturbance to one of the following:
 - a designated rehabilitation area which has a specific post-mining land-use (PMLU) with:
 - nominates rehabilitation milestones (RMs) (which when all are achieved, represents completed rehabilitation);
 - provides a detailed schedule for the progressive rehabilitation of all RAs towards achieving the RMs; or
 - A non-use management area (NUMA) with specific management milestones.

The EP Act includes transitional provisions for the application of the PRC Plan requirement to existing mines. Holders of an existing site-specific mining EA will be issued with a notice from the administering authority within the first three years following the PRC Plan start date (being 1 November 2019).

1.1.3. Document Purpose and Interaction Between the PRC Plan Components

This document in its entirety (including appendices) represents the PRC Plan for the MCP, developed in accordance with the requirements of the EP Act and PRCP Guideline. The components of the PRC Plan within this document are as follows:

- the “PRC Plan” which is provided as the body of this document; and
- the “PRCP Schedule” is submitted separately in the approved form but is also provided as **Appendix A** of this document.

The PRC Plan and the PRCP Schedule can be considered, reviewed, and implemented separately. Additionally, both components can be amended independently without requiring amendment of the other. However, where such an amendment results in an inconsistency between the two components, the inconsistency requires resolution.

Where the PRCP Schedule is amended and as a result the PRC Plan requires amendment to resolve an inconsistency between the components, a copy of the amended PRC Plan will be provided to the administering authority within 10 business days as required by section 316H of the EP Act.

1.1.4. Site History and Existing Approvals

The exploration tenements held by QCoal (and its subsidiaries) underlying the MCP include:

- Exploration Permit Coal (EPC) 613 (held since 1996);
- EPC 683 (held since 1998); and
- Mineral Development Licence (MDL) 445 (held since 2014).

Exploration within these tenements defined a coal resources which has led to the proposed development of the MCP. The MCP was originally approved as a single ML (ML80101), which was granted in 2005. The original EA was assessed as a Level 1 Non-Code Compliant EA with an associated Environmental Management Overview Strategy (EMOS), and was granted on 12/08/2003 as MIN800036802.

MLA80175, which is a northern extension of the MCP is still in application (lodged 10/02/2011); however, MLA80175 was added to the MCP EA in 2022 via a Major EA Amendment. The MCP MLs and EA are held by the MCJV.

Table 1 provides further details on the MCP MLs and EA.

Table 1 – MCP ML and EA Details

Details	ML80101	MLA80175	EPML00418713
Permit Type	Mining Lease	Mining Lease	Environmental Authority
Permit Status	Granted	Application	Granted
Lodgement Date	2/04/2002	10/02/2011	-
Grant Date	21/04/2005	TBD	Original: 12/08/2003 Current: 13/01/2022
Expiry Date	30/04/2035	TBD	-
Authorised Holder	Monto Coal 2 Pty Ltd	Monto Coal 2 Pty Ltd	Monto Coal 2 Pty Ltd
Area	471.1	178.1	-
Permit ID	109870	109933	EPML00418713
Native Title Category	Exclusive Land	Exclusive Land	-

Condition A2 of EA EPML00418713 authorises Monto Coal to extract a maximum of 1.5 million tonnes per annum of ROM coal at the MCP. The Environmentally Relevant Activities (ERAs) authorised under EA EPML00418713 are listed in **Table 2**:

Table 2 – MCP ERAs

ERA	Description	Status
Resource Activity, Schedule 3, 13	Mining black coal	Not yet commenced.
Ancillary 08 – Chemical Storage 3	Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	Not yet commenced.
Ancillary 31 – Mineral Processing 2(b)	Processing, in a year, more than 100,000t of mineral products, other than coke	Not yet commenced.
Ancillary 60 - Waste disposal, 2(e)	Operating a facility for disposing of, in a year, more than 20,000t but not more than 50,000t	Not yet commenced.
Ancillary 63 – Sewage Treatment 1(a-i)	Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 to 100EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	Not yet commenced.

The MCP has not required any referrals to the relevant Commonwealth environment departments for any of the proposed activities as they were not deemed to have a significant residual impact to Matters of National Environmental Significance (MNES).

1.1.5. Land Outcome Documents

The MCP was approved prior to the PRC Plan commencement date (1 November 2019). Consequently, the transitional arrangements detailed in Section 6 of the PRCP Guideline apply to this PRC Plan. This includes the use of existing Land Outcome Documents (LODs) to facilitate the transition of existing mines with existing landforms and mine plans into the PRC Plan framework. LODs are nominated pre-existing documents related to rehabilitation and closure, the contents of which are agreed as pre-approved by the regulatory authority for continued implementation on the site and adoption in the PRC Plan and/or PRCP Schedule.

Relevant content examples in an LOD include nominated PMLUs, non-use-management-areas (NUMAs), rehabilitation methodologies, completion criteria and the related antecedent studies.

LODs are defined under section 750 of the EP Act as:

land outcome document, for land, means the following documents relating to the land—

- (a) an environmental authority for a resource activity on the land;
- (b) a document made under a condition of an environmental authority mentioned in paragraph (a), if—
 - (i) the document relates to the management of a void within the meaning of section 126D on the land, or the rehabilitation of the land; and
 - (ii) the document was received by the administering authority before the assent date; and
 - (iii) the administering authority has not, within 20 business days after the assent date, given notice to the holder of the environmental authority that the document is insufficient in a material particular relevant to a matter mentioned in subparagraph (i); and
 - (iv) before the assent date, the document had not been superseded;
- (c) a document made under a condition of an environmental authority mentioned in paragraph (a) if—
 - (i) the document relates to the management of a void within the meaning of section 126D on the land, or the rehabilitation of the land; and
 - (ii) the environmental authority requires the document to be given to the administering authority on a stated day that is on or after the assent date, or does not state a day when the document must be given; and
 - (iii) the document is received by the administering authority within 3 years after the assent date; and
 - (iv) the administering authority does not, within 20 business days after receiving the document, give the holder of the environmental authority notice that the document is insufficient in a material particular to a matter mentioned in subparagraph (i);
- (d) a report evaluating an EIS under the State Development and Public Works Organisation Act 1971, section 34D;
- (e) an EIS assessment report;
- (f) a written agreement between the holder of an environmental authority mentioned in paragraph (a) and the State that is in force on the assent date.

Following this hierarchy, the relevant LODs for the MCP are detailed in **Table 3**.

Table 3 – MCP Land Outcome Documents

Land Outcome Document	Approval Date	Disturbance Area	Document Reference	Outcome and Detail
EA EPML00418713	Granted: 12/08/2003	Residual Voids	Condition F3 / Table F2	Outline the residual voids that are to be permitted to be retained and other requirements
	Current: 13/01/2022	'All other areas'	Condition F1	Condition F1 nominates that all areas other than residual voids will have a PMLU of grazing pasture

The EP Act requires that all areas disturbed for mining activities under an EA within a relevant mining tenure be rehabilitated to either a specified PMLU (see **Section 3**), or where a PMLU cannot be sustained, be retained as a NUMA (see **Section 3.1 and Section 4**).

Under Condition F1 of the MCP EA, all areas significantly disturbed by mining activities must be rehabilitated to achieve a PMLU of grazing pasture with the exception of residual voids. The additional exception is for infrastructure to be retained by written agreement with the landholder. **Table 4** details the PMLU and the relevant LOD for each domain at the MCP.

Table 4 – MCP Domain PMLU and Source LOD

Domain	PMLU	LOD
Residual voids	- Water Storage	EA
Overburden Dumps	- Grazing pasture	EA
Mine Infrastructure	- Grazing pasture; or - retained by the landholder with written agreement	EA
Out of pit Co-disposal Facility	- Grazing Pasture	EA
ROM and product stockpiles	- Grazing pasture; or - retained by the landholder with written agreement	EA
Haul Roads and Access tracks	- Grazing pasture; or - retained by the landholder with written agreement)	EA
Sediment dams and water management infrastructure	- Grazing pasture; or - retained by the landholder with written agreement	EA

Residual voids permitted to be retained at the MCP are addressed by Condition F3 of the EA, with further detail provided in Table F2 of the EA (reproduced as **Table 5** below), including the specific

voids to be retained and relevant details including void area and the maximum highwall and low-wall slopes.

Table 5 – EA Residual Void Details

Residual Void	Void Area	Maximum Slope
IA1 and Residual Void Lake	25 ha*	High Wall: 51° Low Wall: 37°

* The maximum approved void area NUMA and extent of the residual void lake will be determined through the required assessments of PRCP Condition 10 of the approved PRCP Schedule V1.

Unless otherwise stated, a reference to the ‘MCP EA’ in this PRC Plan is a reference to the MCP EA version received 13/01/2022, which was in place at the time of issue of this PRC Plan. It is noted that following the approval of the MCP PRCP Schedule, EA conditions in Schedule F related to rehabilitation will be removed from the EA by an amendment by agreement as they will be largely redundant (as per the PRCP Guideline). This PRCP will not reflect any such EA amendment. References to redundant EA conditions may be included in this document as they represent the LOD requirements in place at the time of writing that inform and justify the approach taken in this PRCP.

1.2. Underlying Properties and Landholders

Land tenure details for the real property within and adjoining the MCP are shown in **Table 6**. **Figure 2** shows the location of the property boundaries and land tenure within the MCP.

Table 6 – MCP Underlying Land Tenure

Lot/Plan	Tenure	Holder	Total Area (ha)	MCP ML Overlap Area (ha)
Lot 4 on RW99	Freehold	MCJV	134.6	78.7
Lot 5 on RW591	Freehold	MCJV	130.6	48.7
Lot 122 on RW100	Freehold	MCJV	33.8	33.8
Lot 142 on RW100	Freehold	MCJV	34.4	34.4
Lot 123 on RW101	Freehold	MCJV	106.1	106.1
Lot 126 on RW101	Freehold	MCJV	93.9	93.9
Lot 145 on RW101	Freehold	MCJV	50.4	50.4
Lot 124 on RW714	Freehold	MCJV	92.4	92.4
Lot 125 on RW714	Freehold	MCJV	50.8	50.8
Lot 2 on SP151959	Freehold	MCJV	36.4	36.4
Lot 311 on CP827316	Lands Lease (Rail)	Queensland Rail	5.8	5.8
Lot 331 on CP827317	Lands Lease (Rail)	Queensland Rail	10.2	1.9
Road Reserves	Road Reserve	North Burnett Regional Council	30.9	14.0

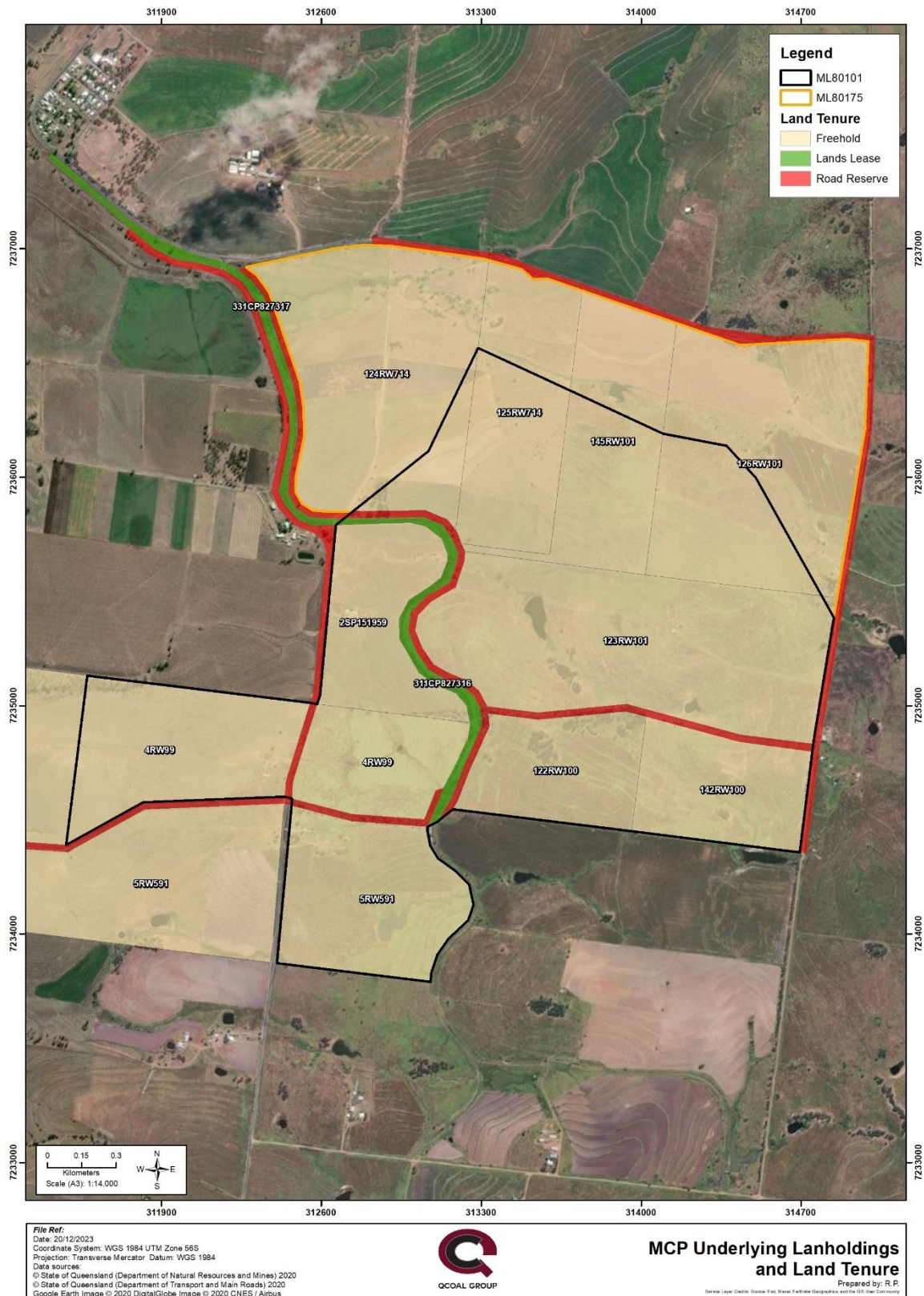


Figure 2 – Underlying Landholdings and Land Tenure

1.2.1. Sensitive Places

Sensitive Places and *Commercial Places* are defined in the MCP EA as follows:

‘sensitive place’ means:

- a) *A dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or*
- b) *A motel, hotel or hostel; or*
- c) *An educational institution; or*
- d) *A medical centre or hospital; or*
- e) *A protected area under the Nature Conservation Act 1992, the Marine Parks Act 1992 or a World Heritage Protection Area; or*
- f) *A public park or gardens.*

‘commercial place’ means *a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees’ accommodation or public roads.*

The nearest sensitive places, commercial places and population centres to the MCP MLs are detailed in **Table 7** and **Figure 3**.

Table 7 - Proximity of Sensitive and Commercial Places to the MCP

Description	Type	Distance from ML Boundary
Homestead #1	Sensitive Place	1.7km
Homestead #2	Sensitive Place	1.8km
Homestead #3	Sensitive Place	0.48km
Homestead #4	Sensitive Place	1.3km
Homestead #5	Sensitive Place	1.4km
Homestead #6	Sensitive Place	0.55km
Homestead #7	Sensitive Place	0.15km
Homestead #8	Sensitive Place	0.49km
Homestead #9	Sensitive Place	0.68km
Homestead #10	Sensitive Place	2.0km
Homestead #11	Sensitive Place	0.44km
Homestead #12	Sensitive Place	0.60km
Homestead #13	Sensitive Place	0.95km
Homestead #14	Sensitive Place	1.3km
Homestead #15	Sensitive Place	1.3km
Homestead #16	Sensitive Place	1.7km
Homestead #17	Sensitive Place	1.8km
Piggery	Commercial Place	0.35km
Mulgildie	Township	0.94km



Figure 3 – MCP Sensitive and Commercial Places

1.3. Pre-Mining Land Use

The MCP is located within the Monto region, which has been utilised for livestock grazing (beef cattle) and farming since the late 1800s. Mining has historically been undertaken in the vicinity of the MCP, specifically the Selene Underground Coal Mine, which closed in the 1970s. Other land uses in the region include quarrying and power generation. As a result of these land uses, the natural landscape in the region has undergone considerable disturbance and modification. This is demonstrated by the almost entirely cleared nature of the land underlying the MCP.

The properties specifically underlying the MCP have also historically been and continue to be, used for beef cattle grazing. As a result the natural landscape of the MCP has undergone considerable pre-mining disturbance and modification. Property improvements on the land have included fencing, construction of dams, thinning and clearing of remnant vegetation, the establishment of improved pasture, and the construction of the Monto-Gayndah Branch Railway. A single pocket of remnant native vegetation remains on the western edge of ML80101 associated with Three Moon Creek.

As no disturbance has been undertaken for the MCP to date, all modification and disturbance of the underlying land has been associated with the previous land use rather than mining activities.

As noted in **Section 1.2**, third-party owned infrastructure is also present within the MCP MLs, including unformed local roads and the Monto-Gayndah branch railway corridor. These existing land-use designations will continue during the LOM of the MCP and afterwards, with any interface between the infrastructure and the MCP governed by the compensation/infrastructure agreements between Monto Coal and the asset owner as required under the MR Act. As these uses do not constitute mining activities, these areas have not been assigned a PMLU. This is consistent with Section 3.2 of the PRCP Guideline which states:

A PMLU is defined under section 112 of the EP Act as the purpose for which the land will be used after all relevant activities for the PRC plan carried out on the land have ended. Relevant activity for a PRC plan is defined in the EP Act as the relevant activities to be carried out on land the subject of the plan. It is not the intention of this definition to include third-party activities or assets that continue to exist once mining activities have ceased, such as third-party pipeline easements, power easements or overlapping tenures for other EAs.

1.4. Operational Site Layout

The extent and type of disturbance that is authorised at the MCP is detailed in Conditions A3 and A4 of the MCP EA as follows:

- A3 *In carrying out the mining activity authorised by this environmental authority, disturbance of land in Figure 1 (Disturbance Footprint):*
- a) may occur in the areas marked 'A';*
 - b) must not occur in the areas marked 'B'; and*
 - c) may occur in the areas marked 'C', but only in accordance with Condition A4 and A5.*

- A4** Any disturbance within the areas marked 'C' on Figure 1 (Disturbance Footprint) is only authorised to the extent reasonably necessary for:
- a) Exploration activities;
 - b) Roads;
 - c) Fences;
 - d) Underground services;
 - e) Low-impact telecommunications facilities;
 - f) Electrical sub-stations;
 - g) Transmission grid works and supply network works;
 - h) Storage depots; and
 - i) Similar minor infrastructure and ancillary facilities for any of the above.
- A5** Any disturbance within areas marked 'A' or 'C' on Figure 1 (disturbance Footprint) must not adversely impact on areas marked 'B'.

Figure 4 shows the extent of EA disturbance categories A, B and C permitted at the MCP, as per MCP EA Figure 1 (Disturbance Footprint). **Figure 5** shows the LOM MCP footprint overlaid on aerial imagery, with key operational areas labelled.

The MCP LOM layout consists of the following elements:

- Monto Stage 1 Pit Mining Area:
 - Monto Stage 1 Pit and associated waste rock dump
 - Associated internal ramps/haul roads
 - Water management infrastructure
- Infrastructure:
 - Coal Handling and Processing:
 - Run of Mine (ROM) stockpile pad
 - CHPP
 - Product coal stockpile pad
 - Rail siding and train loading facilities
 - MIA:
 - Workshops
 - Administration Facilities
 - Ablutions Blocks and
 - Car Parking
 - Tailings Disposal Facility (TDF)
 - Haul Roads not associated with the above areas
 - Light vehicle access tracks not associated with the above areas
 - Water management infrastructure not associated with the above areas including:
 - Sediment basins
 - Clean water diversions
 - Utilities and Services, including
 - Water pipelines (raw and mine-affected)
 - Overhead power supply (33kV feeder)



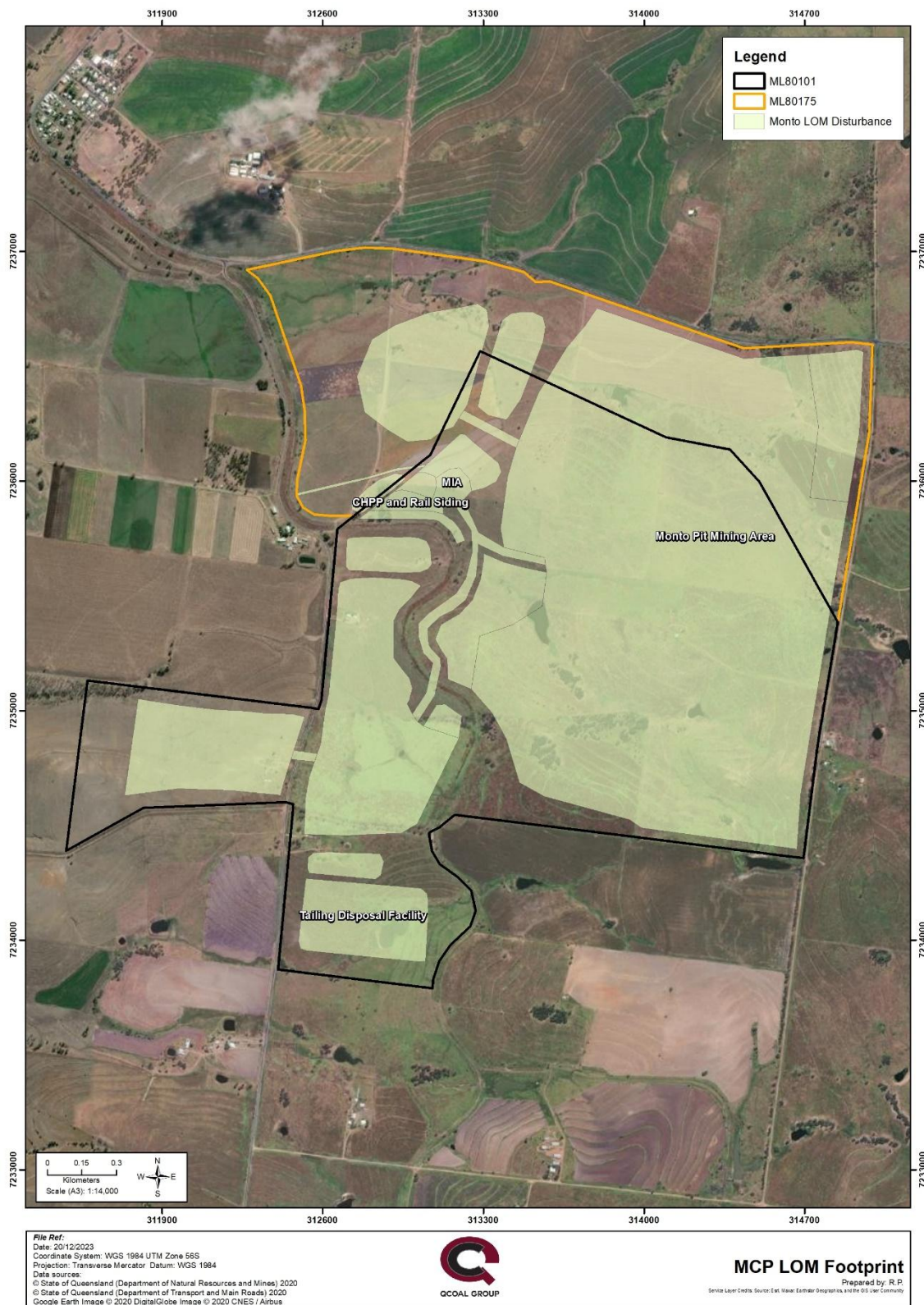


Figure 5 – MCP LOM Footprint

1.4.1. Rehabilitation Areas

When an area of disturbance is no longer required for any operational usage (or is not intended for retention by written agreement with the landholder) it becomes available for rehabilitation. Where an area is still required for any operational purpose (including active waste rock dumps, haul roads, tracks and support infrastructure) it remains unavailable for rehabilitation.

A Rehabilitation Area (RA) within the PRC Plan framework is defined as a geographically delineated parcel/s of land within which any mining-related disturbance is subject to the same PMLU and the same rehabilitation milestones. As mining progresses through the RA, sub-sections of land become available for rehabilitation at different times, which is captured in the PRC Plan – Schedule. A single RA can include multiple non-contiguous areas provided they share the same PMLU, rehabilitation methodology and rehabilitation milestones.

Mining activities on the MCP have not yet commenced, and no disturbance has been undertaken. The full extent of the planned LOM disturbance at the MCP is shown in **Figure 5**. The mining related disturbance areas which are able to be rehabilitated to a stable condition have been allocated into four (4) separate RAs, as detailed in **Table 8** and shown in **Figure 6**. The MCP RAs have been aligned such that each RA only comprises areas which share a common PMLU, rehabilitation methodology and rehabilitation milestones.

Table 8 – Rehabilitation Areas at the MCP

Domain	Description	Activities	Area (Ha)
RA1	Waste Rock Dumps	Waste rock dump areas including out of pit waste rock dumps, backfilled pit areas and associated haulage ramps and roads within the waste rock dump footprint.	387.14
RA2	Tailings Disposal Facility	Out-of-pit tailings disposal facility.	17.35
RA3	Surface Infrastructure	MIA (including HV workshop, administration facilities), CHPP, Rail siding, buried and above-ground services, haul roads and water management infrastructure.	38.83
RA4	Pit	Monto Stage 1 Mining Pit	12.46*
Total			455.78

*Note that the whilst the maximum approved void is 25 ha, this revised area represents the surface area of the pit and is subject to change following required assessments of PRCP Schedule Condition 10

Figure 7 shows the PMLU for the MCP, including for areas undisturbed by mining activities within the MLs.

1.4.2. Improvement Areas

Improvement Area 1 (IA1) consists of the high and low walls of the residual void. This improvement area was added to the PRCP Schedule through discussions with the DETSI surrounding the incompatibility of the approved slope gradients (123.49% and 75.35%).

IA1 is not currently spatially defined as further studies and assessments must occur before the extent of the IA1 area and the extent of the residual void lake can be determined. The determination of the bounds of IA1 will occur in accordance with PRCP Condition 10, which requires MC to undertake baseline studies to identify the conditions of the residual void lake and to amend the Schedule for the inclusion of the NUMA area, residual void lake extent and identify the safety bund setback distance.

The EA approved a maximum residual void area of 25 ha, however this will be apportioned between IA1 and RA4.

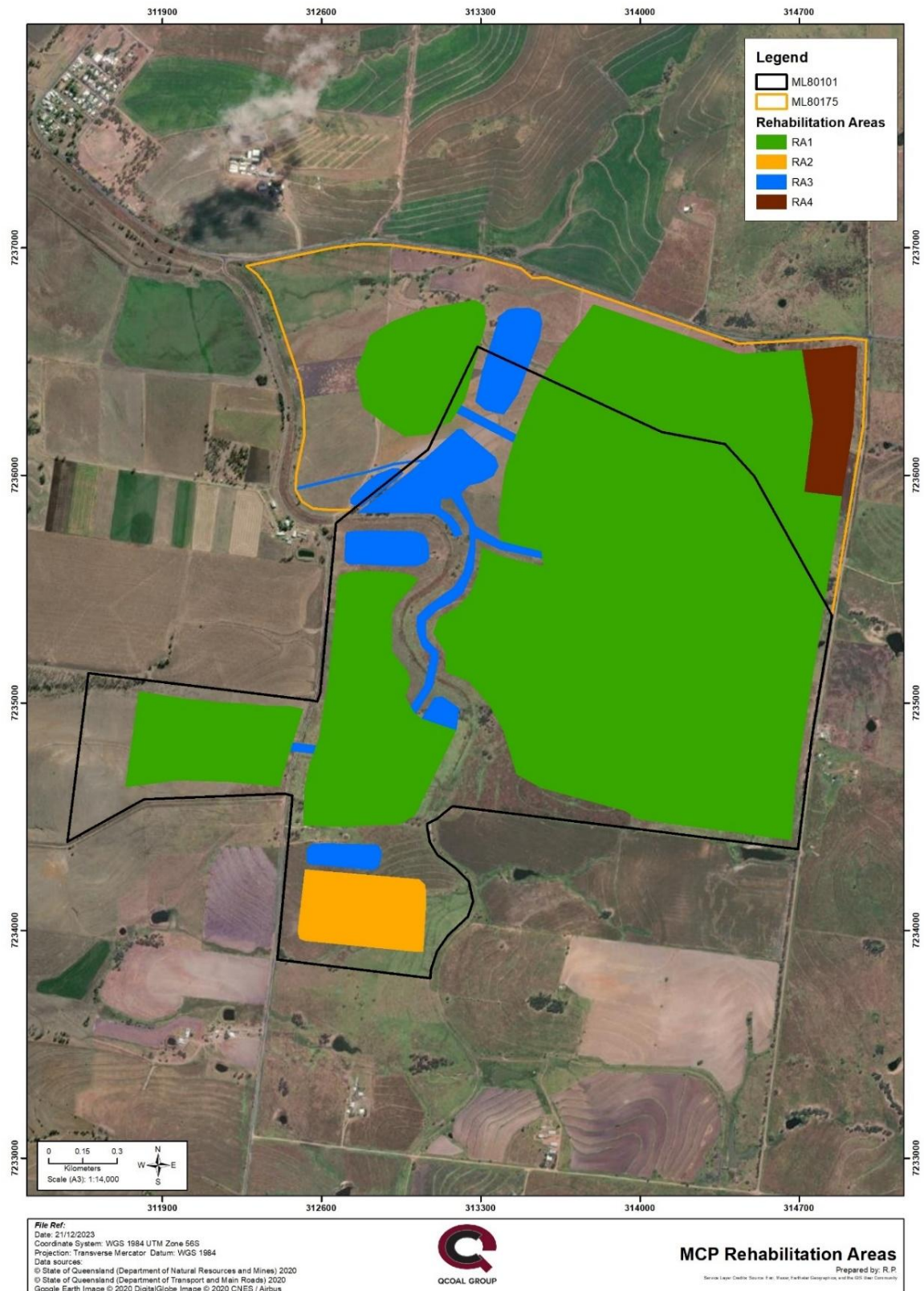


Figure 6 – MCP Rehabilitation and Improvement Areas

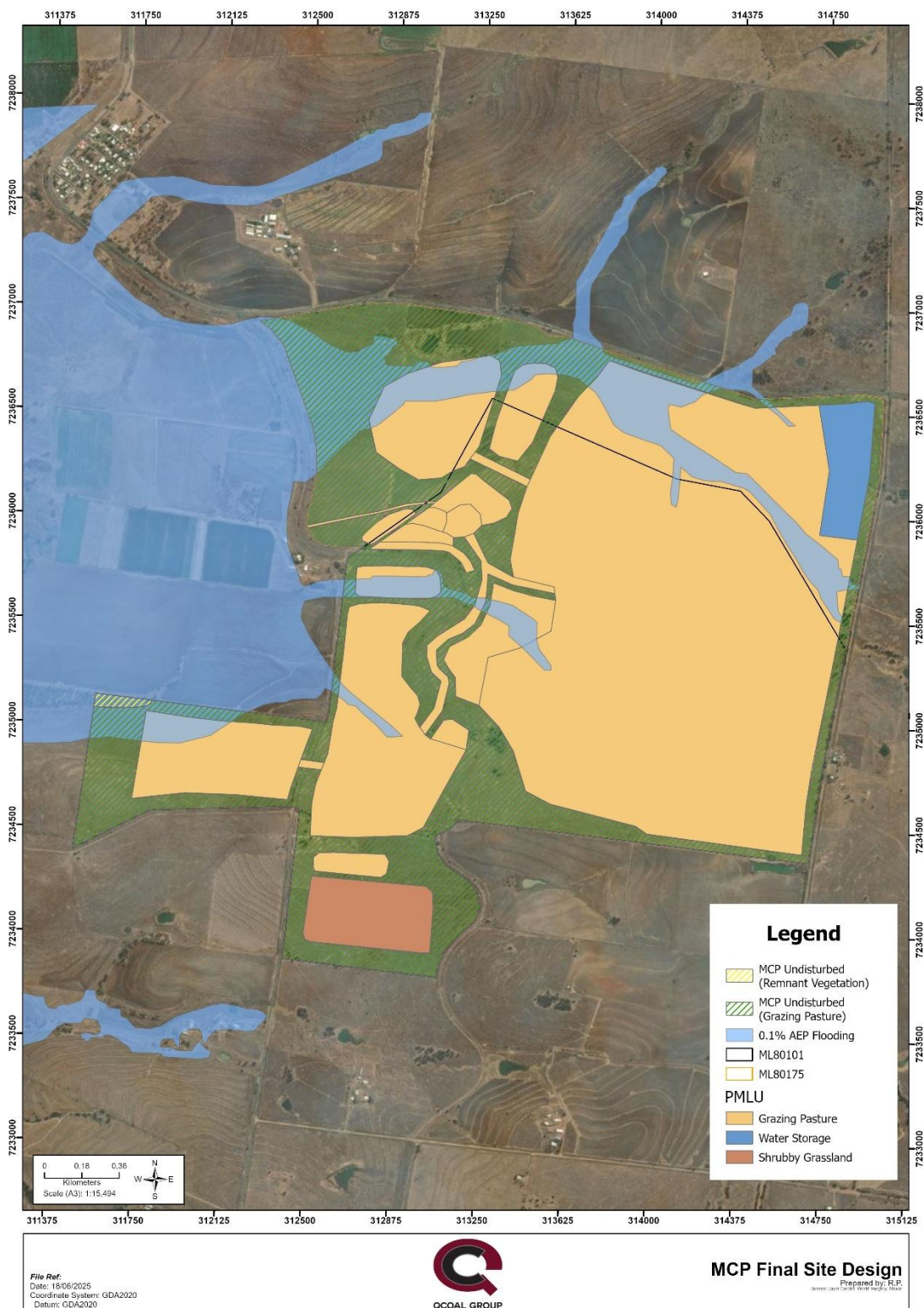


Figure 7 – MCP Post-Mining Land Use

1.5. Mining Methods

Mining activities at the MCP will generally occur in the following sequence:

1. Ongoing coal resource definition (code-compliant exploration activities);
2. Vegetation clearing (where required);
3. Topsoil removal and stockpiling;
4. Construction of haul roads as required;
5. Construction of water management infrastructure as required;
6. Construction of supporting infrastructure as required – pit ROM pads, park-up/go-lines, crib huts etc;
7. Removal of waste rock by drill and blast and truck and excavator and initial placement in out-of-pit waste rock dumps;
8. Transition to in-pit waste rock dumping once sufficient void is created for sustained mining operations;
9. Extraction of coal from the active mining area with ROM coal stockpiled at either the pit ROM or transported directly to the CHPP ROM Pad via the dedicated haul roads;
10. Completion of coal mining within the pit, with the residual void left in-situ; and
11. Rehabilitation in line with the nominated PMLU requirements.

The MCP will operate as a conventional truck and excavator mining operation, using the industry standard model of contract mining. The surface waste material will be free dug, while the remaining waste is blasted, excavated by large hydraulic excavators and hauled by rear dump trucks. An additional fleet of ancillary plant (dozers, graders, loaders, water trucks, etc) will also be used in the mining operations as required.

ROM coal will be excavated by hydraulic excavator and hauled by dump truck to the CHPP ROM pad via dedicated haul roads. ROM coal will be washed at the CHPP, before reporting to the product stockpile for subsequent transport.

The MCP Stage 1 pit will begin as a box-cut along the sub-crop line, with mining following the dip of the coal seam by advancing the high wall in a high-wall benching process. Waste rock is initially placed in an out-of-pit dump located adjacent to the box-cut pit. The high-wall advances until sufficient pit area is created to enable efficient mining operations. At that time, in-pit dumping commences behind the active mining area, which progresses the low-wall at approximately the same rate as the high-wall advances, effectively progressively backfilling the pit area. The pit will continue until an economic limit is reached, at which point the remaining pit is retained as a residual void.

As shown in **Figure 6**, the MCP Pit is located on the eastern portion of the tenure, with the associated out-of-pit waste rock dumps west of the pit area. The pit will advance from west to east, terminating in a final void in the northeastern corner of the MCP.

1.6. Site Topography

The MCP is located in the Mulgildie Basin, which extends over approximately 9,500km² (9,500,000 ha) of Central Queensland from the Surat Basin in the south towards Biloela in the north. The MCP MLs cover approximately 649ha of that area. The topography of the broader MCP is characterized as a flat-to-undulating landscape, with Three Moon Creek west of the site and minor drainage lines bisecting the site.

The pre-mining contours and drainage lines within the MCP area are shown in **Figure 8**. The topography within the MCP area gently slopes east to west. Slopes within the MCP are generally less than 3%, although locally steeper slopes adjacent to drainage lines are also present.

Elevation ranges from 260m AHD in the east to 210m AHD in the west.

The MCP is located within the Three Moon Creek sub catchment of Upper Burnett River sub-basin within the wider Burnett drainage basin. The MCP area drains into Three Moon Creek which flows south into the Burnett River approximately 35km downstream of the site (refer to **Section 1.12.2** for further details).

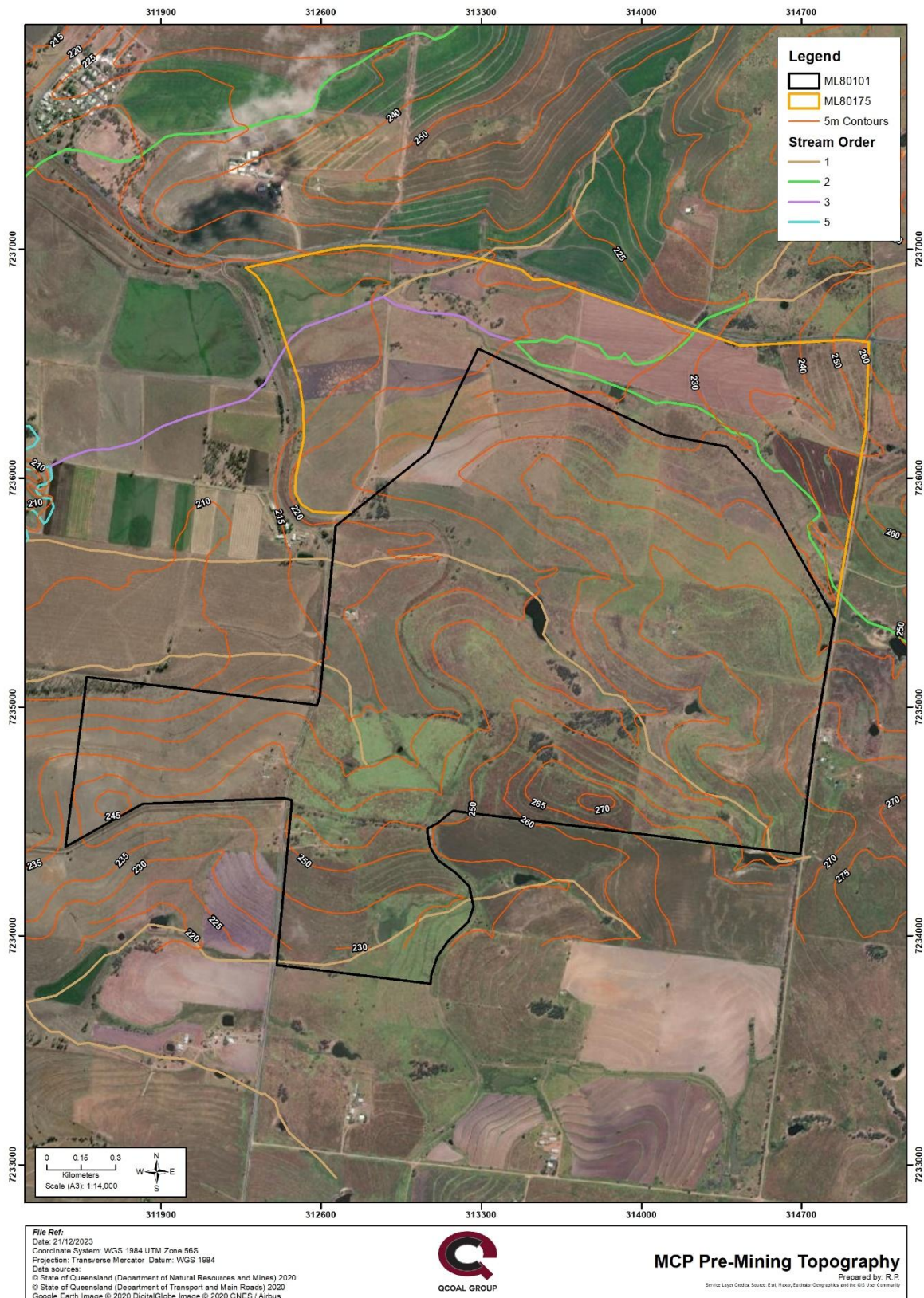


Figure 8 – MCP Pre-Mining Topography

1.7. Climate

The Monto region has a sub-tropical climate with distinct wet and dry seasons, with the majority of the year's rain falling between October and March. As per the climate statistics available from the Bureau of Meteorology's (BoM) Monto Station (no. 039165), mean maximum temperature in the Monto region ranges from 30°C to 32°C in the summer months, with an average of 21 days per year exceeding 35°C. The mean minimum temperature ranges from 5°C in July to approximately 19°C in January. Frosts are more likely in the winter months, where temperatures below 0°C occur an average of six days per year (see **Figure 9**). Wind direction is primarily from the east to northeast (heading in a west to southwest direction). Winds occasionally come from the southeast (heading in a northwest direction) (see **Figure 10**).

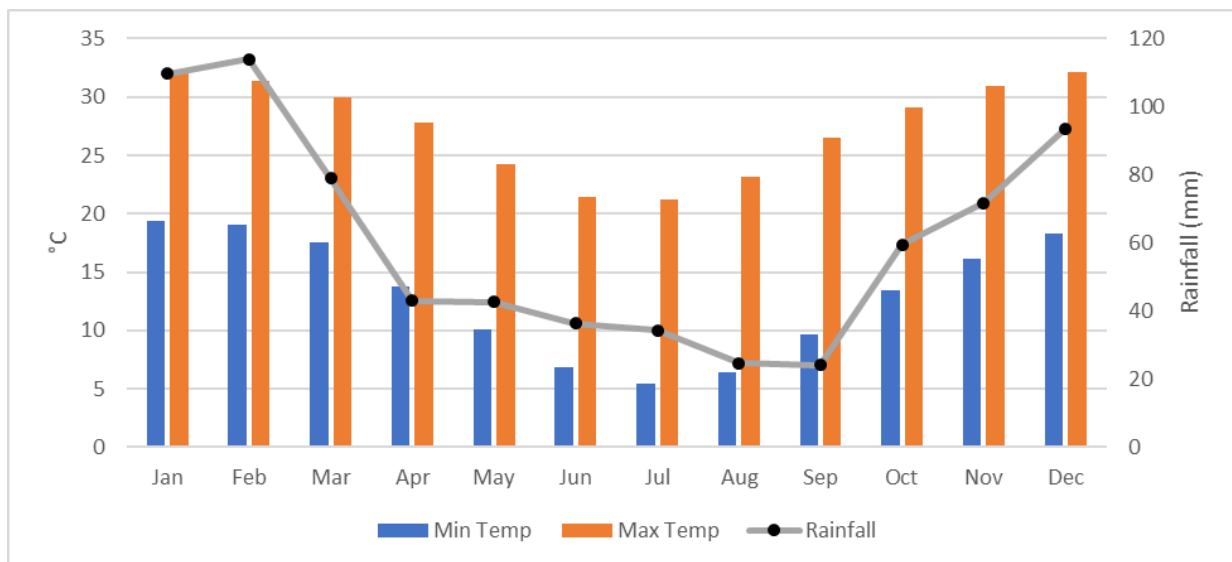


Figure 9 – Monto Climate Averages

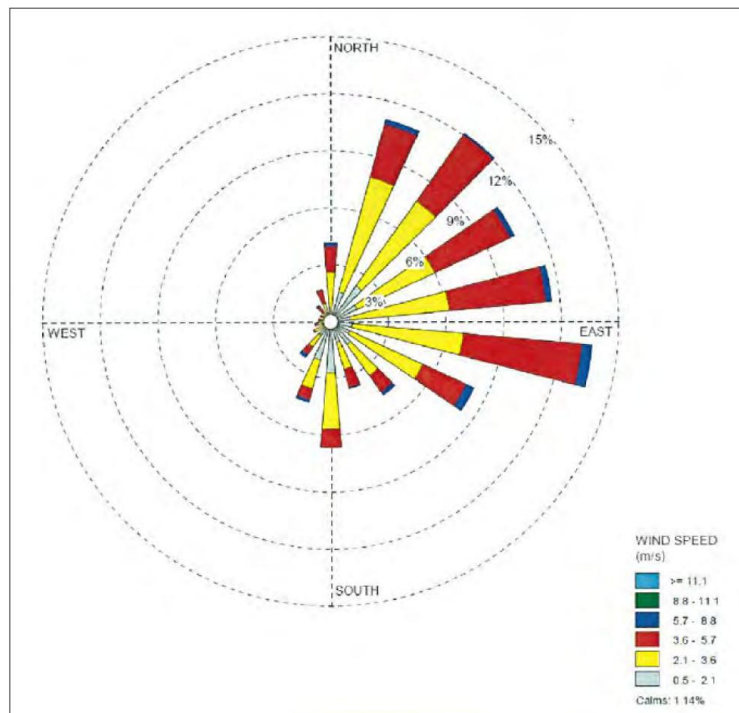


Figure 10 – Monto Wind Rose

1.8. Geological Setting

1.8.1. Regional Geology

The MCP is located in the Mulgildie Basin, which was formed by tectonism during the Lower Triassic period. Subsidence of the Mulgildie Basin continued during the Lower-Middle Jurassic and resulted in deposition of the Precipice Sandstone, Evergreen Formation, Hutton Sandstone, and finally the Mulgildie Coal Measures (MCM) (the target coal measures at the MCP).

The Mulgildie Basin is a narrow, elongated trough of Jurassic sediments which extends off the north-eastern portion of the Surat Basin for approximately 100km from a point halfway between Abercorn and Mulgildie to the north of Monto. The distribution of the Mesozoic sediments is controlled by a system of north-south faults, with the Mulgildie Fault separating the Mesozoic sediments from the Palaeozoic basement rocks to the east.

Fault movement produced a downthrown block between the faults, preserving the MCM and warping the Triassic-Jurassic sediments of the Mulgildie Basin in a gentle asymmetrical syncline.

Immediately and unconformably underlying the Jurassic sediments are a sequence of sediments and volcanics, referred to as the Cynthia Beds and thought to be equivalent to the Callide Coal Measures or the Tarong Beds, which both date from the Triassic.

The stratigraphic succession in the Mulgildie Basin parallels that in the Early to Middle Jurassic of the Surat Basin, with the Precipice Sandstone being followed by the Evergreen Formation, Hutton Sandstone and MCM (refer to **Figure 11**). Other than adjacent to local faults, bedding dips are relatively flat-lying and in the range of 2° to 5°.

The local geology and land system in the immediate MCP area can be divided into three geologic groups, including:

- Deeply weathered sediments and basic volcanics
 - Tertiary rocks in the area crop out along the Mulgildie Plateau to the east of the MCP.
 - Basalt lavas have produced a capping overlying the Middle Jurassic sedimentary rocks of the MCM;
 - Overlying the basalts is a deep-red lateritic cover (ferrosols); and
 - The basalt ranges from fresh to weathered and often contains calcite as fracture infilling.
- The MCM
 - The area immediately surrounding the MCP is dominated by the Middle Jurassic sedimentary rocks of the MCM.
 - The MCM comprises quartzose and sublittoral fine sandstone, siltstone, shale, mudstone and coal and reaches a maximum thickness of 360 m;
 - Fossil plant (terrestrial) material is present within the unit;
 - The MCM is immediately underlain by the Hutton Sandstone; and
 - Rocks within the proposed mining area dip between 2° and 5°, with some faulting present.
- Alluvium
 - The primary source of alluvium in the MCP area is associated with Three Moon Creek, located approximately 2 km west of the proposed mining area.

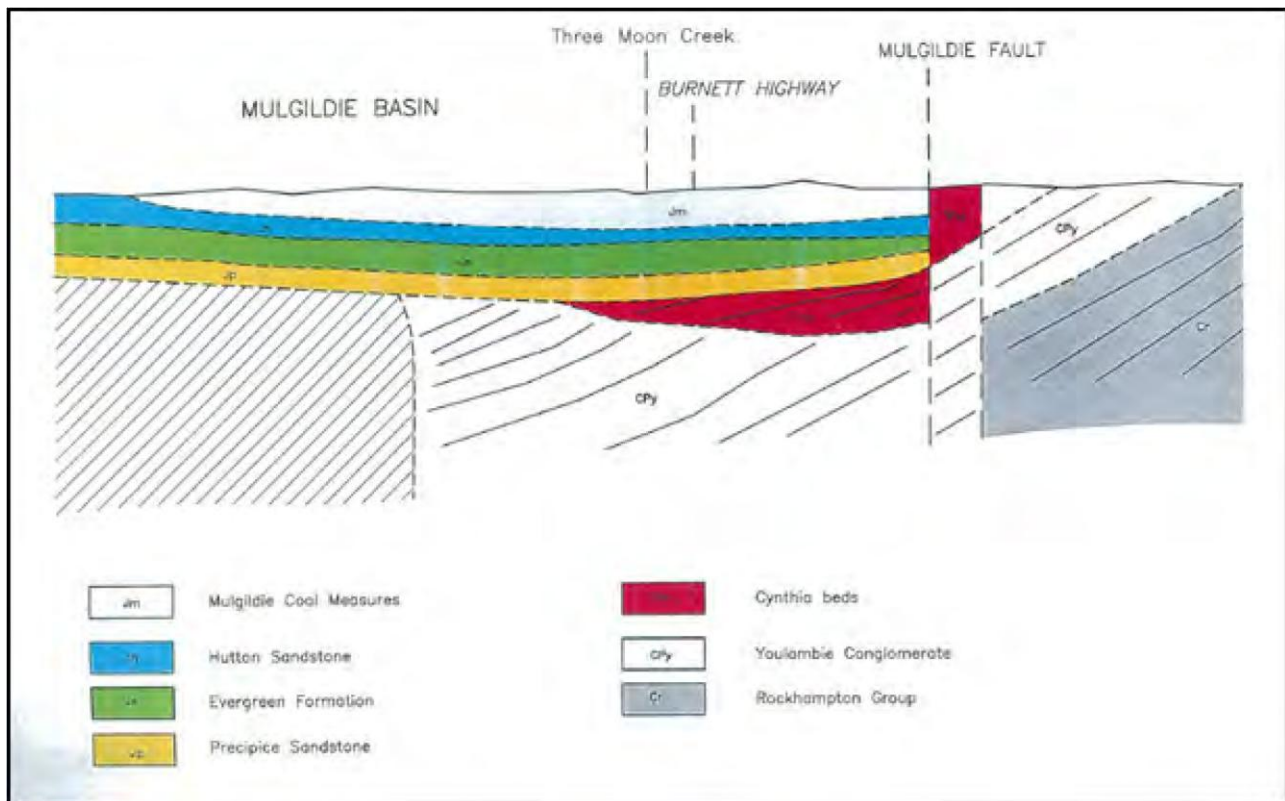


Figure 11 – Monto Regional Stratigraphy

1.8.2. Coal Geology

The MCM are equivalents of the Middle Jurassic Walloon Coal Measures and have been targeted by exploration programs throughout the Mulgildie Basin. The unit contains soft sandstones, carbonaceous shales, siltstones and mudstones, and high volatile bituminous coal seams. The individual coal seams display the typical thickening and thinning of Walloon-type deposits; however, the total coal thickness of the package of seams at Mulgildie is considered much less variable.

The MCM consist of quartzose and sublabe fine sandstone, siltstone, shale, mudstone and coal, and reach a maximum thickness of 360 m. Local studies within the MCP suggest that the unit is thinner in this location, ranging from between 150m and 240 m. Fossil plant (terrestrial) material is present within the unit and has been dated to the Middle Jurassic. These are immediately underlain by the Hutton Sandstone.

The coal resource is located throughout the MCM as a series of seam groups designated as X (the shallowest group), followed by A-F (from shallower to deeper), as shown in **Figure 12**. These groups comprise several seams of varying thickness, with cumulative seam thickness of approximately 10m.

The strata within the proposed mine area dip between 2° and 5°, and some faulting is present within the mine area.

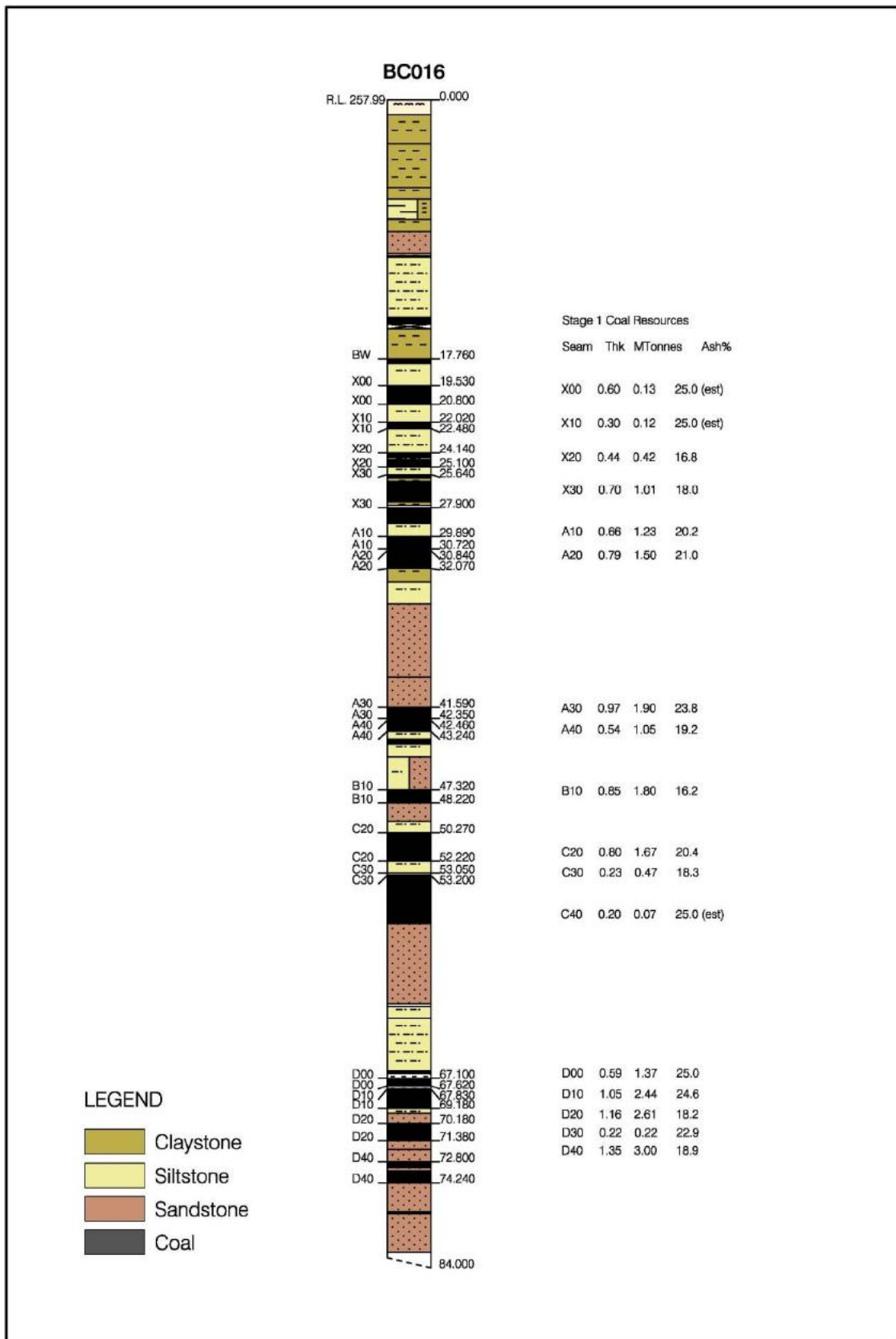


Figure 12 – Typical MCM Coal Seams within the MCP Area

Figure 13 shows a representative cross-section of the seams present in the centre of the MCP. The main target seams at the MCP are described as follows:

- Of the 37 seams present, 20 seams have been defined sufficiently to contribute to the coal resource;
- Moderate variations in ply thickness are expected across the site;
- Eighteen of the 20 seams have an average thickness of less than one metre;
- Six of the seams average 0.5 metres thickness or less;
- The main coal bearing section varies in thickness from about 40 to 50 m within the MCP area;
- W40 and W50 are the most extensive seams, with W50 commonly just below the base of weathering and W40 usually above the base of weathering;
- The A seams occur approximately 5 metres below the W50 seam in the MCP with aggregate thickness ranging up to 4.2 metres;
- The B seam lies between 1 to 13 metres below the A40 seam in the MCP area, with seam thickness up to 1.6 metres;
- The C seam occurs as a stony seam in the north of the MCP and is generally thin (<0.3m); and
- The D seam thickness ranges from 3.5 to 4.8m thick.

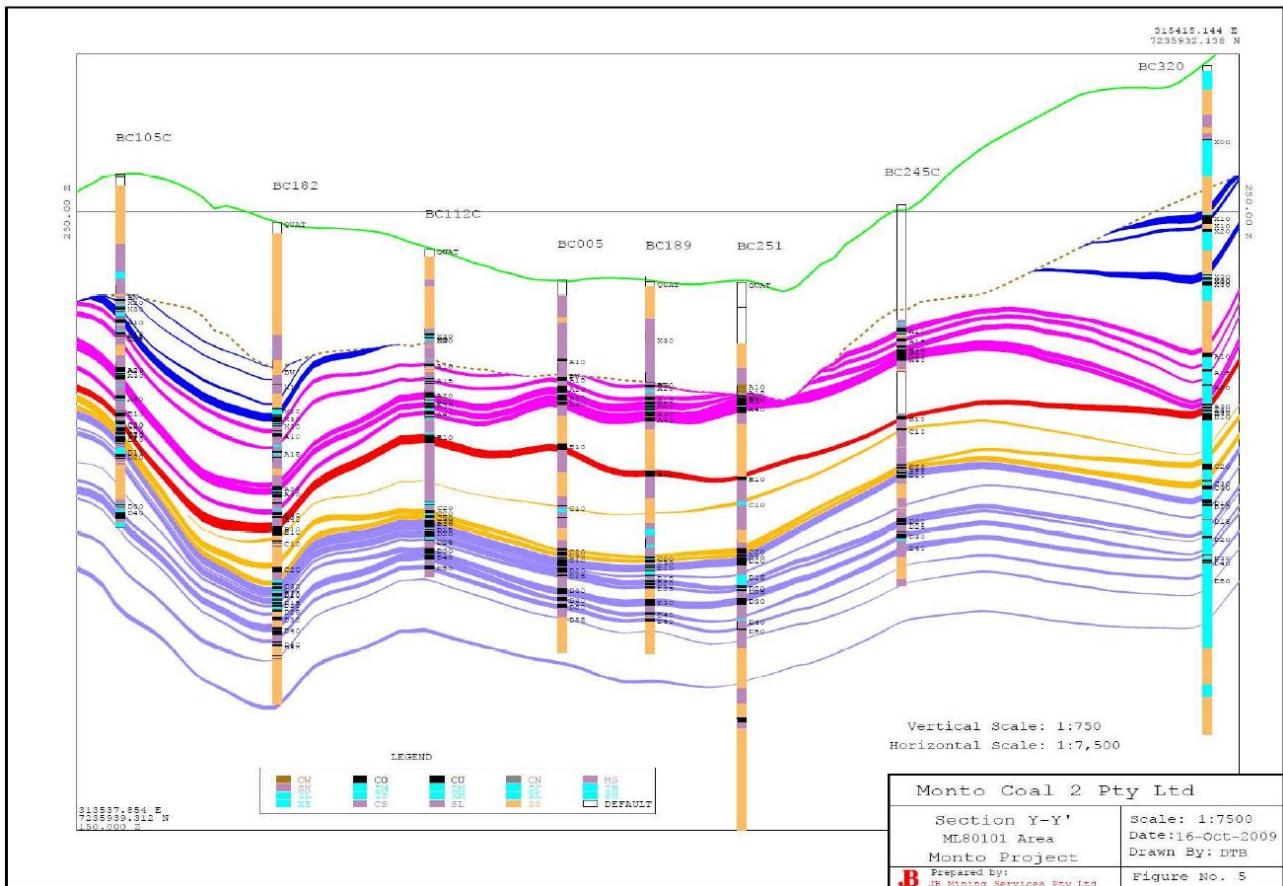


Figure 13 – Representative Cross Section of the MCM Seams through ML80101

1.9. MCP Mine Waste Characterisation

Waste rock and tailings characterisation for the MCP were undertaken during the development of the Monto Coal Project Environmental Management Overview Strategy (EMOS) (see **Appendix D**), which was the supporting document for the original MCP EA application. The EMOS found the following:

- Mine overburden is alkaline, has a low sulfur content and no net acid producing potential.
 - Sulfur levels were found to range between 0.12 to 0.42%.
 - There is a significant amount of calcium carbonate within the MCP sediments.
- The majority of overburden is Non Acid Forming (NAF) with high Acid Neutralising Capacity (ANC);
- As such the presence of any Potentially Acid Forming (PAF) material in the overburden, would be considered to be infrequent and isolated throughout the MCP;
- Mixing of the mine spoil during normal mining operations is expected to conservatively blend and dilute any small quantities of PAF encountered, into the bulk of material which is NAF and has high residual ANC;
- Similarly, any rejects encapsulated within overburden emplacements (if required) are not expected to pose significant environmental impacts, as per the MCP EMP (see **Appendix E**); and
- As such the waste rock dumps are expected to be conservatively NAF overall and the overburden material will not require selective handling or placement.

1.10. Geotechnical Stability

At the MCP, the mining sequence for the pit generally involves excavating a box-cut (with the waste rock reporting to an out of pit dump) before transitioning to in-pit dumping (ie progressive backfilling) when sufficient pit volume is available for steady-state mining operations. At the completion of mining in each pit, the landform therefore typically includes a final void and a waste rock dump area which includes the original box-cut out-of-pit dump and the advancing in-pit/out-of pit dump.

Geotechnical stability considerations for the final landforms at the MCP are relevant to the residual void walls, waste rock dump batters and the out-of pit TDF only. Completion criteria for rehabilitation of the MCP mine domains have been developed as measurable/quantifiable criteria which, once achieved, demonstrate that rehabilitated final landforms are (1) safe to humans and wildlife, (2) structurally stable, (3) non-polluting and (4) able to self-sustain the agreed post-mining land use.

1.10.1. Final Voids

Table F2 (Residual Void Design) in the MCP EA (as the primary LOD) prescribes the following maximum slopes for voids at the MCP:

- High Walls: 51° (123.49%)
- Low Walls: 37° (75.36%)

The maximum slopes for highwalls and low walls differ due to the fact that the highwall is an excavated face of in-situ material, while the low wall is dumped loose waste rock which settles at its natural angle of repose.

The confirmation that the voids physically meet the approved design criteria will be undertaken in two stages at the MCP:

- Upon completion of the final void earthworks in a given area, a survey will be undertaken to confirm that the area has been shaped in accordance with the completion criteria (i.e. the slope criteria is achieved). This will be undertaken using internal QCoal engineering/survey resources using either ground or aerial survey equipment and mine planning software; and
- As part of overall certification that the improvement area actions have been completed, verification of the landform meeting the design criteria will be obtained from a Registered Professional Engineer of Queensland (RPEQ).

1.10.2. Waste Rock Dumps

Table F1 (Rehabilitation Completion Criteria) of the MCP EA (as the primary LOD) includes approved completion criteria to achieve a geotechnically stable slope for waste rock dumps and states that slope angles are to be less than 20% (11.5°).

Additional completion criteria for slopes also includes groundcover requirements for erosional stability and addressing any observed issues.

The confirmation that the waste rock dump final landforms physically meet the approved design criteria will be undertaken in two stages at the MCP:

- Upon completion of the final landform earthworks in a given area, a survey will be undertaken to confirm that the area has been shaped in accordance with the completion criteria (i.e. the slope criteria is achieved). This will be undertaken using internal QCoal engineering/survey resources using either ground or aerial survey equipment and mine planning software; and
- As part of overall certification that a stable landform has been achieved, verification of the landform meeting the design criteria will be obtained from an RPEQ.

In instances where dewatered rejects are available for encapsulation within a waste rock dump, geotechnical stability of the waste rock dump factoring encapsulated cell is required as part of Standard Operating Procedures (SOPS) and operational risk assessments. An example figure from such an SOP is provided as **Figure 14** (e.g. minimum of 10m setback from batter etc). As such once the waste rock dump is completed the existing completion criteria for waste rock dumps would still apply.

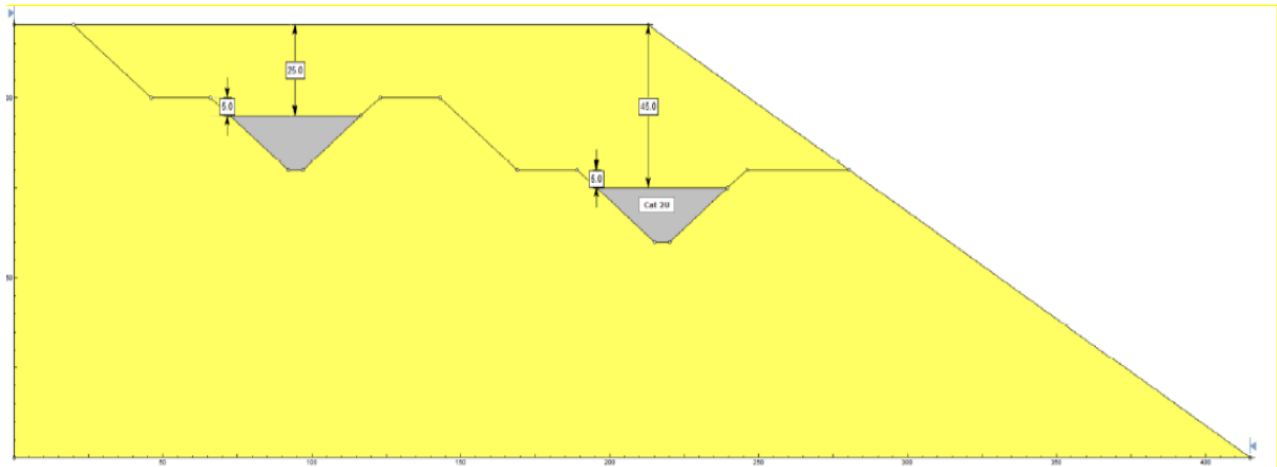


Figure 14 – Example Dewatered Reject Encapsulation

1.10.3. Out-of-Pit Tailings Storage Facility

Coarse and fine reject from the MCP CHPP will be placed in the out-of-pit TSF. Scenarios where dewatered rejects may be encapsulated within the out-of-pit waste rock dumps are summarised in **Section 1.10.2**.

Table F1 (Rehabilitation Completion Criteria) of the MCP EA (as the primary LOD) includes approved completion criteria to achieve a geotechnically stable slope for any out-of-pit TSF and states a requirement for minimum 2m coverage with overburden, capping requirements and final battered slope angle less than 20% (11.5°).

Additional completion criteria for slopes also includes capping groundcover requirements for erosional stability and addressing any observed issues.

The confirmation that the TSF final landforms physically meet the approved design criteria will be undertaken in two stages at the MCP:

- Upon completion of the final landform earthworks in a given area, a survey will be undertaken to confirm that the area has been shaped in accordance with the completion criteria (i.e. the slope criteria is achieved). This will be undertaken using internal QCoal engineering/survey resources using either ground or aerial survey equipment and mine planning software; and
- As part of overall certification that a stable landform has been achieved, verification of the landform meeting the design criteria will be obtained from an RPEQ.

1.11. Surface Water

1.11.1. Existing Environment

The MCP is located in the Upper Burnett River sub-basin of the Burnett drainage basin. The only watercourse in the vicinity of the MCP is Three Moon Creek, an ephemeral waterway which flows from north to south past the townships of Monto and Mulgildie, and the MCP, before joining the Burnett River approximately 35km to the south. The upper portion of the Three Moon Creek catchment is hilly and forested, with land use lower in the catchment being predominantly agricultural. Cania Dam is located on the upper reaches of Three Moon Creek, approximately 60km upstream of the MCP.

All other waterways in the vicinity of the MCP are ephemeral, with water quality and flow dependent on the land use and rainfall in the catchment respectively. Two drainage features have been identified on the MCP, one of which runs across the northern half of the Stage 1 mining area towards the south-west, feeding two dams on the site and discharging through the railway corridor towards the west. A number of additional drainage lines are present in the southern half of the site, and also discharge through the rail corridor line towards the west (see **Figure 15**).

The primary contributors to the flow of all surface drainage features in the region is rainfall. As detailed in **Section 1.7**, rainfall is typically summer-dominant and has been observed to be highly variable. Mean pan evaporation exceeds mean rainfall in all months of the year, indicating that there is a net evaporative climate in the region.

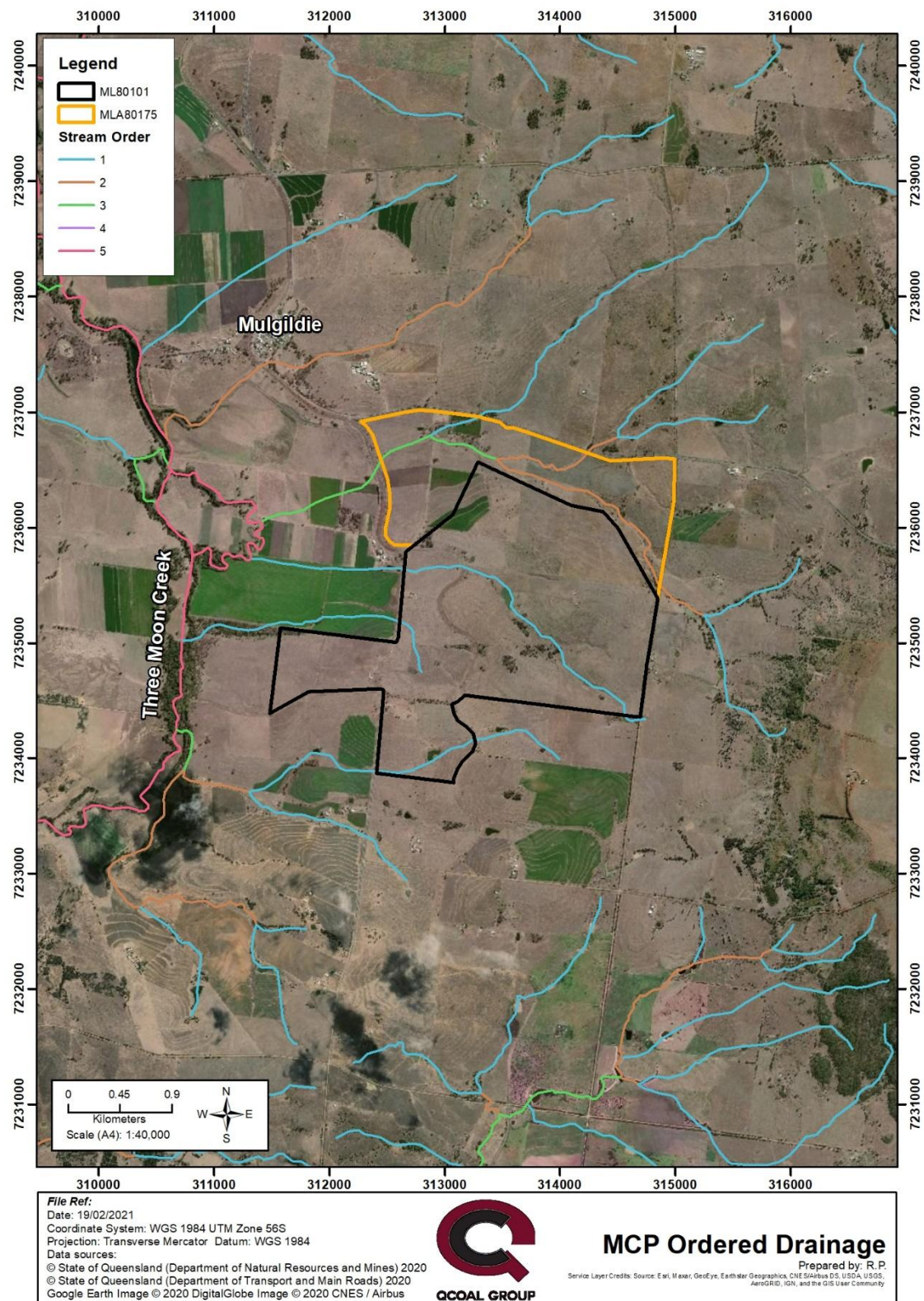


Figure 15 – MCP Surface Water Features

1.11.2. Flood Modelling

Section 3.4 of the PRCP Guideline requires flood plain modelling to be undertaken for all sites with a void proposed as a NUMA to determine if the void is located within a flood plain (defined as the 0.1% Annual Exceedance Probability (AEP) peak water level for a relevant watercourse).

1.11.2.1. Relevant Watercourses

A relevant watercourse is defined in the *Information Sheet – Voids in Floodplains (ESR/2019/4966)* (DES, 2019) as:

Relevant watercourse means—

(a) a watercourse classified as stream order 4 or higher under the Strahler stream order classification system; or

(b) if a watercourse mentioned in paragraph (a) is permanently diverted under—

(i) a condition, or proposed condition, of an environmental authority mentioned in the Water Act 2000, section 98; or

(ii) a water licence or proposed water licence under the Water Act 2000;

the watercourse as permanently diverted.

Using the above criteria, there are no relevant watercourses within the MCP site, with the closest relevant watercourse to the MCP being Three Moon Creek, which is a stream order 5 watercourse located to the west of the MCP, which runs in a north-south direction. Three Moon Creek is located 800m from the MCP ML boundary at its closest point.

1.11.2.2. Pre-Approved Void Outcomes

As per DES (2019), despite the presence of a relevant watercourse adjacent to the site, where a LOD has a pre-approved outcome for a void with a location specified, flood plain modelling is not required.

Table F1 (Rehabilitation Completion Criteria) of the MCP EA (as the primary LOD) nominates a water storage PMLU for the MCP void. Further, Condition F3 and Table F2 of the EA specify the residual void is to be retained, and Condition F1 specifically states that unlike all other areas significantly disturbed by the mining activities, voids do not require rehabilitation to a PMLU of grazing pasture.

As such, there is a pre-approved outcome for the void at the MCP. The location of the voids is implicit in the name within MCP EA Table F2 (i.e. the Stage 1 Pit void is located within the Stage 1 Pit mining area).

As such, the voids at the MCP can be considered to have a pre-approved outcome and location specified, and flood modelling is therefore not required for the PRC Plan.

1.11.2.3. MCP Flood Modelling

Previous flood modelling is available for the relevant watercourse adjacent to the MCP which clearly outlines the extent of the relevant watercourse floodplain within the MCP and the impact of the flood levels on the MCP void and on the final landforms more generally.

Flood modelling was undertaken during the Monto Coal Stage 1 Feasibility Study and was completed to define peak flood levels and inundation extents of Three Moon Creek adjacent to the MCP for 10, 100 and 1,000 ARI events (i.e. up to a 0.1% AEP event). It should be noted that the configuration of the MCP infrastructure has changed since the Feasibility Study was completed, however this does not change the outputs of the flood modelling.

A hydrological model was completed using XP-RAFS software for the whole of the Three Moon Creek catchment up to the Abercorn flow gauging station. The model was calibrated against measured stream flow data at the gauging stations of Upper Monal at Monal Creek and Abercorn at Three Moon Creek.

The modelled flooding extent has been provided in **Figure 16**. It is noted that the floodplain extent extends into a number of drainage channels within the MCP, including to within the Stage 1 Pit footprint during mining (the Stage 1 residual void is outside of the floodplain extent), however the final landforms at the MCP (specifically the waste rock dumps) will result in these drainage channels being removed from the floodplain – refer to **Section 5.2.4** for further detail.

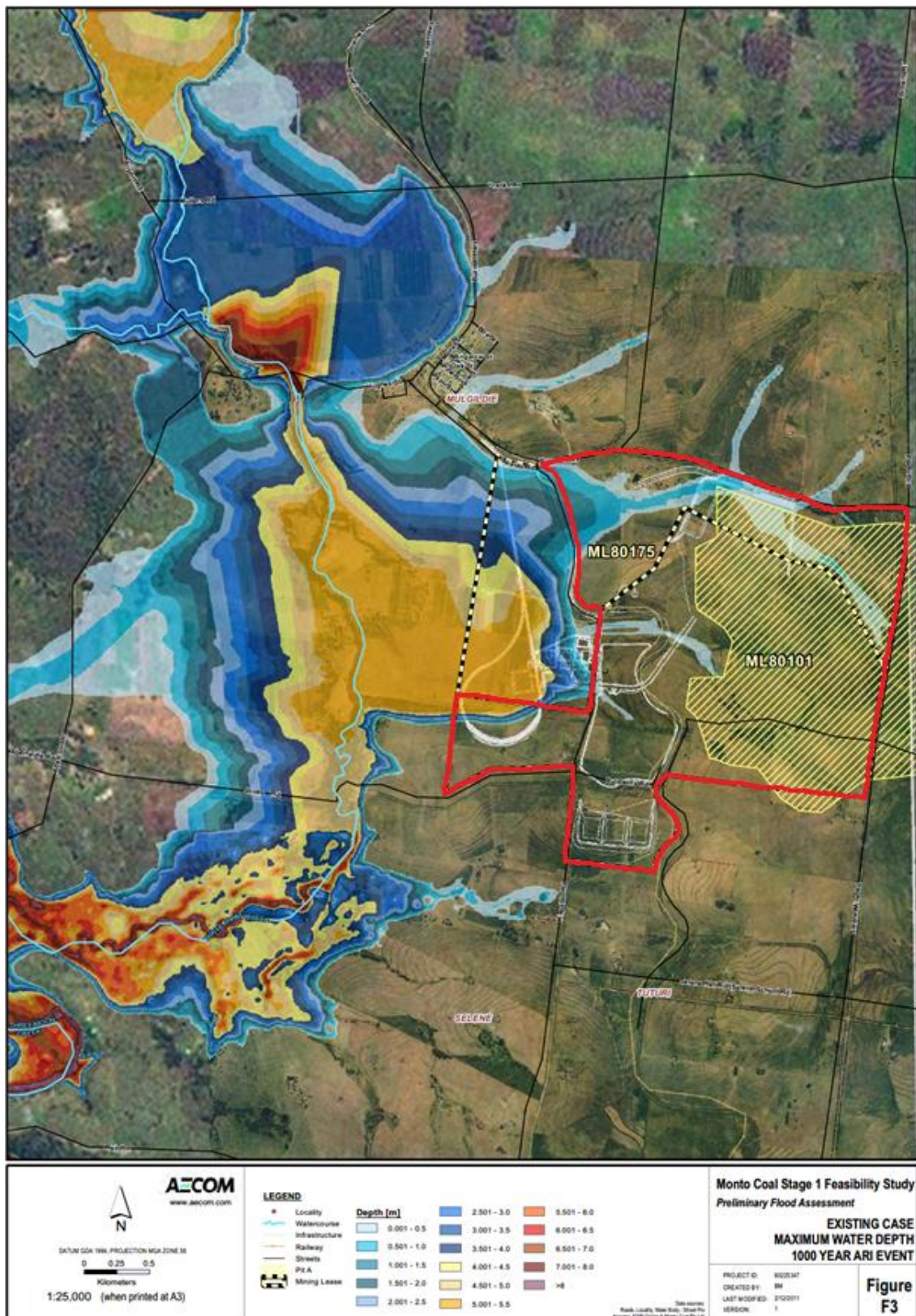


Figure 16 – 0.1% AEP Flood Modelling

1.11.3. Surface Water Values

Environmental Values (EVs) for surface waters are the pre-existing hydrological processes, ecological functions and human uses, which are present either within the area or downstream and rely upon the surface water system. Where site activities have the potential to affect any material changes within the surface water system, an assessment is required to determine whether those changes will have any material negative impact on the EV. Monitoring, management, and mitigation is required where material negative impacts on EVs can potentially occur.

Draft EVs for the Three Moon Creek sub-catchment from Cania Dam to the Burnett River are described in the *Water Quality Improvement Plan for the Burnett Mary Region* (WQIPBMR), which is based on the *Environmental Protection (Water and Wetland Diversity) Policy 2019* (EPP Water). The EVs have an associated set of water quality objectives (WQOs) based on the ANZECC (Australian and New Zealand Environment and Conservation Council) *Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000). The MCP EA prescribes the water quality monitoring parameters for the site based on ANZECC, 2000.

The Draft EVs for the Three Moon Creek from Cania Dam to the Burnett River sub-catchment and their relevance to the MCP are detailed in **Table 9**.

Table 9 – Three Moon Creek Sub-Catchment Surface Water Draft EVs

EV	Description	Three Moon Creek Sub-Catchment – Relevance to MCP
Aquatic Ecosystem	Supporting pristine or modified Aquatic Ecosystems	The local area around the MCP has been cleared and used for long-term grazing and mining, modifying the landscape which has affected the volume and rate of runoff, the flow characteristics of the creeks, and the recharge of groundwater. As such, the aquatic ecosystems near the MCP, including the receiving environment, are considered to be highly disturbed.
Primary Industries - Irrigation	Irrigating crops such as sugar cane, lucerne, etc.	The ephemeral nature and variable water quality of the local drainage features and watercourses near the MCP provide minimal opportunities for usage in irrigation.
Primary Industries - Farm Use	Water for farm use such as in fruit packing or milking sheds, etc.	The ephemeral nature and variable water quality of the local drainage features and watercourses near the MCP provide minimal opportunities for farm usage.
Primary Industries - Stock Watering	Water for stock watering	The ephemeral nature and variable water quality of the local drainage features and watercourses near the MCP provides only opportunistic water supply for production of healthy livestock.
Primary Industries - Aquaculture	Water for aquaculture applications.	The ephemeral nature and variable water quality of the local drainage features and watercourses near the MCP provides only opportunistic water supply for aquaculture.

EV	Description	Three Moon Creek Sub-Catchment – Relevance to MCP
Primary Industries - Human Consumption	Human Consumption of wild or stocked fish or crustaceans	The ephemeral nature and variable water quality of the local drainage features and watercourses near the MCP provide limited opportunities for the provision of fish or crustaceans for human consumption.
Recreation - Primary	Activities with direct contact with water such as swimming.	The ephemeral nature of the local drainage features and watercourses near the MCP provide limited recreational opportunities.
Recreation - Secondary	Activities with indirect contact with water such as boating, canoeing or sailing	The ephemeral nature of the local drainage features and watercourses near the MCP provide limited recreational opportunities.
Recreation - Visual	Activities with no contact with water such as picnicking, bushwalking, sightseeing	The ephemeral nature of the local drainage features and watercourses near the MCP provide limited recreational opportunities.
Industrial Uses	Water for Industrial Use such as power generation, manufacturing plants	There are potential demands around the MCP for industrial use of water including for possible expansions in power generation and for coal mining. These would be upstream of the MCP and are unlikely to be sourced directly from the Cania Dam or Three Moon Creek upstream of the MCP.
Cultural and Spiritual	Cultural and Spiritual values.	Flow in Three Moon Creek and its tributary drainage features is ephemeral. It is noted that while cultural and spiritual values are not linked to flow in watercourses and drainage lines, the ephemeral nature is such that the potential for the MCP to impact downstream values in the absence of flows is limited.

Water will be managed at the MCP in accordance with a Water Management Plan (WMP), with preference given to directing clean water around the mining activities and retaining mine-affected water onsite rather than releasing. Releases are subject to water quality limits established in the EA and only occur during periods of significant background flows in the receiving waters. As such, the EVs for the waterways downstream of the MCP are unlikely to have been affected by the mining activities.

1.11.4. Operational Water Management and Monitoring

Water will be managed at the MCP in accordance with the WMP. Several water storages will be in place at the MCP to support the mining operations, including the pit which can be available for emergency bulk water storage. Water storages for the LOM at the MCP are detailed in **Table 10**, and shown in **Figure 17**. It is noted that at the date of this PRC Plan, none of the listed water storages have been constructed.

Table 10 – LOM Water Storages at the MCP

Name	Structure Type	Water Type	Status
Sediment Dam 1	Catchment Dam	Mine-affected	Catchment dam
Sediment Dam 2	Catchment Dam	Mine-affected	Catchment dam
Sediment Dam 3	Catchment Dam	Mine-affected	Catchment dam
Sediment Dam 4	Catchment Dam	Mine-affected	Catchment dam
Stage 1 Pit	Void	Mine-affected	Bulk water storage as required.
Return Water Dam	Decant Dam	Mine-affected	TSF decant water storage and recovery

In accordance with Condition C2 of the MCP EA, no releases of mine-affected water to the receiving environment are permitted. In accordance with Condition C1, water may be released from sediment-affected water dams (i.e. dams not containing mine-affected water). Specific location and operational parameters will be established at detailed design stage and included in the MCP WMP to address the needs of the site at that time, and therefore have not been listed in **Table 10**.

Conditions C6 and C7 require the development, implementation and maintenance of a Receiving Environment Monitoring Program (REMP) prior to the commencement of mining operations. The MCP REMP will outline the requirements for ongoing collection of baseline monitoring results, including water quality and macroinvertebrate assemblages within the watercourses surrounding the MCP. The REMP will also identify potential impacts from releases of sediment-affected water into the environment.

The MCP WMP will describe the catchments, water storage and water movement infrastructure on the MCP. The WMP will also contain the Erosion and Sediment Control Plan (ESCP) for the site.



Figure 17 – MCP LOM Operational Water Storages

1.11.5. Surface Water Quality

A baseline water quality assessment within Three Moon Creek was undertaken upstream and downstream of the MCP area as part of the Macarthur Coal Monto Project Baseline Water Quality Monitoring Program. The monitoring program consisted of three (3) monitoring locations, namely 3M-US1, 3M-MS2, and 3M-DS2.

Laboratory analysis of samples collected at these locations indicated that the analytes were below the corresponding ANZECC Guideline (2000) values with the exception of lead. The 95th percentile water quality results are presented in **Table 11**. The quality of the water is indicative of the highly disturbed nature of the adjacent land, with agricultural activities contributing heavily to sediment load in the creek. The high turbidity and suspended solids in the creek indicate a moderately disturbed aquatic ecosystem.

Table 11 – Three Moon Creek Water Quality (95th Percentile)

Parameter		Monitoring Location			ANZECC Guideline Value*
		3M-US1	3M-MS2	3M-DS1	
pH (pH Units)		7.99	8.00	7.69	6.0-9.0**
Temperature (°C)		33.8	28.4	27.7	-
EC (µS/cm)		744	714	760	-
Dissolved Oxygen (mg/L)		8.6	8.8	7.6	-
Turbidity (NTU)		970	312	2,180	-
Suspended Solids (mg/L)		1,829	3,737	17,560	-
TDS (mg/L)		425	432	397	4,000***
Oil & Grease (mg/L)		<7	<7	<7	-
Petroleum Hydrocarbons (mg/L)		<5	<5	<5	-
TPH (C6-C9) (µg/L)		<20	<20	<20	-
TPH (C10-C14) (µg/L)		<50	<50	<50	-
TPH (C15-C28) (µg/L)		<100	<100	<100	-
TPH (C29-C36) (µg/L)		<50	<50	<50	-
1,2-Dichloroethane-D4 (%)		107.7	106.4	112.8	-
Toluene-D8 (%)		105.7	102.1	104.0	-
4-Bromofluorobenzene (%)		103.7	99.0	99.6	-
Chromium (Total) (mg/L)		0.004	0.004	0.006	1
Mercury (Total) (mg/L)		<0.0001	<0.0001	<0.0001	0.002
Dissolved Metals (mg/L)	Silver	<0.001	<0.001	<0.001	<0.005****
	Aluminium	2.9415	2.8725	4.6110	5
	Arsenic	0.0049	0.0155	0.011	0.05
	Barium	0.0925	0.8740	2.6145	-
	Beryllium	<0.001	<0.001	<0.001	-
	Cadmium	<0.0001	<0.0001	<0.0001	0.01
	Cobalt	0.0038	0.1618	0.2759	1
	Chromium	0.0569	0.1309	0.1074	1
	Copper	0.0792	0.1766	0.2012	1***

Parameter	Monitoring Location			ANZECC Guideline Value*
	3M-US1	3M-MS2	3M-DS1	
Manganese	0.3085	12.7144	20.3250	-
Molybdenum	<0.001	<0.001	<0.001	0.15
Nickel	0.0485	0.1295	0.1626	1
Lead	0.0447	0.1050	0.0942	0.1
Antimony	<0.003	<0.003	<0.003	-
Selenium	<0.002	<0.01	<0.01	0.02
Zinc	0.194	0.871	0.687	20
Vanadium	<0.01	0.01	<0.01	-
Iron	3.238	3.548	5.5605	-

Notes:

* ANZECC guideline values presented are based on livestock drinking water guidelines unless otherwise

** Based on the ANZECC guideline value for irrigation and general

*** Based on the trigger value for cattle

**** Based on ANZECC guideline values for freshwater aquatic ecosystems

1.12. Groundwater

Construction (and mining) activities have not yet commenced on the MCP and as such no site-specific groundwater bore installation has been undertaken. While there is a lack of existing analogous open cut coal mines in the vicinity of the MCP from which to source groundwater data, data referred to in the EMOS and the EMP, combined with publicly available information from registered bores surrounding the MCP, provides adequate geological data to identify hydrogeological units and occurrence of groundwater, allowing for development of a conceptual groundwater model.

1.12.1. Aquifers and Conceptual Groundwater Model

The potentially water bearing strata relevant to the mining operations on the MCP have been identified and described below (as summarised from the MCP EMOS, see **Appendix D**), from deepest to shallowest (a cross section of the regional stratigraphy has been provided as **Figure 18**):

- **Precipice Sandstone**

The Precipice Sandstone contains the lowest total dissolved solids (TDS) groundwater identifiable in the region (~430 mg/L). The water supply for the adjacent township of Mulgildie is sourced from this aquifer. Iron precipitation in steel bore casings can be an issue in this aquifer as the water is quite aggressive due to high levels of dissolved CO₂.

The top of the Precipice Sands ranges from approximately 582m below ground level (BGL) to 1,588m BGL. Operations on the MCP will not have any interactions with the precipice sandstone aquifer based on the depth of mining and the presence of the confining Evergreen Formation as described below.

- **Evergreen Formation**

The Evergreen Formation is a confining layer overlying the Precipice Sandstone that is typically encountered between 330m and 590m BGL.

- **Hutton Sandstone**

The Hutton Sandstone aquifer is not considered an important aquifer locally, as it is relatively clayey. No current groundwater users have been identified as utilising water from the Hutton Sandstone. Water quality information is sparse; however, indicative data from the groundwater database indicates a highly variable TDS, ranging from 1,000 mg/L to 7,000 mg/L. The potential yield from this aquifer is also unknown.

- **Mulgildie Coal Measures**

The Mulgildie Coal Measures are typically utilised in areas where alluvial aquifers are not present to provide water for stock. The presence of water is inconsistent with variable water quality (TDS values ranging from less than 500mg/L to greater than 16,000 mg/L). The majority of samples within this aquifer returned a TDS of greater than 2,000 mg/L. The yields from this aquifer are considered to be highly variable.

- **Alluvial Aquifer**

Alluvial deposits with associated local alluvial aquifers are located along the locally significant watercourses, including Three Moon Creek. These deposits are exploited as a source of water for irrigation, stock water, and domestic supply. Recharge weirs are located along stretches of Three Moon Creek in order to facilitate recharge of the alluvial aquifer when the upstream Cania Dam discharges. An assessment of borelogs from exploration and third-party drilling activities and geological mapping indicates that the Three Moon Creek alluvium is located to the west of the MCP and does not extend into the MCP mining areas.

Conceptually, the above studies conclude that there is limited inter-aquifer / surface water-groundwater connectivity (indicative example presented in **Figure 19**).

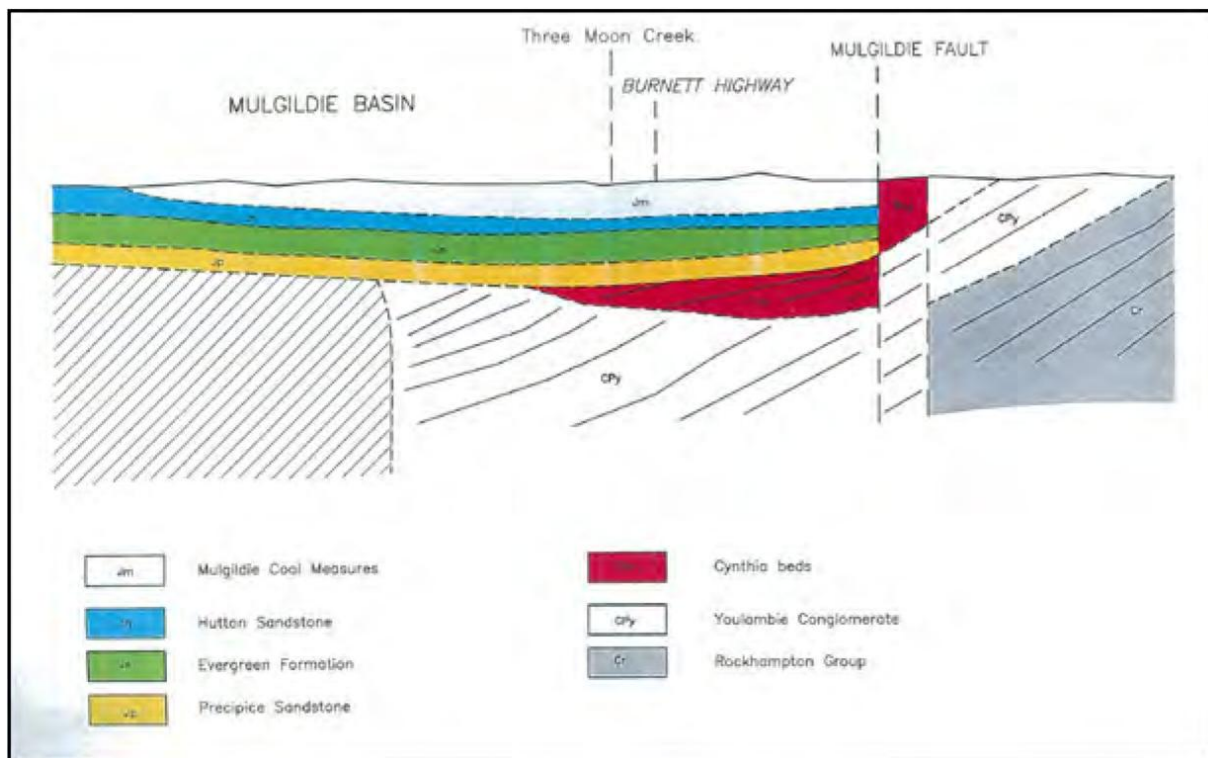


Figure 18 – Cross-section of Regional Stratigraphy

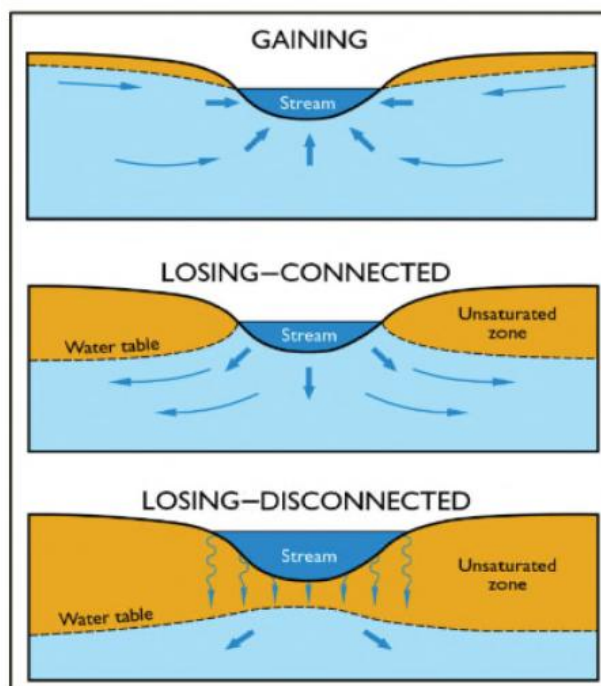


Figure 19 – Groundwater to surface water connectivity (NSW Government 2010)

1.12.2. Groundwater Values

The EPP (Water) identifies the environmental values of groundwater that are to be protected or enhanced in Queensland. The known hydrogeology of the MCP area was assessed for relevance against these values, as detailed in **Table 12**.

Table 12 – MCP Groundwater EVs

Environmental Value	Description	Relevance to MCP
Aquatic Ecosystem	Supporting pristine or modified Aquatic Ecosystems	The local area around the MCP has largely been cleared and used for long-term grazing and mining, modifying the landscape. This has in turn affected the volume and rate of runoff, the flow characteristics of the creeks, and the recharge rate of groundwater. As such, the aquatic ecosystems within the MCP area were heavily modified prior to mining activities commencing. No Groundwater Dependent Ecosystems (GDEs) have been identified within the MCP and GDEs are not considered likely to be present due to the vegetation species/communities present, the regional soils and geology, the depth to measured groundwater levels and the lack of springs or seeps in the area.
Primary Industries - Irrigation	Irrigating crops such as sugar cane, lucerne, etc.	The groundwater quality data indicates that the groundwater from the coal seams contain elevated salinity that exceeds health and/or irrigation guideline values. Further, no alluvial aquifers have been identified within the MCP and the Precipice Sandstone will not be influenced by mining activities. As such, the MCP is not expected to have any material impact on the use of groundwater for irrigation in the region.
Primary Industries - Farm Use	Water for farm use such as in fruit packing or milking sheds, etc.	There are no significant users of groundwater for farm usage within the local area based on a search of registered bores. Farm users tend to require large volumes of water which would be unsustainable in the aquifers potentially impacted by the MCP operations.
Primary Industries - Stock Watering	Water for stock watering	Groundwater from the quaternary alluvium is generally suitable for stock watering; however, the alluvium is dry for the majority of the year due to the ephemeral nature of the local watercourses and drainage lines which recharge the aquifer. The lack of continuity within the alluvium and low sustainable yield makes usage of the quaternary alluvium for stock watering unlikely. Groundwater from the coal seam aquifer is generally unsuitable for cattle watering.
Primary Industries - Human Consumption	Human consumption of wild or stocked fish or crustaceans	There are no groundwater springs or seeps that supply surface water bodies in the area that are used for primary industries. Additionally, no production bores used to supply aquaculture are present in the region.

Environmental Value	Description	Relevance to MCP
Recreation - Secondary	Activities with indirect contact with water such as boating, canoeing or sailing	There are no groundwater springs or seeps that supply surface water bodies in the area that are used for recreational use.
Recreation - Visual	Activities with no contact with water such as picnicking, bushwalking, sightseeing	There are no groundwater springs or seeps that supply surface water bodies in the area that are used for recreational use.
Drinking Water	Raw drinking water supplies	The groundwater quality data obtained during exploration indicate that the groundwater contains elevated levels of salinity above the drinking water guideline values within the MCM. As such, the MCP is not expected to have any material impact on the use of groundwater for drinking water supply.
Industrial Uses	Water for Industrial Use such as power generation, manufacturing plants	It is believed that there are no industrial users of groundwater from the potentially impacted aquifers within the local area based on a search of registered bores.
Cultural and Spiritual	Cultural and Spiritual values.	There are no known groundwater springs or seeps that supply surface water bodies in the area that may have significant indigenous and/or non-indigenous cultural heritage.

With specific regard to human use of groundwater in the area surrounding the MCP, based on interrogation of the Queensland Government database which includes bore logs and hydrogeological information:

- There are 57 registered bores within the 4km of the MCP.
- The majority are water supply bores that are installed into the Three Moon Creek alluvium and into the deeper Precipice Sandstone (e.g. Mulgildie supply).
- The MCP pit design does not intercept these hydrogeological units.
- As such groundwater use (including, but not limited to pastoral, irrigation, industrial, stock, domestic, and town water) is not considered a groundwater value for the MCP operation.

1.12.3. Existing Groundwater EA Requirements

The MCP EA (the primary LOD) specifically addresses the requirement for a site specific groundwater assessment and monitoring to be completed prior to the commencement of development on the MCP:

- Conditions G12, G13 and G14 require the development, implementation and submission of a Baseline Groundwater Monitoring Program in advance of the development of the MCP,

which will identify site specific pre-mining groundwater conditions for the MCP and include the development of a conceptual groundwater model.

- Conditions G15, G16 and G17 require the development, implementation and submission of a Groundwater Monitoring and Management Plan (GMMP) closer to the commencement of operations. The GMMP must be implemented throughout the LOM of the MCP and must be reviewed on an annual basis by an appropriately qualified person.
- Condition G22 and G23 require the preparation and submission of a Groundwater Modelling Report prepared by a suitably qualified person prior to the commencement of mining operations at the MCP. Groundwater modelling must be undertaken in accordance with the current Australian Groundwater Modelling Guidelines for the LOM activities at the MCP and be recalibrated/validated every 5 years.

The baseline groundwater monitoring program required by Condition G12 of the MCP EA will seek to identify the occurrence of any groundwater and where encountered, measure yields, levels, flow direction and quality. This information will be utilized in the development of the GMMP and the Groundwater Model Report which will include an update to the conceptual groundwater model (including recharge) with more site-specific data.

As such the EA (a LOD) provides approved rehabilitation completion criteria for the MCP, including for the final void and TDF, in consideration of what groundwater data is currently available, and conditions for future site-specific groundwater assessments and monitoring. This approach is considered suitable for the MCP PRC Plan as it is established in the EA.

1.13. Soils and Land Suitability

1.13.1. Soil Assessment

A series of ground traverses with sampling from shallow test pits (with locations based on the geomorphologic setting) were undertaken during the development of the MCP EMOS and EMP. Laboratory testing of selected samples was undertaken to assess topsoil chemistry and soil dispersivity and plasticity. Fourteen shallow test pits were dug manually to log the soil profile. Three units were found to be present within the MCP MLs:

- **Vertosols**

Vertosols (cracking clay soils) are common within the MCP MLs and dominate the landscape. They are typically dark brown in colour (~10R1.7/1), with a very stiff to hard consistency and often grade into residual weathered coal measures. Test holes were terminated at less than 0.5m BGL in these soils due to their hardness. The upper 0.02m generally forms a crust with wide cracks. This crust floats above the underlying profile. In some test holes (particularly those close to gullies and on hill crests) trace amounts of ironstone pebbles and some caliche (calcium carbonate) were present.

- **Calcarosols**

Calcarosol was observed at one location within the MCP area. This profile is overlain by a

thin vertosol (black soil) skin approximately 0.15m thick. Below this, the profile exhibits mottling (orange staining) and grades into a white-grey (N 8/0) zone, rich in carbonate. Caliche pebbles are common throughout the pan layer, which is approximately 0.4m thick (0.8m BGL – 1.2m BGL).

- **Rudosols**

Rudosols were observed at two locations and were identified in some of the drainage lines within the MCP area. These are soils that have little to no soil profile development and are essentially only sedimentary or colluvial deposits. This soil type is confined to the areas close to the drainage channels within gullies (fluvial deposits) and the foot of slopes (colluvial deposits). It is dark brown in colour, similar to the black soils (vertosols). Due to the hardness of this soil, test holes were terminated at approximately 0.5m BGL.

The following tests were carried out on soil samples within the MCP area:

- Atterberg Limits;
- Emerson Class;
- Particle size distribution;
- Double hydrometer; and
- Chemical testing.

Field pH tests of soils in the area revealed that soils are generally alkaline, ranging between pH 8 and pH 9. Five Atterberg Limits tests were undertaken, the results of which are summarised alongside the Emerson Class in **Table 13**. The results imply that all samples tested were of high plasticity with a moderate to high potential for seasonal shrink/swell movement.

Table 13 – Atterberg Limits Test Results

Sample No.	Location	Depth (m)	Description	Liquid Limit %	Plasticity Index %	Emerson Class
MC0101	01	00–01	Clay (CH)	–	–	4
MC01001	01	0.0–0.2	Clay (CH)	73	44	6
MC0201	02	0.0–0.1	Clay (CH)	60	34	5
MC0202	02	0.1–0.2	Clay (CH)	–	–	5
MC0401	04	0.15–0.3	Clay (CH)	73	46	4
MC01101	11	0.0–0.15	Clay (CH)	75	44	6
MC01201	12	0.0–0.3	Clay (CH)	51	29	–

Note: CH indicates clay is of high plasticity

Dispersion testing was undertaken on sample MC0101 at 0.0 – 0.1 m depth. The test provided a dispersion percentage of 10%.

The Atterberg Limits and Emerson Class tests indicated that the clays are likely mixed clays, being montmorillonites, illites and kaolinites. Montmorillonites tend to be dispersive, but the chemical

tests indicated that the sample was saturated in calcium, which tends to lower dispersion potential. Emerson Class numbers of 4 to 6 are regarded as indicating low dispersion or being non-dispersive, and as such the soils on the MCP are considered to be non-dispersive. Further, a percentage dispersion value of 10% is below the lower bound value of 15%, and the sample tested is not considered susceptible to piping or dispersion. Chemical testing indicated that the samples tested are within acceptable limits for topsoil reuse as a natural soil.

1.13.2. Topsoil Stripping

As described in **Section 1.13.1**, the majority of the topsoil to be stripped during the LOM at the MCP is the vertosol soil unit. Testing of soils determined that all soils on the MCP are suitable for reuse as natural soil, therefore all soils are to be stripped to a depth of 200mm to be reused in rehabilitation activities.

1.13.3. Land Capability

As stated in the MCP EMOS, the pre-mining grazing and agricultural land capability for the MCP was determined from the soil survey and based on Queensland DNRM *Land Resource Bulletin* reference DNRQ990067. During this assessment, the following was noted in relation to land suitability on the MCP:

- The majority of the area of the properties underlying the MCP have been cleared historically for grazing;
- Logging and ringbarking have been undertaken historically in riparian zones, and mixed woodlands have been thinned, with understories removed to facilitate grazing;
- Soils and landforms are generally suitable for cattle grazing and cropping (with anthropogenic inputs); and
- Ongoing pastoral activities by landholders across the MCP MLs and the surrounding region have included agistment/grazing, cropping, animal husbandry, clearing regrowth, weed control, and control of feral animals (dogs, cats, pigs, etc.).

The majority of the land was determined to be Class II (suitable with moderate limitations) for dryland cropping, and Class II (suitable with minor limitations) for improved grazing pastures.

The rehabilitation objectives within *Table F1 (Rehabilitation Completion Criteria)* of the MCP EA (the primary LOD) states that land disturbed by mining activities on the MCP are to be returned to Land Suitability Class 3 grazing pasture, with associated completion criteria also specified.

1.14. Terrestrial Ecology

The MCP is located within the Brigalow Belt Bioregion, which covers a total area of 135,500 km² and includes coastal areas, rugged ranges and alluvial plains (Young et al., 1999). The Brigalow Belt Bioregion supports a range of flora and fauna including a number of rare and threatened species. Finer variations within bioregions on geology, geomorphology and climate produce characteristic patterns of landforms, soils and vegetation. These distinctive provinces are mapped

as subregions (Sattler and Williams, 1999). The MCP is located within the Barakula Sub-Bioregion.

As previously noted, cattle grazing and cultivation has been ongoing within the MCP area and surrounds since the early 20th century, and native vegetation has been entirely cleared within the MCP MLs, with the exception of a very small pocket of remnant vegetation associated with Three Moon Creek at the far western extent of ML80101. As a consequence, the majority of the MCP MLs comprises improved pasture or cultivated fodder.

Flora and fauna surveys were undertaken in December 2001 to assist in the development of the MCP EMOS, the results of which are discussed in the following subsections.

1.14.1. Vegetation Communities

Table 14 and **Figure 20** detail the remnant regional ecosystems (REs) currently mapped within the MCP, including biodiversity status (BD status) and *Vegetation Management Act* 1999 (VM Act) status. A significant proportion of the MCP site has been historically cleared of remnant vegetation, with the remaining single mapped RE occurring outside the LOM disturbance area.

Ongoing vegetation management since the initial clearing has periodically thinned the limited areas of regrowth within the site.

Table 14 – Mapped Remnant REs within the MCP

Regional Ecosystem	Description	BD Status	VM Act Status
11.3.4	<i>Eucalyptus tereticornis</i> and/or <i>Eucalyptus</i> spp. Woodland on alluvial plains	Of Concern	Of Concern



Figure 20 – MCP Mapped Remnant Vegetation Communities

1.14.2. Flora

The land underlying the MCP has been generally cleared of native vegetation, with the exception of a small pocket remaining adjacent to Three Moon Creek on the western edge of the site. No disturbance is proposed in this area. The majority of the site is farmland used for cattle grazing and growing sorghum and lucerne crops.

No species of conservation significance were observed on site during the field assessment undertaken as part of the development of the EMOS. Twenty-four species of flora were recorded as occurring on the site and/or immediately adjacent, with fourteen of those species being invasive (i.e. weeds).

Native vegetation on the site is minimal and comprises small thin stands of brigalow (*Acacia harpophylla*) with occasional poplar box (*Eucalyptus populnea*), narrow-leaved ironbark (*Eucalyptus crebra*) and Queensland bottle tree (*Brachychiton ripensis*). The existing stands of brigalow lack an understorey as a result of grazing and previous clearing on the site. River she-oak (*Casuarina cunninghamiana*) was also present in one drainage channel.

Exotic grasses and low-growing herbaceous species form a dense groundcover across the MCP in areas where there are no crops or unsealed roads. Species within this groundcover include guinea grass (*Panicum maximum* var. *maximum*), buffel grass (*Cenchrus ciliaris*), Rhodes grass (*Chloris Gayana*) and red natal grass (*Melinis repens*).

1.14.3. Fauna

No mapped essential habitat is present within the MCP area, and no fauna species of conservation significance were detected on the site at the time of the field assessment undertaken as part of the development of the EMOS. A general description of fauna identified and potential habitat have been provided below.

- **Birds** – Bird species typical of disturbed farmland were noted in the vicinity of the site. The lack of continuity of vegetated areas and of old-growth vegetation with hollows precludes most native avifauna species from inhabiting the site. It is likely that birds of prey may forage in the area when it is under cultivation. The following species were noted on site during field surveys:
 - Torresian crow (*Corvus orru*)
 - Magpie-lark (*Grallina cyanoleuca*)
 - Pied butcherbird (*Cracticus nigrogularis*)
 - Apostlebird (*Struthidea cinerea*)
 - Galah (*Eolophus roseicapilla*)
 - Superb fairy-wren (*Malurus cyaneus*)
 - Fairy martin (*Hirundo ariel*)
- **Mammals** – The cleared nature of the site means there is minimal habitat for native ground-dwelling and arboreal fauna. A number of eastern grey kangaroos were observed individually and in groups in the vicinity of scattered trees. Other native mammals are unlikely to persist in the area as a result of a lack of habitat and vegetative cover due to current and historical farming activities, such as blade ploughing. Introduced rodents,

including the black rat and house mouse are likely to forage around buildings, sheds and in the open croplands on the site. Anabat recordings undertaken at Three Moon Creek approximately 2 km to the northwest of site detected seven species of bat; however, there is little bat roosting, breeding or foraging habitat on the MCP.

- **Reptiles** – The cleared nature of the site precludes the presence of most reptile species, which was verified by the field assessment. Reptiles were few in number, but included the wall skink (*Cryptoblepharus virgatus*), which was detected around the Selene Mine ruins south of the MCP. A single snake skin was found, indicating that snakes do utilise the site, with potential species including the eastern brown snake (*Psuedonaja textilis*) and carpet python (*Morelia spilota variegata*).
- **Amphibians** – Amphibians are abundant in the grassy drainage channels adjacent to the roads around the site, particularly in the south-east of the site. No species of conservation significance were identified on site. Species recorded during site surveys included the following:
 - Cane toad (*Bufo marinus*)
 - Eastern sedge frog (*Litoria fallax*)
 - Striped rocket frog (*Litoria nasuta*)
 - Emerald-spotted tree frog (*Litoria peronii*)
 - Common green tree frog (*Litoria caerulea*)
 - Salmon striped frog (*Limnodynastes salmini*)

Pest species observed within and adjacent to the MCP area included the following:

- Cane Toad (*Rhinella marinus*); and
- Feral Pigeon (*Columba livia*).

2. Community Consultation

2.1. PRCP Community Consultation and Register

Section 126C(1)(c) of the EP Act includes the following requirements regarding community consultation in relation to the PRC Plan:

- (iii) requires that the PRC Plan include details of any community consultation undertaken in development of the PRC Plan; and
- (iv) requires that the PRC Plan include details as to how ongoing community consultation will be undertaken regarding rehabilitation.

The DES information sheet “*Community Consultation for Progressive Rehabilitation and Closure Plan – ESR/20196/5101*” (the Consultation Guideline) provides more detail on identifying relevant parties and the nature of their interest, to enable relevant community consultation as required. Community consultation refers to engagement with relevant parties, which are identified as being:

- directly influenced by the rehabilitation of the mine; and
- having a demonstrable and legitimate genuine interest regarding:
 - the land where the activities are occurring,
 - the land adjacent to where the activities are occurring,
 - the land/amenities surrounding where the activity will occur that are likely to be impacted by the activity (e.g. groundwater/drinking water users within the surrounding area or community located upstream or downstream of the activity).

The Consultation Guideline provides a list of genuine interests (which much be demonstrable and legitimate), all of which have been considered for the MCP as follows:

- **Direct interest** (e.g. underlying and adjacent landholders):
 - Underlying and adjacent landholders have been identified (see **Section 1.2**).
 - The parties identified in **Table 15** are considered to have a genuine interest in the rehabilitation of the MCP.
 - The following underlying and adjacent landholders are not considered to be directly influenced by the rehabilitation of the MCP and/or not to have a genuine interest in the rehabilitation of the MCP.
 - TMR (as owner of the Burnett Highway): the Burnett Highway is not directly or indirectly influenced by the rehabilitation of the MCP.
- **Cultural interest** (e.g. indigenous communities, traditional owners including Native Title Holders):
 - No indigenous communities are located within the vicinity of the MCP.
 - The properties underlying the MCP are freehold and as such, native title over the properties has been extinguished. Rehabilitation of the MCP to a stable landform that supports a grazing pasture PMLU is consistent with the pre-mining land-use and no specific further consultation has been undertaken for this PRC Plan.

- **Heritage interest** (e.g. state or local government or relevant community groups where heritage value is identified on the land the activity is to occur):
 - No non-indigenous cultural heritage sites have been identified within the MCP site. As such, there is no heritage value identified for the MCP and there are no parties with a genuine heritage interest in the rehabilitation for the MCP.
- **Environmental interest** (e.g. state or local government or relevant community groups where environmental value is identified on the land the activity is to occur):
 - There are no identified environmental values within the MCP site that are of relevance to State or local government or relevant community groups.
 - All disturbance is within the approved disturbance area identified in the EA (a LOD).
 - As such, there are no parties with a genuine environmental interest in the rehabilitation processes and final land outcomes at the MCP.
- **Recreational interest** (e.g. relevant community groups who use the immediate, adjacent, upstream or downstream land for recreational purposes):
 - Other than the areas held under the MCP MLs, the land parcels immediately surrounding the MCP are either privately held and used for grazing (see **Section 1.2** and **Section 1.3**), or contain transport infrastructure (e.g. rail corridor or the Burnett Highway).
 - As such, there are limited opportunities for parties to have a direct recreational interest in the area surrounding the MCP.
- **Land use interest** (e.g. overlapping tenure holders, agricultural entities or local government where a planning scheme for the land is in place):
 - The overlapping/adjoining coal exploration tenements (EPCs and MDLs) are held by parties associated with QCoal.
 - There are no overlapping mineral, or petroleum exploration or production, tenure holders for the MCP.
 - There are no overlapping agricultural entities for the MCP (other than the landowners).
 - The MCP area is subject to the North Burnett Regional Council Planning Scheme, in which the underlying real property is zoned as 'rural intensive agriculture district'. The rural zoning is consistent with both the pre-mining grazing land-use and the adopted PMLU for the MCP. As the MCP PMLU is consistent with the zoned usage in the North Burnett Regional Council Planning Scheme, the Planning Scheme will have no impact on the rehabilitation and final land outcomes for the MCP and no further specific consultation has been undertaken with North Burnett Regional Council for this PRC Plan.
- **Health Interest** (e.g. state or local government or relevant community groups who have health concerns relating to the rehabilitation processes and final land outcomes for the project):
 - There are no known community groups or state or local government bodies which have health concerns relating to the rehabilitation processes and final land outcomes for the MCP.

In following the approach in the Consultation Guideline, Monto Coal has identified those members of the community with a genuine interest in the rehabilitation and closure of the MCP (listed in **Table 15**). The list of identified community consultation members is subject to change in the event of a change in the landholdings, or tenure arrangements for the nominated parties.

Table 15 – Identified Community Consultation Members

Community Member	Interest Type	Interest Description
Monto Coal 2 Pty Ltd	Direct – Underlying / Adjacent Landholder	Landholder – All properties underlying the MCP
Ian John Hill	Direct – Adjacent Landholder	Landholder - Lot 1 on SP151959 and Lot 46 on RW712
Sarah Emily Avis & Brett William Avis	Direct - Adjacent Landholder	Landholder – Lot 2 on RP 222226
Rona Ella Benecke & Leigh Gordon Benecke	Direct - Adjacent Landholder	Landholder – Lot 1 on RW805
Graeme Walter Hill	Direct - Adjacent Landholder	Landholder – Lot 7 on CP844130 and Lot 6 on RW113
Wayne Robert Goody & Amanada Jane Goody	Direct – Adjacent Landholder	Landholder – Lot 1 on RW112
Stuart Andrew Leahy & Patricia Kaye Leahy	Direct – Adjacent Landholder	Landholder – Lot 127 on RW797, Lot 174 on RW848, Lot 129 on RP840293, and Lot 120 on RW100
Tracey Michelle Pattie & Matthew Alexander Pattie	Direct – Adjacent Landholder	Landholder – Lot 121 on RW100
William John Dow & Kathleen Lesley Dow	Direct – Adjacent Landholder	Landholder – Lot 105 on RW100
Neville William Iversen & Helen Joy Iversen	Direct – Adjacent Landholder	Landholder – Lot 166 on RW152
Samantha Jane Dow & Martin Robert Dow	Direct – Adjacent Landholder	Landholder – Lot 6 on RW99
Queensland Rail Limited	Direct – Underlying / Adjacent Landholder	Landholder – Lot 311 on CP827316 and Lot 331 on CP827317
North Burnett Regional Council	Direct – Underlying / Adjacent Landholder	Road Reserves

A MCP PRC Plan Community Consultation Register has been developed to record consultation with the identified community members (undertaken during the development and implementation of this PRC Plan). The MCP PRC Plan Community Consultation Register is attached as **Appendix C** and is considered to be a stand-alone Register, which will be updated as required.

2.2. General Community Consultation

General consultation with community members has been included for completeness in **Table 16**. It is noted this consultation was undertaken with a project and operations focus, and not specifically for PRCP purposes (as the majority of consultation undertaken pre-dated the PRCP legislation).

Table 16 – MCP Community Consultation Overview

Date	Consultation Type	Matters Discussed
29/06/2001	Monto Shire Council meeting	Presentation of exploration results.
16/08/2001	Advertisement (Central & Burnett Times)	Advertised intention to continue exploration and evaluation work in Monto Shire. Burnett Coal also advertised that it was seeking to purchase a property in order to obtain a bulk sample of coal (23 responses received).
12/09/2001	Monto Shire Council Meeting of Interested Parties	Interested parties discussed the future use of the Monto to Gladstone rail line as a result of the raising of the Awoonga Dam.
01/11/2001	Public meeting (approximately 350 attendees).	Meeting called to inform community of economic issues affecting Monto Shire. Key issues included: • Local employment; • Type of contract mining operations; and • Water supply.
02/11/2001	Affected Landholders Meeting (40 attendees)	Purpose of meeting was to field specific questions concerning the project. Following the meeting ten individual property owners met with Burnett Coal representatives to discuss their respective property interests.
15/11/2001	Meeting between Monto Coal Project and Monto Shire Council, Queensland Rial, & PPK.	Discussion of the key aspects of the Monto Coal Project.
15/11/2011	Letter to Landholders	A letter and maps were sent to forty-six landholders showing the outlines of land holdings together with geology. The letter also clarified some outstanding issues raised in previous meetings.
20/11/2001	Landholder Meeting	Presentation to affected landholders on land acquisition issues.
29/11/2001	Landholder Meeting	Project representatives outlined the concept for the mine development, progress with current studies and probable timetable for mining lease application.
23-25/01/2002	Individual Landholder Meetings	23 landholders and other interested parties met with representatives to discuss the MCP and potential areas for acquisition.
27/02/2002	Rotary Club Enterprise Dinner	Presentation dinner on progress to date on the MCP.
06/09/2002	Public Notice for ML80101	Notification of the application for ML80101 was publicly advertised, and the community was given the opportunity to object/comment.

Date	Consultation Type	Matters Discussed
06/09/2021	Public Notice for ML80175	Notification of the application for ML80175 including the amendment to the MCP EA to include the new ML. Public comment/objection was open.
30/10/2023	Public Notice for ML80175	Notification of the application for ML80175. Public comment/objection was open.

2.3. PMLU and NUMA Consistency with Outcomes of Consultation

Section 126C(1)(d) of the EP Act requires that a PRC Plan states the extent to which each post-mining land use (PMLU) and non-use management area (NUMA) is consistent with the outcomes of community consultation, and any strategies or plans for the land of a local government, the State or the Commonwealth.

The PMLUs proposed for the MCP are consistent with community consultation, which commenced during the application for the MCP MLs.

The PMLUs proposed for the MCP are consistent with strategies and plans of local, State and Commonwealth governments as follows:

- **Local Government (North Burnett Regional Council (NBRC)) Plans and Strategies:**
 - The MCP area is subject to the North Burnett Regional Council Planning Scheme, in which the underlying real property is zoned as 'rural intensive agriculture district'. The rural zoning is consistent with both the pre-mining grazing land-use and the adopted PMLU for the MCP. As the MCP PMLU is consistent with the zoned usage in the North Burnett Regional Council Planning Scheme, the Planning Scheme will have no impact on the rehabilitation and final land outcomes for the MCP and no further specific consultation has been undertaken with North Burnett Regional Council for this PRC Plan.
 - Rural zoning under the NBRC Planning Scheme has the following outcome to achieve the purpose of the zoning:

6.2.7.2 (2) (c) – extractive industries and associated processing develop where the resource is available with appropriate management of environmental impacts and site rehabilitation.

The NBRC Planning Scheme does not preclude the retention of voids associated with extractive industries.
 - As such, the proposed MCP PMLUs are considered to be consistent with the NBRC Planning Scheme.

- **State Government Plans and Strategies:**

- The most relevant State Government ‘strategies/plans’ is the key legislation which governs the mining industry, being the *Mineral Resources Act* 1989 (MR Act) and the *Environmental Protection Act* 1994 (EP Act).
- The MCP EMOS was developed, and an application to the Queensland government was undertaken for approval of the MCP, and was subject to consultation with relevant stakeholders including government bodies and public notification.
- ML80101 was subsequently granted under the MR Act, with the ML conditions not precluding the retention of voids/NUMAs following the completion of mining.
- As such, the proposed MCP PMLU is considered to be consistent with the relevant State Government legislation and policy governing the resources sector (considered to incorporate any relevant State Government plans and strategies).

- **Commonwealth Government Plans and Strategies:**

- No specific Commonwealth Government strategies or plans are relevant to the MCP site other than the overarching Environment Protection and Biodiversity Conservation Act (EPBC Act);
- As noted in Section 1.1.4, the MCP has not required any referrals to the Commonwealth as it was deemed to not have a significant residual impact to Matters of National Environmental Significance (MNES). In the absence of any referral, no approval from the Commonwealth is required for the MCP;
- As such, the proposed MCP PMLU are considered to be consistent with the relevant Commonwealth Government legislation and policy governing the resources sector (considered to incorporate any relevant Commonwealth Government plans and strategies).

The MCP EA had nominated the residual void (high walls, low walls and void lake) with specific rehabilitation goals, objectives and completion criteria.

Whilst the PRCP has now achieved a PMLU for the residual void lake (livestock drinking water) and NUMA/Improvement Area for the high wall and low wall slopes, this remains consistent with the consultation undertaken with respect to the description of the residual voids in the MCP EA.

2.4. PRCP Community Consultation Plan

A Community Consultation Plan (CCP) for the MCP PRC Plan is presented in **Table 17**. The purpose of the CCP is to provide a plan for Monto Coal to engage with the identified relevant parties (as outlined in **Table 15**). The objective of engagement is to enable those parties to provide input into the PRC Plan development (as well as any potential amendments) and be advised on progress of its subsequent implementation.

Table 17 – MCP PRC Plan Community Consultation Plan

Item	Details
Identified Community Members	The identified community members are those relevant parties which are: • directly influenced by the rehabilitation of the mine; and • having a demonstrable and legitimate genuine interest regarding: ○ the land where the activities are occurring, ○ the land adjacent to where the activities are occurring, ○ the land/amenities surrounding where the activity will occur that are likely to be impacted by the activity (e.g. groundwater/drinking water users within the surrounding area or a community located upstream or downstream of the activity). The relevant community members are identified in Table 15 of the PRC Plan. For the MCP, one of the identified community members with a relevant interest (as listed in Table 15 of the PRC Plan) is associated with QCoal. Engagement and consultation regarding the PRC Plan with these entities as community members is implicit and does not require specific documentation. The community members listed in Table 15 are subject to change in the event of a change in the landholdings or tenure arrangement. Where such a change occurs, and an additional community member is identified that is not associated with QCoal, consultation will be undertaken with the identified party.
Consultation Objective and Approach – applicable to identified community member not associated with QCoal	The objective of the communication with the identified community members will differ somewhat depending on the community member's specific interest in the MCP, but may include the following: • Outline the existing approved PMLU/NUMAs for the MCP*; • Outline the progress of mining and rehabilitation activities at the time of consultation*; • Outline the proposed final landforms at the MCP*; • Outline the MCP PRCP schedule timeframes; • Record, consider and respond to feedback on the MCP PMLU, final landform and PRCP Schedule.

Item	Details
	*Initial consultation with relevant parties undertaken during previous consultation Such consultation may include the following approaches as appropriate or requested by the member: telephone, face to face meetings; written contact, or MCP Community Consultation events. It is noted that as the MCP has been previously assessed and approved, the approved PMLU, rehabilitation methods and outcomes are being transitioned into the PRC Plan and PRCP Schedule and there is limited scope to amend these elements.
Frequency – applicable to identified community member not associated with QCoal	- PRC Plan Development – Overlaps with previous consultation undertaken for the MCP. - PRC Plan Implementation - Upon commencement of the MCP and every 5 years thereafter. - PRC Plan Amendment - During preparation of PRC Plan / PRC Schedule amendments which have a material impact on the community member (as required). To take place a minimum of 1 month prior to PRC Plan amendment submission.
Information to be Provided – applicable to identified community member not associated with QCoal	- PRC Plan Implementation - Progress against PRCP Schedule - PRC Plan Amendment - Presentation detailing PRC Plan and PRCP Schedule, and proposed schedule of amendment.
Feedback Consideration – applicable to identified community member not associated with QCoal	- PRC Plan Implementation - Feedback to be noted. A response to feedback including details of how it has been addressed will be provided to the relevant community member. - PRC Plan Amendment - Feedback to be noted. A response to feedback including details of how it has been addressed will be provided to the relevant community member.
Consultation Records – applicable to identified community member not associated with QCoal	- PRC Plan Implementation - Meeting records. Consultation to be included in PRC Plan Consultation Register. - PRC Plan Amendment - Meeting records. Consultation to be included in PRC Plan Consultation Register.

3. Post Mining Land Use

As detailed in **Section 1.1.5**, the PMLUs for the MCP final landforms are stated within EA EPML00418713, which is the primary LOD for the MCP.

EA EPML00418713 (Condition F3 and Table F2) authorises a residual void to be retained at the MCP. For clarity, the term ‘residual void’ refers to the remaining part of a mining pit which has not been backfilled. Where an area of pit is progressively backfilled during operation or campaign backfilled, these areas transition from Domain 1 (residual voids) to Domain 2 (overburden dump) and/or Domain 6 (sediment dams and water management infrastructure).

The agreed PMLU for the MCP, as per Condition F1 of the MCP EA (as the primary LOD for the MCP), is grazing pasture for all domains other than residual voids.

Table 18 outlines the PMLU outlined in the EA for each disturbance type/domain at the MCP.

Table 18 – Post Mining Land use by Domain for the MCP

Domain Number	Domain	PMLU on MCP	LOD
1	Residual voids	- Water Storage	EA
2	Overburden Dumps	- Grazing pasture	EA
3	Mine Infrastructure	- Grazing pasture; or - retained by the landholder with written agreement	EA
4	Out of pit Co-disposal Facility	- Shrubby Grassland	Determined through discussions with DETSI
5	ROM and product stockpiles	- Grazing pasture; or - retained by the landholder with written agreement	EA
6	Haul Roads and Access tracks	- Grazing pasture; or - retained by the landholder with written agreement)	EA
7	Sediment dams and water management infrastructure	- Grazing pasture; or - retained by the landholder with written agreement	EA

For rehabilitation to be considered successful, the land must be returned to a “stable condition” as defined in Section 111A of the EP Act:

111A Meaning of stable condition

*Land is in a **stable condition** if –*

- (a) the land is safe and structurally stable; and*
- (b) there is no environmental harm being caused by anything on or in the land; and*
- (c) the land can sustain a post-mining land use.*

With the exception of any retained infrastructure, all disturbed land within the MCP will be rehabilitated to a stable condition. Areas within the MCP that are undisturbed by mining will have a PMLU consistent with the pre-mining land-use (i.e. grazing pasture or third-party infrastructure) and do not require further consideration as part of this PRC Plan.

3.1. Rehabilitation Goals

Rehabilitation goals for the MCP are defined in Condition F1 of the MCP EA (the primary LOD), which generally align with the rehabilitation goals summarised in the *Rehabilitation Requirements for Mining Projects* (EHP, 2014). The Condition F1 rehabilitation goals in the MCP EA are:

- safe to humans and wildlife;
- stable (*referring specifically and only to geotechnical stability*);
- non-polluting; and
- self-sustaining for the post-mining land use of grazing pasture, with the exception of residual voids.

The definition of “stable” for rehabilitated landforms referred to above is distinct from the definition of “stable condition” in Section 111A of the EP Act (applicable to mines under EAs). Section 111A of the EP Act defines land as being in “stable condition” only if it meets all the following conditions:

- safe and structurally stable (i.e. geotechnical wall/slope stability); and
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (i.e. self-sustain a specified use for the landform after rehabilitation).

Accordingly, final landforms must achieve one of two outcomes:

- rehabilitated to a “stable condition” as per Section 111A of the EP Act in which case the rehabilitation is considered successful; or
- rehabilitated to a condition which does not satisfy all three of the requirements to be considered in “stable condition” as per Section 111A of the EP Act (i.e. the final landform is unable to meet all of the criteria to be considered in “stable condition”). Section 112 of the EP Act defines such landforms as NUMAs, which are discussed in **Section 4**.

All disturbed land within the MCP will be rehabilitated to a stable condition as per Section 111A of the EP Act, with the exception of residual voids and infrastructure retained by the landholder (by written agreement).

3.2. Requirements for Grazing Pasture

The PRCP Schedule Version 1 requires the Rehabilitation Areas with a grazing pasture PMLU to meet undertake a land suitability assessment to meet land suitability class 3 or better as defined in the 'Guidelines for Agricultural Land Evaluation in Queensland' (State Department of Queensland, 2015) for low intensity grazing.

This is a departure from the approved EA at the time.

3.3. Completion Criteria

The relevant completion criteria for the MCP PRCP Version 1 can be found in the PRCP Schedule Appendix A. The criteria have been selected from a combination of previously developed and accepted mine domains of the MCP EA and from consultation with DETSI throughout the PRCP schedule negotiation process.

3.4. PRCP Schedule Milestone Criteria

The MCP PRCP Schedule Rehabilitation Milestone Criteria have been developed in discussions with DETSI. The milestone criteria have been drafted in accordance with the SMART principles of Specific, Measurable, Achievable, Relevant and Time-Bound.

The MCP PRCP Rehabilitation Milestone (RM) criteria (for RAs) are summarised in **Appendix A**.

4. Non-Use Management Areas

As stated in **Section 3**, final landforms will achieve one of two outcomes:

- rehabilitated to a “stable condition” as per Section 111A of EP Act in which case the rehabilitation is considered successful; or
- rehabilitated to a condition which does not satisfy all three of the requirements to be considered in “stable condition” as per Section 111A of the EP Act (i.e. the final landform is unable to meet all of the criteria to be considered in a “stable condition”). Section 112 of the EP Act defines such landforms as “non-use management areas” (NUMAs) – specifically defining a NUMA as an area of land the subject of a Progressive Rehabilitation and Closure Plan (PRC Plan) that cannot be rehabilitated to a “stable condition” after all relevant activities for the PRC Plan carried out on the land have ended.

PRCP negotiations with DETSI determined that the existing LOD EA rehabilitation criteria for the highwall and low wall of the final void could not result in a post mining land use due to the approved slope gradient. It was appropriately determined that this area would be considered a NUMA to the extent that the highwall and low wall reached the residual void lake, of which maintains a use of livestock drinking water. The PRCP Schedule has been conditioned to require MC to determine the extent of the NUMA and update Figure 1 and Figure 2 of the Schedule prior to the nominated commencement date.

Details of the approved NUMA / Improvement Area including timing and milestone criteria are provided in **Appendix A**.

5. Rehabilitation Management Methodology

5.1. Mine Planning for Operations and Closure

Mining activities at the MCP are planned to maximise the recovery of the economic coal resources while also enabling the timely and cost-effective rehabilitation of the site. Planning for progressive rehabilitation and closure of the MCP has been incorporated into the proposed mine layout and mining methodology to be utilised at the site.

5.1.1. Mine Design and Layout

The proposed layout for the MCP has been developed to maximise extraction of the identified coal resources with the minimum amount of overall disturbance footprint. The mine design, layout and proposed final landforms have pre-existing approval (as part of the MCP approval), most recently considered during the EA amendment undertaken in 2021. Aspects of layout and design are detailed in the EA (the primary LOD). As such, and as per the transitional provisions discussed in Section 3.1 of the PRCP Guideline, the derivation and justification of design, layout and final landforms is not required to be included in the MCP PRC Plan.

5.1.2. Mining Methods

As a result of the potentially challenging nature of the MCP coal geology and fluctuations in coal price over the last 25 years, flexibility in the development, operation and scheduling during the LOM is required. Fluctuations in coal price are driven by the global demand for seaborne coking and thermal coal, and the economic extraction of coal resources depends on the prevailing coal price combined with the cost to extract, process and transport the coal. Onsite factors which can impact the cost of extraction for a particular part of the coal resource include strip ratio, haulage distance, coal quality, and geology (presence of intrusions and faults).

The mining methods to be utilised for the LOM at the MCP will minimise the overall disturbance footprint while facilitating the efficient mining of the economic coal resources and the progressive rehabilitation of the site. The mining method at the MCP incorporates the following practices which will assist in the rehabilitation and closure of the site:

- Mining utilising hydraulic excavator and dump trucks, giving more flexibility for the size and orientation of the final landform than other potential methods (e.g. dragline).
- Mining commences in each pit with a box-cut at the coal subcrop (i.e. the shallowest area of the coal resource).
- Mine waste initially reports to an out-of-pit dump before transitioning to in-pit dumping once sufficient void has been created to allow for in-pit dumping via an advancing low-wall (progressive backfilling).

- The pit is advanced using benching of the highwall for each consecutive mine strip, following the coal down-dip. The extent to which the pit progresses depends on geological and real-time (current) economic factors.
- Where practical, waste rock dumps are placed in 10-12m lifts, with a minimum 10m offset provided between the crest of a lift and the toe of the next lift above to facilitate the eventual battering of the dump slope to the design grade during rehabilitation earthworks. Battering is undertaken using large mining-class bulldozers.
- Haul roads have been located within the pit/dump disturbance footprint where possible.

5.1.3. Voids in Flood Plains

One final void is proposed to be retained on the MCP; however, this is located at the eastern end of the site, and outside of the 0.1% AEP floodplain of Three Moon Creek (the only relevant watercourse for the MCP) (see **Section 1.12.3**). As such, voids in floodplains are not a relevant consideration for the MCP PRC Plan.

5.2. General Rehabilitation Management

Rehabilitation activities at the MCP are planned with the objective of establishing a final landform which achieves and maintains a stable condition (as defined in the EP Act) and supports the grazing, shrubby grassland and livestock drinking waterPMLUs. Achieving a stable landform is demonstrated by meeting the completion criteria (**Section 3.3**).

5.2.1. Hydrogeology

Data available regarding the pre-mining hydrogeological regime for the MCP area is detailed in **Section 1.12**, which includes a summary of potential EVs.

The baseline groundwater monitoring program required by Condition G12 of the MCP EA will seek to identify the occurrence of any groundwater and where encountered, measure yields, levels, flow direction and quality. This information will be utilized in the development of the GMMP and the Groundwater Model Report which will include an update to the conceptual groundwater model (including recharge) with more site-specific data.

As such the EA (a LOD) provides approved rehabilitation completion criteria for the MCP, including for the final void and TSF, in consideration of what groundwater data is currently available, and conditions for future site-specific groundwater assessments and monitoring. This approach is considered suitable for the MCP PRC Plan as it is established in the EA.

5.2.1.1. MCP Final Void

One final void is proposed to remain following completion of mining on the MCP. It is categorised by two land uses, the residual void lake with a rehabilitation outcome of livestock drinking water and the low and highwall deemed the NUMA portion of the void.

The MCP PRCP Schedule version 1 stipulates the relevant criteria each portion of the void must achieve to meet the relevant rehabilitation and management milestones. As the NUMA area has not yet been determined due to the conceptual nature of the project, it has been conditioned that MCP will undertake the appropriate assessments to determine the spatially extent of the NUMA and update improvement area 1 (IA1) and the PRCP Schedule.

Generally, the NUMA must still meet the following parameters:

- maximum slope of 123% (51°) for high walls;
- maximum slope of 75% (37°) for low walls; and
- maximum area of 25ha (including residual void lake).

5.2.2. Flooding

As discussed in **Section 1.12.3** and **Section 5.1.3**, modelling of Three Moon Creek to determine the extent of a 0.1% AEP flood has been undertaken. The residual void at the MCP is not located within the 0.1% floodplain (s demonstrated in **Figure 21**), therefore the PRC Plan only requires consideration of flooding as it relates to potential influences on the final landforms.

As previously noted in **Section 1.11.2**, flood modelling undertaken for Three Moon Creek is outlined in the Monto EMP (see **Appendix E**), with the extent of the modelled existing 0.1% AEP floodplain within the MCP shown in **Figure 21**. The 0.1% AEP flood extent extends outside of the natural creek channel, and has some potential interactions with the MCP final landform as follows:

- The northern tributary to Three Moon Creek is largely removed by the Stage 1 Pit waste rock dump, with the remaining catchment diverted around the in-pit dump, the northern dam, and the northwestern waste rock dump. Final landform interactions with the floodplain will be limited to backflow into the minor drainage channels up to the rehabilitated final landforms. Modelling indicates the depth remains relatively shallow (i.e. <1m), and velocity will be similarly minimal, the impact to the final landform is considered to be negligible.
- The central Three Moon creek tributaries will be removed by several pieces of infrastructure, with the majority of the disturbed catchment captured by the central dam.
- The Stage 1 Pit residual void is entirely outside of the pre-mining 0.1% AEP flood extent. The 0.1% AEP flood extent is further reduced by the presence of the final landforms which remove the channels and catchment of the upper part of the minor drainage channels within the MCP MLs which previously formed part of the Three Moon Creek floodplain.

- While PMF flooding for Three Moon Creek has not been modelled, based on the catchment and topography a PMF flood extent would be expected to similarly be confined to backflow effects in the minor drainage features with a slightly greater depth than the 0.1% AEP as previously described. The design and placement of the MCP final landforms are such that a PMF flood would have no greater impact on the final landforms than those described for the 0.1% AEP flood above.

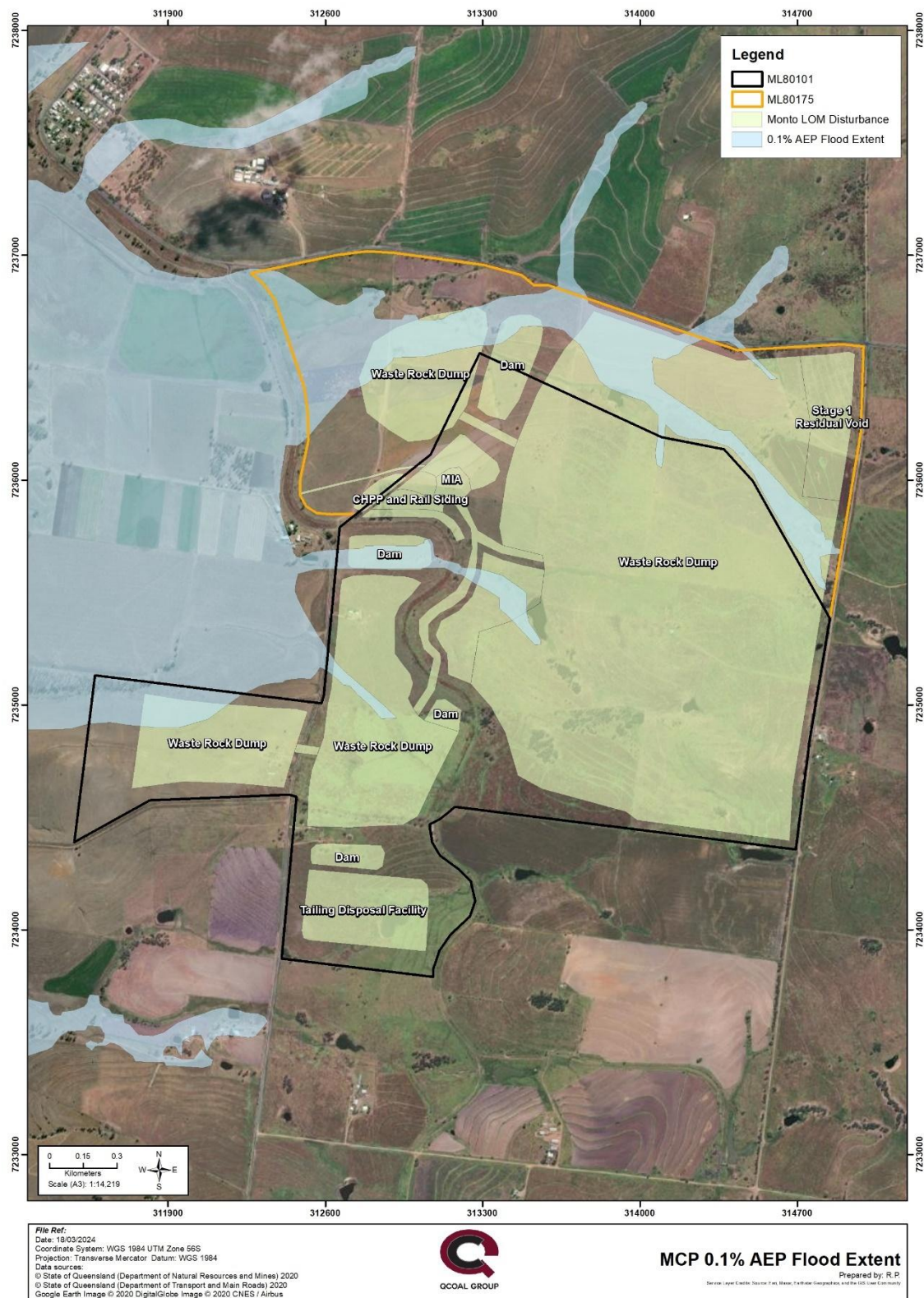


Figure 21 - MCP Three Moon Creek 0.1% AEP Flood Extent

5.2.3. Mine Waste Management

5.2.3.1. Mine Waste Classification

As discussed in **Section 1.9**, investigations have been undertaken to assess the geochemical characteristics of the waste rock and coal rejects generated at the MCP. The results of these investigations are summarised in the MCP EMOS (see **Appendix D**). The results have informed the classification and operational management of mine waste as discussed in the following sections.

5.2.3.1.1. AMD Classification

Characterisation of waste rock is generally based on the potential for materials to generate AMD, as follows:

- **Non-Acid Forming (NAF) material:** where geochemical testing of mining waste and coal rejects shows that materials have a very low likelihood of generating AMD.
- **Material with some capacity to generate AMD:** This is referred to as Potentially Acid Forming – Low Capacity (PAF-LC). Geochemical testing of these materials indicate that these wastes may or will generate small quantities of AMD. A medium risk classification applies to all mining waste and coal rejects material not classed as low or high risk.
- **Potentially Acid Forming (PAF) material:** Geochemical testing of these materials shows that these materials will almost certainly generate AMD. This classification may also apply to materials of less acid generating capacity, but with a short lag period until the onset of AMD.

No waste rock material at the MCP has been classified as PAF. Initial studies by CSR Coal Division in 1985 (see **Appendix D**) on the chemical nature and the handling limitations of the overburden have not identified any material requiring selective handling or burial due to toxicity or net acid-generating potential. There is no current evidence to indicate that any overburden strata are particularly toxic to plant growth or the environment, and hence, apart from normal mixing during the mining process, selective overburden handling is not required.

Waste rock will be blasted, excavated, hauled and dumped in bulk, with the minor volumes of potentially medium risk waste rock mitigated by the significant majority of the volume being low risk NAF waste rock. As such, waste rock dumps on the MCP are classified as NAF with low salt and metals concentrations.

5.2.3.1.2. MCP Waste Rock Risk Categories and Management

Irrespective of the findings from the geochemical studies outlined in the EMOS, mining waste generated at the MCP is grouped into four (4) categories as defined in Error! Reference source not found., with a risk classification assigned to each category which informs how the material is handled.

Table 19– Waste Rock Categories and Risk

Category	AMD Characterisation	Risk Classification	Material
Topsoil	NAF	Low	Soil (including sub-soil) to a nominal depth of 1 m below natural surface.
Waste Rock – Category 1	NAF	Low	Waste Rock – Upper: - Non-coal and non-carbonaceous material above the coal seams, and not within 1 m above or below ROM coal. - Typically weathered or moderately weathered.
	NAF to PAF-LC	Low to Medium	Waste Rock – Lower: - Non-coal and non-carbonaceous material below the upper seam, and not within 1 m above or below ROM coal. - Typically fresh or slightly weathered.
Waste Rock – Category 2	PAF-LC	Medium	Carbonaceous waste rock and unsuitable coal: - Carbonaceous material, material located within 1 m of ROM coal seams. - Sub-economic coal, intruded coal or heat-affected coal.
Coal Rejects	Unknown, but expected to be benign as per MCP EMP (see Appendix E)	Low	CHPP rejects (coarse and fine) as co-disposal slurry.

A conceptual schematic of an example coal lithology with associated categorised mining wastes is presented in **Figure 22**.

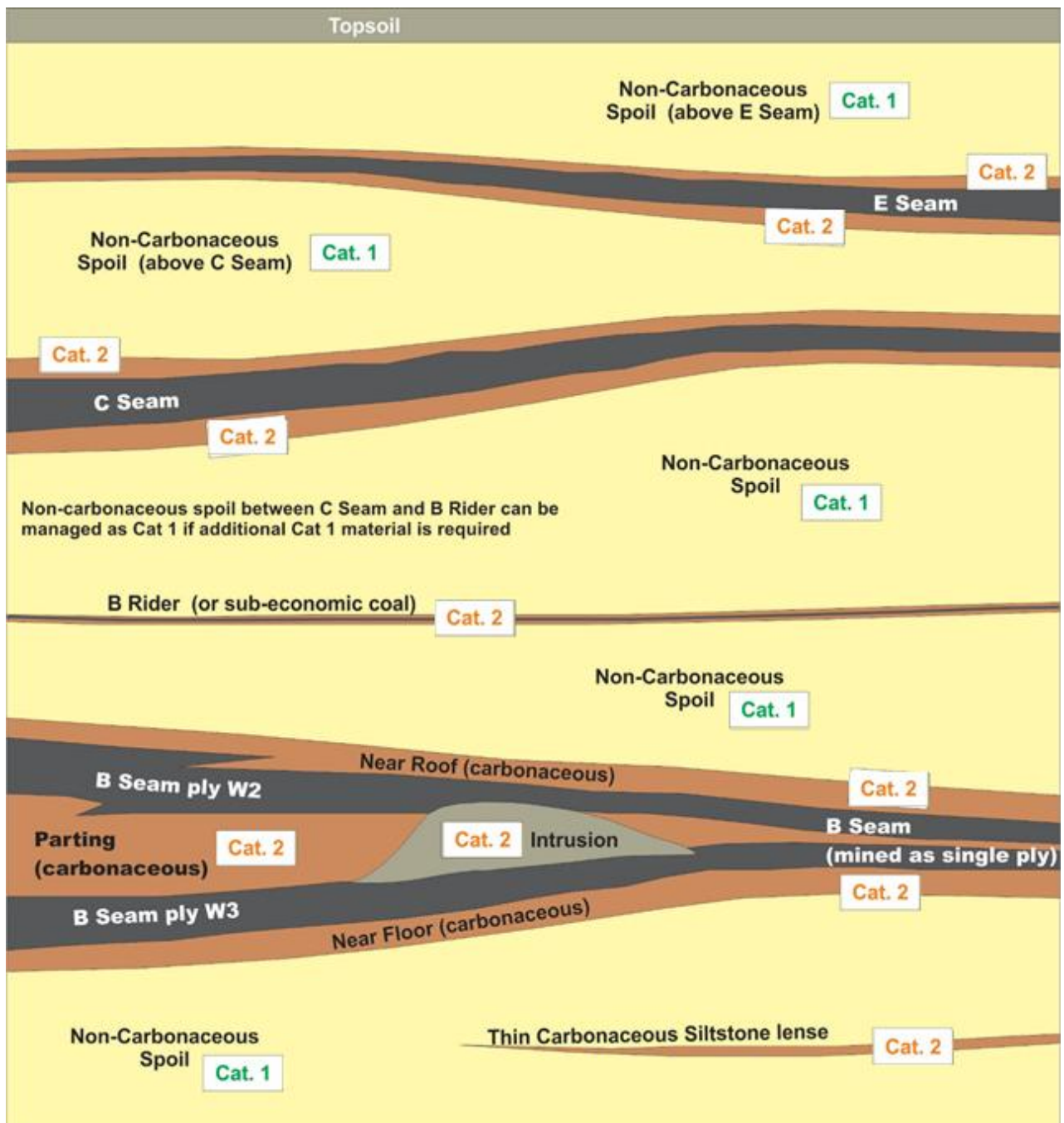


Figure 22 – Conceptual Example of Mining Waste Classification

5.2.3.2. Waste Rock Management

Strategies for each of the identified waste rock management categories are outlined in the following sub-sections.

5.2.3.2.1. Waste Rock - Category 1

The majority of waste rock excavated on the MCP will be designated as Category 1, and will be managed as follows:

- Materials are to be identified by a mine geologist and communicated to excavator and haul truck operators.
- Place material in overburden dumps (out-of-pit and/or in-pit).
- Materials may be used as site construction material, provided it meets geotechnical and engineering specifications.
- Materials may be used as a sub-soil cover material for rehabilitation of co-disposal facilities, ROM pads, and sediment dams at mine closure, prior to application of topsoil.
- Possible use as a final growth medium, should the geochemical and geophysical composition designate as suitable for such an application.
- Materials are blended with Waste Rock – Category 2 during normal excavation, haulage and dumping.
- Where there is insufficient blending/dilution of Waste Rock - Category 2 with Waste Rock - Category 1, (such as instances where there is a significant volume of Waste Rock – Category 2 being mined and dumped for an extended period without any accompanying Waste Rock – Category 1), then Waste Rock – Category 1 should be used to encapsulate Waste Rock – Category 2 to a depth of at least 5m.

5.2.3.2.2. Waste Rock - Category 2

Any identified Category 2 material will be managed as follows:

- Materials are to be identified by a mine geologist and communicated to excavator and haul truck operators.
- Materials will be blended with (diluted by) Waste Rock – Category 1 during normal excavation, haulage and dumping.
- Where there is insufficient blending/dilution of Waste Rock - Category 2 with Waste Rock - Category 1, (such as instances where there is a significant volume of Waste Rock – Category 2 being mined and dumped for an extended period without any accompanying Waste Rock – Category 1), then Waste Rock – Category 1 should be used to encapsulate Waste Rock – Category 2 to a depth of at least 5m.
- Traffic compact material (where practical) prior to encapsulation (where required).

Due to the lack of trace elements within the waste rock lithological units, the risk of trace element (i.e. metalliferous) or saline drainage is considered to be minimal.

5.2.3.3. Coal Rejects Management

The TDF cells will comprise an initial external clay starter embankment, from which the co-disposal material will be deposited, with the TDF cannon moved as required to facilitate the deposition of coarse reject 'beaches' around the perimeter of the starter embankments. Decant structures within the cells will enable free water to report to the solution trenches and ultimately to the return water dam for reuse in the MCP CHPP. Successive lifts of the TDF will be undertaken using segregated coarse rejects from the pumped co-disposal stream to build the walls for the next lift.

The design, construction, operation and rehabilitation planning of such an out-of-pit TDF, will require certification by an RPEQ and submission to the administering authority (likely being a Regulated Structure). Submissions are required to include a specific Management/Operational plan for any regulated structure.

5.2.4. Landform Design

Where nominated as a grazing or shrubby grassland PMLUs, the final landforms at the MCP are designed to be consistent with the requirements for Class 3 suitability grazing land, and the surrounding topography of the land to the extent possible. Landform stability is typically achieved by achieving a desired slope length and angle, correct material selection and establishment of groundcover to improve erosion resistance. The above-natural grade landforms resulting from the mining activities at the MCP are the waste rock dumps and the TDF. Due to the TDF being capped and buttressed with waste rock (see **Section 5.2.5**), the PMLU and associated landform design considerations, the TDF has a PMLU of Shrubby Grassland. This was determined to be the most appropriate use for the area as the capping layer must maintain its integrity, free from grazing and deeply rooted plant species to ensure the ingress of water and air is prevented.

Final landforms (slope, height, size/footprint etc) for the waste rock dumps are designed taking into account the designed size/footprint, height, and operational slopes at the completion of operation of the dump. In this way the structure at the cessation of waste rock placement is as close as possible to the approved final landform design, which reduces the bulk earthwork requirements to achieve the desired final landform. Landform design plans are produced commensurate with the operational requirements to ensure as much of the bulk earthworks can be undertaken during regular operation as is possible. The maximum final landform slopes for the various rehabilitation domains are detailed in **Section 3.3**.

The final landform design at the MCP reflects the planning approach taken for mine operations and closure outlined in **Section 5.1**, and has been developed in consideration of the following constraints:

- Location of drainage features within the MCP and the extent of the riparian zones and floodplains where present;
- Location of mapped remnant ecosystems; and
- Size and location of the waste rock dumps and voids.

Figure 23 shows the designed final landforms for the MCP mining areas in plain view with the design contours displayed. **Figure 24** shows two section lines across the MCP final landforms. Cross-sections of the final landforms along these section lines, along with the current topography and natural ground level are displayed in **Figure 25**.

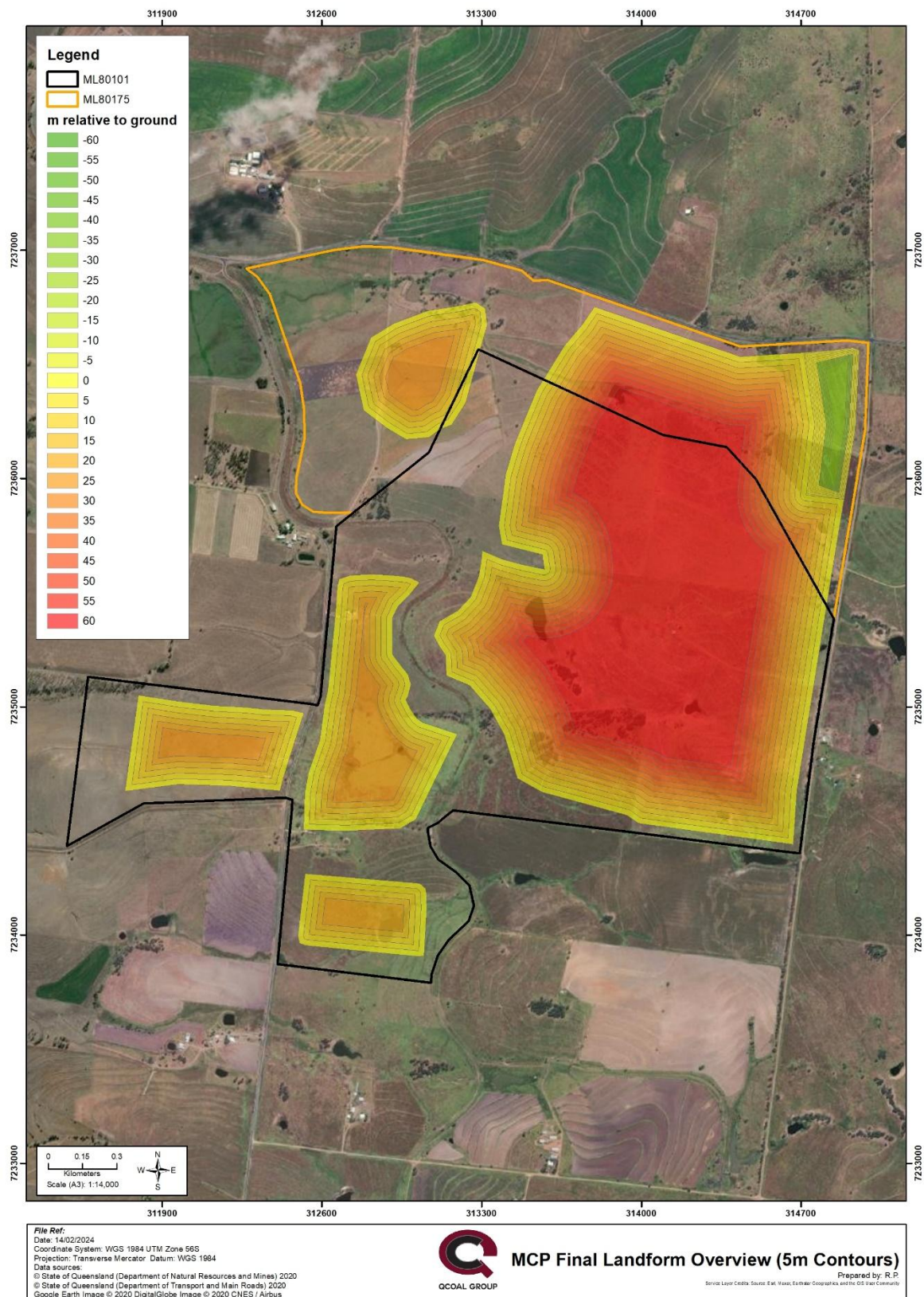


Figure 23 – MCP Final Landform Design

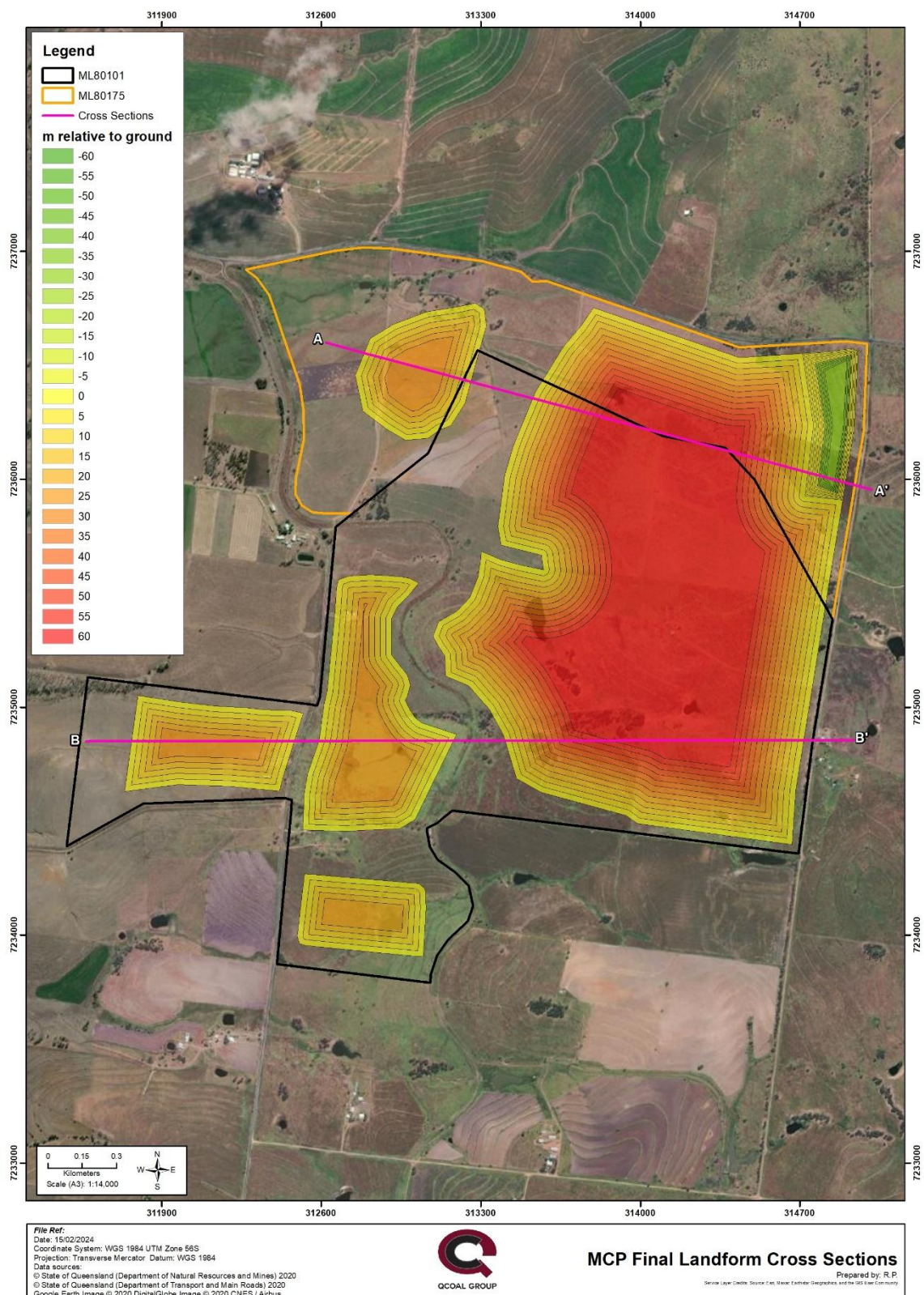


Figure 24 – MCP Final Landform Section Lines

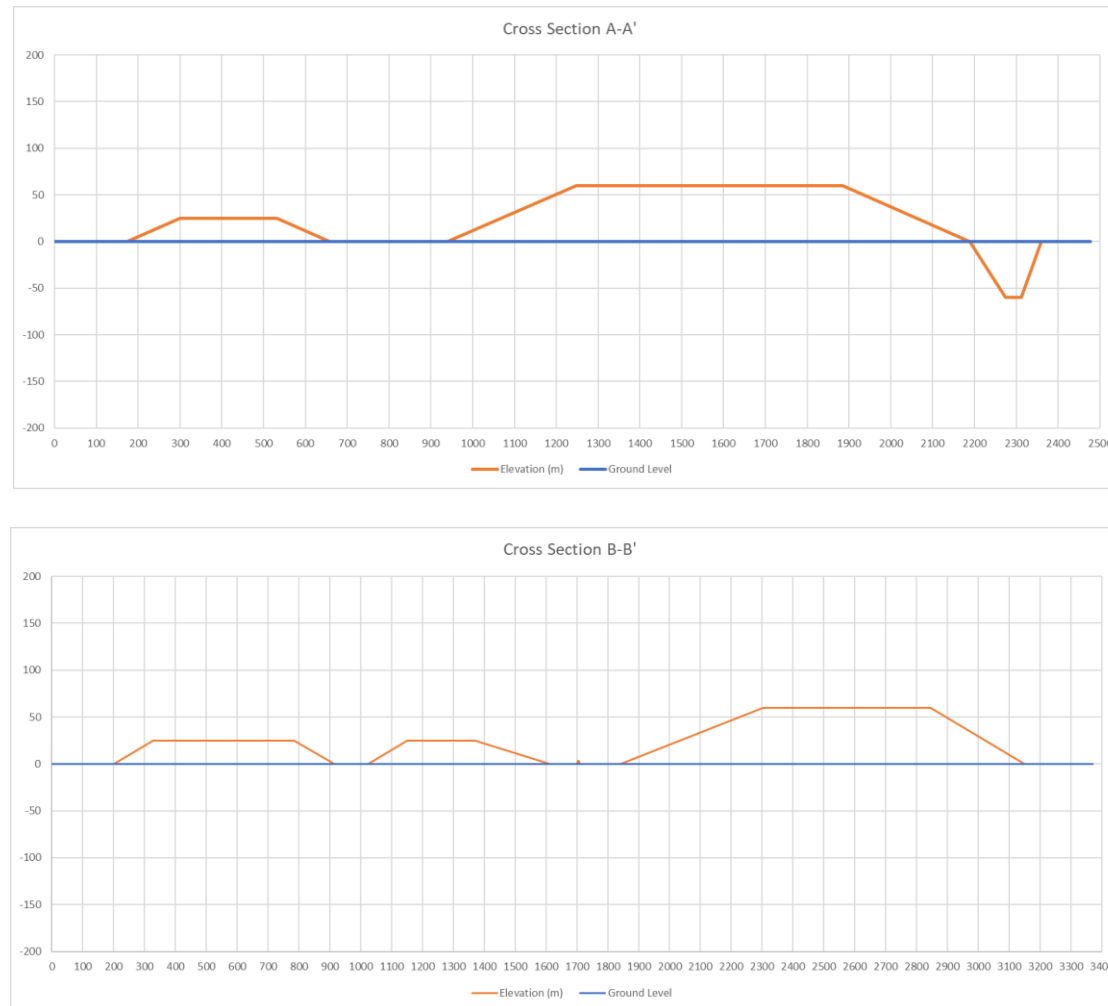


Figure 25 – MCP Final Landform Sections

5.2.5. Capping Requirements

5.2.5.1. Waste Rock Dumps

As previously detailed in **Section 1.9**, the waste rock generated at the MCP is expected to be relatively benign and to generate slightly alkaline and low-to-moderately saline runoff and seepage following surface exposure. Accordingly, capping of waste rock is not proposed to be undertaken for the completion of rehabilitation at the MCP.

5.2.5.2. Tailings Disposal Facility

The TDF will contain mixed coarse and fine reject material from the MCP CHPP. As previously noted in **Section 1.9**, co-disposal materials generated are expected to be relatively benign and to generate slightly alkaline and low-to-moderately saline runoff and seepage following surface exposure. While the co-disposal material itself is expected to not pose a significant risk of adverse environmental impacts (as per the MCP EMP, see **Appendix E**), it is not suited to be utilised as a growing medium or substrate for rehabilitation for a shrubby grassland PMLU for the following reasons:

- The rejects material itself is generally devoid of clays, silts, sands, nutrients and organic materials;
- Where left at surface, the co-disposal material absorbs significant heat from sunlight which may impact on the ability of vegetation to establish;
- While the coarse walls typically create a surface which dries/dewaters and is safely trafficable, in areas where a higher concentration of fines have been directed during operation (such as the central part of the TDF), trafficability may vary;
- The design and operation of the TDF results in relatively steep perimeter batters formed of coarse reject material. The landform cannot be shaped to the design slope ($\leq 20\%$) using the cut and fill approach typically used on waste rock dump benches as the rejects walls are designed to remain as placed during operation. Instead, the outer batters need to be buttressed with waste rock which is then shaped as required.

As such, the TDF requires capping and buttressing to be able to support the shrubby grassland PMLU.

Additionally, a capping layer provides a restriction on the rate of infiltration of rainfall into the body of the TDF. Whilst quality of seepage/leachate is not expected to be an issue at the MCP due to the expected benign coal rejects geochemistry (as discussed in **Section 1.9**), continued dewatering requires that the rate of infiltration from rainfall is restricted. Dewatering is desirable for interim stability during rehabilitation works but also so that seepage does not report to the surface of the wall buttressing.

The rationale and approach adopted for rehabilitation of TDF is as follows:

- allow a period of drying/dewatering following cessation of operation;
- placement of Category 1 waste rock on the TDF surface to a minimum depth of 2m which considers:
 - the 2m minimum will be at the outer crest, as such the majority of the capping layer will be thicker, to facilitate shaping/mounding of the cap to allow runoff to drain off the outer batters;
 - the minimum depth for safe trafficability of mine haul trucks;
 - the minimum required to enable shaping for the purposes of drainage along the crest
 - a conservative depth for the purposes of reducing the potential for oxidation;
 - a conservative depth for the purposes of restricting rainfall infiltration, and accelerating dewatering, and reduce capillary rise (should that be identified as a likely issue), especially when combined with revegetation;
 - provide a suitable substrate for revegetation and be constructed of non-dispersive material with a minimal thickness of 2m. Topsoil should be spread to a minimum of 0.2m above this.
- coarse reject walls (perimeter batters) of the TDF are then buttressed with Category 1 waste rock which is shaped to achieve the design slope – at the top of the batter the minimum thickness will be 2m while at the base of the buttress the thickness will be in the 10s of meters as the buttress is required to achieve the PMLU slope.

At completion of the capping, the TDF will therefore be encased in (and resemble) an out-of-pit waste rock dump. The landform will then have topsoil applied and be revegetated to achieve the shrubby grassland PMLU.

Category 1 waste rock is sourced directly from the Stage 1 Pit and either hauled and dumped directly on the TDF surface or rehandled from the adjacent out-of-pit waste rock dumps.

5.2.6. Topsoil

Topsoil placement at the MCP involves the application of previously salvaged topsoil to a minimum depth of 0.2 m (as per the MCP EA), to act as a growing medium for the establishment of grazing pasture.

Waste rock is considered a suitable substrate for the topsoil.

As the PMLU for the final landforms (other than for residual voids) is consistent with the pre-mining grazing pasture land-use, the stripped topsoil is inherently a suitable growth medium for use in rehabilitation.

5.2.6.1. Topsoil Availability

Topsoil is to be managed in accordance with Condition F5 of the MCP EA as follows:

- Topsoil must be progressively stripped ahead of mining advancement;
- Topsoil should be reused as soon as practically possible;
- Topsoil must be stockpiled separately from any subsoils or spoil;
- Topsoil stockpiles must not be more than two (2) metres in height; and
- Topsoil must be applied to land for rehabilitation at a rate of 0.2 m depth.

In following these management actions, the MCP will ensure sufficient suitable topsoil material is available for rehabilitation as required. Approximately >0.2 m of topsoil will be stripped prior to disturbance, ensuring a surplus of material available for rehabilitation at any given time.

A topsoil register for the MCP will be maintained to track topsoil quantities and locations for the available topsoil resources against planned rehabilitation. As mining has not commenced on site, there is no current topsoil resource available for the site.

5.2.6.2. Subsoil preparation

Where compaction of subsoil has occurred, the surface is ripped to between 0.5 m and 1 m prior to topsoiling. This relieves any compaction, 'keys' the topsoil and subsoil soil layers together, assists with rainfall infiltration and allows vegetation to establish more readily. In order to prevent degradation of soils with high clay content, ripping is only undertaken when the material is sufficiently dry. In areas where compaction has not been identified, ripping may still be undertaken on a case-by-case basis to assist in establishing a soil bed.

As the prepared surface must be suitable for equipment access for placement of topsoil, in some circumstances a light grade may be undertaken to smooth over the elevated furrows from ripping of the subsoil. Drainage and erosion and sediment controls for the final landform will typically be installed at this point, although this may be deferred until after topsoil placement if the drainage structures will impact access for mobile plant used for topsoil placement.

5.2.6.3. Topsoil Placement

Topsoil is typically placed directly in-situ by scrapers, or paddock-dumped at the top of batters and dozer-pushed to the required coverage and thickness. During steady-state mining operations, topsoil will typically be stripped, as required, 1-2 strips in advance of the pit progression. Where practicable, topsoil will be placed directly on future rehabilitation areas for respreading by dozer. This reduces the need for topsoil to be stockpiled for extended periods. Stripped topsoil is hauled by mining truck and then "paddock dumped" directly on areas for future spreading rather than being stockpiled then stripped, hauled and dumped by belly scraper.

This approach has the following benefits:

- Haulage and dumping of stripped topsoil via trucks rather than scrapers minimises compaction of the topsoil during stockpiling;
- Double-handling of topsoil is avoided in the majority of areas; and
- Paddock dumped topsoil stockpiles are less prone to soil degradation than typical scraper topsoil stockpiles (due to limited height, an increase in exposed surface area, better retention of moisture, protection of the seedbank, and less compaction);

Spot-checks or survey comparison will be undertaken during topsoil application to ensure that the minimum thickness of topsoil has been placed.

5.2.6.4. Compaction Relief

Upon completion of topsoil application, and in other areas where topsoil has been compacted during operations the surface is then typically ripped to a depth of less than 0.4m –, particularly on batters. This has the following benefits:

- Compaction relief;
- Keying the topsoil into the subsoil material; and
- Creating furrows which reduce run-off, trap sediment, and encourage moisture retention. The furrow areas are typically the first areas in which vegetation establishes which assists with erosion control.

5.2.6.5. Topsoil Amelioration

Following the application of topsoil, the need for fertiliser application is informally assessed. The topsoil resources available at the MCP have been identified as clay soils which will be salvaged to mining. As discussed in **Section 1.13.1**, these soils are slightly alkaline, and are non-dispersive. The pre-mining grazing pasture and cultivation land-uses for these soil units indicates these soils should readily support productive grazing pastures without fertiliser application.

Consideration is given to the application of fertiliser where rehabilitation monitoring or periodic inspections identify failed or stressed rehabilitation, and the cause of the failure is assessed as being due to poor nutrient loading. In this situation, a low phosphate fertiliser may be applied at a nominal application rate of up to 250 kg per hectare or as otherwise appropriate. The potential for run-off from fertilised areas into drainage catchments, as well as weed growth within rehabilitation areas are considerations when determining if fertiliser application is appropriate.

5.2.7. Water Management

All water management infrastructure at the MCP will be constructed and operated in accordance with the MCP WMP, which will detail the operating philosophy for water management and will be updated periodically as mining progresses. The WMP will also incorporate the ESCP for the site.

5.2.7.1. Operational Water Management Infrastructure

Operational water management infrastructure at the MCP will consist of dams and drainage structures. These structures will either be rehabilitated at closure or integrated into the final landforms, in consideration of the PMLU. Alternately, these may be retained by the underlying landholder under a formal agreement.

5.2.7.2. Rehabilitated Landforms

Above ground waste rock dump final landforms have been designed to allow the installation of erosion and sediment controls to minimise erosion risk to the final landform. The final landforms at the MCP will have permanent drainage and erosion and sediment control (ESC) structures installed as required, as determined by landform slope, slope length, and the reporting catchment.

Installation of drainage and ESC structures is typically undertaken prior to the application of topsoil but in certain instances it may be undertaken after topsoil application (e.g. due to the erosion structures preventing access/potentially being damaged by the large earthmoving equipment used to apply topsoil).

In addition to establishing groundcover, the most effective way to control surface flow (and therefore erosion) in rehabilitated areas is to construct contour furrows or contour banks at regular intervals down the slope, effectively dividing long slopes into a series of shorter slopes. Where there is a minimal slope, such erosion controls are typically not required. As slope angle increases, contour banks or furrows are spaced closer together.

Contour banks are typically the preferred erosion control option for relevant domains with slopes that may be subject to sheet or rill erosion (e.g. waste rock dumps, out-of-pit co-disposal facilities, etc.). Contour banks are typically constructed with a small dozer (civil scale) with a 0.5-1% fall to divert run-off to nominated channels to ultimately convey the run-off down-slope. These channels are sized and frequently rock stabilised depending on the expected run-off flow rates and velocities.

The specific ESC controls for the final landforms will be designed and installed during rehabilitation establishment such that no ongoing management of surface water run-off (e.g. capture, storage or treatment) will be required following the completion of rehabilitation. Contour banks and other drainage channels within final landforms are intended to be retained as part of the final landform to avoid additional disturbance required to remove them and respread topsoil. The requirement for

any repair works will be addressed on a case by case basis, including rectification and/or improvement of the structure. Removal of the structure will, however, be considered if required.

The occurrence of AMD seepage has been deemed unlikely based on previous laboratory testing of waste rock.

5.2.8. Revegetation

As per **Section 3**, the approved PMLU for areas disturbed by mining activities at the MCP (other than for final voids or retained infrastructure) is grazing and shrubby grassland. These PMLUs are reflective of the pre-mining land-use within and surrounding the MCP (where not otherwise utilised for mining). The focus of revegetation activities at the MCP is therefore to establish a suitable vegetation cover to ensure a stable (as defined by Section 111A of the EP Act) and productive landform. Vegetative cover significantly reduces the erosivity of rehabilitated landforms, particularly waste rock dumps with long slopes.

Vegetation at the MCP will be established via a reliance on a viable seedbank within previously stripped topsoil and direct seeding.

5.2.8.1. Natural Seedbank

The stripped and stockpiled topsoils at the MCP are (by definition) considered to contain a seedbank with a representative diversity of the dominant grass, shrub and tree species present on the land prior to disturbance. As such, the reliance on the natural seedbank is considered an appropriate approach as a first approach, particularly in early rehabilitation as a trial of the methodology to determine its ongoing potential for use in rehabilitation on the MCP. The reliance on the natural seedbank within the topsoil is considered likely to reflect the improved pasture and native species present locally prior to the topsoil being stripped. The species present within the seedbank will therefore naturally vary, and, as such, a flexible approach to determining preferred, intermediate and non-preferred species within rehabilitation at the MCP has been adopted.

Preferred, Intermediate and Non-Preferred vegetation species for rehabilitation at the MCP are determined in reference to the following documents:

- Grazing Land Management (GLM) land type descriptions for the Inland Burnett region:
 - Blue gum on cracking clay (IB02)
 - Softwood Scrub (DD15)
 - Brigalow belah uplands (DD14)
- Where a pasture species is present within the rehabilitation that is not specifically listed within the above land type descriptions, the 'Intermediate Species' definition* in the *State Rural Leasehold Land Strategy Guidelines for Determining Land Condition* ('the Guidelines') is applied:
 - Intermediate species—all perennial grass species that are not weed species and are any of the following:

a) *not recognised as preferred or non-preferred species;*

*Note *the Guidelines* include other criteria/species within the Intermediate Species definition but these are not relevant to the MCP and have been omitted.

- Native trees and shrubs are considered to be preferred/intermediate species for rehabilitation at the MCP. Native tree and shrub species will naturally establish within rehabilitation areas (or any cleared grazing land for that matter) and are useful as shade trees for grazing cattle, but they are considered to be incidental to (and not essential to) the grazing pasture PMLU.

5.2.8.2. Direct Seeding

Topsoiled landforms will be seeded using a selection of the recommended species seed mix and seeding rates as described in Appendices 1 and of the PRCP Schedule.

Seed can be purchased from a central Queensland-based commercial supplier or collected from the local area. Collection of seed may only take place where the collector has the relevant permission and/or permits for the area from which they are collecting. Any seed requiring storage prior to planting is kept in a cool, dry area and protected from insects.

Based on regional pasture areas, native grass and preferred pasture species composition will align with the list presented in Error! Reference source not found..

Seeding, where required, will ideally be undertaken immediately prior to the onset of the wet season (i.e. December or January). This gives seed the best chance of striking, as soil moisture will be at its highest in the late wet season. Seeding is undertaken utilising an agricultural-class tractor and spreader.

5.2.8.3. Groundcover Establishment

It is well established that the key factor in ensuring the erosional stability of final landforms is the establishment of ground cover. The presence of ground cover reduces impacts from rain -drop strike and wind erosion, as well as reducing the velocity and volume (and thus erosion potential) of run-off as overland flow. Studies such as Carroll et al (2000) included field trials on mining landforms of varying slopes (10%, 20%, 30%) and concluded that there is no material difference in soil erosion rates between slope gradients once a minimum level of groundcover is established (in this case in the form of grass cover). Carroll et al (2000) is considered relevant given the trials were carried out on analogous mine landform batters. The study found that erosion rates on all trial areas were significant prior to the establishment of groundcover (between 70 and 500t/Ha/yr), but groundcover as low as 30% was sufficient to reduce sediment loss significantly (to below 20t/Ha/yr), regardless of the slope.

Groundcover establishment has a more proportionate influence on erosional stability than other factors and remains the most effective mitigation. More specifically, the proportionate influence of soil type (sodicity and dispersivity) and slope angle on the erosion potential, diminishes rapidly with

the establishment of groundcover. This also means that groundcover proportion is considered an appropriate analogue for the measurement/monitoring of potential for erosion/erosional stability, when combined with visual monitoring of any rills or gullies.

5.2.8.4. Establishment Monitoring

Regardless of reliance on the seedbank or direct seeding, the establishment period for species can vary, so progress is regularly monitored following spreading of topsoil or any seeding undertaken. Topsoil spreading, seeding or reseeding will be undertaken in consideration of the season and weather forecasts (preferably prior to or during the wet season or forecast wet weather).

Formal monitoring of rehabilitated areas will commence after at least one wet season has passed following completion of rehabilitation works and is undertaken in conjunction with monitoring of reference sites.

5.2.9. Void Closure Plan

For mine sites with voids, the PRCP Plan is required to incorporate a void closure plan that addresses the listed criteria in the PRCP Guideline.

The void closure plan for the MCP Stage 1 Void is detailed in Error! Reference source not found., which addresses the requirements of the PRCP Guideline.

Table 20 – PRCP Guideline Void Closure Plan Requirements

Requirement	Discussion
Options available for minimising final void area and volume	Once sufficient space is available within the MCP Stage 1 Pit, progressive backfilling of the void in the form of in-pit dumping will commence, effectively minimising the final void area and volume remaining at the end of mining.
Proposed final dimensions of the void (depth*, length** and width**)	Depth – ~60m Length – ~650m Width – ~220m
	*The final void and the delineation of the NUMA and residual void lake areas will occur in accordance with the conditions of the PRCP Schedule prior to the date nominated by PRCP Condition 10.

Requirement	Discussion
Pit wall geotechnical and geochemical stability, considering the effects of long-term erosion and weathering of the pit wall and the effects of significant hydrological events	In accordance with Condition F4 of the MCP EA, Monto Coal must complete an investigation into the residual void geotechnical and geochemical stability and submit the investigation to the administering authority prior to mine closure. Refer to Section 1.12.3 and Section 5.2.2 of this PRC Plan.
Proposed final slope angles of high wall, low wall and end walls of each final void	As discussed in Section 1.11.1 and Section 3.3 of this PRC Plan, <i>Table F2 (Residual Void Design)</i> in the MCP EA (as the primary LOD) prescribes the following maximum slopes for voids at the MCP: • High Walls: 51° • Low Walls: 37°
Void hydrology, addressing the long-term water balance and water level in the voids, stratification connections to groundwater resources and potential for overflow	Refer Section 1.12.3 , Section 5.2.1 and Section 5.2.1.1 .
Groundwater modelling to determine whether the void is acting as a sink or a source for groundwater	
A water balance study including an assessment of void surface and groundwater interactions such as:	
Groundwater lowering/reduction in hydraulic head (from new voids e.g. caves/karst systems)	
Cones of depression and associated impacts	
The drainage and flooding behaviours of surface waters in the vicinity of the void	

Requirement	Discussion
The potential extent of flooding and implications of interactions with the void	
A conceptual model that incorporates all projected inflows, outflows, and recharge rates	
Water storage and long-term water balance	
Each of the major water fluxes into and out of the void	
The sources of surface water within the mine catchment that are likely to influence the water quality in the void	
Predicted water quality in the long-term including potential stratification	

5.3. Rehabilitation Area – Specific Strategies

Disturbance areas at the MCP have been divided into Rehabilitation Areas (RAs) to support the development of the PRCP Schedule and the Rehabilitation Milestones (refer to **Figure 6**). The MCP RAs have been aligned such that each RA only comprises areas which share a common PMLU and rehabilitation methodology.

Each RA at the MCP will typically have been subject to a number of overlapping domains/activities during the LOM, for example where part of the mining void becomes a waste rock dump, or an area of waste rock dump is utilised as a haul ramp/road. Rehabilitation strategies for each area are specific to the most recent domain activity but also account for the previous domain/activities where relevant.

Specific rehabilitation strategies for each RA at the MCP are outlined in the following sections.

5.3.1. Rehabilitation Area 1 – Waste Rock Dumps

RA1 consists of the rehabilitated waste rock dumps within the MCP which, while not contiguous, share a common rehabilitation methodology and PMLU. RA1 consists of a total of 387.14ha, and includes the following areas:

- Stage 1 Pit waste rock dump;
- Western out-of-pit dump;
- Southern out-of-pit dump; and
- North-western out-of-pit dump.

The availability of waste rock dumps for rehabilitation is contingent on:

- Completion of progressive waste rock placement in accordance with the LOM plan to an extent that allows for shaping to the designed final landform;
- Availability of sufficiently sized, oriented and accessible areas to undertake rehabilitation activities;
- Haulage ramps/roads/other linear infrastructure through the waste rock dump areas being no longer required. A number of haul roads will traverse the MCP Stage 1 Pit waste rock dump footprint in order to maintain access to the pit. These haul roads/ramps will be required for the life of mine of the MCP. The presence of the active haul roads/ramps may also preclude the rehabilitation some areas of the adjoining/underlying waste rock dump from being available for rehabilitation due to the future earthworks requirements to cut/fill the angle of repose spoil batters adjacent to the haul roads to establish the final landform.

Areas within RA1 will become progressively available as dumping within waste rock dumps is completed, and haul roads/ramps/other infrastructure within the dump footprint are no longer

required to support mining activities. The final areas of waste rock dumps are projected to be available for rehabilitation in project Year 27.

Waste rock dumps are designed and placed to be geotechnically safe and stable during the mining operations, with the angle of repose slope ($\sim 37^\circ$) for dumped waste rock materials considered to be geotechnically stable. Where possible, waste rock dumps are constructed in 10-12m high benches. This approach minimises the need for major earthworks during rehabilitation, other than trimming by cutting/filling to other edges of each batter to the design slope/landform.

The methodology generally followed when rehabilitating waste rock dumps at the MCP will be as follows:

- Complete dumping of waste rock as per the final landform design.
- Shape and grade the final landform to a geotechnically stable slope, in accordance with the final slope completion and milestone criteria as per **Section 3.3** and **Section 3.4** and the landform designs outlined in **Section 5.2.4**.
- Rip surface material on the contour to <400mm depth.
- Establish drainage and erosion controls through ripping, profiling and/or construction of control structures.
- Apply topsoil to a minimum depth of 0.2 m.
- Scarify the surface immediately prior to any required seeding.
- Seed with an appropriate species mix (see PRCP Schedule Appendix 1)
- Control weeds and pest animals.
- Exclude livestock during establishment of groundcover.

During mining, in-situ waste rock will be blasted and extracted using excavators and dump trucks. This handling results in the waste rock 'swelling' in volume. Some subsequent compaction occurs during waste rock dumping due to heavy equipment (e.g. haul trucks, dozers); however, due to the height of the benches during waste rock dumping and the variable size and nature of the materials, the dumped material remains somewhat 'swollen'.

Waste rock dumps are typically subject to ongoing gradual settlement following dumping, with the rate of settlement at its greatest during the initial years following dumping while the material consolidates. As the waste rock dumps are placed in lifts (typically 10-12m high) and typically take a number of years to dump up to the designed dump limit, the majority of this settlement (particularly in the lower lifts) occurs while the dump is being placed rather than post-rehabilitation.

While the actual rate and extent of settlement of waste rock materials is difficult to predict, the final landforms at the MCP have been designed such that whole-of-dump settlement is unlikely to compromise the stability or suitability of the structure for the grazing pasture PMLU. Should any

areas of localised settlement occur, they will be identified during monitoring and addressed on a case-by case basis. Any identified settlement that interferes with drainage pathways will be addressed as a priority.

5.3.2. Rehabilitation Area 2 – Tailings Disposal Facility

RA2 consists of the out-of-pit TDF area, as well as the additional footprint required for placement and battering of the capping and buttressing material to the designed final landform. RA2 consists of a total of 17.35ha.

Further detail relating to the out-of-pit TDF can be found in the following sections of this PRC Plan:

- Background on the design, construction and operation of the TDF: **Section 5.2.3.3**
- Capping /cover requirements: **Section 5.2.5.2**
- Details of the designed final landform: **Section 5.2.4**

Rehabilitation of the MCP TDF will involve the following steps:

- A period of passive consolidation, drying and dewatering (the period depends on climatic factors, location within TDF cell (i.e. proportion of coarse/fines in particular location, depth of deposited material, etc;
- Application of capping layer to the surface of the TDF to a minimum depth of 2m at the outer crest and mounded towards the centre allowing for drainage.
- Placement of buttress material to achieve the design slope and final landform design;
- Establish drainage and erosion controls;
- Apply topsoil to a minimum depth of 0.2m;
- Scarify the surface immediately prior to seeding;
- Revegetation from seed mix consistent with Appendix 2 of the PRCP Schedule V1;
- Control weeds and pest animals;
- Exclude livestock during establishment of groundcover.

Monitoring of the rehabilitated TDF will be undertaken in accordance with **Section 7.1**. The TDF cells will also be subject to annual regulated structures inspections should they be found to be regulated structures as part of the Consequence Category Assessment (until such time as the structure is de-regulated).

5.3.3. Rehabilitation Area 3 – Surface Infrastructure

RA3 consists of all major surface infrastructure at the MCP with the exception of the TDF. RA3 covers a total area of 38.83 ha. All surface infrastructure at the MCP will be required for the LOM of the MCP. Elements of the surface infrastructure will be required to support the decommissioning and rehabilitation phase of the MCP (for example the administration offices, ablutions facilities, fuel

and chemical storages, workshops, etc.); therefore, these facilities will be removed towards the end of the rehabilitation phase.

The majority of surface infrastructure at the MCP will be constructed on engineered pads which have been constructed using subsoil/waste rock salvaged from within the footprint of disturbance areas at the MCP. Rehabilitation of the surface infrastructure at the MCP will involve the following general steps (as noted above some infrastructure will be required to support the rehabilitation activities, therefore the implementation of these steps will be staggered):

- Demolition of the following infrastructure to the engineered pad or natural ground level:
 - Built support infrastructure including the workshop, stores, administration facilities, ablutions blocks, STP and WTP, including slabs, footings and services.
 - Built processing infrastructure including the CHPP, ROM and product coal transfer conveyors, stackers and loading bins, etc. including slabs, footings and services.
 - The rail siding, including rails, sleepers, ballast and drainage structures (e.g. culverts).
- Undertake contaminated land assessment, as infrastructure areas represent the primary areas where contaminated material (hydrocarbons) could potentially accumulate. Significant contamination is considered unlikely due to the incident reporting and management procedures onsite, which require that hydrocarbon spills are contained, reported and remediated;
- Undertake removal of contaminated material/other actions as determined by the contaminated land assessment;
- Removal of constructed walls and backfilling of all water storage dams with the finished surface to be at the approximate natural ground level, with no ability to retain water;
- Scalp surficial coaliferous material from the ROM and product stockpile pads down to the engineered pad/subsoil level. All removed coaliferous material will be deposited in the in-pit or in the TDF;
- Remove surface sheeting (e.g. bitumen spray seal/gravel sheeting) from carparks, laydown areas and access roads (where not being retained);
- Undertake earthworks to achieve required grades for all disturbed areas/pads (including pad surfaces and any cut/fill batters) where required. Pads will typically remain at the design grade (<2%), while any batters will be levelled to a maximum of 10% (or as otherwise advised by an RPEQ). The engineered fill used at the MCP consists of salvaged or in-situ clay subsoils or waste rock, therefore no capping of this material is required;
- Rip surface material of all pads and other disturbed areas on the contour at a depth of 0.4m as required to provide a 'key' for topsoil placement.
- Install drainage / ESC structures through ripping, profiling and/or construction of control structures as required, as per **Section 5.2.7**. Minor operational drainage structures (e.g. upslope diversion banks, etc) may be retained.

- Apply topsoil to disturbed areas to a minimum depth of 0.2m, as per **Section 5.2.6**.
- Control weeds and pest animals.
- Exclude livestock during establishment of groundcover where required.

5.3.4. Rehabilitation Area 4 – Residual Void Lake

RA4 consists of only one feature, being the MCP Stage 1 Residual Void Lake. The milestone criteria applicable to the void lake refers to water quality monitoring, surface water runoff monitoring and groundwater quality and level monitoring to demonstrate that the residual void lake is not having an impact to the surrounding water environmental values outside of the impact approved by the Conditions of the EA and PRCP.

5.3.5. Exploration Areas

Exploration areas generally comprise an access track (cleared but not topsoil stripped), and a cleared drill pad (typically 20m by 30m) within which the drill hole, drill sump and run-off diversion drain are located, and, as such, do not represent a significant area of disturbance.

The MCP EA does not impose any conditions for exploration holes. Exploration activities within an operational mining environment do not align well with the designated structure of the PRCP Schedule, in particular the requirement for the Rehabilitation Areas to be spatially defined. The key issue is that exploration activities within an ML are undertaken progressively throughout the LOM to refine and upgrade the geological model and the defined coal resource, and to optimise the mine plan. Exploration is undertaken at locations and at timing which is informed by factors such as the prevailing/forecast coal price, outcomes of preceding exploration programs, and to investigate identified or suspected geological structural changes (e.g. to further define the presence of localised faulting or intrusions). As such, the physical location of the exploration activities for the LOM are not able to be spatially defined for the PRCP Schedule.

QCoal (as parent company of Monto Coal) has previously engaged with DETSI in relation to the transition of disturbance associated with exploration activities into the PRCP Schedules for its various coal mines. Condition PRCP12 of the PRCP Schedule (Appendix A) specifies the rehabilitation requirements for exploration activities that occur outside of a Rehabilitation Area which must be in accordance with the *Eligibility criteria and standard conditions for exploration and mineral development projects*.

5.3.6. Improvement Area 1

Improvement Area 1 was added through discussions with DETSI, surrounding the applicability of a PMLU for the high and low wall slopes. It was determined that the high and low walls would be considered a NUMA due to the incompatibility of the slope gradient with the proposed PMLUs.

The rehabilitation approach will consist of:

- RPEQ certification that the NUMA has been constructed to meet the design parameters of the PRCP Schedule;
- Installation of a competent safety bund and appropriate fencing and signage around the perimeter of the residual void;
- AQP certification that the NUMA has achieved a minimum groundcover of 50%;
- RPEQ certification that the continues to meet the design parameters, is not being adversely impacted by erosion and maintains safe access to facilitate the use of the residual void lake.

6. Risk Assessment

Section 126C(1)(f) of the EP Act requires the PRC Plan to include the identification of risks to achieving a stable (as defined in the EP Act) condition for land with a designated PMLU, and any proposed management or mitigations to address those identified risks.

In order to be considered stable (as defined by the EP Act), rehabilitation has to meet the following conditions:

- safe and structurally stable (i.e. geotechnical stability); and
- there is no environmental harm being caused by anything on or in the land; and
- the land can sustain a post-mining land use (i.e. self-sustain a specified use for the landform after rehabilitation).

The physical rehabilitation works undertaken on site are broken up into Rehabilitation Milestones, with associated milestone criteria. Accordingly, this PRC Plan, has undertaken the required risk assessment by identifying risks in completing the milestones, so as to better relate to actual on-site rehabilitation/improvement works.

The QCoal risk assessment matrix (as shown in **Figure 26**) has been utilised in conducting the required risk assessment.

		Risk Assessment Matrix				
		Consequences				
Loss Type		Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
People Injury or Illness		Slight injury or health effects – First aid / minor medical treatment level	Minor injury or health effects – restricted work or minor lost workday case	Major injury or health effects – major lost workday case / permanent disability	Permanent total disabilities, single fatality	Multiple fatalities
Damage and Consequential Losses		Easily addressed or rectified by immediate corrective action. No loss of production. No Damage to equipment	Minor or superficial damage to equipment and/or facility. No loss of production	Moderate damage to equipment and/or facility. Loss of production < one week	Major damage to facility requiring significant corrective / preventative action. Loss of production < six months	Future operations at site seriously affected. Urgent corrective / remedial action. Loss of production > six months
Reputation, Community Regulatory Compliance		Slight impact – public awareness may exist but no public concern. Slight impact – Traditional Owner awareness may exist but no Traditional owner concern	Limited impact – some local public concern. Limited impact – some Traditional Owner concern	Considerable impact – regional public concern. Considerable impact – Traditional Owner concern	National impact – National public concern. Major impact – Traditional Owner Elders involved	International impact – International public concern Major impact – Stop Work Direction from Traditional Owners
Environmental Impact		Environmental nuisance, no clean up, aesthetic impact only.	Minor clean up, no legal breach, minimal impact, minor non conformance	Major clean up, license breach, Business disruption at site level.	Local Ecosystem damage, Legal / Statutory breach	Regional Ecosystem damage, Major rehab failure, Mine closure
Financial / Commercial		<AUS \$10,000	AUS \$10,000 to \$100,000	AUS \$100,000 to \$1M	AUS \$1M to \$10M	>AUS \$10M

Likelihood		Risk Rating				
Almost Certain (A)	This event is expected to occur in most circumstances (once per month)	M (15)	H (10)	H (6)	E (2)	E (1)
Likely (B)	Will probably occur in most circumstances (once per year)	M (19)	M (14)	H (9)	E (4)	E (3)
Possible (C)	Might occur at some time (once per 10 years)	L (22)	M (18)	H (13)	H (8)	E (5)
Unlikely (D)	Could occur at some time (once per 100 years)	L (24)	L (21)	M (17)	H (12)	H (7)
Rare (E)	May occur only in exceptional circumstances (once per 1000 years)	L (25)	L (23)	M (20)	M (16)	H (11)

Figure 26 – QCoal Risk Assessment Matrix

6.1. Risk Treatment Options

Error! Reference source not found. details the risks to the completion of the Rehabilitation Milestones (and achievement of stable landforms with the approved PMLU) at the MCP, as well as the controls to be applied to manage, mitigate or reduce those impacts.

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Table 21– Risk Assessment

Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Trea tment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Conse quences	Likelihood	Risk Rating						Conse quences	Likelihood	Risk Rating
RM1: Infrastructure Removal (RA3)												
Delays in RAs becoming available (infrastructure only becomes available for removal at end of mine life)	RM not completed in the required timeframes, non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in MCP annual budget as required	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule.	MCP Mining Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					Inclusion of rehabilitation activities in MCP Mine Schedule/Forecast	Inclusion of rehabilitation activities in the schedule ensures that resources, personnel and equipment are available to undertake the required scope	MCP Mining Manager					
					PRCP progress meetings	Regular meeting to track progress against PRCP Schedule	MCP Mining Manager QCoal Environmental Personnel					
					PRCP Schedule amendment	A PRCP Schedule amendment would only be undertaken where the schedule for land becoming available has slipped and there is no reasonable possibility of recovery	QCoal Environmental Personnel					
Items of infrastructure not identified and removed	RM not completed in the required timeframes, non-compliance with PRCP Schedule	2	C	M	Decommissioning Plan (DMP) or equivalent to be in place	DMP will identify detailed scope of infrastructure removal works and sequence for removal	MCP Mining Manager			2	D	L
Inadequate management of waste materials	Incorrect disposal of waste material onsite during infrastructure removal (e.g disposal of fines from ROM pad, etc	2	C	M	Decommissioning Plan (DMP) or equivalent to be in place	DMP will identify detailed scope of infrastructure removal works, sequence for removal and waste management requirements	MCP Mining Manager			2	D	L
Previously unidentified contaminated land	Remediation work required, delay to completion of RM	2	C	M	Bulk fuel and chemical storages are located in discrete areas at the MCP	Bulk fuel and chemical storages will be located in fixed areas for the LOM (MIA) with designated adjacent refuelling areas	MCP Mining Manager			2	D	L
					LOM bulk fuel and chemical storages are designed in accordance with relevant Australian Standards	Storages are designed with containment systems in the event of spillages	MCP Mining Manager					
					Spill reporting processes and remedial actions during operations	Fuel and chemical spills are required to be contained, reported and cleaned up during operations. Records maintained in site incident reports	MCP Mining Manager					
					Stage 1 Contaminated Land Assessment to be undertaken	Contamination is most likely to occur on or adjacent to infrastructure (in particular fuel and chemical storages), refuelling areas, and park-up areas so these areas will be the primary focus	QCoal Environmental Personnel Contaminated Land Consultant					
					Specific remediation actions to be developed to address any identified contamination	Remediation actions will depend on extent, location and risk of identified contamination.	QCoal Environmental Personnel Contaminated Land Consultant					

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Trea tment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
PRCP Schedule non-conformance, non-achievement of Milestone	Milestone timeframes not achieved, potential non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in MCP Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule.	MCP Mining Manager			2	D	L
					Inclusion of rehabilitation activities in MCP Mine Schedule/Forecast	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule.	MCP Mining Manager					
					PRCP progress meetings	Regular meeting to track progress against MCP PRCP Schedule	MCP Mining Manager QCoal Environmental Personnel					
					PRCP Schedule Amendment	A PRCP Schedule amendment would only be undertaken where the schedule for land becoming available has slipped and there is no reasonable possibility of recovery	QCoal Environmental Personnel					
Decommissioning exploration drillholes												
Borehole backfilling/sealing non-compliant with relevant requirements	Potential for rehabilitated bores to require rework to meet relevant requirements.	2	C	M	Boreholes to be decommissioned by experienced personnel	Experienced personnel to undertake decommissioning with QA records to be retained	MCP Site Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan – Rehabilitation Planning Part	Monitoring and reporting as outlined in Section 7 of the PRC Plan – Rehabilitation Planning Part	2	D	L
RM2: Identification, Remediation and Removal of Contaminated Land												
Previously unidentified contaminated land	Remediation work required, delay to completion of RM	2	C	M	Bulk fuel and chemical storages are located in discrete areas at the MCP	Bulk fuel and chemical storages are located in fixed areas for the LOM (MIA) with designated adjacent refuelling areas	MCP Mining Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	C	L
					LOM bulk fuel and chemical storages are designed in accordance with relevant Australian Standards	Storages are designed with containment systems in the event of spillages	MCP Mining Manager					
					Spill reporting processes and remedial actions during operations	Fuel and oil spills are required to be contained, reported and cleaned up during operations. Records maintained in site incident reports	MCP Mining Manager					
					Stage 1 Contaminated Land Assessment to be undertaken	Contamination is most likely to occur on or adjacent to haul road and park-up areas so these areas will be the main priority	Contaminated Land Consultant					
					Specific actions to be developed to address identified contamination	Remediation actions will depend on extent, location and risk of identified contamination.	QCoal Environmental Personnel Contaminated Land Consultant					
RM3: Landform Development (reprofiling/reshaping)												

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
Delays in RAs becoming progressively available	RM not completed in the required timeframes, non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in MCP Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule.	MCP Mining Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					Inclusion of rehabilitation activities in MCP Mine Schedule/Forecast	Inclusion of rehabilitation activities in the schedule ensures that resources, personnel and equipment are available to undertake the required scope	MCP Mining Manager					
					PRCP progress meetings	Regular meeting to track progress against MCP PRCP Schedule	MCP Mining Manager QCoal Environmental Personnel					
					PRCP Schedule Amendment	A PRCP Schedule amendment would only be undertaken where the schedule for land becoming available has slipped and there is no reasonable possibility of recovery	QCoal Environmental Personnel					
Landform design does not conform to acceptance criteria	Designed landform does not meet RM criteria	3	C	H	Completion of QA check for landform design	QA check of the landform design against the landform design criteria	MCP Technical Services Personnel			3	E	L
Designed ESC/drainage structures are inadequately sized/configured	Failure of drainage structures, erosion of final landform, RM not achieved	2	C	H	Completion of QA check for landform design	QA check of the landform design against the landform criteria	MCP Technical Services Personnel			2	E	L
Constructed landform does not conform to design	Constructed landform does not meet RM criteria	3	C	H	Completion of QA check for landform design	QA check of the constructed landform against the landform criteria.	MCP Technical Services Personnel			3	E	L
					'As Constructed' Survey	The 'as constructed' survey of the completed landform is checked for compliance with the designed landform	MCP Technical Services Personnel					
PRCP Schedule non-conformance / non-achievement of Milestone	Earthworks not completed, RM not completed in the required timeframes, non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in MCP Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule.	MCP Mining Manager			2	D	L
					Inclusion of rehabilitation activities in MCP Mine Schedule/Forecast	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule.	MCP Mining Manager					
					PRCP progress meetings	Regular meeting to track progress against MCP PRCP Schedule	MCP Technical Services Personnel					
					PRCP Schedule Amendment	A PRCP Schedule amendment would only be undertaken where the schedule for land becoming available has slipped and there is no reasonable possibility of recovery	QCoal Environmental Personnel					
RM4: Installing cover system at RA2												

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Trea tment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
Inadequate dewatering of CDA material prior to placement of capping material	Inability to apply capping material using in the preferred method/with the preferred equipment	3	C	H	Decant structures to be maintained in operational condition	Decant structures (in conjunction with surface drying) will continue to function after deposition ceases to dewater the CDA sufficiently to enable capping	MCP Mining Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					CDA deposition methodology	Deposition methodology for final CDA lifts have ensured deposition of mixed CDA material to provide the firmest possible working surface	MCP Mining Manager					
					Capping to be undertaken by experienced personnel	Personnel experienced with capping/managing CDA materials will be utilised for the placement of the capping material	MCP Mining Manager					
Inadequate capping material depth placed	Inadequate capping material for rehabilitated landform to meet RM criteria, rework required	2	C	M	Waste rock from nearby MCP pit to be made available for capping as required	Adequate waste rock will be generated to meet the required LOM capping needs for rehabilitation of the CDA	Survey Personnel			2	D	L
					Spot-checks of capping material depth during placement	Survey/spot checks of applied capping material thickness within rehabilitation areas will be undertaken during spreading to ensure an adequate depth is respread.	QCoal Environmental Personnel MCP Survey Personnel					
PRCP Schedule non-conformance, non-achievement of Milestones	Milestone timeframes not achieved, potential non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in MCP Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule	MCP Mining Manager			2	D	L
					Inclusion of rehabilitation activities in MCP Mine Schedule/Forecast	Inclusion of rehabilitation activities in the schedule ensures that resources, personnel and equipment are available to undertake the required scope	MCP Mining Manager					
					MCP PRCP progress meetings	As required meetings to track progress against MCP PRCP Schedule	MCP Technical Services Personnel QCoal Environmental Personnel					
					PRCP Schedule Amendment	A PRCP Schedule amendment would only be undertaken where the schedule for land becoming available has slipped and there is no reasonable possibility of recovery	QCoal Environmental Personnel					
RM5: Surface Preparation (Topdressing, Contour Ripping, Soil Amelioration) and Revegetation												
Inadequate topsoil volumes available	Inadequate topsoil available for rehabilitated landform to meet RM criteria,	2	C	M	MCP topsoil inventory managed via register	Appropriate handling of topsoil during stripping will ensure that sufficient topsoil is available for rehabilitation as required.	MCP Survey Personnel	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					Implementation of additional topsoil management measures if <10% surplus identified at the MCP at any point	If a topsoil deficit is identified, additional measures such as cartage of surplus topsoil from a third party will be considered	QCoal Environmental Personnel					
Inadequate topsoil volumes placed	Inadequate topsoil for rehabilitated landform to meet RM criteria, rework required	2	C	M	MCP topsoil inventory managed via Register	Adequate topsoil is currently available at the MCP for rehabilitation of all disturbed areas. Managing existing resources will minimise the likelihood of a deficit in the future.	MCP Survey Personnel					2

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
					Spot-checks of depth during resspreading	Random spot checks of applied topsoil thickness within rehabilitation areas will be undertaken during spreading to ensure an adequate depth is respread.	QCoal Environmental Personnel MCP Survey Personnel					
					Survey of topsoil stockpiles post-spreading and confirmation of total volume removed is within 20% of calculated required volume	Topsoil stockpile surveys are used to calculate the topsoil volume removed, which together with the spreading area, can be used to calculate an average spreading depth. Allowing a 20% variance allows for the swelling of the topsoil during rehandling.	MCP Survey Personnel					
Topsoil quality non-conformance with milestone criteria	Topsoil quality compromises rehabilitation establishment, milestone criteria unable to be achieved	2	C	M	Pre-disturbance topsoil assessments	The topsoil assessments undertaken to date indicate the topsoil available at the MCP is suitable for use in rehabilitation.	-			2	D	L
					Scheduled topsoil assessments in rehabilitation areas	Future topsoil assessments are expected to confirm the pre-disturbance assessment findings	Rehabilitation Monitoring Consultant					
					Specific actions to be developed to address any identified topsoil issues	Remedial actions will depend on the location, extent and type of issue identified but may include amelioration, etc	QCoal Environmental Personnel Rehabilitation Monitoring Consultant					
Weed contamination from respread topsoil	Excessive growth of non-desired species within prepared areas	2	C	M	MCP topsoil management incorporates weed management requirements for topsoil stockpiles	Management of weed establishment on topsoil stockpile reduces likelihood of establishment following resspreading	QCoal Environmental Personnel Weed Control Contractor			2	D	L
Weed contamination -from vehicles / equipment	Excessive growth of non-desired species within prepared areas	2	C	M	Weed hygiene requirements to be followed for all plant and equipment	MCP weed hygiene requirements	QCoal Environmental Personnel Weed Control Contractor			2	D	L
PRCP Schedule non-conformance, non-achievement of Milestone	Milestone timeframes not achieved, potential non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in MCP Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule	MCP Mining Manager			2	D	L
					Inclusion of rehabilitation activities in MCP Mine Schedule/Forecast	Inclusion of rehabilitation activities in the schedule ensures that resources, personnel and equipment are available to undertake the required scope	MCP Mining Manager					
					MCP PRCP progress meetings	As required meetings to track progress against MCP PRCP Schedule	MCP Technical Services Personnel QCoal Environmental Personnel					
					PRCP Schedule Amendment	A PRCP Schedule amendment would only be undertaken where the schedule for land becoming available has slipped and there is no reasonable possibility of recovery	QCoal Environmental Personnel					
RM6: Achievement of Surface Requirements												

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
Seeding inadequate strike, species diversity, groundcover	Rehabilitation does not meet ground cover requirements, acceptance criteria unable to be achieved	2	C	M	Soil testing and visual inspections following topsoil spreading	Routine documented inspections will note any issues with ground cover establishment. Testing of soil quality to confirm if amelioration is required.	QCoal Environmental Personnel	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					Additional seeding to be undertaken before following wet season	Targeted seeding program to address areas not establishing adequate groundcover.	QCoal Environmental Personnel Seeding Contractor					
Poor establishment, die-off of first strike due to drought conditions	Rehabilitation does not meet ground cover requirements, acceptance criteria unable to be achieved	2	C	M	Soil testing and visual inspections following topsoil spreading	Routine documented inspections will note any issues with ground cover establishment. Testing of soil quality to confirm if amelioration is required.	QCoal Environmental Personnel			2	D	L
					Additional seeding to be undertaken before following wet season	Targeted seeding program to address areas not establishing adequate groundcover.	QCoal Environmental Personnel Seeding Contractor					
Settlement of landform impacting flow paths	Installed drainage not functioning to design leading to erosion of final landform, completion criteria unable to be achieved	2	C	M	Ad-hoc and 6-monthly visual inspections includes drainage structures	Routine documented inspections will note any issues with constructed flow paths	QCoal Environmental Personnel			2	D	L
					Noted issues to be included in MCP Environmental Actions Register	MCP Environmental Actions Register is to be utilised to track and close-out remedial actions in rehabilitated areas	QCoal Environmental Personnel Resources for remedial actions as required					
Failure of ESC structures due to lack of groundcover during establishment	Erosion of final landform, sedimentation of receiving waters, completion criteria unable to be achieved	2	C	M	Drainage/ESC to be designed for the no ground-cover scenario	Design for 'worst case' scenario, as ground cover establishes risk reduces	MCP Technical Services Personnel QCoal Environmental Personnel			2	D	L
					Ad-hoc and 6-monthly visual inspections includes drainage structures	Routine documented inspections will note any issues with constructed flow paths	QCoal Environmental Personnel					
					Noted issues to be included in MCP Environmental Actions Register	MCP Environmental Actions Register is to be utilised to track and close-out remedial actions in rehabilitated areas	QCoal Environmental Personnel Resources for remedial actions as required					
Surface water contamination from unexpected waste rock material geochemical issue	Run-off/seepage to surface waters exceeds water quality requirements, completion criteria unable to be achieved	3	D	M	Previous geochemical testing programs	Geochemical testing indicates that issues with run-off/seepage to surface water from waste rock dumps are unlikely	-			3	E	L
					Run-off sampling at nominated locations	Geochemical testing indicates that run-off/leachate issues from waste rock dumps are unlikely	QCoal Environmental Personnel					
					Specific actions to be developed to address identified geochemical issues	Remedial actions will depend on the location, extent and type of geochemical issue identified	QCoal Environmental Personnel Geochemical Consultants					
Groundwater contamination from unexpected waste rock geochemical issue	Run-off/seepage to groundwater exceeds water quality requirements,	3	D	M	Previous geochemical testing programs	Geochemical testing indicates that issues with leachate to groundwater from waste rock dumps are unlikely	-			3	E	L

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
	completion criteria unable to be achieved				Groundwater sampling at nominated locations	Ongoing groundwater monitoring program will identify trends that would indicate a geochemical issue	QCoal Environmental Personnel					
					Specific actions to be developed to address identified geochemical issues	Remedial actions will depend on the location, extent and type of geochemical issue identified	QCoal Environmental Personnel Geochemical Consultants					
Weeds - proportion/increase/species of concern	Acceptance criteria unable to be achieved	2	C	M	Ad-hoc and 6-monthly visual inspections includes weed establishment	Generally, weed establishment is most likely to occur following topsoil placement when there is minimal ground cover present. Some establishment is expected, however declared/controlled weeds and weeds that may impact growth of pasture grasses (e.g. dense areas of weeds) will be monitored	QCoal Environmental Personnel			2	D	L
					Annual rehabilitation monitoring to identify weeds species present and trends/issues and recommend actions	The presence and spread of weeds within rehabilitation areas will be noted during rehabilitation monitoring	Rehabilitation Monitoring Consultant					
					Noted actions to be included in MCP Environmental Actions Register	MCP Environmental Action Register is to be utilised to track and close-out remedial actions in rehabilitated areas	QCoal Environmental Personnel Resources for remedial actions as required					
					Weed control program to be implemented	Ongoing weed control program	Weed Control Contractor					
Fire in rehabilitation areas	Reduction of groundcover, acceptance criteria unable to be achieved	2	C	M	Maintenance of on-lease and off-lease firebreaks	Off-lease fire breaks are in place west by the adjacent landholders as a routine property management activity. On-lease, the rail corridor acts as a natural fire break.	Fire Break Maintenance Contractor			2	D	L
					Mine water carts available onsite 24/7 for firefighting if required	Mine water carts have a high water capacity and are equipped with cannons and spray bars to make them suitable for firefighting where required	-					
					Ad-hoc and 6-monthly visual monitoring of fire-impacted areas to ensure reestablishment of pasture species is occurring and determine if reseeding is required	Fire impacted areas would be expected to re-establish from residual seed in the topsoil. Monitoring will determine if any intervention is required						
Ground-disturbing pests - pigs, rabbits, etc.	Damage to rehabilitation/landform, RM criteria unable to be achieved	2	C	M	Ad-hoc and 6-monthly visual inspections include noting any pest species present	Pests are not expected to a major issue based on rehabilitation monitoring to date, and the active pest control programs implemented by the surrounding land holders	QCoal Environmental Personnel			2	D	L
					Annual rehabilitation monitoring to identify evidence of pest	The presence of pest species within rehabilitation areas will be noted during rehabilitation monitoring	Rehabilitation Monitoring Consultant					

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Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
				M	species present and trends/issues and recommend actions							
					Noted actions to be included in MCP Environmental Actions Register	MCP Environmental Actions Register is to be utilised to track and close-out remedial actions in rehabilitated areas	QCoal Environmental Personnel Resources for remedial actions as required					
					Pest control program to be implemented	A pest control program will be implemented if required	Pest Control Contractor					
Damage to rehabilitation from premature livestock grazing	Permanent reduction of ground cover, acceptance criteria unable to be achieved	2	C	M	Livestock to be excluded until <50% groundcover has been maintained for a minimum of 2 successive years, as measured by annual rehabilitation monitoring.	Sufficient time is required for pasture to become established and self-sustaining prior to the introduction of cattle onto rehabilitated areas.	-			2	E	L
PRCP Schedule non-conformance	Milestone timeframes not achieved, potential non-compliance with PRCP Schedule	3	C	H	Annual rehabilitation monitoring to quantify progressive establishment of grazing pasture against the Milestone Criteria	Monitoring will be used to track the progress of ground cover establishment, project where grazing pasture unlikely to meet the Milestone in the required timeframe and recommend remedial actions as required.	Rehabilitation Monitoring Consultant			2	D	L
RM7: Achievement of Post-Mining Land Use To A Stable Condition												
PRCP Schedule non-conformance, non-achievement of Milestone	Milestone timeframes not achieved, potential non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule	MCP Mining Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					Inclusion of rehabilitation activities in Mine Schedule/Forecast	Inclusion of rehabilitation activities in the schedule ensures that resources, personnel and equipment are available to undertake the required scope	MCP Mining Manager					
Non-compliance with void area and slope criteria	Milestone Criteria not achieved	3	C	H	Survey of completed residual void	The MCP mining pit will be developed in accordance with the slope criteria during LOM operations The maximum residual void areas form part of the design considerations during LOM planning for the MCP	MCP Technical Services Personnel QCoal Environmental Personnel					2
RM8: Achievement of Post-Mining Land use (Residual Void Lake)												

Monto Coal Project Progressive Rehabilitation and Closure Plan

Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
PRCP Schedule non-conformance, non-achievement of Milestone	Milestone timeframes not achieved, potential non-compliance with PRCP Schedule	3	C	H	Inclusion of rehabilitation activities in Annual Budget	All mining activity is driven by the budget and associated schedule, and rehabilitation activities are to be included in the budget to align with the PRCP Schedule	MCP Mining Manager	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
Residual void declining water quality.	Stored water may not be utilised for its intended use	2	C	M	Routine monitoring to detect changes in water quality parameters to determine declining quality trends	Routine documented monitoring will detect changes in water quality	Monitoring personnel	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	2	D	L
					Management of algae growth within the waterbody as required.	Where algal growth is identified in the residual void waterbody, treatment of the algae will prevent declines in water quality, and particularly spikes in pH levels.	QCoal Environmental Personnel Resources for any remedial actions					
Groundwater declining water quality	Short- or long-term impacts to groundwater quality	4	E	M	Routine monitoring to ensure water quality meets the livestock drinking guidelines and groundwater quality	Monitoring of water quality will allow for early detection where parameters are outside the expected range.	QCoal Environmental Personnel	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	4	E	M
RM9: Achievement of post-mining land use (Water Quality)												
Groundwater declining water quality	Short- or long-term impacts to groundwater quality	4	E	M	Routine monitoring to ensure water quality meets the livestock drinking guidelines and groundwater quality	Monitoring of water quality will allow for early detection where parameters are outside the expected range.	QCoal Environmental Personnel	Achievement of the PRCP Milestone Criteria as per Section 3 of the PRC Plan	Monitoring and reporting as outlined in Section 7 of the PRC Plan	4	E	M
Surface water quality and runoff criteria not able to be met	Short- or long-term impacts to surface water quality	4	E	M	Routine monitoring to ensure water quality meets the surface water quality and runoff quality limits.	Monitoring of water quality will allow for early detection where parameters are outside the expected range prompting investigation into cause.	QCoal Environmental Personnel	Achievement of the PRCP Milestone Criteria	Monitoring and reporting	4	E	M
MM1: Achievement of Final Landform Design												
Final Landform does not meet design parameters	Geotechnical stability impacts Erosional stability impact Personal or livestock safety due to overtopping Personal or livestock safety due to lack of safe access	5	E	H	- RPEQ Designed Landform - ITP process - Post construction survey and as constructed plans - RPEQ Design is modelled for 0.1% AEP event.	The final landform design process has been developed to ensure achievement of the management milestone criteria.	RPEQ QCoal Personnel	Achievement of the PRCP Milestone Criteria	Monitoring and reporting	2	E	L
MM2: Achievement of Safety Requirements												

Monto Coal Project Progressive Rehabilitation and Closure Plan

Risk	Impact	Untreated Risk			Selected Control/ Treatment	Control/Treatment Justification	Resources Required	Performance Measures	Reporting and Monitoring	Residual Risk		
		Consequences	Likelihood	Risk Rating						Consequences	Likelihood	Risk Rating
Safety requirements are not undertaken	Personal or livestock safety Bund failure Erosion due to lack of groundcover	2	E	L	- RPEQ Designed Landform - ITP process - Post construction survey and as constructed plans	The implementation of safety requirements has been considered to ensure achievement of the management milestone criteria.	RPEQ QCoal Personnel	Achievement of the PRCP Milestone Criteria	Monitoring and reporting	2	E	L
MM3: Achievement of Sufficient Improvement												
IA1 does not achieve 50% groundcover IA1 does not achieve RPEQ Certification	Erosional risk Bund failure Geotechnical impacts due to ingress of flood waters Personal or livestock safety due to lack of safe access	5	E	H	- RPEQ design landform - ITP process - Post construction surveys and as constructed design plans - Rehabilitation Monitoring program and after care and maintenance recommendations - Void and flood modelling assessments	The achievement of sufficient improvement has been considered to ensure achievement of the management milestone criteria.	RPEQ QCoal Personnel	Achievement of the PRCP Milestone Criteria	Monitoring and reporting	2	E	L

6.2. Rehabilitation Trials

6.2.1. Rehabilitation Methodology

The rehabilitation methods proposed to be undertaken on the MCP are standard for the mining industry and have been implemented at various other QCoal site and third-party sites across the state. As such, the established track record of the methodologies proposed negates the need for trials related to rehabilitation methodology (which themselves are limited in scale, time and location).

Further, rehabilitation monitoring at the MCP will commence one year after the completion of the first rehabilitation works and will be undertaken annually from that point (see **Section 7.1**). The rehabilitation monitoring program provides will provide data relating to actual completed rehabilitation during the LOM, including the effectiveness of the methodologies and the progression of rehabilitated areas towards meeting the completion criteria.

Where ongoing rehabilitation monitoring identifies potential improvements or adjustments to the rehabilitation methodology, those improvements or adjustments will be implemented as part of the continuous improvement of the rehabilitation methodology.

6.2.2. Grazing Trials

The PRCP Schedule Milestone Criteria do not refer specifically to grazing trials; however, grazing trials are intended to be undertaken within the MCP, where the size, orientation, access to water, and contiguity with existing grazing land are suited to the requirements for a grazing trial area.

The grazing trails are intended to provide evidence that the carrying capacity and other relevant milestone criteria are being achieved at representative site. Not all areas of rehabilitation (within the wider rehabilitation areas) are suited for grazing trials due to their size and their orientation/location, such that they could be readily incorporated into a grazing trial in isolation of the surrounding operational areas. If grazing trials were required to be undertaken for each individual subsection of the rehabilitation areas at the MCP, this would not be physically possible until the end of mine life, which would therefore delay the MCP Rehabilitation Areas from progressively achieving the Rehabilitation Milestones.

Grazing trials will involve controlled access for cattle to suitable nominated and defined areas of rehabilitation at the MCP to confirm the carrying capacity of the rehabilitated land over a suitable time period. Grazing trial sites will be selected in consideration of the following:

- Results of rehabilitation monitoring confirming that the milestone criteria are being achieved in the potential grazing trial site;
- Seasonal considerations;
- Proximity of potential grazing trial sites to operational mining activities;

- Contiguity of potential grazing trial sites with adjoining undisturbed grazing areas for ease of third-party agistment and to allow for livestock to safely access the trial area;
- Existing/required property improvements in potential grazing trial sites (e.g watering points, fencing, etc.);
- Incorporation of a range of final landform slopes with the potential grazing trial sites including waste rock dump crests, benches, and batters, and rehabilitated natural ground where possible.

7. Monitoring and Maintenance

Following completion of rehabilitation in an area, its progress towards achieving rehabilitation milestone criteria will be monitored. The ongoing monitoring activities will identify any maintenance that is required to be undertaken to enable the milestone criteria to be met, these maintenance actions will be scheduled and undertaken within set timeframes.

7.1. Monitoring

Monitoring will continue at the MCP until such time as the rehabilitation in an area is demonstrated to be stable by achieving the approved PRC Plan milestone criteria. Requirements, frequencies and methods of rehabilitation monitoring are detailed in the following subsections.

7.1.1. Rehabilitation Monitoring

7.1.1.1. Timing

Rehabilitation monitoring would be undertaken annually following the wet season, or at an alternate frequency based on recommendations from a AQP. Monitoring of progressive rehabilitation areas will only commence after a minimum of one wet season has passed following completion of rehabilitation works. This will allow monitoring to better assess the performance of the seedbank, rates of growth, areas of erosion, and other issues.

Soil assessments at both monitoring and reference sites (to allow comparison) will be undertaken approximately every five (3) years. Soils assessments may also be undertaken more frequently where required to achieve relevant rehabilitation milestone criteria.

7.1.1.2. Survey Intensity

A 1:15,000 monitoring scale (or approximately one (1) observation per nine (9) hectares) has been adopted, as this allows for a detailed assessment of the land (McKenzie *et al.* 2008). This may be scaled up or down, depending on the level of detail required as recommended by an AQP.

Rehabilitation areas are broken into discrete management units to facilitate data management and planning for rehabilitation monitoring. Management units are to be delineated based on the age of the rehabilitation, waste type, and rehabilitation methodology.

7.1.1.3. Selection of Suitable Reference Sites

Reference sites are used as a non-mine affected point of comparison to assess performance of the rehabilitated areas with regard to groundcover, carrying capacity (productivity), weed proportion, and species mix and composition.

Monitoring reference sites are chosen (as per PRCP Condition 10) to be appropriate analogues to the areas being monitored and on-the-ground assessments are required to select the most appropriate locations. The land use of the reference sites align with the intended PMLU of the

rehabilitation area(s) being monitored. The location of reference sites are determined during monitoring works but can be altered based on the dynamic nature of ephemeral landscapes that are, and have historically been, used for cattle grazing. The location of reference sites may also change based on landholder access restrictions and usage.

7.1.1.4. Parameters

7.1.1.4.1. Land Suitability and Vegetation

Vegetation assessments are to be conducted using 50 m transects to confirm land suitability has been achieved. Sites are to be chosen by the AQP undertaking the work and will be landform dependent. Any photographs taken during vegetation assessment are to follow the methodology found in the *Pasture photo standards* (DPIF, 2003). The following parameters are to be measured:

- Species present in for each transect to determine species composition and proportion of preferred/non-preferred species.
- Groundcover within 1 m square quadrats and is averaged to assess compliance with the groundcover completion criteria (see **Section 3.2**). This measurement also includes characterisation of the groundcover (e.g. vegetation, woody debris, rock, etc.).
- Stock carrying capacity as head/ha based on grass load.
- Vegetation structure.
- Species showing evidence of fruiting or flowering are to be noted.
- Prescribed weed species are to be noted.

Carrying capacity is calculated as per previous advice from the Queensland Department of Agriculture Fisheries and Forestry (NRA, 2015), as follows:

- One adult equivalent (450 kg beast) requires 2.2% of live body weight of dry biomass per day (3,650 kg per annum).
- A utilisation rate of 25% to 30% should be applied to prevent degradation.
- Therefore, one beast requires between 12,167 and 14,600 kg of dry biomass per annum.

The number of hectares required per beast is calculated by dividing the dry biomass required per annum by the measured mean pasture biomass (in kg/ha) of each management unit. To determine the carrying capacity, the number of hectares per beast is then converted to head/ha.

7.1.1.4.2. Soils

Where soil monitoring is undertaken, profiles are excavated to a depth of at least 1 m below the soil surface, with samples collected at intervals of 10 cm, except where an AQP recommends that sampling be undertaken to a different depth or at different intervals. Analysis is to be undertaken by a laboratory that is NATA-accredited for the parameters listed within the PRCP schedule and for parameters as recommended by the AQP.

The following information is also gathered in accordance with the methods and categories in the *Australian Soil and Land Survey Field Handbook* (NCST, 2009):

- Slope;
- Surface condition
- Depth of topsoil and other horizons;
- Soil colour per horizon (as per the Munsell Soil Colour Charts);
- Soil structure per horizon;
- Coarse fragment content at the soil surface and in each horizon;
- Root depth; and
- Presence of waterlogging features.
- Presence of free carbonate and other segregations.

7.1.1.4.3. Other

Other data collected during monitoring is as follows:

- Evidence of any slope failure or rock falls;
- Evidence of erosion as per the framework in Appendix 3 of the PRCP Schedule;
- Evidence of pest animals;
- Note any leachate observed originating from rehabilitated co-disposal facilities/waste rock dumps; and
- Where required - water quality monitoring to determine ongoing suitability of the water stored for livestock use.

7.1.1.5. Reporting

Following annual monitoring (or any other frequency as proposed by an AQP), a report is to be prepared providing a summary of data collected and an update on the progress towards meeting the relevant criteria. These reports are to be reviewed to assess the progression of rehabilitation establishment and to determine the readiness of the rehabilitated areas for certification. Monitoring reports will also be used to identify the need to amend or optimise rehabilitation practices, prior to future rehabilitation works.

7.1.2. Rehabilitation and Improvement Area Milestone Tracking

The progress of rehabilitation works will be tracked internally against the rehabilitation milestones and will be monitored to ensure the timeframes in the PRCP Schedule are achieved. Additionally, progressive reporting against Rehabilitation Milestones will be undertaken in each annual return, and three-yearly PRCP audits will be undertaken by a appropriately qualified third party and will

assess progress against the timeframes and Rehabilitation Milestones presented in the PRCP Schedule.

7.1.3. Surface and Groundwater Monitoring

Surface water monitoring will be undertaken at the locations and frequencies specified in the MCP EA and the PECP Schedule (including the residual void lake), and at any other suitable identified locations as identified by an AQP. This monitoring will include surface water monitoring associated with any releases of mine-affected water, as well as a Receiving Environment Monitoring Program (REMP).

Additionally, specific surface water and groundwater monitoring requirements are described in the PRCP Schedule and will be integrated into the EA monitoring regimes:

- Condition PRCP10;
- Rehabilitation milestones RM7, RM8 and RM9;
- Interim surface water quality limits – Appendix 5;
- Groundwater monitoring bores – Appendix 6; and
- Interim groundwater quality limits – Appendix 7.

Groundwater monitoring will be established as part of the site-specific assessments discussed in **Section 1.12.3**.

The intention of the surface and groundwater monitoring programs will be to identify long-term trends and to ultimately provide evidence that the MCP has been rehabilitated to a condition that does not have a significant impact on the downstream surface or groundwater values present at the MCP. The MCP EA requires this monitoring be undertaken through the life-of-mine which includes the period of rehabilitation establishment and is required to continue up to the point of surrender of the EA.

The monitoring programs will be designed to enable potential impacts to receiving waters to be assessed in consideration of:

- specific site-based factors,
- actual monitoring data from the life-of mine including the rehabilitated landform,
- trend analysis, and
- a broad-catchment overview with high local resolution.

The surface water monitoring program at the MCP will be undertaken in association with the release of mine affected water for the LOM. As detailed in **Section 1.11.1** flow in the receiving environment is highly ephemeral and the background water quality is highly variable. This creates the situation where the background water quality parameters will potentially exceed the relevant

receiving water trigger levels (as outlined in Table C1 in the MCP EA and Appendix 5 of the PRCP Schedule) during flow events. This is acknowledged in Table C1 of the EA which sets water quality limits based on measured upstream water quality. This is also a relevant consideration when assessing impacts from rehabilitated landforms.

The REMP monitoring required by the EA is to be undertaken by an aquatic ecologist (a relevant AQP) and will include analysis of surface water, sediment and aquatic ecology in the receiving environment throughout the LOM to determine potential impacts to the receiving environment and its values from site activities.

7.2. Maintenance

Maintenance requirements for completed rehabilitation areas are identified during ongoing rehabilitation monitoring, as well as during scheduled and ad-hoc inspections. Where issues are noted, they are assessed on a case-by-case basis to determine appropriate remedial actions.

Rehabilitation maintenance actions are to be recorded, where they are allocated to a responsible person, scheduled, and tracked through to completion. Where appropriate, the outcomes/learnings from rehabilitation issues which require maintenance will be used to inform future rehabilitation programs, for example where a standard practice can be modified to prevent recurrence.

Table 27 details examples of potential issues that may arise and possible remedial actions which would be considered should these occur.

Table 22– Potential Issues and Remedial Action

Issue	Remedial Action
Seedbank fails to germinate or groundcover dies following early establishment when using the seedbank present in topsoil.	Investigate topsoil quality. Considering supplementary seeding of future rehabilitation using this topsoil. Reseed rehabilitated areas as required.
Rapid die-off of groundcover.	Investigate cause, and reseed rehabilitation as required.
Groundcover species are failing to thrive.	Investigate soil quality, consider the suitability of applying fertilisers
Water stress – wilting foliage, heavy insect damage, die back.	Apply water to the rehabilitation area until signs of stress have been alleviated.
Water logging – stem rot, fungal infection	Ensure that drainage features are installed correctly. Where additional drainage is required, instate drainage features. Cease, or cut back, any watering regime being undertaken. Reassess the use of fertiliser (if it had been applied)
Extensive exotic weed cover	Assess the viability of undertaking additional weed management actions in order to ensure that the groundcover seedbank can undertake secondary succession.
No germination or die-off of direct seeding	Assess the seed being used and consider reseeding with a different stock. Assess soil quality and consider the requirement for fertilisation.
Erosion or Slippage in rehabilitation areas	Investigate for failures in drainage features and reinstate or add additional drainage as required. Repair in accordance with erosion types, for example, repair of rill erosion by ripping and re-contouring and repair gully erosion by filling and recontouring.

7.3. Weed Management

Weeds that pose the highest risk to sustaining cattle grazing productivity are those that limit stocking rate, are toxic to animals and/or may potentially outcompete pasture grasses. These include, but are not limited to Parthenium, Lantana, Chinee Apple, and Prickly Mimosa. As grazing pasture is the agreed post-mining land use, the control of these weeds should be prioritised.

Where weed control is required, a licenced and qualified professional undertakes herbicide treatment (including selection of appropriate herbicides and application) with a focus on priority weed species. Weed control is an ongoing process and will likely require repeated treatments.

Weed prevention is more effective and economical than weed treatment; therefore, efforts are made to prevent the spread of weeds into rehabilitation areas. These include:

- Limiting the area of soil disturbed at any one time to minimise exposure of bare ground.
- Using mulches and establish preferred groundcover as quickly as practicable.
- Avoiding importing or using soils where their origins and seedbanks are unknown.
- Avoiding re-using weed infested topsoils if possible.
- Ensuring that any seed mixes used for rehabilitation are weed free.
- Ensuring stockpiled topsoil material is weed-free prior to use.

Priority weed species will be identified and updated during the operation of the MCP.

7.4. Rehabilitation Completion

Rehabilitation will be considered functionally complete once the milestone criteria set out in **Section 3.4** have been achieved the associated performance verification works undertaken. Assessments and certifications that will be undertaken for the MCP RAs are outlined in Error! Reference source not found..

Table 23– Assessments and Certifications

Task	Description	Timing
Contaminated Land Assessment	Undertaking a contaminated land investigation in accordance with Environmental Protection Act 1994 Section 326BA.	Prior to rehabilitation of relevant areas where directed under section 326BA (e.g. haul roads, MIAs, Infrastructure areas, CHPPs etc.).
Geotechnical Assessment	Confirmation/Certification that the final landforms meet the design criteria and are therefore stable/geotechnically sound.	Confirmation: Upon completion of the final landform earthworks in a given area (i.e. RM1), a survey will be undertaken to confirm that the area has been shaped in accordance with the completion criteria (i.e. the slope criteria is achieved).
		Certification: As part of overall certification that a stable landform has been achieved, verification of the landform meeting the design criteria will be obtained from an RPEQ (i.e. RM4).
Geotechnical studies	Certification that the final landforms are stable/geotechnically sound, and there is a low risk of rock falls with serious environmental or safety consequences.	Following completion of all rehabilitation works with associated geotechnical or rock-fall related risks.
Surface and groundwater monitoring	Monitoring is to be undertaken to identify occurrence of any potential downstream impacts.	During rehabilitation works and following completion of works until rehabilitation is certified.
Soils Assessment	Monitoring of topsoil is to be undertaken in order to determine chemical, physical and biological properties remain appropriate for the proposed land use.	Every 3 years.
Final Rehabilitation Report	Report outlining compliance with conditions of the EA, achievement against completion criteria, the extent and success of the rehabilitation, ongoing environmental management and monitoring requirements, and residual risk.	Following completion of rehabilitation works, to be submitted in order to discharge Financial Assurance.
Compliance Statement	Details compliance with EA conditions and confirms the accuracy of the Final Rehabilitation Report.	To be submitted with the Final Rehabilitation Report.

Once completion criteria have been met to a satisfactory level and the performance verification has been completed, the final rehabilitation report will be provided to the administering authority. The final rehabilitation report outlines compliance with conditions of the MCP EA (the primary LOD) and the PRCP Schedule milestone criteria, the extent and success of the rehabilitation, any ongoing environmental management and monitoring requirements, as well as any residual risk. A compliance statement must also be provided with the final rehabilitation report, detailing compliance of the report against the various requirements of the EA and the PRCP Schedule, as well as the accuracy of the report itself.

Upon receipt of the final rehabilitation report, the administering authority can certify the rehabilitation and subsequently allow for the surrender of the site EA, at which time the PRCP Schedule will cease to have effect.

8. References

- ANZECC 2000. *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volume 1 The Guidelines*. Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra, October 2000.
- Carroll C. and Tucker A., 2000. *Effects of pasture cover on soil erosion and water quality on central Queensland coal mine rehabilitation*. Tropical Grasslands 34, 254-262.
- DME, 1995. *Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*. Queensland Department of Minerals and Energy, Brisbane, 1995.
- DNRM, 2013. *State Rural Leasehold Land Strategy: Guideline for determining Land condition* Version 3.0, Queensland Department of Natural Resources and Mines, Brisbane, 2013.
- DPIF, 2003. *Pasture photo standards*. Department of Primary Industry and Fisheries, Brisbane, 2003.
- DSITI & DNRM, 2015. *Guidelines for Agricultural Land Evaluation in Queensland, Second Edition*. Department of Science, Information Technology and Innovation and Department of Natural Resources and Mines, 2015.
- EHP, 2016. *Eligibility criteria and standard conditions for exploration and mineral development projects—Version 2*. Department of Environment and Heritage Protection, Brisbane, 2016.
- EHP, 2019. *Guideline Progressive Rehabilitation and Closure Plans*. Department of Environment
- McCollum, 2012. *Environmental Management Plan Monto Coal Project*. McCollum Environmental Management Services Pty Ltd, 2012.
- PPK, 2002. *Monto Coal Project Environmental Management Overview Strategy*. PPK Environment & Infrastructure, 2002.

Appendix A MCP PRC Plan – Draft Schedule

DRAFT PRCP schedule

Environmental Protection Act 1994

DRAFT PRCP schedule PRCP_EPML00418713_V1

This is the approved form for a PRCP schedule issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

PRCP schedule: PRCP_EPML00418713_V1

PRCP schedule holder(s)

Name(s)	Registered address
Monto Coal 2 Pty Ltd	Level 15, 40 Creek Street, Brisbane QLD 4000
H & J Enterprises (QLD) Pty Ltd	25 Hedge Avenue, Mermaid Beach QLD 4218
Sanrus Pty Ltd	1095 Waterworks Road, The Gap QLD 4061

Location details

Location(s)
ML80101 and ML80175

Take effect

In accordance with section 202B of the *Environmental Protection Act 1994* (EP Act), the PRCP schedule has effect on the day the environmental authority for carrying out relevant activities on land to which the schedule relates takes effect. Pursuant to section 202C of the EP Act, a PRCP schedule continues in force until the environmental authority for the relevant activities to which the PRCP schedule relates is cancelled or surrendered, even if the resource tenure expires or is cancelled and even if the relevant environmental authority is suspended under Chapter 5, part 11 or 11A of the EP Act.



Signature

25 July 2025

Date

Dr Alison Cummings
Department of the Environment, Tourism, Science
and Innovation
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Business Centre Coal
PO Box 3028, Emerald QLD 4720
(07) 4987 9320
CRMining@detsi.qld.gov.au



**Queensland
Government**

Obligations under the *Environmental Protection Act 1994*

Pursuant to section 202E of the EP Act, if there is an inconsistency between an environmental authority and a PRCP schedule, the environmental authority prevails to the extent of the inconsistency.

Pursuant to section 285 of the EP Act:

- the holder of a PRCP schedule must commission an audit of the schedule by a rehabilitation auditor for the following periods (each an audit period) —
 - (a) the 3-year period starting on the day the schedule takes effect
 - (b) each 3-year period starting on the day after the previous audit period ended.
- the holder must, within 4 months after the end of each audit period, give the administering authority -
 - (a) the rehabilitation auditor's report (an audit report) about the audit that complies with section 286 of the EP Act, and
 - (b) a declaration for the audit report that complies with section 285 of the EP Act.

In addition to the requirements found in the conditions of this PRCP schedule, the holder must also meet their obligations under the environmental authority, the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the EP Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443).

PRCP schedule

The PRCP schedule incorporates the following sections:

- Section A - Conditions of PRCP schedule
- Section B - Definitions
- Section C - Final site design and reference maps
- Section D - Post mining land uses
- Section E – Non-use management areas
- Section F - Appendices

Section A - Conditions of PRCP schedule

Pursuant to section 206A of the EP Act:

- it is a condition of this PRCP schedule that, in carrying out a relevant **activity** under the schedule, the holder must comply with a requirement stated in the environmental authority relevant to carrying out the **activity**.
- it is a condition of this PRCP schedule that the holder must comply with the following matters stated in the schedule -
 - (a) each rehabilitation milestone and management milestone; and
 - (b) when each rehabilitation milestone and management milestone is to be achieved.

General conditions

- PRCP1** Prior to any **significant disturbance** occurring within mining leases (ML) 80101 and ML80175, the holder must nominate in writing to the administering authority a commencement date for the mining activities in the format of a calendar year.
- PRCP2** Once a calendar year is nominated under condition **PRCP1**, that nominated year is to be read in place of XXXX in the PRCP schedule.
- PRCP3** For each rehabilitation area, the holder must achieve the rehabilitation milestone criteria (milestone reference):
- (a) For the cumulative area available specified in this schedule; and
 - (b) By the milestone completion date specified in this schedule.
- PRCP4** Where land becomes '**available for rehabilitation**' earlier than the date nominated in this schedule, the holder must:
- (a) Notify the administering authority in writing within **thirty (30) days**, or a longer timeframe as agreed with the administering authority of the land being assessed as becoming 'available for rehabilitation'. and
 - (b) Whether or not it considers that it would be reasonable and appropriate to apply to the administering authority to amend this schedule in a way that maximises the progressive rehabilitation of the land to a **stable condition**.
- Note:**
- (a) Reference to "earlier than the nominated date in the schedule" means a date that is greater than 1 year prior to the date nominated in the schedule.
 - (b) Assessment of land becoming available is undertaken on nominally an annual basis.
 - (c) Rehabilitation of land size must be practicable and economical.
 - (d) The dates by which milestones are to be completed is brought forward, to the extent it is reasonably practicable to do so, by the same amount of time as the commencement was brought forward.
- PRCP5** Where an area achieves a rehabilitation milestone, the holder must continue to achieve the milestone criteria for that rehabilitation milestone until:
- (a) The next rehabilitation milestone is achieved; or
 - (b) A progressive certification area has satisfied the provisions of section 318ZB(4) of the EP Act; or
 - (c) A surrender is approved.

PRCP6 Following the commencement of **significant disturbance**, the holder must maintain a risk register that identifies the risks to not achieving a **stable condition** for post-mining land uses, and how the risks are being managed or minimised. The risk register must be reviewed every **three (3) years**.

PRCP7 The holder must carry out monitoring of the rehabilitation activities in the rehabilitation areas in accordance with:

- (a) The monitoring and maintenance program described in the rehabilitation planning part relating to this PRCP schedule;
- (b) Any requirement under this PRCP schedule; and
- (c) As necessary to demonstrate achievement of each rehabilitation milestone or management milestone criteria.

Note: Where there is any inconsistency between this schedule and the rehabilitation planning part the schedule criteria prevail to the extent of the inconsistency.

PRCP8 The holder must make, and keep until the relevant milestone criteria has been met or progressive rehabilitation certification has been achieved, up to date records on:

- (a) Achievement and maintenance of achievement of each rehabilitation milestone criteria of this schedule;
- (b) Rehabilitation activities and the results of those activities (including but not limited to, actions taken, date, location, methods, data collected, Quality Assurance/Quality Control, photos, waste tracking and disposal records, **appropriately qualified person (AQP)** details and assumptions);
- (c) Maintenance of rehabilitation and the results of maintenance activities;
- (d) Monitoring of rehabilitation and the results of monitoring;
- (e) Details and results of rehabilitation trials;
- (f) Designs, drawings, specifications and any similar documents developed in accordance with good professional practice in relation to rehabilitation milestones or milestone criteria;
- (g) All documents in relation to the requirements of this schedule, including reports (e.g. site investigation report), statements (e.g. site suitability statement), certifications, assessments, investigations, inspections, audits or any similar documents developed in relation to rehabilitation milestones or milestone criteria; and
- (h) Details of community consultation in the community consultation register relating to rehabilitation and closure activities.

PRCP9 Records made under **PRCP8** must be provided to the administering authority in the specified format within **ten (10) business days** or an alternative timeframe agreed to by the administering authority of a written request.

PRCP10 The holder must prior to the date to be nominated under **PRCP1**, complete and submit to the administering authority the following:

- (a) Geochemical assessment to identify the **Contaminants** of Concern and leachate risks that influence the rehabilitation or management strategies and the capacity of the site to support revegetation.
- (b) Geotechnical assessment on the proposed PRCP landform to assess the mechanisms for achieving a **stable** landform with Factor of Safety (FOS) ≥ 1.5 .
- (c) Topsoil assessment to assess the quantity, quality, and topsoil's suitability to align with the final landform design.
- (d) Landform stability assessment and landform evolution modelling to inform the suitability of the landform design to minimise erosion.

- (e) Detail the location and number of selected rehabilitation reference sites, and justification for the suitability of each nominated reference site.
- (f) Baseline studies with raw data, and modelled surface water assessment to propose the locations of the monitoring points, and site-specific closure surface water release quality limits.
- (g) Baseline studies with raw data, and groundwater modelling and assessment to propose the locations of the monitoring bores, and site-specific closure groundwater quality limits and groundwater level thresholds.
- (h) Residual void water quality modelling undertaken to confirm the PMLU of livestock drinking water approved by this schedule.
- (i) Flood assessment to model the flood immunity to the residual voids, as required by this schedule.
- (j) Any amendments to the final site design as approved by this schedule, including identification of:
 - (i) The final area of the NUMA of IA1;
 - (ii) The area of the residual void lake of RA4;
 - (iii) The area between the void crest and the safety bund; and
 - (iv) Update **Figure 1- Final Site Design** and **Figure 2 – Reference Map** of the PRCP Schedule.

PRCP11 The holder must prior to the date to be nominated under **PRCP1**, and via application, seek to amend the PRCP schedule to include the outcomes of the pre-commencement reports required by condition **PRCP10**.

PRCP12

- (a) The administering authority and holders agree that PRCP conditions should, where possible, be based on site-specific data.
- (b) The administering authority and holders note that the milestone criteria in this PRCP, are not currently based on site-specific data.
- (c) The holder must, when seeking to amend the PRCP schedule as required in condition **PRCP11**, replace the milestone criteria, with site-specific data.
- (d) The administering authority must consider the site-specific data provided by the holders when deciding such amendment application.

PRCP13 Disturbance due to exploration and minor **ancillary activities** in areas not planned to be mined and not within a Rehabilitation Area in this Schedule must be rehabilitated in accordance with the provisions detailed in the '*Eligibility criteria and standard conditions for exploration and mineral development projects*' or its successor, with the exception that land must be rehabilitated to a **stable condition** and achieves the pre-disturbance land use as detailed in **Figure 1 – Final Site Design**.

END OF CONDITIONS

Section B – Definitions

Activity (EP Regulation)	includes that part, if any, of an activity relating to the following: (a) preparing a place for the activity before carrying out the activity; (b) rehabilitating a place after it has been used for carrying out the activity.
Ancillary activities	see section 19A of the <i>Environmental Protection Act 1994</i> .
Appropriately qualified person (AQP)	means a person who has professional qualifications, training, skills and experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.
Available for rehabilitation	see section 126D(5) of the <i>Environmental Protection Act 1994</i> .
Contaminants	can be a gas, liquid or solid; or an odour; or an organism (whether alive or dead), including a virus; or energy, including noise, heat, radioactivity and electromagnetic radiation; or a combination of contaminants.
Growth media	is defined as all soil and soil-like material that will support the final vegetation cover. This includes the topsoil and subsoil where these materials are applied independently. Where the topsoil is incorporated into the underlying subsoil/spoil, topsoil refers to the depth of incorporation and the remaining depth is regarded as subsoil. The total depth of growth media is nominally considered to be the effective plant root zone.
Gully	a gully is a channel excavated by water; more than 0.3m deep.
Registered Professional Engineer of Queensland (RPEQ)	means a person who is an RPEQ under the provisions of the <i>Professional Engineers Act 2002</i> and has demonstrated competency and relevant experience for the nominated subject matter.
Rill	a rill is a channel excavated by water; less than 0.3m deep.
Significant disturbance	means mechanical disturbance of the land surface or clearing of vegetation but does not include access tracks for land management, fire breaks or disturbance associated with environmental monitoring or exploration
Stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of environmental context, geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.
Stabilised	means one or both of the following conditions apply: no evidence of sediment movement; sides and/or floors of erosion form are revegetated (Australian Soil and Land Survey Field Handbook Fourth Edition).
Stable condition	see section 111A of the <i>Environmental Protection Act 1994</i> .

Suitably qualified and experienced person (SQP)	for performing a regulatory function under chapter 7, part 8 (Contaminated Land) of the EP Act or another function prescribed under a regulation, means a person who— (a) has qualifications and experience relevant to performing the function; and (b) if a regulation prescribes an organisation for this paragraph—is a member of the organisation.
Vegetative groundcover	means plants, plant litter, tree leaf litter, twigs and woody debris capable of protecting the soil surface from erosion.

Section C - Final site design and reference maps

Figure 1 – Final Site Design

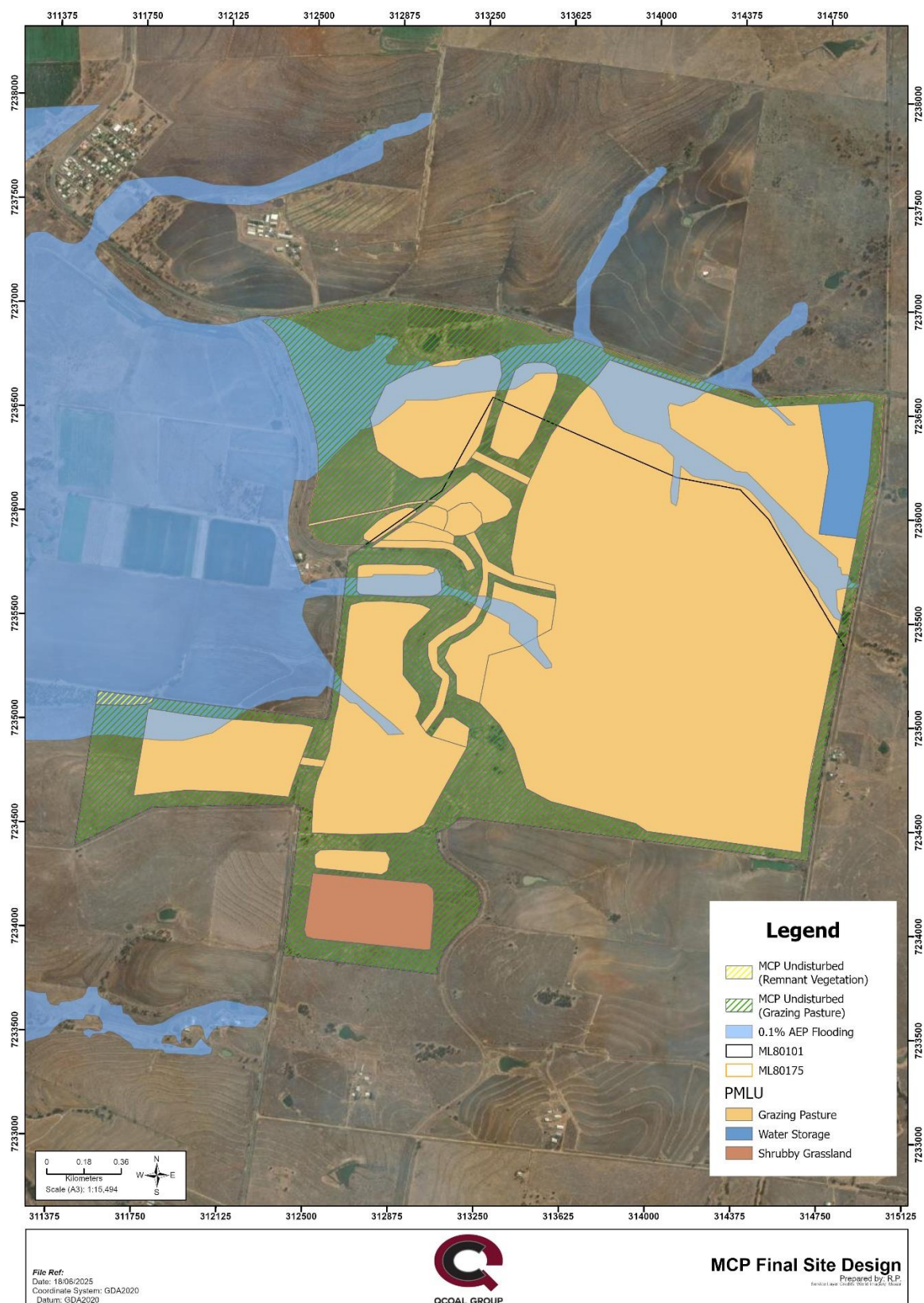
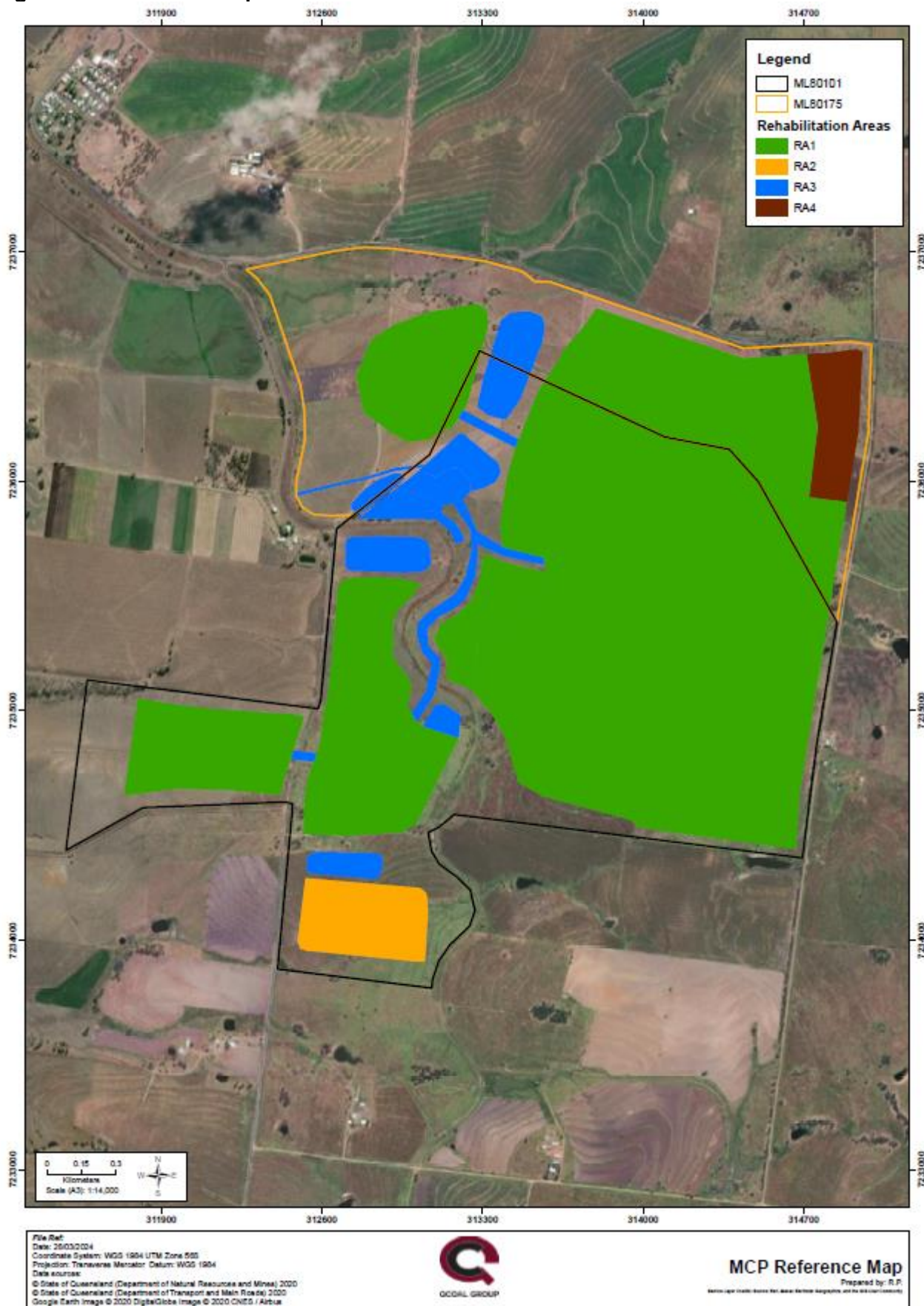


Figure 2 – Reference Map



Section D – Post mining land uses

Milestone reference	Rehabilitation milestone	Rehabilitation Area (RA)				Improvement Area (IA)
		RA1	RA2	RA3	RA4	IA1
RM1	Infrastructure decommissioning and removal					
RM2	Identification, remediation and removal of contaminated land					
RM3	Landform development (re-profiling / re shaping)					
RM4	Installing cover system at RA2					
RM5	Surface preparation (topdressing, contour ripping, soil amelioration) and revegetation					
RM6	Achievement of surface requirements					
RM7	Achievement of post-mining land use to a stable condition					
RM8	Achievement of post-mining land use (Residual Void Lake)					
RM9	Achievement of post-mining land use water quality					
MM1	Achievement of final landform design					
MM2	Achievement of safety requirements					
MM3	Achievement of sufficient improvement					

(RA1) Rehabilitation area 1

Post-mining land uses (PMLU)							
Rehabilitation area			RA1				
Relevant activities			Waste rock dump				
Total rehabilitation area size (ha)			387.14ha				
Commencement of first milestone: RM2			10/12/XXXX ¹ + 7 Years				
PMLU			Grazing				
Date area is available	10/12/XXXX + 7 Years	10/12/XXXX + 12 Years	10/12/XXXX + 17 Years	10/12/XXXX + 22 Years	10/12/XXXX + 27 Years	10/12/XXXX + 32 Years	
Cumulative area available (ha)	70	140	210	280	387.14	387.14	
Milestone completed by	10/12/XXXX + 12 Years	10/12/XXXX + 17 Years	10/12/XXXX + 22 Years	10/12/XXXX + 27 Years	10/12/XXXX + 32 Years	10/12/XXXX + 37 Years	10/12/XXXX + 47 Years
Milestone Reference	Cumulative area achieved (ha)						
RM2	70	140	210	280	387.14		
RM3	70	140	210	280	387.14		
RM5	70	140	210	280	387.14		
RM6		70	140	210	280	387.14	
RM7			70	140	210	387.14	
RM9							387.14

¹ XXXX is the year of commencement of the Project as per conditions PRCP1 to PRCP3 inclusive.

(RA2) Rehabilitation area 2

Post-mining land uses (PMLU)				
Rehabilitation area	RA2			
Relevant activities	Tailings disposal facility			
Total rehabilitation area size (ha)	17.35 ha			
Commencement of first milestone: RM2	10/12/XXXX + 20 Years			
PMLU	Shrubby grassland			
Date area is available	10/12/XXXX + 20 Years	10/12/XXXX + 30 Years	10/12/XXXX + 40 Years	
Cumulative area available (ha)	17.35	17.35	17.35	
Milestone completed by	10/12/XXXX + 30 Years	10/12/XXXX + 35 Years	10/12/XXXX + 45 Years	10/12/XXXX + 50 Years
Milestone Reference	Cumulative area achieved (ha)			
RM2	17.35			
RM3	17.35			
RM4	17.35			
RM5		17.35		
RM6			17.35	
RM7			17.35	
RM9				17.35

(RA3) Rehabilitation area 3

Post-mining land uses (PMLU)				
Rehabilitation area	RA3			
Relevant activities	Surface infrastructure			
Total rehabilitation area size (ha)	38.83 ha			
Commencement of first milestone: RM1	10/12/XXXX + 22 Years			
PMLU	Grazing			
Date area is available	10/12/XXXX + 22	10/12/XXXX + 27 Years	10/12/XXXX + 32 Years	
Cumulative area available (ha)	38.83	38.83	38.83	
Milestone completed by	10/12/XXXX + 27 Years	10/12/XXXX + 32 Years	10/12/XXXX + 37 Years	10/12/XXXX + 47 Years
Milestone Reference	Cumulative area achieved (ha)			
RM1	38.83			
RM2	38.83			
RM3	38.83			
RM5		38.83		
RM6		19	38.83	
RM7			38.83	
RM9				38.83

(RA4) Rehabilitation area 4

Post-mining land uses (PMLU)		
Rehabilitation area	RA4	
Relevant activities	Residual void lake	
Total rehabilitation area size (ha)	12.46 ha	
Commencement of first milestone: RM8	10/12/XXXX + 33 Years	
PMLU	Livestock drinking water	
Date area is available	10/12/XXXX + 33 Years	
Cumulative area available (ha)	12.46	
Milestone completed by	10/12/XXXX + 37 Years	10/12/XXXX + 47 Years
Milestone Reference	Cumulative area achieved (ha)	
RM8	12.46	
RM9		12.46

Rehabilitation area milestones

Milestone reference	Rehabilitation milestone	Milestone Criteria
RM1	Infrastructure decommissioning and removal	1.1 With the exception of any infrastructure to remain as part of the post-mining land use (PMLU) or where infrastructure is agreed to be retained by the landholder as evidenced by a signed landholder agreement, the following are complete: (a) All services disconnected and removed; (b) All concrete, bitumen and gravel roads removed; (c) All operational pipelines drained and removed; (d) All fencing that is not part of PMLU requirements removed; (e) All buildings demolished and/or removed off-site; (f) All machinery and equipment removed; (g) All surface water drainage infrastructure removed; and (h) All waste removed.
RM2	Identification, remediation and removal of contaminated land	2.1 Contaminated Land Investigation Document completed in accordance with the <i>Environmental Protection Act 1994</i> section 326BA, including a site investigation report, and, where required, a Validation Report and/or a draft Site Management Plan. 2.2 Contaminated water and contaminated sediment removed from dams. 2.3 Contaminated and hazardous material either remediated in-situ or removed/transported to facility lawfully able to accept the material. 2.4 A declaration from a SQP that no contamination remains.
RM3	Landform development (re-profiling / re shaping)	For RA1, RA2 and RA3 3.1 Final landform design has been completed and certified by an AQP. 3.2 Geotechnical assessment undertaken by an AQP prior to construction confirms that the landform design will achieve long-term stability, with a Factor of safety (FOS) ≥ 1.5. 3.3 All major earthworks completed to achieve final landform design. For RA1 and RA2: 3.4 Batter slopes reshaped to maximum slopes of <20%, or lower as recommended by an AQP, when measured from toe of the slope to the crest of the slope. 3.5 The maximum vertical height of the batter slopes must be as per the AQP design. For RA2:

		3.6 Free-draining top surface graded to slopes as per the AQP design.
		3.7 Fencing to exclude livestock installed.
		For RA3:
		3.8 Landforms within the surface infrastructure RA3, with the exception of the batter slopes of sediment dams and water management infrastructure are reshaped to a maximum slope of ≤10%.
		3.9 All sediment dams and water management infrastructure, with the exception of those to be retained by landholder agreement, are dewatered, desilted, and reshaped to a maximum slope of <20%.
RM4	Installing cover system at RA2	4.1 Detailed cover system design completed by an AQP .
		4.2 The cover system has been installed as per design.
		4.3 Capping layer surface has slopes 0.5-1% to facilitate water shedding and minimise surface ponding.
		4.4 The minimum depth from the final landform surface to compacted potentially acid forming (PAF) material is 2m.
		4.5 RPEQ certifies the cover system geotechnically stable and has achieved a FoS≥1.5.
RM5	Surface preparation (topdressing, contour ripping, soil amelioration) and revegetation	For RA1, RA2 and RA3:
		5.1 Assessment of growth media characteristics and the development of an amelioration and physical treatment plan is completed by an AQP every 3 years.
		5.2 Ameliorant and physical treatments such as fertiliser, lime, gypsum and/or organic matter are applied as identified in RM5.1.
		5.3 Following amelioration as per RM5.1 and RM5.2 , representative soil testing of growth media confirms:
		(a) Plant available water capacity at effective root depth of 0.6m >75mm;
		(b) pH of between 5.0 – 8.5;
		(c) Rootzone EC (mS/cm) <900;
		(d) ESP of <6%; and
		(e) Bicarbonate P >5ppm.
		5.4 Topsoil placed at ≥200mm thickness in areas where topsoil has previously been removed
		5.5 Ripping undertaken across contour to <400mm depth.
		5.6 Where recommended by an AQP , erosion controls are in place.
		For RA1 and RA3:

		5.7 Topsoiled landforms seeded using a selection of the recommended species seed mix and at the minimum seeding rate as described in Appendix 1- Species and sowing rates for grazing PMLU. 5.8 The seed mix should include a minimum of 3, 3P species, and a nitrogen fixing legume. For RA2: 5.9 Topsoiled landforms seeded using a selection of the recommended species seed mix and at the minimum seeding rate as described in Appendix 2- Species and sowing rates for shrubby grassland PMLU.
RM6	Achievement of surface requirements	For RA1, RA2, and RA3: 6.1 $\geq 50\%$ of established and persistent vegetative groundcover 6.2 No prohibited invasive plants present, and proportion of weed cover (excluding exotic pasture grasses) is $< 10\%$ of total vegetative groundcover. 6.3 No evidence of erosion classified as 'moderate' or 'severe' as defined by Appendix 3 - Erosion classification framework is present. 6.4 Where the AQP determines erosion will not stabilise, intervention measures and corrective actions must be undertaken to ensure RM6.3 is met. For RA1 and RA3: 6.5 Proportion of legumes preferred and intermediate species is $> 60\%$ of vegetative groundcover. For RA2: 6.6 Total percentage of ground cover (i.e. ground cover foliage, woody debris, organic litter and rock) is $\geq 70\%$. 6.7 Assessment of RA2 landform by an AQP confirms landform continues to conform with cover and technical design.
RM7	Achievement of post-mining land use to a stable condition	For RA1, RA2, and RA3: 7.1 Mean $> 70\%$ of established and persistent vegetative groundcover. 7.2 No prohibited invasive plants present, and weed cover is $\leq 10\%$ (excluding exotic pasture grasses). 7.3 No evidence of erosion classified as 'moderate' or 'severe' as defined by Appendix 3 - Erosion classification framework is present. 7.4 AQP certifies that the erosion present is stabilised and will not compromise the achievement of a PMLU to a stable condition. 7.6 Surface run-off leaving rehabilitation to the receiving environment is non-polluting and meets the contaminant limits below: (a) pH 6.5-9.0;

		(b) EC 800µS/cm or background +10%, whichever is greater; and (c) Turbidity 50NTU or background +10%, whichever is greater. 7.7 Surface run-off which remains on the rehabilitated landform must meet livestock drinking water defined in ANZECC & ARMCANZ 2000.
		For RA1 and RA3: 7.8 Land suitability assessment undertaken by an AQP confirms that land has achieved a land suitability class 3 or better as defined in the 'Guidelines for Agricultural Land Evaluation in Queensland' (State Department of Queensland, 2015) for low intensity grazing.
		For RA2: 7.9 Vegetation species are consistent with Appendix 2 - Species and sowing rates for shrubby grassland PMLU and include a mixture of native shrubs and grasses. 7.10 No deep-rooted species present. 7.11 Monitoring of the cover system and encapsulated material confirms that the cover system is working in accordance with the AQP design.
RM8	Achievement of post-mining land use (Residual Void Lake)	8.1 An AQP certifies that the water quality within the residual void lake must have EC ≤5970µS/cm and all water quality parameters are below the trigger values for livestock drinking water defined in ANZECC & ARMCANZ 2000 for a minimum of 5 years. 8.2 Groundwater level monitoring confirms that the residual void drawdown extent aligns with the groundwater model predictions. 8.3 The modelling of long term water quality of the residual void continues to meet livestock drinking water.
RM9	Achievement of post-mining land use water quality	9.1 Surface water quality results monitored monthly during flow at, but not limited to, downstream locations specific in Appendix 4 – Surface water monitoring locations, must not exceed the limits in Appendix 5 – Surface water quality limits, for a minimum of five (5) consecutive years. 9.2 If the surface water quality exceeds criteria in RM9.1, the applicable upstream site must be compared to the downstream site result; and quality result measured at a downstream site must be equal to or less than the quality result measured at the applicable upstream site.

		9.3 Where the surface water quality at the downstream site exceeds the upstream site result, an AQP must complete an assessment of the cause and risk of the rehabilitation not achieving a stable condition within the schedule timeframe and: (a) Where the likelihood of the rehabilitation not achieving a stable condition is low, then no further action is to be taken; or (b) Where the likelihood of greater than low to achieving a stable condition then an assessment of potential environmental harm by the AQP and their recommended rectification actions to rehabilitation activities must be determined and implemented. 9.4 The assessment/s under RM9.3 must be completed and provided to the administering authority by 1 November each year. 9.5 The five (5) year timeframe under RM9.1 is reset by a single occurrence of RM9.3(b). 9.6 For a minimum of five (5) consecutive years groundwater quality must be monitored quarterly at, but not limited to, bores specified in Appendix 6 – Groundwater monitoring bores, for all quality characteristics listed in Appendix 7 – Groundwater quality limits. 9.7 Groundwater quality results must not exceed the limits in Appendix 7 – Groundwater quality limits, for three (3) consecutive results.
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Section E – Non-use management areas**(IA1) Improvement area 1**

Non-use management area (NUMA)		
Improvement area	IA1	
Relevant activities	Pit walls (High wall and low wall of the final void above the maximum predicted water level at equilibrium), and set back area between crest of the highwall and low wall to the toe of the safety bund	
Total size (ha)	XX*	
Commencement of first milestone: MM1	10/12/XXXX* + 20 Years	
NUMA	Non-Use Management Area	
Date area is available	10/12/XXXX + 20 Years*	
Cumulative area available (ha)	XX*	
Milestone completed by	10/12/XXXX + 27 Years*	10/12/XXXX + 47 Years*
Milestone Reference	Cumulative area achieved (ha)	
MM1	XX*	
MM2	XX*	
MM3		XX*

*To be updated based on PRCP10.

Improvement area milestones

Milestone reference	Management milestone	Milestone criteria
MM1	Achievement of final landform design	1.1 An RPEQ certifies the NUMA landform is constructed to the following design parameters: (a) High wall is competent rock battered to a maximum slope of 123.49%. (b) Low wall is battered to a maximum slope of 75.36%. (c) Drainage and erosion controls established. (d) Highwall and low wall achieves a FoS ≥ 1.5 within the NUMA extent. (e) The residual void is not subjected to floodwaters up to and including the 0.1% AEP. (f) Predictive modelling confirms that there is no risk of over topping. (g) Safe access is incorporated to facilitate potential use of void water.
MM2	Achievement of safety requirements	2.1 Competent safety bund or equivalent landform in place to prevent access to the residual void, at the geotechnical set-back distance of a minimum of 15m. 2.2 Safety bund constructed around highwall, and low wall meets the following dimensions and requirements: (a) Height $\geq 2\text{m}$; and (b) Base width $\geq 4\text{m}$ wide. 2.3 Appropriate seed mix as per Appendix 2- Species and sowing rates for shrubby grassland PMLU applied to the setback area between the crest of the high wall and low wall and the safety bund. 2.4 Strand barbed wire fencing erected around the perimeter of the safety bund. 2.5 Warning signage to deter public access and warn of void related risks are designed in accordance with the Australian Standard AS1319-1994 and are erected as 100m intervals along the fence.
MM3	Achievement of sufficient improvement	3.1 AQP certification that the area between the crest of the high wall and low wall and the safety bund, has a minimum 50% vegetation cover. 3.2 Certification from an RPEQ that the final NUMA landform complies with items (a) to (e) below: (a) The final landform has been designed by an RPEQ and constructed in accordance with those final design specifications. (b) Appropriate safety infrastructure at the geotechnical set-back distance and fencing has been installed to prevent stock access to the NUMA. (c) Predictive hydrological modelling re-run at end of mine life and calibrated against the final landform, demonstrates that the residual void will retain flood immunity in a 0.1% AEP event. (d) Erosion occurring within the NUMA landform will not adversely impact the stability of adjacent rehabilitation areas. (e) Safe access is incorporated to facilitate potential use of void water.

Section F – Appendices

Appendix 1- Species and sowing rates for grazing PMLU

Scientific name	Common name	Indicative Sowing rate (kg/ha)
Preferred grazing species		
<i>Heteropogon contortus</i>	Black Speargrass	As recommended by an AQP
<i>Bothriochloa bladhii</i>	Forest Bluegrass (Burnett Bluegrass)	
<i>Dichanthium sericeum</i>	Queensland bluegrass	
<i>Capillipedium spicigerum</i>	Scented tops	
<i>Panicum effusum</i>	Hairy panic	
<i>Megathyrsus maximus</i>	Green panic	
<i>Rhynchosia minima</i>	Rhynchosia	
<i>Ancistrachne uncinulata</i>	Hooky grass	
<i>Urochloa foliosa</i>	Leafy panic	
Intermediate grazing species		
<i>Austrostipa verticillata</i>	Bamboo speargrass	As recommended by an AQP
<i>Cyperus alternifolius</i>	Umbrella grass	
<i>Sporobolus creber</i>	Slender rat’s tail grass	
Legumes		
<i>Rhynchosia sp.</i>	Rhynchosia	As recommended by an AQP
<i>Grona triflora</i>	Creeping tick trefoil	
<i>Glycine tomentella</i>	Woolly glycine	
<i>Glycine tabacina</i>	Glycine pea	
Trees		
<i>Eucalyptus tereticornis</i>	Queensland blue gum	As recommended by an AQP
<i>Eucalyptus melanophloia</i>	Silver-leaved ironbark	
<i>Eucalyptus populnea</i>	Poplar box	
<i>Casuarina cristata</i>	Belah	
<i>Acacia harpophylla</i>	Brigalow	
Minimum total sowing rate		As recommended by an AQP

Appendix 2- Species and sowing rates for shrubby grassland PMLU

Scientific name	Common name	Indicative Seeding rate (kg/ha)
Shrubs		
<i>Eremophila mitchellii</i>	False Sandalwood	As recommended by an AQP
<i>Geijera parviflora</i>	Wilga	
<i>Alectryon oleifolius</i>	Boonaree	
<i>Atalaya hemiglauca</i>	Whitewood	
<i>Psydrax oleifolia</i>	Bush myrtle	
<i>Capparis mitchelli</i>	Wild orange	
<i>Denhamia cunninghamii</i>	Yellowberry bush	
<i>Dodonaea viscosa</i>	Hop bush	
<i>Grevillea striata</i>	Silver honeysuckle	
<i>Citrus glauca</i>	Desert Lime	
Ground layer		
<i>Paspalidium criniforme</i>	Fine panic	As recommended by an AQP
<i>Dichanthium sericeum</i>	Silky blue grass	
<i>Themeda triandra</i>	Kangaroo grass	
<i>Eragrostis spartinoides</i>	Love grass	
<i>Aristida leptopoda</i>	White speargrass	
<i>Bothriochloa decipiens</i>	Red grass	
<i>Enteropogon acicularis</i>	Curly windmill grass	
<i>Aristida jerichoensis</i>	Jericho wire grass	
<i>Chloris divaricata</i>	Slender Chloris	
<i>Heteropogon contortus</i>	Black Speargrass	
<i>Bothriochloa bladhii</i>	Forest Bluegrass (Burnett Bluegrass)	
<i>Dichanthium sericeum</i>	Queensland bluegrass	
<i>Capillipedium spicigerum</i>	Scented tops	
<i>Panicum effusum</i>	Hairy panic	
<i>Megathyrsus maximus</i>	Green panic	
<i>Rhynchosia minima</i>	Rhynchosia	
<i>Ancistrachne uncinulata</i>	Hooky grass	
<i>Urochloa foliosa</i>	Leafy panic	
Minimum total sowing rate		As recommended by an AQP

Appendix 3 - Erosion classification framework

Erosion classification ¹	Minor	Moderate	Severe
Sheet erosion	Indicators may include shallow soil deposits in downslope sediment traps (fence lines, farm dams). Often very difficult to assess as evidence may be lost with cultivation, pedoturbation or revegetation.	Indicators may include partial exposure of roots, moderate soil deposits in downslope sediment traps (fence lines, farm dams).	Indicators may include loss of surface horizons, exposure of subsoil horizons, pedestalling, root exposure, substantial soil deposits in downslope sediment traps (fence lines, farm dams).
Rill erosion	<0.3m deep <15 rills/transect ²	<0.3m deep 15-30 rills/transect ²	<0.3m deep >30 rills/transect ²
Gully erosion	Absent	>0.3m deep Gullies are linear, continuous and restricted to primary and minor drainage lines.	>0.3m deep Gullies are continuous or discontinuous and either tend to branch away from primary drainage lines and on to foot slopes, or have multiple branches within primary drainage lines.
Tunnel erosion	Absent	Absent	Present
Mass movement	Absent	Absent	Present

¹Source: NCST (2009) *Australian Soil and Land Survey Field Handbook, 3rd edition*. The National Committee on Soil and Terrain. CSIRO Publishing, Collingwood, Australia.

²Transect 100m across the contour (Source: Tongway, D. J. and Hindley, N. L. 2005. *Landscape Function Analysis: Procedures for Monitoring and Assessing Landscapes*. CSIRO Publishing, Canberra, Australia).

Appendix 4 - Surface water monitoring locations¹

Monitoring Locations	Receiving waters location description	Latitude (decimal degree, GDA2020)	Longitude (decimal degree, GDA2020)
<i>Upstream monitoring locations</i>			
USMP1			
USMP2			
<i>Downstream monitoring locations</i>			
DSMP1			
DSMP2			
DSMP3			
DSMP4			

¹table to be completed as per requirements of PRCP10.

Appendix 5 – Interim Surface water quality limits

Quality characteristic (units)	Unit	Limit	Comment on limit
pH (lab)	pH unit	7.1-8.2	20 th and 80 th percentile of Three Moon Creek monitoring data ¹
Electrical Conductivity (lab)	µS/cm	900	80 th percentile of Three Moon Creek monitoring data from 2010-2025 ¹
Turbidity (lab)	NTU	25	Burnett catchment draft WQO ²
Sulphate (lab)	mg/L	5	Burnett catchment draft WQO ²
Major ions: Calcium, chloride, potassium, magnesium, sodium, bicarbonate, carbonate	mg/L	For interpretation purposes only	
Aluminium - dissolved (pH>6.5)	µg/L	55	ANZG 2018 for moderately disturbed system (95% protection)
Antimony - dissolved	µg/L	9	ANZG 2018 for moderately disturbed system (95% protection)
Arsenic - dissolved	µg/L	13	ANZG 2018 for moderately disturbed system (95% protection)
Barium - dissolved	µg/L	2000	Australian Drinking Water Guidelines
Boron - dissolved	µg/L	940	ANZG 2018 for moderately disturbed system (95% protection)
Cadmium - dissolved	µg/L	0.2	ANZG 2018 for moderately disturbed system (95% protection)
Cobalt - dissolved	µg/L	1.4	ANZG 2018 for moderately disturbed system (95% protection)
Chromium - dissolved (CrVI)	µg/L	1	ANZG 2018 for moderately disturbed system (95% protection)
Copper - dissolved	µg/L	1.4	ANZG 2018 for moderately disturbed system (95% protection)
Iron - dissolved	µg/L	300	Australian Drinking Water Guidelines
Manganese - dissolved	µg/L	1,900	ANZG 2018 for moderately disturbed system (95% protection)
Mercury - dissolved (inorganic)	µg/L	0.06	ANZG 2018 for moderately disturbed system (99% protection)
Molybdenum - dissolved	µg/L	34	ANZG 2018 for moderately disturbed system (95% protection)
Nickel - dissolved	µg/L	11	ANZG 2018 for moderately disturbed system (95% protection)
Nitrate	µg/L	2400	<u>Updating nitrate toxicity effects on freshwater aquatic species Ministry for the Environment</u>
Selenium - total	µg/L	5	ANZG 2018 for moderately disturbed system (99% protection)
Uranium - dissolved	µg/L	0.5	ANZG 2018 for moderately disturbed system (95% protection)
Vanadium - dissolved	µg/L	6	ANZG 2018 for moderately disturbed system (95% protection)

Quality characteristic (units)	Unit	Limit	Comment on limit
Zinc - dissolved	µg/L	8	ANZG 2018 for moderately disturbed system (95% protection)
Total recoverable hydrocarbons(C6-C9)	µg/L	20	Limit of reporting for typical analytical method
Total recoverable hydrocarbons (C10-C36)	µg/L	100	Limit of reporting for typical analytical method

¹136101C Three Moon Creek at Abercorn [WMIP: Queensland Government](#)

²Coastal Catchment Initiative (2007) Burnett/Baffle Water Quality Improvement Plan. Draft Water Quality Objectives. Burnett Mary Regional Group

Notes:

- EC, pH, Turbidity must be measured in lab. Limits apply to the lab results.
- All metals and metalloids must be measured as 'dissolved' (from analysis of a filtered sample) and total (unfiltered). Limits for metals and metalloids apply to dissolved results.

Monitoring Bore	Hydrogeological Unit	Compliance assessment required		Location	
		Water quality (Y/N)	Water level (Y/N)	Latitude (decimal degree, GDA2020)	Longitude (decimal degree, GDA2020)

¹Table to be completed as per PRCP10

Appendix 7 – Interim Groundwater quality limits

Quality characteristic (units)	Units	Monitoring Bore	Limit	Source
pH	pH units	All bores	7.1-8.2	20 th and 80 th percentile of Three Moon Creek monitoring data from 1996-2005 ¹
Electrical conductivity	µS/cm	All bores	900	80 th percentile of Three Moon Creek monitoring data from 2010-2025 ¹
Sulfate	mg/L	All bores	5.0	Burnett catchment draft WQO ²
Major ions Calcium, chloride, potassium, magnesium, sodium, bicarbonate, carbonate	mg/L	All bores	For interpretation purposes only	
Aluminium - dissolved (pH>6.5)	mg/L	All bores	55	ANZG 2018 for moderately disturbed system (95% protection)
Antimony - dissolved	µg/L	All bores	9	ANZG 2018 for moderately disturbed system (95% protection)
Arsenic - dissolved	µg/L	All bores	13	ANZG 2018 for moderately disturbed system (95% protection)
Barium - dissolved	µg/L	All bores	2000	Australian Drinking Water Guidelines
Boron - dissolved	µg/L	All bores	940	ANZG 2018 for moderately disturbed system (95% protection)
Cadmium - dissolved	µg/L	All bores	0.2	ANZG 2018 for moderately disturbed system (95% protection)
Cobalt - dissolved	µg/L	All bores	1.4	ANZG 2018 for moderately disturbed system (95% protection)
Chromium - dissolved (CrVI)	µg/L	All bores	1	ANZG 2018 for moderately disturbed system (95% protection)
Copper - dissolved	µg/L	All bores	1.4	ANZG 2018 for moderately disturbed system (95% protection)
Iron - dissolved	µg/L	All bores	300	Australian Drinking Water Guidelines
Manganese - dissolved	µg/L	All bores	1,900	ANZG 2018 for moderately disturbed system (95% protection)
Mercury - dissolved (inorganic)	µg/L	All bores	0.06	ANZG 2018 for moderately disturbed system (99% protection)
Molybdenum - dissolved	µg/L	All bores	34	ANZG 2018 for moderately disturbed system (95% protection)
Nickel - dissolved	µg/L	All bores	11	ANZG 2018 for moderately disturbed system (95% protection)
Nitrate	µg/L	All bores	2400	<u>Updating nitrate toxicity effects on freshwater aquatic species Ministry for the Environment</u>
Selenium - total	µg/L	All bores	5	ANZG 2018 for moderately disturbed system (99% protection)
Uranium - dissolved	µg/L	All bores	0.5	ANZG 2018 for moderately disturbed system (95% protection)

Quality characteristic (units)	Units	Monitoring Bore	Limit	Source
Vanadium - dissolved	µg/L	All bores	6	ANZG 2018 for moderately disturbed system (95% protection)
Zinc - dissolved	µg/L	All bores	8	ANZG 2018 for moderately disturbed system (95% protection)
Total recoverable hydrocarbons(C6-C9)	µg/L	All bores	20	Limit of reporting for typical analytical method
Total recoverable hydrocarbons (C10-C36)	µg/L	All bores	100	Limit of reporting for typical analytical method

Notes:

- EC, pH, and Sulfate must be measured in lab. Limits apply to the lab results.
- All metals and metalloids must be measured as 'dissolved' (from analysis of a filtered sample) and total (unfiltered). Limits for metals and metalloids apply to dissolved results.

END OF PRCP SCHEDULE

Appendix B MCP Environmental Authority

Permit

Environmental Protection Act 1994

Environmental authority EPML00418713

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Environmental authority number: EPML00418713

Environmental authority takes effect on **07 June 2024**.

Environmental authority holder(s)

Name(s)	Registered address
Monto Coal 2 Pty Ltd	Level 15, 40 Creek Street BRISBANE QLD 4000
H & J Enterprises (QLD) Pty Ltd	25 Hedge Avenue MERMAID BEACH QLD 4218
Sanrus Pty Ltd	1095 Waterworks Road THE GAP QLD 4061

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 3 – 13: Mining black coal	ML80101 and ML80175
Ancillary Activity, Schedule 2 – 08: Chemical storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	ML80101 and ML80175
Ancillary Activity, Schedule 2 – 31: Mineral processing, 2: processing, in a year, the following quantities of mineral products, other than coke—, (b) more than 100,000t	ML80101 and ML80175
Ancillary Activity, Schedule 2 – 60: Waste disposal, 2: Operating a facility for disposing of, in a year, the following quantity of waste mentioned in subsection (1)(b), (e): more than 20,000t but not more than 50,000t	ML80101 and ML80175
Ancillary Activity, Schedule 2 – 63: Sewage treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of—, (a): 21 to 100EP—, (i): if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	ML80101 and ML80175

Additional information for applicantsEnvironmentally relevant activities

The description of any environmentally relevant activity (ERA) for which an environmental authority (EA) is issued is a restatement of the ERA as defined by legislation at the time the EA is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an EA as to the scale, intensity or manner of carrying out an ERA, the conditions prevail to the extent of the inconsistency.

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days)

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise- one the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.



Signature

07 June 2024

Date

Alison Cummings
Department of Environment, Science and Innovation
Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:
Business Centre (Coal)
Department of Environment, Science and
Innovation
PO Box 3028
EMERALD QLD 4720
Phone: (07) 4987 9320
Email: CRMining@des.qld.gov.au

Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Other permits required

This permit only provides an approval under the *Environmental Protection Act 1994*. In order to lawfully operate you may also require permits / approvals from your local government authority, other business units within the department and other State Government agencies prior to commencing any activity at the site. For example, this may include permits / approvals with your local Council (for planning approval), the Department of Transport and Main Roads (to access state controlled roads), the Department of Resources (to clear vegetation), and the Department of Agriculture and Fisheries (to clear marine plants or to obtain a quarry material allocation).

Development Approval

This permit is not a development approval under the *Planning Act 2016*. The conditions of this environmental authority are separate, and in addition to, any conditions that may be on the development approval. If a copy of this environmental authority is attached to a development approval, it is for information only, and may not be current. Please contact the Department of Environment and Science to ensure that you have the most current version of the environmental authority relating to this site.

Conditions of environmental authority

The environmentally relevant activity(ies) conducted at the locations described above must be conducted in accordance with the following site-specific conditions of approval. This environmental authority consists of the following Schedules and Appendices:

Schedule A	General
Schedule B	Air
Schedule C	Water
Schedule D	Noise and Vibration
Schedule E	Waste
Schedule F	Land
Schedule G	Groundwater
Schedule H	Regulated Structures
Schedule I	Sewage Treatment
Definitions	
Figures	

Schedule A: General	
Condition number	Condition
A1	This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.
A2	This environmental authority authorises the mining of a maximum of 1.5 million tonnes run of mine (ROM) coal per annum (Mtpa) .
A3	Authorised Activities In carrying out the site mining activities authorised by this environmental authority, disturbance of land in Figure 1 (Disturbance Footprint): (a) May occur in the area marked 'A'; (b) Must not occur in the areas marked 'B'; and (c) May occur in the areas marked 'C', but only in accordance with Conditions A4 and A5.
A4	Any disturbance within the areas marked 'C' on Figure 1 (Disturbance Footprint) is only authorised to the extent reasonably necessary for: (a) Exploration activities; (b) Roads; (c) Fences; (d) Underground services; (e) Low-impact telecommunications facilities; (f) Electrical sub-stations; (g) Transmission grid works and supply network works; (h) Storage depots; and (i) Similar minor infrastructure and ancillary facilities for any of the above.
A5	Any disturbance within areas marked 'A' or 'C' on Figure 1 (Disturbance Footprint) must not adversely impact on areas marked 'B'.
A6	Monitoring Except where specified in another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than six (6) years.
A7	All monitoring and determinations required under any condition of this environmental authority must be conducted by an appropriately qualified person.

A8	Upon request from the administering authority, copies of monitoring results, complaints, records, registers, management plans and reports required by the conditions of this environmental authority must be made available in the requested format and provided to the administering authority within— (a) Ten (10) business days; or (b) An alternative timeframe agreed between the administering authority and the environmental authority holder.
A9	Contravention of Conditions Any contravention, or likely contravention, of a condition of this environmental authority must be reported to the administering authority within twenty-four (24) hours of becoming aware of the contravention.
A10	Within twenty-eight (28) days (or a longer period agreed to in writing by the administering authority) of making a notification under Condition A9 an investigation must be undertaken to determine: (a) The potential circumstances and actions on site that may have contributed to the contravention; and (b) Reasonable measures that could be implemented to address the cause of the contravention to prevent future contraventions of this nature.
A11	Measures identified under Condition A10 must be implemented within: (a) Twenty-eight (28) days of the investigation required by Condition A10 being finalised; or (b) A longer period agreed to in writing by the administering authority.
A12	The following details must be recorded for all contraventions of the environmental authority: (a) Date and time the contravention occurred (if known); (b) Nature and details of the contravention; (c) Investigations carried out in response to the contravention as required by Condition A10; (d) The results of investigations; and (e) Measures taken under Condition A11.
A13	Complaints An investigation must be undertaken within twenty-eight (28) days (or a longer period agreed to in writing by the administering authority) into all complaints received to determine: (a) The potential circumstances and actions on site that may have contributed to the basis of the complaint; and (b) Reasonable measures that could be implemented to address the complaint.
A14	Measures identified under Condition A13 must be implemented within: (a) Twenty-eight (28) days of the investigation required by Condition A13 being finalised; or (b) A longer period agreed to in writing by the administering authority.

A15	The following details must be recorded for all environmental complaints received: (a) Date and time the complaint was received; (b) If authorised by the person making the complaint, their name and contact details; (c) Nature and details of the complaint; (d) Investigations carried out in response to the complaint as required by condition A13; (e) The results of investigations; and (f) Measures taken under condition A14.
A16	Third-Party Audits The environmental authority holder must ensure that: (a) An appropriately qualified person carries out and documents an audit of all conditions of this environmental authority within one (1) year of commencement of Mining Operations; (b) Further audits in accordance with a) are conducted at intervals not exceeding once every three (3) years from completion of the initial audit; and (c) Necessary corrective actions to achieve compliance with the conditions of this environmental authority are implemented within twenty (20) business days of the date each audit is carried out.
A17	All documents (including plans, procedures, programs, reports and methodologies) required by this environmental authority must be: (a) Developed and endorsed in writing as being compliant with the conditions of this environmental authority by an appropriately qualified person; (b) Implemented in accordance with the requirements stated within the document; (c) In effect at all times during the carrying out of the activity; and (d) Reviewed and re-endorsed in writing as being in compliance with the conditions of this environmental authority by an appropriately qualified person at least annually or an alternative timeframe as agreed with the administering authority.
A18	Risk Management The holder must develop and implement a risk management system for the activities which is equivalent to the content requirement of the <i>Environmental Management Standard (ISO14001:2015)</i> or <i>Australian standard for Environment management (AS/NZS ISO 14001:2016)</i> or as per an alternative risk assessment standard or guideline within three (3) months of the commencement of Mining Operations.

A19	Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the environmental authority holder must: (a) Comply with the amended or changed standard, policy or guideline within two (2) years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, or where the amendment or change relates specifically to regulated structures, the time specified in those conditions; and (b) Until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.
A20	Maintenance of Measures, Plant and Equipment The environmental authority holder must: (a) Install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; (b) Maintain such measures, plant and equipment in a proper condition; (c) Operate such measures, plant and equipment in a proper manner; and (d) Ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.
A21	Storage and Handling of Chemicals and Fuels Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with Section 5 of 'AS 1940-2004 <i>Storage and Handling of Flammable and Combustible Liquids of 2004</i>'.
A22	Community Consultation Program The environmental authority holder must develop and maintain a community consultation program for the duration of Mining Operations. The community consultation program must include a regular community forum occurring at intervals no greater than quarterly (i.e. three-month) intervals, within which: (a) Affected persons within the North Burnett Regional Council are given the opportunity to raise concerns regarding mining progress and emerging issues; and (b) The environmental authority holder conveys information regarding mining progress and emerging issues.
A23	Commencement of Mining The environmental authority holder must not commence Mining Operations until the requirements of Condition A26 are met to the satisfaction of the administering authority.

A24	Pre-Commencement of Mining Operations: Prior to the commencement of Mining Operations, the environmental authority holder must submit to the administering authority information to replace 'TBD', 'TBA' and 'blank' in all of the following: (a) Table B2 (Dust and Particulate Matter Monitoring Point Locations); (b) Table C1 (Sediment Dam Release Limits); (c) Table C2 (Surface Water Monitoring Points); (d) Table C3 (Sediment Dam Release Locations); (e) Table G1 (Groundwater Monitoring Locations and Frequency); (f) Table G2 (Groundwater Quality Limits); (g) Table G3 (Groundwater Standing Water Level Trigger Threshold); and (h) Figure 2 (Groundwater Monitoring Bore Locations).
A25	Notification of Commencement of Mining Operations The environmental authority holder must: (a) Provide a written statement advising the administering authority of the date for when Mining Operations will commence (the Commencement Date) under this environmental authority; and (b) Provide the written statement to the administering authority at least five (5) business days before the commencement of Mining Operations.

Schedule B: Air	
Condition number	Condition
B1	Dust Nuisance The release of dust or particulate matter or both resulting from the activity must not cause an environmental nuisance at any sensitive or commercial place.
B2	Dust and Particulate Matter Limits For the purposes of Condition B1, an environmental nuisance includes any instance where an exceedance of any of the below levels is measured in accordance with the relevant method(s) in Table B1 (Dust, Particulate Matter and Meteorological Monitoring Methods): (a) Dust deposition of 120 milligrams per square metre per day on a monthly average; or (b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometres (µm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24-hour averaging time, at a sensitive or commercial place downwind of the licensed place.
B3	Where monitoring identifies instances where a concentration specified in Condition B2 is exceeded at any sensitive place or commercial place, the environmental authority holder must report to the administering authority within ten (10) business days: (a) The air quality data at the sensitive place or commercial place; (b) A description of meteorological conditions recorded in accordance with Table B1 (Dust and Particulate Matter Monitoring Methods) and Table B2 (Dust and Particulate Matter Monitoring Locations) at the time of exceedance; (c) The air quality data upwind of Mining Operations (if known); and (d) Measures taken to reduce dust generated by the mining activities.

B4	Dust Management Plan A Dust Management Plan must be developed, implemented and maintained by an appropriately qualified person for all stages of the authorised mining activities. The Dust Management Plan must be submitted to the administering authority for review and comment prior to the commencement of Mining Operations. The Dust Management Plan must include the following as a minimum: (a) Identification of all potential sensitive and commercial places which may be affected by air quality impacts from mining activities; (b) Identification of all major sources of air emissions that may occur as a result of mining activities; (c) Identification of the number and location of monitoring sites representative of variability of meteorological conditions and distribution of sensitive and commercial places; (d) Identification of monitoring methodologies for each monitoring location; (e) A description of the procedures to manage the air emissions from the sources identified; (f) Meteorological condition monitoring; (g) A dust control strategy which activates a timely implementation of dust control management actions aimed to avoid or minimise elevated levels of dust including PM₁₀ at a sensitive place or commercial place due to mining activities; (h) Consideration of best practice environmental management dust control measures; (i) Description of procedures to be undertaken if any exceedance of air quality objectives is detected; (j) Roles and responsibilities; and (k) Incorporation of an annual review of the Dust Management Plan for continuous improvement for the management of dust and particulate matter resulting from the activity.
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Table B1 (Dust, Particulate Matter and Meteorological Monitoring Methods)

Air Quality Parameter	Monitoring Method
Deposited dust	Australian Standard AS3580.10.1 <i>Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method.</i>
Particulate matter with an aerodynamic diameter of less than 10 micrometres (PM ₁₀)	Real time monitoring of the 24-hour average using the following method: (i) Australian Standard AS3580.9.6 <i>Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 high volume sampler with size selective inlet – Gravimetric method; or</i> (ii) Australian Standard AS3580.9.7 <i>Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Dichotomous sampler (PM10, Coarse PM and PM2.5) – Gravimetric method; or</i> (iii) Australian Standard AS3580.9.8 <i>Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 continuous direct mass method using a tapered element oscillating microbalance analyser; or</i> (iv) Australian Standard AS3580.9.9 <i>Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 low volume sampler – Gravimetric method; or</i> (v) Australian Standard AS3580.9.11 <i>Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM10 beta attenuation monitors.</i>
Meteorological data (including but not limited to wind speed and direction, humidity, temperature and precipitation)	Australian Standard AS3580.14 <i>Methods for sampling and analysis of ambient air. Meteorological monitoring for ambient air quality monitoring applications.</i>
Siting of monitoring equipment	Australian Standard AS3580.1.1 <i>Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment.</i>

Table B2 (Dust and Particulate Matter Monitoring Locations)

Monitoring Point Name	Receiving Area	Latitude (GDA2020)	Longitude (GDA2020)	Monitoring Description
TBD	TBD	TBD	TBD	TBD
TBD	TBD	TBD	TBD	TBD

Schedule C: Water	
Condition number	Condition
C1	Contaminants must not be released to any waters or the bed and banks of any waters other than treated or settled stormwater from sediment dam(s) that comply with the contaminant release limits in Table C1 (Sediment Dam Release Limits) .
C2	The environmental authority holder must not release mine affected water to the receiving environment.
C3	Monitoring of contaminant releases must be undertaken at the overflow or spillway from the sediment dam(s) for the quality characteristics, and at the frequency specified in Table C1 (Sediment Dam Release Limits) .

Table C1 (Sediment Dam Release Limits)

Quality Characteristic	Units	Release Limit	Monitoring Frequency
Total Dissolved Solids	mg/L	Must not exceed 500 mg/L or 10 percent greater than a background value* of the receiving waters whichever is the greater.	Upon commencement of release the first sample must be collected within two (2) hours. Subsequent samples must be collected daily thereon, and the final sample must be collected within two (2) hours after the cessation of release.
Turbidity	NTU	Must not exceed 50 NTU or 10 percent greater than a background value* of the receiving waters whichever is the greater.	
pH	-	6.5 – 9.0 (range)	
EC	µS/cm	Must not exceed 800 µS/cm or 10 percent greater than a background value* of the receiving waters whichever is greater.	
NOTE: * a “background value” for a quality characteristic is the value of the quality characteristic measured on the same day at a background sampling and in situ monitoring point listed in Table C2 (Surface Water Monitoring Points) in the receiving waters not affected by the release, situated between 20 and 500 metres upstream from the release point into Three Moon Creek.			

Table C2 (Surface Water Monitoring Points)

Monitoring Point Name	Monitoring Area	Purpose	Latitude (GDA2020)	Longitude (GDA2020)
Upstream				
Flow Gauge 1 (FG1)	TBA e.g. Three Moon Creek (500m Upstream)	Flow Gauge and Water Quality Sampling	TBA	TBA
Downstream				
TBA	TBA e.g. Three Moon Creek (500m Downstream)	Water Quality Sampling	TBA	TBA

Table C3 (Sediment Dam Locations)

Sediment Dam Name	Receiving Waters	Latitude (GDA2020)	Longitude (GDA2020)
TBA	TBA	TBA	TBA
TBA	TBA	TBA	TBA

C4	Water Management Plan The environmental authority holder must develop and maintain a Water Management Plan which meets the requirements of Condition C5, prior to the commencement of Mining Operations.
C5	The Water Management Plan required under Condition C4 must include the following at a minimum: (a) Be developed, implemented and maintained by an appropriately qualified person; (b) Identification of the environmental values of the receiving waters including three moon creek; (c) Identification of site-specific water quality objectives and how they will be achieved; (d) Identification of contingency procedures in the case of flooding, drought and poor water quality using a risk management approach; (e) A description of the procedures to manage recycling of water on-site; (f) A description of the procedures to manage stormwater discharge; (g) A description of the procedures to develop and implement a system for emergency spills or discharges; (h) A description of the procedures to separate clean water from undisturbed areas and water from disturbed areas; (i) A description of the procedures to manage site water quality and quantity during the three (3) phases of mining: development, operation and decommission, and include a site water balance; (j) A description of the procedures to safeguard against the potential for soil erosion, saline drainage and acid drainage; (k) Provide details of operational monitoring and monitoring of hydrological processes including associated performance indicators; (l) Incorporation of an annual review of the water management plan for continuous improvement for the management of water on site; and (m) A figure of the on-site water management system.
C6	Receiving Environment Monitoring Program Prior to the commencement of Mining Operations, the environmental authority holder must develop, implement and maintain a Receiving Environment Monitoring Program (REMP) which complies with the requirements of Condition C7.
C7	The REMP required under Condition C6 must at a minimum: (a) Be developed, implemented and maintained by an appropriately qualified person; (b) Identify the waters to be considered the receiving environment, including, but not necessarily limited to three moon creek; (c) Identify any sensitive receiving waters or environmental values downstream of the authorised mining activity that will potentially be affected by the unauthorised release of mine affected water; (d) Monitor, identify, and describe any adverse impacts to surface water environmental values, including quality and flows due to the authorised mining activity; and (e) Monitor the effects of the mine on the receiving environment due to the authorised activity under normal flow conditions and where water is released from the site.

C8	A report outlining the findings of the REMP required by Condition C7 , including all monitoring results and interpretations must be prepared annually. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current discharge limits to protect downstream environmental values.
C9	Third-Party Water Reuse Mine affected water may be piped or trucked or transferred by some other means and deposited into artificial water storage structures, such as farm dams or tanks, or used directly at properties owned by the environmental authority holder or a third-party for the purpose of: (a) Supplying stock water; (b) Supplying irrigation water; (c) Supplying water for construction and/or road maintenance; or (d) Some other purpose, to which the administering authority agrees in writing.
C10	If the responsibility of mine affected water (the water) is to be given or transferred to another person in accordance with Condition C9: (a) The responsibility for the mine affected water must only be given or transferred in accordance with a written agreement (the third-party agreement); (b) The third-party agreement must include a commitment from the person utilising the mine affected water to use it in such a way as to prevent environmental harm or public health incidents and specifically make the persons aware of the General Environmental Duty (GED) under s. 319 of the <i>Environmental Protection Act 1994</i>, environmental sustainability of the water disposal and protection of environmental values of waters; and (c) The third-party agreement must be signed by both parties to the agreement.
C11	Erosion and Sediment Control Plan All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment to waters for all stages of the Mining Operations. .
C12	Erosion protection measures and sediment controls must be provided and maintained to effectively minimise any likelihood of erosion and release of sediments from the licensed place and be maintained during Mining Operations . Such measures should include diversion drainage works and sedimentation traps and dams.

Schedule D: Noise and Vibration	
Condition number	Condition
D1	Noise Limits Noise generated by the Mining Operations must not exceed the limits in Table D1 (Noise Limits at Sensitive and Commercial Places) at a sensitive or commercial place.

Table D1 (Noise Limits Measured at Sensitive and Commercial Places)

Noise level dB(A) measured as	Noise measured at a 'Sensitive place'		
	All days		
	7am – 6pm	6pm – 10pm	10pm – 7am
L _{Aeq, adj, 15 mins}	CV = 50	CV = 45	CV = 40
	AV = 5	AV = 5	AV = 0
	bg = 32	bg = 34	bg = 30
	NL = 40	NL = 42	NL = 34
L _{A1, adj, 15 mins}	CV = 55	CV = 50	CV = 45
	AV = 10	AV = 10	AV = 5
	bg = 32	bg = 34	bg = 30
	NL = 45	NL = 47	NL = 39
Noise level dB(A) measured as	Noise measured at a 'Commercial place'		
	7am – 6pm	6pm – 10pm	10pm – 7am
L _{Aeq, adj, 15 mins}	CV = 55	CV = 50	CV = 45
	AV = 10	AV = 10	AV = 5
	bg = 32	bg = 34	bg = 30
	NL = 45	NL = 47	NL = 39

NOTE:

1. CV = Critical Value;
2. AV = Adjustment Value;
3. bg = background noise level (L_{A90, adj, 15 mins})
4. NL = Noise Limit
5. To calculate noise limits in Table D1:
 - If $bg \leq (CV - AV)$ then Noise limit = $bg + AV$
 - If $(CV - AV) < bg \leq CV$, then Noise limit = CV
 - If $bg > CV$, then Noise limit = $bg + 0$
6. In the event that measured bg(L_{A90, adj, 15 mins}) is less than 30 dB(A), then 30 dB(A) can be substituted for the measured background level

D2	Noise Monitoring Program Prior to the commencement of Mining Operations, the environmental authority holder must develop, implement and maintain a Noise Monitoring Program which complies with the requirements of Condition D3.
D3	The Noise Monitoring Program required under Condition D2 must be conducted in accordance with the most recent edition of the administering authority's <i>Noise Measurement Manual</i> (ESR/2016/2195) and must include recording for the following descriptor characteristics and matters: (a) Background noise (L_{A90}); (b) L_{A10}, adj, 15 min; (c) L_{A1}, adj, 15 min; (d) L_{Aeq}, adj, 15 min; (e) Max L_pA; (f) The level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to statistical levels; atmospheric conditions including temperature, relative humidity, wind speed and wind directions; (g) Effects due to any extraneous factors such as traffic noise; (h) Location, date and time of monitoring; (i) An assessment of any low frequency noise; and (j) Where monitoring concerns a complaint, low frequency noise, Max $L_{pLIN,T}$ and one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range.
D4	When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of an authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within fourteen (14) days to the administering authority following completion of monitoring.

D5	Noise Investigation Report In the event of a complaint about noise environmental nuisance that the administering authority considers is not frivolous or vexatious then a Noise Investigation Report is to be developed and completed within twenty-eight (28) days of the environmental authority holder being advised in writing of the complaint. The Noise Investigation Report must address at least, but not be limited to, the following matters: (a) Identification of component noise sources and activities at the place(s) which impact on noise sensitive areas; (b) The measured and/or predicted level of these noise sources and activities at noise sensitive places; (c) The reasonable and practicable control or abatement measures that can be undertaken to reduce identified intrusive noise sources; (d) The level of noise at noise sensitive places that would be achieved from implementing these measures; (e) The handling of future noise complaints; (f) Community liaison and consultation; and (g) Training of staff in noise management practices.
D6	Upon the completion of the Noise Investigation Report in accordance with Condition D5 , the Report must be submitted to the administering authority within fourteen (14) days for review and comment.
D7	After the administering authority has provided comment on the Noise Investigation Report in accordance with Condition D6 , the environmental authority holder must consider implementation of any recommendations in the Report within the stated timeframe of the recommendations.
D8	Noise Management Plan Prior to the commencement of Mining Operations, the environmental authority holder must develop, implement and maintain a Noise Management Plan which meets the requirements of Condition D9.
D9	The Noise Management Plan required under Condition D8 must include the following as a minimum: (a) Describe the reasonable and practicable methods by which Mining Operations will be carried out as necessary to prevent the emission of noise that constitutes an unreasonable intrusive noise; and (b) Incorporation of an annual review of the Noise Management Plan for continuous improvement for the management of noise resulting from the activity.
D10	Airblast Overpressure Nuisance Blasting may only be carried out between 9.00am to 7.00pm Monday to Friday excluding public holidays and must not exceed the limits prescribed in Table D2 (Blasting Noise and Vibration Limits) at a sensitive place or commercial place.

Table D2 (Blasting Noise and Vibration Limits)

Blasting Noise and Vibration Limits	Sensitive Places	Commercial Places
Airblast Overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time	
Ground Vibration Peak Particle Velocity	5mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/second peak particle velocity at any time	10mm/second peak particle velocity for 9 out of 10 consecutive blasts and not greater than 15mm/second peak particle velocity at any time.

D11	Blasting Monitoring Program Prior to the commencement of Mining Operations, the environmental authority holder must develop, implement and maintain a Blasting Monitoring Program which complies with the requirements of Condition D12.
D12	The Blast Monitoring Program required under Condition D11 must be conducted in accordance with the most recent edition of the administering authority's guideline <i>Noise and vibration from blasting</i> (ESR/2016/2169) or a relevant Australian Standard and must include recording of the following matters: (a) Peak particle velocity (mm/s); and (b) Location of the blast/s within the site (including which bench level); and (c) Atmospheric conditions including temperature, relative humidity and wind speed and direction; and (d) The level and frequency of occurrence of impulsive or tonal noise; and (e) Effects due to extraneous factors; (f) Location, date and time of recording; and (g) Compliance with Condition D2 and Table D2 (Blasting Noise and Vibration Limits) for: (i) At least 80% of all blasts undertaken on this site in each calendar year at the nearest sensitive place or commercial place; and (ii) All blasts conducted during any time period specified by the administering authority at the nearest sensitive place or commercial place.

Schedule E: Waste	
Condition number	Condition
E1	Disposal and Storage of Tyres Disposing of scrap tyres in spoil emplacements is acceptable, provided tyres are disposed of in accordance with the latest edition of the administering authority's operational policy <i>Disposal and storage of scrap tyres at mine sites</i> (ESR/2016/2380).
E2	Waste Management Plan From the commencement of Mining Operations, the environmental authority holder must develop and implement a Waste Management Plan in accordance with the <i>Waste Reduction and Recycling Act 2011</i>, that must at least: (a) Describe how Monto Coal Mine recognises and applies the waste and resource management hierarchy (b) Identify the waste streams from the project; (c) Nominate a program for the safe recycling or disposal of all wastes, which reuse and recycling options utilised where practicable; (d) Propose waste management control strategies that must consider: (i) The type of wastes; (ii) Segregation of the wastes; (iii) Storage of the wastes (iv) Transport of the wastes; (v) Monitoring and reporting matters concerning the waste; (vi) Emergency response planning; (vii) Disposal, reuse and recycling options. (e) Detail the hazardous characteristics of the waste generated (if any); (f) Cover a disposal procedure for hazardous waste; (g) Outline the process to be implemented to allow for continuous improvement of the waste management systems, including an annual review; (h) Identify responsible staff (positions) for implementing, managing and reporting on the Waste Management Plan; and (i) Cover a staff awareness and induction program with regard to the content of the Waste Management Plan.
E3	Burning Waste Unless otherwise permitted by the conditions of this environmental authority or with prior approval from the administering authority and in accordance with a relevant standard operating procedure, waste must not be burnt.
E4	The holder of this environmental authority may burn vegetation cleared in the course of carrying out extraction activities, with relevant rural fire services permits obtained, provided that the activity does not cause environmental nuisance at any sensitive place or commercial place.

E5	Mineral Waste Management Plan The environmental authority holder must develop a Mineral Waste Management Plan which meets the requirements of Condition E6, prior to the commencement of Mining Operations, and implement for the duration of mining operations.
E6	The Mineral Waste Management Plan required under Condition E5 must be developed, implemented and maintained by an appropriately qualified person and include the following as a minimum: (a) A map of the location(s) of mineral waste placement; (b) Effective characterisation of mineral waste to predict under the proposed placement and disposal strategy the quality of runoff and seepage generated concerning potentially environmentally significant effects including salinity, acidity, alkalinity and dissolved metals, metalloids and non-metallic inorganic substances; (c) A program of progressive sampling and characterisation to identify: (i) Dispersive and non-dispersive spoil; (ii) The salinity, acid and alkali producing potential and metal concentrations of mineral waste; (iii) Acid producing potential and metal concentrations of tailings; (a) A materials balance and disposal plan which demonstrates how acid forming and potentially acid forming mineral waste will be selectively placed and/or encapsulated to minimise the potential generation of acid mine drainage; (b) Where mineral waste is encapsulated, a sampling program to verify encapsulation and/or placement of acid forming and potentially acid forming mineral waste; (c) A description of the methods of tailings containment within tailings storage facilities; (d) Details as to how seepage or leachate, if any, from tailings storage facilities will be monitored and managed; and (e) Incorporation of an annual review of the Mineral Waste Management Plan for continuous improvement for the management of mineral waste resulting from the activity.

Schedule F: Land	
Condition number	Condition
F1	All areas significantly disturbed by mining activities must be rehabilitated to achieve the following rehabilitation goals: (a) Safe to humans and wildlife; (b) Stable; (c) Non-polluting; and (d) Self-sustaining for the post mining land use of grazing pasture with the exception of the residual void.
F2	Rehabilitation Management Plan The environmental authority holder must develop and implement a Rehabilitation Management Plan within twelve (12) months of commencing Mining Operations to ensure that all areas disturbed by mining activities are rehabilitated in accordance with Table F1 (Rehabilitation Completion Criteria). The Rehabilitation Management Plan must include, but is not limited to, the following: (a) Rehabilitation objectives to achieve the rehabilitation goals for all disturbance areas; (b) Detailed rehabilitation methods for each disturbance are; (c) Rehabilitation indicators to measure the success of the rehabilitation against the rehabilitation objectives; (d) Final completion criteria that will achieve the rehabilitation goals and objects; (e) Details of proposed monitoring and maintenance of rehabilitation; (f) Identification of 3 reference sites to be used to develop rehabilitation success criteria for each disturbance domain; (g) A description of monitoring of reference sites, and how they inform assessment of rehabilitated landforms; (h) A description of progressive rehabilitation planning; and (i) A map of post-mining land uses.

Table F1 (Rehabilitation Completion Criteria)

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria		
Overburden emplacement	a) Waste rock dumps b) Topsoil stockpiles c) In-pit overburden emplacement	Safe	Safe to humans and wildlife.	Rehabilitated land is not significantly different to surrounding land with respect to safety hazards.		
		Stable	Geotechnical and erosional stability.	Slope angles less than 20% (11.5°).		
				Mean pasture groundcover >50% or > the grazed reference site mean minus one standard deviation		
				Appropriate drainage works within rehabilitation areas completed		
		Non-polluting	Rehabilitated landform is non-polluting	Assessment of rill and gully erosion to be undertaken following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.		
				Surface run-off leaving rehabilitation is non-polluting to receiving environment and meets the contaminant limits below:		
				Quality Characteristic	Unit	Limit
				TDS	mg/L	500 or background +10%, whichever is greater
				Turbidity	NTU	50 or background +10%, whichever is greater
				pH	-	6.5 – 9.0
Self-sustaining land use	Land Suitability Class 3 grazing pasture	EC	µS/cm	800 or background +10%, whichever is greater		
		Monitoring results indicate that rehabilitated land has the following soil properties:				
		- Plant Available Water Capacity at Effective Root Depth of 0.6m >75mm - Rootzone EC <0.9 mS/cm or Rootzone Cl <900 ppm - pH range 5.0 – 8.5 - Exchangeable Sodium Percent (ESP) <15% - Slope <20% (11.3°) - Bicarbonate P >5 ppm				
- Proportion of Category 3 restricted invasive plant species is not >10% of total vegetative groundcover. ≥70% of the productivity (carrying capacity measured as pasture biomass) of grazed reference sites. - Mean groundcover >50% or > the grazed reference site mean minus one standard deviation (whichever is the highest). - Proportion of preferred and intermediate species is >60% of vegetative groundcover. - A minimum of 3 preferred and intermediate pasture grass species must be present.						

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria															
Residual Voids	a) Residual voids	Safe	Safe to humans and wildlife	Access to the high wall is restricted by bunding, fencing and signage.															
		Stable	Geotechnical and erosional stability	Maximum slope of 123% (51°) for high walls and 75% (37°) for low walls.															
				RPEQ has certified that the final landform has achieved an appropriate factor of safety and is geotechnically stable.															
				Assessment of rill and gully erosion to be undertaken following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.															
		Non-polluting	Rehabilitated landform is non-polluting	Hydrogeological assessment indicates no potential for pollution from the final residual void															
Void does not over top.																			
		Void water quality will not diminish the EVs of the surrounding groundwater as determined by ongoing monitoring by an appropriately qualified person and does not exceed the quality characteristics of Table G2 (Groundwater Quality Trigger Limits) .																	
		Self-sustaining land use	Residual void is suitable for water storage	Void water quality is compliant with the ANZECC (2000) guidelines for stock watering or another nominated standard for the proposed water use															
Mine Infrastructure	a) MIA areas b) CHPP c) Train load out d) Rail siding e) Crib areas f) Go-lines	Safe	Safe to humans and wildlife	All contaminated land is effectively remediated.															
		Stable	Geotechnical and erosional stability.	Only infrastructure remaining on-site is as per an agreement with the underlying landholder.															
				For all infrastructure, the adopted maximum slope is 10% (5.7°)															
				Pasture groundcover >50% or > the reference site mean minus one standard deviation.															
		Non-polluting	Non-polluting final landform	Assessment of rill and gully erosion to be undertaken following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.															
				Surface run-off leaving rehabilitation is non-polluting to receiving environment and meets the contaminant limits below:															
				<table><tr><th>Quality Characteristic</th><th>Unit</th><th>Limit</th></tr><tr><td>TDS</td><td>mg/L</td><td>500 or background +10%, whichever is greater</td></tr><tr><td>Turbidity</td><td>NTU</td><td>50 or background +10%, whichever is greater</td></tr><tr><td>pH</td><td>-</td><td>6.5 – 9.0</td></tr><tr><td>EC</td><td>µS/cm</td><td>800 or background +10%, whichever is greater</td></tr></table>	Quality Characteristic	Unit	Limit	TDS	mg/L	500 or background +10%, whichever is greater	Turbidity	NTU	50 or background +10%, whichever is greater	pH	-	6.5 – 9.0	EC	µS/cm	800 or background +10%, whichever is greater
				Quality Characteristic	Unit	Limit													
				TDS	mg/L	500 or background +10%, whichever is greater													
		Turbidity	NTU	50 or background +10%, whichever is greater															
pH	-	6.5 – 9.0																	
EC	µS/cm	800 or background +10%, whichever is greater																	
Self-sustaining land use	Land Suitability Class 3 grazing pasture.	Monitoring results indicate that rehabilitated land has the following soil properties:																	
		- Plant Available Water Capacity at Effective Root Depth of 0.6m >75mm - Rootzone EC <0.9 mS/cm or Rootzone CI <900 ppm - pH range 5.0 – 8.5 - Exchangeable Sodium Percent (ESP) <15% - Slope <10% (5.7°)																	

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria															
				- Bicarbonate P >5 ppm - Proportion of Category 3 restricted invasive plant species is not >10% of total vegetative groundcover. ≥70% of the productivity (carrying capacity measured as pasture biomass) of grazed reference sites. - Mean groundcover >50% or > the grazed reference site mean minus one standard deviation (whichever is the highest). - Proportion of preferred and intermediate species is >60% of vegetative groundcover. - A minimum of 3 preferred and intermediate pasture grass species must be present.															
Tailings storage facilities	Out-of-pit co-disposal facilities	Safe	Safe to humans and wildlife	All contaminated land is effectively remediated.															
		Stable	Geotechnical and erosional stability.	Slope angles less than 20% (11.5°)															
				A minimum slope of 0.5 - 1% (0.3 – 0.6°) for finished surface over capped material to facilitate the shedding of water and minimise ponding.															
				Potentially Acid Forming (PAF) material not within 2m of surface.															
				RPEQ has certified that the final landform has achieved an appropriate factor of safety and is geotechnically stable.															
				Mean pasture groundcover >50% or > the grazed reference site mean minus one standard deviation.															
				Assessment of rill and gully erosion to be undertaken by a suitably qualified person following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.															
		Non-polluting	Non-polluting final landform	Surface run-off leaving rehabilitation is non-polluting to the receiving environment and meets the contaminant limits below:															
				<table><tr><th>Quality Characteristic</th><th>Unit</th><th>Limit</th></tr><tr><td>TDS</td><td>mg/L</td><td>500 or background +10%, whichever is greater</td></tr><tr><td>Turbidity</td><td>NTU</td><td>50 or background +10%, whichever is greater</td></tr><tr><td>pH</td><td>-</td><td>6.5 – 9.0</td></tr><tr><td>EC</td><td>µS/cm</td><td>800 or background +10%, whichever is greater</td></tr></table>	Quality Characteristic	Unit	Limit	TDS	mg/L	500 or background +10%, whichever is greater	Turbidity	NTU	50 or background +10%, whichever is greater	pH	-	6.5 – 9.0	EC	µS/cm	800 or background +10%, whichever is greater
				Quality Characteristic	Unit	Limit													
TDS	mg/L			500 or background +10%, whichever is greater															
Turbidity	NTU			50 or background +10%, whichever is greater															
pH	-	6.5 – 9.0																	
EC	µS/cm	800 or background +10%, whichever is greater																	
		Groundwater seepage from rehabilitation is non-polluting to the receiving environment as determined by ongoing monitoring and does not exceed the limits within Table G2 (Groundwater Quality Trigger Limits) .																	

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria		
		Self-sustaining land use	Land Suitability Class 3 grazing pasture.	Monitoring results indicate that rehabilitated land has the following chemical and physical properties: - Plant Available Water Capacity at Effective Root Depth of 0.6m >75mm - Rootzone EC <0.9 mS/cm or Rootzone Cl <900 ppm - pH range 5.0 – 8.5 - Exchangeable Sodium Percent (ESP) <15% - Slope <20% (11.5°) - Bicarbonate P >5 ppm - Proportion of Category 3 restricted invasive plant species is not >10% of total vegetative groundcover. ≥70% of the productivity (carrying capacity measured as pasture biomass) of grazed reference sites. - Mean groundcover >50% or > the grazed reference site mean minus one standard deviation (whichever is the highest). - Proportion of preferred and intermediate species is >60% of vegetative groundcover. - A minimum of 3 preferred and intermediate pasture grass species must be present.		
ROM and Product Stockpiles	ROM and Product Stockpiles	Safe	Safe to humans and wildlife	All contaminated land is effectively remediated.		
		Stable	Geotechnical and erosional stability.	For all infrastructure, the adopted maximum slope is 10% (5.7°)		
				Pasture groundcover >50% or > the reference site mean minus one standard deviation.		
		Non-polluting	Non-polluting final landform	Assessment of rill and gully erosion to be undertaken by a suitably qualified person following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.		
				Surface run-off leaving rehabilitation is non-polluting to the receiving environment and meets the contaminant limits below:		
				Quality Characteristic	Unit	Limit
				TDS	mg/L	500 or background +10%, whichever is greater
				Turbidity	NTU	50 or background +10%, whichever is greater
pH	-	6.5 – 9.0				
EC	µS/cm	800 or background +10%, whichever is greater				
		Groundwater seepage from rehabilitation is non-polluting to the receiving environment as determined by ongoing monitoring and does not exceed the limits within Table G2 (Groundwater Quality Trigger Limits) .				

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria															
		Self-sustaining land use	Land Suitability Class 3 grazing pasture.	Monitoring results indicate that rehabilitated land has the following soil properties: - Plant Available Water Capacity at Effective Root Depth of 0.6m >75mm - Rootzone EC <0.9 mS/cm or Rootzone Cl <900 ppm - pH range 5.0 – 8.5 - Exchangeable Sodium Percent (ESP) <15% - Slope <10% (5.7°) - Bicarbonate P >5 ppm - Proportion of Category 3 restricted invasive plant species is not >10% of total vegetative groundcover. ≥70% of the productivity (carrying capacity measured as pasture biomass) of grazed reference sites. - Mean groundcover >50% or > the grazed reference site mean minus one standard deviation (whichever is the highest). - Proportion of preferred and intermediate species is >60% of vegetative groundcover. - A minimum of 3 preferred and intermediate pasture grass species must be present.															
Site Roads	a) Haul roads b) Tracks	Safe	Safe to humans and wildlife	All contaminated land is effectively remediated (supervised by an appropriately qualified person).															
		Stable	Geotechnical and erosional stability.	Haul roads and tracks may be retained through formal agreement with the landholder.															
				For all infrastructure, the adopted maximum slope is 10% (5.7°)															
				Pasture groundcover >50% or > the reference site mean minus one standard deviation.															
				Assessment of rill and gully erosion to be undertaken by a suitably qualified person following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.															
		Non-polluting	Non-polluting final landform	Surface run-off leaving rehabilitation is non-polluting to receiving environment and meets the contaminant limits below:															
				<table><tr><th>Quality Characteristic</th><th>Unit</th><th>Limit</th></tr><tr><td>TDS</td><td>mg/L</td><td>500 or background +10%, whichever is greater</td></tr><tr><td>Turbidity</td><td>NTU</td><td>50 or background +10%, whichever is greater</td></tr><tr><td>pH</td><td>-</td><td>6.5 – 9.0</td></tr><tr><td>EC</td><td>µS/cm</td><td>800 or background +10%, whichever is greater</td></tr></table>	Quality Characteristic	Unit	Limit	TDS	mg/L	500 or background +10%, whichever is greater	Turbidity	NTU	50 or background +10%, whichever is greater	pH	-	6.5 – 9.0	EC	µS/cm	800 or background +10%, whichever is greater
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				TDS	mg/L	500 or background +10%, whichever is greater													
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EC	µS/cm	800 or background +10%, whichever is greater																	

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria		
		Self-sustaining land use	Land Suitability Class 3 grazing pasture.	Monitoring results indicate that rehabilitated land has the following chemical and physical properties: - Plant Available Water Capacity at Effective Root Depth of 0.6m >75mm - Rootzone EC <0.9 mS/cm or Rootzone Cl <900 ppm - pH range 5.0 – 8.5 - Exchangeable Sodium Percent (ESP) <15% - Slope <10% (5.7°) - Bicarbonate P >5 ppm - Proportion of Category 3 restricted invasive plant species is not >10% of total vegetative groundcover. ≥70% of the productivity (carrying capacity measured as pasture biomass) of grazed reference sites. - Mean groundcover >50% or > the grazed reference site mean minus one standard deviation (whichever is the highest). - Proportion of preferred and intermediate species is >60% of vegetative groundcover. - A minimum of 3 preferred and intermediate pasture grass species must be present.		
Sediment dams and other water management infrastructure	a) Sediment dams b) Other water management infrastructure	Safe	Safe to humans and wildlife	All contaminated land is effectively remediated.		
		Stable	Geotechnical and erosional stability.	Sediment dams and other water management infrastructure may be retained through formal agreement with the landholder.		
				For all infrastructure, the adopted maximum slope is <20% (11.5°)		
				Pasture groundcover >50% or > the reference site mean minus one standard deviation.		
				Assessment of rill and gully erosion to be undertaken by an appropriately qualified person following the achievement of surface requirements to determine if active erosion is present and if any remedial works are required. Any recommended remedial works completed.		
		Non-polluting	Non-polluting final landform	Surface run-off leaving rehabilitation is non-polluting to the receiving environment and meets the contaminant limits below:		
				Quality Characteristic	Unit	Limit
				TDS	mg/L	500 or background +10%, whichever is greater
				Turbidity	NTU	50 or background +10%, whichever is greater
				pH	-	6.5 – 9.0
EC	µS/cm	800 or background +10%, whichever is greater				

Mine Domain	Mine Feature Name	Rehabilitation Goal	Rehabilitation Objectives	Completion Criteria
		Self-sustaining land use	Land Suitability Class 3 grazing pasture.	Monitoring results indicate that rehabilitated land has the following soil properties: • Plant Available Water Capacity at Effective Root Depth of 0.6m >75mm • Rootzone EC <0.9 mS/cm or Rootzone Cl <900 ppm • pH range 5.0 – 8.5 • Exchangeable Sodium Percent (ESP) <15% • Slope <20% (11.5°) • Bicarbonate P >5 ppm • Proportion of Category 3 restricted invasive plant species is not >10% of total vegetative groundcover. • ≥70% of the productivity (carrying capacity measured as pasture biomass) of grazed reference sites. • Mean groundcover >50% or > the grazed reference site mean minus one standard deviation (whichever is the highest). • Proportion of preferred and intermediate species is >60% of vegetative groundcover. • A minimum of 3 preferred and intermediate pasture grass species must be present.

F3	Residual Void Outcome Residual void(s) must comply with the following outcome: (a) The residual void(s) or contents of the residual void(s) must not cause any environmental harm to land or waters, other than the environmental harm to land within the footprint of the residual void itself; and (b) The residual void(s) must comply with the design criteria in Table F2 (Residual Void Design).
F4	The environmental authority holder must complete an investigation into the residual void and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in Condition F3 and landform design criteria in Table F2 (Residual Void Design) prior to mine closure.

Table F2 (Residual Void Design)

Void identification	Void high wall - competent rock slope (°)	Void low wall slope (°)	Void maximum surface area (ha)
Stage 1 void	51	37	25

F5	Topsoil Management Topsoil must be managed in such a manner that complies with the following: (a) Topsoil must be progressively stripped ahead of mining advancement; (b) Topsoil should be reused as soon as practically possible; (c) Topsoil must be stockpiled separately from any subsoils or spoil; (d) Topsoil stockpiles must not be more than two (2) metres in height; and (e) Topsoil must be applied to land for rehabilitation at a rate of 200 mm depth.
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Schedule G: Groundwater	
Condition number	Condition
G1	Groundwater The environmental authority holder must not release contaminants, directly or indirectly, to groundwater.
G2	The construction, maintenance operation and decommissioning of each monitoring bore must be undertaken in a manner that: (a) Prevents contaminants entering the groundwater; and (b) Ensures representative groundwater samples from the target hydrogeological unit (aquifer).
G3	A bore report must be kept for each monitoring bore which includes: (a) Identification reference number and geographic coordinate location; (b) Construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details; (c) Lithological strata, stratigraphies and target hydrogeological unit (aquifer) of the bore; and (d) Pre-development standing groundwater level at the time the bore was drilled.
G4	Monitoring and sampling must be carried out in accordance with the requirements of the latest version of the following documents unless otherwise approved by the administering authority: (a) Monitoring and Sampling Manual: Environmental Protection (Water) Policy, Department of Environment and Science, 2018; (b) Groundwater Sampling and Analysis – A Field Guide (2009:27 GeoCat#6890.1); and (c) Australian Standard AS/NZS 5667.11:1998 Water quality—Sampling -Part 11: Guidance on sampling of groundwaters.
G5	Groundwater monitoring Groundwater quality and standing water level must be monitored: (a) At the locations and frequencies defined in Table G1 (Groundwater Monitoring Locations And Frequency), and as illustrated in Figure 2 (Groundwater Monitoring Bore Locations); and (b) For quality characteristics identified in Table G2 (Groundwater Quality Limits).

Table G1 (Groundwater Monitoring Locations and Frequency)

Monitoring Bore	Hydrogeological Unit (Aquifer)	Compliance assessment required		Location (GDA2020)		Surface RL* (m)	Screened Interval RL (m)	Monitoring Frequency	
		Standing Water level (Y/N)	Water quality (Y/N)	Latitude	Longitude			Water level	Water quality
Background Bores									
MB1	Alluvium	Y	Y					Monthly	Monthly
MB3	Mulgildie Coal Measures (MCM)	Y						Monthly	Monthly
Etc.								Etc.	
Compliance Bores									
MB2	Alluvium								

NOTE: * 'RL' means relative level.

Table G2 (Groundwater Quality Trigger Limits)

[illegible]

G6	Groundwater Quality If groundwater quality characteristics at the compliance bores identified in Table G1 (Groundwater Monitoring Locations and Frequency) exceed the Contaminant Limits specified in Table G2 (Groundwater Quality Limits) on three (3) consecutive occasions, the holder of the environmental authority must notify the administering authority via WaTERS within twenty-four (24) hours of receiving the results.
G7	Trigger Investigation If monitoring results from water quality compliance bores listed in Table G1 (Groundwater Monitoring Locations and Frequency) exceed any of the Contaminant Limits specified in Table G2 (Groundwater Quality Limits) on three (3) consecutive occasions, the approval holder must complete an investigation within fourteen (14) days of receiving the results to determine if the exceedance is a result of: (a) Activities authorised under this environmental authority; (b) Natural variation; or (c) Neighbouring land use resulting in groundwater impacts.
G8	The holder of this environmental authority must provide a report of the investigation required under Condition G7 to the administering authority within fourteen (14) days of completion of the investigation.
G9	If the investigation under Condition G7 determines that the exceedance was the result of activities authorised under this environmental authority, then a further investigation must be completed within twenty-eight (28) days by the environmental authority holder to determine the source, cause and extent of contamination and implement appropriate mitigation and management measures to address any existing groundwater contamination and prevent recurrence of groundwater contamination.
G10	Groundwater Standing Water Level Groundwater standing water level when measured at the water level compliance bores specified in Table G1 (Groundwater Monitoring Locations and Frequency) must not exceed the Level Trigger Thresholds specified in Table G3 (Groundwater Standing Water Level Trigger Threshold).

G11	If the Level Trigger Thresholds of groundwater measured at any compliance bore specified in Table G1 (Groundwater Monitoring Locations and Frequency) exceeds any of the corresponding trigger levels specified in Table G3 (Groundwater Standing Water Level Trigger Threshold) on three (3) consecutive occasions, the holder of the environmental authority must: (a) Notify the administering authority via WaTERS within twenty-four (24) hours of receiving the results; (b) Complete an investigation into the cause of the exceedance within ten (10) business days; and (c) If the investigation carried out under part b) determines that the mining activities are a potential cause or contributor to the exceedance– (i) Notify the administering via WaTERS within twenty-four (24) hours of making the determination; and (ii) Take immediate action to ensure compliance with Condition G1 of this environmental authority.
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Table G3 (Groundwater Standing Water Level Trigger Threshold)

Monitoring Location	Monitored Unit	Pre-mining baseline level (mAHD)	Year 3 Level Trigger Threshold*	Maximum Level Trigger Threshold†
TBD	TBD	TBD	TBD	TBD

NOTE:

* Refers to 3 years post-commencement of **Mining Operations**.

† 90th percentile predicted maximum cumulative drawdown over the life of the Project beyond any background non-mining related influence, except where specifically identified.

G12	Baseline Groundwater Monitoring Program A baseline groundwater monitoring program must be developed and implemented by a suitably qualified person(s) and be provided to the administering authority.
G13	The Baseline Groundwater Monitoring Program must be provided to the administering authority at least ninety (90) days prior to commencement of Mining Operations, excluding surface construction activities.
G14	The Baseline Groundwater Monitoring Program must: (a) Continue until the Groundwater Monitoring and Management Program (GMMP) required under Condition G15 commences; (b) Contain representative groundwater quality samples from the geological units identified as potentially affected by mining activities; (c) Include at least twelve (12) sampling events that are no more than two (2) months apart over a two (2) year period, so as to determine background groundwater quality; (d) Include a conceptual model used to determine the location of ground water bores (e) Nominate suitable monitoring locations, duration and frequency to populate Table G1 (Groundwater Monitoring Locations and Frequency) and determine baseline groundwater quality and level as determined by a suitably qualified person; (f) Allow for the identification of natural groundwater level trends and groundwater contaminant trigger levels; (g) Identify suitable trigger limits to populate Table G2 (Groundwater Quality Limits) and Table G3 (Groundwater Standing Water Level Trigger Threshold); (h) Complete an investigation to demonstrate that groundwater drawdown resulting from the activity will not impact environmental values including but not limited to Groundwater Dependent Ecosystems (GDEs); (i) Proposed mitigation and monitoring measures to ensure the activity will not impact environmental values; and (j) Detail how impacts to prescribed environmental matters have been or will be avoided as a result of the disturbance with the installation of proposed bores.
G15	Groundwater Monitoring and Management Program At least ninety (90) days prior to the commencement of Mining Operations, the environmental authority holder must develop, implement and maintain a Groundwater Monitoring and Management Program (GMMP) which complies with the requirements of Condition G16, and provide a copy of the GMMP to the administering authority.

G16	The Groundwater Monitoring and Management Program required under Condition G15 must at a minimum: (a) Identify all potential sources of contamination to groundwater from the activities authorised under this environmental authority; (b) Provide a hydrogeological conceptual groundwater model; (c) Identify all environmental values that may be impacted; (d) Detail groundwater levels in all identified aquifers present across and adjacent to the site to confirm existing groundwater flow paths; (e) Ensure all potential groundwater impacts due the activities authorised under this environmental authority are identified, monitored and mitigated; (f) Ensure adequate groundwater monitoring and data analysis is undertaken to: (i) Detect any impacts to groundwater level due to the mining activities and rehabilitation activities; (ii) Detect any impacts to groundwater quality due to the mining activities and rehabilitation activities; (iii) Determine compliance with Conditions G6 and G10; (iv) Determine trends in groundwater quality; and (v) Determine any interaction or impact from groundwater on surface water (groundwater monitoring locations should align with receiving environment surface water quality monitoring locations), if appropriate; (a) Document groundwater management and monitoring methodologies; (b) Provide an appropriate quality assurance and quality control program; and (c) Include a review process to identify improvements to the program and to address any comments provided by the administering authority.
G17	The GMMP must be reviewed on an annual basis by an appropriately qualified person to determine if it continues to meet the requirements stated in Condition G16. Any recommended changes to the GMMP must be submitted to the administering authority for approval.
G18	An Annual Groundwater Monitoring Report (AGMR) is required to be completed and submitted to the administering authority commencing after the first year of Mining Operations.
G19	The AGMR required by Condition G18 must include: (a) The groundwater quality and standing water level of all groundwater bores listed within Table G1 (Groundwater Monitoring Locations and Frequency); (b) An assessment of long-term water quality and water level trends at all groundwater bores listed in Table G1 (Groundwater Monitoring Locations and Frequency); (c) Details of any review undertaken of the groundwater conceptual model; (d) An assessment of any differences between the groundwater level impact predicted and actual impacts for the corresponding period; and (e) Comparison with receiving environment surface water quality monitoring results to determine any interaction or impact from groundwater on surface water.

G20	Groundwater Dependent Ecosystems The extraction of, or interference with, groundwater by the environmental authority holder must not cause environmental harm to any groundwater dependent ecosystem, including, but not limited to: (a) The Three Moon Creek system; and (b) The Abercorn Mound Springs.
G21	All water monitoring data required under this environmental authority or related to environmental management activities must be provided to the administering authority annually in the specified electronic format via the Queensland Government's Water Tracking and Electronic Reporting System (WaTERS).
G22	Groundwater Modelling Prior to the commencement of Mining Operations, a Groundwater Modelling Report prepared by a suitably qualified third-party, summarising groundwater modelling undertaken for the area potentially impacted by the activity, must be submitted to the administering authority
G23	Groundwater modelling, as required by Condition G22, for the area potentially impacted by the activities authorised by this environmental authority, must: (a) Include all hydrogeological units and aquifers potentially impacted by the mining activity; (b) Model the full potential impacts caused by the activity (including spatial extent) for the life of mining activities; (c) Be undertaken in accordance with the most recent version of the 'Australian Groundwater Modelling Guidelines'; and (d) Be recalibrated/validated by a suitably qualified third-party at a minimum interval of five (5) years.

Schedule H: Regulated Structures	
Condition number	Condition
H1	Assessment of Consequence Category The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the administering authority's <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> (ESR/2016/1933) at the following times: (a) Prior to the design and construction of the structure, if it is not an existing structure; or (b) Prior to any change in its purpose or the nature of its stored contents.
H2	A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.
H3	Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the administering authority's <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933).
H4	All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the administering authority's <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933).
H5	Construction of a regulated structure is prohibited unless: (a) The holder of the environmental authority has submitted a consequence category assessment report and certification to the administering authority; and (b) Certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this authority.
H6	Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933) and must be recorded in the Register of Regulated Structures.

H7	Regulated structures must: (a) Be designed and constructed in compliance with the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933); (b) Be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of: (i) Floodwaters from entering a regulated dam from any watercourse or drainage line; and (ii) Wall failure due to erosion by floodwaters arising from any watercourse or drainage line. (c) Have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.
H8	Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that: (a) The 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; and (b) Construction of the regulated structure is in accordance with the design plan.
H9	Operation of a regulated structure is prohibited unless the holder of the environmental authority has submitted to the administering authority in respect of regulated structure, all of the following: (a) One paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with Condition H6; (b) A set of 'as constructed' drawings and specifications; (c) Certification of the 'as constructed drawings and specifications' in accordance with Condition H8; (d) Where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan; (e) The requirements of this authority relating to the construction of the regulated structure have been met; (f) The holder of the environmental authority has entered the details required under this authority, into a Register of Regulated Structures; and (g) There is a current operational plan for the regulated structure.
H10	Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
H11	Conditions H12 to H15 inclusive only apply to Regulated Dams which have not been certified as low consequence category for 'failure to contain – overtopping'.

H12	The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.
H13	The holder of the environmental authority must, as soon as practicable but within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.
H14	The holder of the environmental authority must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.
H15	The holder of the environmental authority must record any changes to the MRL in the Register of Regulated Structures.
H16	The holder of the environmental authority must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.
H17	By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).
H18	The holder of the environmental authority must, as soon as practicable but within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.
H19	The holder of the environmental authority must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.
H20	Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
H21	At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.
H22	The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the <i>Manual for assessing consequence categories and hydraulic performance of structures</i> (ESR/2016/1933).

H23	The holder of the environmental authority must within twenty (20) business days of receipt of the annual inspection report, provide to the administering authority: (a) The recommendations section of the annual inspection report; and (b) If applicable, any actions being taken in response to those recommendations; and (c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder of this environmental authority, provide this to the administering authority within ten (10) business days of receipt of the request.
H24	The holder of the environmental authority must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder of this environmental authority on transfer of this authority
H25	A Register of Regulated Structures must be established and maintained by the holder of the environmental authority for each regulated structure.
H26	The holder of the environmental authority must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated structure is submitted to the administering authority.
H27	The holder of the environmental authority must make a final entry of the required information in the Register of Regulated Structures once compliance with Condition H9 has been achieved.
H28	The holder of the environmental authority must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.
H29	All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of the environmental authority of this authority, or their delegate, as being accurate and correct.
H30	The holder of the environmental authority must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority

Schedule I: Sewage	
Condition number	Condition
I1	Treated sewage effluent may only be released to land in compliance with the release limits stated in Table I1 (Contaminant Release Limits to Land) and the following requirements: (a) Within a suitable irrigation area (minimum 1 ha excluding any necessary buffer zones) to be selected based on the location of mine infrastructure areas and associated sewage treatment plant(s); (b) Monitoring must be in accordance with the administering authority's Water Quality Sampling Manual (c) The daily volume of treated effluent used for irrigation must be measured and records kept of the volumes of effluent released; (d) Use on haul roads and areas of mining activity for the purpose of dust suppression; (e) Re-use in coal processing; and (f) Use in firefighting.
I2	Irrigation with treated effluent must be carried out in a manner such that: (a) Vegetation is not damaged; (b) There is no surface ponding of effluent; and (c) There is no run-off of effluent.
I3	If irrigation areas are accessible to employees or the general public, prominent signage must be provided advising that effluent is present and care should be taken to avoid consuming or otherwise coming into unprotected contact with the effluent.
I4	When circumstances prevent the irrigation or beneficial reuse of treated sewage effluent such as during or following rain events, waters must be directed to a wet weather storage or alternative measures must be taken to store/lawfully dispose of effluent.
I5	Water or stormwater contaminated by irrigation activities must not be released to any waters or the bed and banks of any waters.
I6	Treated sewage effluent must only be supplied to another person or organisation that has a written plan detailing how the user of the treated sewage effluent will comply with their general environmental duty under section 319 of the <i>Environmental Protection Act 1994</i> whilst using the treated sewage effluent. <i>Note: The supply of treated wastewater for re-use is regulated under the Water Supply (Safety and Reliability) Act 2008.</i>

Table I1 (Contaminant Release Limits to Land)

Contaminant	Unit	Release limit	Limit type	Frequency
5-day BOD	mg/L	20	Maximum	Monthly
TSS	mg/L	30	Maximum	Monthly
Nitrogen	mg/L	30	Maximum	Monthly
Phosphorus	mg/L	15	Maximum	Monthly
E-coli	CFU/100mL	1000	Maximum	Monthly
pH	-	6 – 9	Range	Monthly

END OF CONDITIONS

Definitions

Key terms and/or phrases used in this document are defined in this section. Where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Word definitions

Abercorn Mound Springs means the springs as stated in the EMOS.

Acceptance criteria means the measures by which the actions implemented to rehabilitate the land are deemed to be complete (same as completion criteria).

Administering authority means the agency or department that administers the environmental authority provisions under the *Environmental Protection Act 1994*.

Affected persons means groups and persons with demonstrable rights or interest in the land affected by the project.

Airblast overpressure means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dB).

Alluvial aquifers means an aquifer comprising unconsolidated material deposited by water, typically occurring adjacent to watercourses.

Ambient (or total) noise at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

Annual exceedance probability or AEP means the probability that the given event will be exceeded within a one year period.

Appropriately qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods or literature.

Annual inspection report means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan);

- (a) Against recommendations contained in previous annual inspections reports;
- (b) Against recognised dam safety deficiency indicators;
- (c) For changes in circumstances potentially leading to a change in consequence category;
- (d) For conformance with the conditions of this authority;
- (e) For conformance with the 'as constructed' drawings;
- (f) For the adequacy of the available storage in each regulated dam, based on an actual observation or observations taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam (or network of linked containment systems); and
- (g) For evidence of conformance with the current operational plan

ARD means acid rock drainage and refers to the low pH, high heavy metal pollutant typical of sulfidic mine wastes, and most commonly associated with the production of ferrous iron and sulphuric acid through the oxidation of sulphide minerals.

Assessed or **assessment** by a suitably qualified and experienced person in relation to a consequence assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit of the assessment:

- (a) Exactly what has been assessed and the precise nature of that determination;
- (b) The relevant legislative, regulatory and technical criteria on which the assessment has been based;
- (c) The relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- (d) The reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

Associated works in relation to a dam, means:

- (a) Operations of any kind and all things constructed, erected or installed for that dam; and
- (b) Any land used for those operations.

Authority means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

Background bore means a groundwater monitoring bore which is located outside of any potential influence or impact by the mining activity, as identified in the groundwater model provided in the Groundwater Monitoring Program required by **Condition G5** that are used for comparative and interpretative purposes and represent natural background quality and levels. **Background noise level** means either:

- (a) $L_{A90, T}$ being the A-weighted sound pressure level exceeded for 90 percent of the time period not less than 15 minutes, using Fast response, or
- (b) $L_{avg, T}$ being the arithmetic average of the minimum readings measured in the absence of the noise under investigation during a representative time period of not less than 15 minutes, using Fast response.

Blasting means the use of explosive materials to fracture-

- (a) Rock, coal, and other minerals for later recovery; or
- (b) Structural components or other items to facilitate removal from a site or for reuse.

Category 3 invasive plant species means a category 3 invasive plant as defined by the *Biosecurity Act 2014*.

Certification means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A)).

Certifying, certify or certified have a corresponding meaning as 'certification'.

Climax community means flora and fauna communities that have attained a stable biological diversity and have reached equilibrium with the surrounding ecosystems.

Commercial place means a place used as an office or for business or commercial purposes, other than a place within the boundaries of the operational land.

Compliance bore – means a groundwater monitoring bore which is the subject of compliance requirements for groundwater quality and/or level. Compliance bores should be located where they:

- (a) Are within aquifers that could be affected by the mining activity that is authorised by the EA (i.e. within the potential area of impact);
- (b) Provide for the early detection of negative impacts on environmental values of groundwaters, surface waters and GDEs, including from the taking of or interference with; and
- (c) Provide for the early detection of contamination/impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations).

Construction activity means works involving preparation of infrastructure and roads in the infrastructure area.

Construction or constructed in relation to a dam includes building a new dam and modifying or lifting an existing dam, but does not include investigations and testing necessary for the purpose of preparing a design plan.

Consequence category means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/193313).

Dam means a land-based structure or a void that contains, diverts or controls flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.

Dam crest volume means the volume of material (liquids and/or solids) that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls, without regard to flows entering or leaving (for example, via spillway).

Design plan means a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

Design storage allowance or DSA means an available volume, estimated in accordance with the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/193313) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.

Designer for the purposes of a regulated dam, means the certifier of the design plan for the regulated dam. Development approval means a development approval under the *Planning Act 2016* (or under the repealed *Sustainable Planning Act 2009* or *Integrated Planning Act 1997*) in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

Emergency action plan means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to affected persons and the implementation of protection measures. The plan must require dam owners to annually review and update contact information where required.

EMOS means the environmental management overview strategy report titled Monto Coal Project Environmental Management Overview Strategy and dated March 2002.

Environmental authority holder means the holder of this environmental authority.

Extreme Storm Storage means a storm storage allowance determined in accordance with the criteria in the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/193314) published by the administering authority.

Flare pit means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted. The flare pit is only used during the drilling and work over process on a petroleum well.

Flowable substance means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

Groundwater means underground water as defined in Schedule 19, Part 2 of the Environmental Protection Regulation 2019).

Groundwater quality trigger values means the concentrations (or loads) of the key performance indicators measured for the ecosystem, below which there exists a low risk that adverse biological (ecological) effects will occur. They indicate a risk of impact if exceeded and should ‘trigger’ some action, either further ecosystem specific investigations or implementation of management/remedial actions. **Holder** means:

- (a) Where this document is an environmental authority, any person who is the holder of, or is acting under, that environmental authority; or
- (b) Where this document is a development approval, any person who is the registered operator for that development approval.

Hydraulic performance means the capacity of a regulated dam to contain or safely pass flowable substances based on the design criteria specified for the relevant consequence category in the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/193314).

Intermediate species for pasture composition means the preferred and intermediate species listed against Inland Burnett Region Grazing Land Management land type IB08 Brigalow with melonholes.

L_A 10, adj, 10 mins means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 10% of any 10 minute measurement period, using Fast response.

L_A 1, adj, 10 mins means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10 minute measurement period, using Fast response

L_A, max adj, T means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

Land in the 'land schedule' of this document means land excluding waters and the atmosphere.

Land use term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

Land Suitability Class 3 Grazing Pasture means ‘Class 3 Suitable land with moderate limitations’ as defined in the most recent edition of the Department of Science, Information Technology and Innovation (DSITI) and the Department of Natural Resources and Mines (DNRM), or their successor’s *Guidelines for Agricultural Land Evaluation in Queensland*’ (State of Queensland, 2015).

Leachate means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

Levee means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

Low consequence dam means any dam that is not a high or significant consequence category as assessed using the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/193314)

Mandatory reporting level or MRL means the volume below the spillway crest, equivalent to the lower of the annual exceedance probability (design risk) 72 hour storm or the annual exceedance probability wave allowance.

Manual means the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/193314) published by the administering authority, as amended from time to time.

Mineral waste means waste materials resulting from the extraction of coal including spoil, overburden, interburden, waste rock, tailings and rejects.

Mining Operations means authorised activities:

- (a) Including mine construction, resource extraction, mineral processing, mine site management, rehabilitation, and decommissioning; and
- (b) Excluding exploration activities and monitoring of air, noise, surface water and groundwater.

Modification or modifying (see definition of 'construction')

Mulgildie Coal Measures means the stratigraphic unit of interest at the Monto Coal Project (the actively mined coal measures).

Noxious means harmful or injurious to health or physical wellbeing, other than trivial harm.

NTU means nephelometric turbidity units.

Offensive means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

Operational plan includes:

- (a) Normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA); and
- (b) Contingency and emergency action plans including operating procedures designed to avoid and/or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the regulated structure.

Peak particle velocity (ppv) means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms).

Percent slope = (height difference (metres)/horizontal difference (metres))×100

Preferred species for pasture composition means the preferred species and suitable sown pasture species listed against Inland Burnett Region Grazing Land Management land type IB08 Brigalow with melonholes.

Protected area means

- (a) A protected area under the *Nature Conservation Act 1992*; or
- (b) A marine park under the *Marine Parks Act 2004*; or
- (c) A World Heritage Area.

Progressive rehabilitation means rehabilitation (defined below) undertaken progressively OR a staged approach to rehabilitation as mining operations are ongoing.

Reference site means a location not affected by mining for the final land use description.

Register of Regulated Structures includes:

- (a) Date of entry in the register;
- (b) Name of the structure, its purpose and intended/actual contents;
- (c) The consequence category of the dam as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/193315);
- (d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
- (e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;
- (f) For the regulated dam, other than in relation to any levees –
 - (i) The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;
 - (ii) Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area;
 - (iii) Dam crest volume (megalitres);
 - (iv) Spillway crest level (metres AHD);
 - (v) Maximum operating level (metres AHD);
 - (vi) Storage rating table of stored volume versus level (metres AHD);
 - (vii) Design storage allowance (megalitres) and associated level of the dam (metres AHD);
 - (viii) Mandatory reporting level (metres AHD);
- (g) The design plan title and reference relevant to the dam;
- (h) The date construction was certified as compliant with the design plan;
- (i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;
- (j) Details of the composition and construction of any liner;
- (k) The system for the detection of any leakage through the floor and sides of the dam;
- (l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
- (m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority; and
- (n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

Regulated structure means any structure in the significant or high consequence category as assessed using the most recent version of the *Manual for assessing consequence categories and hydraulic performance of structures* (ESR/2016/1933) or its successor, published by the administering authority. A regulated structure does not include:

- (a) A fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container; or
- (b) A sump or earthen put used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities; or
- (c) A flare pit.

Rehabilitation means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

Representative means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

Residual drilling material means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

Sediment dam means a structure for the capture and treatment of stormwater runoff contaminated only by sediments from disturbed areas and which discharge off-site once full.

Self-sustaining means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

Sensitive place means:

- (a) A dwelling, residential allotment, mobile home or caravan park, residential marina, or other residential premises; or
- (b) An educational institution; or
- (c) A medical centre or hospital; or
- (d) A protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 2004* or a World Heritage Area; or
- (e) A public park or gardens; or
- (f) A place used as a workplace, an office or for business or commercial purposes which is not part of the mining activity and does not include employee's accommodation or public roads.

Spillway means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

Stable means geotechnical stability of the rehabilitated landform where instability related to the bearing capacity, excessive settlement and subsidence caused by consolidation / settlement of the wastes deposited, and sliding / slumping instability has ceased.

Structure means dam or levee.

Suitably qualified and experienced person in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 2002*, and has demonstrated competency and relevant experience:

- (a) For regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design;
- (b) For regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments.

Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology. System design plan means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

Void means any constructed open mining pit.

Waste and resource management hierarchy – has the meaning provided in section 9 of the *Waste Reduction and Recycling Act 2011* and is the following precepts, listed in the preferred order in which waste and resource management options should be considered—

- (a) AVOID unnecessary resource consumption
- (b) REDUCE waste generation and disposal
- (c) RE-USE waste resources without further manufacturing
- (d) RECYCLE waste resources to make the same or different products
- (e) RECOVER waste resources, including the recovery of energy
- (f) TREAT waste before disposal, including reducing the hazardous nature of waste
- (g) DISPOSE of waste only if there is no viable alternative.

Waste and resource management principles – has the meaning provided in section 4(2)(b) of the *Waste Reduction and Recycling Act 2011* and means the:

- (a) Polluter pays principle
- (b) User pays principle
- (c) Proximity principle
- (d) Product stewardship principle.

Watercourse has the meaning in Schedule 4 of the Environmental Protection Act 1994 and means:

- (a) A river, creek or stream in which water flows permanently or intermittently—
 - (i) In a natural channel, whether artificially improved or not; or
 - (ii) In an artificial channel that has changed the course of the watercourse.
- (a) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

Waters includes all or any part of a river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water in natural or artificial watercourses, bed and banks of a watercourse, dams, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and groundwater.

WaTERS means the administering authority's Water Tracking and Electronic Reporting System.

Water year means the 12-month period from 1 July to 30 June.

Wet season means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

µS/cm means micro siemens per centimetre.

END OF DEFINITIONS

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Figure 1 (Disturbance Footprint)

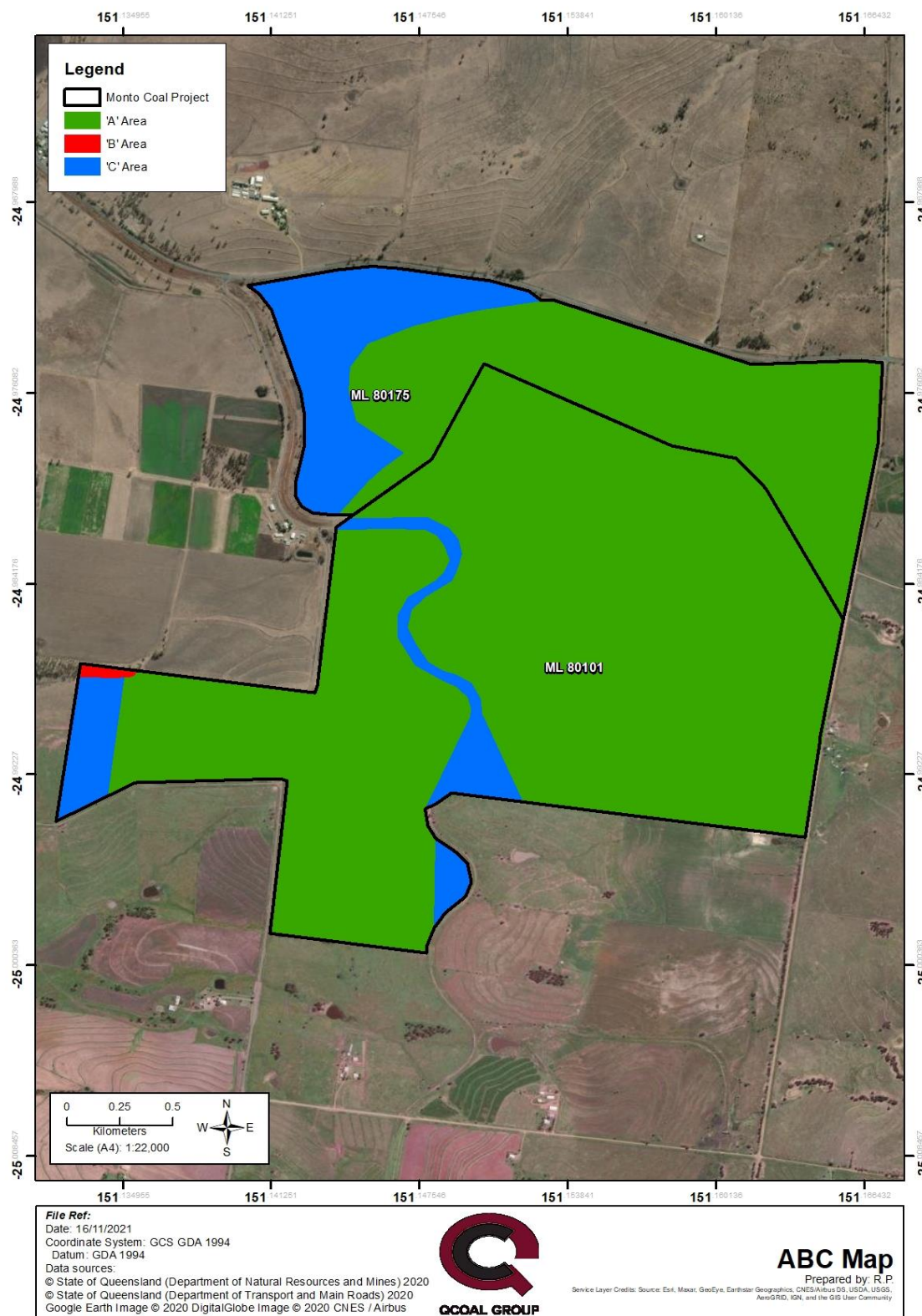


Figure 2 (Groundwater Monitoring Bore Locations)

Note: To be completed prior to commencement of Mining Operations.

END OF ENVIRONMENTAL AUTHORITY

Appendix C MCP PRCP Consultation Register

Monto Coal Project Progressive Rehabilitation and Closure Plan Consultation Register

Date	Interest Group	Interest Type	Interest Description	Consultation Details	Consultation Outcomes
2002 – Present	Monto Coal 2 Pty Ltd	Direct – Underlying / Adjacent Landholder	Landholder: - Lot 4 on RW99 - Lot 5 on RW591 - Lot 122 on RW100 - Lot 142 on RW100 - Lot 123 on RW101 - Lot 126 on RW101 - Lot 145 on RW101 - Lot 124 on RW714 - Lot 125 on RW714 - Lot 2 on SP151959	- Consultation during MCP approvals process. - Public notification of MCP EA amendment to include ML80175. - Compensation agreements with relevant parties developed to enable the grant of the MCP MLs - Monto Coal maintains continued and ongoing consultation with these underlying landholders, including in relation to rehabilitation and the implementation of the CCAs.	- EA issued, with the consultation used to inform the rehabilitation outcomes in the EA (the primary LOD) - Compensation agreements finalised for grant of MCP MLs. - ML80101 subsequently granted - Subsequent to the approval of the ML and EA amendment to include ML80175, there have been no changes to the PMLU and other land outcomes, as currently approved in the LOD (EA).
	North Burnett Regional Council	Direct – Underlying / Adjacent Landholder and regional council	Landholder - Underlying and adjacent road reserves		
	Ian John Hill	Direct – Adjacent Landholder	Landholder - Lot 1 on SP151959 - Lot 46 on RW712		
	Sarah Emily Avis & Brett William Avis	Direct – Adjacent Landholder	Landholder - Lot 2 on RP 222226		

Date	Interest Group	Interest Type	Interest Description	Consultation Details	Consultation Outcomes
	Rona Ella Benecke & Leigh Gordon Benecke	Direct – Adjacent Landholder	Landholder - Lot 1 on RW805		
	Graeme Walter Hill	Direct – Adjacent Landholder	Landholder - Lot 7 on CP844130 - Lot 6 on RW113		
	Wayne Robert Goody & Amanda Jane Goody	Direct – Adjacent Landholder	Landholder - Lot 1 on RW112		
	Stuart Andrew Leahy & Patricia Kaye Leahy	Direct – Adjacent Landholder	Landholder - Lot 127 on RW797 - Lot 174 on RW848 - Lot 129 on RP840293 - Lot 120 on RW100		
	Tracey Michelle Pattie & Matthew Alexander Pattie	Direct – Adjacent Landholder	Landholder - Lot 121 on RW100		
	William John Dow & Kathleen Lesley Dow	Direct – Adjacent Landholder	Landholder - Lot 105 on RW100		
	Neville William Iversen & Helen Joy Iversen	Direct – Adjacent Landholder	Landholder - Lot 165 on RW152		
	Samantha Jane Dow & Martin Robert Dow	Direct – Adjacent Landholder	Landholder - Lot 105 on RW100		



Appendix D Environmental Management Overview Strategy (EMOS)

Monto Coal Project Environmental Management Overview Strategy

Monto Coal Project

PPK Environment & Infrastructure

348 Edward Street
Brisbane Qld 4000
GPO Box 2907
Brisbane Qld 4001
Australia

March 2002
132037A-PR003Agg

Telephone: + 61 7 3218 2222
Facsimile: + 61 7 3831 4223
E-mail: brisbane@ppk.com.au

ABN 84 797 323 433

NCSI Certified Quality System to ISO9001

A Partnership between PPK E&I Pty Ltd and Parsons Brinckerhoff
International (Australia) Pty Ltd
Parsons Brinckerhoff Companies

DOCUMENT ISSUE APPROVAL

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	Environmental Management Overview Strategy		
Client:	Monto Coal 2 Pty Ltd		

	Name	Position	Signature	Date
Prepared by:	Garry Gough	Principal Environmental Consultant		
Reviewed by:	Roger Pattison	Major Projects Executive		
Approved by ¹ :	Roger Pattison	Major Projects Executive		

¹. to be initialled and dated by the person who actions the issue of the documents.

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PROJECT ABSTRACT:

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Appendix B	Community Consultation Plan

1. Project Description

1.1 Location and Proposed Development

Monto Coal 2 Pty Ltd (Monto Coal) is proposing to develop an open-cut coal mine south-east of the township of Mulgildie in the Monto Shire. Monto Coal is a joint venture between Macarthur Coal Limited and Burnett Coal Pty Ltd.

The mine site is located approximately 2 km from Mulgildie and 14 km from Monto. In relation to the nearby ports, the mine site is located approximately 190 km from Gladstone (by rail) and 120 km from Bundaberg.

The Monto Shire forms part of the North Burnett region of south-east Queensland and the proposed mine site is currently used for agricultural purposes — for both cropping and grazing. The proposed lease area covers approximately 471.8 ha. Figure 1-1 shows the regional setting for the proposed mine and Figure 1-2 shows the mine's location and local features.

Mining is planned to continue for at least two years to test the market opportunities. The annual production rate is expected to be approximately 1.5 million tonnes ROM, which translates to 1 Mtpa of high volatile bituminous black coal suitable for both export and domestic markets. There is sufficient resource in the proposed lease area for a mine life of 15 years at the currently proposed production rate. Through the initial development (Stage 1), it is intended to prove the technical and economic feasibility of the mining operation and test the market acceptance of the coal product. In the event that Stage 1 proves viable, production may be increased to approximately 10 million tonnes per annum.

1.2 History

Coal was originally discovered in the Mulgildie area in the 1920s. The Burnett Coal Company operated the underground Selene Mine, south of the subject site, extracting some 500,000 tonnes from a depth of 25–30 metres between 1949 and the mine's closure in 1966. The abandoned Selene Mine Plant is shown in Photograph 1-1.

Exploration of the Mulgildie Basin has been undertaken since 1970 by a number of companies, but the resources were previously considered to be too small to be economic. The development of selective mining techniques in the 1980s has meant that smaller resources have now become economically feasible to mine.



Photograph 1-1: Abandoned Selene Mine headworks

1.3 Mining Tenure

The location of the mining lease property that Monto Coal intends to acquire is shown in Figure 1-3. A title search of lots affected by the proposed mining lease was conducted as part of the native title report and the results are presented in Table 1-1 below. Land adjacent to the area that is the subject of the proposed mining lease is also held as freehold estates in fee simple or as a perpetual lease selection (PLS).

1.4 Company Environmental Policy

The company has developed an environmental policy for the proposed project. The policy is listed in Appendix A.

Table 1-1: Land Tenure Descriptions

Lot	Plan	Owner	Title
124	RW 714	Avis	Freehold
125	RW 714	Avis	Freehold
145	RW 101	Pattie	Freehold
126	RW 101	Pattie	Freehold
122	RW 100	Drinkwater	Freehold
123	RW101	Talbot	Freehold
142	RW 100	Talbot	Freehold
3	RW 99	Hill	Freehold
4	RW 99	Drinkwater	Freehold
5	RW 591	Jobling	Freehold

Environmental Management Overview Strategy

Figure 1-1: Regional locality plan

Environmental Management Overview Strategy

Figure 1-2: Monto locality map

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Figure 1-3: Mine site plan

1.5 Native Title

There is a native title claim by the Wakka Wakka No 2 over the area of land that is the subject of the proposed mining lease; however, title searches (see Table 1-1) have revealed that the land is either freehold or held as perpetual lease selection, which are both tenures inconsistent with the continued existence of native title.

The roads, rail and stock routes crossing the proposed mining lease are all therefore surrounded by extinguishing tenures. The Queensland Government policy on roads and public access routes is consistent with the Federal Court decision in *Fourmile v Selvam*. Accordingly, it is expected that native title is extinguished over the area of land that is the subject of the proposed mining lease.

1.6 Proposed Schedule

The initial construction is expected to take about 9 months, including the box cut. The box cut will be along the western side of the pit, and mining will progress eastwards. Initially spoil will be placed in out-of-pit dumps to the west of the pit. Once the pit has progressed sufficiently, spoil will be placed back in the pit behind the working strip. Out-of-pit spoil dumps should be trimmed to their final shape and topsoiled and seeded by the end of year 3. In-pit spoil will be progressively rehabilitated as the mine proceeds eastwards. A final void will remain at the end of the mine's life, but it will have a surface area of less than 25 hectares. All other areas disturbed by mining activities will be rehabilitated or assigned to a beneficial use before mine closure.

2. Mining Activities

2.1 Mining Operation

Coal will be mined from the Mulgildie Coal Measures using conventional truck-and-shovel methods. A dragline will not be used, due to the small scale of the operation. Waste above the coal seams will be mined using a bulk excavation method. Selective mining techniques will be used to mine the coal and interburden waste intervals separately, and also mine partings of thickness greater than 10 cm.

Topsoil on average runs to a depth of 0.5 m on the site. Topsoil dumps will be formed along the toe of the out-of-pit waste final dump. Once mining is underway, topsoil stripped ahead of the truck-and-shovel operation will be placed on areas contoured to the final landform, ahead of rehabilitation, or stored in topsoil dumps for future use.

The top 4 m to 5 m of overburden is assumed, based on drillhole and engineering core logs, to be free-dig material. This will be excavated either by scraper or backhoe and truck. All non-free-dig waste will be either ripped and dozed or drilled and blasted prior to removal by the digging unit. In general, waste intervals thicker than 3 m to 5 m will require drilling and blasting prior to loading. The transition from ripping to drilling and blasting will be determined by field conditions and the relative productivity of each method. Similarly, some intervals thinner than 3 m may require drilling and blasting to disrupt re-cemented calcite and siderite bands.

The mine area will be divided into 60 m widths to cope with restrictions on out-of-pit dump capacity and the subsequent need to introduce in-pit waste dumping at the earliest opportunity. The proposed box cut and out-of-pit spoil dumps are shown in Figure 2-1.

All of the box-cut waste and waste to the coal seam base will go to out-of-pit dumps. Out-of-pit waste dumps have been designed with a total capacity of 8.9 million m³ of in situ waste. Out-of-pit spoil dumps from the box cut will initially be constructed west of the railway line after forming the initial containment bund for the tailings disposal area. These will be constructed with an external surface slope of 1 in 6, the same as for the final landform. Water management levees and dams will also be constructed.

Overburden waste will be trucked to waste dump extremities to even out haul cycles. Midburden and interburden waste will be trucked to areas closer to the pit to even out haul cycles, and the deepest waste in the mining sequence will be the first to be scheduled for in-pit waste dumping.

The out-of-pit and in-pit spoil will be progressively placed to create a final landform. Plans of the proposed five-year box-cut and final mine landforms are shown in Figure 2-2 and Figure 2-3.

Environmental Management Overview Strategy

Figure 2-1: Box cut

Environmental Management Overview Strategy

Figure 2-2: Year 5

Environmental Management Overview Strategy

Figure 2-3: Final landform

Environmental Management Overview Strategy

The mining method selected allows the creation of a stable final landform to follow closely behind mining as a normal part of the mining cycle. Thus at the end of the mine's life, a final void landform can be created with a minimum of extra work. This is achieved by leaving the last strip mined, open for later extensions to the open pit if it is economic to continue operations after extending the mining lease. If mining is to cease and the lease is not extended, there is scope to change the mining practice in the last years of mining to mine the final strip on the northern side of the ramp ahead of the strip on the southern side of the ramp. The northern void could then be partially backfilled with waste from the southern strip, thereby reducing the effective size of the final void. A conceptual final void arrangement is discussed later in Section 4.3.

2.2 Coal Processing and Handling

ROM coal will be dumped onto the ROM stockpile in the mine infrastructure area. From here it will be fed into a ROM hopper by a front-end loader. Beneath the hopper will be a feeder-breaker that initially breaks the coal down to a manageable size and then feeds it into a crusher (sizer). This will then crush the ROM coal down to a size suitable for feeding onto the ROM conveyor. The conveyor carries the coal to a screen where the coarse rejects are separated and deposited onto a waste stockpile ready for transport back to the spoil piles.

The sized coal will then be fed either direct to a product stockpile or into the wash plant. If the ash content direct from the pit is suitable for domestic thermal coal (20 to 25 percent), it will be sent directly to the product stockpile without washing. If the ROM coal is not suitable for direct sale, it will go into the washing plant where the fine impurities (known as 'slimes') are removed. The amount of slimes removed will depend on the required ash content of the product coal, which will probably be in the 10 to 12 percent range for export thermal coal.

The slimes from the wash plant will report to a thickener tank, where some of the solids settle out, and liquid from near the surface is recycled back to the plant. The underflow containing settleable particles will be pumped to a tailings dam where the solids settle out and the water will be pumped back to the plant for reuse.

Product will emerge from the wash plant on the product conveyor, which carries the coal to a radial stacker. The product will be stacked in stockpiles ready for loading onto rail trucks.

2.3 Product Stockpiling

Two 10,000 tonne product stockpiles will be established. The stockpiles will be located about 30 m from the proposed rail siding on a gravel pavement sloping about 1% away from the siding into a dirty-water drain. The front (train) edge of the stockpile/load-out area will be elevated about 1 metre above the track level for easy loading.

2.4 Transport

The Maryborough to Gladstone (via Monto) rail line will be utilised to transport coal to Port Barney in Gladstone. Coal will be loaded from the product stockpiles to a train with an expected payload of 2,100 tonnes of coal.

It is proposed to upgrade the existing infrastructure to include a rail siding for coal loading. Product load-out will be by a front end loader rather than overhead bin. The existing track running through the site does not lend itself to load-out directly on the main line, as grades are too steep and variable. Therefore a siding will be required for load-out and to run the locomotives around for the return journey. Load-out will be carried out in the reverse direction (away from the port) up a grade of about 1 in 160. The triple locomotives will then be decoupled and run around the wagons for the haul to the port.

As the present rail track is old and not suitable for heavy wagons, an axle weigher will be installed to ensure that there is no overload on any axle. If any overload is detected, the excess coal will need to be scooped out of the wagon by an excavator or backhoe, as there will be no facility for decoupling and siding an overloaded wagon.

To achieve Queensland Rail's required loading rate, two CAT 988 loaders with coal buckets will be required. These loaders may be used elsewhere (e.g. ROM feed or in the pit) when a train is not being loaded.

Following transport of the coal to Port Barney, approximately 70,000 tonnes would be accumulated for shipment to the respective market locations.

2.5 Support Infrastructure

In addition to the preparation and handling plant mentioned above, there will be other services and infrastructure required by a functioning coal mine, which are listed below:

- power supply: this will be a new high-voltage line from Monto at either 11 kV or 66 kV with a capacity of at least 1.5 MVA;
- a water supply of approximately 700 MLpa that will come from the Precipice artesian groundwater;
- an access road of about 1.5 km in length from the Burnett Highway to the mine industrial area;
- on-site dams and diversions for managing clean and dirty water to ensure that eroded sediment will not be transported off site. It is expected that about 100,000 tonnes of tailings will be produced every year and pumped to a dedicated dam for dewatering and disposal. The tailings dam will be constructed from spoil, with the core made from select clay spoil and compacted to achieve a low-permeability wall. The external face of the dam wall will also be battered at 1 in 6 and topsoiled and revegetated consistent with the other spoil piles. It is anticipated that the dam will not be higher than 10 m above natural ground and will not have any significant catchment reporting to it;

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- a sewage collection system. As the life of Stage 1 may be as short as 3 years, it is intended to collect the sewage in a holding tank and regularly pump it out to a tanker for transport to the nearest municipal sewage treatment plant. The volume needing to be transported and treated will be reduced by segregating the grey water (from showers and hand basins) from the black water (from water closets and kitchen sinks) and taking away only the black water. The grey water would be sent to the return water dam via the environmental dam for reuse as process water; and
- a heavy vehicle workshop, an administration building, an ablutions block, a refuelling station and a vehicle wash.

No accommodation, on or off site, will be provided for the workers. The on-site buildings for other facilities will be provided by the contract miner.

The proposed infrastructure layout is shown in Figure 2-4.

2.6 Mine Operation Hours

Based on studies conducted to date, it is expected that the mining operation will be undertaken in a shift system operating up to 24 hours per day, seven days per week. Queensland Rail has requested 24-hour, 7-day-a-week access for rail loading.

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Figure 2-4: Mine industrial area

3. Meteorological Conditions

3.1 Climate and Rainfall

The climate in the North Burnett area is subtropical, with hot summers and mild winters. Rainfall is summer-dominant and is extremely variable, coming mostly from summer thunderstorms.

Records from the rainfall station at Monto indicate that there is a mean annual rainfall of 726 mm. Mean monthly rainfalls vary from about 25 mm in August to 115 mm in January, as shown in Figure 3-1.

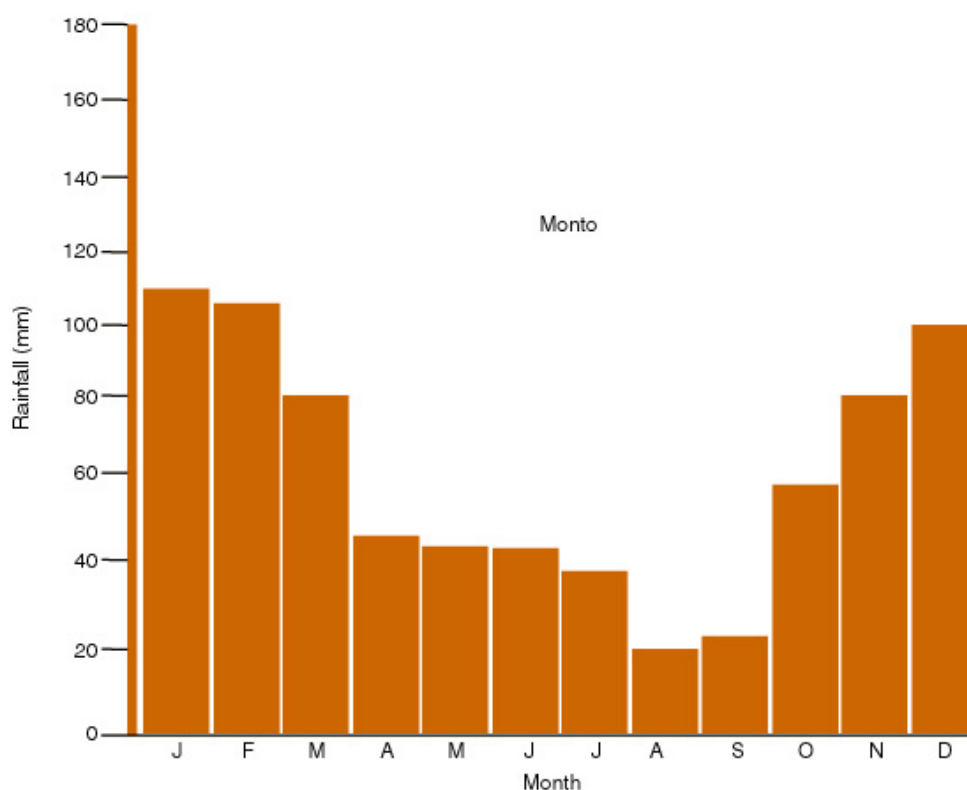


Figure 3-1: Histogram of average monthly rainfall

3.2 Temperature

At Monto, average maximum temperatures range from 30°C to 32°C in the summer months, with an average of 6 days/year exceeding 35°C. The mean minimum temperature ranges from about 6°C in July to about 19°C in January. Frosts are more likely to occur in July, with heavy frosts where the temperature is less than 0°C (temperatures of less than 0°C are recorded, on average, 4 days/year at Monto). Monthly temperature variations are shown in Figure 3-2.

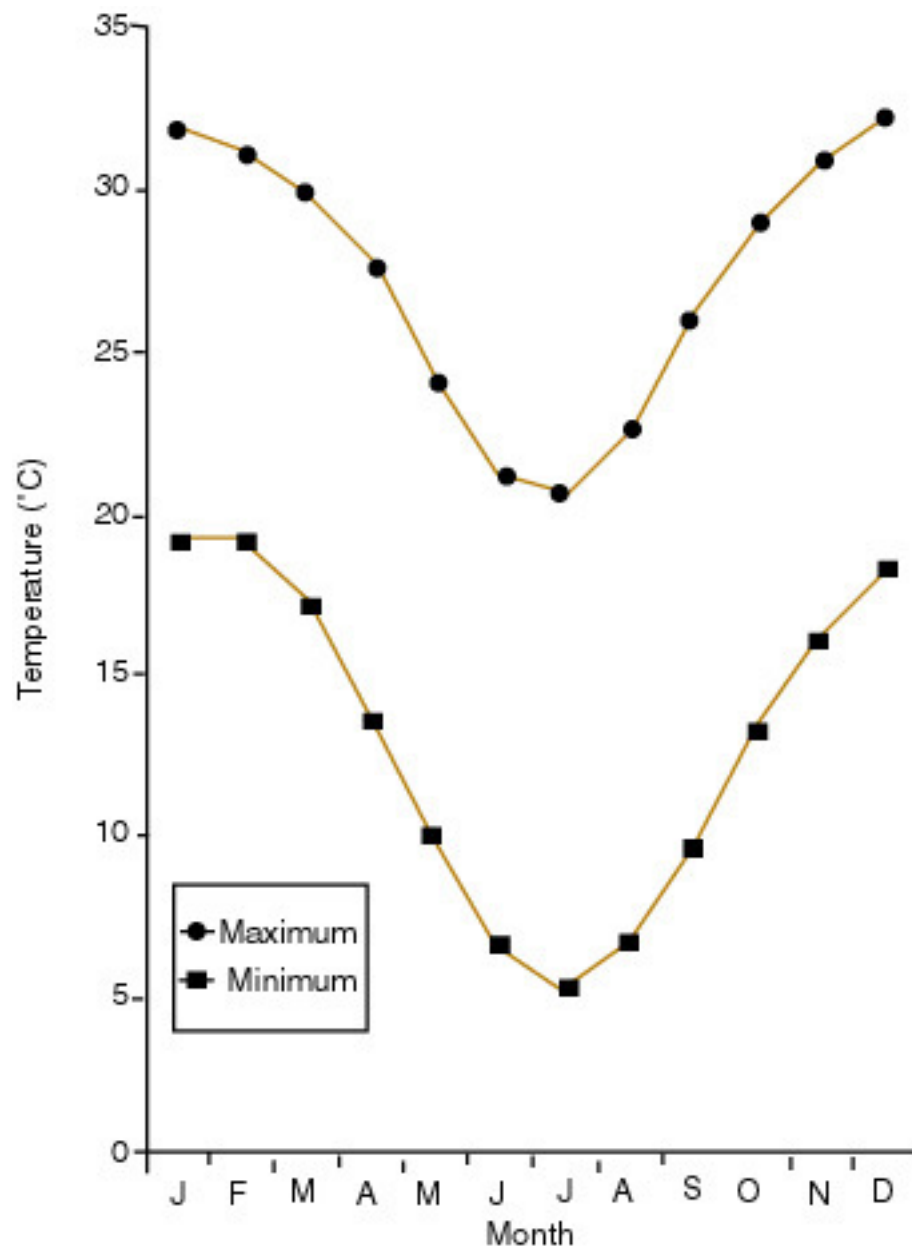


Figure 3-2: Monthly temperature variations

3.3 Evaporation

At Monto, the mean monthly pan evaporation, in mm/day, varies from 3.0 in July to 8.1 in December. Mean pan evaporation exceeds mean rainfall in all months throughout the year. Evaporation ranges from 6 to 8 mm/day during summer to 3 mm/day during winter.

3.4 Wind Direction and Cyclones

The major wind direction in October to April is north-east to south-east, and in May to September, south-west to west. The Gladstone area is subject to the occasional cyclone; however, it is considered that by the time a cyclone crosses the coast and reaches the Monto area, it would have degraded to a rain depression.

3.5 Bush Fires

The mine site is virtually devoid of natural vegetation, with only small fragmented stands of trees adjacent to some of the drainage courses. Bush fires within this vegetation would be minor, consisting mainly of grass fires.

3.6 Seismic Activity: Earthquakes

A search of the Australian Geological Survey Office (AGSO) website identified that a number of earth tremors had occurred in the Monto region. The details of the recorded earth tremors are presented in Table 3-1.

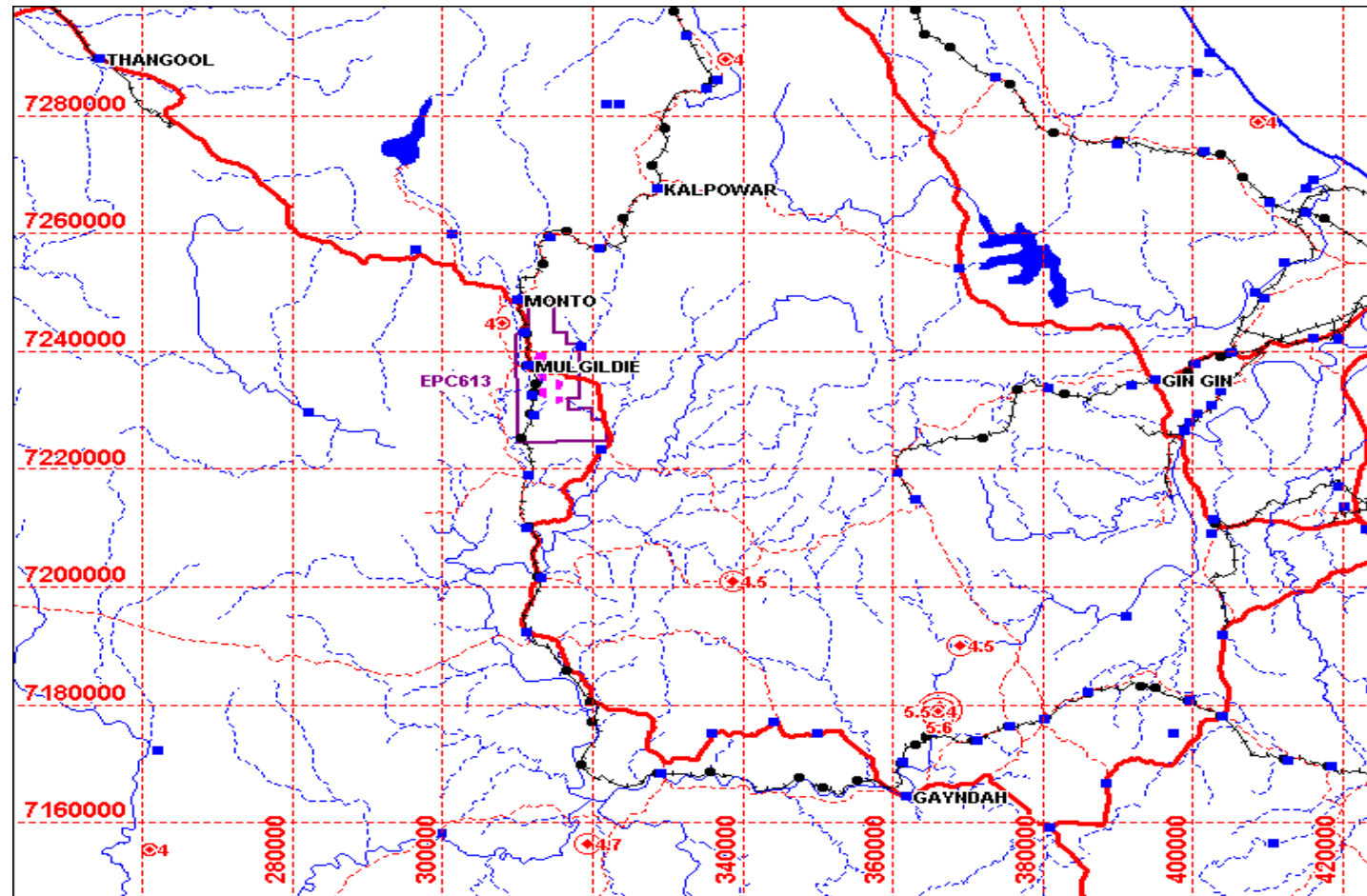
Table 3-1: Recorded Earth Tremors in the Monto Region

UFI	Date	Time	Magnitude (Richter Scale)	Longitude	Latitude
42379	03/12/1953	15:42:49.00 (UTC)	4	151.4	–24.5
41960	15/06/1897	19:00:00.00 (UTC)	4	151.1	–24.9
41971	14/04/1916	6:45:00.00 (UTC)	4	152.1	–24.6
26784	25/03/1964	6:14:37.90 (UTC)	4.5	151.4	–25.3
26785	03/03/1964	6:13:35.00 (UTC)	4.5	151.7	–25.4
3241	28/08/1883	16:55:00.00 (UTC)	5.6	151.67	–25.5
3848	12/04/1935	1:32:24.00 (UTC)	5.5	151.67	–25.5
11931	28/08/1883	18:20:00.00 (UTC)	5	151.67	–25.5
42373	01/06/1935	12:12:00.00 (UTC)	4	151.67	–25.5
20790	24/11/1910	22:52:42.00 (UTC)	4.7	151.2	–25.7
42374	13/02/1998	23:20:51.50 (UTC)	4	150.62	–25.7

Source: Australian Geological Survey Office (AGSO)

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The majority of the recorded tremors had magnitudes of 4 to 4.7 on the Richter scale, which are relatively minor. However, the events of 1883 and 1935 are of significantly higher magnitude (5.5 to 5.6). The location of earthquake epicentres is shown as Figure 3-3. These earthquakes have return periods that vary from 11 to 38 years; the average return period is 25 years. For a mine life of 10 years, there is a 30% probability of an earthquake of magnitude 4 or above occurring in the area.



■ represents epicentres

Source: AGSO2001

Figure 3-3: Locations of earthquake epicentres in the Monto region, magnitude shown at epicentre and grid intervals at 20 km

4. Geology

4.1 Geology

4.1.1 Regional Geology

The coal seams to be mined in the Monto Coal Project occur in the Mulgildie Coal Measures, which are contained in a Mesozoic fault-bounded trough known as the Mulgildie Basin. Tectonism in the Lower Triassic developed several basins, including the Mulgildie Basin.

Subsidence of the Mulgildie Basin continued during the Lower–Middle Jurassic and resulted in deposition of the Precipice Sandstone, Evergreen Formation, Hutton Sandstone and finally the Mulgildie Coal Measures.

4.1.2 Geology of the Mulgildie Basin

The Mulgildie Basin is a narrow, elongated trough of Jurassic sediments which extends off the north-eastern portion of the Surat Basin for approximately 100 km from a point halfway between Abercorn and Mulgildie to the north of Monto. The distribution of the Mesozoic sediments is controlled by a system of north–south faults, with the Mulgildie Fault separating the Mesozoic sediments from the Palaeozoic basement rocks to the east.

Fault movements produced a downthrown block between the faults, preserving the Mulgildie Coal Measures and warping the Triassic–Jurassic sediments of the Mulgildie Basin in a gentle asymmetrical syncline.

Immediately and unconformably underlying the Jurassic sediments are a sequence of sediments and volcanics, referred to as the Cynthia Beds and thought to be equivalent to the Callide Coal Measures or the Tarong Beds, both dating from the Triassic.

The stratigraphic succession in the Mulgildie Basin parallels that in the Early to Middle Jurassic of the Surat Basin, with the Precipice Sandstone being followed by the Evergreen Formation, Hutton Sandstone and Mulgildie Coal Measures. Other than adjacent to local faults, bedding dips are relatively flat-lying and in the range of 2° to 5°.

The Mulgildie Coal Measures are equivalents of the Middle Jurassic Walloon Coal Measures and have been targeted by exploration programs in the search for coal. The unit contains soft sandstones, carbonaceous shales, siltstones and mudstones, and high volatile bituminous coal seams. The individual coal seams display the typical thickening and thinning of Walloon-type deposits; however, the total coal thickness of the package of seams at Mulgildie is considered much less variable.

Tertiary basalts and sediment overlies parts of the Mulgildie Basin, and there are some extensive deposits of recent alluvium (material deposited by flowing water) associated with floodplains, principally around Three Moon Creek.

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Deep weathering during the Cainozoic produced a lateritic profile over a large proportion of the study area. Much of this profile has since been removed by erosion. Relics of this deep weathering profile are preserved on the Mulgildie plateau to the east of the site. The Mulgildie Basin stratigraphy is represented diagrammatically in Figure 4-1 and more detail is given in Table 4-1.

Table 4-1: Stratigraphy of the Mulgildie Basin

Stratigraphy of the Mulgildie Basin			
Age	Formation	Thickness (metres)	Lithology
Quaternary		0 to 10	Soil, alluvium and gravel
Tertiary		0 to 40	Basaltic flows and residual soils, laterite
Middle Jurassic	Mulgildie Coal Measures	150 to 240	Grey mudstones and fine sandstones with numerous coal seams; coarse grey sandstones and granular conglomerates, grading to dark-grey micaceous and carbonaceous mudstones
Early Jurassic	Hutton Sandstone	100 to 275	Fine- to medium-grained quartz sandstone, some mudstone clasts interbedded with siltstone and mudstone
	Evergreen Formation	70 to 260	Black carbonaceous shales and siltstones at the top; coarse quartz sandstone at the base interbedded with siltstone
	Precipice Sandstone	60 to 300	White, coarse grained quartz sandstone
	Unconformity		
Middle Triassic	Cynthia Beds	1400	Intermediate-basic lava, tuffs, agglomerate, siltstone, lithic sandstone

4.1.3 Local Geology and Land System

The local geology and land system near the proposed mine site can be divided into three geologic groups, including:

- deeply weathered sediments and basic volcanics;
- sedimentary rocks, including the Mulgildie Coal Measures; and
- alluvial land systems (alluvium).

4.1.3.1 Deeply Weathered Sediments and Basic Volcanics

The Tertiary rocks in the area crop out along the Mulgildie Plateau to the east of the proposed mine. Basalt lavas have produced a capping overlying the Middle Jurassic sedimentary rocks of the Mulgildie Coal Measures. Overlying the basalts is a deep-red lateritic cover (ferrosols) that is cultivated. The basalt, which is exposed in road cuttings approaching the summit of the plateau, ranges from fresh to weathered and often contains calcite as fracture infilling within the basalts.

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4.1.3.2 Mulgildie Coal Measures

The area immediately surrounding the proposed mine site is dominated by the Middle Jurassic sedimentary rocks of the Mulgildie Coal Measures.

The Mulgildie Coal Measures consist of quartzose and sublabile fine sandstone, siltstone, shale, mudstone and coal, and reach a maximum thickness of 360 m (Day et al., 1983). Local studies suggest that this unit is thinner, ranging between 150 m and 240 m (Gould, in prep.). Fossil plant (terrestrial) material is present within the unit, and has been dated to the Middle Jurassic. These are immediately underlain by the Hutton Sandstone — a major aquifer of the Great Artesian Basin (GAB).

The coal resource is located throughout the Mulgildie Coal Measures as a series of seam groups (A–F+X). These groups comprise several seams of varying thickness, with cumulative seam thickness of about 10 m (see Figure 4-1).

Rocks within the proposed mine area dip between 2° and 5° (Gould, in prep.). It is understood some faulting is present in the mine area.

The aquifer within the Mulgildie Coal Measures is expected to be the coal seams themselves. Little data is currently available on these groundwater aquifers. A typical groundwater conceptual model for the Mulgildie Coal Measures is shown in Figure 4-2.

This figure shows typical inputs (precipitation, seepage) and outputs (evaporation, pumping, subsurface flow in coal seam) to the hydrological regime for both the operational phase and closure phases of a coalmining operation, and how this may influence water quality in the final void.

4.1.3.3 Alluvium

The main source of alluvium in the area is associated with Three Moon Creek, located about 2 km to the west of the proposed mining area.

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Figure 4-1: Basin stratigraphy

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Figure 4-2: Conceptual models affecting final void water quality

5. Description of Environmental Values

5.1 Air Quality

Based on regional data (Richard Heggies & Associates, 2002), the expected background levels near Monto are summarised in Table 5-1.

Table 5-1: Expected background air quality for the Monto mine region (based on Katestone, 1998)

Parameter	Averaging time	Background concentration
Dustfall (mg/m ² /day)	Annual	5–30
PM ₁₀ (µg/m ³)	24-hour	5–40 (mean 20)
	Annual	20–22
PM _{2.5} (µg/m ³)	24-hour	3–20
	Annual	4–10
TSP (µg/m ³)	24-hour	50–80
	Annual	30–50
Sulfur dioxide (SO ₂) (ppb)	Annual	5–10
Nitrogen dioxide (NO ₂) (ppb)	Annual	3–10

The regional wind rose is shown in Figure 5-1. The data shows that the predominant winds range from north-easterly to south-easterly. Overall, 94.7% of all wind speeds were less than 5 m/s.

A piggery is located between the proposed mine site and Mulgildie, near the north-western corner of the site. The piggery may contribute to background levels of odour in the vicinity of the mine but impacts would be expected to be minimal.

Occasional fires and wind-blown dust associated with agricultural land clearing and cultivation can be expected in the region at times.

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Figure 5-1: Regional wind rose

5.2 Water Management

5.2.1 Surface Water

The main watercourse in the area is Three Moon Creek, approximately 2 km to the west of the proposed mining lease. Other watercourses in the area are ephemeral, with water quality likely to depend very much on time of year and land use in the catchment.

There is one easily identified drainage line running north-west across the northern half of the proposed mine area, feeding two dams on the site and discharging under the railway line to the west. There is another drainage line running west in the southern half of the site, and again discharging under the railway line. Outside the proposed mine area, there is a drainage line flowing west between the mining lease boundary and the Burnett Highway. This drainage line has been defined as a watercourse under the *Water Act* by a representative of the Department of Natural Resources and Mines (DNRM).

Flow in all these drainage lines is intermittent, and the water quality is likely to be highly variable depending on season and rainfall. There are farm dams constructed on most of the watercourses and drainage lines in the area surrounding the proposed mine site. The DNRM (John Harvey, pers. comm.) has indicated that no watercourses exist on the area covered by the proposed mining lease.

5.2.2 Groundwater

5.2.2.1 General Hydrogeological Setting

The Burnett River originates in the northern part of the North Burnett area, and is the major river into which all streams flow. Three Moon Creek flows via the Cania Dam through Monto to the west of Mulgildie and about 2 km to the west of the proposed mine site. The Cania Dam is mainly used to recharge the aquifer along Three Moon Creek for irrigation purposes.

Within the proposed mine area, there are three drainage paths, mostly leading into farm dams then across the site and draining from the east of the plateau region towards Three Moon Creek in the west. At the time of inspection (November 2001) all drainages were dry, while the farm dams contained water, as shown in Photographs 5-1 and 5-2.

Monto is located on the eastern margin of the Great Artesian Basin (GAB) in an area generally delineated as a recharge area for GAB aquifers. From basement up, the stratigraphic units encountered at Monto are Precipice Sandstone, Evergreen Formation, Hutton Sandstone, and Mulgildie Coal Measures. Figure 5-2 shows a cross-section of these units, showing their stratigraphic relationship.

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Figure 5-2: Mulgildie Basin cross section



Photograph 5-1: Typical flat-bottomed gully within the proposed mine area



Photograph 5-2: View of valley and convex hillsides

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Searches were undertaken of available data in the Department of Minerals library, on commercial online databases, and the DNRM database. In addition, DNRM personnel in Brisbane, Bundaberg, and Mundubbera provided local knowledge of aquifer systems in the Monto area, and advice on bore licensing and other regulatory matters.

Monto Minerals was contacted directly to obtain reports and data on the drilling and licensing of its Ilmenite Bores Numbers 1, 2, and 3. The company is currently not making these data available, as bore licensing issues have not been finalised. However, it is anticipated that when the licences have been finalised, the data will be made available.

Where possible, water quality information has been obtained from the DNRM groundwater database. The quality of information in the database is uncertain, as matching of water quality information to specific aquifers at specific depths (i.e. screened intervals) is not always possible.

5.2.2.2 GAB Aquifers

According to Habermehl (1996), the main aquifer units of the GAB include the Clematis, Precipice, Boxvale, Hutton, Adori, and Hooray Sandstones, the Cadna-owie Fm (and equivalents) and the Mackunda and Winton Formations. The aquifers are relatively uniform in characteristics, and are continuous and hydraulically connected across sub-basins (except where disrupted by faults).

General hydraulic characteristics of GAB aquifers (mainly from Cadna-owie Fm, Horya, Algebuckina, and Pilliga Sandstones and equivalents) are given in Table 5-2.

The aquifers in the Monto area include the Precipice Sandstone, Hutton Formation, and alluvial sediments of Three Moon Creek and Splinter Creek. DNRM (Bundaberg) indicates that the Mulgildie Coal Measures are used locally as a supply of stock water.

Table 5-2: General properties of GAB aquifers

Property	Range
Hydraulic Conductivity	0.1 – 10 m/day (mostly in lower end of range)
Transmissivity	1 – 2000 m ² /day
Storage Coefficient	1 x 10 ⁻⁴ – 9 x 10 ⁻⁵
Intrinsic Permeability	~10 to > 1000 millidarcies (where 1 darcy = 0.831 m/day @ 20°C)

Source: Habermehl 1996

5.2.2.3 GAB Confining Beds

The main confining beds are the Rewan Group (the hydraulic basement of the GAB), Moolayember, Evergreen, Birkhead, Westbourne, Wallumbilla and Toolebuc Formations (and equivalents), the Allaru Mudstone, and parts of the Mackund and Winton formations.

In the Monto area, the Evergreen Formation acts as a confining bed to the Precipice Sandstone.

5.2.2.4 Local Hydrostratigraphy

An indication of the stratigraphy of the area can be obtained from the Geological Survey of Queensland (GSQ) bore GSQ Monto 1–2R (Gray, 1972). This bore is also known by the DNRM bore-numbering system as 22175. Accurate delineation of the boundary between the Mulgildie Coal Measures and Hutton Sandstone is difficult, and so the boundary between these units may be in question. The recorded depths of other unit boundaries are in good agreement with later bores (Mulgildie Town Bore and Monto Minerals Ilmenite Bore Number 1), and so the boundaries of lower units are not considered to be in question. The formation tops for the same bore in the DNRM database (22175) are several metres different from those converted from the published bore log; the reason for this is unknown.

The location of registered bores is shown in Figure 5-3. It should be noted that subartesian bores drilled outside the Monto Subartesian Area as shown in Figure 5-4, do not need to be licensed. This means that other private bores potentially exist that are not shown on this map.

a) Precipice Formation

The Precipice Sandstone contains the best quality groundwater resource in the region (total dissolved solids (TDS) of Mulgildie Town Supply was 438 mg/L TDS for a sample taken on 6/6/2001). However, iron precipitation from the Mulgildie Town Bore has been an issue, and the water is quite aggressive due to high levels of dissolved CO₂. The Mulgildie Town Bore has one of the highest measured levels of dissolved CO₂ in the GAB (DNRM, pers. comm. 11/12/01). As a result, the steel casing of the Mulgildie Town Bore had to be relined, due to degradation after several years of operation. Later bores constructed in the Precipice Sandstone have had DNRM licence conditions imposed that included a requirement that the bore have an inert casing.

The top of the Precipice Sandstone has been recorded at approximately 582 m below ground level (BGL) in Monto Minerals Ilmenite Bore Number 1, 588 m BGL in the Mulgildie Town Bore, and 593 m BGL in the Geological Survey of Queensland (GSQ) bore GSQ Monto 1-2R.

The hydraulic properties of the Precipice Sandstone in this area are not well known. However, testing of samples from GSQ Monto 1-2R, which was drilled approximately 700 m to the south-south-east of the Mulgildie Town Bore, recorded an average porosity of 15%, and an intrinsic permeability of 1.5–840 millidarcies (0.001–0.7 m/day), with an average of 296 millidarcies (0.25 m/day). It is understood that hydraulic testing has been conducted on the Monto Minerals Ilmenite bore Number 1; however, at this time the data is unavailable.

b) Mulgildie Town Bore

The Mulgildie Town Bore is an artesian bore, drilled and constructed in the Precipice Sandstone, and provides water at a flow rate of 3 litres/second. A 100-hour recession test (DPI 1992) has indicated that, for a flow of 3 litres/second, the back pressure after 2 years would be 2.8 m (i.e. the bore flow is 3 litres/second at 2.8 m head). Therefore the bore is only slightly artesian, and it is probable that additional pumping from the Precipice Sandstone would affect flow from the bore, and make it subartesian (i.e. it would cease to flow).

c) Monto Minerals Ilmenite Bores

Monto Minerals have one production bore (Goondicum Ilmenite Bore Number 1) currently constructed in the Precipice Sandstone (to the north-east of Mulgildie) and two other proposed bores (Goondicum Ilmenite bores Number 2 and Number 3) which will take water from this aquifer.

d) Evergreen Formation

The Evergreen Formation is a confining layer that has been struck in GSQ Monto 1–2R from 330.4 m to 593.1 m BGL, and in the Mulgildie Town Bore from 296 m to 554 m BGL.

e) Hutton Sandstone

The Hutton Sandstone is recognised as an aquifer in other areas of the GAB. While anecdotal information indicates that the Hutton Sandstone is relatively clayey, and may not be an important aquifer locally, it is considered that the aquifer potential of the Hutton Sandstone should be assessed if drilling a deeper bore to the Precipice Sandstone. There do not appear to be any local groundwater users taking water from the Hutton Sandstone (DNRM Mundubbera, pers. comm. 11/12/01). Water quality information is sparse, but the DNRM database reveals that water quality varies from less than 1,000 to over 7,000 mg/L TDS. The aquifer yield is unknown.

f) Mulgildie Coal Measures

The Mulgildie Coal Measures are used in areas outside the alluvium to provide water for stock. The DNRM groundwater database indicates that water quality varies from less than 500 to over 16,000 mg/L TDS, with most samples over 2,000 mg/L TDS. The average yield of bores in this aquifer is uncertain.

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Figure 5-3: Bore classes

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Figure 5-4: Monto declared subartesian area

g) Alluvial aquifer

Alluvial deposits are located along the locally significant watercourses, including Three Moon Creek and Splinter Creek. These alluvial deposits are exploited as a source of irrigation water, and for stock and domestic supply. Both the townships of Monto and Mulgildie rely on groundwater to provide domestic water supply.

The alluvial aquifers of Three Moon Creek and Splinters Creek are within the Monto Declared Subartesian Area (Figure 5-4). The alluvial deposits are recorded as attaining thicknesses of 20 to 25 metres. Recorded water quality varies from less than 1000 to over 9,000 mg/L TDS, with an average of around 2,100 mg/L.

In 1972 and 1974 recharge weirs were constructed on Three Moon Creek at Monto Weir and Youlambie Weir. Monto Weir benefits the Monto Town water supply, while Youlambie Weir has an associated structure that enables diversion of water along a channel and siphon system traversing the alluvial flats of Three Moon Creek. The construction of Cania Dam, approximately 42 km from the mine on Three Moon Creek, was completed in 1983 (see Figure 1-2). It supplies water for downstream groundwater recharge, and surface water for downstream users (DPI Design and Commissioning of the Mulgildie Water Treatment Plant for Monto Shire Council, June 1992). Three Moon Creek is approximately 2 km from the proposed mining lease at its closest point.

Water allocations are part of a conjunctive use scheme. Surface water is used when adequate supplies are available. When discharges from Cania Dam are available (nominally twice a year), they are used to recharge the alluvial aquifers via constructed recharge facilities.

5.2.2.5 Groundwater Springs

There are a number of springs in the area, some of which are deemed to be of significance. The most notable springs are Abercorn Springs (see Figure 1-2), which contain significant flora. These springs are located approximately 17 km from the mine site. The source of water for these springs is uncertain, but based on their water quality, it is postulated that the source is either the Evergreen Formation or Hutton Sandstone (D. Dempster, Bundaberg DNR, pers. comm. 28/11/01).

5.3 Land Management

5.3.1 Pre-Mine Landform

The proposed mine site forms part of a series of low hills trending north–south, and is bounded by the floodplains adjacent to Three Moon Creek to the west and plateau areas to the east.

Locally the landform is dominated by undulating low rolling hills on the Mulgildie Coal Measures. These hills tend to fall westerly to the alluvial plains of Three Moon Creek. Typically, within the site the landform can be subdivided into terrain unit classes, which comprise:

- hillcrests, rounded to flat hillcrests and elevated spurs;

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- spurs and associated saddles, which bound the hillcrests and are apparently controlled by underlying resistive sandstone unit(s) of the Mulgildie Coal Measures with convex profile side slopes; and
- valley floors, mostly flat-bottomed gullies which separate the spurs and saddles.

A contour plan of the pre-mine surface within the Monto Coal mining lease and adjacent areas is shown in Figure 1-3. The figure shows the landform shape and watercourse locations.

5.3.2 Pre-Mine Land Capability

The pre-mining land capability was determined from a soil survey based on a Queensland DNRM *Land Resource Bulletin* Reference DNRQ990067. The description of the eight land capability classes is shown in Table 5-3.

The majority of land is classified for dryland cropping as Class III, suitable with moderate limitations, and for improved pastures as Class II, suitable with minor limitations. The distribution of these areas is shown in Figure 5-5.

5.3.3 Pre-Mine Land Use

The site is currently used for agricultural purposes — for both cropping and grazing on the existing hills, valleys and contour-banked slopes. The land is virtually all cleared, except for scattered minor pockets of trees.

The properties on the proposed mining lease are used for rural and related activities dominated by cattle grazing and crop production, predominately sorghum and lucerne. Pig farming is also carried out adjacent to the site at approximately 1.2 km to the north-west of the proposed northern boundary.

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Figure 5-5: Land capability classes

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Table 5-3: Descriptions of the eight land capability classes used in classifying land in the North Burnett area

Land Class	Description
Class I	Land suitable for all agricultural and pastoral uses. Land is suited to a wide range of crops and is highly productive. Land presents no limitations to use of machinery or choice of implements. Wind and water erosion hazard are low even under intensive cultivation.
Class II	Land suitable for all agricultural uses but with slight restrictions to use for cultivation in one or more of the following categories: Land with some limitation to the choice of crops and/or slight restrictions to productivity. Land with some impediment to the use of cultivation machinery, which limits the choice of implements or restricts the conditions for successful operation. Land which under cultivation requires simple conservation practices to reduce soil loss to an acceptable level. These include agronomic practices such as contour working, strip cropping, stubble mulching.
Class III	Land suitable for all agricultural uses but with moderate restrictions to use for cultivation in one or more of the following categories: Land with moderate limitations to the choice of crops and/or moderate restrictions to productivity. Land with moderate impediment to the use of cultivation machinery which limits the choice of implements or restricts the conditions for successful operation. Land which under cultivation requires intensive conservation practices to reduce soil loss to an acceptable level. These include contour banking systems and intensive residue management involving specialised machinery.
Class IV	Land primarily suited to pastoral use but which may be safely used for occasional cultivation with careful management. Land on which the choice of crops is severely restricted and/or conditions are such that productivity under cropping is severely limited. Land with severe impediment to the use of cultivation machinery which limits the choice of implements or severely restricts the conditions for successful operation. Land which cannot be used safely for permanent cultivation. If cropped, a pasture phase must be the major component in the cropping program to limit soil loss to an acceptable level.
Class V	Land which is suitable for cultivation but is well suited to pastoral use and on which pasture improvement involving the use of machinery is practicable.
Class VI	Land which is not suitable for cultivation but is well suited to pastoral use and on which pasture improvement involving the use of machinery is practicable.
Class VII	Land which is not suitable for cultivation but on which pastoral use is possible only with careful management. Pasture improvement involving the use of machinery is not practicable.
Class VIII	Land which has such severe limitations that it is unsuitable for either cultivation or grazing.

Reference: *Land Resources of the Burnett Region. Part 3: North Burnett* by T.E. Donnollan and R.D. Searle, Department of Natural Resources and Mines DNR 0990067

5.3.4 Soils

A series of ground traverses with sampling from shallow test pits (whose locations were based on their geomorphologic setting) were undertaken. Laboratory testing of selected samples was undertaken to assess soil dispersion, plasticity and topsoil chemistry. The location of the test holes is shown on Figure 5-6.

Fourteen shallow test pits were dug manually (using a 100 mm hand auger and a shovel) to log the soil profile. Three soil units were present within the proposed mining area:

- vertosols — dark-brown to grey 'cracking clays';
- calcarosols — soils interpreted as being mainly located on crestal areas where the vertosol soil profile may still exist, but is of limited depth; and
- rudosols — shallow, medium-textured and coarse-textured soils over rock, with negligible soil profile development.

Field pH tests of soils in the area revealed that the soils are alkaline, ranging between pH 8 and pH 9. Laboratory tests indicated a pH of 7.6 at location 02.

5.3.4.1 Vertosols

The vertosols (cracking clays) are common within the mine area and dominate the landscape. They are typically dark-brown in colour (~10R1.7/1), with a very stiff to hard consistency, and often grade into residual weathered coal measures.

Test holes were terminated at less than 0.5 m BGL (typically 0.3 m BGL) in these soils, due to their hardness. These soils often display slickensides within the profile, indicating that the soil shrinks and swells in response to changes in the moisture content.

All of the vertosols, with the exception of the upper 0.05 to 0.10 m, were damp to moist as a result of recent local rain. The upper 0.02 m generally formed a crust with wide (10 mm) cracks. This crust 'floats' above the underlying profile and is easily removed by hand.

In some holes (close to gullies and on hill crests) trace amounts of ironstone pebbles and some caliche (calcium carbonate) were present.

5.3.4.2 Calcarosols

Calcarosol was observed at location 04 within the area. This profile is overlain by a thin vertosol (black soil) skin approximately 0.15 m thick. Below this the profile exhibits mottling (orange staining) and grades into a white-grey (N 8/0) zone, rich in carbonate. Caliche pebbles are common throughout the pan layer, which is approximately 0.4 m thick (0.8m BGL – 1.2m BGL). The profile is illustrated in Photograph 5.3.

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Figure 5-6: Soils and landform mapping



Photograph 5-3: Calcarosol – carbonate-rich soil

5.3.4.3 *Rudosols*

Rudosols were observed at locations 05 and 12 and were identified in some of the drainages within the mine area. These are soils that have little to no soil profile development and are essentially only sedimentary or colluvial deposits.

Ironstone fragments were identified in one of the profiles classified as rudisol. This soil type is confined to the areas close to the drainage channels within gullies (fluvial deposits), and the foot of slopes (colluvial deposits). It is dark-brown in colour, similar to the black soils (vertisols). Due to the hardness of this soil, test holes were terminated at approximately 0.5 m BGL.

5.3.4.4 *Results of Soil Testing*

The following types of tests were carried out on soils from the proposed mine area: Atterberg Limits, Emerson Class, particle size distribution, and double hydrometer and chemical testing.

Five Atterberg Limits tests were undertaken. The results of the tests are summarised below. They imply that all the samples tested are of high plasticity with a moderate to high potential for seasonal shrink/swell movement.

Table 5-4: Soil Test Results

Sample No.	Location	Depth (m)	Description	Liquid Limit %	Plasticity Index %	Emerson Class
MC0101	01	00–01	Clay (CH)	—	—	4
MC01001	01	0.0–0.2	Clay (CH)	73	44	6
MC0201	02	0.0–0.1	Clay (CH)	60	34	5
MC0202	02	0.1–0.2	Clay (CH)	—	—	5
MC0401	04	0.15–0.3	Clay (CH)	73	46	4
MC01101	11	0.0–0.15	Clay (CH)	75	44	6
MC01201	12	0.0–0.3	Clay (CH)	51	29	—

Note: CH indicates clay is of high plasticity

The parent dispersion or double hydrometer test AS1289.3.8.2 – 1997 was undertaken on sample MC0101 at location 1 at 0.0 – 0.1 m depth. The test provided a dispersion percentage of 10%.

A topsoil sample from location 2 at 0.1 to 0.2 m gave results of pH of 7.6, electrical conductivity of 77 $\mu\text{s}/\text{cm}$ and soluble chloride concentration of 50 mg/kg.

The Atterberg Limits and Emerson Class tests indicated that the clays are possibly mixed clays, being montmorillonites, illites and kaolinites. Montmorillonites tend to be dispersive, but the chemical tests indicated that the sample was saturated in calcium, which tends to lower dispersion potential. Emerson Class numbers of 4 to 6 are regarded as indicating low dispersion or being non-dispersive. A percent dispersion value of 10% is below the lower bound value of 15%, and the sample tested is not considered susceptible to piping and dispersion in dams. Chemical testing indicates that the sample tested is within acceptable limits for topsoil reuse as a natural soil (refer AS4419 'Soil for Landscaping and Garden Use').

5.4 Background Noise Levels

The area is predominantly rural, with principal noise sources being traffic on the nearby highway, rail traffic, and intermittent farm equipment noise. There is a sawmill in the nearby township of Mulgildie.

Background noise levels are presented in Table 5-5 (Richard Heggies & Associates, 2002). The data shows the range of average background noise levels (LA_{90}) and average LA_{10} noise levels at each monitoring site over the day. The results were collected during summer; no results were collected during winter.

Table 5-5: Range of Measured Noise Levels (dBA)

Location	Range of Measured Noise Levels, in dBA		
	Time Period	Background (LA90) Noise Level	LA10 Noise Level
Avis Residence	Day (0700–1800)	30.0 – 35.3	41.8 – 48.7
	Evening (1800–2200)	30.8 – 37.4	40.1 – 47.3
	Night (2200–0700)	30.1 – 34.1	40.7 – 46.9
Hill Residence	Day (0700–1800)	28.8 – 34.0	37.0 – 47.2
	Evening (1800–2200)	30.8 – 34.7	36.8 – 46.3
	Night (2200–0700)	26.8 – 29.3	31.9 – 38.1

Based on the background levels measured with handheld equipment, the absolute quietest background levels are approximately 20 dBA, with the results typically ranging between 19 and 28 dBA.

The noise levels recorded were influenced by seasonal factors, namely the presence of frogs along the waterways in the surrounding area. These additional noise sources, particularly insects (cicadas) and frogs, were found to significantly influence the background noise levels. Hence the levels recorded in Table 5-5 are higher than the handheld results.

5.5 Waste Management

5.5.1 General Assessment

The proposed lease area is currently a greenfield site. As discussed earlier, the site is used exclusively for agricultural purposes.

Existing activities associated with agricultural uses (grazing and cropping) on the proposed lease would generate minimal waste. The environmental and health impacts of current known waste management practices are considered to be negligible. However, arsenic and DDT-based pesticides may have been used in cattle dips and agricultural sprays in the area.

Prickly pear is present within the area, although in isolated pockets. It is possible that in the past this weed was treated using arsenic, and thus there may be local zones of arsenic contamination.

No site investigations have been conducted to identify the presence of contaminated soils within the area. It is possible that such sites exist in the abandoned Selene Mine area, around cattle dip troughs (if any exist or have existed) and local diesel fuel storage areas. Several landowners also have small landfill dumps within their properties.

In general, the values that are affected by waste production are identified in Sections 5.1 'Air Quality', 5.2 'Water Management', and 5.3 'Land Management'.

5.6 Nature Conservation

5.6.1 General Assessment

Both the flora and fauna components of the ecological assessment comprised a background review of relevant databases and literature and a field assessment of the site.

The field assessment investigated individual species of flora and fauna, communities and ecosystems that may exist on the site, as well as areas of habitat value. In addition, the existence of species and communities of conservation significance under the Queensland Nature Conservation (Wildlife) Regulation 1994, Vegetation Management Regulation 2000 and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were considered.

Weather conditions for most of the assessment period were hot, overcast and humid, with occasional light breezes. There was no rainfall during the assessment period.

5.6.2 Desktop Review

The following database searches were undertaken to determine the species of flora and fauna that may occur within the general area of the proposed mine site.

5.6.2.1 Queensland Herbarium Database Search

A search was undertaken of the Queensland Herbarium records (HERBRECS), and records obtained from a grid with the following coordinates: latitude -24.9976° to -24.9629° and longitude 151.1738° to 151.1371°. The records represent only the plant specimens held in the Queensland Herbarium for the nominated grid area. The absence of particular species from the available data does not imply that the species does not occur within the specified area.

The HERBRECS search revealed the likely presence of 78 species of flora within the nominated grid area. Of those species, *Cyperus clarus* (no common name) is listed as vulnerable under the Queensland Nature Conservation (Wildlife) Regulation 1994.

5.6.2.2 Queensland Museum and Queensland Parks and Wildlife Database Search

Searches were undertaken of the Queensland Museum and Queensland Parks and Wildlife (WILDNET) fauna databases, and records obtained from a grid with the following coordinates: latitude -24.9976° to -24.9629° and longitude 151.1738° to 151.1371° (see Figure 1-2 for grid references).

The Queensland Museum records represent only the fauna specimens held in the Queensland Museum for the nominated grid area. The absence of a particular species from the available data does not imply that the species does not occur within the specified area.

The Queensland Parks and Wildlife Service (QPWS) records are obtained from all sightings of fauna by QPWS trained volunteers in the nominated grid area.

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Database records for the assessment area revealed the likely presence of 21 species of fauna. Of those species listed from the Queensland Museum and QPWS records within the nominated grid area, none are of conservation significance under either the Queensland Nature Conservation (Wildlife) Regulation 1994 or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

5.6.2.3 Environment Australia Database Search

The Environment Australia database assists in identifying the locations of places that may be relevant in determining obligations under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC) (Commonwealth). The database holds mapped locations of World Heritage properties, Ramsar wetlands, threatened migratory and marine species, and protected areas.

A search of the Environment Australia database was undertaken, and records obtained from a grid with the following coordinates: latitude between: -24.97° and -24.98°, longitude between: 151.143° and 151.166°.

This search revealed four threatened species of flora and eight threatened species of fauna. In addition, nine species of fauna, listed under both the migratory and marine provisions of the EPBC Act, were identified as possibly occurring in the area.

It should be noted that the results of this database search are indicative only, and as a result of the methods of data entry, the extracted results are typically an overestimate for the area requested (Environment Australia, 2001).

5.6.3 Bioregional Ecosystems

A regional ecosystem is defined as a vegetation community within a bioregion that is 'consistently associated with a particular combination of geology, landform and soil' (Sattler and Williams 1999). The conservation status for each regional ecosystem is assigned one of three categories according to its current distribution relative to its pre-European distribution. An up-to-date conservation status for each regional ecosystem in Queensland is listed in the Vegetation Management Regulation 2000, in the following categories:

- 'Endangered';
- 'Of Concern'; and
- 'No Concern at Present'.

As part of the classification of regional ecosystems, each Queensland bioregion was divided into provinces that each reflects a distinctive pattern of a range of environmental variables or suite of land systems. These provinces are mapped on a scale of 1:500,000. The proposed mine site is located near Monto which is part of the Brigalow Belt Bioregion. The site area falls into Province 22, Banana – Auburn Ranges, within that bioregion.

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Queensland comprises 12 distinct land zones, as described by Sattler and Williams (1999). Land zones are classified according to a combination of geology, landform, soils, and physical processes. The land zone determined for a specific area, combined with bioregion and vegetation community, describe the regional ecosystem represented by the remnant vegetation. The land zones in which the propose mine site is located are described as follows (Sattler and Williams 1999):

Land Zone 9/10: 'Cainozoic to Proterozoic consolidated, fine-grained and medium-to coarse-grained sediments with little or no deformation. Siltstones, mudstones, shales, calcareous sediments and lithic sandstones are typical rock types although minor interbedded volcanics may occur. Usually undulating landscapes with fine textured soils of moderate to high fertility. Also includes siliceous sandstones and conglomerates forming ranges, plateaus and scarps with shallow soils of low fertility. Minor interbedded volcanics may occur. Excludes overlying Cainozoic sand deposits, but includes in situ earths and texture contrast soils. Also includes springs associated with these sediments.'

Land Zone 12: 'Mesozoic to Proterozoic igneous rocks. Predominantly granitoides and intermediate to acid terrestrial volcanics, forming ranges, hills and lowlands with lithosols and texture contrast soils of usually low fertility. Includes granites, granodiorites, andesites and rhyolites, as well as minor areas of interbedded sediments and basic rock types such as gabbros. Excludes serpentinites.'

5.6.4 Field Assessment

A field assessment of the proposed mine site and adjacent areas was conducted in December 2001.

5.6.4.1 Flora field assessment

The proposed site has been almost totally cleared of native vegetation.

The majority of the site is farmland used for growing sorghum and lucerne crops. Some fallow paddocks have become overrun with low-growing weeds.

No species of conservation significance were observed on the site during the field assessment. Twenty-four species of flora were recorded as occurring on the site and/or immediately adjacent. Fourteen of these species were weeds. One of these weeds, the prickly pear (*Opuntia* sp.), is a declared, category P3 weed under the *Rural Lands Protection Act 1985*. Category P3 requires that the 'numbers and/or distribution of the plant are to be reduced throughout the State or the relevant parts thereof'.

Native vegetation on the site was minimal and comprised small, thinned stands of brigalow (*Acacia harpophylla*) with occasional poplar box (*Eucalyptus populnea*), narrow-leaved ironbark (*Eucalyptus crebra*) and Queensland bottle tree (*Brachychiton rupestris*). The existing stands of brigalow lack an understorey as a result of grazing on the site. River she-oak (*Casuarina cunninghamiana*) was also present in a nearby drainage channel.

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Exotic grasses and low-growing herbaceous species form a dense groundcover across the site, in areas where there are no crops or unsealed roads. Species within in this groundcover include guinea grass (*Panicum maximum* var. *maximum*), buffel grass (*Cenchrus ciliaris*), rhodes grass (*Chloris gayana*) and red natal grass (*Melinis repens*).

Threatened Ecological Communities

The brigalow stands observed within the site are likely to be the remains of the federally listed (EPBC Act 1999) endangered community, 'Brigalow (*Acacia harpophylla*) dominant and co-dominant'. However, the remaining brigalow is highly disturbed without the mid-storey and understorey vegetation that usually comprises this regional ecosystem (RE). It is therefore not considered to be representative of this listed ecological community.

5.6.4.2 Bioregional Ecosystems

The field assessment revealed that the site does not support vegetation representative of a RE as described by Sattler and Williams (1999) due to the highly disturbed nature of the site and the extent of vegetation clearing. However, remnant brigalow (*Acacia harpophylla*) stands and occasional poplar box (*Eucalyptus populnea*) are indicative of previous coverage by the 'Of Concern' RE 11.9.10, '*Acacia harpophylla*, *Eucalyptus populnea* open forest on Cainozoic fine-grained sedimentary rocks' (Sattler & Williams, 1999).

5.6.4.3 Abercorn Mound Springs

A group of four springs, the Abercorn Mound Springs, are located in the Mulgildie area. These springs are of significance due to their biological richness, habitat for rare and threatened species, and habitat for endemic species. The Abercorn Springs are the seventh biologically richest springs in the state (Fairfax, EPA pers. comm. 2001). The springs range in wet area from 50 m 315 m to 120 m 360 m (Fairfax, EPA pers. comm. 2001).

The closest of these springs to the proposed Monto Coal mine site is approximately 10 km from the site boundary.

5.6.5 Fauna Field Assessment

As much of the native vegetation on the site and in surrounding areas has been cleared for cropland and grazing, very little habitat of value for native fauna remains.

Native fauna species recorded during the field assessment include 6 amphibians, 20 birds, one mammal and one reptile. Two exotic species were recorded on the site: the cane toad (*Bufo marinus*) and feral pigeon (*Columba livia*). No fauna species of conservation significance were detected on the site at the time of the field assessment. Seven of the fauna species detected in the field were also highlighted in database searches as potentially occurring in the area.

Following is a description of fauna and potential habitat that exists on the site.

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5.6.5.1 Birds

Currently the remaining stands of trees, particularly brigalow, and vegetation along roads attract birds. Robust bird species typical of disturbed farmland were noted in the vicinity of the site. These species included the Torresian crow (*Corvus orru*), magpie-lark (*Grallina cyanoleuca*), pied butcherbird (*Cracticus nigrogularis*), apostlebird (*Struthidea cinerea*), galah (*Eolophus roseicapilla*), superb fairy-wren (*Malurus cyaneus*) and fairy martin (*Hirundo ariel*). The lack of continuity of vegetated areas and of old-growth vegetation with hollows precludes most native avifauna species from inhabiting the site. It is likely that birds of prey may forage in the area when it is under cultivation.

5.6.5.2 Mammals

The cleared nature of the site means that there is minimal habitat for native ground-dwelling and arboreal fauna. A number of eastern grey kangaroos were observed resting individually and in groups in the vicinity of scattered trees. Other native mammals, such as bandicoots, possums and wallabies, are unlikely to persist in the area as a result of lack of habitat and vegetative cover due to current farming activities, such as field ploughing. Introduced rodents, including the black rat and house mouse, are likely to forage around buildings, sheds and in the open croplands on the site.

Anabat recordings at Three Moon Creek, at a point approximately 2 km to the north-west of the site, detected seven species of bats. There is little bat habitat of value on the subject site.

5.6.5.3 Reptiles

The cleared nature of the site precludes the presence of most reptile species, which was verified by the field assessment. Reptiles were few in number, but included the wall skink (*Cryptoblepharus virgatus*), which was detected around the Selene Mine ruins just off the site. A snakeskin was found amongst long grass along Jones Road, indicating that snakes use the site. Possible species include the eastern brown snake (*Pseudonaja textilis*) and carpet python (*Morelia spilota variegata*).

5.6.5.4 Amphibians

There were surprisingly high numbers of amphibians on the site, given the lack of both vegetation and recent rainfall. Although there are constructed dams on the site, the banks were bare of vegetation and therefore there were few amphibians around these waterholes. Amphibians were most abundant in grassy drainage channels adjacent to roads, particularly in the south-east of the site. Those species recorded were the cane toad (*Bufo marinus*), eastern sedge frog (*Litoria fallax*), striped rocket frog (*Litoria nasuta*), emerald-spotted tree frog (*Litoria peronii*), common green tree frog (*Litoria caerulea*) and salmon striped frog (*Limnodynastes salmini*). The cane toad is an introduced species. None of the observed species have conservation status under state or federal legislation.

5.7 Cultural Heritage

5.7.1 Non-indigenous

The historic Selene Mine (1949–1966) is located approximately 2 km south of the proposed southern mining lease boundary. The ruins of the headworks and old stockpiles are still present. There are no other known sites of significance.

5.7.2 Indigenous

The archaeological record within the study area is best characterised as low-density scatter of stone artefacts. Cultural materials found during the survey consisted of 66 stone artefacts, of which 95% were flaked stone, as shown in Figure 5-7. Two fragments of grindstones and a basalt axe were also recorded. The cultural materials do not appear to be evenly distributed across the study area; with the majority of finds occurring on the north-facing slopes in the northern half.

The stream channel margins in the study area did not contain the largest numbers of cultural materials. This suggests that these hydrological features in the study area were not important foci as water sources. The low numbers of artefacts and their widespread distribution support the interpretation that people were coming into this area for short periods of time in order to undertake specific tasks, such as hunting, and collecting plants. Once these tasks were accomplished, the people returned to their camps elsewhere in the region.

5.8 Community

5.8.1 Social environment

Monto Shire is located in the Wide Bay – Burnett Statistical Division, covering 4,322 km² or 8.3% of the total area, but with a population in 2000 of 2,699 or 1.2% of the division population. The population of the Shire fell by 55 between 1999 and 2000, the largest decrease for any of the local government areas in the division, although there was an increase of 2,126 for the statistical division overall. Monto Shire accounted for \$40.6m in agricultural production in 1998–99, or 5.5% of the total for Wide Bay – Burnett Division. The value of selected mineral production (including coal) for the whole Division for 1999–2000 was \$144.4m.

The largest industry sector in the Shire is agriculture, including the production of beef, milk, lucerne, pork, grain and timber.

Mulgildie (population approximately 150) provides a school, hotel, and limited shopping facilities. There is a sawmill in the town.

Monto (population approximately 1500) is the administrative centre for the Shire, and provides primary and secondary schools, a hospital, hotels and motels, and a range of commercial and community facilities. There was a butter factory in the town, but it has closed down.

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Figure 5-7: Cultural Heritage Findings

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Employment opportunities around Mulgildie in areas other than the agricultural sector and local sawmill are limited.

5.8.2 Existing Infrastructure

The Maryborough to Gladstone (via Monto) rail line is currently under-utilised. On average, there are approximately two trains per week, with a total of 5,000 tonnes of freight per annum. The raising of Awoonga Dam and resulting flooding of part of the rail line has given rise to speculation that the line might be closed. This has been addressed in a statement on behalf of the Minister for Transport who has indicated that he expects the line to remain functional and to be relocated by the Gladstone Area Water Board as part of the dam-raising project. The Burnett Highway also appears to be only lightly used, based on brief field inspections in the area.

5.8.3 Proposed Developments

Monto Minerals' Goondicum Mine (approximately 30 km east of Monto) is currently at pilot stage but is expected to enter full production in the near future. It is expected to produce 275,000 tpa of ilmenite and 100,000 tpa of titano-magnetite, and is the only other significant current mining development in the area. A profile of the area in June 2001 showed that the Goondicum ilmenite mine project was the only major project completed, under study or under construction in Monto Shire that was known to the Department of State Development.

6. Assessment of Impacts on Environmental Values and Mitigation Strategies

6.1 Air Quality

6.1.1 Potential Impacts

The main emissions from the proposed mining activities will be dust and greenhouse gases.

6.1.1.1 Dust Emissions

The main sources of dust are as follows:

- land clearing;
- topsoil removal;
- overburden loading and dumping;
- transport of overburden to dump sites;
- wind erosion of stockpiles and exposed areas;
- coal excavation;
- transport of coal to the coal handling and preparation plant (CHPP) stockpiles;
- CHPP, e.g. conveyor transfer points;
- loading coal onto train wagons;
- traffic on unsealed roads; and
- burning of cleared vegetation.

During the first year, out-of-pit dumps will be constructed near the western boundary of the site to take material from the pit. Proposed mining plans show a steady progression of the pit from west to east across the site over an estimated mine lifetime of 15 years. Approximately 100,000 tpa of topsoil and 6 Mtpa of overburden would be moved during mining. It is anticipated that after revegetation of the overburden dumps, gross dust emissions will remain generally constant throughout the years of production. Pit retention of dust is likely to reduce the impact of dust emissions from that area of the mine as the life of the mine progresses (and the pit increases in depth). As mining progresses, overburden will be transferred within the pit to fill areas that have already been mined.

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The nearest residential receptors are located close to the boundaries of the site along existing roads (indicated on Figure 1-3). Receptors close to the western boundary of the site will be close to activities such as stockpile construction. Receptors 5 and 11 are approximately 250 m from the closest stockpiles on the mine site when mining will be taking place at the western end of the site. A piggery is shown as Receptor 6, (see Figure 6-1) approximately 1.2 km north-west of the site, and the township of Mulgildie is located approximately 2 km north-west of the site.

Monto Coal will adopt the air quality standards shown in Table 6-1 for assessing health and nuisance effects.

Table 6-1: Existing ambient air quality goals and guidelines

Parameter	Averaging period (Source)	Value	Units
PM ₁₀	24-hour (NEPC)	50 (exceeded not more than 5 days per year)	µg/m ³
	24-hour (EPP(Air))	150	µg/m ³
	Annual (EPP(Air))	50	µg/m ³
PM _{2.5}	24-hour (USEPA)	65	µg/m ³
	Annual (USEPA)	15	µg/m ³
Dustfall	Annual (Recommended, EPA)	120	mg/m ² /day
TSP	Annual (EPP(Air))	90	µg/m ³
SO ₂	1 hour (NEPC, EPP(Air))	200	ppb
	24-hour (NEPC)	80	ppb
	Annual (NEPC, EPP(Air))	20	ppb
NO ₂	1 hour (EPP(Air))	160	ppb
	1 hour (NEPC)	120	ppb
	Annual (NEPC, EPP(Air))	30	ppb

Notes:

NEPC National Environment Protection Council standards are used for small to medium townships, e.g. Mulgildie.

EPP (Air). Queensland Environmental Protection (Air) Policy 1997 will be used for all other receptors.

USEPA United States Environmental Protection Agency — PM_{2.5} figure was proposed but not ratified.

EPA Informal advice from the Queensland Environmental Protection Agency.

Dispersion modelling was undertaken to determine emissions for the various sensitive receptors present in the local area, based on worst expected emission rates with minimal dust mitigation measures (other than watering of haul roads) applied.

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Figure 6-1: Predicted maximum 24-hour average ground level concentrations of PM10 ($\mu\text{g}/\text{m}^3$) due to emissions from the proposed coal mine for western scenario

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a) Findings of dispersion modelling for fine particulates

Predicted maximum, and second and third highest 24-hour average concentrations of PM₁₀, and maximum 24-hour average PM_{2.5}, including background, are presented in Table 6.2 and Table 6.3 for each of the nearest receptors outside the lease boundary. High concentrations are infrequent, with the second highest 24-hour concentration due to the mine being on average 82% of the maximum and the third highest being 75% of the maximum (although this varies from receptor to receptor).

Figure 6-1 and Figure 6-2 present the maximum predicted 24-hour average ground-level concentration contours of PM₁₀ including background.

Table 6-2: Predicted maximum, second highest and third highest 24-hour average ground-level concentrations of fine particulates (PM₁₀) due to the mine at the nearest receptors off the lease for the western and eastern scenarios (first and last years of current plans)

Receptor	Property Owner	24-hour average PM ₁₀ concentration (µg/m ³) including background					
		West pit			East pit		
		Highest	2 nd highest	3 rd highest	Highest	2 nd highest	3 rd highest
1	Hill	80.6	71.6	64.4	130.2	83.0	76.4
2	Brian	59.1	56.8	53.4	73.7	71.4	53.8
3	Leahy	77.2	76.8	61.2	136.5	115.1	102.4
4	Jobling	58.9	58.7	54.6	60.3	57.8	57.0
5	Drinkwater	125.5	116.8	108.9	79.0	74.1	72.3
6 (Piggery)	Hill	128.8	109.5	108.0	110.2	84.6	78.8
7	Brian	46.4	45.7	40.6	55.4	54.6	53.5
8	Leahy	54.0	52.1	50.4	102.4	79.3	76.7
9	Dow	64.2	51.7	49.8	43.0	43.0	42.9
10	Dow	60.7	57.9	56.7	55.6	53.9	53.6
11	Avis	147.6	145.5	137.5	87.6	81.7	80.0
Mulgildie		119.7	100.9	95.0	62.3	61.7	61.6
Background		20					
Guideline		150 (EPP Air) / 50 (NEPM) ¹					

Note: The NEPM is a regional measure for more populated areas, not considered appropriate for concentrations in the immediate vicinity of a large mining source. The EPP is applicable to mines and used in this report.

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Figure 6-2: Predicted maximum 24-hour average ground level concentrations of PM10 ($\mu\text{g}/\text{m}^3$) due to emissions from the proposed coal mine for eastern scenario

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Table 6-3: Predicted maximum, second highest and third highest 24-hour average ground-level concentrations of fine particulates (PM_{2.5}) due to the mine at the nearest receptors off the lease for the western and eastern scenarios

Receptor	Property Owner	24-hour average PM _{2.5} concentration (µg/m ³) including background					
		West pit			East pit		
		Highest	2 nd highest	3 rd highest	Highest	2 nd highest	3 rd highest
1	Hill	23.66	21.61	19.99	34.82	24.18	22.70
2	Brian	18.81	18.28	17.53	22.09	21.57	17.62
3	Leahy	22.88	22.80	19.27	36.23	31.42	28.56
4	Jobling	18.76	18.72	17.80	19.08	18.51	18.34
5	Drinkwater	33.77	31.81	30.03	23.30	22.19	21.78
6 (Piggery)	Hill	34.50	30.17	29.83	30.31	24.54	23.25
7	Brian	15.95	15.78	14.64	17.97	17.79	17.55
8	Leahy	17.65	17.23	16.85	28.57	23.36	22.77
9	Dow	19.96	17.14	16.71	15.19	15.19	15.17
10	Dow	19.17	18.53	18.28	18.02	17.63	17.56
11	Avis	38.74	38.28	36.45	25.23	23.89	23.52
Mulgildie		32.45	28.22	26.90	19.52	19.39	19.37
Background		10					
Guideline		65 (USEPA)					

Predicted 24-hour ground-level concentrations of PM₁₀ in the township of Mulgildie are below the EPP (Air) guidelines and PM_{2.5} levels are well below the currently unratified USEPA guidelines, taking into account background estimates of 20 µg/m³ for PM₁₀ and 10 µg/m³ for PM_{2.5}. PM_{2.5} concentrations, in particular, are quite sensitive to the method used for estimating emissions. The assumption that the distribution of particle sizes within given ranges is uniform is expected to overestimate PM_{2.5} emissions and hence be conservative.

The main impact on local ground-level concentrations of fine particulates is predicted to occur in the initial years of operation, when the pit depth is shallower and dumps are being established near the western boundary of the site. Maximum 24-hour concentrations of PM₁₀ on a yearly basis, including background (the second highest column) are predicted to be 146 µg/m³ at Receptor 11 and 117 µg/m³ at Receptor 5 compared to the EPP guideline of 150 µg/m³, as shown in Table 6-2. The background level of approximately 20 µg/m³ has been included in these predictions. For the eastern pit scenario, the highest concentrations will occur at receptors 1, 3 and 6. Predicted maximum 24-hour average PM₁₀ concentrations at receptors are approximately 115 µg/m³, which is, again, less than the EPP guideline of 150 µg/m³.

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Annual PM₁₀ concentrations due to the mine at residential receptors are presented in Table 6-4 and plotted in Figures 6-3 and Figure 6-4 (including a background of 20 µg/m³). It can be seen that concentrations are generally well below the guideline, except when the mine is close to individual receptors. The concentration at Receptor 11 is predicted to exceed the EPP guideline of 50 µg/m³ if dust controls are not applied at a higher intensity than those modelled (the only control assumed was watering at a rate to reduce haul road emissions by 40%). As seen, concentrations are lower for the eastern pit scenario because overburden dumping is then taking place in the pit rather than outside the pit.

Table 6-4: Predicted annual average ground-level concentrations of fine particulates at the nearest receptors off the lease for the western and eastern scenarios and basic controls

Receptor	Property Owner	Annual average PM ₁₀ concentration (µg/m ³) including background	
		West pit	East pit
1	Hill	23.4	24.8
2	Brian	22.6	25.2
3	Leahy	23.7	26.5
4	Jobling	22.4	23.9
5	Drinkwater	43.5	32.3
6 (Piggery)	Hill	33.5	31.7
7	Brian	22.0	22.2
8	Leahy	22.5	27.3
9	Dow	21.6	21.6
10	Dow	24.3	25.7
11	Avis	65.8	38.6
Mulgildie		32.3	28.8
Background		20	
Guideline		50 (EPP Air)	

a) Findings of dispersion modelling for Total Suspended Particulates and dustfall

Predicted annual average ground-level concentrations of nuisance dust (TSP and dustfall) at the nearest receptors are presented in Table 6-5 for the western and eastern scenarios. The effect of rainfall on TSP levels and dustfall is not included in the modelling and hence the dust levels predicted may be conservative. Figure 6-5 and Figure 6-6 present predicted ground-level concentration contours of dustfall for the western and eastern scenarios (including background levels).

At the township of Mulgildie the predicted annual average TSP concentration of 47–56 µg/m³ and dustfall of 24–31 mg/m²/day are well below the relevant guidelines of 90 µg/m³ and 133 mg/m²/day respectively. Hence dust nuisance is unlikely to occur at Mulgildie.

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Figure 6-3: Predicted maximum annual average ground level concentrations of PM10 ($\mu\text{g}/\text{m}^3$) due to emissions from the proposed coal mine for western scenario

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Figure 6-4: Predicted maximum annual average ground level concentrations of PM10 ($\mu\text{g}/\text{m}^3$) due to emissions from the proposed coal mine for eastern scenario

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Figure 6-5: Predicted annual average dustfall (mg/m²/day) due to emissions from the proposed coal mine for western scenario

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Figure 6-6: Predicted annual average dustfall (mg/m²/day) due to emissions from the proposed coal mine for eastern scenario

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The impacts of dustfall and TSP occur over a similar area to that predicted for fine particulates (PM₁₀ and PM_{2.5}), mainly to the north-west and south-south-east of the mine. TSP levels, including background, are predicted to exceed the guideline of 90 µg/m³ at Receptor 11, and dustfall levels may exceed the nuisance guideline during the first year of operation if controls are not carefully applied. The level of impact subsequently reduces as the mine pit operations progress further to the east. Local drainage flows would be expected to reduce the frequency of winds blowing toward Mulgildie and reduce annual concentrations at some locations.

Table 6-5: Predicted annual average ground-level concentrations of TSP (µg/m³) and daily dustfall (mg/m²/day), including background, at the nearest receptors off the lease for the western and eastern scenarios

Receptor	Property Owner	TSP (µg/m ³)		Dustfall (mg/m ² /day)	
		West	East	West	East
1	Hill	46.1	43.8	26	21
2	Brian	43.2	44.1	21	21
3	Leahy	43.6	44.9	21	22
4	Jobling	43.1	43.4	21	21
5	Drinkwater	79.2	50.8	122	30
6 (Piggery)	Hill	65.2	48.6	49	25
7	Brian	42.7	41.8	21	20
8	Leahy	43.0	45.7	21	22
9	Dow	41.8	41.4	21	20
10	Dow	45.0	44.3	24	22
11	Avis	117.1	77.2	206	131
Mulgildie		56.4	46.8	31	24
Background		40	40	20	20
Guideline		90 (EPP(Air))		133 (Recommended, EPA)	

6.1.1.2 Greenhouse Gas Emissions

Greenhouse emissions from the mine include carbon monoxide, nitrogen oxides, carbon dioxide, and volatile organic compounds (VOCs) in exhaust emissions from on-site. Emissions of sulfur dioxide and nitrogen dioxide will occur mainly from on-site vehicles such as bulldozers, haul trucks and graders.

Predicted emissions from the mine and total global warming potential predictions in terms of tonnes of CO₂-equivalent for 20-year time horizons are presented in Table 6-6.

Table 6-6: Estimated greenhouse gas emissions from the proposed coal mine

Gas	Tonnes
CO ₂	12,258
N ₂ O	86
CH ₄	86,360
Total	98,704

6.1.2 Environmental Protection Objective

The objective is to maintain air quality within relevant guidelines and ensure sensitive receptors are not adversely affected.

6.1.3 Control Strategies

1. Purchase of impacted properties on the eastern side of the proposed lease is being considered.
2. Water haul roads and other unsealed roads including the site entry road. Particular attention should be paid to haul and access roads relatively close to residential areas particularly Receptors 5 and 11.
3. Where possible, permanent access roads should be sealed and well maintained, particularly access roads linked to public roads.
4. Avoid topsoil stripping and replacement on days where wind speed and direction is sufficient to carry dust beyond the mining lease to sensitive receptors.
5. Vegetate topsoil stockpiles where short-term use is not practicable.
6. Adopt scheduled clearing of land.
7. Progressively rehabilitate disturbed land.
8. Provide dust suppression sprays at locations at coal handling facilities that produce excessive dust, e.g. crusher and conveyor transfer points.
9. Avoid burning cleared vegetation when wind will be blowing towards sensitive receptors.
10. Revegetate overburden and topsoil dumps as soon as possible after they are no longer required.
11. On wet days, wash the wheels of vehicles leaving the site, to prevent the transfer of mud onto sealed roads and hence dust generation.
12. Undertake monitoring at the most affected locations (Receptors 5 and 11) and then increase the level of controls if and where required.

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13. Adopt appropriate awareness training for operators.

6.1.4 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.1.4.1 Dust Nuisance

(B1-1) Subject to Conditions (B1-2) and (B1-3) the release of dust or particulate matter or both resulting from the mining activity must not cause an environmental nuisance at any sensitive location.

(B1-2) When requested by the Administering Authority, dust and particulate monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

(B1-3) If the environmental authority holder can provide evidence through monitoring that the following limits are not being exceeded then the holder is not in breach of (B1-1):

- a) Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulates - Deposited matter - Gravimetric method of 1991; and
- b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a sensitive place downwind of the operational land, when monitored in accordance with:
 - Particulate matter – determination of suspended particulate PM10 high volume sampler with size selective inlet- gravimetric method, when monitored in accordance with AS 3580.9.6 - Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – PM 10 high volume sampler with size selective inlet – Gravimetric method 1990;

or in situations where appropriate

 - Any alternative method of sampling PM10 that may be permitted by the Air Quality Sampling Manual as published by the administering authority.

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(B1-4) If monitoring indicates Condition (B1-3) is not being met then the environmental authority holder must:

- a) Address the complaint including the use of appropriate dispute resolution if required; or
- b) Immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.

6.1.4.2 Odour nuisance

(B2-1) Subject to condition (B2-2), the release of noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) resulting from the mining activity must not cause an environmental nuisance at any sensitive place.

(B2-2) When requested by the Administering Authority, odour monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

(B2-3) If monitoring indicates Condition (B2-1) is not being met then the environmental authority holder must:

- address the complaint including the use of appropriate dispute resolution if required; or
- immediately implement abatement measures so that emissions of odour from the activity do not result in further environmental nuisance.

6.1.4.3 General

(B3-1) The Plan of Operations will include a monitoring plan and dust mitigation measures for the operation.

6.2 Water Management

6.2.1 Potential Impacts on Surface Water

The potential impacts on water resources of the proposed mine are:

- sediment-laden run-off from disturbed areas;
- possible discharge to Three Moon Creek;
- contaminants from the infrastructure area (e.g. hydrocarbons, detergents, degreasers);
- acid mine drainage;
- increases in salinity of run-off due to possible occurrences of saline soil in the coal measures aquifer;
- tailings dam leakages; and
- sewage effluent.

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6.2.1.1 Sediment Flows from Disturbed Areas

Monto Coal's mining leases cover an area of 471.8 ha, all of which may be disturbed during the life of the mine (depending on the mine plan). A water management system will be implemented that diverts 'clean' water around disturbed areas and intercepts all 'dirty' water. Run-off from all disturbed areas will be directed to a network of sediment dams to remove sediment during a critical storm, and a single environmental (retention) dam will capture run-off from the infrastructure area.

In order to meet the mine's supply demands, a water management plan (WMP) will be implemented. The WMP ensures that:

- accumulated pit water is pumped into the tailings dam so that mining operations are not jeopardised by flooding;
- dam water is managed so that there are no uncontrolled direct releases of mine water offsite; and
- water collected around the mine site is recycled as much as practicable to minimise dependence on outside supplies.

6.2.1.2 Possible Discharge to Three Moon Creek

Operational water flows will be designed so that there will be no off-site discharges to land or watercourses. Dams will be designed to manage stormwater events outlined in Section 6.2.4.

6.2.1.3 Infrastructure Area Effluent Management

Infrastructure areas such as vehicle workshops and servicing areas represent a potential source of hydrocarbon contamination if not properly controlled. Run-off from these areas is collected by a drain that flows into an environmental dam, as shown in Figure 2-1. An oil-water separator will be installed in this area. Excess water will be sent to the tailings dam for recycling to the CHPP. Regulated waste will be removed from site by a licensed regulated waste removal and transport contractor for recycling or disposal in a licensed regulated waste disposal facility.

6.2.1.4 Acid Mine Drainage

Monto Coal mine overburden is alkaline, has a low sulfur content and no net acid-producing potential. Hence there is little likelihood of acid generation by spoil during or after mining. The results of studies are discussed in more detail in Section 6.3.1.1, 'Land Management'.

6.2.1.5 Saline Water Run-off from the Mulgildie Coal Measures Aquifer

Water generated from mining operations has the potential to have an environmental impact due the salt levels in the Mulgildie Coal Measures aquifer. Water will be pumped to the tailings dam and used for recycling purposes.

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6.2.1.6 Tailings Dam Management

Under the current legislation, the tailings dam is not a referable dam. Annual inspections will be conducted of the dam's structural integrity, as well as periodically during operational checks.

It is necessary to ensure that any water leaking from the tailings dam is collected through a suitably constructed and engineered environmental dam, from which water can be collected and used for purposes such as dust suppression. From a post-mining perspective, water cannot be allowed to pond on the rehabilitated tailings dam, as this will produce seepage of saline water that would potentially affect rehabilitated areas and, ultimately, the local watercourse.

6.2.1.7 Sewage Effluent

As discussed in Section 6.7, all sewage effluent will be collected and removed by licensed contractors and disposed of at a licensed treatment centre.

6.2.1.8 Surface Water Impact Summary

In conclusion, any mine-derived changes to suspended solids, salinity or pH of water are not expected to have any impact on downstream water used for stock or irrigation, or have any effect on the physical or chemical integrity of Three Moon Creek water quality.

6.2.2 Environmental Protection Objective

The objective is that contaminated surface water on the lease does not affect watercourses located off the lease, or local aquifers.

6.2.3 Control Strategies

- 1) Design operational water flows such that there are no uncontrolled off-site discharges.
- 2) Design landforms and water management systems to separate clean water from undisturbed areas and water from disturbed areas.
- 3) Direct rainfall run-off from all disturbed areas and the pit to sediment dams for settlement of suspended solids, and use for haul road watering.
- 4) Fuel and hazardous chemical storage areas will be bunded.
- 5) Develop and implement a system for emergency spills or discharges.
- 6) Recycle water from the tailings dam for use in the coal preparation plant and for haul road dust suppression.
- 7) Control and recycling strategies will be part of the Water Management Plan and will be managed through the Plan of Operations.
- 8) The design of the rehabilitated tailings dam will not allow the ponding of water.

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- 9) Establish an oil–water separator and recycling initiatives at the infrastructure area.
- 10) Pump any saline water seepage from the Mulgildie Coal Measures to the tailings dam for recycling purposes.
- 11) Sewage effluent will be collected and removed by a licensed contractor and disposed of at a licensed treatment station.

6.2.4 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.2.4.1 General

(C1-1) A Water Management Plan will be prepared prior to the commencement of construction on the mining lease. The plan will be managed through the Plan of Operations.

(C1-2) The Water Management Plan will identify methods to:

- manage recycling;
- manage stormwater discharge;
- develop and implement a system for emergency spills or discharges;
- separate clean water from undisturbed areas and water from disturbed areas.

6.2.4.2 Tailings and Process Water Dams

(C2-1) Dam design will be in accordance with the design criteria set out in Schedule C – Table 1.

(C2-2) In the event that the tailings dam water does not comply with the contaminant limits defined in Schedule C – Table 2, measures will be implemented to prevent access by all livestock and to minimise access by native fauna.

(C2-3) All water analyses will be undertaken by a NATA registered and accredited laboratory and sampling will follow the EPA Water Quality Sampling Manual (3rd Edition 1999).

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Schedule C – Table 1

Storage Type	Stormwater Design	Comment
Sediment Dam	1 in 10 year ARI, 24 hour	10 day release*
Environmental Dam	1 in 100 year ARI, 24 hour	No release
Tailings dam	1 in 100 year ARI, 24 hour	No release

Reference: Technical Guidelines for the Environmental management of Exploration and Mining in Queensland, January 1995.

Schedule C - Table 2 Tailings Dam Contaminant Limits & Monitoring Frequency

Analyte	Units	Investigation Level	Monitoring Frequency**
Al	(mg/L)	5	3 monthly
As	(mg/L)	0.5	3 monthly
Ca	(mg/L)	1,000	3 monthly
Cd	(mg/L)	0.01	3 monthly
Cl	(mg/L)	N/A	3 monthly
Cu	(mg/L)	0.5	3 monthly
F	(mg/L)	2	3 monthly
Fe	(mg/L)	N/A	3 monthly
Hg	(mg/L)	0.002	3 monthly
K	(mg/L)	N/A	3 monthly
Mg	(mg/L)	<2000 has no effect on cattle	3 monthly
Mn	(mg/L)	N/A	3 monthly
Na	(mg/L)	N/A	3 monthly
Pb	(mg/L)	0.1	3 monthly
SO ₄	(mg/L)	1000	3 monthly
Zn	(mg/L)	20	3 monthly
HCO ₃	(mg/L)	N/A	3 monthly
CO ₃	(mg/L)	N/A	3 monthly
Nitrate	(mg/L)	400 as nitrate	3 monthly
Nitrite	(mg/L)	30 as nitrite	3 monthly
TDS	(mg/L)	* No investigation level. Long-term safe levels for Beef cattle, pigs, horses <4000, sheep <5000	3 monthly
EC	µS/cm		3 monthly (field)
PH	unit	* Range 6-8.5	3 monthly (field)

Notes

Investigation levels are ANZECC 2000 guideline levels for livestock use

* Dependant on background water quality – not yet determined

** Initial round of sampling to be taken, then at stated frequency for 12 months then review frequency and analytes with the administering authority.

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Final Void

(C3-1) A study of the final void water quality will be undertaken prior to mine decommissioning.

Sewage Effluent

(C4-1) Sewage effluent will be removed by a licensed contractor and disposed of at a licensed treatment station.

6.2.5 Potential Impacts on Groundwater

The potential impacts of the proposed mine on groundwater resources are:

- affecting other users by lowering water levels in the Precipice, alluvial and Mulgildie Coal Measures aquifers;
- groundwater aquifer contamination from the tailings dam and environmental dam.

6.2.5.1 Aquifer Impacts

The Precipice Sandstone is likely to provide the most reliable long-term yield of any of the aquifers in the area, and is likely to be the only aquifer capable of supplying 700 ML/year from a single bore. Anecdotal evidence suggests that the Hutton Sandstone is clayey in the project area, and may not provide a reliable water supply of low-salinity water.

This aquifer now has a number of local users (Mulgildie town, Monto Minerals), and their needs as existing users will be taken into consideration through the DNRM licensing system and assessment process. However, an allocation of 700 ML/year is relatively small when compared to Monto Minerals' allocation (understood to be around 3,000 ML/year from three bores). Extraction from this aquifer may have some effect on the Mulgildie town supply (i.e. the town bore may cease to flow).

Seepage of groundwater into the mining pit will lower the water level in the Mulgildie Coal Measures. The effect and extent of depressurisation is unknown at present, but given the proximity of the mine to the boundary of the subartesian area, there may be an effect on the potential for downward flow from the alluvial aquifer. At present the pressures in the Mulgildie Coal Measures are reported to be higher than those in the alluvial aquifer (the magnitude of the differential is unknown), and water quality in the Mulgildie Coal Measures is generally poorer than that of the alluvial aquifer. This means that, at present, poorer quality water from the Mulgildie Coal Measures discharges to the alluvial aquifer in some areas, making the alluvial aquifer more saline. There may be some advantage locally in reversing the vertical flow potential (i.e. lowering the potential for ingress of saline water) but there would be concern if flow of water from the alluvial aquifer to the Mulgildie Coal Measures were induced.

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6.2.5.2 *Groundwater Contamination*

The main potential source of groundwater contamination is seepage from the tailings and environmental dams. The major contaminant present in the tailings dam would be from pit water (elevated salinity levels) while the environmental dam would potentially contain very low levels of hydrocarbons. It is unlikely that these contaminants would have a significant impact on any of the aquifers.

6.2.5.3 *Summary of Impacts*

No adverse impacts are expected on groundwater quality or quantity within the area to be mined, apart from possible localised lowering of the water table adjacent to the pit. Potential impacts on water quality and levels will be investigated further.

6.2.6 Environmental Protection Objectives

The objectives are to:

- 1) Extract groundwater without affecting other groundwater users.
- 2) Avoid degradation of groundwater quality resulting from mining activities.

6.2.7 Control Strategies

- 1) To determine the potential for aquifer interaction to affect groundwater levels, a conceptual model of the groundwater system will be developed and data gaps identified. Groundwater monitoring bores will then be used to establish a numerical model to evaluate any long-term impacts on the alluvial and Mulgildie aquifers. The monitoring bores will be constructed in the Mulgildie Coal Measures and alluvial aquifer at the same location where appropriate to monitor impacts on groundwater resources. The siting of bores will, where possible, be complementary with the existing DNRM monitoring network. The bore network will be established as early as possible to allow the longest possible period for collection of background data prior to mine development. The establishment of a nested site will allow the pressure differential and water quality for each aquifer to be established. This will be undertaken prior to construction.
- 2) The location of all groundwater users (licensed and non-licensed) within a 2 km radius of the mine boundary is being determined. Water levels and water quality of the alluvial and Mulgildie Coal Measures aquifers, at selected monitoring bores, will be assessed initially and then at a set frequency to determine the degree of impact, if any, on groundwater levels and quality within this area.
- 3) Groundwater monitoring bores will be established up and down the hydraulic gradient of the tailings and environmental dams.

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6.2.8 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.2.8.1 Groundwater Usage

(C5-1) Abstraction from the Precipice Sandstone aquifer will not exceed the licence volume as specified by the administering authority.

(C5-2) Ground water potentially affected by the mining activities will be monitored at the frequencies indicated in parts a) and b) of this condition. Details of monitoring depths and a plan showing the actual monitoring locations indicated by this table will be shown in the Plan of Operations following the completion of a detailed groundwater study.

- a) Water level data for the alluvial and Mulgildie Coal Measures will be collected initially, then quarterly for a 12 monthly period. If the operation is having a negligible impact on water levels, then an appropriate monitoring frequency will be agreed to with the administering authority.
- b) Water quality data for the alluvial and Mulgildie Coal Measures will be collected initially then 3 monthly for a 12 month period. If the operation is having a negligible impact on water quality, then an appropriate monitoring frequency and modified list of analytes will be agreed to with the administering authority.

Schedule C - Table 3 Groundwater Monitoring Locations

Aquifer	Bore Location
Alluvial	DNRM Monitoring Bore #13610114
Mulgildie Coal Measure	Adjacent to DNRM Monitoring Bore 13610114
Mulgildie Coal Measure	Up and down gradient of the open pit
Tailings dam	1 upgradient and 2 down gradient
Environmental dam	2 down gradient

(C5-3) Subject to Condition (C5-2), if the ground water contaminant investigation (trigger levels) defined in Schedule C – Table 4 are exceeded then the environmental authority holder will complete an investigation into the potential for environmental harm and notify the administering authority within 3 months of receiving the analysis results.

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Schedule C - Table 4 Ground Water Contaminant Limits & Monitoring Frequency

Monitoring Point	Analyte	Units	Investigation Level	Monitoring Frequency**
1,2,3	Al	(mg/L)	5	12 monthly
1,2	As	(mg/L)	0.5	12 monthly
3	Ca	(mg/L)	1,000	12 monthly
1,2	Cd	(mg/L)	0.01	12 monthly
3	Cl	(mg/L)	N/A	12 monthly
1,2	Cu	(mg/L)	0.5	12 monthly
1,2,3	F	(mg/L)	2	12 monthly
1,2,3	Fe	(mg/L)	N/A	12 monthly
1,2	Hg	(mg/L)	0.002	12 monthly
3	K	(mg/L)	N/A	12 monthly
3	Mg	(mg/L)	<2000 has no effect on cattle	12 monthly
3	Mn	(mg/L)	N/A	12 monthly
3	Na	(mg/L)	N/A	12 monthly
1,2	Pb	(mg/L)	0.1	12 monthly
1,2,3	SO ₄	(mg/L)	1000	12 monthly
1,2	Zn	(mg/L)	20	12 monthly
1,2,3	HCO ₃	(mg/L)	N/A	12 monthly
1,2,3	CO ₃	(mg/L)	N/A	12 monthly
1,2,3	Nitrate	(mg/L)	400 as nitrate	12 monthly
1,2,3	Nitrite	(mg/L)	30 as nitrite	12 monthly
1,2,3	TDS	(mg/L)	* No investigation level. Long-term safe levels for Beef cattle, pigs, horses <4000, sheep <5000	12 monthly
1,2,3	EC	µS/cm		3 monthly (field)
1,2,3	PH	unit	* Range 6-8.5	3 monthly (field)

Notes

Investigation levels are ANZECC 2000 guideline levels for livestock use

* Dependant on background water quality – not yet determined

** Initial round of sampling to be taken, then at stated frequency

1 Tailings dam bores

2 Environmental dam bores

3 Groundwater level monitoring bores – levels will be also measured

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(C5-4) Subject to Condition (C5-2), ground water levels of the Mulgildie Coal Measures will be monitored and ground water draw down fluctuations in excess of two meters per year, not resulting from the pumping of licensed bores, must be notified within 14 days to the administering authority following completion of monitoring.

(C5-5) Water analysis will be undertaken by a NATA accredited laboratory and the method of sampling of ground water must comply with that set out in the latest edition of the Environmental Protection Agency's Water Quality Sampling Manual.

6.3 Land Management

6.3.1 Potential Impacts

Mining will require the disposal of rock from the overburden and interburden, plus coarse reject and fine tailings from the wash plant.

Initially, the box-cut overburden material will be placed in out-of-pit spoil dumps. Generally, overburden from the mining operation will be placed back into the mined void. However, overburden may need to be placed in external spoil dumps during mining to maintain working room in the pit. This will also assist with recontouring the in-pit spoil piles. Some overburden will be used to construct the tailings dam. The areas of backfilling and external dumps are shown diagrammatically in Figure 2-3. Dumps will be constructed so as to allow progressive rehabilitation, to blend in with the existing topography, and to drain run-off from the upper surface onto natural ground. Dump construction will commence at the toe of the lower lift and progress to form the outer slope at the required gradient, nominally 1:6 (v:h) that is, about 10°. The more competent overburden material (such as low-strength to medium-strength calcareous sandstone or siltstone) will be preferentially dumped to form the outer slope.

Approximately 422 ha of land will be disturbed during the life of the project, comprising spoil, final voids and land for infrastructure purposes.

Impacts on land resources produced by mine-related disturbance include:

- possible land capability changes;
- potential land use changes;
- changes to existing landforms (including erosion and sedimentation rates, profile, elevation and stability); and
- possible land contamination.

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6.3.1.1 Post-mine Land Capability

The post-mine land capability will differ from the pre-mine land capability due to the formation of an elevated landform and final void.

For the total site, post-mining land capability based on current information will be:

- Class III — lowland area, valley, floors
- Class IV — rehabilitated hillcrests
- Class V — rehabilitated slopes, tailings and sediment dams, haul roads
- Class VIII — final void.

The pre-mine capability is currently class II and class III. Accordingly there will be a reduction in the agricultural capability of the land inside the mining lease.

6.3.1.2 Post-mine Land Use

The removal of overburden will result in out-of-pit spoil dumps, which will be reshaped, re-covered with previously stockpiled topsoil and rehabilitated to be consistent with the five-year, and final landform plans. Dam structures constructed for pit dewatering and water runoff will remain after the operation is finished and could be used as farm dams.

After mining, pits and ramps not backfilled will be left as final voids and made safe, with persons and stock excluded. The land use will accordingly not be as suitable for agriculture as it currently is in the pre-mine state.

6.3.1.3 Post-mine Landform

The anticipated contour plan of the final mine is given in Figure 2-3. Final contour plans for the eastern side of the project will be developed when the mine plan is further advanced. As seen, the final landform will consist of steeper slopes created from rehabilitated out-of-pit-spoil dumps. The slopes will be designed at a maximum of 10°.

The new profile will generate new drainage patterns and contours when compared to the existing land, and will reduce level III land capability. This will change the type of end land use that is possible post-mining.

A final void of approximately 4.2 ha in area will remain on the eastern boundary. The void will be approximately 60 m deep.

In general, visual amenity impacts will occur during the life of the mine. Out-of-pit spoil stockpiles will exist throughout the life of the project and some part will remain, but will be minimised through progressive rehabilitation.

6.3.1.4 Possible Land Contamination

Possible land contamination that will be created during the life of the operation will occur at the tailings area, coal-contaminated water-drainage channels and dams, infrastructure areas, fuel storage area, landfills, and tyre disposal sites.

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Potential impacts and control strategies for land contamination are outlined in Section 5.3 of this document.

Initial studies by CSR Coal Division in 1985 on the chemical nature and the handling limitations of the overburden have not identified any material requiring selective handling or burial due to toxicity or net acid-generating potential. There is no current evidence to indicate that any overburden strata are particularly toxic to plant growth or the environment, and hence, apart from normal mixing during the mining process, selective overburden handling to ensure burial of toxic strata is not required.

6.3.1.5 *Summary of Impacts*

There will be some changes in land capability, land use and land form. Disturbed areas will need to be rehabilitated to control erosion and sedimentation.

6.3.2 Mitigation Strategies

6.3.2.1 *Overburden Characteristics*

Sulfur levels were found to range between 0.12 to 0.42%, and there is a significant amount of calcium carbonate present within the Coal Measures sediments. Mixing of the mine spoil produced during normal mining operations provides a profile that would tend to neutralise any sulfides in the overburden materials. The presence of sulfur in the overburden is likely to be variable throughout the area. The 1985 report by CSR Coal Division concluded that although isolated bands of concentrated acid-producing material may exist, 'the overburden tested has a high neutralization potential', and suggested that 'selective handling of the overburden' is not warranted.

A neutralising agent may be required if collected groundwater from stockpiles is acidic. Further testing is required to assess findings over a larger area to a sample intensity of one bore per 2.25 km². If insufficient carbonate is available to safely neutralise any acid-producing material, the addition of more lime/carbonate may be required.

Of the overburden strata, only bentonitic-type clays, if present, will need to be buried by at least one metre of relatively inert material. The presence of these clays will be ascertained during the overburden removal stage.

6.3.2.2 *Land Recontouring*

a) **Slope Angles**

An assessment was completed on the potential for erosion of those soils present within the area. The soils are generally 'heavy', plastic, non-dispersive clays, and therefore erosion levels are expected to be low.

Table 6-7 and Figure 6-7 show that the estimated erosion rates are dependent on several factors. It is indicated that slopes of 10° are required to minimise soil erosion. Accordingly a slope angle of 10° will be used in slope design.

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Table 6-7: Erosion Estimation within the Project Area

Soil Type	Slope Height	Slope Length	Surface Texture	Distributed Depth	Expected Loss t/ha/y
Heavy Clay	0.5	50	No roots	0.3	3.589
			Grass after 60 days		1.616
			No roots		0.179
Heavy Clay	2.5	50	No roots	0.3	18.179
			No vegetation, only roots		8.180
			Grass after 60 days		0.908
Heavy Clay	10	50	–	–	–
Heavy Clay	20	133	–	–	–

Note: t/ha/y = tonnes/hectare/year

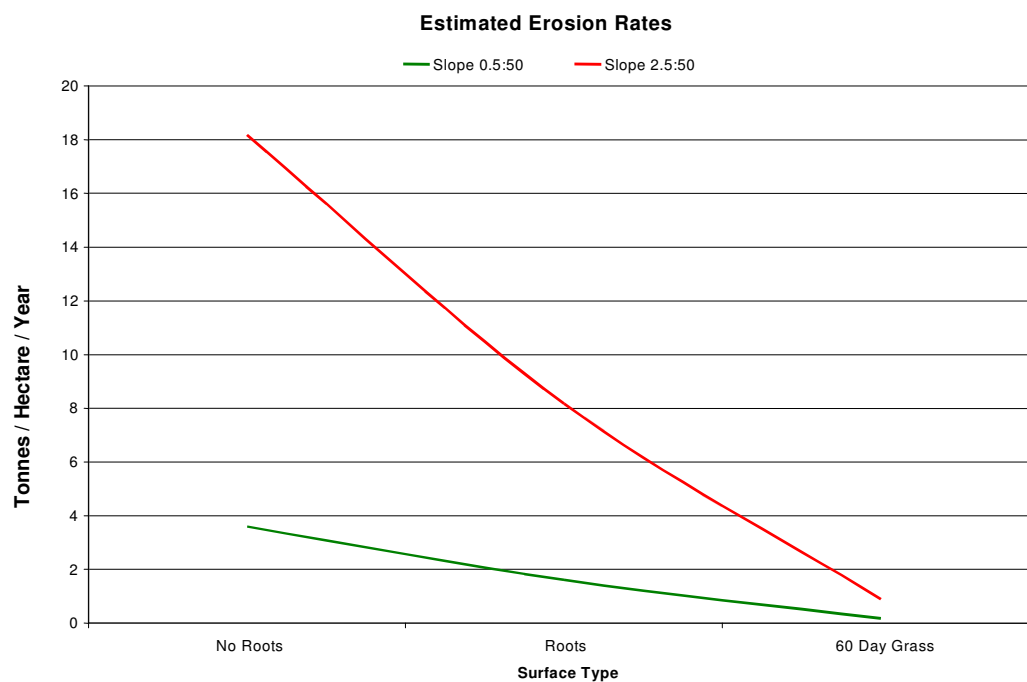


Figure 6-7: Estimated erosion rates based on surface cover slope

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A system of contour banks and grassed waterways will be complemented, where necessary, with additional contour drainage to direct run-off away from areas to be stripped for mining to further minimise erosion potential.

As illustrated in Figure 6-8, the maximum slope criteria to be achieved by reclamation are:

Box cut	Typical low-wall slopes 45° above base of weathering 20 m berm at base of weathering 70° below base of weathering
Final void	Filled section: low-wall max average slope 37° Highwall Section: highwall max average slope 45° in weathered material maintain highwall angle at 51° from horizontal, provided it is stable.
Haulage ramps	25 m wide 10% gradient

b) Slope Length

Landform design criteria in Table 6-8 will be used for slope length for final landform design.

Table 6-8: Landform design criteria

Slope %	Slope (°)	Vertical Height (m)	Design Maximum Length between Benches (m)
20	11.5	10	50
15	8.6	20	133
10	5.8	22	220
5	2.9	26	520
3	1.7	28	900

The nominated design lengths will be considered as maxima, and the detailed landform design will be required to create a drainage pattern to reduce the slope length and direct the water into controlled waterways. The design will incorporate, wherever possible, constant concave spoil profiles, as these are geotechnically the most stable and least prone to erosion.

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Figure 6-8: Indicative pitwall design

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c) Graded Banks

Graded banks will be installed on those slopes in accordance with Table 6-8 criteria.

Graded bank design parameters will include:

- 50-year average recurrence interval (ARI);
- 0.5% gradient along the flow alignment;
- spoil construction, covered by 200–300 mm of topsoil; and
- bank invert left bare, with no topsoil.

d) Waterways

Graded banks effectively minimise erosion on slopes, but tend to produce concentrated high-velocity flows at their discharge end. Contour drains will therefore be arranged to discharge into a strategically placed energy dissipation basin or waterway. Some waterways may require rock armouring due to the high flow velocities encountered. All waterways will be designed to a 10-year ARI. The rock will also provide stability if the grass cover is reduced by drought or fire. Hydraulic jump basins will be used at the bottom of the slope to dissipate energy and therefore limit the length of the waterway.

6.3.2.3 Topsoil Management

The reinstatement of land suitable for sustainable ecosystem use will require the re-establishment of suitable topography and stable drainage systems, as well as the replacement of a soil profile. The replacement of a soil profile will be managed by replacing the topsoil separately from the subsoils (or spoil), as soil quality generally declines with depth, and mixing of subsoils with topsoil will lead to poorer soil quality.

a) Topsoil Assessment

The topsoil will be progressively stripped from areas to be disturbed. The soil has an electrical conductivity of a 1:5 soil–water solution of <0.8 mS/cm or the exchangeable sodium percentage (ESP) of $<10\%$. A nominal depth range of stripping of 0.3–0.5 m has been allowed in assessing topsoil volumes. Testing gave a salinity of 0.77 mS/cm and an exchangeable sodium percentage of 3.5%, indicating that the soils on site should meet these criteria. With reference to AS4419 'Soil for Landscaping and Garden Use', natural soils with a pH of 7.6 are classed as slightly alkaline. The phosphorus levels suggest that more work is required if phosphorus-sensitive plants are proposed to be used. Further on-site investigations will be required.

Areas to be disturbed will be surveyed for the above properties prior to disturbance. In the event that insufficient quality soil exists as defined above for the rehabilitation plan, spoil or other material with suitable properties will be used as topsoil. It is considered that there is sufficient topsoil on site to meet projected demand for a topsoil depth of 200 to 300 mm. Some of the topsoil may have to be stockpiled for short periods prior to respreading.

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b) Stockpiling

All topsoil stockpiles will be built to a maximum height of 2 metres to limit soil degradation. Topsoil will be reused as soon as practically possible. If this option is not available, then topsoil will be stored and revegetated for future use.

6.3.2.4 Surface Preparation for Final Landform Stability

Surface preparation will be undertaken prior to landform profiling. The following preparations will be undertaken:

- Material adverse to plant growth is defined as having an acid-neutralising capacity with a net potential deficiency of 5 t of CaCO₃ equivalent per 1,000 t, or an electrical conductivity >5 mS/cm in a 1:5 water solution. If visual inspection of overburden during drilling programs and active mining identifies any overburden that may produce toxic material, samples will be taken for testing. Any toxic material will be buried to a minimum of 1 m, using non-toxic spoil. To date, no toxic spoil has been identified (refer CSR Report).
- Spoil dumps account for the bulk of the disturbed area and will be progressively created to the specified final landform during mining.
- Infrastructure sites not required by subsequent landholders will first have any equipment and plant removed. Any contaminated land (excluding the tailings dam area) will be ripped and buried. The sites will be recontoured, then deep ripped on contour to 0.5 m at 1 m spacing, and revegetated.
- Freshwater dams and sediment control dams may be left for reuse after relinquishment of the leases.
- Operating voids will be progressively backfilled, while the final void will be decommissioned.

6.3.2.5 Final Landform Profile

a) Spoil dumps

The local soil and rock profiles will be affected by the mining activity. At the cessation of the mining program, the landscape will be significantly altered, with a large volume of material (coal) and in-seam partings having been removed from the area.

Spoil will be placed and recontoured in such a way as to control erosion. Other suitable erosion controls will also be used, such as revegetation plus contour drains and drained benches.

The highwall area of the pit will weather, erode and potentially fail if batters are too steep. Prior to closure of the pit, the highwall areas will be assessed. Further geotechnical studies to assess slope stability and strategies will be required at that time.

Based on experience at existing mines, an average spoil swell of 15% is expected. At Monto it is envisaged that swell will be minimal, initially at least because of the overburden ratio of 4.5:1 (overburden:coal). Hence it is envisaged that the final rehabilitated slopes will be less than 10°.

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The proposed final land suitability for the waste dump is a sustainable ecosystem, although any access left to steeper slopes and gullies will be restricted to native forest habitat. The main erosion control will be to establish and maintain a grass pasture.

The proposed final landform is shown in Figure 2-3. The top surfaces of the in-pit spoil areas will be gently sloping and suitable for grazing or forest plantation. Rainwater will collect in ponds shaped into the top surface. Any excess will spill down rock-lined chutes in the batters.

b) Final Void

The final void will be 60 to 80 m below natural ground level. The northern end of the final blocks will be backfilled with spoil so that the final void has a surface area of less than 25 ha, measured to the top of the batters. It is expected that the final void will not fill to the top with water, as the natural topography means that surface run-off from most adjoining areas does not report to the void. However, this prediction has not yet been confirmed by modelling. Steep faces will be protected by a diversion bank or topped with competent large rocks to restrict vehicular and stock access. Light-vehicle access to a suitably fenced final void will be maintained. This will also provide an escape route for stock or wildlife. Drainage channels will not discharge over the walls. Ramps leading into the mining void will either be surcharged with spoil or have the sides recontoured.

As discussed above, a single final void will remain at the end of the mine's life. The final void will act as a sediment trap for suspended solids carried in run-off from the elevated landform. At low points where the safety berms may overtop, collected water will be channelled into the final void via a rock-lined chute arrangement. The void will also provide habitat for water flora and fauna.

The highwall will be finished to a maximum angle of 51°. Access to the highwall of the final void will be discouraged, for safety reasons.

Two studies will be undertaken before final void issues are clarified. These are:

- a void hydrology study, addressing the long-term water balance in the voids, connections to groundwater resources and water quality parameters in the long term; and
- a pit wall stability study, considering the effects of long-term erosion and weathering of the pit wall, and of significant hydrological events, and final void engineering to address these potential effects.

These studies will be undertaken during the life of the mine, and include detailed research and modelling.

c) Water Management Structures

All sedimentation and environmental dams will be decommissioned, with the possible exception of the main sedimentation dam to the west, which could be converted into a useful farm dam. Dirty water diversion drains would be removed as necessary, and stormwater will flow off site in about the same location as it did pre-development.

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d) Tailings Storage

Tailings will be produced at an average rate of around 100,000 cubic metres per year to the end of mine life in 2016.

The final dewatering of the tailings dam may be achieved by leaving the residual water to evaporate. Decommissioning will be achieved by capping the surface with a domed, self-draining cap of overburden, which will be topsoiled and revegetated.

Rehabilitation of the tailings dam will be the subject of detailed hydrogeological studies at the appropriate time. Rehabilitation of the main embankment will include stabilisation by placement of suitable topsoil, and seeding with selective grass seeds and native tree seeds.

6.3.2.6 Rehabilitation Schedule & Revegetation Methods

The rehabilitation schedule is built around five benchmarks as follows:

- recontoured (reshaped to final grade);
- topsoiled;
- seeded (ripped and seeded);
- established (vegetation has established, although minor reseeding/erosion repairs may be necessary); and
- successfully rehabilitated (compliance with rehabilitation success criteria).

Some of the effectively disturbed area comprises infrastructure, final void and ramps, much of which will become available for recontouring and subsequent rehabilitation only near the end of the mine's life, and after mining ceases. The tailings dam would become available for recontouring after its capacity is used, and after hydrogeological studies determine the appropriate rehabilitation strategy. Dams and drains would be graded and re-shaped to final landform designs prior to re-topsoiling and revegetation as appropriate.

A rehabilitation schedule will be developed and placed in the Plan of Operations.

a) Deep Ripping

Deep ripping of spoil and topsoil is a necessary treatment to improve rainfall/runoff infiltration, and to decrease erosion. The rip-lines are oriented across the slope at a gradient of 0.5% off the contour.

Deep ripping will be carried out after topsoil replacement and in conjunction with the seeding operation.

b) Seeding

The seed mix to be used will depend on a number of factors, namely:

- tree trials;
- research work and reports;
- site observations of surrounding countryside;

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- experiences from other sites in the Bowen Basin and elsewhere;
- consultation with Landcare;
- seed availability; and
- climate.

Ongoing research and development information and field observations will continue to guide the selection of species and seeding rates.

Seeding is normally carried out in late October and early March. This will vary from time to time, to suit equipment availability, seasonal variances and topsoil replacement programs.

Fertiliser will be applied for pasture establishment, where research indicates that it is beneficial to do so.

All mine traffic will be restricted to authorised access roads to ensure that the soil profiles and vegetation growth are not unnecessarily disturbed.

a) Rehabilitation Success

Quantifiable success criteria provide an objective means by which the success of rehabilitation can be gauged. Monto Coal will develop success criteria, which will include:

- minimum canopy cover in areas of native vegetation;
- minimum stems/ha of native trees and shrubs in rehabilitated areas;
- run-off water quality
- soil loss less than 40 tonnes/ha/year for normal strip spoil areas.
- tree height and girth;
- percentage cover of grasses and weeds by species;
- leaf nutrient analysis;
- soil microbiology; and
- salt profile changes.

Monto Coal will seek the assistance of recognised research organisations such as the Centre for Mined Land Rehabilitation (CMLR) at the University of Queensland to investigate credible success criteria. The trend of these parameters over time will assist in developing useful indicators of rehabilitation success.

It is Monto Coal's view that success criteria measurements will be made in conjunction with selected reference sites subjected to similar conditions, either within the region or at other identified sites.

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6.3.3 Environmental Protection Objectives

The objectives are to:

1. Return disturbed land to a self-sustaining native species vegetation cover, which is suitable for local flora and fauna to colonise; and
2. Ensure that post-mining landforms are safe, stable and non-compromising for final use.

6.3.4 Control Strategies

1. Monto Coal will produce a landform design that will emulate the natural drainage and natural slope in the mining area where possible. Landform design as specified in the Plan of Operations will incorporate natural and engineered structures to minimise erosion.
2. Landform morphology will conform to the landform plan as per the Plan of Operations.
3. If required, a study will be conducted to confirm the results of the CSR studies in 1985 on the potential for acid generated by the overburden material and to design bunding and treatment ponds for the leachate produced from any stockpiled overburden material.
4. An overburden and topsoil monitoring program will be conducted to test material stockpiles in order to establish suitable material for revegetation.
5. Graded banks will be constructed on recontoured spoil to minimise erosion.
6. Banks (including topsoil) will be graded at 0.5–1% to drain water from storms.
7. Rock-lined waterways will be used to dissipate energy from collected water from contour drains.
8. Where possible, topsoil will be reused immediately in preference to stockpiling. Where this is not possible, stockpiles will be revegetated.
9. Topsoil will be recovered, volumes recorded, mapped and managed for future revegetation uses as outlined in the Plan of Operations.
10. Topsoil and spoil stockpiles will be placed away from natural drainage areas so that any leachate does not drain directly into creeks without first being contained and/or treated on site. Good management dictates that the topsoil material also be placed so as not to affect any future infrastructure requirements or coal resources.
11. Topsoil will be used for rehabilitation by placing it on top of ripped recontoured spoil to minimise sheet flow and wind erosion.

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12. Monto Coal will undertake a study of its tailings dam as part of its preparation for final rehabilitation.
13. The final void, including pits and ramps not backfilled, will be made safe, and persons and stock excluded.
14. Deep ripping of spoil and topsoil in conjunction with seeding will be utilised to minimize erosion.
15. Revegetation will be carried out mainly by seeding and, where appropriate, by planting tubestock.
16. Revegetation will be surveyed on an as-required basis and maintenance will be carried out to meet rehabilitation goals as listed in the Plan of Operations.
17. A study will be undertaken to determine an appropriate species mix of native (or introduced) trees, shrubs and grasses for revegetation and to determine rehabilitation success criteria. Data will also be collected from other analogous sites where possible.
18. Haul roads will be rehabilitated by removal of contaminated material and/or ripping of compacted areas, followed by topsoiling and seeding.
19. All mine traffic will be restricted to authorised access roads where possible.
20. A rehabilitation schedule and plan will be placed in the Plan of Operations.
21. Revegetation studies, using reference sites at both the Monto Coal site and at analogous sites, will be conducted (where possible) to establish post-mining rehabilitation success criteria.

6.3.5 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.3.5.1 Rehabilitation Landform Criteria

(D1-1) Monto Coal will produce a Final Land Use and Rehabilitation Approval Schedule to ensure that all areas significantly disturbed by mining activities will be rehabilitated. The schedule will include disturbance areas, pre and post mine land descriptions, post mine capability and analogue site(s) where appropriate.

(D1-2) Rehabilitation slope angles and slope lengths will be within 10% of design parameters.

(D1-3) Progressive rehabilitation will commence as soon as practicable after land becomes available.

(D1-4) Graded banks and supporting drains will continue to be designed as shown in Schedule D – Table 1.

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6.3.5.2 *Sustainable Ecosystem Outcome*

(D2-1) Monto Coal will continue to progressively rehabilitate disturbed land to a sustainable ecosystem and will continue to comply with the following outcomes:

- a) A self sustaining ecosystem using species yet to be determined by research will be listed in the Plan of Operations.
- b) Tailings and sediment dams will be designed to meet the standards in Schedule D - Table 2.
- c) The final landforms are stable with erosion rates of less than 40 tonnes/ha/year for normal strip spoil areas and runoff water less than 1000 $\mu\text{S}/\text{cm}$.

(D2-2) Monto Coal will monitor the current progress of disturbed area rehabilitation and submit a report to the administering authority to propose success criteria to meet the outcomes of D2-1 and the landforms criteria at an appropriate date prior to mine closure.

6.3.5.3 *Residual Void Outcome*

(D3-1) Residual Voids will comply with the following outcome:

- a) residual voids will not cause any serious environmental harm to land, surface waters or any groundwater aquifer other than the harm generated by the existence of the void itself; and
- b) residual void design criteria will be submitted to the administering authority once detailed modelling has been completed. It will include void wall competent and incompetent rock slopes and maximum void area.

(D3-2) An investigation report of the residual void proposing acceptance criteria to meet the requirements of D3-1 will be generated prior to mine closure and submitted to the administering authority.

Schedule D - Table 1 Earthworks Design

Drainage Structure	Design Storm
Tailings dam	10 year ARI
Sediment dams	10 year ARI
Graded banks on < 10 % slopes	50 year ARI
Collector drains on <10% slopes	1 in 10 year ARI

Schedule D – Table 2 Landform Design

Slope %	Slope (°)	Vertical Height (m)	Design Maximum Length between Benches (m)
20	11.5	10	50
15	8.6	20	133
10	5.8	22	220
5	2.9	26	520
3	1.7	28	900

6.3.5.4 Infrastructure

(D4-1) All infrastructure constructed during the mining project will be removed from the site prior to lease surrender except where agreed to in writing by the future owner.

6.4 Noise and Vibration

6.4.1 Potential Impacts

Sources of potential noise impacts from the proposed mining operation are:

- blasting operations;
- construction noise (during initial stage);
- operational noise, e.g. coal haulers, dump trucks, loaders, CHPP; and
- rail transport.

6.4.1.1 Blasting and Vibration Predictions

The predicted level of blast emissions, using the appropriate distances to the mine's extraction boundary, are shown in Table 6-9.

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Table 6-9: Predicted Levels of Blast Emissions for a 65 kg Maximum Instantaneous Charge

Receptor/Property Owner	Distance (m)	PVS Ground Vibration (mm/s)	Peak Airblast (dB Linear)
Hill Residence and Piggery	945 m	0.2	107
Browning	105 m	8.2	130
Leahy	118 m	6.8	129
Dow	1600 m	0.1	102
Hill	1400 m	0.1	103
Stewart	900 m	0.3	108
Leahy	582 m	0.5	112
Brian	1120 m	0.2	106
Drinkwater	806 m	0.3	109
Jobling	945 m	0.2	107
Avis	885 m	0.3	108
Guideline Limits		10 ¹	115
		25 ²	(4 out of 5 consecutive blasts)

Note 1: Human Comfort Criteria as per the Queensland EPA guidelines for vibrations greater than 35 Hz

Note 2: Human Comfort Criteria as per the Queensland EPA guidelines for vibrations of not greater than 35 Hz

As can be seen:

- The predicted levels of ground vibration comply with the Queensland EPA general human comfort criterion (of 10 mm/s) at all receptors.
- The predicted levels of peak airblast at all receptors comply with the Queensland EPA general human comfort criterion of 115 dB Linear at all receptors except at the Browning and Leahy properties.

6.4.1.2 Construction Noise

Construction work occurring during normal recommended daytime hours (see Table 6-10) will be undertaken by powered plant fitted with appropriate mufflers. For construction activities occurring outside these hours of operation, the noise limits detailed in Table 6-11 will be adopted.

Table 6-10: Hours of Operation for Construction Activity Affecting Receptors and Other Residential Accommodation

Location	Recommended Hours of Operation
Rural Areas	7.00 am – 6.00 pm - Monday – Saturday

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Table 6-11: Noise Limits for Construction Works Undertaken Outside Recommended Hours of Operation, Based on Minimum Typical Background Noise Levels

Location	Time Period	Construction Noise Limit
		L _{Amax} adj,15min dBA
Rural areas	Monday to Friday: 6.00 pm – 10.00 pm	50
	Saturday 12.00 noon – 10.00 pm	45
	Sunday and public holidays 7.00 am – 10.00 am	40
	10.00 pm – 6.00 am	Construction noise inaudible within any habitable room of affected residential premises

6.4.1.3 Operational Noise

Minimum background noise levels of 30 dBA were observed. As the daytime noise limit is nominated at 45 dBA LA10, potential noise levels due to mining operations are expected to have a significant impact on the surrounding receptors, resulting in increases of at least 15 dBA above pre-mining noise conditions.

6.4.1.4 Noise Standards

The noise limits that will be adopted for operations by Monto Coal are shown in Table 6-12. In view of the low background levels, the values adopted are based on the minimum limits applied in the guidelines (*Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland*, January 1995).

Table 6-12: Recommended Noise Limits

Time Periods	Noise Limits on Affected Premises	
	L _{Amax} adj,T (dBA)	
	Residential	Non-Residential
Monday to Saturday 7.00 am to 6.00 pm	45	50
Monday to Saturday 6.00 pm to 10.00 pm	40	45
Monday to Saturday 10.00 pm to 7.00 am hours	30	35
Sundays and Public Holidays 9.00 am to 6.00 pm	35	40
Sundays and Public Holidays 6.00 pm to 10.00 pm	35	40
Sundays and Public Holidays 10.00 pm to 9.00 am	30	35

Reference: Technical Guidelines for the Environmental Management for the Exploration and Mining in Queensland (January 1995)

6.4.1.5 Noise Predictions

Modelling was undertaken to predict noise levels at sensitive receptors for (a) the initial earthworks, and (b) the extractive operations at outdoor receptor locations. The outcomes

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are shown in Table 6-14 and Table 6-15 respectively. The predicted noise levels refer to reasonable worst-case weather conditions, i.e. stable atmospheric conditions, with a low-level temperature inversion, or alternatively, stable conditions with a light breeze from source to receiver.

Table 6-13: Predicted Noise Levels Attributable to Initial Earthworks

Receptor	Storey	Direction	Predicted LA10 Noise Levels (dBA)		
			Maximum	Minimum	Average
Hill Residence and Piggery	1	S	38	29	33
Hill Residence	1	S	49	28	40
Dow Residence	1	NE	37	19	30
Brian Residence	1	W	49	26	40
Browning Residence (Floor 1)	1	W	67	36	49
Browning Residence (Floor 2)	2	W	67	37	19
Drinkwater Residence	1	E	51	27	38
Talbot Residence	1	N	43	35	39
Avis Residence	1	NE	49	35	42
Leahy (Rental) Residence	1	W	67	36	48
Mulgildie A	1	SE	37	37	33
South A	1	NW	40	23	30
West A	1	NE	34	25	31
North A	1	SE	36	21	30
East A	1	SE	38	25	33
Guidelines as per Table 6-12	Day (7.00 am – 6.00 pm)		45		
	Evening (6.00 pm – 10.00 pm)		40		
	Night (10.00 pm – 7.00 am)		30		

Table 6-14: Predicted Noise Levels Attributable to Extractive Operations

Receptor	Storey	Direction	Predicted Noise Levels - dBA LAmax			
			Seam S01/S02			
			Block 01/02	Block 04	Block 06	Block 12
Hill Residence and Piggery	1	S	18	26	22	23
Hill Residence	1	S	33	26	32	35
Dow Residence	1	NE	19	18	17	14
Brian Residence	1	W	21	20	24	29
Browning Residence (Floor 1)	1	W	28	27	31	29
Browning Residence (Floor 2)	2	W	29	27	31	29
Drinkwater Residence	1	E	30	28	28	25
Talbot Residence	1	N	32	35	34	24
Avis Residence	1	NE	32	35	41	30
Leahy	1	W	29	27	30	29
Mulgildie A	1	SE	19	24	25	21
South A	1	NW	17	16	15	24
West A	1	NE	17	19	22	16
North A	1	SE	19	25	21	21
East A	1	SE	19	22	23	23
Guidelines as per Table 6-12			Day (7.00 am – 6.00 pm)			
			Evening (6.00 pm – 10.00 pm)			
			Night (10.00 pm – 7.00 am)			

The results show that:

- Predicted noise levels from the project indicate that, given the existing low ambient and background noise levels, significant noise and vibration impacts may occur at the nearest adjacent dwellings, such as the Browning, Leahy (rental), Avis and Drinkwater residences. This would particularly be the case for operations extending into the evening and night/early morning periods.
- The predicted levels of blast emissions for ground vibrations and airblast overpressure would be achieved at all the nearest receptors, with the exception of the Browning and Leahy (rental) properties.

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6.4.2 Environmental Protection Objectives

The objectives are to:

1. Ensure that there will be no unlawful nuisance noise attributable to mining activities at noise-sensitive receptors.
2. Ensure that vibration levels are such that no adverse effects are caused to local residences or businesses (such as structural damage, generation of undesirable effects on the social behaviour of local farm stock, or nuisance).

6.4.3 Control Strategies

The following control strategies will be employed:

1. Purchase of impacted properties on the eastern side of the proposed lease is being considered.
2. Blasting will be restricted to daylight hours.
3. Vehicles will be fitted with appropriate mufflers. Manufacturers' external noise levels will be in accordance with AS2021.1 for earthmoving machinery and AS 2436 1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites.
4. Where practical, the noisiest activities will be scheduled to occur at times when they would generate least disruption.
5. For the adjacent receptors, particularly the Browning and Leahy (rental) residences, the design phase of the project, blast design and the detailed management of noise issues on site will be considered in order to ensure that the potential impacts at these locations are minimised.
6. All noise complaints will be investigated.

6.4.4 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.4.4.1 Noise Nuisance

(E1-1) Subject to Conditions (E1-2) and (E1-3) noise from the mining activity must not cause an environmental nuisance, at any sensitive place.

(E1-2) When requested by the Administering Authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

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(E1-3) If the environmental authority holder can provide evidence through monitoring that the limits defined in Schedule E - Table 1, 2 and 3 inclusive, are not being exceeded then the holder is not in breach of Condition (E1-1). Monitoring will include:

- LA, max adj, T;
- the level and frequency of occurrence of impulsive or tonal noise;
- atmospheric conditions including wind speed and direction; and
- location, date and time of recording.

(E1-4) If monitoring indicates exceedence of the limits in Schedule E - Table 1, then the environmental authority holder must:

- address the complaint including the use of appropriate dispute resolution if required; or
- immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.

(E1-5) The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.

Schedule E - Table 1 Noise limits - 'Sensitive place (other than a sensitive place which is a commercial place)'

Noise level dB(A) measured as	Noise measured at a 'Noise sensitive place'					
	Monday to Saturday			Sundays and public holidays		
	7am – 6pm	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 10pm	10pm - 9am
L _{A10} , adj, 10 mins	45	40	30	35	35	30
L _{A1} , adj, 10 mins	50	45	35	40	40	35

Note: The method of measurement and reporting of noise levels must comply with the latest editions of the Environmental Protection Agency's Noise Manuals.

Schedule E - Table 2 Noise limits - 'Commercial place'

Noise level dB(A) measured as	Noise measured at a 'Commercial place'					
	Monday to Friday			Sundays and public holidays		
	7am – 6pm	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 10pm	10pm - 9am
L _{A10} , adj, 10 mins	50	45	35	40	40	35
L _{A1} , adj, 10 mins	55	50	40	45	45	40

Note: The method of measurement and reporting of noise levels must comply with the latest editions of the Environmental Protection Agency's Noise Manuals.

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Schedule E - Table 3 Airblast Overpressure Level - 'Sensitive place'

Vibration parameter	Airblast Overpressure Level – Sensitive Place	
	Monday to Friday 9am - 5 pm Saturday 9am - 1 pm	Sundays and public holidays
Houses and low rise residential buildings and commercial buildings not included below	115 dB for 4 out of 5 blasts	No blasting
Commercial and industrial buildings or structures of reinforced concrete or steel construction	115 dB for 4 out of 5 blasts	No blasting

6.4.4.2 Vibration Nuisance

(E2-1) Subject to Conditions (E2-2) and (E2-3) vibration from the mining activity must not cause an environmental nuisance, at any sensitive place.

(E2-2) When requested by the Administering Authority, vibration monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

(E2-3) If the environmental authority holder can provide evidence through monitoring that the limits defined in Schedule E - Table 4 are not being exceeded then the holder is not in breach of (E2-1). Monitoring must include:

- location of the blast/s within the mining area (including which bench level); and
- atmospheric conditions including temperature, relative humidity and wind speed and direction; and
- location, date and time of recording.

(E2-4) If monitoring indicates exceedence of the relevant limits in Schedule E - Table 4, then the environmental authority holder must:

- address the complaint including the use of appropriate dispute resolution if required; or
- immediately implement vibration abatement measures so that vibration from the activity does not result in further environmental nuisance.

Schedule E - Table 4 Vibration Limits - 'Sensitive place'

Vibration parameter	Vibration measured at a sensitive place	
	Monday to Friday 9am – 5 pm Saturday 9am - 1 pm	Sundays and public holidays
Houses and low rise residential buildings and commercial buildings not included below	10mm/s peak particle velocity	No Blasting
Commercial and industrial buildings or structures of reinforced concrete or steel construction	25mm/s peak particle velocity	No Blasting

Note: The method of measurement and reporting of noise levels will comply with the latest editions of the Environmental Protection Agency's Noise Manual.

6.5 Waste Management

6.5.1 Potential Impacts

The major types of waste from the mining operation, with the potential to cause impacts, will be:

- regulated wastes (e.g. hydrocarbon waste);
- fuels, oils and lubricants, vehicle batteries, oil filters, tyres, detergents, solvents from workshop activities;
- scrap metal (e.g. drums);
- sewage;
- construction wastes;
- loss of containment from fuel storage (distillate) in above-ground storage tanks and from oil storage;
- tailings from the CHPP;
- coarse rejects from the CHPP;
- general wastes (e.g. food scraps, wrapping paper, office waste, rags); and
- recyclable general waste (e.g. paper, cans).

6.5.2 Environmental Protection Objective

All non run-of-mine waste will be managed in a manner to avoid any direct or indirect impacts on the health of people working and living in the vicinity of the mine, and to minimise the risk of impacts on air, land and water resources.

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6.5.3 Control Strategies

- 1) Develop a waste management plan which identifies how waste streams will be managed through identifying, categorising and quantifying waste types at the source, and identifying methods of waste elimination (cleaner production), minimisation, recycling, treatment and disposal.
- 2) Maintain a system of waste bins/containers used to segregate and collect waste. This includes the current application of appropriate labelling and making material safety data sheets available for ready access by mine personnel. Install appropriate signage.
- 3) General waste will be removed from the site and disposed of at a licensed landfill.
- 4) Recyclable waste will be collected by licensed recyclers.
- 5) Regulated waste will be removed from the site by a licensed regulated waste removal and transport contractor for recycling or disposal in a licensed regulated waste disposal facility.
- 6) Sewage waste will be collected by licensed contractors.
- 7) Scrap tyres will be disposed of in spoil emplacements and placed as deep in the spoil as reasonably practicable but not directly on the pit floor. Scrap tyres disposed of within the operational land will not impede saturated aquifers or compromise the stability of the consolidated landform.
- 8) Vegetation waste from clearing will be burnt only under permit and where there is a minimal risk of causing nuisance to neighbouring receptors.
- 9) Waste run-off from the vehicle washdown bay will be collected in an interceptor and separated into silt, oil and recycled water components. The oil will be managed as per strategy 5 above.
- 10) Wastes (tailings) generated from the CHPP will be pumped into a tailings dam. Coarse rejects will be collected and buried with spoil as part of the rehabilitation process. At the end of the mine's life, the tailings disposal areas will be rehabilitated by capping the area with inert spoil, topsoiling and planting out the area as discussed in the Land Management section.
- 11) Site procedures will be implemented and maintained to manage the storage, containment, disposal and spill response for potentially hazardous materials.
- 12) Any sites that become contaminated will be investigated and managed in accordance with the contaminated land provisions of the *Environmental Protection Act 1994*.

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6.5.4 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.5.4.1 *General Waste Management*

(F1-1) The waste management plan will be implemented and maintained. It will identify activities that generate waste, waste volumes generated, and methods for waste elimination (cleaner production), minimisation, recycling, treatment, disposal and interim storage prior to collection.

6.5.4.2 *Regulated and General Waste Disposal*

(F2-1) Any regulated or recycled waste will continue to be removed from site by a licensed waste removal and transport contractor for recycling or disposal in a licensed regulated waste disposal facility.

6.5.4.3 *Management of Contaminated Sites*

(F3-1) Any sites that become contaminated will be investigated and managed in accordance with the contaminated land provisions of the *Environmental Protection Act 1994* as required.

6.5.4.4 *Spill Management*

(F4-1) Site procedures for the storage, containment, disposal and spill response for potentially hazardous materials are to continue to be implemented and maintained.

6.5.4.5 *Disposal of Tyres*

(F5-1) Disposing of scrap tyres in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable but not directly on the pit floor.

(F5-2) Scrap tyres disposed within the operational land must not to impede saturated aquifers or compromise the stability of the consolidated landform.

(F5-3) It is acceptable for tyres to be temporarily stored on site prior to collection by a licensed waste removal and transport contractor for recycling or disposal in a licensed regulated waste disposal facility.

6.5.4.6 *Vegetation Waste Management*

(F6-1) Vegetation waste from clearing will only be burnt under permit.

6.6 Nature Conservation

6.6.1 Potential Impacts

Impacts on remnant flora and fauna from construction and operation of the proposed coal mine will be minimal.

Unavoidable disturbance will be mainly limited to removal of the mature eucalypts and acacias that currently provide most of the substantial habitat on the site. However as the site contributes only minor habitat and vegetation to the greater region, loss of this vegetation should not substantially affect the species composition or distribution.

The activities associated with the proposed open-cut mine site are likely to cause loss of habitat and fatalities for reptilian species in the vicinity of the site.

Mining activities may compound the existing weed problem if weed management and eradication practices are not undertaken throughout all phases of mining activities. Weeds have been highlighted as a concern by the local farming community and will therefore require ongoing management. The declared (Category P2) weed species parthenium (*Parthenium hysterophorus*) is a locally significant pest in the Monto Shire and surrounding areas. Monto Shire Council is currently applying an eradication program to this species.

While the site is located at least 10 km from Abercorn Springs, groundwater extraction for use in the mine may affect these springs by reducing the groundwater flow and/or aquifer source. This could result in a reduction in the wet areas of these springs, and consequently a change in environmental conditions for those species that depend on the springs for their survival.

Threatened species overview

Database searches highlighted the potential for 22 threatened species to occur in the region. No species of conservation significance were identified on or adjacent to the site during the field assessment.

The field assessment has identified land uses in the area as being predominantly agriculture, with little native vegetation coverage remaining. Isolated stands of trees are scattered around the area.

A lack of suitable habitat for the majority of the threatened species identified from database searches suggests that the presence of such species in the area is highly unlikely. There is potential for bat species of conservation significance to occasionally visit the area as Anabat recordings revealed that numerous bats occur along Three Moon Creek.

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Extensive disturbance and clearing in the Monto area limits habitat availability, particularly for more sensitive plants and animals such as rare and threatened species. The closest potential habitat for such species may occur at Three Moon Creek, at least 2 km from the site.

6.6.2 Environmental Protection Objectives

The environmental protection objectives are to:

- 1) Prevent the introduction of new weed species and prevent the spread of existing weed species.
- 2) Protect on-site fauna.
- 3) Re-introduce flora and fauna to the mined area by undertaking a staged rehabilitation program (as discussed in the land resource commitments).
- 4) Ensure that mining operations do not affect flora and fauna located at Abercorn Springs.

6.6.3 Control Strategies

- 1) A targeted Weed Management Plan including surveys, training at induction level and controls, including Monto Shire's weed protection procedure for parthenium weed, will be implemented. The site Induction Program will include training for site personnel on weed control and nature conservation.
- 2) Where fauna may be present, trees will be inspected for fauna prior to removal. Detected individuals will be flushed or removed prior to tree clearance.
- 3) If sick, injured or displaced animals are found during clearing activities, the Queensland Parks and Wildlife Service will be contacted.
- 4) Land clearing requirements will be specified in the Plan of Operations.
- 5) The wet areas of Abercorn Springs will be monitored regularly.
- 6) Flora and fauna surveys will be specified in the Plan of Operations.

6.6.4 Proposed Environmental Authority Conditions

Such conditions are not required under *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

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6.7 Cultural Heritage

6.7.1 Potential Impacts

Mining activities could result in the destruction or burial of artefacts.

6.7.2 Environmental Protection Objectives

The objectives are to:

- 1) Minimise any impacts to cultural heritage values on the mining lease site.
- 2) Recognise the values and beliefs of the traditional owners, and their attachment to their land.

6.7.3 Control Strategies

- 1) A Cultural Heritage Management Plan will be negotiated between Monto Coal and the Wakka Wakka elders.
- 2) Prior to any activity, the recorded cultural materials will be collected by a qualified archaeologist.
- 3) Policies and company procedures will be implemented, including training in the identification and preservation of sites and relics discovered, and notification to the appropriate authorities.
- 4) Unauthorised disturbance to sites will be prevented by the use of barricading materials, and such areas will be excluded from mining activities where possible.
- 5) A register will be established to record any heritage sites or relics discovered.
- 6) Appropriate communication will be maintained with the appropriate authorities and with the traditional owners.
- 7) Undertake appropriate reporting to the Environmental Protection Agency to ensure that cultural heritage information held by the Queensland Museum and the Environmental Protection Agency is kept up to date.
- 8) The Cultural Heritage Management Plan will be implemented through the Plan of Operations.

6.7.4 Proposed Environmental Authority Conditions

Such conditions are not required under *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

6.8 Community

6.8.1 Potential Impacts and Benefits

The proposed mine will have a number of impacts on the immediate area, including on the town of Mulgildie and local landowners. A summary of the short-term and long-term effects is presented below:

a) Costs

- 1) acquisition of land for the mining lease, need for some residents to relocate;
- 2) short-term loss of 471.8 ha of agricultural land within the mining lease;
- 3) loss of amenity for some residents with respect to noise, air quality and loss of visual amenity for the life of the mine;
- 4) minor increased traffic levels on local roads; and
- 5) impact on existing water supply.

b) Benefits

- 1) increased employment opportunities in the Monto Shire;
- 2) purchase of services and materials in the local and regional area for mine construction and operation;
- 3) increased utilisation of the QR regional rail line (and justification for maintaining the line);
- 4) realisation of the economic value of the coal resource; and
- 5) return of land to productive uses after mining, consistent with Monto Shire objectives of protecting good-quality agricultural land.

6.8.2 Environmental Protection Objectives

The objectives are to:

- 1) Improve the wellbeing of the community through the provision of economic benefits.
- 2) Minimise the exposure of the public to risks and impacts from the mining operations and minimise any risk from post-mining landforms.

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6.8.3 Control Strategies

- 1) Establish access to appropriate site personnel for the community throughout the life of the operation.
- 2) Conduct consultation meetings as appropriate and evaluate feedback from such meetings. A list of community consultation conducted to date is included in Appendix B.
- 3) Implement company procedures covering:
 - operation of the site; and
 - complaints recording and investigation.
- 4) Utilise local services and skilled personnel where appropriate.
- 5) Use local rail service as appropriate to transport coal.
- 6) Implement the community consultation plan shown in Appendix B.

6.8.4 Proposed Environmental Authority Conditions

All complaints received will be recorded including details of the complainant, reasons for the complaint, investigations undertaken, conclusions and actions taken. This information will be made available to the administering authority on request.

6.9 Monitoring

6.9.1 Environmental Protection Objective

The objective is to check the effectiveness of the control strategies and corresponding programs by confirming that environmental authority conditions are being met.

6.9.2 Control Strategies

- 1) Develop a monitoring program to measure performance with respect to environmental authority conditions. The details of the monitoring program will be incorporated into the Plan of Operations.
- 2) The relevant site procedures will also include a mechanism for implementing corrective actions if environmental authority conditions are not met.
- 3) All monitoring data will be maintained in a database to allow ready access by relevant company staff and the administering authorities. The register will be maintained by the site environmental officer.

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6.9.3 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

(G1-1) Monitoring programs will be detailed in the Plan of Operations and implemented to meet licence conditions.

(G1-2) Sampling techniques will be adopted that meet the requirements of the relevant EPA manual and relevant standards.

(G1-3) Chemical analyses will be undertaken by NATA registered and accredited laboratories.

(G1-4) Monitoring results will be maintained for 5 years and made available to the administering authority as required.

6.10 Reporting

6.10.1 Environmental Protection Objective

The objective is to provide timely and relevant information on environmental performance of the project to the relevant parties.

6.10.2 Control Strategies

- 1) Maintain a schedule of statutory and corporate reporting requirements and assign responsibilities.
- 2) Have environmental performance data available so it can be provided to the public on request.

6.10.3 Proposed Environmental Authority Conditions

Where appropriate, these conditions have been adopted from *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard Mining Projects* (Queensland Parks and Wildlife Service, Environmental Protection Agency, 11 March 2002).

(H1-1) Environmental authority reporting will be completed as per the provisions stated.

(H1-2) Other statutory reports will be provided to the EPA in accordance with the requirements of the *Environmental Protection Act*.

6.11 Continuous Improvement

Monto Coal will maintain an incident management system to report and investigate incidents (including complaints) and to implement corrective actions agreed on by relevant parties. These corrective actions will be completed within agreed timeframes.

Rehabilitation research will be undertaken with the aim of improving rehabilitation techniques. Site environmental management practices and operational procedures will be refined in the light of experience to improve overall performance consistent with the company's environmental policy, shown in Appendix A.

6.12 Training

Monto Coal will continue to train employees, contractors and visitors to ensure that appropriate levels of environmental awareness and competency are achieved and maintained by all personnel who visit and work at the site. Induction training will be provided for all employees, contractors and visitors. Ongoing training will be provided to maintain and improve levels of environmental awareness.

6.13 Environmental Auditing

An environmental auditing program will be maintained to validate and, where possible, improve current operating systems for the life of the mine. The auditing program will also assess compliance with regulatory requirements. The program will be described in the Plan of Operations.

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Legislation

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3. Nature Conservation (Wildlife) Regulation 1994 (Qld).
4. Vegetation Management Regulation 2000 (Qld).
5. *Water Act 2000* (Qld).
6. *Water Resources Act 1989* (Qld).

Appendix A

Monto Coal Environmental Policy

Monto Coal

Environmental Policy

It is Monto Coal 2 Pty Ltd's (Monto Coal) policy to achieve the highest standard of environmental care in conducting its business as a resources company.

Specifically, Monto Coal's policy is to:

- Comply with all applicable laws, regulations and standards, and where laws do not adequately protect the environment, apply standards that minimise any adverse environmental impact resulting from its operations.
- Consider all aspects of the environment in its planning, development and operational phases of its activities.
- Maintain an open relationship with Government and the community on environmental matters, and contribute to the development of policies and legislation that may affect Monto Coal.
- Integrate performance evaluation and a system of continual improvement in its environmental management of the operations.
- Ensure that employees, contractors and suppliers of goods and services are informed of this policy and have management systems to identify, control and monitor environmental risks arising from their business with Monto Coal.

General Manager

Date

Appendix B

Community Consultation Plan

Community Consultation Plan

1) Introduction

The Community Consultation Plan has been prepared as part of the Monto Coal Project EMOS to provide a framework strategy for ongoing consultation with key stakeholders and the community throughout all phases of the project.

2) Approach

Actively involving the key stakeholders (affected business, community groups and property owners) and the local community will encourage community ownership of the project. Comprehensive and flexible community consultation will provide opportunities for the community to help understand and identify social and environmental issues. This process of community input is critical to the project's instigation, acceptance and future success. A central point of contact via a staffed site office and after hours telephone contact will improve accessibility to information about the project, engender community understanding and support for the project and assist to build a relationship between the proponents and the affected communities.

The staffed site office will provide proponent representatives (on a part time basis) and a detailed project fact sheet. These will be used as the key communication tools to provide information to the general community. For key stakeholders, namely affected property owners and businesses a series of meetings will be undertaken to ensure issues are identified and managed in the planning, construction and operation phases of the project. In providing a better understanding of the project and a familiarity with company personnel, the aim of the community consultation plan will include limiting the scope for any objections to the mining lease application and environmental authority.

The strategy comprises two key aspects: communication and consultation. The objectives of the overall strategy as they relate to each specific aspect are:

- Management of information to ensure the general community and key stakeholders are informed throughout the project.
- Building upon existing established relationships with key stakeholders and the community in the study area.

3) Consultation Objectives

The objectives of public consultation are to:

- facilitate a consultation process which balances the community's need for information with opportunities to provide input into the project;
- ensure that community feedback is taken into account during the course of the project;
- ensure that opportunities for community input are maximised;
- ensure all key stakeholders are fully aware of the project and its likely scope; and
- increase broader community support of the project.

Environmental Management Overview Strategy

4) Communication Objectives

- increase the awareness and understanding of the project;
- provide the community with an association with key Monto Coal personnel;
- inform community and stakeholder groups of project progress and;
- encourage positive perceptions of the project.

5) Key Messages

The following key messages should be emphasised in all communication material produced for the consultation process. This will assist in encouraging positive community perceptions of the project.

- The Monto Coal Project will provide widespread economic benefits to the local community.
- Monto Coal is committed to the Monto Coal Project and playing a positive part in the long term future of the Monto Shire.
- Monto Coal will consult with affected property owners on an ongoing basis throughout the project.
- The proposed mine will be subject to strict environmental controls administered through the Environment Protection Agency.
- Property owners will be appropriately compensated for loss of property and relocation expenses.
- The Monto and Mulgildie communities will have opportunities to be kept informed throughout all stages (planning, construction and operation) of the project via briefing meetings, site office contact, the advertisement of telephone contacts and the local newspaper.

The IAS identified the following stakeholder groups, which are currently being verified with Monto Shire Council, as shown in Table 1 below.

Environmental Management Overview Strategy

Table 1- Stakeholder Groups

Stakeholder Group	Location
Environmental Protection Agency	Bundaberg, Maryborough & Brisbane
Dept of Natural Resources and Mines	Rockhampton
Treasury Dept, Energy Division	Brisbane
Dept of Primary Industries	Rockhampton
Dept of Local Government and Planning	Rockhampton
Dept of Main Roads	Rockhampton
Queensland Rail	Rockhampton
Dept of State Development	Rockhampton
Dept of the Premier and Cabinet	Rockhampton
Gladstone Economic and Industrial Development Board	Gladstone
Wacka Wacka # 2 Native Title Claimant Group	Rockhampton
Monto Shire Council (CEO and Elected Representatives)	Monto
State Member for Callide Hon. Geoff Seeney MLA	
Federal Member for Wide Bay Hon. Warren Truss MP	
Wildlife Preservation Society of Qld	Brisbane
Queensland Conservation Council	Brisbane
Queensland Landcare Council	Maleny
Agforce	Brisbane
Sunwater	Brisbane
Landowners (TBA)	Mulgildie
Monto Chamber of Commerce	Monto
Mulgildie Bore Committee	Mulgildie
North/South Burnett Conservation Group	Monto
Mulgildie Piggery	Mulgildie
Officer in Charge of Police – Col Giles	Monto

Environmental Management Overview Strategy

Community consultation will inform the following groups as follows:

COMMUNICATION & CONSULTATION TECHNIQUES				
	Briefing Meetings	Newspaper Advertisements & Media Releases	Telephone Hotline	Monto Information Office
Local residents and businesses located within, and adjacent to, the proposed mine				
Local communities of Monto and Mulgildie				
Advisory bodies				
Local, state and federal elected representatives				
identified special interest groups				

Activities

Summary of Communication and Consultation Activities

The following table summarises the completed and recommended consultation and communication activities to be undertaken as part of the EMOS development and up until Mining Lease approval.

A more detailed Action Plan will be prepared to supplement this summary of activities in conjunction with Monto Coal representatives.

Activity	Timing	Rationale	Actions & Responsibility
Inception Activities			
Review previous consultation activities and prepare stakeholder list	19 Jan 2002	Confirm understanding of community issues and key stakeholders.	PPK and Monto Coal to review previous consultation activities and confirm stakeholder list
Undertake strategic risk assessment	19 Jan 2002	Identify any risks to the project that could occur through the consultation process. Develop plans to address and manage these risks and issues for reference throughout the project.	PPK to prepare Issues Management Plan.
Establish project-specific community database and issues register	31Jan 2002 - ongoing	Record community information and track emergent community issues.	PPK to establish community database and issues register. Current mailing list maintained as part of database.
Establish and maintain toll-free Hotline	31Jan 2002 - ongoing	Tool for obtaining community feedback on planning issues, and opportunity for community to contact project team for information.	Monto Coal to establish hotline
Information Dissemination			
Meet with elected representatives (Federal, State and local).	ongoing	Advise elected representatives of project progress and provides information that addresses constituent questions.	Monto Coal to meet with elected representatives (local and state) on a regular basis at key stages of the project

Environmental Management Overview Strategy

Activity	Timing	Rationale	Actions & Responsibility
Conduct one to one meetings with key affected property owners (properties to be acquired by Monto Coal)	Completed by 31 Jan 2002	To ensure the smooth passage for purchase of affected properties	Monto Coal to finalise purchases prior to application for Mining Lease Approval.
Conduct briefing meetings with affected Mulgildie local community, advisory bodies and special interest groups.	Ongoing	Advise local community, advisory bodies and special interest groups about the project at key stages.	Monto Coal to meet with local community, advisory bodies and special interest groups.
Local Community Relationship Management	Ongoing	To demonstrate commitment to improvement of the local community as a result of the project through the provision of local employment opportunities and use of existing services where possible	Monto Coal to identify what services and products can be sourced locally.
Project Fact Sheet	31 Jan 2002`	A Fact Sheet will provide information about the project and will be made available at the Site Office and at key community venues in the Monto Shire.	PPK to prepare A4 double sided (two colour) Fact Sheet.
Project Information Posters	31 Jan 2002	A general project information poster would be prepared for display in Mulgildie shop front window display to bring the project to the attention of the broader community and to direct them to Monto Site Office and telephone hotline for further information.	PPK to prepare A1 size poster for Mulgildie shopfront window display
Prepare and distribute media releases and newspaper advertisements	31 Jan 2002	Brief the local newspaper (Central & Burnett Times) at key stages of the project. (i.e. lodgement of EA/ML, EMOS and at commencement of objection period). Advertisements in 'Monto Matters' and Public Notice Section will advise the broader community of the project's status, and advertise site office details.	PPK to prepare and distribute media releases at key stages of the project. Newspaper advertisements prepared for public notice section (during objection period) and regular fortnightly project updates in 'Monto Matters' Section of Central & Burnett Times.

Environmental Management Overview Strategy

Activity	Timing	Rationale	Actions & Responsibility
Establish Monto Site Office and Mulgildie Shopfront Window (Project Information) Display	31 Jan 2002	A site office would be established in Monto to attend to general community enquiries about the project. The site office would be staffed on part-time basis (one day/8 hours per week). These hours would be advertised in the local newspaper and on the project information poster at the Mulgildie shopfront window. A shopfront window display will also be established in Mulgildie to provide general information on the project and how the community can find out further information either via the Monto Site Office or the telephone hotline.	Monto Coal representative to staff Monto site office to allow public to discuss project and review information.
Consultation Reporting			
Prepare Consultation Report	End of May 2002	Report on consultation activities and outcomes and follow up consultation activities to be undertaken in subsequent stages of the project (construction and operation).	PPK to prepare Interim Consultation Report

RECORD OF CONSULTATION

Representatives of Burnett Coal Pty Ltd and subsequently Macarthur Coal Limited, have participated in several meetings in the Monto Shire to provide information and updates to a range of stakeholder groups about the Monto Coal project.

The following table summarises consultation activities from 29 June 2001 to 27 February 2002.

Date	Consultation Type	Monto Coal Project Representatives	Key Issues/Matters Discussed	Record of Media
29 June 2001	Monto Shire Council meeting	Mr Chris Wallin & Mr Wayne Wilson (Burnett Coal Pt Ltd)	Presentation of exploration results	
16 August 2001	Advertisement		Advertised intention to continue exploration and evaluation work in Monto Shire. Burnett Coal also advertised that it was seeking to purchase a property in order to obtain a bulk sample of coal (23 responses received).	Advertisement in 'Central & Burnett Times'
12 September 2001	Monto Shire Council Meeting of Interested Parties	Burnett Coal Representatives attended	Interested parties discussed the future use of the Monto to Gladstone rail line as a result of the raising of the Awoonga Dam.	Burnett Coal presentation recorded in 'Central & Burnett Times' (21 September, 2001)
1 November 2001	Public Meeting (approx 350 attendees)	Monto Coal Project representatives	Meeting called to inform community of economic issues affecting Monto Shire. Key issues discussed included: ◆ local employment; ◆ type of contract mining operations (would not involve 'fly-in, fly-out'); and ◆ water supply (given water sources are all allocated in Monto Region)	Announcement of meeting published in 'Central & Burnett Times'. Meeting reported in 'Central & Burnett Times' on 8 November 2001.

Environmental Management Overview Strategy

Date	Consultation Type	Monto Coal Project Representatives	Key Issues/Matters Discussed	Record of Media
2 November 2001	Affected Landholders Meeting (40 attendees)	Burnett Coal's Managing Director	Purpose of meeting was to field specific questions concerning the project. Following the meeting ten individual property owners met with Burnett Coal representatives to discuss their respective property interests.	Public Notice of meeting published in 'Central & Burnett Times' on 1 November 2001.
15 November 2001	Meeting between Monto Coal Project and Monto Shire Council, Queensland Rail, & PPK.	Mr Keith DeLacey (Chairman, Macarthur Coal), Mr Chris Wallin (Managing Director, Burnett Coal) & Mr Wayne Wilson (Director, Burnett Coal)a	Purpose of meeting was to discuss key aspects of Monto Coal project.	Meeting reported in 'Central & Burnett Times' on 22 November 2001.
15 November 2001	Letter to Landholders	Sent by Burnett Coal	Forty-six maps were sent to landholders showing the outlines of land holdings together with geology (as requested at 1 November 2001 meeting). The letter also clarified some issues raised at these meetings.	
20 November 2001	Landholders meeting	Not required	Presentation to affected landholders by Mr Warren McLachlan (WW & SM McLachlan Consultancy) on land acquisition issues.	Details of meeting not publicly reported

Environmental Management Overview Strategy

Date	Consultation Type	Monto Coal Project Representatives	Key Issues/Matters Discussed	Record of Media
29 November 2001	Landholder meeting	Mr Dennis Wood (project Manager, Macarthur Coal) & Mr Chris Wallin (Managing Director Burnett Coal)	Project representatives outlined the concept for the mine development, progress with current studies and probable timetable for mining lease application Ms Christine King (Macarthur Coal) was announced to meetings the as the Liaison Officer for the Project	Notice of meeting published in 'Central & Burnett Times' on 15 November 2001.
23-25 January 2002	Individual Landholder meetings	Burnett Coal representative	23 landholders and other interested parties (by prior arrangement) met with a Burnett Coal representative to discuss the project and potential areas for acquisition.	
27 February 2002	Rotary Club Enterprise Dinner	Burnett Coal representative	Presentation to dinner attendees on progress to date on the Monto Coal Project.	

Appendix E Environmental Management Plan



Environmental Management Plan Monto Coal Project

17 April 2012

Client No: 2-1000



McCollum Environmental Management Services Pty Ltd

ABN 271 015 698 31

6 Malcomson Street, Mackay Qld 4740

PO Box 8120, Mount Pleasant Qld 4740

Telephone: 07 4953 2700

Facsimile: 07 4953 2755

International: +61 7 4953 2700

Level 2/276 Edward Street, Brisbane Qld 4000

GPO Box 5107, Brisbane Qld 4001

Telephone: 07 3220 3166

Facsimile: 07 3220 3199

International: +61 7 3220 3166

Email: info@mems.com.au

Web: www.mems.com.au

Document Control			
Version	Date	Author	Reviewer
		Name	Name
EMOS		Parsons Brinckerhoff	
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1. INTRODUCTION

1.1 Purpose of this Environmental Management Plan

A Mining Lease Application (MLA) 80175 was submitted on 10 February 2011, for the extension of the existing Mining Lease (ML) 80101. As part of this application, the Department of Environment and Heritage (DEH) has indicated the requirement for the current Environmental Management Overview Strategy (EMOS) to be updated to include MLA80175 and ensure compliance with current legislative requirements.

This Environmental Management Plan replaces the current approved EMOS (version 15, March 2002) for ML80101. It has been prepared in accordance Section 203 of the *Environmental Protection Act 1994* (EP Act). The primary role of this EM Plan is to propose environmental protection commitments for the proposed activities on ML80101 and additional activities to be undertaken on MLA80175 (the Project).

This plan is written in accordance with:

- Section 203 of the EP Act; and
- The DEH Guideline – Preparing an environmental management plan (EM plan) (exploration permit or mineral development licence) for a level 1 mining project (due to the fact that no guideline exists for Level 1 Mining Lease Projects).

The reason for submission of this EM Plan is to support changes to the Project. Changes to the Project include the utilisation of MLA80175 to incorporate a rail loop, load-out facility, product stockpile, coal handling preparation plant (CHPP), dams, open cut and other mine infrastructure to compliment ML80101 mining operations.

This EM Plan describes the environmental values likely to be affected by the mining activities. It also states the potential adverse and beneficial impacts of the mining activities on the environmental values including environmental protection commitments, standards, indicators and control strategies.

The environmental protection commitments must:

- (a) be stated in a way that allows them to be measured and to be audited; and
- (b) state the environmental protection objectives and the standards and measurable indicators, including, for example, objectives for progressive and final rehabilitation and management of contaminated land; and
- (c) include control strategies to ensure the objectives are achieved, including for example, strategies for the following in relation to the mining activities:
 - continuous improvement;

- environmental auditing;
- monitoring;
- reporting; and
- staff training.

The environmental protection objectives mentioned must:

- include specific rehabilitation objectives; and
- identify the indicators that will be measured to establish when rehabilitation is, by reference to specific completion criteria, complete.

1.2 The Project

The Project currently has approval for the development and operation of an open cut coal mine on ML80101 producing up to 1.5 million tonnes per annum (Mtpa) Run of Mine (ROM) high volatile bituminous black thermal coal suitable for both export and domestic markets.

The coal resources on ML80101 will be developed as an open cut mine with >75% of the pit located within the existing ML80101 area. The inclusion of MLA80175 will allow for additional placement area for critical mine infrastructure and a portion of the pit required to meet the production rate of 1.5Mtpa. This EM Plan addresses the environmental management of activities associated with the ML80101 and the additional use of MLA80175.

1.3 Project Location

The Project is located approximately 2km to the South from Mulgildie township and 14km from Monto in Central Queensland. It is situated inside the North Burnett Regional Council, a well-established grazing and cropping area. In relation to the nearby ports, the Project is located approximately 190km from Gladstone (by rail) and 120km from Bundaberg (**Figure 1**). The Project covers an area of approximately 810hectares (ha).

1.4 Project Proponent

The proponent is the joint venture participants in the Monto Coal Joint Venture, being as follows:

Monto Coal 2 Pty Ltd	51.00%
Sanrus Pty Ltd	39.20%
Edge Developments Pty Ltd	4.90%
H & J Enterprises (Qld) Pty Ltd	4.90%

The structure of the Monto Coal Joint Venture is outlined in **Figure 2**.



Author: McCollum Environmental - MEMS18	Date: 27 October 2011	Checked: AF
Scale: 1 : 1,000,000 (A4P)	Projection: MGA94, Zone 56, GDA94	
Plan:M:\GIS\Plans\2011\Monto\111024MP_Monto Project_Fig 1 Regional Location		

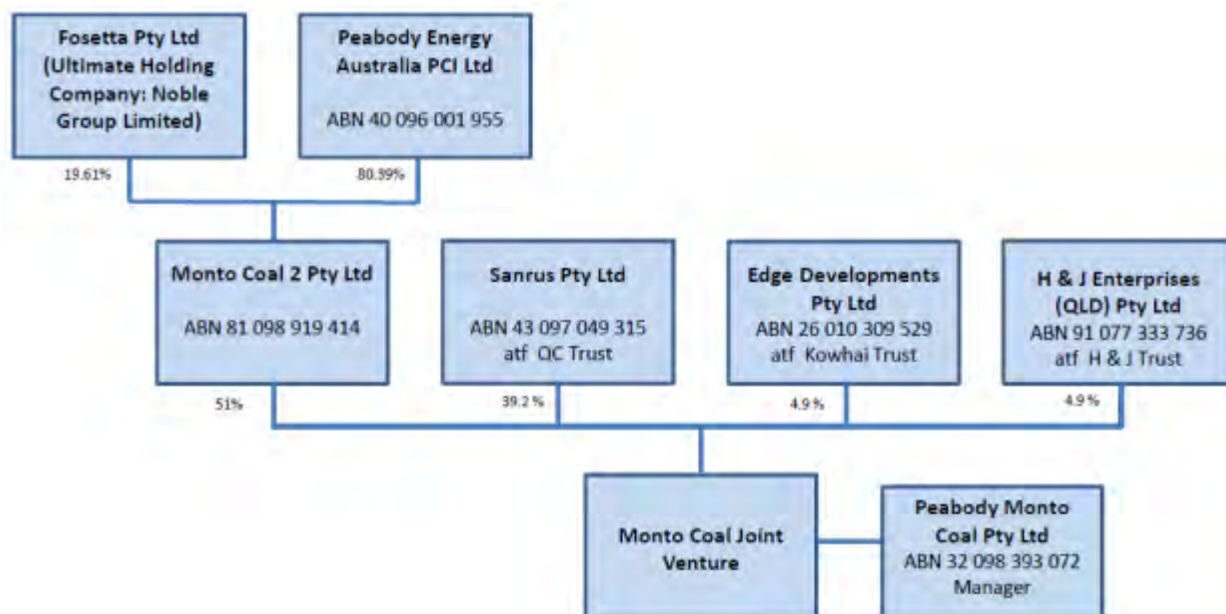


Figure 2: Structure of the Monto Coal Joint Venture

Peabody Monto Coal Pty Ltd (PMCP) is the Manager of the Monto Coal Joint Venture, and is owned by Fosetta Pty Ltd and Peabody Energy Australia PCI Ltd (which will change its status to a proprietary limited company at or about the end of April 2012, to then be named Peabody Energy Australia PCI Pty Ltd). PMCP acts as agent on behalf of the participants in the Monto Coal Joint Venture. Monto Coal 2 Pty Ltd acts as the Principal Holder.

1.5 Mining Leases

Details of the mining tenure relevant to this EM plan are shown in **Table 1**.

Table 1: Project ML and MLA Details

Mining lease number	Status	Principal holder	Area (ha)	Local authority
80101	Granted	Monto Coal 2 Pty Ltd	476.9	North Burnett Regional Council
80175	Application	Monto Coal 2 Pty Ltd	333.7	North Burnett Regional Council

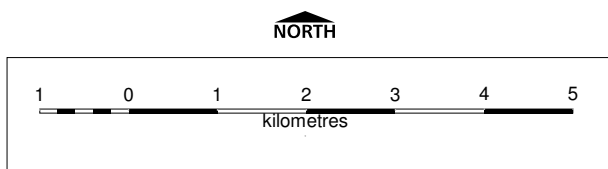
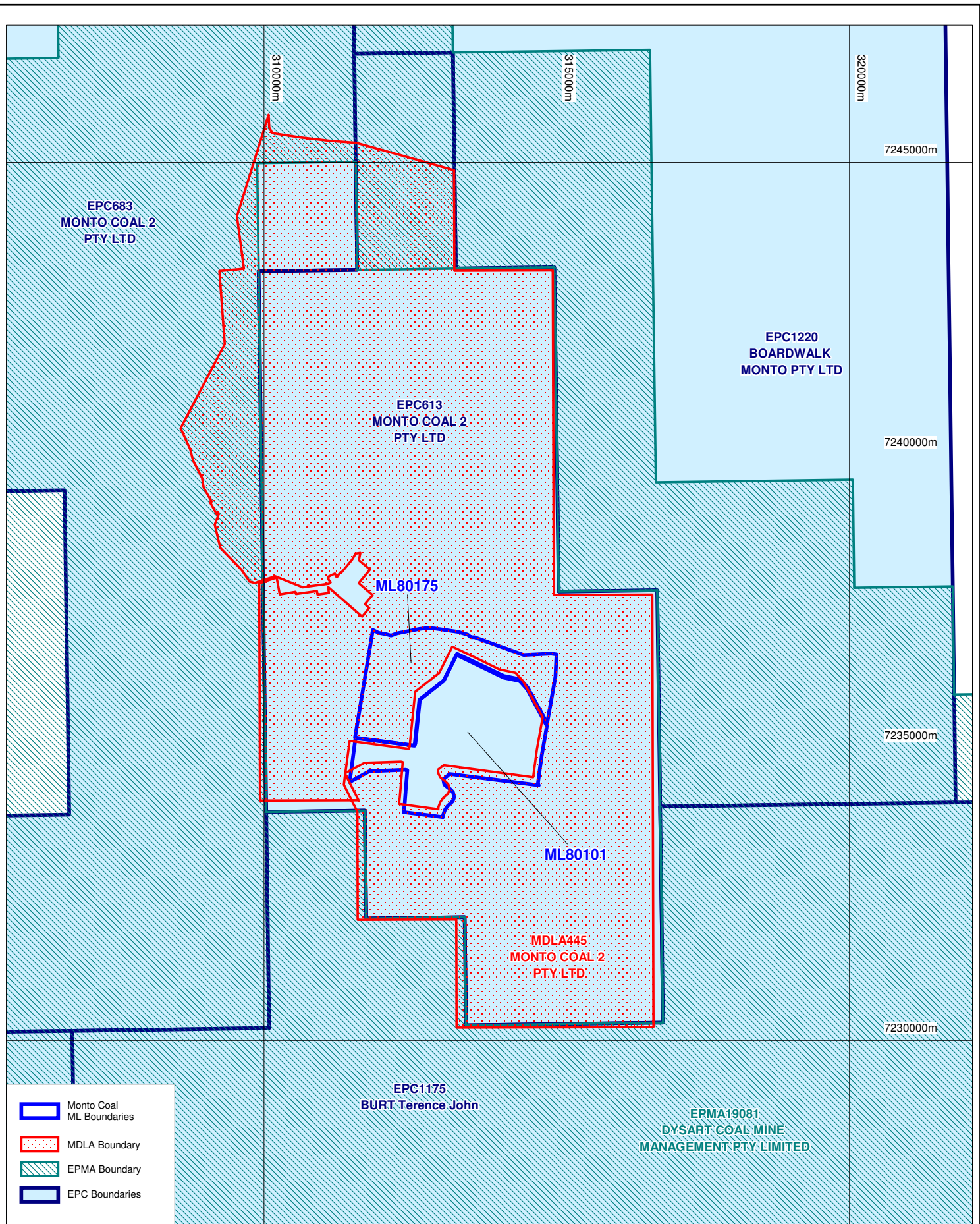
1.6 Land Use and Tenure

MLA80175, covers a portion of the underlying tenement of Exploration Permit for Coal (EPC) 613 and is an extension of the existing ML80101. It is located between the northern boundary of ML80101 and the Burnett Highway. A Queensland Rail (QR) rail line (Maryborough to Gladstone via Monto) passes through the MLA80175 area (**Figure 3**).

Land tenure and ownership details for properties underlying ML 80101 and MLA 80175 are shown in **Table 2** and illustrated in **Figure 3**. Surrounding mining and petroleum tenements in the vicinity of the Project area are shown in **Table 3** and illustrated in **Figures 4 and 5**.

Table 2: Land tenure and ownership details

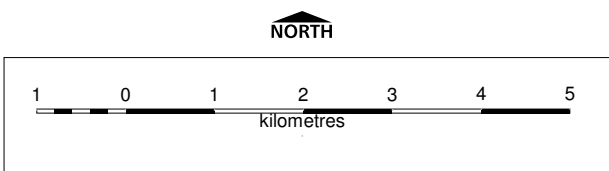
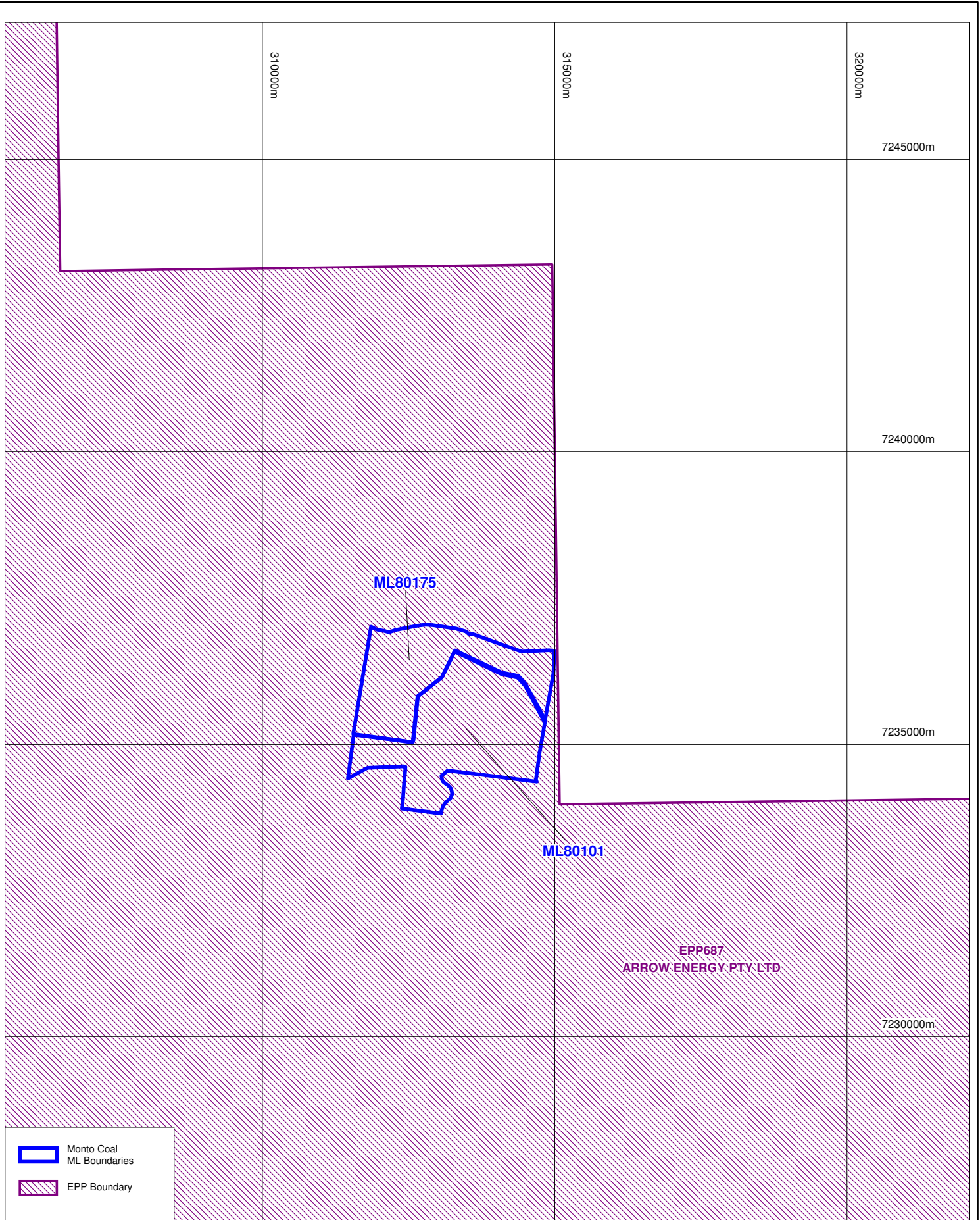
Lot	Plan	Tenure	Registered Owner
5	RW591	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
4	RW99	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
122	RW100	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
142	RW100	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
123	RW101	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
2	SP151959	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
1	SP151959	Freehold	Privately Owned
2	RP222226	Freehold	Privately Owned
1	RW805	Freehold	Privately Owned
124	RW714	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
125	RW714	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
145	RW101	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
126	RW101	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
331	CP827317	State Land	Queensland Rail – Gayndah to Monto Branch Railway
311	CP827316	State Land	Queensland Rail - Gayndah to Monto Branch Railway
1	RP840293	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd
5	RW753	Freehold	Sanrus Pty Ltd, Monto Coal 2 Pty Ltd, H & J Enterprises Pty Ltd, Edge Developments Pty Ltd



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Figure 4
Monto Coal Project
Surrounding Mining
Tenement

Author: McCollum Environmental - MEMS15	Date: 06 December 2011	Checked: ME
Scale: 1:60,000 (A3P)	Projection: MGA94, Zone 56, GDA94	
Plan: M:\GIS\Plans\2011\Monto\EM Plan figures\111205MP_Monto Project_Surrounding Mining Tenement		



McCollum Environmental Management Services		
Figure 5 Monto Coal Project Surrounding Petroleum Tenement		
Author: McCollum Environmental - MEMS15	Date: 06 December 2011	Checked: ME
Scale: 1:60,000 (A3P)	Projection: MGA94, Zone 56, GDA94	
Plan: M:\GIS\Plans\2011\Monto\EM Plan figures\111205MP_Monto Project_Surrounding Petroleum Tenement		

Table 3: Mining and Petroleum tenements in the vicinity of the Project area

Tenure	Tenure Holder	Status	Comments
Mining			
EPC613	Monto Coal 2 Pty Ltd	Granted 04 September 1996	Expires 03 September 2012
EPC1220	Boardwalk Monto Pty Ltd	Granted 08 April 2009	Expired 07 April 2011 – Renewal Lodged
EPC683	Monto Coal 2 Pty Ltd	Granted 12 April 2005	Expired 11 April 2011 – Renewal Lodged
EPC1175	Terrence John Burt	Granted 29 June 2011	Expires 28 June 2016
MDLA445	Monto Coal 2 Pty Ltd	Lodged 14 July 2010	
EPMA19081	Dysart Coal Mine Management PTY LTD	Lodged 16 February 2011	
Petroleum			
EPP687	Arrow Energy Pty Ltd	Granted 07 June 2011	Expires 30 June 2015

1.7 Affected and Interested Parties

A number of affected and interested parties are identified for the Project, including:

- Property owners underlying the MLs (**Table 2**);
- Surrounding and underlying mining and petroleum tenement holders (**Table 3**);
- Surrounding landowners, land holders or land managers;
- Local and regional service providers and agencies;
- Local Government including elected representatives;
- State Government departments and agencies; and
- Commonwealth Government departments and agencies, including the Minister for Sustainability, Environment, Water, Population and Communities, and the Federal Member for Flynn.

1.8 Native Title & Cultural Heritage

A search of the National Native Title Tribunal (NNTT) was undertaken and confirmed that there are currently no registered Native Title claimant applications over the Project area. The Wakka Wakka People #2 have had their claim dismissed, however, are the most recent claimant group. Therefore they remain the group to consult in the area for Native Title purposes.

Due to the background tenure of ML80101 and MLA80175, no Native Title negotiations or agreements are required for the Project at this point in time. Further expansion of the Project may require negotiations with the relevant Native Title parties.

2. RELEVANT MINING ACTIVITIES

2.1 Monto Coal Project Overview

The Project currently has approval to mine 1.5Mtpa ROM coal from ML80101. The Project coal resource within ML80101 and MLA80175 is estimated at 49Mt. ML80101 is currently operated under an approved Plan of Operations (PoOps) that complies with the current approved EA conditions. The Project is in the early stages of development with the construction of a 700 Megalitre (ML) per annum production water bore recently completed (**Figure 6**).

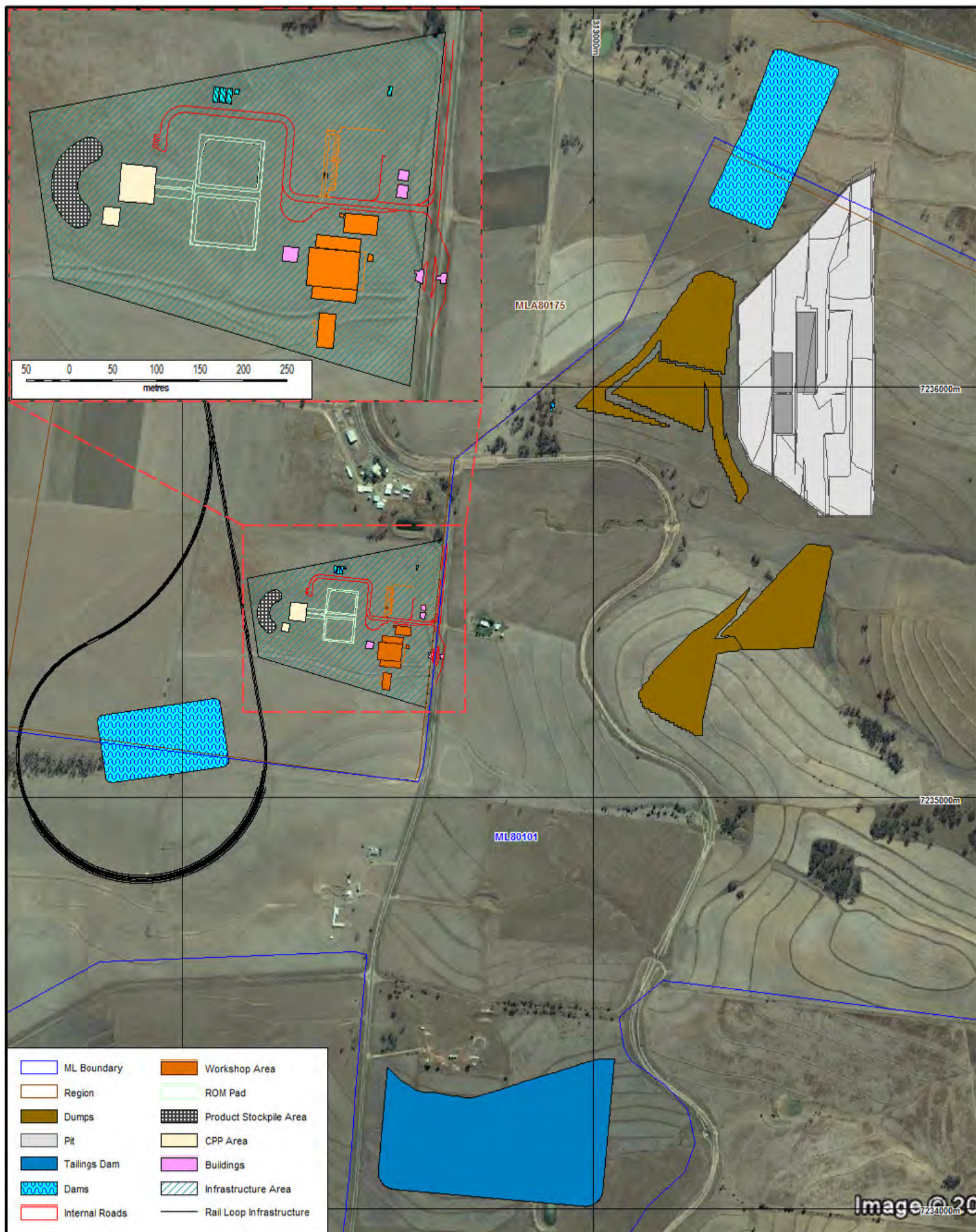
2.2 Mining Operation

Coal mining within ML80101 and MLA80175 will be undertaken by open-cut methods. Coal will be mined from the Mulgildie Coal Measures using conventional truck-and-shovel methods. A dragline will not be used, due to the small scale of the operation. Waste above the coal seams will be mined using a bulk excavation method. Selective mining techniques will be used to mine the coal and interburden waste intervals separately and also mine partings of thickness greater than 30cm.

Topsoil on average runs to a depth of 0.5m on the site. Topsoil dumps will be formed along the toe of the out-of-pit waste final dump. Once mining is underway, topsoil stripped ahead of the truck-and-excavator operation will be placed on areas contoured to the final landform, ahead of rehabilitation, or stored in topsoil dumps for future use.

The top 4-5m of overburden is assumed, based on drill hole and engineering core logs, to be free-dig material. This will be excavated either by scraper or excavator and truck. All non-free-dig waste will be either ripped and dozed or drilled and blasted prior to removal by the digging unit. In general, waste intervals thicker than 3-5m will require drilling and blasting prior to loading. The transition from ripping to drill and blast will be determined by field conditions and the relative productivity of each method. Similarly, some intervals thinner than 3m may require drilling and blasting to disrupt re-cemented calcite and siderite bands.

Mining will commence along the western extent of the mine design. Life of mine planning has been conducted within ML80101 and MLA80175. A 1.5Mtpa operation will exhaust the coal resource in approximately 20 to 25 years.



NORTH

200 0 200 400 600 800 1000
metres



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Figure 6
Monto Coal Project
Mine Infrastructure

Author: McCollum Environmental - 11/03/19 Date: 05 December 2011 Created: PT
Scale: 1:8500 (main), 1:4,000 (insert) (ASPI) Projection: UTM84, Zone 56, GDA94
Plan: 11/03/19 Plans 2011 (Monto) SU Plan Square 111203UP, Monto Project, Mine Plan

The mine area will be divided into 60m to 50m widths to cope with restrictions on out-of-pit dump capacity and the subsequent need to introduce in-pit waste dumping at the earliest opportunity.

All of the box-cut waste and waste from the coal seam base will go to out-of-pit dumps. Out-of-pit waste dumps have been designed with a total capacity of 8.9 million m³ of in situ waste. Out-of-pit spoil dumps from the box cut will initially be constructed west of the railway line after forming the initial containment bund for the tailings disposal area. These will be constructed with an external surface slope of 1 in 6, the same as for the final landform. Water management levees and dams will also be constructed.

Overburden waste will be trucked to waste dump extremities to even out haul cycles. Overburden and interburden waste will be trucked to areas closer to the pit to even out haul cycles, and the deepest waste in the mining sequence will be the first to be scheduled for in-pit waste dumping.

The out-of-pit and in-pit spoil will be progressively placed to create a final landform. Plans of the pit and dump progression for the first four years of operation are shown in **Figures 7–10**.

The mining method selected allows the creation of a stable final landform to follow closely behind mining as a normal part of the mining cycle. At the end of the mine's life, a final void landform can be created with a minimum of extra work. This is achieved by leaving the last strip mined, open for later extensions to the open pit if it is economic to continue operations after extending the mining lease. If mining is to cease and the lease is not extended, there is scope to change the mining practice in the last years of mining to mine the final strip on the northern side of the ramp ahead of the strip on the southern side of the ramp. The northern void could then be partially backfilled with waste from the southern strip, reducing the effective size of the final void. A conceptual final void arrangement is presented in **Section 3.5.4**.

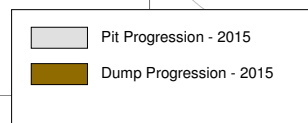
2.3 Coal Handling and Preparation Plant (CHPP)

The CHPP will process 1.5Mtpa of ROM coal producing around 1Mtpa of product coal. The plant will operate for approximately 6,000hrs per annum to achieve the throughput of 1.5Mt.

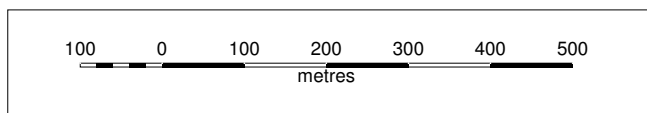
ROM coal will be dumped onto the ROM stockpile in the mine infrastructure area. From here it will be fed into a ROM hopper by a front-end loader. The proposed CHPP will have six circuits which will include:

- Crushing;
- Deslime;
- Dense Medium Cyclone;
- Fine Coal;
- Dewatering; and





NORTH



McCollum Environmental Management Services

Figure 9 **Monto Coal Project** **Conceptual Mine Plan 2015**

Author: McCollum Environmental - MEMS19	Date: 02 December 2011	Checked: PT
Scale: 1:6,500 (ASP)	Projection: MGA94, Zone 56, GDA94	
Plan: M:\GIS\Plans\2011\Monto\EM Plan figures\111202MP_Monto Project_2015 Conceptual Plan		

- **Tailings Thickener.**

Beneath the hopper will be a feeder–breaker that initially breaks the coal down to a manageable size and then feeds it into a crusher (sizer). This will then crush the ROM coal down to a size suitable for feeding onto the ROM conveyor. The conveyor carries the coal to a screen where the coarse rejects are separated and deposited onto a waste stockpile ready for transport back to the spoil piles.

The sized coal will then have the fine impurities (known as 'slimes') removed. The amount of slimes removed will depend on the required ash content of the product coal, which is predicted to be in the 10-12% range for export thermal coal.

The slimes from the wash plant will report to a thickener tank, where some of the solids settle out, and liquid from near the surface is recycled back to the plant. The underflow containing settleable particles will be pumped to the Tailing Storage Facility (TSF) where the solids will settle out and the water pumped back to the plant for reuse.

Product will emerge from the wash plant on the product conveyor. The product will be stacked in stockpiles ready for loading via the train load-out facility.

2.3.1 Tailings Storage Facility (TSF)

The TSF consists of three major cells, TSF1, TSF2 and TSF3.

Key features of the TSF include:

- sub-cells utilised to allow wet tailings material to be deposited and to allow water to be recovered for re-use within the CHPP;
- clay lining to avoid leachate migration from the TSF to surrounding areas; and
- designed to minimise inflow runoff from adjacent catchment.

Tailings material will be pumped into the TSF via the reject thickener underflow pump. Sub-cells of the TSF will have three basic operational phases:

- a tailings cell filling phase;
- a tailings cell drying phase; and
- a tailings cell solids removal phase.

The initial stage of TSF operation will incorporate progressive deposition and subsequent removal of material from the sub-cells. Return water decanted from the TSF will be pumped to the clarification water tank in the CHPP. The material deposited in the sub-cells will be allowed to dry via natural evaporation and desiccation until the material is solid enough to be excavated and

removed by mobile plant. This process will continue until such time that the TSF will accommodate the remaining life of mine tailings material.

The TSF has a storage capacity of 295 Mega Litres (ML) in TSF1, 318ML in TSF2 and 300ML in TSF3.

Chemical analysis of the dried tailings is undertaken on a regular basis. If testing indicates the waste is relatively benign and poses no or minimal risk of environmental harm, testing will be rationalised to a six monthly frequency.

All potentially acid forming (PAF) tailings will be segregated, isolated and strategically encapsulated within in-pit dumps, along with material that has acid neutralising capacity. Records will be kept of the disposal of identified PAF tailings to indicate locations, volumes and characteristics of PAF tailings stored within the in-pit dumps.

Where the acid producing potential of tailings material has not been conclusively determined, geochemical kinetic testing will be conducted to indicate oxidation rates, potential reaction products and effectiveness of control strategies.

Any dewatered tailings that display non-acid forming (NAF) properties will be transported by truck for disposal within defined emplacement areas in the in-pit spoil dump. There will be no out-of-pit tailings emplacement areas other than the TSF.

As dried tailings are dumped in defined emplacement areas and in-pit spoil dumping continues and on decommissioning and rehabilitation, the emplacement areas will be encapsulated so material will not cause significant harm to the environment.

Records will be kept of the tailings disposal to indicate locations and characteristics of tailings disposed of within the in-pit spoil dump.

2.3.1.1 Return Water System

Return water will be pumped from the TSF via a pontoon pump and pipeline and decanted into a clarified water tank for use in the CHPP. Additional water required will be supplied to the clarified water tank from the raw water dam.

2.3.1.2 Fire/Wash-down/Dust Suppression Systems

Fire water will be supplied to the CHPP by dedicated line and pumps from the raw water dam. Wash down and dust will be supplied from the clarified water tank off the tails thickener.

2.3.1.3 Wash-down Water

Washdown water will be provided in transfer stations and in the CHPP building at each floor. All washdown water will be supplied from the raw water dam. Washdown water will generally be provided through 25mm hoses in the transfer stations and CHPP.

2.3.1.4 Dust Suppression

Dust suppression misting sprays will be located in the feed boot transfer points on the raw coal handling plant. There will also be dust suppression located at the ROM hopper.

2.4 Storage of Chemicals Required for the CHPP

Based on an annual total ROM tonnes of 1.5Mt, the quantities of chemicals required by the CHPP for operation and storage on site at any one time are as detailed below in **Table 4**.

Table 4: Dangerous goods potentially stored on site

Chemical	Usage Rate	Annual Quantity Required	On Site Storage Requirement
Flocculant	0.004kg/ROM tonne	6 tonnes	3 tonnes
Magnetite	0.4kg/ROM tonne	700 tonnes	40 tonnes
Frother/MIBC	0.025L/ROM tonne	40kL	25kL
Collector/Diesel	0.04L/ROM tonne	65kL	15kL

2.5 Product Stockpiling

Two 10,000 tonne product stockpiles will be established. The stockpiles will be located about 30m from the proposed rail siding on a gravel pavement sloping about 1% away from the siding into a dirty-water drain.

2.6 Transport

2.6.1 Coal Transport

The Maryborough to Gladstone (via Monto) rail line will be utilised to transport coal to Port Barney in Gladstone. This existing QR railway line passes through ML80101 and MLA80175, however regular service was suspended in 2006 with the line currently requiring maintenance.

The Project intends to utilise this infrastructure and is currently in negotiations with QR for the line to be re-opened for regular service.

A proposed new rail spur and balloon loop will be constructed on ML80101 and MLA80175 and will enable trains to be loaded and turned around. The construction of the rail spur and a small portion of the loop will be within 2km of Mulgildie Township (**Figure 6**). However all mining and processing activities will be located 2km from the township.

Coal will be loaded from the product stockpiles to a train with an expected payload of 2,100 tonnes of coal.

2.6.2 Access Road

Proposed upgrades to the existing Kapaldo Road intersection with the Burnett Highway are planned, as well as upgrades to the existing road for approximately 2km to the south. The upgrade will improve the road to an all-weather sealed double carriage way suitable for the anticipated mine work force and the delivery of consumables.

An application for a temporary road closure of Kapaldo Road will be applied for at the southern boundary of ML80101. This will keep local traffic off the mining leases and enable the sealed section of Kapaldo Road to be a dedicated mine access road.

A new intersection off Kapaldo Road will be constructed to provide access into the mine industrial area.

2.6.3 Mine Haul Road

An unsealed haul road and associated water management structures are proposed to connect the mining pits to the mine industrial area. The new haul road will cross the temporarily closed Kapaldo Road and extend to the industrial area.

2.7 Coal Resource

2.7.1 Lithology

The Mulgildie Coal Measures are equivalents of the Middle Jurassic Walloon Coal Measures. Reaching up to 150m in thickness they comprise light and dark grey mudstones and siltstones, carbonaceous shales, high volatile bituminous coal seams and soft white to brown friable quartzes sandstones characterised by a soft clayey matrix. The coal seams are generally banded and display the thickness variations, seam splitting and coalescence typical of Walloon type deposits, but with much less variation in aggregate seam thicknesses.

The Mesozoic strata of Monto are essentially flat lying, although the drill hole data demonstrates a slight syncline which parallels the main axis of the Mulgildie Basin, strata dips 1-3°, flattening to zero in the eastern third of the mine area.

Tertiary basalts and sediments overlie parts of the Mulgildie Basin and there are some extensive deposits of recent alluvium associated with flood plains.

Of the 37 coal seams present, 20 seams contribute to the coal resources. Not all seams are present over the entire area. From a recent revision (2011) of seam correlation (and as applied for the basis for the mining study), seven main composite seam groups have been recognised, designated A to F in descending stratigraphic order, with a less persistent group designated X above the A group of seams. The nomenclature and average coal thickness of each of the seam groups is presented in **Table 5**.

Table 5: Nomenclature adopted for individual seams in each group

Seam Group	Coal Ply Nomenclature	Average Coal Thickness
X	10, 15, 20, 30	1-2m (3.5m max)
A	10, 15, 20, 30, 40	3-4m (5.75m)
B	10	0.8-2m
C	20, 30	1-3m (4m)
D	10, 15, 20, 25, 30, 40, 50	5-6m
E	10, 20, 30, 40, 50, 60, 70, 80, 90	3-6m
F	10, 20, 30	2-2.7m

Figure 11 illustrates a typical coal sequence in the area proposed for initial mining.

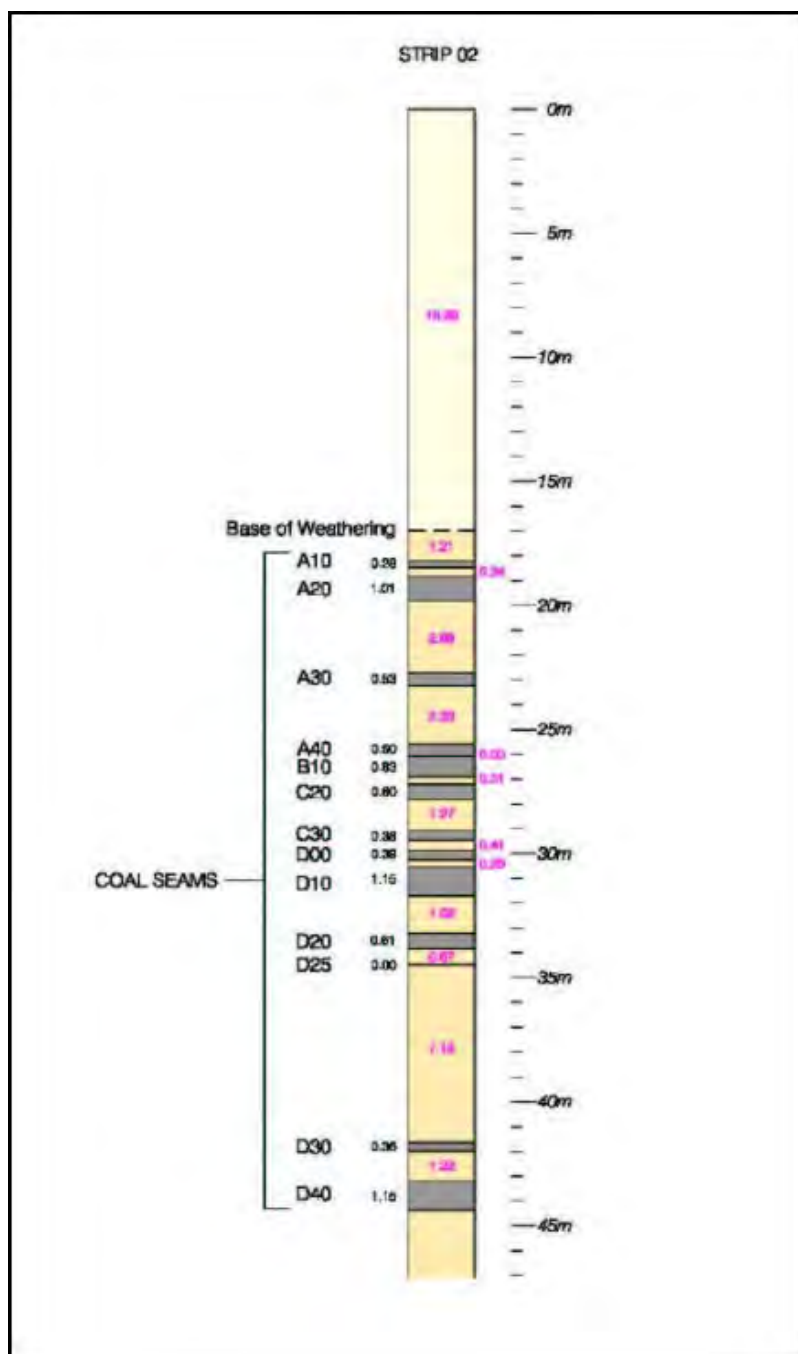


Figure 11: Typical coal sequence in proposed mine area.

2.7.2 Coal Resource Estimate within ML 80101 and MLA 80175 Area

In September 2011, a resource estimate was undertaken in order to provide sub-division tonnages of the resource estimate by seam group in the ML80101 and MLA80175 areas (see **Table 6**).

The estimate was prepared in accordance with the Australian Guidelines for Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves (March 2003) and is reported according to the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (December 2004), the JORC Code.

Table 6: Coal Resource in ML80101 and MLA80175 areas (David Broome, JB Mining Services Pty Ltd, September 2011)

Area	Seam Group	Coal resource - Depth < 100m (Mt)			Coal resource - Depth > 100m (Mt)	Total Resource (Mt)
		Measured	Indicated	Inferred	Inferred	
ML80101	X	0.6	1.4	0	0	2
	A	4.2	3.3	1	0	8
	B	1.4	1.0	0	0	2
	C	2.8	2.1	1	0	5
	D	5.1	7.0	5	0	17
	Total	14.0	15	6	0	35
ML80175	X	0.0	0.0	0	0	0
	A	2.0	0.7	0	0	3
	B	0.7	0.3	0	0	1
	C	0.8	1.1	0	0	2
	D	2.2	2.8	3	0	8
	Total	5.7	4.8	3	0	13
Total		19.8	20	9	0	49

For the target depth of coal mining (<100m), no significant coal seam gas or gas potential has been identified. The application area has low coal seam gas prospectivity for the depths to which coal mining are proposed. Therefore a gas resource estimate has not been made.

2.8 Mining Schedule

Only one pit is scheduled for the operational life of the mine. Conceptual mine layouts for the Project at the end of financial years 2013, 2014 and 2015 at the approved rate of up to 1.5Mtpa can be seen in **Figure 7 - 10**.

Table 7 provides a list of the equipment anticipated for mining under the currently approved production rate of up to 1.5Mtpa, including maximum equipment numbers for any one year. The sizes and numbers of equipment are indicative only based on the mine plan and proposed mining operations.

Table 7: Proposed Mining Equipment

Item	Type	Number	Function
Excavator	250T	1	Overburden Removal
Excavator	40T	1	Coal edge, road maintenance and dust suppression
Dump Truck	150T RDT	5	Overburden Removal
Loader	WA900/992	1	Coal removal
Loader	WA600	1	ROM Loader
Dump Truck	90t RDT	7	Coal removal
Dozer	D10/375	2	Pit maintenance
Dozer	D11/475 dozer	1	Dump maintenance
Wheel dozer		1	Coal clean up, road and pit maintenance
Grader	Cat 16H/M	2	Road maintenance
Water Truck	50t		Road maintenance

Table 8 provides quantities of material moved during mining operations under the currently approved production rate of 1.5Mtpa.

Table 8: Material movement during mining operations

	UOM	Yr1	Yr2	Yr3	Yr4	Yr5
Prime Waste						
Topsoil Prime	kbcm	324	59	62	53	48
Free Dig	kbcm	2,918	531	556	476	430
Blasted Dig	kbcm	8,424	5,726	4,698	4,776	4,125
Inseam Coal Parting	kbcm	27	53	64	61	49
Total Prime Waste	kbcm	11,693	6,370	5,380	5,366	4,651
Coal Mining						
ROM Coal Tonnes	kt	1,500	1,500	1,500	1,500	1,500
ROM Coal Volume	kbcm	988	993	996	1,001	1,006
RoM Ash		29%	28%	28%	27%	27%
Raw Ash		21%	21%	21%	20%	20%
Clean Coal Tonnes	kt	1,163	1,192	1,195	1,200	1,206

Dilution Tonnes	kt	337	308	305	300	294
Mining Ratio	t/bcm	7.8	4.2	3.6	3.6	3.1
Disturbance Area						
Area	ha	21.38	27.27	30.60	45.98	

2.9 Mine Infrastructure

2.9.1 Mine Infrastructure Area (MIA)

Mine site infrastructure will be constructed on a dedicated hardstand (**Figure 6**). Train load-out (TLO) facilities and the Coal Handling and Preparation Plant (CHPP) will be situated adjacent to the rail loop and on a hard stand area.

Other mine site infrastructure includes:

- Demountable administration offices;
- Light vehicle and heavy vehicle workshops;
- Warehouse and storage facilities;
- Water management structures;
- Diesel power generators;
- Ablution facility;
- Refuelling facilities;
- Run-off water management structures;
- Emergency services;
- Lighting;
- Haul road and associated road infrastructure;
- Package sewerage treatment site;
- Potable water supply;
- Fire protection infrastructure; and
- Bathhouse and crib room facilities.

Figure 6 illustrates the proposed infrastructure for the project.

Key activities/features of the Project include:

- Vegetation clearing where required;
- Bulk earthworks;
- Recovery of available topsoil ahead of overburden removal operations and direct use or stockpiling for later use in the rehabilitation process;
- Overburden removal utilising drill and blast and conventional truck and excavator methods;

- Overburden and interburden disposal to the in-pit dumps or the out-of-pit dump;
- Coal mining utilising conventional truck and loading methods;
- Re-contouring of dumped overburden utilising conventional methods;
- Topsoil recovery from stockpiles and placement on re-contoured overburden landforms and other rehabilitation areas;
- Revegetation of topsoiled landforms utilising vegetation species appropriate to the region;
- Transfer of stockpiled ROM coal to the CHPP for processing;
- Processing of ROM coal through the CHPP, producing Thermal Coal product and both coarse and fine reject;
- Transportation of product coal by train to Port Barney in Gladstone for shipping to overseas export markets;
- Construction of a rail spur and balloon loop for the mine;
- Construction of water management infrastructure for recycling of pit water and the introduction of raw water for dust suppression activities; and
- Post decommissioning rehabilitation of infrastructure areas with either pasture grasses or native vegetation.

The key disturbance types associated with the Project include:

- Vegetation clearing;
- Recovery of available topsoil;
- Overburden removal and coal mining;
- Development of out of pit overburden dumps;
- Stockpiling of ROM coal for transfer to processing facilities;
- Water management infrastructure;
- Haul roads; and
- Support infrastructure hardstands, including bulk earthworks.

2.10 Workforce Requirements

The workforce requirements for the project will consist of both a construction workforce and an operational workforce. The construction phase will require a larger number of personnel including the use of offsite labour. Work force requirements for both phases can be seen in **Table 9**

Table 9: Workforce Requirements

Phase	Workforce
Construction	200
Operational	120

The operational workforce for the Project includes management, engineering and technical services, operational, maintenance and administrative personnel. It is anticipated that personnel will be sourced from within both the local community and Queensland more broadly, as required.

Operational and maintenance personnel will generally work a continuous roster with a 7 day on, 7 day off roster. Management, engineering, technical services, and administration personnel will generally work a 5 day on, 2 day off roster, Monday to Friday.

The operational workforce will comprise a mix of contracted and permanent staff. The number of required workforce changes over the life of the mine, however, typical operational workforce numbers will be approximately 120.

A large portion of the workforce will be working on a 12 hours per day, 7 day on, 7 day off roster. Therefore, half this number (approximately 60) will be required for each 24 hours 7 days a week with approximately 30 people onsite at any given time.

2.11 Workforce Accommodation and Transport

The Project will supply accommodation for construction and operational personnel. A workers village will be constructed at or in close proximity to Monto. The facility will be capable of housing up to 110 persons during the construction of the Project and approximately 70 persons during the operational phase. The construction of the village will be subject to Development Approval from the North Burnett Regional Council.

Rostered construction and mine personnel will be provided with bus transport from the village to site as a proactive control against possible fatigue-related vehicle incidents and to reduce traffic congestion.

2.12 Activities Potentially Causing Environmental Harm

Mining operations have the potential to cause environmental harm unless effective management programs are developed and implemented to mitigate, remediate and rehabilitate the associated environmental impacts.

2.12.1 Environmentally Relevant Activities (ERAs)

The operation of the Project will require the following Environmentally Relevant Activities (ERAs):

- 8 - Chemical storage;
- 17 - Abrasive blasting;
- 18 - Boiler making or engineering;
- 33 - Crushing, milling, grinding or screening;

- 38 - Surface coating;
- 57 - Regulated waste storage; and
- 63(1) - Sewage treatment.

2.12.2 Land Clearing

Past agricultural activities in the region have resulted in the disturbance of land within the Project area. The site is almost exclusively cleared of native vegetation, however, some progressive land clearing will be undertaken ahead of mining activities and infrastructure construction. Clearing in the Project area is not likely to result in the loss of habitat. The Project commits to limiting disturbance to only that required for practicable mining operations. Disturbed areas will be progressively rehabilitated as the mine progresses.

2.12.3 Topsoil Stripping, Removal of Overburden and Interburden and Coal Mining

Recovery of topsoil for use in rehabilitation activities, overburden and interburden blasting, removal and dumping of overburden and interburden and coal mining operations have the potential to cause environmental harm. Potential harm may include dust generation, noise, vibration, soil erosion, creation of land with reduced agricultural and habitat values, temporary and permanent changes to surface water and groundwater quantities and qualities, changes in visual amenity including light pollution at night and increased Green House Gas (GHG) emissions.

2.12.4 Coal Hauling

ROM coal will generally be stockpiled out of pit at selected stockpiles or directly at the CHPP ROM. Loading and hauling activities have the potential to cause environmental harm in the form of water contamination, dust generation, noise, light pollution and increased GHG emissions.

2.12.5 Water Usage

Water resources are predominately utilised for coal washing and dust suppression activities. Use of raw water has the potential to deplete third party water resources and impact surface water and groundwater on the mine site if raw water is not appropriately stored. Water management practices via the mine water management system are designed to avoid causing environmental harm through maximising on-site reuse and recycling.

2.12.6 Waste Disposal

Waste materials (non-mineral waste) generated on site will require disposal. Inappropriate waste disposal practices have the potential to cause environmental harm including land contamination, direct faunal impacts and degradation of visual amenity.

2.12.7 Hydrocarbon Storage and Handling

Storage of diesel and lubricants is required for operation and maintenance of the machinery associated with the mining operations. Spillage of hydrocarbons can cause environmental harm through contamination of land and water resources.

2.12.8 Machinery Maintenance

Routine service and maintenance of mobile equipment used on site is required to ensure efficient operation. Maintenance activities have the potential to cause environmental harm, including spillage of hydrocarbon and chemicals which may result in contamination of land and water resources.

2.13 Rehabilitation and Remediation

Rehabilitation and remediation will be undertaken in order to achieve:

- progressive mine rehabilitation;
- final rehabilitation; and
- decommissioning of mine site infrastructure.

Rehabilitation strategies as described in **Section 3.5.4** have been developed based on the existing environment within the Project area, existing EA requirements and current best practice technologies employed throughout the mining industry. The primary rehabilitation objectives are:

- to ensure the final landform is safe to humans and wildlife;
- to ensure the site is non-polluting;
- to ensure the final landform is stable; and
- to ensure the site is able to sustain an agreed post-mining land use.

2.14 Exploration Activities

No additional resource evaluation activities are planned within the ML or MLA. However, drilling will continue on site during the life of mining operations to further define the depth and location of the resource and update the mine plan.

3. ENVIRONMENTAL VALUES, POTENTIAL IMPACTS, COMMITMENTS AND ENVIRONMENTAL AUTHORITY CONDITIONS

This section provides a description of environmental values likely to be affected by the Project. For each environmental value identified, an assessment of the potential beneficial and adverse impacts from the mine on the environmental value is described. Environmental objectives, control strategies and commitments have been proposed for the protection of each environmental value.

Broadly, the following apply:

- environmental values:
 - those qualities or physical characteristics of the environment that are conducive to ecological health, public amenity, or safety.
- environmental protection objectives:
 - describe the key elements of the environment and the outcomes to be protected in order to minimise impacts on the environmental values.
- environmental commitments:
 - describe the technological and design elements together with management plans and strategies to be undertaken to meet the environmental protection objectives and achieve agreed standards.
- Existing ML80101 EA conditions (**Appendix A**):
 - contain measurable standards and indicators.

3.1 Air Quality

Air quality impacts from coal mining and associated activities including coal transport have been identified as having the potential to adversely affect public amenity if effective control strategies are not introduced.

The *Environmental Protection (Air) Policy 2008* (EPP (Air)) specifies air quality indicators and objectives for the air environment of Queensland. The environmental values to be enhanced or protected under the EPP (Air) are:

- the qualities of the air environment that are conducive to protecting the health and biodiversity of ecosystems;
- the qualities of the air environment that are conducive to human health and wellbeing;
- the qualities of the air environment that are conducive to protecting the aesthetics of the environment, including the appearance of buildings, structures and other property; and
- the qualities of the air environment those are conducive to protecting agricultural use of the environment.

3.1.1 Environmental Values – Air Quality

The environmental values of the air environment to be enhanced or protected under this EM Plan are the qualities of the air environment that are conducive to the wellbeing of the community, including its social and economic amenity.

Existing Air Quality

The local air shed is typically rural and sparsely populated. The small township of Mulgildie (Pop. Of 114) is located to the north west of the Project and is not likely to influence the local air shed. There are no known industrial sources of nitrogen oxides (NO_x), sulfur dioxide (SO₂) odorous compounds or volatile organic compounds (VOC) surrounding the Project location. The current and

proposed sources of emissions to air in the region do not contain these pollutants in significant amounts and are highly unlikely to have any impact on the air environment.

A piggery is located between the Project and Mulgildie, near the north-western corner of the Project. The piggery may contribute to background levels of odour in the vicinity of the mine but impacts would be expected to be minimal.

Occasional fires and wind-blown dust associated with agricultural land clearing and cultivation can be expected in the region at times. The major sources of PM₁₀ in the region are from agricultural activities

Based on data from the VIPAC Air Quality assessment, background levels at the Project site are summarised in **Table 10**. The initial Environmental Management Overview Strategy for the Project used a background of 20mg/m²/day for dust deposition. As this was an estimate of the background level, there is some uncertainty involved. For the purposes of current modelling a more conservative background dust deposition of 40mg/m²/day was adopted, as this is considered an upper limit for rural environments.

Table 10: Background air quality

Pollutant	Background (µg/m ³)	Averaging Period
PM ₁₀	25	24 hours
Deposited Dust	40mg/m ² /day	24 hours
CO	1490	8 hours
NO ₂	48.9	1 hour
	11.3	1 year
SO ₂	73.3	1 hour
	13	24 hours
	5.2	1 year

At Monto, the average maximum temperature ranges from 30°C to 32°C in the summer months, with an average of 6 days/year exceeding 35°C. The mean minimum temperature ranges from about 6°C in July to about 19°C in January. Frosts are more likely to occur in July, with heavy frosts where the temperature is less than 0°C (temperatures of less than 0°C are recorded, on average, 4 days/year at Monto). Monthly temperature variations are shown in **Figure 12**.

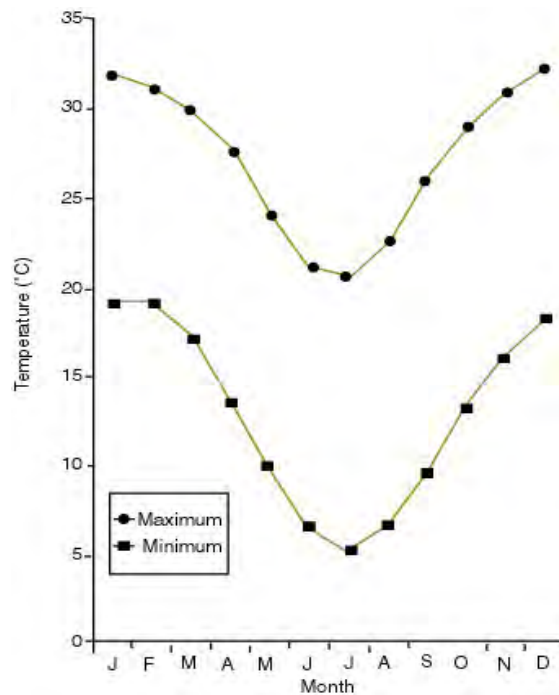
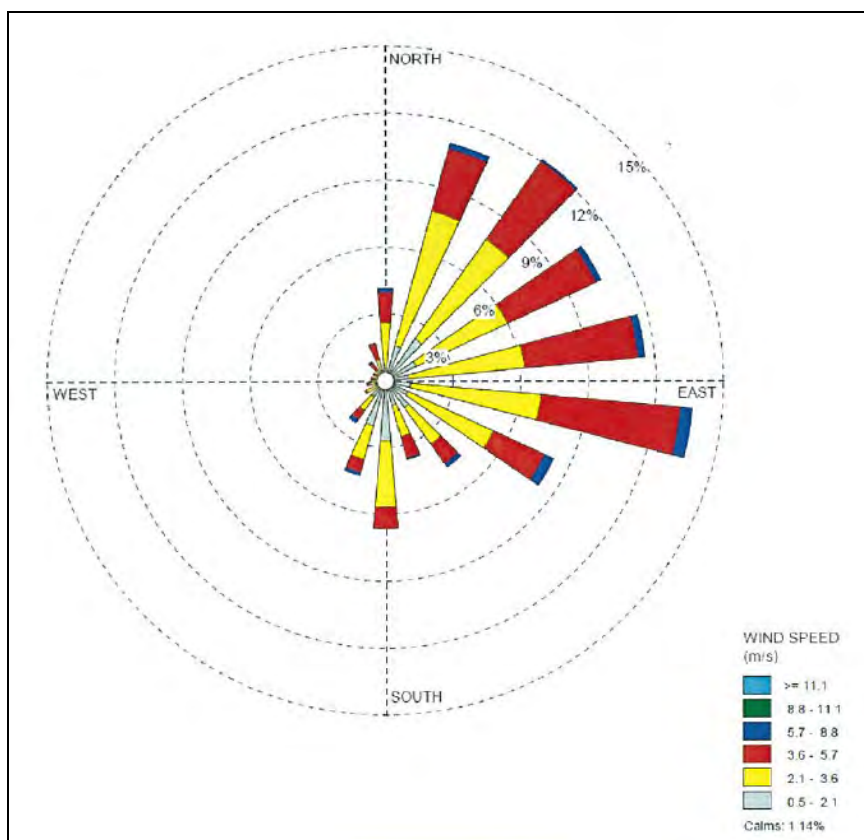


Figure 12: Monthly temperature variations

Wind Direction and Cyclones

The predominant wind direction is from the north-northeast to east-southeast with an average wind speed of 3.22m/s. The regional wind rose is shown in **Figure 13**. The data shows that the predominant winds range from north-easterly to south-easterly. Overall, 94.7% of all wind speeds were less than 5m/s.

The Gladstone area is subject to the occasional cyclone. However, it is considered that by the time a cyclone crosses the coast and reaches the Monto area, it would have degraded to a rain depression.



Bush Fires

The Project site is virtually devoid of natural vegetation, with only small fragmented stands of trees adjacent to some of the drainage courses. Bush fires within this vegetation would be minor, consisting mainly of grass fires.

3.1.2 Potential Impacts on the Environmental Value – Air Quality

The potential impacts on the air quality environment value are related to the generation of dust and GHG emissions from mining activities, coal hauling and handling activities.

Dust Impacts

The major source of dust emissions from conventional open-cut mining is the truck and shovel operation to remove coal, overburden and interburden. The remaining sources of dust from the Project will be from coal transportation, wind-blown dust from pit dumps, bare-ground and rehabilitated areas.

Dust emissions from the Project have been estimated, accounting for actual mine activities including:

- Land clearing;
- Topsoil removal;
- Overburden loading and dumping;
- Transport of overburden to dump sites;

- Wind erosion of stockpiles and exposed areas;
- Coal excavation;
- Transport of coal to the coal handling and preparation plant (CHPP) stockpiles;
- CHPP, e.g. conveyor transfer points;
- Loading coal onto train wagons;
- Traffic on unsealed roads; and
- Burning of cleared vegetation.

During the first year, out-of-pit dumps will be constructed close to the western boundary of ML80101 to take material from the pit. Proposed mine plans show a steady progression of the pit from west to east across the site over an estimated mine lifetime of 20-25 years. Approximately 324,000 bank cubic metres (bcm) of topsoil and 11.6 Mbcm of overburden would be moved during the first year of mining operations. During more normal operational periods after the first year, this will reduce to approximately 59,000bcm of topsoil and 6.3Mbcm of overburden being moved. It is anticipated that after revegetation of the overburden dumps, gross dust emissions will remain generally constant throughout the years of production. Pit retention of dust is likely to reduce the impact of dust emissions from that area of the mine as the life of the mine progresses (and the pit increases in depth). As mining progresses, overburden will be transferred within the pit to fill areas that have already been mined.

A report produced by VIPAC in December 2011 provides details of air quality impacts associated with the predictive air impact modelling. The original EA (2002) had a PM₁₀ limit of 150µg/m³/day however this limit was reduced to 50µg/m³/day with the updated EPP (Air). Remodelling of air impacts was undertaken due to the regulatory change. The modelling was carried out using a 3-dimensional dispersion wind field model, CALPUFF, to simulate the impacts from the mine. The modelling was based on worst case meteorological conditions and standard best practice mitigation procedures have been included in these simulations.

The impacts of the mine have been assessed in four phases that reflect operational activities of the mine over time:

- Phase one: Includes emissions from the operation of CHPP, TLO operations, stockpiling, mining of the north-west pit, the main haul road, the road for the north-west pit and the roads for the surface rock dumps;
- Phase two: Includes emissions from the operation of CHPP, TLO operations, stockpiling, mining of the north-east pit, the main haul road and the road for the north-east pit;
- Phase three: Includes emissions from the operation of CHPP, TLO operations, stockpiling, mining of the south-west pit, the main haul road and the road for the south-west pit; and
- Phase four: Includes emissions from the operation of CHPP, TLO operations, stockpiling, mining of the south-east pit, the main haul road and the road for the south-east pit.

The dust impact was predicted on the following 21 potentially affected sensitive receptors as detailed below in **Table 11** and **Figure 14**. The criteria for PM₁₀ Concentration and Dust Deposition are taken from the EPP (Air) (2008) and EPA guideline, which are outlined in **Table 12** below.

Receptors in close proximity are significantly affected by all phases of the mine.

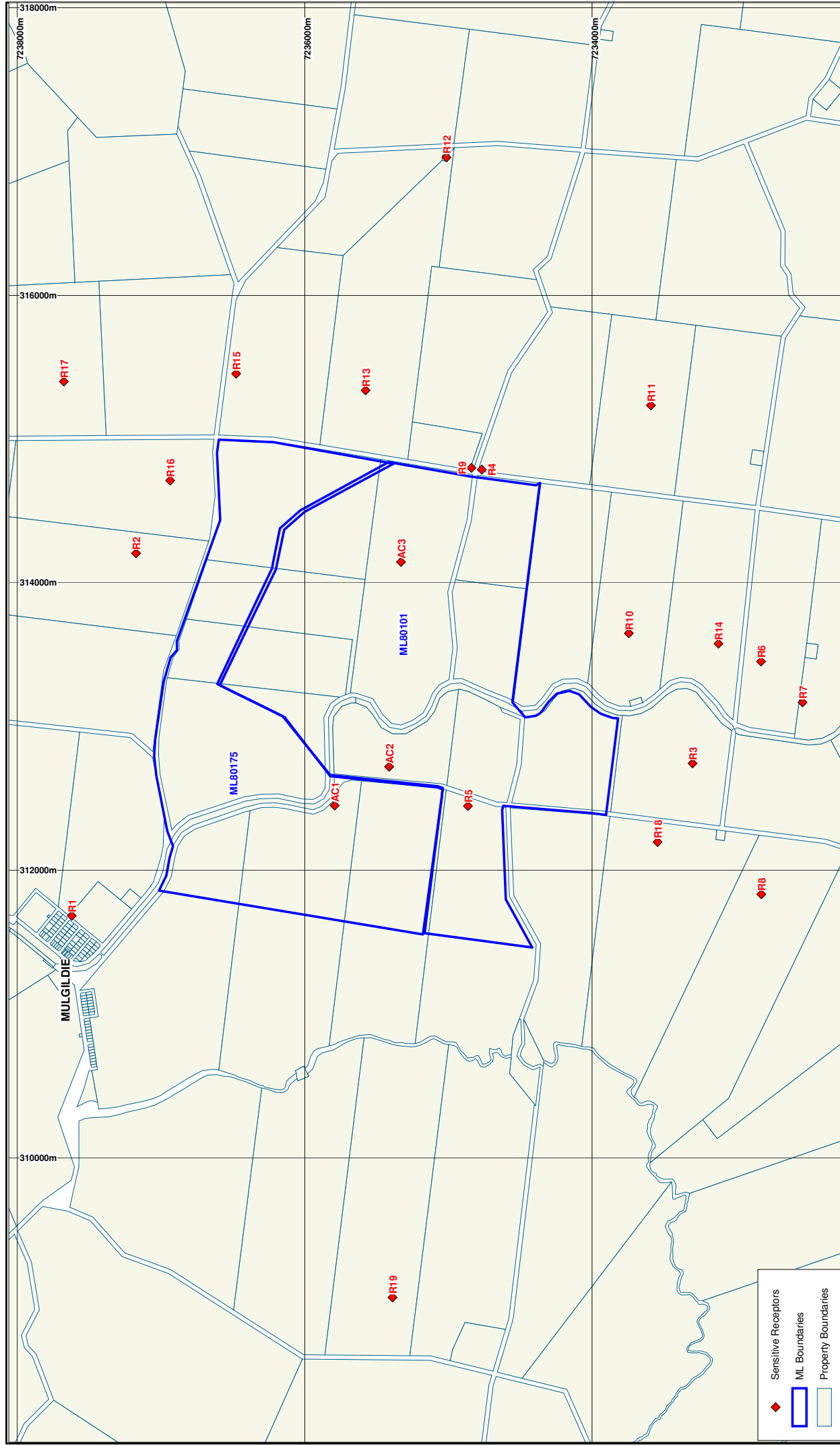
Dust impacts to the South are significant during phases two and four due to the southern location of mining activities in the pit. Also, phase one has significant southern impacts due to a combination of predominant wind patterns and emission source alignment.

Dust impacts to the north are significant during phases one and two due to the northern location of mining activities in the pit. Similarly, impacts to the east are significant during phases two and four.

PM₁₀ impacts to the west are not significant as emission sources that contribute significantly to PM₁₀ concentration are not located on the western side of the mine. Dust deposition is more significant to the west than any other direction due to the location of the crusher, which produces large amounts of coarse particulate matter. However, there are only a small number of receptors on the western side of the mine.

Table 11: Nearest Potentially Affected Sensitive Receptors

Receptor ID	PM ₁₀ Concentration (µg/m ³ /day)		Dust Deposition (mg/m ³ /day)		Compliance	
	Highest	Mine Phase	Highest	Mine Phase	PM ₁₀	Dust
Criteria	50* (EPP (Air) 2008)		120 (EPA Guideline (Unpublished))			
R1	60.63	1	67.3	1	✓	✓
R2	212.36	1	127.74	1	X	X
R3	83.66	1	109.19	1	✓	✓
R4	831.70	4	461.37	4	X	X
R6	67.56	1	70.84	1	✓	✓
R7	57.02	1	79.17	1	✓	✓
R8	95.41	1	76.61	1	✓	✓
R10	88.42	4	102.83	1	✓	✓
R11	45.38	4	78.63	4	✓	✓
R12	34.44	4	48.51	3	✓	✓
R13	89.25	3	82.51	4	✓	✓
R14	66.25	4	78.32	4	✓	✓
R15	112.69	2	106.00	2	✓	✓
R17	104.35	2	114.92	2	✓	✓
R18	114.42	1	106.34	1	✓	✓



McCollum Environmental Management Services

Figure 14
Monto Coal Pty Ltd
Air Quality
Sensitive Receptors

Author: McCollum Environmental - MEMS 19	Date: 04 January 2012	Checked: PT
Scale: 1:25,000 (A3)	Projection: WGS84, Zone 56, GDA94	
Plan No: GSP/Environment/MontoES/1201/MAP/MontoProject_AirQualitySensitiveReceptors		



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R19	46.01	3	68.23	3	✓	✓
AC1	305.64	1	629.59	1	X	X

*Note: Predictions highlighted in red exceed guideline values. Predicted exceedances for properties owned by the Proponent are not included in **Table 11**. Compliance with PM₁₀ and Dust is based on EA 2002 Limits.*

Greenhouse Gas (GHG) impacts

The Australian Government Department of Climate Change and Energy Efficiency (DCCEE) monitor and compile databases on anthropogenic activities that produce GHG emissions. Emissions of GHG can be classed as either direct or indirect. Direct emissions are defined as occurring from sources within the boundary of an organisation as a direct result of that organisation's activities, such as combustion of fossil fuels in electricity generators (DCCEE, 2010). Indirect emissions are defined as occurring in the wider economy as a consequence of an organisations activity but which are physically produced by the activities of another organisation, such as the consumption of electricity (DCCEE, 2010).

The major activities conducted at a coal mine that produce GHG emissions can be grouped into these categories:

- transport fuel combustions – direct;
- fugitive emissions due to coal production – direct;
- electricity usage – indirect; and
- vegetation clearing – direct.

Stationary fuel combustion includes the use of diesel fuel in site plant and stationary equipment. The indirect use of access roads and explosives has not been quantified in this assessment.

A qualitative estimate of typical annual GHG emissions by VIPAC, December 2011, is provided below. All greenhouse gas emissions are converted to a tCO₂-e output which represents 'tonnes of emissions of carbon dioxide equivalent' emissions. The calculations below show the following emissions applicable per annum to the Project:

The potential GHG emissions resulting from the Project are summarised below:

- Construction phase
 - Diesel consumption 3kt CO₂-e
 - Embodied energy of materials and haulage 67t CO₂-e
- Operational phase (per annum for 15-20 years)
 - Open cut mining 26kt CO₂-e
 - Power generation 17kt CO₂-e
 - Transport fuel 36kt CO₂-e

The cumulative total potential GHG emissions over the life of the Project (assuming 15 year operation) are approximately 1,454kt CO₂-e.

3.1.3 Environmental Protection Objective – Air Quality

The EPP (Air) environmental protection objectives for air quality in relation to the Project are:

- to ensure that impacts on sensitive receivers, due to airborne contaminant releases from the Project are minimised;
- to control potential airborne contaminants at the source in order to minimise releases; and
- to minimise GHG emissions in accordance with best practice environmental management.

3.1.4 Commitments (Control Strategies) – Air Quality

Air quality control strategies will focus on minimising emissions of substances likely to affect air quality.

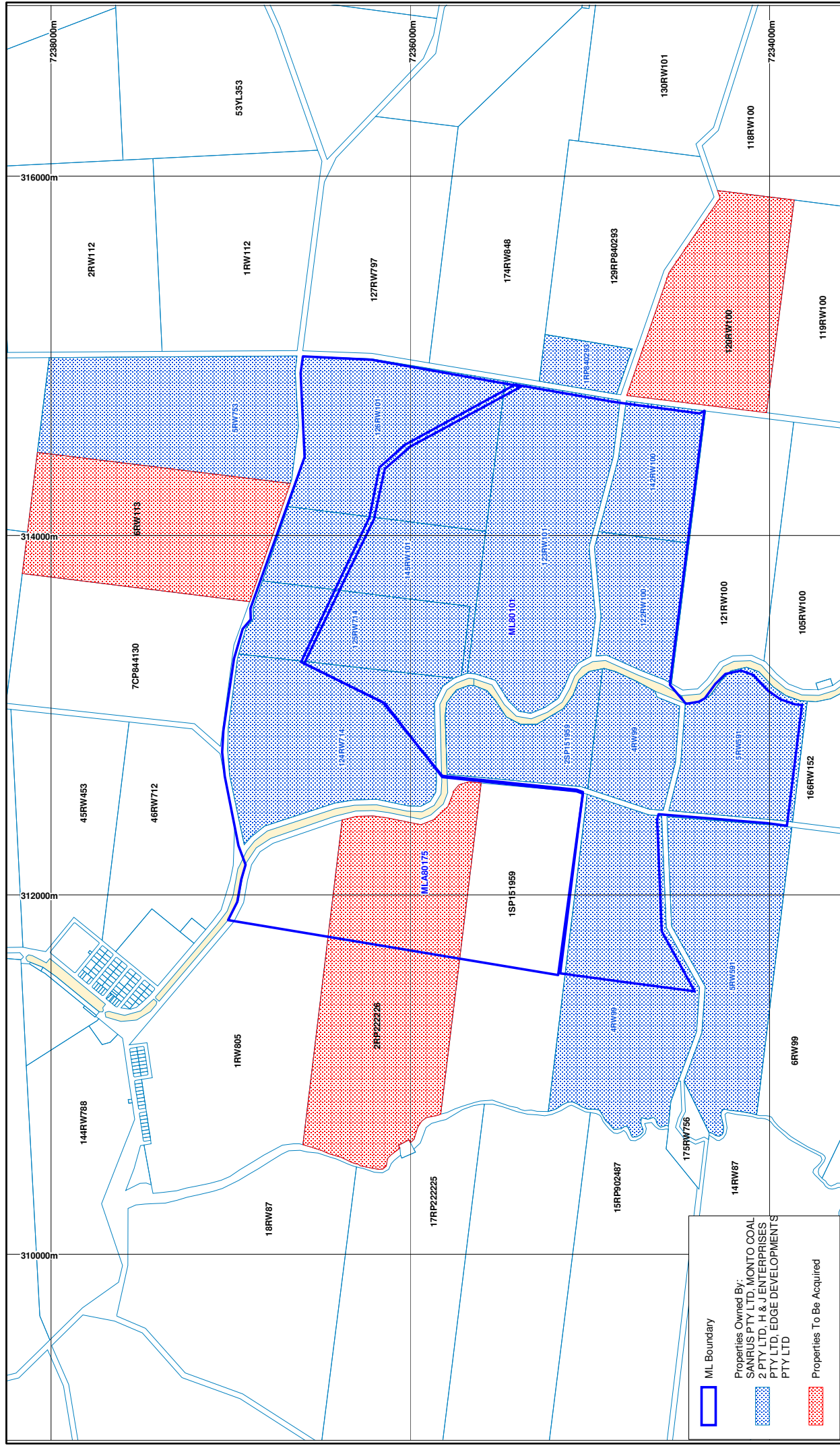
The Project will adopt the current EA air quality values presented in **Table 12**. These limits will ensure dust impacts from the mine do not cause a nuisance and minimise any health impacts to neighbouring residents of the mine.

The Proponent will conduct consultation with occupiers where predictive modelling indicates potential impacts that exceed compliance limits.

Table 12: Air Quality Goals and Guidelines for Particulates

Parameter	Averaging Period	Source	Value	Units
PM ₁₀	24 hour	EPP (Air) (2008)	50	µg/m ³
Dust Deposition	Annual (daily average)	EPA guideline (unpublished)	120	mg/m ² /day

The joint venture has purchased properties within and surrounding the Project location as part of the development strategy. The purchase of these properties has resulted in the ownership of many of the sensitive locations predicted to exceed the Air Quality Goals shown in Table 12. The Air Quality Assessment has indicated that there remain thirteen properties which are predicted to exceed the Air Quality Goals shown in Table 12. **Figure 15** shows properties owned by the joint venture and also those properties not owned by the proponent with residences predicted to exceed air quality goals.



McCollum Environmental Management Services

Figure 15
Monto Coal Project
Properties Currently Owned

North

0 500 1000 1500 2000 2500 metres

Author: McCollum Environmental- MEMS 19
Project: MGA4, Zone 96, GDA94
Scale: 1:20,000 (A3/L)
Plan: MGS/Plans/2011/Monto/EM Plan Figures/111201_Monto Project_MacCoal Owned Properties

Date: 01 December 2011
Checked: PT

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The primary substances generated by activities undertaken at the Project likely to impact air quality are dust, machinery exhaust particulate and GHG, therefore management strategies will focus on:

- minimising areas of disturbance;
- watering of exposed areas such as haul roads, access roads and ROM pads;
- progressive rehabilitation of disturbed areas as they become available;
- rigorous maintenance and repair of vehicles and machinery;
- regular audit and review of energy usage; and
- ongoing research into cleaner technologies and energy minimisation practices, leading to implementation where practicable.

Commitments for the control of dust impacts

Monitoring will be conducted near the boundary of owned properties adjacent to non-owned properties identified by modelling as being potentially impacted during construction and the initial phases of operation. Monitoring will include PM₁₀, depositional dust and meteorological conditions. Monitoring will be conducted in accordance with the DEH Air Quality Sampling Manual, appropriate Australian Standards and in consultation with the DEH. Monitoring results will be assessed against modelling predictions and appropriate dust mitigation measures will be determined.

Depending on monitoring results, appropriate mitigation measures may include:

- modification of operations during meteorological conditions responsible for exceedence of criteria;
- identification and treatment of significant emission sources;
- treatment at the sensitive receiver;
- relocation of residence; and
- purchase of properties

The Proponent will consult with the occupier of each property where predictive modelling indicates the potential for exceeding the compliance limits to discuss and agree upon suitable mitigation measures at that property.

PMCPL will establish a dust management plan which will include, where feasible, the implementation of mitigation measures when conditions become adverse.

The plan will document standard best practice mitigation procedures, including:

- Dust monitoring will be undertaken by a suitably qualified consultant and the appropriate Australian Standards will be adopted for assessment;
- Water haul roads and other unsealed roads including the site entry road. Particular attention will be paid to haul and access roads relatively close to residential areas;
- Moderate level watering (>2L/m²/h) to be adopted wherever there is a potential for emissions to exceed the criteria limits such as during high winds;

- Where it is apparent moderate watering frequency is not being effective high level watering (~4L/m²/h) is to be adopted or operations reduced or ceased;
- Where possible, permanent access roads will be sealed and well maintained, particularly access roads linked to public roads;
- Light and heavy vehicle speed restrictions of 40km/hr will be imposed on unsealed surfaces;
- Avoid topsoil stripping and replacement on days where wind speed and direction is sufficient to carry dust beyond the mining lease to sensitive receptors;
- Vegetate topsoil stockpiles where short-term use is not practicable;
- Adopt scheduled clearing of land;
- Progressively rehabilitate disturbed land;
- Provide dust suppression sprays at locations within the coal handling loop that produce excessive dust, e.g. crusher and conveyor transfer points;
- Avoid burning cleared vegetation when wind will be blowing towards sensitive receptors;
- Revegetate overburden and topsoil dumps as soon as possible;
- Adopt dust awareness training for all staff at induction; and
- Developing a comprehensive Complaint and Investigation Management System, designed to process legitimate complaints regarding air quality and document follow up actions.

Commitments for the control of spontaneous combustion impacts

- Compaction and shaping to reduce the potential for heating for any medium and long term coal stockpiles.
- Isolation of burning coal and potentially spreading the material over a larger area and covering/smothering the burning coal with inert overburden material and/or water.

Commitments for the control of GHG impacts

- Commitment to reporting GHG emissions as required under the *National Greenhouse and Energy Reporting Act 2007*;
- Commitment to reporting electricity usage as required under the *Energy Efficiency Opportunities Act 2006*;
- Commitment to producing an annual National Pollutant Inventory (NPI) report;
- Undertake assessment of the energy (fuel/electrical) efficiency when selecting equipment;
- Undertake regular audits of energy usage;
- Undertake ongoing assessment of cleaner technologies, including feasibility of adopting relevant cleaner technologies;
- Select energy efficient motors;
- Maintain equipment to retain high levels of energy efficiency;
- Fitting and maintaining appropriate exhaust systems on all earth moving equipment to minimise diesel particulate emissions;

- Where feasible, using biofuels (biodiesel, ethanol, or blends such as E10 and B80), to reduce GHG emissions from plant and equipment;
- Where feasible, utilise local materials and personnel to reduce transport related emissions;
- Co-ordinate a camp to site bus service for site operational and constructional personnel;
- Use recycled materials wherever possible, such as replacement of cement with fly ash, recycled aggregate, and recycled content in steel, to minimise the lifespan impact of GHG emissions in production;
- Restrict vegetation clearing to that necessary for mining and associated activities. If vegetation is cleared, consider the beneficial reuse of the material, to substitute for other vegetation clearance activities and avoid on-site burning;
- Adopt mining methods that uses large equipment and economies of scale to significantly reduce greenhouse emissions;
- Extract and transport coal and overburden efficiently to minimising the number of trips and fuel consumption;
- Recycle refrigerants in equipment and air conditioning;
- 'Greenhouse' awareness training at induction;
- Audit energy conservation and greenhouse, with results compiled into annual progress reports; and
- Implement progressive rehabilitation.

3.1.5 Monitoring – Air Quality

The effectiveness of control strategies will be assessed as follows:

- Review results from any dust and particulate monitoring against trigger levels and “calibrate” results against numerical modelling predictions to inform mitigation and management decisions undertaken to ensure that levels are managed within the conditions set out in the EA;
- Review of the number of legitimate complaints received in relation to air quality from residents at sensitive locations;
- Review of the number of spontaneous combustion incidents recorded;
- Review of the National Greenhouse and Energy Reporting data;
- Review of the Energy Efficiency Opportunities reporting; and
- Review of the NPI reporting.

Complaints

Dust Complaints

Complaints in relation to dust nuisance beyond the boundary of the mine will be managed using the Complaint Management and Investigation System. The system will identify legitimate complaints and detail further actions to be undertaken, including a response monitoring program.

In the event of a dust complaint during construction and operation phases, monitoring will be conducted as follows:

- Particulate monitoring of PM₁₀ levels (using automated continuous particulate monitors) will be conducted at the location (or near location) of complaint.
- to aid with determination of compliance, simultaneous particulate monitoring will also be conducted at an intermediate location between the mine and the complainant;
- a record of construction/mining activities will be taken during the dust monitoring period. This information will include details of the plant machinery used onsite and which areas the various plant were located;
- a minimum dust monitoring period of five days weather data will be collected during the monitoring period including wind speed, direction, rainfall and temperature;
- Dust gauge samples will be collected by MCC staff and forwarded to a laboratory for analysis

In the event that monitoring indicates that particulate levels exceed the relevant criteria, dust mitigation measures will be reviewed and updated as necessary.

Particulate Dust monitoring will be conducted again following implementation of mitigation measures to ensure that compliance with the relevant particulate criteria has been achieved

3.1.6 Current EA Conditions – Air Quality

Current conditions, as stipulated in the existing approved ML80101 EA, are listed below. No changes to the Conditions relating to the Department Interest 'Air' in the current EA are proposed.

Dust Nuisance	
(B1-1)	<i>The release of dust or particulate matter or both resulting from the mining activity must not cause an environmental nuisance at any sensitive or commercial place.</i>
(B1-2)	<i>Exceedance of any of the following levels when measured at any dust sensitive place is an environmental nuisance for the purpose of condition B1-1</i> <i>i) Dust deposition of 120 milligrams per square meter per day (month average), when monitored in accordance with Australian standard AS 3580.10 of 1991; OR</i> <i>ii) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM₁₀) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a dust sensitive place downwind of the licensed place, when monitored in accordance with:</i> <i>a) Australian standard AS 3580.9.6 'Ambient air – Particulate matter – Determination of suspended particulate PM 10 high volume sampler with size</i>

	<i>selected inlet – Gravimetric method'; or</i> <i>b) Any alternative method of monitoring PM₁₀ which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.</i>
(B1-3)	<i>When requested by the administering authority or as a result of a complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised office), dust and particulate monitoring must be undertaken, and the results thereof notified to the administering authority within fourteen (14) days following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place. Dust and particulate matter must not exceed the following levels when measured at any nuisance sensitive or commercial place:</i> <i>a) Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method of 1991; and</i> <i>b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM₁₀) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a sensitive place downwind of the operational land, when monitored in accordance with:</i> <i>i) Particulate matter – Determination of suspended particulate PM₁₀ high-volume sampler with size-selective inlet – Gravimetric method, when monitored in accordance with AS 3580.9.6 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter – PM (sub) 10 high volume sampler with size-selective inlet – Gravimetric method of 1990; or</i> <i>ii) Any alternative method of monitoring PM₁₀ which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.</i>

3.2 Water

3.2.1 Environmental Value – Water

The key environmental values for water that are to be protected according to the *Environmental Protection (Water) Policy 2009* (EPP Water) include:

- Physical, chemical and biological integrity of the water courses within the catchment and their amenity as potential water sources for stock and small-scale irrigation;
- The qualitative and quantitative integrity of local groundwater as a water source for the environment, agriculture, town water supply and other existing uses;
- The integrity of raw water supplies and associated infrastructure in the region; and
- Cultural and spiritual values.

3.2.1.1 Surface Water

Existing Tributaries

Three Moon Creek is a tributary of the Burnett River. It flows from north to south past the townships of Monto and Mulgildie before joining the Burnett River. The upper part of the catchment is hilly and forested. Land use of the lower part of the catchment between Monto and Mulgildie is mostly agricultural. A number of tributaries contribute to the flow of Three Moon Creek. The major tributaries are Monal Creek, Cedar Creek, Spring Creek and Bailey Creek. Cania Dam is located on the upper reaches of the Three Moon Creek (**Figure 16**).

Other watercourses in the area are ephemeral, with water quality likely to depend on the time of year and land use in the catchment.

There is one identified drainage line running north-west across the northern half of the proposed mine area, feeding two dams on the site and discharging under the railway line to the west. A second drainage line runs west and is positioned in the southern half of the site and again, discharging under the railway line.

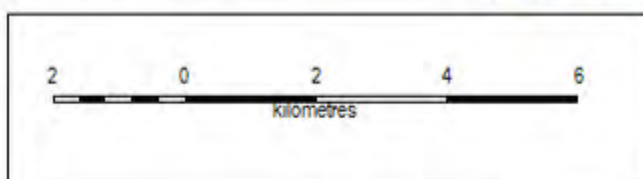
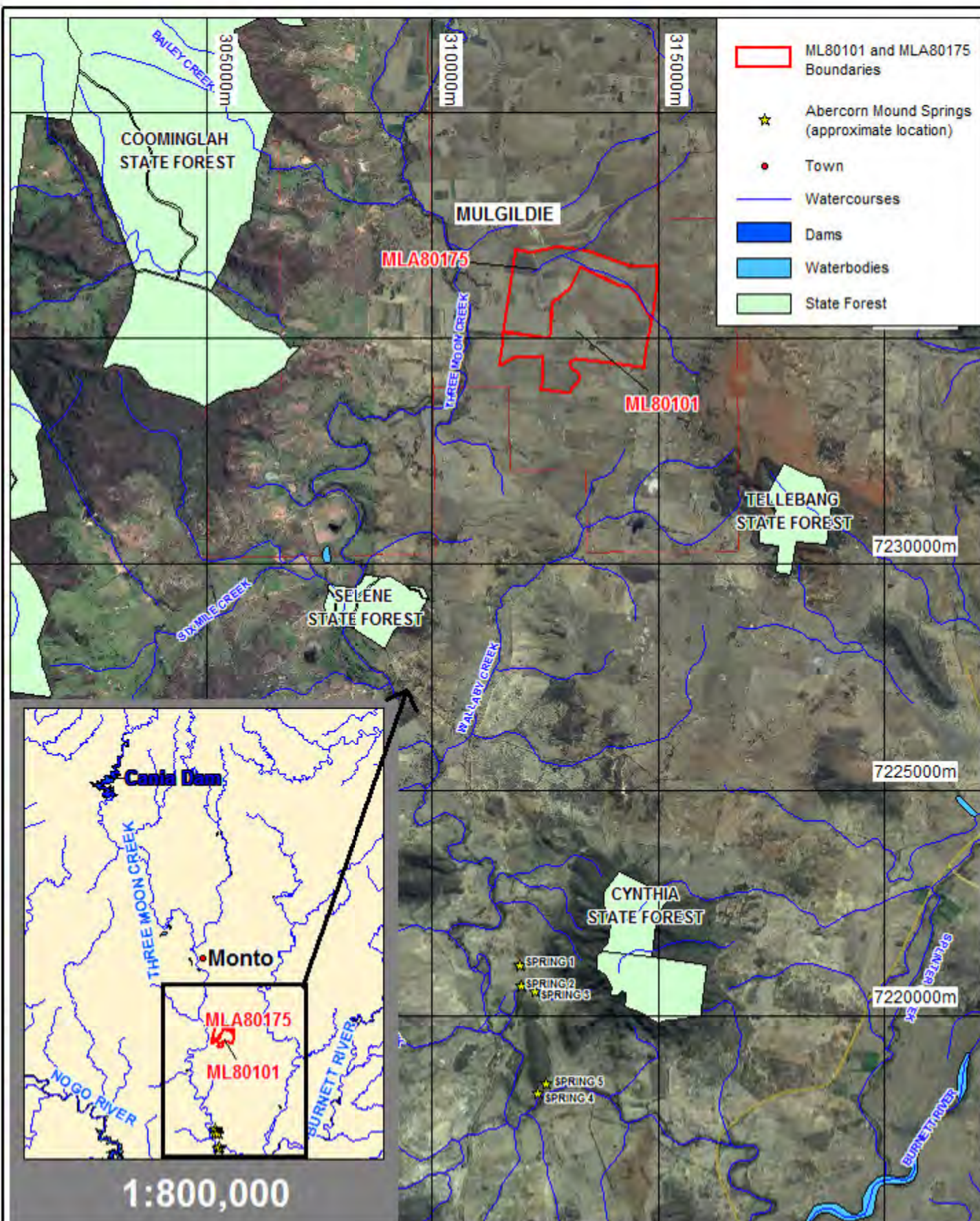
Flow rates and Stormwater Contributions

The climate in the North Burnett area is subtropical, with hot summers and mild winters. Rainfall is summer-dominant and is extremely variable, coming mostly from summer thunderstorms.

Records from the rainfall station at Monto can be seen in **Table 13** and show a mean annual rainfall of 740mm. Mean monthly rainfalls vary from about 25mm in August to 115mm in January, as shown in **Figure 17**.

Table 13: Climate statistics for Monto Township (BOM 2011)

Parameter	Monto Township
Mean rainfall (mm)	740.3 ²
Mean number of days of rain ≥ 1 mm	64.0 ²
Mean number of clear days	112.4 ¹
Mean number of cloudy days	116.8 ¹



NORTH



McCollum Environmental Management Services

Figure 16 Monto Coal Project Surrounding Watercourses

Author: McCollum Environmental - MEIS15 Date: 30 November 2011 Checked: PT
Scale: 1:115,000 (A4P) Projection: MGA94, Zone 56, GDA94
Plan: M/G/S/Plans/2011/Monto/EM Plan Figures/111128MP_Monto Project_Watercourses

Mean 9am relative humidity (%)	70 ¹
Mean 9am wind speed (m/s)	8.2 ¹
Mean 3pm relative humidity (%)	45 ¹
Mean 3pm wind speed (m/s)	11.1 ¹

¹ Data for period 1930-2011

² Data for period 1962-2011

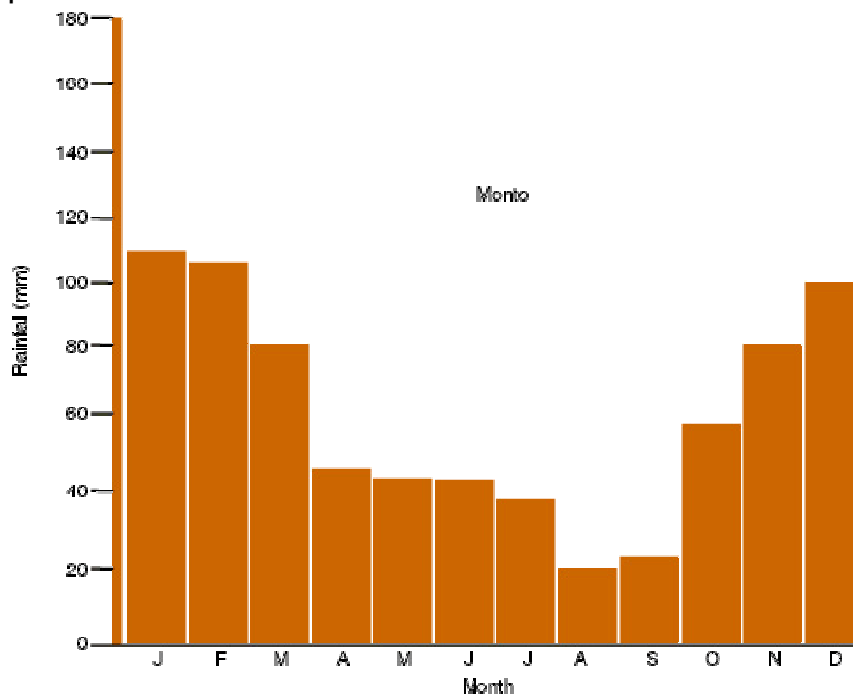


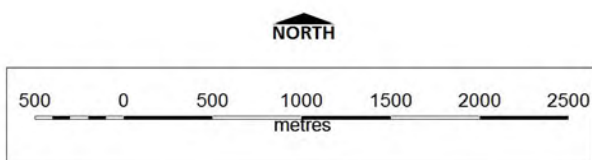
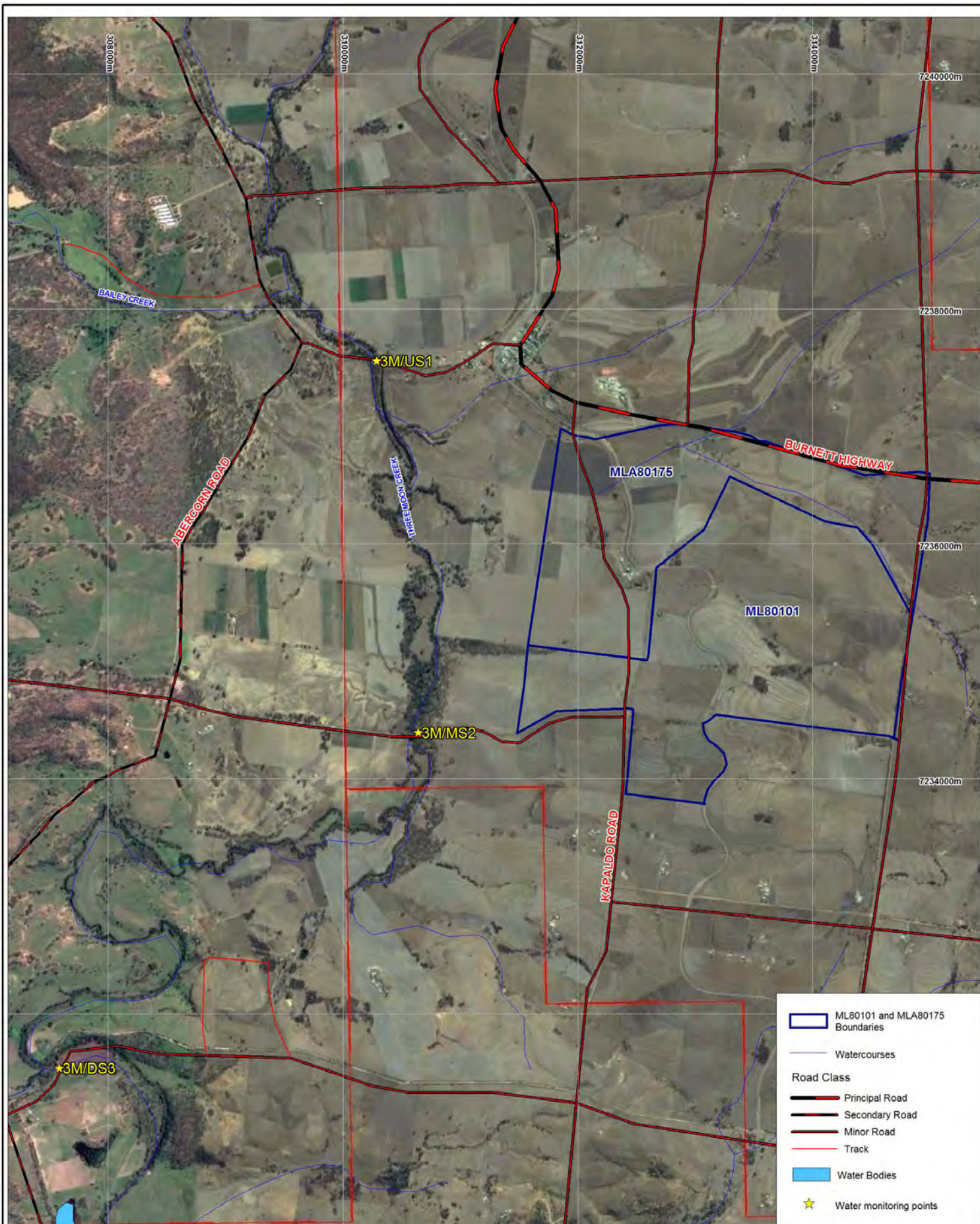
Figure 17: Histogram of average monthly rainfall

Mean pan evaporation exceeds mean rainfall in all months throughout the year. Evaporation ranges from approximately 6-8mm/day during summer to 3mm/day during winter.

Flood Modelling

Flood modelling (Monto Coal Stage 1 Feasibility Study) was completed to define peak flood levels and inundation extents of Three Moon Creek in the proximity of the Project and associated infrastructure area for 10, 100 and 1000 year ARI storm events.

A hydrologic model has been completed using XP-RAFS software for the whole of the Three Moon Creek catchment up to the Abercorn flow gauging station. The model was calibrated against measured stream flow data at the gauging stations of Upper Monal at Monal Creek and Abercorn at Three Moon Creek (**Figure 18**). Observed and simulated flow hydrographs at Upper Monal and Abercorn flow gauging stations for February 2003 are shown in **Figure 19-20**.



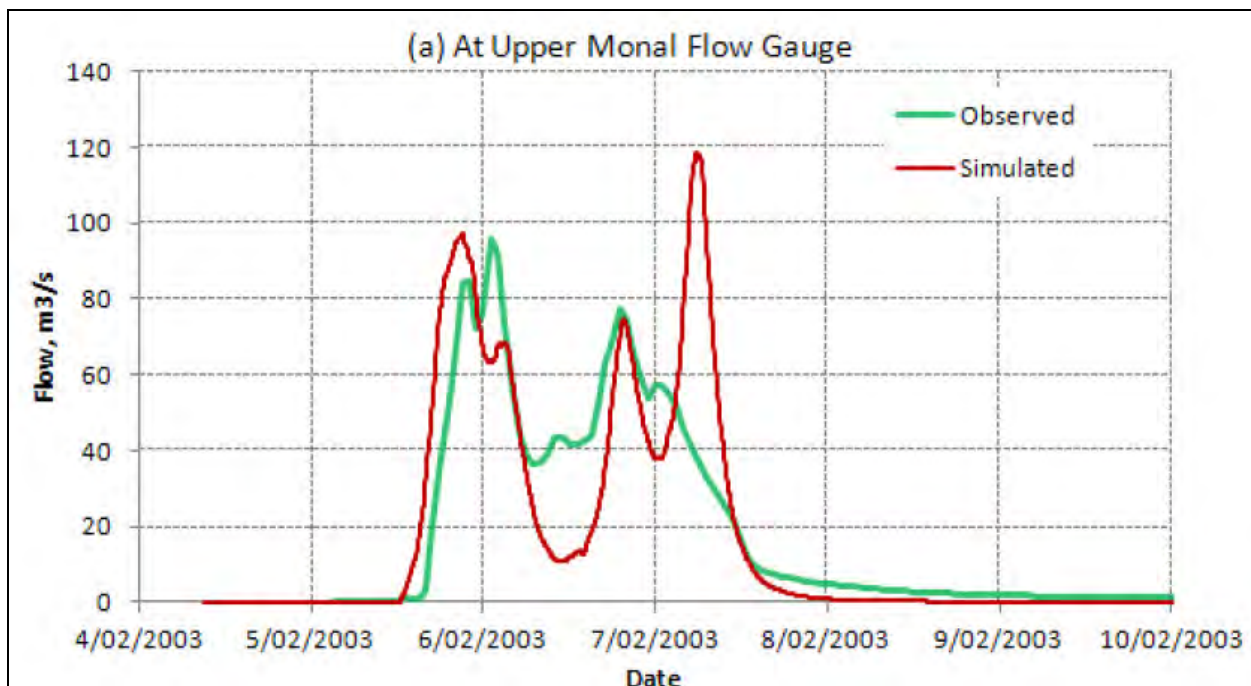


Figure 19: Upper Monal Flow Gauge (February 2003)

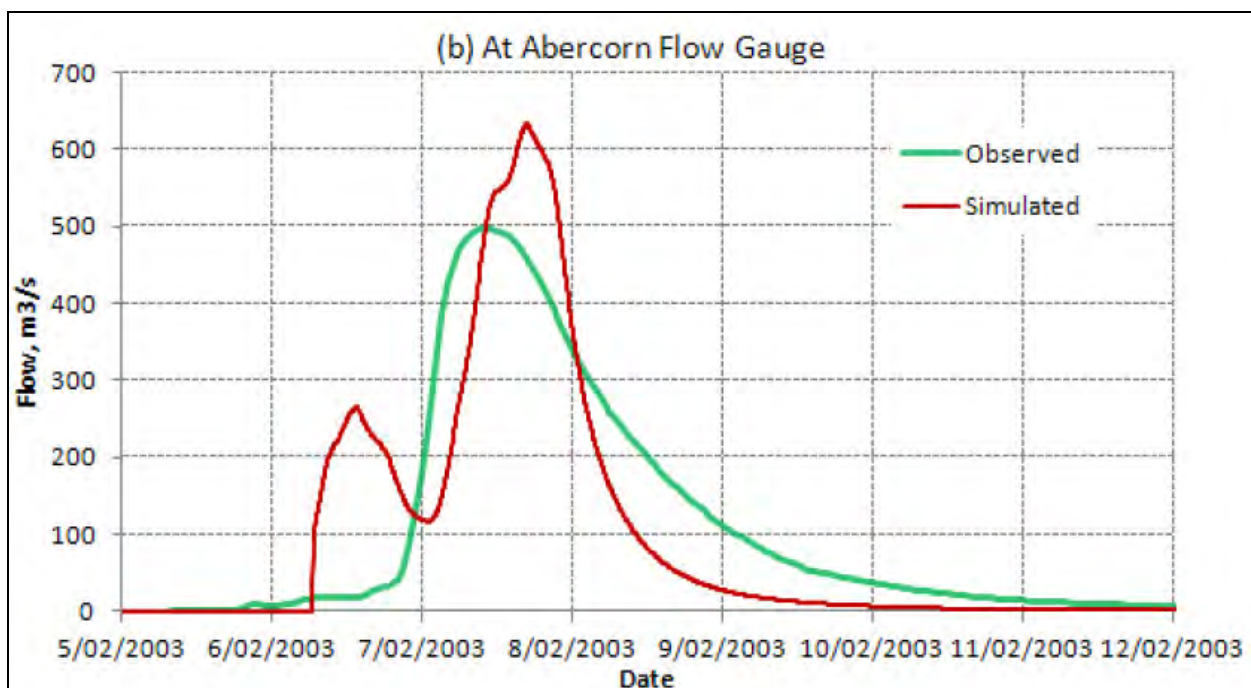


Figure 20: Three Moon Creek Flow Gauge (February 2003)

The calibrated hydrologic model was used to estimate design flood discharges for 10, 100 and 1000 year ARI events.

The location and period of monitoring records for Three Moon Creek and Upper Monal Creek are presented in **Table 14**.

Table 14: List of Stream Gauging Stations

Waterway	Stream Gauging Station	Station Number	Latitude (oS)	Longitude (oE)	Period of Record	
					Start of Record	End of Record
Three Moon Creek	Abercorn	136101C	-25.1289	151.1307	1965	2011
Monal Creek	Upper Monal	136108A	-24.6132	151.1139	1963	2011

Estimated Australian Height Datum (AHD) flood levels at and surrounding the Project for a 10, 100 and 1000 ARI are presented in **Table 15**. Estimated flood water level contours for 10, 100 and 1000 ARI can be seen in **Figures 21-23**.

Table 15: Estimated flood levels

ARI	Storm Duration (hour)	Project Location (AHD)
10	9	213.25
	12	213.28
	18	213.26
100	9	214.19
	12	214.26
	18	214.29
1000	6	214.96
	12	215.21
	18	215.30

Existing Water Quality of Three Moon Creek

The Macarthur Coal Monto Project Baseline Water Quality Monitoring Program (MCMPBWQMP) has been assessing the water quality of Three Moon Creek upstream and downstream of the Project. The monitoring program consists of three (3) monitoring locations, 3M-US1, 3M-MS2 and 3M-DS3 (**Figure 18**).

As stated in numerous surface water reports provided by Australian Laboratory Services (ALS) *“the elements tested for in the laboratory analysis occur both naturally, due to the composition of the surrounding soils and rock deposits and artificially due to the introduction via fertilisers, pesticides, herbicides and other agricultural chemicals.”*

Analyte levels measured at the three monitoring sites are all well below the corresponding ANZECC Guideline (2000) values with the exception of lead and aluminium (**Table 16**). The 95th percentile calculated from the water quality results for lead was 0.105mg/L, due to an uncharacteristically

high result of 0.169mg/L obtained in the May 2011 round of sampling. This is above the guideline value of 0.1mg/L, however, all other sampling events show lead levels well below this result. The aluminium levels measured at 3M-DS3 were higher than the other two sites, with the highest level recorded at 4.7mg/L. This is just under the guideline value of 5mg/L.

Table 16: 95th percentile water quality results for Three Moon Creek monitoring sites.

Parameter		Monitoring Site			ANZECC Guideline Value*
		3M-US1	3M-MS2	3M-DS3	
pH (units)		7.9905	8.003	7.6935	6.0-9.0**
Temp (°C)		33.756	28.418	27.66	
EC (µs/cm)		744.045	714.36	759.725	-
Dissolved Oxygen (mg/L)		8.58	8.81	7.57	-
Turbidity (NTU)		969.95	312.345	2180	-
Suspended Solids (mg/L)		1829.2	3737.05	17560	-
TDS (mg/L)		424.8	432.35	397.4	4000***
Total Oil & Grease (mg/L)		<7	<7	<7	-
Petroleum Hydrocarbons (mg/L)		<5	<5	<5	-
TPH (C6-C9 fraction) (µg/L)		<20	<20	<20	-
TPH (C10-C14 fraction) (µg/L)		<50	<50	<50	-
TPH (C15-C28 fraction) (µg/L)		<100	<100	<100	-
TPH (C29-C36 fraction) (µg/L)		<50	<50	<50	-
1,2-Dichloroethane-D4 (%)		107.65	106.4	112.75	-
Toluene-D8 (%)		105.65	102.1	104	-
4-Bromofluorobenzene (%)		103.65	98.98	99.6	-
Total Chromium (mg/L)		0.004	0.004	0.006	1
Total Mercury (mg/L)		<0.0001	<0.0001	<0.0001	0.002
Total Metals	Silver (mg/L)	<0.001	<0.001	<0.001	<0.005****
	Aluminium (mg/L)	2.9415	2.8725	4.611	5
	Arsenic (mg/L)	0.0049	0.0155	0.0171	0.05
	Barium (mg/L)	0.0925	0.874	2.6145	-
	Beryllium (mg/L)	<0.001	<0.001	<0.001	-
	Cadmium (mg/L)	<0.0001	<0.0001	<0.0001	0.01
	Cobalt (mg/L)	0.00375	0.1618	0.2759	1
	Chromium (mg/L)	0.0569	0.1309	0.1074	1
	Copper (mg/L)	0.0792	0.1766	0.2012	1***
	Manganese (mg/L)	0.3085	12.7144	20.325	-
	Molybdenum (mg/L)	<0.001	<0.001	<0.001	0.15
	Nickel (mg/L)	0.0485	0.1295	0.1626	1
	Lead (mg/L)	0.0447	0.105	0.09415	0.1
	Antimony (mg/L)	<0.003	<0.003	<0.003	-
	Selenium (mg/L)	<0.002	<0.01	<0.01	0.02
	Zinc (mg/L)	0.194	0.871	0.6874	20

	Vanadium (mg/L)	<0.01	0.01	<0.01	-
	Iron (mg/L)	3.238	3.548	5.5605	-

Notes:

*ANZECC guidelines values are based on the livestock drinking water guideline values unless otherwise stated.

**Based on the ANZECC guideline value for irrigation and general use.

*** Based on the trigger value for cattle.

**** Based on ANZECC guideline values for freshwater aquatic ecosystems.

Agricultural use

Agricultural use of surface water in the Project area is primarily related to livestock watering. Surface water samples from the monitoring sites have relatively low concentrations of dissolved metals and all parameters were generally below or within the ANZECC 2000 Guidelines for livestock watering. Therefore, the surface water can be considered to have environmental values relevant to stock watering.

Cultural and spiritual values

There is no known environmental value in relation to cultural and spiritual values of surface water within the Project area.

Biodiversity

The biological values of aquatic ecosystems within and adjacent to the mine are relatively low and consistent with those of the wider catchment. Environmental values are dictated primarily by the ephemeral and intermittent nature of the region's waterways. Creeks in the catchment are generally in moderate condition and are characterised by low habitat diversity.

It is noted that the southern portion of Three Moon Creek has been assessed as having high biodiversity values under the Burnett Riverine Aquatic Conservation Assessment (BRACA). The BRACA also assessed the northern portion of Three Moon Creek as having medium biodiversity values.

The creeks surrounding the Project area provide 'upstream' dispersal habitat for the fish species recorded (and possibly breeding habitat for some species). Therefore, macro invertebrate and fish communities found within the mine are likely to contribute to the success of downstream populations through movement and/or migration.

No rare or threatened species of aquatic flora or fauna have been recorded from or are likely to occur in the waterways of the area. There are no wetlands of Regional, State or National significance within or adjacent to the Project. On this basis, the receiving water ecosystem is considered to be in the slightly to moderately disturbed category.

Abercorn Springs is located 17km South of the Project and contains significant flora and terrestrial species. A report was commissioned by the Proponent for a flora, fauna and freshwater aquatic study of the Abercorn Mound Springs (Wormington and Robert 2009). The report listed the biodiversity present at the springs and provided a baseline of data required to implement and maintain a comprehensive monitoring program of the springs. The report identified a range of native species using the springs as habitat. Species of significance included:

- Hairy Jointgrass (*Arthraxon hispidus*) a flora species with conservation significance;
- Amphibian species including Eastern Dwarf Tree Frog (*Litoria fallax*), Striped Marsh Frog (*Limnodynastes peronii*) and an abundance of lizard and skink species;
- Cotton Pygmy-goose (*Nettapus coromandelianus*) listed under the *Nature Conservation Act 1992* as “rare”; and
- Seventeen migratory bird species listed under the *Environmental Protection and Biodiversity Conservation Act (EPBC) 1999*.

3.2.1.2 Groundwater

Monto is located on the eastern margin of the Great Artesian Basin (GAB) in an area generally delineated as a recharge area for GAB aquifers. From basement up, the stratigraphic units encountered at Monto are Precipice Sandstone, Evergreen Formation, Hutton Sandstone, and Mulgildie Coal Measures. **Figure 24** shows a cross-section of these units, showing their stratigraphic relationship.

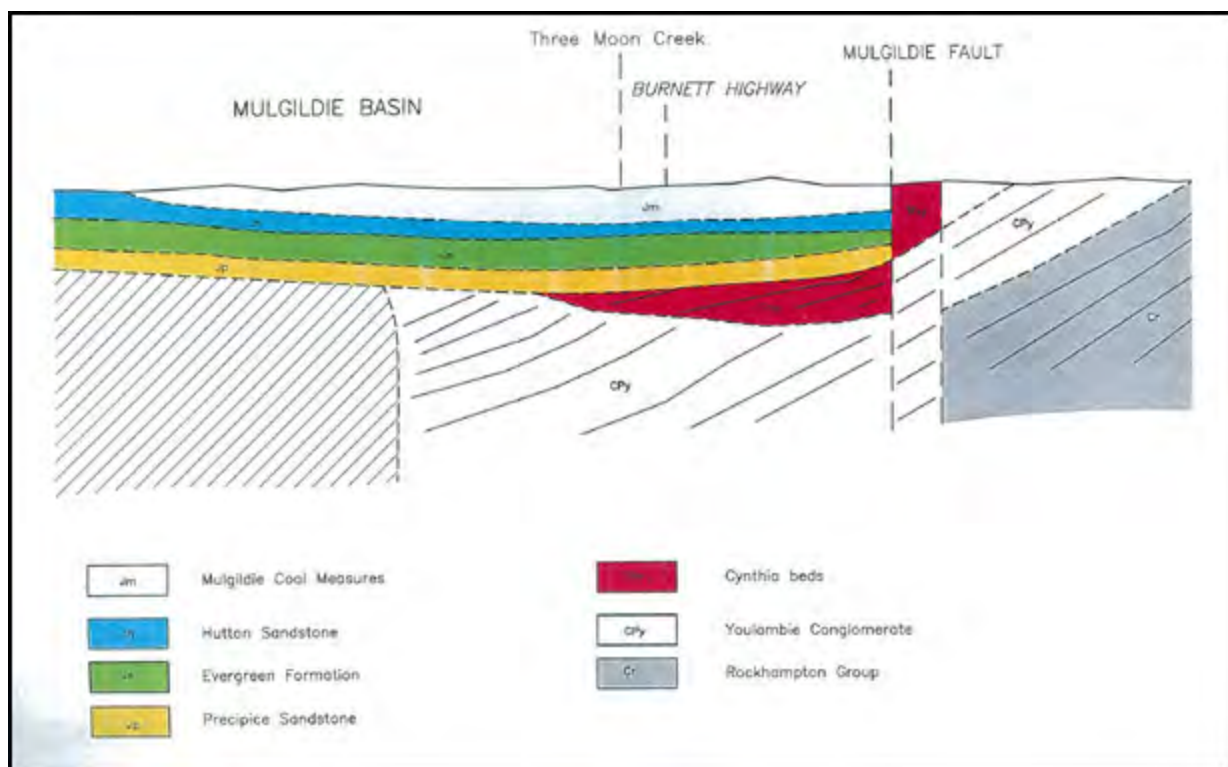


Figure 24: Cross-section showing stratigraphic relationship.

Regional Groundwater Data

Searches were undertaken of the DEH Digital Groundwater Bore Database. In addition, DEH personnel in Brisbane and Bundaberg provided local knowledge of aquifer systems in the Mulgildie and Monto areas, along with advice on bore licensing and other regulatory matters. Current registered bore locations and associated aquifers in the vicinity of the Project can be seen in **Figure 25**.

Groundwater use entitlements

The Monto Subartesian Area is a Declared Subartesian area under the *Water Regulation 2002*. The area has been defined for the purpose of introducing area specific regulations for groundwater extraction.

GAB Aquifers

According to Habermehl (1996), the main aquifer units of the GAB include the Clematis, Precipice, Boxvale, Hutton, Adori, and Hooray Sandstones, the Cadna-owie Formation (and equivalents) and the Mackunda and Winton Formations. The aquifers are relatively uniform in characteristics and are continuous and hydraulically connected across sub-basins (except where disrupted by faults).

General hydraulic characteristics of GAB aquifers (mainly from Cadna-owie Fm, Horya, Algebuckina, and Pilliga Sandstones and equivalents) are provided in **Table 17**.

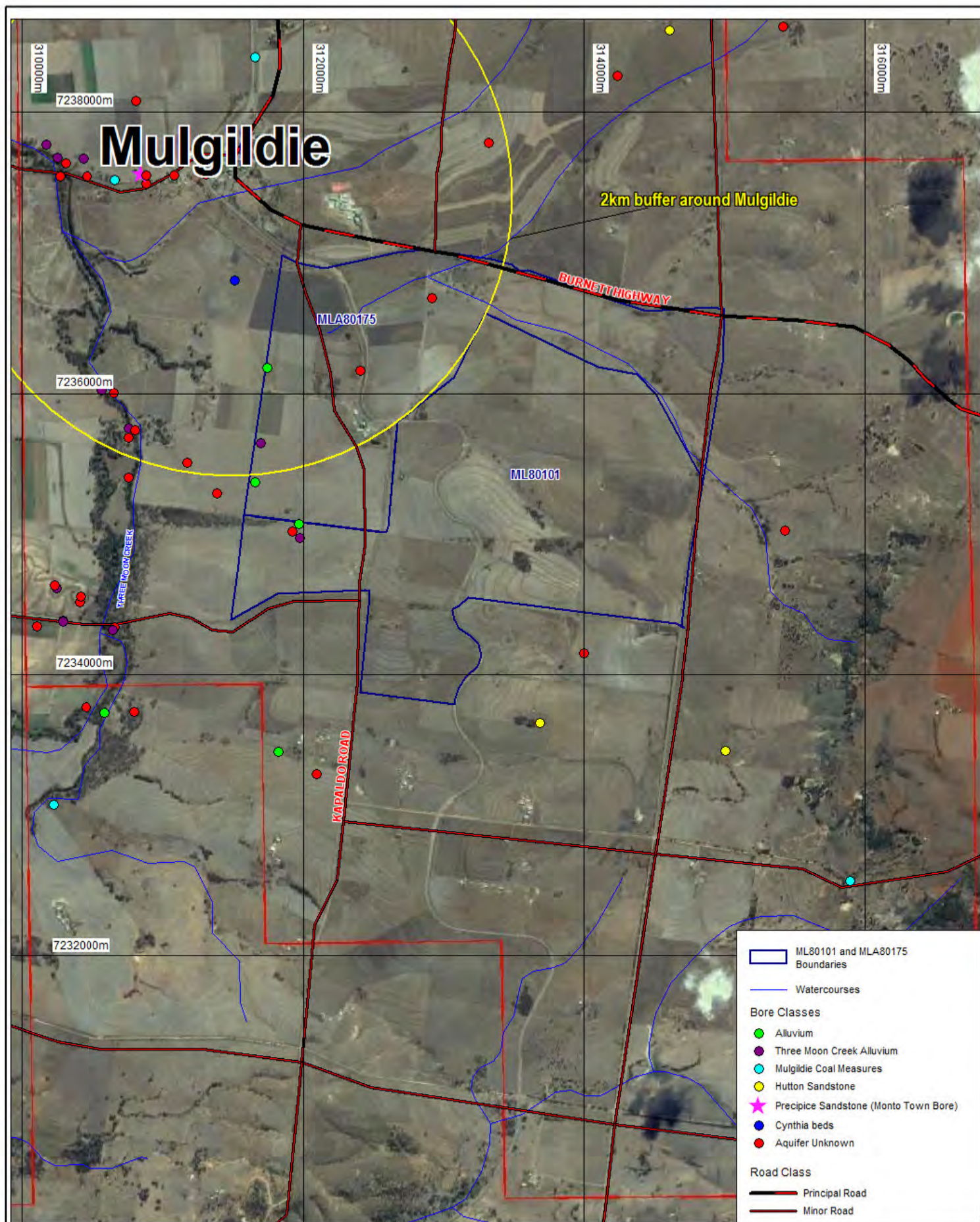
Table 17: General properties of GAB aquifers

Property	Range
Hydraulic Conductivity	0.1 – 10 m/day (mostly in lower end of range)
Transmissivity	1 – 2000 m ² /day
Storage Coefficient	1×10^{-4} – 9×10^{-5}
Intrinsic Permeability	~10 to > 1000 millidarcies (where 1 darcy = 0.831 m/day @ 20°C)

Source: Habermehl 1996

Aquifer Characteristics and Current Users

The location of registered bores is shown in **Figure 25**. It should be noted that Subartesian bores drilled outside the Monto Subartesian Area do not need to be licensed. This means that other private bores potentially exist that are not shown in **Figure 25**.



NORTH

500 0 500 1000 1500 2000 2500
metres

a) *Precipice Sandstone*

The Precipice Sandstone contains the best quality groundwater resource in the region (total dissolved solids (TDS) of Mulgildie Town Supply was 438mg/L TDS for a sample taken on 6/6/2001). Iron precipitation from the Mulgildie Town Bore has been an issue, and the water is quite aggressive due to high levels of dissolved CO₂. The Mulgildie Town Bore has one of the highest measured levels of dissolved CO₂ in the GAB (DNR, pers. comm. 11/12/01). As a result, the steel casing of the Mulgildie Town Bore had to be relined, due to degradation after several years of operation. Later bores constructed in the Precipice Sandstone have had licence conditions imposed that included a requirement that the bore have an inert casing.

The top of the Precipice Sandstone has been recorded at approximately 582m below ground level (BGL) in Monto Minerals Ilmenite Bore Number 1, 588m BGL in the Mulgildie Town Bore, and 593m BGL in the Geological Survey of Queensland (GSQ) bore GSQ Monto 1-2R.

The hydraulic properties of the Precipice Sandstone in this area are not well known. However, testing of samples from GSQ Monto 1-2R, which was drilled approximately 700m to the south-south-east of the Mulgildie Town Bore, recorded an average porosity of 15% and an intrinsic permeability of 1.5–840 millidarcies (0.001–0.7 m/day), with an average of 296 millidarcies (0.25 m/day).

b) *Mulgildie Town Bore*

The Mulgildie Town Bore is an artesian bore, drilled and constructed in the Precipice Sandstone, and provides water at a flow rate of 3 litres/second. A 100-hour recession test (DPI 1992) has indicated that, for a flow of 3 litres/second, the back pressure after two years would be 2.8m (i.e. the bore flow is 3 litres/second at 2.8m/head). Therefore the bore is only slightly artesian and it is probable that additional pumping from the Precipice Sandstone would affect flow from the bore and make it subartesian (i.e. it would cease to flow).

c) *Monto Minerals Ilmenite Bores*

Monto Minerals have one production bore (Goondicum Ilmenite Bore Number 1) currently constructed in the Precipice Sandstone (to the north-east of Mulgildie) and two other proposed bores (Goondicum Ilmenite bores Number 2 and Number 3) which will take water from this aquifer.

d) *Evergreen Formation*

The Evergreen Formation is a confining layer that has been struck from 330.4m to 593.1m BGL, and in the Mulgildie Town Bore from 296m to 554m BGL.

e) *Hutton Sandstone*

The Hutton Sandstone is recognised as an aquifer in other areas of the GAB. While anecdotal information indicates that the Hutton Sandstone is relatively clayey and may not be an important

aquifer locally, it is considered that the aquifer potential of the Hutton Sandstone should be assessed if drilling a deeper bore to the Precipice Sandstone. There does not appear to be any local groundwater users taking water from the Hutton Sandstone (DNRM Mundubbera, pers. comm. 11/12/01). Water quality information is sparse, but the DEH groundwater database reveals that water quality varies from less than 1,000 to over 7,000mg/L TDS. The aquifer yield is unknown.

f) Mulgildie Coal Measures

The Mulgildie Coal Measures are used in areas outside the alluvium to provide water for stock. The DEH groundwater database indicates that water quality varies from less than 500 to over 16,000mg/L TDS, with most samples over 2,000mg/L TDS. The average yield of bores in this aquifer is uncertain.

g) Alluvial Aquifer

Alluvial deposits are located along the locally significant watercourses, including Three Moon Creek and Splinter Creek. These alluvial deposits are exploited as a source of irrigation water, and for stock and domestic supply. Both the townships of Monto and Mulgildie rely on groundwater to provide domestic water supply.

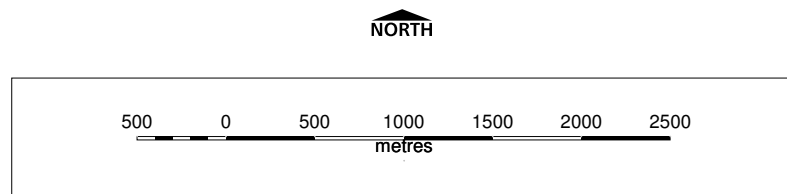
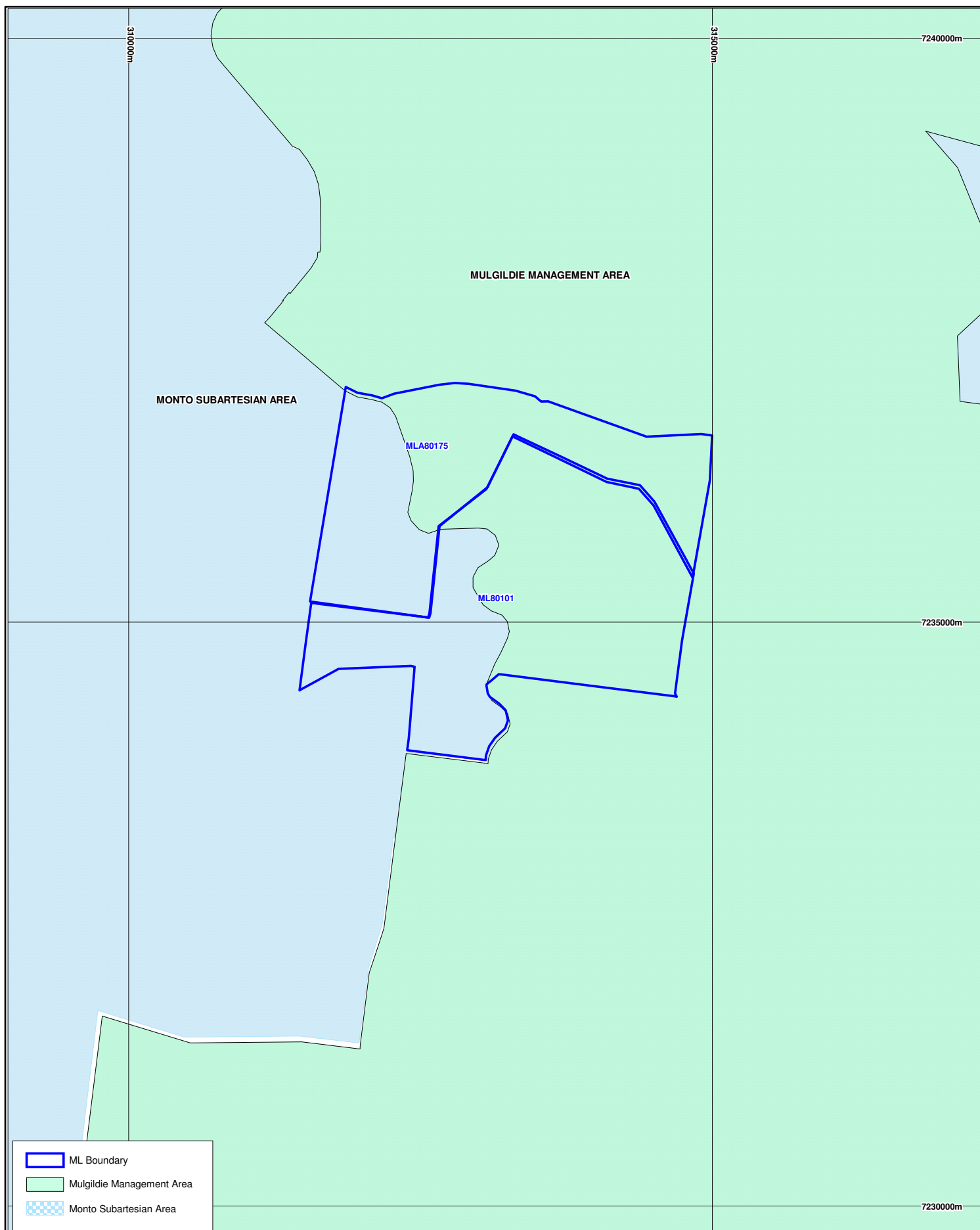
The alluvial aquifers of Three Moon Creek and Splinters Creek are within the Monto Declared Subartesian Area (**Figure 26**). The alluvial deposits are recorded as attaining thicknesses of 20 to 25 metres. Recorded water quality varies from less than 1000 to over 9,000mg/L TDS, with an average of around 2,100mg/L.

In 1972 and 1974 recharge weirs were constructed on Three Moon Creek at Monto Weir and Youlambie Weir. Monto Weir benefits the Monto Town water supply, while Youlambie Weir has an associated structure that enables diversion of water along a channel and siphon system traversing the alluvial flats of Three Moon Creek. The construction of Cania Dam, approximately 42km from the mine on Three Moon Creek, was completed in 1983 (see **Figure 16**). It supplies water for downstream groundwater recharge, and surface water for downstream users (DPI Design and Commissioning of the Mulgildie Water Treatment Plant for Monto Shire Council, June 1992). Three Moon Creek is approximately 2km from the proposed mining lease at its closest point.

Water allocations are part of a conjunctive use scheme. Surface water is used when adequate supplies are available. When discharges from Cania Dam are available (nominally twice a year), they are used to recharge the alluvial aquifers via constructed recharge facilities.

Groundwater Springs

There are a number of springs in the area, some of which are deemed to be of significance. The most notable springs are Abercorn Springs (see **Figure 16**), which contain significant flora and



McCollum Environmental Management Services

Figure 26
Monto Coal Project
Declared Subartesian Areas

Author: McCollum Environmental - MEMS19	Date: 01 December 2011	Checked: PT
Scale: 1:30,000 (A3P)	Projection: MGA94, Zone 56, GDA94	
Plan: M:\GIS\Plan\2011\Monto\EM Plan figures\111201MP_Monto Project_Declared Subartesian Areas		

fauna species. These springs are located approximately 17km from the mine site. The source of water for these springs is uncertain, but based on their water quality, it is postulated that the source is either the Evergreen Formation or Hutton Sandstone (D. Dempster, Bundaberg DNR, pers. comm. 28/11/01) (see **Figure 23**).

3.2.1.3 Site Water Management System

The Project water management system will consist of the following structures (**Figure 27**):

- Sedimentation Pond 1;
- Sedimentation Pond 3;
- Sedimentation pond 4;
- Sedimentation Pond 5;
- Mine Water Dam 1;
- Mine Water Dam 2;
- Tailings Dam;
- Process Water Dam; and
- Raw Water Dam.

Raw Water

The majority of the water supply for the Project will be obtained from the Precipice Sandstone aquifer. Water Licence 174797 (**Appendix B**) enables a 700MLpa production bore to provide all site raw water demands, and provides a high security of supply during drought periods. Potable water will be treated on site as required to meet demands of approximately 2.7MLpa.

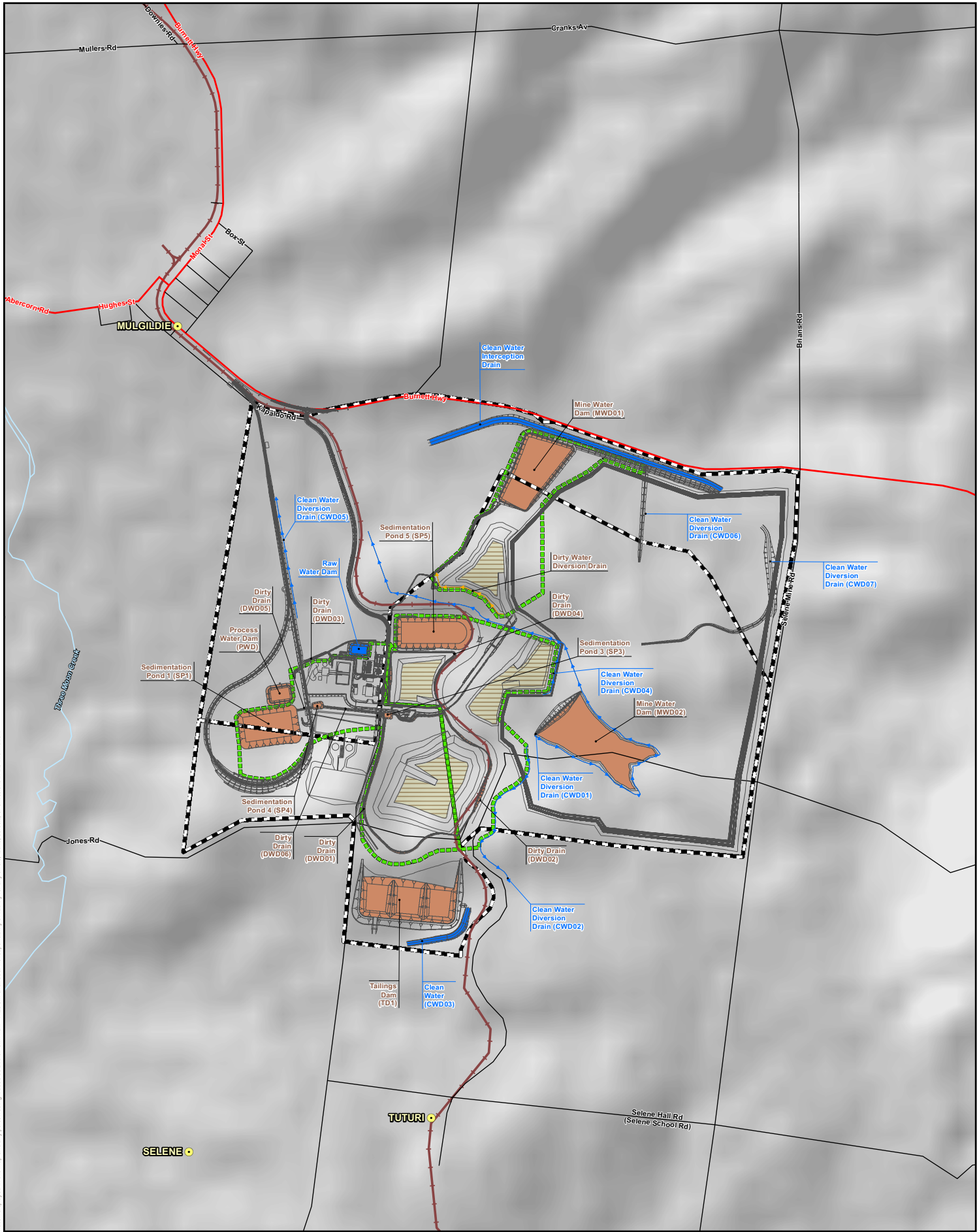
Dams

Dams included in the site water management system and their proposed capacities are shown in **Table 18**.

Table 18 Dam Design Volumes and Catchment Area

Type	Capacity (ML)	Total Catchment Area (Ha)
Mine Water Dam 1	308	44
Mine Water Dam 2	464	15
Process Water Dam	50	1.3
Sediment Pond 1	523	75
Sediment Pond 5	483	69
Tailings Dam	913	22.1

Under the proposed draft *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (DERM, 2008)* (The Manual) all dams at mine sites must have their hazard category assessed. A dam is assigned a high, significant or low hazard based on its potential impact to the



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DATUM GDA 1994, PROJECTION MGA ZONE 56

0 0.2 0.4

Kilometers

1:20,000 (when printed at A3)

www.aecom.com

LEGEND

- Mine Layout
- Clean Water Diversion Drain
- Dirty Water Diversion Drain
- Railway
- Road Type
- Highway
- Road

- Catchment Boundary
- Mine lease: ML80101 & ML80175
- Clean Water Drain, Ponds & Dams
- Dirty Water Drain, Ponds & Dams
- Overburden Dumps

DRAFT

Data sources:
Roads, Locality, Water Body - Street Pro
Contours: 25m SED DEM
Mine Layout: Lambert/Reichen CAD0 drawing

**MONTO STAGE 1
WATER MANAGEMENT PLAN**

**MINE WATER MANAGEMENT
SYSTEM LAYOUT**

PROJECT ID: 60242822
CREATED BY: BM
LAST MODIFIED: 7/03/2012
VERSION: 1

**Figure
6**

environment, humans, stock or general economic loss in the event the dam overflows or the dam wall fails. A dam must be regulated by the DEH if the dam falls into the high or significant hazard category. Whilst all dams on site will be designed by a suitably qualified engineer, considering the design criteria requirements of the Manual, and will have their hazard category reassessed on an annual basis, regulated dams require certified design plans to be submitted to DEH and certified annual inspections and reports must be provided.

Dams automatically become high or significant hazard dams if the dam wall exceeds a height of 8m or the quality of the stored water exceeds the guideline contaminant concentration and minimum volume requirements.

Summary details of the hazard category (failure to contain scenario) of the mine site water management dams are provided in **Table 19** below. This is a preliminary assessment based on conceptual structure, a detailed assessment including contained water quality will be completed at the time of final design.

Table 19: Project Water Management Dam Summary Details and Hazard Category

Dam	Description of Catchment	Hazard Category
Sedimentation Pond 1	Drains waste rock dump and mine infrastructure area (MIA). Mine water supply to the process water dam (PWD). Release to Three Moon Creek.	Significant
Sedimentation Pond 3	Drains waste rock dump. Primary settlement of sediment before flow passes through SP4 onto SP1.	-
Sedimentation Pond 4	Drains MIA and receives flow from SP3. Secondary settlement of sediment before flow passes to SP1.	-
Sedimentation Pond 5	Drains waste rock dump. Supply to SP1.	Significant
Mine Water Dam 1	Drains waste rock dump. Secondary storage for pit dewater flow.	Significant
Mine Water Dam 2	Primary storage for pit dewater flow.	Significant
Tailings Dam	Tailings storage. Provide decent return flow to CHPP.	High
Process Water Dam	Supplies CHPP and dust suppression demands.	Significant
Raw Water Dam	Operational storage of raw water supply. Truck washing and make-up supply to the PWD.	-

Drains and Channels

Drains will span the length of the Project Haul road to collect runoff from the road surface and shoulders. These drains will be constructed on both sides of the road and flow to sedimentation basins.

Drains will direct runoff from disturbed areas of the Project to the dams of the Site Water Management System. Clean water drains will direct water away from disturbed areas of site to existing watercourses. All drains around the Project will be constructed to a 20 year ARI event.

3.2.1.4 Water balance study

A water balance study has been undertaken as a component of the water management plan development process.

The objectives of the water balance study were to:

- Identify the quality and quantity of waters expected to be produced and used on site;
- Inform an operational plan for management of various water qualities, quantities under different seasonal events;
- Determine the adequacy of the proposed water management system;
- Determine the requirements and volumes of water releases.

The study was designed to simulate the operation of the major components of the water management system at the project and include the following:

- Pit water catchment and collection including rainfall, runoff and groundwater infiltration;
- Pit dewatering;
- Transfers between pit water dams;
- On site water usage such as haul road dust suppression and irrigation;
- Water storage dams including losses such as evaporation and seepage; and
- Controlled releases.

The program GoldSim was used to create the water balance model. The water balance model was run for a total of 20 years, with the model assessed at 3, 10 and 20 years. The inputs for the model are presented in **Table 20** and the inputs for salt fluxes are presented in **Table 21**.

The controlled release conditions used in the GoldSim model were based on conditions W8 and W9 of the *Final Water Conditions for Coal Mines in the Fitzroy Basin* (DERM, 2009). The model indicated that the minimum flow in Three Moon Creek required for a release event, based on 20th percentile average daily flow, is 0.2ML/day (or 0.002m³/s).

The GoldSim water balance results showed that the likelihood of uncontrolled discharges from all mine water storage is minimal (less than 1%) over 3, 10 and 20 years of the mine life given the management strategies to be implemented, including opportunistic controlled releases.

GoldSim modelling for TSF was based on two scenarios:

- Scenario 1 – tailings will be excavated such that, on average, one cell will be available for tailings disposal (33% freeboard); and
- Scenario 2 – tailings will be excavated such that, on average, half a cell will be available for tailings disposal (17% freeboard).

Results of the TSF modelling showed that at worst case there would be a 5% likelihood of uncontrolled discharge at 20 years, under scenario 2.

Table 20: Water Balance Model Inputs

Input	Description	Data Input
Inflows		
Rainfall	Time varied element applied over dam surface area	Data drill rainfall sequence
Dirty Water Runoff	Time varied element applied over catchment area, scaled in proportion to land use	Runoff sequence generated from Australian Water Balance Model
Groundwater bore licence	- Transferred from bore to raw water system - Transferred from raw water system to mine water system	700 ML/yr (max)
Groundwater infiltration rate	Uniformly distributed between 0-1ML/day/km at pit face	Pit length of 0.6km
Intra-Site Flows		
Potable water	From raw water dam, for use in site buildings	2.7ML/yr
Treated sewage effluent	Recycled flow from sewerage treatment plant, 85% of potable water flow	2.3ML/yr
Tailings decant	Tailings water returned to CHPP	0-6 months: 0ML/yr 6-12 months: 215ML/yr 12 months onwards: 430 ML/yr
CHPP demand	Water used in CHPP, from process water dam	780ML/yr
CHPP dust suppression and fire water	Dust suppression and fire fighting water	Included in above 780ML/yr
Vehicle wash	Water used in vehicle wash, from raw water dam	5.3ML/yr

Vehicle wash recycle	Water returned to mine water circuit from vehicle wash, 50% of flow to wash	2.65ML/yr
Outflows		
Evaporation	Time varied element applied over surface area of dams	Evaporation sequence
Seepage	Fixed value applied over dam surface	
Dust suppression	Fixed value – applied on days of little to no rainfall only	62 ML/yr
Release to Three Moon Creek	Water release to Three Moon Creek during flow events	Refer section 3.2.1.4

Table 21: Water Balance Model Salt Flux Inputs

Input	Description	Data Input
Inflows		
Dirty Water Runoff	Salt removed from the environment during rainfall events	
Salt removed from coal	Salt removed from coal during washing process	300 kg/day
Outflows		
Releases to Three Moon Creek	Salt in release flow	Refer section 3.2.1.4
Dust suppression	Salt in dust suppression flow	Dependent on process water dam concentration

3.2.2 Potential Impacts on the Environmental Values – Water

Potential Impacts on Surface Water Quality

The current potential impacts on surface water quality include:

- Contribution of salts from regional soils;
- Sediment loads resulting from soil erosion within the region; and
- Contribution of nutrients and salts from fertiliser usage and cattle waste within the region.

The Project has the potential to impact surface water quality within the catchment by:

- Sediment-laden run-off from disturbed areas;
- Potential discharge to Three Moon Creek;
- Contaminants from the infrastructure area (e.g. hydrocarbons, detergents, degreasers);
- Acid mine drainage;

- Increases in salinity of run-off due to possible occurrences of saline soil in the coal measures aquifer;
- Tailings dam leakages; and
- Sewage effluent.

Operations have the potential to impact the downstream water quality within the catchment through the following processes:

- Impacts on flora and fauna;
- Disruption to natural processes and ecosystems in receiving waters;
- Impact downstream water users; and
- Sedimentation of receiving waters and disruption of ecosystems.

Potential Impacts to Existing Groundwater Resources

The potential impacts of the proposed mine on groundwater resources are:

- Affecting other users by lowering water levels in the Precipice, alluvial and Mulgildie Coal Measures aquifers;
- Groundwater aquifer contamination from the tailings and mine water dams; and
- Reduced water availability to Abercorn Springs from reduction in ground water levels.

Aquifer Impacts

The Precipice Sandstone aquifer is likely to provide the most reliable long-term yield of any of the aquifers in the area and is likely to be the only aquifer capable of supplying 700ML/year from a single bore. Test results on the bore, which has been constructed, confirm suitability.

This aquifer currently has a number of local users including Mulgildie town and Monto Minerals (**Figure 25**). Extraction from this aquifer may have some effect on the Mulgildie town supply (i.e. the town bore may see a reduction of flow).

Seepage of groundwater into the mining pit and subsequent dewatering will lower the water level in the Mulgildie Coal Measures. The effect and extent of depressurisation is unknown at present, but given the proximity of the mine to the boundary of the subartesian area, there may be an effect on the potential for downward flow from the alluvial aquifer. At present the pressures in the Mulgildie Coal Measures are reported to be higher than those in the alluvial aquifer (the magnitude of the difference is unknown), and water quality in the Mulgildie Coal Measures is generally poorer than that of the alluvial aquifer. This means that, currently, poorer quality water from the Mulgildie Coal Measures may be naturally discharging in to the alluvial aquifer in some areas, making the alluvial aquifer more saline. There may be some advantage locally in reversing the vertical flow

potential (i.e. lowering the potential for ingress of saline water) but there would be concern if flow of water from the alluvial aquifer to the Mulgildie Coal Measures were induced.

Groundwater Contamination

The main potential source of groundwater contamination is seepage from the Tailings Storage Facility (TSF) and mine water dams. The major contaminant present in the tailings dam would be from pit water (elevated salinity levels) while the mine water dams would potentially contain very low levels of hydrocarbons. It is unlikely that these contaminants would have a significant impact on any of the aquifers.

Abercorn Mound Springs

The Project's main potential impact on the Abercorn Mound Springs is from a reduction in groundwater heights. The springs are dependent on groundwater levels that could be potentially impacted by the Project through the disturbance of local aquifers and the utilisation of groundwater. A monitoring bore has been constructed to monitor potential impacts as per the water licence and current EA conditions. Additionally, monitoring of Abercorn Mound Springs will be undertaken as discussed in **Section 3.2.4.1**.

3.2.3 Environmental Protection Objective - Water

The environmental protection objectives for both surface and groundwater are:

- To maintain the existing chemical, physical and biological integrity of downstream water quality within acceptable parameters, so as to minimise potential impacts to the environmental value of stock watering;
- To minimise impacts on groundwater quality and quantity, so as to protect existing and potential ground water users as well as the condition of the Abercorn Springs;
- To manage raw water usage to minimise potential impacts on the water supply system of the area;
- To manage the sewage treatment system to minimise the potential biological impacts on surface and groundwater quality;
- Maintain surface water quality and protect existing downstream uses of those waters (including maintenance of in-stream biota and the littoral zone); and
- Minimisation of impacts on flooding levels and frequencies both upstream and downstream of the Project.

In achieving the specific environmental protection objectives for water, the objectives of the *Environmental Protection (Water) Policy 2009*, {EPP (Water)} - Part 4, will be taken into consideration.

3.2.4 Commitments (Control Strategies) – Water

The following commitments will ensure that the environmental protection objectives will be achieved:

- Establish a site Water Management Plan;
- Separate runoff from disturbed and undisturbed areas;
- Minimise the contamination of surface and groundwaterwater;
- Contain, treat and reuse surface water on site in preference to discharge;
- Minimise impacts to existing groundwater users and ground water dependent ecosystems;
- Conduct monitoring to identify any impacts; and
- Manage releases to protect downstream environmental values, such as stock watering.

3.2.4.1 On-Site Water Management

On site water will be controlled through the implementation of a site specific Water Management (WM) Plan. The WM Plan will be implemented prior to the commencement of construction of the mine and associated works.

The WM Plan will include the following:

- Identify the environmental values of the receiving waters including Three Moon Creek and water quality objectives and how they will be protected;
- Protection of groundwater resources, minimising the interruption to mining operations, recycle mine water, hierarchical use of water from poorest quality to best quality, consistent with the EPP (Water), and to comply with statutory requirements;
- Details of water management structures, including dams, bunds, pipelines and drains;
- Design rational for structures such as sediment retention ponds;
- Methods for separation of clean and dirty water, including management of water contaminated by hydrocarbons;
- Mine pit dewatering strategies;
- Utilisation of waste mine water for dust suppression;
- Details of flood study and any consequent measures to protect the pit from flood inundation;
- Periodic revision and updating of the water balance model for use as a management tool;
- Procedure for controlled water release in the event of excess water build-up;
- Water release system and release protocols;
- Operational water monitoring requirements;
- Mine site water monitoring requirements;
- Water quality monitoring results review process;
- Water management infrastructure inspection and maintenance regime;
- Emergency response procedure for uncontrolled water release; and
- Position responsibilities for various components of the WM Plan.

The WM Plan will detail regular inspections and monitoring of water management and storage infrastructure to ensure compliance with the site EA.

The management of these components will be covered by the WMP and consist of the following:

- Monitoring of background stream water quantity and quality levels;
- Monitoring water quantity and quality characteristics of Abercorn Springs including the wetted areas of the springs;
- Monitoring of ground water levels at the raw water production bore and monitoring bore within the Hutton Sandstone;
- Monitoring water quantity and quality levels in the water management dams;
- Monitoring water quantity and quality of any discharge waters from the mine;
- Monitoring water quantity and quality and levels of groundwater, raw water production bore and monitoring bores constructed for the Project;
- Management of stored water to maximise use of stored dirty water as the priority;
- Management of sewage effluent treatment;
- Regular maintenance and monitoring of water management structures; and
- Regular review of water management procedures to allow for identification of areas for improvement.

3.2.4.2 Management of Sediment Containment Dams

The release of settled stormwater from Sediment Dams to Three Moon Creek will not exceed the contaminant release limits listed in **Table 22** and will be monitored at the specified frequencies. Background values will be measured on the same day as the release at locations upstream from specified release points.

Table 22: Sediment dam contaminant release limits

Quality Characteristic	Units	Release Limit to be adopted	Monitoring Frequency
Total Dissolved Solids	mg/L	EC of receiving waters not to exceed 1000uS/cm	Daily in the event of a release
Turbidity	NTU	Must not exceed 300 or 10% greater than background value	Daily in the event of a release
pH	unit	6.5 – 9.0 (range)	Daily in the event of a release

3.2.4.3 Management of Hazardous / Regulated Dams

Management activities will include but may not be limited to:

- Suitably qualified person will be contracted to design the dam to an appropriate engineering standard;
- Submit the certified plans to the Administering Authority prior to construction;
- Construction will only commence after a letter from the Administering Authority has been received acknowledging receipt of the certified plans;
- When construction of the dam is complete, certification from a suitably qualified person stating that the dam has been constructed in accordance with construction plans and will be submitted to the Administering Authority;
- Before operation of a dam containing hazardous waste an updated Plan of Operations will be submitted to the Administering Authority;
- The dam will be operated in accordance with the WMP in order to prevent or minimise the potential for environmental harm; and
- Undertake an annual audit/assessment of the dam.

The Management of Regulated Dams will also be undertaken in accordance with the DEH Information Sheet *“Managing dams containing hazardous waste”* and the DEH Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste.

3.2.4.4 Management of Tailings Storage Facility (TSF)

TSF design will be in accordance with the design criteria set out in **Table 23**.

Tailings will be periodically excavated from the TSF and placed in the pit in order to maintain optimum TSF storage capacity.

In the event that the TSF water quality does not comply with the contaminant limits defined in **Table 24**, measures will be implemented to prevent access by all livestock and to minimise access by native fauna.

All water analyses will be undertaken by a NATA registered and accredited laboratory and sampling will follow the DEH *Monitoring and Sampling Manual* 2009 (Version 2).

Table 23: Tailings Storage Design Requirements

Storage Type	Storage Critical Wet Period	Spillway Critical design	Mandatory Reporting Level
Tailings dam	10 year ARI four month wet season	10,000 Year ARI	1:100 year ARI

Table 24: Tailings Dam Contaminant Limits & Monitoring Frequency

Analyte (Total Metals)	Units	Investigation Level	Monitoring Frequency**
Al	mg/L	5	Quarterly
As	mg/L	0.5	Quarterly
Ca	mg/L	1,000	Quarterly
Cd	mg/L	0.01	Quarterly
Cl	mg/L	N/A	Quarterly
Cu	mg/L	0.5	Quarterly
F	mg/L	2	Quarterly
Fe	mg/L	N/A	Quarterly
Hg	mg/L	0.002	Quarterly
K	mg/L	N/A	Quarterly
Mg	mg/L	1000	Quarterly
Mn	mg/L	N/A	Quarterly
Na	mg/L	N/A	Quarterly
Pb	mg/L	0.1	Quarterly
SO ₄	mg/L	1000	Quarterly
Zn	mg/L	20	Quarterly
HCO ₃	mg/L	N/A	Quarterly
CO ₃	mg/L	N/A	Quarterly
Nitrate	mg/L	400	Quarterly
Nitrite	mg/L	30	Quarterly
TDS	mg/L	4000	Monthly
EC	µS/cm	5970	Monthly (field)
PH	unit	6.0 – 8.5 (range)	Monthly (field)

Notes

Investigation levels are ANZECC 2000 guideline levels for livestock use

* Dependant on background water quality – not yet determined

** Initial round of sampling to be taken, then at stated frequency for 12 months then review frequency and analytes with the administering authority.

The storage capacity available in the TSF on 1 November of each year will be capable of capturing the total run-off over the critical wet period of a 10 Year ARI four month wet season. Each sediment dam will be designed with a spillway critical design of 10,000 Year ARI.

3.2.4.5 Mine Water Dam

The design allowance storage available in the mine water dams on the 1st of each year will be capable of capturing the total run-off over the critical wet period of a 10 Year ARI for a four month wet season.

The combined capacity of the site mine water dams will be 772 ML and both fitted with a pump that is capable of delivering a minimum of 100L/sec to an interim storage location. The mine water dams will be designed to have a spillway critical design of 1000 Year ARI and a mandatory reporting level of 10 year ARI (72hr duration).

In order to minimise the likelihood of any release of contaminants through the bed or banks of the dams and to insure the stability of dam construction, the base and walls of the tailings and mine water dams will be constructed to current engineering standards.

3.2.4.6 Disposal of Treated Effluent

Treated sewage effluent will be collected and stored in a holding tank prior to being taken off site by a waste contractor licensed to accept and dispose of the effluent.

The sewage collection and storage system selected will be operated and maintained in accordance with the suppliers guidelines. The sewage collection infrastructure will be serviced and/or maintained by the supplier's contractor or appropriately qualified subcontractor as required to ensure that the infrastructure is operated as designed to ensure no uncontrolled release of effluent occurs.

Ongoing monitoring of the Sewage Treatment Plan (STP) infrastructure will be undertaken to ensure that any visual faults can be quickly identified and appropriate actions can be taken to ensure identified faults are addressed.

3.2.4.7 Management of Dams

Ongoing environmental management measures to be employed throughout the life of the Project. All dams and other water management structures will undergo regular inspections and auditing of the performance of the water management system and water quality. This will ensure that the system operates efficiently and to ensure that the risk of failure of any dam is minimised. Specific monitoring and maintenance requirements will be specified in the WM Plan.

Prior to commencement of final rehabilitation of the Project and prior to relinquishment of the MLs the options for retention of any dams will be discussed with the future landowner. If agreed with

the future landowner, dams may be retained or decommissioned and rehabilitated. A more detailed description of the methods of rehabilitation to be employed is discussed in **Section 3.5**.

3.2.4.8 Surface Water Quality Monitoring Locations and Limits

The Peabody Monto Project Baseline Water Quality Monitoring Program will be maintained by a suitably qualified person with experience in the field of surface water quality monitoring and who can make recommendations on water quality matters. Surface water quality monitoring will be in accordance with the guideline values presented in **Table 25** and at monitoring frequencies presented in **Table 26**.

Table 25: Guideline Values for Surface Water Monitoring Program

Core Parameter	Unit	Guideline Value
Electrical conductivity	uS/cm	125-2,200 ¹
pH	pH unit	6.5-8.0 ¹
Turbidity	NTU	6-50 ¹
Total Dissolved Solids	mg/L	0-4,000 ³
Total Suspended Solids	mg/L	3
Dissolved Oxygen	% saturation	85-110% ¹
Sulphate	mg/L	
CaO3	mg/L	350 ⁵
Total phosphorous	mg/L	50 ¹
Total nitrogen	mg/L	500 ¹
Ammonia	mg/L	20 ¹
Nitrate	mg/L	400 ⁴
Nitrite	mg/L	30 ⁴
NO _x	mg/L	40 ¹
Petroleum Hydrocarbons (C6-C9)	mg/L	ID
Petroleum Hydrocarbons (C10-C36)	mg/L	0.6 ⁷
Aluminium	ug/L	55 ²
Arsenic	ug/L	24 ²
Cadmium	ug/L	0.2 ²
Calcium	mg/L	1,000 ⁴
Chromium	ug/L	1.0 ²
Copper	ug/L	1.4 ²
Fluoride	mg/L	2.0 ⁴
Iron	ug/L	ID

Lead	ug/L	3.4 ²
Mercury	ug/L	0.6 ²
Nickel	ug/L	11 ²
Boron	ug/L	370 ²
Cobalt	ug/L	ID
Molybdenum	ug/L	ID
Selenium	ug/L	11 ²
Silver	ug/L	0.05 ²
Uranium	ug/L	ID
Vanadium	ug/L	ID
Zinc	ug/L	8.0 ²

¹ ANZECC Guideline – Default trigger values for slightly disturbed ecosystems, lowland rivers

² ANZECC Guideline – Trigger value for protection of 95% of species

³ ANZECC Guideline – Tolerance level for no adverse impacts to beef cattle, horses, sheep and pigs

⁴ ANZECC Guideline – Trigger value for livestock drinking water

⁵ ANZECC Guideline – Trigger value for irrigation and general use to limit excess encrustation

Table 26: Surface Water Monitoring Frequencies

Parameters	Frequency of Sampling
Core Parameters	Fortnightly sampling (November – February) Monthly sampling (March – October)
Metals and Metalloids	Monthly Sampling

The monitoring program will provide sufficient frequency and spatial replication to make a statistically valid establishment of background water quality in Three Moon Creek that could potentially be affected by mining activities (See **Figure 18**).

Water monitoring will be completed in accordance with the DEH *Monitoring and Sampling Manual* 2009 (Version 2) with consideration to the relevant methodology and water quality criteria specified in the *Australian Guidelines for Water Quality Monitoring and Reporting 2000* and *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000*.

Monitoring outcomes will be summarised and reported within the PoOps as the monitoring program drives relevant changes to strategies.

3.2.4.9 Protection of Watercourses

Current best practice for erosion and sediment control measures will be taken in accordance with the Engineers Australia (formerly Institute of Engineers Australia) *Soil, Erosion and Sediment Control Guidelines* to minimise the potential for sedimentation of receiving waters during the

construction phase. Measures to minimise sediment laden or contaminated runoff discharging to Three Moon Creek will be detailed in the WM Plan.

3.2.4.10 Contamination of Surface Water and Groundwater

Adequate control measures will be undertaken to ensure that contamination of surface and ground water is minimised. Control strategies include, but not limited to:

- Design operational water management systems such that there are no uncontrolled off-site discharges;
- Design landforms and water management systems to separate clean water from undisturbed areas and water from disturbed areas;
- Direct rainfall run-off from all disturbed areas and the pit to sediment dams for settlement of suspended solids, and use for haul road watering;
- Fuel and hazardous chemical storage areas will be bunded;
- Develop and implement a system for emergency spills or discharges;
- Recycle water from the TSF for use in the coal preparation plant and for haul road dust suppression;
- Control and recycling strategies will be part of the WM Plan and will be managed through the PoOps;
- The establishment of an oil–water separator and recycling initiatives at the infrastructure area;
- Lining of dams with clay to prevent seepage into groundwater;
- Pumping any saline water seepage from the Mulgildie Coal Measures to the tailings dam for recycling purposes; and
- Sewage effluent will be collected and removed by a licensed contractor and disposed of at a licensed treatment station.

Chemical and fuel storage areas will be constructed and maintained in accordance with the relevant Australian Standards and current best practice measures. The environmental impact of the accidental release of chemical and hydrocarbon are considered to be minimal as all the required spill response equipment will be available.

The spill prevention and containment system will consist of bunds constructed around the bulk fuel, oil storage tanks and waste oil tanks as per *AS1940: The Storage and Handling of Flammable and Combustible Liquids*. Staff will be trained in the correct procedures for the prevention, management and clean-up of chemical and fuel spills. Spill management kits will be retained in the workshop and on service vehicles. Any sites that become contaminated will be investigated and managed in accordance with the requirements of the contaminated land provisions of the EP Act.

3.2.4.11 Groundwater Resource

A groundwater monitoring program will be included as part of the water management plan and will ensure the Project does not:

- Directly or indirectly cause environmental harm to the Abercorn Mound Springs;
- Cause the drawdown of groundwater levels in the alluvial aquifers associated with the Three Moon Creek system;
- Impact groundwater beyond EA trigger levels; and
- Draw down groundwater in the Mulgildie Coal Measures to a level that impacts other users of the groundwater.

If groundwater monitoring demonstrates that proposed mining activities have an unacceptable impact on groundwater, the Proponent proposes measures to mitigate potential impacts to groundwater users, these may include:

- Modify activities impacting groundwater levels;
- Subsidising pumping costs of affected users;
- Provision of alternative water sources;
- Installation of additional and replacement bore holes; and
- Deepening of bore holes and provision of suitable abstraction equipment as required.

3.2.4.12 Groundwater monitoring

The groundwater monitoring program will be designed and implemented by a suitably qualified and experienced person. The program will include a sufficient number of compliance bores surrounding the Project to provide the following:

- Representative groundwater samples from the upper most aquifer;
- Establish background groundwater quality from bores not impacted by mining activities; and
- Determine the quality of groundwater down gradient of any potential source of contamination.

Compliance bores located within the Project area will be monitored to record groundwater in both the alluvial aquifer and Mulgildie Coal Measures. Monitoring will include:

- Collection of water quality characteristics in accordance with **Table 27**;
- Sufficient number of sampling events to develop baseline groundwater quality, level (Standing Water Level (SWL)) and flow (where applicable) prior to the development of the Project for characteristics presented in **Table 27**; and
- Collection of water quality data with sufficient regularity, spatial and temporal replication to provide statistically valid determinations on ground water contamination, levels (SWL) and flow.

Table 27: Groundwater contaminant limits and levels

Quality Characteristic	Units	Contaminant limits and groundwater level	Monitoring Frequency
Al	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
As	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Ca	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Cd	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Cl	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Cu	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
F	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Fe	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Hg	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
K	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Mg	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Mn	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Na	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Pb	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
SO ₄	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Zn	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
HCO ₃	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
CO ₃	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Nitrate	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
Nitrite	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
TDS	(mg/L)	Baseline Value $\pm$ 20%	Quarterly
EC	μ S/cm	Baseline Value $\pm$ 20%	Monthly
PH	unit	Baseline Value $\pm$ 0.5	Monthly
Standing water level	mAHD	N/A	Monthly

The Administering Authority will be notified within 14 days in the event that:

- Groundwater draw down exceeds 2m per year in any bore used for compliance located at least 750m from the edge of the mine pit;
- Groundwater level fluctuations within compliance bores caused by the seepage from the TSF or mine water dams in compliance bores; and
- Water quality recorded in compliance bores exceed contaminant levels presented in **Table 27** above.

Raw Water Production Bore

The raw water production bore will be regularly monitored for pump rates and water quality during construction and operational phases of the project.

3.2.4.13 Abercorn Mound Springs Monitoring

The Abercorn Mound Springs monitoring program will ensure that mining activities including the utilisation of ground water does not impact on the condition or the extent of Abercorn Mound Springs. The Abercorn Mound Springs monitoring program will include:

- The volume of water extracted from the Precipice Sandstone by the Proponent (the raw water production bore, which is located 17km north east of the project;
- The potentiometric level of the Hutton Sandstone monitoring bore and the production bore;
- Collection of water quality data from a licensed ground water bore and from Abercorn Mound Springs in accordance with in **Table 28** at the locations presented in **Table 29**; and
- Monitor monthly the distance from determined reference points to both the edge of the wet ground and the distance to wetland reeds.

Table 28: Monitoring parameters

Quality Characteristic	Unit
Conductivity	µS/cm
TDS	mg/L
pH	pH units
Dissolved Oxygen (at spring only)	% saturation
Carbonic Acid CO ₂	mg/L
Na	mg/L
K	mg/L
Ca	mg/L
Mg	mg/L
HCO ₃	mg/L
OH	mg/L
Cl	mg/L
F	mg/L
Total P	mg/L
Total N	mg/L
NO ₃	mg/L
SO ₄	mg/L

Table 29: Abercorn Mound Springs Reference Points

Latitude degree	Latitude minute	Latitude second	Longitude degree	Longitude minute	Longitude second	Bearing
25	6	59.1	151	7	59.3	300
25	6	58.7	151	8	3.8	340
25	6	52.8	151	8	2.4	200
25	6	56.3	151	7	56.6	40

In the event the wetted area of Abercorn Mound Springs is reduced by 50% or more below the lowest minimum area measured during the first year of monitoring, the Proponent will implement an investigation into the cause and impact to the springs. The Proponent will also inform the Administering Authority within thirty (30) days.

The Administering Authority will be notified immediately if any of the following occurs:

- Conductivity of the springs is outside the range of 625-2,500µS/cm;
- The occurrence of an algal bloom;
- The death of birds, fish, or other aquatic fauna inhabiting the springs; and
- A significant change in vegetation in or at the springs.

3.2.5 Current EA Conditions – Water

No changes to the Conditions relating to the Department Interests ‘Water’ (Schedule C) in the current EA are proposed.

Schedule C - Water	
(C1-1)	<i>Contaminants must not be released from the boundary of the mining lease to any waters or the bed and banks of any waters other than treated/settled contaminated stormwater from sediment dam(s) that is in accordance with the contaminant release limits in Schedule C - Table 1.</i>
(C1-2)	<i>Monitoring of contaminant releases must be undertaken at the overflow from the sediment dam(s) and records kept, for the quality characteristics and at the frequency specified in Schedule C – Table 1.</i>
(C1-3)	<i>For the purpose of condition (C1-2) a “background value” for a quality characteristic is the value of the quality characteristic <u>measured on the same day</u> at a background sampling and insitu monitoring point in the receiving waters not affected by the release situated between 20 and 100 metres up-current from the release point into Three Moon Creek.</i> <i>NOTE: In the event that a background value is not measured, the quality of the release must be less than 50 NTU turbidity and 500mg/L total dissolved solids.</i>
(C1-4)	<i>A Water Management Plan must be developed and implemented prior to the</i>

	<i>commencement of construction of the mine and any associated work on the mining lease.</i> <i>NOTE: The Water Management Plan is to be managed through the Plan of Operations.</i>
(C1-5)	<i>The Water Management Plan must identify methods to:</i> ▪ <i>identify the environmental values of the receiving waters including Three Moon Creek and water quality objectives and how they will be protected;</i> ▪ <i>incorporate a risk management approach to how changing levels of flood, drought and water quality risks should be addressed;</i> ▪ <i>manage recycling;</i> ▪ <i>manage storm water discharge;</i> ▪ <i>develop and implement a system for emergency spills or discharges;</i> ▪ <i>separate clean water from undisturbed areas and water from disturbed areas;</i> ▪ <i>manage site water quality and quantity during the three (3) phases of mining: development, operation and decommission and include a site water balance;</i> ▪ <i>safeguard against the potential for soil erosion and acid drainage;</i> ▪ <i>provide details of operational monitoring and monitoring of hydrological processes including associated performance indicators.</i>
General	
(C4-1)	<i>All determinations of the quality of contaminants released must be in accordance with methods prescribed in the latest edition of the Environmental Protection Agency Water Quality Sampling Manual, and carried out on samples that are representative.</i>
Tailings and Environmental Dams	
(C5-1)	<i>The design storage allowance available on 1st November of each year for any tailings dam constructed within the operational land must be equivalent to the total run-off assuming no losses from the catchment of the dam and any contributions from other sources from the critical wet period in Schedule C – Table 3.</i>
(C5-2)	<i>The spillway for any tailings dam constructed within the operational land must be designed to withstand the peak flow from the critical design storm in Schedule C – Table 3.</i>
(C1-6)	<i>The holder of the environmental authority must maximise the recycling or reuse of impounded waters on the licensed place.</i>

Three Moon Creek Surface Water Monitoring Program

(C2-1)	<i>Commencing from the date of issue of the environmental authority the holder of this environmental authority must develop and implement a Surface Water Monitoring Program. The Surface Water Monitoring Program must:</i> <i>i) be carried out by a person possessing appropriate qualifications and experience in the field of surface water monitoring program design to be able to competently make recommendations about these matters;</i> <i>ii) record the quality of the surface water at monitoring locations upstream and downstream of the mining activity and be undertaken for, but not limited to, the following water quality characteristics:</i> <i>- oils and petroleum hydrocarbons (mg/L);</i> <i>- total metals (mg/L);</i> <i>- total dissolved solids (mg/L);</i> <i>- total suspended solids (mg/L);</i> <i>- dissolved oxygen (mg/L);</i> <i>- turbidity (NTU); and</i> <i>- pH.</i> <i>iii) Include a sufficient number of monitoring locations to establish background water quality and water quality in sections of Three Moon Creek potentially affected by mining activities; and (COMPLETED – EM Plan Figure 17)</i> <i>iv) Provide representative water sampling from Three Moon Creek carried out with sufficient regularity and spatial and temporal replication to make statistically valid conclusions about the water quality; and</i> <i>v) Give consideration to relevant methodology and water quality criteria specified by the Australian and New Zealand Environment and Conservation Council and Agriculture and Resources Management Council of Australia and New Zealand in “Australian Guidelines for Water Quality Monitoring and Reporting 2000” and “Australian and New Zealand Guidelines for Fresh and marine Water Quality 2000”.</i>
(C2-2)	<i>A record of the results of the surface water monitoring program including background water quality monitoring must be kept and forwarded to the administering authority on</i>

	<i>request.</i>
Tailings Dam Water Quality	
(C3-1)	<i>In the event that tailings dam water quality does not comply with the limits defined in Schedule C – Table 2, implement measures to prevent access by all livestock and minimise access by native fauna.</i>
(C5-3)	<i>The capacity of the environmental dam must be 18 mega litres and fitted with a pump capable of delivering 17 litres per second to another interim storage (e.g. Mine pit).</i>
(C5-4)	<i>The environmental dam must have a spillway critical design storm of 1000 Year ARI and a mandatory reporting level of 1:10 year ARI.</i>
(C5-5)	<i>The holder of this environmental authority must notify the administering authority when the pondage level of any tailings dam or environmental dam reaches the mandatory reporting level defined in Schedule C Table 3.</i>
(C5-6)	<i>The mandatory reporting required by condition (C5-5) must also include analysis results (as they become available) of the dam water quality for at least but not limited to the following water quality characteristics:</i> <i>i) Oils and petroleum hydrocarbons (mg/L);</i> <i>i) total metals (mg/L);</i> <i>ii) total dissolved solids (mg/L);</i> <i>iii) turbidity (NTU); and</i> <i>iv) pH</i>
(C5-7)	<i>The base and walls of the tailings dam and environmental dams must be constructed, installed and maintained:</i> <i>i) so as to minimise the likelihood of any release of effluent through the bed or banks of the dam to any waters (including groundwater);</i> <i>ii) so as to insure the stability of the dams' construction.</i>
(C5-8)	<i>Construction of sediment dams other than any dams in the final rehabilitated landform must not occur on out-of-pit spoil dumps.</i>
Erosion and Sediment Control	
(C6-1)	<i>All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment to the environmental dam.</i>
(C6-2)	<i>Erosion protection measures and sediment controls must be provided and maintained to effectively minimise any likelihood of erosion and release of sediment from the licensed</i>

	<i>place and be maintained during site clearing, construction, mining operations and rehabilitation. Such measure should include diversion drainage works and sedimentation traps and dams.</i>
(C6-4)	<i>In the event that a release from any dam spillway is necessary the release must be managed in such a manner that prevents or minimises erosion of any watercourse or area affected or potentially affected by the release.</i>
Groundwater	
(C7-1)	<i>The extraction of groundwater for use in the mining activity from underground aquifers must not directly or indirectly cause environmental harm to the Abercorn Mound Springs.</i>
	<i>Mining activities carried out on the licenced place must not cause any draw down of groundwater levels in the alluvial aquifers associated with the Three Moon Creek system.</i>
	<i>Contaminants must not be directly or indirectly released to the alluvial aquifers.</i>
	<i>Any draw down of groundwater in the Mulgildie Coal Measures must not impact on other users of groundwater.</i>
Groundwater Monitoring	
(C8-1)	<i>A groundwater monitoring network must be installed for the mine site. The network must:</i> <i>i) be installed and maintained by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater monitoring program design to be able to competently make recommendations about these matters; and</i> <i>ii) be constructed in accordance with methods prescribed in the latest edition of the Agriculture and Resource Management Council of Australia and New Zealand manual titled 'Minimum Construction Requirements For Water Bores In Australia';</i> <i>iii) include a sufficient number of "bore(s) of compliance" that are located an appropriate distance from potential sources of impact from mining activities and provides the following:</i> <i>- representative groundwater samples from the uppermost aquifer; and</i> <i>- background groundwater quality in hydraulically up-gradient or background bore(s) that have not been affected by any mining activities to groundwater; and</i> <i>- the quality of groundwater down gradient of any potential source of contamination including groundwater passing the relevant bore(s) of compliance.</i>

(C8-2)	<i>Conduct monitoring and keep records of groundwater quality for the relevant bores of compliance for both the alluvial aquifer and Mulgildie Coal Measures. All determinations of groundwater quality must be:</i> <i>i) conducted for the water quality characteristics and at the minimum frequency stated in Schedule C - Table 4;</i> <i>ii) taken from sufficient monitoring points and/or wells to obtain representative samples of groundwater both up-gradient and down-gradient of the potential influence;</i> <i>iii) carried out with sufficient regularity and spatial and temporal replication to make statistically valid conclusions about the presence or absence of contamination or other impact;</i> <i>iv) carried out with sufficient number of sampling events to determine ambient groundwater quality, level and flow prior to any development of the site occurring;</i> <i>v) followed by an assessment of whether or not there has been any statistically significant adverse change compared to background values at locations hydraulically down gradient of the potential sources of contamination for each quality characteristic in Schedule C - Table 4.</i>
(C8-3)	<i>On any occasion that samples are obtained in accordance with condition (C7-2) the holder of this environmental authority must measure and record standing groundwater levels in metres accurate to 0.01 metres. The elevation of the reference point, relative to Australian Height Datum, for use in any groundwater level measurement must be determined to an accuracy of 0.01 metres.</i>
(C8-4)	<i>Groundwater draw down fluctuations in excess of 2 metres per year in any 'bores of compliance' located at least 750 metres from the edge of the mine pit, not resulting from the pumping of licensed bores, must be notified within 14 days to the administering authority following completion of monitoring.</i>
(C8-5)	<i>Groundwater level fluctuations as measured in 'bores of compliance' that are caused by seepage from tailings dam or process water dam must be notified within 14 days to the administering authority following completion of monitoring.</i>
(C8-6)	<i>Groundwater quality in the Mulgildie Coal Measures aquifer must not exceed the contaminant limits specified in Schedule C – Table 4.</i>
(C8-7)	<i>The baseline value for condition (C8-6) is to be determined by sampling on at least four occasions one month apart from reference bores determined by the Plan of Operations prior to the commencement of mining activity.</i>

(C8-8)	<i>A record of the results of baseline monitoring must be kept and forwarded to the administering authority on request.</i>
Monitoring Requirements for the Abercorn Mound Springs	
(C9-1)	<i>The holder of the environmental authority must monitor and record not less frequently than monthly the following:</i> <i>i) the volume of water extracted from the Precipice Sandstone bore; and</i> <i>ii) the potentiometric level.</i>
(C9-2)	<i>The holder of the environmental authority must monitor and record the quality of the licensed bore water and Abercorn Mound Springs at least monthly for the water quality characteristics in Schedule C – Table 5.</i>
(C9-3)	<i>The Abercorn Spring samples must be a composite sample of three (3) samples collected from the middle of the water column along the main pond axis.</i>
(C9-4)	<i>For the purposes of determining any changes to the size of the Abercorn Mound Springs the holder of this environmental authority must monitor at least monthly the distance from reference points specified in Schedule C – Table 6 to:</i> <i>i) the edge of the wet ground; and</i> <i>ii) the distance to wetland reeds.</i>
(C9-5)	<i>Within six (6) months of the date of issue of this environmental authority the holder must carry out a baseline study of the ecology of the Abercorn Mound Springs with reference to the Environment Australia publication Environmental Water Requirements to Maintain Groundwater Dependent Ecosystems and report the results to the administering authority.</i> (Completed: Wormington, K. 2009, <i>Flora, fauna and freshwater aquatic study of the Abercorn Mound Springs near Monto, North Burnett</i>, unpublished report, Centre for Environmental Management, Central Queensland University, Rockhampton)
(C9-6)	<i>In the event that the wetted area of the Abercorn Mound Springs is 50% or more below the minimum area measured during the first year of monitoring, the holder of this environmental authority shall investigate and report to the administering authority within thirty (30) days on the possible causes of such impact. The investigation report must include an assessment of any impact on the ecology of the Springs.</i>
(C9-7)	<i>In addition to the reporting requirements required by condition (C8-6) the administering authority must be notified immediately in the event of the following:</i> <i>i) the conductivity of spring water falls outside the range of 625 to 2 500 μS/cm; or</i> <i>ii) the occurrence of an algal bloom; or</i>

	<i>iii) the death of birds, fish or other aquatic fauna inhabiting the spring; or</i> <i>iv) a significant change to vegetation dependent on the springs.</i>
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3.3 Noise and Vibration

3.3.1 Environmental Value – Noise and Vibration

3.3.1.1 Noise

The key environmental values for noise and vibration are outlined in the Environmental Protection (Noise) Policy 2008 (EPP (Noise)). The environmental values to be enhanced or protected under this policy are:

- a) the qualities of the acoustic environment that are conducive to protecting the health and biodiversity of ecosystems; and
- b) the qualities of the acoustic environment that are conducive to human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following:
 - i. sleep;
 - ii. study or learn; and
 - iii. be involved in recreation, including relaxation and conversation; and
- c) the qualities of the acoustic environment that are conducive to protecting the amenity of the community.

Therefore the operation of noise emitting machinery and activities associated with the Project should not materially impact on any noise sensitive receiver within the context of the social or economic amenity and the wellbeing of individuals including sleep, learning, relaxation and conversation.

The area is predominantly rural, with principal noise sources being traffic on the nearby highway, rail traffic and intermittent farm equipment noise.

3.3.1.2 Vibration

The EP Act, regulations, policies and local government laws combine to protect the quality of Queensland's environment. Specifically, section 440ZB of the Act states that:

A person must not conduct blasting if:

- a) The airblast overpressure is more than 115dB Z Peak for 4 out of any 5 consecutive blasts.
- b) The airblast overpressure is more than 120dB Z Peak for any blast.
- c) The ground vibration is:

- i. For vibrations of more than 35Hz – more than 25mm a second ground vibration, peak particle velocity.
- ii. For vibrations of no more than 35Hz – more than 10mm a second ground vibration, peak particle velocity.

3.3.2 Potential Impacts on the Environmental Value – Noise and Vibration

3.3.2.1 Noise

Potential sources of noise impacts from the proposed mining operations are:

- Construction noise (during initial stage);
- Blasting operations;
- Operation noise (coal haulers, dump trucks, loaders and CHPP); and
- Rail transport.

A noise assessment was completed by VIPAC in December 2011. SoundPLAN noise modelling software was used to predict the noise impact of the Project. SoundPLAN is a three-dimensional graphics oriented program that hosts a digitiser interface and can be used to import bitmaps to digitize the mine plan.

The noise modelling indicates that there is non-compliance with EA noise level criteria for a number of sensitive receptors surrounding the Project (**Figure 28**).

Predicted noise levels with and without the noise mitigation are presented in **Table 30**. Exceedances of the EA noise limits (Schedule D Table 3 and Table 4) are highlighted red. With the noise mitigation measures in place, 11 sensitive receptors are predicted to exceed the applicable noise limits, five of these properties are currently owned by the Proponent.

Table 30: Acoustic quality objectives

Receptor	Predicted noise without noise controls	Predicted noise with noise controls	Receptor	Predicted noise without noise controls	Predicted noise with noise controls	Receptor	Predicted noise without noise controls	Predicted noise with noise controls
AC1	59	49	R7	32	26	R17	33	26
AC2*	59	51	R8	31	22	R18	36	28
AC3*	58	54	R9*	53	47	R20	31	26
R1	34	25	R10	39	35	R21	32	26
R2	50	45	R11	35	29	R25	32	27
R3	34	26	R13	44	38	R26	34	29
R4	51	45	R14	35	30	R27	36	30
R5*	54	46	R15	43	37	R28	31	26
R6	34	29	R16*	53	49	R30	34	29

**On property owned by the Proponent*

Enclosing the CHPP, primary and secondary crushers and train load out is expected to achieve at least a 10 dB (A) reduction and these will be considered during the design of the facilities. During the design phase of the CHPP, selection of low noise equipment may also result in lower total noise less than that predicted above.

3.3.2.2 Vibration and Airblast

Potential sources of vibration and airblast impacts will be primarily from the blasting of consolidated strata overlying the coal seams and from the use of rail transportation.

Blast designs consistent with industry practice will be developed for the range of operating conditions and the operational requirements of the mine. Blasting of coal seams is not envisaged.

The potential impacts include:

- fly-rock;
- ground vibration; and
- airblast overpressure.

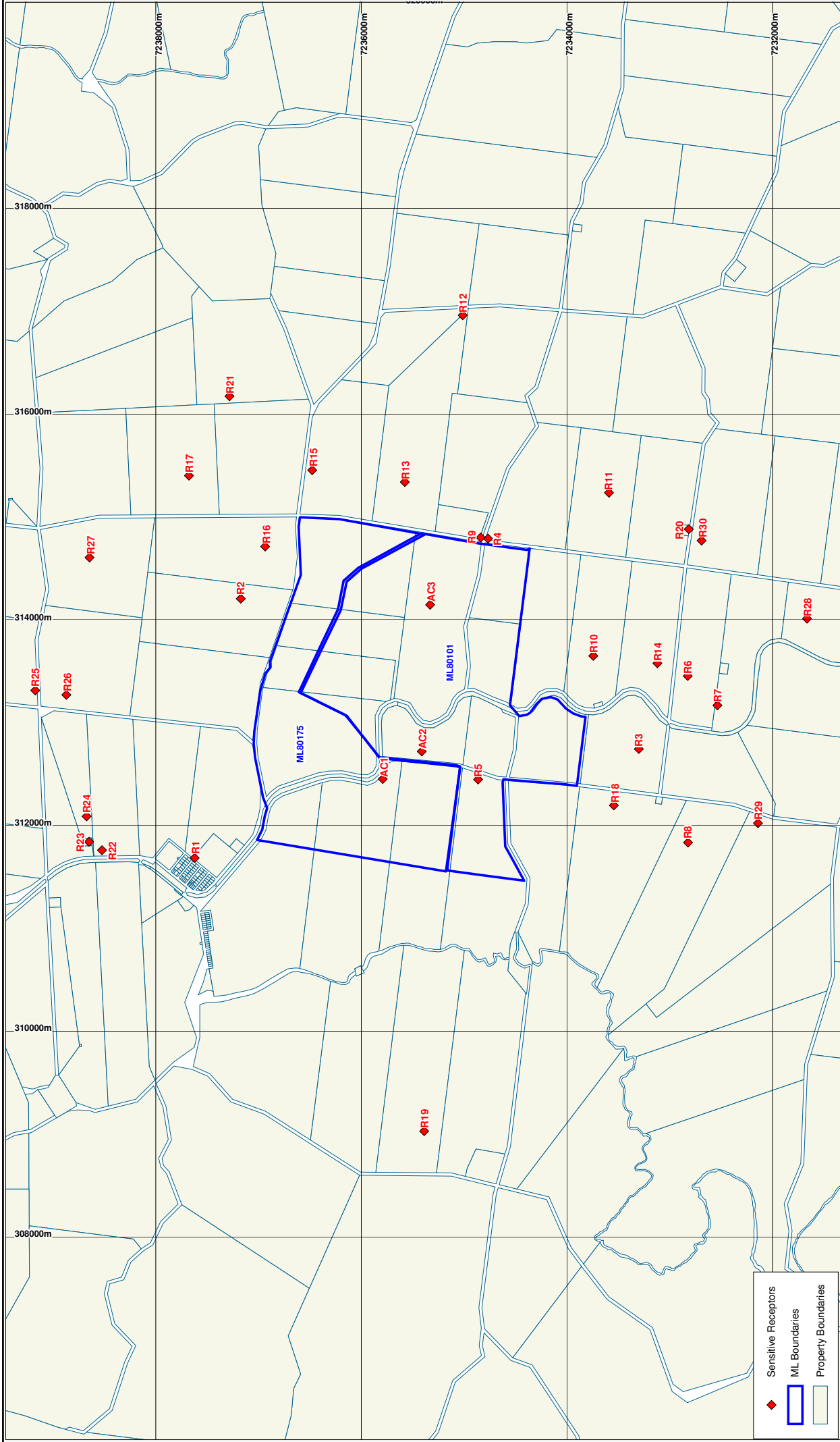
The Proponent plans to adopt a minimum 1,000m exclusion zone for personnel around each blast. Exclusion zones of this size can be established without affecting property outside the mine and so there should be no fly-rock impact from the proposed blasting operations.

The environmental conditions for the Project require that 4 of 5 consecutive blasts comply with ground vibration of 5mm/s and airblast overpressure of 115 dB. The statistical nature of this requirement can be considered equivalent to 90 to 95% of all blasts complying with limits of 5mm/s and 115dB.

Using current blasting practices, no sensitive sites in the vicinity of the Project will be exposed to ground vibrations levels greater than 5mm/s or airblast overpressure levels greater than 115dB (linear).

3.3.3 Environmental Protection Objective – Noise and Vibration

The EPP (Noise) 2008 provides the intent that the acoustic quality objectives be progressively achieved as part of achieving the purpose of the policy over the long term. **Table 31** lists the acoustic quality objectives of the EPP (Noise).



McCollum Environmental Management Services

Figure 28 Monto Coal Pty Ltd Noise & Vibration Sensitive Receptors



Author: McCollum Environmental - MEMS 19
 Date: 05 January 2012
 Projection: MGA84, Zone 56, GDA94
 Scale: 1:35,000 (A3)
 Plan: M.GIS/Plans/2011/Monto/EN Plan Figures/2011/Monto Project Noise Sensitive Receptors



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Table 31: Acoustic quality objectives

Sensitive receptor	Location	Time of day	Acoustic quality objectives (measured at the receptor) dB(A)
			$L_{Aeq,adj,1hr}$
Dwelling	Outdoors	Daytime and evening	50
Dwelling	Indoors	Daytime and evening	35
		Night-time	30
Library and educational institution (including a school, college and university)	Indoors	When open for business or when classes are being offered	35
Childcare centre or kindergarten	Indoors	When open for business, other than when the children usually sleep	35
Childcare centre or kindergarten	Indoors	When the children usually sleep	30
School or playground	Outdoors	When the children usually play outside	55
Hospital, surgery or other medical institution	Indoors	Visiting hours	35
Hospital, surgery or other medical institution	Indoors	Anytime, other than visiting hours	30
Commercial and retail activity	Indoors	When the activity is open for business	45
Protected area, or an area identified under a conservation plan under the <i>Nature and Conservation Act 1992</i> as a critical habitat or an area of major interest		Anytime	The level of noise that preserves the amenity of the existing area or place
Marine park under the <i>Marine Parks Act 2004</i>		Anytime	The level of noise that preserves the amenity of the existing marine park
Park or garden that is open to the public (whether or not on payment of an amount) for use other than for sport or organised entertainment		Anytime	The level of noise that preserves the amenity of the existing park or garden

The EPP (Noise) also states that the management intent of the Project must also address potential increases in background noise levels as a result of the Project. Section 10 Part (2) of the Policy states the following:

- (2) *To the extent that it is reasonable to do so, noise from an activity must not be —*
- (a) *For noise that is continuous noise measured by $L_{A90,T}$ — more than nil dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$; or*
- (b) *For noise that varies over time measured by $L_{Aeq,adj,T}$ — more than 5 dB(A) greater than the existing acoustic environment measured by $L_{A90,T}$.*

The primary environmental protection objectives for noise and vibration are to:

- ensure that there is no unreasonable intrusive noise or vibration attributable to the mining operation at the nearest noise sensitive receptors; and
- control noise and vibration sources at the mine to enable achievement of the statutory environmental protection objectives.

3.3.4 Commitments (Control Strategies) – Noise and Vibration

3.3.4.1 Commitments for the control of noise impacts

The Proponent will adopt the current 2002 ML80101 EA noise limit values presented in **Section 3.3.5 (Schedule D, Table 3)**. These limits will ensure noise impacts from the mine do not cause a nuisance to neighbouring residents of the mine.

There will be early consultation with occupiers where predictive modelling indicates potential impacts that exceed compliance limits.

Monitoring will be conducted at sensitive receiver locations of non-proponent owned properties identified by modelling as being potentially impacted during construction and the initial phases of operation. Monitoring will include noise and meteorological conditions. Monitoring will be conducted in accordance with the appropriate Australian Standards and the current version of the DEH Noise Measurement Manual. Monitoring results will be assessed against modelling predictions and, if required, appropriate noise mitigation measures will be determined.

Depending on monitoring results, additional mitigation measures may consider:

- Enclosure of plant;
- Treatment at the sensitive receiver;
- Relocation of residence; and
- Purchase of properties.

The proponent will consult with the occupier of each property where predictive modelling indicates the potential for exceeding the compliance limits to discuss and agree upon suitable mitigation measures at that property.

The Proponent will establish a noise management plan which will include, where feasible, the implementation of mitigation measures when conditions become adverse. The plan will document standard best practice mitigation procedures such as:

- Restricting blasting to daylight hours;
- Temporarily ceasing operations in areas generating elevated noise levels;
- Moving operations to an alternative area on-site;
- Reducing activity rates;
- Restricting vehicle speed;
- Maintaining all equipment to a high standard;
- Fitting mobile equipment with appropriate silencing equipment where required (i.e. mufflers);
- Enclosing plant;
- Investigating and responding to all non-vexatious noise complaints expeditiously; and
- Implementing noise awareness training for all staff.

3.3.4.2 Commitments for the control of vibration impacts

The Proponent will adopt the current EA vibration level values presented in **Section 3.3.5**. These limits will ensure noise impacts from the mine do not cause a nuisance and minimise any health impacts to neighbouring residents of the mine.

- Blast design will ensure that the relevant vibration criteria are complied with at the surrounding sensitive receivers;
- Vibration standards have been selected based on the EPP (Noise) criteria and will form the basis for response monitoring assessment. These standards are:
 - a) Blasting operations at the project will be conducted in accordance with *AS 2187.2 Explosives - Use of Explosives*; and
 - b) Blast design will ensure that ground vibration does not exceed the statutory limits defined in the EP Act at any noise sensitive receptor;
- Blasting will only be permitted during the hours of 9am and 5pm, Monday to Friday or 9.00am to 1.00pm on Saturday;
- Investigate all non-vexatious noise complaints expeditiously and respond to the complainant;
- All complaints will be recorded into the site Complaints Register;
- Initially, vibration complaints will be investigated through a review of blast records to determine if the complaint is in relation to a blast from the site. If it is determined that the

complaint correlates to a blast event at the site then a suitability qualified person will be engaged to undertake further monitoring and to make recommendations. Monitoring of airblast overpressure and ground vibration will be undertaken at the complainant's residence in accordance with the recommendations stated in the Queensland Environmental Protection Agency Guideline – *Noise and Vibration from Blasting*; and

- Appropriate warnings will be given prior to blasting in accordance with legislative controls.

3.3.4.3 Monitoring – Noise and Vibration

Reactive Noise Monitoring

Complaints in relation to noise nuisance beyond the boundary of the mine will be managed using the Complaint Management and Investigation System. The system will identify legitimate complaints and detail further actions to be undertaken, including a response monitoring program.

In the event of a noise complaint during construction and operation phases, noise monitoring will be conducted as follows:

- noise monitoring will be conducted in accordance with the requirements of the most current version of the DEH Noise Measurement manual and within equipment manufacturers specifications;
- in determining the mine's noise compliance, monitoring of noise levels will be conducted at the location or near vicinity of complaint;
- to aid with determination of compliance, simultaneous noise monitoring will also be conducted at an intermediate location between the mine and the complainant;
- a record of mining activities will be taken during the noise monitoring period. This information will include details of the plant machinery used onsite and which areas the various plant were located;
- a minimum noise monitoring period of seven days. In the event that poor weather occurs during the noise monitoring period, extended noise monitoring will be necessary;
- weather data will be collected during the monitoring period including wind speed, direction, rainfall and temperature;
- the noise monitoring will include as a minimum the following acoustic descriptors, L_{Amax} , L_{A01} , L_{A10} , L_{Aeq} , L_{A90} , L_{Amin} ; and
- noise monitoring instrumentation capable of 1:3 octave analysis would aid in determination of appropriate tonality penalties.

In the event that monitoring indicates that noise levels exceed the relevant criteria, noise mitigation measures will be reviewed and updated as necessary. Noise monitoring will be conducted again following implementation of mitigation measures to ensure that compliance with the relevant noise criteria has been achieved.

Vibration

The Proponent will routinely monitor the environmental performance of their blasting operations. The locations and techniques selected for routine monitoring will comply with the requirements of AS2187.2 and include:

- a fixed monitoring location at the Mulgildie township;
- a fixed monitoring location at the mine office in the Mine Infrastructure Area or other major facility; and
- relocatable monitors placed as required by specific blasting situations.

The mine's Blast Management Plan will ensure that mine electrical equipment is isolated and checked following near-by blasts and that powerlines, rail facilities and structures are inspected for fly-rock damage following near-by blasts in keeping with normal industry practice.

3.3.5 Current EA Conditions – Noise and Vibration

No changes to the Conditions relating to the Department Interest 'Noise and Vibration' in the current EA are proposed.

Schedule D – Noise and vibration	
Noise nuisance – general	
(D1-2)	<i>The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.</i>
Noise nuisance – mining operations (other than blasting and construction)	
D2-1	<i>Notwithstanding any other condition of this environmental authority noise from the mining activity must not cause an environmental nuisance, at any sensitive place.</i>
(D2-2)	<i>When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.</i>
(D2-3)	Noise Monitoring must include: i) <i>background noise level</i> ii) <i>L_{Amax}, adj, 15 mins</i> iii) <i>L_A 10, adj, 10 mins</i> iv) <i>L_A 1, adj, 10 mins</i> v) <i>the level and frequency of occurrence of impulsive or tonal noise;</i>

	vi) <i>atmospheric conditions including wind speed and direction;</i> vii) <i>effects due to extraneous factors such as traffic noise; and</i> viii) <i>location, date and time of recording.</i>
(D2-4)	<i>In the event of a complaint about noise environmental nuisance that the administering authority considers is not frivolous or vexatious then a noise management plan is to be developed within (1) month of the environmental authority holder being advised in writing of the complaint. The noise management plan must address at least, but not limited to, the following matters:</i> <i>i) identification of component noise sources and activities at the place(s) which impact on noise sensitive areas;</i> <i>ii) the measured and/or predicted level of these noise sources and activities at noise sensitive places;</i> <i>iii) the reasonable and practicable control or abatement measures that can be undertaken to reduce identified intrusive noise sources;</i> <i>iv) the level of noise at noise sensitive places that would be achieved from implementing these measures;</i> <i>v) the handling of future noise complaints</i> <i>vi) community liaison and consultation; and</i> <i>vii) training of staff in noise management practices.</i>
(D2-5)	<i>Upon the completion of the noise management plan it must be submitted to the administering authority within 14 days for its review and comment.</i>
(D2-6)	<i>After the Administering Authority has provided comment on the noise management plan, the holder of this authority must implement the plan as soon as practicable.</i>
(D2-7)	<i>The environmentally relevant activity (ies) must be carried out by such reasonable and practicable means necessary to prevent the emission of noise that constitutes an unreasonable intrusive noise. The reasonable and practicable measures adopted for the licensed place must be incorporated into the relevant procedure(s) implemented under the Plan of Operations and may include but not necessarily be limited to the following noise abatement measures:</i> <i>i) ensure that any new equipment to be used on the site is assessed for potential noise nuisance impacts and appropriately attenuated;</i>

	ii) ensure that all plant and equipment is operated and maintained in a proper and efficient manner; iii) ensure that engine cowlings and high efficiency silencers are fitted to all the engines of all plant and equipment identified as impacting on noise sensitive receivers; iv) ensure that noise generating activities are not undertaken in close proximity to noise sensitive places or commercial places; v) ensure that noise abatement barriers are sited such that they effectively intercept the sound transmission path between the sources of noise and receptor premises; vi) locate haul and access routes within the premises as far away from the boundaries of the licensed place as is practical having regard to operational convenience; and vii) where operation of reversing beepers is likely to cause environmental nuisance, taking measures to ensure mitigation of the nuisance, for example by de-tuning the reverse beepers, replacing the reversing beepers with alternative reversing beepers which adjust their noise level output in accordance with the prevailing background noise level.
Noise nuisance - construction activities	
(D3-1)	Construction activity must only be carried out between the hours of: 7:00 am and 6:00 pm – Mondays to Saturdays and at no times on Sundays or Public Holidays
(D3-2)	Notwithstanding condition D3-1, construction activity may be undertaken outside these hours provided that the emission of noise from the construction activity does not result in levels greater than specified in Schedule D - Table 3.
Blasting	
(D4-1)	Blasting is to be carried out only between 9.00am to 5.00pm Monday to Friday, or 9.00am to 1.00pm on Saturday.
(D4-2)	The instantaneous sound pressure level when measured at a noise sensitive place must not exceed those levels in Schedule D – Table 4.
(D4-3)	Noise from each blast must be measured using noise measurement equipment with a lower limiting frequency of 2 Hz (-3 dB response point of the measurement system) and a detector onset time of not greater than 100 Hsec as assessed in accordance with AS 1259.

(D4-4)	<i>Vibration from the mining activity must not cause an environmental nuisance, at any sensitive place.</i>
(D4-5)	<i>Vibration emitted from activities must not exceed the levels specified in schedule D Table 5 and any sensitive place.</i>
(D4-6)	<i>Vibration monitoring must be measured at a sensitive place for each blast. Monitoring must include:</i> <i>i) peak particle velocity (mm/s); and</i> <i>ii) location of the blast/s within the site (including which bench level); and</i> <i>iii) atmospheric conditions including temperature, relative humidity and wind speed and direction; and</i> <i>iv) the level and frequency of occurrence of impulsive or tonal noise; and</i> <i>v) effects due to extraneous factors; and</i> <i>vi) location, date and time of recording.</i>

Schedule D: Table 3 (Noise Limits – ‘Sensitive Place’)

Noise level dB(A) measured as	Noise measured at a ‘Sensitive Place’			
	Monday to Friday		Sundays and public holidays	
	6pm-10pm	10pm-7am	9am-6pm	6pm-9am
L_{Amax}, adj, 15 mins	45	30	35	30
Maximum instantaneous level (Max L_{pA}, adj)	55	40	45	40

Schedule D: Table 4 (Airblast overpressure level – ‘Sensitive Place’)

Noise parameter	Instantaneous sound pressure level
Air blast overpressure level (dB linear park)	4 out of 5 shots not to exceed 115dB and a maximum of 120dB for any blast

3.4 Waste Management

Waste management in Queensland is governed by the *Environmental Protection Act 1994* (EP Act) and the *Waste Reduction and Recycling Act 2011* (WRR Act).

Under the EP Act, relevant waste subordinate legislation includes the Environmental Protection Policies and Regulations, including the *Waste Reduction and Recycling Act 2011*. Together with

the *Waste Reduction and Recycling Regulation 2011* (WRR Reg), these provide a legal and strategic framework for managing waste. Under the EP Act, waste is defined as anything that is:

- left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or
- surplus to the industrial, commercial, domestic or other activity generating wastes.

The WRR Reg defines general waste as waste other than regulated waste. Regulated wastes are defined in Schedule 1 of the WRR Reg as non-domestic waste. The WRR Act further defines regulated waste, as any waste:

- that contains a significant quantity and concentration of a hazardous contaminant; or
- where the hazardous contaminant exhibits hazardous characteristics because of its toxicity, carcinogenicity, mutagenicity, teratogenicity, flammability, corrosiveness, reactivity, ignitability or infectiousness, through its physical, chemical or biological characteristics; or
- that may cause environmental harm if improperly transported, treated, stored, disposed or otherwise managed.

The WRR Act provides guidance for waste management through waste management principles and hierarchies. The principles are the:

- polluter pays principle – all costs associated with waste management should, where possible, be borne by the waste generator;
- user pays principle – all costs associated with the use of a resource should, where possible, be included in the price of goods and services developed from the resource; and
- product stewardship principle – the producers or importer of a product should take all reasonable steps to minimise environmental harm from the production, use and disposal of the product.

Waste should be managed following the hierarchy below (in order of priority):

- Avoid;
- Reduce;
- Re-use;
- Recycling; and
- Recover, treat and dispose.

The WRR Act also requires that “cleaner production” be considered in determining how waste is managed. A cleaner production program is defined in the WRR Act as:

‘a program to identify and implement ways of improving a production process so that the process –

- a) Uses less energy, water or another input; or
- b) Generates less waste; or
- c) Generates waste that is less environmentally harmful.’

In Queensland, the movement of regulated waste, other than as specified in Section 35 of the WRR Reg, is subject to a waste tracking system.

The EP Regulation provides an outline of the waste management strategies for Queensland including:

- littering;
- waste receipt and disposal; and
- waste tracking and transportation.

The objective of the EP Regulation is to:

- minimise the impact of wastes on the Queensland environment; and
- establish a framework for minimising wastes under Ecologically Sustainable Development (ESD) principles.

The mine, associated infrastructure, and decommissioning of infrastructure are expected to generate various wastes including:

- regulated waste including hydrocarbon waste (oils, emulsions, oily wastewaters, oily sludge, grease, oil rags, filters and drums), asbestos, detergents, solvents, paints, resins and batteries;
- inert building waste (concrete materials, sand, aggregate, bricks and pavers);
- general and putrescible waste including food waste, packaging and food containers;
- recyclable waste including paper, cardboard, glass, aluminium cans and plastics;
- green waste arising from vegetation clearance;
- wood waste including timber, pallets and off-cuts;
- tyres including light vehicle tyres and mine truck tyres;
- treated effluent from the sewage treatment plant; and
- coarse and fine rejects from mineral processing.

3.4.1 Environmental Value – Waste

The WRR Act, provides the following environmental values to be enhanced or protected:

- (a) The life, health and wellbeing of people; and
- (b) The diversity of ecological processes and associated ecosystems; and
- (c) Land use capability, having regard to economic considerations.

The environmental protection objectives for waste are to:

- avoid contaminating land, surface water, groundwater or air through poor waste management practices;
- minimise the generation of waste in accordance with the waste management hierarchy; and

- manage waste through the use of licensed contractors, transporters and disposal facilities.

3.4.2 Potential Impacts on the Environmental Value – Waste

If not appropriately managed, wastes generated by the Project have the potential to create impacts upon the air quality, water (surface and groundwater) quality, soil quality and visual amenity of the site and the surrounding environment. Sensitive receptors, including residences and ecosystems, surrounding the Project site could be detrimentally impacted if waste streams were to enter waterways and groundwater systems and migrate off-site. Similarly, air emissions have the potential to impact sensitive receptors off-site.

Potential adverse impacts during construction and operations resulting from either uncontrolled discharge or poor waste management practices include:

- soil contamination and adverse impacts to current and future land use;
- land contamination and expensive site remediation;
- increase hazards to human and ecological health i.e. sharp edges, increase prevalence of vermin, mosquito breeding habitat and animal entanglement;
- degradation of native habitat and diminishing ecological value of habitat;
- groundwater and surface water contamination;
- odour emissions and airborne contaminants;
- reduction in visual amenity of the surrounding area; and
- broader impacts to community and general amenity of the Project area.

3.4.3 Environmental Protection Objective – Waste

The key environmental protection objective is to manage all waste in a manner avoiding direct or indirect impacts resulting from operations on:

- The life, health and wellbeing of people;
- The diversity of ecological processes and associated ecosystems; and
- Land use capability, having regard to economic considerations.

3.4.4 Commitments (Control Strategies) – Waste

Prior to commencement of construction or mining related activities, a site Waste Management Plan will be developed in accordance with the EPP (Waste). The plan will address the following:

- Characterise wastes generated from the Project and general volume trends;
- The waste management hierarchy when selecting waste management strategies;
- Procedures for the identification of regulated wastes and an approved tracking system for regulated waste movement;
- Waste removal and transport from site by licensed contractor(s) with disposal only to licensed re-processors, recyclers, or waste disposal facilities;

- The marketability of waste for recycling and reuse;
- Procedures for dealing with accidents, spills and other incidents that may impact on the waste management;
- Waste commitments with auditable targets to reduce, reuse and recycle;
- Measures to ensure wastes do not attract or propagate pests, disease vectors or vermin, and do not impact on public health;
- Monitoring of waste streams and auditing against the Waste Management Plan with measures for continuous improvement; and
- Training of all personnel on procedures concerning waste minimisation, handling, storage, reuse, segregation, collection and disposal.

3.4.4.1 Waste segregation and storage

Waste streams will be segregated and stored according to the type of waste stream and taking into account health, hygiene and safety standards, i.e. flammable and combustible liquid wastes will be stored within facilities designed to *AS 1940: The Storage and Handling of Flammable and Combustible Liquids* to prevent contamination of land, surface water and groundwater.

Where practical, wastes will be segregated at the point of generation to maximise the opportunity for subsequent reuse and recycling. This will be achieved by providing designated containment areas for reusable and recyclable materials.

Wastes will be stored temporarily prior to collection from the mine by licensed contractors for subsequent reuse, recycling or disposal. Waste storage facilities will be located close to the point of generation, thereby limiting handling of wastes. A number of locations will be allocated for the establishment of waste storage facilities:

- CHPP;
- Mine infrastructure area workshop;
- Administration building; and
- Go line area.

Other construction and operational areas may also have smaller waste storage units, with waste potentially being removed directly from these points by licensed contractor or moved to the closest of one of the areas listed above.

3.4.4.2 Waste collection, transport and tracking

The Proponent will use licensed contractors for the transport and off-site reuse, reprocessing, recycling, or final disposal of waste materials. The contractors will be responsible for reporting the final destination of all wastes removed from site.

The movement of regulated waste, as identified in Section 17 of the Waste Regulation, is subject to a waste tracking system. Schedule 2 of the Waste Regulation describes the process to allow such wastes to be tracked from the point of generation to the point of final processing, recycling or disposal. Waste Transport Certificates for the collection, transport and management of regulated wastes will be kept by the Proponent for five years.

3.4.4.3 Off-site waste disposal

Wastes will be disposed to landfill where options for reuse, recycling or energy recovery are considered unfeasible. Wastes will be disposed at licensed facilities, which may include:

- Municipal refuse tip;
- Sewage treatment facilities;
- Clean waste recycling facilities;
- Hazardous waste recycling facilities; and
- Hazardous waste disposal facilities.

The Proponent commits to working with North Burnett Regional Council with regard to managing demand on municipal waste management facilities and developing plans for a long-term solution to waste disposal in the Monto/Mulgildie area as necessary. The Proponent will ensure its licensed waste contractors will not adversely impact the operations of any existing facilities.

3.4.4.4 On-site waste disposal

The only materials proposed to be disposed of on-site are waste tyres, processed timber/wood and concrete (if beneficial reuses cannot be found) and green waste.

Under the EP Act, all items of waste buried on-site that are classed as Notifiable Activities must be identified on DEH's Environmental Management Register (EMR). This includes Notifiable Activities occurring on MLs.

If possible, tyres will be removed by the tyre supplier for recycling, or used onsite for road barriers and demarcation. Otherwise tyres will be stored and appropriately disposed of by burying in the mine overburden in designated locations, in accordance with the following principles:

- Tyres awaiting disposal or transport for take-back, will be stockpiled in volumes less than 3m in height and 200m² in area. Fire precautions will include removal of grass and other flammable materials within a 10m radius of the tyre store. Tyres will be stored in a manner that prevents water retention and minimises mosquito breeding events;
- Scrap tyres may be disposed of in spoil emplacements where tyres are placed as deep in the spoil as possible but not directly on the pit floor. Placement will ensure scrap tyres do

not impede saturated aquifers and do not compromise the stability of the final landform;
and

- Any scrap tyre disposal sites will be recorded on DEH's EMR.

3.4.4.5 Specialist waste management strategies

A list of the waste materials likely to be generated during site preparation, construction and operational phases of the Project and the management of these materials is shown in **Table 32**. These strategies will be continually reviewed and improved during the life of the mine.

Table 32: Waste streams and management strategies

Waste streams	Management strategies
Green waste	Avoid disturbance to areas outside those necessary for mine operation. Suitable material to be used on site to provide fauna habitat. Remaining material to be chipped and mulched, and reused during progressive rehabilitation and revegetation.
General and putrescible wastes	Minimise waste by producing/procuring only the amount required. General refuse to be collected in covered bins and removed from site by a licensed contractor.
Non-hazardous waste recycled/reused (paper, cardboard, glass, plastics, rubber and aluminium cans)	Collection and segregation of recyclable materials for removal off site for recycling where possible by a licensed recycling or waste contractor.
Scrap metal	Minimise waste by producing/procuring only the amount required. Collection, segregation and reuse on-site, otherwise transportation off-site by a waste contractor for recycling.

Waste streams	Management strategies
Processed timber and wood (timber pallets and off-cuts)	Minimise waste by producing/procuring only the amount required. Any undamaged pallets will be returned to the supplier for reuse. Excess waste will be chipped and reused on-site as mulch for landscaping and erosion control where practical. Where reuse is not possible, processed timber and wood to be removed from site and disposed to a licensed waste disposal facility. If hazardous materials are present, such as lead based paints, asbestos or timber treatment chemicals, specialist handling and disposal will be undertaken.
Concrete materials, bricks and pavers	Minimise waste by producing/procuring only the amount required. Where practicable, building waste will be reprocessed and reused onsite. Where options for beneficial reuse of building wastes are not available, these materials will be separated into their constituent parts and the inert parts may be used as clean fill on-site, or removed off-site by a licensed recycling or waste contractor.
Batteries	Appropriate servicing and maintenance of vehicles and plant to prolong battery life. Mobile phone, radio and other batteries to be segregated and then transported off-site by a licensed waste contractor for reuse, reprocessing, recycling or disposal.
Oils and grease (synthetic and mineral)	Appropriate servicing and maintenance to prolong vehicle and plant life. Waste oil to be removed from machinery in workshops using pneumatic pumps and oil transferred to bunded waste oil holding tank for collection by a licensed contractor as a regulated waste for reuse, reprocessing, recycling or disposal.

Waste streams	Management strategies
Regulated waste (other hydrocarbon and hydrocarbon contaminated materials, asbestos, empty containers, sealers, resins, solvents and paint materials, filters)	Minimise waste by producing/procuring only the amount required. Stored in a covered, sealed and bunded area with enclosures in place for periodic collection by a licensed waste contractor as a regulated waste for reuse, reprocessing, recycling or disposal. Tracking of all regulated wastes will be undertaken. Asbestos will be managed in accordance with the Workplace Health and Safety Regulation 2008 and the Code of Practice for the Management and Control of Asbestos in Workplaces (2005).
Tyres	Appropriate servicing and maintenance of vehicles to prolong tyre life. Tyres will be removed by the tyre supplier for reprocessing or used on-site for road barriers and demarcation. Otherwise tyres will be stored and appropriately disposed of by burying in the mine overburden in designated locations, in accordance with the principles described in DEH's Operational Policy – Disposal and Storage for Scrap Tyres at Mine Sites.

3.4.4.6 CHPP waste

Coarse rejects and dried tailings material will be placed into the in-pit mine overburden dumps. It is noted that the coarse rejects and dried tailings are not expected to pose significant adverse environmental impacts. However, chemical analysis will be conducted on each TSF sub-cell prior to rehandling and placement in the waste dumps. Tailings will also be stored in a certified designed, constructed and geotechnically designed TSF.

As the TSF is to be classified as a regulated dam, monitoring of the TSF's physical integrity will be undertaken regularly and will include both visual inspection and regular structural audits by a qualified Registered Professional Engineer Queensland (RPEQ). Any potential structural faults identified during visual inspections will be investigated by a qualified RPEQ and any recommendations will be implemented. Decant water from the tailings dam will be directed to the CHPP for reuse.

3.4.4.7 Decommissioning

If an agreement is reached with the post-mine landowner, buildings and other infrastructure will remain intact on site. However, if required, any building material wastes will be transported off site and recycled wherever possible. If any building materials cannot be recycled, they will be transported to a licensed waste landfill.

A contaminated land specialist will be contracted to undertake any investigations/remediation works to determine any contamination issues, and determine suitable actions in the event of contamination being identified. Contaminated soils will be transported to a waste landfill licensed to accept the waste in accordance with the contaminated land provisions of the EP Act.

3.4.5 EA Conditions – Waste

No changes to the Conditions relating to the Department Interest 'Waste' in the current EA are proposed.

Schedule E - Waste	
Storage of Tyres	
(E1-1)	<i>Tyres stored awaiting disposal or transport for take-back and, recycling, or waste-to-energy options - should be stockpiled in volumes less than 3m in height and 200 sq.m in area and at least 10m from any other tyre storage area.</i>
(E1-2)	<i>All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.</i>
Disposal of tyres	
(E2-1)	<i>Disposing of scrap tyres in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as possible but not directly on the pit floor.</i>
(E2-2)	<i>Scrap tyres disposed within the operational land must not impede saturated aquifers and compromise the stability of the consolidated landform.</i>
Waste handling and management	
(E3-1)	<i>From the commencement of the activity, the holder of this environmental authority must implement a Waste Management Plan that addresses at least the following matters:</i> <i>i) the types and amounts of waste generated by the activity;</i> <i>ii) how the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management</i>

	<i>practices mentioned in the waste management hierarchy (section 10 of the Environmental Protections (Waste Management) Policy 2000);</i> <i>iii) procedures for identifying and implementing opportunities to improve the waste management practices employed;</i> <i>iv) procedures for dealing with accidents, spills and other incidents that may impact on the waste management;</i> <i>v) details of any accredited management system employed, or planned to be employed, to deal with the waste;</i> <i>vi) how often the performance of the waste management practices will be assessed (at least annually); and</i> <i>vii) the indicators or other criteria on which the performance of the waste management practices will be assessed.</i> <i>NOTE: The Waste Management Plan is to be managed through the Plan of Operations.</i>
(E3-2)	<i>All regulated waste removed from site must be removed by a licensed waste removal and transport contractor for recycling or disposal in a licensed regulated waste disposal facility.</i>
(E3-3)	<i>The holder of this integrated authority must not:</i> <i>▪ allow waste to burn or be burned at or on the licensed place; or</i> <i>▪ remove waste from the licensed place and burn such waste elsewhere.</i> <i>(This condition does not apply to the material that is required to be burnt under quarantine regulations and, burning of such materials is to be carried out in a way that does not cause environmental harm and this condition does not refer to activities carried out under the provisions of the Fire Services Act 1990.)</i>
Waste Rock Management	
(E4-1)	<i>Subject to the release limits defined in Schedule – C, all reasonable and practicable measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of the activity to any groundwater or water course.</i>

3.5 Land Management

3.5.1 Environmental Values - Land Management

The environmental value for land is the maintenance of the existing land suitability classification, i.e. suitability for grazing and cropping.

3.5.1.1 Current Land Use

The site is currently used for agricultural purposes, for both cropping and grazing on the existing hills, valleys and contour-banked slopes. The land is virtually all cleared, except for scattered minor pockets of trees.

The properties on the proposed ML are used for rural and related activities dominated by cattle grazing and crop production, predominately sorghum and lucerne. Pig farming is also carried out adjacent to the site at approximately 1.2km to the north-west of the proposed northern boundary.

3.5.1.2 Existing Contamination Assessment

Searches of the DEH Environmental Management Register (EMR) and Contaminated Land Register (CLR) identified no lots within the Project area.

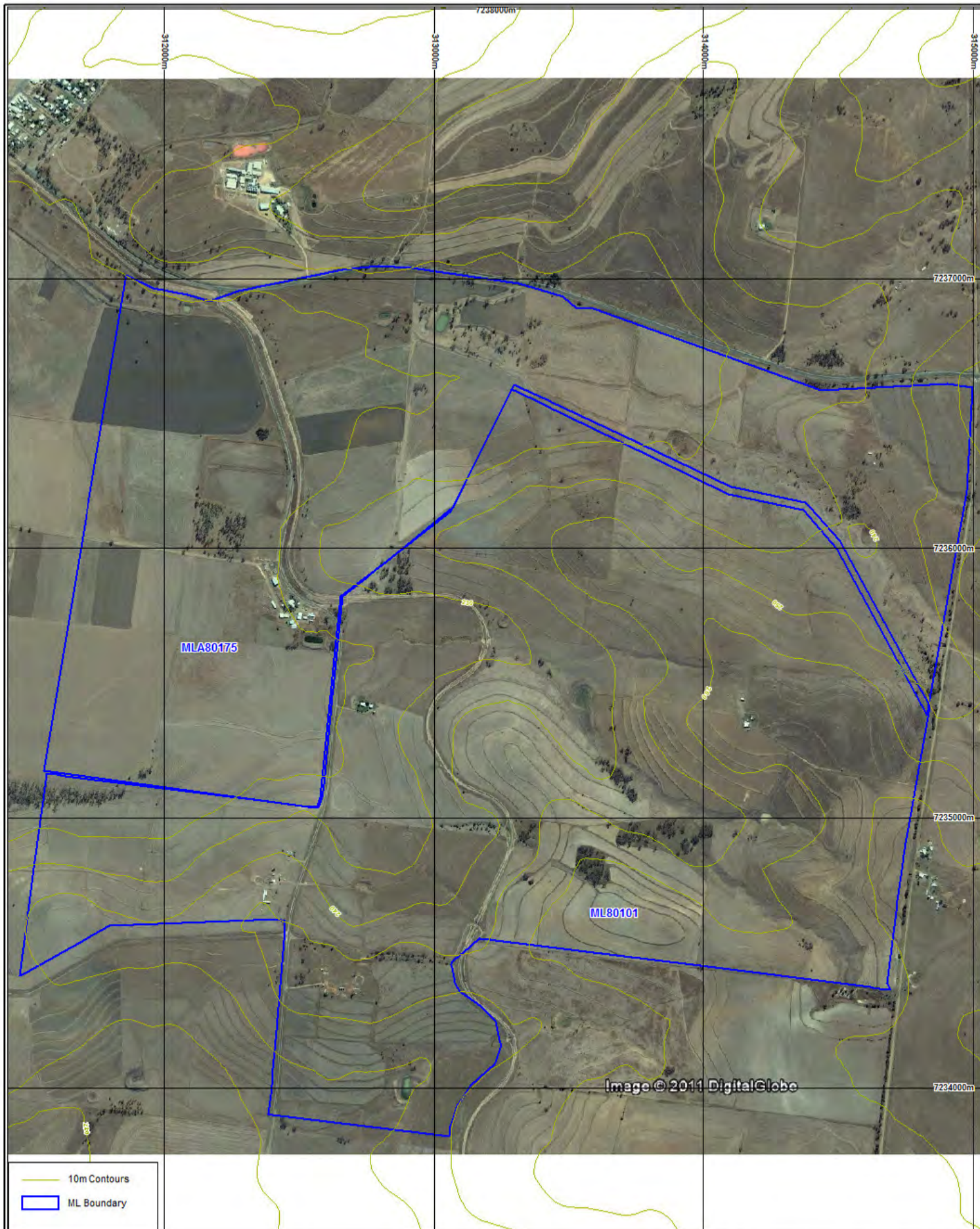
3.5.1.3 Pre-Mine Landform

The proposed mine site forms part of a series of low hills trending north–south, and is bounded by the floodplains adjacent to Three Moon Creek to the west and plateau areas to the east.

Locally the landform is dominated by undulating low rolling hills on the Mulgildie Coal Measures. These hills tend to fall westerly to the alluvial plains of Three Moon Creek. Typically, within the site the landform can be subdivided into terrain unit classes, which comprise:

- hillcrests, rounded to flat hillcrests and elevated spurs;
- spurs and associated saddles, which bound the hillcrests and are apparently controlled by underlying resistive sandstone unit(s) of the Mulgildie Coal Measures with convex profile side slopes; and
- valley floors, mostly flat-bottomed gullies which separate the spurs and saddles.

A contour plan of the pre-mine surface within ML 80101 lease and adjacent areas is shown in **Figure 29**.



NORTH

200 0 200 400 600 800 1000
metres



McCollum Environmental Management Services

Figure 28
Contour Plan of the
Pre-Mine Surface

Author: McCollum Environmental - MBS19 Date: 20 December 2011 Created: PT
Scale: 1:13,000 (A3D) Projection: UTM38S, Zone 38S, GDA94
Plan: M/G/S/Plans/2011/01/01/SU Plan Square/111229, M/G/S/Plans/Pre-Mine Contours

3.5.1.4 Soils

A series of ground traverses with sampling from shallow test pits (whose locations were based on their geomorphologic setting) were undertaken. Laboratory testing of selected samples was undertaken to assess soil dispersion, plasticity and topsoil chemistry.

Fourteen shallow test pits were dug manually (using a 100mm hand auger and a shovel) to log the soil profile. Three soil units were present within the proposed mining area:

- vertosols — dark-brown to grey 'cracking clays';
- calcarosols — soils interpreted as being mainly located on crustal areas where the vertosol soil profile may still exist, but is of limited depth; and
- rudosols — shallow, medium-textured and coarse-textured soils over rock, with negligible soil profile development.

Field pH tests of soils in the area revealed that the soils are alkaline, ranging between pH 8 and pH 9. Laboratory tests indicated a pH of 7.6.

Vertosols

The vertosols (cracking clays) are common within the mine area and dominate the landscape. They are typically dark-brown in colour (~10R1.7/1), with a very stiff to hard consistency and often grade into residual weathered coal measures.

Test holes were terminated at less than 0.5m BGL (typically 0.3m BGL) in these soils, due to their hardness. These soils often display slickensides within the profile, indicating that the soil shrinks and swells in response to changes in the moisture content.

All of the vertosols, with the exception of the upper 0.05 to 0.10m, were damp to moist as a result of recent local rain. The upper 0.02m generally formed a crust with wide (10mm) cracks. This crust 'floats' above the underlying profile and is easily removed by hand.

In some holes (close to gullies and on hill crests) trace amounts of ironstone pebbles and some caliche (calcium carbonate) were present.

Calcarosols

Calcarosol was observed at location 04 within the area. This profile is overlain by a thin vertosol (black soil) skin approximately 0.15m thick. Below this the profile exhibits mottling (orange staining) and grades into a white-grey (N 8/0) zone, rich in carbonate. Caliche pebbles are common throughout the pan layer, which is approximately 0.4m thick (0.8m BGL–1.2m BGL).

Rudosols

Rudosols were observed at locations 05 and 12 and were identified in some of the drainages within the mine area. These are soils that have little to no soil profile development and are essentially only sedimentary or colluvial deposits.

Ironstone fragments were identified in one of the profiles classified as rudosol. This soil type is confined to the areas close to the drainage channels within gullies (fluvial deposits), and the foot of slopes (colluvial deposits). It is dark-brown in colour, similar to the black soils (vertosols). Due to the hardness of this soil, test holes were terminated at approximately 0.5m BGL.

3.5.1.5 Results of Soil Testing

The following types of tests were carried out on soils from the proposed mine area:

- Atterberg Limits;
- Emerson Class;
- Particle size distribution;
- Double hydrometer; and
- Chemical testing.

Five Atterberg Limits tests were undertaken. The results of the tests are summarised below in **Table 33**. They imply that all the samples tested are of high plasticity with a moderate to high potential for seasonal shrink/swell movement.

Table 33: Soil Test Results

Sample No.	Location	Depth (m)	Description	Liquid Limit %	Plasticity Index %	Emerson Class
MC0101	01	00-01	Clay (CH)	-	-	4
MC01001	01	0.0-0.2	Clay (CH)	73	44	6
MC0201	02	0.0-0.1	Clay (CH)	60	34	5
MC0202	02	0.1-0.2	Clay (CH)	-	-	5
MC0401	04	0.15-0.3	Clay (CH)	73	46	4
MC01101	11	0.0-0.15	Clay (CH)	75	44	6
MC01201	12	0.0-0.3	Clay (CH)	51	29	-

Note: CH indicates clay is of high plasticity

The parent dispersion or double hydrometer test AS1289.3.8.2 – 1997 was undertaken on sample MC0101 at location 1 at 0.0 – 0.1m depth. The test provided a dispersion percentage of 10%.

A topsoil sample from location 2 at 0.1 to 0.2m gave results of pH of 7.6, electrical conductivity of 77µs/cm and soluble chloride concentration of 50mg/kg.

The Atterberg Limits and Emerson Class tests indicated that the clays are possibly mixed clays, being montmorillonites, illites and kaolinites. Montmorillonites tend to be dispersive, but the chemical tests indicated that the sample was saturated in calcium, which tends to lower dispersion potential. Emerson Class numbers of 4 to 6 are regarded as indicating low dispersion or being non-dispersive. A percent dispersion value of 10% is below the lower bound value of 15% and the sample tested is not considered susceptible to piping and dispersion in dams. Chemical testing indicates that the sample tested is within acceptable limits for topsoil reuse as a natural soil (refer AS4419 'Soil for Landscaping and Garden Use').

3.5.1.6 Land use capability and strategic cropping land assessment

In accordance with the *Strategic Cropping Land Act 2011* (SCL Act), the Project area is being assessed for presence of strategic cropping land (MLA80175). The Act does not apply retrospectively to mining leases already granted, so does not affect ML80101. According to *Strategic Cropping Land – Draft Trigger Map C1* (DERM, 2010c) the Project area is considered strategic cropping land. As a result, further assessment of the mining lease area is required. The Project area is currently being assessed for the accuracy of DEH Trigger Mapping. The results of the assessment will be used to complete a site specific Land Use Capability and Strategic Cropping Land Management Plan.

3.5.2 Potential Impacts on Environmental Values – Land Management

Potential impacts on land resources from mine related disturbances include:

- land suitability changes;
- land use changes;
- changes to existing landform;
- land contamination; and
- destruction of fossil material.

These potential impacts could result from activities including, but not limited to, the following:

- removal or changes in vegetation communities;
- wind erosion of soil and dust generation;
- loss of topsoil through poor topsoil management practices;
- dispersion, slaking and erosion of exposed soils;
- degradation of downstream water quality;
- blasting and excavation;
- Disposal of rock from overburden, interburden and coarse reject and fine tailings from the wash plant into the pit;

- development of a void, TSF and overburden dumps;
- acid and heavy metal generation from solid and liquid process wastes including overburden and reject coal;
- contamination resulting from acid rock drainage and/or leaching of heavy metals;
- reduction in the productivity of land for post-mining land use;
- contamination of land from storage, use and management of fuels, lubricants, oils and other chemicals;
- generation and storage of regulated and domestic wastes;
- storage of sewage;
- demolition of existing infrastructure which may contain contaminants such as asbestos or lead-based paints;
- generation, storage and disposal of wash bay water; and
- contamination from waste materials.

3.5.2.1 Post Mine Land Suitability and Use

The existing land use will be impacted upon by mining activities, resulting in a post mining landform within the mining leases including:

- Elevated landforms (waste dumps);
- Water storages;
- Remaining Infrastructure; and
- Residual voids.

Post Mining agricultural land suitability will primarily be affected by residual voids and remaining infrastructure.

3.5.2.2 Landform Changes

Landform changes will occur due to placement of waste spoil and excavation of the final void. Mine planning objectives include maximising in pit spoil placement to minimise land disturbance and to minimise the final void size.

3.5.2.3 Possible Land Contamination

Waste generation during the construction and operational phases of the mine will be managed through the implementation of a Waste Management Plan.

Following the completion of mining, all plant, equipment, structures and buildings not required by the subsequent landowner after mining has ceased will be decommissioned. A contaminated site assessment will be conducted and will form part of the Final Rehabilitation Report and any necessary action taken.

3.5.3 Environmental Protection Objectives – Land Management

The primary land management objectives for the Project site during construction, operation and post-mining are:

- to manage land within the ML areas so as to minimise impact on surrounding properties and downstream water quality;
- to ensure the site is non-polluting;
- to protect future land use values of areas by ensuring that only the land within the ML areas that is required for mining activities is disturbed;
- to ensure that adverse impact on the nature conservation and biodiversity value of the area is minimised;
- to appropriately manage overburden so as to minimise potential impacts on the surrounding environment;
- to progressively rehabilitate land disturbed by mining consistent with the post-mining land use objective;
- to ensure the final landform is self-sustaining, safe and geotechnically stable;
- to minimise the residual void size post-mine life;
- to ensure the final landform is safe for humans, livestock and wildlife;
- to minimise water quality impacts from the residual void on groundwater and surface water environmental values; and
- to ensure the site is able to sustain an agreed post-mining land use.

3.5.4 Control Strategies and Commitments – Land Management

3.5.4.1 Topsoil management

The primary topsoil control strategies and commitments for the Project site during construction, operation and post-mining are:

- Topsoil and vegetation clearing will only be carried out as necessary for ongoing operations;
- Suitable topsoil will be stripped and stockpiled for future rehabilitation use;
- Topsoil stockpiles will be located away from drainage paths and the final surface will be ripped to promote natural revegetation;
- The placement of topsoil will consider the landscape position the topsoil was stripped from, with soils of the undulating topography, used on slopes and hilltops, and the alluvial soils used in lower slopes and areas where water accumulation may occur;
- All topsoil stockpiles will be no higher than 2-3m to retain seed germination potential;
- Topsoil will be stored for the shortest period practicable and/or reused as soon as possible in order to maximise the viability of the seed bank in the topsoil;
- When areas with topsoil susceptible to wind erosion are stripped and stockpiled, even if for only a few months, the stockpiles will be covered by grass, other vegetation, geofabric or less erosive topsoil to minimise wind erosion;

- Long-term stockpiles of topsoil will be planted with vegetation to minimise mobilised of soil particles into the air and minimise erosion through raindrop impact; and
- All topsoil stockpiles will be surveyed and the locations and volumes of topsoil recorded in both the Topsoil Register and Topsoil Management Plan.

3.5.4.2 Land management

The primary land management control strategies and commitments for the Project site during construction, operation and post-mining are:

- Design criteria for overburden waste dumps will consider slope angles, slope length, dump heights, compaction and management of poor quality material within dumps, visual amenity and stormwater runoff management;
- Ensure that water quality standards, as they relate to land management, are implemented on site. Primarily focusing on sediment, salinity and targeted chemical parameters relevant to overburden and soil types within the lease area;
- Active control of weeds and pests on the MLs;
- A number of environmental management measures will be implemented to prevent land contamination which include but may not be limited to the following:
 - the design and construction of fuel storage areas in accordance with Australian Standard AS1940: The storage and handling of flammable and combustible liquids;
 - the provision of spill control kits at all hydrocarbon and chemical storage areas;
 - the provision of bunding around any liquid storage facilities wherever appropriate;
 - storage of chemicals in appropriately designed and covered chemical storage areas;
 - the maintenance of an environmental incident register on site to record details of any hydrocarbon or chemical spill include location, date, immediate actions taken and recommended remediation actions;
 - the provision of oil interceptors in workshop areas to prevent the contamination of stormwater runoff from those areas;
 - the training of all staff responsible for servicing of machinery, hydrocarbon and chemical use or transportation to ensure that they are aware of the correct procedures for carrying out day to day activities involving chemical or hydrocarbons, emergency response procedures and the use of spill control kits; and
 - regular integrity testing and auditing of hydrocarbon storage facilities;
- Any sites that become contaminated will be investigated and managed in accordance with the requirements of the contaminated land provisions of the EP Act; and
- All notifiable activities undertaken will be listed on the EMR.

Disturbance of areas will be limited to only those required for mining related activities. Mine planning strategies will be implemented by the Proponent to ensure unnecessary disturbance of land is avoided. Areas of pasture, remnant vegetation and remnant habitat not being disturbed by mining will be managed to protect their value for post mining land use.

Monitoring strategies will be implemented by the Proponent to ensure rehabilitation and landform stability. Data will be collected on initial rehabilitated areas to determine if the nominated landform criteria are acceptable or if modification to future final landforms is required. During mining operations, slope stability performance will be monitored and reviewed to assist in modifying the designs if required.

3.5.4.3 Residual void

- A Residual Void Plan will be developed to manage the residual void and will be based on operational experiences and geotechnical assessment;
- The Residual Void Plan will include consideration of:
 - minimisation of the size of the residual void;
 - development of a detailed plan for post mining management of the feature;
 - groundwater draw-down;
 - long term water quality;
 - ensuring the void is geotechnically stable;
 - ensuring exposed coal seams do not present a potential fire risk;
 - provision of reasonable permanent safety measures to prevent accidental entry to the void by persons, vehicles, stock or wildlife; and
 - provision of water diversion structures to avoid flooding.
- The residual void will be rehabilitated to ensure a safe, non-polluting, stable landform that can sustain the agreed land use.

The Residual Void Plan will be developed in consultation with the Administering Authority and other relevant stakeholders and will be completed in accordance with EA design criteria presented in **Table 34**.

Table 34: Residual void design

Void Identification	Void wall – competent rock slope (O)	Void wall – Incompetent rock slope (O)	Void maximum surface area (ha)
Stage 1 void	51	37	25

3.5.4.4 Rehabilitation

- Rehabilitation strategies will be monitored and adjusted as required to reduce the risk of erosion and destabilisation of dumps;
- The development of a final land use and rehabilitation plan in future PoOps will include the following integrated measures:
 - detailed planning prior to disturbance, such as topsoil stockpile locations, etc.;
 - implementation of practical landform designs, to prevent erosion and establish final landform stability;
 - post-mine land use consistent with EA Schedule F;
 - revegetation trials, for the selection of appropriate species selection and methodology;
 - progressive rehabilitation of disturbed areas, using appropriate rehabilitation procedures for the area having been disturbed;
 - implementation of best practice erosion control measures;
 - a rehabilitation monitoring program to assess success or potential for improvement of rehabilitation practices;
 - a corrective action program to address failed areas of rehabilitation; and
 - prepare a Final Rehabilitation Report within two years prior to the surrender of the Mining Lease.
- Rehabilitation areas will be designed to meet the final rehabilitation design criteria outlined below:
 - Outer dump slopes will be designed at no greater than 15%;
 - The low wall will remain as dumped as long as the spoil is geotechnically stable under these conditions. The low wall will be benched as required. The low wall will drain internally to the final void;
 - High wall slopes in geotechnically stable ground which have not been mined could remain at their final batter angles as long as they are made safe to ensure humans and animals are not harmed;
 - Seal the seam in final voids using pre-strip, if practicable;
 - Design and install perimeter stormwater diversion;
 - Fence the perimeter of the residual void to restrict access; and
 - Surface runoff from all rehabilitated areas will be directed to sediment control structures to reduce the amount of final sediment loads reporting to watercourses.
- The basic process that will be adopted to achieve the desired outcomes of the rehabilitation strategies, are:
 - clearing and piling up of vegetation ahead of mining;
 - topsoil recovery as per the Topsoil Management Plan to be developed for the operation;
 - management of poor quality overburden materials within dumps;
 - recontouring of overburden dumps;

- construction of drainage structures if required;
- spreading of topsoil on recontoured surface as detailed in the Topsoil Management Plan;
- ripping along the contour;
- application of relevant seed mix and fertiliser;
- monitoring and success assessment of rehabilitation areas; and
- maintenance of rehabilitation as required.
- On completion of mining and subject to agreement with the post-mining landowner, the site infrastructure will be managed as follows:
 - mine roads will remain for use as farm roads;
 - water dams will remain and approved by regulators;
 - the TSF will be rehabilitated in accordance with the Final Rehabilitation Plan;
 - all buildings, plant and equipment will be removed and the surface rehabilitated. This will include the CHPP, workshop, office, storage tanks, and coal handling facilities; and
 - concrete pads will be covered with benign waste rock, topsoiled and revegetated.
- The decommissioning and final rehabilitation of the Project will occur on a stage basis over several years.
- A contaminated site assessment will be undertaken as part of the Final Rehabilitation Report.

Progressive rehabilitation strategies will be further detailed and presented in the relevant PoOps for the Project. Ongoing refinement of the strategies may occur as a result of site experience or industry advances and rehabilitation will be undertaken progressively throughout the life of the Project.

Elevated landforms will be rehabilitated with flora species native to the area. This will enhance the current degraded state of the existing habitat on site as noted within both the soil and fauna and flora baseline assessments. Elevated landforms could potentially be set aside as conservation zones should the rehabilitation objective prove successful through the monitoring program outlined within the EM Plan.

The specific criteria for achieving a self-sustaining vegetation community will be developed during the operation based on rehabilitation trials and the monitoring of progressive rehabilitation. Aesthetically, the final land forms will be constructed to blend with the existing environment as far as practicable.

3.5.4.5 Rehabilitation Success Criteria

Criteria for successful rehabilitation include, but are not limited to, the following parameters:

- tree, shrub and grass density;

- species diversity;
- percentage ground cover;
- soil characteristic development;
- indicators for rill and gully erosion;
- pasture dry matter performance;
- grazing trial demonstrations; and
- downstream water quality.

The success of rehabilitation strategies will be monitored through assessment of results obtained from the Rehabilitation Monitoring program and results from the Water Quality Monitoring program as it applies to land management.

3.5.4.6 Monitoring – Land Management

The success of rehabilitation strategies will be monitored through assessment of results obtained from the Rehabilitation Monitoring Program and results from the Water Quality Monitoring Program as it applies to land management.

Results from the monitoring program will be assessed and utilised in driving alterations to the rehabilitation strategy where relevant. Monitoring outcomes will be summarised and reported within the PoOps as the monitoring program drives relevant changes to strategies.

3.5.5 Current EA Conditions – Land

No changes to the Conditions relating to the Department Interest ‘Land’ in the current EA are proposed.

Schedule F – Land	
Rehabilitation landform criteria	
(F1-1)	<i>The holder of this authority must develop and implement a Final Land Use and Rehabilitation Plan to ensure that all areas disturbed by mining activities will be suitably rehabilitated in accordance with Schedule F – Table 1. The Plan must include, but is not limited to the following:</i> <i>i) disturbance type;</i> <i>ii) disturbance area;</i> <i>iii) pre and post mine land descriptions;</i>

	iv) <i>pre mine and post mine land capability;</i> v) <i>analogue site(s) identification;</i> vi) <i>a description of rehabilitation management techniques incorporating works and monitoring programs and timetables;</i> vii) <i>indicators for success; and</i> viii) <i>keeping of appropriate records of rehabilitation measures implemented including taking of photographs demonstrative of rehabilitation achieved and the preparation of annual rehabilitation progress reports. A summary of the annual rehabilitation progress report must be submitted to the administering authority with each annual return.</i> <i>NOTE: The Final Land Use and Rehabilitation Plan are to be managed through the Plan of Operations.</i>
(F1-2)	<i>In developing the Final Land Use and Rehabilitation Approval Plan required by condition (F1-1) the mining lease must as a minimum be returned to a productive land use e.g. forestry, cropping or a combination of the both</i>
(F1-3)	<i>Progressive rehabilitation must commence as soon as practicable when areas become available within the operational land.</i>
Rehabilitation landform criteria	
(F1-1)	<i>The holder of this authority must develop and implement a Final Land Use and Rehabilitation Plan to ensure that all areas disturbed by mining activities will be suitably rehabilitated in accordance with Schedule F – Table 1. The Plan must include, but is not limited to the following:</i> <i>ix) disturbance type;</i> <i>x) disturbance area;</i> <i>xi) pre and post mine land descriptions;</i> <i>xii) pre mine and post mine land capability;</i> <i>xiii) analogue site(s) identification;</i> <i>xiv) a description of rehabilitation management techniques</i>

	<i>incorporating works and monitoring programs and timetables;</i> <i>xv) indicators for success; and</i> <i>xvi) keeping of appropriate records of rehabilitation measures implemented including taking of photographs demonstrative of rehabilitation achieved and the preparation of annual rehabilitation progress reports. A summary of the annual rehabilitation progress report must be submitted to the administering authority with each annual return.</i> <i>NOTE: The Final Land Use and Rehabilitation Plan are to be managed through the Plan of Operations.</i>
(F1-2)	<i>In developing the Final Land Use and Rehabilitation Approval Plan required by condition (F1-1) the mining lease must as a minimum be returned to a productive land use e.g. forestry, cropping or a combination of the both</i>
(F1-3)	<i>Progressive rehabilitation must commence as soon as practicable when areas become available within the operational land.</i>
Closure and Post Closure	
(F2-1)	<i>When the deposition of tailings ceases, the holder of an environmental authority must install a final cover system to the tailings dam which effectively minimises:</i> <i>i) infiltration of water into the tailings dam; and</i> <i>ii) the likelihood of any erosion occurring to either the final system, dumped spoil material or deposited tailings.</i>
(F2-2)	<i>The final cover system must include an upper layer of earthen material that is capable of sustaining plant growth.</i>
Sustainable Final Land Use Outcome	
	<i>Areas that are to be progressively rehabilitated must comply with, but not be limited to, the following outcomes;</i> <i>i) All areas disturbed by mining activities must be rehabilitated to the landform design criteria defined in the Final Land Use and Rehabilitation Plan required by condition F1-1.</i> <i>ii) The final landforms must be stable with erosion rates comparable</i>

	<i>to analogue sites.</i> <i>iii) For a self-sustaining ecosystem final land use the establishment of vegetation species for a type and density determined by research of appropriate analogue sites. These vegetation species must be listed in the Final Land Use and Rehabilitation Plan.</i>
Residual voids outcome	
(F4-1)	<i>Residual voids must comply with the following outcome:</i> <i>i) residual voids or contents of residual voids must not cause any environmental harm to land or waters, other than the environmental harm to land within the footprint of the residual void itself; and</i> <i>ii) residual voids must comply with the design criteria in Schedule F – Table 2.</i>
(F4-2)	<i>The holder of this authority must complete an investigation into the residual void and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in (F3-1) and landform design criteria in Schedule F – Table 2 prior to mine closure.</i>

3.6 Nature Conservation

3.6.1 Environmental Value – Nature Conservation

3.6.1.1 Vegetation Communities/Flora

A field assessment of the proposed mine site and adjacent areas was conducted in December 2001.

The proposed site has been almost totally cleared of native vegetation.

The field assessment revealed that the site does not support vegetation representative of a Regional Ecosystem (RE) as described by Sattler and Williams (1999) due to the highly disturbed nature of the site and the extent of vegetation clearing. However, remnant Brigalow (*Acacia harpophylla*) stands and occasional poplar box (*Eucalyptus populnea*) are indicative of previous

coverage by the 'Of Concern' RE 11.9.10, '*Acacia harpophylla*, *Eucalyptus populnea* open forest on Cainozoic fine-grained sedimentary rocks' (Sattler & Williams, 1999).

A search of the Queensland Herbarium records revealed the likely presence of 78 species of flora in the vicinity of the proposed mine site. Of those species, *Cyperus clarus* is listed as vulnerable under the Queensland *Nature Conservation (Wildlife) Regulation 1994*.

3.6.1.2 Fauna Habitat/Fauna

As much of the native vegetation on the site and in surrounding areas has been cleared for cropland and grazing, very little habitat of value remains for native fauna. Database records for the area revealed the likely presence of 21 species of fauna. Native fauna species recorded during the field assessment include six amphibians, 20 birds, one mammal and one reptile. Two exotic species were recorded on the site, the cane toad (*Bufo marinus*) and feral pigeon (*Columba livia*). No fauna species of conservation significance were detected on the site at the time of the field assessment. Seven of the fauna species detected in the field were also highlighted in database searches as potentially occurring in the area.

3.6.2 Potential Impacts on Environmental Value - Nature Conservation

Impacts on remnant flora and fauna from construction and operation of the proposed coal mine will be minimal. Potential impacts include:

- Destruction of habitat;
- Uncontrolled tree clearing and erosion;
- Translocation of weeds;
- Infestation of animal pests;
- Noise and lighting;
- Vehicle collisions with fauna;
- Release of poor quality water; and
- Alteration of hydrological regimes and stream water quality.

Unavoidable disturbance will be mainly limited to removal of the mature eucalypts and acacias that currently provide most of the substantial habitat on the site. However, as the site contributes only minor habitat and vegetation to the greater region, loss of this vegetation should not substantially affect the species composition or distribution.

Mining activities may compound the existing weed problem if weed management and eradication practices are not undertaken throughout all phases of mining activities. Weeds have been highlighted as a concern by the local farming community and will therefore require ongoing

management. The declared (Class 2) weed species *Parthenium* (*Parthenium hysterophorus*) is a locally significant pest in the Monto Shire and surrounding areas.

While the site is located at least 17km from Abercorn Springs, groundwater extraction for use in the mine may affect these springs by reducing the groundwater flow and/or aquifer source. This could result in a reduction in the wet areas of these springs and consequently a change in environmental conditions for those species that depend on the springs for their survival.

Potential impacts beneficial to nature conservation values may result from the activities associated with the proposed mine, including:

- Habitat enhancement and protection through proactive land management practices including avoidance of unnecessary clearing, erosion control and weed control;
- Sound rehabilitation strategies involving revegetation using native flora species complementary to remnant habitat; and
- Construction of water management facilities that provide reliable water sources for wildlife.

3.6.3 Environmental Protection Objectives - Nature Conservation

The primary objective in relation to nature conservation is to protect and ultimately enhance the nature conservation value both on and off the ML area, by:

- Preventing the introduction of new weed species and preventing the spread of existing weed species;
- Protecting on-site fauna;
- Re-introducing flora and fauna to the mined area by undertaking a staged rehabilitation program;
- Ensuring that mining operations do not affect flora and fauna located at Abercorn Springs.

3.6.4 Commitments (Control Strategies) - Nature Conservation

Control strategies will be implemented during operation of the proposed mine to minimise the amount of land disturbed at any one time. These strategies include, but are not limited to, the following:

- Restriction of clearing to only that is essential for the practicable development of mining activities.
- A targeted Weed Management Plan including surveys, training at induction level and controls, including Monto Shire's weed protection procedure for *Parthenium* weed, will be implemented. The site induction program will include training for site personnel on weed control and nature conservation.
- A qualified fauna spotter/catcher holding a Rehabilitation Permit from the Queensland parks and Wildlife Service will inspect any tree immediately prior to it being felled for the

presence of vertebrate fauna. The fauna spotter/catcher will be present at all times whilst native vegetation is being removed to collect, remove and rehabilitate any native animals that are displaced or injured as a consequence of vegetation clearing activities.

- Land clearing requirements will be specified in the Plan of Operations.
- The wet areas of Abercorn Springs will be monitored regularly.
- Flora and fauna surveys will be specified in the Plan of Operations.

3.6.5 Current EA Conditions

Currently the EA does not contain any conditions required under Nature Conservation. The above commitments have been made by the Proponent in recognition of best practice management and the company's willingness to go up and beyond its environmental requirements.

3.7 Community

3.8 Environmental Value - Community

The community and social values relating to the proposed mine include the amenity, liveability and sense of community. These values also consist of access to social, community services and infrastructure in the region surrounding the Project, including economic conditions and benefits within the affected community.

3.8.1 Community Consultation

In order to facilitate an understanding of community values and concerns so they could be addressed and incorporated into appropriate environmental management commitments, the Proponent has undertaken extensive consultation with affected and interested stakeholders. This consultation included the following stakeholder groups:

- Local residents and landowners;
- Local government councillors and officers (both North Burnett Regional Council and its predecessor, the Monto Shire Council);
- Traditional owners;
- State and federal regulatory authorities;
- Government departments;
- Emergency service agencies; and
- Infrastructure providers.

More recently (September to December 2011) the Proponent has undertaken a targeted consultation process with North Burnett Regional Council, directly impacted landholders, traditional owners and residents of Mulgildie.

Based on the advice of the North Burnett Regional Council in September 2011, the Proponent focused the latest round of consultations with landholders (both directly impacted and neighbouring), traditional owners and the residents of Mulgildie.

The consultation process has been implemented to ensure issues, including those relating to social and community issues have been identified and potential impacts discussed to ensure impacts are minimised and strategies developed to ensure ongoing mitigation and/or minimisation of the identified impacts. This process has enabled many of the strategies in the EM Plan to be developed in recognition of the specific issues of concern to relevant stakeholders. This program has provided an opportunity for identification of contact points for stakeholders seeking information regarding the Project.

3.8.2 Ongoing Community Consultation

The Proponent has developed a Community Relation Plan for the development and operation of the Project. The Community Relations Plan has four sub-plans including, a Social Impact Management Plan, Community Consultation Plan, Sustainable Communities Plan and a Community Investment Plan.

Each of the four sub-plans are currently in draft form and will be finalised in consultation with relevant stakeholders once the Project has approval to proceed.

The Community Relations Plan (including the four sub-plans) will be regularly reviewed and updated at key project milestones in consultation with relevant stakeholders.

3.8.3 Existing Community Environment

The proposed mine is located approximately 2km from the township of Mulgildie and 12km from the town of Monto. The largest industry sector in the Shire is agriculture, including the production of beef, milk, lucerne, pork, grain and timber. Monto Shire is the administrative centre for the Shire, and provides primary and secondary schools, a hospital, hotels and motels and a range of commercial and community facilities.

Relevant population, industry of employment and housing data for Mulgildie Township and Monto have been obtained from the Australian Bureau of Statistics website. The most recent data available is from the 2006 census which shows that the population of Mulgildie is 113 and population of Monto is 1,361. The regions reliance on agriculture is demonstrated in employment statistics from that census. Both Monto and Mulgildie rely heavily on agriculture with a majority employed in the industry. Employment opportunities other than in the agricultural sector and retail are limited.

Accommodation in Monto and Mulgildie is made up predominately of stand-alone housing. Mulgildie provides a school, hotel and limited shopping facilities. Monto is the administrative centre for the Shire and provides primary and secondary schools, a hospital, hotels and motels, and a range of commercial and community facilities.

Like many towns within the area, Mulgildie and Monto have experienced poor growth over the last 10 years due to closure of sawmills in both towns and the butter factory in Monto.

3.8.4 Existing Accommodation

As noted above, almost all of the housing in Monto and Mulgildie are stand-alone, private dwellings. It is estimated that between 100 and 120 shift workers will be employed at the mine site and require some form of accommodation in the area. In recent years there has been a significant trend away from stand-alone housing towards camp-style accommodation for mine staff. The Proponent plans to build a camp on the outskirts of Monto to accommodate approximately 70 workers and contractors.

3.8.5 Potential Impact on the Environmental Value – Community

The main issues of concern to stakeholders include the effects on the communities and their ability to meet the requirements of the additional workforce and demand for community services generated by the mine. This concern arises from the fact that facilities and services are generally limited within the Monto Shire.

During the consultation undertaken to date, the key issues identified relating to social and community impacts were as follows:

- Accommodation;
- Road impacts and traffic generation;
- Impacts on public amenity, such as dust;
- Water supply for domestic consumption in Monto;
- Cumulative impact on community services and infrastructure;
- Acquisition of land for the ML; and
- Impacts on accommodation.

Accommodation options provided by the mining industry vary in some elements throughout Australia but policies typically adopted by mining companies and mining contractors cover a few broad parameters, namely:

- 1) Employment of local staff, with accommodation arrangements left up to each staff member;
- 2) Provision of houses, often for key company personnel and group housing;
- 3) Rent subsidies or purchase assistance for private accommodation; and

- 4) Provision of camp accommodation, including some shared arrangements such as hot bedding and motel style arrangements, and varying cost arrangements including fixed price and free accommodation.

Given the circumstances discussed regarding the Monto Shire employment conditions, the first option has a high prospect of success particularly given the recent closure of sawmills in the Shire. However, due to small the population this would not supply the entire workforce.

Due to the shortage of private housing and the lack of supply of new housing in the Monto Shire, the second and third options are difficult to adopt as the principal accommodation strategies for new projects.

Therefore the Proponent must as its primary option, seek to provide camp-accommodation for the majority of its workforce. As a secondary option, the Proponent will also seek to obtain private housing options to provide employees with an alternative to camp accommodation and as a tool to try to attract families to the region.

3.8.5.1 Impacts to Road Systems

The Proponent will provide bus arrangements to and from the mine to Monto in order to reduce the impact on the local road system. In order to further reduce vehicle movements, the Proponent proposes to investigate options for providing bussing between the camp and several major cities.

3.8.5.2 Impacts to Public Amenity

The range of potential impacts to community and public amenity from the Project includes:

- Noise;
- Dust;
- Ground vibration;
- Blasting overpressure;
- Reduction in groundwater levels;
- Increase of rail crossings;
- Localised flooding; and
- Lighting from fixed or mobile plant.

The potential for adverse impacts from each of the above issues have been assessed within this EM Plan. In each of those areas, specific control strategies have been identified to minimise and mitigate potential impacts, should they arise and to monitor conditions to ensure that any potential adverse impacts are identified.

In addition to the specific strategies for each of the above issues, the Proponent will develop and maintain a complaints/incidents management system during construction and operation of the Project. In relation to public amenity and community development, the Proponent recognises the importance of social infrastructure and networks as being vital to the development of local communities.

3.8.5.3 Cumulative Impact on Community Services and Infrastructure

The Project and its employees will generate additional demand for goods and services in the Shire beyond that which currently exists. the Proponent recognises that beyond accommodation, it will create demand for community infrastructure and services.

3.8.5.4 Positive Impacts

The development of open-cut mining in the Mulgildie region is in the public interest as it provides an opportunity for economic diversity for the region and economic income for the State.

The direct contribution of the Project, whilst a relatively small project in comparison to many in Queensland, is substantial. The State and Federal governments would receive substantial royalties and other revenue through personal income and company taxes, fees and levies and payments to Government-owned enterprises.

By working with the North Burnett Regional Council, community members and other stakeholders, the construction and Project operation is expected to provide:

- An opportunity for economic diversification in the region leading to more resilient and sustainable communities;
- Direct and indirect employment opportunities for people living in the region and attract local people back to working in the region (rather than outside the region);
- Opportunities for local and regional business security and potential growth;
- Population stability and growth; and
- Improved community wellbeing through the realisation of opportunities.

3.8.6 Environmental Protection Objectives - Community

The primary environmental objectives relating to the community are:

- To manage operations in a manner that minimises negative impacts on the local and broader community, both during and post mining;
- To ensure that the Project assists in provision of community services and infrastructure to meet the increased demand created by the Project; and
- To manage the operation in a manner that contributes positively to the economy and services of the local and broader community.

3.8.7 Commitments (Control Strategies) – Community

In order to minimise and/or mitigate potential social and community impacts, the Proponent will:

- Continue the ongoing development and implementation of a community consultation program. The community consultation program will be implemented specifically to reflect the stages of project development, namely project application stage, pre-development and construction, ongoing operation and mine closure/post-mine land use;
- Develop and maintain a complaints management system during construction and operation of the Project;
- Provide bussing arrangements from Monto to the Project site to minimise traffic flows on the Burnett Highway;
- Ensure that Project lighting is oriented to minimise light spill beyond what is required for project operations;
- Participate and contribute to community organisations, activities and events in the Monto Shire; and
- Develop and implement policies relating to service provision and purchasing hierarchies, e.g. local personnel and business first if qualified and commercially competitive.

Success of the control strategies relating to community conditions will be measured through:

- The level of public consultation conducted by the Proponent in relation to the project development and operation. The development and implementation of procedures to manage risks to the public from proposed operations;
- The number of community projects involving participation by the Proponent; and
- The number of complaints received by the public in relation to operations at the mine.

3.8.8 Current EA Conditions – Community

Current conditions, via the existing approved EA are attached. No changes to the Conditions relating to the Department Interest 'Community' (Schedule G) in the current EA are proposed.

Schedule G – Community	
Complaint Response	
(G1-1)	<i>All complaints received must be recorded including details of complainant, reasons for the complaint investigations undertaken, conclusions formed and actions taken. This information must be made available for inspection by the administering authority on request.</i>
(G1-2)	<i>The holder of this environmental authority must continue to keep the community informed of the operation's progress and to be available to discuss concerns raised by individuals or community groups through a community consultation program.</i>

(G1-3)	<i>The community consultation program required by condition (G1-2) must provide for an ongoing community consultation forum to be implemented for the duration of Stage 1 of the Monto Coal Project. The community consultation forum must include regular community meetings at no greater than quarterly (3 month) intervals to facilitate:</i> <i>(i) Conveyance of information to the community regarding mining progress and emerging issues; and</i> <i>(ii) The raising of specific concerns regarding mine operation by community members.</i>
Community Notification of Amendment	
(G2-1)	<i>The holder of this environmental authority must notify the residents of Monto Shire of any application to amend this environmental authority that, if approved, would result in an increase in ROM coal production beyond 1.5Mt/a.</i> <i>NOTE: The notification provisions will be satisfied if the holder of the environmental authority places an advertisement on the local newspaper that contains sufficient detail to inform the residents of the nature and extent of the proposed amendment, and the time and location of a meeting of the community consultation forum required by condition (G1-3) that will discuss the proposed amendment. This meeting is to be held at least two weeks before any objection period for the amendment ends.</i>

4. ADDITIONAL STRATEGIES

Environmental Management Systems (EMS) will be developed consistent with the principles of IOS14000. The EMS will include the below elements:

- Water management, Erosion and sediment control plan;
- Storage and handling of hazardous substances;
- Waste management plan; and
- Final land use and rehabilitation plan.

4.1 Monitoring and Reporting

Monitoring of potential impacts of proposed mining activities at the Project site will form an integral part of operations. The purpose of monitoring is to verify the success, or otherwise, of control strategies adopted at the Project and where indicated as necessary lead to altering strategies to ensure the desired objectives for protection of the environmental value achieved.

All results of monitoring at the Project will be kept for a minimum of five years and will be made available for inspection upon request by the Administering Authority. Appropriately qualified persons will conduct all monitoring at the site.

4.1.1 Waste Tracking and Reporting

Waste disposed of offsite will be quantified, tracked and reported in accordance with Part 4 of the *Waste Reduction and Recycling Regulation 2011*.

4.2 Continuous Improvement

Strategies to foster continuous improvement in environmental management will be adopted by the Proponent, including:

- Scheduled review of monitoring data obtained from the various site monitoring programs and consequent alterations to programs and strategies based on review findings;
- Staff environmental awareness training as outlined in Section 4.3.1 of this EM Plan;
- Auditing of environmental practices as outlined in Section 4.3.2 of this EM Plan; and
- Involvement in industry wide research programs where relevant opportunities exist.

4.2.1 Staff Training

All staff and contractors will receive an environmental induction upon commencement of employment at the Project site. The environmental induction will include the below elements:

- Legislative framework including relevance to the project and employees;
- Cultural heritage requirements;
- Water management requirements;
- Waste management practices;
- Land management requirements;
- Rehabilitation strategies;
- Air quality and noise; and
- Social responsibilities.

The induction will include an assessment component to verify understanding of the environmental management requirements and practices.

In addition to the induction, refresher courses and general environmental awareness topics will be developed for presentation to workgroups within regular “toolbox” meetings.

Training records will be maintained and made available to the administering authority upon request.

4.2.2 Environmental Auditing

An annual external audit of the environmental requirements at the Project will be undertaken. The audit will be conducted by a third party and action plans will be developed from the audit findings to maintain the continuous improvement process.

Intermittent internal environmental audits will be undertaken for various sections of the environmental management program between external audit periods. Action plans will be developed from audit findings to maintain the continuous improvement process.

5. REFERENCES

Environmental Protection Act 1994

Environmental Protection Regulation 2008

Environmental Protection (Air) Policy 2008

Environmental Protection (Noise) Policy 2008

Waste Reduction and Recycling Act 2011

Waste Reduction and Recycling Regulation 2011

Environmental Protection (Water) Policy 2009

Environmental Protection and Biodiversity Conservation Act 1999

Land Protection (Pest & Stock Route Management) Act 2002

National Environment Protection (Ambient Air Quality) Measure 2003

Nature Conservation Act 1992

Nature Conservation (Wildlife) Regulation 1994

Sustainable Planning Act 2009

Waste Reduction and Recycling Act 2011

Water Act 2000

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6. DEFINITIONS

Words and phrases used throughout this licence are defined below except where identified in the *Environmental Protection Act 1994* or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

“accepted engineering standards” in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the Australian National Committee on Large Dams (ANCOLD), guidelines published by Queensland government departments, and relevant Australian and New Zealand Standards.

“acceptance criteria” means the measures by which the actions implemented to rehabilitate the land are deemed to be complete. The acceptance criteria indicate the success of the rehabilitation outcome or remediation of areas which have been significantly been disturbed by the mining activities. Acceptance criteria may include information regarding:

- vegetation establishment, survival and succession;
- vegetation productivity, sustained growth and structure development;
- fauna colonisation and habitat development;
- ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes;
- microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration;
- effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development;
- resilience of vegetation to disease, insect attack, drought and fire; and
- vegetation water use and effects on ground water levels and catchment yields.

“administering authority” means the Department of Environment and Resource Management or its successor.

“AEP” means the Annual Exceedance Probability, which is the probability that at least one event in excess of a particular magnitude will occur in any given year.

“airblast overpressure” means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dBL).

“ambient (or total) noise” at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

“ANZECC” means the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000.

“assessed” or **“assess”** by a suitably qualified and experienced person in relation to a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- a) exactly what has been assessed and the precise nature of that assessment;
- b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- c) the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

“associated works” in relation to a dam, means:

- a) operations of any kind and all things constructed, erected or installed for that dam; and
- b) any land used for those operations.

“bed and banks” for a waters, river, creek, stream, lake, lagoon, pond, swamp, wetland or dam means land over which the water of the waters, lake, lagoon, pond, swamp, wetland or dam normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed and banks that is from time to time covered by floodwater.

“beneficial use” in respect of dams means that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is:

- a) of benefit to that owner in that it adds real value to their business or to the general community,
- b) in accordance with relevant provisions of the *Environmental Protection Act 1994*,
- c) sustainable by virtue of written undertakings given by that owner to maintain that dam, and
- d) the transfer and use have been approved or authorised under any relevant legislation.

“biosolids” means the treated and stabilised solids from sewage.

“blasting” means the use of explosive materials to fracture-

- a) rock, coal and other minerals for later recovery; or
- b) structural components or other items to facilitate removal from a site or for reuse.

“bunded” means within bunding consistent with Australian Standard 1940.

“certification” or **“certified”** by a suitably qualified and experienced person in relation to a design plan or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- a) exactly what is being certified and the precise nature of that certification.
- b) the relevant legislative, regulatory and technical criteria on which the certification has been based;
- c) the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- d) the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

“chemical” means –

an agricultural chemical product or veterinary chemical product within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994 (Commonwealth)*; or

- a) a dangerous good under the dangerous goods code; or
- b) a lead hazardous substance within the meaning of the *Workplace Health and Safety Regulation 1997*; or
- c) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers’ Advisory Council and published by the Commonwealth; or
- d) any substance used as, or intended for use as –
 - i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or
 - ii. a surface active agent, including, for example, soap or related detergent; or
 - iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, bleach, sanitiser, disinfectant, or biocide; or
 - iv. a fertiliser for agricultural, horticultural or garden use; or
- e) a substance used for, or intended for use for –
 - i. mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or
 - ii. manufacture of plastic or synthetic rubber.

“commercial place” means a work place used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees accommodation or public roads.

“competent person” means a person with the demonstrated skill and knowledge required to carry out the task to a standard necessary for the reliance upon collected data or protection of the environment.

“construction” includes building a new dam and modifying or lifting an existing dam.

“contaminant” A contaminant can be –

- a) a gas, liquid or solid; or
- b) an odour; or
- c) an organism (whether alive or dead), including a virus; or
- d) energy, including noise, heat, radioactivity and electromagnetic radiation; or
- e) a combination of contaminants.

“contaminate” means to render impure by contact or mixture.

“contaminated” means the substance has come into contact with a contaminant.

“control measure” means any action or activity that can be used to prevent or eliminate a hazard or reduce it to an acceptable level.

“cover material” means any soil or rock suitable as a germination medium or landform armouring.

“dam” means a land-based structure or a void that is designed to contain, divert or control flow able substances - including any substances that are thereby contained, diverted or controlled by that land-based structure or void; but does not mean a fabricated or manufactured tank or container designed to a recognised standard. In case there is any doubt, a levee dyke or bund is a dam.

“design plan” is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include ‘as constructed’ drawings.

“design storage allowance” or “DSA” means the minimum storage required in a dam at the first of November each year in order to meet the hydraulic performance requirements.

“development approval” means a development approval under the *Sustainable Planning Act 2009* in relation to a matter that involves an environmentally relevant activity under the *Environmental Protection Act 1994*.

“domestic waste” means waste, other than domestic clean-up waste, green waste, recyclable waste, interceptor waste or waste discharged to a sewer, produced as a result of the ordinary use or occupation of domestic premises.

“dwelling” means any of the following structures or vehicles that is principally used as a residence:

- a) a house, unit, motel, nursing homes or other building or part of a building; or
- b) a caravan, mobile home or other vehicle or structure on land; or
- c) a water craft in a marina.

“effluent” treated waste water discharged from sewage treatment plants.

“end of pipe” means the location at which water is released to waters or land.

“environmental authority” means an environmental authority under Chapter 5 of the *Environmental Protection Act 1994*.

“environmental authority holder” means the holder of this environmental authority.

“environmentally relevant activity” means an environmentally relevant activity as defined under Section 18 of the *Environmental Protection Act 1994* and listed under Schedule 1 of the *Environmental Protection Regulation 1998*.

“financial assurance” means a security required under the *Environmental Protection Act 1994* by the Administering Authority to cover the cost of rehabilitation or remediation of disturbed land or to secure compliance with the environmental authority.

“floodwater” means water overflowing, or that has overflowed, from waters, river, creek, stream, lake, pond, wetland or dam onto or over riparian land that is not submerged when the watercourse or lake flows between or is contained within its bed and banks.

“flowable substance” means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

“foreseeable future” is the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptable probability of failure before that time.

“general waste” means waste other than regulated waste.

“hazardous waste” means a substance, whether liquid, solid or gaseous that, if improperly treated, stored, disposed of or otherwise managed, is likely to cause environmental harm.

“hazard” in relation to a dam as defined, means the potential for environmental harm resulting from the collapse or failure of the dam to perform its primary purpose of containing, diverting or controlling flowable substances.

“hazard category” means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

“hydraulic performance” means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category in the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

“infrastructure” means water storage dams, roads and tracks, buildings and other structures built for the purpose of mining activities but does not include other facilities required for the long term management of mining impacts or the protection of potential resources. Such other facilities include dams, waste rock dumps, voids, or ore stockpiles and buildings as well as other structures whose ownership can be transferred and which have a residual beneficial use for the next owner of the operational land or the background land owner.

“LA 10, adj, 10 mins” means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 10% of any 10-minute measurement period, using Fast response.

“LA 1, adj, 10 mins” means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10-minute measurement period, using Fast response

“LA, max adj, T” means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

“land” in the **“land schedule”** of this document means land excluding waters and the atmosphere.

“land capability” as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

“land suitability” as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

“land use” term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

“landfill” means land used as a waste disposal site for lawfully putting solid waste on the land.

“levee” means a dam, dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.

“mandatory reporting level” or **“MRL”** means a warning and reporting level determined in accordance with the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

“mg/L” means milligrams per litre.

“mineral” means a substance which normally occurs naturally as part of the earth’s crust or is dissolved or suspended in water within or upon the earth’s crust and includes a substance which may be extracted from such a substance, and includes—

- a) clay if mined for use for its ceramic properties, kaolin and bentonite;
- b) foundry sand;
- c) hydrocarbons and other substances or matter occurring in association with shale or coal and necessarily mined, extracted, produced or released by or in connection with mining for shale or coal or for the purpose of enhancing the safety of current or future mining operations for coal or the extraction or production of mineral oil therefrom;
- d) limestone if mined for use for its chemical properties;
- e) marble;
- f) mineral oil or gas extracted or produced from shale or coal by in situ processes;
- g) peat;
- h) salt including brine;
- i) shale from which mineral oil may be extracted or produced;

- j) silica, including silica sand, if mined for use for its chemical properties;
- k) rock mined in block or slab form for building or monumental purposes;

But does not include—

- a) living matter;
- b) petroleum within the meaning of the *Petroleum Act 1923*;
- c) soil, sand, gravel or rock (other than rock mined in block or slab form for building or monumental purposes) to be used or to be supplied for use as such, whether intact or in broken form;
- d) water.

“mine water” means process water and contaminated storm water.

“NAF” means non-acid forming.

“natural flow” means the flow of water through waters caused by nature.

“nature” includes:

ecosystems and their constituent parts; and
all natural and physical resources; and
natural dynamic processes.

“noxious” means harmful or injurious to health or physical wellbeing.

“offensive” means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

“operational land” means the land associated with the Project for which this environmental authority has been issued.

“operational plan” means a document that amongst other things sets out procedures and criteria to be used for operating a dam during a particular time period. The operational plan as defined herein may form part of a plan of operations or plan otherwise required in legislation.

“PAF” means potentially acid forming.

“peak particle velocity (ppv)” means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms-1).

“Probable Maximum Flood (PMF)” is the flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in a particular drainage area.

“protected area” means:

- a) a protected area under the *Nature Conservation Act 1992*; or
- b) a marine park under the *Marine Parks Act 1992*; or
- c) a World Heritage Area.

“progressive rehabilitation” means rehabilitation (defined below) undertaken progressively or a staged approach to rehabilitation as mining operations are ongoing.

“process water” means water used or produced during the mineral development activities.

“recycled water” means appropriately treated effluent and urban stormwater suitable for further use.

“reference site” (or analogue site) may reflect the original location, adjacent area or another area where rehabilitation success has been completed for a similar biodiversity. Details of the reference site may be as photographs, computer generated images and vegetation models etc.

“regulated dam” means any dam in the significant or high hazard category as assessed using the Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland (DME 1995).

“regulated waste” means non-domestic waste mentioned in schedule 7 of the *Environmental Protection Regulation 1998* (whether or not it has been treated or immobilised), and includes –

- a) for an element – any chemical compound containing the element; and
- b) anything that has contained the waste.

“rehabilitation” the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

“representative” means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

“residual void” means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

“self-sustaining” means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

“sensitive place” means:

- a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- b) a motel, hotel or hostel; or
- c) an educational institution; or
- d) a medical centre or hospital; or
- e) a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- f) a public park or gardens.

“sewage” means the used water of person’s to be treated at a sewage treatment plant.

“spillway” means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

“stable” in relation to land, means land form dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (traffic ability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.

“Stage 1 of the Monto Coal project” means mining activities using the methods and infrastructure as described in the EMOS March 2012 resulting in maximum coal production of 1.5Mt/a.

“storm water” means all surface water runoff from rainfall.

“trackable waste” means a waste or combination of waste stated in Schedule 1 of the *Waste Reduction and Recycling Regulation 2011*.

“trivial harm” means environmental harm which is not material or serious environmental harm and will not cause actual or potential loss or damage to property of an amount of, or amounts totalling more than \$5,000.

“tolerable limits” means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values. For example, a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing pondage and limiting infiltration and percolation.

“void” means any man-made, open excavation in the ground.

“waste” as defined in section 13 of the *Environmental Protection Act 1994*.

“water” means –

- a) water in waters or spring;
- b) underground water;
- c) overland flow water; or
- d) water that has been collected in a dam.

“waste water” means used water from the activity, process water or contaminated storm water.

“water quality” means the chemical, physical and biological condition of water.

“waters” includes –

- a) river, creek, stream in which water flows permanently or intermittently either:
- b) in a natural channel, whether artificially improved or not; or
- c) in an artificial channel that has changed the course of the river, creek or stream; or
- d) lake, lagoon, pond, swamp, wetland, dam; or
- e) unconfined surface water; or
- f) storm water channel, storm water drain, roadside gutter; or
- g) bed and banks and any other element of a river, creek, stream, lake, lagoon, pond, swamp, wetland, storm water channel, storm water drain, roadside gutter or dam confining or containing water; or
- h) groundwater; or
- i) non-tidal or tidal waters (including the sea); or
- j) any part thereof.

“µg/L” means micrograms per litre

“µs/cm” means microsiemens per centimetre

FIGURES

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APPENDIX A

Current Environmental Authority (MIN100646307)



Queensland Government
Environmental Protection Agency
Queensland Parks and Wildlife Service

Wide Bay Burnett District Office (Maryborough)
 PO Box 101 MARYBOROUGH QLD 4650
 Phone: (07) 4121 1800 Fax: (07) 4121 1650
 www.env.qld.gov.au ABN: 87221158786

Environmental Authority No. MIM800036802 (mining activities)

Section 226 *Environmental Protection Act 1994*

This draft environmental authority is given to the applicant and mining registrar under the Environmental Protection Act 1994 and includes conditions to minimise environmental harm caused, or likely to be caused, by the proposed mining activities. An environmental authority (mining activities) may be for mining activities authorised (under the Mineral Resources Act 1989) to occur under one of the following mining tenements: a prospecting permit; mining claim; exploration permit; mineral development licence; or mining lease. In general, a mining activity means: prospecting, exploring, mining; or processing minerals; remediation; rehabilitation; and includes facilitation and supporting activities and any action taken to prevent environmental harm.

Under the provisions of the *Environmental Protection Act 1994* this environmental authority is issued to:

Monto Coal 2 Pty Ltd
 Sanrus Pty Ltd
 Edge Developments Pty Ltd
 H & J Enterprises (Qld) Pty Ltd
 1095 Waterworks Road
 THE GAP QLD 4061

in respect of carrying out activity as part of the following mining project:

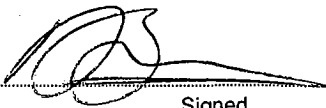
Stage 1 of the Monto Coal Project.

Type of environmental authority (mining activities)	Authorised mining tenements	Location
Mining Lease	ML80101	2 km southeast of Mulgildie

This environmental authority is subject to the conditions set out in the attached schedules.

The anniversary date of this Environmental Authority is **(date to be inserted)** each year.

This environmental authority does not take effect until ML80101 is granted.


 Signed

12/8/03
 Date

D J Brown
Manager (Licensing)
 Delegate of Administering Authority
Environmental Protection Act 1994

Note: This environmental authority document is not proof of the current status of the environmental authority. The current status of the environmental authority may be ascertained by contacting the Environmental Protection Agency.



Minister's Decision – S225 of Environmental Protection Act 1994

On 26 June 2003 the Minister for Environment decided that:

- the application be granted, but on conditions that are different to the conditions in the draft environmental authority; and
- the changes to the conditions be in accordance with the Land and Resources Tribunal objections decision and subsequent consultation and be the conditions as shown in the schedule of conditions

This **Environmental Authority** incorporates the following schedules:

- | | |
|---------------|-----------------------|
| a) Schedule A | - General |
| b) Schedule B | - Air |
| c) Schedule C | - Water |
| d) Schedule D | - Noise and vibration |
| e) Schedule E | - Waste |
| f) Schedule F | - Land |
| g) Schedule G | - Community |
| h) Schedule H | - Definitions |
| i) Schedule I | - Maps / Plans |

Schedule A - General

Financial assurance

- (A1-1) Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.

NOTE: The calculation of financial assurance for condition (A1-1) must be in accordance with Guideline 17 Financial assurance for mining activities and may include a performance discount. The amount is defined as the maximum cost of rehabilitation for each year as defined in the current Plan of Operations and calculated using the formula: (Financial Assurance = Maximum Annual Rehabilitation Cost x Percentage Required)

- (A1-2) The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.

NOTE: Where progressive rehabilitation is completed and acceptable to the administering authority, progressive reductions to the amount of financial assurance will be applicable where rehabilitation has been completed in accordance with the acceptance criteria defined within this environmental authority.

Maintenance of measures, plant and equipment

- (A2-1) The holder must:

- i) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; and
- ii) maintain such measures, plant and equipment in a proper condition; and
- iii) operate such measures, plant and equipment in a proper manner.

Monitoring

- (A3-1) Record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.
- (A3-2) Where monitoring is a requirement of this environmental authority, ensure that an appropriately qualified person conducts all monitoring.

Storage and handling of chemicals and fuels

- (A4-1) Spillage of all chemicals and fuels must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.
- (A4-2) All petroleum product storage's must be designed, constructed and maintained in accordance with AS 1940 - Storage and Handling of Flammable and Combustible Liquids.
- (A4-3) The base and walls of all bunded areas must be maintained free from gaps or cracks that may result in the loss of containment.

END OF CONDITIONS FOR SCHEDULE A

Schedule B - Air

Dust nuisance

- (B1-1) The release of dust and/or particulate matter resulting from the activity must not cause an environmental nuisance at any sensitive place.
- (B1-2) Exceedence of any of the following levels when measured at any dust sensitive place is an environmental nuisance for the purposes of condition B1-1.
 - i) Dust deposition of 120 milligrams per square metre per day (monthly average), when monitored in accordance with Australian Standard AS 3580.10 of 1991; OR
 - ii) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a dust sensitive place downwind of the licensed place, when monitored in accordance with:
 - a) Australian Standard AS 3580.9.6 'Ambient air - Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet - Gravimetric method'; or
 - b) any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.
- (B1-3) When requested by the Administering Authority, dust and particulate monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter, and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring must include:
 - i) for a complaint alleging dust nuisance, dust deposition; and
 - ii) for a complaint alleging adverse health effects caused by dust, the concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time; and
 - iii) must be carried out a place(s) relevant to the potentially affected dust sensitive places and upwind control sites.



Schedule C - Water

- (C1-1) Contaminants must not be released from the boundary of the mining lease to any waters or the bed and banks of any waters other than treated/settled contaminated stormwater from sediment dam(s) that is in accordance with the contaminant release limits in Schedule C - Table 1.
- (C1-2) Monitoring of contaminant releases must be undertaken at the overflow from the sediment dam(s) and records kept, for the quality characteristics and at the frequency specified in Schedule C - Table 1.

Schedule C - Table 1 (Sediment dam contaminant release limits)

Quality Characteristic	Units	Release Limit	Monitoring Frequency
Total Dissolved Solids	mg/L	Must not exceed 500 or 10 percent greater than a background value of the receiving waters whichever is the greater.	Daily in the event of a release
Turbidity	NTU	Must not exceed 50 or 10 percent greater than a background value of the receiving waters whichever is the greater.	Daily in the event of a release
pH	unit	6.5 – 9.0 (range)	Daily in the event of a release

- (C1-3) For the purposes of condition (C1-2) a "background value" for a quality characteristic is the value of the quality characteristic measured on the same day at a background sampling and insitu monitoring point in the receiving waters not affected by the release situated between 20 and 100 metres up-current from the release point into Three Moon Creek.

Note: In the event that a background value is not measured, the quality of the release must be less than 50 NTU turbidity and 500 mg/L total dissolved solids.

- (C1-4) A Water Management Plan must be developed and implemented prior to the commencement of construction of the mine and any associated work on the mining lease.

NOTE: The Water Management Plan is to be managed through the Plan of Operations.

- (C1-5) The Water Management Plan must identify methods to:
- identify the environmental values of the receiving waters including Three Moon Creek and water quality objectives and how they will be protected;
 - incorporate a risk management approach to how changing levels of floods, drought and water quality risks should be addressed.
 - manage recycling;
 - manage stormwater discharge;
 - develop and implement a system for emergency spills or discharges;
 - separate clean water from undisturbed areas and water from disturbed areas;
 - manage site water quality and quantity during the three (3) phases of mining: development, operation and decommission and include a site water balance;
 - safeguard against the potential for soil erosion and acid drainage;
 - provide details of operational monitoring and monitoring of hydrological processes including associated performance indicators.



- (C1-6) The holder of this environmental authority must maximise the recycling or reuse of impounded waters on the licensed place.

Three Moon Creek Surface Water Monitoring Program

- (C2-1) Commencing from the date of issue of the environmental authority the holder of this environmental authority must develop and implement a Surface Water Monitoring Program. The Surface Water Monitoring Program must:
- i) be carried out by a person possessing appropriate qualifications and experience in the field of surface water monitoring program design to be able to competently make recommendations about these matters;
 - ii) record the quality of the surface water at monitoring locations upstream and downstream of the mining activity and be undertaken for, but not be limited to, the following water quality characteristics:
 - oils and petroleum hydrocarbons (mg/L);
 - total metals (mg/L);
 - total dissolved solids (mg/L);
 - total suspended solids (mg/L);
 - dissolved oxygen (mg/L);
 - turbidity (NTU); and
 - pH.
 - iii) include a sufficient number of monitoring locations to establish background water quality and water quality in sections of Three Moon Creek potentially affected by mining activities; and
 - iv) provide representative water sampling from Three Moon Creek carried out with sufficient regularity and spatial and temporal replication to make statistically valid conclusions about the water quality; and
 - v) give consideration to relevant methodology and water quality criteria specified by the Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand in "Australian Guidelines for Water Quality Monitoring and Reporting 2000" and "Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000".
- (C2-2) A record of the results of the surface water monitoring program including background water quality monitoring must be kept and forwarded to the administering authority on request.

Tailings Dam Water Quality

- (C3-1) In the event that tailings dam water quality does not comply with the limits defined in Schedule C - Table 2, implement measures to prevent access by all livestock and minimise access by native fauna.

Schedule C - Table 2 (Tailings dam water quality limits)

Quality characteristic	Units	Contaminant limit	Monitoring frequency
Al	mg/L	5	Quarterly
As	mg/L	0.5	Quarterly
Ca	mg/L	1000	Quarterly
Cd	mg/L	0.01	Quarterly
Cu	mg/L	0.5	Quarterly
F	mg/L	2	Quarterly
Hg	mg/L	0.002	Quarterly
Mg	mg/L	1000	Quarterly
Pb	mg/L	0.1	Quarterly
SO ₄	mg/L	1000	Quarterly
Zn	mg/L	20	Quarterly
Nitrate	mg/L	400	Quarterly
Nitrite	mg/L	30	Quarterly
TDS	mg/L	4000	Monthly
EC	µS/cm	5970	Monthly (field)
pH	unit	6.0 - 8.5 (range)	Monthly (field)

General

- (C4-1) All determinations of the quality of contaminants released must be made in accordance with methods prescribed in the latest edition of the Environmental Protection Agency Water Quality Sampling Manual, and carried out on samples that are representative.

Tailings and Environmental Dams

- (C5-1) The design storage allowance available on 1st November of each year for any tailings dam constructed within the operational land must be equivalent to the total run-off assuming no losses from the catchment of the dam and any contributions from other sources for the critical wet period in Schedule C - Table 3.
- (C5-2) The spillway for any tailings dam constructed within the operational land must be designed to withstand the peak flow from the critical design storm in Schedule C - Table 3.

Schedule C - Table 3 (Storage design)

Storage type	Storage critical wet period	Spillway critical design storm*	Mandatory Reporting Level
Tailings dam	10 Year ARI** four month wet season	10 000 Year ARI	1:100 year ARI***

* The critical design storm has a duration that produces the peak discharge for the catchment.

** ARI means 'annual recurrence interval'.

*** refers to volume below the spillway crest, either the ARI 72 hour storm or the ARI wave allowance, whichever is lower.



- (C5-3) The capacity of the environmental dam must be 18 mega litres and fitted with a pump capable of delivering 17 litres per second to another interim storage (eg. mine pit).
- (C5-4) The environmental dam must have a spillway critical design storm of 1000 Year ARI and a mandatory reporting level of 1:10 year ARI.
- (C5-5) The holder of this environmental authority must notify the administering authority when the pondage level of any tailings dam or environmental dam reaches the mandatory reporting level defined in Schedule C - Table 3.
- (C5-6) The mandatory reporting required by condition (C5-5) must also include analysis results (as they become available) of the dam water quality for at least but not limited to the following water quality characteristics:
- i) oils and petroleum hydrocarbons (mg/L);
 - ii) total metals (mg/L);
 - iii) total dissolved solids (mg/L);
 - iv) turbidity (NTU); and
 - v) pH.
- (C5-7) The base and walls of the tailings dam and environmental dams must be constructed, installed and maintained:
- i) so as to minimise the likelihood of any release of effluent through the bed or banks of the dam to any waters (including groundwater);
 - ii) so as to ensure the stability of the dams' construction.
- (C5-8) Construction of sediment dams other than any dams in the final rehabilitated landform must not occur on out-of-pit spoil dumps.

Erosion and Sediment Control

- (C6-1) All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment to the environmental dam.
- (C6-2) Erosion protection measures and sediment controls must be provided and maintained to effectively minimise any likelihood of erosion and release of sediments from the licensed place and be maintained during site clearing, construction, mining operations and rehabilitation. Such measures should include diversion drainage works and sedimentation traps and dams.
- (C6-3) Erosion control and sediment control structures must be maintained at all times and repaired or replaced as required after each rainfall event.
- (C6-4) In the event that a release from any dam spillway is necessary the release must be managed in such a manner that prevents or minimises erosion of any watercourse or areas affected or potentially affected by the release.

Groundwater

- (C7-1) The extraction of groundwater for use in the mining activity from underground aquifers must not directly or indirectly cause environmental harm to the Abercorn Mound Springs.
- (C7-2) Mining activities carried out on the licensed place must not cause any draw down of groundwater levels in the alluvial aquifers associated with the Three Moon Creek system.
- (C7-3) Contaminants must not be directly or indirectly released to the alluvial aquifers.
- (C7-4) Any draw down of groundwater in the Mulgildie Coal Measures must not impact on other users of groundwater.

Groundwater Monitoring

- (C8-1) A groundwater monitoring network must be installed for the mine site. The network must:
 - (i) be installed and maintained by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater monitoring program design to be able to competently make recommendations about these matters; and
 - (ii) be constructed in accordance with methods prescribed in the latest edition of the Agriculture and Resource Management Council of Australia and New Zealand manual titled '*Minimum Construction Requirements For Water Bores In Australia*';
 - (iii) include a sufficient number of "bore(s) of compliance" that are located an appropriate distance from potential sources of impact from mining activities and provides the following:
 - representative groundwater samples from the uppermost aquifer; and
 - background groundwater quality in hydraulically up-gradient or background bore(s) that have not been affected by any mining activities to groundwaters; and
 - the quality of groundwater down gradient of any potential source of contamination including groundwater passing the relevant bore(s) of compliance.
- (C8-2) Conduct monitoring and keep records of groundwater quality for the relevant bores of compliance for both the alluvial aquifer and Mulgildie Coal Measures. All determinations of groundwater quality must be:
 - (i) conducted for the water quality characteristics and at the minimum frequency stated in Schedule C - Table 4;
 - (ii) taken from sufficient monitoring points and/or wells to obtain representative samples of groundwater both up-gradient and down-gradient of the potential influence;
 - (iii) carried out with sufficient regularity and spatial and temporal replication to make statistically valid conclusions about the presence or absence of contamination or other impact;
 - (iv) carried out with sufficient number of sampling events to determine ambient groundwater quality, level and flow prior to any development of the site occurring;
 - (v) followed by an assessment of whether or not there has been any statistically significant adverse change compared to background values at locations hydraulically down gradient of the potential sources of contamination for each quality characteristic in Schedule C - Table 4.
- (C8-3) On any occasion that samples are obtained in accordance with condition (C8-2) the holder of this environmental authority must measure and record standing groundwater levels in metres accurate to 0.01 metres. The elevation of the reference point, relative to Australian Height Datum, for use in any groundwater level measurement must be determined to an accuracy of 0.01 metres.
- (C8-4) Groundwater draw down fluctuations in excess of 2 metres per year in any 'bores of compliance' located at least 750 metres from the edge of the mine pit, not resulting from the pumping of licensed bores, must be notified within 14 days to the administering authority following completion of monitoring.

- (C8-5) Groundwater level fluctuations as measured in 'bores of compliance' that are caused by seepage from tailings dam or environmental dam must be notified within 14 days to the administering authority following completion of monitoring.
- (C8-6) Groundwater quality in the Mulgildie Coal Measures aquifer must not exceed the contaminant limits specified in Schedule C – Table 4.
- (C8-7) The baseline value for condition (C8-6) is to be determined by sampling on at least four occasions one month apart from reference bores determined by the Plan of Operations prior to the commencement of mining activity.
- (C8-8) A record of the results of baseline monitoring must be kept and forwarded to the administering authority on request.

Schedule C - Table 4 (Ground water contaminant limits and levels)

Quality Characteristic	Units	Contaminant limits and groundwater level	Monitoring Frequency
Al	mg/L	Baseline Value $\pm$ 20%	Quarterly
As	mg/L	Baseline Value $\pm$ 20%	Quarterly
Ca	mg/L	Baseline Value $\pm$ 20%	Quarterly
Cd	mg/L	Baseline Value $\pm$ 20%	Quarterly
Cl	mg/L	Baseline Value $\pm$ 20%	Quarterly
Cu	mg/L	Baseline Value $\pm$ 20%	Quarterly
F	mg/L	Baseline Value $\pm$ 20%	Quarterly
Fe	mg/L	Baseline Value $\pm$ 20%	Quarterly
Hg	mg/L	Baseline Value $\pm$ 20%	Quarterly
K	mg/L	Baseline Value $\pm$ 20%	Quarterly
Mg	mg/L	Baseline Value $\pm$ 20%	Quarterly
Mn	mg/L	Baseline Value $\pm$ 20%	Quarterly
Na	mg/L	Baseline Value $\pm$ 20%	Quarterly
Pb	mg/L	Baseline Value $\pm$ 20%	Quarterly
SO ₄	mg/L	Baseline Value $\pm$ 20%	Quarterly
Zn	mg/L	Baseline Value $\pm$ 20%	Quarterly
HCO ₃	mg/L	Baseline Value $\pm$ 20%	Quarterly
CO ₃	mg/L	Baseline Value $\pm$ 20%	Quarterly
Nitrate	mg/L	Baseline Value $\pm$ 20%	Quarterly
Nitrite	mg/L	Baseline Value $\pm$ 20%	Quarterly
TDS	mg/L	Baseline Value $\pm$ 20%	Quarterly
EC	μ S/cm	Baseline Value $\pm$ 20%	Monthly
pH	unit	Baseline Value $\pm$ 0.5	Monthly
Standing water level	cm	N/A	Monthly



Monitoring requirements for the Abercorn Mound Springs

- (C9-1) The holder of the environmental authority must monitor and record not less frequently than monthly the following:
- i) the volume of water extracted from the Precipice Sandstone bore; and
 - ii) the potentiometric level.
- (C9-2) The holder of the environmental authority must monitor and record the quality of the licensed bore water and Abercorn Mound Springs at least monthly for the water quality characteristics in Schedule C – Table 5.

Schedule C – Table 5

Quality Characteristic	Unit
Conductivity	µS/cm
TDS	mg/L
pH	Unit
Dissolved Oxygen (at spring only)	% saturation
Carbonic Acid CO ₂	mg/L
Na	mg/L
K	mg/L
Ca	mg/L
Mg	mg/L
HCO ₃	mg/L
OH	mg/L
Cl	mg/L
F	mg/L
Total P	mg/L
Total N	mg/L
NO ₃	mg/L
SO ₄	mg/L



- (C9-3) The Abercorn Spring samples must be a composite sample of three (3) samples collected from the middle of the water column along the main pond axis.
- (C9-4) For the purposes of determining any changes to the size of the Abercorn Mound Springs the holder of this environmental authority must monitor at least monthly the distance from reference points specified in Schedule C – Table 6 to:
- i) the edge of the wet ground; and
 - ii) the distance to wetland reeds.
- (C9-5) Within six (6) months of the date of issue of this environmental authority the holder must carry out a baseline study of the ecology of the Abercorn Mound Springs with reference to the Environment Australia publication *Environmental Water Requirements to Maintain Groundwater Dependent Ecosystems* and report the results to the administering authority.
- (C9-6) In the event that the wetted area of the Abercorn Mound Springs is 50% or more below the minimum area measured during the first year of monitoring, the holder of this environmental authority shall investigate and report to the administering authority within thirty (30) days on the possible causes of such impact. The investigation report must include an assessment of any impact on the ecology of the Springs.
- (C9-7) In addition to the reporting requirements required by condition (C9-6) the administering authority must be notified immediately in the event of the following:
- i) the conductivity of spring water falls outside the range of 625 to 2 500 $\mu\text{S}/\text{cm}$; or
 - ii) the occurrence of an algal bloom; or
 - iii) the death of birds, fish or other aquatic fauna inhabiting the spring; or
 - iv) a significant change to vegetation dependent on the springs.

Schedule C – Table 6

Latitude degree	Latitude minute	Latitude second	Longitude degree	Longitude minute	Longitude second	Bearing
25	6	59.1	151	7	59.3	300
25	6	58.7	151	8	3.8	340
25	6	52.8	151	8	2.4	200
25	6	56.3	151	7	56.6	40

END OF CONDITIONS FOR SCHEDULE C



Schedule D - Noise and vibration

Noise nuisance - general

- (D1-2) The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.

Noise nuisance – mining operations (other than blasting and construction)

- (D2-1) Notwithstanding any other condition of this environmental authority noise from the mining activity must not cause an environmental nuisance, at any sensitive place.
- (D2-2) When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of an authorised officer) of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.
- (D2-3) Noise Monitoring must include:
- i) background noise level
 - ii) L_{Amax} , adj, 15 mins
 - iii) L_A 10, adj, 10 mins
 - iv) L_A 1, adj, 10 mins
 - v) the level and frequency of occurrence of impulsive or tonal noise;
 - vi) atmospheric conditions including wind speed and direction;
 - vii) effects due to extraneous factors such as traffic noise; and
 - viii) location, date and time of recording.
- (D2-4) In the event of a complaint about noise environmental nuisance that the administering authority considers is not frivolous or vexatious then a noise management plan is to be developed within one (1) month of the environmental authority holder being advised in writing of the complaint. The noise management plan must address at least, but not be limited to, the following matters:
- (i) identification of component noise sources and activities at the place(s) which impact on noise sensitive areas;
 - (ii) the measured and/or predicted level of these noise sources and activities at noise sensitive places;
 - (iii) the reasonable and practicable control or abatement measures that can be undertaken to reduce identified intrusive noise sources;
 - (iv) the level of noise at noise sensitive places that would be achieved from implementing these measures.
 - (v) the handling of future noise complaints;
 - (vi) community liaison and consultation; and
 - (vii) training of staff in noise management practices.
- (D2-5) Upon the completion of the noise management plan it must be submitted to the administering authority within 14 days for its review and comment.

- (D2-6) After the Administering Authority has provided comment on the noise management plan, the holder of this authority must implement the plan as soon as practicable.
- (D2-7) The environmentally relevant activity(ies) must be carried out by such reasonable and practicable means necessary to prevent the emission of noise that constitutes an unreasonable intrusive noise. The reasonable and practicable measures adopted for the licensed place must be incorporated into the relevant procedure(s) implemented under the Plan of Operations and may include but not necessarily be limited to the following noise abatement measures:
- i) ensure that any new equipment to be used on the site is assessed for potential noise nuisance impacts and appropriately attenuated;
 - ii) ensure that all plant and equipment is operated and maintained in a proper and efficient manner;
 - iii) ensure that engine cowlings and high efficiency silencers are fitted to all the engines of all plant and equipment identified as impacting on noise sensitive receivers;
 - iv) ensure that noise generating activities are not undertaken in close proximity to noise sensitive places or commercial places;
 - v) ensure that noise abatement barriers are sited such that they effectively intercept the sound transmission path between the sources of noise and receptor premises;
 - vi) locate haul and access routes within the premises as far away from the boundaries of the licensed place as is practical having regard to operational convenience; and
 - vii) where operation of reversing beepers is likely to cause environmental nuisance, taking measures to ensure mitigation of the nuisance, for example by de-tuning the reversing beepers, replacing the reversing beepers with other warning devices and/or replacing reversing beepers with alternative reversing beepers which adjust their noise level output in accordance with the prevailing background noise level.

Noise nuisance - construction activities

- (D3-1) Construction activity must only be carried out between the hours of:

7:00 am and 6:00 pm – Mondays to Saturdays
and at no times on Sundays or Public Holidays

- (D3-2) Notwithstanding condition D3-1, construction activity may be undertaken outside these hours provided that the emission of noise from the construction activity does not result in levels greater than specified in Schedule D - Table 3.

Schedule D – Table 3 (Noise limits - 'Sensitive place')

Noise level dB(A) measured as	Noise measured at a 'Sensitive place'			
	Monday to Saturday		Sundays and public holidays	
	6pm - 10pm	10pm - 7am	9am - 6pm	6pm - 9am
L _{Amax} , adj, 15 mins	45	30	35	30
Maximum instantaneous level (Max L _{pA} , adj)	55	40	45	40

Note: L_A 10, adj, 15 mins levels may be substituted for L_{Amax}, adj, 15 mins levels if evidence is provided that L_A 10, adj, 15 mins levels are representative of component noise levels from source(s)/premises under investigation.

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Blasting

- (D4-1) Blasting is to be carried out only between 9.00am to 5.00pm Monday to Friday, or 9.00am to 1.00pm on Saturday.
- (D4-2) The instantaneous sound pressure level when measured at a noise sensitive place must not exceed those levels in Schedule D – Table 4.

Schedule D - Table 4 (Airblast overpressure level - 'Sensitive place')

Noise parameter	Instantaneous sound pressure level
Air blast overpressure level (dB linear peak)	4 out of 5 shots not to exceed 115dB and a maximum of 120dB for any blast

- (D4-3) Noise from each blast must be measured using noise measurement equipment with a lower limiting frequency of 2 Hz (-3 dB response point of the measurement system) and a detector onset time of not greater than 100 μ sec as assessed in accordance with AS 1259.
- (D4-4) Vibration from the mining activity must not cause an environmental nuisance, at any sensitive place.
- (D4-5) Vibration emitted from activities must not exceed the levels specified in Schedule D - Table 5 at any sensitive place.
- (D4-6) Vibration monitoring must be measured at a sensitive place for each blast. Monitoring must include:
- peak particle velocity (mm/s); and
 - location of the blast/s within the site (including which bench level); and
 - atmospheric conditions including temperature, relative humidity and wind speed and direction; and
 - the level and frequency of occurrence of impulsive or tonal noise; and
 - effects due to extraneous factors; and
 - location, date and time of recording.

Schedule D - Table 5 (Vibration limits - 'Sensitive place')

Vibration parameter	Peak particle velocity
Houses and low rise residential buildings and commercial buildings not included below	4 out of 5 shots not to exceed 5mm/s and a maximum of 10mm/s for any blast
Commercial and industrial buildings or structures of reinforced concrete or steel construction	4 out of 5 shots not to exceed 10mm/s and a maximum of 15mm/s for any blast

END OF CONDITIONS FOR SCHEDULE D





Schedule E - Waste

Storage of tyres

- (E1-1) Tyres stored awaiting disposal or transport for take-back and, recycling, or waste-to-energy options - should be stockpiled in volumes less than 3m in height and 200 sq.m in area and at least 10m from any other tyre storage area.
- (E1-2) All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.

Disposal of tyres

- (E2-1) Disposing of scrap tyres in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as possible but not directly on the pit floor.
- (E2-2) Scrap tyres disposed within the operational land must not impede saturated aquifers and compromise the stability of the consolidated landform.

Waste handling and management

- (E3-1) From the commencement of the activity, the holder of this environmental authority must implement a Waste Management Plan that addresses at least the following matters:
 - (i) the types and amounts of waste generated by the activity;
 - (ii) how the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices mentioned in the waste management hierarchy (section 10 of the *Environmental Protections (Waste Management) Policy 2000*);
 - (iii) procedures for identifying and implementing opportunities to improve the waste management practices employed;
 - (iv) procedures for dealing with accidents, spills and other incidents that may impact on the waste management;
 - (v) details of any accredited management system employed, or planned to be employed, to deal with the waste;
 - (vi) how often the performance of the waste management practices will be assessed (at least annually); and
 - (vii) the indicators or other criteria on which the performance of the waste management practices will be assessed.

NOTE: The Waste Management Plan is to be managed through the Plan of Operations.

- (E3-2) All regulated waste removed from site must be removed by a licensed waste removal and transport contractor for recycling or disposal in a licensed regulated waste disposal facility.
- (E3-3) The holder of this integrated authority must not:
 - allow waste to burn or be burned at or on the licensed place; or
 - remove waste from the licensed place and burn such waste elsewhere.

(This condition does not apply to the material that is required to be burnt under quarantine regulations and, burning of such materials is to be carried out in a way that does not cause environmental harm and this condition does not refer to activities carried out under the provisions of the Fire Services Act 1990.)





Waste Rock Management

- (E4-1) Subject to the release limits defined in Schedule - C, all reasonable and practicable measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of the activity to any groundwater or water course.

END OF CONDITIONS FOR SCHEDULE E

Schedule F - Land

Rehabilitation landform criteria

- (F1-1) The holder of this authority must develop and implement a Final Land Use and Rehabilitation Plan to ensure that all areas disturbed by mining activities will be suitably rehabilitated in accordance with Schedule F – Table 1. The Plan must include, but is not limited to the following:
- i) disturbance type;
 - ii) disturbance area;
 - iii) pre and post mine land descriptions;
 - iv) pre mine and post mine land capability;
 - v) analogue site(s) identification;
 - vi) a description of rehabilitation management techniques incorporating works and monitoring programs and timetables;
 - vii) indicators for success; and
 - viii) keeping of appropriate records of rehabilitation measures implemented including taking of photographs demonstrative of rehabilitation achieved and the preparation of annual rehabilitation progress reports. A summary of the annual rehabilitation progress report must be submitted to the administering authority with each annual return.

NOTE: The Final Land Use and Rehabilitation Plan is to be managed through the Plan of Operations.

Schedule F – Table 1

Disturbance		Pre-mine land capability class	Post-mine land capability class	Max Slope design criteria		Max vertical height (m)	Max distance between erosion control structures (m)	Final land use description
Type	Area (ha)			%	°			
Infrastructure	7.5	III	III	N/A	N/A	N/A	N/A	Remove all plant and equipment and land returned to productive land use including but not limited to cropping, forestry and grazing.
Out of pit spoil dump	80	III	IV	16.7	9.4	10-30	60	Productive land use including but not limited to cropping and forestry.
Elevated landform (overburden) – upper surface	108	III	IV	16.7	9.4	20	60	Productive land use including but not limited to cropping and forestry.
Elevated landform (overburden) - slopes	65	III	V	16.7	9.4	20	60	Productive land use including but not limited to cropping and forestry.
Haul roads	2	III	V	N/A	N/A	N/A	N/A	To be retained as access roads.
Tailings dam embankment	10	III	V	16.7	9.4	20	60	Permanent stable structure.
Tailings dam storage area	11	III	V	16.7	9.4	20	60	Capped with a final cover system in accordance with conditions (F2-1) and (F2-2).
Sediment dam embankments	1.4	III	V	N/A	N/A	N/A	N/A	Dams to be removed and land returned to productive land use including but not limited to cropping and forestry.
Sediment dam pondage areas	4.8	III	V	N/A	N/A	N/A	N/A	Dams to be removed and land returned to productive land use including but not limited to cropping and forestry.
Environmental dam embankment	0.2	III	V	N/A	N/A	N/A	N/A	Dams to be removed and land returned to productive land use including but not limited to cropping and forestry.
Environmental dam pondage area	0.4	III	V	N/A	N/A	N/A	N/A	Dams to be removed and land returned to land use including but not limited to cropping and forestry.
Residual void	25	III	VIII	*	*	*	*	Proposed water storage.
Rail loop	0.6	III	N/A	N/A	N/A	N/A	N/A	Will be owned by Queensland Rail and will remain after completion of the project.

Note¹: % means percent slope.

Note²: ° means degrees.

Note*: refer to condition (F4-1).

Note: N/A means not applicable.

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- (F1-2) In developing the Final Land Use and Rehabilitation Approval Plan required by condition (F1-1) the mining lease must as a minimum be returned to a productive land use eg forestry, cropping or a combination of both.
- (F1-3) Progressive rehabilitation must commence as soon as practicable when areas become available within the operational land.

Closure and Post Closure Care

- (F2-1) When the deposition of tailings ceases, the holder of this environmental authority must install a final cover system to the tailings dam which effectively minimises:
- infiltration of water into the tailings dam; and
 - the likelihood of any erosion occurring to either the final cover system, dumped spoil material or deposited tailings.
- (F2-2) The final cover system must include an upper layer of earthen material that is capable of sustaining plant growth.

Sustainable Final Land Use Outcome

- (F3-1) Areas that are to be progressively rehabilitated must comply with, but not be limited to, the following outcomes;
- All areas disturbed by mining activities must be rehabilitated to the landform design criteria defined in the Final Land Use and Rehabilitation Plan required by condition F1-1.
 - The final landforms must be stable with erosion rates comparable to analogue sites.
 - For a self sustaining ecosystem final land use the establishment of vegetation species for a type and density determined by research of appropriate analogue sites. These vegetation species must be listed in the Final Land Use and Rehabilitation Plan.

Residual void outcome

- (F4-1) Residual voids must comply with the following outcome:
- residual voids or contents of residual voids must not cause any environmental harm to land or waters, other than the environmental harm to land within the footprint of the residual void itself; and
 - residual voids must comply with the design criteria in Schedule F – Table 2.
- (F4-2) The holder of this authority must complete an investigation into the residual void and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in (F3-1) and landform design criteria in Schedule F – Table 2 prior to mine closure.

Schedule F - Table 2 (Residual void design)

Void identification	Void wall - competent rock slope (°)	Void wall - incompetent rock slope (°)	Void maximum surface area (ha)
Stage 1 void	51	37	25

Infrastructure

- (F5-1) All infrastructure, constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner / holder.

END OF CONDITIONS FOR SCHEDULE F

Schedule G - Community

Complaint response

- (G1-1) All complaints received must be recorded including details of complainant, reasons for the complaint investigations undertaken, conclusions formed and actions taken. This information must be made available for inspection by the administering authority on request.
- (G1-2) The holder of this environmental authority must continue to keep the community informed of the operation's progress and to be available to discuss concerns raised by individuals or community groups through a community consultation program.
- (G1-3) The community consultation program required by condition (G1-2) must provide for an ongoing community consultation forum to be implemented for the duration of Stage 1 of the Monto Coal Project. The community consultation forum must include regular community meetings at no greater than quarterly (3 month) intervals to facilitate:
- (i) conveyance of information to the community regarding mining progress and emerging issues; and
 - (ii) the raising of specific concerns regarding mine operation by community members.

Community notification of amendment

- (G2-1) The holder of this environmental authority must notify the residents of Monto Shire of any application to amend this environmental authority that, if approved, would result in an increase in ROM coal production beyond 1.5 Mt/a.

Note: The notification provisions will be satisfied if the holder of this environmental authority places an advertisement in the local newspaper that contains sufficient detail to inform the residents of the nature and extent of the proposed amendment, and the time and location of a meeting of the community consultation forum required by condition (G1-3) that will discuss the proposed amendment. This meeting is to be held at least two weeks before any objection period for the amendment ends.

END OF CONDITIONS FOR SCHEDULE G

Schedule H - Definitions

Words and phrases used throughout this licence are defined below except where identified in the EP Act or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

Interpretation

"EMOS" means the environmental management overview strategy report titled Monto Coal Project Environmental Management Overview Strategy and dated March 2002. Although legally the environmental authority is the enforceable document, not the EMOS, if there was any need for interpretation of the conditions, then the interpretation should be in the context of the EMOS.

Word definitions

"Abercorn Mound Springs" means the springs as stated in the EMOS.



"acceptance criteria" means the measures by which the actions implemented to rehabilitate the land are deemed to be complete (same as completion criteria).

"airblast overpressure" means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dB).

"alluvial aquifers" means the aquifers as stated in the EMOS.

"ambient (or total) noise" at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

"analogue site" means a reference site not affected by mining for the final land use description stated in Schedule F – Table 1.

"annual exceedence probability" means the probability that the given event will be exceeded within a one year period.

"appropriately qualified person" means any person who conforms to the EPA operational policy for an 'appropriately qualified person (analyst)' in accordance with Section 490(7) of the *Environmental Protection Act 1994*.

"ARD" means acid rock drainage and refers to the low pH, high heavy metal pollutant typical of sulphidic mine wastes, and most commonly associated with the production of ferrous iron and sulphuric acid through the oxidation of sulphide minerals.

"authority" means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

"background noise level" means either:

$L_{A90, T}$ being the A-weighted sound pressure level exceeded for 90 percent of the time period not less than 15 minutes, using Fast response, or

$L_{avg, T}$ being the arithmetic average of the minimum readings measured in the absence of the noise under investigation during a representative time period of not less than 15 minutes, using Fast response.

"blasting" means the use of explosive materials to fracture-

- rock, coal and other minerals for later recovery; or
- structural components or other items to facilitate removal from a site or for reuse.

"climax community" means flora and fauna communities that have attained a stable biological diversity and have reached equilibrium with the surrounding ecosystems.

"commercial place" means a place used as an office or for business or commercial purposes, other than a place within the boundaries of the operational land.

"construction activity" means works involving preparation of infrastructure and roads in the infrastructure area.

"design storage allowance" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"environmental authority holder" means the holder of this environmental authority.

" $L_{A 10, adj, 10 mins}$ " means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 10% of any 10 minute measurement period, using Fast response.

" $L_{A 1, adj, 10 mins}$ " means the A-weighted sound pressure level, (adjusted for tonal character and impulsiveness of the sound) exceeded for 1% of any 10 minute measurement period, using Fast response

" $L_{A, max adj, T}$ " means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

"land" in the 'land schedule' of this document means land excluding waters and the atmosphere.

"land capability" means the classifications as described in Table 5.3 of the EMOS.

"land use" term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

"leachate" means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

"mandatory reporting level" means the volume below the spillway crest, equivalent to the lower of the annual exceedance probability (design risk) 72 hour storm or the annual exceedance probability wave allowance.

"Mulgildie Coal Measures" means the aquifer as stated in the EMOS.

"noxious" means harmful or injurious to health or physical well being, other than trivial harm.

"NTU" means nephelometric turbidity units.

"offensive" means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

"peak particle velocity (ppv)" means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms).

"percent slope" = $\frac{\text{height difference (metres)}}{\text{horizontal difference (metres)}} \times 100$

"precipice sandstone aquifer" means the aquifer as stated in the EMOS.

"protected area" means

- a protected area under the Nature Conservation Act 1992; or
- a marine park under the Marine Parks Act 1992; or
- a World Heritage Area.

"progressive rehabilitation" means rehabilitation (defined below) undertaken progressively OR a staged approach to rehabilitation as mining operations are ongoing.

"rehabilitation" means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

"representative" means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

"sediment dam" means a structure for the capture and treatment of stormwater runoff contaminated only by sediments from disturbed areas and which discharge off-site once full.

"self sustaining" means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

"sensitive place" means:

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- an educational institution; or
- a medical centre or hospital; or
- a protected area under the Nature Conservation Act 1992, the Marine Parks Act 1992 or a World Heritage Area; or
- a public park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes which is not part of the mining activity and does not include employees accommodation or public roads.

"stable" means geotechnical stability of the rehabilitated landform where instability related to the bearing capacity, excessive settlement and subsidence caused by consolidation / settlement of the wastes deposited, and sliding / slumping instability has ceased.

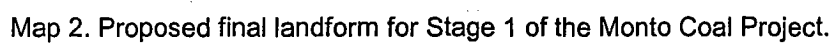




"Stage 1 of the Monto Coal Project" means mining activities using the methods and infrastructure as described in the EMOS March 2002 (including the EMOS addendum, September 2002) resulting in maximum ROM coal production of 1.5 Mt/a.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), and any under groundwater, any part-thereof.

END OF DEFINITIONS FOR SCHEDULE H



END OF ENVIRONMENTAL AUTHORITY

APPENDIX B

Water Licence 174797

WATER LICENCE

Water Act 2000



Queensland
Government

Natural Resources,
Mines and Water

Reference 174797 **Expiry Date** 30/06/2035

Licensee MONTO COAL NO 2 PTY LTD
SANRUS PTY LTD
H & J ENTERPRISES PTY LTD
EDGE DEVELOPMENTS PTY LTD

Authorised Activity The taking of underground water from PRECIPICE SANDSTONE under land described as Lot 124 on RW714.

Authorised Purpose Mining

Nominal Entitlement 700 megalitres per water year

This water licence is subject to the conditions endorsed hereon or attached hereto.

Under the *Integrated Planning Act 1997* a development permit may be required for operational works to take or interfere with the water described in this licence. The licensee must ensure that the relevant development approvals have been obtained prior to installing or constructing new or additional operational works.

Given at Bundaberg this THIRD day of JULY 2006.

Bob McCarthy
DIRECTOR-GENERAL
DEPARTMENT OF NATURAL RESOURCES, MINES AND WATER

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Expiry Date 30/06/2035



**Queensland
Government**

**Natural Resources,
Mines and Water**

Conditions: Schedule A

1.01

The licensee must notify the chief executive of any new or additional works through which water under this water licence is to be taken, prior to taking the water from these new or additional works. The notification must be given in writing and if the new or additional works require development approval, this notification must include details of the relevant development permit(s).

1.40

The licensee must commence the taking of the water authorised under this water licence within five (5) years.

4.37

Water must not be taken under the authority of this water licence unless a meter of a type approved by the chief executive to record the volume taken is installed.

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**Natural Resources,
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Conditions: Schedule B

RECITALS

A. Monto Coal 2 Pty. Ltd., Sanrus Pty. Ltd., H & J Enterprises (Qld.) Pty. Ltd., Edge Developments Pty. Ltd (hereinafter "the Licensee") is the owner of Lot 124 on RW714, upon which it proposes to operate an open-cut coal mining operation (hereinafter "the Mine"). The licensee will construct a bore accessing the Precipice Sandstone aquifer within the Mulgildie Basin to provide water as part of the supply to the Mine and take water from the bore under the licence.

B. The taking of water under this licence will impact on the piezometric levels in the region of the bore constructed to take water under this licence. The impact will progressively diminish after closure of the Mine.

C. Subsequent to making an application for this licence, the Licensee submitted to the Department of Natural Resources, Mines and Water predictions of the impact of the taking of water under this licence on the piezometric levels in the region. These predictions were derived from a numerical model developed to enable such predictions to be made. The reduction in piezometric level is expected to affect the water supply available from some existing bores. The reduction in piezometric level is also likely to extend as far as the Abercorn Springs, and in that event it is possible that the supply of water to the Abercorn Springs will be reduced. This Licence provides for the taking of water only to the extent:

- (i) That the activity does not reduce the supply of water to the Abercorn Springs; and
- (ii) On the condition that the licensee makes good the supply of water from a pre-existing bore that is diminished as a consequence of the activity.

DEFINITIONS

In this License:

"annual", "annually", "annual period" or similar references mean the period 1 July to 30 June following each year;

"chief executive" means the chief executive of the Department of the State administering the Water Act 2000.

"conditions" are the conditions of this licence established in accordance with section 214 of the Water Act 2000 that are specified in schedule A and schedule B to this licence.

"cost of measures to make good" means the cost incurred by the licensee of this licence to carry out the measures necessary to make good the supply of water to the licensee or owner of an unduly affected bore pursuant to SPEC 04.01.

"licensee" is the licensee of this licence, either as referenced in Recital A or another entity or entities to which the licence may be transferred during the period of the licence.

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"Hutton sandstone" means the Hutton sandstone aquifer in the Mulgildil 1 management unit of the Mulgildil Management Area specified in Schedule 4 to the Water Resource (Great Artesian Basin) Plan 2006.

"measures to make good" has the meaning ascribed to it in SPEC04.01.

"pre-existing bore" has the meaning ascribed to it in SPEC01.

"Precipice sandstone" means the Precipice sandstone in the Mulgildil 2 management unit of the Mulgildil Management Area specified in Schedule 4 to the Water Resource (Great Artesian Basin) Plan 2006.

"quarter", "quarterly", "quarterly period" or similar references mean the three monthly periods ending 30 September, 31 December, 31 March, 30 June each year.

"unduly affected" has the meaning ascribed to it in SPEC02.

INTERPRETATION

In this Licence:

(a) headings to conditions are for ease of reference only and shall not in any way affect the meaning of the conditions;

(b) words in the singular shall include the plural and vice versa.

NOTICES

(a) Form of Notice

Any notices, consents, documents, invoices or other communication ("notice") required or permitted to be given under the conditions of this licence:

(i) must be in writing; and

(ii) may be given by being hand-delivered; sent by prepaid registered post; or by facsimile transmission, where facsimile transmission facilities are available for receipt of such a communication; to the address of the parties set out below or such other address as may be notified as the appropriate address from time to time for the purposes of this Licence.

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**Queensland
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Natural Resources,
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The Chief Executive:

The Chief Executive
C/- Resource Management Officer
(Water Management and Use)
Department of Natural Resources, Mines and Water
PO Box 1143
BUNDABERG QLD 46750
Telephone: (07) 41315867
Facsimile: (07) 41315896

Licensee:

Monto Coal 2 Pty. Ltd., Sanrus Pty. Ltd., H & J Enterprises (Qld.) Pty. Ltd., Edge Developments Pty. Ltd

Level 18
215 Adelaide St
BRISBANE QLD 4001
Telephone: (07) 32217210

(b) Time Service Occurs

A notice is deemed to be served on a party:

(i) in the case of post - on the third business day after posting; or

(ii) in the case of facsimile - on the day of the transmission if the transmission is before 5.00pm on a business day; or in all other circumstances, on the first business day following transmission of the facsimile; provided in either case that the sending party has received a communication report confirming that there has been a correct and complete transmission.

UNDULY AFFECTED PRE-EXISTING WATER SUPPLIES TO BE IDENTIFIED

SPEC01

(a) Any bore that:

- (i) is in existence at the date of issue of this licence, and
- (ii) is approved development under the Integrated Planning Act 1997; and
- (iii) takes water from the Precipice Sandstone; and
- (iv) takes that water under the authority of the Water Act 2000;

is a "pre-existing bore."

(b) Any bore that is constructed to replace a pre-existing bore is taken to be a pre-existing bore.

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(c) Any bore that is constructed as a measure to make good the supply of water from a pre-existing bore under the licence is taken to be a pre-existing bore.

SPEC02

02.01

For a pre-existing bore, if at any time, in the opinion of the chief executive, the taking of water causes either:

(a) a material reduction in the piezometric level in the pre-existing bore relative to the piezometric level existing immediately before the commencement of the taking of water under the licence and that reduction in piezometric level causes -

(i) a material reduction in the supply of water from the pre-existing bore relative to the supply available immediately prior to the taking of water under the licence; or

(ii) a material increase in the cost of maintaining the supply of water from the pre-existing bore relative to the cost of supply immediately prior to the taking of water under the licence; or

(b) a material reduction in the quality of water available to the owner of the pre-existing bore,

then the pre-existing bore will be regarded as being "unduly affected" by the taking of water under the licence.

02.02

The licensee must co-operate with the owner of any pre-existing bore that is unduly affected, or is likely to become unduly affected, to collect piezometric, water supply and water quality information necessary to support conclusions concerning the impact of the taking of water under the licence on the supply, reliability, quality or quantity of water available from such pre-existing bore.

UNDULY AFFECTED PRE-EXISTING SUPPLIES TO BE MADE GOOD

SPEC03

03.01

Where a pre-existing bore is unduly affected by the taking of water under the licence, the licensee shall, at the cost of the licensee, carry out such measures, or cause such measures to be carried out, as are necessary to make good the supply of water to the owner of the unduly affected bore, pursuant to the terms of the licence (the "measures to make good").

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03.02

A water supply to the owner of a pre-existing bore unduly affected by the taking of water under the licence will be considered to be made good if:

(a) the supply of water available to the owner of the pre-existing bore, whether from the pre-existing bore or another source, is not materially less than that which would have been available from the pre-existing bore but for the taking of water under the licence; and

(b) the reliability and the quantity of water is equivalent to that which was available from the pre-existing bore immediately before the commencement of the taking of water under the licence; and

(c) the owner of the pre-existing bore does not suffer increased cost in the operation of the made good water supply; and

(d) the quality of the water available to the owner of the pre-existing bore is suitable for the purposes for which the owner uses the water.

03.03

Where there is more than one person taking water from the Precipice sandstone, the licensee's obligations to make good a supply of water is proportional to the impact caused by the taking of water by the licensee under the licence. The proportion will be determined by the chief executive having regard to:

- i. the location of the licensee's bore and the pre-existing bore(s);
- ii. the distance between the licensee's bore and the pre-existing bore (s);
- iii. the volume of water taken by the licensee under the licence;
- iv. the rate at which water is taken by the licensee under the licence;
- v. the best available hydrogeological information about the area.

The chief executive may require the licensee to undertake hydrological assessment and/or modelling to demonstrate or assess the impact that the taking of water under the licence has on a pre-existing bore(s).

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MEASURES TO MAKE GOOD PRE-EXISTING SUPPLIES

SPEC04

04.01

Measures to make good an unduly affected pre-existing bore may include one or more of the following:

- (a) deepening a pre-existing bore in the Precipice Sandstone;
- (b) replacing a pre-existing bore with another bore;
- (c) replacing or modifying existing water supply equipment;
- (d) providing a water supply of an equivalent quantity and suitable quality by piping from an alternate water source;
- (e) providing a cash settlement to the owner of a pre-existing bore; or
- (f) other measures as may be agreed between the Licensee and the owner of the pre-existing bore.

04.02

If a pre-existing bore is unduly affected by the taking of water under the licence then the licensee shall make all reasonable attempts to agree with the owner of the unduly affected pre-existing bore on measures to make good the supply of water from such pre-existing bore.

04.03

If, after advice from the parties that agreement pursuant to SPEC04.02 cannot be reached, and in the opinion of the chief executive all reasonable attempts have been made to achieve agreement, then the chief executive:

- (a) may give a notice to the licensee to require the licensee to provide to the satisfaction of the chief executive any data necessary to determine the measures necessary to make good the supply of water from the pre-existing bore;
- (b) will, in consultation with the licensee and the owner of the pre-existing bore, determine the measures to be taken to make good the supply of water from the pre-existing bore; and
- (c) will, upon determining the measures to be taken to make good the supply of water from the pre-existing bore, give the licensee a notice to inform the licensee of the determination.

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04.04

The licensee must implement, at the cost of the licensee but subject to Spec 03.03, all measures necessary to make good the supply of water from an unduly affected pre-existing bore, either as agreed between the licensee and the owner of such bore under condition SPEC04.02 or as determined by the chief executive and notified under condition SPEC 04.03.

CONSTRUCTION OF PIEZOMETRIC MONITORING WORKS

SPEC05

05.01

Before commencing to take water under the licence, the licensee must construct monitoring bores to monitor the piezometric level in the Precipice Sandstone and the Hutton Sandstone. The monitoring bores are to be located at a site adjacent to Lot 68 on Plan RW92 on Anyarro Road at a site to be established in consultation with the chief executive.

05.02

The licensee must obtain a lease, licence or Permit to Occupy under the Land Act 1994 over the site of the monitoring bores referred to in SPEC 05.01 prior to commencing to construct the works.

05.03

The licensee must apply for a development permit to construct the monitoring bores referred to in SPEC 05.01 within 30 days of the grant of the licence. The licensee must construct the monitoring bore in accordance with the development permit.

05.04

The chief executive may cause piezometric monitoring equipment to be installed on the bore owned and operated by Monto Shire Council for Mulgildie Town water supply to monitor the piezometric level in that bore. The licensee must meet the full cost incurred by the chief executive in the installation and operation of such equipment.

ABERCORN SPRING MONITORING REQUIREMENTS

SPEC06

06.01

The chief executive will monitor the Abercorn Springs in accordance with the obligations specified in section 37 of the Water Resource (Great Artesian Basin) Plan 2006.

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PIEZOMETRIC AND AQUIFER WATER QUALITY MONITORING REQUIREMENTS

SPEC07

07.01

The licensee must monitor the piezometric level and the water quality in the monitoring bores specified in SPEC 05 and in the production bore operated by the licensee. The monitoring must commence immediately on completion of construction of the respective bores and continue thereafter at the end of each quarter, including at the end of the quarter in which the initial monitoring is completed. The monitoring parameters are specified in Attachment A to this schedule.

07.02

The licensee must undertake piezometric and water quality monitoring for all monitoring bores referenced in conditions under SPEC 05 for a continuous period of not less than 6 months immediately prior to commencing to take water under the authority of this licence.

07.03

If directed by the chief executive, the licensee must also monitor the piezometric levels and the water quality in the water bore operated by Monto Shire Council for Mulgildie town water supply. The licensee's obligation to comply with the direction of the chief executive is subject to the licensee's obtaining the written agreement of Monto Shire Council, on terms acceptable to the licensee acting reasonably, in relation to arrangements necessary to give effect to such direction.

07.04

If directed by the chief executive, the licensee must also monitor the piezometric levels and the water quality in any pre-existing bore that is unduly affected, or that in the opinion of the chief executive is likely to become unduly affected by the taking of water under the licence. The licensee's obligation to comply with the direction of the chief executive is subject to the licensee's obtaining the written agreement of the owner of such a pre-existing bore, on terms acceptable to the licensee acting reasonably, in relation to arrangements necessary to give effect to such direction.

07.05

The licensee must give the chief executive an annual report on the monitoring of piezometric levels and water quality carried out in accordance with SPEC 07.01; SPEC 07.02; SPEC 07.03; SPEC 07.04 and SPEC 07.05. This annual report must be given to the chief executive by 30 September following the end of each annual reporting period. This report is to be annexed to the report required under SPEC08.

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WATER OPERATIONS REPORTS

SPEC 08

08.01

The licensee must provide an annual water operations report to the chief executive. The report must be given to the chief executive by 30 September following the end of each annual period.

08.02

A water operations report must include:

(a) the results of monitoring carried out under conditions SPEC 06 and SPEC 07; and

(b) in respect of the monitoring data:

(i) an assessment of the cause of any material change in the quality of water taken under the licence; and

(ii) an assessment of any material difference between the monitored piezometric level and the piezometric level predicted at time of application for the licence in the "Report on Monto Coal Project - Stage 1, Precipice Sandstone Groundwater Model. August 2002"; and

(iii) an assessment of the need for adjustment of the model used to predict piezometric impact;

(iv) if adjustment has been made to the model used to predict piezometric impact:

(A) details of the adjustments; and

(B) plans showing the revised prediction, made using the adjusted model, of the total piezometric impact from the commencement of pumping for 30 years, being 15 years of pumping plus 15 years of recovery from pumping; and

(C) plans showing the difference between these predicted piezometric impacts and the piezometric impacts as predicted at the time of application for the licence as described in condition SPEC08.02(b)(ii) above; and

(c) details of the quantity of water taken each month of the annual period.

(d) details of any measures to make good the supply of water from an unduly affected pre-existing bore undertaken during the reporting period.

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WATER OPERATIONS REVIEW

SPEC 09

09.01

If a water operations report or an independent assessment carried out by the chief executive, shows that:

(a) the taking of water under the licence is predicted to cause at a time 15 years from the commencement of taking water, a piezometric drawdown that is more than 10 metres greater than that predicted in the Report: Monto Coal Project - Stage 1, Precipice Sandstone Groundwater Model, August 2002; and

(b) this condition is predicted to exist over an area that is more than 10% of the area predicted to be impacted by more than 10 metres of drawdown, then the taking of water under the licence will be "impacting on piezometric level outside design assumptions".

09.02

If the taking of water under the licence is impacting on piezometric level outside design assumptions, then the chief executive may:

(a) give the licensee a notice requiring the licensee to redevelop the model used to predict piezometric impacts and to submit to the chief executive a report on that redevelopment; and

(b) commence a process to amend the licence to change the monitoring works requirement specified in condition SPEC05, the piezometric monitoring program specified in condition SPEC07, and the required contents of the water operations reports specified condition SPEC08.

ABERCORN SPRING IMPACT REPORTING

SPEC 10

10.01

If the monitoring carried out by the chief executive as referenced in SPEC 06 demonstrates that the flow of water to the Abercorn Spring is reduced such that:

(a) the wetted area of the Abercorn Spring is reduced by 50% or more from the wetted area existing at commencement of the taking of water under the licence; or

(b) the wetted area of the Abercorn Spring is reduced by more than 10% compared to the previous monitoring period; or

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(c) the conductivity of the spring water either halves or doubles compared to the initial monitoring conducted by the chief executive;

then the chief executive may direct the licensee to submit to the chief executive an "Abercorn Spring impact report" within 60 days.

10.02

An Abercorn Spring impact report given in accordance with SPEC 10.01 must contain complete information as to the nature of the identified impact and:

(a) an assessment of the impact; and

(b) an assessment of the cause of the impact, including an assessment of the possibility that the impact is caused to any extent by the taking of water under the licence.

ABERCORN SPRING MAINTENANCE PROGRAM

SPEC 11

11.01

If, in response to an Abercorn Spring impact report, the chief executive concludes that the taking of water under the licence has caused, in whole or in part, a reduction in supply of water to the Abercorn Spring, the chief executive may give the licensee a notice directing the licensee to prepare and submit to the chief executive an "Abercorn Spring Maintenance Program".

The notice will specify the period, being a period of not less than 20 business days from the day the chief executive gives the notice, within which the licensee must prepare and give to the chief executive such Abercorn Spring Maintenance Program.

The chief executive will notify the licensee of the chief executive's acceptance or rejection of an Abercorn Spring Maintenance Program submitted by the licensee pursuant to a notice given by the chief executive under this condition.

If the chief executive rejects an Abercorn Spring Maintenance Program prepared by the licensee pursuant to a notice given under this condition, the chief executive's notification of such rejection may include a direction to the licensee to modify the program in respect of the deficiency causing the chief executive to reject the program. Such direction will specify the period, being a period not less than 20 business days from the day the chief executive notifies the licensee of the rejection of the program, within which the licensee must prepare and give to the chief executive a modified Abercorn Spring Maintenance Program.

Water Licence 174797

Expiry Date 30/06/2035



**Queensland
Government**

**Natural Resources,
Mines and Water**

11.02

The licensee must prepare and give to the chief executive an Abercorn Spring Maintenance Program, or a modified Abercorn Spring Maintenance Program, in accordance with any notice given by the chief executive under SPEC11.01

11.03

A notice given by the chief executive under condition SPEC11.01 may include a direction that the licensee co-operate with other licensees also impacting on the Abercorn Spring to jointly prepare the Abercorn Springs Maintenance Program.

11.04

An Abercorn Spring Maintenance Program must include:

- (a) a schedule of pumping reductions, or other measures to remove impact and avoid future impacts on the spring from the taking of water under the Licence;
- (b) an assessment showing why the measures provided in the program will be effective in removing impact; and
- (c) an implementation timetable.

11.05

If the chief executive accepts an Abercorn Spring Maintenance Program prepared by the licensee pursuant to a notice given under condition SPEC11.01, the licensee must proceed to implement any requirements of the program that are relevant to the licensee within 20 business days of the notice of acceptance given by the chief executive under condition SPEC11.01.

11.06

If the licence is inconsistent with an Abercorn Spring Maintenance Program accepted by the chief executive, the chief executive will, immediately upon giving notice of the acceptance of the program under condition SPEC11.01, commence a process to amend the licence to make it consistent with the accepted program.

11.07

If, when required by a notice given by the chief executive under condition SPEC11.01, the licensee fails to give the chief executive an Abercorn Springs Maintenance Program that is acceptable to the chief executive, the chief executive will commence a process to amend the licence as necessary to protect the Abercorn Springs including, for example, by reducing the volume of water authorised to be taken under the licence.



Under the *Water Act 2000*, the chief executive of the Department of Natural Resources, Mines and Water has certain powers that are applicable to the management of water resources. For your information, those powers applicable to your water licence are outlined below. Please note that the wording in these notes does not reflect the exact wording in the *Water Act 2000* and reference should be made to the Act for precise details.

- The chief executive may grant a licence with all the conditions that are considered necessary and may amend, revoke or add to the conditions of a licence at any time.
- If a licensee contravenes or fails to carry out any conditions of a licence, the licensee may be liable to a penalty and the licence may be cancelled or suspended or amended.
- Water taken under this licence may only be used within the boundaries of the land identified on the licence as "attached" land unless a regulation or a Water Resource Plan allows water to be seasonally assigned to other land.
- Water use on an area in excess of any authorised area or in excess of any authorised volume (ie unauthorised use) is not permitted and is an offence under the *Water Act 2000*. Unauthorised use may result in prosecution. Repeat offences will result in a prosecution and/or potentially cancellation of a licence.
- Should you sell all of the land attached to this licence, the new owner of the land becomes the licensee. To assist the processing of the transfer of water licence the new owner should give this Department notice of the change of ownership.
- Should you sell part of the land attached to this licence, the licence will expire on that day. You and/or the new owners of the disposed land have only 60 business days to apply for a replacement licence or licences. Failure to meet this deadline will mean a new application will be required and there is no guarantee that such an application will be approved. Where an application or applications are made to replace the original expired licence, the allowed volume may be redistributed, reduced or revoked in a manner determined by the chief executive. To prevent your licence from expiring on disposal of part of your land, it is possible to apply to subdivide or amend the licence before the sale, so that on disposal, the original licence or a new subdivided licence will travel with the land to which it attaches.
- Water licences are issued for a stated period and will expire if not renewed. While a licensee may apply to renew a licence, there is no guarantee that the renewal application will be approved. If it is renewed, the chief executive may amend the conditions of the licence at the time of renewal.
- It is the responsibility of the licensee to apply for renewal of a licence before the licence expires. Failure to do so will cause the licence to expire. The original licensee has only 30 business days to apply for reinstatement of the licence. An application for reinstatement incurs an application fee. If the licensee has ceased to be the owner of the land that the licence attaches then the new owner of that land can make application for reinstatement of licence within 30 business days of expiry of the licence.
- The licensee must not tamper, or allow others to tamper with any measurement or recording device associated with this licence such that it fails to cooperate accurately. Tampering with any measurement or recording device is an offence under the *Water Act 2000* and may result in prosecution.
- Where the chief executive has any reason to doubt the accuracy of a meter or any other recording device, the chief executive may calculate the volume, time or rate of water diverted by any means that the chief executive deems appropriate.
- The licensee must allow an authorised officer of the Department of Natural Resources, Mines and Water full and free access to the facility at all reasonable times for the purpose of checking compliance with the licence conditions or the *Water Act 2000* generally.
- Should it be considered necessary, the chief executive may limit:
 - The times during which water may be taken during any period specified; or
 - The volumes of water which may be taken during any water year or in any other specified period; or
 - The area that may be irrigated in any water year or any other specified period, by publishing a notice in a newspaper circulating in the locality in question or by writing to a licensee. Unless otherwise specified, any such restriction shall remain in force until revoked by the chief executive.
- The licensee must pay any fee or charge prescribed by a regulation made under the *Water Act 2000*.

APPENDIX C

Monto Coal Air Quality Assessment

APPENDIX D

Monto Coal Noise & Vibration Impact Assessment